Rural Broadband in Northern Ontario:
Investigating the Status of Connectivity and the Role of Planners

by

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Abstract

Rural Broadband in Northern Ontario

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This research investigates the current state of broadband internet access in Northern Ontario and explores the role of planners in facilitating its development. The motivation behind this study stems from the critical need for reliable internet services in rural and remote communities, which is essential for economic development, social inclusion, and access to essential services. The research was guided by two key questions: (1) What is the current status of the broadband internet access in four Northern Ontario communities, and (2) What is the role of planners in the process of facilitating broadband internet access in these four Northern Ontario communities? A mixed-methods approach was employed, combining a comprehensive literature review, discussions with the planners, and an analysis of relevant policies and initiatives. The findings reveal that broadband access in Northern Ontario remains uneven and that planners have had limited involvement in broadband infrastructure development. The study underscores the need for a more integrated approach to planning and broadband development to address the connectivity challenges in the region.

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1 Introduction

Technology and the internet are at the center of our daily economic and social activities. Having broadband internet access in developed country like Canada is considered a fundamental service just like heat, water and electricity. This consideration is due to the internet being essential for participation in educational, medical, modern economical and social purposes. Despite this, there prevails disparities between urban, rural, and northern areas in terms of access to access to and speed of high-speed internet. Northern Ontario is a huge landscape with communities scattered and has changing levels of terrains which amplifies the digital divide in Canada. This research paper delves into the current status of broadband internet access in Northern Ontario and explores the role of planners in facilitating its deployment and adoption.

1.1 The Digital Divide: A Persistent Issue

The gap that exists between those who have access to the internet and those who do not have access and has profound implications is referred as the Digital Divide. This divide is particularly evident in Northern Ontario as it affects four key facets of life.

- Education: Having access to high-speed internet gives vast range of educational opportunities. In Northern Ontario, students may seem to struggle with remote learning or accessing digital resources, that directly affects their educational outcomes and hinders their future prospects (Middleton & Parkin, 2021).
- Economic Development: In the times of online shopping, all the major business operations requires access to high-speed internet. It also play critical role in attracting investments, and fostering innovation. Without reliable internet, rural businesses in Northern Ontario face competitive disadvantages, limiting economic growth and job creation (Canadian Radio-television and Telecommunications Commision (CRTC), 2019).
- Healthcare: As Northern Ontario has scattered communities, telemedicine is very crucial and is becoming increasingly important as healthcare facilities are scarce. Having limited broadband access hinders the ability of residents to utilize telehealth services, intensifying healthcare inequities (Government of Ontario, 2021).
- Social Connectivity: Internet helps in connecting individuals to social networks, entertainment, and civic engagement opportunities. Northern Ontario's people are feeling isolated and are missing out on many aspects of contemporary life due to not having broadband access (Northern Policy Institute, 2020).

One of the prominent reasons for limited broadband deployment is the physical geography of Northern Ontario. The region is home to vast, sparsely populated areas with uneven terrain that increases the costs of infrastructure projects and also makes it logistically complex. Furthermore, the population density of Northern Ontario is low compared to southern regions, that discourages the private sector investors as it

weakens the business case for investing in the broadband infrastructure. These factors contribute to the slow pace of broadband expansion and underscore the need for strategic planning and public investment (Rural Ontario Institute, 2018).

The importance of bridging the digital gap between the rural and remote communities has been recognized by various levels of government. Multiple levels of government have initiated programs aims to close the digital gap. The federal government has launched programs like Universal Broadband Fund initiated in 2020 and the Connecting Canadians in 2014 that aims to provide financial support for broadband projects. Provincial programs like Improving Connectivity for Ontario (ICON) Program and Ontario Connects, in conjunction with municipal efforts, also play crucial roles. Despite these initiatives, progress has been uneven, and significant gaps remain (Innovation, Science and Economic Development Canada, 2020).

1.2 Research Questions

Building from the literature, this research focuses on two primary questions:

1.   What is the current status of the broadband internet access in four Northern Ontario communities, and
2.   What is the role of planners in the process of facilitating broadband internet access in these four Northern Ontario communities?

These research questions will be answered through literature available online and also by reaching out to the planners working at the selected communities for discussions on their experiences.

1.3 Motivation for the Research

There are four key motivations for undertaking this research, each briefly described below.

1.3.1 Addressing Inequities

One of the main reasons for conducting research is to highlight the inequities faced by the residents of Northern Ontario. Not having the broadband access further aggravates the existing disparities for economic and social development. By understanding the current status of broadband access and identifying the role of planners, this research will contribute to efforts to bridge the digital divide and promote equitable development (Reimer, 2020).

1.3.2 Enhancing Regional Competitiveness

For Northern Ontario to enhance their competitiveness, they require improved broadband access. The economy is increasing digitally and the regions without reliable

access to internet they are at significant disadvantage. This research seeks to identify strategies that can boost regional competitiveness and foster investment opportunities in Northern Ontario by exploring the role of planners in the process.

1.3.3 Supporting Sustainable Development

Broadband access is one of the key component for sustainable development. The reason behind is that it guides us to use the resources efficiently, support monitoring and management of those resources, and also enhances the service delivery. This research aims to highlight the importance of integrating broadband infrastructure into sustainable development plans for Northern Ontario (Sustainable Development Technology Canada, 2020)

1.3.4 Contributing to Policy and Practice

By understanding the current status of broadband access and the role of planners, this research contributes to the existing knowledge on rural broadband deployment. Findings from this study might provide valuable perceptions to policy makers, planners and other stakeholders involved in the expansion of broadband access in rural and remote areas and it can also help take policy decisions and practical actions (Canadian Urban Institute, 2020).

1.4 Organization of the Major Research Paper

This research paper is organized into several sections to provide a comprehensive understanding of broadband internet access and the role of planners in Northern Ontario. The first section introduces the context and motivation for the research, emphasizing the significance of broadband access in modern society and the challenges faced by Northern Ontario. The second section presents the literature review, summarizing existing studies and theories related to digital divide and broadband infrastructure development. The third section outlines the methodology used in the research, detailing the data collection process, the criteria for selecting case study communities, and the analytical approaches employed. The fourth section discusses the findings, focusing on the current status of broadband access in selected Northern Ontario communities and the role of planners in this process. Finally, the paper concludes with a summary that revisits the research questions, compares the findings with the literature, suggests areas for future research, and summarizes the overall significance of the study.

2 Literature Review

2.1 Introduction and History

The literature on rural broadband in Northern Ontario highlights the unique challenges and ongoing efforts to improve internet connectivity in the region. Historically, the development of broadband infrastructure in Northern Ontario has been uneven, with significant disparities in access and quality between urban and rural areas. The geographical challenges, such as rugged terrain and low population density, have contributed to the digital divide, making it difficult for traditional broadband infrastructure to reach remote communities (Davis, 2009; Hudson et al., 2021).

The evolution of broadband technology has been a critical factor in addressing these disparities. Initially, communities relied heavily on slower dial-up connections, which have gradually been replaced by various high-speed technologies such as Digital Subscriber Line (DSL), cable modem, fiber optics, wireless, satellite, and broadband over power lines (BPL). Each of these technologies presents distinct advantages and limitations. For example, fiber optics provide the highest speeds and reliability but require substantial infrastructure investment, making them less feasible for sparsely populated regions (McNally et al., 2021).

The development of broadband infrastructure in Northern Ontario has been supported by numerous government initiatives and local efforts. Federal programs, such as the Universal Broadband Fund, and provincial investments aim to expand access to high-speed internet, but challenges remain in implementation due to financial and policy constraints (CRTC, 2019; ISEDC, 2019). Local initiatives, such as those led by community organizations and First Nations, have played a significant role in tailoring solutions to meet specific local needs, often filling gaps left by larger providers (Rural Ontario Institute, 2017).

The role of planners is crucial in facilitating broadband access. They engage in strategic planning, coordinate with stakeholders, and advocate for resources and policy changes that support infrastructure development. Their efforts are essential in ensuring that broadband projects align with regional development goals and address community-specific challenges (Ontario Professional Planners Institute, 2019).

Finally, technological advancements continue to shape the future prospects for broadband in Northern Ontario. Innovations such as low-Earth orbit satellites and 5G wireless technology offer potential solutions to overcome geographic and economic barriers. However, the successful deployment of these technologies requires comprehensive planning, sustained investment, and supportive policies (Crandall, 2022).

2.1.1 Geographic and Demographic Overview
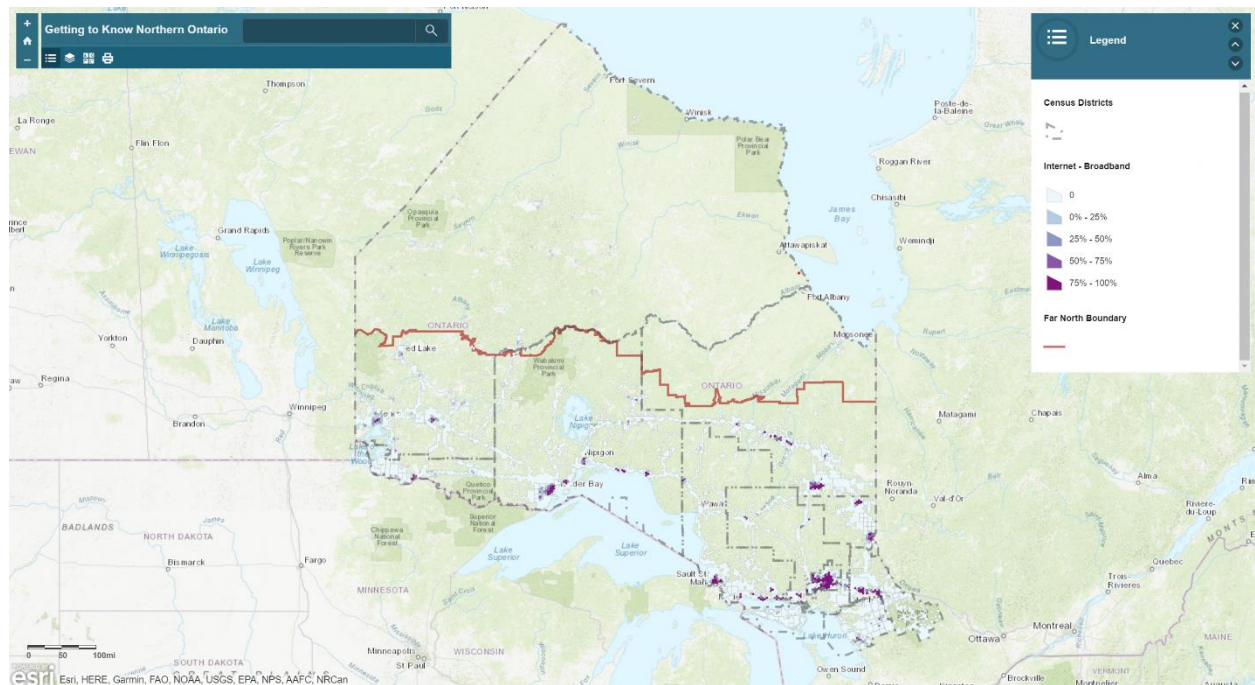
Figure 1 Map of Northern Ontario

Source: Northern Ontario Infrastructure & Boundary Map, Northern Policy Institute (2024)

