

Appendix G

Technology And Innovation



BURNSIDE



Innisfil

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To: Town of Innisfil
From: R.J. Burnside & Associates Limited

1.0 Introduction

Transportation is undergoing a rapid evolution due to the change in lifestyle, increase in environmental awareness and shift in social trends seeking convenience and flexibility. As well, in the last decade, people are placing a stronger emphasis on sustainability and affordability. In response to this phenomenon are emerging transportation technologies and the concept of Mobility as a Service (MaaS). These innovated solutions help improve transportation efficiency by increasing travel options and capacity.

MaaS aims to integrate different transport services seamlessly into one on-demand mobility service allowing travelers to plan and manage their trip. Services can include, but are not limited to, transit, ride/car/bike-sharing, taxi and/or private automobile.

The approach addresses transportation services as a system, which ultimately provides a more convenient and attractive option to the use of a private vehicle, reducing congestion on the road network. Improvements to MaaS is conducive to achieving a higher sustainable mode share. It is also integral in supporting transit use as it ensures safe access to transit stops.

In the Greater Toronto and Hamilton Area (GTHA), there are on-going projects that are considered pilot MaaS projects including the Innisfil Transit and Uber partnership. The project provides servicing to areas of the Town that may have been difficult to achieve through conventional transit services. Details are provided in the following sections. In addition, the following sections explore emerging transportation technologies and mobility models that brings the Town a step closer to MaaS. They identify any potential impact these may have to the Town and discuss how the Town could prepare for this new trend through policies, initiatives and / or infrastructure improvements.

2.0 Shared Mobility

The concept of shared mobility allows individuals to share a transportation service and / or travel mode either simultaneously as a group or one after another. This creates a hybrid between a personal vehicle and mass public transport. Shared mobility has become a popular method with the increase in access to on-demand services and the desire to reduce the

financial burden of vehicle ownership. Shared mobility takes on various forms:



Car-share / Ride-share



Bike-share



Scooter-share



Private Bus / Microtransit

Shared mobility influences travel behaviour i.e., when, and how people travel. It can improve transportation system efficiency. In addition, ease parking pressure and can help manage parking demand through the decrease of single-occupancy vehicles on the roads. Municipalities are discovering these potential impacts of shared mobility on transportation policy and planning process including:

- Zoning Management: shared mobility affects land use related planning factors such as:
 - Parking minimums: with a decreased need for parking, adjustments could be made to reduce the parking space requirement,
 - Substitute general parking spaces for shared mobility parking spaces,
 - Consider opportunities for future conversion of parking to floor space if parking demand declines due to MaaS,
 - Allowance for additional density,
- A component to a Transportation Demand Management Strategy for any new development, and
- Appropriate allocation within public right-of-way for space dedicated to shared mobility such as on-street parking, curb space and biking infrastructures.

Apart from public sectors, some organizations have incorporated shared mobility into their planning processes such as Leadership in Energy and Environmental Design (LEED) certification program. LEED provides certification credits for incorporating carshare, bikeshare, and rideshare services into a development project. Implementing shared mobility into both public and private sector planning processes and program is the key to integrating it into the transportation network and allowing individuals to recognize it as one of a number of potential transportation options available. Details for the various forms of shared mobility are discussed in the following sections.

2.1 Automobile-based

Within the Greater Golden Horseshoe Area (GGHA), there are numerous of emerging automobile sharing options including car and ride share services.

Car-Sharing

Car-sharing services connect individuals to short term (by hours) car rentals. Renters can enjoy the convenience of driving without the worry and hassle of ownership, maintenance and insurance. There are two types of car-sharing services within the GGHA - fleet operator and peer-to-peer platforms.

Fleet operators are typically owned and operated by a single organization offering short term vehicle rentals. In comparison to the traditional car rentals, vehicles are not located in a centralized location but scattered throughout a city. Figure G-1 illustrates an example from car share provider, Communauto. From their online application users can see the available vehicles within a set service boundary.

