



Findings Report

Benchmarking Spatial Access for Community-Level Accessibility Standards

PEACH Research Unit | November 2025

Benchmarking Spatial Access for Community-Level Accessibility Standards

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Acknowledgement

This project was made possible with funding from the Accessibility Standards Canada's Advancing Accessibility Standards Research grant. The research team would like to thank the numerous experts with lived experience of disability who shared their knowledge and personal insights with us. We also thank the advisory board who provided their valuable expertise throughout the development of this project. Additionally, we would like to acknowledge the hard work of our research assistants who developed many of the critical visual elements of our research outputs. Finally, this research would not have been possible without the valuable partnership of the Rick Hansen Foundation, Walk n' Roll Halifax, and the CNIB Foundation.



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Section 1: Introduction

1.1 Project overview

This report details the results of the research project “Benchmarking Spatial Access for Community-Level Accessibility”, led by the Planning for Equity, Accessibility, and Community Health (PEACH) Research Unit of Dalhousie University. This project was funded by the Accessibility Standards Canada for the period of June 2022 to November 2025.

The discourse on accessibility related to persons with disability has focused mostly on the physical design of individual features indoors or outdoors of buildings (e.g., ramps, automatic doors), and a more comprehensive view of accessibility at a community-level—the ‘bigger picture’ of how communities are designed and arranged spatially to enable access for everyone—has not yet been given necessary attention.

North American cities are typically designed and built for car-centric lifestyles. Many Canadian cities and towns also take an advantage of the country’s large geographic scale, typically ‘stretching out’ rather than ‘building up’. As a result, services and amenities in many communities are places where residents cannot easily get to on foot—therefore, they are not accessible by walking or wheeling (in case of wheelchair use).

Urban planning literature has shown that walkable communities are those where you can walk (or wheel) to key services and amenities within 15 minutes. For average, able-bodied adults, a 15-minute walk translates to about 1.2 km in distance (Dumbaugh, 2008). In reality however, not many communities in Canada are designed in ways that key amenities are within 1.2 km of walking or wheeling.

What is more, this 1.2 km is a gauge applicable for only average, able-bodied adults. How about persons who walk slower? Persons with mobility disability? Older adults? Children?

The purpose of this study was to propose benchmarks for spatial access as a way to reference optimum or acceptable travel distance and time to services and amenities pertinent to the daily lives of persons with diverse mobility needs in the Canadian context. To produce the benchmarks, we assessed the spatial access of key services and amenities identified as priorities by persons with lived expertise of disability for over 30 cities and towns of different sizes across Canada. Building on the lived expert insights and spatial access benchmarks, we additionally created the visual representation of a (spatially) accessible landscape to demonstrate what kind of infrastructure is needed to make communities more walk and wheelable. The findings from this project can be used to create new spatial accessibility standards that recommend accessible distances, densities, and qualities of a journey to services and amenities that are critical for all Canadians to have access to, many of which are federally regulated (e.g., post offices, government service offices, banks).

1.2 About PEACH

Since 2018, the team members of the PEACH Research Unit have been doing research and community advocacy on topics relating to planning, accessibility, and health equity in Nova Scotia and nation-wide. PEACH works on projects collaboratively with community partners including non-profit organizations, government groups, and individuals living with disability experiences. Our research aims to identify and address the physical and societal barriers that prevent equitable and meaningful participation in communities for all.

1.3 Project partners & funding

The Rick Hansen Foundation (RHF), the CNIB Foundation (CNIB), and Walk n' Roll Halifax all partnered on this project and worked with the research team to develop the project findings. RHF and CNIB are national non-profit, charitable organizations in Canada pioneering efforts to improve the content and



transmission of accessibility standards for the built environment. Walk n' Roll Halifax is a local advocacy organization that promotes safer communities for pedestrians of all ages and abilities. Members from all organizations involved in this research, including advocates who have lived experience of disability, accessibility professionals, academics, and building industry professionals, have been assets to this research. The results of this research will also be circulated through each organization's respective networks and can be expected to inform their future work.

Finally, the activities of this project were overseen by an Advisory Board of individuals located in Nova Scotia who have lived experience of disability and professional experience working with accessibility standards. Their guidance was key to reaching the outcomes of this research.

Section 2: Background & Rationale

2.1 The need for benchmarks

The concepts of accessibility and spatial accessibility have many overlaps but are often treated differently in research. Spatial accessibility is generally defined as the ease with which one can physically travel to services and amenities and is often measured in terms of an established acceptable walking distance (e.g., 15-minute neighbourhood) (Moreno et al., 2021). Spatial access measures used in research often assess whether a given distance to an amenity meets a singular target for ‘an average population.’ On the other hand, accessibility mainly points to the design barriers—such as width of building entrances, presence or absence of ramps, audible signals at crosswalks, and grab bars in washrooms—for individuals to reach and use a given amenity in a place (Schreuer et al., 2019; Bonaccorsi et al., 2020).

Spatial allocations of services and amenities within communities are most typically selected according to land use efficiency and economic viability for businesses. The planning processes that determine these allocations regularly overlook spatial access to services and amenities as an accessibility issue for persons living with disabilities. Additionally, the

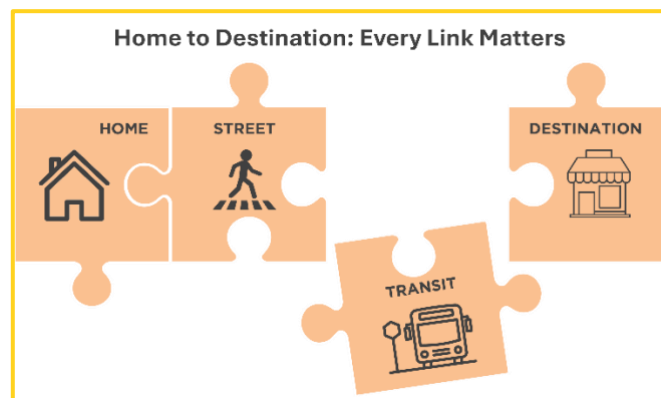


Figure 1: Visual representation of the features along a journey that are necessary for spatial accessibility.

ergonomic considerations for accessibility of services are often addressed in isolation from the journey to access them; as an example, even if a grocery store building is considered fully accessible, a manual wheelchair user may have difficulty accessing it if it is located at the top of a steep hill. As a result, many communities are still designed in a way that impedes persons with disability from conducting daily activities and participating in social and independent life.

What, then, should the spatial allocations of services and amenities look like from the perspectives of persons with a wide range of disabilities? Recent literature on walkability prescribes 15 minutes as an acceptable walkable travel time between residences and services and amenities in communities. However, the now popular ‘15-minute neighbourhood’ concept only uses measures that are based on average, able-bodied adults, and therefore it is inaccurate when assessing different walkable (or rollable) distance and time for non-able-bodied individuals of different ages (and genders).

Furthermore, the current understanding of spatial access has not been examined based on empirical evidence in existing communities – which has also left a gap in determining the feasibility of achieving ideal distance and time for pedestrian travel at the community level. For municipalities with goals to improve walkability to services, there are currently no clear benchmarks to monitor their progress with. Moreover, in a country as vast as Canada, benchmarks that are specific to the context of different scales and geographies are necessary. A realistic goal for walking distance to a grocery store in a small town may differ from that of a large city, for instance (particularly if sidewalk infrastructure is inconsistent or absent entirely).

This research recognizes that the distance and quality of a journey to services and amenities can be barriers to accessibility in themselves. The goal of this project was to establish benchmarks for current and target levels of spatial access to services and amenities pertinent to the daily lives of persons with diverse levels and types of disabilities, and, therefore, accessibility needs.

2.2 Relevance to accessibility standards

Current accessibility standards provide guidance for how individual buildings or streetscapes should be designed to be as accessible to as many people as possible. However, there is little direction about how distinct buildings and streetscapes can work together to contribute to more accessible communities. For example, a public library may be considered fully accessible, but someone who lives several blocks down the street from it who

requires frequent rest breaks may not be able to access it if there are no seating options along their journey.

Understanding the reality of spatial access across Canadian cities and towns, can help in creation of benchmarks that can be contrasted and targeted in planning. Using these benchmarks as tools, planners, accessibility advocates, and community members can recommend accessible distances and densities to services and amenities, and what qualities of the journey between home and these destinations should be considered as parameters for the accessible standard of community-level development. In other words, this new knowledge will inform a new type of accessibility standard that considers community-level access, which can guide policy on accessible infrastructure implementation in a more concrete way than current standards.

Section 3: Project Objectives

The objectives of the project were as follows:

- 1) Identify what **priority services and amenities** are important to include when assessing accessible communities and determine what **qualities of the journey** to these services and amenities (e.g., curb cuts, road safety, shade, resting places) are pertinent to consider.

- 2) Measure the **range of spatial access** (distance and quality of pathways to walk/roll) to these services and amenities in select cities, towns, and rural settlements across Canada as multi-case studies using residential locations as journey origins.

- 3) Determine the **recommended benchmarks** (distance and quality of journey by walking/rolling) to these services and amenities based on the findings through objectives #1 and #2.

