Executive Summary

What is Moving Forward?
Moving Forward is the 2018 Transportation Master Plan for the Region of Waterloo. It outlines plans for providing road, transit, walking, and cycling infrastructure, and policies needed to encourage sustainable travel and economic growth, to support Waterloo Region as “a community where people matter and ideas grow.” Moving Forward also provides guidelines for the Region to identify and prioritize transportation projects and a process to evaluate them over the coming 25 years. This report is Phase 1 of Moving Forward and its purpose is to identify the trends, needs, and opportunities for transportation in Waterloo Region.

Moving Forward is a plan reflecting public and stakeholder consultation
A great amount of consultation is included in the Moving Forward update, including:

• Public Consultation Centres to gather input on all aspects of the project. The first round was held in September 2016.

• Stakeholder Panel: Representatives from the area municipalities, private agencies, business owners, developers, and transportation service providers.

• General Public Panel: A focus group of volunteers selected to represent a general cross-section of members of the public.

• Public attitude surveys using the Engage Region of Waterloo website.

• Public opinion survey: A statistically valid telephone survey collected public opinions related to transportation from 1,500 residents.

• Ad-hoc meetings with specific transportation-related groups.

How has the 2010 RTMP been working so far?
The 2010 Region of Waterloo Transportation Master Plan (the 2010 RTMP) provided a set of policies and recommended actions to develop the Region’s
transportation infrastructure over a 20-year time horizon (2011–2031). The four goals of the 2010 RTMP were:

**Optimize the Transportation System**
Make the most of what exists. Preserve and maximize the use of facilities and services, avoid or defer the need for new infrastructure that does not support the other goals.

**Promote Transportation Choice**
Provide and maintain a transportation system that offers competitive choices for moving people and goods in an integrated and seamless manner while minimizing single occupancy vehicle trips.

**Foster a Strong Economy**
Provide a transportation system that supports the retention of existing businesses and attraction of sustainable economic activity.

**Support Sustainable Development**
Provide and maintain a transportation system that supports sustainable growth in both urban and rural areas and reduces transportation contributions to climate change.

The 2010 RTMP set out an overarching goal that by 2031, 15% of all PM peak hour trips made within the Region of Waterloo would be made using transit, and 12% of trips would be made either by cycling or walking. Attaining these mode share targets would require a reduction of 15% of all trips made by car, with 11% of total trips shifting to transit, and the other 4% shifting to active transportation. These targets are an aggressive goal for the Region considering its size and geography.

In implementing the 2010 RTMP, the Region has realized a number of achievements, as follows:

- The Region continues to invest in public transit: Since 2010, the Region has continued to grow transit service and has implemented a number of changes to Grand River Transit (GRT).
- The Region is supporting active transportation: The Region completed its Active Transportation Master Plan in 2014 and has constructed a significant amount of cycling facilities.
• Roadway capital improvements have kept pace with the plan: About $400 million has been invested in expansions of Regional road and Provincial highways since 2004, including a number of bridges, road widenings, and construction of 19 modern roundabouts.

• Transportation Demand Management programs are making a difference: More than 8% of Waterloo Region’s workforce are within TravelWise, the local Transportation Management Association, and 5% of those employees have shifted from driving alone to more sustainable modes of travel.

• The Region has kept pace with its Transportation Master Plan: Of 17 Action Items identified in the 2010 RTMP, most are complete or under way.

How is the Region Changing?

Local trends are influencing how Waterloo Region continues to change, as follows:

• **Waterloo Region continues to grow and urbanize**: Waterloo Region has maintained steady growth over the past 15 years, with growth predominantly in the Cities of Cambridge, Kitchener and Waterloo, where 88% of residents live. Intensification is proceeding and greenfield lands are continuing to be developed.

• **Waterloo Region is younger than the rest of the Province**: Waterloo Region has a slightly higher proportion of youth, and a slightly lower proportion of seniors, than the average for Ontario and Canada.

• **The service sector continues to grow as the goods sector declines**: While Waterloo Region has maintained a relatively steady employment rate, there is a continuing shift in employment away from manufacturing and towards the professional and service sectors.

• **The post-secondary student population is growing faster than the rest of Waterloo Region**: The proportion of Waterloo Region’s population that is post-secondary students has increased since 2006.

• **Waterloo Region’s townships are growing at a faster rate than the cities**: The population of the townships has grown by 21% since 2006, compared to only 11% in the three cities. This has occurred largely because of greenfield development in the towns.
Transportation trends

A review of the 2011 Transportation Tomorrow Survey (TTS) reveals a number of trends in the evolution of transportation:

- **Inter-regional travel is growing rapidly**: Waterloo Region residents make about 1.1 million trips per weekday, of which about 5% (56,600) are made to destinations outside of Waterloo Region. The City of Guelph accounts for a significant share of these trips, and trips to Peel Region are also larger than trips to Toronto. The difficulty of serving these trips with inter-regional transit may make highway improvements an inevitable requirement.

- **Internal travel within Waterloo Region follow a typical urban demand profile**: Car travel in Waterloo Region still exhibits defined morning and afternoon peaks. This means that road congestion is not significant enough to encourage users to consider travelling at other times. Active transportation demonstrates similar peaks, but is concentrated more on school start and end times. Transit trips are more consistent throughout the day, and the peaks occur slightly earlier than for car trips, possibly because of longer trip times for transit.

- **Commuting patterns at the Area Municipalities are changing**: Work trips to Waterloo and the townships have increased, but have decreased to Kitchener and Cambridge: The increase to the City of Waterloo may reflect growth of the service industry and knowledge-based economy, with a continuing decline in manufacturing in Cambridge and Kitchener.

- **Commuters are still highly car-dependent**: Auto driver remains by far the dominant mode choice for commuters, at more than 80% of trips. About 8% of commuters are auto passengers, with transit at 4% and active modes at 5%. Relative to 2006, auto driver and cycling have increased slightly, auto passenger and walking have decreased slightly, and transit use has remained unchanged.

- **Discretionary trips are car-dependent**: About 97% of discretionary trips are made by car, either as a driver or a passenger.

- **Transit ridership growth was strong but peaked in 2013**: Annual ridership grew from about 14 million in 2006 to 22 million in 2013, but has since declined to about 20 million in 2015. This reflects local changes but also mirrors larger trends seen across North America.
• **Students remain major users of transit and active transportation:** About 35% of all students walk or cycle to school. Transit use by post-secondary students has grown to 35%, while for primary and secondary school students it was about 13% by GRT and 28% by school bus in the 2011 TTS. Similar to other municipalities in the Greater Toronto-Hamilton Area, walking to school has declined in recent years.

• **Residents continue to drive even for short trips:** For trips less than two kilometres, there has been an increase in car and transit trips, and a decrease in walking. For trips two to five kilometres in length, car use has declined slightly, while transit use has increased. However, these short trips are still done by car drivers more than 60% of the time.

• **New private transportation services have emerged:** Transport Network Companies (TNCs), such as Uber and RideCo, have emerged in the past five years and are disrupting the established taxi industry.

**Strategic Outlook for Moving Forward**

A number of local and global considerations will affect how the Region will continue to change in the future.

**Local outlook**

Local considerations affecting transportation include:

• **Waterloo Region is expected to continue its strong growth:** The population and employment of Waterloo Region is expected to grow significantly. The Provincial Growth Plan forecasts a 2031 population of 742,000, and employment is forecast to grow to 366,000. This is a level of growth that will have implications on Waterloo Region’s transportation network.

• **New transit service will support sustainable travel and development within Waterloo Region:** The ION light rail transit (LRT) is expected to being service in 2018. The Region and the Cities of Kitchener and Waterloo have been supporting intensification along the ION LRT corridor, and GRT services have been realigned to improve service connectivity.

• **The extension of GO Rail to Kitchener has introduced a new means for inter-regional travel:** GO Train service was extended to Kitchener in 2011 and provides a new connection to downtown Toronto.
• **Road and highway projects are still needed**: Even with the aggressive sustainable transportation targets in the 2010 RTMP, the Region has undertaken a number of roadway Environmental Assessments that include road widening, new roads and operational improvements.

**Global outlook and best practices**

Wider changes are happening at the national and global level that nonetheless affect Waterloo Region, including:

• **Climate change is a serious agenda item and transportation plays a significant role**: Waterloo Region’s transportation sector accounted for 40% of all greenhouse gas emissions. The Province of Ontario has adopted ambitious goals for reductions in greenhouse gas emissions, including a 37% percent reduction by 2030, and the transportation sector will have to change significantly for this goal to be realized.

• **Public health and city planning are inter-connected**: Research and advocacy continue to raise awareness of the many connections between transportation systems, land use planning and public health. The dominance of transportation by private auto contributes to obesity, which raises the rates of public health issues such as cardiovascular disease and diabetes. In addition, exhaust from cars and trucks contributes to poor air quality, which worsens diseases such as asthma, chronic bronchitis and emphysema.

• **Transportation systems need to cater to an aging population**: Demographic trends forecast that 20% of Waterloo Region’s population will be over age 65 by 2031. Senior citizens have increased rates of physical and cognitive impairments that may limit their ability to drive, increasing the need to plan for an age-friendly transportation system.

• **Social equity is a pressing issue**: This refers to the ability of a transportation system to provide equitable opportunity for all residents, regardless of socioeconomic class. The major dimensions of transportation equity are opportunity, affordability and accessibility, and improving transportation equity means considering those with financial, age or physical limitations.

• **New mobility options are emerging**: New business models and technologies are taking shape outside of traditional government planning, and include:
o The continuing development of Transportation Network Companies
o Dynamic services enabled by mobile communications
o Car and bike sharing programs
o Mobility as a Service, a model for marketing multimodal services

• **Travel by single mode is being replaced by travel by multiple modes**: There is a growing demographic using multiple modes of travel on a regular basis.

• **Connected and Autonomous Vehicles (CAVs) are on the horizon**: Rapid progress is being made on vehicles that connect to other aspects of their environment to improve safety and operating efficiency. Additionally, autonomous vehicles that remove the need for human drivers are showing continuous rapid improvements.

• **Combining new emerging mobility options with CAV technology has the potential to redefine the transportation paradigm**: Combining the emerging mobility services with CAVs may significantly disrupt current patterns of auto ownership, land use planning and many established industries. However, the extent of uncertainty around these new technologies means that it is by no means certain what transportation paradigm will arise, and there may be significant pitfalls to certain scenarios.

• **Road safety is of paramount concern**: A movement attracting recent attention is Vision Zero, an international initiative based on the idea that no one should be killed or seriously injured within the road transport system.

• **Mobility pricing is gaining traction**: Many implementations internationally, and recent initiatives in Ontario (the rejected plan to implement tolls on the Gardner Expressway and the Ministry of Transportation pilot of High-Occupancy Toll lanes on Provincial highways), suggest that Moving Forward should identify areas where mobility pricing may present opportunities.

• **“Big Data” and predictive analytics**: The rise of data collection through smartphones and the sharing of habits by users has created a huge amount of transportation data. While there is great potential to use the data to understand transportation patterns, challenges include the sheer quantity of data, the range of data owners, and ongoing privacy concerns.
Key needs and opportunities for the Region of Waterloo

The local and global trends suggest five key needs and opportunities as the Region continues to plan transportation:

1. Make active transportation a safe and practical mode choice.
2. Improve connections to rapid transit for all modes.
3. Take advantage of Waterloo Region’s strengths as an innovation hub.
4. Mitigate environmental and health impacts of transportation.
5. Support economic growth by supporting connections to destinations within and outside Waterloo Region.

Action Areas

Phase One of Moving Forward has identified several action areas for consideration. There are a number of specific strategies in each action area.

