ETSAB: First Kilometre/Last Kilometre

Closing the Gap on First/Last KM Transit Trip Plans

Recommendation

That Administration provide a report on the recommendations from Edmonton Transit Service Advisory Board as outlined in the Edmonton Transit System Advisory Board report CR_6413, including implementation, alternative approaches where applicable, alignment with the Transit Strategy and timelines.

Executive Summary

Building upon the new direction for Edmonton Transit Service, Edmonton Transit System Advisory Board (ETSAB) recognizes the importance of understanding how people will move within and access the transit system. This shift in transit provision will increase the need for multimodal opportunities. As the Transit Strategy focuses on improving service on well utilized routes, ETSAB anticipates that the importance of multimodal connections is key to a positive user experience. Specifically, ETSAB has investigated the role of transit centres to facilitate multimodal service provisions, and the services that can improve the first and last kilometre experience.

Report

First Kilometre/Last Kilometre (First/Last KM), also referred to as *the First Kilometre/Last Kilometre Challenge* or the *First Mile/Last Mile Challenge*, is the term that transportation specialists use to describe the start and end of a transit users experience. The start and end of every journey can have a profound effect on how and if one will use public transit. In communities with sprawling development patterns, the connecting ends of a transit trip can result in significant inefficiencies with travel time, and can lead to car dependence. As such, transit agencies are now emphasizing the importance of improving the First/Last KM experience. The City of Edmonton has created a specific *First Kilometre/Last Kilometre Study* within the framework of the current ETS Bus Network Redesign.

ETSAB recommendations:

- That City Administration consider different First/Last KM solutions for different areas, i.e. to keep an open mind about different First/Last KM solutions, in conjunction with a scan of practices in similar cities;
- That City Administration examine the feasibility of establishing pilot projects, testing different First/Last KM solutions in different areas (e.g. a bikeshare in one area, DRT in another;);
- That City Administration make the mode-shift towards transit and human-powered transportation a key goal in their investigation of First/Last KM solutions, as outlined in The Way We Move.
- Encourage the use of best practice and Universal Design when directing City Administration to investigating and/or implementing First/Last KM solutions.

Attachments

1. Report: Closing the Gap on First KM/Last KM Transit Trip Plans

ETSAB: Closing the Gap on First Kilometre/Last Kilometre Transit Trip Plans

Building upon the new direction for Edmonton Transit Service, ETSAB recognizes the importance of understanding how people will move within and access the transit system. This shift in transit provision will increase the need for multimodal opportunities. As the Transit Strategy focuses on improving service on well utilized routes, ETSAB anticipates that the importance of multimodal connections is key to a positive user experience. Specifically, ETSAB has investigated the role of transit centres to facilitate multimodal service provisions, and the services that can improve the first and last kilometre experience.

What is the First Kilometre/Last Kilometre?

First Kilometre/Last Kilometre (First/Last KM), sometimes also referred to as *the First Kilometre/Last Kilometre Challenge* or the *First Mile/Last Mile Challenge*, is the term that transportation specialists use to describe the start and end of a transit users experience. The start and end of every journey can have a profound effect on how and if one will use public transit. In communities with sprawling development patterns, the connecting ends of a transit trip can result in significant inefficiencies with travel time, and can lead to car dependence.[1] As such, transit agencies are now emphasizing the importance of improving the First/Last KM experience; the City of Edmonton has created a specific *First Kilometre/Last Kilometre Study* within the framework of the current ETS Bus Network Redesign.[2]

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- Direct City Administration to consider different First/Last KM solutions for different areas, i.e. to keep an open mind about different First/Last KM solutions, in conjunction with a scan of practices in similar cities;
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- Encourage the use of best practice and Universal Design when directing City Administration to investigating and/or implementing First/Last KM solutions.

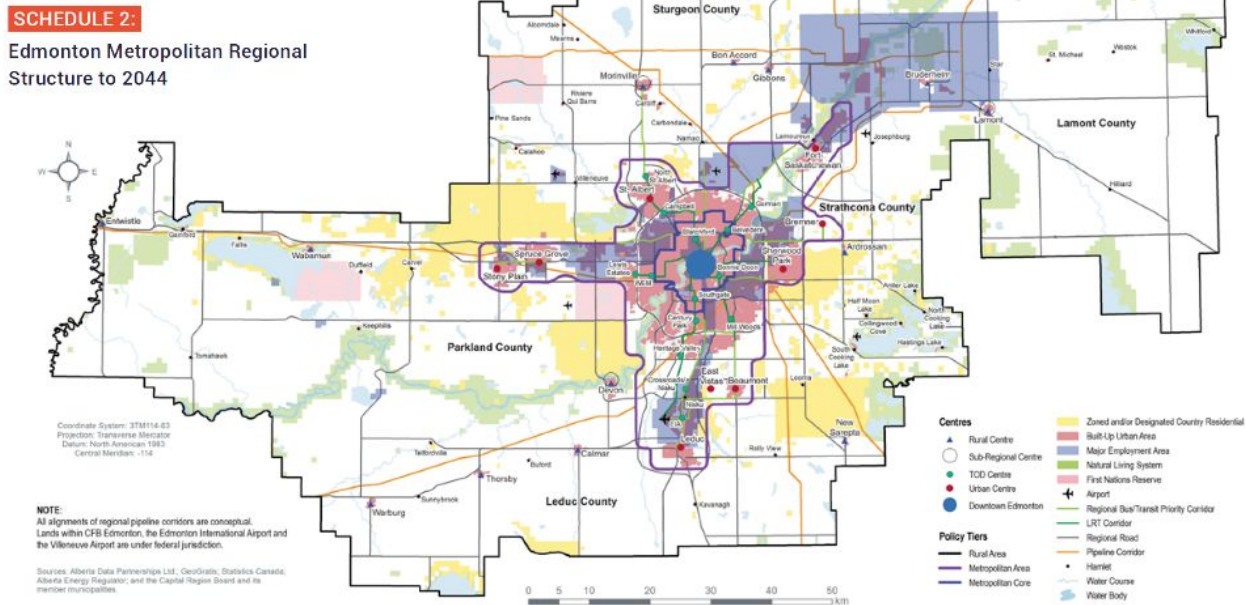---

[1] Smith (2016)
[2] City of Edmonton (n.d.)

