

**Transportation Inclusion and Community Wellbeing: Exploring Public
Transit Accessibility of Winnipeg's North End Neighbourhoods**

by

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ABSTRACT

Analyzing public transit accessibility to marginalized communities is critical to exploring the link between transportation inclusion and wellbeing in automobile-centered cultures. This study is an attempt to examine public transit accessibility to Indigenous residents in Winnipeg's North End. Apart from analyzing the current level of transit accessibility, the study explores barriers that hinder the use of public transit in the North End and examines strategies to improving transit accessibility to its residents.

This study adopts a holistic approach to understanding 'accessibility' and recognizes the importance of socio-economic, perceptual, and demographic factors in shaping the demand for transit facilities in an area. Findings of the study illustrate the need to include transportation inclusion as an essential component of the urban Indigenous welfare policies in the country. The lessons learned will also provide an initial framework to understand the link between community wellbeing and transportation inclusion of other socio-economically vulnerable communities.

Keywords: Indigenous communities, transit accessibility, transportation equity, North End

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1 INTRODUCTION

Community wellbeing is "the combination of social, economic, environmental, cultural, and political conditions identified by individuals and their communities as essential for them to flourish and fulfill their potential" (Wisemand & Bracher, 2008, p. 358). Transportation is a major determinant of socio-economic wellbeing of the population (Dodson et al., 2006). The availability of transportation facilities shapes the spatial distribution of various amenities, pattern of population concentration, and availability of employment opportunities. Hence, transportation accessibility is strongly linked to access to opportunities, and therefore equity (Littman, 2015). Due to the central role transportation plays in one's day-to-day activities, it is regarded as a fundamental right in the contemporary "mobility culture" (Matthews, 2001, p. 9; Ontario Human Rights Commission, 2002; Sanchez et al., 2003). Consequently, denial of transportation facilities to marginalized communities or individuals "exists as both a cause and consequence of social exclusion" (Kenyon et al., 2002, p.1).

The inability to own private vehicles, high transportation cost, dispersed location of services, and stigmatization of non-driving options remarkably limits low-income households' access to transportation networks in automobile-centered development (Murray & Davis; 2001; Litman, 2003). These constraints lead to severe 'transportation disadvantage'¹ and unequal access to transportation facilities amongst various population groups (Travers Morgan Pty. Ltd, 1992; Church et al., 2000). Low-income households, which are disproportionately ethnic minorities, unemployed, single parents, and seniors (Lucas & Clifton, 2004) are often compelled to

¹ Clifton and Lucas (2004) define a low-income individual/household living in car-dominant societies but without a car as 'transportation-disadvantaged'. Transportation disadvantage is positively correlated with components of social inclusion such as income, unemployment, and social capital, while negatively correlated with community wellbeing (Currie & Delbosc, 2011).

minimize trips due to lack of transportation options. Apart from limiting their accessibility to basic goods, this also negatively impacts their potential for social capital building, sense of community, and satisfaction in life (Stanley & Vella-Brodrick, 2009; 2011).

With an aim to ensure accessibility to all populations, transportation is treated as one of the few sectors where "the egalitarian norms tends to predominate" (Altschular, 2012, p. 4). Achieving the goals of transportation inclusion also demands policy makers to recognize the transportation needs of those who are unable to reach their destinations due to various accessibility barriers rather than focusing on the visible demand for transportation (SEU, 2003). However, the travel needs of the people facing transportation exclusion or disadvantage often remain hidden, making it more difficult to frame strategies for their transportation inclusion (Stanley & Vella-Brodrick, 2011). Consequently, ensuring transportation inclusion remains a major challenge despite the numerous policy measures taken to ensure acceptable, affordable, and accessible transportation facilities to all (Lucas, 2004).

Unlike many developed countries, the Canadian Government plays a minor role in planning, public transit investments, and in framing policies to ensuring transportation-related social inclusion (Litman, 2003b). A history of automobile-centered transportation and land use policies in many Canadian cities has worsened transportation exclusion of non-drivers who are mostly from low-income, non-driver, single-parent, and physically and mentally disabled categories (Litman, 2003a). Roughly 20% of Canadian households do not own automobiles; about 33% of the households have at least one transportation-disadvantaged member while roughly 10 to 30% of the population is affected by transportation-related social exclusion (p. 1).

Public transit plays an important role to improving the socio-economic quality of life of all citizens, and enables them to "save and expand opportunities and choices" (American Public

Transportation Association, 2007, p. 1). It is particularly true for the transportation-disadvantaged households who predominantly depend on public transportation to meet their basic mobility needs (Johnson-Anumonwo, 1995; Currie & Delbosc, 2011). Therefore, provision of a minimum level of public transportation services—in terms of both spatial and temporal coverage, and frequency—is beneficial to all sections of the population (Stanley & Vella-Brodrick, 2011). In addition, policies to ensuring public transit accessibility entrench democratic values. Thus, a bus is a symbol of "democracy at work" (Penalosa, 2013, 3:49).

The urban Indigenous population is widely regarded as a marginalized community in Canada (Environics Institute, 2011). Despite having numerous examples of successful transition of Indigenous migrants from their traditional territories to urban societies, they disproportionately represent socially and economically vulnerable population in Canadian cities including Winnipeg (Peters, 2006). Their wellbeing is constrained by lack of employment opportunities, poor access to education, and health care (Belanger, 2005). Currently, more than half of the country's Indigenous population lives in urban areas and experience high levels of unemployment, poverty, and related social challenges (Statistics Canada, 2011), directly impacting their wellbeing, and Winnipeg is not an exception to this trend. Therefore, examining transit accessibility to Indigenous population in Winnipeg's North End, and strategies to ensuring residents' accessibility to basic amenities is a key step to ensuring community wellbeing and transportation equity.

1.1 Research Purpose and Questions

This study is an attempt to examine the degree of public transit accessibility to Indigenous residents of Winnipeg's North End. The study also explores factors that influence the

residents' access to transit services and strategies to ensure transit accessibility if the need is established by the study. The research questions that guide this study are:

1. What is the current level of transit accessibility in Winnipeg's North End? Are there particular concerns for Indigenous residents?
2. What are the socio-economic implications of the current level of transit accessibility in the North End? Are there any implications specific to Indigenous residents?
3. What are the possible strategies to improve accessibility to transit facilities in the North End? Are there particular strategies to improving the transit accessibility to Indigenous residents?

In this study, 'accessibility' is defined as "people's ability to reach goods, services, and activities" (Litman, 2015, p. 1). Majority of the studies on transportation accessibility primarily focuses on the supply dimension--often restricting to the physical, geographical, and temporal availability of transportation services. However, this study adopts a holistic approach to defining 'accessibility'. It recognizes that paying due attention to the specific socio-economic settings and forces that shape these settings is essential to understand transit accessibility in a given context. Thus, the study also examines the role of factors such as financial affordability, perceptions about safety and security, comfort and convenience, and access to transit-related information to determining accessibility.

This study also recognizes that there is a lack of agreement on the geographical boundaries of Winnipeg's North End. The North End Community Revitalization Corporation (NECRC), a major community development organization working to revitalize the North End neighbourhoods, defines North End as the geographical area that lies north of the CPR tracks,

south of Carruthers Avenue, east of McPhillips Street, and west of Red River (NECRC, 2016, June 30). According to this definition, there are eleven neighbourhoods in the North End while the neighbourhoods that form its southern part are the most socio-economically disadvantaged area in the city (Buckland et al., 2005). On the other hand, McMonagle et al. (2011) defines North End as the area that lies between Main Street in the east to McPhillips in the West, and Dufferin Avenue in the south to Mountain Avenue in the north.

According to the boundary description adopted by the Manitoba Housing and Community Development, the North End includes only five neighbourhoods, most of which falls within the Point Douglas South neighbourhood cluster. Quite differently, the definition adopted by the Winnipeg Regional Health Authority (WRHA) characterizes 'North End' as the 'Point Douglas Community' and includes all the neighbourhoods in the Point Douglas North and South neighbourhood clusters. Community development initiatives such as Winnipeg Boldness Project follow the WRHA's definition of North End. This study does not approve or disapprove any of the above geographical definitions. Nonetheless, choosing the appropriate neighbourhoods for quantitative analysis was a major step in the study.

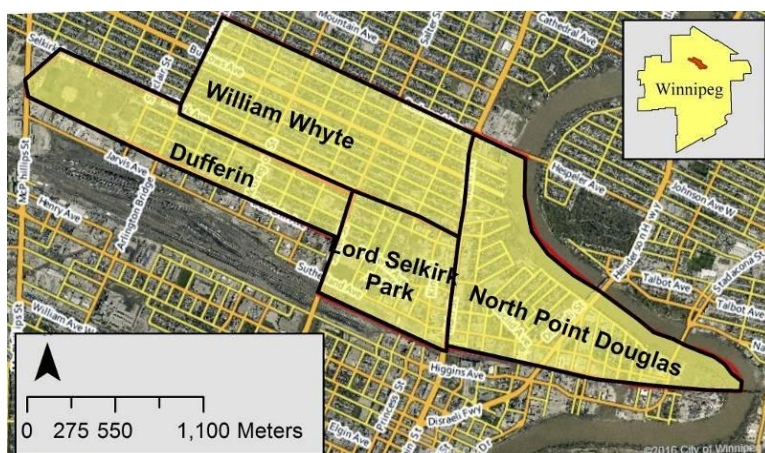


Figure 1.1 Location of North End covered in the quantitative analysis. (Image source: Map prepared by the author with base layer from the City of Winnipeg, 2006)

The quantitative component of the study covers four among the six neighbourhoods in the Point Douglas South Neighbourhood Cluster: William Whyte; Lord Selkirk Park; Dufferin; and North Point Douglas (Figure 1.1). Though part of the same neighbourhood cluster, the study does not include Dufferin Industrial and South Point Douglas neighbourhoods because of their very small population size and predominantly industrial land use (Figure 1.2). Several other neighbourhoods are generally regarded as part of the North End. However, the quantitative component of the study included only four neighbourhoods mentioned above because of two reasons: firstly, Point Douglas South neighbourhood cluster is considered as the core of the historic North End, and secondly, limiting the geographical coverage was essential to complete the study within the limited timeframe.

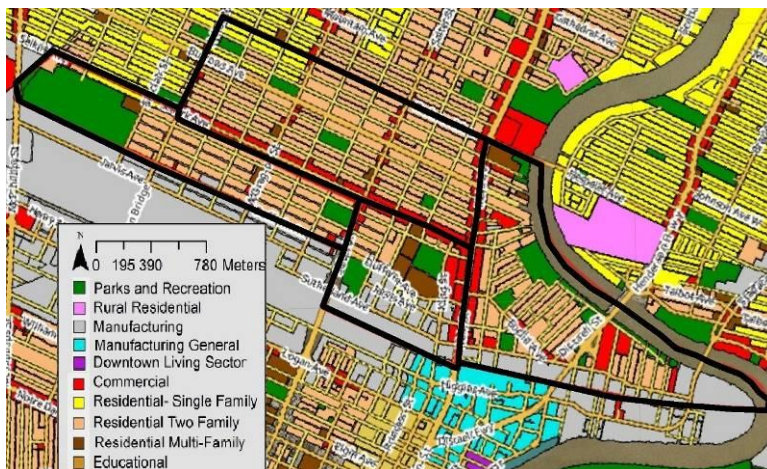


Figure 1.2 Zoning categories of neighbourhoods covered in the quantitative analysis. (Image source: Map prepared by the author with base layer from the City of Winnipeg, 2016)

Despite not including all North End neighbourhoods, the area covered in the quantitative analysis is termed as the 'North End'. The entire North End was considered as a single unit in the qualitative analysis and no geographical restrictions were set. Most of the North End community service organizations serve the entire North End community, with very limited or no neighbourhood level restrictions on their services. This made it almost impossible to keep neighbourhood level restrictions while undertaking the qualitative component of the study.

1.2 Geographic, Historic, and Socio-economic Context of the North End

Winnipeg is a highly divided city on social, ethnic, and economic basis (Silver, 2008) and Indigenous communities form a visible segment of its socio-economically marginalized population (Silver, 2008; Environics Institute, 2011). Currently, Winnipeg is home to largest number of Indigenous peoples of any other city in Canada, with the city's Indigenous population growing significantly faster than any other population categories (Statistics Canada, 2006; 2011). A significant share of the city's Indigenous population lives in the inner-city neighbourhoods, and in the city's historic North End district in particular (Figure 1.3).

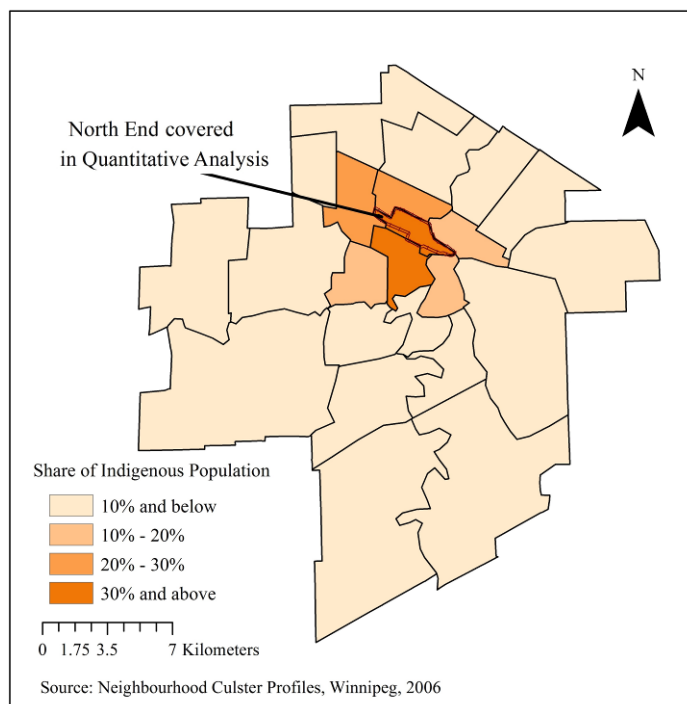


Figure 1.3 Share of Indigenous population in total neighbourhood cluster population. (Source: Map prepared by the author with data from the Neighbourhood Cluster Profiles, City of Winnipeg, 2006)

The north End is often described as a highly culturally diverse area (Artibise, 1975) located "on the wrong side of the tracks" or as an area characterized by high levels of poverty, vacant buildings, and low-level of political participation (McMonagle et al., 2011). Since the early twentieth century, Winnipeg's North End has been regarded as a "less desirable", part to live in the city and was also known as "foreign quarter", "New Jerusalem" and "CPR Town"

(Artibise, 1975, p. 158). The discriminatory municipal policies further reinforced the gap between the North End and the area located south of it (Artibise, 1975). However, the North End's decline began with the onset of suburbanization and deindustrialization processes that began during the Post Second World War era (Silver, 2010). During this process, Indigenous residents gradually replaced Eastern European migrants, and the building stock and the commercial activities deteriorated (Artibise, 1975; Radke, 2012).

Table 1.1 Socio-economic and demographic indicators

Indicators	North End	Winnipeg City
Average household income (in \$)	30650	63023
Share of children (% of population)	26.2	17.7
Non-driving commuters (% of workers)	53.3	32
Indigenous population (% of population)	45.5	10.2
No certificate/degree (% of population > 15 years)	50.0	23.1
Unemployment rate ((% of labor force population)	14.8	5.2
Average value of dwelling (in \$)	65411.6	161999

Source: Neighbourhood Profiles, City of Winnipeg, 2006

The visible concentration of poverty in the North End creates a starkly different demographic profile than the rest of the city (Table 1.1). For Indigenous peoples, these experiences of poverty and the associated negative neighbourhood impacts (Silver, 2008) can also be understood as an outcome of social-identity based filtering: the process that restricts the residential options available to the low-income Indigenous residents in the city, and forces them to settle in areas that are already established as the centers of poverty (Nicholas, 2013 as cited in Greene et al., 2013). The growing poverty and the resultant social issues, as well as the limited support systems currently available in the North End, act as a spiral and exacerbate the intensity of the existing socio-economic challenges and the area's negative identity (Silver, 2010). For as

observed by Silver (2010) and Welch (2012), the current north-south divide is not merely socio-economic but also psychological. The *Urban Indigenous Peoples Study-Winnipeg* published by Environics Institute, (2011) also confirms the existing psychological gap between Indigenous and the non-Indigenous residents and the ongoing process of Indigenous marginalization in the city.

The North End is also a home to numerous inner-city revitalization and community development initiatives that predominantly have a 'social' focus. However, the potential of these non-profit organizations to transform the North End is constrained by inadequate and irregular funding (Silver, 2004) as well as government housing policies that have privileged market-based approaches (Lawrence, 2004). Media reports have played a significant role in strengthening the negative image about Winnipeg's inner-city, so much so that the North End often functions as a synonym for poverty, crime, gang activities, violence, drugs, and racism (Lawrence, 2004; Silver et al., 2006)—further discouraging private investments in the area (Silver et al., 2009). Attempts to revitalize the North End are further constrained by the ways in which the area remains spatially, and not just socio-economically, cut-off from the rest of the city (Silver, 2010).

The Canadian Pacific Railway (CPR) that runs through the North End's heart played a key role in shaping the socio-economic and demographic composition of the area and separated it from the rest of the city (Silver, 2008; 2010). It still exists as a "physical and psychological barrier between the North End and the rest of the city" (Welch, 2012). Currently, the access to North End neighbourhoods from the adjacent areas is limited to two bridges over the CPR yards on Salter Street, Arlington Avenue, and an underpass on Main Street. Consequently, limited connectivity of the North End with rest of the city—including geographically close

destinations—remains a major concern. In the recent years, poor transportation accessibility has been emerging as one of the major issues facing this district (Welch, 2012).

1.3 Importance of Transit Services in the North End

The limited commercial activities in the North End means that the residents must travel outside the district to meet basic needs, such as employment, financial activities, shopping, and recreation (NECRC, 2011). Funding constraints and non-profit agencies' inability to provide a full range of services (Silver, 2004) is another factor that increases the residents' need to travel outside the neighbourhood. Therefore, it is likely that any mismatches in the demand and supply of transit facilities in the North End will restrict access of basic amenities to a significant share of its low-income, non-car-owning residents.

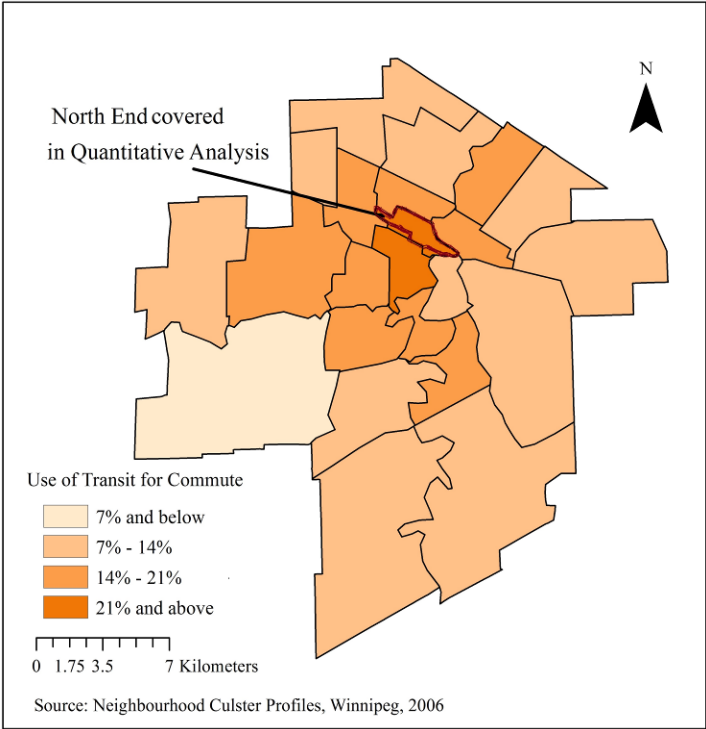


Figure 1.4 Use of transit for commute at neighbourhood cluster level. (Source: Map prepared by the author with data from the Neighbourhood Cluster Profiles, City of Winnipeg, 2006)

Winnipeg Transit provides spatial, temporal, and route coverage details of transit services in the North End, which provides insight into the supply of transit services. However, the data on

the demand for public transit in the area is very limited. Data on commute-related transit use at the neighbourhood cluster level (see Figure 1.4) provides some insight into the demand for transit services, with a high proportion of the North End residents reporting that they rely on public transportation for their daily commute². Also, analyzing various indicators of transit dependency is likely to indicate the importance of transit service in the North End community.

Table 1.2 Selected indicators of transportation disadvantage

Name of neighbourhoods	Indicators of transit-dependency (All values in %)		
	Avg HH income <\$30,000	Commuters using transit	Indigenous & visible minorities
Point Douglas North	51.6	30.4	42.9
Dufferin	62.6	26.1	68.2
William Whyte	45.8	30.1	66.6
Lord Selkirk Park	75.0	22.4	67.8
Winnipeg	27.5	14.2	26.5

Source: Neighbourhood Profiles, City of Winnipeg, 2006

According to the 2006 Census figures, roughly 29% of the workers from the North End commuted by transit while the corresponding share of the city was only 14%. Although not necessarily a clear predictor of transportation demand, it should also be noted that the North End community exhibits several indicators of transit dependency. Several transportation studies have observed non-ownership of cars, low-income, and minority ethnic identity³ as major indicators of transportation disadvantage and transit dependency (Graham & Delbosc, 2011; Currie, 2004; Wixey et al., 2005; Dodson et al., 2006). Apart from the above population categories, Indigenous

² Commute data captures the general travel behavior of workers in the week preceding the survey. Hence, it does not necessarily reflect the level of transit use in the North End. However, studies such as DeRiviere and Brojges (2011) and Fernandez (2012) observed high shares of commuting-related transit use in the North End as indicator of high demand for transit services.

³ Minority ethnic communities are often transportation-disadvantaged. However, it will be erroneous to assume all ethnic minorities as transportation-disadvantaged (Wixey et al., 2005).

communities are also a highly transportation-disadvantaged category in the Canadian context (Litman, 2003b).

A comparison of the shares of households with annual income below \$30000, commuters using public transit, and Indigenous and visible minorities in total neighbourhood population (see Table 1.2) suggests that the neighbourhoods in the North End are likely to be significantly more transit dependent than the rest of the city. However, the above indicators have several limitations, and are inadequate to establish the level of transit dependency in the study area. This necessitated the study to include a qualitative component that analyses transit dependency of the North End residents based on real-life experiences.

1.4 Significance of the Study

Literature and Census statistics indicates the marginalized status of Indigenous residents in Winnipeg. However, no studies have examined the transportation-related exclusion of Indigenous population in the Canadian context including Winnipeg. The results of the study will be fruitful to adopt a holistic approach towards the socio-economic development of the urban Indigenous communities and similarly socio-economically marginalized communities in Canada. As the study is expected to reveal critical issues of transit accessibility encountered by the urban Indigenous communities, it is also relevant from the transportation planning perspective.

The study is undertaken with the support of Winnipeg Boldness Project, a community organization that functions to improve the socio-economic condition of Winnipeg's North End neighbourhoods largely from an Indigenous perspective. Transportation accessibility in the North End is one of the five major concerns that the Boldness Project is dealing with at present. The organization, currently, has very limited information on the transit-related facilities available

in the area. The sharing of the quantitative and qualitative findings of this study may assist the Boldness initiative to evolve strategies and policies to support the North End community's transportation priorities. Consequently, the lessons learnt from the present study are likely to have direct impacts on the wellbeing of the North End community.

None of the existing studies has attempted to explore the importance of transit accessibility to Indigenous communities in Canada. Therefore, this thesis can be considered as a pilot research in the realm of transportation inclusion of urban Indigenous communities in the country that can be undertaken by other researchers on a larger scale in the future. In summary, it is anticipated that the proposed research will contribute to our understanding of the importance of public transit and factors that influence transit accessibility to urban Indigenous communities in the country.

1.5 Chapter Outline

The study is organized into six major chapters. Chapter 1 has provided an introduction to the study and includes research problem, research purpose and questions, a brief socio-economic and historic background to the research site, and significance of the study. Through a review of relevant literature, Chapter 2 provides a theoretical background to the understanding of transportation-related issues and importance of public transportation. The chapter also explains concepts such as accessibility and transportation equity that are central to this study and reviews selected transit accessibility measurement methods used by researchers and policymakers.

Chapter 3 explains the research framework that provided logical guidance in this study. Apart from explaining the qualitative and quantitative data collection and analysis, this chapter also discusses the ethical issues involved and the limitations of the study. Based on the data

collected from Winnipeg Transit, Chapter 4 provides a detailed quantitative analysis of the transit facilities in the study area. This chapter can be regarded as the background to the qualitative component in the study. The chapter primarily includes both quantitative and spatial analysis of the temporal, spatial, and physical dimensions of transit accessibility, and the availability of transit-related facilities at the bus stops.

