



INTERNET CONNECTIVITY & BROADBAND STUDY

October 2022

PREPARED FOR:

City of Novi, MI
45175 Ten Mile Road
Novi, Michigan 48375

PREPARED BY:

FORESITE
group

Foresite Group, LLC
3740 Davinci Court, Suite 100
Peachtree Corners, GA 30092

o | 770.368.1399

f | 770.368.1944

w | www.foresitegroup.net

TABLE OF CONTENTS

- PROJECT OVERVIEW 3
- EXECUTIVE SUMMARY 4
- GAP ANALYSIS AND RECOMMENDATIONS 5
- DEMAND AGGREGATION SURVEY 10
- BROADBAND AVAILABILITY 21
- DEMOGRAPHIC INFORMATION 28
- PRIORITIZING FIBERHOOD AREAS 32
- REGULATORY ENVIRONMENT 42
- APPENDIX A – GLOSSARY OF TERMS 45
- APPENDIX B – METRO NETWORK PROVIDERS 48
- APPENDIX C – LONG HAUL NETWORK PROVIDERS 50
- APPENDIX D – DIG ONCE AND OPEN TRENCH POLICY EXAMPLES 52
- APPENDIX E – LINKS TO FCC REQUIREMENTS 67
- APPENDIX F – MAP REFERENCES 68

PROJECT OVERVIEW

SPONSOR:

City of Novi, Michigan

LOCATION:

45175 Ten Mile Road
Novi, Michigan 48375

LOCAL JURISDICTION AUTHORITIES:

City of Novi
Oakland County
State of Michigan

DATE OF REPORT:

October 31, 2022

STATEMENT OF PURPOSE:

The purpose of this internet connectivity and broadband study is to evaluate infrastructure and services available from current incumbent providers and assess current technology applications utilized by the city of Novi. A demand aggregation will be performed to document consumer experience and will highlight any differences between those consumer experiences and data that has been reported by internet service providers. This assessment will then be used to identify gaps and offer possible solutions to resolve the challenges presented.



EXECUTIVE SUMMARY

Foresite Group was engaged by the City of Novi to complete an internet connectivity and broadband study to identify current broadband coverage, gaps, and opportunities within the community.

Novi is a fast-growing community northwest of Detroit. It hosts a diverse, highly educated population with a relatively high median income. One critical need for all strong communities today is access to high-speed broadband services and broadband dependent technologies. Upon reviewing infrastructure available throughout the City, it appeared that fiber infrastructure was prevalent throughout the City, but the service was rarely being extended to residents.

The City of Novi currently has near complete coverage by cable providers for residential fixed broadband service. This technology offers sufficient speeds for most present and near future residential needs; however, it is not a long-term solution due to limitations in upload speeds, the speed at which data is transferred from the consumer. Fiber is a better long-term connection method as it allows equal download and upload speeds, or symmetrical transfer of data. As technologies evolve and more devices are connected, higher capacity broadband technologies will be necessary.

From Foresite Group's investigation, the City is beginning to see residential fiber investment from private internet service providers. It is likely these providers will continue to expand their fiber services to Novi residents. Since private providers are present and actively building, Foresite Group is not recommending the City build out its own fiber network. Instead, Foresite Group is suggesting that the City should define a deliberate broadband strategy through a Broadband Master Plan. This plan will detail policies and strategies for incentivizing private providers to continue to extend service to Novi residents.

In addition to policy strategies, Foresite Group also recommends the City synchronize its Capital Improvement Plan with conduit expansion. Using the Broadband Master Plan and a high-level conduit network design, as the City opens the ground for street and sidewalk improvements, conduit can be laid to open the door to private service providers. This could also provide the city with a potential revenue source in the future.

The strategies above have been defined as four distinct gaps that Novi can address through broadband solutions. The Gap Analysis and Recommendations section of this report addresses each opportunity and offers possible solutions that can be implemented by the City of Novi.

GAP ANALYSIS AND RECOMMENDATIONS

Gap 1: Incumbent Internet Service Providers Not Meeting Local Demand for Fiber Service

Addresses can be provided internet service through multiple technologies. High-speed connection methods today are primarily made with fiber and cable connections. Of the two, fiber is better equipped to move data at faster speeds and allows for the symmetrical transfer of data (having similar upload and download speeds). Cable on the other hand, offers sufficient bandwidth to meet present day and near future needs, but does not have the capacity to transfer data symmetrically. As more connected technologies become available, this capacity will need to be expanded to meet consumer demands. Further detail on symmetrical speeds and applications requiring higher upload speeds is discussed in the Broadband Technologies section of this report.

While the City of Novi has adequate telecom infrastructure for today's needs, there are currently few options for fiber residential service. Novi boasts a relatively young, highly educated, multi-ethnic community, and the top employers are in the healthcare, education, and transportation and logistics industries. The city's economic development would benefit from high-speed broadband. A recent study showed that an estimated 58% of Americans currently have the option to work from home for part or all the work week. Hybrid work environments and remote learning opportunities support the need for faster, reliable broadband networks. When asked to rate their current Internet satisfaction on a six-point scale from very, mostly, or somewhat dissatisfied to somewhat, mostly, or very satisfied, only 36% of Novi residents responded to the community broadband survey with a "Mostly Satisfied" or "Fully Satisfied" response.



Solution: Incentivize Current Providers to Upgrade to Fiber Networks Through Revised Urban Policies Relating to Broadband Construction Permit Review

The City should consider creating a separate broadband permitting process or updating their existing permitting process to create a more streamlined practice for providers to apply for construction in the public right-of-way. Some municipalities opt for setting up a more direct, expedited process of specifically reviewing permit applications for broadband related projects that often have lower fees associated with the application. Having a separate process avoids broadband project reviews getting bogged down between the other infrastructure and capital projects reviews that tend to occupy more resources and take longer to review.

Based on Foresite Group's experience building fiber networks and current pricing, street excavation to install underground infrastructure typically represents 65% to 75% of the cost of a fiber network buildout. A Dig Once/Open Trench policy could reduce the cost of network construction, while also ensuring efficient, non-duplicative street cuts.

Going forward, the City should consider implementing a dig-once policy for all public construction projects that involve breaking ground in the public Right-of-Way. This would include the installation of conduits and handholes for fiber purposes. These conduit runs should be for the entirety of the impacted Right-of-Way and should, at a minimum, include dedicated conduits for the City's own use, conduits available for leasing purposes and spare conduit. The City could

incorporate a construction moratorium for a reasonable amount of time to minimize any additional construction that might impact the city's streets. In turn, the City would make the installed conduit available to any service provider in a non-discriminatory way, for use in installing telecommunication service to residents and businesses to help with any perceived burden the construction moratorium might cause.

As a variation of the dig-once policy, the City could consider incorporating an open-trench policy. Along with requiring city-owned and leasable conduit to be installed on all public projects, the city could invite existing and prospective telecom providers to participate and take advantage of ongoing construction to install their privately-owned conduits in the same trench. Interested providers would need to contribute to the effort which would help reduce some of the costs that the project would undertake. This option would give incumbents an opportunity to enhance their infrastructure but keep it under their management. At the same time, the City-owned infrastructure would provide an opportunity to newcomers and help bolster a more competitive broadband market.

For reference, listed below are links to existing municipal dig once policies. The Gonzales, CA Dig Once Policy is straightforward and lists the types of projects that would require the installation of a spare conduit for the City of Gonzales, CA. The policy also specifies the standards for the conduit type and installation. Dig Once/Open Trench policies from other municipalities are provided in Appendix D. Links are provided in the list below.

- [Salinas, CA](#)
- [Gonzales, CA](#)
- [Santa Cruz, CA](#)
- [Breckenridge, CO](#)

The City could also consider implementing a policy to incentivize conduit installations in all new developments. The Northline Leander Development Company (NLDC) took this approach on a 115-acre mixed-use development in Leander, Texas by placing double the number of conduits that would normally be recommended. These conduits were allocated for use by utility owners and encouraged multiple Internet Service Providers (ISPs) to expand their coverage to the new development. The current urban development policies could be revised to provide incentives to developers to install full telecom conduit runs along all proposed right-of-way they intend to turn over to the City upon completion. These incentives can range from expedited review process to the waiving of certain requirements or reduced fees. As with public projects, enough conduit should be provided for both the city's own use and private provider's use via leasing.

Opportunity: Develop Relationships with Current Internet Providers Through Broadband Permitting Process

Three reputable Internet providers already provide Internet service within the City of Novi today. Although there are multiple providers, very few areas have been upgraded to a fiber network. If the City can create and include incentives for telecom construction within city ordinances and building codes, it can reduce one of the larger obstacles for these providers and lead to them improving or expanding their current network to meet the growing broadband demands of the community. An expedited review process can incentivize providers to build out or improve their networks as it would expedite their engineering and construction schedules and allow for a

quicker return of investment in their endeavors. In Kansas City, Missouri, when the city was attempting to attract Google Fiber to build out a network, they streamlined the permitting process and waived permitting fees. This helped the city win the bid for the network, and today, they have a Google Fiber network that offers plans of 1 Gbps symmetrical and 2 Gbps download/1 Gbps upload for \$70/month and \$100/month, respectively. The network was awarded in 2011 and is still expanding today.

Gap 2: Lack of Knowledge of Existing Telecom

During community engagement sessions, the City expressed concern about not knowing exactly what type of telecommunications infrastructure was being placed in new developments. If current fiber infrastructure is unknown, then it is difficult to plan where service is needed and where expansions need to take place. It may not be practical to retroactively map all existing infrastructure, but the City can take steps to begin keeping track of future telecommunications installations and upgrades.



Solution: Require Permit Drawings Include Infrastructure Type and Service Locations

The City of Novi could require permits to show what type of infrastructure is being placed instead of only showing the locations of the proposed infrastructure. This information would include conduit size and quantity and cable type, size, and quantity. It should also be required that telecom designs show their potential service locations on the site plans with the intent that every parcel within the limits of the project areas receive service. This accomplishes two separate goals, a tangible record of telecommunications buildouts, and certainty that all new developments will have access to telecommunications infrastructure.



Opportunity: Maintain a Robust GIS Database for Telecommunications within the City

As the City collects telecom infrastructure data, it should be organized into a Geographic Information System (GIS) database to inform ongoing efforts. It can also be used to prioritize the most urgent connectivity needs within the city. If the City has a database to expose where infrastructure is lacking, it can then be leveraged as a resource when discussing with providers where services should be extended.

Gap 3: Fiber Infrastructure not Included in Capital Improvement Plan

The City of Novi currently dedicates funds to a Capital Improvement Plan as part of the City's annual budget process. These funds are used for items such as road maintenance and improvement, water and sewer repairs and replacements, park improvements, and government building maintenance, among others. As part of the Capital Improvement Plan, the City should consider installing conduit in the public right of way which could possibly be leased out or utilized for city services and result in revenue for the City.



Solution: Synchronize Capitol Improvement Plans with Conduit Deployment

The conduit design and construction plan should align with planned capital improvement projects. This would allow the City to build out conduit infrastructure while saving on the cost of a separate conduit installation project. An asset would be developed that the City could use to either lease out to incumbent Internet Service Providers (ISPs) to reach high priority areas with

fiber or for their own city purposes. By aligning the conduit installation projects, such as water main replacements or road rehabilitation, it would reduce the perceived inconveniences to the community like road closures and construction noise by achieving multiple construction projects in the same location at once.

Foresite Group recommends developing standards for conduit placement to ensure provisions are in place for fiber optic facilities in new business and residential developments. Standardized duct banks, designed per road classification (arterial, primary, residential, etc.) should be created to expedite the design and construction processes. **Specific conduit requirements for new buildings should be integrated in the building permit application process.** Having these policies in place will ensure a path for future fiber optic cables and will mitigate future construction and fiber installation costs.



Opportunity: Invite Private Telecom Companies to Participate

In conjunction with an open trench policy described in the previous gap, these capital improvement projects can also be used as an opportunity to attract private internet providers to expand infrastructure as well. The city should create a master schedule for infrastructure work in the city that should include the expected sequence of individual projects and then exact dates when different construction tasks will occur. For fiber and conduit deployment, it is essential to know when city right-of-way will be excavated, when other infrastructure will be laid, when fiber and conduit could be safely installed along other infrastructure, and when the right-of-way will be restored.

Gap 4: No Broadband Master Plan

While the city of Novi has several master planning reports, Foresite Group was not able to identify a broadband specific master plan. To implement many of the solutions presented in this report, there needs to be a defined pathway to success. The existing planning documents cover thoroughfare, housing, economic development, and land use among other topics. **While infrastructure is a goal in the City's 2016 Master Plan, the development of broadband infrastructure is missing from the current master plans.** Since Novi has a presence from incumbent telecom service providers, the area does have basic telecommunications coverage for residential and business customers.

Unfortunately, the lack of fiber and municipal broadband infrastructure planning places the City at a large disadvantage for deployment of new technologies. Municipal technologies are advancing at a very rapid pace and many of these advanced data-intensive products allow operational efficiencies and cost savings for city activities. **These types of technologies include traffic and parking monitoring systems that help optimize driving and walking routes, smart lighting systems that turn off and on when activity is detected, and monitoring municipal services such as utility meters or waste management services.** Each of these applications requires some form of connection and the more inputs, the more robust that connection needs to be.

The 2016 Master Plan Goals included quality and a variety of housing, community identity, environmental stewardship, infrastructure, and economic development. A broadband master

plan would allow the City to continue to support these goals and prepare for the projected continued growth within the city.



Solution: Create a Broadband Master Plan

The City of Novi currently has a Municipal Broadband Committee. This committee, with the addition of a broadband master plan, would be able to integrate the identified solutions included here into the current planning efforts. The City should evaluate its current and future broadband requirements for telecommunications systems needed to support anchor institutions such as police, fire, EMA, hospitals, government and municipal facilities, libraries, etc. The committee should also evaluate the advantages, disadvantages, and risks involved with broadband programs.

The Broadband Master Plan is the document that would unify each of these solutions and provide the framework for continued prioritization of connectivity needs both for city purposes and residential connectivity. Developing a Broadband Master Plan does not necessitate that a city or community build out their own fiber network, but it does help establish clear goals and define the path towards getting there. For Novi, the plan would include solutions to the previously mentioned gaps, such as timelines for implementing policies, telecommunications infrastructure data collection, and optimizing capital improvement planning and schedules with conduit deployment. It also provides an opportunity to continue to adapt and set goals as needed by the City. It may expand to include “smart” city technologies and other economic development efforts.



Opportunity: Create Guidelines that Promote Deployment and Implementation of Broadband Technology

Broadband connection to the internet is an essential component of everyday life for work, education, and economic development. It is incumbent upon cities to include this as part of their planning activities. There are discussions happening nationally that would re-classify broadband service as a required public utility service. A component of the broadband master plan must be how broadband infrastructure will be used to support other city planning initiatives. Broadband infrastructure can be an expensive undertaking and planning activities should include a comprehensive risk management plan including state and federal grants and public-private partnerships. The plan should focus on the immediate needs of Novi and the community. The Broadband Master Plan could also include recommendations for city governance of rights-of-way (ROW), moratorium rules, or broadband permitting requirements.

DEMAND AGGREGATION SURVEY

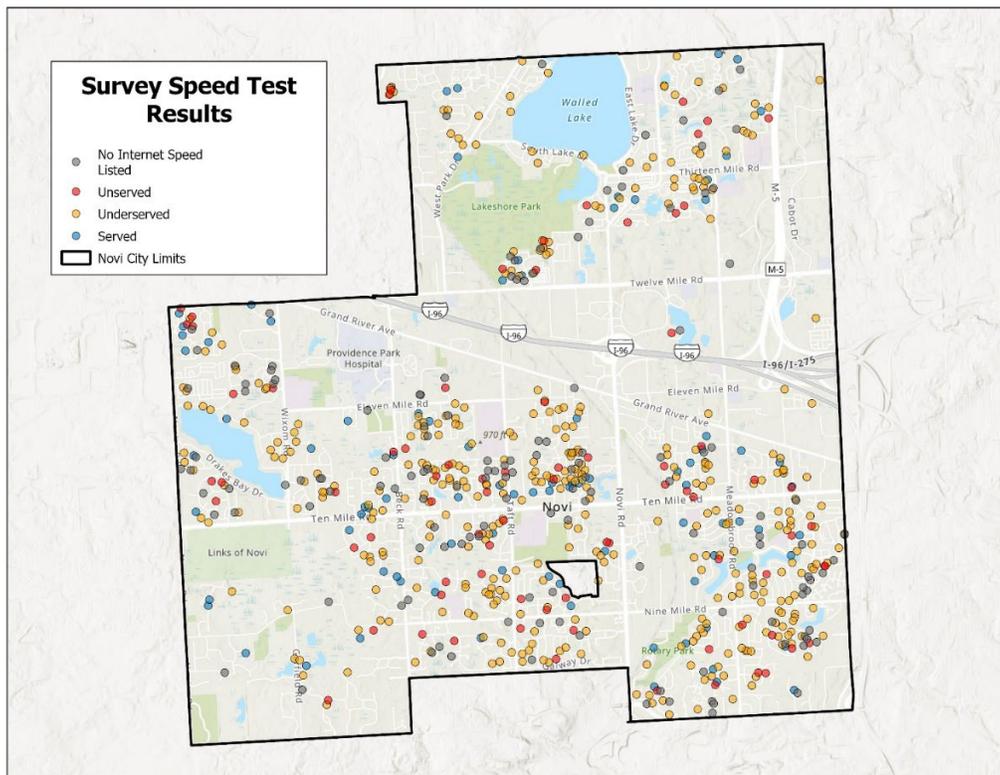
The demand aggregation process for the City of Novi broadband study began on May 20th, 2022 and concluded on September 19th, 2022. The demand aggregation survey helped to gather feedback from the community about their technology needs, existing or future Internet service cost, satisfaction with services, and service availability. A total of 721 surveys were recorded, with 700 responses being from unique households. A total of 16 broadband champions, local advocates in the community, offered their support to spread the word about the survey and were sent custom flyers to distribute. The demand aggregation survey included up to 21 individual questions relating to broadband, ranging from "Do you have Internet service today?" to "How important is Internet service availability and/or Internet speed when choosing a location to live?". For respondents with current Internet service, an Internet speed test was recorded at the end of the survey and placed in the following broadband definitions:

Unservd	Underserved	Served
Less than 25 Mbps Download	Greater than or equal to 25 Mbps but less than 100 Mbps Download	Greater than or equal to 100 Mbps Download
Less than 3 Mbps Upload	Greater than or equal to 3 Mbps but less than 20 Mbps Upload	Greater than or equal to 20 Mbps Upload

* Chart figures may not add up due to rounding

* Internet speeds are based on the internet speed test unless noted otherwise.

The map below shows the areas where responses were received from the demand aggregation survey. Each pinned location represents a broadband speed (Unservd, Underserved, or Served) categorized if the respondent participated in the Internet speed test portion of the survey.



The chart below indicates the age distribution of survey respondents. Most respondents were between 34 and 64 years old.

Age Group	Respondents	Percentage of Respondents
Not specified	3	<1%
18-24	9	1%
25-34	46	7%
35-44	167	24%
45-54	202	29%
55-64	133	19%
65 or older	140	20%

The next chart displays the breakdown of internet service provider among survey respondents.
** Cellular providers have been excluded from provider table.*

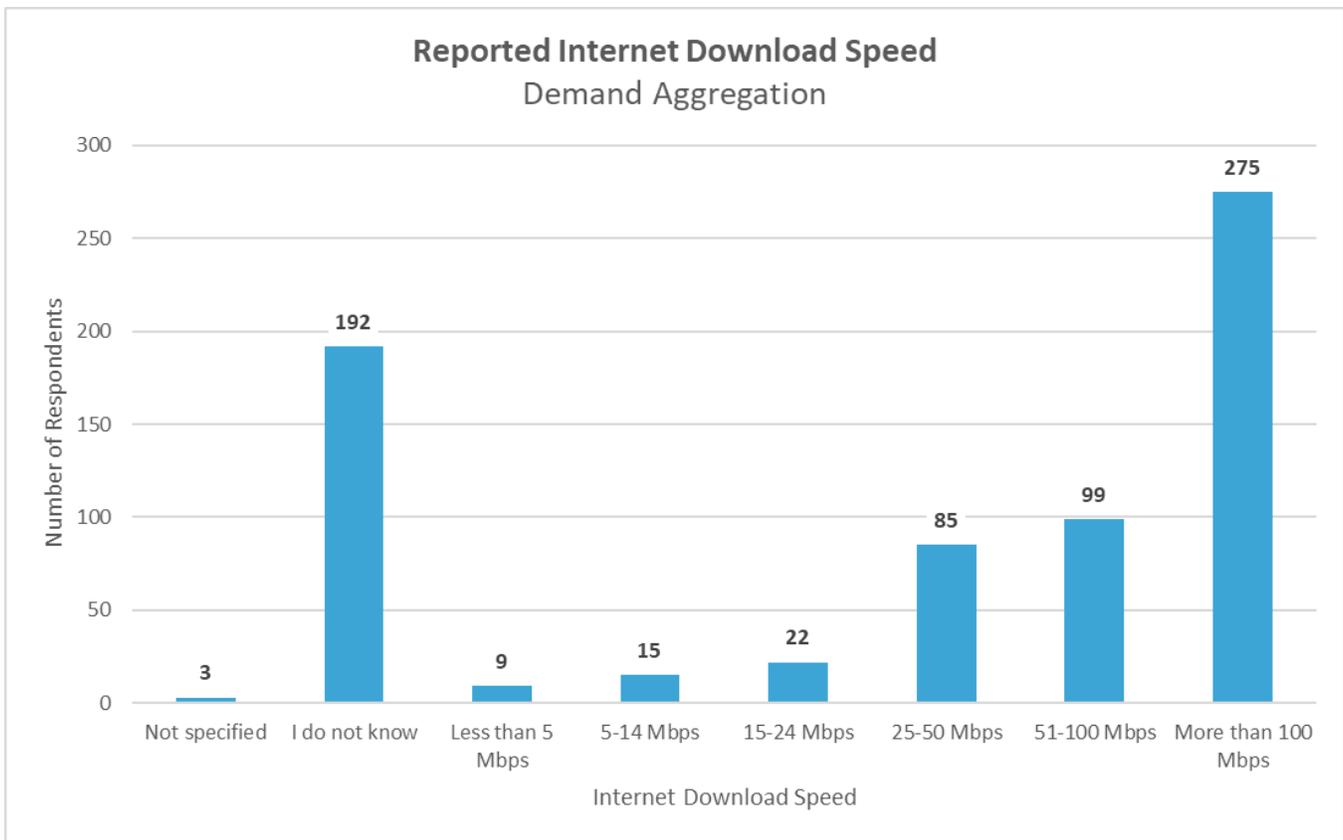
Internet Service Provider	Respondents	Percentage of Respondents
AT&T	148	26%
Comcast	3	1%
Spectrum	413	73%

The following tables present a breakdown of questions.