Figure 1: *Edmonton Metropolitan Regional Structure to 2044.*[3]

Within Edmonton, this topic of discussion is of top of mind, as Edmonton Transit Service (ETS) is currently engaged in a major overhaul of route structure and service delivery. Within the *Edmonton Metropolitan Regional Plan*'s[4] Metropolitan Core, transit service improvements are envisioned (cf. Fig. 1) that could be supplemented with First/Last KM solutions. However, efficient First/Last KM options are even more important and necessary in communities outside the Metropolitan Core to ensure continued transit ridership growth and convenient access to the primary transit system.

First/Last KM in the City of Edmonton Policy

When reviewing the First/Last KM topic, close regard was given to the existing policies within the City of Edmonton. These policies provide City Administration and the public direction regarding transit implementation.

Policy direction within the City of Edmonton supports a focus on improving public transit and interconnectivity between transportation modes. There is an interest in encouraging active transport and in exploring new opportunities in public transit. Enabling safe active transportation (cycling and walking) is a key component of improving the First/Last KM experience. In addition, new opportunities and changes to public transit delivery provide a good anchor point for implementing a variety of different First/Last KM transport options, both those already in existence in the city (feeder buses, car-sharing), and new additions or improvements (bike share, demand-responsive public transit, better walking infrastructure).

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[3] Edmonton Metropolitan Regional Board (2017), p. 27
[4] Edmonton Metropolitan Regional Board (2017)

The overarching themes contained within the policy direction that are applicable to the First/Last KM discussion include:

- addressing the transportation needs of a **diverse urban population regardless of mobility challenges or vehicle ownership**;
- providing **reasonable access with a variety of modes**, and
- **capitalizing on new opportunities** for public transportation.

The Way We Move – Transportation Master Plan[5]

Access and Mobility

- The transportation system is interconnected and integrated to allow people and goods to move efficiently throughout the city and to provide reasonable access with a variety of modes for people across demographic, geographic, socio-economic, and mobility spectrums.
- An accessible transportation system addresses the transportation needs of a diverse urban population regardless of mobility challenges or vehicle ownership.

Transportation Mode Shift

- Public transportation and active transportation are the preferred choices for more people making it possible for the transportation system to move more people more efficiently in fewer vehicles.
- Developing and expanding the existing public transportation system while capitalizing on new opportunities for public transportation within the greater Edmonton

Encouragement of Active Transportation:

- A walkable, cycle-friendly city supports the creation of a healthy, barrier-free, age-friendly and safe city where active modes are a preferred transportation choice.
- Pursuing opportunities, alone or in partnership with others, to provide and improve pedestrian and cycling connections between LRT stations/stops, transit centres and adjacent developments.
- Pursuing opportunities to provide and improve pedestrian and cycling connections to bus stops and transit centres.

In addition to the policies contained within the *Way We Move*, the City of Edmonton has recently adopted new *Complete Streets Design and Construction Standards*.[6] A "Complete Street" is defined as being "designed to integrate all road users safely, including pedestrians, cyclists, motorists, truck drivers, and public transportation users of all ages and abilities." The goal of Complete Streets complements the First/Last KM discussion as it:

- Provides travel options for all users and trip purposes in a safe, accessible, context sensitive manner in all seasons,
- Is adaptable by accommodating the needs of the present and future through effective space allocations for the many functions of the street, and

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[5] City of Edmonton (2009)
[6] City of Edmonton (2018)

- Contributes to the environmental sustainability and resiliency of the city.

Multi-Modal Transportation and First/Last KM

Multimodal transportation describes the process of using several different travel modes to arrive at a destination. Multimodal transportation is a growing trend for daily travel with public transit, car-sharing, bike-sharing, walking and car ownership all being a part of the multi-modal network.[7] In order to ensure successful multi-modal transportation within the First/Last KM, several factors are required:
- Ease of transition between modes
- Real Time Notifications
- demand-responsive and smart technology integration
- Quality transit stations

In addition, depending on location, there are also different needs for First/Last KM approaches. Within the city core, walking, cycling and traditional bus services are key for integrated transit. Outside the core, additional solutions are needed. Increasingly, ride-hailing, car-sharing, and demand-responsive transit service are becoming more widespread.

Walking[8]

Many transit trips begin and end with a walk, either to and from an individual's home, their workplace, or the location of an errand, appointment, or meeting. Walking thus ties in crucially with the public transit system, and should be regarded as an integral component of the appeal and convenience of public transit.

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[7] American Public Transportation Association (2013)
[8] Note that the term "walking," for the purpose of this report, also refers to moving at roughly a walking pace using wheelchairs and other mobility aids.

Figure 2: An example of an intersection where walkability is low.[9]

Walkability, which is defined as "the extent to which the built environment is friendly to the presence of people walking, living, shopping, visiting, enjoying, or spending time in an area," is associated with numerous benefits for individual and public health, the environment, the economy, social equity, and individual happiness. Research has shown that residents engage in more green mode share when they live in highly walkable neighbourhoods, regardless of their personal attitude towards green transport.[10] This suggests that the urban form influences mode choice beyond personal conviction,[11] so that walkability can be promoted through a street design that values pedestrian safety, security, convenience, efficiency, and comfort. This can be achieved through, for example, providing frequent crossings, eliminating missing sidewalk links, keeping the sidewalk free of obstructions, and increasing the aesthetics of the pedestrian space.

It is important to note that walkability is vital to both the city core and to suburban settings. It might seem easier to achieve in the core due to the presence of a street grid, but this setting comes with its own challenges, such as traffic light timings, crossing locations, and pedestrian safety in the face of large amounts of vehicle traffic. In suburban areas, there is typically less traffic; however, a built form using cul-de-sacs and omitting sidewalks can be hostile to pedestrian activity. The presence of direct walking routes and sidewalks should be ensured to improve the experience.