Chapter 5 is based on the experiences shared by the community service workers, community leaders, and experts on transit accessibility issues in the North End during the semi-structured interviews. This chapter analyzes the accessibility of the North End residents to various basic amenities and attempts to answer if the current level of transit facilities in these neighborhoods is a hurdle to access services of critical importance. The chapter also examines the factors that influence transit accessibility in the North End and the possible strategies to improving transit accessibility in the study area if the need is established. Chapter 6 discusses the major conclusions of the study including the answers to the three initial research questions. It also identifies important lessons for planning practice and research, as well as opportunities for future research.

2 LITERATURE REVIEW

Accessibility of individuals to transportation facilities gives them the freedom and opportunity to access basic amenities of life. Mobility is highly valued in Western cultures, and automobiles are considered as the symbol of freedom and choice (Combs, 1984). Consequently, the transportation policies in automobile-centered societies are used as tools to accommodate the needs and aspirations of the automobile users (Litman, 2003). Availability of public transportation plays a significant role in meeting the mobility needs of the low-income, non-car-owning populations in the automobile-dominant cultures. However, the pressure to meet political expectations on the one hand, and to protect the interests of the highly mobile, car-owning population on the other, often, compels the authorities to compromise the quality of public transportation services (Garret and Taylor, 1999). Also, the deterioration of public transportation options in the automobile-oriented developments directly affects the socio-economic wellbeing of the low-income households than any other categories (Moulding, 2005).

Emphasis on transportation equity ensures that the transportation needs of the socio-economically vulnerable populations that are part of an automobile-centered culture are not compromised at the cost of other considerations. Achieving goals of transportation equity are also crucial to the building of healthy, livable communities and to bridge socio-economic disparities across various population categories (Sanchez, 2003; Moulding, 2005). However, the benefits from transportation investments, often, are not evenly distributed across various communities⁴ (Bullard, 2003). Analyzing the distribution pattern of benefits derived from the

⁴ The policies that promoted highway expansion at the cost of public transit improvements in the US is a good example of how the discriminatory government policies exclude certain categories of the population from availing benefits of public transportation investments (Bullard, 2003).

public transportation investments, both across transportation modes and socio-economic groups, is a powerful strategy to examine transportation equity (Bullard, 2003; Manaugh & El-Geneidy, 2010).

This chapter aims to systematically review the relevant literature on transportation accessibility and equity, and thereby to develop a theoretical understanding of the transportation accessibility concerns and related challenges. The chapter also compares various definitions of 'accessibility' and 'transportation equity'. This comparison was done to scrutinize and to finally adopt unambiguous and logical definitions for important concepts discussed in the study. Transportation-related literature in the context of Indigenous communities in Canada is unavailable at present. Therefore, the transportation accessibility literature on similarly socio-economically marginalized populations from comparable contexts is used. The literature review provides the framework for the arguments and data interpretations in the study.

2.1 Transportation Equity in Planning

The concept of 'transportation equity' is strongly linked to 'equity planning': an approach that attempts to offer a wider range of choices to individuals who at present have few options (Krumholz & Forrester, 1990). It is a planning strategy to reduce distributional inequalities and a planning practice that emphasizes the responsibility of the planners to uphold the rights of the least advantaged, to redress the existing socio-economic disparities, and to ensure the equitable distribution of the community's limited resources (Shindruk, 1992). 'Equity planning' criticizes institutional policies that are against the interests of the disadvantaged sections, and is a departure from the 'trickle down' principle (Henderson, 1995).

The concept of 'transportation equity' is loosely defined and lacks clarity as to what constitutes a 'just' allocation of transportation resources or how it can be measured (Martins et al., 2002). In general it deals with the fairness in the distribution of costs and benefits derived from the transportation policies and investments (Manaugh et al., 2015). From a social justice perspective, efforts to achieve 'transportation equity' should bridge the accessibility gap between the highest and the lowest accessible areas or between the car-owning and car-less households within a predefined range while maximizing the average figures of accessibility (Martins et al., 2012). As transportation related policy decisions have wide-ranging impacts on people's lives, measures to ensure 'transportation equity' should be regarded as a critical component of transportation planning (Litman, 2002). However, equity concerns in transportation planning were largely neglected until the early 2000s (Manaugh et al., 2015). Transportation equity can be divided into i) horizontal equity that is concerned with the equal distribution of the benefits, ii) vertical equity that is concerned with the distribution of benefits across various socio-economic groups, and iii) vertical equity that is concerned with the differences in abilities and needs (Litman, 2002). In reality, one form of equity conflicts with the other two types. Nevertheless, transportation is "most equitable if it provides the greatest benefits at the least cost to the disadvantaged groups" (p. 4).

Transportation-related injustices in the US were noticed decades after the construction of interstate highways and the resultant deterioration of public transportation system and the inner-city neighbourhoods (Grengs, 2015). With an emphasis on transportation equity, the subsequent years witnessed the rise of the Civil Rights and Environmental Justice movements. The Civil Right movement stood for the rights of the disadvantaged populations to benefit from the country's public transportation investments while the Environmental Justice movement

questioned the government policies that led to the disproportionately high concentration of the transportation-related burdens on the low-income, inner-city neighbourhoods (Bullard, 2003). Biased transportation investments which favoured freeway investments in the US over public transportation needs in the inner-cities boosted emptying of the central cities through suburbanization on the one hand and isolated the poor in the inner-cities on the other (Garett & Taylor, 1999). Such unequal distribution of transportation costs and benefits were results of procedural, geographic, and social inequities (Bullard & Johnson, 1997).

Transportation planners have a general tendency to prioritize the tangible outcomes at the cost of the less or non-tangible outcomes such as equity and exclusion (Handy, 2008). As the 'tangible' outcomes of transportation can be easily measured and presented to the public, they are more politically appealing as compared to outcomes of 'equity'. This is one of the reasons why equity concerns are often undermined in transportation planning (Manaugh et al., 2015). Even in those transportation policies that have attempted to address equity concerns, social policy is mostly restricted to issues of safety, disability, and access to jobs: neglecting other dimensions of equity (Stanley & Vella-Brodrick, 2009). Despite the increasing recognition of the need to include equity concerns in transportation planning, only one among the forty transportation sustainable strategies implemented in 18 North American cities focused on social equity while the rest focused on narrow economic and environmental goals (Manaugh et al., 2015).

Analysis of the various categories of transit users is an effective strategy to examine transit equity. Most of the transportation studies classify transit users as "captive and choice riders" (Jacques et al., 2013, p. 625). Captive riders always use transit as they do not have any other transportation options while choice-riders are the current automobile users who also have the option to use transit. However, this approach is very narrow and fails to capture the reality. A

detailed analysis of the socio-economic characteristics and travel behavior reveals four categories of transit users: "true captivity; dedication; utilitarian; and convenience" (p. 625). In order to ensure transit equity, the interests of the existing users, particularly the 'true captives' who are entirely transit dependent due to lack of choice, should be given priority as compared to efforts to expand ridership by attracting the choice riders (Jacques et al., 2013).

In reality, the transit planning agencies often encounter conflicts between the 'coverage' goals and 'patronage' goals (Walker, 2008). Also, the pressure on the transit planners to accommodate the political interests and the expectations of the car-owning—mostly white suburban population—leads to socially inequitable distribution of public transit benefits (Garret & Taylor, 1999). Consequently, most transit systems tend to focus on attracting the middle and high-income riders out of their automobiles or to encourage 'choice ridership' while taking the needs of the low income, captive riders for granted (Garret & Taylor, 1999; Beimborn et al., 2003). The dominance of environmental and economic goals over strategies to better serve the existing transit riders is well reflected in the prioritization of suburban rail system over inner-city bus lines in many North American cities even today (Manaugh & El-Geneidy, 2010).

However, the negligence of transportation equity concerns is not true for all Canadian cities. For instance, several cities such as Calgary, Saskatoon, and Windsor currently have affordable or low-income transit passes. Such transit affordability measures also encourage more people to use transit and to reduce automobile dependency (Fernandez, 2012; City of Peterborough, 2016). The recent transit investments in large Canadian cities such as Montreal and Toronto are expected to considerably improve the accessibility of the low-income neighbourhoods to employment centers and benefit them in the long-run (Manaugh & El-

Genediy, 2010; Foth et al., 2013). Also, most socially disadvantaged census tracts in Toronto had significantly better transit accessibility as compared to the rest of the city (Foth et al., 2013).

The increasing emphasis on equity concerns within the broad realm of transportation planning is also echoed in the policy documents published by the City of Winnipeg and Winnipeg Transit. Winnipeg Transit's *Direction to the Future* report (2000) highlighted the existing inequities in transportation investments that favour the automobile users in the city and how the continuation of these policies would affect the functioning of transit in Winnipeg and the wellbeing of the city's transit-dependent population. Similarly, *Winnipeg Transportation Master Plan (2011)* elaborated on the need to invest in the transit system and to make transit affordable to all sections of the population. Nonetheless, Winnipeg Transit is yet to introduce a low-income bus pass. Two major equity concerns with regard to transit services in Winnipeg at present are the gradually rising transit fares and huge investments made on Rapid Transit System that does not benefit the low-income neighbourhoods in the North End (Fernandez, 2012).

2.2 Defining Accessibility

The word 'accessibility' is frequently used in transportation literature since the 1950s. Nonetheless, the strategies to improving accessibility reemerged as one of the major focus areas of urban and land use planning only in the recent years (Iacono et al., 2010). Despite being a popular concept, the term 'accessibility' does not have a universally accepted definition and it varies depending on the research focus. For instance, Seider (2013) in his study about 'accessible transit' focused entirely on the 'physical' accessibility of transit facilities. The author analyzed various strategies to ensure 'universal accessibility' of public transit to widen the mobility options to people with disabilities. The *Accessibility Guide* published by Transport Canada (2011) and

the *Toronto Transport Commission Accessibility Plan Report* (2016) published by the Toronto Transit Commission are few examples of transportation documents that have solely focused on the 'physical' dimension of accessibility.

Hansen (1959) defined 'accessibility' as the opportunities that an individual at a specific location has for interaction. Supporting Hansen's definition of 'accessibility', Wachs and Kumagai (1973) added that accessibility is also a function of the socio-economic characteristics of the population. They argued that 'accessibility' varies across socio-economic groups and is not homogeneously distributed in a given geographical area. Highlighting the role of spatial location in determining accessibility, Hack (1976) defined accessibility as the function of the location or a point on space in relation to rest of the points in the system. From this viewpoint, an 'accessible location' refers to its physical proximity to other locations or very low cost of transportation or less travel time required to reach other locations. Supporting these arguments, Litman (2003b) defined accessibility as the comparative ease and convenience with which people reach their desired goods, activities, and services.

The definitions of 'accessibility' change depending on the contexts. In general terms, it refers to physical access to good whereas in geographical terms it means the comparative ease to reach a given destination. In social planning, it refers to the ability of people to use various services and opportunities (Litman, 2015). The Department of Transport Environment and the Regions (DETR) (2000) report of UK Government identified 'accessibility' as one of the four factors that determines adequacy of public transport while the other three factors are: affordability; availability; and acceptability (cited in Titheridge, 2004). The Social Exclusion Unit Report (2003) identified all the above factors as components of accessibility. Thus, a service or activity is considered 'accessible' if it can be accessed "at reasonable cost, reasonable

time and with reasonable ease" (p. 2). Accessibility comparisons can be done between modes, over time, trip purposes, and destination categories (Foth et al., 2013). Murray et al. (1998) explained factors such as cost, safety consideration, and other barriers from or to the transit stops as determinants of public transit access. According to this viewpoint, 'access to public transit' differed from the 'accessibility to public transit'.

A transportation-related concept similar to 'accessibility' is 'mobility'; a concept that measures the actual movement of people and goods. However, 'accessibility' based measurements are less used in transportation planning as compared to 'mobility' measurements due to their relative difficulty to assess (Litman, 2006). Transportation studies have examined accessibility from various perspectives. One such example is the study by Pigliacelli (2015) which attempted to analyze the relative ease of the homeless population living in the homeless shelters to go to public places where they spent most of the time during the day. As bus shelters are crucial facilities at the bus stops—especially during winter—the study also analyzed the physical accessibility of the homeless population to bus stops with bus shelters.

2.3 Transportation Inclusion and Community Wellbeing

The importance of transportation is ever increasing in the recent years. Evidence illustrate that the level of personal mobility and accessibility of goods and services are strongly linked to poverty, inequality, and social exclusion (Lewis, 2011). The concepts of 'no go' and 'no exit' communities introduced by Murray et al. (1998) explain the existing unequal distribution of transportation benefits across various social groups and the instances of public transportation networks bypassing the poor neighbourhoods. The low level or mediocre public transit service in areas with high proportion of transit dependents further accentuates the problems of isolation and

leaves negative impacts on their lives. Contrarily, the limited transit services in such contexts further diminish the existing transportation choices of the disadvantaged populations (Garrett & Taylor, 1999).

Transportation policies also have an ethnic dimension. The role of discriminatory practices in transportation planning and their negative impacts on community wellbeing is well established, especially in US cities. The roots of the unequal access of the low-income communities and ethnic minorities in the US to transportation facilities can be traced back to the biased transportation policies that prioritized highway expansion over public transportation (Moulding, 2005). Despite having shorter commuting distance, the transit-dependent black population in the US had significantly longer commute duration than the rest of the population (Taylor & Ong, 1995). Similarly, the comparison of various transportation projects in US cities also illustrates that ethnic minorities mostly living in the degenerated inner-city neighbourhoods are discriminated against in accessing the transportation amenities (Stolz, 2000; Bullard, 2003).

Government policies, particularly in the United States, encouraged the white flight to suburban areas and directly contributed to the worsening of transportation exclusion of the inner-city residents (Stolz, 2000). The pro-suburbanization policies remarkably reduced the access of low-income residents in US inner cities to the new employment opportunities that were created in the new suburban centers, leading to 'spatial mismatch' in job creation and population concentration (Sanshez, 1998). Nonetheless, this mismatch can be drastically altered by improving the accessibility of the inner-city residents to public transit networks (Estis & Gilleylen, 2007). Investing on public transportation systems has the potential to tackle mobility constraints in a sustainable manner than what is possible through an automobile-centered strategy (Golub et al., 2013).

'Social exclusion' framework to explain transportation exclusion gained popularity since the late 1990s in the UK. Use of this framework allows the policy makers to understand how different dimensions of social exclusion interact with one another—ultimately leading to transportation exclusion as one of its outcome (Lucas, 2012). From this perspective, transportation-related exclusion is "the process by which people are prevented from participating in the economic, political, and social life of the community because of their reduced accessibility to opportunities, services, and social networks, due in whole or in part to insufficient mobility in a society and environment built around the assumption of high mobility" (Kenyon et al., 2002, p. 211). Transportation exclusion has various dimensions: physical exclusion; geographical exclusion; exclusion from facilities; economic exclusion; time-based exclusion; fear-based exclusion; and space exclusion. Hence, any attempt towards transportation inclusion should adopt a holistic approach rather than focusing on a few selected dimensions (Church et al., 2000).

A milestone in the field of transportation exclusion studies is the report published by the Social Exclusion Unit (SEU) of UK government in 2003. The report explained poverty and social inclusion as strong determinants of an individual's accessibility to goods and amenities, public participation, and civic engagement through legal and institutional mechanisms. In accordance with the findings of the previous studies, Currie et al. (2009) observed that the limited transportation facilities curtail the opportunities of the people to build and enrich social networks, and leaves negative impacts on their psychological health and overall wellbeing. On the other hand, improvements in transportation facilities can contribute to the wellbeing of the disadvantaged groups by improving their accessibility and "reduced stigmatic harms associated with social exclusion" (Lewis, 2011, p. 5).

The analysis of travel patterns and transit services used by various transportation-disadvantaged population also confirms the strong correlation between social exclusion and transportation accessibility (Currie et al., 2009). Transportation-related social exclusion can be tackled through smart growth strategies such as implementing policies to promote affordable housing options, ensure transportation affordability, improving travel mode options, providing mobility substitutes, and reforming the biased automobile-oriented transportation policies (Murray & Davis, 2001; Litman, 2003a). Social exclusion framework is less frequently used in the North American planning context that favours concepts such as "transportation disadvantage" and "basic mobility" to capture transportation-related exclusion (Litman, 2003b, p. 2). The study by Litman (2003b) was one of the initial attempts to explain transportation-related social exclusion in context of Canada and identified several transportation-excluded populations in the country who do not enjoy basic mobility⁵. It also highlighted the need to invest in "accessibility-oriented solutions" (p. 24) to ensure transportation inclusion rather than investing in strategies to accommodating automobile-dependency.

2.4 Public Transit Dependence among Low-Income Groups

The inner-city neighbourhoods in US cities that are predominantly settled by the low-income, ethnic minorities differ from the rest of the population in terms of their remarkably high transit dependence (Hu & Young, 1993; Johnson-Anumonwo, 1995). Despite the central cities comprising only 20% of workers in the US, the same area accounts for 69% of transit use (Hu & Young, 1995, p. 2-10). Similarly, 57% of the transit riders in Los Angeles earn less than \$15,000

⁵ 'Basic mobility' is defined as "the minimum level of transportation services needed to access goods, services, and activities that a society considers as of high social value" (Litman, 2003b, p. 2).

per year and 83% of this population was non-whites (MTA, 1991-93 as cited in Garrett & Taylor, 1999, p. 11). Despite the broader differences in the realm of transportation policies, Canadian urban communities are very similar to the US or European urban communities in terms of population concentration; hence present a scenario of high automobile dependency (Litman, 2003b). The Canadian travel behavior, "are converging with those in the US" (p. 15) in the recent years, with increasing automobile-dependency and declining transit use. Nonetheless, the per capita transit ridership is higher in Canadian cities than comparable US cities, but lower than their European counterparts (p. 16).

Similar to US cities, the low-income inner-city areas in the UK had insufficient transit services and often lacked comfort and reliability while the economically better off suburban residents enjoyed efficient, new, and comfortable transit (Bae & Mayers, 2005). Transportation investments and policies that favour car-users or the middle and high-income transit users in areas characterized by low-income households and high public transit dependence, often lead to the creation of "transit deserts", or areas that are characterized by wide demand-supply mismatch in transit services (Jiano & Dilivan, 2013, p. 23). This may lead to "forced ownership of car": the circumstances wherein an individual is forced to buy private vehicle despite the economic constraints, further worsening their economic condition (Bannister, 1994 as cited in Currie et al., 2009, p. 99).

'Transportation disadvantage' is yet another concept that captures the limited transportation accessibility of the non-car owning, low-income households. The degree of transportation disadvantage varies across various sub-categories of transportation-disadvantaged population (Lucas, 2004). Nonetheless, these sub-groups have several common characteristics: lack of access to information; unaffordability to pay for the service; lack of confidence; biased

operating practices and rules; lack of support from staff; lack of personal security to use certain transportation modes; and poor design of vehicles and infrastructure (Wixey et al., 2005). Also, the spatial patterns of transportation disadvantage are generally positively correlated with the spatial patterns of socio-economic disadvantages (Dodson et al., 2006).

Kenyon et al. (2002) identified a range of barriers to transit accessibility and explained their role in reinforcing various dimensions of transportation exclusion. These barriers were: low service during the off-peak times; poor accessibility to bus stops; inadequate facilities on board/at bus stops/ at transfer points; unreliability; unaffordability; and long travel times especially for local travel. Demographic characteristics, user information, affordability, land use factors, and availability of mobility substitutes were found to be the crucial determinants of transit accessibility in the Canadian context (Litman, 2016). Despite the general negligence of transportation inclusion concerns in transportation planning (Litman, 2003b), several Canadian cities, such as Thunder Bay, Guelph, Kingston, and Windsor have taken measures in the recent years to make transit more affordable to low-income households, and thereby to improve accessibility (City of Peterborough, 2016). Large cities in the country, such as Toronto and Montreal have also taken similar measures (Manaugh & El-Geneidy, 2010; Foth et al., 2013).

2.5 Measures to Examine Transportation Accessibility

Accessibility assessments help transportation policy makers to examine mobility needs and service gaps, and thereby to design corrective service expansion plans and policies (Mamun & Lownes, 2010). Transportation planners and researchers use a wide range of indicators and composite indices to measuring transportation accessibility and demand for transit services in specific areas. These indices vary widely from one another in terms of measurement focus,

complexity, and indicators included. The following table summarizes the transportation accessibility indices and indicators proposed by selected transportation studies:

Table 2.1 Summary of selected studies on transportation accessibility

Author(s)/ Year	Focus of measurement	Major accessibility indicators used	Highlight of the study
Hammersmith and Fulham (1992)	Ease to access public transportation facilities	Walking time to access point, reliability of services, average waiting time, number of services available from a point	Integrated accessibility index of all transportation modes at a point
Rood (1998)	Level of local accessibility to public transit services	Service Frequency, Vehicle Capacity, Route Coverage.	Comfort and convenience level of transit ride
Schoon et al. (1999)	Basic attempt to measure transit accessibility	Travel time and cost	Travel cost (affordability)
Polzin et al. (2002)	Quality of transit service in an area	Service Frequency, spatial and temporal coverage of service, population characteristics	Level of Service concept (LOS concept)
Kittelsohn et al. (2003)	Spatial and temporal coverage of transit services	Service Frequency, temporal & spatial coverage, population characteristics	Level of Service concept (LOS concept)
Currie et al. (2004)	Demand/need for transit service in an area	Service frequency, spatial coverage, travel time, Car Ownership, population characteristics	Transport Need measure
Bhat et al. (2006)	Public transit accessibility	Local spatial and temporal accessibility, network accessibility, vehicle capacity, safety on the way to and at bus stops	Transit Accessibility Measurement (TAM) tool
Mamun (2011)	Measure service gap in transit facilities	Spatial, physical and temporal coverage, vehicle capacity and comfort	Measuring gap between demand & accessibility indices
Jiao & Dillivan (2013)	Measure service gap in transit facilities	Size of transit dependent population, no: of bus stops, frequency of bus service and number of sidewalks/bike lanes in	Measuring demand and supply gap in transit services (transit desert

		every block, number of bus routes serving each bus stop	concept)
Chicago Metropolitan Agency (2013)	Transit Accessibility Index	Service frequency, proximity to nearest bus stop, pedestrian environment, transit connectivity	Pedestrian environment, comfort and convenience

Source: Prepared by the author based on review of literature

The majority of the transit accessibility studies have focused on the spatial, geographical, and temporal coverage of transit services while Schoon et al. (1999) gave thrust on travel cost as a determinant of transit accessibility. Supporting the arguments of Schoon et al. (1999), Litman (2003a) explained that transportation is affordable only if the transportation cost is below 20% of the household income and hence emphasized the need to include affordability as a determinant of transportation accessibility (p. 9). Table 2.1 also illustrates that only a few studies, such as Kittelson et al. (2003) and Bhat et al. (2006), have emphasized the role of comfort in transit accessibility measurement—primarily owing to difficulties in its measurement.

Similar to the selection of accessibility indicators, the benchmarks to assess various dimensions of accessibility also vary widely. Transportation studies including National Household Travel Survey (2009) and Kittelson et al. (2003) consider 10 minutes as the acceptable waiting time at the bus stop and 400 meters as the convenient walking distance from/to the bus stop. Similarly, most of the transportation studies including Kittelson et al. (2003) and Mamun (2011) have used the 400-meter walk buffer in the Geographical Information System (GIS) software to examine the spatial accessibility of the passengers to bus stops. However, Foda & Usman (2010) questioned the use of buffer method and proposed a new transit accessibility measure based on the actual pedestrian distance. Approving the arguments of Foda & Usman (2010), the Chicago Metropolitan Agency for Planning (2013) and Foth et al. (2013)

used network-based distance to bus stops or 'network analysis' instead of creating buffer zones to examine spatial accessibility of transit facilities.

Merely concentrating on 'physical accessibility' is inadequate to capture transportation-related exclusion. This demands a move away from the conventional, location-based approaches of accessibility to an individual-based approach that focuses on the spatiotemporal factors of transportation accessibility (Lucas & Markovich, 2011). Adopting a holistic approach to measure accessibility also enables the identification of various population groups that are highly vulnerable to transportation disadvantage or transportation-related exclusion. Consequently, the importance of qualitative approaches to measuring accessibility has increased in the recent years. Through methods such as interviews and focus group discussions, the individual-based approach facilitates the researchers to learn from the personal experiences of the transportation-disadvantaged population and thereby to identify the 'less-tangible' aspects of transportation accessibility such as road condition or safety issues (Wright & Curtis, 2002; Bayley et al., 2004).

