



OTTAWA COUNTY
BROADBAND
DATA COLLECTION
EXECUTIVE FINDINGS REPORT

Introduction

Ottawa County's Board of Commissioners have prioritized broadband as essential infrastructure, critical for Ottawa County's long-term sustainability and prosperity for over a decade. County leadership has a storied history in broadband expansion, forging a comprehensive approach to tackling the digital divide; from large-scale public-private partnerships resulting in the construction of new infrastructure to securing funding for public library hotspot lending programs aimed at closing hyperlocal access gaps. Challenges still persist, and inconsistent broadband access negatively impacts economic development, local prosperity and quality of life for the county's residents. In response, Ottawa County is undertaking a four-phase Strategic Plan to bring robust and affordable broadband to residents and businesses throughout the county. Ottawa's Digital Inclusion Strategy is multifaceted and considers not only upgrading and adding infrastructure, but also enhancing hyperlocal access in schools and libraries, as well as a forward-thinking digital literacy strategy in support of critical 21st century technology skills.

Phase 1 of the Strategic Plan has three goals;

- 1) Refine broadband availability maps
- 2) Improve understanding of how residents need and use broadband
- 3) Improve understanding of barriers to broadband access by both connected users and those currently without high-speed Internet.

In order to achieve these goals, Ottawa County's Data Collection Steering Committee identified the need to quantify residents' experiences with broadband and the ways in which access, or lack of access, impacts quality of life. The Ottawa County Data Collection Steering Committee requested that Merit Network perform a citizen-driven survey and speed test mapping effort to grasp the scale of the County's broadband gap.

The survey assesses access and adoption of digital technology within the county. Respondents also contributed speed test data to a countywide database, helping Ottawa County measure broadband coverage (or lack thereof) across the county. This executive summary discusses the results of the quantitative survey and speed test effort undertaken in Ottawa County.

What Is Broadband?

Broadband is a very fast Internet connection. To understand the importance of broadband Internet access, consider this analogy from the transportation system: If a road has one lane and heavy traffic, it will take a long time for drivers and passengers to reach their destinations. If the same road had multiple open lanes, the same group of cars could reach their destinations in a shorter period of time. To continue the analogy, “broadband” refers to high-speed Internet “lanes” or connections that provide someone the capability to upload and download data efficiently. Broadband connections have wide bandwidth and can handle “heavy traffic”, older or connections such as dial up cannot.

Why Broadband?

Broadband access allows high-quality teleconferencing, video

and audio streaming, e-gaming, e-commerce, and large file transfers to function smoothly. Broadband connections also enable new technologies like smart-home devices like thermostats with automatic room temperature control, home security cameras, health monitoring devices, and televisions and speakers with built-in streaming entertainment.

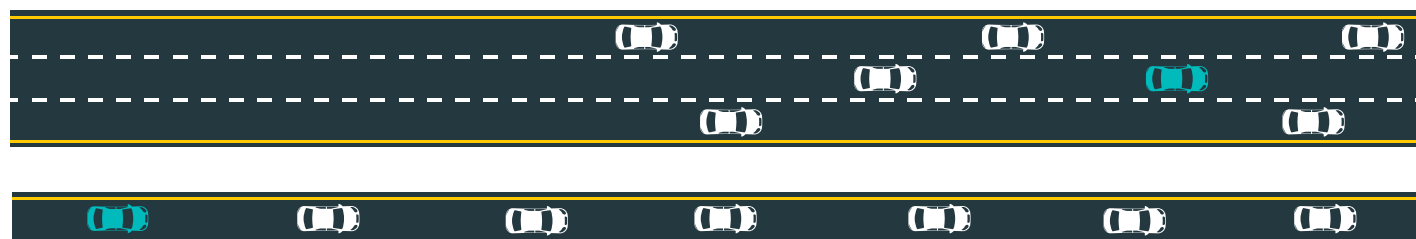
As mentioned earlier, current federal standards define a broadband connection as 25 megabits per second for download and 3 megabits per second for upload. Technology to deliver this connection can include cable, DSL, fiber, wireless, and more.