Figure G-1: Communauto Toronto Boundary and available vehicles and stations

Source: <https://ontario.communauto.com/>

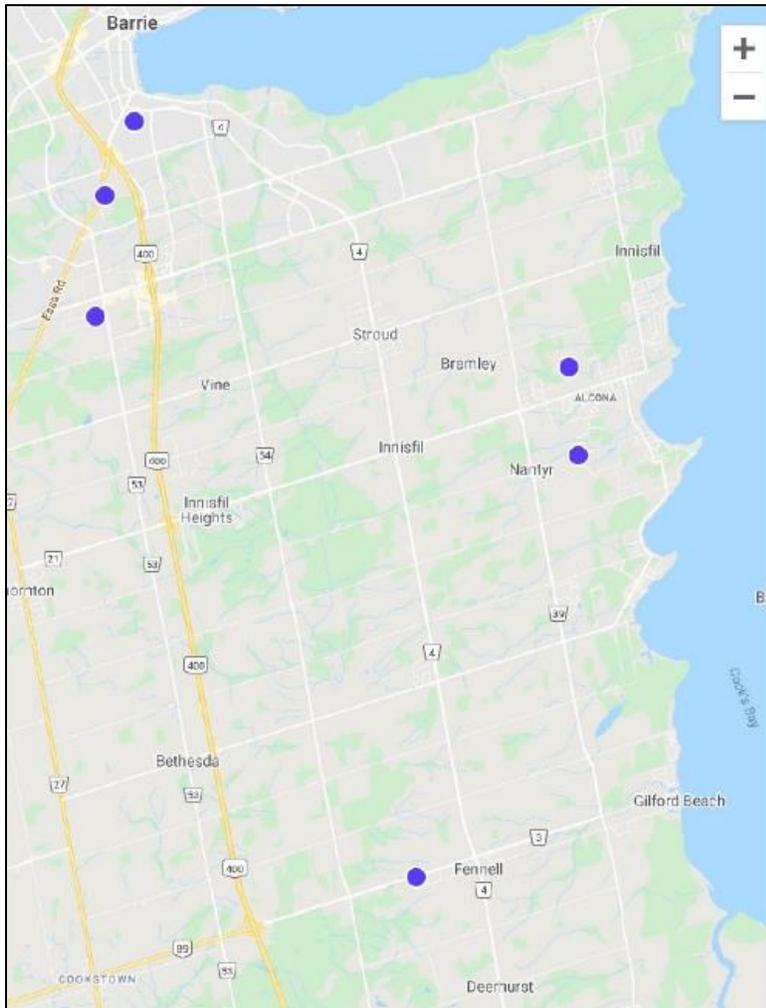


Advance technology, such as a telematic device, can be installed on the vehicle allowing renters to open and close a vehicle with their smartphone or Radio Frequency Identification (RFID) card. In addition, devices can provide real-time information to relay back to the provider such as location, fuel level and state of vehicle. Access can be convenient and flexible (anywhere, anytime). Most of the operators are using recent car models with emission control, fuel-efficient options, plug-in hybrids and electronic vehicles contributing to environmental efficiency.

Peer-to-Peer platforms allow vehicle owners to rent out their cars to members on the same platform on an agreed price and time period. Currently, Turo is the only peer-to-peer platform available in the GGHA. As seen in Figure G-2, there are currently three listings in Innisfil and three listings in the neighbouring City of Barrie.

Figure G-2: Turo available vehicles

Source: <https://turo.com/ca/>



Car owners will list their vehicles on the platform providing the make and model of the car. Renters can browse through the list and instantly reserve a vehicle that matches their requirement. Arrangements can be made for the vehicle to be drop-off and picked up at a desired location.

Aside from the operators mentioned previously, there are several other car-sharing operators across the GGHA and are summarized in Table G-1.

Table G-1: Car-Share Options

Service Provider	Where has it been implemented
Fleet Operators	
Enterprise ¹	Across GGHA, the closest location for the Town is in the City of Barrie.
ZipCar ²	<ul style="list-style-type: none"> • Toronto • Scarborough • North York • Etobicoke • Mississauga • Oakville • Hamilton • St. Catherines • Waterloo
ShiftRide ³	<ul style="list-style-type: none"> • Toronto • Richmond Hill • Mississauga • Kitchener
Communato ⁴	<ul style="list-style-type: none"> • Toronto • Hamilton • Waterloo • Kitchener • Cambridge • London • Guelph • Kingston • Ottawa
Peer-to Peer Platforms	
Turo ⁵	<p>Across GGHA, depended on location of the vehicle owners.</p> <p>3 current listing in Town.</p>

Sources:¹ <https://www.enterprise.ca/>
² <https://www.zipcar.com/en-ca>
³ <https://www.shiftride.com>
⁴ <https://ontario.communauto.com/>
⁵ <https://turo.com/ca/>

Ride-Sharing

Ride-sharing or ride-sourcing is the act of sharing a ride with another passenger, typically both passengers are travelling in the same direction. It has become popular over the last decade, but dates back the 1940s. With technological advancement i.e., smartphone, it has modernized ride-shares and transformed into an on-demand mobility service. The provides the upfront cost and offer different options of rides such as carpooled rides. Vehicles will be equipped with GPS system to allow for automatic ride matching, deployment and tracking.

Table G-2 summarizes where both these services have been implemented in the GGHA.

Table G-2: Ride-Share Options

Service Provider	Where has it been implemented
Lyft ¹	<ul style="list-style-type: none"> • Ajax • Brampton • Hamilton • Mississauga • Newmarket • Oshawa • Richmond Hill • Toronto
Uber ²	<ul style="list-style-type: none"> • Ajax • Aurora • Barrie • Brampton • Belleville • Bowmanville • Burlington • Hamilton • Innisfil • Kitchener - Waterloo • London • Markham • Milton • Newmarket • Niagara Region • Oshawa • Toronto • Vaughan

Sources:¹ <https://www.lyft.com/>

² <https://www.zipcar.com/en-ca>

The Innisfil arrangement with Uber to provide on-demand services is Canada’s first ridesharing and transit partnership. With a population of 37,000 residents spread over 262 km², this partnership helps respond to the need for efficient and effective transit service for lower densities of population. Residents can travel to and from places within Town for flat rate of \$4 to \$6 (e.g., Town Hall, Community Centres, GO Station, Highway 400 carpool lots). This partnership has been successful according to Colleen Shaefer¹, Transit Partnership manager at Uber. The partnership showcases an innovated way of catering to specific transportation needs within the Town and the flexibility of ride-share services.