1. Do you have Internet service today?

Currently has an Internet service	Respondents	Percentage of Respondents
No	3	<1%
Yes	697	99.6%

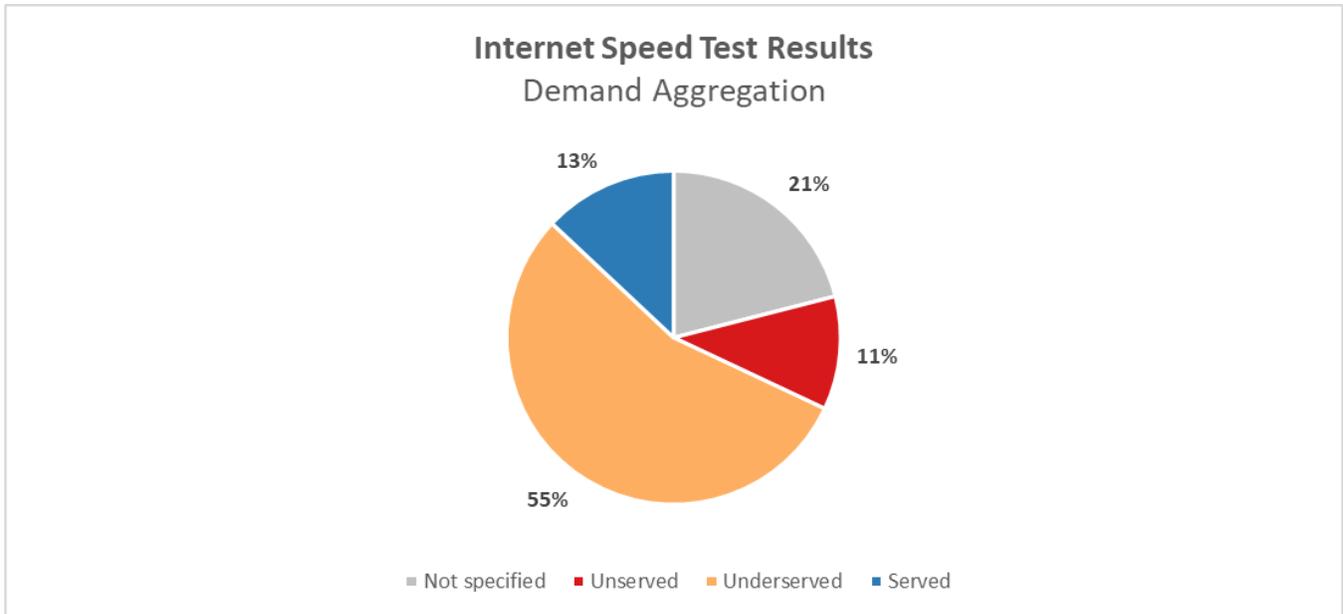
2. What is your current Internet download speed?



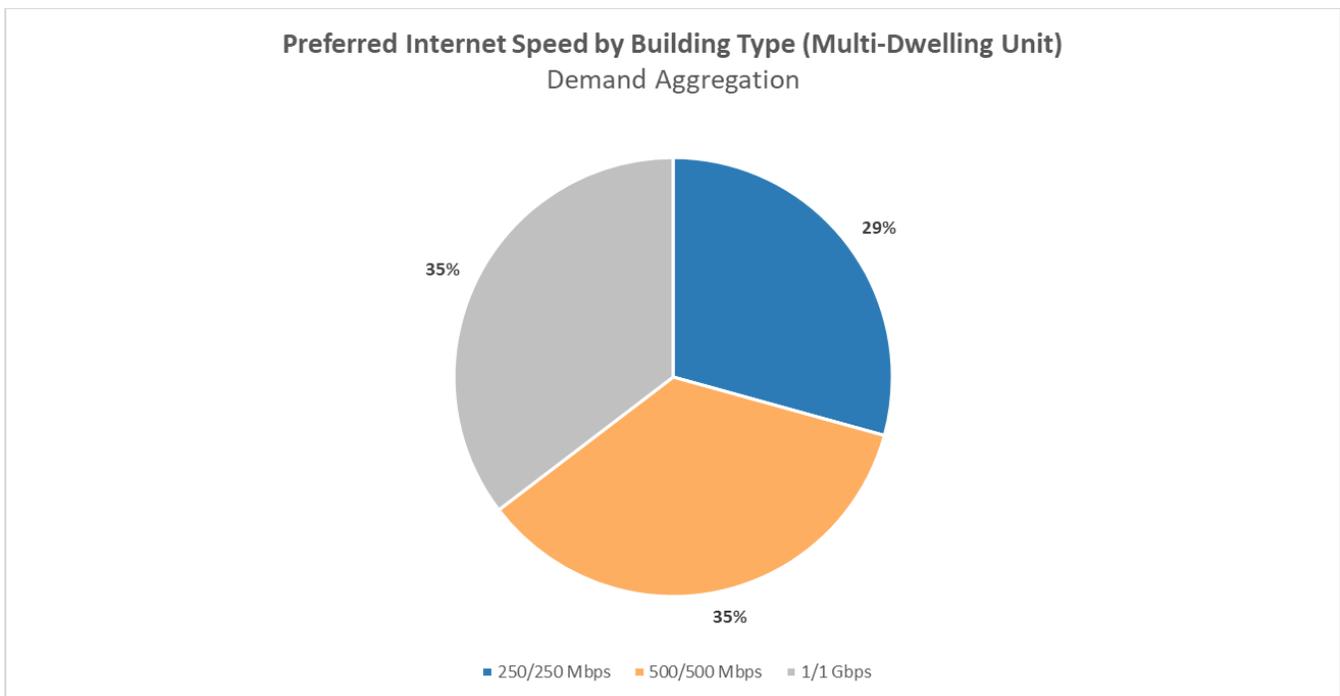
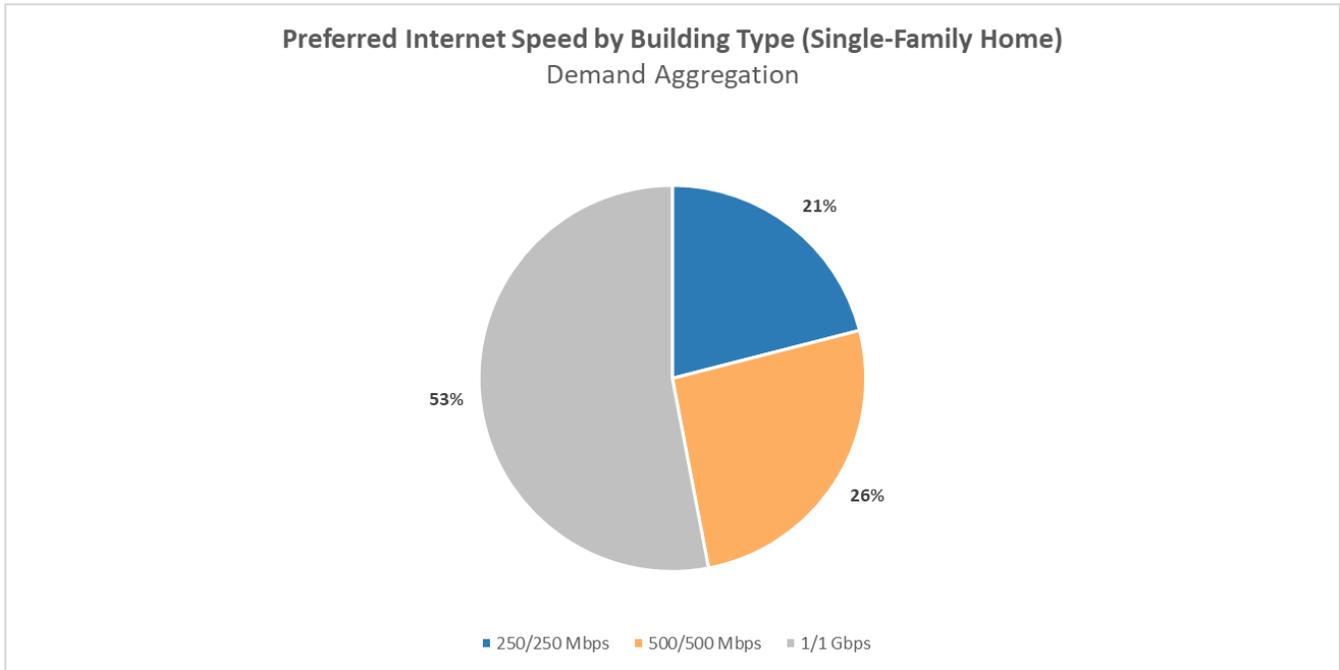
**This chart indicates an Internet download speed based on the understanding of the respondent.*

3. Internet speed test results

The median Internet speed for both Single-Family Units and Multi-Dwelling Units was 80 Mbps Download/12 Mbps Upload.

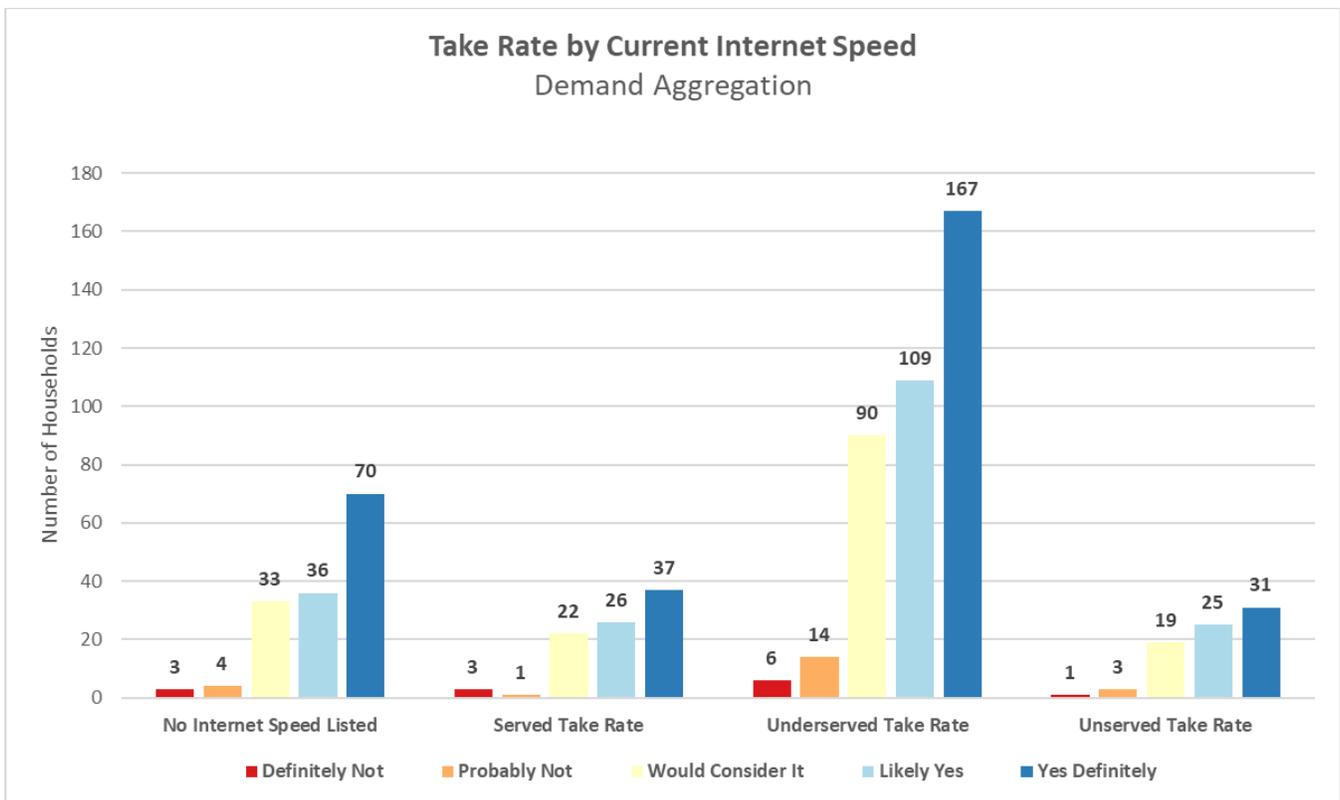
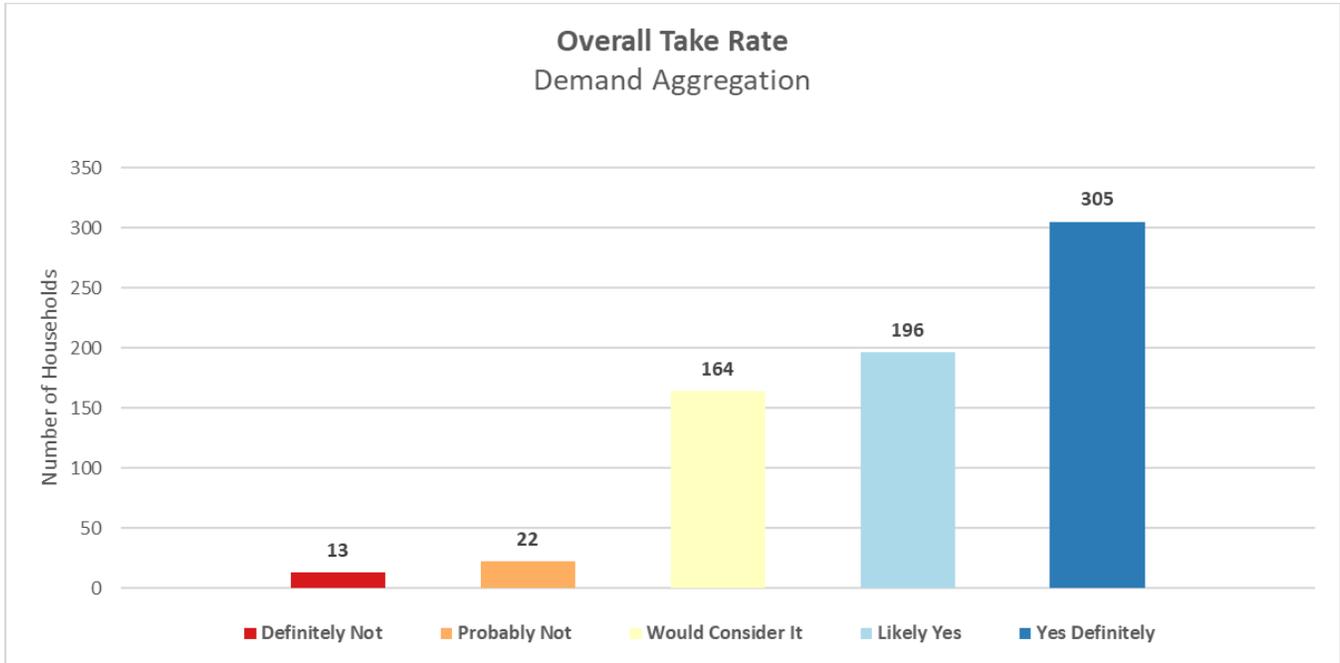


4. Which Internet service plan would you prefer?

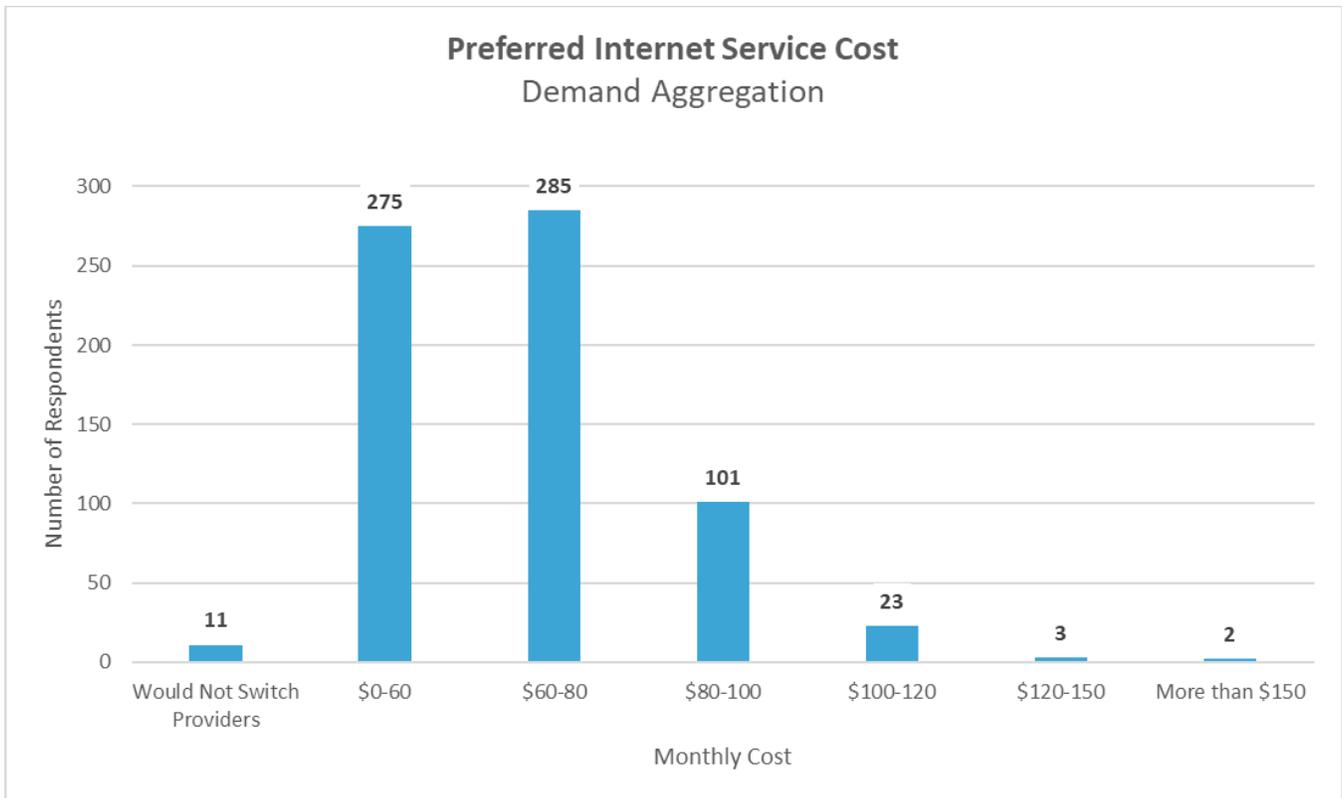
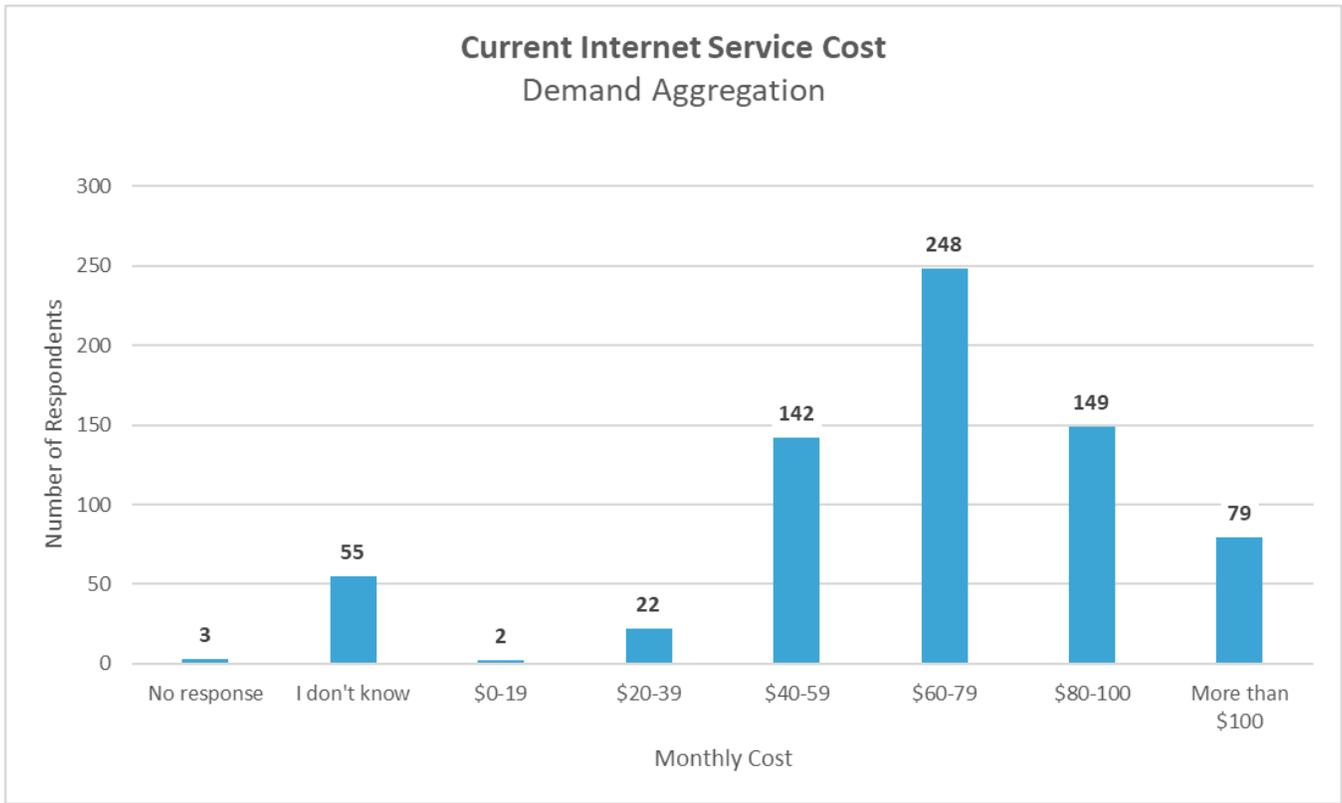


5. How likely would you consider this plan?

The take rate is a weighted measurement of a resident's consideration for switching to an improved Internet Service. Definitely Not (0.00), Probably Not (0.25), Would Consider It (0.50), Likely Yes (0.75), Yes Definitely (1.00).



6. What is your monthly Internet service cost?



7. How satisfied are you with your current Internet speed, reliability, and price?

14% of respondents say they are “Fully satisfied” or “Mostly satisfied” with their current Internet price.
52% of respondents say they are “Somewhat satisfied” or “Somewhat dissatisfied” with their current Internet price.

34% of respondents say they are “Very dissatisfied” or “Mostly dissatisfied” with their current Internet service price.

43% of respondents say they are “Fully satisfied” or “Mostly satisfied” with their current Internet service reliability.

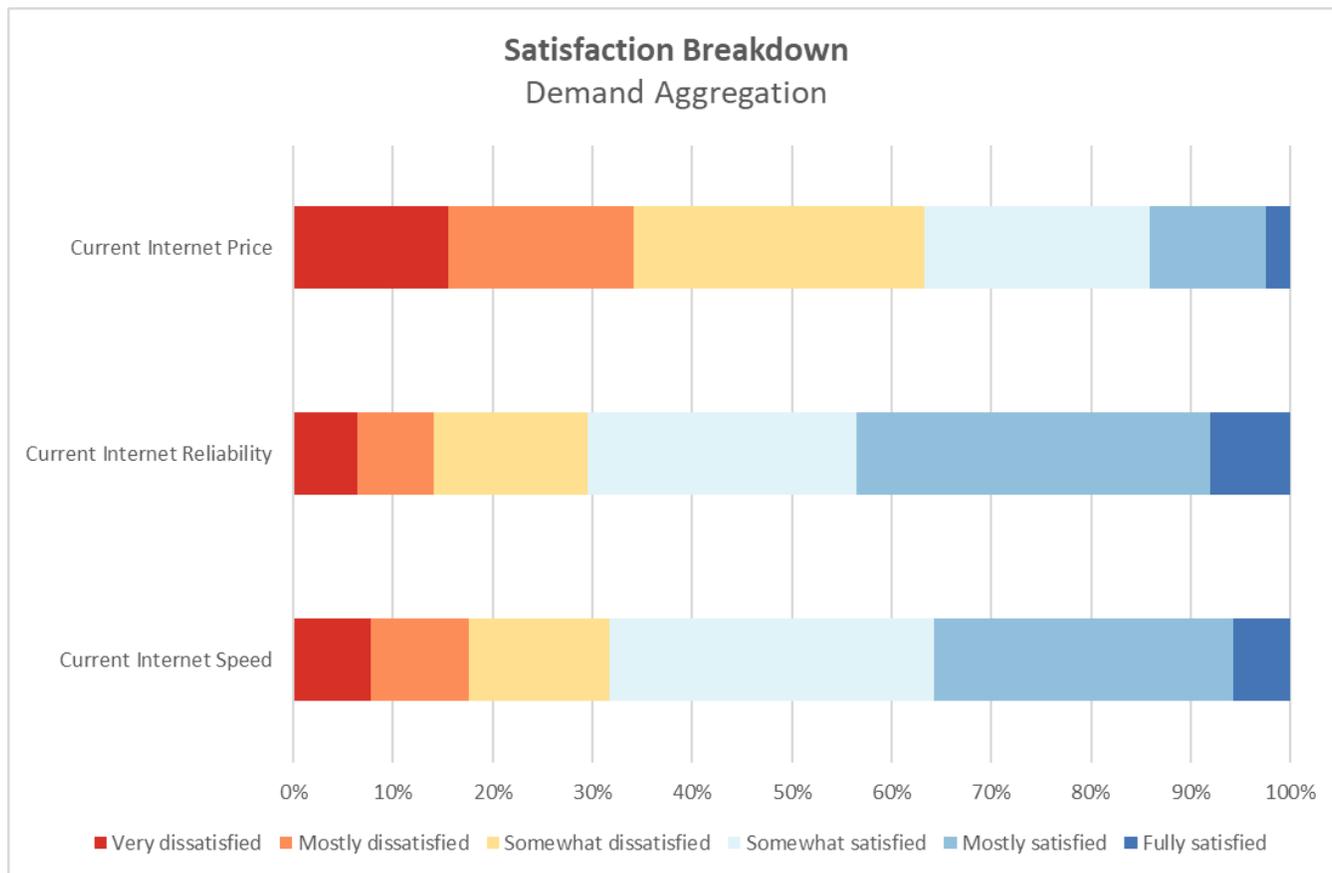
42% of respondents say they are “Somewhat satisfied” or “Somewhat dissatisfied” with their current Internet service reliability.