Broadband Mapping

Funding eligibility for all state and federal grant programs rely upon broadband penetration data. The primary existing

source of this data is the Federal Communications Commission (FCC) Form 477. Form 477 data is self-reported by service providers, aggregated to the census block level, and is the basis for mapping broadband coverage in the United States. This data is unreliable and lacks the granularity needed for accurate coverage inferences (Mack et al., 2019, p.6). Initial results from community speedtests throughout Michigan signify greater connectivity issues than identified by the FCC. The magnitude of the problem is much higher than suggested by federal data; in other Michigan counties, as many as 64% of households do not have access to fixed broadband at the FCC threshold of 25 Mbps download and 3 Mbps upload. (Merit Network, 2020).

Figure 1. Cars Along a Road



Impacts of Broadband on a Community



The presence of fiber-based broadband can be associated with a positive effect on property values in a neighborhood (Molnar et al., 2015, p.12).



Broadband access is associated with increased agricultural yields (LoPiccalo, 2020, p. 24).



Middle and high school students with high-speed Internet access at home have more digital skills, higher grades, and perform better on standardized tests, such as the SAT. Regardless of socioeconomic status, students who cannot access the Internet from home or are dependent on a cell phone for Internet access do worse in school and are less likely to attend college or university (Hampton et al., 2020, p. 48).



Internet connectivity, particularly access to broadband, plays an increasingly important role in both healthcare and public health (Bauerly et al., 2019, p. 39).



There is evidence that access to state of the art Internet like optical fiber and employment growth are related (Lapointe, 2015, p.25).



It is suggested that improving broadband adoption in rural areas can improve labor productivity (Gallardo et al., 2021, p.181).

Survey Design and Methodology

Ottawa County partnered with Merit Network's Michigan Moonshot team to develop and deploy a survey for 23 communities. Survey participants were recruited through printed postcards and direct mail, radio, social media, newspaper advertisements, email, fliers and community partner outreach efforts, among others.

Residents with Internet access at their properties were instructed to complete a survey and Internet connection speed measurement online. Residents without Internet connectivity were asked to complete a mobile-optimized

web survey through their cellular phone. Text message surveys were available via SMS, and printed surveys were available upon request. All survey materials, including the informational websites, were available in English and Spanish languages.

After the data were cleaned, 3,940 surveys were eligible for analysis. From this total number, 3,469 surveys indicated they had some form of Internet service in their home. There were 471 surveys completed by residents who self-reported that they had no Internet in their home.* Connected residents were

asked to complete a speed test after entering their survey. Of these, 2,224 households with Internet access completed a speed test, and 1,245 responding households did not complete a speed test. Ookla data totaling an additional 1,802 additional speed test measurement tiles were incorporated to augment speed test analysis, totaling 4,497 speed test measurements overall. The overall response rate for the survey is about 3.8% of all households in Ottawa County. When accounting for additional data points and survey responses the project margin of error is **1.5%**



Survey Results

There are two areas of lower broadband density, which include the northern part of the county (Wright Township, Polkton Township, and Chester Township) and a band slightly south of the center (Olive Township). However, there are many communities within Ottawa County that contain areas which lack access. FCC Form 477 broadband penetration data indicates that 100 % of surveyed communities have Internet service. **The proportion of households in Ottawa County that do not have Internet access is higher: 10.5% of households in this study report having no access at all.****

The FCC defines broadband speed as Internet service at a minimum of 25 Mbps download and 3 Mbps upload. Survey results indicate that **26% of households overall do not** have access to fixed broadband at the FCC threshold of 25 Mbps

download and 3 Mbps upload. In households without children, 64% total experience Internet access at broadband speeds. In households with children, 63% total have access to broadband speeds.