Northern Ontario is an expansive and diverse region, covering approximately 802,000 square kilometers, which is about 87% of Ontario's landmass. Despite its large size, the region is home to only about 6% of the province's population (Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry, 2021). The population is highly dispersed, with many small communities scattered across vast distances, often separated by challenging terrain such as dense forests, rocky landscapes, and numerous lakes and rivers. This rugged landscape, combined with a dispersed and often remote population, presents significant challenges for the development of broadband infrastructure. The region encompasses 12 districts with 285 communities, each varying significantly in terms of access to high-speed internet.

According to the Blue Sky Net Northern Ontario Broadband Report (2023), only 74 of these communities have at least 50% of households accessing internet speeds of 50/10 Mbps, and just 47 communities achieve at least 75% household coverage at these speeds. For example, the Greater Sudbury District enjoys complete coverage in its two communities, while other districts, such as Manitoulin, have only one community with significant broadband access (Blue Sky Net, 2023).

2.1.2 Definition of Broadband Internet

Broadband internet refers to high-speed internet access that is always on and faster than traditional dial-up access. According to the Federal Communications Commission (FCC), broadband includes several high-speed transmission technologies such as Digital Subscriber Line (DSL), cable modem, fiber optics, wireless, satellite, and broadband over power lines (BPL). The Canadian Radio-television and Telecommunications Commission (CRTC) defines high-speed internet as having a minimum download speed of 50 megabits per second (Mbps) and an upload speed of 10 Mbps (CRTC, 2019).

2.2 Current Status of Broadband in Northern Ontario

Broadband access in Northern Ontario has undergone significant changes over the past few decades. In the early 2000s, internet access in many parts of the region was limited to dial-up connections, which were not only slow but also unreliable. The introduction of Digital Subscriber Line (DSL) in the region, which occurred around the mid-2000s, marked the first major improvement in broadband access, allowing for faster and more stable internet connections (CRTC, 2007). However, DSL was only available in more densely populated areas, leaving many rural and remote communities without access.

The early 2010s saw the advent of satellite internet as a solution for remote communities that could not be reached by wired connections (Northern Policy Institute, 2013). While satellite internet provided broader coverage, it was hampered by high latency and lower speeds, making it less effective for modern internet usage, such as video streaming or online gaming. Cellular internet, introduced around the same time, offered another alternative, particularly with the rollout of 3G and later 4G LTE networks. However, these networks also struggled with coverage in Northern Ontario's more remote areas.

The Canadian government, recognizing the importance of broadband access for economic development and quality of life, launched several initiatives aimed at improving internet connectivity in rural and remote areas. The Connecting Canadians program, launched in 2014, was one of the first major efforts to bring high-speed internet to underserved communities, including those in Northern Ontario (Government of Canada, 2014). This was followed by the Connect to Innovate program in 2016, which focused on building "backbone" infrastructure, such as fiber optic cables, to connect more communities to high-speed internet (Innovation, Science and Economic Development Canada, 2016).

Despite these efforts, many communities in Northern Ontario continue to struggle with inadequate broadband access. The ongoing challenge is to extend fiber optic and other high-speed technologies to these remote areas in a way that is both economically feasible and sustainable.

2.2.1 Technological Disparities and Types of Technologies

Broadband access in Northern Ontario varies significantly, not only between communities but also in terms of the technologies available. The primary types of internet technology used in the region include:

1. Fiber Optic: The gold standard for broadband, fiber optic internet offers the fastest speeds and lowest latency. However, the high cost of installing fiber optic cables, particularly over long distances and difficult terrain, means that this technology is limited to more populated areas (Government of Canada, 2020).
2. Digital Subscriber Line (DSL): DSL uses existing telephone lines to deliver internet service. It is more widely available than fiber optic but offers lower speeds and is less reliable over long distances, making it less suitable for remote communities (CRTC, 2019).
3. Cable Internet: Using the same infrastructure as cable television, cable internet provides higher speeds than DSL but is also limited to areas where cable networks are available (Northern Policy Institute, 2020).
4. Satellite Internet: Satellite internet is often the only option for the most remote communities. While it provides broader coverage, it suffers from high latency, making it less suitable for applications that require real-time communication (ISEDC, 2020).
5. Cellular Internet: Cellular networks, particularly 4G LTE, offer an alternative to wired connections in areas where infrastructure is lacking. However, coverage is often limited, and speeds can vary depending on network congestion and geographic obstacles (CRTC, 2019).
6. Fixed Wireless: This technology uses radio signals to deliver internet from a central point to a receiver at the customer's location. It can provide high-speed internet in areas where laying cables is impractical, but it requires a clear line of sight and can be affected by weather conditions (Blue Sky Net, 2023).

The disparities in technological access are evident in the data provided by the Blue Sky Net report (2023), which shows that many communities rely on less effective technologies such as satellite and cellular internet. These technologies are often unable to meet the current standards for high-speed internet, defined by the Canadian Radio-television and Telecommunications Commission (CRTC) as 50 Mbps download and 10 Mbps upload speeds (CRTC, 2019).

2.2.2 The Significance of the 50/10 Mbps Measurement

The 50/10 Mbps benchmark is significant because it represents the minimum speed required for modern internet usage, including activities such as streaming high-definition video, participating in video conferences, and accessing cloud-based services. The CRTC established this standard in 2016 as part of its universal service objective, which aims to ensure that all Canadians, regardless of location, have access to reliable and affordable broadband internet (CRTC, 2016).

This measurement is important for assessing the adequacy of broadband infrastructure, particularly in rural and remote areas like Northern Ontario. Communities that do not meet this standard are at a significant disadvantage, both in terms of economic opportunities and quality of life. The Blue Sky Net report's reliance on this benchmark is therefore justified, as it provides a clear indicator of which communities are underserved and in need of further investment.

2.3 Challenges in Broadband Development

There are two key challenges in implementing broadband development in Northern Ontario, each briefly discussed below.

2.3.1 Geographic and Economic Barriers

The large geographic distances and low population density of Northern Ontario make the expansion of broadband infrastructure particularly challenging. The necessary infrastructure includes a combination of fiber-optic cables, wireless towers, satellite systems, and sometimes microwave transmission. Fiber-optic cables are essential for providing high-speed, reliable internet, but they are costly and difficult to install, especially across the rugged and forested terrain that characterizes much of Northern Ontario (Dreesen & Dubé, 2015). Wireless towers and satellite systems offer alternatives, but they often come with limitations such as lower speeds and higher latency compared to fiber-optic connections (Blue Sky Net, 2023). Moreover, these systems require significant upfront investments, which are often not economically viable for private Internet Service Providers (ISPs) given the region's sparse population (CRTC, 2019).

The Communications Monitoring Report (2019) by the Canadian Radio-television and Telecommunications Commission (CRTC) underscores these issues, noting that while 97.7% of urban households have access to high-speed internet, only 40.8% of rural households do (CRTC, 2019). This disparity is largely due to the high costs and logistical difficulties of deploying infrastructure across vast and remote areas, where the return on investment for ISPs is typically low (Statistics Canada, 2021).

2.3.2 Policy and Financial Constraints

Despite various government initiatives aimed at bridging the digital divide—the gap between those with access to modern information and communication technology and those without—progress in Northern Ontario has been slow due to significant financial and policy constraints. The digital divide in rural Canada, including Northern Ontario, is particularly pronounced, where the high costs of infrastructure development are exacerbated by the region's vast geography and low population density (Middleton & Longford, 2010). The funding provided by federal and provincial governments is often insufficient to cover these costs, leaving many communities underserved (McNally, 2020).

At the federal level, programs like the Connect to Innovate (CTI) program and the Universal Broadband Fund (UBF) have been established to support the expansion of broadband infrastructure in rural and remote areas (Innovation, Science and Economic Development Canada [ISEDC], 2019). However, these initiatives face challenges, including regulatory barriers such as navigating complex spectrum licensing and rights-of-way issues, which can significantly delay project implementation (Fiser & Clement, 2009). Additionally, bureaucratic hurdles at both federal and provincial levels—such as lengthy approval processes and coordination issues between different governmental bodies—further complicate and slow down the deployment of broadband infrastructure (Attaran, 2019).

ISEDC (2019) outlines the ambitious targets set by the federal government, such as providing all households with access to 50/10 Mbps internet by 2030, but acknowledges the significant challenges in reaching these goals. These challenges include the need for substantial financial investment, the logistical difficulties of installing infrastructure in remote areas, and the need for more streamlined regulatory processes (ISEDC, 2019). Meeting these targets requires not only increased funding but also more effective collaboration between different levels of government and private sector stakeholders.

2.4 Government Initiatives and Investments in Broadband in Northern Ontario

Broadband access in Northern Ontario has been a critical issue due to the region's vast geography, low population density, and challenging terrain. To address these challenges, both the federal and provincial governments, as well as local and community organizations, have launched several initiatives aimed at improving broadband connectivity across the region. These initiatives involve significant investments and are part of broader efforts to bridge the digital divide between urban and rural areas in Canada.