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[9] Hubert (2018)
[10] Florida (2014)
[11] Stantec (2009), p. 41

Figure 3: An example of a human-scale, highly walkable street.[12]

Factors Influencing Walking[13]
- ***Quality of the Journey*** *– safety, security, convenience, efficiency, comfort, appeal, and ease of travel.*
- ***Urban Form*** *– scale, block size, connectivity, street design, proximity to destinations, mixed uses, residential, commercial and employment density, and access to an extensive public transit system with good service levels.*
- ***Pedestrian Infrastructure*** *– sidewalks, accessibility, crossings, transit amenities, street amenities, lighting, driveways, off-street parking, parkades and access to buildings.*
- ***Policies and Programs*** *– design standards and guidelines, roadway operations standards, zoning bylaws, area and neighbourhood plans, support and education, government support and resources, funding, and implementation.*

Considering the walkability of an area in conjunction with public transit, cycling facilities, and connections to other modes of transport is crucial when planning for effective and convenient multi-modal travel that addresses the First Kilometre/Last Kilometre challenge.

ETSAB believes that these considerations are well in line with proposals and guidelines in the City of Edmonton's *Walkability Strategy*, the *Walk Edmonton Report*, and the *S idewalk*

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[12] UrbanGrammar (2010)
[13] *Walk Edmonton: Steps to a Walkable City* (n.d.), p. 4

Strategy,[14] and hence suggests that the City of Edmonton allocate sufficient resources to improving the pedestrian experience both in the core and in less dense neighbourhoods as a crucial component to solving the First Kilometre/Last Kilometre challenge.

Cycling

With the installation of the downtown bike grid, the bikeability of the city core has improved dramatically over the past year,[15] triggering a significant increase in cyclist numbers.[16,17] As the bike grid passes several LRT stations and high-frequency bus stops in the city core, cycling has become a viable First/Last KM solution for this area.

In the suburbs, cycling can be a highly effective "feeder" system, as riders can choose their own timing and are not dependent on schedules or shared ride arrival times. However, cycling in these areas, where safe cycling infrastructure may not exist, may not be attractive to everyone for reasons of personal safety. Additionally, even though bicycles typically cost a fraction to purchase and maintain compared to a personal motor vehicle, purchasing a bicycle can be considered a significant investment that may not be attainable for all citizens. A bike sharing model has the potential to close this gap, as will be discussed below.

Using your own bicycle can come with its own restrictions or deterrents, such as trains or buses not allowing - or not being equipped for - bike transport,high rates of bike theft in the destination area, or the only bike lockup options being available in a dark, deserted area. As previously presented by ETSAB in an April 2015 report to Council, well-lit, secure areas for bike storage, such as lockers or supervised bike parking areas at transit stations, could be added to address some of the above concerns and increase the appeal of multimodal travel.

Encouraging cycling for transport is an explicit goal of several City of Edmonton documents, such as *The Way We Move.* ETSAB believes that providing better links between cycling and transit would be beneficial both for riders and transit users, and for the general appeal of the transit system, while at the same time promoting the health and societal benefits associated with a higher cycling mode share.

Demand-Responsive Transit

What is Demand- Responsive Transit?
"Demand-Responsive Transit" (DRT) refers to an ecosystem of transportation models which can fulfill the public desire for providing transit access, but which is scaled according to type of user, specific user group needs, number of riders, and type of origin and destination. This could include any number of different vehicle types, and any number of different delivery models on a spectrum from full public provider to partnerships with private providers.

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[14] Stantec (2008)
[15] Brown (2018)
[16] Downtown Bike Grid Monitoring (2018)
[17] Pavlek (2018)

Generally, Demand-Responsive Transit describes transportation services in which individual passengers can request a ride from one specific location to another specific location at a certain time. The vehicles providing demand-response service do not follow a fixed route, but rather travel throughout the community transporting passengers according to their specific requests.[18]

Figure 4: A Transport for London London Dial-a-Ride *vehicle.*[19]

This is a rapidly evolving field, which has appeared as a method of providing transit over the past ten years as mobile technology evolved to enable complex ride-matching and predictive capabilities, and as interstitial methods of providing transit which are common in many areas of the world became transplanted and trialled in North America. Faced with diverse needs and demands, and expensive capital-intensive approaches to providing traditional fixed-route bus and rail services, many transit operators are looking at Demand Responsive Transit models to serve expensive or hard-to-serve users and places, and increase ridership to mainline services by providing feeder service, and on the margin of service areas that may not otherwise have any transit service.

In the past, DRT could have been described as "dial-a-ride" or "dial-a-bus". Today, the ability to provide these services is much more sophisticated and diverse. For instance, a system may provide riders the ability to request service by *all* of mobile app, website, text message, phone call, and pre-arranged booking request- and might provide the service using one, any, or all of a bus, a community bus, a shuttle van, a car, a partnered taxi cab or ride for hire/rideshare, a mini vehicle/jitney, etc.

When is DRT most Useful?
DRT is usually employed in areas of low or irregular demand, and areas of low density. It is commonly being used in North America to service suburban areas within cities, to service all of smaller urban centres, or to connect low-density exurban fringes and rural areas to the higher density city proper. It is also useful not just where population densities are low, but also where the job base is dispersed. Often,

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[18] Joblinks Employment Transportation (n.d.)

[19] Transport for London (n.d.)