- 4) **Visualize** what the landscapes (e.g., pathways from home to services) would look like when these spatial access needs by the diverse disability experiences are met from the perspectives of persons with lived knowledge.

Section 4: Methodology

4.1 Overall process

The study used a mixed-methods approach combining experience-based information gathering via engagement with people with disabilities and quantitative network analysis using GIS software. The process involved two steps:

1. Engagement activities (focus groups, survey, and mapping workshops) identified priority services, acceptable travel distances, and important built environment design features from the perspective of individuals with diverse accessibility needs.
2. Network analysis was performed across a national sample of Canadian population centers to measure walking/wheeling distances to services identified during engagement activities.

The results of these activities were translated into visual media and published to our [website](https://peachresearch.ca/benchmarking-spatial-access) (URL: peachresearch.ca/benchmarking-spatial-access). These media include an interactive online dashboard that allows users to compare the results of the study settlements and a 3D tour of a “5-minute neighbourhood” that was designed based on feedback from the engagement sessions.

4.2 Survey and engagement

Focus Groups

Two online focus groups and two in-person focus groups were held between June and September 2023. The combined participation from all focus groups was 32 people. All participants identified as experiencing some form of disability or were aged 60 years or older, except one (1) who was a caregiver to someone living with disability. Disabilities experienced by the participants included physical and mobility impairment (n=14), neurodivergence (n=7),

Participatory Mapping

Separately from the focus group sessions, we developed a participatory mapping activity to get feedback about what features are considered most important to consider along a typical 5-minute journey. The activity took place at the Accessibility Professionals Network Conference in March 2024 hosted by the Rick Hansen Foundation, which attracts accessibility experts from across Canada.

Using an axonometric line drawing (a method of drawing three-dimensional objects; see Figure 3) of four city blocks, participants were asked to draw their ideal neighbourhood layout by using stickers to place key destinations in proximity to their ‘home’ and using markers and sticky notes to customize the map of their ideal neighbourhood. We asked specifically about what services should be in the neighbourhood, how they might design the infrastructure of roads, sidewalks, and buildings, and imagine how the landscape could be improved

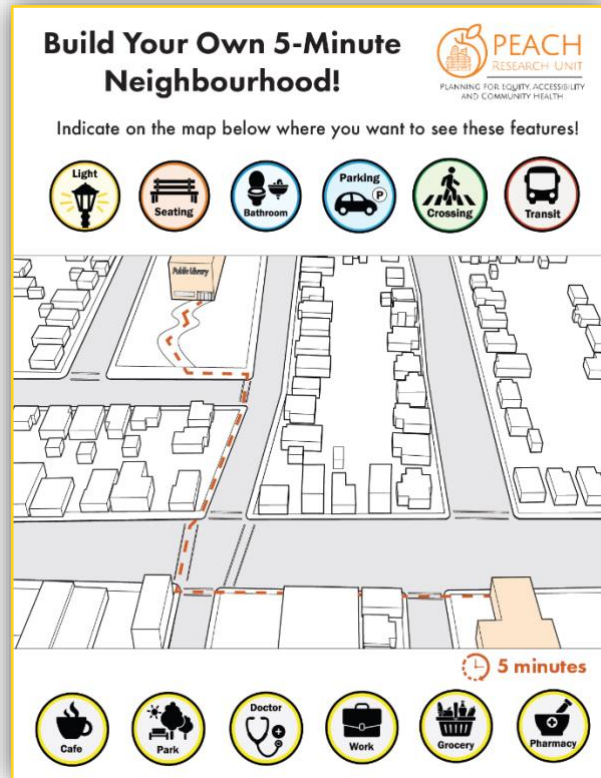


Figure 3: Base map used for the participatory mapping activity.



Figure 4: Photos of the participatory mapping activity in action at the 2024 APN Conference.

beyond existing accessibility standards to meet their needs.

There were 30 people who actively participated in the mapping activity. Because this was a drop-in workshop in a communal space at a conference venue, there were dozens of passive participants who partially participated in the activity but did not submit a completed map. Each map was photographed and the destinations and features participants prioritized were recorded and analyzed.

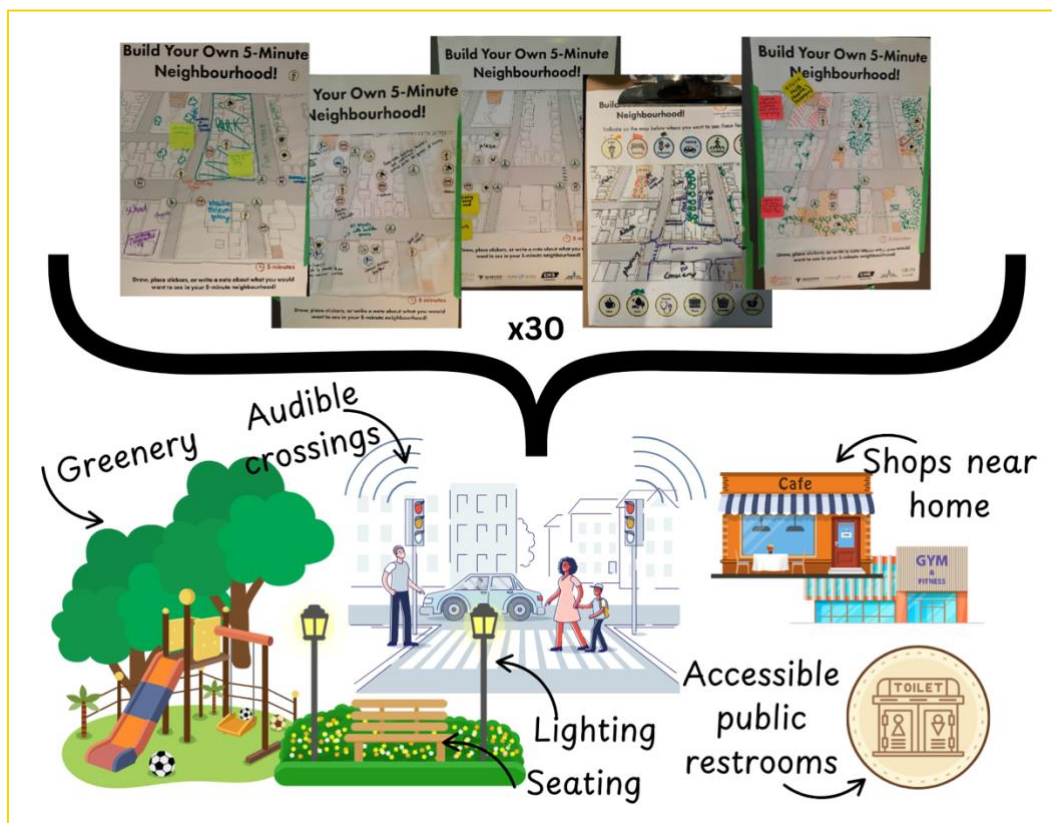


Figure 5: An illustration of the process used to extract themes from the participatory mapping exercise from 30 participants.

Using the results from the mapping activity (in addition to feedback from focus groups and survey responses), we developed a 3D walkthrough video that showcases an imaginary accessible streetscape rendered through a digital 3D model. The purpose of the video was to demonstrate what a neighbourhood could look like when the spatial access needs of people with diverse disability experiences are met from their perspectives.

The model was built in a 3D modeling software (SketchUp) and was then imported to a rendering software (Lumion) to add environmental details (benches, trees, people, cars) and animate movement. Finally, it was edited using video editing software (Da Vinci Studio) to add annotations, titles, and final edits. Visual icons were used to highlight specific accessibility features.

We created two iterations of the model. For the first one, we used an “additive” approach, meaning that we applied suggestions from the mapping activity at the 2024 Accessibility Professionals Network (APN) Conference to a preexisting model with a basic street grid, adjusting features like sidewalk widths, tactile indicators, tree shade, and other basic accessibility features that were suggested. We brought this model back to the 2025 APN Conference the following year to ask attendees (many of whom had participated in the mapping activity the year before) for their feedback. We compiled this feedback and used it to update the final model.

Online Survey

The intent of the survey was to learn from people with experience of disability (both lived experts and caregivers) about their preferences on walking/rolling distance to services, as well as what services they consider to be most important to have nearby. The survey was distributed through email, social media, and through physical invitation (e.g., post cards and posters). Several partner organizations helped share the survey, notably the Rick Hansen Foundation, the National Disability Coalition, as well as provincial branches of CNIB, and Walk and Roll Halifax. The survey was conducted from October 19, 2024 to April 15, 2024.

There were 124 respondents to the survey. Of the 124 respondents, 26 identified as being part of a visible minority (20.9%), 8 identified as Indigenous (6.4%), 3 Identified as being newcomers to Canada (2.4%), 15 identified as being LGBTQ2+ (12.1%), 7 identified as being part of an Official Language

Minority (5.6%), 56 did not identify with any of the above (45.2%), and 11 left the question blank or responded they'd prefer not to say (8.9%).

The gender of respondents was overwhelmingly female with 78 identifying as female (62.9%), 30 identifying as male (24.2%), 6 identifying as non-binary (4.8%), and 10 preferred not to say or blank (8.1%).