2.4.1 Federal Programs

These are the following programs initiated by the federal government.

2.4.1.1 Universal Broadband Fund (UBF)

The Universal Broadband Fund (UBF) is one of the most significant federal initiatives aimed at providing high-speed internet access to Canadians, particularly those in rural and remote areas. Announced in 2020, the UBF was established with an initial investment of $1.75 billion, which was later increased to $2.75 billion (ISEDC, 2020). The fund's goal is to ensure that 98% of Canadians have access to high-speed internet by 2026, with a target of 100% coverage by 2030. The UBF is open to various applicants, including municipalities, Indigenous communities, non-profit organizations, and private sector entities. Projects funded through the UBF are expected to deliver minimum speeds of 50/10 Mbps, which is considered the standard for high-speed

internet by the Canadian Radio-television and Telecommunications Commission (ISEDC, 2019).

2.4.1.2 Broadband Canada: Connecting Rural Canadians (BRAND)

Before the UBF, the federal government launched the Broadband Canada: Connecting Rural Canadians (BRAND) program in 2009. BRAND was a $225 million initiative aimed at extending broadband access to rural and remote communities that were previously underserved. The program provided funding to Internet Service Providers (ISPs) and other stakeholders to help offset the high costs associated with deploying broadband infrastructure in these areas. BRAND was particularly focused on providing last-mile connectivity, ensuring that households in remote regions could access high-speed internet. The program concluded in 2012, having improved broadband access for approximately 218,000 households across Canada, including in Northern Ontario (Government of Canada, 2013).

2.4.1.3 Connect to Innovate (CTI) Program

Launched in 2016, the Connect to Innovate (CTI) program was another significant federal initiative aimed at improving broadband access in rural and remote communities. With an initial budget of $500 million, CTI focused on building and upgrading "backbone" networks that connect communities to the broader internet infrastructure. The program emphasized connecting institutions like schools, hospitals, and Indigenous communities, which often serve as critical hubs for surrounding areas. The CTI program ran until 2021, and its investments have been crucial in improving broadband access in many parts of Northern Ontario (ISEDC, 2016).

2.4.2 Provincial Programs

These are the following programs initiated by provincial government.

2.4.2.1 Ontario's Broadband and Cellular Action Plan

The Ontario government has also made significant investments in improving broadband access through its Broadband and Cellular Action Plan, announced in 2019. This $315 million initiative aims to expand high-speed internet and cellular service to underserved areas across the province by 2025. The plan includes funding for projects that involve partnerships between the provincial government, municipalities, Indigenous communities, and private sector providers. The Southwestern Integrated Fiber Technology (SWIFT) project, which is part of this plan, has been instrumental in improving connectivity in Northern Ontario, particularly in rural areas where broadband access has historically been limited (Ontario Ministry of Infrastructure, 2020).

2.4.2.2 Northern Ontario Heritage Fund Corporation (NOHFC)

Another key provincial initiative is the Northern Ontario Heritage Fund Corporation (NOHFC), which has been supporting economic development in Northern Ontario since 1988. NOHFC provides funding for a wide range of projects, including those aimed at improving broadband infrastructure. For instance, NOHFC has funded several projects in partnership with local municipalities and Indigenous communities to enhance internet connectivity in remote areas. These projects not only improve broadband access but also support local economic development by attracting businesses and creating jobs (NOHFC, 2021).

2.4.3 Local and Community-Based Initiatives

Local governments, First Nation governments, and community organizations play a crucial role in enhancing broadband access, particularly in areas where commercial interests are lacking. For example, the Lac Seul First Nation has been operating its own internet service provider (ISP) for over a decade, in partnership with organizations like Keewaytinook Okimakanak. This community-driven project is vital in providing tailored solutions that address the specific needs of the Lac Seul community, where traditional ISPs have been reluctant to invest due to the high costs of infrastructure development (O'Neil & Perez, 2016). The Lac Seul First Nation's efforts highlight the importance of local initiatives in bridging the digital divide in remote areas.

Another notable example is the Matawa First Nations Management, which represents nine First Nations in Northern Ontario. The organization has been actively involved in broadband development through its Rapid Lynx project. This initiative aims to build and operate a high-speed fiber-optic network connecting the nine Matawa communities to the broader internet infrastructure. The project, which began in 2019, is supported by federal and provincial funding and is expected to significantly improve internet access in some of the most remote and underserved areas of Northern Ontario (Matawa First Nations Management, 2021).

2.5 Role of Planners in Facilitating Broadband Access

Broadband access is increasingly recognized as a critical infrastructure requirement, similar to water, electricity, and roads. Planners are uniquely positioned to integrate broadband development into regional planning frameworks, playing a crucial role in ensuring that this essential service reaches all communities, particularly in rural and remote areas like Northern Ontario.

2.5.1 Strategic Planning and Coordination

Planners are responsible for ensuring that broadband infrastructure is integrated into broader regional and municipal planning frameworks. This integration is crucial because broadband access impacts various aspects of community development, including

economic growth, education, healthcare, and social inclusion. Planners work to ensure that broadband infrastructure is not an afterthought but a fundamental component of regional development strategies. This involves aligning broadband initiatives with other infrastructure projects, such as transportation or utilities, to maximize efficiency and cost-effectiveness (American Planning Association, 2019).

In regions like Northern Ontario, where geographic and economic challenges are significant, planners play a critical role in identifying priority areas for broadband expansion. This prioritization process involves analyzing demographic data, current broadband coverage, and projected growth to determine which communities are most in need of improved internet access. Planners use tools such as Geographic Information Systems (GIS) to map out areas with poor connectivity and to plan for the most effective deployment of resources (Ontario Professional Planners Institute, 2019). By identifying these priority areas, planners can help ensure that investments are targeted where they will have the greatest impact.

One of the most challenging aspects of broadband development is coordinating among the various stakeholders involved in these projects. These stakeholders include federal, provincial, and local governments, private Internet Service Providers (ISPs), community organizations, and Indigenous groups. Planners act as facilitators, bringing these diverse groups together to collaborate on broadband initiatives. This coordination is essential to avoid duplication of efforts and to ensure that projects are implemented efficiently and effectively. For example, planners might work with provincial government agencies to align local broadband projects with larger provincial initiatives, ensuring that funding and resources are used optimally (Cook, 2020).

Planners also play a vital role in identifying and securing funding for broadband projects. This involves staying informed about available federal and provincial funding programs, such as the Universal Broadband Fund or the Southwestern Integrated Fiber Technology (SWIFT) project, and ensuring that local projects meet the eligibility criteria for these programs. Additionally, planners may work to develop funding applications, coordinate with grant writers, and advocate for the allocation of resources to broadband projects in rural areas. By leveraging these funding opportunities, planners help ensure that financial constraints do not impede the development of critical broadband infrastructure (Federation of Canadian Municipalities, 2020).

2.5.2 Community Engagement and Advocacy

Community engagement is a cornerstone of successful broadband planning, particularly in rural and remote areas where needs can vary widely. Planners must engage with local residents, businesses, and organizations to understand the specific challenges they face regarding internet access. This engagement might involve conducting surveys, holding public meetings, and organizing focus groups to gather input directly from the community. Understanding these needs helps planners tailor broadband projects to address the unique requirements of each community, whether that means

prioritizing connectivity for schools, healthcare facilities, or small businesses (Ontario Professional Planners Institute, 2019).

In many rural and Indigenous communities, there may be skepticism or distrust towards large infrastructure projects, particularly if past initiatives have failed to deliver on promises. Planners must work to build trust and foster collaboration between the community and other stakeholders involved in broadband projects. This can be achieved through transparent communication, regular updates on project progress, and involving community members in decision-making processes. By building strong relationships with the community, planners can help ensure that broadband projects receive the local support needed for successful implementation (Cook, 2020).

Planners often find themselves in the role of advocates, pushing for the necessary funding and regulatory support to facilitate broadband access in underserved areas. This advocacy involves working with local government officials, provincial and federal representatives, and other stakeholders to highlight the importance of broadband access for community development. Planners might advocate for policy changes that make it easier to deploy broadband infrastructure, such as streamlining permitting processes or providing tax incentives for ISPs that invest in rural areas (Federation of Canadian Municipalities, 2020).

Another critical aspect of community engagement is addressing digital literacy and inclusion. Simply providing broadband access is not enough; planners must also ensure that community members have the skills and resources to take full advantage of the internet. This might involve working with local schools, libraries, and community centers to offer digital literacy training and support programs. Planners can also advocate for initiatives that provide affordable devices and internet services to low-income households, ensuring that all community members can benefit from improved broadband access (American Planning Association, 2019).

2.5.3 Technological and Innovative Approaches

Planners are also tasked with promoting the adoption of innovative technologies that can help overcome the geographic and economic barriers to broadband deployment in rural areas. This might include exploring the use of fixed wireless, satellite broadband, or other emerging technologies as interim solutions while more robust infrastructure is developed. The Federation of Canadian Municipalities (2020) suggests that planners should be proactive in seeking out and supporting innovative solutions that are adaptable to the unique challenges faced by rural and remote communities. Additionally, planners can play a role in facilitating public-private partnerships that leverage both government resources and private sector expertise to accelerate broadband deployment (Cisco, 2021).

2.6 Technological Advancements and Future Prospects

The landscape of broadband technology in Northern Ontario has evolved significantly over the years, driven by both technological advancements and increasing recognition of the importance of high-speed internet access for economic and social development. As the region continues to grapple with geographic and demographic challenges, innovative solutions and robust policy support are key to overcoming these barriers. The future of broadband in Northern Ontario hinges on the integration of cutting-edge technologies, data-driven approaches, and sustained governmental and community efforts. This section delves into the recent technological advancements that have the potential to reshape internet access in the region and explores the future prospects for achieving comprehensive broadband coverage.

2.6.1 Data-Driven Approaches

Data collection and analysis have become indispensable tools in the strategic planning and implementation of broadband projects, particularly in rural and remote areas like Northern Ontario. The collaboration between Blue Sky Net and the Canadian Internet Registration Authority (CIRA) exemplifies the power of data-driven approaches in addressing connectivity challenges. Through initiatives like the CIRA Internet Performance Test, these organizations have been able to gather granular data on internet speeds and service quality across the region (Blue Sky Net, 2023). This data is not only crucial for identifying areas with inadequate service but also for tracking progress and ensuring that investments in infrastructure are yielding the desired improvements.