15% of respondents say they are “Very dissatisfied” or “Mostly dissatisfied” with their current Internet service reliability.

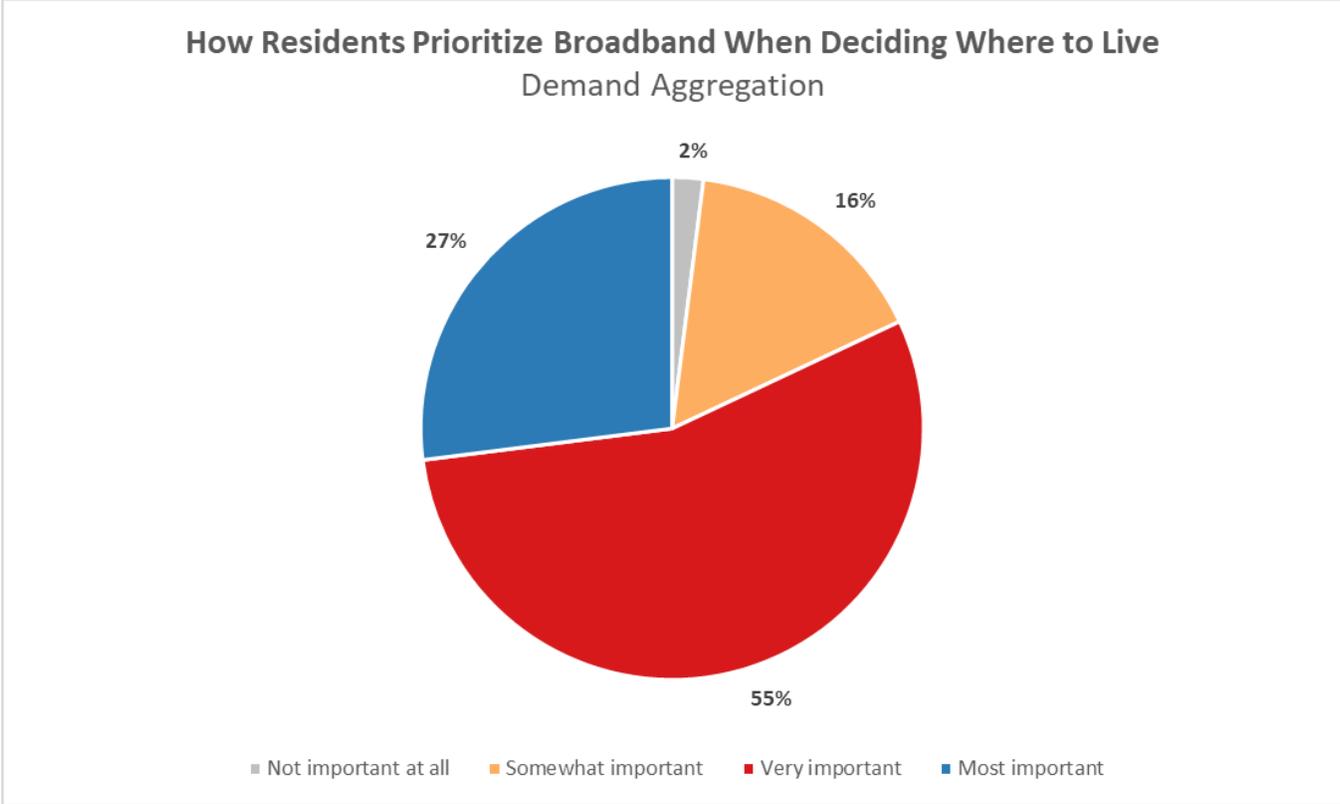
36% of respondents say they are “Full satisfied” or “Mostly satisfied” with their current Internet speed.

46% of respondents say they are “Somewhat satisfied” or “Somewhat dissatisfied” with their current Internet speed.

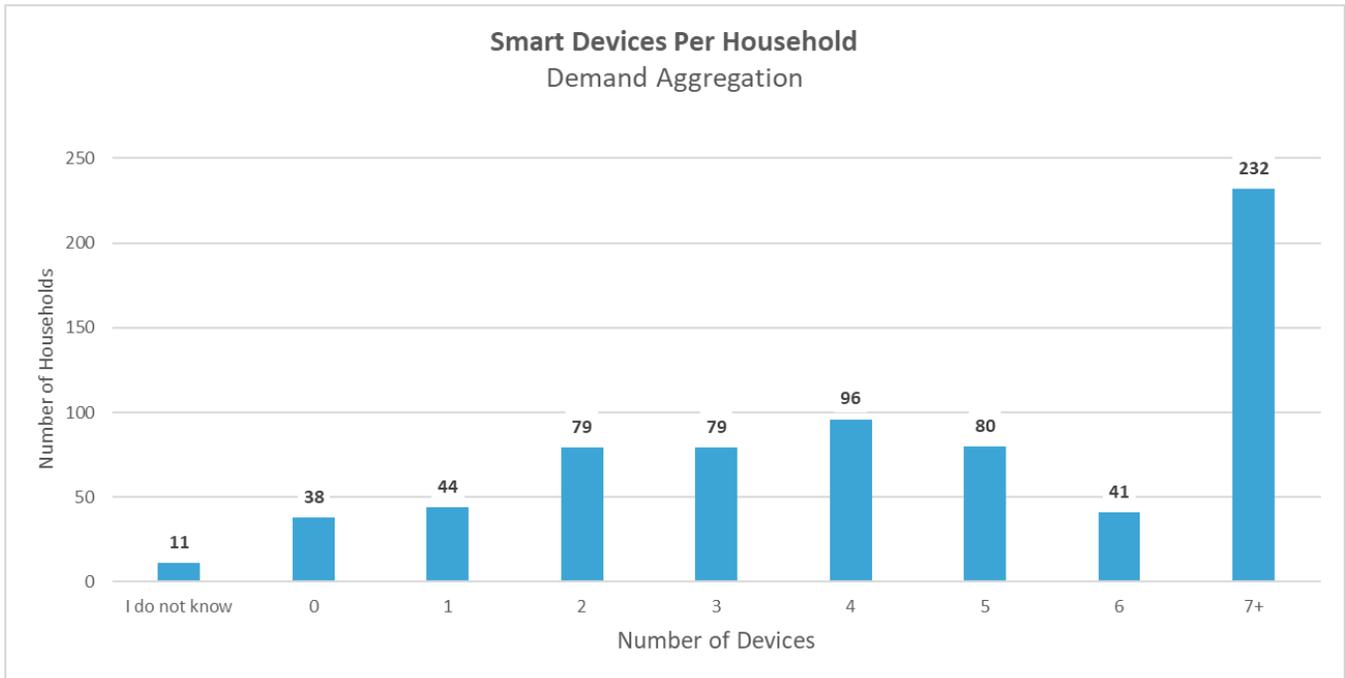
18% of respondents say they are “Very dissatisfied” or “Mostly dissatisfied” with their current Internet speed.



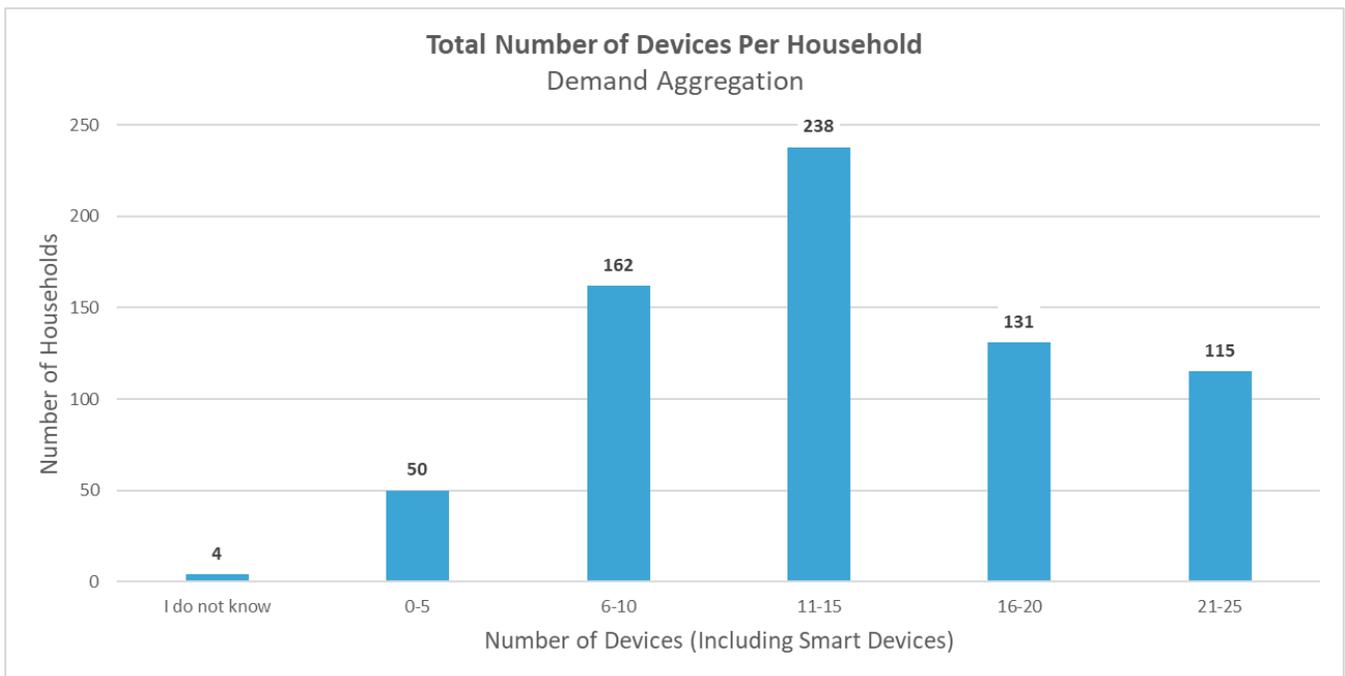
8. How important is Internet service availability and/or Internet Speed when choosing a location to live?



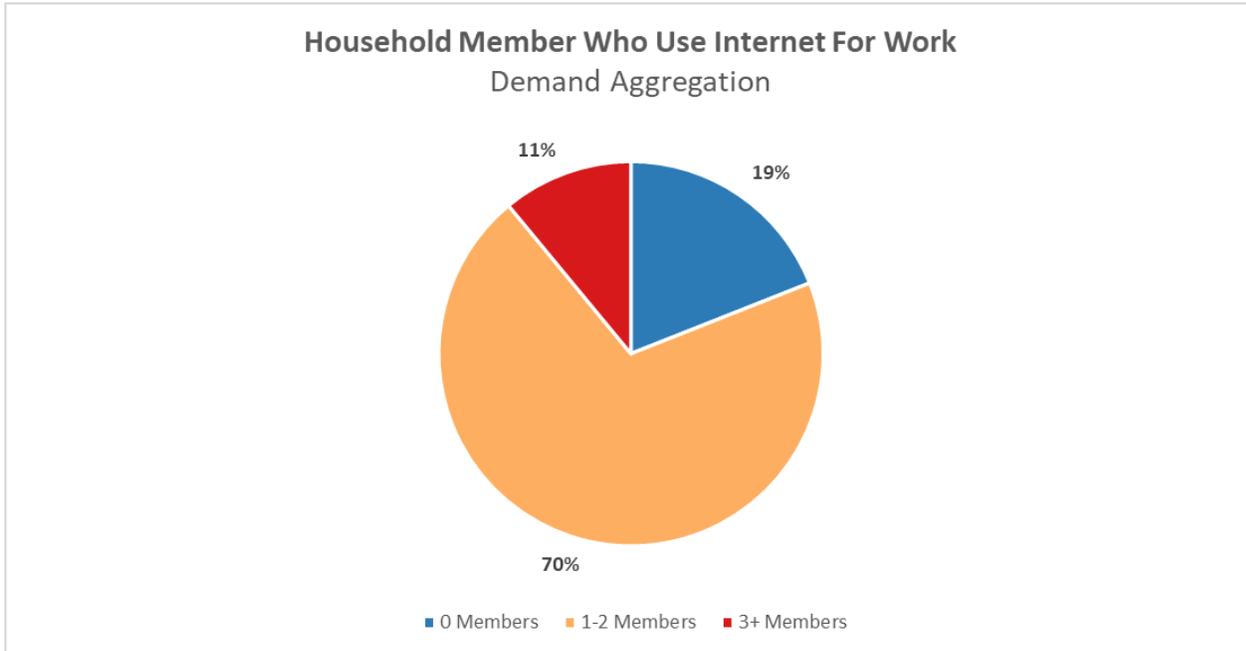
9. How many smart home devices (Ring Video Doorbell, Nest Thermostat, Amazon Echo, Smart TVs) in your household require an Internet connection?



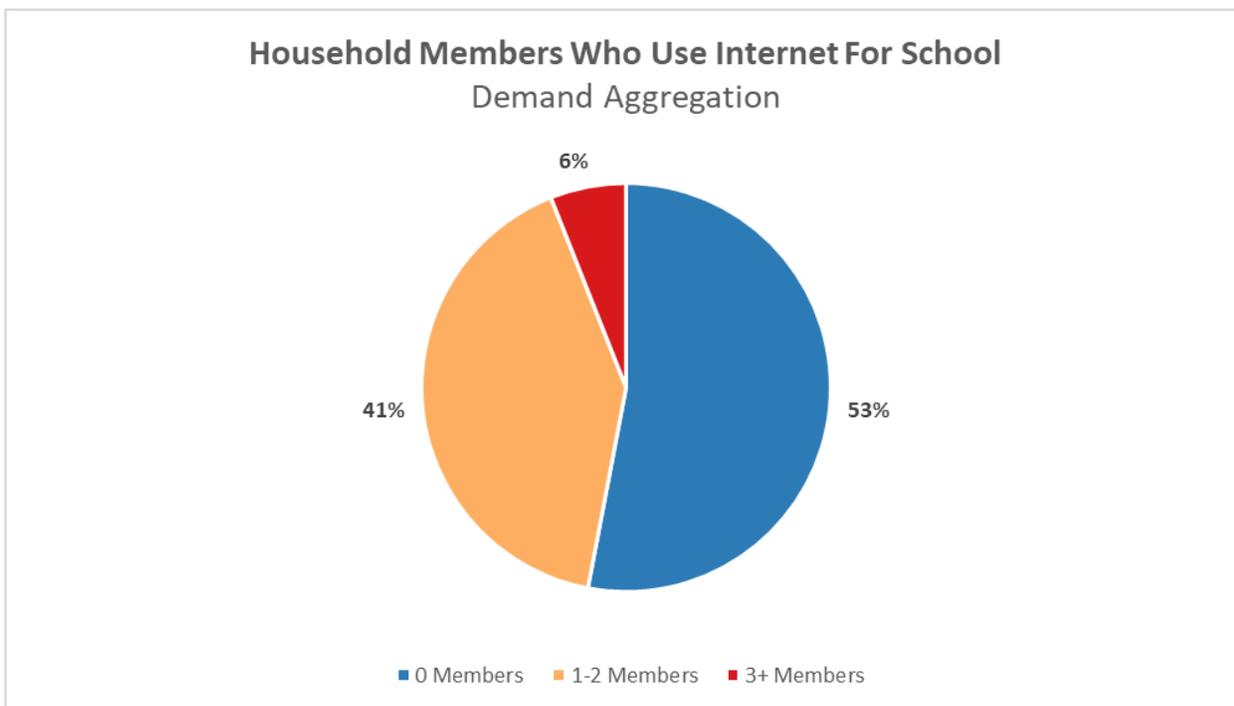
10. How many devices (Desktop Computers, Laptops, Tablets, Mobile Phones) in your household require an Internet connection?



11. How many members of the household use an Internet connection for work/business?



12. How many members of the household use an Internet connection for school?



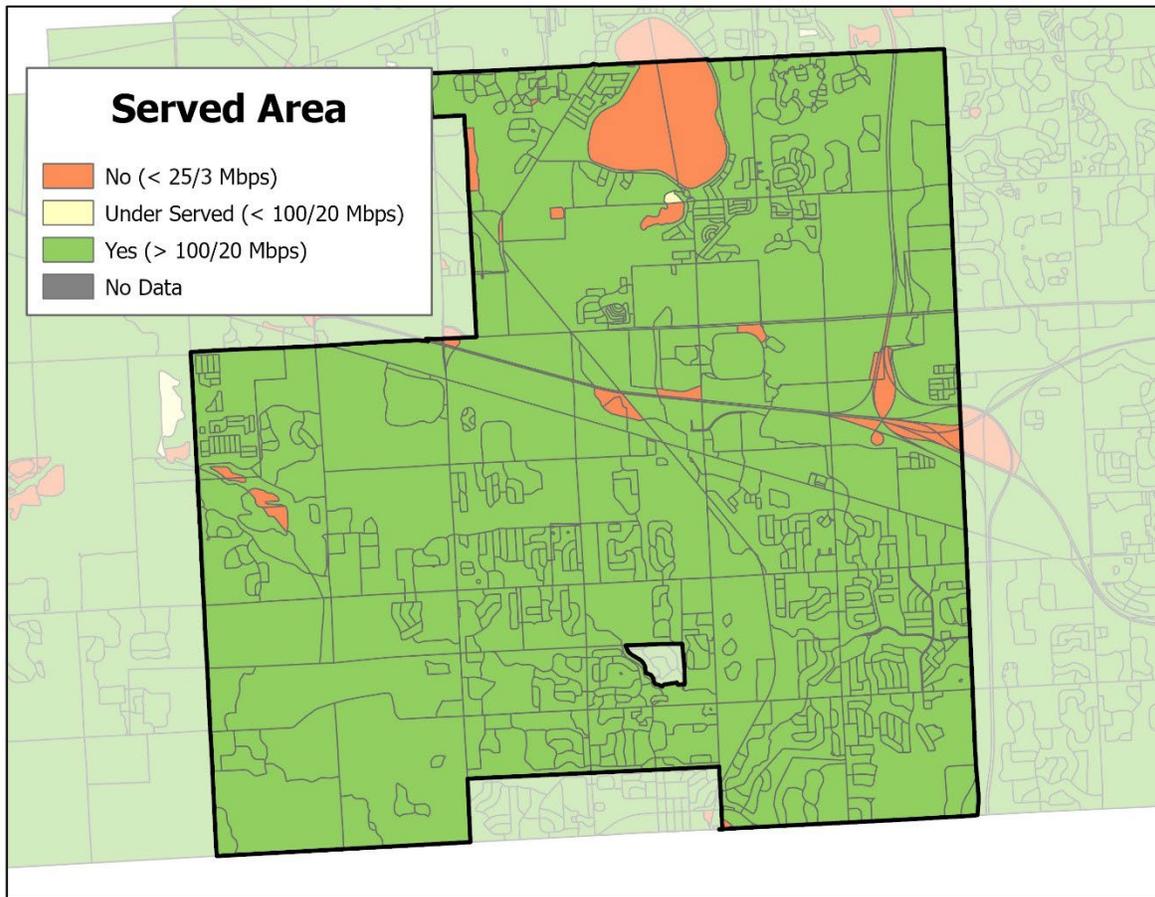
BROADBAND AVAILABILITY

Broadband coverage information was acquired from various sources, including US census data, telecommunications industry information sources, and the Federal Communication Commission (FCC) broadband databases. The FCC collects broadband information using Form 477 from all facilities-based providers who offer internet access including wireline, fixed mobile, and mobile broadband. This dataset has been criticized for accuracy since an entire census block is considered served if a single address within that block has broadband service. However, it is still the most comprehensive dataset available, and provides insight to the current level of service, speed offerings, and providers serving any given area. The FCC has been mandated by Congress to produce more accurate broadband maps. These maps have a projected release date for November 2022 and are expected to report service availability at individual locations instead of block-level.

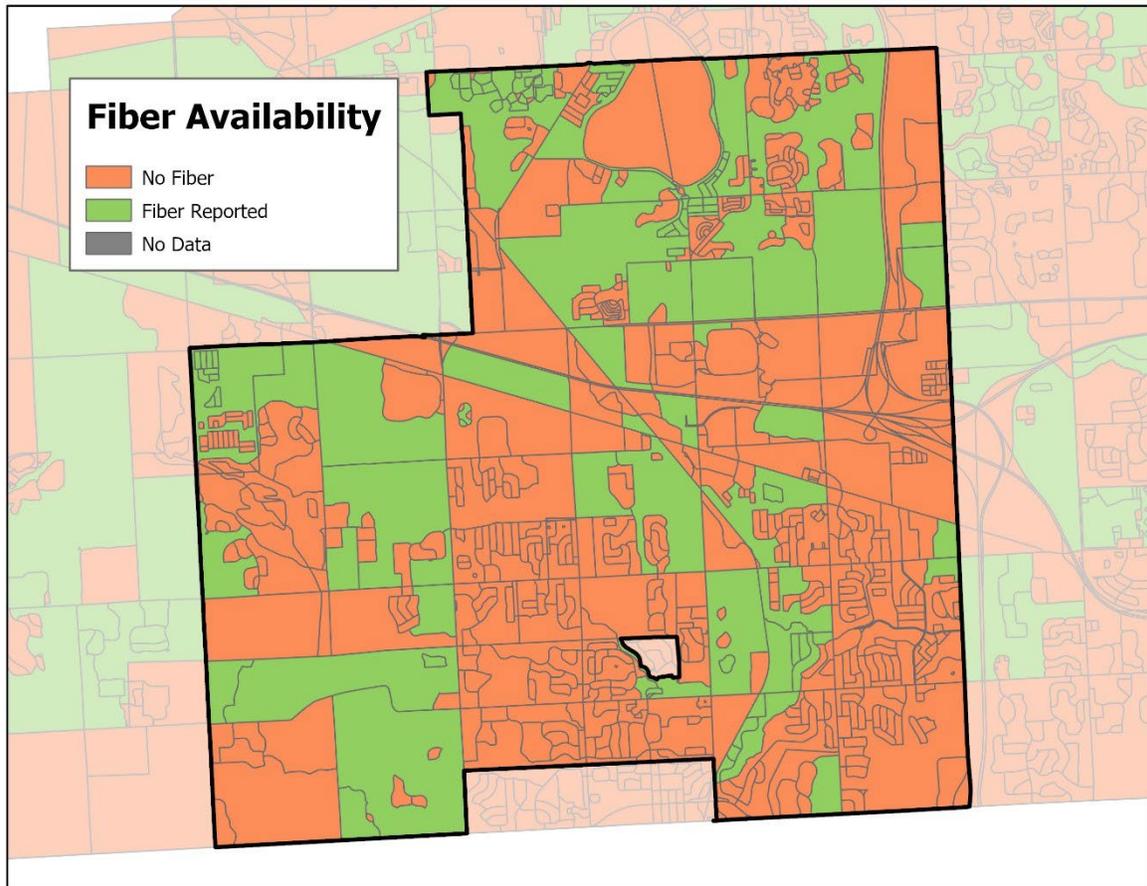
The FCC uses download speed and upload speed to define broadband. In 2010, the speeds considered broadband were 4 Mbps download and 1 Mbps upload. Mbps, or megabits per second, is a measure of internet bandwidth. This refers to the speed at which data packets can be received (download) and sent (upload) from your personal computer or other connected device. For example, streaming a television show primarily utilizes download speed, but sending an email with a large attachment would be utilizing upload. An activity such as a video conference uses both download and upload because the device is both receiving video from other areas and sending video to other devices. Since 2010, the definition of broadband has increased to 25 Mbps download and 3 Mbps upload. While this is substantially faster than the previous definition, it is already beginning to fall short for present day internet needs.