Although the survey included responses from across Canada, a significant proportion of our participants currently live in Nova Scotia (42.2%). This is likely attributable to our research lab's base in Halifax, Nova Scotia and thus a more enthusiastic survey response from local accessibility advocates who are familiar with our work. However, the survey received responses from all ten provinces, with 20.9% of them from Ontario, 17.6% from British Columbia, 7.7% from Alberta and 5.5% from Quebec.

We asked respondents to select which age cohort they were from 18 to 34 in 5-year intervals (18 to 24, 24 to 29, 30 to 34) then 35 to 74 in 10-year age intervals (35 to 44, 45 to 54, 55 to 64 and 65 to 74 years of age). While we had respondents of five or more from each age group, a higher proportion fell within the ages of 35-54 years old (49.2% of our responses).

4.3 Network Analysis

A network analysis was designed to measure how far residents in different Canadian settlements must travel to access essential services. Network analysis is a method used to calculate distances from multiple origins to multiple destinations using Geographic Information System (GIS) software (ArcGIS Pro). The benefit of this method is that it determines distances along specified travel paths based on real road network datasets, similar to how Google Maps determines directions and travel time (as opposed to "as the crow flies" straight-line distances between two points).

To gain a representative sample of cities and towns across Canada, we selected 32 **population centres** (see note below) of various sizes across 9 provinces (there was insufficient data available to sample the Territories and Newfoundland and Labrador). We selected the population centres based on the availability of data and the diversity of geography (i.e., ensuring that there was a balanced selection of different sized settlements from all provinces).

Population centres are units of geography defined by Statistics Canada that have a population of at least 1,000 and a population density of 400 persons or more per square kilometre (Statistics Canada, 2022). Population centres are categorized into three groups:

- Small (population between 1,000 and 29,999)
- Medium (population between 30,000 and 99,999)
- Large (population of 100,000 or more)

Note: *Population centre boundaries are not always consistent with municipal boundaries (for example, the population centre of Halifax is geographically much smaller than the Halifax Regional Municipality, but it contains the majority of the Municipality's population within it).*

Data collection and preparation

To conduct the network analysis, we used a tool called “Origin-Destination Matrix” in ArcGIS Pro. This tool uses data that we input to calculate the distances between hundreds of **origin** points and their nearest **destination** points along the length of a **road network** (see Figure 7). For this study, our “origins” were representative of residential locations, and “destinations” of the services sampled.



Figure 6: Map of Canada showing the locations of the population centres sampled in this study.

Residential Origin Points

We approximated residential origin points by identifying a “population centroid” (a single point representative of where most residential addresses are located) for each dissemination block in the settlement. Dissemination blocks (DB) are the smallest unit of geography available from Statistics Canada with population data. We derived these population centroid points using civic address data points, which helped us to determine geographically where most residential addresses are most densely populated (and therefore, where most people live, on average).

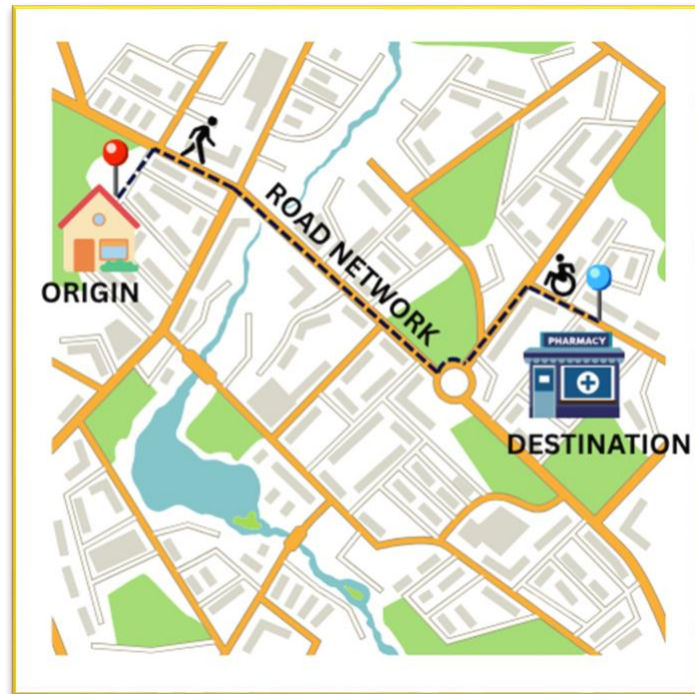


Figure 7: Diagram demonstrating how distance calculations were measured between residential origin points and destination points.

Road Network

The National Road Network from GeoBase (Government of Canada, 2015) was used to build the travel network. To best approximate actual pedestrian travel paths, we excluded highways and expressways from the dataset. Road network data were used instead of sidewalk/active transportation route data for a few reasons. First, pedestrian infrastructure data were inconsistent across the country with varying levels of accuracy and completeness. Second, although many communities do not have sidewalks (particularly in more rural or suburban areas), people still use roads for active travel, so we wanted this to be reflected in our results.

Service Destinations

Locations of grocery stores, pharmacies, transit stops, and cafés (using Tim Horton’s establishments as an example – see note below) were collected from a combination of different sources, including the national Open Database of Businesses (Statistics Canada, 2023), municipal and provincial directories, corporate store lists, and Google Maps. These destinations were chosen specifically because they were identified as among the top five priority sites in survey and focus group results. These locations were catalogued in our database and were used to map out the “destinations” in the network analysis.

Tim Hortons as a common café example across Canada

Survey and focus group participants identified “restaurants, cafés, or other food destinations” as a priority destination that they access by walking or wheeling. As a Canada-wide study, it was not within our scope or timeframe to identify cafes in all our sample cities. Business directory data varies widely across the country, so there was no straightforward way to determine the locations of all the cafés in each sample city. As an alternative, we used Tim Horton’s locations as a proxy for cafés due to their ubiquity and near Canada-wide coverage (3,665 locations in Canada (Tim Hortons, 2019)).

Parks were among the top five destinations of interest, however distances to parks were excluded from the study due to variations in the types of parks (hiking trails, nature parks, children’s play space) that are not well-captured in available data at a national scale. The challenges of determining an appropriate ‘entry point’ of parks and trails are well documented (Wang et al., 2021), therefore parks were determined to be outside the scope of what was feasible for this project.

Data processing and analysis

Once the network analysis data were compiled, we processed the data so that we could compare the results for each of the different population centres in our sample.

For each population centre, we calculated the **average shortest distance** from residential origin points (i.e. population centroids of DBs) to each of the services we sampled. This calculation considered the population of each DB to ensure that more populated areas had proportionally greater influence on the population centre-level average. The calculation followed the formula:

$$PWASD = \frac{\sum D_i \times P_i}{\sum P_i}$$

Where:

PWASD = Population-Weighted Average Shortest Distance

D_i = shortest road-network distance from dissemination block *i* to the nearest service

P_i = population living in dissemination block *i*

Σ = summation across all dissemination blocks in a city

We also calculated **population coverage** for each of the population centres, i.e. the percent of the population that is within a given distance to each of the services. We established three distances based on an approximate 15-minute walk at three different walking speeds reflective of the following levels of mobility:

- **400 m** (~0.4 m/s), approximating travel by frail older adults or those with significant mobility impairments (Graham et al., 2010);
- **800 m** (~0.8 m/s), reflecting typical travel for older adults or children (Dumbaugh, 2008; Morrongiello et al., 2015)

- **1,200 m** (~1.2 m/s), average walking speed aligned with conventional able-bodied walkability standards (Dumbaugh, 2008).

Table 1: Distances travelled based on average walking/wheeling speeds and time spent walking/wheeling.

	0.4 m/s	0.8 m/s	1.2 m/s
15 minutes	360 m (0.4 km)	720 m (0.7 km)	1,080 m (1.2 km)
30 minutes	720 m (0.7 km)	1,440 m (1.4 km)	2,160 m (2.2 km)
1 hour	1,440 m (1.4 km)	2,880 m (2.8 km)	4,320 m (4.3 km)

Section 5: Findings

This section presents our findings that address our four objectives, reiterated below:

- 1) Identify what **priority services and amenities** are important to include when assessing accessible communities and determine what **qualities of the journey** to these services and amenities (e.g., curb cuts, road safety, shade, resting places) are pertinent to consider.

- 2) Measure the **range of spatial access** (distance and quality of pathways to walk/roll) to these services and amenities in select cities, towns, and rural settlements across Canada as multi-case studies using residential locations as journey origins.

- 3) Determine the **recommended benchmarks** (distance and quality of journey by walking/wheeling) to these services and amenities based on the findings through objectives #1 and #2.

- 4) **Visualize** what the landscapes (e.g., pathways from home to services) would look like when these spatial access needs by the diverse disability experiences are met from the perspectives of persons with lived knowledge.

