

The Changing Transportation System User

City of Guelph Transportation Master Plan
Background Paper Series



Guelph Transportation Master Plan

Moving Guelph Forward

Guelph is growing and how we move around our city is changing. As a result, we are exploring transportation options to make our city move better in every way. Through the Transportation Master Plan (TMP) update, we will review all of the ways we move: walking, cycling, riding transit, driving, trucking, and using trains. Our goal is to ensure that we offer diverse travel options, have appropriate transportation capacity, and maintain a high quality of life for both existing and future residents and workers.

The updated TMP will look at transportation planning in Guelph beyond 2031. The main objectives of this update are:

- To ensure that the new plan builds upon current policies, including the Official Plan and other master plans that have been approved since 2005;
- To recommend new policies and guidelines that reflect the vision for our community and balance mobility, environment, and efficiency, while prioritizing safety and access for all travellers; and
- To explore how new, evolving technologies and travel services will shape the future of transportation in Guelph.

This paper is part of a series of background papers intended to communicate information, key trends, and concepts. These will form the foundation of and set the strategic direction for our updated TMP. The papers are intended to support conversations in the community and within City Hall about how we plan for the future of mobility.

The series includes the following papers, which are all available at guelph.ca/tmp:

- **Transportation Technology and New Mobility Options**
- **The Changing Transportation System User**
- **Transportation and Building 21st Century Cities**
- **Road Safety**
- **Network Planning**
- **Transportation System Resilience**

Each of the background papers opens with an introductory primer on the topic before it examines key global trends, considers how these topics and trends are currently addressed in Guelph, and concludes with an analysis of the implications of that topic on planning Guelph's future transportation system.

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The Changing Transportation System User: A Primer

The inherent challenge in any transportation planning exercise is predicting the future mobility needs of a community that is constantly evolving. The needs, values, and desires of a community all play a direct role in determining where people need to go and how they want to get there. But in our complex societies, these needs, values, and desires change over time. This means the profiles of the people who use transportation - the transportation system users - are always changing.

This paper discusses the way that transportation usage is likely to change in the future, starting with a primer on the factors that influence travel behaviour. The paper also provides an overview of some major trends and changes in how people move around the world as well as in Guelph. It concludes with some key takeaways about what to consider when planning a transportation system for the future.

Factors Influencing Travel Behaviour

Transportation professionals use the terms “travel demands” or “transportation demands” to discuss the transportation needs of a given community. Although there is no way to predict how people will travel in the future with 100 per cent certainty, understanding transportation demands of today and how they differ from demands of the past is helpful to making informed hypotheses about the future. Forecasted future demands are fundamental to planning for tomorrow.







Making hypotheses about how and why people will travel is challenging. Travellers in a transportation system are able to make different choices and shift their trips in terms of time, mode, and route. They also choose whether a trip is made at all.

A number of key demographic indicators such as age, income, gender, education, employment, or household size all impact individual travel behaviour. Societal shifts such as distribution of where people live (i.e. in urban, suburban, or rural areas) as well as the rate of growth also impact overall travel patterns and demands.

Though there are many factors that affect transportation demand, this paper will specifically focus on three emerging societal trends that are likely to have the most significant impacts on transportation demands in the next several years:

- Changing demographics in urban communities;
- Declining popularity of personal car ownership; and
- Growing concerns about environmental impacts of transportation.