2.6 Summary

Access to public transportation facilities is regarded as a human right (Ontario Human Rights Commission, 2002). Irrespective of the contextual differences, exclusion of the socio-economically disadvantaged populations from the existing public transportation networks will lead to their increased isolation and reinforce other dimensions of social exclusion. Public transit plays a key role in providing mobility options to those with few or no mobility options. Hence, ensuring adequate transit investments especially in the areas with high transit need is crucial to the building of healthy and livable communities.

The political pressures to meet various environmental commitments and the expectations of the middle/high-income population hinder the equitable distribution of transportation investments in favour of the transportation-disadvantaged populations. Such tendencies often leave the low-income, inner-city neighbourhoods as 'transit deserts'. Also, transportation policies that overlook the comfort, convenience, accessibility, and affordability of the low-income, transit-dependent population, worsen their accessibility to basic goods and services. The literature review indicates that the needs of the transit-dependent population have to be given higher priority over the interests of the choice riders in transit planning.

This study defines 'accessibility' as the relative ease of a person to reach his/her destinations in the network, but within the constraints imposed by his/her socio-economic attributes. Similarly, transportation researchers and planners have developed a wide range of methods and indicators to capture transportation accessibility. This study adopts a holistic approach—including issues related to affordability, access to transit-related information, passenger comfort, and safety that may influence the demand dimension of transit accessibility—rather than limiting the analysis to the physical, spatial, and temporal dimensions of accessibility.

3 RESEARCH METHODS

'Research design' can be defined as the "plans and procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis" (Creswell, 2009, p. 3). A carefully framed research design ensures that the evidence obtained by the researcher to address a given issue are logical and are capable of answering the initial research questions with least ambiguities (De Vaus, 2001). The researcher should first focus on the research problem, and then appropriately use pluralistic approaches to understand it. This strategy will enable the researcher to understand the complexities of an issue from various angles (Patton, 1990). It is also important that the researcher is aware of the possible threats to the validity and reliability of the study and take necessary precautions to avoid or minimize these threats throughout the research process (Creswell, 2009). This chapter provides an overview of the research framework that has been used in the present study.

3.1 Mixed Methods Approach

Often, a combination of qualitative and quantitative approaches can be used to better address policy-related research issues, as the researcher is able to focus attention on the research problem and the approaches for understanding it instead of focusing on the differences between qualitative and quantitative approaches (Rossman & Wilson 1985; 1991). This allows the researcher to use both the methods for "corroboration, elaboration, and to initiate solutions that answer the research questions" (Rossman & Wilson 1991, p. 3). In this study, I adopted 'mixed method' approach to exploring the degree of transit accessibility and its socio-economic implications at various levels. As with all mixed methods studies, I needed to consider the overall strategy for mixing the qualitative and quantitative approaches (Creswell, 2009). Clear

articulation of methodological decisions and setting a clear plan of how different categories of data will be collected, analyzed, and integrated into the study to inform the research questions, are essential components of mixed-approach researches (Creswell, 2009; Lieber, 2016).

This study followed the 'sequential' approach to mixed method research where the findings from one method were used to elaborate or strengthen the findings from the second method (Creswell, 2009). The analysis of quantitative data was done in the first stage while the second stage involved data collection through semi-structured interviews that were conducted in locations chosen by the participants themselves. The final stage was the report writing based on the interpretation of the primary data that was collected, supported strongly by the findings arrived at through the quantitative and spatial analysis component of the study. Structuring study in the above manner allowed for triangulation and thereby helped to ensure its validity.

3.2 Quantitative and Spatial Analysis of Transit Services and Amenities

All the data used in the quantitative analysis were collected from secondary sources, and included both spatial and basic statistical analysis. GIS software was used for spatial analysis of transit services and related facilities at the bus stops while Microsoft-Excel was used for statistical analysis. The following section provides a synopsis of the quantitative component of the study.

3.2.1 Choosing an area for comparison

Comparing transit accessibility parameters of two or more areas with similar geographical location, but with significantly different socio-economic and demographic background can be used as a tool to explore issues of transit equity. This approach has been followed in transportation-related studies including Foth et al. (2013). In this study, the area

chosen for comparison is termed as 'Osborne Village-Fort Rouge' and includes four neighbourhoods—Roslyn; River Osborne; McMillan; and Armstrong Point.

The North End and Osborne Village-Fort Rouge have geographical similarities in terms of their location in relation to Winnipeg's downtown. Like the North End, all the four neighbourhoods in Osborne Village-Fort Rouge fall within the city's inner-city boundaries but outside the downtown area. The areas are also similar with regard to grid-based street plan and built form. Nonetheless, the areas significantly differ in terms of socio-economic and demographic composition (see Table 3.1) as well as in terms of their relative location in the city's transit network, especially the Rapid Transit Corridor.

Table 3.1 Important statistics on the North End and Osborne Village-Fort Rouge

Name of the author/study	North End	Osborne Village-Fort Rouge
Population (2006)	11900	12800
Geographical Area (in sq km)	3.55	2.02
Population density (per sq km)	3350	6340
Average annual HH income (in CAD)	28970	61340
Commuters using transit (%)	29	19
Minorities and Indigenous population (%)	62.6	21.7

Source: Neighbourhood Profiles, City of Winnipeg, 2006

Table 3.1 indicates that the households in Osborne Village-Fort Rouge (see Figure 3.1) are financially better off than in the North End whereas the share of households belonging to the visible minorities or Indigenous categories is visibly higher in the North End. Apart from the population characteristics, the areas also differ in terms of the land use pattern.

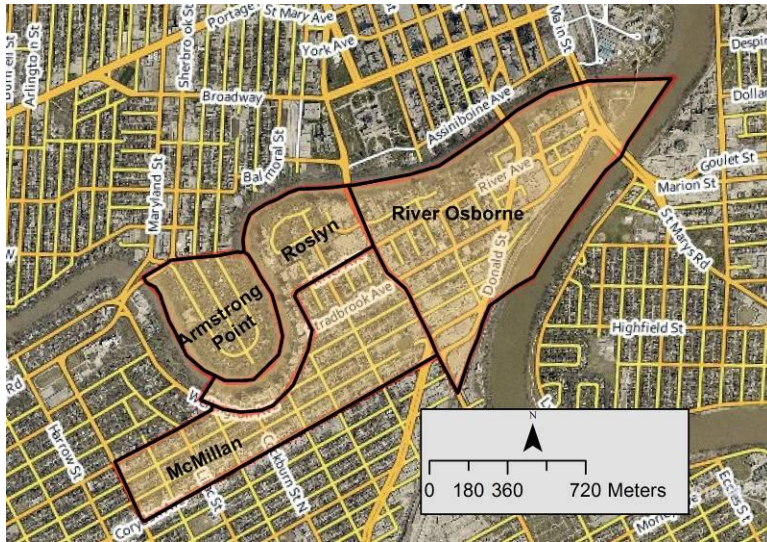


Figure 3.1 Location of Osborne Village-Fort Rouge. Neighborhood boundaries are shown in black. (Source: Map prepared by the author with base layer from the City of Winnipeg, 2016)



Figure 3.2 Zoning map of Osborne Village-Fort Rouge. Neighborhood boundaries are shown in black. (Source: Map prepared by the author with base layer from the City of Winnipeg, 2016)

Osborne Village- Fort Rouge is primarily residential in nature, with majority of the commercial activities located along Corydon Avenue and Osborne Street (see Figure 3.2). Unlike the North End, manufacturing activities are less common in Osborne Village-Fort Rouge and are limited to the Southwest Rapid Transit Corridor and the rail line passing through the River Osborne neighbourhood. The strikingly dissimilar socio-economic characteristics of both the areas despite their comparable location in relation to downtown, allowed the study to analyze

transit equity concerns. Nonetheless, a major limitation of choosing Osborne Village-Fort Rouge for comparison is its location in relation to the city's Rapid Transit Corridor network that is likely to influence residents' travel behavior and overall transit accessibility figures⁶.

3.2.2 Methods of Data Collection

The collection of secondary data available in the form of figures, tables, graphs or other numerical formats is one of the initial steps in the quantitative analysis. Data from the following sources were collected to complete the spatial and quantitative analysis in this study.

i) Neighbourhood data profiles, City of Winnipeg (2006)

Statistics on average household income, demographic composition, average dwelling cost, and modal split for commute available in the Neighbourhood Profiles were used to provide a background to the study area and thereby establish the significance of this study in the context of the North End. The high non-response rates in the optional, long Census schedule introduced in 2011, did not permit the use of the latest Neighbourhood Profile statistics available. Therefore, I used Neighbourhood profile data of the 2006 Census.

ii) Winnipeg Transit, 2015

Data collected from Winnipeg Transit included categories of bus routes, average and peak-time headway calculations for each bus route, and bus stop activity. All the above statistics were collected for the study area as well as Osborne Village-Fort Rouge. In order to analyze accessibility of transit-related facilities at the bus stops, I also collected data on transit facilities such as the location of bus stops, bus shelters, seating arrangements, and bus-time displays.

⁶ The Rapid Transit Corridor that passes through the River Osborne neighbourhood offers faster and easier connectivity to residents to reach various locations. It is also likely to attract 'choice riders', with better temporal availability of services, route coverage, and bus stop facilities.

I manually collected data on temporal and daily availability of transit services from Winnipeg Transit's official website. Using the bus stop number, I collected the above details for each bus stop in the North End and Osborne Village-Fort Rouge. Data on the temporal availability of transit services was collected separately for weekdays, Saturday, and Sundays to understand the changes in the hours of transit service. In addition, the transit route map had been helpful to validate the categories of bus routes that serve each bus stop covered in the analysis.

3.2.3 Methods of Data Analysis

Data analysis is the process that enables the researcher to move deeper into the data and thereby to understand the larger meaning of the texts and figures (Creswell, 2009). Quantitative analysis done in this study can be broadly categorized into four sections: physical accessibility of transit services; temporal availability of transit services; trip coverage of transit services; and availability of transit-related facilities at the bus stops. Various indicators were used to assess each component.

i) Physical accessibility of transit services

Physical accessibility to transit services examines the ease to reach the nearest bus stop from a given origin or destination. The accepted convenient walking distance from a bus stop to a destination or origin is 400 meters (Kittelsohn et al., 2003; NHTS, 2009). Instead of using buffer analysis, 'network analysis' was used to demarcate the area with physical accessibility to transit⁷. As residents can easily walk to bus stops located within the 400-meter distance, the bus stops located within the 400-meter buffer area around the North End and Osborne Village-Fort Rouge

⁷ Buffer analysis assumes that a person can walk in any direction from a bus stop and can cover the same distance in the given time whereas 'network analysis' takes into account of the physical constraints between the bus stops and destinations, and follows the existing street network.

were also included in the analysis. The share of area with physical accessibility to transit stops was calculated using the 'service area' option under network analysis. The same method was followed to calculate the accessibility of bus stops with various transit-related facilities.

ii) Temporal availability of transit services

Temporal coverage examines when, how often, and for how long one can use the transit services (Bhat et al., 2006). This study included three aspects of temporal availability: hours of service; service frequency; and daily availability of transit service in a week. These indicators were included to examine the convenience and freedom that transit riders enjoy in a trip. Data on the hourly duration of transit service was categorized into three: below 13 hours; 13-18 hours; and 18 hours and above. Also, service frequency was analyzed by calculating the 'minimum wait time': the minimum time that a person is required to wait at a bus stop irrespective of the route differences. Finally, the daily availability of transit service was categorized into three: service on all seven days; service on weekdays and Saturday; and service only on weekdays.

iii) Trip coverage of transit services

Trip coverage denotes the areas or destinations that a transit rider can directly reach by transit. In order to understand trip coverage of transit services, the categories of bus routes available at a given location were analyzed. Identification of the categories of routes serving a given bus stop is also an indicator of the comfort and choice that a transit rider enjoys while using transit to reach his/her destination. Currently, Winnipeg Transit offers seven major categories of transit services in the city.

iv) Availability of transit-related facilities at the bus stops

Availability of transit-related facilities such as benches, shelters, and time displays at bus stops ensures comfort and convenience, and enhances the experience of transit users (Ontario

Ministry of Transportation, 2012). Data on the availability of bus shelters, benches, and bus-time displays were imported as individual GIS layers to examine the spatial distribution of these facilities. The area that has physical accessibility to each of the facilities was calculated using the 'service area' option under 'network analysis'. Also, the percent share of bus stops with each of the facilities was also calculated to understand their spatial allocation in both the areas.

3.3 Qualitative Analysis of Indigenous Experience of Transit

Socio-economic and demographic factors are key to determining the demand dimension of transit accessibility in a community. Many of these factors are difficult to quantify despite their potential to shape the overall transit use. Consequently, qualitative approaches are increasingly used to explore transportation-related issues, particularly in relation to travel behavior, perceptions, attitudes, and travel preferences (Grosvenor, n.d.). This study uses it in association with the quantitative approach rather than using it as an independent research technique. The qualitative section of the study involved conducting semi-structured interviews with selected informants and their analysis. Important details on the qualitative component of the study are discussed in this section of the chapter.

3.3.1 Ethical issues involved

As the proposed research does not "rely exclusively on information that is publically available or made accessible through legislation or regulation" (TCPS-2, 2014, p. 1), there are several ethical considerations. Most importantly, the study followed the guidelines issued by the Tri-Council Policy Statement for conducting research studies on the First Nation, Inuit, and Metis people of Canada. The Tri-Council Policy Statement stipulates that the researcher should seek community engagement with the 'relevant' community while undertaking any research that

is likely to affect the welfare of Metis, Inuit, and First Nation communities. To ensure that this study is connected to and is informed by the needs and perspectives of Indigenous residents of the North End, it was undertaken with the support of the Winnipeg Boldness Project: a community development initiative that is currently working towards the socio-economic welfare of Winnipeg's North End community. The study's findings can be used by the Winnipeg Boldness Project to extend understanding of various transit accessibility issues, and to evolve strategies to support its transportation priorities; hence the study follows the principle of 'reciprocity' in participation.

Participation in the demand did not demand the informants to perform any unusual act; hence, the study falls in the minimum risk category (TCPS-2, 2014). All the participants were provided with the details concerning the study at the beginning, including the risks and benefits involved in participation (Appendix F). All the participants were assured about the confidentiality of the information provided and their anonymity. No participant was forced to be part of the study against their individual will, and all had the freedom to withdraw from the study at any point (TCPS-2, 2014). The participant's welfare is also dependent on how the people related to the participant are conceived in the study (TCPS-2, 2014). Therefore, I was very careful not to use any words that may hurt the sentiments of the participants or the values of the participant community. Following the principle of 'justice' (TCPS-2, 2014), the study treated all participants fairly and equally.

3.3.2 Community engagement: Role of Winnipeg Boldness Initiative

As mentioned in the previous section, the present study was undertaken with the support offered by the Winnipeg Boldness Project. Based on the shared experiences of community

members over the years, transportation has been identified as one of the five priority areas of Boldness Project. A copy of the letter of support received from the Winnipeg Boldness Project is provided in Appendix A. The Boldness Project has partnerships with several funding agencies such as United Way and the Province of Manitoba, and works in collaboration with community organizations that serve the study area, such as North End Family Centre, Mount Carmel Clinic, and Winnipeg SEED Inc. The support offered by the Boldness project staff and the Community Leaders Guide Group members was very crucial in the successful completion of this study.

Even though not exclusively an Indigenous initiative, the Boldness Project's foundation for problem solving and solution finding is guided largely by Indigenous worldviews, research principles, and values. A remarkably large section of the parents, children, and leaders that the project team works with are Indigenous. The Boldness Project's Guide Groups which also includes a Traditional Knowledge Holders Guide Group, facilitate the identification of critical issues faced by the North End community as well as the necessary research and innovation tools to reach the broader project goals. The findings of this research were presented to the Guide Groups before the final submission. This was done to invite community feedback and to ensure that the conclusions of the study appropriately represents the experiences of the community leaders.

3.3.3 Selection of participants

"The access to the 'researched' is negotiated and renegotiated through the research process", hence, "access is based on the sets of relationships between the researcher and the researched" (Burgess, 1991, p. 43). In order to build relationships with the participant population, community engagement was done in different stages of the study. As the basic

"purpose of qualitative design is to purposefully select participants or sites that will best help the researcher understand the problem and the research question" (Creswell, 2009, p. 178) I paid keen attention to participant selection. I interviewed nine community workers who have closely worked with the North End community, particularly as part of various community service organizations serving the study area (See Appendix B). The participants had knowledge of a range of Indigenous experiences of transportation accessibility.

At the invitation of the Winnipeg Boldness Project, I attended the meeting of the Community Leaders' Guide Group and gave a presentation on the quantitative and spatial analysis findings on transit accessibility. Following the presentation, I gave a brief description of the qualitative component of the study and participant selection (see Appendix C). The members of the Boldness Project's Community Leaders Guide Group were then asked to distribute the 'Project Backgrounder' to the relevant staff members in their respective organizations, and ask that these members get in touch with me directly if they wish to participate in the study (See Appendix D).

Use of snowballing technique⁸ in participant recruitment is regarded as an easy and informal means to reach the potential research participants and is found to be very useful in exploratory, qualitative, and descriptive studies (Hendricks et al., 1992). Therefore, this study followed snowballing method to recruit participants. Given the Boldness Project's role in the study, I primarily interviewed community service workers from the organizations that participate in the Boldness Project's Community Leaders Guide Group. However, the members of the

⁸ This is a sampling method where an individual informs the researcher of potential participants in the study who may be able to inform the researcher about other potential participants. Hence, the sample size is not fixed permanently but constantly evolves as a process with time. This benefits the research as a whole in answering the research questions (Hendricks et al., 2002).

Community Leaders Guide Group were also invited to participate as interviewees, and were encouraged to suggest names of potential participants or experts who were not associated with the Boldness Project but could contribute to this study.

This approach to participant selection and recruitment was done for three reasons: to ensure community engagement in the study; to make the study manageable within the limited timeframe; and to minimize the risks involved in direct participant recruitment. As some of the community leaders could not attend the meeting, the staff at the Boldness Project sent the electronic copy of the 'Project Backgrounder' to all members of the Community Leaders Guide Group. Upon expressing interest in taking part in the study, the participants were contacted directly (see Appendix E).

The consent form that explains to the participants the important details on the project and their participation in the study was sent to the participants after the initial contact (see Appendix F). I also repeated these points and clarified all their doubts about participation before the interview. After providing detailed information about participation in the study, interviews were conducted on convenient dates and at locations chosen by the participants. Informed consent was obtained from each participant in the form of a signature in the consent form prior to the interview.

3.3.4 Semi-structured interview process

An interview enables the researcher to unfold "the views, experiences, beliefs, and motivations of individuals on specific matters" (Gill et al., 2008, p. 291), and thereby to have a deeper understanding of the researched phenomena than would be unfolded through quantitative approaches (Gill et al., 2008). This study used semi-structured interviews, which enabled me to

exercise discretion in arranging the questions, and to collect detailed information on transit accessibility concerns in the North End in a highly conversational manner (Harell & Bradley, 2009). Also, the semi-structured interviews contributed to the quality of the research outcomes by "providing additional insights which can be unfolded only through a narration of personal experiences and historical incidents" (Creswell, 2009, p. 179).

The semi-structured interviews focused on the participants' professional experience of working with clients in the study area, reflecting on their clients' transit accessibility concerns, and the related impacts on their lives. The average time for the completion of an interview was 45 minutes. Carefully framed questions are necessary to collect evidence that can efficiently "answer the research questions" (De Vaus, 2001, p. 9). Thus, designing interview schedule was an important stage in this study. I used the questionnaire as a guide for the discussion with the participants, and included seven major and related descriptive questions (see Appendix G). Each interview was recorded with the consent of the participants.

Afterward, the audio files of the interviews were transferred to my laptop and were saved in a password-protected folder. In order to ensure anonymity and confidentiality, names and the gender details of the participants were removed at the coding stage and pseudonyms were used. The copy of the original transcripts that was sent to the participants within a week after the interview, offered them the freedom to make any desired changes in the transcript. These changes were incorporated in the final transcripts before proceeding to data analysis. Triangulation or crosschecking of qualitative data in this manner, ensured that the participants' statements during the interview were transcribed accurately, and hence improved the 'reliability' and 'validity' of the qualitative data analysis in the study (Gibbs, 2007).

3.3.5 Methods of Data Analysis

The qualitative data analysis was undertaken in several stages: preparing data for analysis; understanding data from different dimensions so that the interpretations stand closer to reality; and finally trying to get a broader picture of the issue (Creswell, 2009). Content analysis was the most important method of data analysis in the study. Using simple functions such as tabulation, word search, and text highlighters, the analysis was done using various functions in Microsoft Word software.

Once the final transcripts were ready, "reading through data" (Creswell, 2009, p. 183) was done so that the issues related to transit accessibility in the study area could be analyzed from different dimensions. It helped me to understand the inner meanings and relationships. On the basis of the comprehensive picture that emerged from the close reading of the final interview transcripts, major themes in data analysis were identified. The next stage involved evolving plans for logically arranging the identified themes so that they fitted well into a single narrative. As major questions in the interview schedule were structured intending to gather information on different aspects of transit accessibility in the study area, systematically arranging the themes or clustering similar topics prior to data coding was not difficult in this study. Some of the themes included in the analysis were: 'reasons to use transit'; 'trip coverage'; 'challenges to access public transit'; 'socio-economic impacts of current level of transit accessibility'; and 'strategies to improve transit accessibility'.

Identification of themes was followed by the identification of sub-themes and their corresponding codes. The study included both 'inductive' and 'deductive' codes. Deductive codes were listed on the basis of the theoretical framework developed through the review of literature while the inductive codes were determined on the basis of the information provided by the

participants during the interview. I was also careful to include codes that were representative, but also included outlier options or responses. One of the crucial steps in the analysis of qualitative data was the preparation of a qualitative codebook that listed out sub-themes and codes under each theme. The codebook was prepared in Microsoft Excel in the form of separate tables. Each of these tables contained separate columns for themes, sub-themes, codes, and the context where a given code was mentioned in a transcript. The list of major themes and sub-themes that were identified during the analysis are given in Appendix H.

I interpreted the data and made broad conclusions on the basis of the tables prepared for coding. In order to get the deeper meaning of the data in few occasions, the themes were combined and new lists of codes were prepared. I was careful to draw conclusions that not only reflected the opinions of the majority but also the outlier responses. Arguments evolved from the analysis of the interviews were supported by findings of the quantitative and spatial analysis of transit accessibility and evidence from relevant literature. At the final stage, the lessons learned from the analysis were summarized to provide a broader picture of transit accessibility in Winnipeg's North End and its impacts on Indigenous residents' wellbeing.

3.4 Reliability and Validity

Any study irrespective of the qualitative and quantitative distinction requires checks of validity and reliability as a means to evaluate the research quality. The degree of reliability reflects the "soundness of the research in relation to the application and the appropriateness of the methods undertaken and integrity of the final conclusions" (Noble & Smith, 2015, p. 34). In order to confirm the reliability of the present study, I was keen to keep my personal experiences aside—so that the findings of the study were unaffected by the personal biases while allowing

the unfolding of participants' experiences in a natural setting (Patton, 1990). I cautiously chose the participants, and attempted to seek answers to the research questions by asking appropriate questions; leading to a final report which is an accurate reflection of reality. All decisions at various stages of the study were taken on the basis of pre-set criteria, making the entire research a very transparent process.

The study took various measures to ensure 'validity' and 'reliability'. Attempts to ensure validity and reliability began with seeking the support of the Winnipeg Boldness Project to undertake this study. The close engagement that I maintained with the community leaders and Boldness Project staff at various stages of the study, reassured that the study findings reflect Indigenous worldview, and are valid, reliable, and unbiased. With this purpose, I gave two presentations to the community leaders: one on the findings of the quantitative and spatial analysis of transit accessibility; and another on the conclusions and major arguments of the study. In order to ensure the accuracy of the information shared by the participants during the interview, I sent a copy of the original transcripts to each participant via email. Besides, the interpretation of the participant experiences and the findings of the study were shared with the participants so that consistency and truthfulness could be achieved while avoiding inaccurate judgments (Yin, 2014).

The interpretation of the individual experiences supported by relevant literature allows for triangulation and thereby reveals points of convergence (Yin, 2014). Consequently, after content analysis, I strengthened the conclusions of the study by supporting the findings with evidence from the relevant literature. However, the lack of studies available on the accessibility of transit facilities to Indigenous communities in the Canadian context was a major challenge.