5.1 Priority services and amenities & qualities of the journey

We used a combination of focus groups and surveys to ask participants to identify their most frequent travel destinations and where their journeys typically begin. While many focus group participants said they begin walking/wheeling from their home or place of work, many others told us that they drive or take public transit to areas with a high density of destinations, such as a downtown area or a shopping mall with multiple services, and walk or wheel from there. They highlighted the need for accessible parking in these areas, as well as safe and convenient transit stops.



Figure 8: Some of the top priority services identified by people in focus group sessions.

The most common destinations amongst all participants included post offices, pharmacies, grocery stores, dining establishments, parks/green spaces, gyms/recreational spaces, medical appointment locations, and shopping malls with multiple services within them. Seventy-one (78%) survey respondents put grocery stores in their top five most important destinations. The next highest most selected services/amenities were pharmacies (54%, n=49) and transit stops (52%, n = 47); restaurants/café (48%, n=44) and parks (48%, n = 44) were tied.

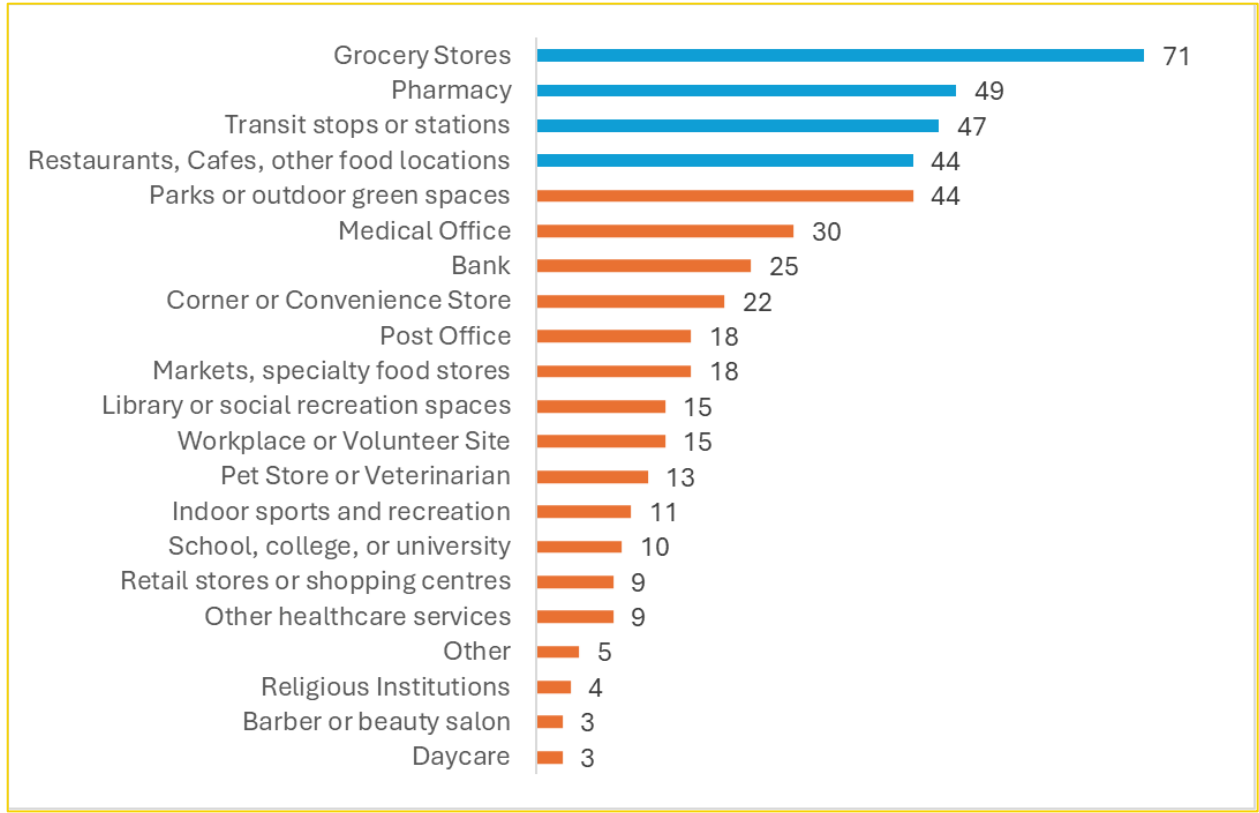


Figure 9: Bar graph representing the number of times various services were named as a top priority by survey participants. The top 4 services utilized in this study are highlighted in blue.

Several participants noted that there were few places within a walking/wheeling distance of their homes. Some said that the only places that they could access easily were hiking trails, while others said that they either drive or get driven to get to their daily destinations.

The length of a journey varied depending on the purpose of the trip and the conditions of the journey. Some participants noted that they would walk or wheel for a maximum of 30 minutes or 2 kilometers for trips done for utility (e.g., running errands), but would be more willing to

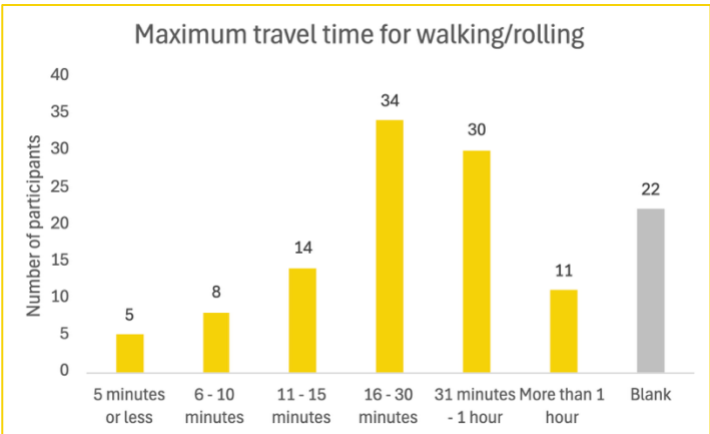


Figure 10: Amount of time survey participants were willing to travel while walking/wheeling to access services.

take more time when walking/wheeling for pleasure, exercise, or to visit friends. The majority of survey participants (63%) indicated that their maximum walking/wheeling distance was somewhere between 15 minutes and 1 hour. Only 11% of participants were willing to walk or wheel for longer than 1 hour.

Participants also noted that they were more willing to walk or roll longer distances if the conditions of that journey were pleasant (e.g. good quality lighting, quiet streets, shade trees). Participants were less willing to take longer trips during poor weather conditions or if they had to carry heavy parcels (e.g. grocery shopping).

In addition, many participants noted that the quality (and existence) of pedestrian infrastructure (e.g., sidewalks, street crossings) were also major factors impacting not only their decision to make a journey, but also their personal feeling of safety. As one participant noted, they “have to walk on the side of the highway and know [they] might die every time”. In the survey, 69% (n=71) noted lack of sidewalks or the quality/maintenance of existing paths as their top factor, and the mapping activity and focus group sessions elicited similar feedback. Participants living in smaller settlements often noted the lack of sidewalk infrastructure in their communities, such as sidewalks on only one side of the road (or, sometimes, no sidewalks at all). Many participants also noted that the temporary absence of sidewalks during periods of construction heavily impact their travel plans. Focus group participants noted that what would normally be a 15-minute journey could turn into a 30+ minute one with construction barriers. There was also significant concern over the speed at which vehicles travel and calls for enhanced traffic calming measures and/or more clearly marked pedestrian crossings.

When asked about what environmental features most heavily impact the decision to make a journey by walking or wheeling, most survey respondents ranked weather conditions as one of their top concerns (n=90), particularly winter conditions like snow and ice. As one respondent commented, “If snow

removal has pushed snow onto the ramps at the street corner... [it's] impossible to cross the street". These sentiments were echoed during both the mapping activity and focus group sessions, with many agreeing that winter conditions create an "obstacle course". Participants expressed frustration at sidewalks that were not plowed properly (if at all) in their neighbourhoods. Others noted that cold temperatures diminish the battery life of their power-operated wheelchairs, which in turn limits the distance that they are able to travel.

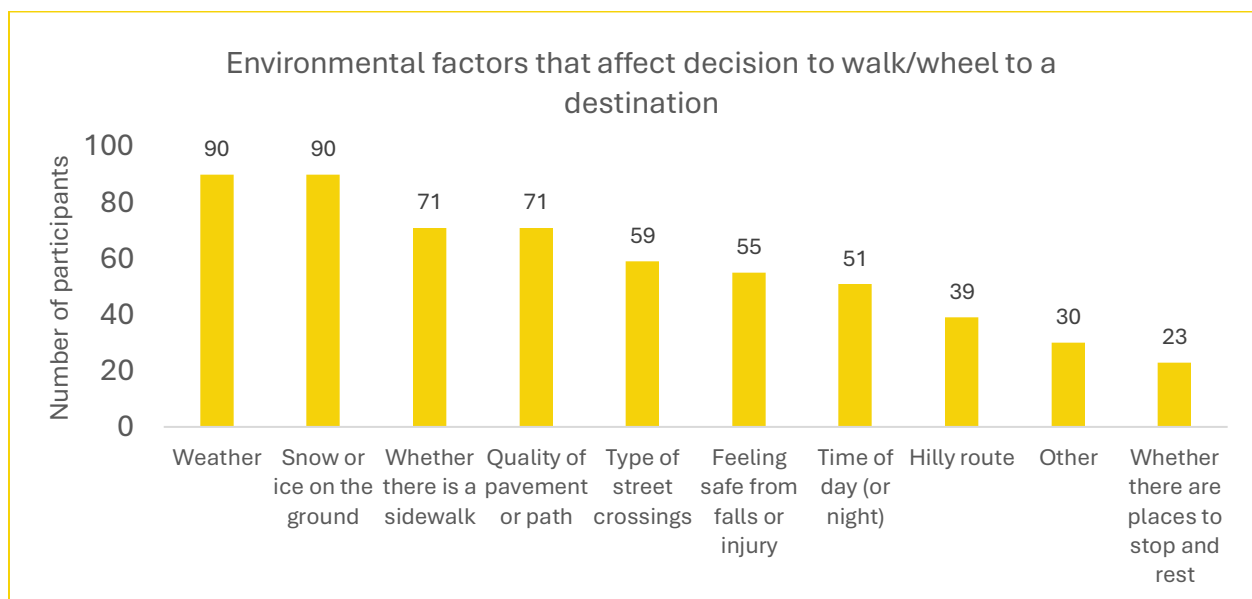


Figure 11: Environmental factors that affect decision to walk/wheel to a destination identified by survey participants.