Public Transit

This action area represents investing in public transit to grow modal share and support the Moving Forward objectives. Strategies include:

- Leveraging the investment in ION LRT
- More funding for transit
- New technology for transit operations
- Creating a transit information system
- Easier walking and biking to transit stops
- Public promotion of transit
- Improving transit operations/efficiency
- Making all transit stops accessible

Regional Roads

Almost every trip in Waterloo Region is made on roads or highways. Improvements to Regional roads must consider all users, and strategies include:

- Intelligent Transportation Systems
- High-Occupancy Vehicle (HOV) lanes
- Targeted capacity improvements
- Creation of a goods movement strategy
- Complete streets
- Updating the Corridor Design Guidelines to support an active streetscape
Taking Advantage of Technology
A wide range of technologies have been developed in recent years. The Region can play a role in easing the adoption of mobility technology, initiating pilot projects, and gaining an understanding of how residents perceive technologies to inform policy development. Strategies include:

- Ride sharing
- Car share
- Electric vehicles
- Autonomous vehicles

Influencing Travel Behaviour
This action area includes Travel Demand Management (TDM) and other strategies. The Region’s TDM plan is already making a difference in travel demand. Strategies to expand this area include:

- Priority parking
- Tools to connect rides
- Carpool lots
- Cash in lieu of parking
- Electric vehicle charging at carpool lots

Walking and Cycling
Making walking and cycling more comfortable and convenient will enable people of all ages to reach school, work, shopping and other destinations. Strategies to improve walking and cycling include:

- Expanding the bike network
- Vision Zero
- Reducing barriers
- Measuring benefits for all road users
- Developing design guidelines for cycling facilities and sidewalks
- Improving the active transportation realm
- Public promotion of cycling and walking
- Supporting active transportation during all seasons
- Supporting cycling tourism
Transit-Supportive Land Use
This action area represents designing new and growing neighbourhoods across Waterloo Region to support all transportation options. Potential strategies include:

- Complete communities
- Minimizing parking
- Building new transit corridors
- Urban design around transit stations/stops

Travel to and from Waterloo Region
The public has identified improving travel to and from the Region as an important priority. Some potential strategies include:

- Highway and road improvements, primarily to the GTHA
- Improved VIA Rail service/high speed rail
- Improving speed and service on the Kitchener GO Line
- Extending GO Train service on the Milton GO Line to Cambridge
- Connecting the airport to rapid transit

Next Steps
The needs and opportunities identified in this Phase One report will be updated through consultation with stakeholders and the public. This will lay the groundwork for Phase Two, which will analyze travel demands from now to 2041 to determine the effectiveness of current plans and identify new needs. A future “recommended network” will be developed. Following this work, Phase Three will establish and update policies, timing and an implementation plan for those recommendations.
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1. What is Moving Forward?

Introduction

Moving Forward is the 2018 Transportation Master Plan for the Region of Waterloo. It outlines plans for providing road, transit, walking, and cycling infrastructure, and policies needed to encourage sustainable travel and economic growth, to support Waterloo Region as “a community where people matter and ideas grow.” Moving Forward also provides guidelines for the Region to identify and prioritize transportation projects and a process to evaluate them over the coming 25 years.

Transportation master plans have traditionally provided municipalities with a list of infrastructure projects and policies to solve transportation issues and to support expected population growth. However, Moving Forward also seeks to

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1 Region of Waterloo Vision.
be part of a larger integrated planning process where investment and policies are used as a tool to help attain Regional, community-level and even local-area level planning objectives.

As this report kicks off the Moving Forward update, there are a number of significant projects and plans taking shape in the Region:

- The ION light rail transit is expected to enter service in 2018. It will be a transformational investment for the Central Transit Corridor and for the Region.
- Several environmental assessments (EAs) are underway to increase road capacity, improve safety, and provide new transit service and active transportation facilities.
- Congestion and increasing demand for interregional travel have led the Ontario Ministry of Transportation (MTO) to expand the highway network.
- GO Transit has increased rail and bus service to Waterloo Region with plans underway for new track and station improvements.
- The Cities of Kitchener and Waterloo have new or updated transportation plans and policies to support local objectives and growth, and Cambridge is currently preparing a plan.
- The Region of Waterloo International Airport Master Plan was recently approved. The master plan sets the strategic direction and growth strategy for optimizing the commercial value of the airport over the next 20 years.

Moving Forward seeks to answer a significant question: with the imminent arrival of these new travel options and facilities, how can the Region take the greatest advantage to promote sustainable mode choice and improve mobility and accessibility for all residents and businesses?

This report is Phase 1 of Moving Forward and its purpose is to identify the trends, needs, and opportunities for transportation in the Region. Phase 2 will develop and evaluate several alternative strategies, and Phase 3 of Moving Forward will develop short, medium, and long term plans and policies to support the overall transportation objectives.
Time for an update – Introducing the new Moving Forward

A Transportation Master Plan (TMP) provides a planning ‘snapshot’ of the future based on the best information available when it is written. The Region has a practice to update its TMP approximately every five years, in line with what is recommended by Transport Canada. In less than five years, economic changes or travel trends may not be apparent, and greater than five years, municipalities may find themselves planning and building projects without an overall guiding strategy.

This introductory section identifies efforts that have taken place to date, including public consultation approaches and feedback received from the public around this study.

Section 2 of this report reviews the vision and goals developed for the 2010 Regional Transportation Master Plan (hereinafter referred to as the 2010 RTMP), and the status of its recommended policies, projects, and initiatives.

Section 3 of this report provides an overview of the demographic and travel trends in the Region. These include population growth rates, growth areas, and demographic trends. Travel trends include commuting behavior, modal
trends, interregional travel, student travel, and active transportation. Current transportation needs and plans are also reviewed.

Section 4 provides an outlook for Moving Forward, including new macro-economic trends, policy plans, and technological trends that can influence the Region, and how to incorporate these into the Moving Forward update.

Section 5 provides the preliminary actions and strategies for Moving Forward to be brought forward and evaluated in Phases 2 and 3.

Moving Forward is a plan reflecting public and stakeholder consultation
A great amount of consultation is included in the Moving Forward update. These include:

- **Public Consultation Centres (PCCs):** A first round of PCCs were held in September 2016 to introduce the project to the public and consult with them on the goals, objectives, and scope of Moving Forward. Future PCCs will be used to gather input on all aspects of Moving Forward.

- **Stakeholder Panel:** A wide range of stakeholders have been assembled that includes representatives from the area municipalities, private agencies, business owners, developers, and transportation service providers.

- **General Public Panel:** A focus group of volunteers selected to represent a general cross-section of members of the public. The General Public Panel allows for an opportunity to have in-depth discussions and receive feedback on issues related to Moving Forward throughout the project.

- **Public attitude surveys:** The Engage Region of Waterloo website is used to engage the public on various aspects related to transportation through an online platform.

- **Public Opinion Survey:** A statistically valid telephone survey of 1,500 residents was launched between December 2015 and January 2016 to collect public opinions related to transportation within Waterloo Region. This sample was randomly selected through telephone listings to represent a valid cross-section of Waterloo Region’s population.

- **Ad hoc meetings** with specific transportation-related groups to solicit input and feedback to Moving Forward.
Moving Forward intends to consolidate and reflect the trends, analysis and information gathered through these consultation approaches.

The Public Opinion Survey

The Public Opinion Survey was built on similar studies completed in 1997 and 2007 to enable comparisons among local municipalities across time. Here are some key findings:

- The survey found that respondents were satisfied with walking facilities, somewhat satisfied with bike lanes and public transit in Waterloo Region, and dissatisfied with regional road congestion, transit to the Greater Toronto Area (GTA), and highways to the GTA.

- People perceive others as more likely to adopt sustainable travel behaviors rather than themselves.

- Initiatives that ranked high, which if implemented could result in a shift from driving alone to using sustainable transportation alternatives, include:
  - Providing better support for school children to not be driven to school
  - Winter maintenance of walking/cycling trails
  - Providing additional bike lanes and sidewalks.

- Initiatives that ranked low, which if implemented may not influence a shift from driving alone to using sustainable transportation alternatives, include:
  - Providing better transit stop amenities
  - More frequent transit service
- Employer support for sustainable travel alternatives
- Women tended to be more receptive to new transportation initiatives than men.
- Residents of the City of Waterloo, perhaps due to its large student base, emphasized bicycle initiatives, while Township residents highlighted extra bus stops & transit service.
- Social marketing techniques hold promise as a means to influence travel behavior.
The First Round of Public Consultation Centres

The first round of PCCs also provided an opportunity for public input and an opportunity for Region staff to communicate the purpose and intent of Moving Forward. Public input from the PCCs included a range of commentary. Overall there was broad support for the Goals and Objectives developed in the current policy, the 2010 Regional Transportation Master Plan (RTMP). At the PCC, participants were encouraged to prioritize the Goals and Objectives identified in the 2010 RTMP, which included:

- Support sustainable development,
- Promote transportation choice,
- Foster a strong economy, and
- Optimize the transportation system.

The results of this exercise are summarized in Exhibit 1-2.

Through comments received at the PCC and online, the public expressed strong interest in developing travel choices that provide alternatives to the private car, efforts towards filling in gaps in the bike and the recreational trail network, and added or extended transit service. The word cloud in Exhibit 1-3 illustrates the keywords that were gathered from comment sheets. The size of each word is representative of the frequency in which it was found in the public’s comments.
The Transportation Context

The Region of Waterloo plans and maintains a transportation system that serves both a regional and a local function. The framework of Moving Forward, as developed in prior versions of the Transportation Master Plan, is to build on and support both the regional and the local transportation context.

At a larger scale, Waterloo Region is situated in an important corner of the Quebec City – Windsor Corridor, shown in Exhibit 1-4, which is the most populated and heavily industrialized region of Canada. Within the corridor, Waterloo Region is located adjacent to the GTA, and along core railway and
highway routes providing market access between the United States and Canada. This location has allowed a mix of development and industry ranging from agricultural to manufacturing and logistics, which were historical drivers of its transportation network. The arterial road network managed by the Region of Waterloo provided connectivity between municipalities and to Provincial highways, connecting Waterloo Region to the rest of Ontario. Steady growth over the past 50 years has been supported by complementary improvements to the transportation network, which has allowed growth to continue and new industry to locate in Waterloo Region.

Exhibit 1-4: The Quebec City – Windsor Corridor

Waterloo Region is situated in an important corner of the Quebec City – Windsor Corridor, which is the most populated and heavily industrialized region of Canada.

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2 Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Quebec-Windsor_Corridor.svg
As manufacturing has changed and tapered off since the 1990s, Waterloo Region has remained economically competitive through continued industrial development, albeit at a slower pace than previously, plus a transition into a knowledge and service economy. Waterloo Region has a solid reputation as an education and technology centre. The University of Waterloo is internationally known and it is a frequent destination within Waterloo Region, along with other major post-secondary institutions. With growth in post-secondary enrollment, and a growing knowledge- and technology-based employment sector to retain graduates, travel to post-secondary facilities and supporting employment areas, including downtown Kitchener and Waterloo, are becoming increasingly important factors for the transportation network.

While the above context points towards a need for high-capacity roads and transit service, the Region also serves a local transportation role within rural and urban communities. Regional roads serve a wide array of users including non-motorized vehicles, such as horse-drawn carriages and bicycles. The Region’s transportation facilities also include sidewalks and regional recreational trail networks to support walking, cycling and access to transit. In an effort to improve and promote cycling habits, the Region continues to implement bicycle lanes on urban arterial roads in Kitchener, Waterloo, and Cambridge, and paved shoulders along rural roads in the four Townships. The constrained nature of certain roads, which would otherwise be good candidates for bicycle lanes or improved pedestrian facilities, has made it challenging to implement some routes for active transportation as identified in the Active Transportation Master Plan (ATMP).

Connecting with the ATMP for roads under the jurisdiction of the Area Municipalities can also be a challenge to coordinate. However, it is important to note that both the Region and the three cities have active transportation plans that consider the peer jurisdictions. Some of Waterloo Region’s townships are also developing active transportation strategies that will need to consider connections to the broader Regional and adjacent cycling networks.