Table 1: Factors that affect transport demand¹

 Demographics	 Commercial Activity	 Transport Options	 Land Use	 Demand Management	 Prices
<ul style="list-style-type: none"> • Number of people (residents, employees and visitors) • Employment rate • Wealth/incomes • Age • Lifecycles • Preferences 	<ul style="list-style-type: none"> • Number of jobs • Business activity • Freight • Transport • Tourist activity 	<ul style="list-style-type: none"> • Walking • Cycling • Micromobility • Public transit • Ride-hailing • Ride-sharing • Car-sharing • Automobile • Taxi services • Telework • Delivery services 	<ul style="list-style-type: none"> • Density • Mix • Walkability • Connectivity • Transit service • Proximity • Roadway design 	<ul style="list-style-type: none"> • Road use prioritization • Pricing reforms • Parking management • User information • Promotion campaigns 	<ul style="list-style-type: none"> • Fuel prices and taxes • Vehicle taxes and fees • Road tolls • Parking fees • Vehicle insurance • Transit fares

¹ Adapted from Litman, T., 2019, *Understanding Transport Demands and Elasticities: How Prices and Other Factors Affect Travel Behavior*, Victoria Transport Policy Institute. <http://www.vtpi.org/elasticities.pdf>

Transportation Demand – The Example of Peak Times

One challenge of a growing community is mitigating impacts of additional travellers on the transportation network. Most people commute around the same time on weekday mornings and afternoons so the worst of traffic congestion typically occurs during those times. As a result, transportation analysis has traditionally focused almost exclusively on traffic conditions during the peak hours of travel for a typical weekday – typically one hour in the morning between 7AM and 9AM and one hour in the afternoon between 4PM and 6PM. The intent behind this was to ensure that the road network has sufficient capacity to handle the most significant vehicle demands during the busiest periods.

This conventional approach considers capacity of the transportation system like a series of pipes, where a fixed capacity must be large enough to meet the fixed demands. In other words, if the pipes are not big enough to accommodate demand, the system will fail. But the pipe metaphor only extends so far. In reality, the peak hour is not a closed system. Transportation professionals can calculate a volume-to-capacity (v/c) ratio of greater than 1.0, which implies that transportation demands will exceed the capacity of the roads. But in practice this is physically impossible – there can never be a number of vehicles on a street that exceeds the capacity of the lanes. And users of the transportation system are not inanimate like water. Users are able to adapt and make different decisions in response to real-time conditions and the options available to them.

For one, people can choose to make their trips outside of the peak hour. This would result in a “flattening” of the peaks on a travel demand profile, as shown in **Figure 1**. Flattening will lead to longer peak periods of busy activity but it will also require a lower system capacity.

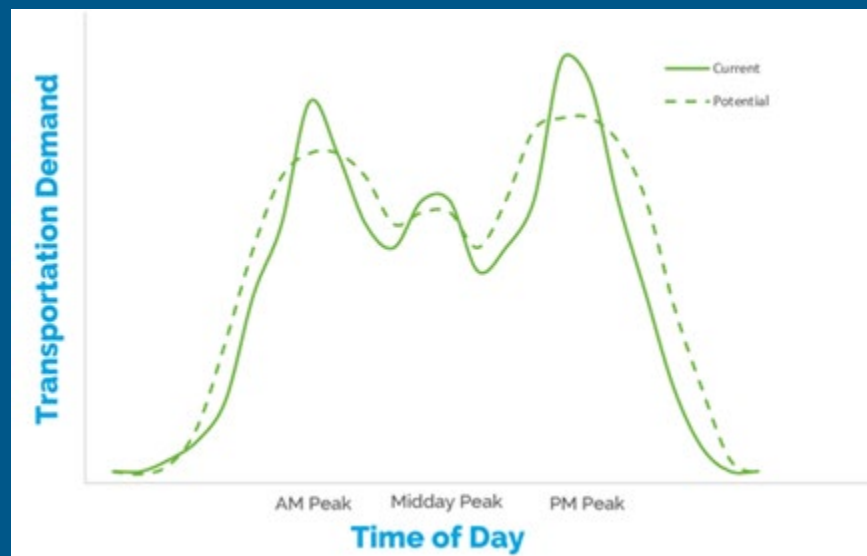


Figure 1: A visual representation of flattening a generic travel demand profile's curves.

People can also decide to travel by modes other than car to avoid traffic congestion or to get more exercise by choosing an active mode. They can also change their routes to avoid the worst of congestion. And ultimately, they can decide not to travel at all by opting to work from home or to order delivery, for example.