In contrast to the FCC's definitions of broadband, industry experts and members of the US Congress and US Senate assert that broadband should be classified at speeds above 100 Mbps download and 20 Mbps upload. Current FCC data in Ottawa County suggest 93% of residents have access at the 100 Mbps/20 Mbps speed. Contrasting federal reporting, **only 15% of respondent households** throughout the County have broadband Internet at speeds above 100 Mbps/20 Mbps. **The citizens of Ottawa County indicate that underservice in their communities is much higher than**

reported by Federal data.

Satisfaction with broadband options is another factor impacting adoption, and 40% of residents are satisfied with options for competitive choice at their homes. Around 26% of residents had neutral feelings, and 34% of residents are dissatisfied with their provider choices.

The majority of unconnected residents in Ottawa County do not have service because they simply do not have availability at their address. An absence of service availability impacts 72% of unconnected homes in the survey. The price of Internet service is another key barrier for unconnected residents; 26% of unserved households replied service costs are prohibitively expensive.

Footnote for Speeds

**We received 3,745 total speed test results. Speed test results that seemed to originate from 1) cellular or satellite Internet connections and 2) from connections originating from an ISP not serving Ottawa County or connections over a Virtual Private Network (VPN) were excluded. As a result, a total of 203 survey-based speed test results were omitted from our data analysis. Additionally, some households took the speed test or responded to the survey more than once. From this, the highest recorded speed from an address was used in the calculations and an additional 1,318 speed tests were removed from analysis. There were also 1,245 respondents that took the served survey and either did not take a speed test or there was an error with their speed test. These responses were used in the sentiment analysis only.*

***Individual household speed test results can vary depending upon time of day and network traffic. All figures and calculations in this report reflect the highest measured speed from a household.*

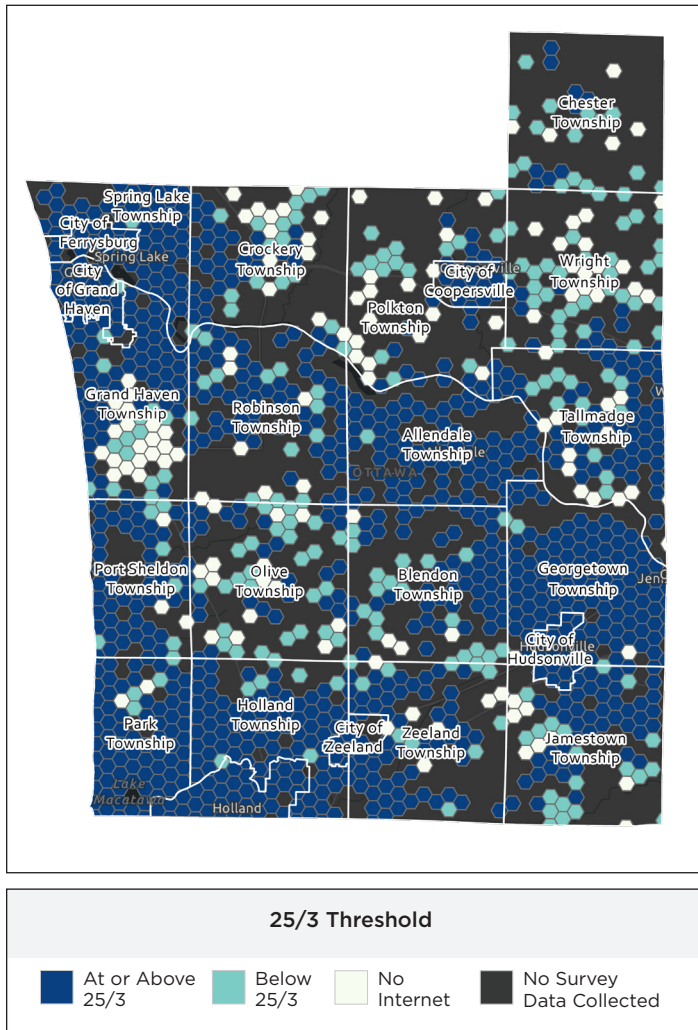
Countywide Heatmaps

25/3 and 100/20 Thresholds

Maps are based on the survey results (and not a census of all the households in the area).