The Region assumed control of municipal transit services in 2000 and created Grand River Transit (GRT), which has since grown to a full-fledged metropolitan transit service. GRT provides a needed accessibility function, and with the opening of the ION LRT, it will be considered an attractive mobility option for key markets such as trips to educational facilities and
urban core areas. In anticipation of the ION, the three cities have already started to support infill development and densification along the Central Transit Corridor.

Looking forward, Waterloo Region is expected to continue to grow, both via infill developments (densification) and new suburban development, as directed by the Growth Plan for the Greater Golden Horseshoe. This will contribute to a continued need for comprehensive transportation network planning and implementation supporting all modes and residents, and points to the need for sustainable planning initiatives needed to curb growth in personal car use.

Finally, current changes in the technology landscape present an unknown. Autonomous vehicles, ride-sharing, on-demand transit, the online economy and telecommuting may, in some cases, point to more demand for long-distance car trips, and in some cases for less demand. The Region must develop a resilient transportation plan that examines the potential of these technologies, and provide strategies to ensure that the Region invests efficiently and continues to develop as a community where people want to live, work and invest.
2. How has the 2010 Regional Transportation Master Plan been working so far?

The 2010 Region of Waterloo Transportation Master Plan (hereinafter referred to as the 2010 RTMP) provided a set of policies and recommended actions to develop Regional transportation over a 20-year time horizon (2011-2031). This section provides an overview of the 2010 RTMP and a review of its objectives, recommendations, and the implementation status.

Ambitions of the 2010 RTMP

Moving Forward 2031 identified aggressive sustainable transportation goals

The 2010 RTMP outlined the Region’s transportation goals and set out how its transportation system will grow and change to the year 2031. While no vision statement was crafted specifically for the 2010 RTMP, it was noted that
“the vision for transportation in the Region of Waterloo in 2031 is based on Council’s vision for the Region as a whole”, which was:

“Waterloo Region will be an inclusive, thriving and sustainable community committed to maintaining harmony between rural and urban areas and fostering opportunities for current and future generations.”

The four goals of the 2010 RTMP were:

**Optimize the Transportation System**
Make the most of what exists. Preserve and maximize the use of facilities and services, avoid or defer the need for new infrastructure that does not support the other goals.

**Promote Transportation Choice**
Provide and maintain a transportation system that offers competitive choices for moving people and goods in an integrated and seamless manner while minimizing single occupancy vehicle trips.

**Foster a Strong Economy**
Provide a transportation system that supports the retention of existing businesses and attraction of sustainable economic activity

**Support Sustainable Development**
Provide and maintain a transportation system that supports sustainable growth in both urban and rural areas and reduces transportation contributions to climate change.

To support its key goals, the 2010 RTMP strove to:

- Create a transportation network centered on transit, with a rapid transit system connecting Waterloo, Kitchener and Cambridge;
- Create additional cycling lanes and pedestrian-friendly routes;
- Create an expanded bus network, including more express bus service to feed rapid transit stations and improved service to busy residential and commercial centres beyond the Central Transit Corridor;
- Improve roads to ensure movement of goods, relieve traffic problems and support transit; and,
• Create policies to encourage transit ridership, cycling and walking, manage congestion and promote vibrant urban places.

The 2010 RTMP set out an overarching goal that by 2031, 15% of all PM peak hour trips made within the Region of Waterloo would be made using transit, and 12% of trips would be made either by cycling or walking, as shown in Exhibit 2-1. Prior to developing the targets, a “road/car-oriented” alternative was developed that would maintain the reliance on private automobiles as the dominant form of transportation primarily through widening roads. Screening of this alternative determined that it would not achieve most of the 2010 RTMP goals, and that social and environmental impacts would be significant.

A “transit-oriented plan with strategic road improvements” alternative was also developed, which resulted in the mode share targets discussed above. This alternative was found to achieve the goals, and was ultimately carried forward.

Attaining these targets would require a reduction of 15% of all trips made by car, with 11% of total trips shifting to transit, and the other 4% shifting to active transportation. With the forecasted increase in travel demand in the year 2031, these targets would require doubling the number of walk trips and a six-fold increase in transit and cycling trips. These targets are an aggressive goal for the Region considering its size and geography.

Changes in travel mode share from 2006 to 2011 in the Transportation Tomorrow Survey (TTS) are summarized in Section 3.

Exhibit 2-1: Region of Waterloo Mode Share Targets, source: 2010 RTMP

<table>
<thead>
<tr>
<th>Mode</th>
<th>2006 PM Peak Hour</th>
<th>2031 PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Person Trips</td>
<td>Share</td>
</tr>
<tr>
<td>Auto Driver</td>
<td>85,038</td>
<td>69.6%</td>
</tr>
<tr>
<td>Auto Passenger</td>
<td>19,098</td>
<td>15.6%</td>
</tr>
<tr>
<td>Local Transit</td>
<td>4,651</td>
<td>3.8%</td>
</tr>
<tr>
<td>School Bus</td>
<td>3,204</td>
<td>2.7%</td>
</tr>
<tr>
<td>Cycle</td>
<td>841</td>
<td>0.7%</td>
</tr>
<tr>
<td>Walk</td>
<td>8,719</td>
<td>7.1%</td>
</tr>
<tr>
<td>Other</td>
<td>514</td>
<td>0.4%</td>
</tr>
<tr>
<td>Total</td>
<td>122,154</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

1: Across entire Region, some corridors will have higher targets
Achievements of the 2010 RTMP

The Region continues to invest in transit

Since 2010 the Region has continued to grow transit service and has implemented a number of changes to Grand River Transit:

- Annual ridership in 2015 was about 20,300,000, an increase of about 2,200,000 over 2010.
- Bus service as measured by revenue-kilometres of service has increased from 11,332,000 in 2010 to 14,352,000 in 2015, an increase of 27%.
- The Region has approved and almost completed construction of the ION LRT.
- The EasyGo electronic traveller information system, which helps users plan trips on Grand River Transit, has increased to over 5 million uses annually, compared to less than 1 million in 2008.
- Expanded real-time passenger information displays have been added at iXpress stations.
- The bus fleet has grown to 254 buses in 2015, exceeding the 2016 target of 233 buses.
- All Grand River Transit buses are wheelchair accessible and have bike racks.
- Investments in improving passenger terminals continue to be made, including The Boardwalk (Waterloo), Cambridge Centre Mall (Cambridge) and the Ainslie St Transit Terminal.
- The cost recovery ratio (the percentage of the operating budget supported by user fares) increased from 37.6 in 2010 to 40.6 in 2013, and the net operating cost per rider has declined from $2.11 to $1.97.
- Current ridership on iXpress and Route 7 between Conestoga Mall and Fairview Park Mall is 20,000 rides per day, which is approaching the 2017 target ridership of 25,000 on the ION light rail.
- The UPass program expanded from 10,000 to 40,000 students from 2005–2014.

The above are significant achievements, and the Region is a leader among Canadian jurisdictions in regards to transit investment. However, while
construction of the LRT continues, it is noted that transit ridership peaked at 22,000,000 in 2013 and has since declined, a trend seen across Canada. Reasons for the decline may include global trends, such as changes in economic trends, a decrease in the cost of gasoline, as well as local trends such as changes in employment from goods-production to knowledge based, introduction of new private transportation services (e.g., Uber), increases in active transportation facilities, as well as construction along the ION light rail corridor. Further discussion on modal trends is provided in Section 3.2 of this report.

The Region is supporting active transportation

The Region has implemented several active transportation improvements since the 2010 RTMP, and continues to invest:

- The Region’s Active Transportation Master Plan was completed in 2014. It identified locations for an additional 418km of new facilities in the Regional network (of which half are rural bike lanes), 122 km of new trails along Regional roads, and 124 km of new sidewalks along Regional roads. The plan identified a winter maintenance network, as well as increased funding targets for active transportation projects through the transportation capital projects budget. At this time, there are no mechanisms to fund active transportation projects outside of this capital projects budget.
- From 2006–2014, bike lanes have nearly doubled to almost 300 km.
- Most major road projects include active transportation facilities as a core element, including new roads, road widenings and road reconstruction projects.

These investments are positive indications that the Region is keeping with its commitment to support active transportation.

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Exhibit 2-2: Bike Lanes on Townline Road in Cambridge (source: Google)

Roadway capital improvements have kept pace with the plan
A number of significant road projects have been undertaken at the Region to increase capacity or to improve operations and safety. The following provides an overview of changes to the road network:

• Since 2004, about $400 million has been invested in expanding the Regional road and Provincial highways in Waterloo Region;

• Bridges and widenings include: Fairway Road bridge, Hespeler Road railway bridge, Maple Grove Road widening and rail grade separation, Ira Needles Boulevard, Weber Street widening and CNR/ETR railway bridge;

• Modern roundabouts are increasingly being used on Regional roads (19 added since 2004);

• A number of major road environmental assessments (EAs) have been initiated or completed since 2010, including the River Road Extension, East Boundary Road, South Boundary Road, and Fischer-Hallman Road; and,

• 66 pedestrian countdown timers were added at signalized intersections (2009–2014), and since 2012, 17 accessible traffic signals were added and 42 are being retrofit.
These indicators show that the Region is investing in roads to support development and population growth. All Regional roadway EAs consider transit and active transportation and the majority of recent projects provide improvements to the transit or active transportation realm.

**Transportation Demand Management (TDM) programs are making a difference**

One of the recommendations of the 2010 RTMP was to enhance existing transportation demand management programs and develop new initiatives.

- TravelWise, the local Transportation Management Association, has been promoted to more than 8% of Waterloo Region’s workforce, and in one year 5% of TMA-participating employees surveyed have shifted from driving alone to more sustainable modes of travel;
- A new park and ride and carpooling facility of 125 spaces was built at the GO Bus station at Sportsworld Drive;
- Four residential individualized marketing campaigns since 2009 in various neighbourhoods have achieved a reduction of 8.8 million vehicle kilometers travelled and 2,200 tons of GHG;\(^4\)
- The Region has established a Transportation Demand Management team of two full time staff and integrated it with GRT.

These measures have provided a foundation for TDM that is comparable or superior to most peer municipalities. The Region is ahead of the industry and it is a positive reflection of the Region’s goals.

**The Region has kept pace with its Transportation Master Plan**

The 17 Action Items identified in the 2010 RTMP are for the most part completed or underway. Exhibit 2-3 provides a detailed summary of the Action Items status. A further list of detailed policies and strategies in the TMP are also summarized for reference.

Together this overview indicates that the Region is successfully implementing its 2010 RTMP. It is actively involved in a number of initiatives ranging from transit investment to travel demand management to active transportation and road improvements. These initiatives and the upcoming rollout of the ION LRT provide an exciting foundation for the Moving Forward update.