3.5 Limitations of the Study

This thesis can be regarded as a pilot study that examines transit accessibility to Indigenous communities in Winnipeg's North End. As the research focuses on an unexplored dimension of Indigenous wellbeing, there are several limitations to this study. Firstly, it focuses on Indigenous experiences of transit accessibility in the context of South Point Douglas neighbourhood cluster: an area where Indigenous residents account for 45% of the total population. For many of the community service organizations in the North End are not exclusively serving Indigenous communities, it is difficult to differentiate Indigenous experience of transit accessibility from the corresponding non-Indigenous experiences. Moreover, the information shared by the interview participants on transit accessibility may not be strictly limited to the experiences in the context of the four North End neighbourhoods covered in the quantitative analysis section. This is problematic, especially considering the ambiguities that exist in the geographical definitions of the North End.

Unavailability of data on the spatial distribution of jobs and important destinations that can be reached from various locations within a given timeframe, limits the scope of trip coverage analysis in the study. Similarly, the physical accessibility analysis is restricted to calculating area within the convenient walking distance from the bus stops, and does not take into account of the real travelling needs of the residents. Another limitation of the quantitative analysis in the study is the selection of Osborne Village-Fort Rouge for comparison. Both the areas are similar in terms of built form and location in relation to Winnipeg's downtown; however, differ remarkably with regard to their relative location in the city's transportation network, socio-economic characteristics, commercial importance, and land use. The high level of commercial activities

and the presence of Rapid Transit network in the latter area are likely to influence its transit accessibility figures.

Possibility of biased responses is another major limitation of the study. Instead of getting first-hand information from the residents on their transit accessibility experiences, the qualitative component of the study was based on the second-hand experiences shared by community workers/staff from organizations serving the North End. Hence, it is likely that the responses of participants were biased—at least to some extent—and were influenced by various factors. Some of these are: the nature of professional interaction with community members; personal travel behavior and assumptions, level of knowledge on transportation issues in the North End, and ideology and activities undertaken by the affiliated organizations⁹. Consequently, the results of this study can be used only to have a broad understanding of the transit accessibility concerns encountered by Indigenous communities in the North End.

The small sample size that was required to meet the time and resource constraints, impacts the validity of the findings. A more detailed study based on a wider range of participants including Indigenous and non-Indigenous residents as well as transportation planners might have helped the researcher to reveal a larger picture of the transit accessibility issues in the North End. Finally, accessibility of individuals or communities to basic amenities can be achieved through a range of strategies, such as improving the range of transportation modes, reducing the need for travel, supporting Community Economic Development (CED), and through careful land-use planning. However, this study has focus on the strategies to improving public transit accessibility

⁹ It is likely that a staff from an organization that serves only a certain category of the community /provide a certain nature of services to the residents, have rich knowledge on the impacts of transit accessibility on the lives of their client population, but may have very limited information on the impacts on the other categories.

in the North End, and pays inadequate attention to examine the potential of other strategies to improving accessibility.

Despite the above limitations, the study contributes to our understanding of the link between transit accessibility and community or individual wellbeing. The lessons learnt from the study have the potential to assist the Boldness Project and transit policy makers to take necessary measures to support the specific transportation-related needs of the community. Therefore, the contributions of the study far outweigh its limitations.

4 TRANSIT ACCESSIBILITY AND NEED IN WINNIPEG'S NORTH END

Accessible transit service is a key social service and an "essential part of livable communities" (Mamun, 2011, p. 28). However, the mere provision of publicly operated transit services is not enough to ensure comfortable, secure, and user-friendly transit that meets the needs of all sections of the population. Some of the important factors of transit accessibility are: locating bus stops at accessible locations; designing of transit stops to enhance the riders' comfort; implementing transit-supportive land use strategies; and transit scheduling that meets local travel demand; providing direct transit services to important locations; and reducing transfer time and over-crowding (Ontario Ministry of Transportation, 2012). A high-quality transit service not only improves the accessibility of the transportation-disadvantaged to basic amenities but also encourages choice-riders or the current automobile users to use transit.

This chapter examines the transit accessibility of Winnipeg's North End neighbourhoods through quantitative and spatial analysis of data collected from Winnipeg Transit. The chapter is broadly divided into four sections: physical accessibility of transit services; temporal availability of transit services; trip coverage of transit routes; and availability of key transit-related facilities at the bus stops. Based on the evidence from relevant literature, the analysis has included several indicators to capture various dimensions of transit accessibility. Transit accessibility values derived from various quantitative and spatial indicators are compared against the corresponding values for an area with a similar geographical location in the city. This comparison was necessary to examine if the North End neighbourhoods are subjected to transportation-related exclusion. As explained in Chapter 3, the area chosen for comparison is termed as the 'Osborne Village-Fort Rouge', while the four North End neighbourhoods included in the analysis is collectively termed as the 'North End'.

4.1 Physical Accessibility to Transit Service

'Physical accessibility' measures the ease to use the available transit services, that is, if the travelers can access public transit within the reasonable walking distance. The established convenient walking distance norm from the location of origin or destination to a local bus stop is 400 meters (Kittelson et al., 2003; NHTS, 2009). The physical accessibility of bus stops in the North End and Osborne Village-Fort Rouge is examined using the 'network analysis' in ARC-GIS software (see Chapter 2 & 3 for more details). As residents also may have easy access to bus stops that are located within the convenient walking distance but outside their neighbourhoods, bus stops located within the 400-meter walking distance from the outer boundaries of both the areas were also covered in the network analysis.



Figure 4.1 Physical accessibility of bus stops, North End. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

There are 95 bus stops that are located inside the study area, and the average number of bus stops per sq. km is 26.7 (see Appendix I). Roughly 94% of the geographical area has easy physical accessibility to bus stops. The areas that are not physically accessible by transit are mostly non-residential in nature such as the Old Exhibition Grounds, or the area along the Red River bank (see Figure 4.1). On the other hand, there are 54 bus stops in Osborne Village-Fort Rouge, and the average number of bus stops per sq. km is 26.7. Roughly, 83% of this area is

located within the 400-meter walking distance from the bus stops. A significant share of the area that does not have easy spatial accessibility to bus stops is in the Armstrong Point neighbourhood: a high-income, single-family community (see Figure 4.2).

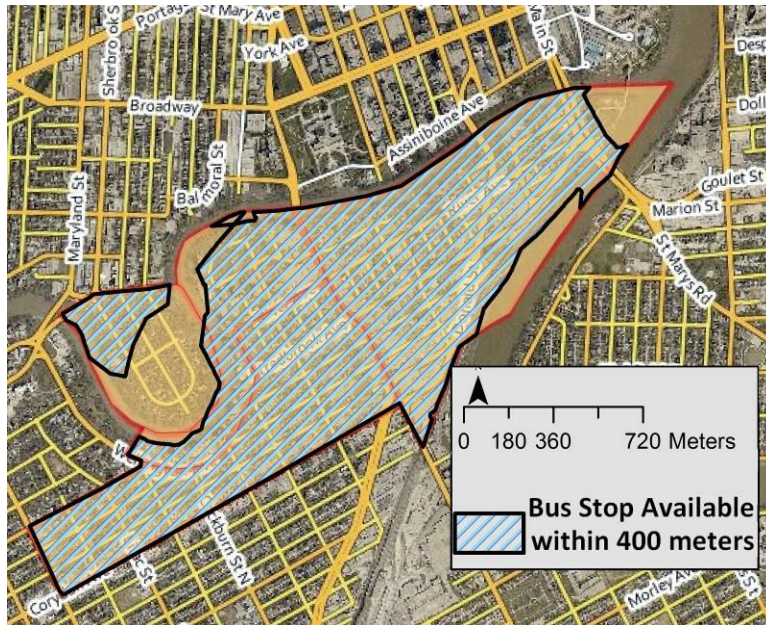


Figure 4.2 Physical accessibility of bus stops, Osborne Village-Fort Rouge. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

Because socio-economic disadvantages and transportation disadvantage are positively correlated (Dodson et al., 2006), limited physical accessibility to bus stops in the high-income Armstrong Point neighbourhood may not impede accessibility of basic amenities to its residents. The high income of the Armstrong Point households enables them to own private automobiles or hire taxis to meet their mobility needs. On the contrary, existence of a similar situation in the North End is likely to worsen transportation disadvantage of its residents. The above analysis suggests that physical accessibility of transit services is not an issue in the North End.

4.2 Temporal Availability of Transit Services

Temporal coverage of transit service is a major indicator of transit accessibility. From the temporal perspective, transit service is considered accessible "if the services are available at the time that a person needs to travel" (Mamun, 2011, p. 6). Duration of transit services available

varies across the bus stops depending on their location in relation to major streets and transit rider base. A longer duration of transit service provides passengers—especially those who are entirely transit-dependent—the freedom to travel to their destinations in a convenient manner. Similarly, the unavailability of transit services on certain routes during the weekend may drastically impede transit accessibility to a section of residents. This section analyzes three components of temporal availability of transit services: hours of transit service available; service frequency; and transit availability by days of the week.

4.2.1 Hours of Transit Service Available

Length of transit service is a critical factor that determines passengers' ability to reach various locations at the required times. In addition, it enhances attractiveness of transit services. Roughly 10% of the bus stops in the North End have transit services available for 13 hours or less on weekdays (see Appendix J). Most of these bus stops are located in the Lord Selkirk Park neighbourhood, and do not have transit services after 7 p.m. (see Figure 4.3). The corresponding figure for Osborne Village-Fort Rouge is 46%, and these bus stops are mostly located on Wellington Crescent and Grosvenor Avenue (see Figure 4.4).

Approximately 90% of the bus stops in the North End have transit services available after midnight that enables residents, especially those who are working on evening shifts, to use transit to reach their homes. The respective figure for Osborne Village-Fort Rouge is only 41% (see Appendix J). Limited hours of operation and unavailability of transit services in the late evenings are components of transportation exclusion (Wixey et al., 2005). The comparison suggests that despite having a similar geographical location in relation to Winnipeg's downtown, the North End enjoys a significantly higher hours of transit operation as compared to the latter area. This

can be also regarded as a sign of equity in terms of the temporal availability of transit services (Foth et al., 2013).

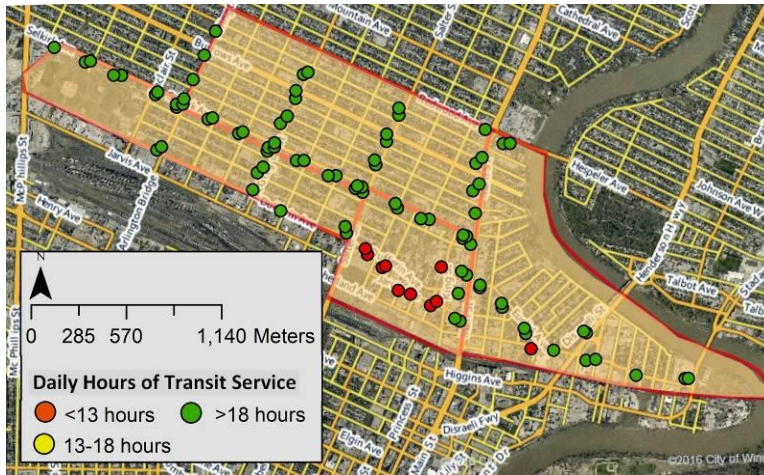


Figure 4.3 Hours of transit service available, North End. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

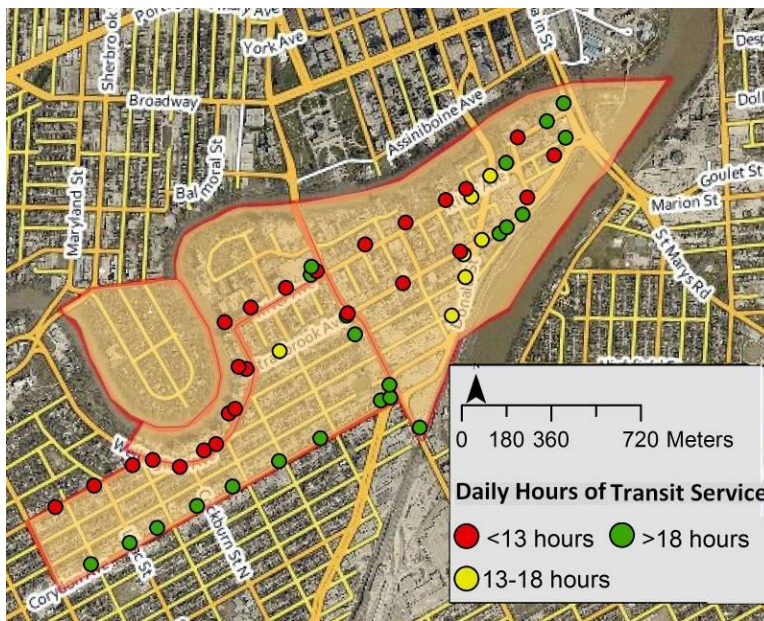


Figure 4.4 Hours of transit service available, Osborne Village-Fort Rouge. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

The analysis indicates that the North End does not face transportation exclusion in terms of hours of transit service. The Lord Selkirk Park neighbourhood, located in the south-west portion of the study area, is an exception with less than 13 hours of daily transit service. The limited hours of transit service, especially in the late evenings, is likely to leave the low-income residents of this neighbourhood heavily transportation-disadvantaged. On the other hand, limited

hours of transit service available in Osborne Village-Fort Rouge, (see Figure 4.6) may not result in similar degree of transportation disadvantage, primarily due to better economic conditions and higher possibilities for car-ownership.

4.2.2 Transit service frequency

A transit trip has three components: "the walk to the bus stop; the wait at the bus stop; and the journey on the bus" (Winnipeg Transit, 2006, p. 18). The time that is spent waiting at the bus stops is an important determinant of user satisfaction. Attempts to reduce wait time or walking time to the bus stops have twice the impact on user experience as compared to reductions to the time spent inside the bus (p. 18). This study uses minimum wait time at the bus stops as an indicator of transit service frequency. The time that a person is required to spend at the bus stop depends on the bus route and the time of the day. According to the National Household Travel Survey by the US Department of Transportation (2009), 10 minutes is the tolerable wait time at bus stops. The average wait time or the service frequency for the bus routes that connect the North End with downtown is 20 minutes (see Appendix K). The corresponding figures for the express and suburban routes are 10 minutes and 45 minutes. With regard to Osborne Village-Fort Rouge, the average wait time is 21 minutes for a downtown route and 16 minutes for a Rapid Transit or express route (see Appendix L).

The transit service frequency also varies by the bus stops depending on location. Irrespective of the route difference, a transit rider at a bus stop on Selkirk Avenue or Main Street will have to wait for a minimum of 10-15 minutes (see Figure 4.5). On the other end of the scale are the transit riders who have to wait for a minimum 30 minutes at the bus stops on Dufferin Avenue or Sutherland Avenue. Similarly, roughly 33% of the bus stops in the North End have a

minimum wait time of more than 25 minutes (see Appendix M). Being located away from the major intersections, most of these bus stops lack other facilities including shelters. Poor frequency of transit service, in addition to the lack of a comfortable waiting area at the bus stops, is likely to negatively impact user satisfaction, and may fail to attract choice riders.



Figure 4.5 Minimum wait time at bus stops, North End. (Map prepared by the author with data from Winnipeg Transit, 2015)

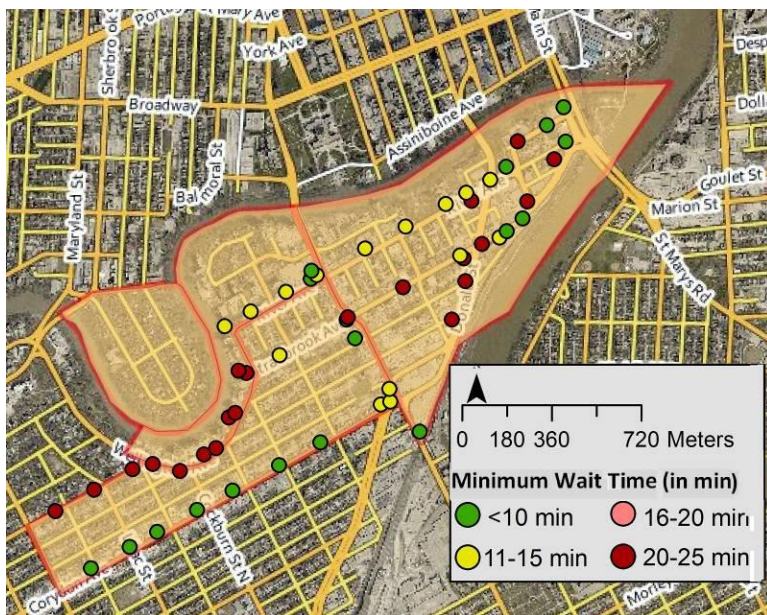


Figure 4.6 Minimum wait time at bus stops, Osborne Village-Fort Rouge. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

The service frequency irrespective of the route differences is significantly better in Osborne Village-Fort Rouge as compared to the North End (see Appendix M). Roughly, 33% of the bus stops in Osborne Village-Fort Rouge have a minimum wait time of 10 minutes and below. Also, there are no bus stops where the minimum wait time is beyond 25 minutes (see

Figure 4.6). The analysis suggests that the bus stops in the North End as a whole have significantly lower level of transit service frequency as compared to the latter area.

4.2.3 Transit Availability by Days of the Week

Unavailability of transit services during the weekend is an important component of time-related transportation exclusion (Wixey et al., 2005). Availability of transit service on all seven days allows the residents to depend on transit to meet their transportation needs. It not only encourages people to go out during the weekend for leisure and other social activities, but is also helpful to those who work during the weekend. Roughly, 90% of the bus stops in the North End have transit service on all seven days whereas the remaining 10% have transit service only during the weekdays (see Appendix N).

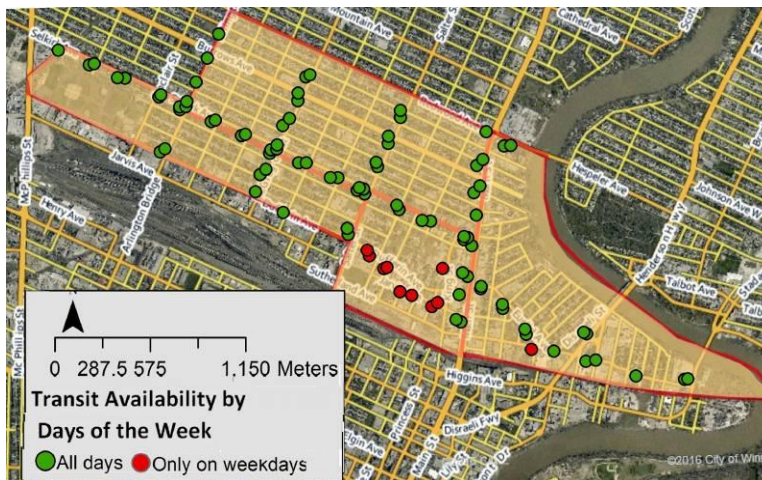


Figure 4.7 Daily availability of transit service at bus stops, North End. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

The North End bus stops that do not have weekend transit service are served only by route 97: the suburban transit route running through the Lord Selkirk Park neighbourhood, primarily on Dufferin Avenue (see Figure 4.7). Lord Selkirk Park is a neighbourhood with numerous industrial activities and high transit use for commuting purpose (22%) (City of Winnipeg, 2006). Unavailability of transit service during the weekend may discourage transit-dependent people living in this neighbourhood from taking trips, or may compel them to walk to

distant bus locations or to use costlier options like taxis. In Osborne Village-Fort Rouge, only 50% of the bus stops have transit service throughout the week while 48% have transit service on all days except Sundays (see Appendix O). The bus stops that do not have seven days of transit service are mostly located on Wellington Crescent and River Avenue (see Figure 4.8).

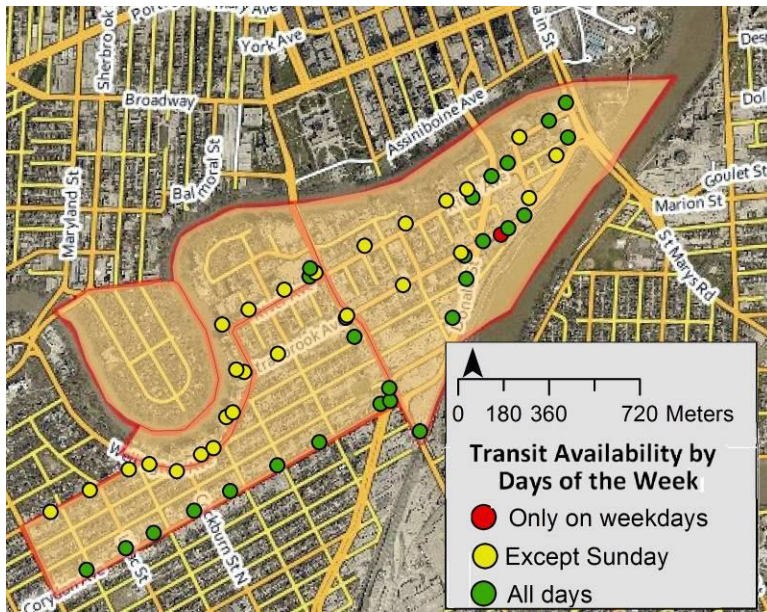


Figure 4.8 Daily availability of transit service at bus stops, Osborne Village-Fort Rouge. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

The existing built form and the narrow street width in the North End¹⁰ do not permit safe walking or cycling. Therefore, the unavailability of weekend transit services at the bus stops, in addition to the poor transit services in general, is likely to further restrict the mobility of many North End residents or force, some household at least, to own a car—leading to 'transport poverty'¹¹. On the contrary, the absence of transit service on Sundays in Osborne Village-Fort

¹⁰ Since the late nineteenth century, the plots in North End were very narrow, only half as wide as the plots in the south of the city, mostly without setbacks (Artibise, 1975).

¹¹ Gleeson and Randolph (2002) observed that a household can be considered as undergoing "transport-poverty" (p. 102) if it is compelled to spent more travel costs than it can reasonably afford, particularly in relation to the ownership, use and maintenance of a private automobile.

Rouge, and the Armstrong Point neighbourhood in particular, may not obstruct residents' mobility due to the relatively high-economic condition of its residents.

4.3 Trip Coverage of Available Transit Routes

Trip coverage of transit routes analyzes the spatial coverage of locations that can be reached by a transit user via the bus routes serving a location. From this perspective, transit can be considered accessible if transit services are available from or to the origins or destinations of the passengers (Mamun, 2011). In order to analyze trip coverage, this study examines various categories of transit route that serve a given bus stop.

Winnipeg Transit has seven categories of transit routes: downtown routes that operate to or through the city's downtown; downtown Spirit routes that provide free transit service within downtown; Rapid Transit routes that operate from and to downtown along a Rapid Transit corridor; express routes that have limited stops and operates to or from downtown; cross-town routes that connect important locations but without touching downtown; suburban routes that provide transit service in the suburban areas; and Dial-A-Ride-Transit (DART) routes that provide service in specific neighbourhoods on a door-to-door basis. With a few exceptions, all Rapid Transit routes are also express routes, and connect different parts of the city to downtown in significantly less time than other routes.

Currently, ten downtown routes, two suburban routes, and one express route serve the North End. Except 18% bus stops that are mostly located in the Lord Selkirk Park and William Whyte neighbourhoods, downtown routes serve all the bus stops in the North End. Express routes serve only 2% stops in the North End while 41% have suburban transit routes serving them (see Appendix K). Few bus stops are served by more than one category of transit routes.

Most of the bus stops in the Lord Selkirk Park and William Whyte neighbourhoods are served only by the route 97 and route 71: the suburban routes passing through the area (see Figure 4.9). Therefore, the residents of these two neighbourhoods and the Lord Selkirk Park in particular, have to either walk to longer distances or take transfers to reach downtown, despite the spatial proximity between the two areas.



Figure 4.9 Categories of transit routes serving bus stops, North End. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

As Route 97 does not operate on all seven days, walking to distant bus stops is Lord Selkirk Park residents' only option to reach downtown during the weekend. The unavailability of weekend service is a major issue in this neighbourhood, especially because the transit network requires its residents to travel to downtown in order to go to any other destinations in the south or other parts of the city. Similarly, with few exceptions such as route 71 and route 38, transit connectivity from the North End to other important destinations away from downtown such as Polo Park, Kenaston, and St. Vital is very limited. Route 71 and 38 directly connects the area with locations such as Garden City and Seven Oaks hospital. Nonetheless, physically accessing the bus stops that are served by these routes seems to be another challenge.