“Innisfil was way ahead of the curve with this one... And over the years, we’ve learned so much from the town of Innisfil, who have been incredible partners, by the way. I mean, our team continues to focus public transit use cases and partnering with agencies using many of the same insights from Innisfil as a foundation for innovation. So, over the years together, we’ve evolved the offering to better suit the needs of the Innisfil community, especially as its population has grown, and the need for additional services becomes more apparent.”

Opportunities

- Investigate the viability of a local car and ride-sharing service throughout the Town. To create and opportunity such that residents have more flexibility.

¹ Innisfil Accelerates, ‘Uber and the Orbit’, *Innisfil Accelerates*, Town of Innisfil, <https://innisfilaccelerates.ca/operation-innovation-uber-and-the-orbit/>, (Accessed 11 September 2021)

This ride-share partnership provides a unique opportunity to quantify transit demand and identify opportunities for conventional scheduled transit service. In the longer-term ride-share can be focused on the challenges associated with first-mile / last-mile of conventional transit. A Burnside survey of ride-share partnerships that have been coordinated with conventional transit service, such as:

- City of Belleville and their partnership with Pantonium to coordinate on-demand services for their night bus routes.
- City of Stratford has on-demand weekend services managed by Pantonium.
- Pinellas Suncoast Transit Authority in Pinellas County, Florida and Marin Transit in Marin County, San Francisco are both working with Uber to facilitate the first / last mile connection to and from existing transit stops.

2.2 Micromobility

Micromobility is the ability of movement through minimalistic means on short distances (usually within 10 kilometers) using lighter vehicle mode such as bicycle and scooters. The COVID-19 pandemic accelerated the shift in preference for this method of transportation. With fewer points of contact and ease of maintaining physical distancing, it is considered the less risky mode of travel. Policies makers around the world has observed this trend and are starting to increase their focus on providing more active transportation infrastructure such as bicycle lanes and multi-use pathways.

Shared micromobility such as bike-share and scooter-share has grown in use over the past 10 years. Both these options are summarized in detail below.

Bike-Share

Bike-sharing services enable individuals to rent and access bicycles within a designated area on a short-term basis. These services can be carried out using a dock system where bicycles are locked into docks as illustrated in

Figure G-3. There are fixed stations scattered throughout a boundary area. In the GGHA, Bike Share Toronto, in the City of Toronto, is the largest bike-share program. There are approximately 625 stations with 6,850 bikes.

Figure G-3: Bike Share Toronto station at Front Street & Yonge Street

Source: https://www.thestar.com/news/city_hall/2018/08/15/torontos-bike-share-system-expanding-again.html



Advance technology such as solar-powered station, keypads to unlock the bicycles and kiosks are implemented. The latter element will assist individuals without smartphones as the kiosks can provide information on how to use the bicycles, buy passes and redeem gift certifications.

In comparison to the dock system is the dockless model. As the name implies, bicycles can be retrieved and returned without the need of a physical dock. Built-in GPS would be required to track the bicycle location and the lock mechanism will be activated with a smartphone. This alternative approach is common in Germany and China. Users can retrieve a bicycle from one location and drop it off at another within a set time period. The Town had explored this service through a pilot project called ShareCycle, which started August 2017 and ended October of the same year. Twelve bicycles donated by South Simcoe County Police Services with tracking system were available in the following sites:

- Innisfil Beach Park
- Sobeys Alcona Beach
- Rotary Trail
- Sandy Cove Acres
- Stroud Arena
- Foodland – Stroud
- Church Street Park, Lefroy
- Various libraries including Lakeshore libraries and Cookstown

The ShareCycle initiative was a free service. The project connected various groups in the community as illustrated in

Figure G-4 and allowed users to explore amenities within the Town.

Figure G-4: Innisfil Youth and Volunteers decorating the donated bicycles from South Simcoe Police Services for the ShareCycle program

Source: <https://www.toronto.com/news-story/7540237-free-bike-sharing-service-launches-in-innisfil/>



Other parts of the GGHA where pilot programs for dockless bike-share, Dropbike, was launched included the City of Kingston in 2017, the University of Toronto’s St. George campus in 2019 and the Region of Waterloo (Cambridge, Kitchener and Waterloo) in 2019. Dockless bike-share provides more convenience and freedom for user. However, the scattered returns pose a drawback related to bicycle maintenance, durability, sustainability and lack of visibility in comparison to stationed bicycles.

The City of Hamilton adopted a hybrid of both these models in their Social Bicycles Hamilton (also known as SoBi Hamilton) program. There are approximately 129 stations with 825 bicycles servicing the downtown, Westdale and Dundas areas of the City. Users can retrieve bicycles at any stations and return them at another or for an extra fee; the bicycle can be returned on any post or regular bike rack.