\(^4\) UrbanTrans (2011), Advancing Transport Demand Management in Waterloo Region, prepared for TravelWise.
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Proposed Timing</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Update the Cycling Master Plan and develop a Pedestrian Master Plan to create an Active Transportation Plan</td>
<td>2010–2011</td>
<td>ATMP Completed in 2014. Active transportation facilities have been implemented in conjunction with associated Transportation Capital Plan projects. Six (6) of twelve (12) “special study areas” have been studied or implemented.</td>
</tr>
<tr>
<td>2</td>
<td>Strengthen the Transportation Impact Study requirements for developments to support active transportation modes and TDM plans</td>
<td>2012</td>
<td>Completed in 2013.</td>
</tr>
<tr>
<td>4</td>
<td>Develop and implement smart card technology for transit</td>
<td>2013</td>
<td>Easy Go Fare Card available in 2018.</td>
</tr>
<tr>
<td>5</td>
<td>Prepare 3-year TravelWise Action Plan to identify priority initiatives</td>
<td>2011–2012</td>
<td>3-year TDM plan completed in 2011. The TDM Program Plan 2017–2021, which includes recommendations for the TravelWise TMA and is aligned with the GRT Business Plan timeline, was completed in 2017.</td>
</tr>
<tr>
<td>6</td>
<td>Complete a Commuter/Park-N-Ride/Kiss-N-Ride parking lot feasibility study</td>
<td>2013</td>
<td>Not yet commissioned.</td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
<td>Proposed Timing</td>
<td>Status</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Establish a Parking Coordination Committee with the Area Municipalities and develop a Terms of Reference to review areas of common interest and initiatives required to support transit</td>
<td>2010–2012</td>
<td>Established in 2011, however no longer active as parking is being addressed by the local municipalities.</td>
</tr>
<tr>
<td>9</td>
<td>Prepare a detailed Goods Movement Study</td>
<td>2013</td>
<td>Not yet commissioned.</td>
</tr>
<tr>
<td>10</td>
<td>Work with Province to undertake a strategic transportation study for the area west of GTA</td>
<td>2011–2012</td>
<td>Data collection has been completed and a terms of reference is being drafted.</td>
</tr>
<tr>
<td>11</td>
<td>Work with the Province, Metrolinx, GO Transit and VIA Rail to pursue improved inter-regional transit connections to the Region</td>
<td>2010</td>
<td>In progress. Continued discussions and advocacy with Metrolinx and the federal government.</td>
</tr>
<tr>
<td>12</td>
<td>Initiate the Environmental Assessment for improved connection to Highway 401</td>
<td>2011</td>
<td>Studied and deferred. This will be revisited in Moving Forward. Improved connections to Highway 401 will require the approval of MTO.</td>
</tr>
<tr>
<td>13</td>
<td>Prepare annual reports regarding the Region’s progress towards achieving RTMP goals</td>
<td>Annual</td>
<td>Update was provided in 2014.</td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
<td>Proposed Timing</td>
<td>Status</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>14</td>
<td>Investigate and prepare a report on financing opportunities/strategies to fund infrastructure improvements</td>
<td>2010–2011</td>
<td>To fund the Region’s capital costs and operating and maintenance costs of LRT and conventional transit, a 1.5% dedicated property tax rate increase in the urban transit service area was approved for 2012 to 2018. In 2013, Regional Council approved a ten year plan to fund transit-supportive strategies in Cambridge with $1 million annually.</td>
</tr>
<tr>
<td>15</td>
<td>Pursue with the Province modifications to the Development Charges Act</td>
<td>2011</td>
<td>The Province modified the Development Charges Act in 2015 to increase eligible expenses for public transit. The Region modified its Development Charges By-law #16-053 in 2016, to increase funding for transit.</td>
</tr>
<tr>
<td>16</td>
<td>Incorporate policy initiatives into the Regional Official Plan and other regional policy documents</td>
<td>2011</td>
<td>Policies for transit-oriented development, rapid transit and TDM were incorporated in 2015 ROP update.</td>
</tr>
<tr>
<td>17</td>
<td>Meet regularly with the Area Municipalities and the Province to ensure alignment/coordination of transportation initiatives</td>
<td>Ongoing</td>
<td>Ongoing collaboration with MTO on highway project and transportation studies, and with area municipalities on road improvements, TDM and parking studies.</td>
</tr>
</tbody>
</table>
3. How is the Region Changing?

Growth Trends

This section looks at how Waterloo Region has changed since the 2010 RTMP, which used statistics from the 2006 Census and 2006 Transportation Tomorrow Survey. Population projections and estimates, as well as statistics from the 2011 Census and 2011 Transportation Tomorrow Survey (TTS), were used to determine recent trends. 2016 Census data and 2016 TTS had not been released at the time this document was written and will be cross-checked where appropriate to assess key trends.

Waterloo Region continues to grow and urbanize

Waterloo Region has maintained its steady growth in the past 15 years, with rapid growth in the 2000s, followed by a less rapid, but steady growth in the first half of this decade. Waterloo Region grew by 4.2% from 2011 to 2015, 5.3% from 2007 to 2011, and 7.6% between 2004 and 2007. Exhibit 3-1 illustrates the population growth of Waterloo Region.

Growth since 2011 has predominately been in Waterloo Region’s three urban municipalities, Cambridge, Kitchener and Waterloo, which are home to approximately 88% of residents. Population growth has included both infill
development and greenfield development. The Region has identified a Central Transit Corridor for targeted densification and this corridor is experiencing growth within the downtown area of the three cities. The data is limited to 2011 and it is expected that further infill has occurred since then providing a positive picture of development along the corridor.

Exhibit 3-1: Waterloo Region Population Growth (2000–2015) (including students)

Greenfield lands are also continuing to be developed. The City of Waterloo has limited greenfield land left to be developed, while the Cities of Cambridge and Kitchener still have significant greenfield supply. Exhibit 3-2 illustrates where the growth in the Region occurred between 2001 and 2011. The highlighted areas are those that had population and employment density increases by more than 15 persons and jobs per hectare. The percentage of Waterloo
Region’s population that lives in the Central Transit Corridor has increased from 17.5% in 2011 to 18.1% in 2015.\textsuperscript{5}

Exhibit 3-2: Increases in Population/Employment Densities greater than 15 Persons or Jobs per Hectare

Based on the Ontario Ministry of Transportation’s transit supportive guidelines, densities greater than 160 persons and jobs per hectare are considered to be supportive of dedicated rapid transit service, while densities over 50 persons and jobs per hectare are considered to be supportive of basic transit service. Exhibit 3-3 identifies the minimum densities suggested to be supportive of varying levels of transit service.

Exhibit 3-3: MTO Transit-Supportive Guidelines

<table>
<thead>
<tr>
<th>Transit service type</th>
<th>Population and employment densities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Service (20-30 minute headways)</td>
<td>50</td>
</tr>
<tr>
<td>Frequent Service (10-15 minute headways)</td>
<td>80</td>
</tr>
<tr>
<td>Very Frequent Service (5 minute headways)</td>
<td>100</td>
</tr>
<tr>
<td>Dedicated Rapid Transit</td>
<td>160</td>
</tr>
</tbody>
</table>

Exhibit 3-4 indicates the areas of the three cities with high population and employment densities and shows that areas along the rapid transit corridor have the highest densities. Areas such as downtown Kitchener have densities that are greater than 160 persons and jobs per hectare.

Exhibit 3-4: Population and Employment Densities
Although the growth rate in Waterloo Region in the past 5 years has slowed compared to the rapid growth experienced in the 2000s, it is still growing faster than the rest of Ontario. From 2001 to 2010, Waterloo Region grew by 17% while Ontario grew by only 10%, and since 2010 Waterloo Region has grown by 5.7% while Ontario has grown by 5.1%, as shown in Exhibit 3-5. While the rate of growth appears to have declined recently, it remains strong enough to support and require transportation infrastructure improvements.

**Exhibit 3-5: Growth Rates (Waterloo Region vs. Rest of Ontario)**

Waterloo Region is younger than the rest of the Province

As indicated in Exhibit 3-6, Waterloo Region’s population has a higher portion of children (aged 0-14) than Ontario and Canada as a whole. This age group relies on active transportation, transit and auto passenger modes, as they do not have driver’s licenses. The younger demographic also presents a good opportunity for the Region to establish sustainable transportation patterns, as it is far more difficult to encourage modal shift after habits are established.
Waterloo Region also has a lower portion of seniors (aged 65+) than Ontario and Canada as a whole. However, while this paints a portrait of 2011 in Waterloo Region, the Region is expected to age significantly in the future, with a higher portion of people aged 65+ than today. As elderly people lose their ability to drive, they will require alternative modes of transportation to ensure they can maintain their ability to travel throughout and beyond the Region.

These demographics indicate that the Region is well-situated in terms of promoting sustainable transportation alternatives including walking, cycling, and transit.

Exhibit 3-6: Age Distribution amongst Regional, Provincial and National Populations (2011)

The service sector continues to grow as the goods sector declines

While unemployment rates have remained relatively steady in Waterloo Region over the past 15 years, Exhibit 3-7 illustrates a shift in the nature of employment. As many jobs in the goods-producing sector have left the region (e.g. Budd Automotive, Lear, Schneiders, Blackberry, etc.) an influx of
professional and service sector jobs have kept the employment rate in balance.

A general shift towards more service sector jobs and fewer goods producing jobs will affect the transportation network. The Transportation Association of Canada’s (TAC) Urban Transportation Indicators survey has revealed a relationship between occupation type and commuting mode in Canada’s major metropolitan areas. It states that people who work in manufacturing and trades are more likely to drive to work than those who work in sales and service, who are more likely to take transit or active modes. This may reflect the dispersed and lower density of employment in industrial and manufacturing zones, which is a challenge for providing high-quality transit service in comparison to higher density jobs in downtown areas. TAC notes that while professional occupations fall somewhere in between, employers of professionals value urban areas for their ability to attract young, educated adults.
The post-secondary student population is growing faster than the rest of Waterloo Region

With the exception of a low growth period between 2013 and 2015, the rate of growth in enrollment at Waterloo Region’s universities has outpaced population growth of the rest of Waterloo Region, and the portion of the population that is comprised of post-secondary students has been increasing, as shown in Exhibit 3-8.

As post-secondary students are one of the demographics that is the most reliant on alternative modes of transportation, it is important to continue to create an inviting and comfortable active transportation network that provides quality access to post-secondary institutions.

Exhibit 3-8: Portion of Waterloo Region’s Population that are Post-Secondary Students

Waterloo Region’s townships are growing at a faster rate than the cities

While Waterloo Region’s townships only represent 12.5% of the population, this number has increased from 11.6% in 2006. Between 2006 and 2016, Waterloo Region’s townships grew by a combined 21%, while the cities grew
by only 11%. Almost all of this growth can be attributed to greenfield development in towns such as Elmira, New Hamburg, Baden, and Wellesley. These new residents rely on the road network to get around for work or otherwise. As these towns are not well served by GRT, township residents are likely to continue to rely on personal automobiles for the majority of trips.

### Transportation Trends

This section will review regional transportation trends in greater detail to better understand current needs and gaps in services. This is accomplished by comparing data published in the 2006 Transportation Tomorrow Survey (TTS), which was used in the 2010 RTMP, and the latest TTS survey in 2011.

The 2016 TTS will not be published until later in 2017, so key metrics may be updated following its release to reflect the changes in travel patterns over the past five years. For the purposes of this report, the 2011 TTS data will be supplemented with other sources of information including population and employment forecasts, travel demand models, local travel opinion surveys, and GO ridership estimates.

### Inter-regional travel is growing rapidly

Waterloo Region residents make approximately 1.1 million trips per day, of which 95% remain within Waterloo Region and 5% (or 56,600) are made to destinations outside of Waterloo Region, as indicated in Exhibit 3-9.

Exhibit 3-10 shows the most frequent places of origin and destination for trips made into and out of Waterloo Region. Together, these figures portray Waterloo Region as a major self-sustaining centre capable of offering a place for its residents to work and live within its boundaries with limited need for commuting to and from its surrounding areas. Overall, Waterloo Region generates a net out-commuting travel, but by a relatively low margin.

Also indicated in Exhibit 3-10 is that the City of Guelph already accounts for over one-quarter of all inter-regional travel, and this number may grow in the coming years given the ongoing construction of new Highway 7. It is also noted that trips to Toronto are less than trips to Peel Region and much less than trips to Guelph. The implications for Moving Forward may be the need to support more inter-regional transit, but it is also noted that providing high-quality transit service to dispersed employment areas such as Peel Region...
may be difficult, and therefore road capacity improvements may be an inevitable requirement.

Exhibit 3-9: Daily Trips Remaining within the Region vs. Exiting the Region (2011)

Exhibit 3-10: Most Common Places of Origin/Destination for Inter-regional Travel (2011)
Internal travel within Waterloo Region follows a typical urban demand profile

Exhibit 3-11 shows the number of auto driver trips, transit trips, and active transportation trips that begin at each hour of the day. The profile for automobile use is a typical urban demand profile with sharp and roughly even peaks in the morning and afternoon. The profile indicates that peak spreading, or shifting of travel times to avoid congestion during peaks, has not become a major factor in Waterloo Region as it has in the Greater Toronto Area. This generally means that adequate road capacity is available to support normal commuting patterns, and roads are not congested enough to encourage car users to consider travelling at other times or via other modes.