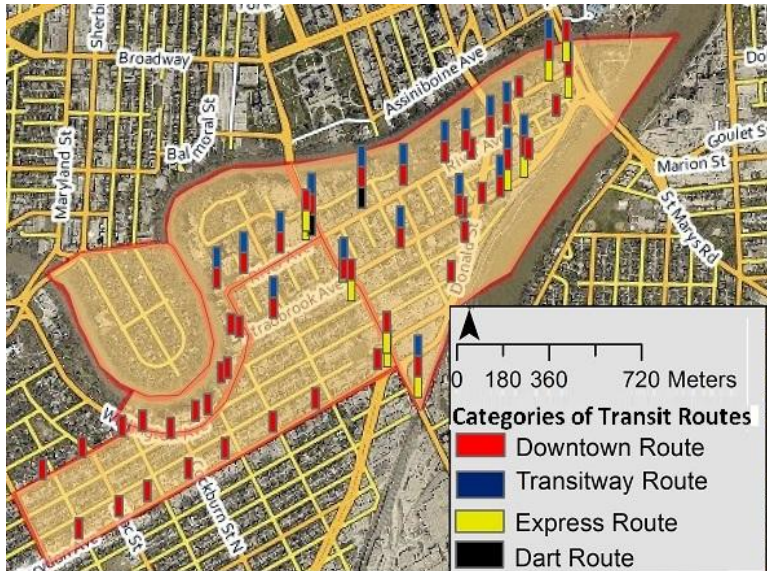


Figure 4.10 Categories of transit routes serving bus stops, Osborne Village-Fort Rouge. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

Five downtown routes, three express routes, thirteen Rapid Transit routes, and two DART routes serve Osborne Village-Fort Rouge. All the 54 bus stops in this area have direct connectivity to downtown. Approximately 33% stops have Rapid Transit services while 22% have express route service that are not part of the Rapid Transit system. Also, 4% bus stops in this area are covered under the Dial-a-Ride Transit service that offers late evening to midnight transit service on a door-to-door basis on demand (see Figure 4.10).

The Rapid Transit system reduces delays through special infrastructural designs, while the express routes save traveling time by limiting the number of stops on a route; consequently, they provide attractive options for commuters (El-Geneidy & Surprenant-Legault, 2010). Express routes and Rapid Transit routes serve approximately 43% of the bus stops in Osborne Village-Fort Rouge, providing its residents with fast and easy connectivity to downtown and other important locations, such as the University of Manitoba, Victoria General Hospital, and Grant Shopping Center (see Appendix L). On the contrary, express routes serve only 2% of the bus stops in the North End while there are no Rapid Transit routes that serve this area at present.

The analysis indicates that Osborne Village-Fort Rouge fares better than the North End in general in terms of trip coverage. The presence of numerous Rapid Transit and express routes in Osborne Village-Fort Rouge (see Figure 4.10) offers easier connectivity to its residents to various locations as compared to the transit routes in the North End, despite having a similar location in relation to the downtown. Similarly, 15% of the bus stops in the North End do not have direct connectivity to downtown. In addition, with very few exceptions, the transit routes in the North End do not offer connectivity to important locations away from downtown.

4.4 Availability of Transit-Related Facilities at Bus Stops

Availability of transit-related facilities such as bus shelters, benches, and bus-time displays directly influence the comfort level of the passengers during their wait at bus stops. As transit service do not provide door-to-door service, it is necessary to ensure that bus stops have designated waiting areas for all age categories throughout the year (Ontario Ministry of Transportation, 2012). The availability of these facilities also shapes the image about transit services available in an area by creating a 'sense of place' and making it more appealing and functionally efficient (Transportation Research Board, 1997). In addition, the lack of facilities at the bus stops can drastically reduce satisfaction level of transit users, and increase the perceived waiting time (Ontario Ministry of Transportation, 2012). This section examines availability of important transit related facilities at the bus stops.

4.4.1 Bus shelter

The extreme weather conditions of Winnipeg make shelters necessary facilities at the bus stops. Among the 95 bus stops in the North End, only 25% have shelters (see Appendix P), and none have internal heating. With a few exceptions, all the bus stops with shelter facilities are

located at the intersections of major streets in the area. Thirteen shelters are located on Main Street while the remaining eleven are located mostly on Selkirk Avenue, Salter Street, and McGregor Street (see Figure 4.11). Network analysis illustrates that people from only 73% of the study area can access bus stops with shelters.

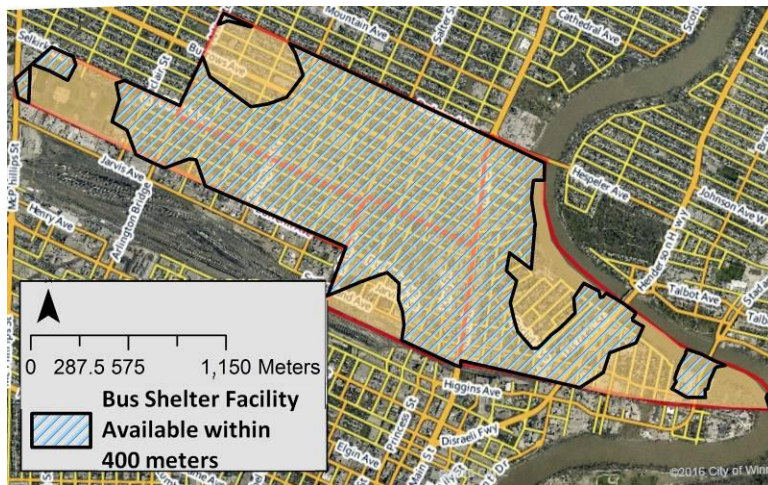


Figure 4.11 Accessibility of bus stops with bus shelters, North End. (Source: Map prepared by the author with data from Winnipeg Transit Office, 2015)

Two major criteria are used by Winnipeg Transit for installing shelters: an average 150 transit riders per day, or 800 riders per week, and minimum sidewalk width of 3.1 meters. In addition, the following priority criteria are also used to evaluate the need for bus shelter at a location: common transfer points where waiting is necessary; major transit passenger generators; points where minimum walking distance is above 400 meter; bus stops near seniors' housing; and open areas affected by wind/rain (Winnipeg Transit, 2006).

Minimum bus stop activity alone does not make bus stops eligible to get shelters. Thus, several bus stops in the North End do not have shelter facilities despite a large number of transit riders. The possible reason for the absence of shelters, at least at some of the bus stops with high bus stop activity, is the narrow sidewalks that do not permit the safe installation of the shelters (Winnipeg Transit, 2006). Nonetheless, unavailability of shelters at 75% of the bus stops in the

North End is likely to hamper transit accessibility to its residents, especially during extreme weather conditions.

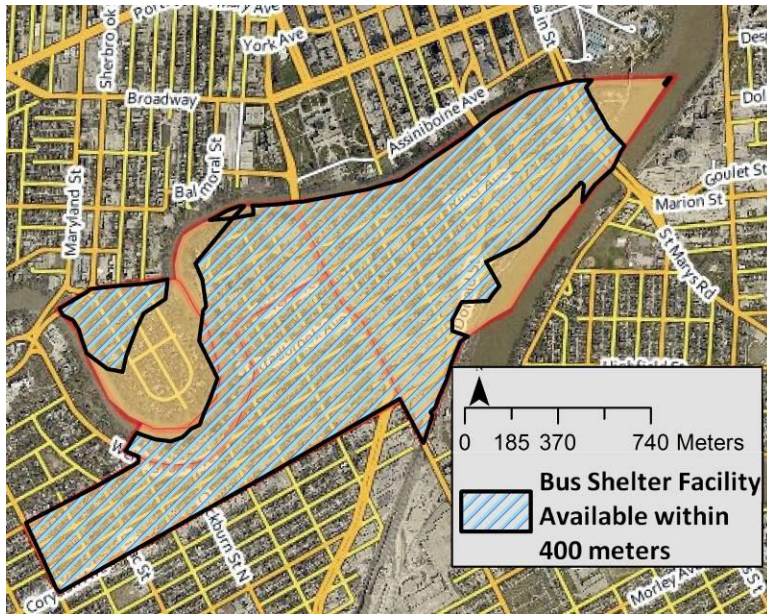


Figure 4.12 Accessibility of bus stops with shelters, Osborne Village-Fort Rouge. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

Among the 54 bus stops in Osborne Village-Fort Rouge, roughly 37% have shelter facilities (see Appendix P). Roughly, 30% of the shelters have internal heating facilities; these are primarily located along the Rapid Transit corridors passing through the area. As with the North End, few bus stops in Osborne Village-Fort Rouge do not have shelter facilities despite fulfilling the minimum bus stop activity criteria. Network analysis suggests that people residing in 81% of its geographical area have easy access to bus stops with shelter facilities (see Figure 4.12).

The above analysis suggests that residents in the North End are less likely to have access to bus stops with shelter facilities as compared to residents in Osborne Village-Fort Rouge. Transportation research in US cities confirm that poor design and use of space at and immediately around bus stops can have a visible impact on crime rates, and perceptions about crime and safety (Transportation Research Board, 1997). Transit policy documents published in

Canada such as the Transit Supportive Guidelines by the Ontario Ministry of Transportation (2002) also have observed that the availability of well-designed and well-maintained bus shelters with transparent sides, lighting, and comfortable seating arrangements, not just protect the transit riders from extreme weather, but is likely to offer a sense of security to the passengers.

Therefore, it is likely that the unavailability of shelters at most of the bus stops in the North End may make the passengers feel less secure, and may discourage them from using transit, especially in the winter season.

4.4.2 Seating

The availability of seating at bus stops improves riders' overall transit experience, especially when the wait or transfer time is long. Hence, availability of seating is important to ensure transit users' satisfaction—irrespective of their age or health-related barriers. Winnipeg Transit also has several measures to make sure that the seats at the bus stops are used by transit riders, and not for other purposes such as "sleeping or loitering" (Winnipeg Transit, 2006, p. 29). Currently, only 22% of the bus stops in the North End have seating arrangements (see Appendix P). More than half of these seats are located on Main Street while the remaining, mostly, are placed on Selkirk Avenue. On the other hand, roughly 81% of the bus stops in Osborne Village-Fort Rouge have seating. The comparison indicates the inadequate provision of seating facilities at the bus stops in the North End.

Residents from roughly 83% of the North End's geographical area can access bus stops with seating arrangements (See Figure 4.13). A significant share of the residential area that does not have access to bus stops with seats is in the low-income William Whyte and North Point Douglas neighbourhoods. The corresponding figure is 82% in Osborne Village-Fort Rouge (See

Figure 4.14). A substantial share of the area without accessibility to bus stops with seating arrangements falls in the high-income Armstrong Point neighbourhood.

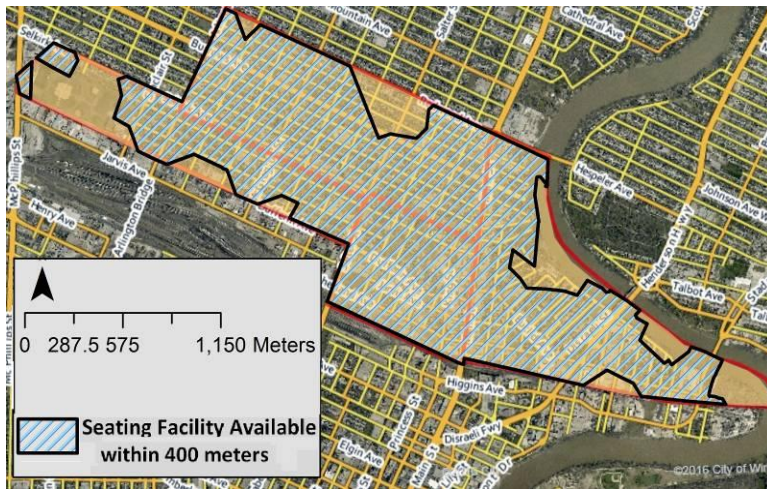


Figure 4.13 Accessibility of bus stops with seats, North End. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

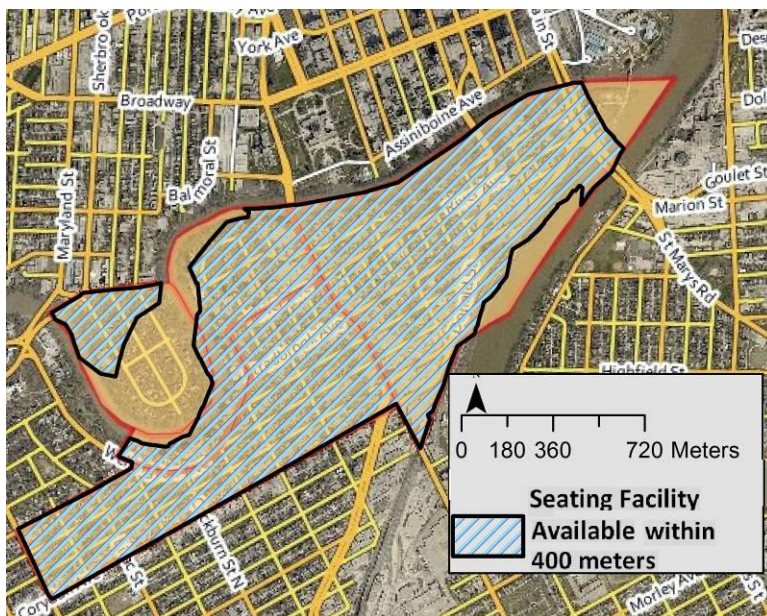


Figure 4.14 Accessibility of bus stops with seats, Osborne Village-Fort Rouge. (Source: Map prepared by the author with data from Winnipeg Transit, 2015)

As a low-income community, the North End is likely to have significantly higher levels of transit use as compared to Osborne Village-Fort Rouge. Therefore, the inconvenience arising from the limited seating arrangements at bus stops is likely to be more felt in the North End neighbourhoods as compared to the latter area.

4.4.3 Bus-time displays

The availability of reliable information on transportation options and services is an essential factor that affects transit accessibility (Litman, 2016). Bus-time displays provide free transit schedule and route related information to the riders reaching a given stop. Provision of transit-related information is particularly important at those locations that attract a large number of transit riders and have poor transit frequency (Ontario Ministry of Transportation, 2012).

Currently, riders can access real-time transit information provided by Winnipeg Transit via mobiles or other electronic devices. Posting of paper timetables at bus stops is another option to provide transit-related information to the riders. Such information reduces uncertainty about bus arrivals, and has been well received by passengers in Winnipeg (Winnipeg Transit, 1999). The provision of posted timetables and bus-time displays is also very important to facilitate the access of transit-related information to those who do not have electronic devices and/or mobile phones to access internet data and/or Telebus service.

There are no bus-time displays or posted transit timetables at any of the bus stops in the North End (see Appendix P). Network analysis suggests that residents living in only 0.6% of the North End's geographical area can easily access bus stops with bus-time displays (see Figure 4.15). The corresponding figure for Osborne Village-Fort Rouge is 48% (see Figure 4.16). There are eight bus-time displays in the area all of which are located on the Rapid Transit corridors. However, the neighbourhoods that do not have access to bus stops with bus-time displays in Osborne Village-Fort Rouge have remarkably higher household income as compared to the neighbourhoods in the North End, hence may not visibly affect the residents' accessibility to transit-related information.

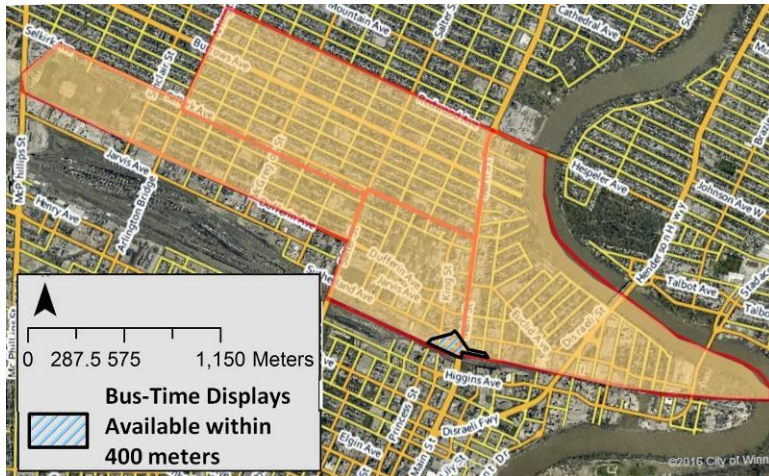


Figure 4.15 Accessibility of bus stops with bus-time displays, North End. (Map prepared by the author with data from Winnipeg Transit, 2015)

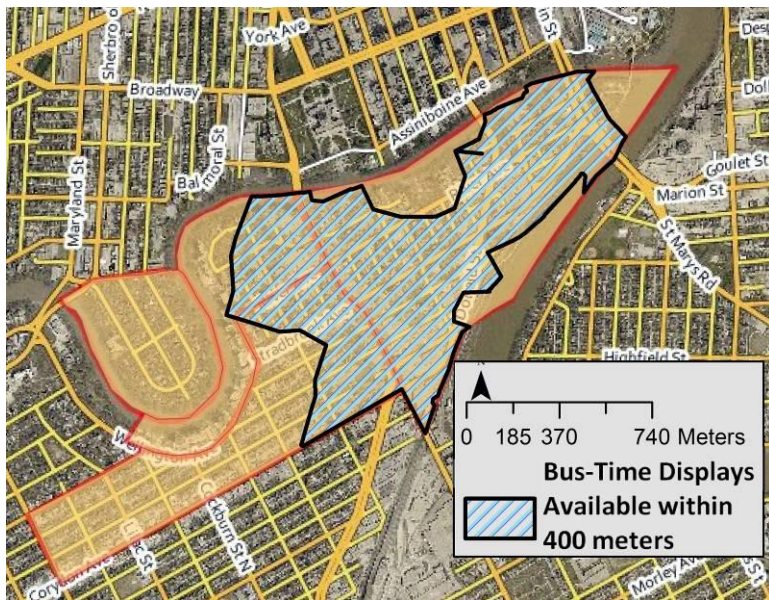


Figure 4.16 Accessibility of bus stops with bus-time displays, Osborne Village-Fort Rouge. (Map prepared by the author with data from Winnipeg Transit, 2015)

Given that the average household incomes of the North End neighbourhoods are significantly lower than the city average, it is likely that many of the residents in this area do not have access to mobile and/or internet data. Consequently, the absence of bus-time displays may seriously hamper the riders' access to real-time transit information, directly impacting their transit use comfort. This problem can be exacerbated if the passengers also have to wait for a long time in the extreme weather conditions. This suggests that information-related exclusion of

the low-income, transportation-disadvantaged residents (Wixey et al., 2005; Litman, 2003) is a challenge to accessing transit services in the North End.

4.5 Summary

This chapter has attempted to do a brief analysis of the level of transit accessibility to the residents in the North End, using data collected from Winnipeg Transit. It provides a brief background to the level of various dimensions of transit accessibility in the study area. Nonetheless, it does not reveal any transit accessibility information specific to Indigenous residents in the North End. In order to examine the issue of transit equity, transit accessibility values derived from the quantitative analysis in context of the North End were compared against corresponding figures of an area that has similar location in relation to the downtown. Nonetheless, the depth of analysis was limited due to paucity of data that are essential to do any detailed analysis of transit accessibility, such as employment distribution in the city, and travel demand and travel behavior of the residents.

In general, the analysis indicates that bus stops located on Main Street and Selkirk Avenue have better temporal availability, physical accessibility, and trip coverage than the bus stops located on other streets in the North End. The Lord Selkirk Park neighbourhood has the lowest level of transit service—area along Dufferin and Jarvis Avenue in particular. The North End has high levels of physical accessibility to bus stops and hours of transit service, even higher than the corresponding figures of Osborne Village-Fort Rouge. However, poor service frequency at many of the bus stops and unavailability of transit service during the weekend at several bus stops in the Lord Selkirk Park neighbourhood were identified as two major issues at present.

Hence, the analysis suggests that residents of the North End do not face physical exclusion of transit services, but encounters temporal exclusion to a large extent.

The analysis indicates that limited trip coverage of transit routes is a challenge in the North End. Despite being very close to downtown, several bus stops in the North End do not have transit service directly linking them to downtown. To a large extent, the transit routes in the North End do not offer easy connectivity to other important locations in the city. On the other hand, the presence of numerous Rapid Transit and express routes in Osborne Village-Fort Rouge is likely to provide the residents from these neighbourhoods easy connectivity to downtown and several other important locations in the city.

The North End generally lags behind Osborne Village-Fort Rouge in terms of transit-related facilities at the bus stops. The presence of the Rapid Transit corridor in the latter area is the most important reason behind this gap. The other reasons for the poor availability of transit-related facilities at the bus stops in the North End are lower population density, narrow sidewalks, and absence of major passenger-generator locations/transfer points as compared to Osborne Village-Fort Rouge. Inadequate provision of these facilities is also likely to make the transit less attractive in the North End, and may discourage people from using transit, especially during extreme weather conditions.

As the allocation of transit facilities at the bus stops in the city are strictly determined by a set of pre-set criteria, the inadequate shelter, sitting, and information provisions at the bus stops in the North End cannot be regarded as indicative of transit exclusion. However, the analysis suggests the need to use a modified set of criteria to meet the specific needs of the North End community. For instance, as most of the bus stops have poor frequency of transit service, adding indicators such as poor transit frequency in the priority list to install shelters and benches may be

beneficial to the North End community. Additional study is required to confirm these possibilities.

The quantitative analysis suggests that transit accessibility in the North End can be improved through a variety of ways such as improving service frequency, ensuring access to transit-related facilities at the bus stops, especially information, and improving connectivity to important locations in the city including the downtown. Nonetheless, with very limited evidence, the analysis presented in this chapter is inadequate to prove any demand-supply mismatches in transit service in the North End, hence cannot recommend well-defined strategies to improving transit accessibility. Also, there are several other factors such as the need to travel outside the community, availability of electronic devices, and technical capability to use various transit applications that are crucial to revealing the demand-dimension of transit accessibility. Thus, the next chapter examines transit accessibility in the North End community from a qualitative approach.

5 COMMUNITY/INDIVIDUAL WELLBEING AND TRANSIT ACCESSIBILITY

Qualitative methods of data collection and analysis have several advantages. Apart from strengthening the findings derived through the quantitative analysis, the experiences and stories shared by the informants facilitate a deeper understanding of the hidden relationships. The quantitative analysis done in Chapter 4 illustrated the spatial and temporal distribution pattern of transit services in the North End. Nonetheless, it left many important questions on transit accessibility unanswered, most importantly to illustrate whether and how the Indigenous identity of the North End residents influence their overall transit use experiences and accessibility. Also, the unavailability of reliable statistics on transit use in the area poses challenges in analyzing the demand for transit services in the North End, and only partially illustrates the need to improve transit accessibility in the area. Therefore, the use of qualitative approaches to explore transit accessibility is an essential component in this study.

Using information shared by community workers that are part of various North End community organizations, this chapter examines transit accessibility concerns encountered the North End community. This chapter is broadly divided into four sections: transit accessibility and its importance in the North End; barriers to transit accessibility; implications of the current level of transit accessibility; and strategies to improve accessibility to transit.

5.1 Transit Accessibility and its Importance in the North End

The North End is a strong and resilient community with immense resources and community support (Personal interview, Ronald, August 8, 2016; Personal interview, Maria, August 8, 2016; Personal interview, Susan, August 17, 2016). All the participants identified that high concentrations of low-income, Indigenous households—mostly with young and large

families—high rate of unemployment, large number of residents with physical/mental disabilities, and high dependence on social assistance for sustenance are the basic characteristics that define North End community. Interviews also indicated the importance of community service organizations in the North End that play a key role in addressing the poverty-driven challenges and the resultant barriers at various levels (Personal interview, Maria, August 8, 2016). These activities range from the day-to-day services, such as resume preparation, internet-surfing, free laundry, and recreation facilities, to specialized services, such as counseling, advocacy, and teaching life-skills.

Public transit is not the only mode of transportation in the North End. The generally low economic condition of many of the households compels residents to depend on non-driving modes of transportation, and even force the minority that own automobiles to keep their vehicle idle during periods of economic struggles (Personal interview, David, August 5, 2016). A small share of the residents depends on bikes for short trips; however, several factors discourage residents' dependence on biking to meet their basic needs. The most common challenge is stealing of bikes or bike parts that may even result in the physical assault of cyclists (Personal interview, Philip, August 11, 2016; Personal interview, Sherry, August 3, 2016). One of the participants observed that the absence of biking infrastructure and lack of integration between various modes of transportation in the North End are two other challenges that deter people from using bikes.