Transportation System User Trends

This section presents the patterns that are being observed around the world with respect to the three major societal trends identified in the introduction. It also discusses the possible impacts that these trends may have on future transportation.

Changing Demographics

In 2018, the United Nations (UN) reported that 55 per cent of the world's population lived in urban areas. The UN expects this proportion to increase to 68 per cent by 2050.² As more people migrate into urban centres around the world, travel demands in cities will increase. This represents an opportunity: if cities plan, design, and construct infrastructure to make sustainable transportation more attractive and convenient, people who move to cities might never require a car. Instead, they might become accustomed to travelling by sustainable modes from the start. But if cities remain car-oriented as they grow, people who move to cities will just contribute to further traffic congestion.

While the global population is growing, particularly in cities, the UN also reports that in many communities, the population is aging. In a recent report, the UN reported that:

In 2018, for the first time in history, persons aged 65 years or over worldwide outnumbered children under age five. Projections indicate that by 2050 there will be more than twice as many persons above 65 as children under five. By 2050, the number of persons aged 65 years or over globally will also surpass the number of adolescents and youth aged 15 to 24 years.³

An aging population presents new consideration for transportation planning. Mobility that's designed for older people will require accessibility to become a fundamental pillar of our transportation networks. Cities will also need to ensure a variety of convenient and comfortable transportation options for those who may no longer be able to drive.

² United Nations Department of Economic and Social Affairs, 2018, "68% of the world population projected to live in urban areas by 2050, says UN." <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

³ United Nations Department of Economic and Social Affairs, 2019, *World Population prospects 2019: Highlights*. https://population.un.org/wpp/Publications/Files/WPP2019_Highlights.pdf

The societal values of communities are also affected by demographics. Currently, Millennials and Generation Z make up over half of the world’s population. Most of Generation Z have yet to reach adulthood, but Millennials, who represent about 30 per cent of the world’s population, are the biggest cohort of adults today.⁴ This gives their perspectives a bigger platform and more power to influence decisions. And when it comes to perspectives, studies of attributes associated with different generations suggest that when compared to generations that preceded them, Millennials tend to:

- Be more socially and environmentally conscientious;
- Be more comfortable with societal change and technological disruption;
- Have increased levels of technological literacy; and
- Be more supportive of a sharing economy.

These demographic trends can have important implications on what communities want from their transportation systems. The attributes associated with Millennials suggest a desire to move away from car-oriented transportation and towards sustainable transportation or new forms of mobility.

⁴ World Economic Forum, 2018 “Generation Z will outnumber Millennials by 2019.” <https://www.weforum.org/agenda/2018/08/generation-z-will-outnumber-millennials-by-2019/>

⁵ Pew Research Center, 2019, “Defining generations: Where Millennials end and Generation Z begins.” <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/>

A Primer on Generations

Thresholds and cut-offs for where one generation ends and another begins are often blurred because there is no one accepted definition for different generations. **Table 2** provides a general guideline for some commonly accepted birth years and ages of members of differential generational cohorts.

Table 2: Overview of Generational Cohorts⁵

Generational Cohort	Approximate Birth Year Cut-offs	Approximate Age Ranges as of 2020
Silent Generation	1928-1945	75 - 92
Baby Boomers	1946-1964	56 - 74
Generation X	1965-1980	40 - 55
Generation Y or Millennials	1981-1996	24 - 39
Generation Z	1997-2012	8-23

** Note that the exact cut-off years for each generation may vary slightly in different sources.*



Declining Popularity of Cars

Car ownership, once a rite of passage, is not as popular as it once was. Around the world, young people are choosing not to own cars. A 2013 study on the behavior of Millennials found that only 15 per cent of those surveyed find car ownership to be “extremely important.” Furthermore, 25 per cent of respondents said that car ownership is “important, but not a big priority” while an additional 25 per cent would “purchase one if [they] really needed it, but [are] indifferent otherwise.” And about 30 per cent of respondents had no intention “to purchase one in the future” at all. ⁶