Transit usage shows somewhat less pronounced peak demand periods, with transit demand remaining steadier throughout the day in comparison to other modes. Additionally, transit usage peaks before car trips in both the morning and afternoon, which could be a consequence of longer commuting times for transit users caused by route connections and additional wait time, or “first mile” and “last mile” connections at the beginning/end of the trip.

Active transportation, which includes both walking and cycling trips, has distinct morning and afternoon peak periods, however these appear to more closely align with school hours as opposed to typical working hours. The greatest number of active transportation trips are made between 7:30–8:30 am and between 2:30–3:30 pm. A second, smaller afternoon peak can be seen at approximately 5:00 pm, which likely represents the number of commuters that travel to work via active transportation modes.
Commuting patterns at the Area Municipalities are changing

Focusing on work trips, as shown in Exhibit 3-12, between 2006 and 2011 the number of work trips destined to the City of Waterloo and the Townships (combined) has increased, while the number of work trips destined to Kitchener and Cambridge has decreased. These figures may reflect the City of Waterloo as continuing to experience growth as a service industry and knowledge-based economy, with a continuing decline in manufacturing in Cambridge and Kitchener.
Exhibit 3-12 through Exhibit 3-16 show the place of work for commuting trips made by residents of each municipality. Generally, the data supports the trend indicated above, with trips to Waterloo increasing from all jurisdictions and trips to work in Kitchener and Cambridge decreasing. The following observations regarding the commuting trends for the various municipalities can be made:

- City of Waterloo residents primarily commute to one of either Waterloo or Kitchener, with growth in numbers of trips observed in both instances. The percentage of commuting trips made to the City of Cambridge from Waterloo is relatively small, as is the percentage of inter-regional commuting trips made to the City of Guelph and other locations outside of the Region.

- With the City of Kitchener being located in the centre of Waterloo Region, Kitchener residents enjoy a greater convenience in being able to commute to any location, as evident in commuting patterns. A significant percentage of Kitchener residents also commute to destinations located outside of Waterloo Region.

- Work trips within Kitchener have showed the largest change, with a notable decline from 40,000 to 36,000, though there appears to be a
corresponding increase in trips from Kitchener to Waterloo, Guelph, and Peel Region.

- The City of Cambridge can be considered somewhat more geographically and physically separated from Kitchener-Waterloo by both the Grand River and by Highway 401. This separation appears to be reflected in commuting trends, as the vast majority of commuters stay within Cambridge. Additionally, a high percentage of Cambridge residents commute outside of the Region, likely due to its proximity to locations such as Brantford and Hamilton. With that said, the number of commuting trips to both Kitchener and Waterloo increased between 2006 and 2011.

- The Townships of North Dumfries, Wilmot, Wellesley and Woolwich have seen significant growth over recent years. Census information indicates that between 2011 and 2006, the populations of these Townships have increased as follows:
  - North Dumfries – 103%
  - Wilmot – 112%
  - Wellesley – 109%
  - Woolwich – 118%

- This growth is reflected in commuting trends, as a comparison of TTS data shows that a greater number of trips are being made into and out of the Townships (combined) in 2011 as compared to 2006. The greatest growth occurred in trips destined to Waterloo, Kitchener, and outside Waterloo Region.
Exhibit 3-13: Destination of Work Trips by City of Waterloo Residents (TTS)

Exhibit 3-14: Destination of Work Trips by City of Kitchener Residents (TTS)
Exhibit 3-15: Destination of Work Trips by City of Cambridge Residents (TTS)

Exhibit 3-16: Destination of Work Trips by Residents of the Townships (TTS)

North Dumfries

Wilmot
Commuters are still highly car-dependent
As indicated in Exhibit 3-17, auto driver remains by far the dominant mode choice for commuting to work, representing 83% of work trips. Auto passenger accounts for 8% of work trips, transit 4%, and active modes are 5%. The high reliance on cars is likely correlated to the dispersed employment centres across Waterloo Region, and to Guelph and the Greater Toronto Area.

Looking at trends since 2006, the car driver mode share for commuting travel increased by 2.2% between 2006 (80.5%) and 2011 (82.7%). During this same period, car passenger mode share decreased by 2.3%, from 10.7% to 8.4%, and transit mode share has remained consistent at 4%. These indicate that the Region’s investment in transit service from 2006 to 2011 has allowed transit modal split to keep pace with population growth. However, more progress needs to be made in light of the 2010 RTMP’s goal of attaining 15% of all trips by 2031. The downward trend in car passenger mode share may also indicate a need/opportunity for greater carpooling incentives within Waterloo Region.
In terms of active transportation, walking accounted for 3.5% of all commuting trips, which represents a decrease of 0.9% between 2006 and 2011. Cycling accounted for only 1.1% of commuting trips, however this represented an increase of 0.5% since 2006 and suggests that investments in cycling infrastructure have benefited commuters.

**Exhibit 3-17: Daily Commuter Travel Mode Share (2011)**

Discretionary trips are car-dependent

Car use dominates discretionary travel to an even greater extent. As shown in Exhibit 3-18, the mode share for car passengers is significantly greater for discretionary travel (23%) than it is for commuting travel (8%).

**Exhibit 3-18: Daily Discretionary Travel Mode Share (2011)**
Transit ridership growth was strong but peaked in 2013

Exhibit 3-19 provides a graph of ridership as well as revenue hours from 2006 to 2015. Transit ridership has grown significantly from 2006 to 2013, reflecting the Region’s strong investment in transit since establishing GRT and taking over municipal transit services in 2000. Revenue has grown across the period from 2006 to 2015. However, revenue growth from 2013 to 2015 appears to be driven by fare increases rather than ridership, which experienced a drop from 2013 to 2015.

The decline in transit ridership from 2013 to 2015 was significant, dropping from approximately 22 million yearly rides to 20 million. This trend is being seen across North America and is therefore the result of several non-local factors. The comparatively low price of gasoline, the emergence of new private transportation services (e.g. Uber, etc.), the increase in active transportation, and changes in teleworking habits are all likely contributors. Within Waterloo Region, the following additional factors have contributed:

6 Canadian Urban Transit Association, Canadian Transit Factbook, 2006-2015 Operating Data
The Region’s largest group of pedestrians are primary and secondary students.

- Transit detours due to ION LRT construction have affected bus routes
- Local school boards have shifted many high school trips to yellow buses
- Fares have been increased every year from 2012 to 2015
- There were service cuts in some areas in 2013 and 2014

Additionally, commuting trends have pointed to the growth in the knowledge-based economy of Waterloo with increase in travel to Waterloo from other municipalities, plus the increase in trips to and from the Region to Peel Region and Guelph. These longer-distance trips are typically less served by transit.

A recent analysis by Metrolinx of commuter personas has identified six markets of non-captive transit users. The study identifies common motivators and preferences of these groups, which will be helpful to understand how to attract more transit users.

**Students remain a major user of transit and active transportation**

This section provides an overview of travel mode choice and trends for students, first among primary and secondary school students and then among post-secondary students.

The average distance between home and school for primary and secondary school students (combined) is 3.7 kilometers, which lends to making active transportation an attractive means of travel. The mode share for walking trips among grade-school students in 2011 was 33%, which is substantially higher than the 1.8% mode share for walking trips across all trip purposes. However, this figure has decreased in recent years, as this mode share was 39% in 2006. This finding reflects the #1 desire stated by residents in the Public Opinion Survey of improving school travel for children. Additionally, mode share for cycling among grade-school students in 2011 is 1.4%, which is higher than the overall cycling mode share across all trip purposes (0.6%).

The above figures reflect similar trends that are being seen in the Greater Toronto and Hamilton Area (GTHA). Walking mode share for school travel appears lower when compared to numbers in the GTHA. According to a recent study published by Metrolinx, 32.5% of grade school students in the GTHA walk to school, and 40.4% walk home from school.\(^8\) However, similar to the

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\(^8\) Metrolinx, Smart Commute, School Travel in the GTHA
case for Waterloo Region, walking mode share amongst grade-school students in the GTHA has decreased in since 1996.

Among university and college students, walking accounts for 35% of all trips in 2012 based on results from the Ministry of Transportation’s 2012 Post Secondary School Travel Survey. The complete journey to campus mode split can be found in Exhibit 3-21.

Exhibit 3-20: Mode Share for School Trips Aged 17 and under (2011)

Based on data from the TTS, which collects information on travel trends of students in permanent residences and does not include students on-campus or in temporary residences, between 2006–2011 there was a significant change in selected travel mode for post-secondary students, seeing a significant increase in transit mode share (from 18.3% to 35.7%) and a corresponding significant decrease in walking mode share (from 26.0% to 7.4%). This change can be attributed to the introduction of the student pass and improvements in transit service and network coverage during those years. This has allowed post-secondary students to take transit when they may have otherwise walked, and also given them more flexibility in selecting locations of residence. This notion is supported by the fact that the average commuting
distance for post-secondary students increased by 3.4 kilometers between 2006 and 2011. ION Rapid Transit, which will include stops directly at University of Waterloo and near Wilfrid Laurier University, will provide further flexibility for students in selecting their home location.

**Exhibit 3-21: Mode Share for Post-secondary Students (MTO, 2012)**

![](image)

Residents continue to drive even for short trips less than two kilometres

Exhibit 3-22 illustrates mode share for trips under two kilometres in length. For trips under two kilometres, 78% are made by car and 17% are made by walking. This is in line with the Greater Toronto Area as a whole, however the City of Toronto has only 59% of trips under two kilometres by car and 28% by walking. Factors such as density and urban form, availability and cost of parking, and variety of nearby destinations likely play a large role in the use of cars for walkable short trips.

The walk mode share of trips made within walkable distances of less than two kilometers saw a decrease of 3.3% between 2006 and 2011, from 20.5% to 17.2%. In turn, auto mode share for walkable trips increased by 3.7% during this same period, from 58.2% to 61.9%.
To reverse these trends and meet the Moving Forward vision and goals for walking and cycling trips, continuous effort is required to support active transportation choices by creating walkable urban spaces, and ensuring that they are integrated with the transit system to allow for seamless multi-model travel. A 2013 study in Waterloo Region showed that neighbourhoods that are more walkable lead to higher rates of walking.9

Educational campaigns, TravelWise TMA and social marketing will also support a change in travel behaviour to reduce private car use for short trips.

Exhibit 3-22: Mode Share for Very Short Distance Trips (0 to 2 kilometres)

<table>
<thead>
<tr>
<th>Mode</th>
<th>2006</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>20.6%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Cycle</td>
<td>1.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Transit</td>
<td>2.6%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Auto passenger</td>
<td>17.1%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Auto driver</td>
<td>58.0%</td>
<td>61.9%</td>
</tr>
</tbody>
</table>

When considering trips with a distance between two and five kilometres (Exhibit 3-23), cycling saw an increase of 0.2% between 2006 and 2011, from 0.9% to 1.1%. In the meantime, auto driver mode decreased by 1.1% within this same period. This provides an indication that cycling investments over this period have resulted in a small positive benefit.

9 NEWPATH
New private transportation services have emerged TNCs (Uber and RideCo)

In the past five years, new private transportation services, commonly referred to as Transport Network Companies (TNCs), have established a presence in Waterloo Region. These services have captured a significant portion of the taxi market, and potentially part of the transit market, but are ultimately perceived as a user-focused service that improves transportation choice.

After significant pushback from the local taxi industry and by-law enforcement, the Region responded in 2016 by revising the Taxi By-law, laying out regulation for the operation of TNCs in Waterloo Region. The by-law was considered to be light on restrictions and is still seeing push back by the taxi industry. Regardless, this transportation mode is here to stay and should be considered in all transportation studies from this point on.
4. Strategic Outlook for Moving Forward

This section focuses on identifying regional and global trends that will influence the implementation of best practices in transportation planning within Waterloo Region. These will inform the needs and opportunities identified at the end of this section.