DRT serves as the feeder service from areas of low density, or during off-peak/late-night hours, delivering people to and from transit stations or hubs which connect to the mainline transit system.[20]
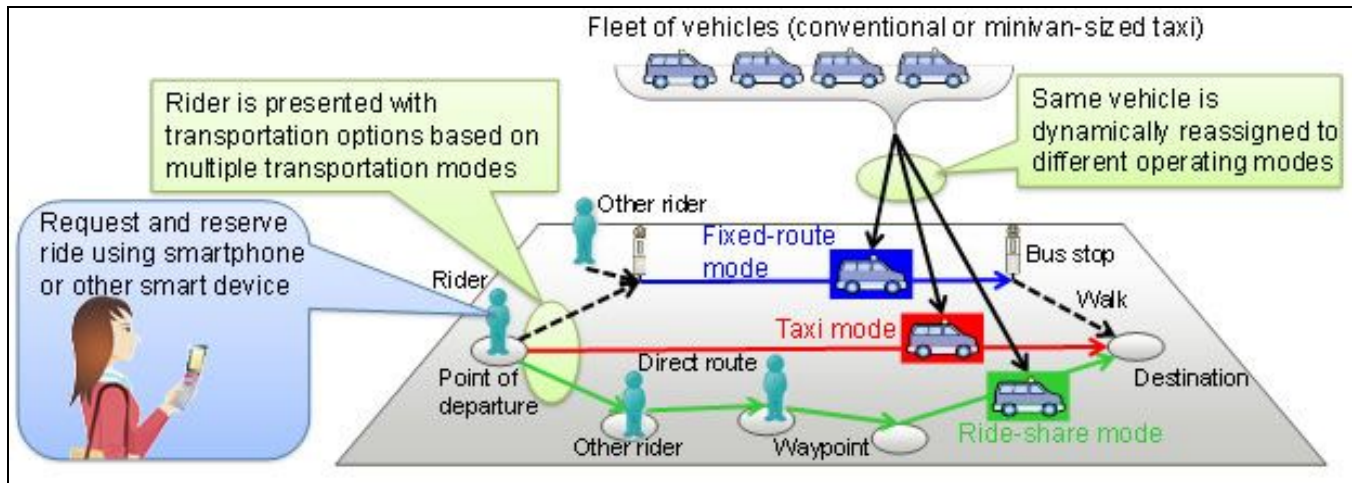

Figure 5: Schematic representation of DRT services.[21]

Models

DRT can be run as an extension of the transit system, or it can be run as a partnership to reach specific job sites and companies. It could be publicly operated, a joint public-private service, or entirely privately operated. Any number of iterations could be developed, and multiple models could operate within one area, each serving different and specific needs and user groups. DRT may provide additional service to complement paratransit operators as well.

Systems such as local "dial-a-bus" found in the Edmonton Metro region, notably Sherwood Park, are longstanding traditional modes of DRT. A contemporary update to these models might include adding functionality to schedule the public bus via third-party apps (such as Transit App) and a website, in addition to the regular phone. Rather than just run a standard 40-foot bus, the system could choose smaller right-sized vehicles- vans, or community buses that may be cheaper to operate but still remain transit vehicles.

A next step further could be such a system where part of the time public transit vehicles run on the service, but in very low demand times private ride-for-hire (taxi cabs, rideshare providers) are contracted by the transit system to fill the service. Ultimately, the transit system should be seeking to deliver the best service, at the lowest cost- the business case will inform the most effective model to use.

That is, if a standard bus costs $150/hour to operate, and provides only three rides per hour in a low demand time, the municipality has paid $50 per ride. If an alternate model can reduce the cost per ride and provide the stipulated service levels, this would be a benefit to both the transit system and the user. Transit systems can also decide whether they prefer to subsidise the same rate per trip as with the

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[20] Ibid.
[21] Fujitsu Laboratories (2014)

regular system, and leave the user to cover the difference in fare, or cover the entire incremental cost, and ensure the user always still pays just the standard transit fare.

Example Systems

Innisfil, Ontario

- Innisfil Transit[22] set precedent in North America by selecting to contract with private rideshare providers rather than start its own transit system.
- This saved the capital cost of procuring buses and maintenance infrastructure.
- The Transit system provides fixed-rate fares to/from certain destinations, and provides a set amount towards the total cost of fares for others.
- The system runs entirely off of the Uber platform, under contract to the municipality; users use their smartphone, website, or terminals provided at key locations to request trips.
- The municipality estimated the cost of providing its own bus transit system at $270,000 annually for one bus and $610,000 for two buses for very limited service, versus $100,000 in 2017 and $125,000 in 2018 to contract with UberPool and provide on-demand, direct services.

Figure 6: Barrie-Innisfil Taxi.

City of Santa Fe & Rio Arriba County

- City and County contracted with each other to run a public shuttle service.[23]
- Called the Job Access and Reverse Commute (JARC) Service, connecting low density areas to dispersed employment areas.
- Runs on fixed-route service, but each route has been tailored to specific employment areas and where people travel from to reach them.

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[22] Innisfil Transit (n.d.)
[23] Rio Metro (n.d.)

HyperLink, Hillsborough Regional Transit Authority (HART), near Tampa, FL
The service was developed to improve the efficiency of transit service and has approximately 40,000 daily riders. HART has identified several goals for their HyperLink service:

- **User Friendliness:** Different convenient booking options (smartphone, call enter) and payment options (cash, credit). The driver meets the client at the bus stop.
- **Accessibility:** Compliant with Americans with Disabilities Act (ADA); also recognizes that residents who have more access to public transit are more likely to use it.
- **Walkability:** Recognized as a staple of a livable city.
- **Safety:** Trained, tested, licensed drivers.

Originally, HART implemented this service through contracts with private industry ride-hailing companies, however the service has since brought back under the responsibility of the Transit Authority. Rationale for bringing the service back was two-fold: Quality control of the service, and provision of service for people with disabilities. By maintaining a demand-responsive fleet with operators that are employees of the transit agency, any concerns about the drivers, the vehicles, and the safety of the operators were under the purview of the transit agency. This ultimately improved the quality of the service, as the agency was directly responsible for the customer experience. In addition, the transit agency fleet maintains several accessible vehicles to ensure that the agency provides the same level of service for all passengers regardless of ability. This is a requirement of the American Disabilities Act, and was not being adhered to by the previous private operators.

Demand-responsive service can be a First/Last KM solution especially in less dense areas, where running large buses on a fixed schedule may not be viable or necessary. This would mean a continuation of public transit service in these areas, while at the same time ensuring a reasonable allocation of public transit resources. In the core, where transit service is more frequent and stops are more tightly spaced, demand-responsive service can be considered less necessary.