In Canada, the Canadian Automobile Association (CAA) reported that car ownership for young people is significantly down when compared to their parents at the same age.⁷ These findings are echoed in a separate 2019 study, which found that in Canada, the smallest proportion of car owners is found among people aged 18-34, with about 68 per cent of people in this age group owning cars.⁸

The reduction in car ownership coincides with the advent of the smartphone and changes in attitudes about urban living. These technologies and attitudes have given rise to new mobility innovations and made the sharing economy more popular.

⁶ Goldman Sachs, “Millennials: Coming of Age.” <https://www.goldmansachs.com/insights/archive/millennials/>

⁷ Canadian Automobile Association (CMA), 2018, “Why Young People are not Buying Cars.” <https://broker.caainsurance.com/Ontario/Insights/Articles/why-young-people-are-not-buying-cars.aspx>

⁸ Driving, 2019, “Canadians love their cars but they hardly ever use ‘em.” <https://driving.ca/auto-news/news/canadians-love-their-cars-but-they-hardly-ever-use-em>



The emergence of car-, bike, and scooter-sharing services offered an affordable and convenient alternative to individual car ownership, especially for residents of large urban centres or dense urban cores. Shared transportation helps eliminate the high costs associated with vehicle ownership and parking-related fees by providing a reasonable alternative with no long-term commitments.

Other emerging forms of mobility also affect opinions about car ownership. A 2019 study found that in the United States (US,) 46 per cent of Millennials and Generation Z respondents questioned the need to own a car given the rise of ride-hailing. This is compared to 20 per cent of Generation X respondents and only 17 per cent of Baby Boomers and older generation respondents.⁹

There is a possibility that younger generations are simply delaying car ownership instead of foregoing it altogether. Over the last few decades, the cost of higher education and home ownership have skyrocketed beyond inflation while wages have not increased at the same rates. Additionally, the 2008 global recession occurred when many Millennials were just entering the job market, affecting their entry into the workforce. The aforementioned study that found that the smallest proportion of car owners in Canada are people aged 18-34 also noted that this same age cohort is the "most interested in owning a car in

the future." The study also found that only 11 per cent of Canadian car owners planned to get rid of their car in the next 10 years. However, 41 per cent of respondents wished they had better transportation alternatives so they would not need a car and 39 per cent stated that they would prefer to not own a car at some point in their lives.¹⁰

But car ownership isn't the only indicator of shifting attitudes. A study by the University of Michigan and the Automobile Association of America (AAA) found a downward trend in licensing across the US. In 1983, 87 per cent of 19-year olds had their driver's license. However, this number dropped to 69 per cent in 2010. The study also noted that "all of the effects... found for the U.S. were there for Canada."¹¹

Although many members of younger generations might simply be choosing to get their licenses later in life when car ownership becomes a more likely possibility, some might be choosing to never get them at all. And people without a license have no need for a personal car. If these trends continue and if new mobility options are made available to more people, it is possible that dependence on cars will decrease. If less people own cars, the popularity of travel by sustainable modes is likely to grow.

9 Deloitte, 2019, *2019 Global Automotive Consumer Study*. <https://www2.deloitte.com/us/en/pages/manufacturing/articles/automotive-trends-millennials-consumer-study.html>

10 Driving, 2019, "Canadians love their cars but they hardly ever use 'em." <https://driving.ca/auto-news/news/canadians-love-their-cars-but-they-hardly-ever-use-em>

11 CBC News, 2013, "Teens say they're 'too busy' to get driver's licenses." <https://www.cbc.ca/news/canada/windsor/teens-say-they-re-too-busy-to-get-driver-s-licences-1.1381485>



