Thorold Transportation Master Plan

Background Report H:

Travel Demand Management and Emerging Technologies

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1 Introduction

This report discusses two factors that are influencing traditional travel patterns and characteristics. The first is travel demand management, a progressive approach that agencies use to help shape travel behaviour by encouraging more sustainable modes of travel. The second is the external forces of technological change that are rapidly changing how people and goods move through the transportation system in new and unpredictable ways.

This report presents recommendations for the City of Thorold in implementing travel demand management programming and managing the risks of technological change while remaining open to embracing positive impacts.

2 Travel Demand Management

2.1 What is Travel Demand Management?

Travel (or Transportation) Demand Management (TDM) is the use of policies, programs, services, and products to influence travel behaviour and improve the efficiency of the transportation network.

Targeted TDM programming aims to increase awareness of available travel options, educate residents on sustainable travel and remove common barriers that individuals face when considering travel by sustainable modes. TDM-supportive infrastructure such as bike lanes, multi-use trails, end-of-trip facilities, and carpool parking can build capacity for daily sustainable travel.

Shifting trips from the automobile to more sustainable modes such as walking, cycling, transit or carpooling supports the Transportation Master Plan's goals and objectives for a more balanced, sustainable multi-modal transportation network and the development of livable, healthy and safe communities. Additionally, the City of Thorold's Official Plan indicates its intention to "support transportation demand management."

2.2 What can TDM do for Thorold?

Travel Demand Management, in conjunction with other infrastructure and policies recommended in this TMP, can help the City meet its transportation objectives and directions. A well-planned suite of TDM policies can help:

- Encourage sustainable travel modes,

- Optimize use of the existing transportation system,

- Promote active modes to benefit the health and wellbeing of residents, and

- Implement the plan in a fiscally and sustainable manner.

2.3   Existing TDM Programs

The City of Thorold does not currently run any sort of TDM programming or outreach, however, three elementary schools in the city – Monsignor Clancy, Prince of Wales, and Richmond Street – participated in Niagara Region's Active School Travel program during the 2018-19 school year.

Varying approaches have been taken in neighbouring St. Catharines and Niagara Falls, where 53% of the working Thorold residents are employed. St. Catharines does not appear to have an active TDM program. Niagara Falls, on the other hand, outlined a 57-item TDM action plan in its most recent Transportation Master Plan (2011). It is unclear how far this has progressed at this time.

Niagara Region, meanwhile, participates in the Carpool Ontario ride matching program (a program of Commute Ontario – see following section), which provides residents a platform to seek people to carpool with. Moreover, the Region's Transportation Master Plan contains a recommendation to initiate a Travel Demand Management study and take on a leadership role with more TDM initiatives in collaboration with local municipalities.

Elsewhere, it is not common for cities of comparable size to Thorold to undertake TDM initiatives, however, Shelburne (pop. 8,126), Grey Highlands (pop. 9,804), and Orangeville (pop. 28,900) are listed as partners with Commute Ontario.

2.3.1   Commute Ontario

Commute Ontario is a platform designed to encourage commuters in Ontario to adopt healthy and sustainable transportation options. The program is funded by the Ontario Trillium Foundation and is free for municipalities, workplaces, and commuters (outside of the Greater Toronto and Hamilton area) to register until the grant expires in April 2021.

The following programs and services are offered by Commute Ontario:

- **Carpool Ontario:** Online ride-matching tool that helps would-be carpoolers find one another.

- **Active Switch:** Online program offering goal setting and tracking for active transportation and recreation activities aimed at motivating people to use more sustainable transportation modes.

- **Emergency Ride Home Program:** Program offering travel cost reimbursements to eligible commuters in case of unplanned or emergency events.

Additionally, the service offers a free, customizable web-page platform for municipalities and organizations, and provides the communications and marketing materials to help spread the word.

The City of Thorold is not currently a participant in Commute Ontario.