Car-Sharing

Car-sharing describes the process of "renting" a car for short periods of time, such as minutes and hours. It is often considered as a transportation alternative for people who have chosen not to own a vehicle and consequently use other modes for travel. The car-sharing model is hence often used in conjunction with public transit, walking, and cycling. It has been shown to reduce the number of privately owned vehicles[24] and to replace up to eleven personal vehicles on city streets,[25,26] while at the same time encouraging a multi-modal lifestyle.[27]

Within the City of Edmonton, *Pogo Carshare* provides this service through a fleet of vehicles located within the downtown core and old Strathcona, plus the University of Alberta Augustana Campus in Camrose.[28]

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[24] Martin & Shaheen (2011)
[25] Bliss (2016)
[26] Bondorová & Archer (2017)
[27] Bondorová & Archer (2017)
[28] Pogo Carshare (n.d.)

Figure 6: *A young woman by a* Pogo Carshare *vehicle.*[29]

Car-sharing is an important complement to the First/Last KM discussion as it provides a flexible option for people who choose not to own a vehicle; those who generally travel in a multi-modal manner; and for those trips where transit may not be the best choice, such as for transporting heavy loads.

The existing Pogo Carshare zone serves the city core, so that it is a convenient option for residents of this area. In the suburbs, Pogo vehicles can be used, but not parked without the stop counting towards the ongoing trip. As such, the existing car-share system is not as convenient of a solution in the suburbs as it is in the core.

Ride-Hailing

Ride-hailing is a modern "evolution" of the taxi service, providing demand-responsive transportation by using mobile-device technology. Unlike car-sharing services, ride-hailing services, such as *Uber* and *Lyft*, come with a driver, and users of the service would typically not have to worry about parking the vehicle, or returning it to a specified area. This makes ride-hailing an attractive service for both the suburbs and the core.

Ease of use, affordable rates, and convenience all make ride-hailing a viable option to help address the First/Last KM question. While the American Public Transportation Association believes that linking transit apps with ridesharing apps encourages passengers to use both modes, ride-hailing was found to have resulted in a 6% decrease in bus use and a 3% reduction in use of LRT based on a survey of four American cities.[30]

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[29] Pogo Carshare (n.d.)
[30] Clewlow & Mishra (2017)

Figure 7: *A person planning an Uber trip via their mobile phone.*[31]

A list of transit agencies in North America that have implemented a ride-hailing service in conjunction with public transit, or are exploring to do so, is presented below.

Examples of Transit Agencies Exploring or Applying Ride-Hailing to Complement Their Service

- ***L.A. Metro*** *has put out a request for proposals from companies who would be interested in partnering with them to provide service in smaller vehicles (cars or vans) to pick up passengers in areas where operating a bus would be too expensive. LA Metro was deliberately vague in their request hoping that the applicants would come forward with creative solutions.*[32] *The basic idea was for the company to pick up passengers, not necessarily at their door, but maybe at a designated pickup spot or "virtual bus stop" close to them and ferry them to the nearest transit hub. The subsidized fare for the ride would also provide them with a transfer onto transit.*
- *In **Atlanta, MARTA** (the transit company) has integrated their transit app with Uber in the hope that transit users will call Uber when they have reached their end of line transit journey. Uber has noted that hundreds of thousands of ride-hailing trips do start and finish at transit stations.*

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[31] Fong (2018)
[32] Marshall (2017)

- In ***Summit, New Jersey,*** *the transit system is subsidizing 100 people to use Uber to get to and from the transit station in an effort to avoid having to build an extra parkade. The subsidies cost $167,000 per year as opposed to the $10 million cost of the parkade.*
- ***Altamonte Springs, Florida,*** *is spending $500,000 per year subsidizing Uber rides by 20% and an even higher subsidy of 25% for passengers who begin or end their journey at the local rail station.*
- *The **Massachusetts Paratransit Authority** began subsidizing passengers $13 per trip if they use Uber or Lyft and note a significant cost saving over the cost per journey of operating their own system. As well as cost savings this system also allows passengers to call when they need the transportation instead of having to book a day or more in advance.*
- *Several U.S. cities are experimenting with collaborating with ride-hailing companies on occasions of special events like major sporting or cultural events in an effort to ease the extra burden on transit.*

Bike-Share/Scooter-Share

Bike-share is a growing transport option, which has also expanded to include dockless e-scooters. Bike-share infrastructure can follow either a docked or dockless setup: With the former, bicycles are obtained from a docking station, and after use returned to the same or a different docking station. Often, a portion of each trip is included in the fixed user fee, with longer trips incurring a surcharge. With dockless bike share, the docking station is part of the bicycle - bicycles are obtained from wherever the last user left it, and after use are left locked in the same or a different location.
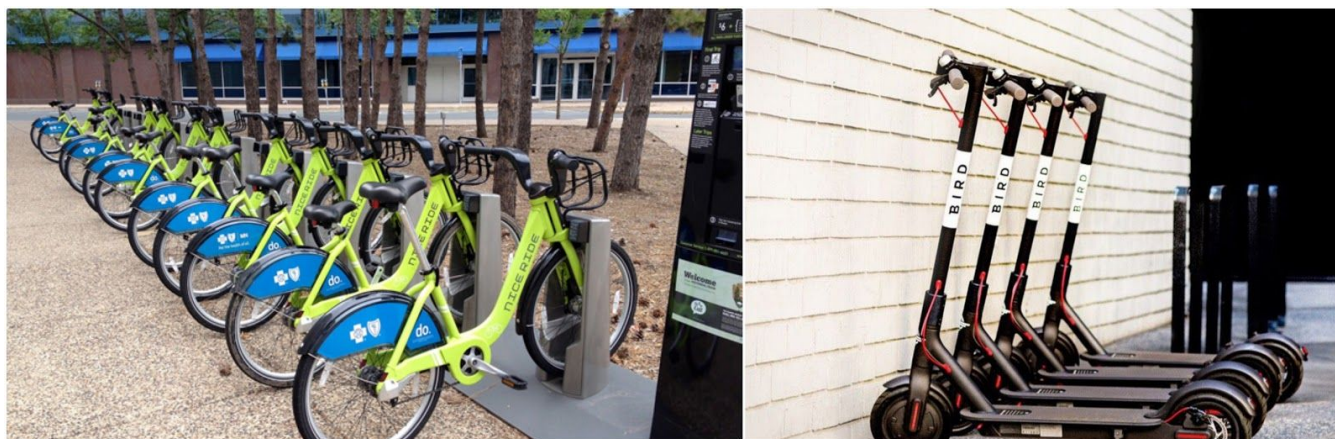

Figure 8: Examples of NiceRide bike share[33] and BIRD scooter share[34] stations.