There are many companies, consumer advocacy groups, and legislators who are urging the FCC to increase the minimum definition for broadband to require higher speeds. For example, the USDA ReConnect Grant calls for a minimum broadband definition of 100 Mbps symmetrical speeds in order to qualify for the funds being made available. This target reflects more accurately the needs broadband consumers will experience in the future. The maps of this section explore different levels of service based on data available through the FCC.

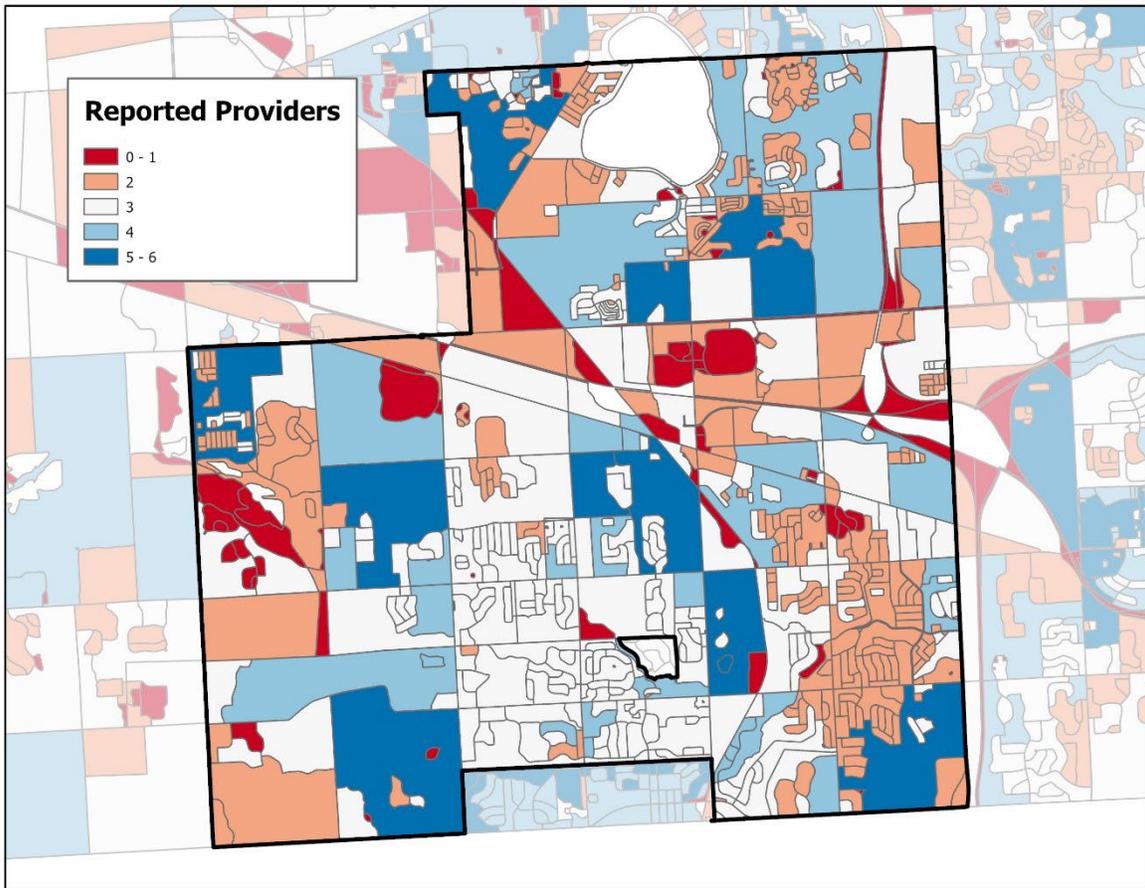
Provider Reported Service and Pricing



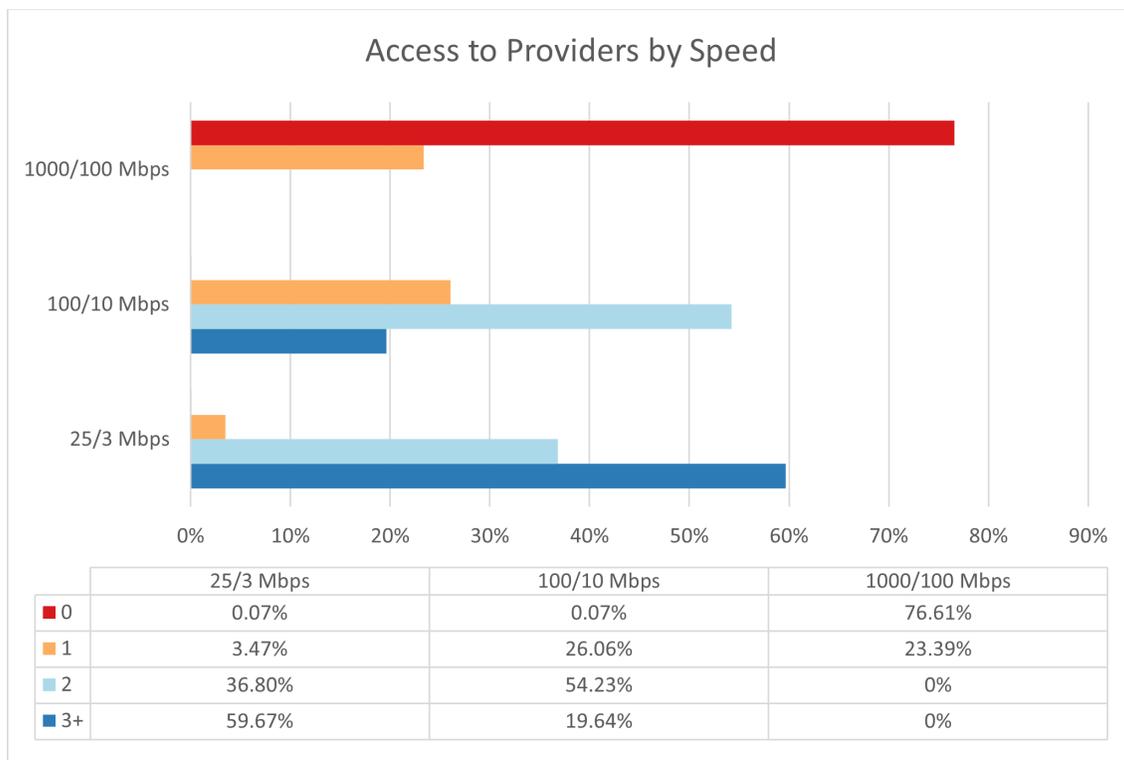
According to data collected by the FCC in June 2021, the majority of the city should have access to a broadband connection by the 25 Mbps download/3 Mbps upload definition. Of the 24,000 address points provided to Foresite Group by the City of Novi, only 15 fell within “unserved” blocks. From the Served Area map, the majority of area considered “unserved” are Walled Lake and land that falls between interstate interchanges where no residents or businesses would exist to deliver service to.



The availability of “served” speeds and the availability of fiber look very different across the city. AT&T is the primary fiber service provider within Novi city limits. On the block scale, AT&T serves about 24% of the population. However, Foresite Group used random addresses scattered in the served areas on AT&T’s website to test whether a resident was capable of signing up for service. Twenty-five random addresses within block groups where fiber service is reported on the FCC maps were tested. Of those twenty-five addresses, sixteen were not able to sign up for fiber connection. Service was offered, but at speeds of 75 Mbps, 50 Mbps, or 25 Mbps download speeds, much lower than the 1 Gbps available to fiber subscribers. This is evidence of some of the shortcomings of the FCC data reporting system. On the block level, there may be many addresses where it looks like high levels of service are available, but only moderate levels of service are available. It suggests the actual percentage of residents who can access fiber service is significantly less than 24%.



The Reported Providers Map displays the number of providers reporting speeds above the 25/3 Mbps threshold. While the 25/3 Mbps is not a very high bar for broadband service, seeing multiple providers in an area indicates a degree of competition that can put pressure on internet service providers to offer higher quality service. The majority of Novi is reported to have at least three providers offering the minimum speeds considered served by the FCC.



The chart above shows the number of providers available to Novi residents at different speed tiers. As previously discussed, with the shortcomings of the FCC dataset, it is more likely these percentages are somewhat lower than they appear here. However, this data still provides a good estimate of service levels throughout the community. According to the FCC, a significant majority (73.9%) have access to at least two providers in the 100/10 Mbps service tier.

Pricing information from the current service providers can be seen in the table below (all pricing dependent on availability of service):

Provider	Speed (Download)	Price
AT&T	Up to 25 Mbps	\$55/mo (first 12 months)
	Up to 50 Mbps	\$55/mo (first 12 months)
	Up to 75 Mbps	\$55/mo (first 12 months)
	Up to 100 Mbps	\$55/mo (first 12 months)
	Up to 300 Mbps	\$55/mo
	Up to 500 Mbps	\$65/mo
	Up to 1 Gbps	\$80/mo
Spectrum	Up to 400 Mbps	\$39.99/mo (first 24 months)
	Up to 1 Gbps	\$79.99/mo (first 24 months)
Comcast	50 Mbps	\$20/mo (promotional); \$59/mo (regular)
	100 Mbps	\$40/mo (promotional); \$79/mo (regular)
	300 Mbps	\$50/mo (promotional); \$89/mo (regular)
	600 Mbps	\$50/mo (promotional); \$99/mo (regular)
	900 Mbps	\$60/mo (promotional); \$109/mo (regular)
	1200 Mbps	\$70/mo (promotional); \$119/mo (regular)

There are a variety of speeds and prices offered through the same providers. While there are many levels of service per provider, this does not guarantee all services are offered within a given provider's service area. Often only two or three tiers are offered, and sometimes only one. Despite limitations, this chart does give a good idea of what prices people in Novi are typically paying for internet service.

Provider Expansion

Using contact information available on Fiberlocator's website, Foresite Group was able to reach out to companies providing backhaul infrastructure in the City of Novi. Of the providers who publicly provided contact information, two responded with interest regarding this area. Foresite Group was able to meet with the two providers and get a better understanding of their expansion goals and service levels within Novi's municipal boundary.

A local infrastructure provider who currently does not offer internet in Novi is planning on expanding its services to include Fiber to the Home (FTTH) service in a Novi neighborhood. This development is in the first wave of FTTH projects the provider has planned throughout the State of Michigan. They also offer municipal and enterprise services. While this is a small step towards full city fiber coverage, it offers evidence of Novi as a desirable market. This could be a good opportunity for the City to reach out in partnership with a local telecom provider who is trying to build a customer base to discuss how the City can help with getting their residents broadband service as quickly as possible.

In addition to the new provider entering the market to provide service, there is also evidence of incumbent providers expanding and upgrading their existing services. The City provided the names of five other neighborhoods where permits had been submitted for fiber projects.

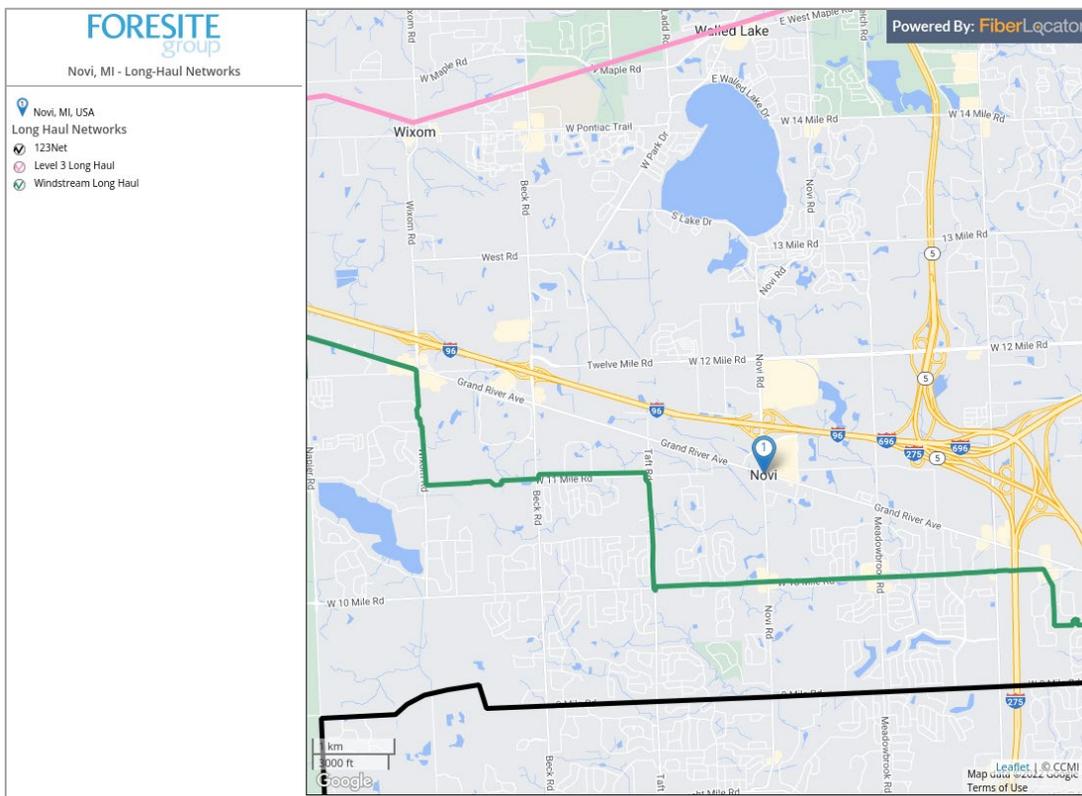
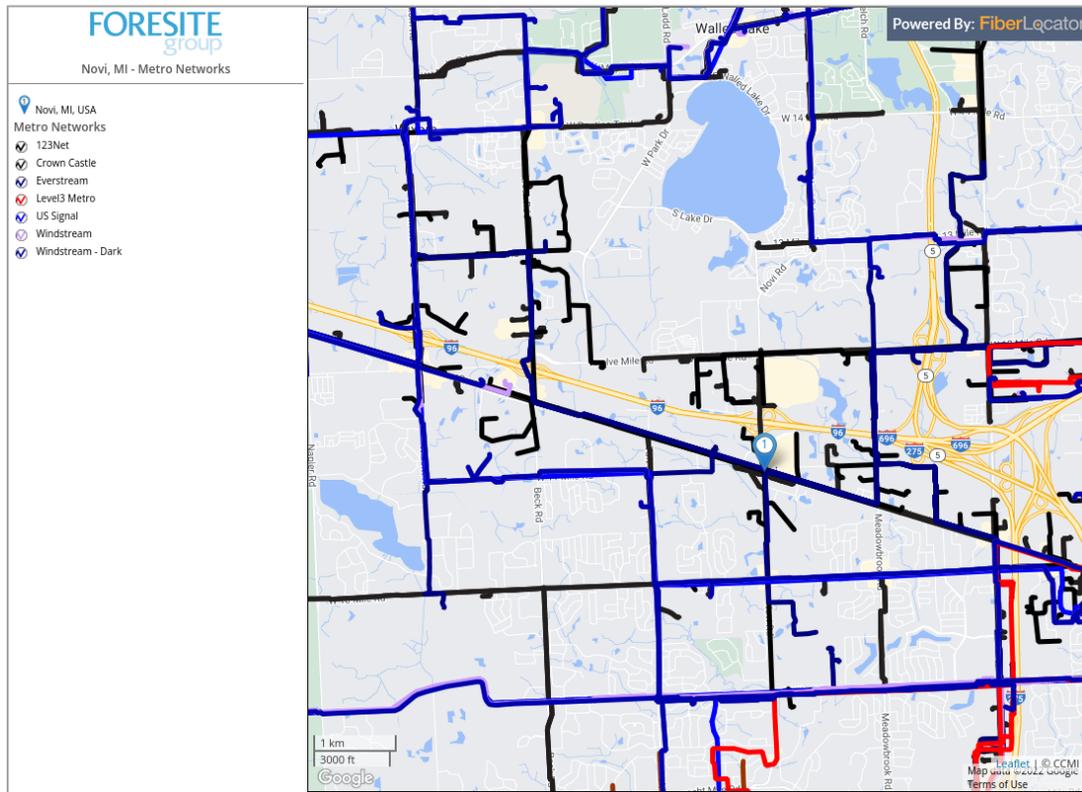
Neighborhoods with Fiber Expansion:

- Vista Hills (completed 2021)
- Orchard Hills (Started)
- Meadowbrook Glens
- Tollgate Woods
- Tollgate Ravines

Fiber Infrastructure

Even though it seems like residential fiber connection is limited throughout the city, there does seem to be a substantial fiber presence. Backhaul networks (also called long-haul networks) are used to transport local data to aggregation sites. If the City or other organization were contemplating a local network build, they would likely use one of the backhaul network providers for connectivity. Because of its proximity to the Detroit metro area, Novi appears to have access to an abundance of long-haul and metro fiber wholesale networks. Metro network telecommunications companies own or lease fiber infrastructure near large cities or industrial areas. They typically provide the high-speed connections required by businesses, utilities, and local ISP companies. They provide commercial high-speed connections that can operate as backhaul, middle-mile, and even last-mile networks to move customer information between data centers or other aggregation locations over very high-capacity fiber links. According to observations

from FiberLocator, there are seven metro fiber providers and two long-haul fiber providers within the city limits. This suggests there is fiber available for commercial and government uses.



DEMOGRAPHIC INFORMATION

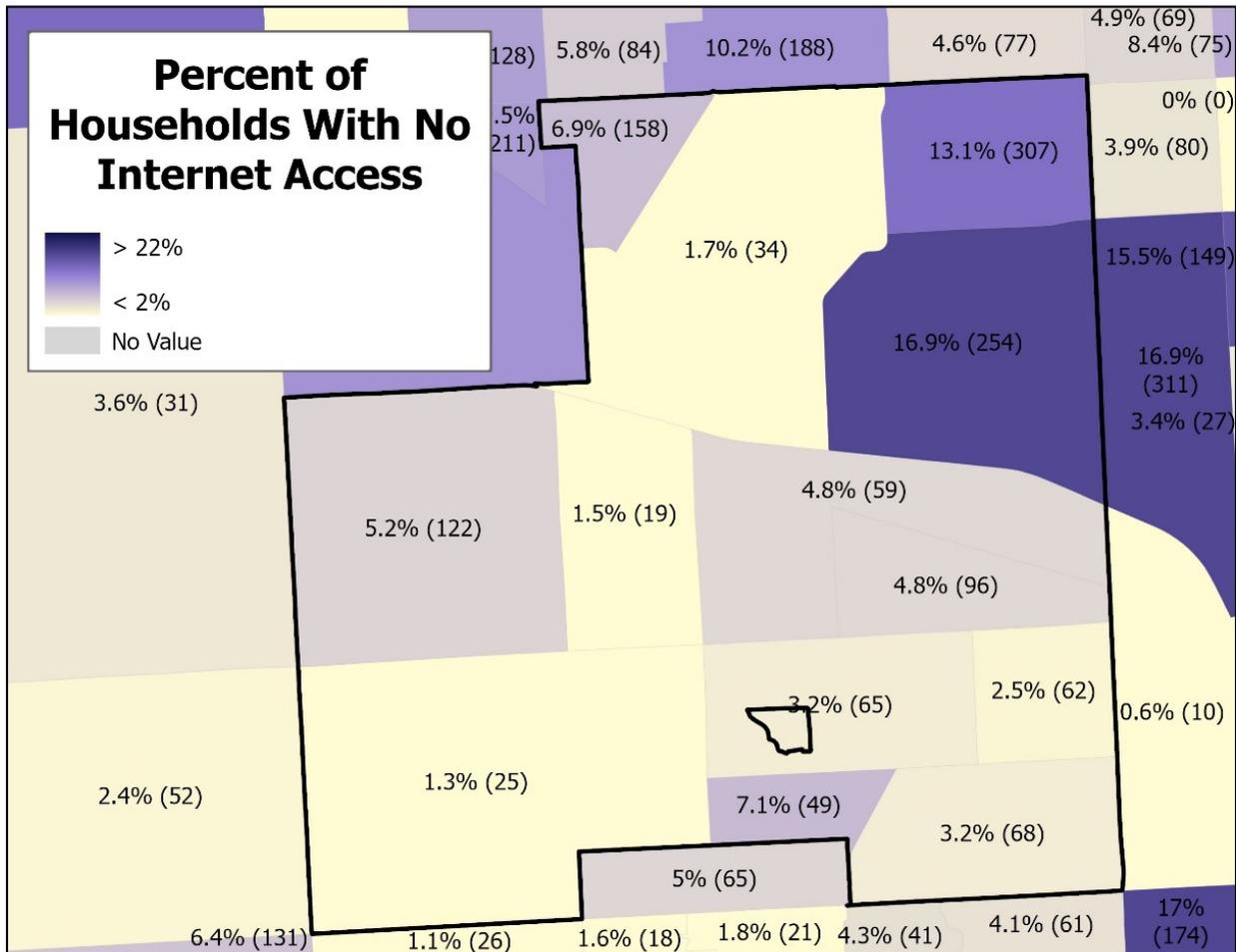
Outside of FCC data, other entities such as the US Census Bureau also publish data related to broadband access. The American Community Survey reports many categories of demographic data on the Census Tract level that can be helpful for understanding if any socioeconomic characteristics correlate with lack of broadband access. For a person to subscribe to a broadband service three requirements must be met:

ACCESSIBLE – the physical infrastructure is available to the end user

AFFORDABLE – the service must be offered at a price compatible with the end user’s budget

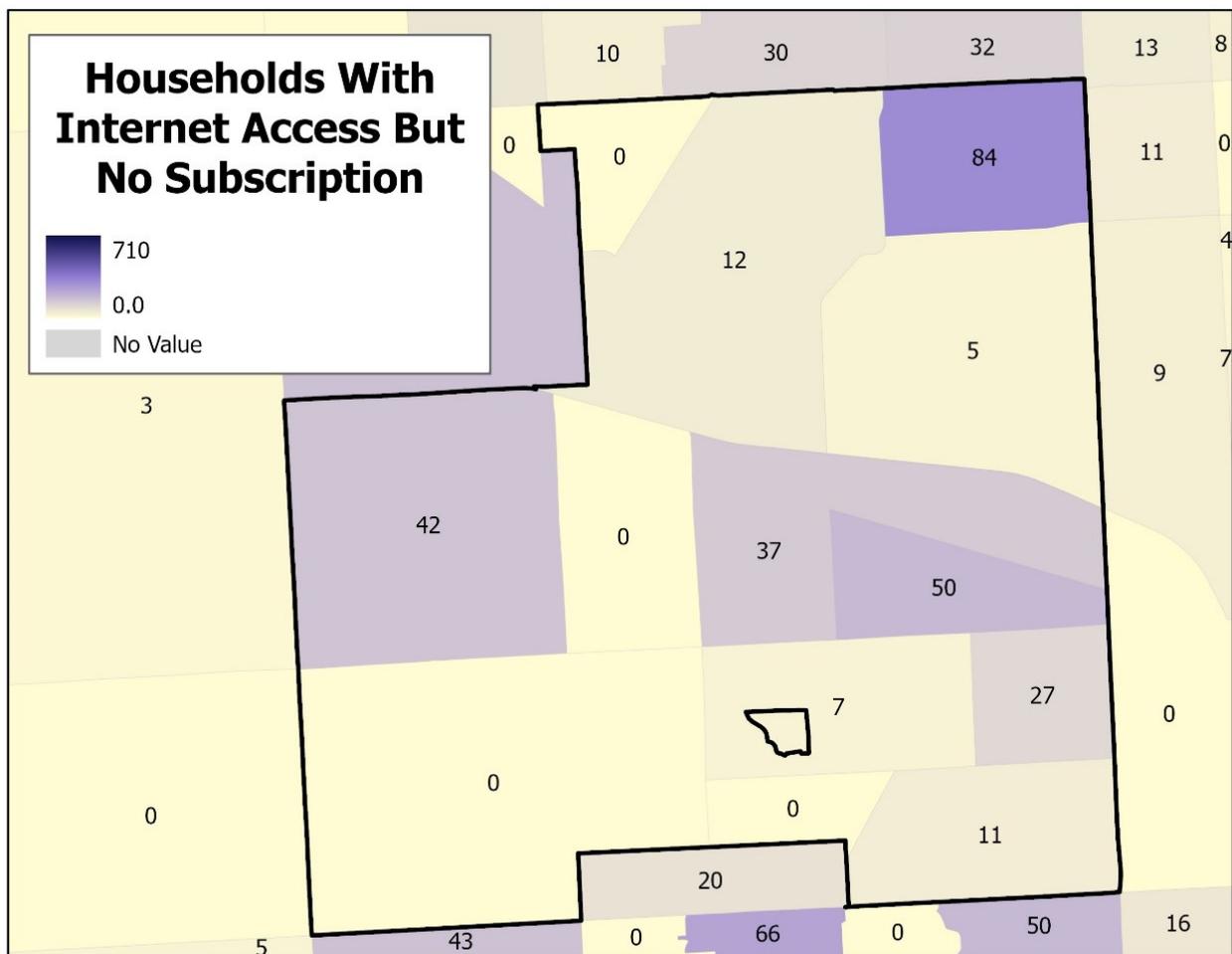
ADOPTABLE – the end user has the tools and skills to meaningfully utilize the broadband service

Analysis to this point has primarily focused on the physical location of infrastructure and whether service at a particular speed is available or not. As other data sources are discussed, such as the American Community Survey and Demand Aggregation responses, there may be more discussion related to affordability and adoptability.