All the participants reported walking as the most important and common mode of transportation in the North End. It is particularly true for short-distance trips within the community and residents with very limited income (Personal interview, Amenda, August 16, 2016). Nonetheless, several factors such as poor sidewalk maintenance and presence of huge

snow-banks in the winter, restrict residents' dependence on walking to reach their destinations (Personal interview, Susan, August 17, 2016; Personal interview, Sherry, August 3, 2016).

It [North End] is the last community to get cleared of snow whereas I feel that it should be the first because they use the sidewalks to get around. And they have to often dredge through crazy snow banks and you often see people walking on the streets in the North End in the winter (Personal interview, Susan, August 17, 2016).

Frequently reported crimes also discourage people from walking on the streets, especially when it is dark (Personal interview, Amenda, August 16, 2016). Several informants observed that carpooling and getting rides from friends/relatives are also important means to many residents to access basic amenities. Interviews suggest that only a minority use private automobiles while the majority depends on cheaper transportation alternatives.

There are several reasons as to why ensuring access to public transit is critical to the wellbeing of North End community. Interviews highlighted the pivotal role that public transit plays in meeting the transportation needs of the residents and in shaping their day-to-day lives. All the informants identified that there is high demand for public transit services in the North End. Similar to the inner-city neighbourhoods in US cities (Sanchez, 1998; Stolz, 2000), several demographic and socio-economic factors make high public transit dependence inevitable in the North End. The interviews suggested heavy transportation disadvantage of the North End residents, with significant share of falling under non-car owning, seniors, ethnic minorities, single parents, and physically and mentally challenged populations.

Several participants observed that the need to travel outside the community is another reason for the high demand for public transit in the North End. Given the very limited commercial/economic activities in the North End, it becomes necessary for its residents to travel outside the neighbourhood to access activities that are not provided by the community

organizations (Personal interview, Sherry, August 3, 2016; Personal interview, Amenda, August 16, 2016). The informants observed that residents from the North End frequently travel to outside destinations—mostly in and around the downtown—to access banks, grocery stores, the Employment and Income Assistance (EIA) office, billing offices, and employment centers. Another reason, as observed by several participants, for the high demand for public transit services in the North End, long distance trips in particular, is the limited transportation options.

The interviews suggest that transit accessibility varies remarkably within the North End. All the participants observed that the community service organizations located on Selkirk Avenue and Main Street are easily accessible by transit. Similarly, the organizations located on Euclid Avenue and areas located within the walking distance from Main Street are also accessible (Personal interview, Sherry, August 3, 2016). The areas that are located away from the major roads in the North End have only limited accessibility, with limited transit services at present. Several interviewees viewed Lord Selkirk Park neighbourhood, especially the area along Dufferin Avenue, as a 'no-go no-exit community'; primarily due to a complete absence of bus service during the weekend; long waiting times; and an absence of options to go to downtown.

Majority of the informants considered destinations on Dufferin Avenue as the least accessible by transit. Consequently, as one participant observed, the North Centennial Center: a major recreational facility located on Dufferin Avenue, is not directly and easily accessible by transit, and remains underutilized at present. Similarly, few informants also noted inadequate access to the health and commercial facilities located on McPhillips as a concern, despite the close geographical location. Other areas that are regarded as less accessible by transit are: the locations close to the Red River in the North Point Douglas neighbourhood; and area south of Salter Bridge (Personal Interview, Sherry, August 3, 2016). Lack of direct transit services across

the bridge, compels residents to travel long distance and make transfers to reach the other side (Personal Interview, Thomas, July 28, 2016).

All the participants regarded downtown as the most accessible location outside the community. Reaching downtown from Main Street and areas close to it is relatively easy as compared to any other parts of the community, due to the presence of several bus routes (Personal interview, David, August 5, 2016; Personal interview, Philip, August 11, 2016). The transit routes, in general, do not provide the North End residents with easy accessibility to other important locations in the city—such as the University of Manitoba and St. Vital Shopping centre— and employment centers in the suburbs (Personal interview, Philip, August 11, 2016). Consequently, travelling to distant places from the North End by public transit often becomes a 'project', and discourages the residents from going out of the community (Personal interview, Philip, August 11, 2016). Even geographically close areas such as Elmwood, are not directly connected to the North End. The absence of direct transit service between the two areas forces the residents to go to downtown first and take a transfer (Personal interview, Philip, August 11, 2016; Personal interview, Amenda, August 16, 2016), negatively impacting the comfort and travel time.

5.2 Challenges to Transit Accessibility in the North End

The qualitative evidence illustrates heavy transit dependence amongst the North End community to meet basic needs. However, accessibility of the residents to public transit facilities is often constrained by both economic and non-economic factors. Based on the information shared by the participants, the study has identified the following barriers to transit accessibility in the North End.

5.2.1 Affordability

Transit cost was a major theme in all the interviews. All the informants emphasized affordability as the most important barrier to accessible public transit in the North End. For the large number of residents who are on government assistance and have to pay for all expenses from their limited income, purchasing a monthly bus pass at over \$80 is unrealistic (Personal interview, Sara, August 10, 2016). The cost of a single bus ticket itself is often unaffordable to those who struggle for their daily basic needs. Moreover, there are no provisions to purchase single tickets but only a slip that contains five tickets. Though riders can buy single cash fare on the bus paying the exact amount of coins, it is costlier than buying single tickets. Consequently, many residents buy tickets from people who are illegally selling them at cheaper rate (Personal interview, David, August 5, 2016).

How do we go about being able to access one or two bus tickets legally? Because I know that it is happening. And I know that it is not legal. That's what people do if you can't afford to buy five tickets or ten tickets or the bus pass (Personal interview, David, August 5, 2016).

High transit cost, often, compels people to walk to various destinations not only within the community but even to distant destinations to pay their bills or for medical appointments (Personal interview, Susan, August 17, 2016). Several informants also reported of various informal practices that help residents to overcome the affordability barrier. Some of these practices are: lending bus-passes from friends; using tickets provided by community organizations to attend various activities for their personal trips; taking rides from friends/relatives; dependence on voluntary transportation services; and getting tickets through the 'bus ticket loan' programs (Personal interview, Maria, August 8, 2016; Personal interview, Sherry, August 3, 2016; Personal interview, Susan, August 17, 2016).

The interviews indicate that a significant share of residents in the North End is unable to use transit primarily due to affordability issues, despite its large transit dependent population. This is particularly true for people with disabilities who depend on disability grants to meet transportation costs, severely ill people with limited income, people on Employment and Income Assistance, and single mothers with several small children (Personal Interview, Sara, August 10, 2016; Personal interview, David, August 5, 2016).

5.2.2 Safety concerns

Six of the nine informants regarded safety concerns as a major challenge to transit accessibility in the North End—especially when it is dark. Several informants stated that the location of bus stops near/opposite to the bars on the Main Street is a major safety issue while using transit. The presence of people under the influence of alcohol or drugs at these locations discourages others from waiting for the bus, often compelling them to walk to distant bus stops or to take cabs, especially for evening trips (Personal interview, Amenda, August 16, 2016). The informants shared several stories that reflect safety issues associated with transit use:

Somebody was sexually assaulted at the Jarvis and Main, just like right there. And then there is a lot of thefts. My cousin, she was pushed off her bike and they took off her bike (Personal interview, Sherry, August 3, 2016).

I have had people who had really bad experiences, who have been jumped or robbed just because they were waiting for the bus especially on Main because there are bars (Personal interview, Amenda, August 16, 2016).

The security issues associated with transit use, during the evening hours in particular, negatively affect its image amongst the residents. Often, residents avoid waiting or getting off at these 'dangerous' locations. Yet, isolating such locations further encourages the negative activities that are happening there, worsening the transit accessibility to the residents (Personal interview, Amenda, August 16, 2016). Several informants noted that the presence of people

under the influence of drugs or alcohol on board presents another threat to the safety of riders and affects their comfort while using transit. This is particularly true for certain routes (Personal interview, Philip, August 11, 2016).

5.2.3 Barriers to physical accessibility of transit

Several factors restrict residents' physical accessibility of transit services in the North End. Few informants stated that limited transit services on certain routes—especially on Dufferin Avenue and on many routes during weekends—compel residents to walk to bus stops on Selkirk Avenue or Main Street, often well beyond the 400-meter comfortable walking distance. Secondly, there are many who walk to distant stops instead of waiting at the nearby bus stops due to safety concerns, especially in the evenings (Personal interview, Amenda, August 16, 2016). The poor physical accessibility of bus stops to residents at certain locations also compels them to combine walking and transit in a single trip to save money and time (Personal interview, Susan, August 17, 2016). This supports the findings of Bajeras (2016).

Several informants observed that the poorly maintained sidewalks and the presence of huge snow-banks at the bus stops in particular, is a major issue that limits transit accessibility to physically challenged residents and mothers with small children. Another issue is the lack of accessible space inside the bus that often compels people with strollers, walkers or wheelchairs to wait for long time at the bus stops (Personal interview, Sherry, August 3, 2016; Personal interview, Ronald, August 8, 2016). Consequently, mothers—especially single mothers with very low-income—frequently walk to various destinations with their small children (Personal interview, Maria, August 8, 2016). The following information shared by the participants reflects these issues:

It becomes hard for them to use the sidewalk and I often see them on the road in the winter time. And then in the winter time, sometimes they have to wait for the bus because there is not enough room in the bus for their stroller (Personal interview, Sherry, August 3, 2016).

Wheelchairs often get passed up because the drivers drive by because there is a woman with a stroller taking up the space (Personal interview, Ronald, August 8, 2016).

Interviews suggest that mere physical presence of bus stops within the 400-meter distance does not ensure accessibility of transit facilities to all population. Thus, the analysis indicates that the quantitative figures of transit accessibility should be interpreted only in combination with real-life experiences of the people.

5.2.4 Discrimination

There is a clear racial divide between Indigenous and non-Indigenous residents in the city (Probe Research Inc, 2014). Several informants observed this divide while using transit in the North End. They identified the negative or unwelcoming attitude of transit drivers towards residents from the North End community, and a few informants went on to suggest that this attitude towards transit riders from the community, including themselves, is based on biased personal assumptions.

There are stories in the newspaper about people getting kicked off from the buses or not picked up. So racism impacts Indigenous people everywhere they go including on buses (Personal interview, Ronald, August 8, 2016).

Often, severely ill people taking transit in the area are misunderstood as being under the influence of alcohol (Amenda, August 16, 2016). Many informants criticized that the transit drivers treat riders from the North End community in a rude manner, just because of their physical traits that are often associated with Indigenous people (Personal interview, Sherry, August 3, 2016; Personal interview, Amenda, August 16, 2016). Few participants stated that the

drivers might not stop the bus merely because they think that somebody is homeless and assume that he/she does not have the money to pay the fare. Such negative and overtly unwelcoming attitudes of the transit drivers and other passengers discourage North End residents from using transit (Personal interview, Ronald, August 8, 2016). These findings support the observations of Barajas et al. (2016).

5.2.5 Information constraints

Access to transit-related information is critical to transit accessibility—particularly in winter when long wait at bus stops can have dangerous health impacts. Winnipeg Transit provides access to transit information via online sources, such as Navigo and several other transit applications for smart phones. However, the high cost of internet connection does not allow majority of the households to have online transit applications on their mobiles or at home, hindering their access to online transit information (Personal interview, Phillip, August 11, 2016; Personal interview, David, August 5, 2016). Unlike downtown, bus stops in the North End do not have transit-time displays or paper timetables. Hence, residents often have to guess the bus times, and wait at the bus stops for long periods (Personal interview, Maria, August 8, 2016; Personal interview, Sara, August 10, 2016).

Several informants observed that many residents cope with the existing transit information constraints with various informal means. This include, memorizing the schedules of the specific bus routes at origins and destinations, or by carrying paper timetables whenever they travel (Personal interview, Sara, August 10, 2016; Personal interview, Amenda, August 16, 2016). All participants agreed that many residents—who do not have the technical ability to obtain and understand the online transit information—also seek help from the staff at community

organizations to get details of transit timings and transfers. Several informants reported issues of information legibility faced by the residents.

Particularly for Indigenous families who might be moving from a First Nation community, who might not be knowing about transit, navigating in this transit system is not easy (Personal interview, Ronald, August 8, 2016).

We are totally assuming that everyone has access to an app but not everybody does, myself included. A lot of people don't understand the 24-hour clock (Personal interview, Philip, August 11, 2016).

Majority of the informants criticized that the currently available means for transit information are based on several unrealistic assumptions and serves only the needs of privileged sections. They observed that lack of access to information and the poor legibility of the available information often make it hard for many North End residents to navigate in transit, especially while making transfers. This is particularly true if there are more than one bus route with the same bus number (Personal interview, Maria, August 8, 2016). The analysis suggests information-related exclusion of the North End residents in terms of transit services. It also indicates that in order to improve transit accessibility in the North End, transit authorities have to address the information constraints currently faced by the less tech-savvy, low-income residents.

5.2.6 Barriers Related to Temporal Availability and Trip Coverage

The interviews indicate that several factors currently restrict the spatial and temporal accessibility of transit facilities in the North End. Despite the long hours of transit service (see section 4.2), several informants reported poor frequency as a major challenge to access transit.

For those with wheelchairs or strollers, long wait is an issue even during peak hours.

Mid-day appointment, health care, or EIA [Employment and Income Assistance] appointments are not during peak hours. Buses don't come frequently that time. So people have to wait (Personal interview, Ronald, August 8, 2016).

And there is no guarantee that you will get a bus when it will come because it may be already packed at that point. And generally, those people [people on wheelchairs or with kids] need the front of the bus but it is already packed (Personal interview, Susan, August 17, 2016).

Many informants observed that transit services are often not accessible in the areas away from the major streets during off-peak hours (Personal interview, David, August 51, 2016). Poor reliability of buses on certain routes, especially in winter, also compels people to wait for long time at bus stops (Personal interview, Philip, August 11, 2016). Similarly, as transfers are valid only for 75 minutes, the long wait time also may require people to buy a second ticket in a single trip. It is particularly true for mothers who have to both take care of their small children and fulfill the purpose of the trip (Personal interview, Sara, August 10, 2016). One of the informants stated that the lack of transit service on Dufferin Avenue during the weekend as well as in the early morning hours compels many shift-workers to hire taxis to reach downtown, costing a minimum of \$25 per day.

Several informants were of the view that the transit routes do not spatially connect the North End to several important destinations within and outside the community, -including downtown. As the major transit routes do not pass through Dufferin Avenue, residents either have to get transfer or walk to major bus stops on Selkirk Avenue or Main Street, irrespective of their destinations (Personal interview, Thomas, July 28, 2016). The bus route options are limited even on important streets like Salter, with Main Street as one notable exception as several downtown routes serve it (Personal interview, David, August 5, 2016). The above findings support the conclusions of the quantitative analysis done in Chapter 4.

5.2.7 Inadequate and poorly maintained transit-related facilities

All the participants perceived the lack of transit facilities as a barrier to transit accessibility in the North End; however, of remarkably less significance as compared to cost or safety considerations. Most of the informants felt that the North End community does not get equitable share of bus stop investments, and that the neighbourhood is being discriminated by the transit authorities. Currently, transit facilities such as bus shelters, benches, and bus-time displays are inadequate in the North End, and are not properly maintained (Personal interview, Sherry, August 3, 2016; Personal interview, Susan, August 17, 2016). The long wait time, in addition to the lack of transit facilities, makes transit ridership very difficult in winter, especially for people with wheelchairs, walkers or small children.

You can't avoid the bus being super late when it is snowing. But then you get these people who are standing waiting for the bus freezing outside at bus stops without shelters and waiting there for 20-30 minutes (Personal interview, Maria, August 8, 2016).

Given that the buses are passing people up all the time, the lack of those covered stops makes a difference (Personal interview, Ronald, August 8, 2016).

Even at high-traffic bus stops in the North End—where important facilities such as schools are located—shelters are not always present (Personal interview, Philip, August 11, 2016). Where shelters do exist, they may not always be used (Personal interview, Amenda, August 16, 2016; Personal interview, Sherry, August 3, 2016). Several informants observed that while people generally feel safer inside bus shelters, the presence of people on drugs or those who are drinking or sleeping inside the shelters poses threat to the safety of people, and discourages transit riders from using them (Personal interview, Sherry, August 3, 2016; Personal interview, Amenda, August 16, 2016). Therefore, the often intersecting issue of poverty, housing insecurity, and substance abuse deteriorate the image of public transit in the North End (Personal

interview, Sherry, August 3, 2016). Some of the informants observed that the lack of interest of Winnipeg transit to maintain the existing facilities in the area is also responsible for the poor state of transit facilities in the North End.

Analysis of the interviews reveals several important demand-related constraints that shape the overall use of transit services in the North End. It suggests that the limited trip coverage, temporal availability, and physical accessibility of transit services, and limited access and ability to use transit information impede residents' ability to use transit. Also, the qualitative analysis reveals racial discrimination as an important barrier to transit use. Most of the findings of the qualitative analysis support the conclusions of the quantitative analysis. However, there is visible disagreement with regard to the physical accessibility of transit services.

5.3 Impacts of Limited Transit Accessibility

As transit accessibility is critical to ensure the transportation needs of residents in heavily transit-dependent communities (Garrett & Taylor, 1999), it is inevitable that the limited accessibility to transit will affect the lives of North End residents in a variety of ways. On the basis of the semi-structured interviews, this study categorizes the impacts of limited transit accessibility under the following categories.

5.3.1 Economic Impacts of Limited Transit Accessibility in the North End

The study identified various economic impacts of limited transit accessibility to the North End residents. Firstly, several participants noted that inadequate transit services compel the low-income residents to spend a notable share of their limited income on transportation— even beyond the average transportation expenses—further worsening their economic strains. Hiring taxis on weekends or early morning hours for commuting due to unavailability of transit services

remarkably raises their transportation expenditures, often compelling them to compromise their access to other basic needs (Personal interview, David, August 5, 2016). This negatively affects the wellbeing of the low-income residents, particularly those who are on social assistance, and thus have to travel frequently to offices in downtown to prove their claims (Personal interview, Ronald, August 8, 2016; Personal Interview, Sara, August 10, 2016).

Secondly, the current level of transit accessibility negatively affects residents' accessibility to employment opportunities in several ways. Limited transit accessibility—especially due to high transit fare—acts as a key barrier for the low-income households and unemployed residents to come out of poverty, including their ability to attend job interviews (Personal interview, Ronald, August 8, 2016; Personal Interview, Amenda, August 16, 2016). Similarly, few participants observed that residents' limited accessibility of the low-entry jobs at the suburban locations spatially restricts residents' their employment opportunities. The workers have to carpool to reach the suburban job centers, or restrict work to areas accessible by transit (Personal interview, Philip, August 11, 2016). Several informants explained that the long wait time and the poor reliability of the buses do not allow the residents to use their time efficiently, negatively affecting the economic productivity of residents—including their ability to reach work places on time or to do multiple jobs. This is particularly true for women who also have to get their children to daycare centers before going to work (Personal interview, Amenda, August 16, 2016).

Currently, transfers during transit trips are valid only for seventy five minutes. Therefore, poor transit frequency and long travel times also mean that the residents may have to use additional tickets on a single trip, increasing the overall transportation cost (Personal interview, Sara, August 10, 2016). Finally, the poor transit accessibility, to some extent, also has

contributed to 'forced car ownership' in the community (Personal interview, Ronald, August 8, 2016). One of the informants explained that stigmatization of transit use as a transportation option for the poor, is another factor that encourages even some of the low-income households to purchase private vehicle.

If the transit was good, they would not have purchased the car. I think if the transit were good and not seen as the sort of crappy service, people would not you know [purchase automobiles] (Personal interview, Ronald, August 8, 2016).

Several informants also observed that the limited transit accessibility hinders residents from claiming their allowances and other benefits, and shared stories of people missing medical, court, and other appointments due of the cost barrier. The repeated missing of appointments further worsens the miseries of the low-income residents (Personal Interview, Susan, August 17, 2016).

5.3.2 Social Impacts of Limited Transit Accessibility in the North End

The interviews confirm that the inadequate accessibility of transit facilities affect the social wellbeing of North End residents in several ways. Firstly, the limited transit accessibility, especially in the evening hours, visibly limits the social and recreational activities of the residents—women, kids, and people with disabilities in particular (Personal interview, David, August 5, 2016; Personal interview, Amenda, August 16, 2016). Consequently, many residents are unable to access full range of community services available to them (Personal interview, Sara, August 10, 2016). A few informants also observed that the high transit fares, often, force the low-income residents to limit non-essential activities to areas within their walking distance (Personal interview, Sara, August 10, 2016). These findings of the study support the conclusions of Agarwal et al. (2011). Some of the informants described the scenario in the following manner:

I think of the people on strollers, on wheelchair. To walk to Selkirk to catch a bus to go to an activity at North Centennial especially when we have winter, those are huge barriers. Never mind, in the summer it's still hard for people and they just don't do it (Personal Interview, Susan, August 17, 2016).

Formal sports leagues and stuffs, those themselves are not that accessible. But transportation acts like another big barrier to be able to get kids to games and activities (Personal Interview, Ronald, August 8, 2016).

Secondly, limited transit accessibility—primarily the high transportation cost—discourages education of children from the low-income households in the North End, often leading to their dropout from schools (Personal Interview, David, August 5, 2016; Personal Interview, Philip, August 11, 2016). The high transit fare is also a barrier to those who are trying to go back to school after long breaks (Personal Interview, David, August 5, 2016).

Another social implication of the limited transit accessibility to the North End residents is in terms of safety on the streets. Several participants reported that poor maintenance of transit facilities at certain locations discourage people from using them, raising several security concerns. Also, the limited accessibility of residents to transit, especially in the evenings, leads to quiet and dark streets, further worsening the safety concerns in the area (Personal Interview, Amenda, August 16, 2016). One participant also observed that mothers walking with their small children to most of their destinations, primarily because of the cost barrier, risk their safety.

Limited transit accessibility in the North End has negative implications on its residents' health. Firstly, difficulties in transit navigation and the high transit cost discourage even severely ill people from going to their medical appointments outside the community; else, they compromise their access to other basic needs including healthy food (Personal Interview, Susan, August 17, 2016). The additional spending on taxis to reach Superstore or other grocery shops in downtown compels the residents to buy low-quality yet costly food available from the local-

stores (Personal Interview, David, August 5, 2016). Similarly, several residents walk to distant bus stops or destinations—including in winter either—due to safety concerns or due to high transit fare (Personal Interview, Sara, August 10, 2016). The long exposure of residents to extreme cold while using transit in winter is likely to have dangerous impacts on their health; especially considering the poor transit-related facilities at the bus stops in the North End.

Finally, interviews suggest that limited transit accessibility in the North End also has psychological impacts on its residents. Poor transit accessibility in the North End, despite the high demand for transit services, is viewed, at least by some of the informants, as a strategically placed discriminatory barrier to isolate the community. Absence of a free shuttle service that is similar to the Downtown Spirit in the highly transit-dependent North End community was pointed by several informants as an example to prove their argument. Also, most of the participants observed that the inability of the residents to reach various destinations, only adds to their frustration and hopelessness.

It [difficulty to access transit] makes everything much difficult or takes things longer. And you are going to be less motivated to do because it is harder to do (Personal Interview, Thomas, July 28, 2016).

It [limited access to transit] is just another opportunity to bring up some of those feeling again right and to feel defeated and then always having to constantly have a struggle (Personal Interview, Susan, August 17, 2016).

All the interviews hinted that the inability of the residents to access available opportunities to improve their lives—including their access to EIA appointments or job opportunities—aggravates their economic and mental stresses. It further isolates them from an active social life, weakens their sense of community, and discourages individuals from approaching others for help even if it is available (Personal Interview, Sara, August 10, 2016). Similar observations are also found in Stanley & Vella-Brodrick (2009) and Bajeras (2016).

Psychological impact of transit accessibility also has a gender dimension. The safety issues associated with transit use in the North End have deeper psychological impacts on women who feel insecure in their own community (Personal Interview, Sara, August 10, 2016). It even compels many to opt for costlier transportation alternatives or to limit their trips to daytime (Personal Interview, Amenda, August 16, 2016). Few participants observed that being 'othered' by rest of the city including in terms of transit accessibility, further widens the perceived gap between the North End and the rest of the city, but has created a strong identity among the residents of the North End; it acts as a source of strength. It is observed that the resilience of the North End community often enables them to ignore the issues arising from limited transit accessibility (Personal Interview, Ronald, August 8, 2016; Personal Interview, Susan, August 17, 2016).