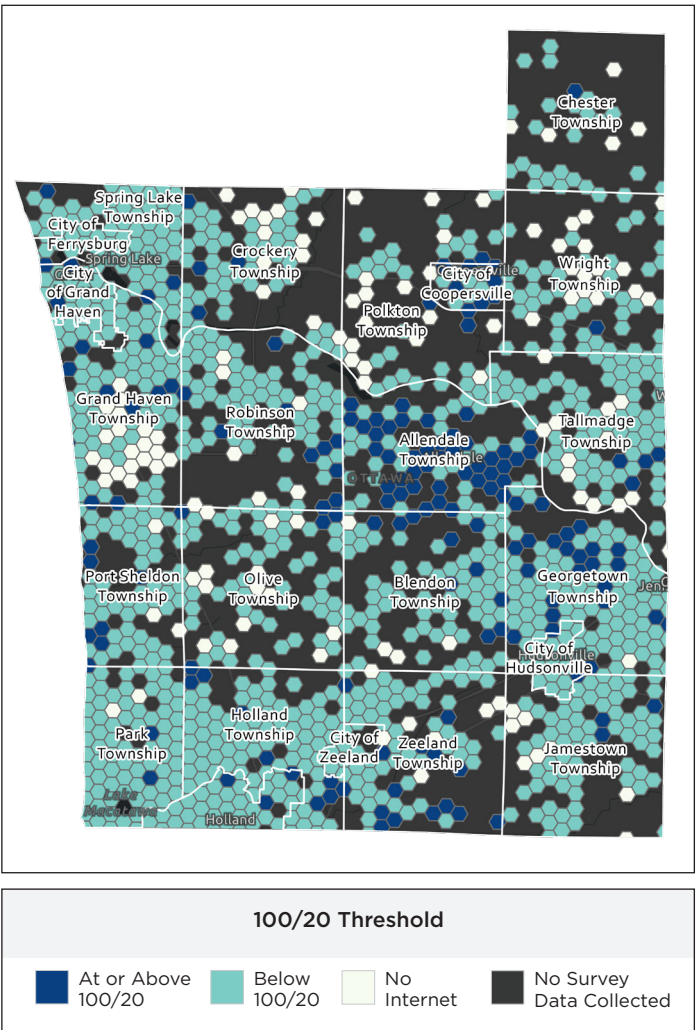
25/3 Threshold:

A Countywide Heatmap



100/20 Threshold:

A Countywide Heatmap



Summary Statistics

Total: 4,478 speed test locations | **Median: Download - 81.59 Mbps Upload - 11.12 Mbps**
Minimum: Download - 0.00 Mbps Upload - 0.00 Mbps | Max: Download - 843.96 Mbps Upload - 891.67 Mbps

The map reflects all served and unserved households as well as the additional Ookla speed test locations aggregated within a 1.5 mile wide hexagonal bin. Using these numbers as indicators of the share of all households (including those who did not respond) that have broadband must take margins of error into consideration, which depend on the total number of responses and the total households in an area. At the county level, the margin of error is in the 1.5% range. For individual municipalities, the margin of error is in the 4%-15% range.