Notably, nearly a third of participants indicated other barriers to walking/wheeling that were not on the list we provided. These included noises from traffic or construction, poor lighting conditions, safety risks associated with construction (e.g., sidewalk closures), conflicts with cyclists, and sensitivity to chemical scents from laundromats or other places with heavy use of chemical cleaners. Public washrooms were also repeatedly mentioned in focus group sessions, with some suggesting that even the availability of temporary "porta-potties" would make a big difference to them.

We also asked survey participants to indicate the approximate speed at which they walk or wheel. 30% of survey participants (n=31) reported walking at an “easy pace” or slower. 70% (n=73) reported walking at an average pace or faster.

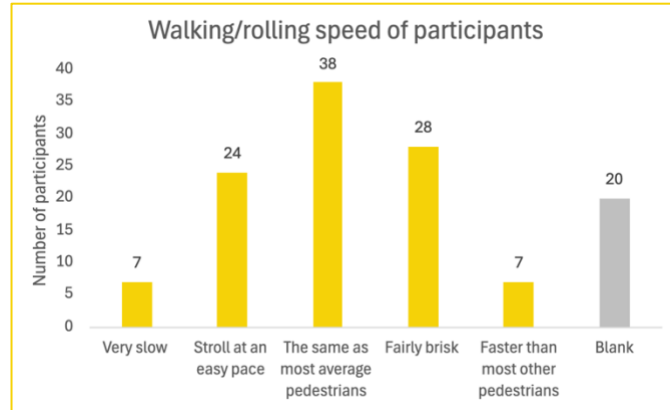


Figure 12: Average walking/rolling speed of survey respondents.

5.2 Range of spatial access across Canadian settlements

To complete the network analysis, we selected 32 settlements across Canada representing a variety of geographies and provincial representation. We determined the locations of pharmacies, grocery stores, transit stops, and Tim Horton’s and used the road network to calculate the shortest distances from approximated residential areas. Table 2 below shows a tally of the number of services for each settlement identified. It also lists the settlements from smallest to largest by population.

Table 2: List of population centres sampled for this research (n=32) ranked from smallest to largest by population. The table also shows the number of services identified in each population centre.

	Population Centre (sorted smallest → largest by population)	Size Classification (per Statistics Canada)	Province	Area (km ²)	Population	Pharmacy Count	Grocery Store Count	Transit Stop Count	Tim Hortons Count
1	Kensington	Small	PE	2.82	1,743	1	1	No data	1
2	Banff	Small	AB	4.08	8,076	2	1	69	1
3	Bridgewater	Small	NS	13.63	8,790	6	4	22	3
4	Portage La Prairie	Small	MB	9.86	12,705	7	4	No data	2
5	Truro	Small	NS	30.81	12,893	12	4	No public transit	5
6	Canmore	Small	AB	13.29	13,268	6	2	155	2
7	Port-Alfred-Bagotville	Small	QC	17.49	13,350	18	2	No data	8
8	Summerside	Small	PE	17.35	14,952	7	3	No data	4
9	Bathurst	Small	NB	30.21	15,980	7	3	No public transit	4
10	Squamish	Small	BC	22.11	22,149	5	2	128	2
11	Ladner	Small	BC	7.38	23,016	4	2	No data	1
12	Rouyn-Noranda	Small	QC	28.49	23,072	12	4	73	4
13	Cape Breton - Sydney	Medium	NS	30.91	30,136	24	6	399	12
14	Charlottetown	Medium	PE	59.26	32,293	20	8	No data	10
15	Stouffville	Medium	ON	14.17	36,692	11	4	60	4
16	Rimouski	Medium	QC	28.26	38,708	16	4	155	4
17	Brandon	Medium	MB	28.82	50,373	21	4	268	6
18	Grande Prairie	Medium	AB	48.31	62,762	6	4	206	9
19	Saint John	Medium	NB	91.58	63,396	24	9	534	21
20	Fredericton	Medium	NB	100.86	64,513	25	7	673	10
21	Chilliwack	Medium	BC	56.02	79,088	26	9	265	6
22	Peterborough	Medium	ON	54.58	83,064	19	10	827	10
23	Nanaimo	Large	BC	86.76	98,693	28	13	831	10
24	Red Deer	Medium	AB	66.16	99,691	33	8	606	12
25	Chicoutimi - Jonquière	Large	QC	103.10	103,615	18	17	No data	8
26	Barrie	Large	ON	95.33	147,050	45	12	692	29
27	Regina	Large	SK	105.17	223,931	83	13	1401	34
28	Oshawa	Large	ON	168.86	335,392	102	20	2184	43
29	Halifax	Large	NS	238.29	346,346	124	27	2404	62
30	Vancouver	Large	BC	317.05	647,893	197	16	1774	38
31	Winnipeg	Large	MB	473.07	732,403	63	39	5115	82
32	Calgary	Large	AB	630.43	1,295,872	66	51	5652	90

Average shortest distance

To gauge the average shortest distances to services across population centre types, we calculated the median value for each service (Table 3). Transit stops had the shortest distances overall, while grocery stores generally had the highest.

Table 3: Median values by settlement types for the four destinations

Population Centre Classification	Pharmacy	Grocery	Transit Stops	Tim Hortons
Small (n=12)	1509.5 m (min: 625.2 m, max: 5001.2 m)	1914.9 m (min: 817.1 m, max: 5762.9 m)	370.0 m (min: 289.8 m, max: 482.5 m)	1948.1 m (min: 630.1 m, max: 5605.6 m)
Medium (n=11)	1431.0 m (min: 1142.1 m, max: 2632.0 m)	2226.7 m (min: 1512.8 m, max: 3610.7 m)	485.8 m (min: 298.3 m, max: 803.9 m)	1997.6 m (min: 493.2 m, max: 10212 m)
Large (n=9)	1384.9 m (min: 568.9 m, max: 2543.1 m)	2125.7 m (min: 1831.6 m, max: 2832.9 m)	332.2 m (min: 233.9, max: 608.2 m)	1867.4 m (min: 1164.2 m, max: 6531.3 m)

Population coverage with different ‘walkable’ distances

The median values for population coverage (i.e., percent of the population within a range of walkable distances to services) are shown in Table 4. Apart from transit stops, percentages were consistently low (<10%) for most services within a 400m range, but increased substantially within the 800m and 1,200m ranges. There was little variation among settlement types for each walkable distance, but there was variation among service types. For instance, the lowest median value for transit stops was 64.5% across all walkable ranges, whereas this value was as low as 1.1% for grocery stores.

Table 4: Median values of proportion by settlement types for the four destinations

Population Centre Classification	Walkable Distance	Pharmacy	Grocery	Transit Stops	Tim Hortons
Small (n=12)	400 m	8.3% (min: 1.6%, max: 16.5%)	3.1% (min: 0%, max: 11.9%)	70.2% (min: 47.1%, max: 81.7%)	2.3% (min: 0.2%, max: 7.9%)
	800 m	26.9% (min: 10.9%, max: 86.8%)	12.0% (min: 3.5%, max: 48.0%)	95.1% (min: 87.8%, max: 100.0%)	12.3% (min: 5.9%, max: 86.8%)
	1200 m	42.9% (min: 18.8%, max: 99.7%)	24.2% (min: 12.9%, max: 98.0%)	98.3% (min: 96.1%, max: 100.0%)	25.8% (min: 13.7%, max: 99.7%)
Medium (n=11)	400 m	8.5% (min: 0.7%, max: 41.8%)	1.1% (min: 0%, max: 5.0%)	64.5% (min: 26.5%, max: 90.1%)	2.6% (min: 0%, max: 11.9%)
	800 m	30.2% (min: 9.7%, max: 77.6%)	10.6% (min: 2.0%, max: 15.9%)	87.5% (min: 71.6%, max: 99.9%)	12.9% (min: 0%, max: 35.2%)
	1200 m	50.5% (min: 28.2%, max: 91.7%)	23.7% (min: 7.3%, max: 35.5%)	93.4% (min: 89.7%, max: 100.0%)	31.9% (min: 0%, max: 56.8%)
Large (n=9)	400 m	7.5% (min: 2.7%, max: 41.8%)	2.0% (min: 0.7%, max: 3.5%)	69.3% (min: 51.1%, max: 90.1%)	2.4% (min: 0.3%, max: 11.9%)
	800 m	29.1% (min: 10.6%, max: 77.6%)	10.5% (min: 4.3%, max: 15.3%)	98.1% (min: 83.3%, max: 99.9%)	12.2% (min: 3.5%, max: 35.2%)
	1200 m	52.7% (min: 22.1%, max: 91.7%)	23.4% (min: 11.5%, max: 32.2%)	99.7% (min: 90.8%, max: 100.0%)	29.6% (min: 10.0%, max: 56.8%)

Grocery Stores

Grocery stores were the highest ranked service that the survey participants identified. To maintain consistency, we decided to include only grocery stores that are part of a nation-wide chain, such as Loblaws, Sobeys, Walmart, Costco, and Metro. In settlements where there were no large chain grocery stores, we used Google Maps to manually select businesses that served a similar function as a general store for everyday groceries and goods.