Scooter-Share

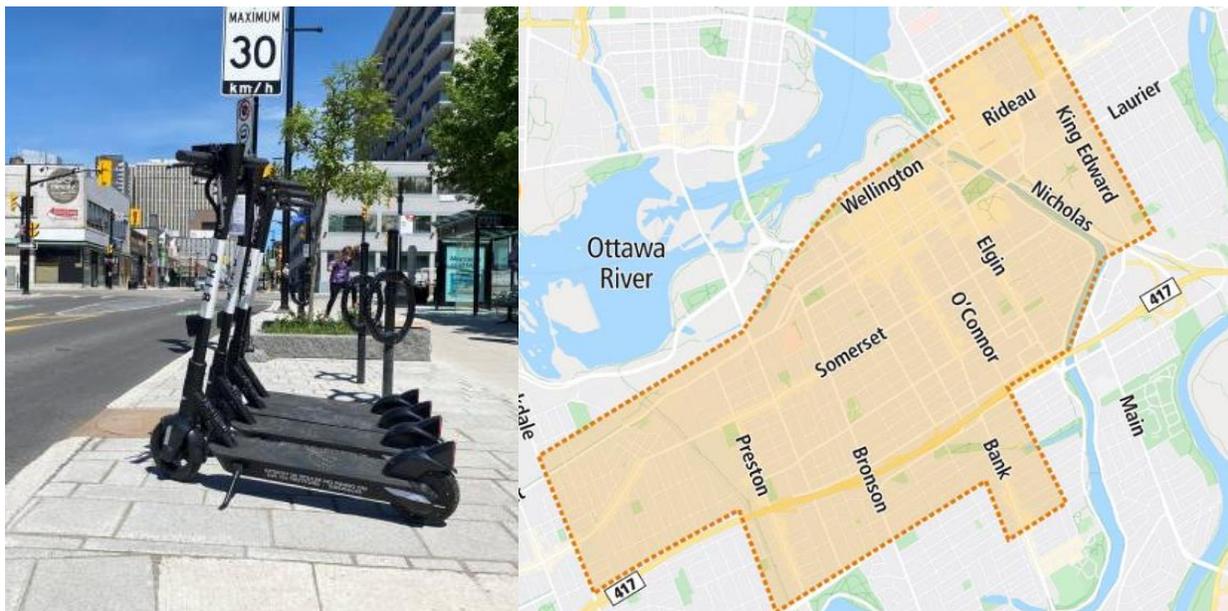
Similar to the concept of bike-share is the scooter-share programs. The scooters are in a form of electric motorized scooters (also known as e-scooters). Scooter-share programs adopt on the dockless model. The Province of Ontario has launched a five-year pilot program which started January 1, 2020 to examine shared e-scooters within a given community. The province has developed best practices, general guidelines, and regulations to ensure the safety of users. Each municipality that partakes will be responsible for passing by-laws to allow the use of e-scooters and determine where it will be permitted to operate. There are several cities

investigating the potential of implementing a scooter-share program, while a few have implemented pilot programs. The cities and the stage of investigation are as follows:

- City of London: collecting public input (September 2021).
- Waterloo Regional Municipality: consultation with stakeholders (September 2021).
- City of Brampton, City of Mississauga and City of Hamilton are in consideration .
- City of Windsor: one year e-scooter pilot program with Bird Canada started May 2021.
- City of Ottawa: passed an E-Scooter By-law 2020-174 on June 10, 2020.
 - Ottawa is considering three fleet companies-Bird Canada, Lime, Neuron. The three companies are providing e-scooters in Ottawa as part of their 2021 program.
 - A specific deployment area where the scooters can be picked up and dropped off.
 - Figure G-5 illustrates Bird Canada e-scooters in Ottawa and its deployment area.

Figure G-5: Bird Canada deployment area in the City of Ottawa

Source: https://www.thestar.com/news/city_hall/2018/08/15/torontos-bike-share-system-expanding-again.html



Opportunities

The Town should consider:

- Investigating the viability of a local bike and scooter sharing programs to help increase micromobility mode share within the Town. Similar to the ShareCycle program, these services can promote amenities and attraction in Innisfil. The program can be integrated with transit programs to provide residents with more mobility choices.
- Exploring the availability, convenience and safety of multimodal options for more active transportation infrastructure, including the deployment of e-bikes, bike-sharing services, and e-scooters to promote active transportation for short distances and address commuters' last-mile needs.

2.3 Microtransit

Microtransit is considered a form of flexible transit or on-demand responsive transit. Much like existing ride-sharing services, microtransit offers a flexible, cost-efficient and environmentally safe alternative to traditional fixed-route mass transit. It allows for users to request for rides on-demand along routes that are fixed or dynamic. Requests are usually made through a mobile application where an algorithm calibrates the most fast and fuel-efficient route for the bus driver to pick-up and drop-off passengers. The fleets generally consist of small/medium vehicles such as vans, minibuses and shuttlebuses. They are usually smaller than the typical public transit. Companies specializing in the development of on-demand transit application include Pantonium, Rideco Inc., Spare Labs Inc. among others.

Microtransit can be a solution to some of the limitations of traditional transit. This can include that the reduction in the likelihood of buses running empty or riders facing infrequent service, especially during the off-peak hours. Additionally, on-demand routes can still make scheduled stops at major destinations, such as senior homes, grocery stores and pharmacies, can also be considered. As a result, it is advantageous in lower-density neighborhoods.