2.4   TDM Recommendations

Given the general commuting patterns of Thorold residents, a standalone TDM program will have limited impacts on influencing travel behaviour. In the shorter term, with 53% of employed residents working in either St. Catharines or Niagara Falls, a collaborative approach would make more sense and be more likely to have measurable impacts.

In the longer term, it is important to note the link between transportation and land use. Compact, higher-density, mixed-use growth allows residents and jobs to be closer to one another, resulting in a much higher likelihood of shorter commutes and in turn, more residents choosing sustainable travel modes.

The following actions are recommended for travel demand management.

Shorter Term:

- Partner with St. Catharines and Niagara Falls to collaborate on a multi-jurisdiction TDM plan.

- Work with Niagara Region to promote the existing Carpool Ontario service to residents of Thorold.

- Join Commute Ontario to take advantage of active transportation promotional programs and commuter ridesharing program.

- Accelerate the implementation of the cycling and pedestrian networks.

- Work with transit service providers to incentivize the use of transit as a commuter option.

Longer Term:

- Strengthen land use policies to encourage more compact, higher-density, mixed use communities.

3 Emerging Technologies

Technology has always influenced how people move and how cities develop. This continues to be the case today. As digital technology rapidly evolves it is having a substantial impact on urban transportation. Technology is making new forms of shared mobility possible and changing the way existing forms of shared mobility operate. The challenge for cities is to proactively manage new technology and shared mobility so that they have a positive impact on transportation trends and the city more broadly.

This memorandum describes emerging technology and its relationship with shared mobility, details the opportunities and risks for Thorold, and proposes two areas for further exploration.

3.1 Technology Overview

Below is an overview of emerging technologies that are most relevant to multimodal transportation planning.

- **Smartphone Applications and Related Software**: New programs are enabling users to access real-time transportation information (such as next bus arrival times) and mobility services (such as ridesharing or bike sharing). Software also enables mobility service providers to be able to provide their services efficiently. For example, new technology enables ridesharing providers to automatically assign drivers to trips and determine the route between destinations and intermediary pick-up/drop-off points.

- **Connected and Autonomous Vehicles (CAVs):** Connectivity refers to the ability of vehicles to communicate with other vehicles, traffic signals, smartphones, and more. This communication can aid safety and traffic management goals. Autonomy is the capability of sensing the immediate environment and navigating with little or no human input. The level of autonomy can vary with the most sophisticated being fully self-driving vehicles. More basic levels of autonomy can include semi-autonomous driver warning systems that intervene only to avoid collisions, vehicles with adaptive cruise control, parking assist, and lane-keeping assist.

- **Electric Vehicles (EVs):** Vehicles that operate entirely on electricity or, in the case of a hybrid vehicle, alternate between conventional fuel and electric power improve fuel economy and reduce emissions. EV technology can be combined with CAV technology.

3.2 Technology and Mobility

The technology itself is not the story; the new services and models enabled by technology and the resulting impacts on cities are what matters. The terms shared mobility, new mobility, and Mobility as a Service (MaaS) are used extensively in transportation planning to refer to the convergence of new

technology and transportation. This report uses definitions provided by Metrolinx in the 2041 Regional Transportation Plan (RTP), which are as follows:

- **Shared Mobility:** A type of new mobility that refers to a broad set of transportation services and business models that are shared among users, such as bike-sharing, car-sharing, micro-transit, ride-sourcing, and ridesharing.

- **New Mobility:** A term to describe the suite of emerging transportation services and that are enabled through the development and convergence of technologies (e.g., smartphones, real-time data, autonomous and connected vehicles) and business models (e.g., shared mobility and mobility as a service.

- **Mobility as a Service (MaaS):** A new mobility technology that describes the integration of various transport services including public transit, bike or car-sharing, taxis, ridesourcing and other forms of shared mobility that are bundled together and consumed on a subscription basis to meet the particular needs of individuals.