Local Outlook

Waterloo Region is expected to continue its strong growth

By 2031, the population of Waterloo Region is expected to grow significantly. While there are several different growth projections for Waterloo Region, the Provincial Growth Plan forecasts a 2031 population of 742,000 people, a 32% increase from the 2015 population. This projection is considered to be at the higher range of growth forecasts. Based on growth projections produced by the Region’s Community Planning Division, Waterloo Region’s population is
expected to reach 632,000 people by 2031. Both of these growth outlooks are illustrated in Exhibit 4-1 and represent a range of growth scenarios, both having implications on the transportation network.

Exhibit 4-1: Population Growth Outlook\(^{10}\)

A 32% population growth suggests a baseline of 32% more vehicle-kilometres of travel (VKT), and the same growth in transit and other modes, if current trends do not change. Trends in Canada show that despite a small drop in VKT per capita after the 2008 recession, Canadians are increasing distances travelled in their vehicles over time.\(^{11}\) The implications on the road network will be analyzed in later reports, but a 32% increase in travel on the Region’s roads would increase and expand congestion, especially at peak travel times and destinations. A combination of strategies will be required to meet future travel demand.

\(^{10}\) Region of Waterloo, Planning, Research and Analytics
\(^{11}\) Data from TAC urban transportation indicators report
New transit service will support sustainable travel and development within Waterloo Region

The ION LRT is expected to begin service in 2018. To support ION, the Region and the Cities of Kitchener and Waterloo have begun supporting and encouraging infill development and intensification along the corridor, and reduced parking requirements for new developments. ION will provide a new paradigm for travel within Waterloo Region, as rail-based transit services are perceived as more comfortable, faster, more direct, and more supportive of an urbanized pedestrian-friendly form compared to bus transit. In addition to ION, GRT is planning to roll out a new service plan over the coming years to make use of ION and provide improved service across the system, including core areas and linkages to destinations not directly on the LRT corridor. This plan illustrates the potential to generate an improved inter-connected grid network supporting trips by transit that previously required an undesirable number of transfers or extended circuitous routing.

The extension of GO Rail to Kitchener has introduced a new means for inter-regional travel

In 2011, the Georgetown GO Line was extended west to Kitchener and renamed the Kitchener GO Line. This line runs between Kitchener and Union Station in Toronto, passing through Wellington County (including a stop in Guelph), Peel Region (including stops in Brampton) and north Etobicoke. Currently, the Kitchener GO Station only operates as a one-way peak service, with four eastbound trains travelling from Kitchener to Union Station in the morning and four westbound trains travelling from Union Station to Kitchener in the evening. The current estimated daily ridership for the Kitchener GO Station is 225 passengers in each direction of travel.

Road and highway projects are still needed

The Region has undertaken a significant number of roadway environmental assessments (EAs) over the past six years including road widening projects, new roads, and operational treatments such as roundabouts or active transportation improvements. Similarly, MTO is widening Highway 401 from Highway 8 to Hespeler Road and has begun construction of the new Highway 7 (Kitchener to Guelph). These projects will improve travel times for traffic, including for buses in mixed traffic. The EA process requires that new roads

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12 Service levels in March 2017.
13 Metrolinx, GO Rail Station Access Plan (2016)
and road widening projects be compared to alternative options for supporting increased travel demand and new development areas. In other words, options other than road improvements were found not to serve projected demands. Sustainable transportation planning can include road improvements as long as they are staged and timed to ensure that developments, road projects, and transit service are in lockstep; coordinated planning and implementation can help ensure new road projects are not just enablers of private car use but part of the sustainable planning framework.

**Global Outlook and Best Practices**

**Climate change is a serious concern and transportation plays a significant role**

Ontario’s greenhouse gas (GHG) emissions from transportation have increased more than those from any other sector since 1990, and now represent 34% of all emissions in the province. Over three-quarters of transportation emissions come from cars, trucks, buses and other on-road motor vehicles. The Province of Ontario has adopted ambitious goals for a 15% reduction in total GHG emissions from 1990 levels by 2020, a 37% reduction by 2030, and an 80% reduction by 2050.

The Region of Waterloo’s transportation sector accounted for 40.6% of all greenhouse gas emissions in 2010, and is projected to increase by 17% by 2020 if mitigation actions are not adopted. Climate Action Waterloo Region has developed a community-wide action plan to curb that trend and achieve a 6% reduction of 2010 emissions levels by 2020. Moving Forward is aligned with the Climate Action Plan as it encourages a shift to sustainable transportation modes, such as transit, cycling, walking, carpooling and carsharing, as well as support for Travel Demand Management and new mobility technologies.

The Region and local municipalities can further support the reduction of greenhouse gas emissions from transportation by encouraging the use of electric vehicles, providing electric vehicle charging stations in public places, requiring them in private developments, and allowing greener vehicles to use high-occupancy vehicle lanes and preferred parking spaces.

Tools to reduce greenhouse gas emissions include:

- Public transit
- Active transportation
- Carpooling or teleworking
- Encouraging more efficient car and truck usage by avoiding rush hours
- Doing several errands in a single trip
- Building denser, mixed-use communities
Public health and city planning are inter-connected

Research and advocacy continue to raise awareness of the many connections between transportation systems, land use and public health. Road safety is the most visible health-related aspect of this issue, and air pollution’s connections to respiratory and cardiovascular ailments have been well documented. Encouraging active transportation, and therefore increasing the number of people walking and cycling, may provide “safety in numbers”, as motorists may be less likely to collide with a pedestrian or cyclist when there are more of them visible.14,15,16

More recently, rising physical inactivity levels, especially amongst children, have been linked to a greater reliance on cars and associated with growing rates of diabetes, cardiovascular disease, cancers and mental health problems. For example, several of the country’s authorities on public health have written that the rate of diabetes could more than double, from 7.1% in 2002 to 16.4% by 2027, if no changes are made. However, a quarter of new cases could be prevented by integrating more physical activity into daily life. By supporting active transportation, individuals can meet physical activity recommendations and reduce their risk for chronic health conditions. For example, adults can gain an additional eight to 33 minutes of physical activity each day by taking public transit.17 As well, people who use active transportation are more likely to be more physically active in their leisure time.18 Biking14 and higher intensity walking 19 for transportation helps significantly reduce the risk of premature death. Using active modes of

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15 De Hartog JJ, Boogaard H, Nijland H, Hoek G. Do the health benefits of cycling outweigh the risks? Env Health Persp. 2010;118(8):1109-1116.
transportation can reduce the risk for heart disease by 11%, independent of other types of physical activity and risk for diabetes is also significantly lower in people who use active transportation. People who walk or cycle for transportation are less likely to have high blood pressure, and higher walking intensity or distance and cycling can lower the risk even further.

Active transportation can also improve mental wellness. Cyclists are more likely to enjoy commuting to work, whereas those who drive to work are more likely to complain of poor sleep, higher stress, and rate their overall health as low compared to those who actively commute to work for less than 30 minutes. Large amounts of driving has also been linked to negative social impacts, including social isolation while walking and other types of physical activity have been shown to prevent depression.

Low-density, car-based neighbourhoods lead to less physical activity and more chronic disease, while pedestrian and transit-friendly communities create more active transportation and other types of physical activity. Making communities better for walking and cycling can improve the overall health of the community. People living in more walkable neighbourhoods are more likely to have better mental health, trust their neighbours, have better social connections, experience less traffic fatalities as pedestrians, and not suffer from high blood pressure or other chronic health conditions.

References:

neighbourhoods mean more walking overall\textsuperscript{29}, more active transportation\textsuperscript{29,30}, lower levels of obesity\textsuperscript{30}, less air pollution and less total vehicle miles travelled.\textsuperscript{30} As well, people have been shown to use active transportation more often when transit stops and stations are closer to where they live and work, and are subsequently more likely to meet the recommended physical activity guidelines.\textsuperscript{17}

Moving Forward can build support by reflecting the health benefits of more sustainable transportation behaviors and supportive development patterns. It should note the positive impacts of strategies to reduce driving and vehicle emissions, while increasing physical activity and access to health-related services. The impacts of air pollution on the health of Waterloo Resident will vary and will disproportionally affect people with heart and lung conditions, older adults and children. Transportation is the most significant source of air pollution, as shown in Exhibit 4-2.

\textbf{Exhibit 4-2: Waterloo Region Residents at Higher Risk from Poor Air Quality}

\begin{tabular}{ccc}
\hline
13\% & 12\% & 60\% \\
\hline
Waterloo Region residents with asthma, chronic bronchitis, or emphysema & Waterloo Region residents with cardiovascular disease or diabetes & The portion of the types of air pollution, for which transportation is the leading cause \\
\hline
\end{tabular}


Transportation systems need to cater to an aging population

While Waterloo Region is younger than the provincial average, it will follow the trend in Ontario and Canada of an aging population. According to the Demographics Trends study by Environics Analytics dated March 2015, 12.5% of Waterloo Region’s population is over 65 years old, compared to 14.6% for the province overall. The portion residents over 65 will increase to 20% by 2031. In response, the Region must be prepared to address a number of transportation-related implications of the aging population, including:

- Higher levels of physical and cognitive disability
- Use and location of public transit services
- More accessible parking
- Increasing need for safe walking routes and surfaces such as sidewalks
- Enhanced readability of street, parking and direction signage
- More accessible dedicated seating on public transit vehicles and facilities
- Increased use of “Mobility Plus” specialized transit services.

It is also expected that some of these challenges will be more acute in the rural and suburban areas of the Region. As a result, Moving Forward will include recommended age-friendly transportation directions that the Region and area municipalities can employ as part of their transportation planning process. This will ensure the needs of a growing seniors population will be understood and addressed over the next 25 years.

Another recent source of information on age-friendly transportation comes from a background paper prepared by the Grand River Council on Aging in 2014. It uses a framework developed by the World Health Organization that has become a checklist for each domain of an age-friendly community. The checklist includes a number of elements that relate mainly to the provision of conventional scheduled public transit, noted as follows:

- Affordability
- Reliability and Frequency
- Travel Destinations
- Age-Friendly Vehicles
- Priority Seating
- Safety and Comfort
- Stops and Stations
Checklist elements relating to subsidized special transit service and other age-friendly aspects of the transportation system include:

- **Specialized Services**: sufficient specialized transport service are available for people with disabilities;
- **Transport Drivers** are courteous, obey traffic rules, and accommodate older passengers stepping on and off vehicles;
- **Community Transportation**, including volunteer drivers and shuttle services for older people to specific events and places;
- **Taxis** are affordable with discounts or subsides provided for older people with low incomes;
- **Roads** are well maintained, adequately wide and lit, have traffic calming features and traffic signals where warranted, and the traffic flow is well regulated; and
- **Parking**: affordable parking is available, with priority parking for the disabled and older people close to buildings and transport stops.

**Social equity is a pressing issue**

Social equity in the transportation context refers to the ability of a transportation system to provide equitable opportunity for all residents, regardless of socioeconomic class. The ability of transportation systems and strategies to both create and mitigate social inequity is the subject of increasing attention across North America. The major dimensions of equity as it relates to transportation are:

- **Opportunity** – People need transportation choices that allow them to reach work, education, shopping, health care, and social opportunities. Transit plays a central role for many people who cannot or choose not to own and drive a car, and the quality and structure of transit services determines the scope of opportunities available to individuals within a reasonable trip from their home.
- **Affordability** – For some families that own a car, the related costs can affect their ability to afford appropriate accommodation, food and other needs. Minimizing the need to own a car is thus a key to building equity. Transit fare policies, including concession fares for low-income riders, are another way to ensure affordable mobility for all residents.
• **Accessibility** - The Accessibility for Ontarians with Disabilities Act, 2005 requires Ontario’s transportation system to be fully accessible by 2025. Transit vehicles, stops and stations are of particular interest, including accessible routes to bus stops in areas that lack sidewalks.