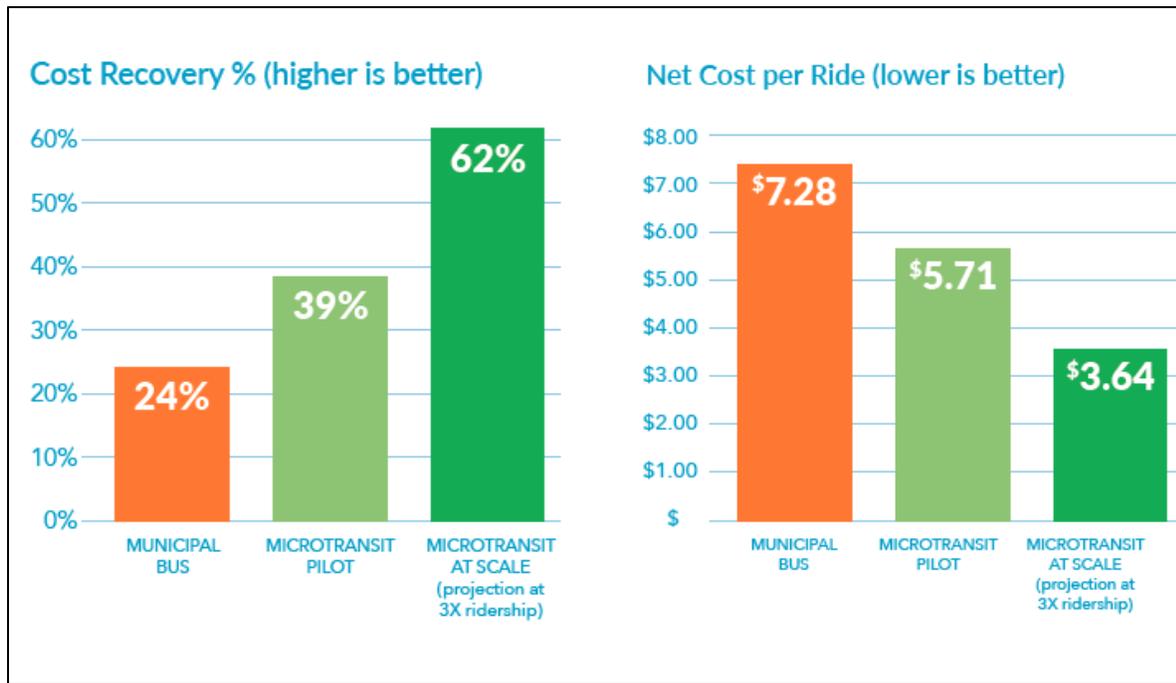
The COVID-19 pandemic has presented serious challenges to transit agencies. However, this provided an opportunity to accelerate the implementation of microtransit and bridged the gap between local transit agencies and private operators within the GGHA. Some examples include:

- Regional Municipality of Durham: Durham Region Transit partnered with Spare to launch on-demand transit services for 25 local bus routes in Ajax, Clarington and Pickering.
- Regional Municipality of Niagara: pilot program NRT OnDemand started August 2020 enabling on-demand services in the region's major transit hubs and inter-municipal transit services in Grimsby, Lincoln, West Lincoln, Pelham and Wainfleet.
- City of Belleville: on-demand services deployed by Pantonium for their night bus routes

The Town's partnership with Uber is also an example of microtransit. In addition, a detailed review is provided for the partnership between Metrolinx, Town of Milton and RideCo Inc. This was a one-year pilot on-demand transit project in 2015 called "GO Connect." The project was an answer to the congestion and parking issues experience at its GO Station. Riders were provided specific pickup and drop-off time and shared rides with other individuals heading in the same direction. All pickup and drop off locations were within a 3-minute walk or less, resulting in approximately 240 stops within the Town. The responses were positive from stakeholders with 45% of riders switching from driving to using RideCo. The financial results including cost recover and net cost per ride from the project are provided in Figure G-6.

Figure G-6: Financial results from GO Connect, Town of Milton

Source: <https://blog.rideco.com/how-transit-operators-are-getting-on-board-with-microtransit-b0e65540f476>



The cost recovery for the microtransit is higher in comparison to the municipal bus.

Opportunities

- With Innisfil Heights as a major employment area adjacent to Highway 400, microtransit could be as an option to service this area. Pick-ups can be available from major nodes of the communities such as parking lots in Alcona. This option could reduce single-occupancy automobile trips.

3.0 Mobility Hub

A mobility hub can be defined as a centralized location with high urban activities where different modes of transportation are integrated seamlessly. The Portland Bureau of Transportation’s *Mobility Hub Typology Study* (PBOT Mobility Hub Typology Study), dated June 2020, had defined potential elements within a mobility hub.

Figure G-7 is an excerpt from this study describing these nodes.

Figure G-7: Elements of a Mobility Hub

Source: *Mobility Hub Typology Study*, prepared by PBOT, dated June 2020.



It is important to note that the designs of these hubs are focused on the users. As a result, the size of mobility hubs can vary from major transit station to integrated bus-stops and are not limited to the above elements. In addition, these hubs are not restricted to be in central city or within a regional gateway, it can also be within local area of towns.

Many European cities including Bremen in Germany, Den Haag in Netherlands, London in the United Kingdom, Madrid in Spain and many more have led the implementation of mobility hubs. However, over the last decade, within the GTHA, Metrolinx has facilitated several mobility hub projects using their Mobility Hub Guideline established in 2011. It provides the framework of planning and developing mobility hubs. Section 3.1 provides an overview of some of Metrolinx’s

projects and other municipalities that have and are at the final stages of implementing mobility hubs.