It is important to note that many of the services noted above predate the widespread use of the internet and smartphones. Bike sharing systems have been in widespread use since the mid-1990s and micro-transit (or flexible transit) has been in operation in the Greater Toronto and Hamilton Area in some form since the 1970s. However, new technology has changed the way that services are delivered and accessed, and new technology-enabled business models have empowered more private sector service provision.

3.3 Opportunities and Risks of Shared Mobility and Emerging Technology

Technological change, from the horse drawn carriage to the smartphone, always presents risks and opportunities for cities. The following section discusses potential risks and opportunities associated with technology-driven transportation changes with a focus on ridesharing, CAVs, and bike share.

3.3.1 Risks

The major risk today is that new technology will actively detract from goals and objectives centred on encouraging sustainable mobility and reducing private car trips, while simultaneously bringing benefits to individual users. Many risks of new mobility involve ridesharing platforms operated by Transportation Network Companies (TNCs). For example, ridesharing services can enable relatively inexpensive and convenient car trips that may otherwise have been made by a sustainable mode or not made at all, contributing to increased traffic congestion and greenhouse gas (GHG) emissions, while potentially taking riders away from public transit.

Similarly, connected and autonomous vehicles, while having the ability to use road space more efficiently by having the ability to travel closer together, may also make driving easier, encouraging more people to take car trips, with similar

consequences noted for widespread TNC use. For CAVs, a related phenomenon could be the emergence of "ghost vehicles". That is, empty vehicles circulating rather than parking, or empty vehicles making return trips after dropping off their passengers. The latter is exacerbated by a model that promotes private ownership of CAVs and could in effect double the number of trips demanded.

There are also significant equity risks presented by these mobility developments. While some individual users may benefit, a major challenge with new technology-enabled mobility is that not all residents may be able to access benefits offered by the technology. For example, residents with low-incomes or disabilities are not likely to be able to access privately-run technology-enabled ridesharing services, detracting from equity and inclusion objectives. Vehicles are not typically equipped for wheelchairs and the requirement to own a smartphone and possess a credit card means that vulnerable residents cannot benefit from these services.[1] Other shared mobility services, such as bike share and car share can also suffer from similar barriers to access.

3.3.2   Opportunities

Although there are many risks for cities posed by new technology and new mobility in general there are also many opportunities. For example, TNCs have the ability to reduce private car ownership by providing individuals who generally rely on sustainable modes for short trips an option to occasionally travel to a destination that is farther away and not served by high quality transit. Ridesharing platforms can also extend the reach of transit service by providing first/last mile connections to/from communities that do not have transit-supportive density. Car sharing services can also offer similar benefits of reducing the need for car ownership by providing access to cars for occasional use.

In addition, to reducing reliance on private car trips and potentially extending the reach of conventional transit service, shared mobility services can themselves provide access to active transportation. Cities around the globe have embraced bike sharing systems to increase access to bikes and encourage the use of more sustainable modes. Some cities are also embracing the rise of shared e-scooter services that enable users to access electric scooters via their smartphones. Although the evidence is mixed on whether bike share services reduce car trips, reduce transit trips, or even replace trips that would have been made by a privately owned bike, services that encourage active travel are a positive feature of the shared mobility landscape.

Providing conventional transit may also be directly impacted by new technology. Farther into the future, connected and autonomous vehicles could alter the cost of providing both conventional and flexible transit service, making it more efficient. A large cost of providing transit service today is the cost of the driver and reducing the need for drivers would save money. However, apart from

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[1] Local government can subsidize rides and require that service providers take telephone bookings and accept cash payments.

limited autonomous shuttle services, the widespread use of fully autonomous surface transit vehicles is far off. Even when automation becomes more widespread, it remains to be seen if transit agencies would be willing to operate vehicles with no operator on board.[2]

Although autonomous vehicles could have monumental impacts on the transportation system, the specific impacts are somewhat unknown. The best course of action in the short-term is for Thorold to stay informed of developments. Additionally, while electric vehicles could reduce GHG emissions, they will not by themselves change transportation behaviour.