The insights gained from these data-driven efforts have already led to positive outcomes. For instance, the Blue Sky Net report (2023) highlights a gradual increase in the number of communities achieving higher internet speeds, a trend that reflects the effectiveness of targeted investments guided by accurate data. As these data collection efforts continue to evolve, they will provide an increasingly robust foundation for policy-making and investment decisions, ensuring that resources are directed to the areas where they are most needed. Moreover, the use of data analytics in broadband planning can help forecast future demand and identify emerging trends, allowing for proactive rather than reactive infrastructure development.

2.6.2 Policy and Regulatory Support

The future of broadband in Northern Ontario is inextricably linked to the policies and regulatory frameworks that govern its development. The Canadian Radio-television and Telecommunications Commission (CRTC) has played a pivotal role in this regard, particularly through its universal service objective, which aims to ensure that all Canadians have access to broadband internet with speeds of at least 50/10 Mbps (CRTC, 2021). Achieving this objective in Northern Ontario requires not only significant

financial investments but also regulatory frameworks that are flexible and responsive to the unique challenges of the region.

Both federal and provincial governments have recognized the importance of supporting broadband expansion in rural and remote areas, as evidenced by ongoing financial commitments through programs like the Universal Broadband Fund and Ontario's Broadband and Cellular Action Plan (Innovation, Science and Economic Development Canada, 2019). However, for these efforts to be truly effective, they must be coupled with policies that address the specific needs of Northern Ontario's diverse communities. This includes streamlining regulatory processes to facilitate quicker deployment of infrastructure, offering incentives for private sector investment in underserved areas, and ensuring that funding is sufficient to cover the high costs associated with broadband development in challenging terrains.

Looking forward, the sustained success of these initiatives will depend on the ability of policymakers to adapt to technological advancements and changing needs. For example, as new technologies like low Earth orbit (LEO) satellites and 5G networks become more prevalent, regulatory frameworks must evolve to accommodate these innovations while ensuring that they are deployed in a way that benefits all communities, including those in Northern Ontario. By maintaining a forward-looking approach and fostering collaboration between government, private sector, and community stakeholders, there is significant potential to bridge the digital divide and ensure that all residents of Northern Ontario have access to reliable, high-speed internet.

2.7 Summary

The literature review of this research paper explores the multifaceted challenges and opportunities surrounding broadband development in Northern Ontario. The review begins by highlighting the significant geographic and economic barriers that complicate the expansion of broadband infrastructure in the region. Northern Ontario's vast and rugged terrain, combined with its low population density, makes the deployment of high-speed internet services particularly challenging and often economically unviable for private Internet Service Providers (ISPs). These challenges are compounded by the high costs associated with laying infrastructure in remote and isolated areas, which has resulted in a persistent digital divide between urban centers and rural communities.

The review further delves into the role of government initiatives, emphasizing the efforts of both federal and provincial programs to address these disparities. Programs like the Universal Broadband Fund and the Ontario government's commitments to improve internet access are central to these efforts, yet the literature suggests that despite these investments, progress has been slow. The involvement of local governments, First Nations, and community-based organizations is also critical in bridging the digital divide, as these groups often provide tailored solutions in areas where commercial interests are lacking. The review also underscores the importance of strategic planning and

community engagement, highlighting the essential role that planners play in coordinating among stakeholders, advocating for policy changes, and promoting innovative technological approaches.

Finally, the literature review emphasizes the significance of data-driven approaches and policy support for the future of broadband in Northern Ontario. The collaboration between organizations like Blue Sky Net and CIRA in gathering performance data has been instrumental in identifying service gaps and guiding investment decisions. However, achieving the ambitious connectivity goals set by the government will require continued policy and regulatory support, along with innovative solutions that are responsive to the unique challenges faced by rural and remote communities in Northern Ontario.

3 Methods

This research adopts a qualitative case study approach to examine the current status of broadband internet access in Northern Ontario and to explore the role of planners in facilitating broadband infrastructure in selected communities. The selected case studies—Timmins, Dryden, Moosonee, and Black River-Matheson—were chosen based on their geographic diversity, varying levels of broadband access, and different population densities. This approach allows for a comparative analysis of broadband development across a spectrum of community types in Northern Ontario.

Data for this research were collected through a combination of primary and secondary sources. Primary data were gathered through discussions with planners from the four selected communities. These discussions were aimed to gather insights into the planners' involvement, if any, in broadband infrastructure development and their perspectives on the challenges and opportunities related to broadband access in their communities. Secondary data were obtained from government reports, academic literature, and official documents from the communities studied. Key sources included the Canadian Radio-television and Telecommunications Commission (CRTC) reports, census data from Statistics Canada, and local government publications. These sources provided valuable context for understanding the current state of broadband access and the demographic and economic characteristics of each community.

A comparative analysis of the secondary data was conducted to assess the differences and similarities in broadband access among the selected communities. This analysis included evaluating the availability of broadband services, the types of technologies used (e.g., fiber-optic, DSL, satellite), and the extent of coverage in urban versus rural areas within each community. The findings from this analysis were then compared with the existing literature to identify gaps and alignments with broader trends in rural and remote broadband development.

While this research provides valuable insights into broadband access and the role of planners in Northern Ontario, it is not without limitations. The focus on four communities limits the generalizability of the findings to other regions in Northern Ontario or Canada. Future research could address these limitations by incorporating a larger sample size and including quantitative measures of broadband access and planning involvement.

4 Findings

4.1 Case Studies

Below are details about the four communities selected for the research purpose and an assessment of their current state of broadband.

4.1.1 Timmins
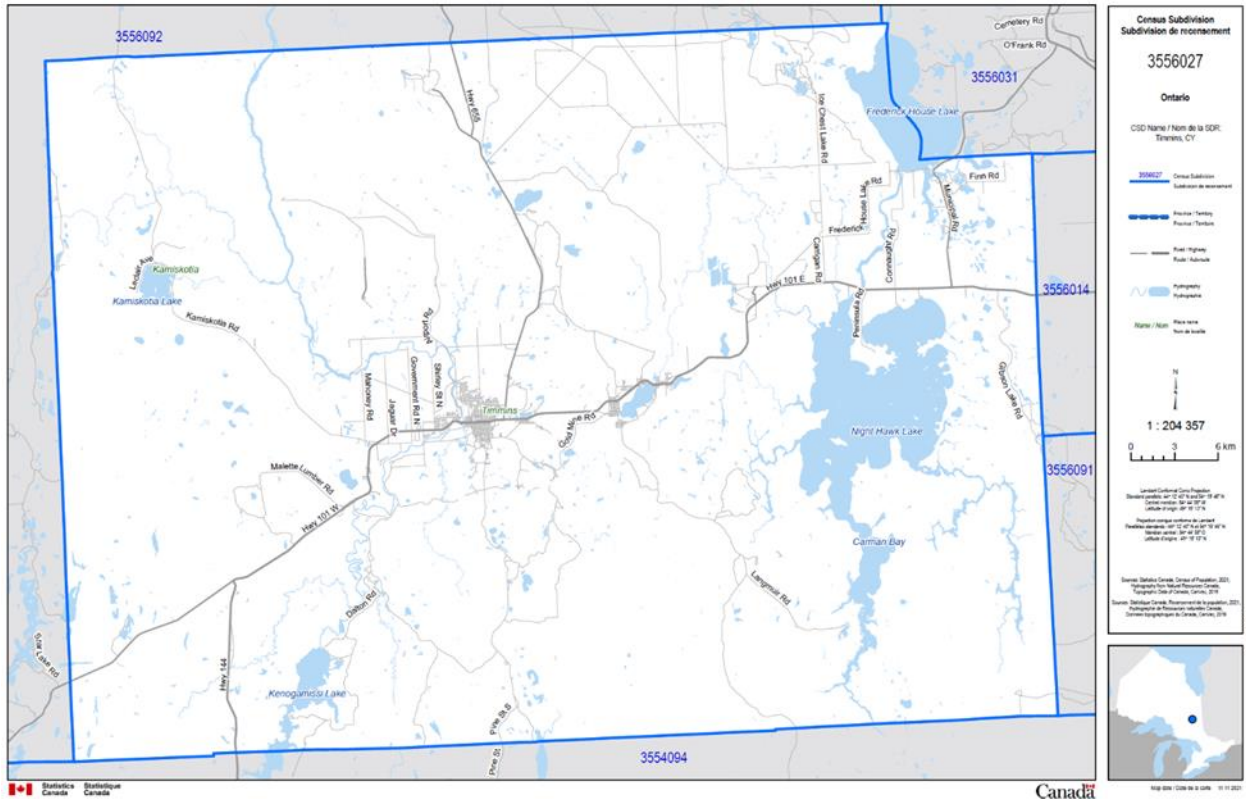
Figure 2 Map of Timmins

Source: Statistics Canada (2021)

Timmins is located in northeastern Ontario, situated along the Mattagami River. It is part of the Cochrane District and is one of the larger cities in the region. Timmins is often considered the gateway to northern Ontario, serving as a central hub for surrounding rural and remote communities.

4.1.1.1 Economic Profile

Timmins is historically renowned for its robust mining industry, primarily gold mining. It hosts some of Canada's largest gold mines, such as the Hollinger Mine, which have been pivotal to its economic development (McCormick, 2011). Besides mining, Timmins

has diversified into forestry, manufacturing, and retail sectors. Tourism is increasingly important, with the city promoting outdoor recreational activities such as snowmobiling, fishing, and hiking, leveraging its abundant natural landscapes (City of Timmins, 2023).

4.1.1.2 Census Profile

According to the 2021 Canadian Census, Timmins has a population of approximately 41,145 residents (Statistics Canada, 2021a). It has a relatively low population density of 13.9 persons per square kilometer due to its expansive geographic area. The city is characterized by a diverse population, with significant Indigenous and Francophone communities (Gagné & Milloy, 2021). Timmins experienced a population decline of -1.5% from 2016-2021. The median age is 41.8 years, with a median household income of around $77,000 (Statistics Canada, 2021a).