Accessible public transit widens an individual's freedom, choices, and opportunities to improve life (American Public Transportation Association, 2007). Given the high demand for transit services in the North End, limited transit accessibility to its residents, both due to demand and supply factors, has several socio-economic implications at the community and individual levels. Nonetheless, population categories such as unemployed people, residents with physical/mental disabilities, single mothers, and seniors are the worst affected, with their multiple barriers to transit accessibility. These observations support the findings of Lucas & Clifton (2004).

5.4 Strategies to Improve Transit Accessibility in the North End

The above discussion indicates that several barriers hinder transit accessibility in the North End; ultimately affecting the wellbeing of the community and its residents in several ways.

The implementation of suitable measures to overcome existing transit accessibility barriers will complement individual level efforts to come out of poverty, and therefore have the potential to make positive impacts on their wellbeing. This section of the chapter provides a brief overview of the solutions identified by the informants to tackle the issue of limited transit accessibility in the North End.

5.4.1 Measures to Improve Affordability

All the informants emphasized cost/affordability as the most important barrier to transit accessibility in the North End. They suggested the introduction of 'affordability' oriented measures as the first step to improving transit accessibility in the community. Most of the informants shared their views on the need to introduce a low-income bus pass while one participant talked about the possibility of introducing a low-income family pass. One of the informant felt that introducing options to purchase one or two tickets instead of buying a whole slip is also likely to make transit use more affordable. The recently introduced Peggo card, an electronic fare card with the ability to reload according to the travelling needs, may be able to overcome this issue.

Many of the participants stated that a free shuttle service in the North End, like the Downtown Spirit, would be very beneficial to the community, especially to those who are currently forced to sacrifice even their basic trips. A free scheduled shuttle may improve the spatial accessibility of important locations within and outside the community such as shopping centers, EIA office, schools, and hospitals will benefit the entire community (Personal Interview, Susan, August 17, 2016). Several participants also suggested that the viability of the shuttle bus can be ensured by restricting the total number of its daily trips. Diverting the money that the

authorities currently invest to provide free bus tickets to EIA claimants from the community, is another option to ensure that the shuttle is economically viable (Personal Interview, David, August 5, 2016; Personal Interview, Susan, August 17, 2016).

Many community organizations provide free bus tickets to the residents either for attending their programs or to go to various appointments. Therefore, giving subsidized tickets to the community organizations in the North End is also likely to make huge difference (Personal Interview, Sherry, August 3, 2016). Informants had mixed views about the introduction of Peggo Card that would allow people to load tickets as per their needs. One of the informants expressed concern that the new system will negatively affect the ability of the community organizations to give free single bus tickets to people attending the programs. However, few weeks after finishing the semi-structured interviews for this study, Winnipeg Transit introduced metal tokens that can be used similar to a transit ticket for one-time trips. Currently, the metal tokens are being distributed to the community organizations and school divisions ("Winnipeg Transit Scraps Ticket for Tokens on Buses", 2016).

5.4.2 Measures to Ensure Safety of Passengers

Several informants emphasized safety concerns as a major barrier to transit use in the North End. Some of the informants had views about ways to improving safety at transit stops in the area. Presence of addicted people inside the bus shelters and physical assault of passengers waiting at certain locations were reported as major security issues in the area. Hence, better surveillance at the bus stops is likely to make transit stops safe public spaces (Personal Interview, Sherry, August 3, 2016). Another solution is placing an emergency button/system at every bus stop that people can press if they are in danger (Personal Interview, Amenda, August 16, 2016).

The same informant also suggested the need to recruit a 'greeting team' that will monitor the activities at bus stops on certain hours in a friendly manner.

5.4.3 Measures to Improve Access to Transit Information

Some the informants had views on ways to improve the provision of transit-related information in the area. It is important to have digital time displays, not necessarily at all stops but at important locations in the community, so that people can better manage their time (Personal Interview, Sara, August 10, 2016). As most of the residents currently do not have access to internet data, the availability of paper timetables at all bus stops is likely to ensure transit information that is accessible to low-income residents (Personal Interview, Ronald, August 8, 2016). The use of AM-PM distinction in the transit information instead of using the 24-hour clock is another simple way to make transit use easier to many of the residents in the community (Personal Interview, Philip, August 11, 2016). Similarly, educating people on how to use transit, including the available travelling options, transfers, and checking timetables also may make transit use less troublesome to many (Personal Interview, Maria, August 8, 2016).

5.4.4 Measures to improve temporal, spatial and physical accessibility

Interviews indicate that several factors limit the spatial, physical and temporal accessibility of transit facilities to the residents of the North End. Improving the frequency of bus service, not only on the major routes but also in the currently less accessible locations and especially during off-peak hours, is likely to improve transit accessibility considerably (Personal Interview, Philip, August 11, 2016; Personal interview, Sara, August 10, 2016). Ensuring the availability of transit service on Dufferin Avenue during weekend, early morning, and late evening hours is also important to make transit more accessible in the area (Personal Interview,

David, August 5, 2016). Limited spatial connectivity of the available routes demands frequent transfers, making transit trips a time-consuming and hard experience to many, and the recent migrants from First Nation reserves in particular (Personal Interview, Ronald, August 8, 2016). Thus, several informants stated that a free shuttle that will connect the important locations in the community and important downtown destinations is very likely to improve the accessibility of the residents to critical facilities.

All informants observed that the presence of snow-banks on the sidewalks impedes movement of transit users in winter— especially the access of physically disabled residents, seniors, and mothers with children to transit. Thus, timely snow removal during the winter can be an effective solution to overcome this challenge (Personal Interview, Ronald, August 8, 2016; Personal Interview, Susan, August 17, 2016). Several informants felt the need to increase frequency of buses with wheelchair/stroller accessibility so that transit riders who need 'accessible space' are not compelled to wait for long at the bus stops (Personal Interview, Ronald, August 8, 2016). Several informants felt that placing more shelters and benches at the bus stops will remarkably improve the comfort of the riders, especially the disabled residents and mothers with small children, and encourage more people to take transit in winter.

5.4.5 Other measures

Few informants shared ways to tackle discrimination on transit. Some participants felt that introduction of social training provisions to transit drivers—so that they will not discriminate the Indigenous/North End residents just because of their ignorance of Indigenous communities and/or Canada's colonial history—would be a major step in this regard (Personal Interview, Maria, August 8, 2016; Personal Interview, Ronald, August 8, 2016). One of the

informants suggested detailed analysis of the available transit data for equitable transit investment. This suggestion is particularly relevant with regard to the allocation of buses with wheelchair/ stroller accessibility.

Investing in options to reduce trips is another strategy to improve residents' accessibility to basic amenities. The informants gave a mixed response when asked to choose options either to improving transit accessibility or to reducing trips through strategies like community economic development (CED) and by making North End a pedestrian and bike-friendly community. Five of the nine participants suggested that measures to improving transit accessibility will benefit the North End community the most. Improved transit accessibility is likely to increase residents' exposure to locations outside the North End and to numerous economic opportunities. Few informants opined that improving travelling options to outside locations is also likely to improve the community's connections to neighbouring communities and contribute to diminish the currently established negative perception about the North End.

I feel that if we try to put in all the amenities in one area, considering that the north end is majority Indigenous people, low-income people, it kind of secludes them from the outer communities. Trying to put everything here, is a kind of keeping them in this area, dependent on this area where they don't get the experience to travel out and find resources in other areas (Personal Interview, Thomas, July 28, 2016).

It's [Winnipeg city] very segregated, poverty, you know. Just to sort of break those moods away, you know and to, I think of more options to get out of the community than into the community (Personal Interview, Philip, August 11, 2016).

However, two participants preferred CED strategy to other measures to improving residents' access to basic needs. They explained that bringing more facilities to the North End through CEDs will further strengthen the community and positively impact the residents' wellbeing. Two other participants observed that a combination of transit-oriented, and non-

transit oriented solutions are needed to ensure residents' accessibility to basic amenities in the North End. These informants felt that the distinction between the transit-oriented and non-transit-oriented options to improving the overall accessibility is very difficult.

5.5 Summary

The analysis indicates that several factors constrain the public transit accessibility of the North End residents. All the participants considered cost as the most important barrier that hinders transit use in the community while the other barriers are lack of safety, discrimination by the drivers, limited wheelchair and stroller accessibility, poor frequency of buses, especially during the off-peak hours, lack of access to transit-related information, and inadequate transit facilities at the bus stops. Vulnerable populations such as single mothers, seniors, physically and mentally challenged persons face multiple and additional barriers to transit use. The qualitative analysis of the interviews with community workers reveals several issues that did not emerge in the quantitative analysis done in Chapter 4. The stories shared by the informants also illustrate the limitations of focusing merely on quantitative approaches to understand transportation planning issues.

Interviews suggest that the restricted transit accessibility directly affects residents' ability to access crucial amenities and affects them socially and economically. The economic implications of limited transit accessibility ranges from failure to attend job interviews to forced car ownership, while the social impacts range from limited social activities to drop out from schools. By raising additional barriers to access basic amenities, the limited transit accessibility also denies the low-income residents the opportunities to come out of poverty. This may even have psychological impacts on the individuals, as it can compel them to shut themselves off from

rest of the community, and discourage them from seeking help from others. Therefore, the existing barriers to use transit affect the wellbeing of the North End community in a multitude of ways—both at the individual and community level. The stories shared by the informants also suggest that Indigenous residents face several additional barriers while using transit, including racial discrimination. Based on the real-life experiences, the study suggests the need to include a social policy dimension in transportation planning.

Existing socio-economic issues arising from the limited transit accessibility in the North End community may further reinforce the north-south divide within the city. Most informants shared views on strategies to improve transit accessibility in the area. These ranged from measures to ensuring transit affordability to introduction of social training provisions to the transit drivers. Nonetheless, all the participants emphasized strategies to improve affordability as the first step to transit accessibility to the residents: the options suggested ranged from the introduction of low-income bus pass to a free shuttle that would provides spatial accessibility to all important locations in the community as well as to major destinations in downtown. Apart from the need to improve transit accessibility in the area, all the informants acknowledged the importance of non-transit oriented strategies, including CEDs, to ensuring residents' accessibility to basic amenities.

6 CONCLUSIONS AND REFLECTIONS

Transportation inclusion is a major component of social inclusion (SEU, 2003). Research studies have well established the key role of public transit to ensuring the transportation needs of the low-income households and other socio-economically vulnerable populations in automobile-centered cultures. Availability of affordable and accessible transit services enables people who are unable to own and maintain private automobiles to access basic needs (Litman, 2015). Hence, assessing and identifying strategies to overcome barriers to transit accessibility are crucial steps to ensuring transportation inclusion.

This study attempted to examine the level of transit accessibility in Winnipeg's North End: a geographically isolated area within the city that has experiences of multiple generations of socio-economic marginalization. While this exploratory study has several limitations (see Chapter 3), it identifies several issues that hinder the accessibility of transit facilities to area residents and explores the associated impacts on community wellbeing. This final chapter is divided into four major sections. The first provides a brief summary of the findings, including the answers to the initial research questions. Important lessons for future research and planning practice are identified in the second section. The third deals with possibilities for future research, while the fourth is a self-evaluation of the entire research processes.

6.1 Key Findings

Winnipeg's North End has been a highly diverse and socio-economically marginalized community in the city since the early twentieth century. Currently, a significant share of its population lives in poverty, and is young and Indigenous. The numerous community service organizations that are functioning in the area provide a wide range of services to the residents

and play a significant role in their day-to-day lives. Nonetheless, commercial activities are very limited, compelling residents to travel outside the area to access critical goods and services. Currently, residents from the community travel to outside locations for shopping, banking, recreation, education, advanced health care, employment, social allowance claims, and bill payment.

With low rates of car ownership and a high low-income population, the North End experiences several categories of transportation disadvantage. Interviews suggest that single parents, working women with small children, people with mental or physical disabilities, and seniors face additional constraints. Currently, only a small share of the households has access to private automobiles, while the majority depends on cheaper means of transportation to access basic needs. In addition to several barriers to walking and biking (e.g. safety, poorly maintained sidewalks), the lack of commercial activities in the area further raises the importance of public transit in the North End, especially for long-distance trips.

Given the current socio-economic composition of the North End community, ensuring public transit accessibility to the residents is critical to ensuring their access to basic goods and services, and community's wellbeing. The study aimed to examine the Indigenous experience on transit use in the North End from the supply and demand dimensions, and attempted to answer three questions.

The first research question is: what is the current level of transit accessibility in Winnipeg's North End? Are there particular concerns for Indigenous residents? This question was answered through a combination of qualitative and quantitative analysis. The limited trip coverage of the transit routes restricts residents' access to several important destinations, both within and outside the North End. With several bus routes, destinations on or close to Main

Street and Selkirk Avenue are easily accessible by transit. In general, residents have comparatively easy access to community organizations serving the North End; most of them being located either on Main Street or Selkirk Avenue.

Transit accessibility drastically declines with increasing distance from the major streets. The Lord Selkirk Park neighbourhood and the area along Dufferin Avenue in particular, is regarded as one of the least accessible areas in the North End. The absence of direct transit routes to downtown, long waiting time, and unavailability of transit service during the weekend compel residents living around Dufferin Avenue to walk to distant bus stops, take transfers, or hire taxis. Experiences shared by the informants suggest that the poor transit service on Dufferin Avenue remarkably restricts the mobility of the residents residing in the adjacent areas and has led to the underutilization of community facilities located on it.

The spatial analysis completed as part of this study indicates that physical accessibility to transit services is not a challenge in the North End. However, the real-life experiences of the residents reveal several hidden barriers to physically accessing transit facilities in the area. The major barriers are: poorly maintained sidewalks; lack of timely snow removal on the sidewalks; and limited access to 'accessible' space inside the buses. With the exception of the Lord Selkirk Park neighbourhood, the North End has longer duration of transit service as compared to Osborne Village-Fort Rouge: an area with similar location with respect to the downtown. However, poor frequency of service, especially during the off-peak hours and at the stops away from major streets, has been identified as a major issue in the North End. Inadequate connectivity to downtown from the locations away from the major roads, limited route choices, and poor transit-related facilities at the bus stops are the other major transit accessibility issues identified by the study.

The interviews suggest that mere availability of transit facilities do not ensure that transit is accessible to residents. With significant share of households on employment and income assistance, high transit cost was identified as the most important deterrent to public transit use in the North End. Interviews indicate that purchasing a monthly bus pass or spending \$2.65 for a ticket is unaffordable to the majority of residents. Within the low-income households, single mothers with small children, seniors, and residents with physical/mental disabilities appear to be the worst affected. Also, the absence of provisions to legally buy single bus tickets has given rise to people illegally selling bus tickets at lower rates (Personal Interview, David, 5, August 2016).

Safety is another barrier to transit accessibility in the North End. Location of bus stops opposite to bars and the presence of intoxicated people inside the shelters, pose security threats to the transit riders. In addition, residents often avoid going to certain bus stops due to the criminal activity in the surrounding area, especially during the evening hours. The tendency amongst residents to isolate the unsafe spots further encourages negative activities at these locations, and aggravates safety concerns. Though impossible to generalize, residents in the North End often face racial discrimination while using transit.

Absence of transit schedules and displays even at important locations, lack of access to transit applications, different bus routes with same number, and the use of 24-hour clock for transit scheduling, hinder the ease and comfort level of transit riders in the North End. This study suggests that inadequate access to transit-related information, both due to economical and technical factors, is a major constraint to transit use in the North End, especially during the winter months.

The second research question is: what are the socio-economic implications of the current level of transit accessibility in the North End? Are there any implications specific to

Indigenous residents? Content analysis of the semi-structured interviews indicates that the current level of transit services available in the North End is inadequate as compared to the high level of transit dependency amongst its population. This is especially true for the very-low income residents whose transportation needs are often hidden. All the interviews indicate that the existing barriers to public transit use restrain the residents from exploiting the available opportunities, and affect the socio-economic and psychological dimensions of their lives. Limited transit accessibility in the North End limits the activities of the residents—especially in the evenings—and impacts their travelling patterns.

Limited transit accessibility has several economic implications on the lives of the residents. Firstly, the high transit fare and limited transit routes in the area directly impacts residents' access to employment opportunities, and therefore their economic condition. Long travel time on transit, even for short trips, prevents people from using their time efficiently. It limits the economic opportunities of mothers of young children who often need to travel to daycare centers before going to work. The limited transit facilities often compel non-drivers to spend on taxis, at least to meet a part of their transportation needs. In addition, the long wait time compels the riders to use additional bus tickets, increasing the overall transportation cost.

Economic barriers to access transit services impact the social dimension of the residents' lives in various ways. In an attempt to reduce transportation cost, a majority of the residents prefer walking to transit rides, thereby limiting their social interaction to areas within walking distance. This is particularly true for very low-income residents, seniors, and women with small children. High transit cost is a major reason that discourages many students in the North End from continuing their schooling. The analysis suggests that the high transportation cost also

compel residents to make compromises on other basic needs in order to save money for critical transit trips (e.g. Doctor's appointment or court hearings).

Limited transit accessibility to the residents directly impacts their health condition. The economical and non-economical constraints to transit use in the area force the low-income residents to minimize their trips and sacrifice even basic needs, including access to healthy food. Often, the high taxi fare and limited transit accessibility hinder the residents' access to fresh fruits and vegetables, and compel them to buy low-quality yet costly food available at corner stores. Also, long exposure to extreme cold while waiting for the bus, or the long walks to distant destinations in minus 30 or 40 can be detrimental to health.

The study also reveals various psychological outcomes of the limited transit accessibility to the residents in the North End. It worsens the social isolation of individuals who are already undergoing economic distress. The limited trips and geographical accessibility reduces residents' capacity to maintain social networks, and act as hurdles to use the available community support. Limited transit accessibility acts as yet another barrier against their individual attempts to overcome poverty, and adds to their feeling of being helpless and isolated.

The third research question is: what are the possible strategies to improve accessibility to transit facilities in the North End? Are there particular strategies to improving the transit accessibility to Indigenous residents? Improving transit accessibility in the North End has the potential to bridge the north-south divide in the city. Informants suggested various ways to improving transit accessibility in the North End. All the informants regarded affordability measures as the first step to improving transit accessibility in the North End. The study indicates that strategies such as a low-income bus passes or provisions for subsidized tickets is likely to encourage low-income residents to use transit. Many large as well as medium sized cities in the

country have successfully implemented low-income bus passes. As one of the informants observed, overcoming the cost barrier is likely to have multiple impacts on transit accessibility.

Then [once the transit becomes affordable] more people will take the bus. More people taking the bus means that there will be more people waiting for the bus, which will start making bus stops safer. With more people taking the bus, transit will have to maintain their bus shelters. Then you know, with all these, you change one thing and then ten things will follow like dominos right (Personal Interview, Amenda, 16, August 2016).

Similarly, introducing a free shuttle connecting the North End and the downtown was suggested as another effective strategy to overcome the cost barrier. Several informants emphasized that the free shuttle if introduced, should connect important destinations within the community and enable easy accessibility to downtown. In order to maintain the financial feasibility of the shuttle service, its operation can be restricted to few times a day. Also, funds that are allocated to provide free tickets to the EIA claimants can be used to partially fund the shuttle service (Personal interview, Susan, 17, August 2016).

Though not necessarily as effective as affordability measures, it is likely that strategies to improve safety of transit riders and improving frequency of buses will encourage more residents to use transit and thereby to reduce their dependence on taxis—particularly if schedules can be extended beyond the traditional business hours. Similarly, provision of social training to transit drivers also was proposed as a strategy to improve transit accessibility in the North End. It may enable the transit drivers to overcome their personal biases, and to train them to fairly treat all transit riders. This study suggests that measures such as adequate sidewalk maintenance, increasing frequency of buses with accessible space, and provision of paper timetables at all bus stops are the other possible strategies to facilitate transit use in the community.

6.2 Lessons for Future Research and Planning Practice

Though very exploratory in nature, the study brings out several useful lessons for future research and planning practice. This section provides a brief overview of the major lessons learnt from the study.

6.2.1 Need to Incorporate Transportation in Urban Indigenous Welfare Policies

The study illustrates the key role of transit services to ensuring residents' access to economic opportunities, social networks, and other critical amenities. Limited accessibility of transit services to residents—due to economic and non-economic reasons—affect the social, economic and psychological dimensions of their lives. This study indicates that apart from the general constraints to transit accessibility, Indigenous peoples in Winnipeg encounter additional barriers such as racial discrimination by the drivers and limited access to transit information. For instance, recent migrants from First Nation reserves may find it very difficult to navigate through transit system if they have, limited economic resources and technical knowledge, which would directly impact their wellbeing and community life. Thus, it is important to include strategies to ensuring transportation inclusion, especially transit accessibility, within the larger urban Indigenous welfare policy frameworks in Canadian cities.

6.2.2 Importance of Mixed Method for Transit Accessibility Studies

Combining qualitative and quantitative approaches in transportation research has several advantages. On the one hand, mixed approach enables the researcher to verify the quantitative figures in the backdrop of the real-life experiences. Simultaneously, it identifies other dimensions of the accessibility issue that cannot be captured in terms of numbers. In this study, quantitative analysis illustrated that, with few exceptions, all residents in the North End have

access to transit stops within the 400-meter distance. Nonetheless, the qualitative analysis confirms that mere physical presence of bus stops within the comfortable walking distance does not necessarily ensure easy physical accessibility to transit facilities.

When analyzing physical accessibility, overlooking the less-quantifiable factors such as wheelchair accessibility, safety, and condition of sidewalks will lead to highly erroneous conclusions. However, combining the available statistics and shared experiences allows researchers to logically interpret both sets of data and draw conclusions that account for grounded experiences of transit use. The mixed method approach also enabled this study to reveal issues related to affordability, temporal availability of services, and technical and financial constraints to access transit information. Similarly, the qualitative component in the study exposed the hidden 'racial' barriers to transit accessibility, and provides a real-life reflection of the racial discriminatory practices that Indigenous residents often have to face while using transit. The combination of qualitative and quantitative findings also positively contributed to the validity of its findings.

6.2.3 Need to Include Social Dimension in Transportation Planning

Transportation inclusion is an integral component of social inclusion and community wellbeing (SEU, 2003). However, transportation planning is mostly dominated by economic and environmental priorities, while the social impacts of new transportation investments are often neglected (Garrett & Taylor, 1999). Sidelineing of social priorities in transit planning is also evident in Winnipeg. The existing transit system has several elements of transportation exclusion as identified by Church et al. (2000), primarily, space-based exclusion, time based exclusion,

fear-based exclusion, and information based exclusion; ultimately contributing to poverty and the widening of the north-south divide.

Given the large share of children and physically disabled people in the North End, there is high need for buses with 'accessible' space in the North End. Similarly, the currently available provisions for real-time transit information undermine the information needs of the majority of the transit riders in the North End who do not have internet access. Also, these information options often fail to cater the needs of the recent migrants from First Nation reserves.

Incorporating the social dimension in transportation planning will enable policy makers to appreciate the specific transportation needs of all socio-economically vulnerable populations, contextualize accessibility barriers at various levels, and thereby to implement measures to ensure transportation inclusion. The decision by Winnipeg Transit to introduce metal tokens for one-time trips on with the recently introduced Peggo card system is an appreciable step in this regard.

6.2.4 Understanding the hidden transportation needs of low-income households

Transportation inclusion facilitates access of individuals or communities to existing transportation networks—thereby provides them the access to opportunities and acts as means to achieve their needs. Thus, addressing the hidden transportation needs is essential to evaluate the overall transportation needs and to implement strategies for inclusion (Stanley & Vella-Brodrick, 2011). The interviews illustrated that a significant share of the travel needs of very poor households often remains hidden and fails to get acknowledged by the decision makers. For instance, the cost barrier compels many poor residents to cancel several critical and optional trips. As the transit planning tools and guidelines are framed largely on the basis of the existing

ridership, the forgone trips by the residents fail to get attention. Qualitative approaches in data collection can be very useful to understand the significance of the sacrificed transportation needs in low-income communities, and to incorporate them in decision-making.

6.3 Questions for Future Research

With a special focus on Indigenous residents, this study examined the level of transit accessibility in Winnipeg's North End and its socio-economic implications. It raises several questions that can be explored by other researchers in the future. Conducting a comparative transit accessibility study in various Canadian cities with a focus on Indigenous communities, will enable the policy makers to identify barriers to transit accessibility, its socio-economic implications on individual and community wellbeing, and to frame strategies to ensuring transit accessibility. Also, similar studies can be undertaken to examine the barriers to transit accessibility amongst similarly socio-economically vulnerable populations across the country. A precedent study that examines various strategies to achieving transit accessibility from comparable socio-economic contexts would be also beneficial.