Internet connectivity is mostly consistent throughout the city with the majority of census tracts showing less than 5% of the population lacking internet access. However, in the northeast corner of the city there are two tracts where over 13.1% of residents are estimated to have no internet access. Together these tracts count for over 500 households lacking internet access.

In addition to households where internet access is not available, there are also homes that could subscribe to internet service but choose not to. Presumably, this is either because the product being offered is not worth the cost, or the cost of service is too high for some residents in those tracts to pay. The northeastern-most census tract and the western-most census tract show the highest number of households who currently do not subscribe to internet service even though it is available. If affordability is potentially an issue, the city should take steps to make residents aware of the Affordable Connectivity Program. It is an FCC benefit program that provides a discount of up to \$30 a month towards internet service for qualifying households. More information on the program can be found [here](#).



The table below from the 2021 Comprehensive Annual Financial Report Shows the largest employers in the city. The data from the report shows significant growth from 2012 to 2021. In 2012, the top 10 employers accounted for 4,814 employees and, at that time, made up over 17% of the total city employment. In 2021, the top ten employers accounted for 7,046 employees and only made up 10.91% of the total city employment. This provides an estimated growth from 27,368 jobs to 64,583 – double the available jobs in the city in less than 10 years. Based on the existing infrastructure, these businesses most likely have access to fiber internet.

CITY OF NOVI, MICHIGAN							Schedule 15 Unaudited
Principal Employers							
Current Year and Nine Years Ago							
Employer	2012			2021			
	Employees	Rank	% of Total City Employment	Employees	Rank	% of Total City Employment	
St. John Health/Providence Park Hospital	1,000	1	3.66%	2,036	1	3.15%	
Harman				1,036	2	1.60%	
Novi Community Schools	807	2	2.95%	940	3	1.45%	
Ryder System	600	3	2.19%	580	4	0.90%	
ITC Holding, Inc.	230	10	0.84%	547	5	0.85%	
Yanfeng				472	6	0.73%	
Hanon				385	7	0.60%	
Lineage Logistics				374	8	0.58%	
Comau North America	288	7	1.05%	370	9	0.57%	
Intier/Magna	550	4	2.01%	306	10	0.47%	
A123							
Macy's	539	5	1.97%				
Fox Run	300	6	1.10%				
CVS Michigan, LLC	250	8	0.91%				
Cooper-Standard Automotive	250	8	0.91%				
	<u>4,814</u>		<u>17.59%</u>	<u>7,046</u>		<u>10.91%</u>	

Source: The City's Neighborhood and Business Relations Group
Southeast Michigan Council of Governments

PRIORITIZING FIBERHOOD AREAS

A Fiberhood is a geographic grouping of service points and a fiber distribution hub (FDH cabinet). Two factors were utilized in the creation of the Fiberhoods. First, the design utilizes both 288 and 432 sized FDH cabinets. These sized cabinets are ideal as they are industry standard sizes and readily available for providers. Second, boundary lines were established by considering factors such as natural geographic features like rivers, highways, and railroads, concentrated groups of service points such as established residential neighborhoods, and existing right-of-way path that may be utilized for fiber path design.

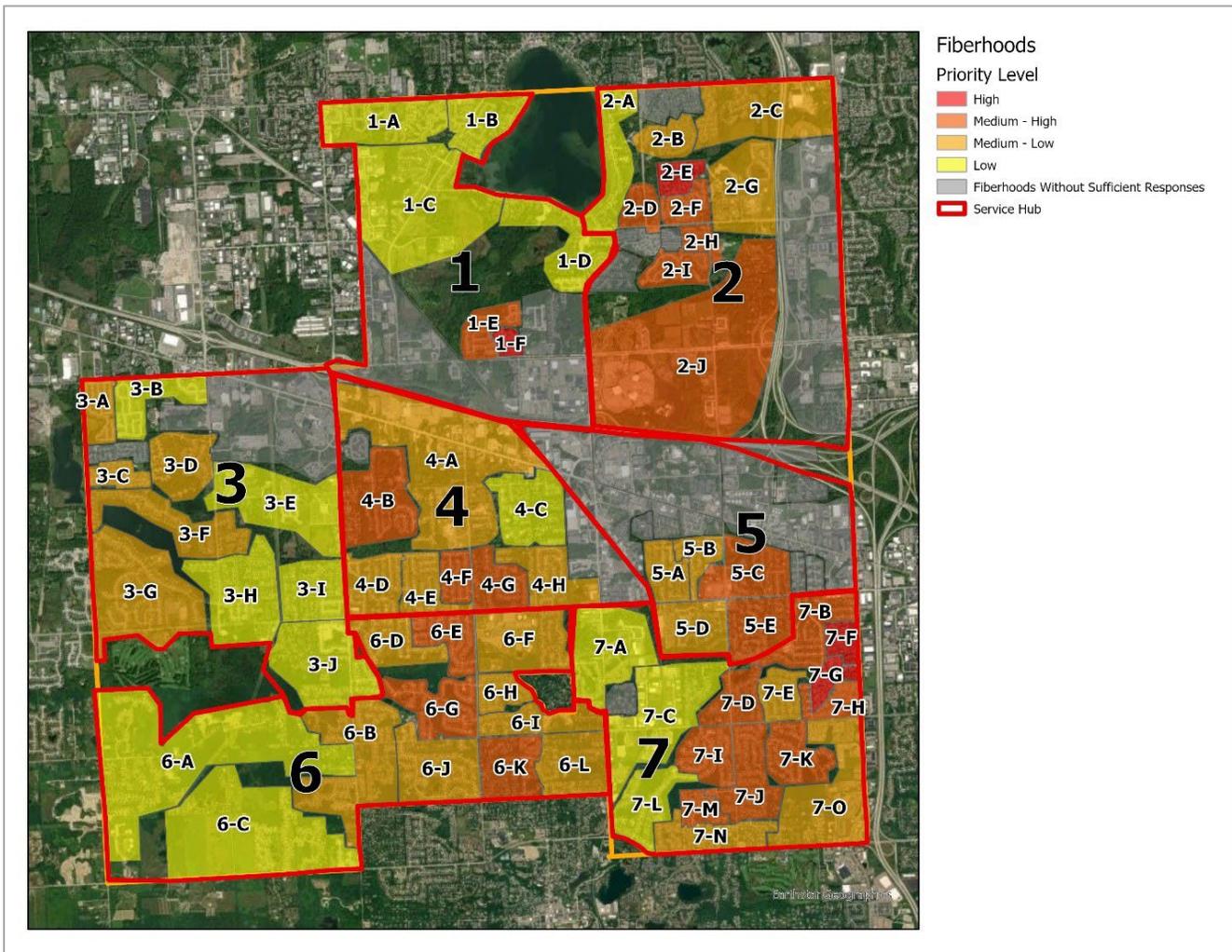
After identifying groupings of service points based on various geographic features, a total count was established for a specific area and compared to the preferred FDH sizes. If a service point count was too far above or below the 288 or 432 service port number, adjustments were made to the boundary to better fit the requirements. Once Fiberhoods were established, those areas were then grouped into larger areas that would be consistent with typical hut sizes, denoted as “service hubs.”

When trying to establish priority levels for both Fiberhood areas and service hub areas, three separate aspects were considered:

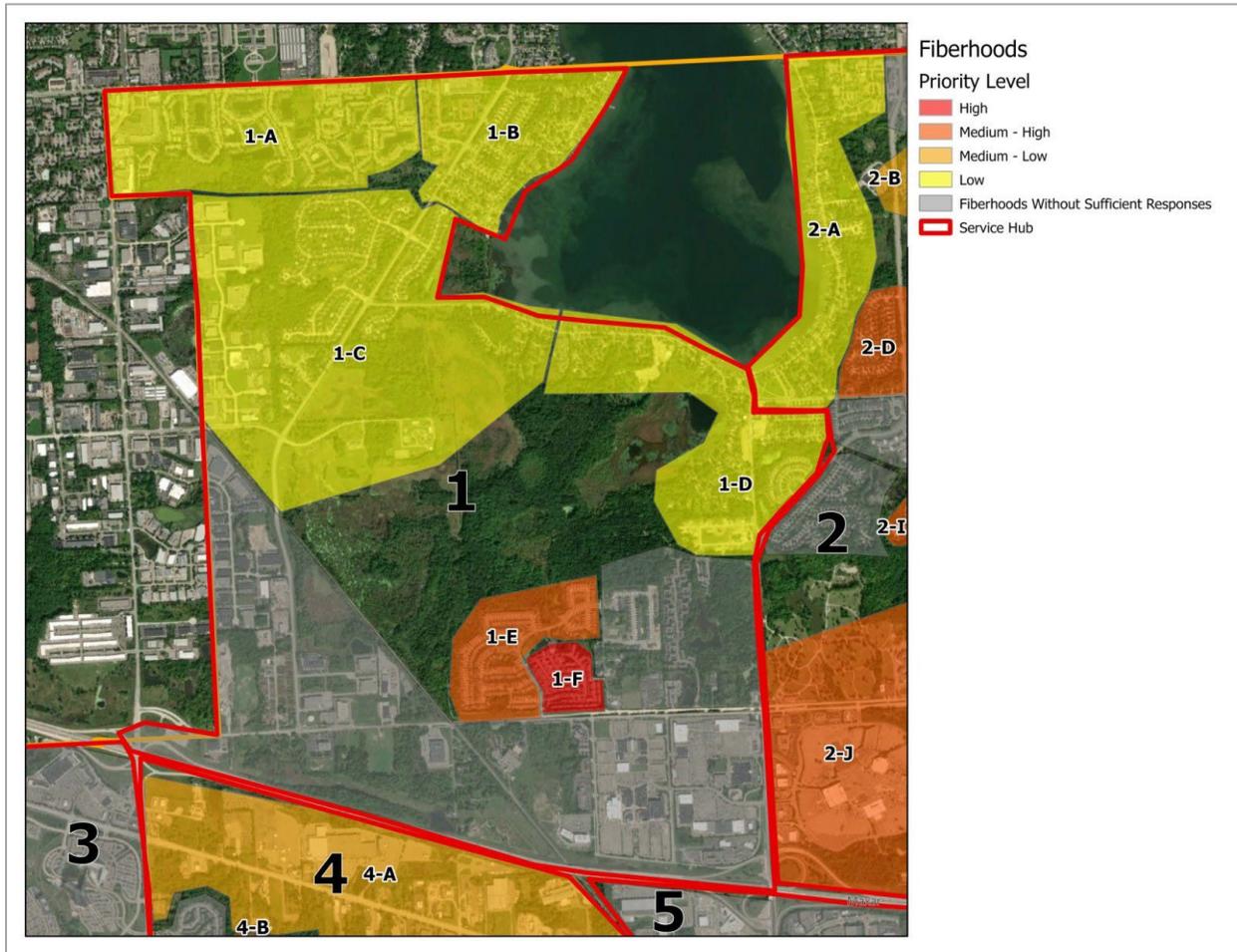
1. Current Level of Service
 - a. Percentage of homes with reported access to fiber
 - b. Results from survey speed test
2. Cost of Build Out
 - a. Number of road miles within the boundary (negative)
 - b. Number of address points served (positive)
3. Likelihood of Residents Signing Up for Service
 - a. Survey results on willingness to upgrade services.

These three categories and five elements were used to produce one composite priority score for each potential Fiberhood within the city boundary. It should be noted that “priority” is referenced with specific context to Novi. It does not indicate a recommendation for the City to build out fiber to that area. High priority in the context of Novi, where the population is generally well served, may not be as urgent as an area with no broadband connectivity. Generally, internet service was sufficient throughout the city; although, based on the speed test results included in the demand aggregation survey, most fell under the 100/20 Mbps benchmark deemed ideal for implementing future technologies. The speed test results showed most residents who took the survey fall between 100-160 Mbps download speeds, which is good, and 11-17 Mbps upload speeds, which is less than ideal. Overall, these speeds are generally fast enough to handle the majority of single-family home needs, but there is room for improvement, particularly in expanding service types that offer more symmetrical speeds where download and upload are close to the same. Current upload speeds may be limiting if multiple occupants within the residence are attempting to work from home and need to upload large datasets or have multiple video conference calls happening at the same time.

The map below shows the result of dividing the city into Fiberhoods. For prioritization purposes, only Fiberhoods that had at least 3 survey responses were considered to prevent a single survey from defining an entire boundary. Fiberhoods shown in grey did not receive sufficient survey responses. Those areas without sufficient responses were primarily in commercial and industrial areas, so overall this still provides a nearly complete picture of current residential service. Generally, connectivity was better within the western two-thirds of the city boundary where there is more reported access to fiber and speed test results were slightly faster, almost all the low priority level Fiberhoods fall within the western two-thirds. Conversely, almost all high and medium-high priority Fiberhoods fall within the eastern two-thirds of the city. This is where fiber was reported as less available and speed test results were slightly slower.



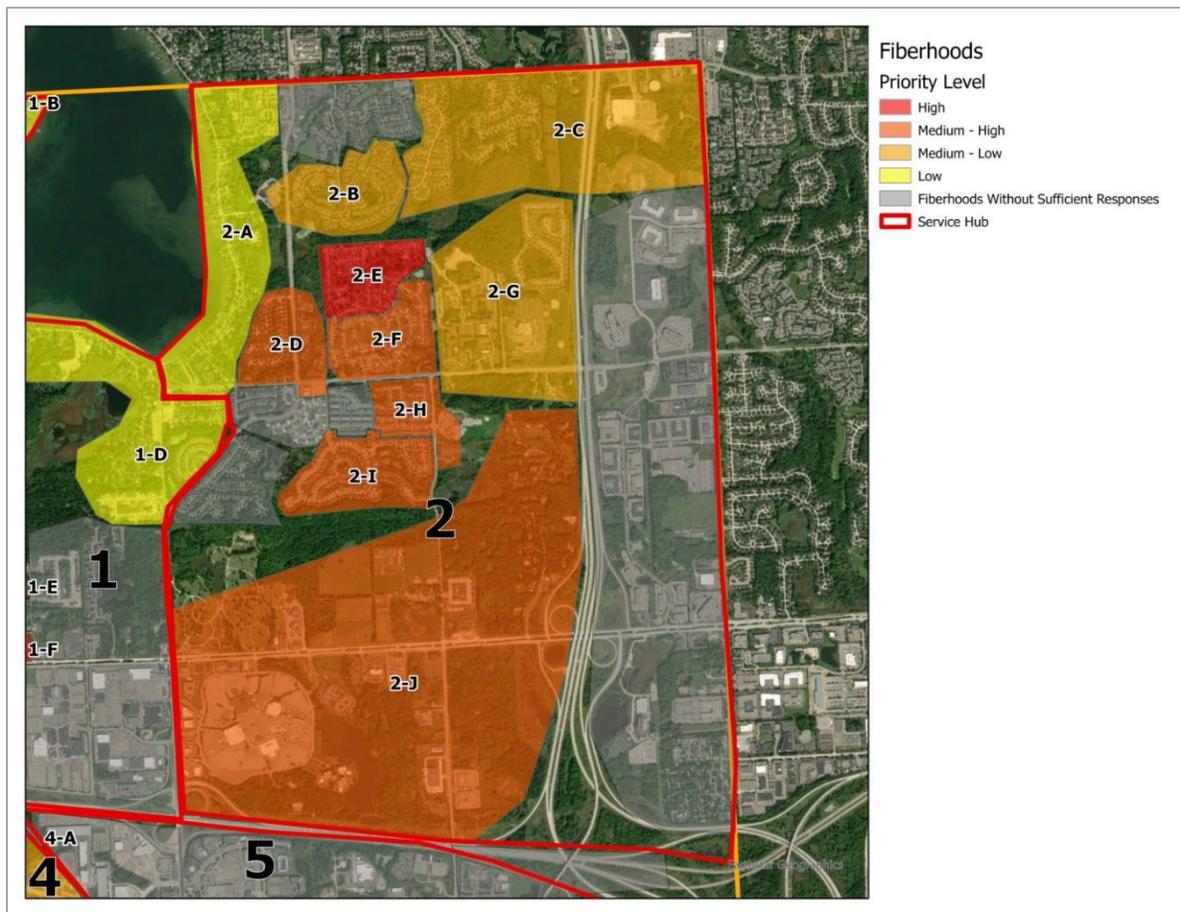
Area 1:



	Name	Priority Grade	Survey Count	Fiber Access Percentage	Survey Download Speed (Mbps)	Survey Upload Speed (Mbps)	Willingness to Upgrade Service
Area 1	1-A	12	9	92.7%	101.71	47.83	86.11
	1-B	10	5	49.8%	250.63	13.41	50.00
	1-C	12	10	49.9%	144.66	13.31	70.00
	1-D	12	11	72.6%	214.06	26.32	75.00
	1-E	18	22	37.9%	146.51	13.83	90.91
	1-F	22	3	0.0%	57.27	13.04	83.33

Zone 1 has some of the highest reported access to fiber connection within Novi’s city limits. Only one Fiberhood was found to be a high priority area for future fiber build. Area 1-F’s relatively high density and lack of reported service to fiber connection makes it stand out among the rest. The download speeds for this Fiberhood were also substantially lower than the neighboring areas. Otherwise, this zone is relatively low priority.

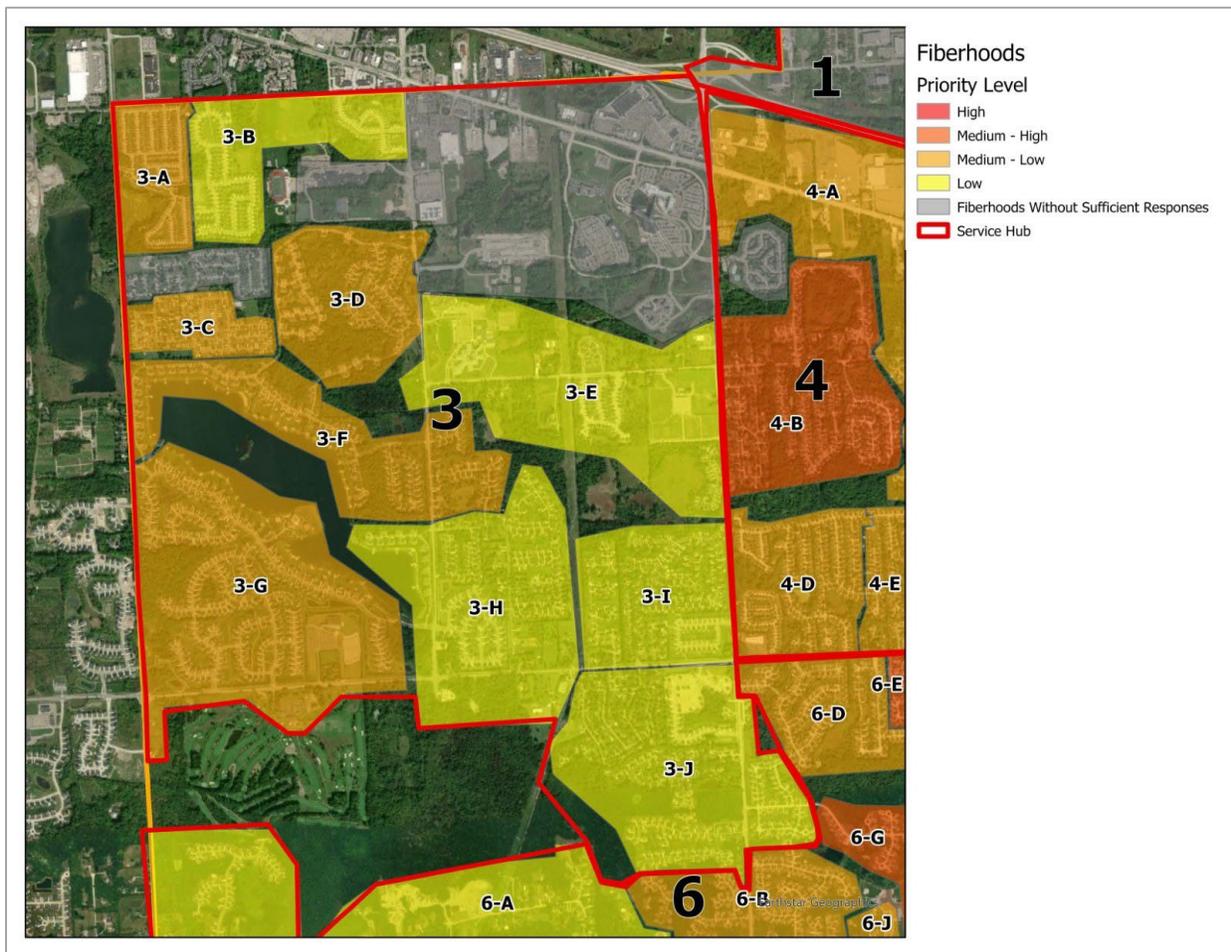
Area 2:



	Name	Priority Grade	Survey Count	Fiber Access Percentage	Survey Download Speed (Mbps)	Survey Upload Speed (Mbps)	Willingness to Upgrade Service
Area 2	2-A	11	3	94.9%	233.22	11.73	75.00
	2-B	16	5	0.6%	121.10	11.98	50.00
	2-C	14	6	0.0%	248.67	17.57	83.33
	2-D	17	3	20.3%	84.63	9.59	75.00
	2-E	23	3	0.0%	23.20	11.11	83.33
	2-F	19	3	0.0%	206.00	16.22	75.00
	2-G	14	11	4.1%	186.72	13.35	79.55
	2-H	18	10	1.5%	149.73	12.86	90.00
	2-I	19	6	0.0%	127.18	11.42	91.67
	2-J	18	3	25.1%	18.68	9.32	100.00

Zone 2 was found to be one of the areas with the highest number of high and medium-high priority zones within the city. Across the zone, there is very little reported fiber access. Some areas such as 2-E and 2-J were found to be below the 25/3 Mbps speed considered served by the FCC, making them stand out as potentially having the worst access to broadband throughout the city.