A relatively new addition is dockless electric scooters, which operate much like the existing dockless bikes. Currently being incorporated around the world, they provide a quick way to move around town with an even smaller footprint than a bicycle.

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[33] Ryan (2016)
[34] Lekach/BIRD (2018)

Bike-share provides a flexible First/Last KM option as it can be used conveniently for one-way trips, and another mode can be chosen on the return trip; the user does not have to worry about transporting their bike on a bus or a train; and as it can relieve concerns of theft regarding expensive personal bicycles. In addition, the use of a bike share program typically does not require steep up-front payments, so that citizens who do not wish or cannot purchase a bicycle for themselves can still have access to cycling in the city.

Some drawbacks of bike-share models include that bikes are often heavier and sturdier than personal bicycles to make maintenance easier, which can result in the bikes feeling "sluggish." This may even result in some users, especially those with health concerns, rejecting the service; a gap that e-scooters have the potential to fill. Concerns for the service provider for both bike and scooter-share are risks of theft and vandalism.

Similarly to car-sharing models discussed above, including outer, less dense areas in the pick-up and drop-off zone may not be economically viable. This would result in the service only being available in the core if it is offered by a private company, with a private provider also retaining the option of removing themselves from a city if the service does not turn a profit. Public transit authorities could consider a partnership with such a private provider in order to increase the service area, and to ensure the service cannot be pulled from a city with short notice.

Multi-Modal Stations

Multi-Modal Stations are transit centres where two (or more) forms of public transportation connect. Traditionally this has been seen as connecting LRT and bus services, but with the evolution of First Kilometre/Last Kilometre services, the multi-modal station has grown to include bike access, car share, kiss and ride, demand-responsive transit service, and pedestrian access, which were discussed in detail above.

As such, it is important to ensure that the station design of multi-modal stations enables efficient connections between the various services. These stations must provide the ability to accommodate all forms of transportation to improve the First Kilometre/Last Kilometre experience.

To encourage multi-modal options for the First Kilometre/Last Kilometre, station design requires:
- Bike-share docking stations
- Bike/scooter storage, such as racks and/or lockers
- Car-sharing parking spaces
- Kiss and Ride and demand-responsive pick up and drop off
- Sidewalk and cycling connections to the transit station from the adjoining neighbourhoods

Universal Design of Multi-Modal Stations

Universal Design, as related to transportation, is defined as "the design and composition of an environment that it may be accessed, understood and used:
- To the greatest possible extent,
- In the most independent and natural manner possible,

- In the widest possible range of situations, and
- Without the need for adaptation, modification, assistive devices or specialized solutions, by any persons of any age or size or having any particular physical, sensory, mental health or intellectual ability or disability."[35]

Universal Design (UD) emerged from the earlier barrier-free concepts, accessibility movements, adaptive and assistive technology and also integrates aesthetics into the core considerations. UD is getting more attention given the growth of the aging population, the increase in life expectancy, and modern medicine that increases the survival rate of those with significant injuries, illnesses and birth defects.

UD principles should be integrated in the design and upgrade of existing and future transit stations. Although this report refers in particular to multi-modal transit stations for the First/Last KM, it should be noted that the same principles should apply to all transit stations (to the extent of their physical limitations), given that, in principle, any transit station has the potential to serve multimodal trips.

The City of Winnipeg *Accessibility Design Standard*[36] provides accessibility requirements for the implementation of the UD Policy and it is meant to be applied to both public and employee spaces within city funded, owned, leased or occupied spaces. The standard provides rationality and requirements for: general access and circulation, general information and communication systems (including acoustics and signage), general amenities (including waiting and queuing areas, and seating), general context specific requirements, exterior design standards (exterior access and circulation, exterior amenities, and exterior context specific requirements such transit facilities and passenger loading zones), and interior design standards.

Principles of Universal Design

1. *Equitable Use: The design is useful and marketable to people with diverse abilities.*
2. *Flexible in Use: The design accommodates a wide range of individual preferences and abilities.*
3. *Simple and Intuitive Use: Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.*
4. *Perceptible Information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.*
5. *Tolerance for Error: The design minimizes hazards and the adverse consequences of accidental or unintended actions.*
6. *Low Physical Effort: The design can be used efficiently and comfortably and with a minimum of fatigue.*
7. *Size and Space for Approach and Use: Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.*

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[35] Centre for Excellence in Universal Design (n.d.)
[36] City of Winnipeg (2015)

In addition, the following accessible features and concepts are to consider when updating or expanding a transit system using UD:[37]

- Related to transit stops: add features that protect users against climate extremes; ensure bus shelters have adequate internal clearances for mobility aid users as well as clear sight lines; consider placing designated paratransit stops at frequently used locations in large buildings such as malls, stadiums, arenas and medical centres.
- Regarding new transit stations: Provide real time information in audible and visual formats; increase the number of elevators in a station from the required minimum of one to at least two (in such case, if one elevator is out of service the station is still accessible for all users. Also, multiple elevators accommodate larger number of riders and it is a safety measure in case an elevator malfunctions); design multimodal terminals to simplify and facilitate transfers; foster public/private partnerships to establish "transit improvement districts" around major stations, even in the suburbs, to provide incentives to transit-oriented development.
- Regarding Pedestrian traffic signals: ensure they have both visual and audible signals; and ensure crossing times that accommodate people who cannot move fast enough.