Two other potential opportunities were identified for Thorold in the shorter term: exploring the feasibility of providing demand responsive transit to low density communities and exploring the feasibility of introducing bike share in partnership with St. Catharines and Brock University. These are discussed in further detail below.

Partnerships between Transit Agencies and Rideshare Providers

Many transportation innovations enabled by new technology are blurring the line between public and private service provision. Government has an important leadership role to play in articulating a clear vision for the future and working towards ensuring that technological innovation enhances rather than detracts from that vision. As noted in the Metrolinx New Mobility Background Paper, private companies are often able to move very quickly, which can prove challenging for governments.[3]

In Thorold, collaboration with Niagara Region and St. Catharines is essential. Niagara Region regulates taxis and transportation network companies and the Region and City of St. Catharines both provide transit service in Thorold. In 2018, Niagara Region updated its Vehicle for Hire By-Law to include Transportation Network Companies. However, licencing ridesharing platforms and drivers does not by itself encourage positive city building outcomes. Governments must do more.

Many jurisdictions in North America have engaged with ridesharing platforms in an effort to meet transit-related objectives. Partnerships with ridesharing platforms and taxi services present opportunities to increase access to transit for those living in communities that do not have transit supportive density.

Recent research published by the Transportation Research Board identified five target markets that are served by partnerships with ridesharing platforms based on twenty case studies in the United States.[4] The common service markets include:

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[2] There are automated rail systems today that still have an operator on board, including Montreal's Metro and Ottawa's O-Train.

[3] Metrolinx New Mobility Background Paper (July 2016) prepared by WSP.

[4] Transportation Research Board (2019). Partnerships Between Transit Agencies and Transportation Network Companies. http://www.trb.org/Main/Blurbs/179005.aspx (Accessed September 27, 2019).

- **Connecting to Transit:** Many transit agencies partner with TNCs to address first and last mile needs by providing connections to transit stations or transit corridors in areas with limited pedestrian and cycling connectivity. The TNC-provided services often replace or supplement low-performing fixed-route services.

- **Serving Lower-Density Neighbourhoods:** Many transit agencies partner with TNCs to provide point-to-point service in low density neighbourhoods that cannot be efficiently served with fixed-route transit. These services can replace low-productivity, low-ridership routes and/or provide new service to areas that previously had no transit service.

- **Serving Early-Morning and Late-Night Travel:** Several transit agencies partner with TNCs to provide demand responsive service outside of regular transit service hours. This recognizes that regular service spans do not adequately serve the needs of certain user groups including service workers.

- **Serving Occasional Trip Needs:** This type of partnership works in conjunction with other transportation demand management programs by providing individuals who take transit to work a guaranteed ride home under certain circumstances, such as having to pick-up a sick child from school in the middle of the day when transit service levels may be lower.

- **Providing Specialized Transit:** Some transit agencies partner with TNCs to provide improved specialized transit. The research notes that because of low vehicle utilization and ridership, specialized transit is often the most expensive to operate. However, many TNCs are not equipped to reliably provide specialized transit service.

The research also identified three common partnership designs including:

- **Subsidized trips:** Transit agencies directly subsidize trips covered by the partnerships. Subsidies take a variety of forms including users paying a fixed fare and the agency covering the balance, agencies covering a fixed portion of the fare and users paying the balance, or agencies paying the full fare of the TNC trip.

- **Marketing:** Transit agencies market TNC services as a supplement to transit, but do not subsidize trips.

- **Software:** Transit agencies use TNC software to offer on-demand transit service, but operate the service using its own fleet. This is a new area of collaboration and was not observed in any of the partnerships studied in the research.

In Thorold, based on public and stakeholder engagement, and a review of transit operations, serving low density communities and providing longer service hours were identified as important needs. However, partnering with a TNC is not

necessarily the best approach to solving these issues as will be discussed in Section 3.4.