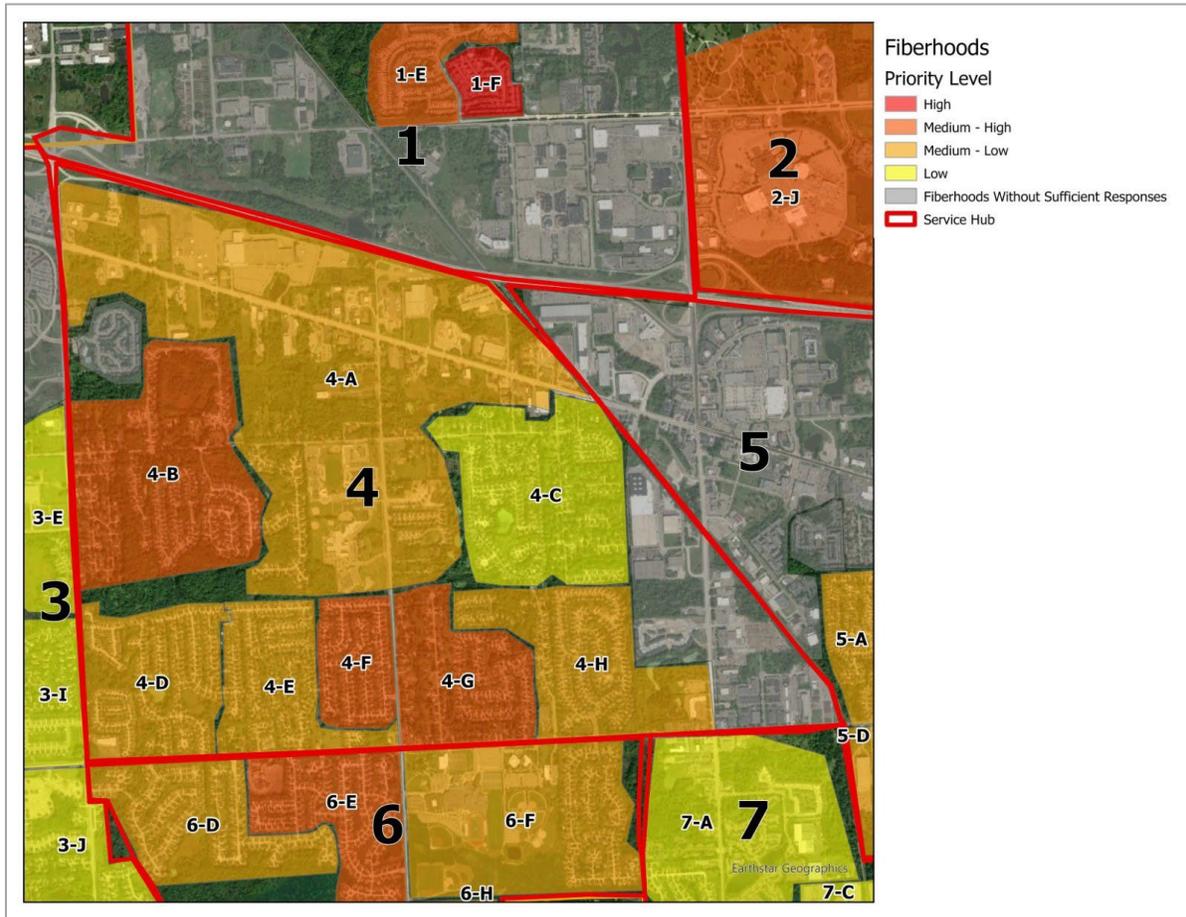
Area 3:



	Name	Priority Grade	Survey Count	Fiber Access Percentage	Survey Download Speed (Mbps)	Survey Upload Speed (Mbps)	Willingness to Upgrade Service
Area 3	3-A	15	11	100.0%	133.44	131.26	77.27
	3-B	11	7	100.0%	216.20	81.50	67.86
	3-C	16	3	33.4%	119.47	6.34	33.33
	3-D	16	14	2.4%	101.72	13.05	76.79
	3-E	11	5	99.2%	163.09	14.46	85.00
	3-F	14	14	23.9%	133.02	12.55	83.93
	3-G	14	19	38.5%	124.13	17.85	80.26
	3-H	12	14	53.9%	124.52	11.59	76.79
	3-I	8	11	60.4%	180.63	18.91	63.64
	3-J	12	14	45.2%	129.27	13.91	76.79

Zone 3 is another well served area. Like Zone 1 it has a high percentage of addresses where fiber is reported to be available. Fiberhoods 3-A and 3-B have service that is much closer to symmetric service, so there are probably a good number of survey respondents that are utilizing fiber connection within that boundary.

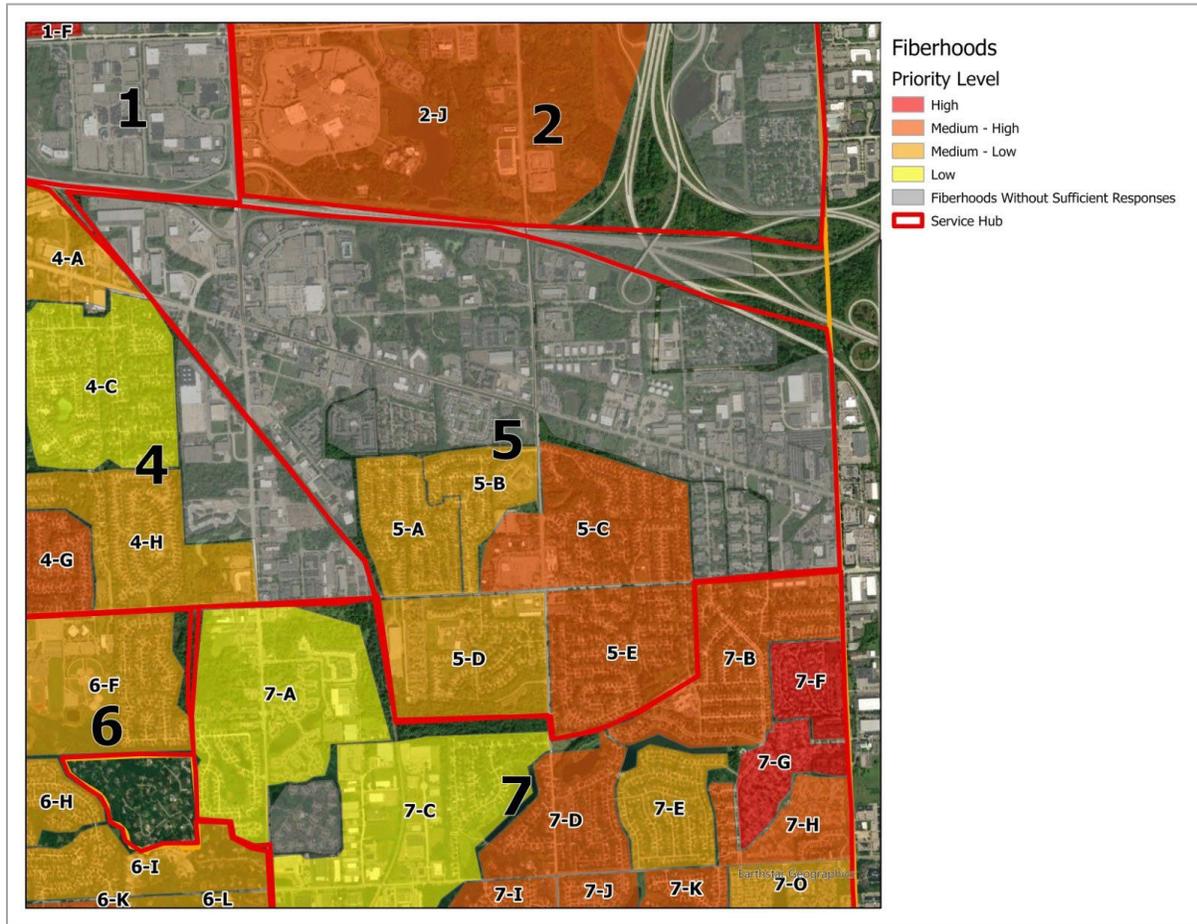
Area 4:



	Name	Priority Grade	Survey Count	Fiber Access Percentage	Survey Download Speed (Mbps)	Survey Upload Speed (Mbps)	Willingness to Upgrade Service
Area 4	4-A	14	6	28.1%	98.81	13.06	83.33
	4-B	17	22	0.0%	145.40	13.36	85.23
	4-C	12	18	63.6%	119.62	11.72	68.06
	4-D	16	17	0.0%	84.13	11.68	58.82
	4-E	16	12	0.0%	159.54	8.97	70.83
	4-F	17	16	0.0%	95.20	9.98	79.69
	4-G	18	15	1.3%	148.19	14.29	85.00
	4-H	14	34	39.5%	135.04	15.68	78.68

Zone 4 has more medium-high and medium-low priority areas. Four of the eight Fiberhoods are reported to have no fiber service available and two Fiberhood areas have below a 10 Mbps upload speed. Areas 4-B, 4-F, and 4-G were determined to be the highest priority areas for this zone. We have discovered through discussion with fiber network owners in Novi that there are some Fiberhoods in this area that have been selected for a fiber to the home build out. This build out would include boundaries 4-D, 4-E, and 4-F, which could significantly lower the overall priority of this zone and make it one of the better served zones in the city.

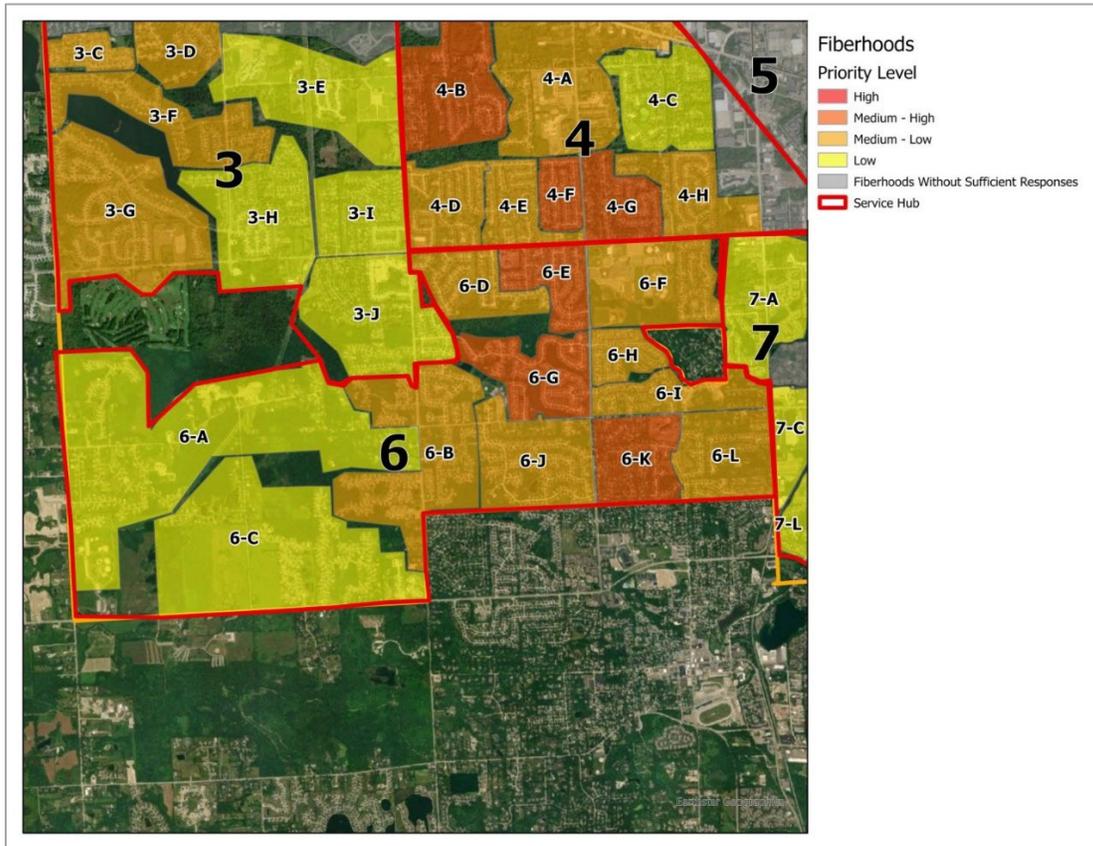
Area 5:



	Name	Priority Grade	Survey Count	Fiber Access Percentage	Survey Download Speed (Mbps)	Survey Upload Speed (Mbps)	Willingness to Upgrade Service
Area 5	5-A	16	13	35.4%	130.17	14.06	73.08
	5-B	16	11	9.0%	182.31	12.81	72.73
	5-C	17	12	0.0%	113.30	15.66	75.00
	5-D	16	8	17.4%	170.14	14.88	75.00
	5-E	18	10	0.0%	162.94	12.45	70.00

Zone 5 consists of medium-high and medium-low priority Fiberhoods. There is not much reported fiber availability throughout the area, but speed test results showed generally high download speeds. Fiberhood 5-C and 5-E were determined to be the Fiberhoods displaying the highest level of priority, primarily because they are reported to have no access to fiber connections throughout the boundaries.

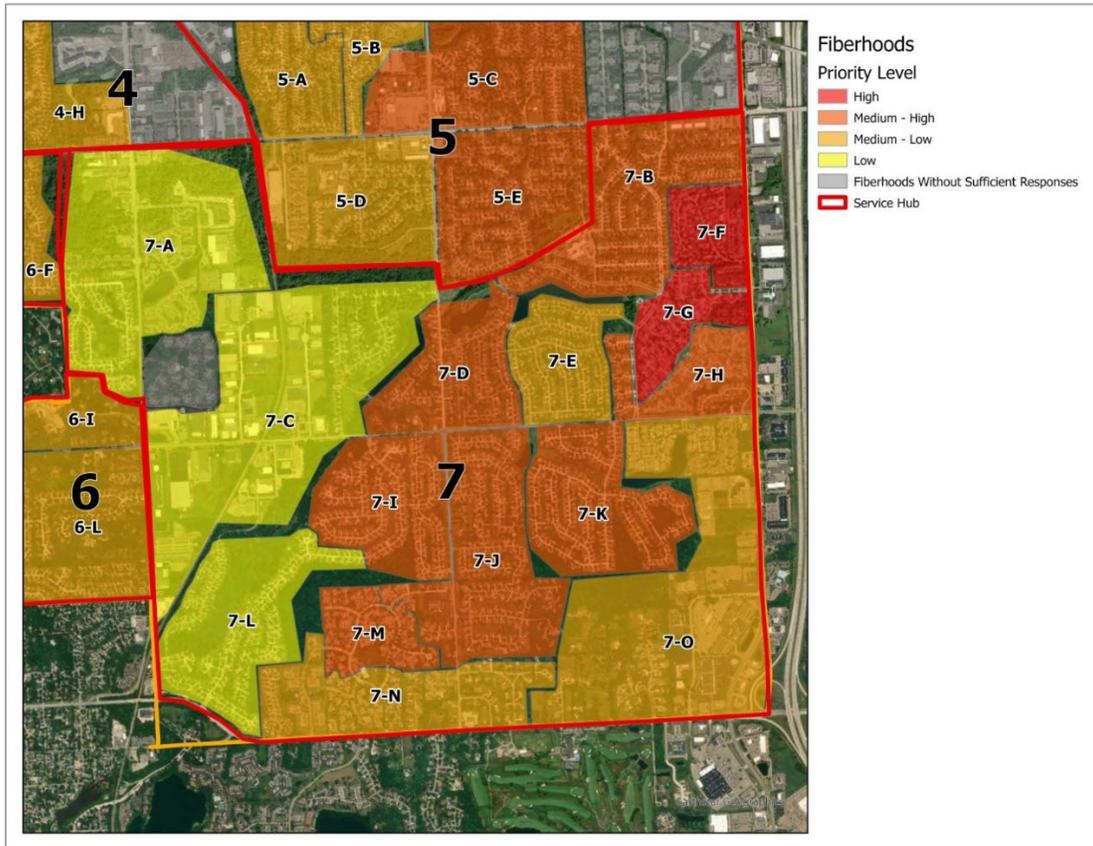
Area 6:



	Name	Priority Grade	Survey Count	Fiber Access Percentage	Survey Download Speed (Mbps)	Survey Upload Speed (Mbps)	Willingness to Upgrade Service
Area 6	6-A	10	10	60.7%	161.35	110.59	77.50
	6-B	14	12	32.7%	140.77	13.83	81.25
	6-C	13	8	58.5%	95.15	17.76	81.25
	6-D	16	10	0.0%	168.88	15.11	80.00
	6-E	17	13	0.0%	91.07	10.54	78.85
	6-F	14	6	0.0%	243.44	9.54	66.67
	6-G	17	17	0.0%	151.65	12.35	83.82
	6-H	16	5	5.9%	164.27	19.30	80.00
	6-I	16	8	27.7%	67.68	32.59	75.00
	6-J	14	10	0.0%	201.88	13.25	75.00
	6-K	19	13	0.0%	40.64	5.82	84.62
	6-L	16	6	0.0%	103.49	8.79	75.00

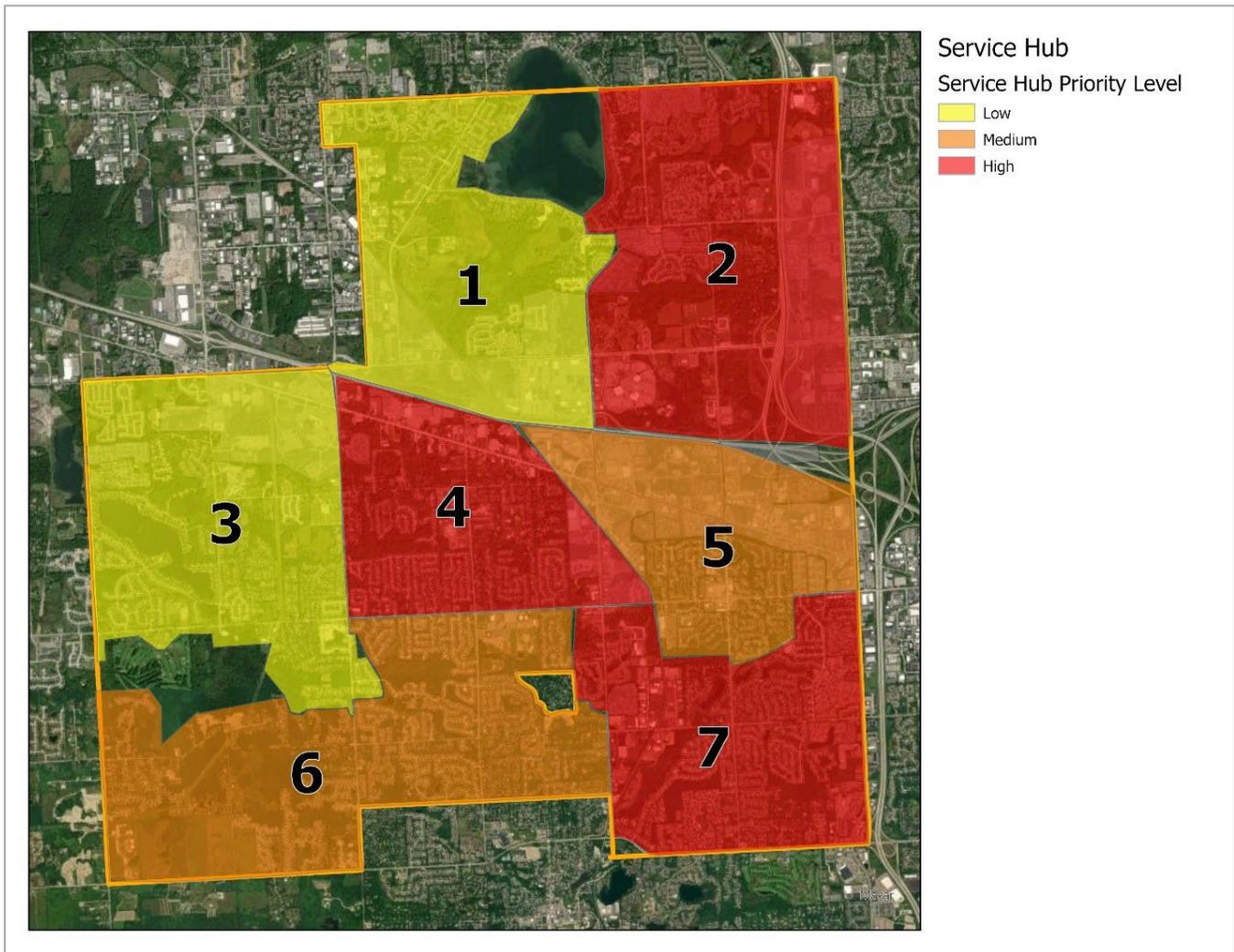
Zone 6 appears to be well connected on the western side, but Fiberhoods further east display lower levels of reported fiber availability and slower download speeds. Fiberhoods 6-K, 6-G, and 6-E were determined to have the highest level of priority, because they lack reported access to fiber and have comparatively slower download speeds within 6-K and 6-E while also presenting a high level of interest in upgrading services within 6-G.

Area 7:



	Name	Priority Grade	Survey Count	Fiber Access Percentage	Survey Download Speed (Mbps)	Survey Upload Speed (Mbps)	Willingness to Upgrade Service
Area 7	7-A	13	10	39.3%	116.76	11.37	70.00
	7-B	18	15	0.0%	106.81	14.80	85.00
	7-C	11	7	84.5%	232.24	100.93	64.29
	7-D	18	11	0.5%	66.40	12.23	81.82
	7-E	16	8	0.0%	137.42	10.72	68.75
	7-F	21	3	0.0%	162.19	10.85	91.67
	7-G	20	11	0.0%	133.63	10.23	79.55
	7-H	19	3	0.0%	31.29	11.72	83.33
	7-I	17	10	0.4%	134.31	13.71	87.50
	7-J	17	13	8.1%	158.06	11.71	80.77
	7-K	19	27	0.0%	94.76	12.75	79.63
	7-L	13	12	22.6%	132.72	32.36	50.00
	7-M	17	7	28.9%	111.05	9.55	75.00
	7-N	14	7	29.3%	105.12	10.98	64.29
7-O	15	3	0.0%	624.16	25.64	83.33	

Zone 7 displayed some of the highest level of need compared to other zones. Many Fiberhoods are reported not to have access to fiber service, and there are a few areas with relatively slow download speeds. The northeast cluster of zone 7 made up of fiberhoods 7-B, 7-F, 7-G, and 7-H creates a dense group of high priority Fiberhoods, which may present an opportunity for incentivizing an incumbent company to build out fiber to the home for that specific area.