3.1 Examples of Mobility Hubs

Partnership with Metrolinx – Kipling Station, Toronto¹

Elements in the Mobility Hub:

- Access to GO Transit, Toronto Transit Commission (TTC) and Mississauga Transit (MiWay).
- Pedestrian bridge and underground tunnel connect to TTC Passenger Pick-Up and Drop-Off.
- Covered bike parking and indoor bike lockers



Kennedy Station, Toronto²

Elements in the Mobility Hub:

- To be completed 2022.
- Mixed-use neighbourhood – high density residential (with some ground floor commercial) and single storey commercial.
- Significant amount of redevelopment.
- TTC subway, TTC bus routes, Scarborough RT, GO Station for Stouffville Line and future Eglinton Crosstown Light Rail Transit.
- Potential for new pedestrian plaza.



Others – Allandale and Downtown Mini Hub, City of Barrie³

Elements in the Mobility Hub:

- Construction phase to be complete by 2022.
- Access to Barrie Transit and GO rail and buses.
- Pedestrian canopies and shelters in waiting area.
- Charging stations for electric vehicles.
- Increase in covered bike shelters and parking.



Source ¹<http://www.metrolinx.com/en/greaterregion/projects/kipling-mobility-hub.aspx>
²<https://blog.metrolinx.com/2019/05/30/take-a-walk-through-tour-of-kennedy-station/>
³Allandale Mobility Hub Study, prepared by City of Barrie and WSP, dated May 2018

3.2 EcoMobility Hub Concept

With the increased awareness of the need for the reduction in global emissions, mobility hubs strive to be sustainable and environmentally friendly. This has contributed to the concept of Ecomobility Hubs. It is a mobility hub that encourages non-motorized transport. The Toronto Parking Authority, Smart Commute program and other businesses in the City of Toronto piloted the EcoMobility Hub concept. This concept was presented in the City of Toronto’s *ConsumersNext Transportation Master Plan*, dated May 2017 and followed the example taken from Sophia von Berg’s concept of EcoMobility as illustrated in Figure G-8.

Figure G-8: Example of EcoMobility Hub Concept

Source: Multi Mobility, Sophia von Berg, 29014



The Town's Orbit project illustrated in

Figure G-9 is an example of an EcoMobility Hub where an urban community will be situated around a new GO Station. Enhanced pedestrian and cycling infrastructures are proposed to connect to the GO Station becoming a one-stop point for multimodal system.

Figure G-9: The Orbit Project, Innisfil



Opportunities

The Town should consider:

- Determining opportunities to incorporate EcoMobility hubs in new development and / or existing popular areas such as recreational complex, town hall, Tanger Outlets, Friday Harbour Resort and 6th Line GO station.
- Exploring how the availability, design, and proximity of EcoMobility hubs could help support advanced sustainable mobility programs, such as AV shuttles or bike-share programs, and enhance ease of access for different users.

4.0 Clean Energy Vehicles

In July 2021, the federal government had announced that Canada will move forward to target all car sales to be zero-emission vehicles by 2035. This goal is a step to reduce greenhouse gas emission and is part of the climate change strategy. The Government has also established the Zero Emission Vehicle Infrastructure Program (ZEVIP), which is a 5-year \$280 million program to address the lack of charging and refueling stations. The focus will be on supporting electric vehicle charging infrastructure in:

- Parking areas intended for public use such as service stations, retail, restaurants, medical offices etc.
- On-street.
- Workplaces.
- Multi-unit residential buildings.
- Commercial and public fleets.

Through this program, Natural Resources of Canada (NRCan) contributes up to 50% of the total project cost for a maximum of \$5,000,000 per project. As a result, the electric vehicles (EV) represent a significant opportunity. There are several municipalities within the GTHA area that has taken advantage of the ZEVIP program fundings. For example, the City of Guelph received \$100,000 fundings from the ZEVIP to install majority of their charging stations. Currently, Guelph has 21 public EV charging stations and 1 private EV charging station for electric vehicles throughout their city. Guelph has both Level 3 and Level 4 charging ports and currently costs \$1.50 per hour to use city wide for all city and non-city owned charging stations in Guelph. In Ontario, there are approximately 1,300 level 2 and 3 charging stations with over 4,000 charging outlets.

The Town has plans for installing EV charging stations at the Town Hall and potentially other locations such as a coffee spot on Innisfil Beach Road (Alcona Tim Horton's). Once the Town acquires electric vehicles for their municipal fleet, these stations can be used for recharge overnight. This also acts as a step towards establishing an EcoMobility Hub.

Opportunities

- With the Provincial Government actively seeking public and private sector partners to create a network of fast-charging EV stations, the Town needs to take initiative and establish an electric vehicle charging station network strategy. To meet the travel needs of the residents

and support businesses and tourism, a plan for electric charging station infrastructures could be established.

5.0 Autonomous and Connected Vehicles

Vehicle automation will drastically reshape and redefine the transportation systems and travel behaviour. Autonomous and connected vehicles may facilitate and accelerate the adoption of the mobility models discussed earlier, including car sharing, ride-sharing and sourcing, and microtransit.