Growing Importance of Environmental Sustainability

In recent decades, there has been an increase in the awareness of the devastating effects that climate change is likely to have on our world. In 2018, a landmark report by the UN Intergovernmental Panel on Climate Change (IPCC) was prepared by 91 authors and review editors from 40 different countries. The report, which included over 6,000 scientific references, stated that the global community had 12 years to make dramatic and unprecedented changes to limit the impacts of climate change to 1.5 degrees Celsius from pre-industrial levels.¹²

More and more communities around the world are being directly affected by climate change and the impacts are difficult to ignore. National, provincial, state, and municipal governments around the world have come to increasingly see climate change as a crisis. In Canada, a growing number of municipalities have declared formal local climate emergencies. In 2019, the House of Commons passed a motion to declare a national climate emergency.

¹² Intergovernmental Panel on Climate Change (IPCC), 2018, *Global Warming of 1.5°C*. <https://www.ipcc.ch/sr15/>

¹³ UN News Centre, 2016, "UN Environment report: Put people, not cars first in transport." <https://www.un.org/sustainabledevelopment/blog/2016/10/un-environment-report-put-people-not-cars-first-in-transport-systems/>

¹⁴ UN Environment, 2016, *Share the Road Global outlook on walking and cycling*. <https://www.unenvironment.org/sw/node/17898>

The global transportation sector is acknowledged to be a major contributor of greenhouse gas (GHG) emissions. In 2016, the Executive Director of the United Nations Environment Program (UNEP) said that "designing transport systems around cars puts more vehicles on the road, increasing both greenhouse gas emissions and deadly air pollution."¹³ A report by the UN Environment Programme (UNEP) also found that motorized transportation is responsible for nearly a quarter of global carbon dioxide (CO₂) emissions. The same report stated that transportation is the fastest growing sector in GHG emissions and is on track to be responsible for a third of all global GHG emissions by 2050.¹⁴

Environmental awareness has led more people to have a better understanding of the negative environmental impacts of their choices, such as relying on cars. As a result, many people are choosing to drive less frequently and are making informed shopping decisions that consider their products' supply chains.

Transportation System Users in Guelph Today

The previous section provided a global perspective on three key societal trends. This section looks at those same trends from a local perspective and identifies how transportation system users are changing in Guelph.

Demographics

Today, Guelph's community is relatively young. In 2016, the median age in Guelph was 38.3 years. And though Guelph is aging (in 2011, Guelph's median age was 37.7), the biggest age group in Guelph continues to be people aged 20-24, who make up about 8 per cent of the population. For context, people aged 20-24 make up 6 per cent of Canada's population. Overall, 36 per cent of Guelph's population is between the ages of 20 and 45 while only 20 per cent of people are 60 or older.^{15,16} However, this could change over time.

Like in most Canadian cities, individuals and families in Guelph often become car-reliant due to their lifestyles and work realities. With trip destinations often scattered across the city, it can be difficult for a parent to drop their child off at school, go to work, and complete all of their weekly errands without a vehicle. But over 50 per cent of households in Guelph do not have children.^{17,18}

This reality presents an opportunity: some people living in households without children may have more flexibility to their lifestyles and could live comfortably without a car given other convenient options for travel.

Guelph has a large proportion of shift-based industrial employment, rendering some local travel demand less flexible. While office-workers may have opportunities to pick their working hours or work from home, those working shifts at a warehouse or manufacturing facility are much less likely to have the same flexibility.

Popularity of Cars

Table 3 shows trends in the number of vehicles per household and the average household size in Guelph and Wellington County over time. As shown in the table, Guelph's car ownership per household has remained stable over the last two decades. During that same time, the average household size has also remained about the same, suggesting that car ownership per person has not changed dramatically.

The trend is different in Wellington County. Over the last 20 years of data, the number of vehicles per household in the County has grown despite the household size remaining roughly the same. This suggests that car ownership per person has gone up.

Although there is no easily accessible data on licensing trends in Guelph, it is likely that rates of licensure in our city show similar patterns to what is observed across the country since mobility options in Guelph are similar to what's available in other Canadian cities.