The final map displays zones of highest priority throughout the city. Zones 2, 4, and 7 received the highest priority scores. However, there is indication that zone 4 will have a significant fiber build out soon, which may lower the overall priority level for this zone. Otherwise, these are areas where the least amount of fiber is reportedly available, speeds tend to be lower relative to other areas, address density is preferable, and levels of interest in upgrading services were high.

Prioritization of fiberhoods is not intended to be a recommendation for the City to build out its own network in these areas, but as an indicator for areas to prioritize as the City incentivizes incumbent providers through the methods described in the Gaps and Analysis section of this report.

REGULATORY ENVIRONMENT

For a municipality to operate as a Broadband or Internet Service Provider in the State of Michigan, certain requirements must be met in addition to the FCC requirements. The information below highlights the basic requirements.

Michigan Requirements to be an Internet Service Provider

Michigan requirements to be met if Novi **DOES** want to be a provider:

All FCC requirements must be met first. Links to information regarding these requirements can be found in Appendix E.

Michigan State Requirements:

MICHIGAN TELECOMMUNICATIONS ACT (EXCERPT) Act 179 of 1991

484.2252 Telecommunication services offered by public entity

Sec. 252.

1. A public entity may provide telecommunication services within its boundaries if the public entity has complied with the requirements of section 14 of the metropolitan extension telecommunications right-of-way oversight act, 2002 PA 48, MCL 484.3114, and all of the following apply:
 - a) b) The public entity has received less than 3 qualified bids from private providers.
 - b) It is more than 60 days from the date the request for bids was issued.
 - c) The public entity is providing the telecommunication services under the same terms and conditions as required under the request for bids issued pursuant to subdivision (a).
2. The public entity has issued a request for competitive sealed bids to provide telecommunication services.
3. Except as provided under subsection (3), a public entity shall not provide telecommunication services outside its boundaries.
4. Two or more public entities may jointly request bids under subsection (1) and provide telecommunication services if all participating public entities meet the requirements of this section. If a public entity does not receive a qualified bid as required under subsection (1), the public entity may contract with another public entity to receive telecommunication services.
5. A public entity shall not establish a board or other entity for the purpose of providing regulation of a private provider of services under this section.

Additional Michigan State requirements:

6. Registration with the Michigan Public Service Commission as an Intrastate Telecommunications Service Provider.
7. Completion of, and adherence to, the Compliance Forms as required by the Michigan Public Service Commission.



SUMMARY OF FINDINGS

Based on the findings in Novi, Foresite Group identified the four gaps highlighted at the beginning of this report. At this time, due to the current level of service available to Novi Residents and evidence that private service provider fiber expansion, Foresite Group would not recommend the City build its own fiber network at this time. Rather, the City should establish a Broadband Master Plan with strategies for incentivizing incumbent providers to continue to expand their services and identify opportunities to expand telecom infrastructure in a cost-effective manner.

APPENDIX A – GLOSSARY OF TERMS

Backhaul – Backhaul consists of national and regional networks that aggregate and transport terra-bytes of data through long distance fiber systems. They interconnect thousands of data centers, central offices, and internet peering locations around the country.

Bandwidth – the volume of data per unit of time that a transmission medium can handle, the larger the bandwidth, the faster you can move a certain amount of data

Broadband – a type of high-speed data transmission via copper or fiber optic cable in which a single cable can carry a large amount of data at once. Broadband is usually always on and therefore available for use. Because fiber transmits data much faster than copper, new broadband installations use fiber. However, many US legacy networks include copper cables.

Cable Modem – Cable modems are a wireline transmission technology that transmits electrical data signals over coaxial lines.

Cellular Wireless – Cellular Wireless (or cell service) uses very compact cellular antennas to transmit data signals over licensed Radio Frequency (RF) spectrum. Receivers can be cell phones, tablets, MiFi devices, or other mobile cellular electronics.

Central Office – a facility where subscriber home and business lines are connected to a local loop

Competitive Local Exchange Carrier (CLEC) – a telecommunications provider company competing with other, already established carriers

Conduit – a tube or trough for protecting wiring

Copper Cable – data transmission medium made of copper that carries electric signals

Data Center – a facility where an organization or service provider centralizes their necessary computing resources

Data transfer – the process of using computing technologies to transmit or transfer electronic or analog data from one computer to another

Digital Subscriber Line (DSL) – DSL is a wireline transmission technology that transmits electrical data signals over traditional copper telephone lines installed in homes and businesses.

Download – receiving data or a file from the internet on your computer

Federal Communications Commission (FCC) – the FCC regulates interstate and international communications by radio, television, wire, satellite and cable

Fiber Infrastructure – includes fiber optic cable, conduit, vaults, cabinets

Fiber Optic Cable – high-speed data transmission medium made of glass or plastic filaments that carry light beams

Fixed Wireless – fixed wireless technology is a well-established method of delivering broadband speeds without the need for physical wiring into a home or business. Fixed wireless leverages the convenience of cellular signals which require no wiring along with the powerful capacity of fiber or other high capacity backhaul methods.

Frequency – the rate of radio signals per second; typically measured in hertz

Gbps – Gbps stands for gigabits per second and is a measure of internet bandwidth. 1 Gbps is equal to 1,000 Mbps.

Incumbent Local Exchange Carrier (ILEC) – an ILEC, referred to as incumbent service provider in this report, is a local telephone company which held regional monopoly on landline service before the market was opened to Competitive Local Exchange Carriers (CLEC)

Internet of Things (IoT) – network of connected devices that communicate and exchange data. This can include anything from vehicles to home appliances and on-street sensors.

Internet Service Provider (ISP) – a company that provides access to the Internet to customers which are any combination of individuals, companies, government entities and non-profit organizations

Last-mile – Last-mile networks are smaller telecommunication cables located inside neighborhoods or directly outside businesses. Last-mile network includes the service drop cable that enters your home or business.

Mbps – Mbps stands for megabits per second and is a measure of internet bandwidth.

Middle-mile – Middle-mile networks move data and internet traffic from Backhaul aggregation locations into neighborhoods and business districts.

Network – a group of two or more computers linked together with cabling and/or radio waves

Point of Presence – the location where two or more different communication devices connect to each other; an access point, location, or facility that connects to and helps other devices establish a connection with the Internet.

Satellite Internet – Satellite Internet service is a wireless technology that relies on small dish-style antennas to transmit and receive data signals from terrestrial locations to satellites orbiting the earth. Providers use licensed Radio Frequency (RF) spectrum to transmit signals.

Scalability – the capability of a communications network to handle a growing amount of data or its potential to be enlarged to accommodate that growth

Small Cell – infrastructure that transmits data to and from a wireless device and consists of small radio equipment and antennas that can be placed on structures such as streetlights, sides of buildings or poles and transmits

Smart City – a city that uses information and communication technology to improve operational efficiency, share information with the public and provide a better quality of government service and citizen welfare

Smart Device – interactive electronic gadget that is able to connect, share and interact with its user and other smart devices. Smart devices are able to understand simple commands sent by users and help in daily activities.

Spectrum – the radio frequencies allocated to the mobile industry and other sectors for communication over airwaves

Symmetrical – a symmetric internet connection means the download and upload rates are the same in both directions.

Teleconference – a conference with participants in different locations linked by telecommunications devices

Telehealth – the provision of healthcare remotely by means of telecommunications technology

Transmission – the process of sending data over a communication medium to one or more computing, network, communication, or electronic devices

Upload – sending data or a file from your computer to the internet

Video streaming service – an on demand online entertainment source for TV shows, movies and other streaming media

Wide Area Network (WAN) – a group of two or more computers that extend over a large geographical distance linked together by copper or fiber optic cabling and/or radio waves

Wi-Fi – wireless technology used to connect computers, tablets, smartphones and other devices to the internet

APPENDIX B – METRO NETWORK PROVIDERS



AT&T Business

AT&T Business Services

AT&T Business provides industry specific, edge-to-edge solutions that help deliver breakthrough customer experiences while keeping your business ahead of the digital curve. AT&T delivers edge-to-edge capabilities that integrate near-seamlessly, from the core of your network all the way to the far reaches of your digital technologies.



Atlantic Broadband

Atlantic Broadband is a TV, Internet and Phone service provider on a mission to deliver compelling, flexible and reliable services plus amazing local support to the residential and business communities it serves. Atlantic Broadband, a wholly owned subsidiary of Cogeco Communications Inc., is the 9th largest cable operator in the United States, based on the number of television service customers served.



Georgia Transmission Corporation

Decades of rapid population growth and rising personal energy use in Georgia have challenged us to expand the capacity fast enough to meet demand. Instead of facing problems from transmission shortages, our maintenance efforts and the investment of more than \$1 billion in new facilities this decade have us setting company records for electric reliability along our transmission network.



Hargray Communications

Hargray Communications is a leader in the telecommunications industry, dedicated to meeting the communication needs of our residential, business, large enterprise and resort customers. Our mission is to envision and deliver customer delight. Our team of more than 350 employees, including 100 service technicians, all live, work and contribute in our Lowcountry community. We're committed to excellence, delivering the most advanced technology and the best customer service.



Southern Telecom

Southern Telecom is the telecommunications subsidiary of Southern Company (NYSE: SO). Founded in 1997 and headquartered in Atlanta, Georgia, Southern Telecom offers an entrepreneurial spirit supported by one of the largest investor-owned utilities in North America. Southern Telecom provides wholesale dark fiber, colocation, conduit and right-of-way solutions throughout the Southeast. Southern Telecom has 1,300 route miles installed in the Southeast. We also construct spurs off this route to support many of the nearby tier II-plus cities. We provide HVAC, power and other custom energy solutions for optronics at our operation hubs and in-line amplification sites (ILAs) on the long-haul routes and points of presence (POPs) in the metro areas supporting metro fiber rings.



Uniti Fiber

Uniti Fiber is the fiber infrastructure segment of Uniti. Uniti Fiber is a leading provider of infrastructure solutions, including cell site backhaul and small cell for wireless operators, and Ethernet, Wavelengths and Dark Fiber for telecom carriers and enterprises. They deliver custom-designed, technology-agnostic and access-agnostic solutions.



Windstream Communications

Windstream Wholesale has a resilient network with over 160,000 fiber route miles, 150 on-net data centers and cable landing stations, over 60,000 fiber-lit buildings, more than 3,000 POPs and serves almost 1,000 cities nationwide. Our network provides unique flexibility in alternative route designs that has proven to be of great value to many of our customers. Our Sales Engineering teams work closely with each individual customer to understand their unique needs, providing customized solutions that are specifically designed to support a vast range of business challenges. From custom routing to protection, bandwidth speeds to diversity – our team maintains a steadfast commitment to ensuring an exceptional customer experience. The end result is creating a network solution that fits your business needs today, and yet flexible enough to meet the needs of the future.



Zayo Metro Services

Zayo provides mission-critical bandwidth to the world's most impactful companies, fueling the innovations that are transforming our society. Zayo's 133,000-mile network in North America and Europe includes extensive metro connectivity to thousands of buildings and data centers. Zayo's communications infrastructure solutions include dark fiber, private data networks, wavelengths, Ethernet, dedicated Internet access, and colocation services. Zayo owns and operates a Tier 1 IP Backbone and 44 carrier-neutral data centers. Through its Cloudlink service, Zayo provides low latency private connectivity that attaches enterprises to their public cloud environments. Zayo serves wireless and wireline carriers, media, tech, content, finance, healthcare and other large enterprises. For more information, visit zayo.com.

APPENDIX C – LONG HAUL NETWORK PROVIDERS



AT&T Business

AT&T Business Services

AT&T Business provides industry specific, edge-to-edge solutions that help deliver breakthrough customer experiences while keeping your business ahead of the digital curve. AT&T delivers edge-to-edge capabilities that integrate near-seamlessly, from the core of your network all the way to the far reaches of your digital technologies.



ExteNet Systems (formerly Hudson Fiber)

Established in 2002 and headquartered in Paramus, New Jersey, HFN has quickly become a premier data transport provider, offering high-bandwidth, low-latency networking solutions for financial, content, carrier and enterprise customers.



Level 3 Communications

Level 3 Communications is an American multinational telecommunications and Internet service provider company headquartered in Broomfield, Colorado. It operates a Tier 1 network.



redIT

redIT, a wholly owned subsidiary of KIO Networks Group, is a telecommunications company that specializes in mission-critical IT services with presence in the USA, Mexico, Spain, Panama, Guatemala and Dominican Republic. With more than 19 years of experience operating high-capacity connectivity networks, redIT is a connectivity leader in Mexico. The company owns a fiber optic network in major cities in Mexico and the United States. redIT makes business connectivity an experience that is completely integrated, secure and provides unlimited transmission rates. redIT. We connect your world with the rest of the world.



Southern Telecom Long-Haul

Southern Telecom is the telecommunications subsidiary of Southern Company (NYSE: SO). Founded in 1997 and headquartered in Atlanta, Georgia, Southern Telecom offers an entrepreneurial spirit supported by one of the largest investor-owned utilities in North America. Southern Telecom provides wholesale dark fiber, colocation, conduit and right-of-way solutions throughout the Southeast. Southern Telecom has 1,300 route miles installed in the Southeast. We also construct spurs off this route to support many of the nearby tier II-plus cities. We provide HVAC, power and other custom energy solutions for optronics at our operation hubs and in-line amplification sites (ILAs) on the long-haul routes and points of presence (POPs) in the metro areas supporting metro fiber rings.



Sprint Long-Haul

Sprint is guided by a corporate commitment to doing the right thing as it brings the freedom of mobility to consumers, businesses and government users with a comprehensive range of wireless and wireline communications services.



Zayo Long-Haul Services

Zayo provides mission-critical bandwidth to the world's most impactful companies, fueling the innovations that are transforming our society. Zayo's 133,000-mile network in North America and Europe includes extensive metro connectivity to thousands of buildings and data centers. Zayo's communications infrastructure solutions include dark fiber, private data networks, wavelengths, Ethernet, dedicated Internet access, and colocation services. Zayo owns and operates a Tier 1 IP Backbone and 44 carrier-neutral data centers. Through its Cloudlink service, Zayo provides low latency private connectivity that attaches enterprises to their public cloud environments. Zayo serves wireless and wireline carriers, media, tech, content, finance, healthcare and other large enterprises. For more information, visit zayo.com.

APPENDIX D – DIG ONCE AND OPEN TRENCH POLICY EXAMPLES

Salinas, CA Dig Once Policy

RESOLUTION NO. _____ (N.C.S.)

A RESOLUTION ESTABLISHING A POLICY REDUCING UNDERGROUND EXCAVATION FOR COMMUNICATIONS INFRASTRUCTURE WITHIN THE CITY RIGHT OF WAY

WHEREAS, the city of Salinas desires to comply with all mandates regarding public utilities as imposed upon it by state and federal law; and

WHEREAS, it is determined that there is a need for wireless telecommunication facilities in the city of Salinas, and the city of Salinas chooses to use its police power and land use planning authority to regulate such facilities; and

WHEREAS, the City of Salinas has an interest in preserving its streets and roadways for their intended purpose, while minimizing interruptions to the flow of traffic; and

WHEREAS, the City of Salinas currently regulates the installation of wireless telecommunication facilities proposed above ground to be placed in the public right of way in accordance with Resolution No 20810 (N.C.S.); and

WHEREAS, the proposed requirements for excavation of permits and entitlements relative to such projects respond to recent changes in laws concerning regulation of wireless telecommunication facilities and provide mechanisms for the City to maintain an aesthetically pleasing community environment, protect the safety and welfare of Salinas residents, minimize degradation of the residential character of neighborhoods, streets, and roadways, and require the best available design to eliminate visual impacts while ensure that adequate public services and facilities are constructed to accommodate the needs of Salinas residents; and

WHEREAS, pursuant to the California Environmental Quality Act (“CEQA”), the proposed requirements for wireless telecommunication facilities in the public right of way are exempt per section 15061(b)(3), as there is no potential to cause a significant effect on the environment; and

NOW, THEREFORE BE IT RESOLVED by the Salinas City Council that the following policy requirements for all underground communications infrastructure within the public right of way are adopted with the purpose of preserving the health, safety, and welfare of the City’s residents and City property, as follows:

1. The purpose of this Resolution shall be to encourage the growth of underground communications infrastructure facilities while preserving the integrity of the City of Salinas’ (“City”) streets.
2. The City has an obligation to comply with all applicable state and federal authority pertaining to utilities and telecommunications, and intends for this Resolution to be interpreted so as to comply with all such authority.

3. The City has an interest in promoting increased connectivity and emerging technology to its City residents and businesses, as well as to businesses seeking growth opportunities within the City limits.
4. In recognition of the need to provide emerging technology to the historically underserved areas of the City, and in further recognition of the need to minimize public inconvenience and traffic, and to preserve the integrity and lifespan of City streets, all construction, reconstruction, repaving of a City right of way shall include a provision for the installation of a public utility infrastructure, such as conduit, tube, duct, or other device designed for enclosing telecommunications wires, fibers, or cables, wherever practical and feasible. Such infrastructure shall be installed in accordance with City regulations, requirements and specifications, including but not limited to the Salinas Municipal Code, as directed by the Director of Public Works or his/her designee. Such excavation shall not take place more than once on a particular City street within a 5-year period.
5. To the extent feasible, the Director of Public Works or his/her designee shall notify (or require an applicant for such work to notify) all known telecommunications service providers of an impending excavation and afford all such service providers the opportunity to utilize the excavation to install, upgrade, co-locate, repair or improve their telecommunications facilities during such an excavation project. Any such notice shall be provided at least 30 days prior to the commencement of excavation. All service providers utilizing the same excavation shall be responsible for their proportionate share of the excavation costs, including but not limited to the costs of permitting. Such excavation shall not take place more than once on a particular City street within a 5-year period.
6. A permit for excavation shall be required and will be charged based on staff time spent at the rate in effect as established by the duly adopted fee schedule for engineering plan review.
7. The Director of Public Works or his/her designee may exempt projects from these requirements where it is determined that it is not practical or feasible. Requests for an exemption must be made in writing with an explanation as to why the project is not feasible. Cost shall not be the determining factor whether a project is feasible or practical. A determination from the Director of Public Works is the final administrative determination of the matter and is not appealable.
8. The Director of Public Works or his/her designee shall have primary responsibility for enforcement of this policy. Pursuant to the Salinas Municipal Code, excavations not in accordance with this policy shall be considered noncompliant encroachments which have been declared a public nuisance and which are subject to abatement, removal, and enjoinder by the City of Salinas, as well as by any other remedies provided by law.

PASSED AND APPROVED this 15th day of November 2016 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

Joe Gunter, Mayor

ATTEST:

Patricia M. Barajas, City Clerk

Dig Once Policy For Public Works Projects in Gonzales, CA

Attachment A

DATE: February 1, 2016

FROM: Gonzales City Council

SUBJECT: "Dig Once" Policy for Public Works Projects in Gonzales

1. Unless waived by the Public Works Director on the basis of undue burden, or an unfavorable cost-benefit analysis, or the consideration of other relevant factors, Gonzales will install or have installed communications conduit whenever the City undertakes or authorizes the following types of projects:
 - a. New street, road, sidewalk, bike path, or other transportation infrastructure construction.
 - b. Maintenance, repaving or other significant work on the above infrastructure.
 - c. Excavations for the purpose of installing utilities, including but not limited to communications, electrical, gas, water, waste water, storm drainage.
 - d. Other excavations, or work on public property on in the public right of way that provide a similar opportunity to install conduit for future use at a low additional cost.
2. The Public Works Director will work with other local agencies to establish common standards for the type, size, and number of conduits and associated fixtures to be installed. Until these standards are established, a single conduit will be installed with the following specifications, unless the Public Works Director or Project Manager determines otherwise:
 - a. A minimum inside diameter of 2-inches.
 - b. Made of PVC Schedule 40 material (color orange).
 - c. Laid to a depth of not less than 18 inches below grade in concrete sidewalk areas, and not less than 30 inches below finished grade in all other areas when feasible, or the maximum feasible depth otherwise.
 - d. When feasible, installed so fiber optic cable maintains a minimum bend ratio of 20-times the cable diameter.
 - e. When practicable, furnish with pull tape and an external locate wire no more than 3-inches above the conduit.
3. When determining if a particular specification is feasible or practicable, the Public Works Director or Project Manager will take into account the added cost, the length of the conduit installed (and therefore its potential future value), the impact on the overall project, and other relevant factors.
4. Because communications facilities are needed to monitor, manage, and provide security for Public Works specifically, and to support Public Safety and Economic Development in general, the cost of purchasing, installing, and documenting the conduit may be included in the cost of the overall project. However, other sources of funds may also be used if available.
5. Conduit installed by or on behalf of the City, will be owned by the City.
6. A record of all City-owned conduits will be maintained, and transferred into a geographic information system (GIS) whenever feasible.

ORDINANCE NO.
ORDINANCE ADDING CHAPTER 12.25 TO SANTA CRUZ COUNTY CODE
RELATING TO TELECOMMUNICATIONS INFRASTRUCTURE IMPROVEMENTS

The Board of Supervisors of the County of Santa Cruz ordains as follows:

SECTION 1

Chapter 12.25 of the Santa Cruz County Code is enacted to read as follows:

TELECOMMUNICATIONS INFRASTRUCTURE IMPROVEMENT ORDINANCE

Sections:

12.25.010 Purpose and Findings.

12.25.015 Definitions.

12.25.020 Telecommunications Infrastructure Improvement.

12.25.025 Implementation.

12.25.030 Exemptions.

12.25.035 Enforcement.

12.25.040 Violations.

12.25.045 Severability.

12.25.050 Effective Date.

12.25.055 No Conflict with Federal or State Law.

12.25.060 Preemption.

12.25.010 Findings and intent.

- A. It is the intent of the County of Santa Cruz, in enacting Chapter 12.25, to streamline and simplify the process of installing and upgrading telecommunications equipment throughout the County, and to encourage improvement and modernization of telecommunications infrastructure.
- B. Access to modern telecommunications infrastructure is vital for communication, education and economic development.
- C. It is the desire of the County to foster a fair and level playing field for all market competitors that does not disadvantage or advantage one service provider or technology over another.
- D. The County seeks to promote widespread access to the most technologically advanced telecommunications services for all County residents and businesses in a nondiscriminatory manner regardless of socioeconomic status.
- E. It is the responsibility of the County to protect and control access to public rights-of-way.
- F. The County has a duty to ensure that all service providers utilizing County property, facilities or rights-of-way comply with all applicable state and local health, safety and other laws.
- G. It is consistent with the County's goals and values to encourage investment in telecommunications infrastructure to help close the digital divide.
- H. It is necessary to update County policies and practices to recognize the authority of the California Public Utilities Commission as established in state and federal statutes.
- I. B. It is the desire of the County to assess fees sufficient to recover the actual costs of providing services but not to discourage improvement of necessary infrastructure.

12.25.015 Definitions.

A. For the purposes of this Chapter, the following definitions apply:

1. "Telecommunications" refers to data, voice, video or other information provided by wire, fiber optic cable or other technology.
2. "Facilities" and "Infrastructure" refers to wires, cables, conduit, switches, transmission equipment or other equipment for use in transmitting or processing telecommunications services or for providing support or connection to such equipment.
3. "Rights-of-way" refers to the area upon or adjacent to any County-owned road, highway or rail line or along or across any of the waters or lands owned or controlled by the County.
4. "Service providers" refers to any person, company, corporation or other entity providing data, voice, cable, video or other information services by wire, fiber optic cable or other technology.
5. "Excavation" refers to any process which removes material from the ground through digging, drilling, boring or other activity for the purpose of installing utilities, infrastructure or other structures or equipment.
6. "Conduit" refers to a tube, duct or other device or structure designed for enclosing telecommunication wires or cables.
7. "Reconstruction" refers to any project which repairs or replaces fifty percent or more of an existing road, highway or rail line.