Automated vehicles (AV) allow the vehicle to control some of the driving functions by utilizing a combination of sensors, controllers and software instead of a human driver. Transport Canada and SAE International has identified six levels of automation ranging from level 0 (no automation) to level 5 (full automation). Currently, most vehicles in Canada are in the lower range of level 0 to 2 with features including lane assistance, cruise control and automatic emergency breaking.

To compliment AVs, are the technology in connected vehicles (CV). These vehicles utilize wireless communication, vehicle sensors, on-board computer processor and other advanced technologies to allow vehicles to communicate and connect with the driver's mobile phone, other vehicles and transportation infrastructure such as intersection traffic signals.

The development of automated and connected vehicles can benefit in the following ways:

- Create safer roads
 - Providing drivers earlier warning and alert them of dangerous situation
 - Applying emergency breaking when danger is detected
 - Assist in better decision making
- Provide a better opportunity of mobility for everyone
 - Seniors, youths, people with disabilities, low-income families and rural communities
 - better logistical and delivery services
- Improve the environment
 - Lower fuel use and emissions
 - Increase road capacity
- Generate new jobs in various sectors including transportation services, digital technology, manufacturing and many more.

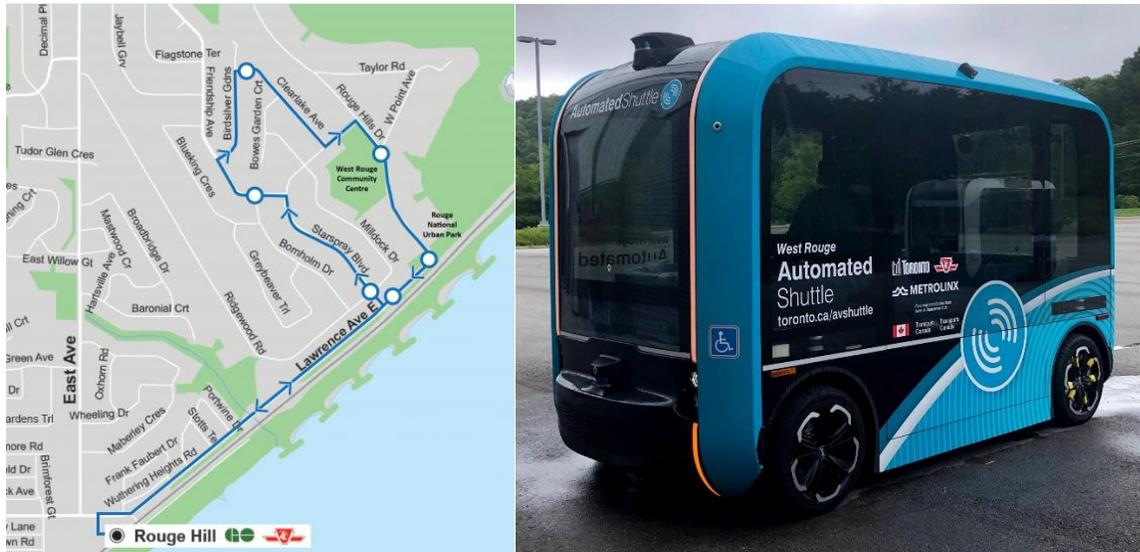
The Canadian Government has established several projects funded by the Program to Advance Connectivity and Automation in the Transportation System. One of the notable projects in the GGHA is the West Rouge Automated Shuttle Trial in the City of Toronto. It is a partnership between the City, the TTC and Metrolinx. The program is free shuttle services taking riders to and from the Rouge Hill GO station, West Rouge Neighborhood, Rouge Community Centre and Rouge National urban Park. The shuttle is self-driving with fixed stops; however, a human attendant will be on-board in case of emergency. During the weekday, the shuttle will operate with 30 minutes frequency from 6:00AM to 9:00AM and 3:30Pm to 6:30PM. During the weekend, the shuttle will also operate with 30 minutes frequency from 9:00AM to 11:00AM and

1:00PM to 3:00PM. The first shuttle was launched October 2021 and the project will be completed February 2022.

Figure G-10 illustrates the type of shuttle bus used and the route it will take.

Figure G-10: West Rouge’s Route and Automated Shuttle

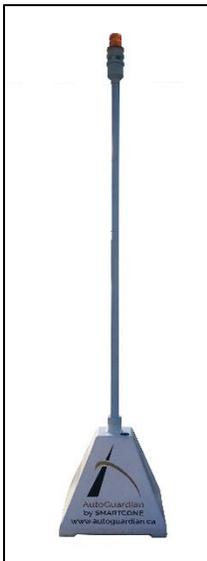
Source: <https://www.toronto.ca/services-payments/streets-parking-transportation/transportation-projects/automated-vehicles/automated-vehicles-pilot-projects/automated-shuttle-trial/>



The province continues to pursue the research into autonomous vehicle technologies. As a result, in 2017 the province invested in the Autonomous Vehicle Innovation Network (AVIN). This allows researchers to test driverless cars under different traffic scenarios and conditions. An additional project supported by the AVIN is the Whitby Autonomous Vehicle Electric (WAVE) shuttle pilot project for their DRT Route 300. Vehicle testing started in the summer 2021 and will be followed by public ridership later 2021. The shuttle will operate at 20 km/h and a trained human attendant will also be on board. The bus will operate between 8:30 AM and 3:30PM during the weekdays and 7:00AM and 7:00PM during the weekends. The off-peak times were chosen to minimize traffic impact. There will be approximately 70 pieces of advance technology equipment used for this pilot including Smart Torch (illustrated in Figure G-11). It will be installed along the route to help eliminate blind spots and provide real-time audio and visual alerts to surrounding road users to ensure safety.