4.1.1.3 Cultural and Historical Significance

Timmins is known for its vibrant cultural scene, with festivals celebrating its mining heritage, such as the Great Canadian Kayak Challenge and Festival. The city also boasts several museums and cultural centers, including the Timmins Museum: National Exhibition Centre, which showcases local history and art (Timmins Museum, 2022).
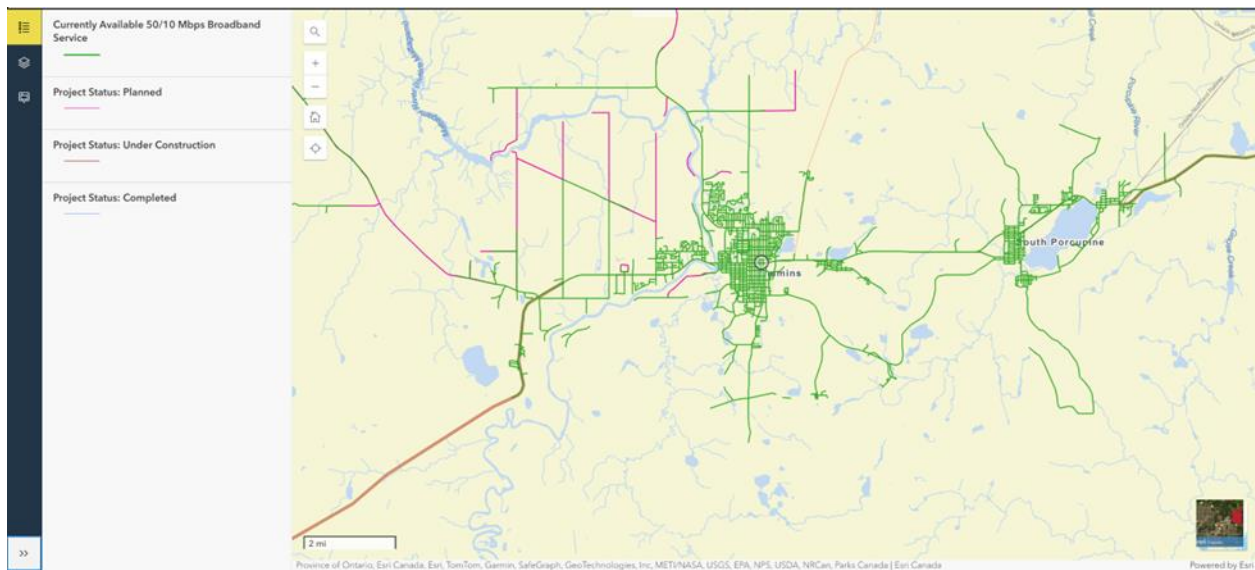
4.1.1.4 Broadband Internet Status

Figure 3 Map of Current Internet Status of Timmins

Source: Ontario Internet Access Map (2024)

Timmins benefits from relatively advanced broadband infrastructure compared to other northern regions of Ontario. The city is equipped with fiber optic and cable internet services, provided by major telecommunications companies, offering speeds up to 100

Mbps in urban and more densely populated areas. This infrastructure supports a range of activities, from residential use to business operations, contributing to the city's economic diversification beyond its traditional industries of mining and forestry (CRTC, 2019).

Despite these advancements, broadband access in Timmins is not uniformly distributed. While urban centers within the city meet or exceed the Canadian Radio-television and Telecommunications Commission's (CRTC) universal service objective of 50 Mbps download and 10 Mbps upload speeds, some outlying and rural areas still face significant connectivity challenges. These areas often fall below the 50/10 Mbps standard, which is considered the baseline for adequate internet service in Canada (CRTC, 2021). The lower population density and the expansive geographic area of Timmins make it economically challenging for internet service providers (ISPs) to extend high-speed broadband to all regions. As a result, residents in these outlying areas may rely on slower and less reliable services, such as DSL or satellite internet, which do not meet the CRTC's speed standards.

Local initiatives have been launched to address these disparities. These initiatives, often supported by both municipal and provincial funding, aim to expand broadband access and improve connectivity across the entire city, including its more remote areas. For example, efforts are underway to leverage federal and provincial broadband funding programs, such as the Universal Broadband Fund, to bring faster internet speeds to underserved communities in Timmins. These programs are crucial for ensuring that all residents, regardless of their location within the city, have access to the minimum 50/10 Mbps standard, thereby supporting equitable access to digital services and opportunities for all citizens (Canada.ca, 2021).
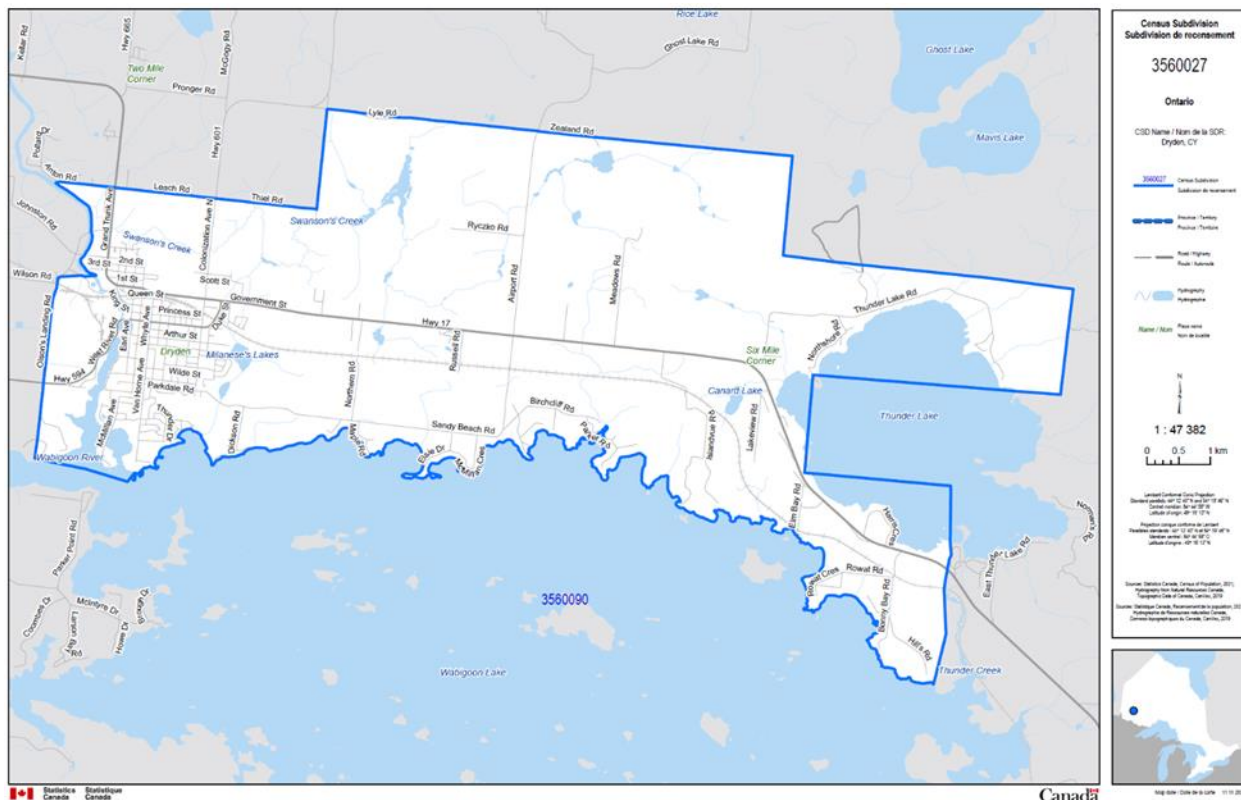
4.1.2 Dryden

Figure 4 Map of Dryden

Source: Statistics Canada (2021)

Dryden is situated in northwestern Ontario, strategically positioned between Thunder Bay and Winnipeg along the Trans-Canada Highway. It is part of the Kenora District and is one of the smallest cities in Ontario by population. Despite its size, Dryden plays a vital role in connecting eastern and western Canada, serving as a crucial link along this major transportation route (City of Dryden, 2023).

4.1.2.1 Economic Profile

Historically, Dryden's economy has been deeply rooted in the forestry and pulp and paper industries, with the Domtar Mill being a significant employer for many years. However, in recent years, the city has actively pursued economic diversification. This shift includes a focus on agriculture, tourism, and retail sectors. Additionally, Dryden's prime location on the Trans-Canada Highway strengthens its role as a transportation and logistics hub, further contributing to its economic resilience and potential for future growth (City of Dryden, 2023).

4.1.2.2 Census Profile

According to the 2021 Census, Dryden has a population of approximately 7,388 and has a population density of 122.7 person per square kilometer (Statistics Canada, 2021). The community has an aging demographic, with a median age of 45.4 years (Statistics Canada, 2021). The median household income is around $72,000. Dryden has experienced decline in population by -4.7% from 2016-2021. The city has a significant Indigenous population, contributing to its cultural richness (Statistics Canada, 2021).

4.1.2.3 Cultural and Historical Significance

Dryden is known for its stunning natural landscapes and outdoor recreational opportunities, with attractions such as Wabigoon Lake and numerous parks drawing both residents and tourists. The city also hosts the annual Dryden Days of Summer event, which features a range of cultural and family-friendly activities, celebrating the community's heritage and fostering a strong sense of local identity.