12.25.020 Telecommunications Infrastructure Improvement

In recognition of the need to provide local residents and businesses within the community with the infrastructure required to meet their telecommunications needs, all construction, reconstruction or repaving of a County right-of-way will include provisions for the installation of telecommunications cable, conduit and other related equipment wherever practical and feasible. Where appropriate, telecommunications infrastructure shall be installed in or adjacent to County rights-of-way in conformance with current County standards. County staff will work with contractors to identify most cost-effective approach consistent with County requirements. If a project includes excavation in or adjacent to a County right-of-way, installation of or upgrades to telecommunications cable, conduit or other infrastructure will be included as needed. **All** installations shall conform to the size, shape, location and other specifications as determined by the Director of Public Works.

12.25.025 Implementation.

No less than 60 days before this ordinance takes effect, the County of Santa Cruz shall email, fax, mail or deliver a copy of it to all telecommunications service providers and other affected entities doing business within the unincorporated County of Santa Cruz,

12.25.030 Exemptions.

- A. The Director of Public Works, or the director's designee, may exempt projects from the requirements of this chapter where compliance is found to be not practical or feasible. Requests for an exemption shall be in writing, and the Director's or the director's designee's decision shall be final.
- B. An exemption application shall include all information necessary for the Director of Public Works or the director's designee to make a decision, including but not limited to documentation showing factual support for the requested exemption.
- C. The Director of Public Works or director's designee may approve the exemption application in whole or in part, with or without conditions.

12.25.035 Enforcement.

Enforcement of this ordinance shall be as follows:

- A. The Director of Public Works, or designee, shall have primary responsibility for enforcement of this ordinance and shall have authority to issue citations for violation of this chapter. The Director, or designee, is authorized to establish regulations or administrative procedures to ensure compliance with this chapter.
- B. A person or entity violating or failing to comply with any of the requirements of this chapter shall be guilty of an infraction.
- C. The County of Santa Cruz may seek legal, injunctive, or any other relief to enforce the provisions of this chapter and any regulation or administrative procedure authorized by it.
- D. The remedies and penalties provided in this chapter are cumulative and not exclusive of one another.
- E. The Director of Public Works or designee may inspect the premises of any construction, reconstruction, repaving or excavation project to verify compliance with this ordinance.

12.25.040 Violations.

Violations of this ordinance shall be enforced as follows:

Violation of this chapter is hereby declared to be a public nuisance. Any violation described in the preceding paragraph shall be subject to abatement by the County of Santa Cruz, as well as any other remedies that may be permitted by law for public nuisances, and may be enforced by injunction, upon a showing of violation.

12.25.045 Severability.

If any word, phrase, sentence, part, section, subsection, or other portion of this chapter, or any application thereof to any person or circumstance is declared void, unconstitutional, or invalid for any reason, then such word, phrase, sentence, part, section, subsection, or other portion, or the proscribed application thereof, shall be severable, and the remaining provisions of this chapter, and all applications thereof, not having been declared void, unconstitutional or invalid, shall remain in full force and effect. The County of Santa Cruz hereby declares that It would have passed this title, and each section, subsection, sentence, clause, and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases had been declared invalid or unconstitutional.

12.25.050 Effective Date.

This ordinance shall become effective three (3) months after the date of final passage by the County of Santa Cruz Board of Supervisors.

12.25.055 No Conflict with Federal or State Law.

Nothing in this ordinance shall be interpreted or applied so as to create any requirement, power, or duty in conflict with any Federal or State law.

12.25.060 Preemption.

The provisions of this chapter shall be null and void if State or Federal legislation, or administrative regulation, takes effect with the same or substantially similar provisions as contained in this chapter. The Board of Supervisors shall determine whether or not identical or substantially similar statewide legislation has been enacted or regulations issued.

SECTION II

This ordinance shall take effect and be in force six months from the date of adoption.

Dig Once Ordinance Town of Breckenridge

I. PURPOSE AND OBJECTIVES

- A. Purpose: to provide principles and procedures for the coordination of construction Excavation within any public Rights of Way, and to protect the integrity of the Rights of Way and road system.
- B. Objectives. Public and private uses of Rights of Way for location of Utilities employed in the provision of public services should, in the interests of the general welfare, be accommodated; however, the Town must insure that the primary purpose of the Rights of Way, namely the safe and efficient passage of pedestrian and vehicular traffic, is maintained to the greatest extent possible. In addition, the value of other public and private installations, Facilities and properties should be protected, competing uses must be reconciled, and the public safety preserved. The use of the Rights of Way corridors for location of Facilities is secondary to these public objectives. This ordinance is intended to assist in striking a balance between the public need for efficient, safe transportation routes and the use of Rights of Way for location of Facilities by public and private entities. It thus has several objectives:
 - 1. To ensure that public health, safety, and welfare is maintained and that public inconvenience is minimized.
 - 2. To facilitate work within the Rights of Way through the standardization of regulations.
 - 3. To conserve and fairly apportion the limited physical capacity of the public Rights of Way held in public trust by the Town of Breckenridge.
 - 4. To promote cooperation among the Applicants and Permittees (as defined herein) and the Town in the occupation of the public Rights of Way, and work therein, in order to (i) eliminate duplication that is wasteful, unnecessary or unsightly, (ii) lower the Permittee's and the Town's costs of providing services to the public, and (iii) minimize Rights of Way Excavations.

II. DEFINITIONS

For this Chapter the following words shall have the following meanings:

- A. "Applicant" means an owner or duly authorized agent of such owner, who has applied for a Permit to Excavate in the Rights of Way.
- B. "Town" means town of Breckenridge, Colorado.
- C. "Conduit" means a single enclosed raceway for cables, fiber optics or other wires, or a pipe or canal used to convey fluids or gases.
- D. "Developer" means the person, partnership, corporation, or other legal entity who is improving property within Town and who is legally responsible to the Town for the construction of improvements within a subdivision or as a condition of a building permit or other land use or development authorization.
- E. "Town Engineer" means the Town Engineer of the Town or his/her authorized representative.
- F. "Emergency" means any event which may threaten public health or safety, or that results in an interruption in the provision of services, including, but not limited to, damaged or leaking water or gas conduit systems, damaged, plugged, or leaking sewer or storm drain conduit systems, damaged electrical and communications facilities, and advanced notice of needed repairs is impracticable under the circumstances.

- G. "Excavate" or "Excavation" means any Work in the surface or subsurface of the Rights of Way, including, but not limited to opening the Rights of Way; installing, servicing, repairing, or modifying any Facility(ies) in or under the surface or subsurface of the Rights of Way, and restoring the surface and subsurface of the Rights of Way.
- H. "Facilities" means, including, without limitation, any pipes, conduits, wires, cables, amplifiers, transformers, fiber optic lines, antennae, poles, ducts, fixtures and appurtenances and other like equipment used in transmitting, receiving, distributing, offering, and providing broadband, utility and other services.
- I. "Landscaping" means materials, including without limitation, grass, ground cover, shrubs, vines, hedges, or trees and nonliving natural materials commonly used in landscape development, as well as attendant irrigation systems.
- J. "Major Work" means any reasonably foreseeable Excavation that will affect the Rights of Way for more than five (5) consecutive calendar days.
- K. "Owner" means any Person, including the Town, who owns any Facilities that are or are proposed to be installed or maintained in the Rights of Way.
- L. "Permit" means any authorization for use of the Rights of Way granted in accordance with the terms of this ordinance, and other applicable laws and policies of the Town.
- M. "Permittee" means the holder of a valid Permit issued pursuant to this Chapter and other applicable provisions of applicable law for Excavation in the Rights of Way.
- N. "Person" means any person, firm, partnership, special, metropolitan, or general district, association, corporation, company, or organization of any kind.
- O. "Rights of Way" means any public street, road, way, place, alley, sidewalk or easement, that is owned, held or otherwise dedicated to the Town for public use. "Work" means any labor performed on, or any use or storage of equipment or materials, including but not limited to, construction of streets and all related appurtenances, fixtures, improvements, sidewalks, driveway openings, street lights, and traffic signal devices. It shall also mean construction, maintenance, and repair of all underground structures such as pipes, conduit, ducts, tunnels, manholes, vaults, buried cable, wire, or any other similar Facilities located below surface, and installation of overhead poles used for any purpose.
- P. "Work" means any labor performed on, or any use or storage of equipment or materials, including but not limited to, construction of streets and all related appurtenances, fixtures, improvements, sidewalks, driveway openings, street lights, and traffic signal devices. It shall also mean construction, maintenance, and repair of all underground structures such as pipes, conduit, ducts, tunnels, manholes, vaults, buried cable, wire, or any other similar Facilities located below surface, and installation of overhead poles used for any purpose.
- Q. "Fee per Access Line" means the Right-of-Way compensation methodology that is replacing the percent of gross revenue formula historically used in franchise/rental agreements for local exchange Internet Service Providers where a fee is assessed per access line.
- R. "Flat Annual Fee" means Right-of-Way compensation to ensure a known revenue amount annually. A yearly escalator or inflation factor to adjust the annual fee for increases in service provided or leased by the Town
- S. "Franchise Agreement" means an agreement executed to manage the occupant of public right-of-way. This ordinance included the rules, rights, and fees associated with using public property for private purpose and are applicable for those right-of-way occupants that provide service(s) to the Town's jurisdictions.

- T. “In-kind Service” means services received by the Town that can be negotiated in addition to or in lieu of cash to be used over a period, or infrastructure to be specified and installed.
 - 1. Types of In-Kind Services
 - 1. “Wireline” means Fiber optic conduit, inner ducts, dark fiber, equipment to “light” the fiber, equipment maintenance and/or upgrading; operations of communications equipment, future upgrades, cost-free or reduced fee communications services etc.
 - 2. “Wireless” means space on private towers for equipment, installation of public sector antennas, construction of equipment sheds and installation of support equipment, back-up service or redundancy, wireless call box installation, cost-free or reduced fee communications services on private system etc.
- U. “Linear Foot Fee” means a compensation methodology that is utilized when rights-of-way occupants require space along a specific route or for a limited purposed with the Town’s rights-of-way.

III. TOWN OF BRECKENRIDGE PROJECTS

- A. Unless waived by the Town Engineer based on undue burden, or an unfavorable cost benefit analysis, or the consideration of other relevant factors, The Town of Breckenridge will install or have installed communications conduit whenever the town undertakes or authorizes the following types of projects:
 - 1. New street, road, sidewalk, bike path, or other transportation infrastructure construction.
 - 2. Major maintenance, repaving, or other significant work on the above infrastructure.
 - 3. Excavations for repairing or installing utilities, including but not limited to communications, electrical, gas, water, storm drainage.
 - 4. Other excavations, or work on public property on in the public right of way that provide a similar opportunity to install conduit for future use at a low additional cost.
 - 5. When determining if a specification is feasible or practicable, the Town Engineer will take into account the added cost, the length of the conduit installed (and therefore its potential future value), the impact on the overall project, and other relevant factors.
- B. Because communications facilities are needed to monitor, manage, and provide security for Town to support Public Safety and Economic Development in general, the cost of purchasing, installing, and documenting the conduit may be included in the cost of the overall project. However, other sources of funds may also be used if available.
- C. Conduit installed by or on behalf of the Town, will be owned by the Town.
- D. A record of all Town-owned conduits will be maintained the Public Works Department, and transferred into the Town’s geographic information system (GIS).

IV. SPECIFICATIONS

- A. The Town will work with local agencies to establish common standards for the type, size, and number of conduits and associated fixtures to be installed. Until these standards are

established, a single conduit will be installed. The “Dig Once Conduit specification” can be obtained from the Town Engineer.

V. POLICE POWERS

A Permittee's rights hereunder are subject to the police powers of the Town, which include the power to adopt and enforce ordinances, including amendments to this ordinance, and regulations necessary to the safety, health, and welfare of the public. A Permittee shall comply with all applicable ordinances and regulations enacted, or hereafter enacted, by the Town or any other legally constituted governmental unit having lawful jurisdiction over the subject matter hereof. The Town reserves the right to exercise its police powers, notwithstanding anything in this ordinance or any Permit to the contrary. Any conflict between the provisions of the ordinance or a Permit and any other present or future lawful exercise of the Town's police powers shall be resolved in favor of the latter.

VI. JOINT PLANNING AND CONSTRUCTION; COORDINATION OF PLANNED EXCAVATIONS

- A. Excavations in the Town’s Rights of Way disrupt and interfere with the public use of those Rights of Ways and can damage the pavement and Landscaping. The purpose of this section is to reduce this disruption, interference, and damage by promoting better coordination among Applicants and Permittees making excavations in Town’s Rights of Way and between these Persons and the Town. Better coordination will assist in minimizing the number of Excavations being made wherever feasible, and will ensure the Excavations in Town’s Rights of Way are, to the maximum extent possible, performed before, rather than after, the resurfacing of the Rights of Way by the Town.
- B. Any Permittee owning, operating, or installing facilities in Town Rights of Way, providing water, sewer, gas, electric, broadband, communication, video or other utility or utility-like services, coordinate with the Town Engineer. If the town has an interest in install conduit in the same location the permittee shall charge the town the direct cost associated with install conduit as described in section IV. Failure to coordinate with the Town Engineer will compromise the Permittee’s ability to work in the right of way.
- C. The Town Engineer shall review the major excavation plan and identify conflicts and opportunities for coordination of Excavations. The Town Engineer shall notify affected Owners and Permittees of such conflicts and opportunities to the extent necessary to maximize coordination of Excavation. Each Applicant for a Permit shall coordinate, to the extent practicable, with each potentially affected Owner and Permittee to minimize disruption in the Rights of Way.
- D. The Town may disclose information contained in a Permittee’s excavation plan to any public or private entity planning on conducting Excavation activities in the Rights of Way only on a need-to-know basis in order to facilitate coordination among excavators and to avoid unnecessary Excavation in the Rights of Way. To the maximum extent permissible under the Colorado Open Records Act, as amended, the Town shall not otherwise disclose to the public any information contained in a excavation plan submitted by a Permittee that is proprietary, trade secret or is otherwise protected from disclosure; provided, however that the Town shall have no duty to decline to disclose any information that the Permittee has not identified on its face as proprietary, trade secret or otherwise protected from disclosure. The Town shall notify a Permittee

of any request for inspection of public records that calls for disclosure of any excavation plan on which any information has been identified as proprietary, trade secret or otherwise protected from disclosure. The Town shall consult with its legal counsel regarding any such request and shall inform the affected Permittee either that the Town will refuse to disclose the protected information or, if there is no proper basis for such refusal, that the Town intends to disclose the requested information unless ordered otherwise by a court.

- E. In performing location of Facilities in the Rights of Way in preparation for construction under a Permit, Permittee shall compile all information obtained regarding its or any other Facilities in the Rights of Way related to a Permit, and shall make that information available to the Town in a written and verified format acceptable to the Town Engineer. If the Permittee fails to provide the locate information requested by the Town, the Town may obtain this information and charge the Permittee the actual costs for obtaining the information.

VII. **JOINT EXCAVATION**

- A. **Public Entity and Special Districts Excavators.** Whenever two or more public entity excavators propose Major Work in the same block within a year, such Work shall be performed by one public entity excavator when practical. The participants to the excavation shall pay their pro rata share of the Work, or as otherwise agreed to by the affected public entities. For purposes of this subsection, the public entity excavators shall be treated as a single Permit Applicant and shall submit one application.
- B. **Private Entity Excavators.** Whenever two or more private entity excavators propose Major Work in the same block, such Work shall be performed by one private entity excavator. For purposes of this subsection, the private entity excavators shall be treated as a single Permit applicant and shall submit one application. If the town has an interest in install conduit in the same location the permittee shall charge the town the direct cost associated with install conduit as described in section IV.
- C. **Public Entity Excavator and Private Entity Excavator.** Whenever a public entity excavator(s) and a private entity excavator(s) propose Major Work in the same block the Department shall condition Permits for such Work in a manner that maximizes coordination and minimizes the total period of construction. If the town has an interest in install conduit in the same location the permittee shall charge the town the direct cost associated with install conduit as described in section IV.

VIII. **CONSTRUCTION OF NEW STREETS**

- A. **Intent.** The intent of this section is to provide for the construction of infrastructure sufficient to allow broadband communications entities desiring to deploy Facilities in the future to do so by pulling the same through the conduit and appurtenances installed pursuant to this section and without Excavating within the Rights of Way. This section is not intended to require Owners of broadband Facilities or other conduit to install additional ducts or conduit in existing Rights of Way; rather, it is intended to require those constructing public streets, including the Town and Developers, to provide and install such conduit and appurtenances as may be necessary to

accommodate future broadband needs within the Rights of Way without further Excavation.

- B. Requirements—Adoption of Standards. Whenever any new public street is constructed, whether by the Town as a public works project or by a Developer or other private party in conjunction with development, the following shall be required:
1. In all new local streets serving or abutting residential development a minimum of two 2" conduit shall be installed by the party constructing the street as described in section IV.
 2. In all new collector or arterial streets serving or abutting residential development, and in all new streets serving or abutting nonresidential development, a minimum of four 2" shall be installed by the party constructing the street; provided however that at the discretion of the Town Engineer, the number and size of the conduit and spacing of pull box may be modified to address the reasonably known plans and/or demand for broadband capacity in these locations.
 3. In addition to installing conduit, the party constructing the street will be required to install such vaults and other appurtenances as may be necessary to accommodate installation and connection of broadband Facilities within the conduit.
 4. All construction and installation shall be accomplished according to construction standards adopted by the Town. The construction standards shall be adopted with due consideration given to existing and anticipated technologies and consistent with industry standards.
 5. All Facilities installed by Developers or other private parties pursuant to this section shall be conveyed and dedicated to the Town with the dedication and conveyance of the public street and/or Rights of Way.
 6. All installation costs shall be the responsibility of the party constructing the public street.
- C. Fees. The Town reserve the right to charge reasonable fees for the use of conduit installed pursuant to this section, to the extent consistent with and as limited by federal and state laws. Any such fees shall be established by resolution or ordinance.

Table 1. Utility Users of Public Rights-of-Way.			
Type	Category of Use	ROW Valuation Method	
Franchise	Local Distribution Networks (i.e. local exchange carrier, competitive access provider, water, steam, chilled water, electric, gas service and solid waste)	Percentage of Gross Revenues	
License	Interstate Carriers (i.e. long-distance telephone, gas pipe interstate)	Linear Foot Fee	
License	Private Networks (i.e. hospitals, universities, private companies, and nonprofit agencies)	Linear Foot Fee	

Table 2. Rights-of-Way Assessment Examples		
Type	Compensation Method	Fee Range
Local distribution networks	Percent of gross revenue or receipts	.05% to 10%
Local distribution networks	Linear foot, Fee per access line	\$0.001 to \$5.50 per ft.
Interstate carriers	Flat fee / linear foot	\$0.30 to \$5.50 per ft.
Private networks	Flat fee / linear foot	\$0.30 to \$5.50 per ft

Table 3. Gross Revenues from Rights-of-Way Fees Case Studies			
City	Electric Franchise Fee		Telephone Franchise Fee
	Revenue	% Gross Receipts	% Gross Receipts
Chicago	\$63,000,000	4%	3%
Houston	\$60,000,000	4%	Flat Fee
St. Louis ¹	\$26,000,000	10%	10%
New Orleans	\$9,000,000	2.50%	3%
¹ St. Louis has a gross receipts tax instead of a franchise fee.			
² https://www.fhwa.dot.gov/utilities/utilitycosts/man03.cfm			

This Ordinance shall take effect immediately upon [insert language appropriate in accordance with City policy]

INTRODUCED, READ, ADOPTED ON FIRST READING AND ORDERED PUBLISHED, as provided by law, by the Town Council of the Town of Breckenridge at its regular meeting held on the day of , 201_ .

Name and Title

ATTEST:

Town Clerk

READ, ADOPTED ON SECOND READING, AND APPROVED this day of _____, 201_

APPENDIX E – LINKS TO FCC REQUIREMENTS

Tier 1 - A Tier 1 network is an Internet Protocol network that can reach every other network on the Internet solely via settlement-free interconnection. Tier 1 networks can exchange traffic with other Tier 1 networks without paying any fees for the exchange of traffic in either direction

Tier 2 - A Tier 2 network is an Internet service provider which engages in the practice of peering with other networks, but which also purchases IP transit to reach some portion of the Internet

Tier 3- A Tier 3 ISP is a provider that strictly purchases Internet transit. A Tier 3 provider is by definition primarily engaged in delivering Internet access to end customers for fee. Tier 3 ISPs focus on local business and consumer market conditions.

FCC Forms page <https://www.fcc.gov/licensing-databases/forms>

- Obtain an FRN (FCC Registration Number) and password / pay fees
 - CORES Filing for FCC FRN
 - PDF <https://www.fcc.gov/sites/default/files/form160.pdf>
- COALS (Cable Operations and Licensing System) registration
<https://apps.fcc.gov/coals/forms/login/coalsLogin.cfm>
- Form 395 if 16 or more full-time employees
 - FCC Form 395 Common Carrier Annual Employment Report and Discrimination Complaint Requirement Instructions <https://transition.fcc.gov/Forms/Form395/395instr.pdf>
 - Form <https://transition.fcc.gov/Forms/Form395/395.pdf>
- Form 477 with FCC twice per year (collects info about service connections to end-user locations)
 - Instructions <https://us-fcc.app.box.com/v/Form477Instructions>
 - Filing Interface User Guide <https://transition.fcc.gov/form477/477guide.pdf>
 - Form 477 Requirement Resources
- <https://www.fcc.gov/economics-analytics/industry-analysis-division/form-477-resources>
 - File a list of census blocks in which you can or do offer service to at least one location, with additional info about service with the FCC
- Form 499-A Telecommunications Worksheet Annual Filing
<https://www.fcc.gov/reports-research/guides/common-carrier-filing-requirements-information-firms-providing-telecommunications-services#dom214>
- Form 499-Q Telecommunications Reporting Worksheet Quarterly Filing
- Obtain lawyer / content provider contracts
- Business license

Links to Michigan Requirements:

- [http://www.legislature.mi.gov/\(S\(4jbwrvnxx0rxbyahvclmlcl\)\)/mileg.aspx?page=getObject&objectName=mcl-484-2252](http://www.legislature.mi.gov/(S(4jbwrvnxx0rxbyahvclmlcl))/mileg.aspx?page=getObject&objectName=mcl-484-2252)
- [http://www.legislature.mi.gov/\(S\(s2piifpfwixolgxpot4rrbde\)\)/mileg.aspx?page=getObject&objectName=mcl-484-3102](http://www.legislature.mi.gov/(S(s2piifpfwixolgxpot4rrbde))/mileg.aspx?page=getObject&objectName=mcl-484-3102)
- [http://www.legislature.mi.gov/\(S\(kmodftwbz5jqiqz3b0ky24ne\)\)/mileg.aspx?page=getObject&objectName=mcl-484-3114](http://www.legislature.mi.gov/(S(kmodftwbz5jqiqz3b0ky24ne))/mileg.aspx?page=getObject&objectName=mcl-484-3114)

APPENDIX F – MAP REFERENCES

US Census Bureau: 2020 American Community Survey 5 year Estimates

URL: <https://data.census.gov/cedsci/>

Blocks, County, and City Boundaries

URL: <https://www.census.gov/cgi-bin/geo/shapefiles/index.php>

FCC Maps and Reports

URL: <https://www.fcc.gov/reports-research/maps/>

FiberLocator Fiber Maps

URL: <https://app.fiberlocator.com/#!/flo>