Figure G-11: Smart Torch used in WAVE

Source: <https://connectwhitby.ca/ridetheWAVE>



The deployment of AV in the Town has the potential to drastically change travel behaviour. For example, if an automated vehicle is owned by a single family, it could be used for several individual trips to service everyone’s needs. However, if an automated vehicle is shared between several families, some of whom work in the same area or attend the same school, trips are shared between several users. The extent of the impact of autonomous vehicles on travel behaviour is currently being explored as there are many possibilities to consider.

Opportunities

- To be aware of the rise of AVs and CVs and adapt accordingly. It is recommended that the Town consider:
 - Permit testing and adoptions of AVs in transit, intercommunity transportation and goods movement.
 - Launching an open-data to make road and traffic information available to public
 - Repurposing unneeded transportation infrastructure to better prepare for AVs
 - Integrating AV ready infrastructure into asset management
 - Investing in educating the benefits of AVs and new mobility models
 - Evaluating the existing road and digital infrastructure (e.g., 5G networks) in consideration for and support of advanced sustainable mobility modes.
 - Developing an approach to prepare the Town’s transportation and digital infrastructure and system for the safe deployment of connected, automated and electric vehicle technology and increase access to new mobility options.

6.0 Smart Cities

There are many ways to define smart cities and the definition changes with time. Smart cities harness technology and data to build infrastructure, to help make decisions and enhance the quality of life for residents. Overall, it is to provide a better flow and connectivity within a city. It is

establishing a city that can evolve year by year, which prevents rebuilding. In contrary to the belief that a futuristic city is beyond the reach of residents and businesses; smart cities are about responding to and designing for daily fundamental processes.

Recognizing the potential benefits of smart cities, government officials, non-governmental organization and industries are dedicating resources to this field. In August 2019, FedDev Ontario had invested \$53.3 million in six Toronto-based organizations including Innovate Cities. This organization is a “*not-for-profit network of innovators working towards to creating inclusive, livable and sustainable cities*”². They provide innovators with data collected from commercial and residential developments and offer them a space to experiment. The funding is put forth to create a cloud-based platform to help with collaboration and education. The first platform is called CommunityHub where innovators can communicate to develop solutions to key urban issues. The second platform will be a series of programs educating customers, in the private and public sectors, on the emergence of smart cities. This is all done while protecting the privacy of the data collected by the citizens.

Within the GGHA, there are other examples of smart cities and are summarized in Table G-3.

Table G-3: Other examples of Smart Cities within the GGHA

Municipalities	Project	What has been Implemented
Toronto	Free Wi-Fi Pilot Project	25 residential apartment buildings in low-income neighborhoods are provided free internet access for a year.
	Chatbot	Uses artificial intelligence technology to answer questions about the City’s services.
	Automated water meters	Sends water usage data to the City and allows residents to check their water usage.
	Transportation Innovation Zones	Emerging transportation approaches and technologies will be tested in a real-world environment. Program will take place at the Exhibition Place. First official challenge will be in Fall 2021.
Stratford	City-wide Wi-Fi	Municipally-owned fiber broadband network and city-wide Wi-Fi.
University of Waterloo	5G Application	Partnership with Rogers Communications Testing 5G application in real-world setting such as smart city infrastructure monitoring and alerting system.

² Innovate Cities. ‘About Us’. *Innovate Cities*. <https://innovatecities.com/about-us/>. (Accessed 11 September 2021)

Municipalities	Project	What has been Implemented
Several municipalities	Open Data Portal	Including York Region, Toronto, Durham Region and many more. Free and open data-sharing portal providing access to geographical maps and other data related to the municipality

Opportunities

- Town to explore developing a Smart City guideline for future development. As well, be aware of any federal and provincial fundings and leverage available funding together with industry.

7.0 Challenges

As the GGHA continues to explore the best way to deploy MaaS and the emerging technologies; the associated challenges will need to be addressed. These challenges may include

- The lack of a consumer protection framework enacted or proposed in Canada, which would ensure performance standards that allow for safe and reliable service across the different travel modes.
- The need for data protection and security measures for users.
- Contractual arrangements to address data sharing between transport operators and other organizations.
- Ensuring a common platform, in order to efficiently execute any of the projects / programs.
- Requirements for access to smartphone or smart device. This may lead to social inequality as it difficult for older population or individuals with lower income.
- Additional funding may be required. Corporations may need to be on board to ensure financial stability.

The implementation of MaaS also requires the proper planning policy and framework to support and encourage these emerging technologies.

8.0 Conclusion

Mobility has become a vital role in everyone’s daily life and defines the way we work, live and play. The use of emerging technologies and viewing Mobility as a Service (MaaS) will transform Innisfil into a town where mobility options will be intentionally linked between the different transportation services. As a result, getting around Town will be more convenient, seamless and enjoyable. In addition, with strategic partnership the Town can be an innovative space to foster more entrepreneurial enterprises and businesses.