4.1.2.4 Broadband Internet Status
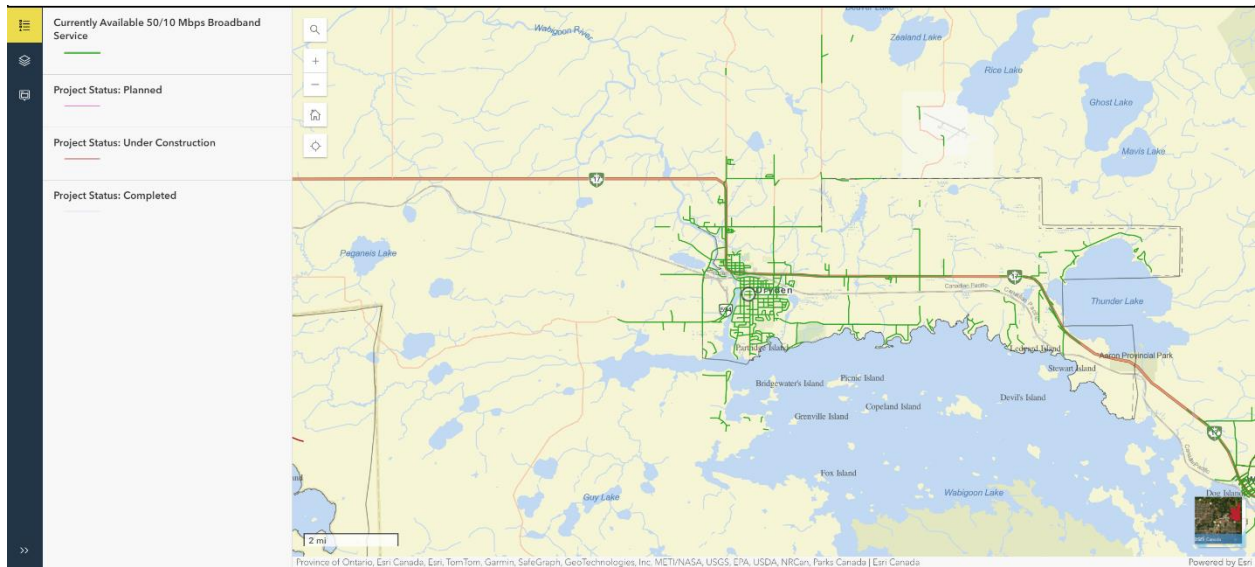
Figure 5 Map of Current Internet Status of Dryden

Source: Ontario Internet Access Map (2024)

Broadband internet access in Dryden exhibits a clear divide between urban and rural areas. Within the city limits, residents generally have access to DSL and cable internet services, with available speeds typically ranging from 25 to 50 Mbps. These speeds are adequate for basic online activities such as browsing, streaming, and remote work. However, they fall short of the 50/10 Mbps benchmark set by the Canadian Radio-

television and Telecommunications Commission (CRTC) as the minimum standard for high-speed internet (CRTC, 2019).

In contrast, rural areas surrounding Dryden face significant connectivity challenges. These areas often rely on slower satellite or fixed wireless options, which are more susceptible to issues such as latency and weather-related disruptions. To address these disparities, local initiatives supported by provincial funding are underway to enhance broadband infrastructure, particularly in underserved areas. These efforts aim to extend the reach of high-speed internet and close the digital divide, ensuring that all residents, regardless of location, have access to reliable and fast internet services (CRTC, 2019; City of Dryden, 2023). Such improvements are critical for supporting economic diversification, education, and healthcare services, particularly in the more remote parts of the region.
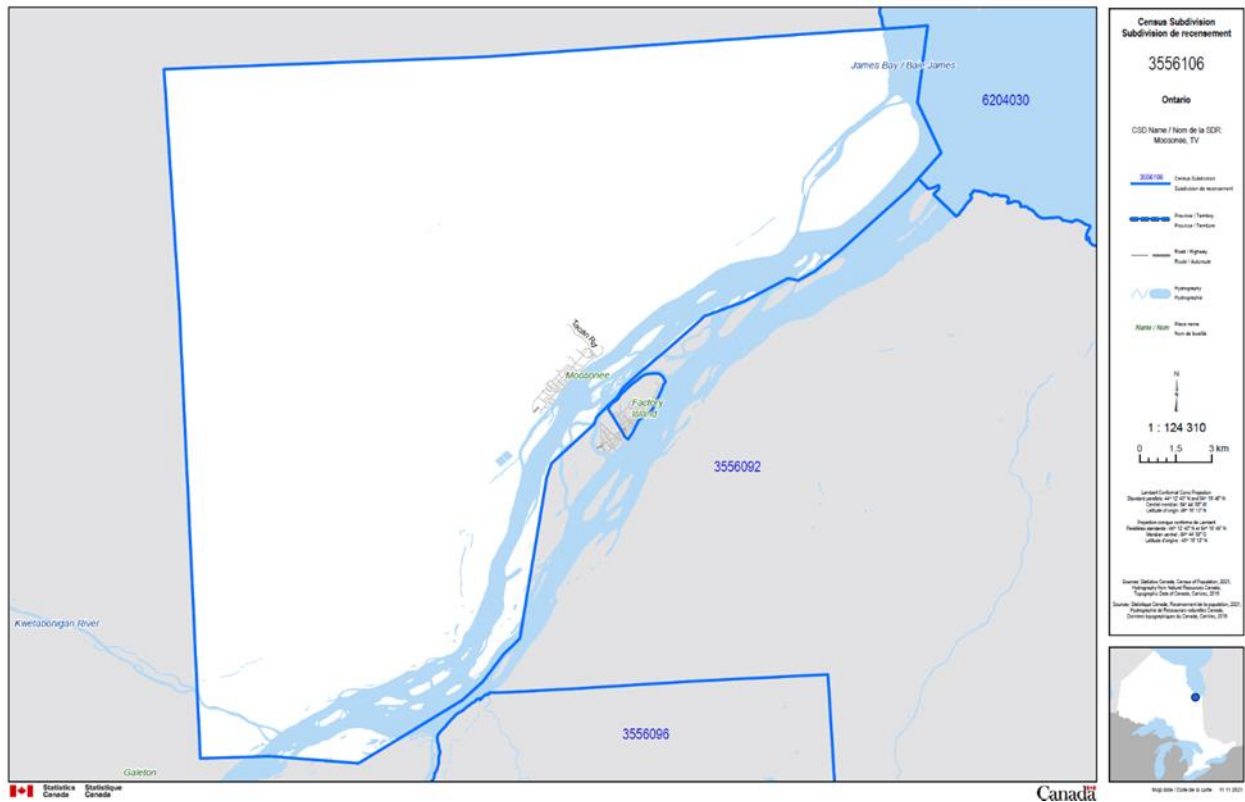
4.1.3 Moosonee

Figure 6 Map of Moosonee

Source: Statistics Canada (2021)

Moosonee is a remote community located on the Moose River, near James Bay in northern Ontario. It is known as the "Gateway to the Arctic" due to its position as a primary access point to the remote regions of the far north. The community is

accessible primarily by air and rail, with the Polar Bear Express train providing a vital connection to Cochrane, Ontario (Town of Moosonee, 2023). Due to its geographical isolation, Moosonee plays a critical role as a logistical hub for the surrounding region, facilitating the movement of goods and people to and from more remote areas.

4.1.3.1 Economic Profile

Moosonee's economy is largely centered around government services, transportation, and tourism. The town serves as a key access point for tourists exploring the surrounding wilderness and nearby Indigenous communities, which has positioned it as an essential node in the region's tourism industry. Efforts to diversify the local economy are underway, with a particular emphasis on cultural and eco-tourism initiatives that leverage Moosonee's unique natural and cultural assets. These initiatives aim to create sustainable economic opportunities while preserving the rich cultural heritage of the area (Town of Moosonee, 2023).

4.1.3.2 Census Profile

As of the 2021 Census, Moosonee has a population of approximately 1,512 residents, with a low population density of 2.8 persons per square kilometer. The community has a relatively young median age of 31.9 years, indicating a significant proportion of families with children (Statistics Canada, 2021). The median household income in Moosonee is about $55,000, which is below the provincial average, reflecting the economic challenges associated with its remote location. The population of Moosonee increased by 2.1% between 2016 and 2021, suggesting modest growth despite its geographic and economic challenges (Statistics Canada, 2021). Moosonee has a predominantly Indigenous population, with approximately 85% of its residents identifying as Indigenous, most of whom are of Cree descent. This strong Indigenous presence deeply influences the community's cultural life and traditions (Statistics Canada, 2021).

4.1.3.3 Cultural and Historical Significance

Moosonee is recognized for its rich Indigenous culture and heritage, serving as a focal point for Cree culture in the region. The community offers various cultural experiences and educational opportunities that highlight Cree traditions, languages, and ways of life. One notable event is the Great Moon Gathering, which celebrates Cree knowledge, traditions, and community life, drawing participants from across the region to engage in cultural exchange and learning.
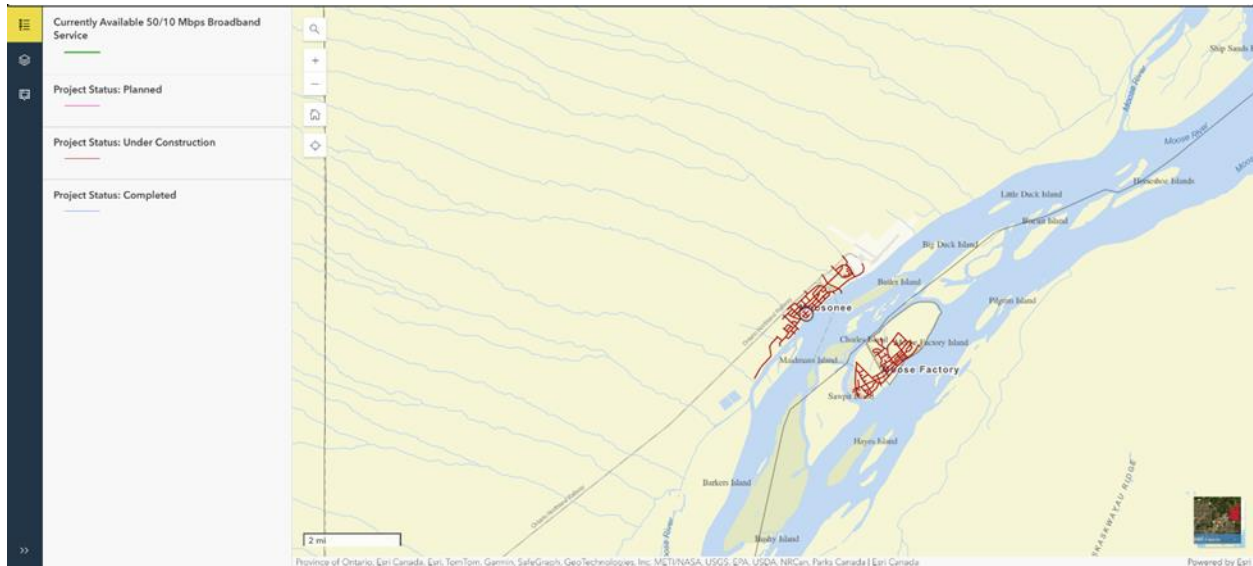
4.1.3.4 Broadband Internet Status

Figure 7 Map of Current Internet Status of Moosonee

Source: Ontario Internet Access Map (2024)

Moosonee faces significant challenges in achieving reliable broadband connectivity, largely due to its remote location and harsh climatic conditions, which complicate infrastructure development. Currently, most residents rely on satellite internet services, which are known for offering limited speeds and higher latency compared to the broadband services available in more urbanized areas. These satellite connections often do not meet the Canadian Radio-television and Telecommunications Commission's (CRTC) 50/10 Mbps standard, which is considered the minimum benchmark for high-speed internet (CRTC, 2019).