Broadband Density Per Census Block

Survey Results Compared to FCC Data

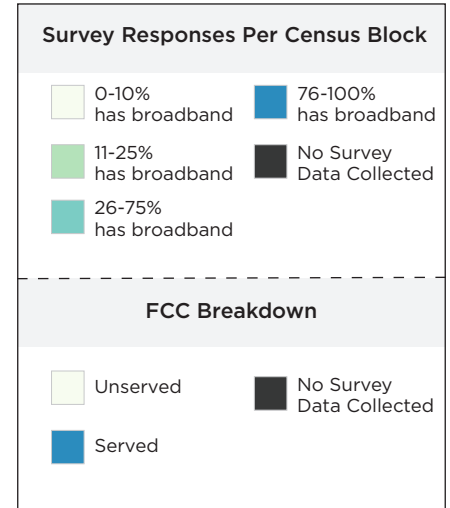
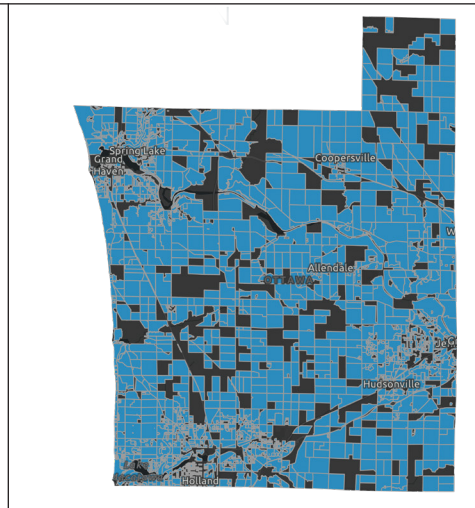
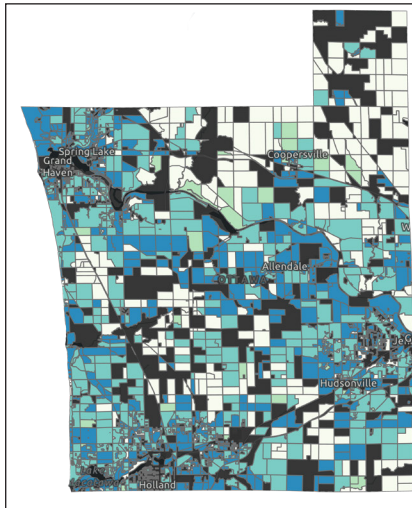
Maps are based on the survey results (and not a census of all the households in the area).

25/3 Threshold:

Survey Responses Per Census Block

FCC Breakdown

Key

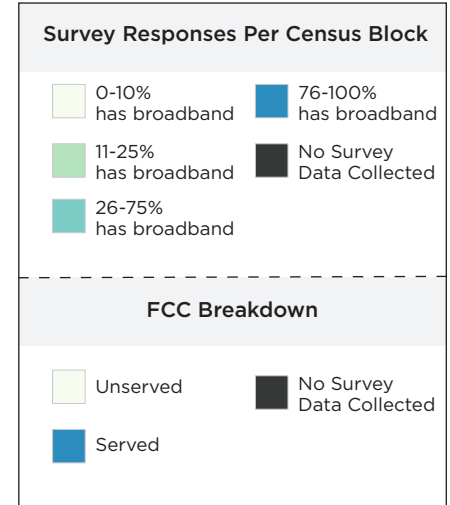
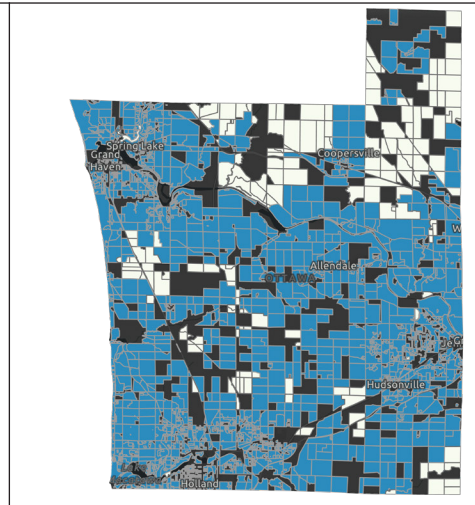


100/20 Threshold:

Survey Responses Per Census Block

FCC Breakdown

Key



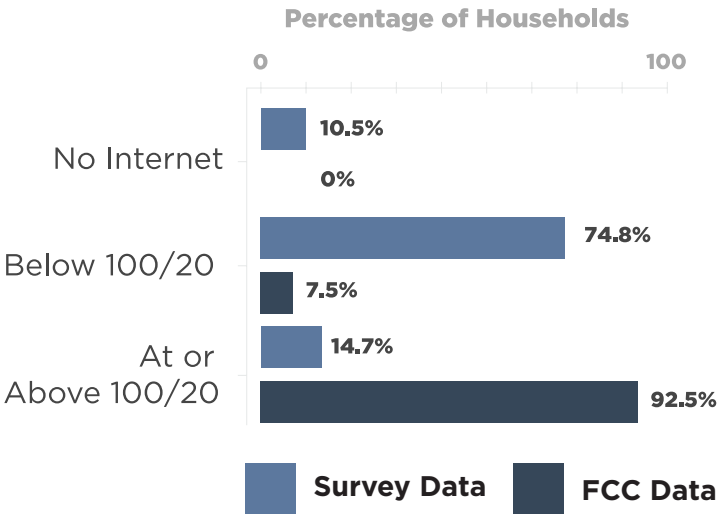
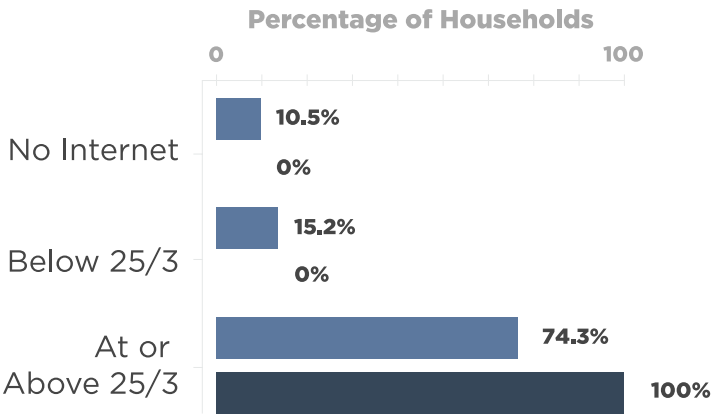
This side-by-side comparison reflects all served and unserved households as well as the additional Ookla speed test locations in order to demonstrate differences between FCC data and respondent data. Using these numbers as indicators of the share of all households (including those who did not respond) that have broadband must take margins of error into consideration, which depend on the total number of responses and the total households in an area. At the county level, the margin of error is in the 1.5% range. For individual municipalities, the margin of error is in the 4%-15% range.

Availability by the Numbers

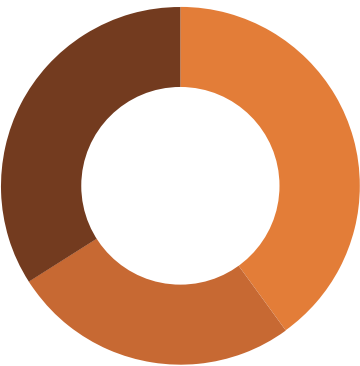
Survey speed data as well as FCC data on the maximum advertised upload and download speeds per census block were each placed into one of the following categories: 1) No Internet, 2) Below 25/3 Mbps, 3) At or Above 25/3 Mbps, or 4) At or Above 100/20 Mbps. Each survey result was then directly compared to the FCC census block the survey point falls within. The differences between coverage reported by the FCC and data from this survey are drastic.

This study suggests that within our sample of survey responses:

- 26% fewer homes have access to broadband Internet speeds at 25/3 Mbps
- 78% fewer homes have access to broadband Internet speeds at 100/20 Mbps
- 15% more homes have some connectivity at speeds lower than broadband
- 11% more homes have no Internet connectivity whatsoever



Satisfaction with Home Internet Provider Options:



Satisfied 40% Neutral 26% Dissatisfied 34%

Only 40% of residents were satisfied with the Internet service provider options at their homes.