The mean average-shortest-distance was 2,257m, which is the equivalent of a 31-minute walk at a 1.2 m/s walking speed (Figure 13). For slower walking speeds of 0.8 m/s and 0.4 m/s, this means a 47-minute walk and a 94-minute walk, respectively, not accounting for slopes or other surrounding conditions.

The lowest average shortest distance was Kensington, PEI (817m), and the highest was in Bathurst, NB (5,763m).

Of the survey participants who selected grocery stores as one of their top priority services to have within walking distance (n=71), over 75% reported using some kind of assistive device (e.g., wheelchair, cane, walker, guide dog).



Figure 13: Average shortest distances to grocery stores (metres) for each population centre in our sample.

Pharmacies

Compared to grocery stores, pharmacies were generally more spatially accessible (shorter in distance), although the trends for each individual population centre were quite consistent for these two services (Figure 14). Across all population centres in the sample, the mean average shortest distance was 1,639m, which is the equivalent of a 23-minute walk at a 1.2 m/s walking speed.

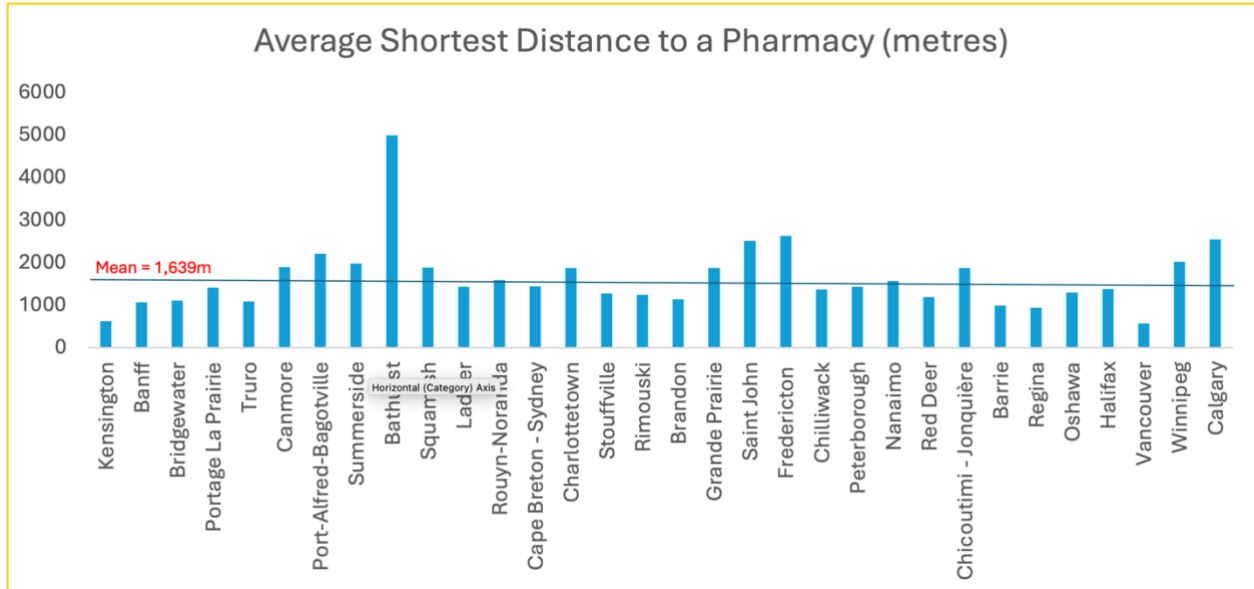


Figure 14: Average shortest distances to pharmacies (metres) for each population centre in our sample.

Transit Stops

Among all the services we sampled, the average shortest distance to transit stops was the shortest across the board (Figure 15). The mean average shortest distance across all population centres was 423m, with a minimum of 234m (Vancouver, BC) and maximum of 804m (Rimouski, QC). The distance to transit stops had the least amount of variation among the services we sampled. Note that because not all settlements in our sample had transit networks or transit data available for use, some of the settlements have no data associated with them.

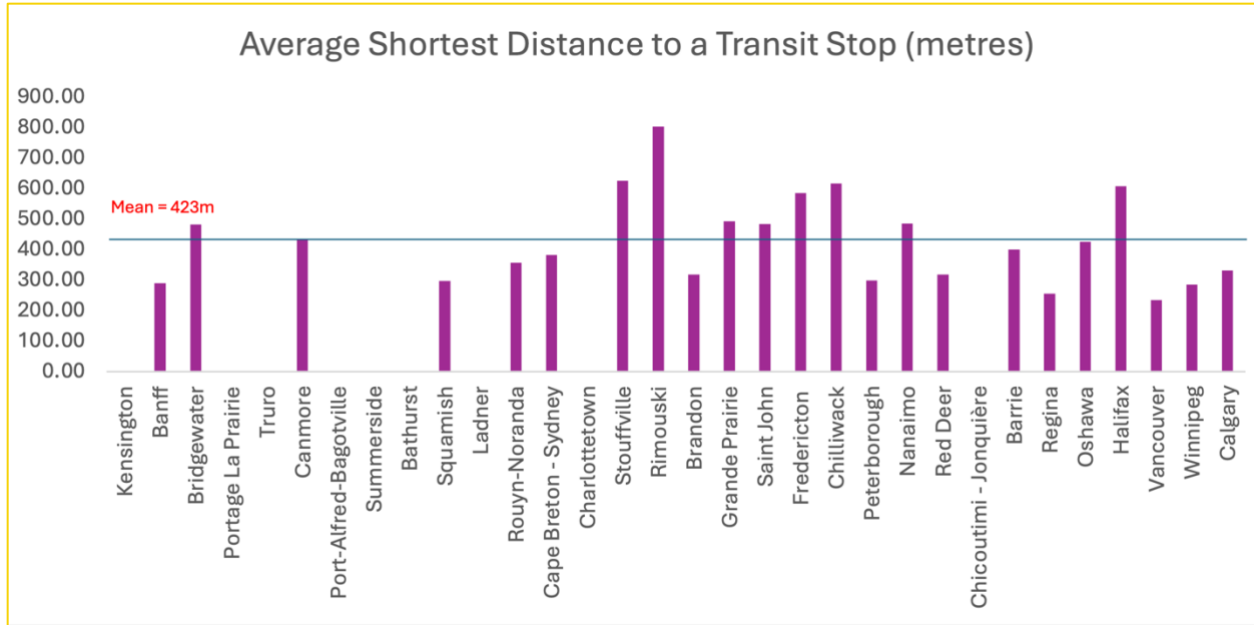


Figure 15: Average shortest distances to transit stops (metres) for each population centre in our sample. Settlements with a value of “0 m” had no data available (either because the settlement did not have a public transit network, or transit data was unavailable).

Tim Horton’s

Proximity to Tim Hortons locations varied the most among municipalities compared to the other services in this study (Figure 16). The average shortest distance in Fredericton, NB was considerably higher at 10,212m, compared to Grande Prairie, AB at 493m; this is particularly noteworthy, as Fredericton and Grande Prairie had similar numbers of Tim Hortons locations sampled (10 and 9, respectively), as well as similar population sizes (64,513 and 62,762, respectively). Tim Hortons franchises were not uniformly distributed across all population centres (for instance, they were more prevalent on a per capita basis in the Atlantic region).