In Moosonee, broadband speeds typically fall below this standard, contributing to the digital divide that affects many remote and rural communities in Northern Ontario. Efforts to improve connectivity are ongoing, with various government-funded projects aimed at deploying more reliable and higher-speed internet solutions. These initiatives are critical for enhancing access to education, healthcare, and economic opportunities in Moosonee, ensuring that the community can fully participate in the digital economy (ISEDC, 2019; Town of Moosonee, 2023).

4.1.4 Black River Matheson
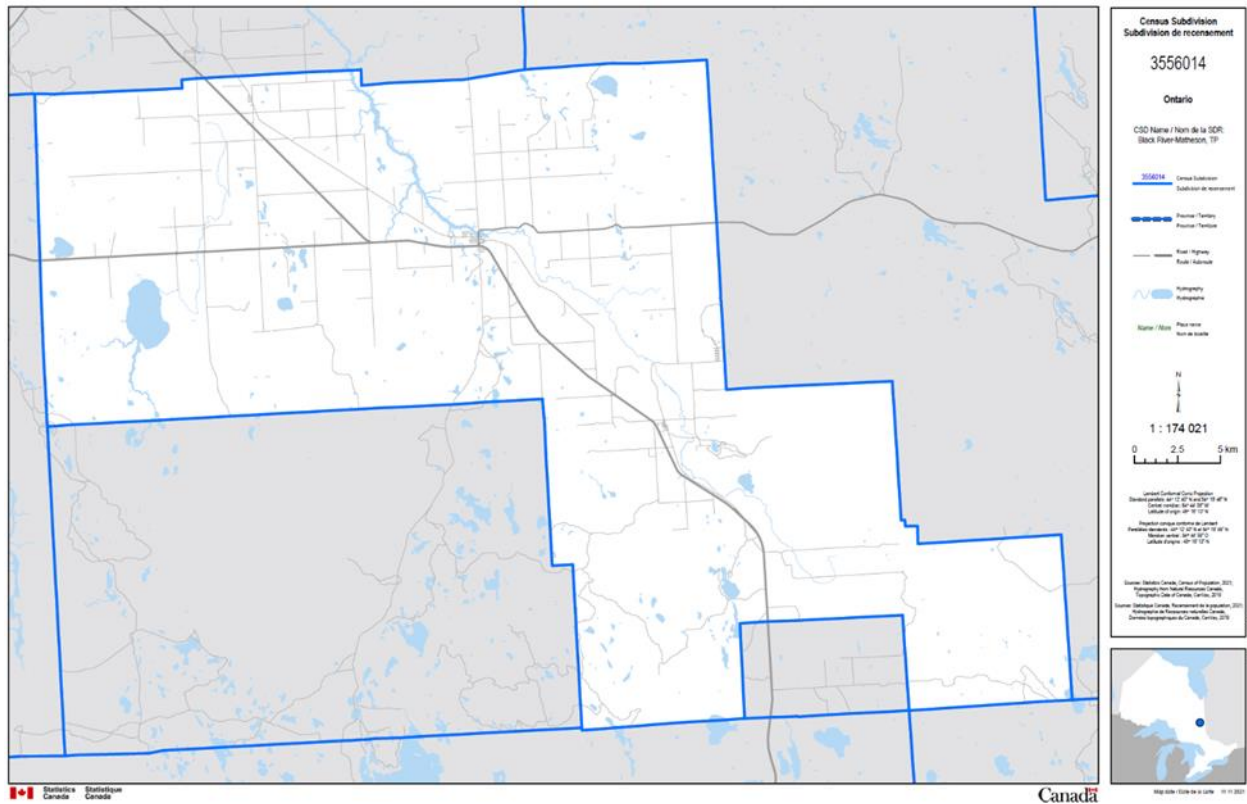
Source: Statistics Canada (2021)

Black River-Matheson, often referred to simply as Matheson, is a small but significant community located in northeastern Ontario within the Township of Black River-Matheson. This township is strategically positioned near major highways, providing easy access to larger urban centers like Timmins, which enhances the mobility and economic opportunities for its residents (Township of Black River-Matheson, 2023).

4.1.4.1 Economic Profile

The local economy of Black River-Matheson is primarily sustained by agriculture, forestry, and small-scale mining activities. The community benefits from its proximity to larger economic hubs, offering additional employment opportunities for residents in sectors such as retail, healthcare, and industry. Recently, there has been a concerted effort to promote local businesses and enhance tourism through outdoor recreational activities. These efforts aim to capitalize on the region's natural beauty and rural charm, attracting visitors for activities like hiking, fishing, and hunting (Township of Black River-Matheson, 2023).

4.1.4.2 Census Profile

According to the 2021 Census, the population of Black Water Matheson is approximately 2,572 and has a population density of 2.2 person per square kilometer (Statistics Canada, 2021). The median age in the community is 43.4 years, indicating an older population compared to the provincial average of 41.6 years, which reflects the demographic trend of aging populations in many rural areas of Northern Ontario (Statistics Canada, 2021). Black River Matheson has experienced growth in population by 5.5% from 2016-2021(Statistics Canada, 2021). The median household income is around $65,000 (Statistics Canada, 2021). The community has a diverse demographic composition, with both Anglophone and Francophone residents (Statistics Canada, 2021).

4.1.4.3 Cultural and Historical Significance

Black River-Matheson is known for its close-knit community atmosphere and rural charm. The town offers various outdoor activities such as fishing, hunting, and hiking, which attract visitors who appreciate nature and rural experiences. The strong sense of community and the natural beauty of the area are central to its cultural and historical identity, making it a desirable location for those seeking a quiet, rural lifestyle (Township of Black River-Matheson, 2023).
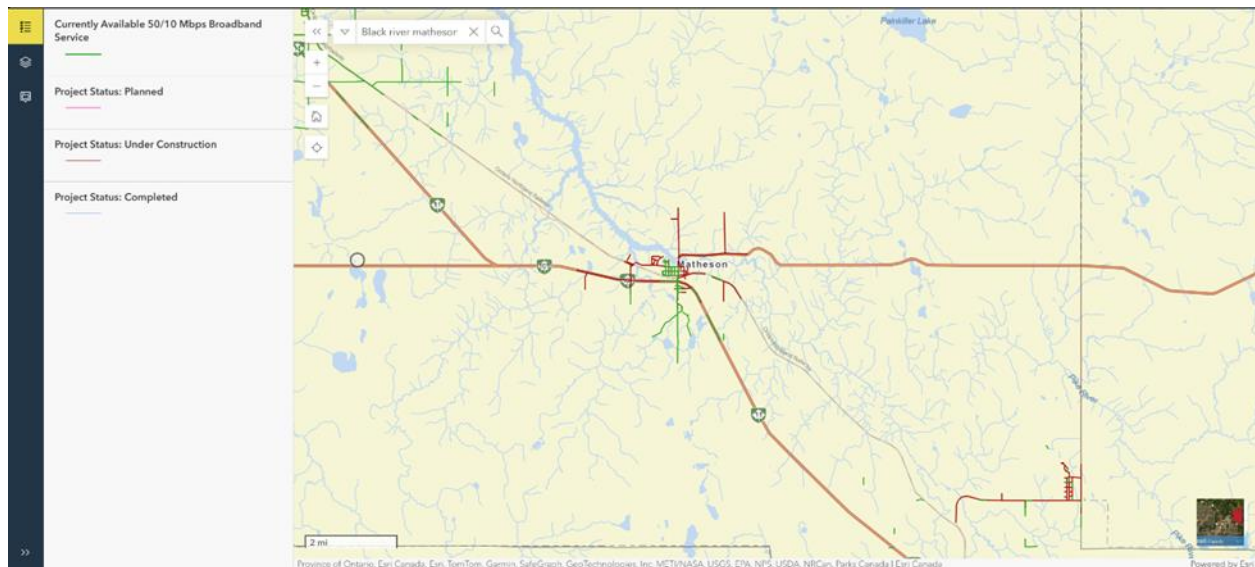
4.1.4.4 Broadband Internet Status

Figure 8 Map of Current Internet Status of Black River Matheson

Source: Ontario Internet Access Map (2024)

Broadband access in Black River-Matheson is limited, particularly in the more rural and remote areas of the township. Most residents rely on DSL and satellite internet services,

with connection speeds frequently falling below 25 Mbps. This lack of high-speed internet poses challenges for both residents and local businesses, affecting everything from educational opportunities to economic development. According to the Canadian Radio-television and Telecommunications Commission (CRTC), the 50/10 Mbps standard—50 Mbps download and 10 Mbps upload—is considered the minimum acceptable speed for broadband internet. However, many parts of Black River-Matheson do not meet this standard, contributing to a digital divide that impacts the community's ability to fully participate in the digital economy (CRTC, 2019).

Efforts to improve broadband infrastructure are ongoing, with community-led initiatives and government support aiming to provide more reliable and faster internet services. These initiatives are crucial for enhancing the quality of life in Black River-Matheson, supporting local businesses, and ensuring that residents have access to the same opportunities as those in more urbanized areas. Expanding broadband access is seen as essential for the community's future economic development and for retaining and attracting residents to this rural area (Township of Black River-Matheson, 2023).