Activities and trip patterns of people from different socio-economic backgrounds vary significantly (Bhat et al., 2006). The study indicates that poor residents often compromise transit trips primarily due to cost barrier; however, they require additional trips to various offices such as for paying utility bills and EIA appointments that the economically better off do not have to make. Thus, examining the transportation needs of the low-income, particularly of very poor residents, is another area with future research scope. From this perspective, the transportation needs and transit accessibility barriers to the recent migrants from First Nation reserves are also worth exploring.

Another possible area of research is the informal practices that are evolved in heavily transportation-disadvantaged communities to overcome the existing barriers to transit accessibility. Buying tickets from people at cheaper rates and free bus service provided by a local businessman on Thursdays are few such examples from the North End. Finally, researchers can also investigate the potential of Community Economic Development (CEDs) and active modes of transportation as alternatives means to improve residents' access to basic amenities.

6.4 Retrospective

This thesis project had been a valuable learning experience—both from a researcher's and potential planner's perspective. Being an exploratory project on transit accessibility to Indigenous communities in Canadian cities, there were numerous challenges to the study in the initial phase, particularly due to the absence of relevant statistics or literature on the research issue. Therefore, I had to depend primarily on the literature on transportation exclusion from comparable contexts, and to interpret the arguments in the socio-economic backdrop of the North End community.

The quantitative analysis was the first stage in the study, and could reveal basic facts on the temporal, spatial, and physical accessibility of transit facilities in the study area. Comparing the transit accessibility of the North End to a similarly located area in the city was useful from a transportation equity perspective. A significant turning point in the study was the collaboration with the Winnipeg Boldness Project. Presentation of the quantitative as well as the qualitative analysis findings before the Boldness staff and community leaders was invaluable opportunity to verify the transit accessibility issues that I identified, and to set a start to the qualitative component of the study.

Being an outsider, conducting interviews with the community workers from the North End would have been a difficult and lengthy procedure without the support of the Boldness Project staff. The interviews well reflected the existing transit accessibility barriers in the North End and the socio-economic implications on the residents' lives. Also, the stories shared by the informants further enriched the study by attributing a real- life dimension to it. Finally, the study was also an opportunity to understand the strength of mixed method approach in transportation planning.

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APPENDICES

Appendix A: Letter of support received from the Winnipeg Boldness Project



Deepa Chandran
Masters of City Planning Candidate
University of Manitoba

April 29, 2016

Dear Deepa:

I am very pleased to have met with you on April 22, 2016 at The Winnipeg Boldness Project Office. Your knowledge of inner city transportation issues is excellent and I was pleased to have an in depth conversation with you about your Master thesis research work and how this aligns with the work of the Project. We would be very happy to support you in your work to undertake your thesis research.

The Winnipeg Boldness Project is a social innovation initiative working alongside the North End community to improve outcomes for young children in the Point Douglas area. The Project is working towards a Bold Goal:

Children and families in Point Douglas will experience dramatically improved wellbeing in all aspects of self: physical, emotional, mental, and spiritual.

The Project is designing and coordinating a six-year healthy baby strategy that will help young children in Point Douglas develop the tools they need to succeed in life. Our starting point in the design process was to engage the Point Douglas community in defining success for their children. Residents, parents and leaders also identified many of the roadblocks to success for their children and are driving the development of solutions to these roadblocks. A large proportion of the residents, parents, and leaders we engage with are Indigenous and espouse an Indigenous worldview and value base. However as a whole, the Project is not an Indigenous organization. We do utilize Indigenous perspectives and methodologies form the foundation of our problem definition and solution finding. We believe that the solutions generated will lead to better outcomes not only for Indigenous children, but better outcomes for all children.

Our Project structure includes Guide Groups. Consistent with community driven research principles the Winnipeg Boldness Project has developed Guide Groups. With their diverse experiences and knowledge base the Guide Groups help us further investigate innovative solutions to complex challenges. The Guide Groups help us organize the most promising ideas and further identify research and innovation

necessary to work towards achieving the bold goal. Currently we have four active & ongoing Guide Groups: **Parent and Caregiver; Community Leadership; Research & Evaluation Guide Group; and, Traditional Knowledge Keepers.**

We are entering the third year of the Project. During the first year of knowledge gathering and prioritizing, community members indicated that transportation was an area that was important for children and families. Transportation is one of five priority areas identified for further development through our community driven design process in year two. As we move into year three, transportation will remain a priority that we continue to work with community to design solutions. As this is a continued priority for the community and the project, we are excited to find ways to support your work as we feel it can be valuable to inform design solutions.

We can see supporting you in several ways that will include inviting you to attend meetings of the Community Leadership Guide Group and the Parent and Caregiver Guide Group. This will allow you to meet with leaders of community organizations and staff who may be interested in or who might be able to suggest colleagues who might like to participate in interviews. You could also talk about your research and present preliminary results of your quantitative/spatial analysis. At the end of your data gathering and analysis, you would be able to present to these groups in order to seek feedback the preliminary results of your study. This would ensure that your writing represents the experiences of community leaders in ways that are appropriate and that can help to support community priorities in transportation.

I look forward to this partnership, please contact me when it is suitable for you to move forward.



Research Manager
Winnipeg Boldness Project
#5-585 Jarvis Avenue
Winnipeg, MB R2W 3B2

Appendix B: Interview Participant Information

Number	Interview Date	Pseudonym (Gender of the interview also may be unreal)
1	28, July 2016	Thomas
2	03 August, 2016	Sherry
3	05, August 2016	David
4	08, August 2016	Maria
5	08, August 2016	Ronald
6	10, August 2016	Sara
7	11, August 2016	Philip
8	16, August 2016	Amenda
9	17, August 2016	Susan

Appendix C: Speaking note I used at the end of a presentation in Guide Group meeting

As transportation has been identified as one of the five most pressing concerns in the North End, the present study will be supported by the Winnipeg Boldness Project. The next phase of my research focuses on how Indigenous residents experience public transit accessibility, with a particular focus on the five neighbourhoods in the South Point Douglas Neighbourhood cluster. The study defines 'Indigenous' as an individual who may self-identify as a member of Metis, Inuit or First Nation communities. As you have just seen, these neighbourhoods were the focus of the quantitative portion of the study.

The qualitative portion of the study aims to use in-depth interviews with community service professionals working in the study area. It is anticipated that community service staff working at the local level under occupational titles such as family/social/child/community/youth service workers, will maintain close contact with the residents, and will have an understanding on transit accessibility concerns of their clients. Hence, I will be particularly interested in interviewing community service professionals who are members of the North End Indigenous community and who are also transit users, as these individuals will be able to triangulate their own experiences of public transportation with their professional understanding of how transportation links to the wellbeing of their clients. Attendees of this meeting are welcome to participate in the study if you are interested in sharing your views on transit accessibility concerns in the North End and/or can suggest staff/experts that will be able to contribute to this study even if they don't belong to your respective organizations.

The 'Project Backgrounder' that is given to you will provide you more details about the project. An electronic copy of the same document will be sent to your official email as well. I would greatly appreciate if you can forward the 'Project Backgrounder' to the potential participants working in your organization and ask them to contact me via email/phone if they are interested to participate in the study.

Please feel free to contact me or my thesis Advisor Dr. Janice Barry for more details on the project. This research has been approved by the Joint-Faculty Research Ethics Board (JFREB). You may also contact the Human Ethics Coordinator of the University of Manitoba for any further clarifications on this study via email or phone. All the contact details are provided in the project backgrounder provided to you.

Thank you for your time and consideration.

Appendix D: Project backgrounder sent to interview participants



UNIVERSITY
OF MANITOBA

City Planning
201 Russell Building
84 Curry Place
Winnipeg, Manitoba
R3T 2N2
Tel: (204) 474-9458
Fax: (204) 474-7532

Faculty of Architecture

(Project Background Backgrounder for Prospective Interview Participants)

You are invited to participate in a semi-structured interview as part of my Master's Thesis Project on public transit accessibility of Indigenous communities in Winnipeg's North End. The following information is intended to provide you with important background information on my Master of City Planning Thesis Project at the University of Manitoba. The project is being supervised by Dr. Janice Barry, Assistant Professor in the Department of City Planning.

Public transportation plays a significant role in meeting the mobility requirements of the marginalized communities in automobile-centered cultures. The purpose of this project is to examine the accessibility of Indigenous communities living in Winnipeg's North End neighbourhoods to public transit. Due to resource and time constraints, the study will be limited to five neighbourhoods in the South Point Douglas Neighbourhood cluster. As a community worker frequently interacting with the residents at the grassroots-level, it is assumed that, you will be able to comment on transit accessibility concerns of your clients and how it impacts various dimensions of their lives.

Due to the shared interest to learn more about the public transit accessibility concerns in the North End, the present study will be supported by the Winnipeg Boldness Project. The project can be regarded as a pilot study in the realm of transportation accessibility and its impacts on the welfare of Indigenous communities in the country. The statement of informed consent attached with this email will provide you detailed information on the procedures, risks and benefits of participating in the study.

This research has been approved by the Joint-Faculty Research Ethics Board (JFREB). If you have any concerns about the project, you may contact the Human Ethics Coordinator (HEC) at [REDACTED] or e-mail: [REDACTED].

Please feel free to contact me at [REDACTED] or [REDACTED] for more details. You may also contact my thesis Advisor Dr. Janice Barry at [REDACTED] or [REDACTED] for any clarifications on the study.

Appendix E: Follow-up email sent to the interview participants



UNIVERSITY
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City Planning
201 Russell Building
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[Salutation],

My name is Deepa Chandran, and I am a second year student in the Master of City Planning program at the University of Manitoba. I am currently doing my Master Degree Project, which explores public transit accessibility of Indigenous communities in Winnipeg's North End.

Thank you for your interest in learning more about my research. I would greatly appreciate your participation in an in-person interview related to this research. The interview will include roughly 7 open-ended questions, should take approximately 60 minutes to complete, and can take place at a time and location of your choosing.

I have attached the Project Backgrounder and the consent form that will explain you the project details, procedures involved and the risks and benefits of participation.

Please feel free to contact me at [REDACTED] or [REDACTED] for more details.

Thank you for your time and consideration,

Sincerely,

Deepa Chandran

Appendix F: Research participant information and consent form



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Faculty of Architecture

Statement of Informed Consent

Research Project Study: *'Transportation Inclusion and Community Wellbeing: Exploring Public Transit Accessibility of Winnipeg's North End Neighbourhoods'*

Principal Investigator: Deepa Chandran, Graduate Student, Master of City Planning, Faculty of Architecture, University of Manitoba

Advisory Committee: **Supervisor** – Dr. Janice Barry, Assistant Professor, Department of City Planning, Faculty of Architecture, University of Manitoba

Internal Advisor – Dr. Orly Linovski, Assistant Professor, Department of City Planning, Faculty of Architecture, University of Manitoba

External Advisor – Ms. Susanne Dewey Povoledo, Senior Transportation Planner, City of Winnipeg

Introduction

You are invited to participate in a research study. The purpose of this consent form, a copy of which you can keep for your own records, is intended to ensure you have consented willingly to participate in the study and with all necessary information. It should also explain the procedures involved in the research and the expectations from you as a participant.

Please read carefully, understand and review the consent form and information about the research. If you would like to know more details on any issues concerning your participation in the interview, please feel to ask me (the Principal Investigator).

Purpose of the study

The proposed study explores the accessibility of public transit to the Indigenous residents of Winnipeg's North End. It is anticipated that the lessons learnt from this study will provide an initial framework to understand the role of transit accessibility in determining the community/individual wellbeing of Indigenous communities and other socio-economically vulnerable populations.

This project is my Major Degree Project, an essential requirement for the completion of the two-year Master of City Planning Program at the University of Manitoba.

Study procedures

As a participant in the study, you will be asked a series of questions related to your professional experience, observation of transit accessibility and its potential impacts on the lives of your clients. The anticipated time for the completion of the semi-structured interview is 60 minutes. An interview schedule comprising 7 major and related additional questions will be used to guide the discussion. You can refuse to answer any questions and to end the interview at anytime. The interviews will be audio recorded and transcribed with your consent. You will have the opportunity to review your transcript prior to the publication of this project.

Participant risks, benefits, costs

There are minimal risks associated with your participation in the research. No personal identification details including the names of the service organization that you are affiliated to, will be mentioned in the report. However, others who know you well or work with you may be able to identify you due to small sample size and the nature of the information shared. This poses a risk to the confidentiality of the details shared in the interview and may harm your professional reputation. I will take various steps to minimize the risks of your participation. The opportunity that you will get to review your interview transcript will allow you to remove/modify any sensitive information. I will use my discretion to make sure that your comments are appropriate to public domain.

As a participant, the study will give you an opportunity to share your knowledge and experience on transit accessibility concerns of your clients and how it affects their lives. You will also be able to share your insights on the possible strategies to improve transit accessibility in the study area. Your participation in the study has the potential to provide a framework to understand the link between transit accessibility and community wellbeing in the context of Indigenous communities, hence to contribute significantly to a progressive change.

Audiotaping & confidentiality

Audio recording ensures the accuracy of the information shared. Hence, the interview will be audio recorded with your consent and later transcribed for content analysis. I will take notes if you have any reservations about interview being audio recorded. All the personal identifiers including your name, age, and gender will be removed within a day after the finalization of interview transcripts for content analysis. As well, the name of the organization that you are affiliated to and the neighbourhood that you serve will not be specifically mentioned. Pseudonyms will be used to explain any of your comments in the report.

Data will be saved in a password-protected folder on my laptop and will not include any personal identification details. However, I will maintain a list to link the real name of the participant to their pseudonym, since it is necessary to send back the interview transcripts for review. This list will be saved in the password-protected folder along with audio recordings and transcripts. All printed documents related to your participation in the study such as the consent form, or transcripts, will be kept inside a locked shelf in my apartment. However, I may have to share a part of information shared by you with my supervisor if any confusion arises regarding

their interpretation. All the files related to your participation will be permanently destroyed a year after the completion of this Master Degree Thesis.

Feedback & debriefing

Within two weeks after the completion of the interview, I will send you the interview transcripts via email. This will provide you an opportunity to verify the accuracy of the information shared during the interview, and to modify/remove any comments that you may feel as inappropriate for the public domain. You are expected to return comments of review within two weeks. I will provide you individual feedback within a week after getting the review comments to ensure the accuracy of the information compiled from the interview. If interested, I will provide you a copy of the final report upon the completion of this project.

Dissemination of results

I will disseminate the final thesis report as a hard copy at the University of Manitoba's Architecture/Fine Arts Library and in my oral defense. An electronic copy of the document will be uploaded in University of Manitoba's M Space following the project approval. A hard copy of the final report will be given to the Winnipeg Boldness Project. Also, I will send a copy of the final report to the interested participants following the thesis defense via email or surface mail. The results from the study may be used by the principal researcher (Myself) to write conference papers/articles for publication.

Voluntary participation/Withdrawal from study

Your decision to take part in this study is voluntary. You have the right to refuse to answer certain questions or to withdraw your participation without explanations at anytime during this study. If you decide to discontinue your participation due to any reason, the information shared by you during the interview will not be used in the final report.

Contact information

Student researcher:

Deepa Chandran
Graduate Student, Department of City Planning, Faculty of Architecture, University of
Manitoba , Phone: [REDACTED], Email: [REDACTED]

Research supervisor:

Janice Barry
Assistant Professor, Department of City Planning, Faculty of Architecture, University of
Manitoba, Phone: [REDACTED], Email: [REDACTED]

Statement of consent

Your signature in this form indicates that you have carefully read and understood to your satisfaction the information regarding participation in this research project and willingly agree to participate as a subject. It does not waive your legal rights as a participant nor release the researchers, institutions and sponsors from their legal and professional responsibilities. You are free to withdraw from the study at any time and/or to refuse to answer certain questions that you are not comfortable with. Your continued participation should be as informed as your initial

consent, so you should feel free to ask clarifications or new information throughout your participation in the study.

This research has been approved by the Joint-Faculty Research Ethics Board (JFREB). If you have any concerns or complaints on your participation in this study, you may contact any of the above named persons or the Human Ethics Coordinator (HEC) at [REDACTED] or by e-mail at [REDACTED]. A copy of this consent form has been given to you to keep for your personal records and reference.

Please place a tick mark in the corresponding box if you have agreed to each of the following. In case you don't agree, please leave the box blank.

I have read and understood the information provided in this consent form.

I have had all my questions answered by the student researcher in the language that I understand.

I understand that my participation in the study is voluntary and have the right to discontinue from the study at any time.

I, _____(print name), agree to participate in this study.

I agree to have the interview audio-recorded and transcribed.

I agree to be contacted by phone or e-mail if further information is required after the interview

I agree to have the findings from this project published or presented in a manner that does not reveal my identity.

Do you wish to receive a summary of the findings? Yes No

How do you wish to receive the summary? E-mail Surface mail

Address: _____

Participant's Signature _____ Date _____

Researcher's Signature _____ Date _____

Appendix G: Interview schedule

The purpose of this interview is to understand Indigenous peoples' experiences of transit accessibility in Winnipeg's North End. This requires exploring current transit accessibility in the study area, the socio-economic impacts of public transit accessibility and the possible strategies that can be implemented to make public transit more accessible to the residents. The proposed study views 'transit accessibility' as the combined outcome of several individual factors that affects an individual's ability to get into or use public transit to meet various needs.

The aim of this research is to understand the role of public transit accessibility in determining the community/individual wellbeing of Indigenous communities. Five neighbourhoods from the North End will be covered in the study: North Point Douglas, South Point Douglas, Lord Selkirk Park, Dufferin, and William Whyte. I am conducting semi-structured interviews with community workers, who are part of organizations serving the study area.

Section 1: Interviewee's Background

1. What kind of services do you and your organization offer to Indigenous residents in the study area?
 - a. How long have you been working with these communities?
 - b. How would you describe your current job position?
 - c. What is the nature of your involvement with the client population?
 - d. Without breaking any confidentiality rules, can you broadly describe the socio-economic background of your clients

Section 2: Examining the Present Transportation Scenario

1. In your professional practice in the study area, what kind of transit accessibility issues have you observed?
2. How important is the accessibility of public transit facilities to your clients?
 - a. Approximately what share of your clients is transit dependant/depends on public transportation to meet their mobility needs?
 - b. Why they are transit dependent?
 - c. How does their transit dependency impact various dimensions of individual/family lives?
 - d. How your clients go to different destinations within their community?
 - e. How many of your clients either walk or bike to different locations within/outside their community?
3. What kinds of facilities or services (such as health/childcare/education/recreation/shopping/community/finance) are available within the community?
 - a. How accessible are the facilities located within the community?
 - b. For what services, do your clients travel to locations outside the community?

- c. How far are the currently available transit routes connecting your clients to service locations outside the community?
4. How do your clients go to their work places?
- a. What kind of jobs do your clients usually do to earn their livelihood?
 - b. Relatively what share of your clients commutes by public transit?
 - c. How easy/difficult is it for your clients to reach their work places by public transit, particularly during the peak times and weekends?

Section 3: Strategies to Improve Transit Accessibility

1. Based on your professional experience, what do you consider as the factors that hinder transit accessibility of your clients?
 - a. How are your clients affected by changes in transit services (such as wait times and schedule changes)?
 - b. How do you think the access to real-time transit information affects the transit accessibility of your clients?
 - c. How affordable is the current cost of bus tickets/bus pass to your clients?
 - d. How far do the current levels of transit routes available to locations within/outside the community impact the lives of your clients?
 - e. How do the currently available transit facilities at the bus stops (such as benches, bus shelters, and time displays) affect transit accessibility of your clients?
2. What kinds of strategies can be implemented to improve the accessibility of your clients to public transit?
 - a. How do you think an improvement in the transit service quality will impact public transit accessibility of your clients?
 - b. How do you think a subsidization of transit fares and introducing a variety of transit passes to meet the trip demand needs of your clients will improve their transit accessibility?
 - c. What is your thought on improving transit-related facilities at the bus stops to improve transit accessibility of your clients?
 - d. How far do you think the opening of new economic and non-economic services within the study area will affect the travel needs of your clients?
3. Which set of policies do you think would be most beneficial to your clients to ensure their access to basic amenities: policies to improve public transit accessibility/policies to improve other modes of transportation/policies to encourage the opening of essential services in the study area. Why?

Appendix H: Codebook (Includes Themes and sub-themes only)¹²

Theme number	Major Themes	Sub-themes identified
1	Services offered by the Community Organizations	Level of community engagement, nature of service, additional services
2	Demographic Information	No sub-themes
3	Facilities Available	Facilities available locally, facilities available in other areas
4	Current Transportation Scenario	Importance of public transit, importance of and barriers to walking importance of and barriers to biking
5	Current Transit Accessibility	Level of local transit accessibility, Level of accessibility to other areas
6	Condition of Transit Related Facilities	Availability and maintenance of bus shelters, Availability and maintenance of seating arrangement, Availability and maintenance of bus-time displays, Physical accessibility to bus stops
7	Challenges to Transit Accessibility	Cost-related, safety-related, technical, temporal availability-related, physical accessibility-related, trip coverage-related, other
8	Impacts of Limited Transit Accessibility	Social impacts, Economic impacts, impacts specific to health, psychological impacts
9	Strategies to Improve Transit Accessibility	Cost-related, safety-related, physical accessibility-related, temporal availability-related, other

¹² A long list of codes was identified under each of the sub-themes during the qualitative analysis section. However, the given list includes only major themes and sub-themes identified in the qualitative analysis.

Appendix I: Spatial Accessibility of bus stops

Bus stops	North End	Osborne Village-Fort Rouge
Number	95	54
Per 100 people	0.80	0.42
Per sq km	26.7	26.7
spatial coverage	94.3%	83.0%

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015

Appendix J: Hours of daily bus service

Hour categories	North End (number of bus stops)			Osborne Village-Fort Rouge (number of bus stops)		
	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
Above 18 hours	85(89.5%)	84(88.5%)	12(11.5%)	22(40.7%)	21(38.9%)	8(14.8%)
13-18 hours	0(0%)	0(0%)	71(75%)	7(13%)	6(11.1%)	13(24.1%)
Below 13 hours	10(10.5%)	1(1%)	2(2%)	25(46.3%)	26(48.1%)	6(11.1%)
No service	0(0%)	10(10.5%)	10(10.5%)	0(0%)	1(1.9%)	27(50%)
Total	95(100%)	95(100%)	109(100%)	54(100%)	54(100%)	54(100%)

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015

Appendix K: Waiting time for various categories of transit routes

North-End	Category	Downtown	Express	Suburban
Service categories	Yes	78 (82%)	2 (2%)	39 (41%)
	No	17 (18%)	93 (98%)	56 (59%)
Waiting time	Peak am time	13.0	10.0	45.0
	Peak pm time	13.7	10.0	44.6
	Average	20.40	10.0	44.9

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015

Appendix L: Accessibility to transit related facilities

Osborne Village-Fort Rouge	Category	Downtown	Transit way/Express route
Service categories	Yes	54(100%)	23 (42.6%)
	No	0 (0%)	28 (57.4%)
Waiting time	Peak am time	17.6	12.7
	Peak pm time	17.9	15.3
	Average	21.3	15.6

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015

Appendix M: Minimum waiting time at the bus stop

Hours of bus service	Number of bus stops	
	Osborne Village-Fort Rouge	North End
Below 10 minutes	18 (33.3%)	0 (0%)
10-15 minutes	15(27.8%)	42(44.3%)
15-20 minutes	0(0%)	22(23.1%)
20-25 minutes	21 (38.9%)	0(0%)
25-30 minutes	0(0%)	12(12.6%)
Above 30 minutes	0(0%)	19(20.0%)
Total	54 (100%)	95(100%)

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015

Appendix N: Availability of daily bus service

Daily service availability	Number of bus stops	
	Osborne Village-Fort Rouge	North End
On all days	27 (50%)	85(89.5%)
Only on weekdays	1(1.9%)	0(0%)
Weekdays and Saturday	26(48.1%)	10(10.5%)
Total	54 (100%)	95(100%)

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015

Appendix O: Number of bus routes serving each bus stop

Number of bus routes	Number of bus stops	
	Osborne Village-Fort Rouge	North End
Only 1 route	19 (35.2%)	57(60.0%)
2 routes	11(20.4%)	23(24.2%)
3 routes and more	24(44.4%)	15(15.8%)
Total	54 (100%)	95(100%)

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015

Appendix P: Availability of transit-related facilities at the bus stops

Facilities	Indicators	North End	Osborne Village-Fort Rouge
Bus shelter	Number	24	20
	spatial coverage	73.0%	81.0%
Benches	Number	21	44
	spatial coverage	83.1%	82.0%
Display boards	Number	0	8
	spatial coverage	0.6%	48.0%

Data source: Calculations by the author based on the data from Winnipeg Transit, 2015