Bike Share in Small Communities

Bike sharing systems offer short term bike rentals that are typically intended for one-way trips. Bike sharing systems have increased in popularity in recent years, with many North American cities, large and small, introducing the service, sometimes in collaboration with a private sector partner.

Most current bike share systems fall into two categories: docked and dockless systems. Docked systems store bikes in docking stations and users access the bikes through automated kiosks. Bikes must be rented from and returned to a docking station. Dockless systems operate with GPS tracked bikes that have locks built into the frame. Depending on the system, users typically access the bikes through a combination of a mobile application and an on-bike computer. Bikes can be picked-up and left anywhere within a designated area. Dockless systems are usually easier to implement and have lower capital costs than docked systems. However, docked systems provide consistent and safe parking locations for the fleet and can be easily identified from the street.

3.4   A Path Forward for Thorold

Two immediate planning considerations for Thorold are the need to provide non-auto mobility options to lower density communities and the need to increase the use of sustainable modes. As such, this section will outline considerations for expanding transit service and investigating a bike share program.

3.4.1   Expanding Transit Service to Rural and Low Density Communities

While partnerships may seem promising, Thorold and its municipal partners should be cautious. Flexible transit services should be used to complement fixed-route transit. As neighbourhoods grow, fixed-route transit services should be introduced because it can serve more people more efficiently.

Providing point-to-point service to/from lower density neighbourhoods and serving early morning and late night travel with subsidized trips would be the target markets. However, more detailed study is needed to determine if a flexible transit model is the best approach or even a feasible approach to meet Thorold's needs.

Partnering with a TNC is only one way to provide flexible transit to low density communities; transit agencies can and have engaged in the practice themselves. Municipalities have also partnered with dedicated private service providers with dedicated drivers to serve occasional trips to/from rural and low density areas. Municipalities must ensure service quality and equitable access, including the ability to take phone reservations and the ability of a service provider to provide accessible vehicles.

Regardless of the model, transit governance is an important question for Thorold. Thorold will have to work with St. Catharines and/or the Region in developing any flexible transit service.

3.4.2   Investigating Bike Share Feasibility

Another possible opportunity for Thorold is bike share. Bike share provides a low-cost active transportation option for short trips and many small cities in North America operate successful bike share systems. Thorold already has a high percentage of short trips, which could positively contribute to the success of bike share in the City. In Thorold's case, however, a partnership with St. Catharines and/or Brock University would be essential. The two cities and the university together have several factors that could contribute to the success of a program.

Brock University itself is a feature of the area that could support a bike share program. Many universities in North America operate successful bike share programs in partnership with local towns. Students have lower rates of car ownership and many live on or close to campus, making cycling an attractive option for many trips. Brock already supports a car share service for longer distance trips and trips for larger loads.

On the Thorold side of the border, the planned expansion of the cycling network through the TMP, geographically concentrated destinations in Thorold proper, and Thorold's proximity to the Welland canal trail are all things that could work in favour of a bike share system.

There are also some challenges to operating bike share in the Thorold area. First, while Brock University and central Thorold are reasonably close, many other destinations, such as downtown St. Catharines and the Pen Centre are farther away, which could limit the service area. Second and closely related is the topography of the area. The Niagara Escarpment is located in St. Catharines just north of Brock, making cycling an unattractive option for trips heading south originating in St. Catharines towards the campus. Also related to geography, Thorold has several significant barriers in the City, including Highways 406 and 58, which can add significant travel distance to trips between destinations that are otherwise close together. Finally, there could be issues with bike distribution. If Brock students are the primary users of the system, it is likely that bikes could end up being overly concentrated at the university during the day, requiring redistribution to other locations in the City to make bikes available to other users.[5]

Despite these issues, Thorold should investigate the feasibility of a bike share pilot program, starting with a best practice review of other programs in small cities with universities.

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[5] Because of the Region's topography, it is also possible that trips between Brock University and St. Catharine's would be one-way (downhill) trips.