Part of improving social equity should consider the substantial proportion of regional residents who do not have access to a private automobile due to financial, age or physical limitations. These groups include low-income families, persons with disabilities, seniors, and youth. As society faces a boom in the number of seniors, more of them are choosing to stay in their own homes as they age. This risks leaving them vulnerable to isolation if the rising costs of driving or health problems forces them to abandon their cars. Researchers also believe the long-term decrease in the rate of children walking or cycling to school\(^{31}\) and daily destinations is detrimental to their health and development, and removing social and physical barriers to children’s use of active transportation can restore their independence.\(^{32}\)

**New mobility options are emerging**

The mobility options enjoyed by Waterloo Region’s residents are growing as new business models and technologies are taking shape outside traditional government planning and delivery frameworks. Here are some prime examples that are likely to bring complexity as well as benefits to the Region’s transportation system:

• **Transportation network companies** (e.g. Uber, Lyft) are becoming a competing force in cities across North America. They are leveraging mobile communications, a user friendly focus, and an entrepreneurial spirit to offer services that compete with other forms of transportation.

• **Dynamic services** enabled by mobile communications are bringing about new

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options including demand-responsive transit services that determine routes in real-time. Online trip planning tools can instantly pair carpool drivers and passengers for as little as one trip, and assist with digital cost-sharing.

- **Car and bike sharing** are growing in popularity, especially among urban millennials (people born between 1980 and 2000) who have less interest in car ownership. Membership in car-sharing services has grown globally, from 346,610 members in 2006 to 4.8 million by 2014. Bike-sharing has also grown from just 11 cities with systems in 2004 to over 1000 bike share services around the world today.\(^{33}\)

- **Mobility as a Service** (MaaS) is a model for marketing multimodal services. Under MaaS, travelers plan and pay for travel through an integrated tool that represents multiple service providers (e.g. transit, taxis, car-share, bike-share), providing convenience and allowing them to reduce their reliance on private cars or transit passes. The intent is to create a seamless transportation experience that is as convenient as, or more convenient than, a personal automobile. Although still conceptual in North America, examples of MaaS models have been emerging in Europe. Several cities in Europe have introduced MaaS platforms in the past year and Helsinki has emerged as a leader, with a goal of eliminating the need for car ownership by 2025. A recent pilot of a MaaS UbiGo in Gotenburg, Sweden\(^{34}\) and the Whim app in Finland\(^{35}\) are current examples of the MaaS concept in action.

Government agencies like the Region of Waterloo have a role in regulating emerging mobility services, where they have authority to do so. They can also explore opportunities to collaborate with the private sector to expand and complement the central role of transit as the key alternative to driving private cars. Areas of collaboration could include enhanced travel choices in areas with low transit service levels, and dynamic transit services for a variety of

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\(^{34}\) [http://www.ubigo.se/las-mer/about-english/](http://www.ubigo.se/las-mer/about-english/)

markets including accessible transit. These could improve user mobility and convenience while lowering public-sector costs.

Travel by a single mode is being replaced by travel by multiple modes

While many people continue to travel using a single primary mode, there is a growing demographic using multiple modes of travel on a regular basis. A number of factors are thought to be driving this trend, including high cost of auto ownership (especially for those under 25), increased availability of car-share services or on-demand transportation, and home location choice that enables use of non-auto modes for some or many trips. This change in transportation mode choice is illustrated in Exhibit 4-3.

Exhibit 4-3: Multiple Mode Travel

Connected and autonomous vehicles are on the horizon

The automobile industry is developing technologies that connect vehicles to other vehicles (Vehicle-to-vehicle, or V2V), to infrastructure (Vehicle to infrastructure) and to mobile devices (Vehicle-to-traveler) to improve road safety, reduce congestion and emissions, increase the capacity of existing roads by enabling closer car following, and improve transportation services. Groups of connected vehicles operating using V2V technology can accelerate and brake as a single unit to maximize space, safety, and fuel efficiency.
These groups of connected vehicles are commonly referred to as a platoon. Exhibit 4-4 illustrates the concept of a vehicle platoon with two connected vehicles that leverage V2V capabilities.

Exhibit 4-4: Vehicle Platoon Diagram

The United States Department of Transportation estimates that vehicle-to-vehicle connectivity could affect or eliminate up to 76% of multi-vehicle crashes involving light-duty vehicles. However, much work is needed before such applications can be commercialized.

Distinct from connected vehicles, autonomous vehicles (AVs), also called fully automated vehicles, driverless cars or self-driving cars, can make “smart” decisions about their navigation, speed, interaction with other road users, and have the ability to operate without human driver behind the wheel. Their widespread use could improve safety for all road users (given that 90% of crashes are caused by human error), and enhance mobility options for non-drivers (e.g. seniors, youth and persons with disabilities). They could also provide an effective solution to “first mile” and “last mile” connections to rapid transit stations, particularly in low-density areas. Autonomous vehicles face real hurdles in terms of technology, policy, regulation and public opinion before they become common, something that may take decades.

Connected and autonomous vehicles will likely emerge through incremental change to current road use. All levels of government would be responsible for establishing protocols, introducing new policies, and for upgrading roads and
roadside infrastructure to regulate the use of these vehicles and to optimize their capabilities.

Regardless of the timeline, removing the human driver from the transportation system will open up new opportunities for individuals who own these vehicles, as well as entities that own and operate fleets of these vehicles, and will disrupt the established business practices across multiple industries.

Combining new emerging mobility options with connected and autonomous vehicles technology has the potential to redefine the transportation paradigm

Combining the emerging mobility services that were described above with connected and autonomous vehicle technology creates the potential to provide a new type of transportation service that will disrupt the economics, and resulting traveler choices, of the current transportation paradigm. If transportation service providers no longer have to charge for the driver labour component of their service, the price point at which passengers will pay for this service will significantly decrease. Such a shift in price point and shift to a transportation-on-demand service model is expected to reshape how people value car-ownership.

However, despite all the optimistic views about the potential that these technologies and trends can provide, there are still several potential negative consequences that could be realized if this technology is not properly leveraged for the public good and to improve the quality of life in cities.

Urban regions will need to identify the actions they can take today to ensure that this technology helps achieve their strategic goals. The report in Appendix B outlines two dramatically different scenarios, both of which centre around the same technology, but that differ based on individual vs. shared ownership. In one scenario, individually owned autonomous vehicles could run errands or ferry individuals without a driver, circle the block to avoid parking, and allow users to work or sleep rather than drive. This scenario could dramatically increase traffic congestion, emissions and sprawl as people would tolerate longer commutes than they do today.

In the second scenario, autonomous cars and buses could offer shared, on-demand mobility without the need for personal car ownership. This could lead to efficient transit-like services and reduce congestion, emissions and
transportation costs while possibly permitting a reduction in road and parking infrastructure. These two scenarios are illustrated in Exhibit 4-5.

Exhibit 4-5: Two Scenarios for Autonomous Vehicles

Local and regional governments should consider supporting the second scenario and discouraging the first, to maximise the benefits and minimise the cost of this innovation. Due to the pace at which connected and autonomous vehicles are developing, the best action in a long-term plan is likely a commitment to monitoring progress, supporting pilot testing, and establishing policy and regulatory frameworks that protect the public interest in areas such as congestion, safety, accessibility and emissions.
Road safety is of paramount concern
A movement attracting recent attention is Vision Zero, an international initiative based on the idea that no one should be killed or seriously injured within the road transport system. Vision Zero represents an increased sense of urgency, commitment and collaboration around reducing death and injury from traffic-related collisions. From its origin in Sweden, Vision Zero has been adopted by some national and local governments across Europe and North America. It promotes safety while preserving the key functions of roads, and integrates strategies related to road design, vehicle technology, education and enforcement. Waterloo Region Council has directed staff to report on the potential application of a Vision Zero policy in the Region.

Mobility pricing is gaining traction
The eventual arrival of mobility pricing in Canadian metropolitan areas seems more assured every year. Road tolls, road pricing, congestion charges and parking levies are no longer assumed to be forbidden topics in public and political dialogue. This change has arisen due to four factors:

1) The documented success of related projects, although almost entirely in foreign cities
2) The rise of enabling technologies such as GPS and vehicle-sensing cameras
3) A growing public willingness to share personal data
4) The fiscal gap that municipalities face in their ability to pay for much-needed transportation infrastructure and services.

While the proposal to adopt road tolls in Toronto on city-owned highways in 2016 was not approved by the Province of Ontario, surveys of residents found that 60% were in favour of road tolls that would raise revenue for transportation projects and reduce heavy congestion at peak hours. The Ministry of Transportation launched a pilot of High-Occupancy Toll (HOT) lanes on a section of the QEW in the fall of 2016, the first project of its kind in Canada.  


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Moving Forward will inform future discussion of mobility pricing possibilities, as it is too early to suggest policies and specific strategies for implementation. Moving Forward will identify areas where mobility pricing strategies might present opportunities (e.g. managing travel demand through price signals, or generating revenues) or challenges (e.g. equity impacts on low-income families, arterial road tolls shifting traffic to local streets, and effects on economic development).

The Region must take advantage of “big data” and predictive analytics

“Big data” refers to extremely large data sets, such as those involving detailed travel characteristics collected through the mass adoption of smart phone technology. The volume of data generated by transportation systems is growing at a rapid rate as new users download transportation-related smart phone applications and share their transportation habits with app providers. Available data include traffic volumes, routes, speeds and delay hotspots; transit boardings and fare payments; cyclist origins, destinations and routes; and all aspects of freight shipments. Continual advances in processing power are creating an ever-growing potential to extract value from data streams, especially in real-time.

From a municipal perspective, there are two principal areas of big data application. One is transportation system monitoring and management, allowing detailed real-time understanding of transportation system performance that can enable short-term predictions (e.g. traffic impacts of unusual braking or lane-changing patterns) and responses (e.g. through adaptive traffic signals).

The other is traveler-focused strategies, such as the customized provision of information and incentives based on individual user profiles, and the offering of dynamic transit or ridesharing services. Taking a long-term view, big data clearly has substantial potential to support efficient road and transit operations, and to shape both travel behaviors and travel services so that the balance between demand and supply is more closely optimized in real-time.

Making the most of big data means overcoming several challenges. First, the wide range of data owners, including many in the private sector, makes it
difficult for transportation system managers to know what databases exist and how to access them. Second is the technical challenge of understanding available data streams, storing them, and processing them to extract value. Third is the difficulty of distributing valuable information to transportation system managers and users (e.g. drivers, shippers, vehicles). The fourth challenge relates to privacy concerns around sourcing third-party data and communicating with transportation system users.

Key Needs and Opportunities for the Region of Waterloo

Based on the analysis of existing and future conditions in the Region as well as the more global trends that implicate transportation policy and planning, the following four themes have been developed that summarize the needs and opportunities to be addressed in Moving Forward:

1. Make active transportation a safe and practical mode choice by continuing to build out the AT network and encourage walking and cycling with programs targeted at all ages. Among other benefits, this would enable improvements to the school travel habits of children, cited as the #1 priority of Regional residents in the Public Opinion Survey.

2. Improve connections to rapid transit for all modes, including providing service to low density areas and new suburban developments.

3. Take advantage of the Region’s strengths as an innovation hub by using locally developed technologies and emerging private transportation services, and exploring opportunities through public-private partnerships.

4. Support economic growth by supporting connections to destinations within and outside Waterloo Region (connections to local and international hubs).

5. Mitigate environmental and health impacts of transportation, by reducing air pollution and greenhouse gases, and supporting greater levels of physical activity to reduce chronic disease.

The Region must address these needs and opportunities to achieve the overall goals and objectives that were identified in Section 1 of this report.
5. Action Areas

This section provides an overview of action areas or strategies for consideration by Moving Forward. The headings provide the overall action areas or categories and the text below provides specific strategies. This list introduces these action areas and strategies as subjects for consideration and assessment. It will be further developed and confirmed through Phases 2 and 3 of Moving Forward and with further consultation to form the final recommended set of actions.