¹⁵ Statistics Canada, 2016 Census of Population

¹⁶ City of Guelph, 2018, "Guelph as a Village of 100 People." <https://guelph.ca/wp-content/uploads/Community-Plan-Guelph-as-a-Village-of-100-People.pdf>

¹⁷ Statistics Canada, 2016 Census of Population

¹⁸ City of Guelph, 2018, "Guelph as a Village of 100 People." <https://guelph.ca/wp-content/uploads/Community-Plan-Guelph-as-a-Village-of-100-People.pdf>

Table 3: City of Guelph and Wellington County Vehicle Ownership Statistics

Survey	City of Guelph		Wellington County*	
	Vehicles/ Household	Persons/ Household	Vehicles/ Household	Persons/ Household
2016 TTS	1.5	2.5	2.2	2.7
2011 TTS	1.6	2.6	2.0	2.7
2006 TTS	1.5	2.6	1.9	2.7
1996 TTS	1.4	2.6	1.8	2.9

*Includes Centre Wellington, Erin, Guelph/Eramosa, and Puslinch

Perspectives on Environmental Sustainability

Strong environmental awareness is important to Guelph’s residents. Environmental stewardship is one of the key values of our 2018 [Guelph Community Plan](#) and protection of the environment is one of the Plan’s key focus themes. Our actions align with these values. In 2016, Guelph residents used less water per person per day (167 L) when compared to the average for the province of Ontario (200 L) and the average for all of Canada (250 L). Guelph also decreased its annual GHG emissions per capita by 35 per cent between 2006 and 2016.¹⁹

Guelph’s [Community Energy Initiative](#) (CEI), established in 2007, is the City’s plan to use less energy and reduce GHG emissions. In 2018, CEI updated its target for Guelph to produce net zero carbon by 2050. As part of the CEI, Guelph’s City Council has also committed all of the City’s corporate operations to being powered by 100 per cent renewable energy by 2050.

In May 2019, Guelph City Council voted to “acknowledge a climate crisis.” Though it is not a formal declaration of a climate emergency, the acknowledgement underlines Guelph’s understanding of the severity of climate change and commits the City to mitigation efforts.

19 Data Management Group, University of Toronto, *2016 Transportation Tomorrow Survey (TTS)*.

20 City of Guelph, 2018, “Guelph as a Village of 100 People.” <https://guelph.ca/wp-content/uploads/Community-Plan-Guelph-as-a-Village-of-100-People.pdf>



Moving Guelph Forward: The Changing Transportation User

Communities are always evolving. As a result, the needs, desires, and values for transportation in communities are also constantly changing. Although we can't know exactly what the future will look like, there are several ongoing social trends that hint at how we may wish to travel in the next several years. Learning more about these trends and incorporating them into our plans will help us be ready for the future.

Based on the trends and existing conditions outlined in this paper, the following is a list of key takeaways about the changing transportation user:

- The demographics of our communities are shifting. More people are moving to urban centres at the same time as the general population is aging. Responding to these shifts will require cities to make their transportation systems

more multimodal, more supportive of sustainable transportation, and more accessible to people of all ages and abilities.

- The number of adults who belong to Millennial and Generation Z cohorts is growing. This makes them a more powerful force in decision-making. The values and preferences of the members of these two generations may influence a shift away from car-dependency in cities.
- While car ownership remains very popular, some trends hint at a communal desire for a transportation system that doesn't require everyone to own a car. Our choices about which modes to prioritize and support with infrastructure can respond to this desire or discourage it.



What do you think?

What will future transportation users expect mobility to look like in Guelph? What should we do to plan for a transportation system that serves the future needs and desires of our community? How do we ensure that imminent future growth doesn't lead to more transportation-related congestion and pollution in our city?

Let us know! Visit guelph.ca/tmp to learn more about the transportation topics and trends informing the development of our Transportation Master Plan and to find out how you can have your say in Moving Guelph Forward.

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