Other recommendations from this publication are:

- Related to the vehicles or equipment: Install lifts and/or ramps on every vehicle; consider the use of smaller vehicles in suburban and urban areas; install automated bridge plates to eliminate the gaps between trains (or other type of vehicle) and boarding surfaces; install onboard audible and visual message signs to announce upcoming stops; provide audible and visual real-time arrival time information; and educate transit staff about new features and how increase access for riders.
- Regarding accessible taxis: consider vehicle with low floors, high ceilings and wide door openings; consider in-taxi audible information systems for riders who have difficulty hearing.
- Regarding fare stations: use wider fare gates as increase rider use and consider making all turnstiles accessible; simplify fare reduction programs; consider contactless fare-payment methods and regional universal fare cards; and increase the time both between fare payment and opening of turnstiles and between opening and closing of turnstiles.

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[37] Easter Seals Project ACTION & Rehabilitation Engineering Research Center on Accessible Public Transportation (RERC-APT). (n.d.)

Finally, Figures 9a through 9c below illustrate some UD features for exterior transit facilities taken from the 2015 City of Winnipeg Accessibility Design Standard.

Applying UD at the new transit stations and to provide accessible and uninterrupted infrastructure to connect to other modes of transportation including but not limited to pedestrians, cyclists, taxis, and other passenger vehicle providers; and to ensure the infrastructure is operable throughout the year regardless of the season, time of day, and weather conditions. In addition, communication systems should be designed to accommodate all users.
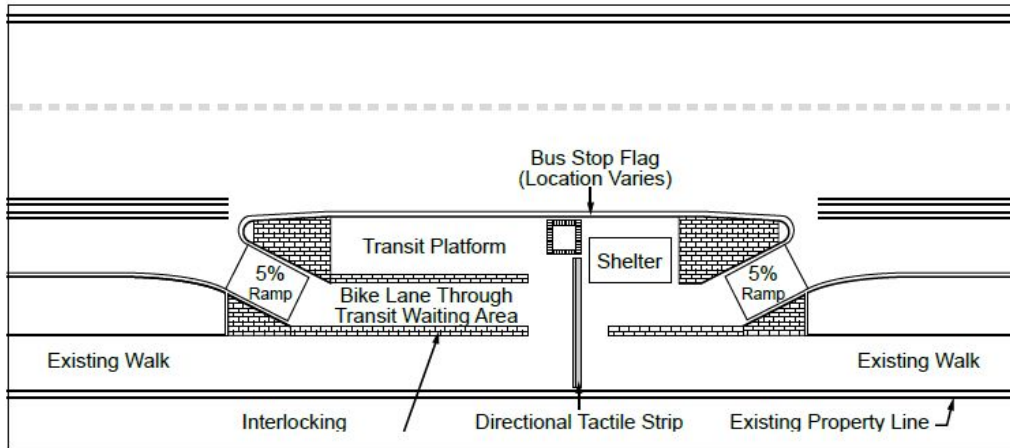
Figure 2.3.4.2   Typical Buffered Bike Lane Bus Stop Design
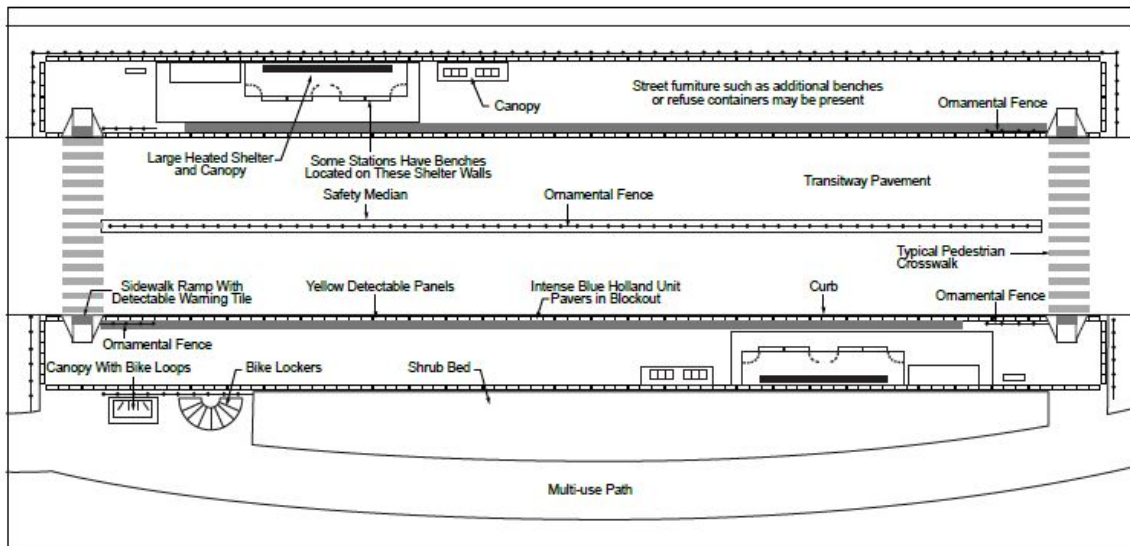
Figure 9a: A floating bus stop featuring UD design.