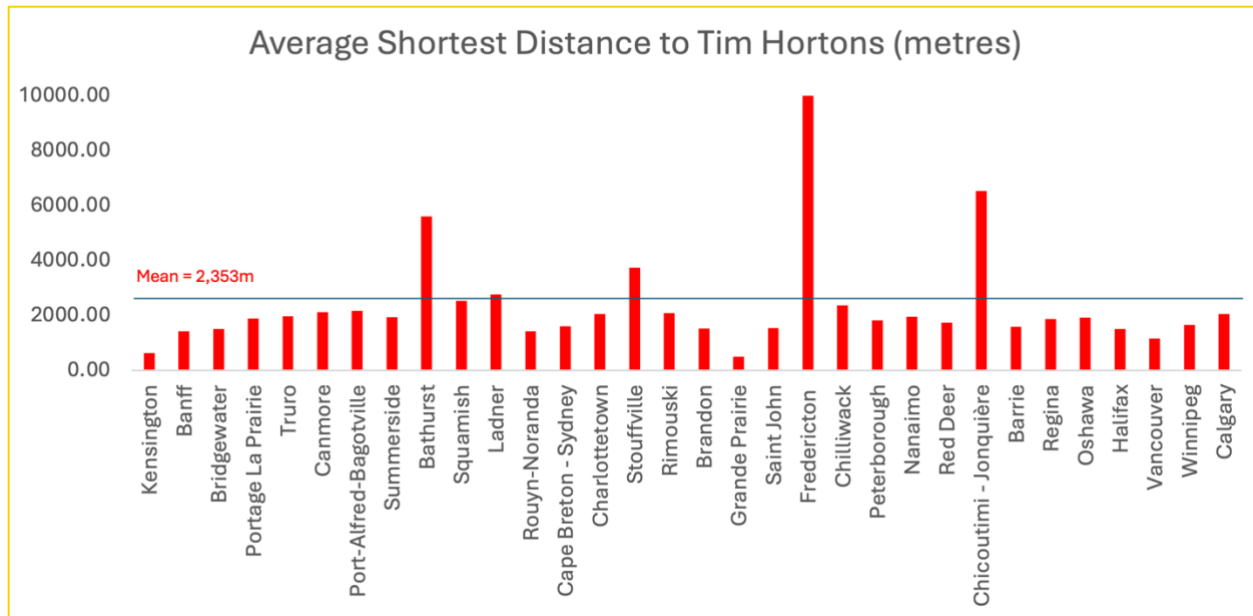


Figure 16: Average shortest distances to Tim Hortons (metres) for each population centre in our sample.

Interactive dashboard

To display the data we collected in a publicly shareable format, we developed an [online dashboard](#) using ArcGIS Online and Experience Builder that visualizes the results of the network analysis. To maintain comparability, datasets from all 32 settlements were merged into four national service layers (one each for grocery, pharmacy, transit, and Tim Horton's café). Each layer was symbolized consistently with colour coding for the three-distance thresholds (400 m, 800 m, 1,200 m).

The dashboard includes the following interactive features:

- Settlement-level filters: A dropdown menu allows users to select a settlement, zoom into its geography, and view corresponding results.
- Infographic panels: Key statistics such as population size, number of services, and population coverage at each distance band are displayed.
- Pie charts: Show the share of residents within the three-distance thresholds for each service type.

- Comparisons across cities: Users can toggle services and instantly compare accessibility outcomes, supported by consistent map symbology.

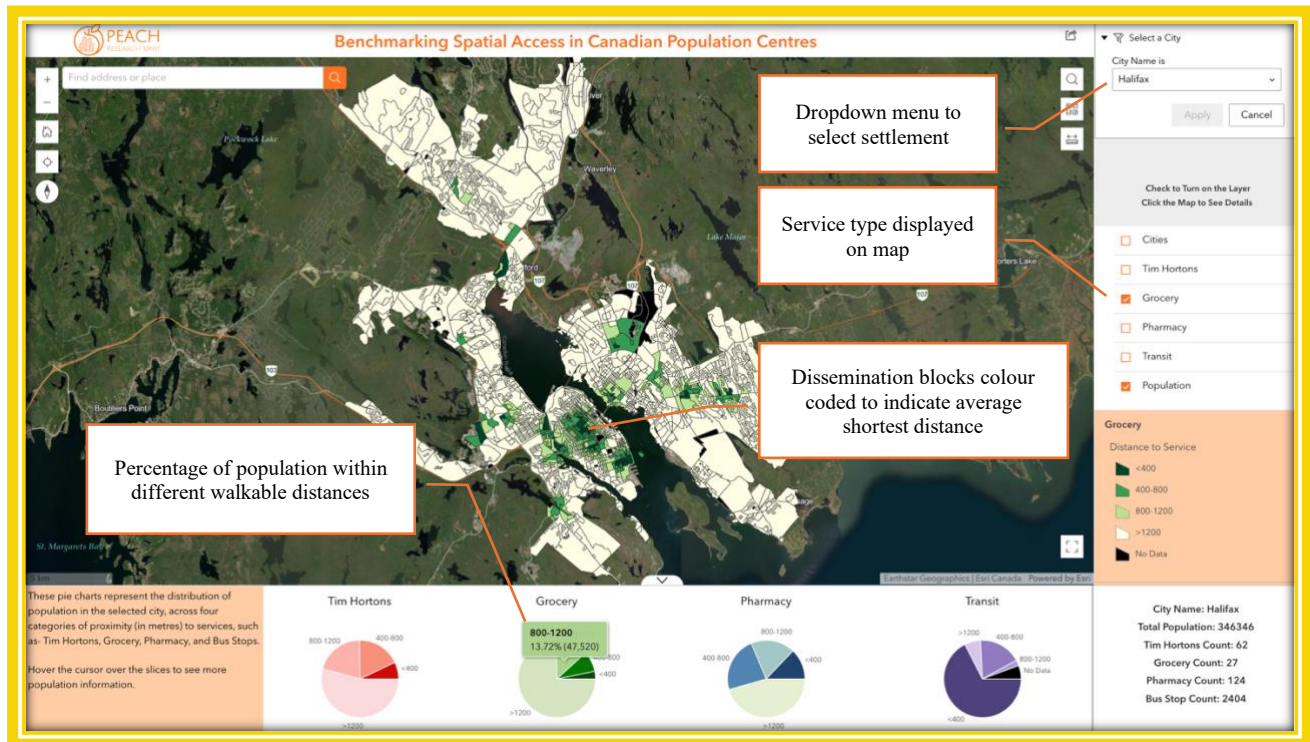


Figure 17: Screenshot of the interactive dashboard containing the network analysis outcomes from this study.

The interactive dashboard offers a multitude of potential uses and benefits to interested parties and users. First and foremost, the dashboard serves as a repository of all the data gathered throughout this project -- a medium through which the data is publicly available and digestible, without sacrificing depth and detail. In providing a public tool and location for the data, the dashboard enables users to access and utilize the data in a variety of ways. Furthermore, while the dashboard enables users to access the data in its entirety, it also provides filter features to specify which data they wish to access (including specific services, communities, and individual dissemination blocks).

Given these features, and the depth of the data available, the dashboard can be utilized for a wide variety of research, policy, and planning purposes. For example, urban planners in one of the communities highlighted in this study could utilize the data to assess the state of spatial accessibility in their municipality – both on a municipality-wide and more specific dissemination block level – and use that data to make informed decisions about further development plans. Alternatively, urban planners outside of the listed communities could also use the data presented to similar effect. Planning policy advocating for “walkable” and “15-minute” cities would particularly benefit from this data.

5.3 Recommended benchmarks -- what is achievable in Canada?

The national average shortest distances we calculated (shown with 1st and 3rd quartiles below) can be considered as benchmarks for Canadian cities and towns:

- Grocery stores: 2.26 km (1.88km-2.60km)
- Pharmacies: 1.16 km (1.19km-1.89km)
- Tim Hortons: 2.35 km (1.54km-2.12km)
- Transit stops: 0.43 km (0.32km-0.49km)

The average national benchmark distance for all services across the country was 1.8 km. The top 25% ‘best performing’ settlements had average shortest distances of less than 1.4 km. Assuming a walking/wheeling distance of about 1.2 km, 0.8 km, and 0.4 km for able-bodied persons, older adults/children, and persons with mobility difficulties respectively, the distances to these amenities for high performing settlements are still not conducive to ‘15-minute’ neighbourhood model. Many far exceed a 15-minute walkable/wheelable distance. Nevertheless, the national average distance can be considered as ‘feasible’ and realistic goal for Canadian cities and towns. A jurisdiction that exceeds these ‘benchmarks’ may be indicative of poor performance relative to many other Canadian settlements on one

indicator of accessibility (spatial access). Conversely, a jurisdiction that has average distances to services of less than 1.4 km would be considered to be better performing than most other settlements in Canada.

In addition to distance-based benchmarks, we identified the following qualities as necessary components of a journey based on feedback from research participants:

- Pleasant conditions for walking/wheeling (e.g., good quality lighting, quiet streets, trees for shade)
- Quality (and existence) of pedestrian infrastructure (e.g., sidewalks, street crossings with audible cues, tactile indicators)
- Reliable winter maintenance (e.g., snow and ice clearing, continued access to transit stops without snow buildup)
- Reduced conflicts with other active transportation (e.g., protected pedestrian spaces separate from bicycle lanes)
- Higher priority of pedestrians over private vehicle traffic (e.g., widening sidewalks at the expense of narrowing roads, dedicated transit lanes)

It was evident from our conversations with participants that in most cases, at least one of these qualities was absent from their day-to-day journeys. It is notable that while these features are included in existing accessibility standards (at either national, provincial, or municipal levels), many communities in Canada are struggling to execute these standards properly (if at all). Unlike benchmarks for distance to services, these benchmarks varied somewhat by geography. The absence of sidewalks, for instance, was much more prevalent for people from smaller, more rural areas. Naturally, people from areas of Canada that receive less winter precipitation were not as concerned with winter maintenance. In general however, these benchmarks are relevant to most Canadian contexts and should be considered when assessing the spatial accessibility of a jurisdiction.