Broadband in Households with Children and Students up to age 18:

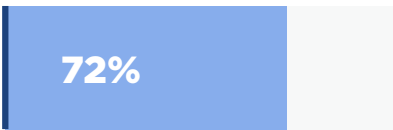


33% of households surveyed in Ottawa County reported having children under age 18. In these homes, 63% have broadband Internet.



64% of households with no children report Internet access at broadband speeds or higher.

Ottawa County Resident Sentiment:



Of Ottawa County residents that have no Internet access, 72% report that no services are available at their address and 26% state that the price for service is too high.



97% of residents with no Internet access responded that they are willing to pay between \$25 and \$101+ for service, indicating that the majority of these residents would pay for Internet service at their properties if it was available.

Conclusion

Broadband is critical to a community's ability to thrive and remain competitive in terms of education, economic development, talent retention, employment opportunities and population growth. Much of Ottawa County is unconnected or insufficiently connected. Connectivity data indicates a problem more stark than established FCC data suggests. Residents without broadband desire service, and connected citizens believe that more provider options are needed. Data from this study will be used to support grant applications and broadband planning efforts in Ottawa County.

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Citations

Bauerly, B. C., Hulkower R., McCord R. F., Pepin D. (2019). Broadband Access as a Public Health Issue: The Role of Law in Expanding Broadband Access and Connecting Underserved Communities for Better Health Outcomes. *The Journal of Law, Medicine & Ethics*, 47 S2 (2019): 39-42. DOI: 10.1177/1073110519857314

Gallardo, R., Whitacre, B., Kumar, I., & Upendram, S. (2021). Broadband metrics and job productivity: a look at county-level data . *The Annals of Regional Science* (2021)(66), p. 181, DOI:<https://doi.org/10.1007/s00168-020-01015-0>

Hampton, K. N., Fernandez, L., Robertson, C. T., & Bauer, J. M. (2020). *Broadband and Student Performance Gaps*, p. 48. James H. and Mary B. Quello Center, Michigan State University. <https://doi.org/10.25335/BZGY-3V91>

Kahan, J. (2019). It's time for a new approach for mapping broadband data to better serve Americans. Retrieved from <https://blogs.microsoft.com/on-the-issues/2019/04/08/its-time-for-a-new-approach-for-mapping-broadband-data-to-better-serve-americans/>

Lapointe, P. (2015). Does Speed Matter?: The Employment Impact of Increasing Access to Fiber Internet. *Journal of the Washington Academy of Sciences*, 101(1), p. 28.

LoPiccalo K., Office of Economics and Analytics Federal Communications Commission (2020). *Impact of Broadband Penetration on U.S. Farm Productivity*, p. 24. Retrieved from <https://docs.fcc.gov/public/attachments/DOC-368773A1.pdf>

Mack, E., Dutton, W., Rikard, RV and Yankelevich, A., Mapping and Measuring the Information Society: A Social Science Perspective on the Opportunities, Problems and Prospects of Broadband Internet Data in the United States (March 25, 2019). *The Information Society*, 35(2), p.6, DOI: 10.1080/01972243.2019.1574526

Merit Network. (2020). *Washtenaw Broadband Data Collection Executive Findings Report*. https://www.merit.edu/wp-content/uploads/2020/06/Washtenaw_ExecutiveFindingsReport_05292020.pdf

Molnar, G., Savage, S., Sicker, D. (2015). The Impact of High-Speed Broadband Availability on Real Estate Values: Evidence from United States Property Markets, p. 12. TPRC 41: *The 41st Research Conference on Communication, Information and Internet Policy*. <http://dx.doi.org/10.2139/ssrn.2241926>

Rachfal, C. (2019). Broadband Data and Mapping: Background and Issues for the 116th Congress. Retrieved from <https://fas.org/sgp/crs/misc/R45962.pdf>