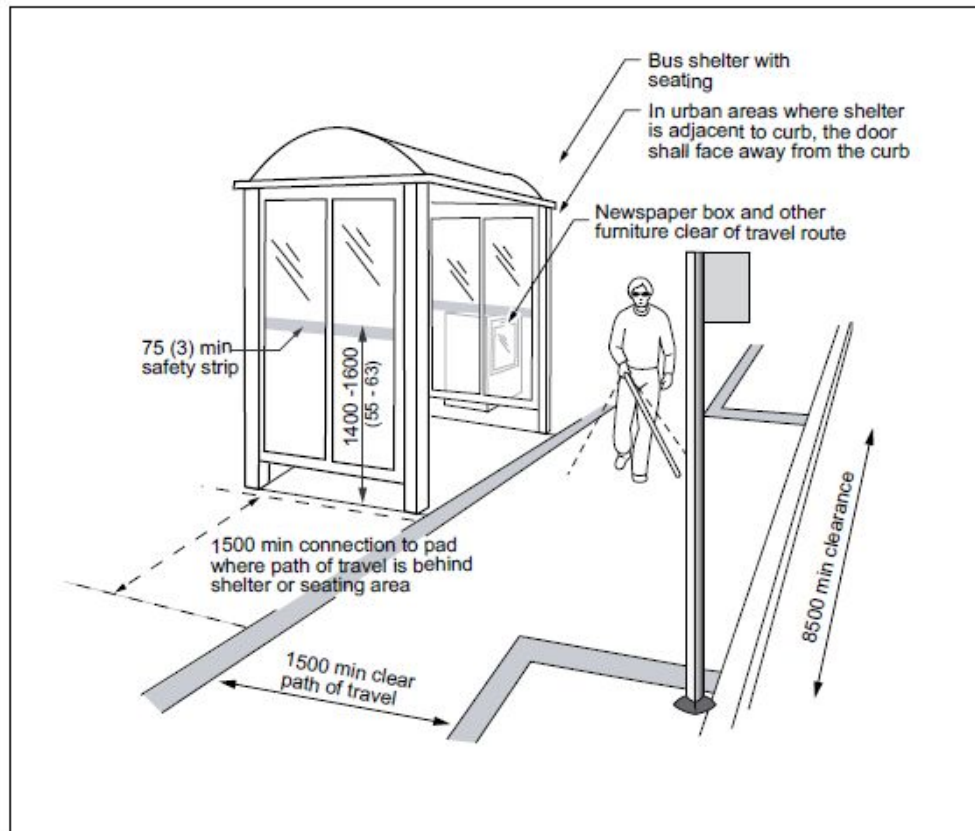**Figure 2.3.4.3**   Typical Bus Rapid Transit Stop

Figure 9b: UD rapid transit stop.

Figure 9c: Bus stop with UD features.

Kiss and Ride and Parking Lots

The least desirable way to bridge the last mile is via automobile, either via "kiss and ride" drop-off locations or park-and-ride lots.[38] Any area dedicated to car infrastructure leaves less room for transit-oriented development and the construction of buildings that act as trip generators. However, in low-density suburban areas, the only realistic option may be to arrive at a station by car, so park-and-ride lots will continue to be necessary.

Historically, line-haul premium transit services provided feeder bus, park-and-ride, and kiss and ride (drop off) opportunities so that travelers could access these premium modes, most typically for longer-distance commute travel. More recently, additional means of access, including bike-share, car-sharing, and transportation network company connection (i.e., Uber, Lyft, etc.), are being deployed. Automated shuttles are being evaluated as yet another means of enhancing the appeal of line-haul premium travel modes. These concepts make sense in contexts where the line-haul mode is sufficiently attractive by virtue of its speed or cost advantages that the

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[38] MacKechnie (2017)

Figure 10: A Kiss and Ride sign in Vienna, Austria[39] (top), and
two Kiss and Ride spots at Gdansk Railway Station in Warsaw, Poland.[40]

traveler is willing to incur the inconvenience, time cost, trip circuitry, or other potential negative characteristics of incurring one or more transfers to complete a trip.[41]

Digital Integration of First Kilometre/Last Kilometre Services

To ensure the most effective and seamless transition between transit and the First/Last KM solutions presented above, linking the payment and registration of public transit and the service in question via one smart card account is recommendable.

With ETS planning the introduction of a Smart Fare system in 2020, bike-share/scooter-share, demand-responsive options, and ride-hailing could potentially be integrated with public transit fare payment. Users could choose their way of payment, top up their account online, and choose travel options on-the-fly, which could rival the personal vehicle in terms of convenience.

ETSAB recommends integrating First/Last KM options, where possible, with e.g. google maps, or the transit app, so that users know the cost, time, and effort that is involved with choosing a certain mode ahead of time. This is already the case for Pogo vehicles (see Fig. X).

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[39] Kristensen (2009)
[40] Wyborcza.pl/Agencja Gazeta (2016)
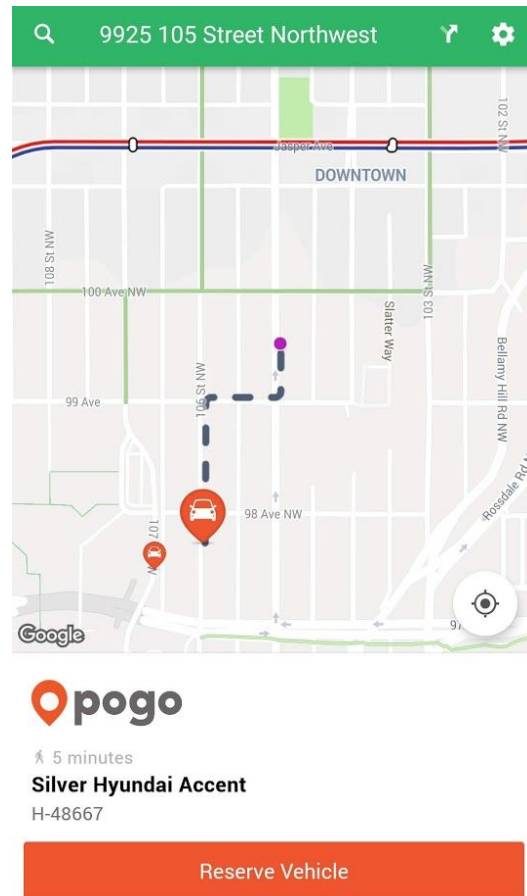[41] Polzin (2017)

Figure 11: Two Pogo Carshare vehicles displayed within the Transit app, and directly reservable from there.

Conclusion

ETSAB recommends that City Council:

● Direct City Administration to consider different First/Last KM solutions for different areas, i.e. to keep an open mind about different First/Last KM solutions, in conjunction with a scan of practices in similar cities;

● Ask City Administration to examine the feasibility of establishing pilot projects, testing different First/Last KM solutions in different areas (e.g. a bikeshare in one area, DRT in another;);

● Direct City Administration to make the mode-shift towards transit and human-powered transportation a key goal in their investigation of First/Last KM solutions, as outlined in *The Way We Move*.

● Encourage the use of best practice and UD when directing City Administration to investigate and/or implement First/Last KM solutions.

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