5.4 Visualization of walkable/wheelable pathways from home to services

A common theme among most mapping activity participants was to reduce the emphasis on car-centric development. Many of the interventions suggested involved adding more pedestrian infrastructure, often at the expense of road widths or traffic thoroughfares. For instance, many people suggested widening sidewalks, adding street furniture, and taking up neighbourhood blocks to develop green spaces and parks. Although some participants were conscientious of parking needs (particularly accessible parking), others were more interested in improving public transit corridors in an effort to reduce parking needs. Overall, most participants were in favour of adding more washrooms, seating options, and lighting throughout the length of the journey. For a summary of participant feedback that informed the development of the final model, please see Table 5 below.

Additionally, the participants identified several notable safety issues when describing the quality of the journey to access services. Although current built environment standards are made with safety in mind, the findings from this research emphasize that different standards need



Figure 18: Screenshots of the final video of the 3D walkthrough visualization.



to work in tandem with one another to contribute to safe, accessible journeys. For instance, while accessibility standards exist to guide the development of bike lanes, many participants noted that the way bike lanes interact with other accessible infrastructure that they require (e.g., tactile indicators) is often unclear. The 3D model demonstrated not only how accessibility standards for cycling lanes can look within the context of a whole neighbourhood, but also visualized any potential unforeseen conflicts with surrounding infrastructure. Participants also noted that winter conditions can drastically change the landscape of accessible infrastructure, so we added heated, sheltered bus stops and designed pedestrian walkways with snow clearance in mind.

To view a video demonstration of the final model, click on the link below:

[Final Benchmarking Model](#)

Table 5: Changes made to the final 3D walkthrough visualization video, based on feedback from the 2025 APN Conference attendees.

Feedback	Change implemented	Rationale
Design sidewalks for caregivers and people with disabilities	Sidewalks widened and more rest stops and benches integrated	Enables side-by-side navigation and assisted travel
Reduce car dominance; prioritize pedestrians	Added bus-only lanes; converted certain two-way side streets to one-way to allow wider sidewalks	Rebalances curb space toward people and transit
Avoid bikes/scooters on sidewalks (dangerous for visually impaired)	Implemented separate, protected bicycle lanes on streets (replacing removed car lanes)	Separates cyclists from pedestrians to reduce conflicts
Winter accessibility concerns (snow, cold)	Added heated, sheltered bus stops and winter maintenance considerations in the model	Improves year-round transit comfort and reliability

Section 6: Discussion

6.1 Key takeaways

The main goal of this project was to establish a set of benchmarks that indicate the performance of spatial accessibility across Canadian cities and towns—measured as distance to key services and amenities considered important by persons with lived expertise of disability. Additionally, this research identified some of the most important qualities of a journey that jurisdictions should consider that make pedestrian travel to services more accessible.

The similarities in distances to services and amenities across all settlement types suggest that population size is not an accurate indicator of whether a settlement is spatially accessible. For many services, these distances are likely based on catchment areas based on driving time (as opposed to walking/wheeling time) for each service’s customer base. For instance, some services like large chain grocery stores likely target a customer base beyond walking distance, assuming most customers will drive to their stores. It is notable that transit stops, services which depend on the ability to walk or wheel to access them, were decidedly the most spatially accessible (distance-wise) service in our sample.

While the average shortest distance may be long, some settlements have a greater proportion of people within walkable/wheelable distances. For instance, Vancouver demonstrated higher population coverage within a 400m range for all services than most other cities in our sample. Although Vancouver was among the largest population centres, it still performed better than those with higher populations than itself (e.g., Calgary, AB; Winnipeg, MB).

Local policies, city planning decisions, and economic and political interests play a critical role in how services are distributed, regardless of the size of a settlement’s population base. Although our findings demonstrate a serious disconnect between the gold standard of “15-minute” neighbourhoods and

actual distances to services, it is not impossible to make meaningful improvement to spatial accessibility—if there is enough will to do it among policymakers, planners and businesses. Buy-in from businesses in particular will have a strong influence on the priorities of policymakers. More research is needed to identify what potential benefits or incentives there might be for services and amenities to be situated closer to where people live so that *everyone* – not just people who drive – can access them.

6.2 Limitations & caveats

There are a few limitations to this study that need to be acknowledged. First, it is important to note that the number of services that we sampled in each settlement varied tremendously depending on the size of each settlement. For instance, Kensington only had one of each service to sample from (except for transit stops, for which we had no data). If we missed a service location in settlements like these, the effect would be felt much more heavily in our calculations than they would for larger settlements with a larger pool of services.

Not all sample settlements had transit services, or if they did, they sometimes did not have the data available. Population centres without public transit options (Truro, NS; Bathurst, NB) were not included in our calculations. Some population centres had public transit, but data were not available (Kensington, PE; Portage La Prairie, MB; Port-Alfred-Bagotville, QC; Summerside, PE; Ladner, BC; Chicoutimi – Jonquière, QC). We also did not account for transit frequency or route types in this study; we were only interested in the distance to any transit stop, regardless of these factors.

Our network analysis did not include any settlements from the three territories or Newfoundland and Labrador. This is due to the lack of publicly available data from there regarding civic addresses, business locations, and road networks. Additionally, due to the remote nature of northern communities, there are specific challenges regarding travel, transit, and

access to goods and services that are unique to these regions, making it difficult to compare to the rest of the country. It would be beneficial for future studies to focus specifically on the spatial access of settlements in northern communities, taking these specific factors and challenges into account.

The slope of pedestrian paths of travel were *not* included in our calculations for travel time, therefore it is important to view the distance calculation results with the caveat that shorter distances do not *always* mean more accessible paths of travel. While there was a uniform network for road data across the country, there was unfortunately no such consistency in the quality of slope data. The inclusion of slope data would inherently add an entire separate layer to the study, which would need to account for changes in walk/wheel speed depending on whether the path is uphill or downhill. Given the Canada-wide nature of this project, it was not within our scope to be able to include so many specific variables in our findings. However, as many of the study participants noted, slope is a critical consideration for accessibility, and should be taken into account when measuring spatial access in individual jurisdictions.

Lastly, the visualization software we used to demonstrate the 3D model was somewhat limited in its ability to accurately represent accessibility features that we would have liked to include. We relied on publicly available 3D model “warehouses” (online databases with individual 3D features ready to download and place into 3D model landscapes) to render complex features like pedestrian crossing signal buttons and tactile indicators. While some of these features were readily available, the number and types of features available are limited. As 3D modeling technology becomes more advanced, and accessibility infrastructure improvements become more commonplace, we are optimistic that these 3D model warehouses will become more populated with accessible infrastructure features, thus allowing for better visualization of accessible landscapes in future.

6.3 Future research directions

The findings from this research contribute a clearer understanding of current spatial distribution of services and amenities in Canada. This study prompts further questions about how planners can establish benchmarks that inform the needs of Canadians who rely on pedestrian infrastructure to maintain full and independent lives. For instance, more evidence is needed to help make informed decisions about where housing should be built in relation to services, particularly for population groups with higher dependence on public transit and walkable amenities. Clearer evidence will be particularly critical over the next decade as government efforts to combat the ongoing housing crisis intensify. Additionally, it would be worth investigating how cities and towns can achieve a more equitable distribution of services through land use, such as creation of mixed income neighbourhoods across jurisdictions.

Our study found that, in Canada, settlement size seemed to have little impact on the average travel distances to the services. However, among the settlements, the levels of spatial access varied. It would be worthwhile to investigate further the role that local policies and situations play in how services are distributed in individual municipalities and identify what policies or practices are most effective at encouraging more equitable access to services. It would also be useful to identify regulatory practices that *discourage* equitable access to services. For instance, a recent federal study has been investigating the extent to which property controls (e.g., restrictive covenants, exclusivity clauses) may restrict the development of grocery store retailers in communities across the country (Government of Canada, 2024).

Section 7: Conclusion

Our study suggests that most of Canadian cities and towns are far from walkable or wheelable. The benchmarks in the form of national average also shows that distance to services across the country are well outside the “15-minute” parameters for able-bodied people and people with disabilities alike – regardless of the size of community they live in. Not everyone drives. If Canada wants to create truly accessible cities and towns for everyone, key services and amenities people use in their everyday lives must be located within the distance that people can walk and wheel to get to. Our study contributes to our understanding for the state of spatial access in Canadian cities and towns, and the benchmarks offer distance and quality-based spatial access measures that governments, accessibility advocates, and community members can use as reference points—whether for comparisons with other jurisdictions, for assessment of the progress over time, or for goal setting to achieve in the future.

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