4.1.5 Comparison Broadband Access in Selected Communities

The following table provides a brief overview of key characteristics among the four selected communities in Northern Ontario.

Table 1 Census Overview of Selected Communities

Name	Population	Population Density (persons per square kilometer)	Area (in square kilometer)	Change in population 2016-2021	Median Income (in $CAD)	Average Age
Black River-Matheson	2,572	2.2	1161.89	5.5%	65,000	43.4
Dryden	7,388	122.7	65.58	-4.7%	72,000	45.4
Moosonee	1,512	2.8	547.83	2.1%	55,000	43.7
Timmins	41,145	13.9	2955.33	-1.5%	77,000	41.8

Source: Statistics Canada (2021)

4.1.5.1 Key Similarities

From the findings, four key similarities emerge, each outlined below.

- Moosonee, Dryden, and Black River-Matheson: All three communities face significant challenges related to their geographic locations. Moosonee's remote location near James Bay, Dryden's rural areas, and Black River-Matheson's expansive and sparsely populated regions contribute to difficulties in providing consistent and high-speed broadband access.
- Dryden, Moosonee, and Black River-Matheson: These communities experience limited broadband access, particularly in their rural or more remote areas. They often rely on slower technologies like DSL, satellite, or fixed wireless options, which do not always meet the CRTC's 50/10 Mbps standard.
- Timmins: While Timmins benefits from relatively advanced broadband infrastructure, outlying areas near the community still face challenges similar to those in Dryden, Moosonee, and Black River-Matheson due to lower population densities and vast geographic areas.
- All Communities: Each community has ongoing or planned initiatives aimed at improving broadband access, often supported by provincial or federal funding. These initiatives are crucial for enhancing connectivity and ensuring that residents and businesses can participate fully in the digital economy.

4.1.5.2 Key Differences

From the findings, four key differences emerge, each outlined below.

- Timmins has relatively advanced broadband infrastructure, including access to fiber optic and cable internet services with speeds up to 100 Mbps in many areas, positioning it ahead of the other communities in terms of overall connectivity. Many areas in Timmins meet or exceed the 50/10 Mbps standard, although this standard is not universally met in more remote parts of the city. Benefiting from more developed infrastructure, the focus in Timmins is on expanding existing fiber optic and cable networks to outlying areas.
- Within the city limits, Dryden offers moderate broadband speeds, generally between 25 to 50 Mbps. However, rural areas in Dryden face connectivity issues similar to Moosonee and Black River-Matheson. Dryden's urban areas approach the 50/10 Mbps standard, but many rural areas fall short of this benchmark. Efforts are geared towards enhancing the existing DSL and cable networks and addressing rural connectivity through provincial funding.
- Moosonee has some of the most significant broadband challenges due to its remote location, with most residents relying on satellite internet, which is slower and less reliable compared to DSL or cable. The 50/10 Mbps standard is largely unmet, with most residents experiencing much slower speeds due to reliance on satellite connections. Solutions in Moosonee are more complex, involving government-

funded projects to deploy more reliable and higher-speed internet solutions, such as improved satellite technology or alternative solutions due to its extreme remoteness.

- Broadband access in Black River-Matheson is also limited, particularly in rural areas, with speeds often below 25 Mbps. However, unlike Moosonee, some parts of the community do have access to DSL services. Similar to Moosonee, Black River-Matheson struggles to meet the 50/10 Mbps standard, particularly in its rural regions. Similar to Dryden, Black River-Matheson focuses on community-led initiatives to improve broadband infrastructure, with a significant reliance on government support to address the gaps.

4.1.6 Conclusion

Broadband internet access across the four communities— Black River-Matheson, Dryden, Moosonee, and Timmins—reveals a complex landscape shaped by geographic, demographic, and infrastructural factors. While all these communities face challenges related to their remote or rural locations, the severity and nature of these challenges vary significantly.

Timmins stands out for its relatively advanced broadband infrastructure, which includes access to fiber optic and cable services, allowing many residents to enjoy speeds up to 100 Mbps. However, even in Timmins, outlying areas struggle with connectivity due to the community's vast geographic expanse and lower population density (CRTC, 2019). This contrasts sharply with Moosonee, where the remote location and climate severely limit broadband options. Residents in Moosonee primarily rely on satellite internet, which, although crucial for connectivity, fails to meet the Canadian Radio-television and Telecommunications Commission's (CRTC) 50/10 Mbps standard, leading to slower speeds and higher latency (ISEDC, 2019). In comparison, Dryden and Black River-Matheson both experience a mix of moderate broadband access within more densely populated areas and significant connectivity challenges in rural regions. Dryden's urban residents can access speeds between 25 and 50 Mbps, but its rural population often contends with slower DSL or satellite services. Similarly, Black River-Matheson struggles to provide consistent internet access across its territory, with many rural areas unable to meet the 50/10 Mbps standard (CRTC, 2019).

Efforts to bridge the digital divide vary across these communities, reflecting their unique circumstances. Timmins focuses on expanding its existing infrastructure to ensure that all areas, including the more remote ones, can benefit from high-speed internet. Dryden and Black River-Matheson are both leveraging community-led initiatives and government funding to improve their broadband networks, although their strategies are shaped by different regional needs and economic conditions. In contrast, Moosonee's broadband improvement efforts are more complex, involving substantial government investment to deploy more reliable and higher-speed solutions, particularly given the limitations of current satellite technology (ISEDC, 2019).

4.2 Role of Planner in Broadband Connectivity in Selected Communities

Discussion were held with planners to understand their role in facilitating broadband internet in these four Northern Ontario communities. Planners and similar local government staff were contacted based on publicly available information on community websites. Individuals were invited to share their experiences as planners in broadband connectivity by email or telephone interview. Follow up emails and phone calls were made to encourage participation. Responses were received from three of the four communities. Responses will be kept anonymously for this research.

One of the respondents indicated, "Based on the type of research and information you are looking for I will not be of much help. In my tenure in the community I have not been involved with anything to do with internet installations. We have reviewed and authorized Cell towers." Other respondent replied, "the City Planning Division does not deal with broadband services within the municipality." Another respondent replied, "We practice the same as one of the community that you are covering, so consider the same answer as what they have told you".

The responses from planners across these communities highlight a significant gap in the involvement of local planning divisions in broadband internet facilitation. This lack of engagement may be due to the traditional focus of planning departments on land use, zoning, and infrastructure projects, which historically have not included broadband as a core element. The minimal role that planners have played in broadband development underscores the potential need for a broader definition of infrastructure within the planning profession, especially in rural and remote communities where connectivity is crucial for economic development and quality of life.

Given the responses, it appears that broadband internet deployment has been primarily managed by private sector telecommunications companies, with limited input or oversight from local planners. This situation suggests a missed opportunity for integrating broadband into comprehensive community planning efforts. The role of planners could be expanded to advocate for better connectivity, ensure that broadband infrastructure is included in long-term planning documents, and collaborate with other stakeholders to bridge the digital divide in these communities. Without the active involvement of planners, broadband initiatives may continue to be reactive rather than proactive, potentially delaying the realization of widespread, reliable internet access in these areas.

In conclusion, the feedback from planners in these Northern Ontario communities reveals an opportunity to rethink the role of planning divisions in broadband development. To effectively facilitate the digital infrastructure required for future growth, planners must be empowered to engage more directly in broadband-related projects, working alongside policymakers, service providers, and the communities they serve.

This shift would not only enhance connectivity but also contribute to the overall socio-economic resilience of these regions.

5 Summary

This research was driven by two central questions: What is the current status of broadband internet access in Northern Ontario? and What is the role of planners in facilitating broadband internet access in these communities? Through case studies ofBlack River-Matheson , Dryden, Moosonee, and Timmins, this study revealed significant disparities in broadband access across these communities, reflecting broader trends identified in the academic literature.

The findings indicate that broadband access in Northern Ontario remains inconsistent, with urban centers like Timmins and Dryden benefiting from relatively advanced infrastructure, including fiber-optic and high-speed cable services (CRTC, 2019). In contrast, more remote communities such as Moosonee and Black River-Matheson continue to face substantial connectivity challenges, relying on slower and less reliable satellite and DSL services (CRTC, 2019). The case of Moosonee, in particular, underscores the difficulty of providing high-speed internet in remote areas, where the harsh climate and geographic isolation hinder infrastructure development.

When these findings are compared to the literature, a clear gap emerges between the theoretical potential of planners to influence broadband development and their actual involvement in these processes. Academic sources emphasize the critical role that planners can play in advocating for and facilitating broadband infrastructure, particularly in rural and remote areas (Davis, 2009; Hudson et al., 2021). Planners are positioned to integrate broadband considerations into broader planning frameworks, ensuring that digital infrastructure is seen as essential to community development (Canadian Rural Revitalization Foundation, 2017). However, the responses from planners in the case studies suggest that broadband is often viewed as outside the traditional scope of planning responsibilities. The planners interviewed reported minimal to no involvement in broadband initiatives, with some noting that their role was limited to reviewing cell tower applications rather than actively facilitating broadband projects.

This disconnect between the potential role of planners and their current level of involvement suggests several avenues for future research. One area of inquiry could focus on the institutional and structural barriers that limit planners' engagement in broadband infrastructure projects. Understanding these barriers could lead to more effective strategies for incorporating broadband considerations into regional and municipal planning processes. Another potential research direction could explore the role of other stakeholders, such as local governments, private sector partners, and community organizations, in driving broadband initiatives. Additionally, a broader study encompassing a larger number of Northern Ontario communities could provide a more comprehensive understanding of the regional disparities in broadband access and the varying roles different stakeholders play in addressing these challenges.

In conclusion, this research has highlighted the uneven landscape of broadband access in Northern Ontario and the limited role that planners currently play in addressing these

disparities. While the literature suggests that planners could be more proactive in advocating for and facilitating broadband development, the reality in these communities indicates a need for greater advocacy, policy changes, and resource allocation to empower planners to contribute more significantly to these efforts. This research contributes to the ongoing conversation about digital equity in rural and remote areas, offering insights that could inform future policy and planning efforts.

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