Public Transit

This action area represents investing in public transit to maintain and grow modal share and support Regional objectives. For example, rapid transit success is tied to maximizing the comfort and attractiveness of the “first mile” and “last mile” of travel (i.e. to and from ION stations), especially in less-dense areas where destinations are less convenient for walking.
Other potential strategies could include:

- **Leverage the investment in the ION LRT** to increase transit use by better connecting transit routes and build transit-oriented development near the ION. The Region can take the investment further by expanding park-and-ride and kiss-n-ride facilities, increasing transit priority for routes connecting to the LRT, and implementing transit-oriented streetscaping and potentially car-free zones at stations.

- **More funding for transit**: Increase funding via traditional sources such as a property tax increase, and identify and adopt new revenue tools for increased funding of transit infrastructure and operations.

- **New technology for transit operations**: Use new technology, including information systems and transit priority technologies, and use or coordinate with private technologies ranging from ride-sharing to future autonomous vehicles.

- **Create a transit information system**: Provide transit users with real-time information on transit vehicle arrival time, either through app-based system or screens at transit stops.

- **Easier walking and biking to transit stops**: Provide comfortable and efficient ‘first-mile, last-mile’ access to transit. Provide more lighting, benches, trees, and bicycle parking around stations and stops.

- **Promote transit**: Promote the benefits of taking public transit, comparing cost and travel times to driving. Announce recent projects and on-going improvements, and implement neighbourhood-based campaigns around stations for the ION LRT Phase 1 launch.

- **Improve transit operations**: Implement bus-only lanes and high-occupancy vehicle (HOV) lanes (transit ways).

- **Make all transit stops accessible**, including shelters and benches.

**Regional Roads**

Almost every trip in Waterloo Region, by foot, bike, car, bus and truck, is made on roads and highways. Protecting their key functions strengthens Waterloo Region’s quality of life, economy and environmental health.

Road design involves trade-offs among the needs of different road users—pedestrians, cyclists, transit passengers, and car or truck drivers. Targets and
tools for maximizing level of service for motorized traffic, based on vehicle delay and volume-to-capacity ratios, have guided road design for decades, frequently at the expense of other road users. Regional roads can do a better job of serving modes other than motor vehicles if the Region can integrate additional level of service measures into its road design processes.

Examples of strategies to improve the design and function of Regional roads that will be considered include:

- **Intelligent Transportation Systems**: Continue implementing traffic signal retiming and congestion management technologies to improve traffic flow without widening roads.
- **HOV lanes**: Consider adding HOV lanes on Regional roads for vehicles carrying more than one person, such as buses, taxis, and carpools.
- **Targeted capacity improvements**: Focus new roads and road widening only where there is a very strong justification and need.
- **Update and maintain a goods movement strategy**: Efficient deliveries, and trucks can travel safely and quickly to/from businesses and Highway 401.
- **Complete streets**: Build the infrastructure needed for all road users when re-constructing roads.
- **Consider an update to the Corridor Design Guidelines** to include more elements that will support an active streetscape, such as trees, flowers and benches.

**Taking Advantage of Technology**

A wide range of technologies have been developed in recent years providing real-time information, new services, and more sustainable travel options. As a leader in innovation and a home to a strong and growing tech industry, the Region has an opportunity to take advantage of the emerging technologies that are being developed in Waterloo Region.

The Region can play a role in easing the adoption of mobility technology, can initiate pilot projects for self-driving buses, and can gain a better understanding of how residents perceive the technology to help inform policy. The University of Waterloo’s Autonomous Vehicles Laboratory has partnered with local manufacturers to test autonomous vehicles on local roads. Being
closely involved with this initiative is one such example of how the Region can be prepared to take advantage of the benefits of these advancements.

Given the great potential that these technologies have to improve transportation efficiency and safety, the Region needs to consider how to realize these benefits while also being cognizant of the challenges that lie ahead.

Potential strategies for leveraging technology include the following:

- **Ride-sharing**: The use of private, for-profit ride-sharing services, such as vanpools and UberPOOL.

- **Car-share**: Work with providers to increase the number of car-share locations and services, such as Community CarShare.

- **Electric vehicles**: Encourage the development of an expanded electric vehicle charging network within the Region and surrounding municipalities.

- **Autonomous vehicles**: Prepare Waterloo Region for emerging technologies such as self-driving cars. Consider protection of corridors or policies to support initial adoption of autonomous vehicles to help maintain the Region’s status as a technological leader.

### Influencing Travel Behaviour

This action area includes Travel Demand Management (TDM) and other strategies to encourage modal shift or greater use of carpooling. The Region’s TDM plan is already making a difference in travel demand, and this program can be expanded and supported to include wide-ranging technologies and features. Broadly speaking, these include land use planning, traveler information, transit marketing, workplace-based TravelWise services, school-based Active and Safe Routes to School services, individualized marketing campaigns, and supporting efforts of local municipalities and non-governmental organizations.

Additional strategies for influencing travel behaviour that may be part of Moving Forward include:
• **Priority parking**: Designate preferential parking near the main doors for people who carpool at businesses, shopping malls, transit stations, and other key locations.

• **Tools to connect rides**: Promote and support ride matching technologies and programs to help people find carpool partners. Encourage carpooling for school, work, shopping and other key destinations.

• **Carpool lots**: Build or designate more carpool parking lots and spots.

• **Cash in Lieu of Parking**: Develop a program to provide financial or other incentives for employees without parking passes. Carpoolers can share the incentive, and transit passengers can use the funds for their transit pass.

• **EV charging at carpool lots**: Provide free electric vehicle (EV) charging stations at carpool lots.

**Walking and Cycling**

This action area focuses on making cycling and walking more comfortable and convenient for people of all ages to reach school, work, shopping and other destinations. A key role for the Region to improve active transportation will be to design roads and facilities to accommodate all road users.

Many Canadian municipalities have integrated the concept of “complete streets” into their long-range plans at a policy level, and are creating supportive tools and processes to bring complete streets to life. Complete streets are roads that are planned, designed, built and operated for all users, including people who use different modes (e.g. walking, cycling, transit, cars, trucks) and people of all ages and abilities (e.g. children, seniors, persons with disabilities). They are more comfortable, more efficient and more attractive for transit, walking and cycling, and they reflect their community context by integrating elements such as sidewalk cafés, lighting, benches, signage and wayfinding, trees, utilities and stormwater management. Although not every street can accommodate all potential users and functions, planning and design activities can explicitly integrate social, economic and environmental priorities to maximize quality of life.

There are several other potential strategies to support active transportation in the Region of Waterloo, such as the following:
• **Expand the bike network**: Update the cycling network and identify links that will improve connectivity, as well as upgrades to cycling facility types (protected bike lanes, high visibility paint at intersections, crosstrails).

• **Vision Zero**: Aim for zero traffic deaths. Improve safety with awareness campaigns, changes to road design, and traffic law-enforcement campaigns.

• **Reduce barriers**: Add more signalized intersection crossings on busy streets, add separated facilities at bridges, highway overpasses and rail crossings.

• **Measure benefits for all road users**: Use or create updated metrics to assess a road’s performance for all users.

• **Develop design guidelines** for high quality cycling facilities and sidewalks.

• **Improve sidewalk and pedestrian realm**: Provide more lighting, benches, and trees, and increase the separation between pedestrians and cars.

• **Promote cycling and walking**: Increase promotion programs and build partnerships to encourage cycling, such as bike to work week, school trip planning, park and bike lots, etc.

• **Support active transportation during all seasons**, including snow clearing of sidewalks, trails and cycling infrastructure. Work with area municipalities to develop standards and resources.

• **Support cycling tourism** with added consideration in the development of the AT network to key tourism destination and recreational trails, as well as improved signage and maps, and the development of partnerships with tourism industry and local organizations.

**Transit-Supportive Land Use**

This action area speaks to designing new and growing neighbourhoods across Waterloo Region to support all transportation options for residents and visitors.

The design and type of developments enables sustainable transportation objectives. For example, the creation of pedestrian-friendly transit-oriented design (TOD) zones around transit stations will be particularly important for the success of rapid transit, and the integration of transit-supportive features (e.g. transit-oriented design, carpool parking, bicycle storage, cyclist support...
features, direct connections to sidewalks and bus stops) into new offices, homes, condos, stores and institutions will be essential to support more sustainable travel choices by commuters, residents, clients and visitors.

Potential strategies include the following:

- **Complete communities**: Plan for buildings with a mix of activities within neighbourhoods, so that people can work and shop near home.
- **Minimize parking**: Manage parking in the central area and along transit corridors.
- **Build near transit**: Incentivize transit-oriented development around rapid transit corridors, such as the Central Transit Corridor and iXpress routes.
- **Urban design**: Design new neighbourhoods with grid networks and street-oriented facades supportive of walking and cycling. Apply the Region’s TDM Checklist for new developments.

**Travel to and from Waterloo Region**

Improving commuting options and travel times to and from Waterloo Region is identified as an important priority by the public. Potential strategies to improve regional commuting include the following:

- **Highway and road improvements**: This includes widening Highway 401 through Waterloo Region to Mississauga and improving connections to Hamilton via Highway 24 and Highway 6. This also includes new highways, such as the GTA West Corridor that would connect Peel and York Region to Milton and eventually to the west of Hamilton and to Niagara Region. Timing of projects falling under the jurisdiction of MTO are subject to funding, planning, design, environmental approval, property acquisition and construction requirements.

- **Improved VIA Rail service/high-speed rail**: Improved VIA service will provide access to communities outside of the GO network. In the longer term, the Region can be a proponent of high speed rail which has been proposed on the Quebec–Windsor corridor.

- **Improving speed on Kitchener GO line**: Track doubling and improved/new stations with enhanced connections and park and ride lots, and the Regional Express Rail (RER) initiative announced by the Province of Ontario.
• **Extend the Milton GO Line to Cambridge**: New GO rail service to Cambridge.

• **Connecting the airport to rapid transit**: Ensure a rapid transit connection is provided from the Region of Waterloo International Airport to the future GO train station at Breslau.
6. Next Steps

This Phase 1 Report has focused on the 2017–2018 context for Moving Forward. The topics covered include the implementation status of the 2010 RTMP (Moving Forward 2031), local and regional transportation trends and outlooks, and a preliminary look at potential strategies, actions, and policies for Moving Forward.

The needs and opportunities identified in the Phase 1 Report will be refined and updated through consultation with the public and stakeholders. This Phase 1 report will lay the groundwork for initiating Phase 2.

Phase 2 of Moving Forward will involve analysis of travel demand trends from present through 2041. The analysis will be used to assess the effectiveness of currently planned and committed projects, and identify new transportation projects to meet future needs. Specific projects and a future “recommended network” will be developed in detail.
Following Phase 2, Phase 3 of Moving Forward will establish and update policies, timing and an implementation plan for the Phase 2 recommendations, finalize the Regional Objectives, and assemble the final Moving Forward document.
Appendix A. Transportation-Supportive Policies and Plans

This section will focus on the policies that support and inform Moving Forward. The section will summarize the complementarity of provincial, regional and local plans with the Regional transportation system and objectives of Moving Forward.

Provincial Plans and Policies

Provincial Planning Act of Ontario, 1990

The Planning Act sets out the legislative framework for land use planning in Ontario. It describes how land uses may be controlled, and sets out the powers for various decision-makers (e.g. municipalities, the Province, and the Ontario Municipal Board.

Section 2 of the Planning Act sets out various ‘matters of Provincial interest’ which all decision makers shall have regard to in carrying out their responsibilities under the Act. Matters of Provincial interest specifically relating to transportation systems include:

- the adequate provision and efficient use of communication, transportation, sewage and water services and waste management systems;
- the orderly development of safe and healthy communities;
- the accessibility for persons with disabilities to all facilities, services and matters to which this Act applies;

The Planning Act also provides the Minister of Municipal Affairs and Housing with the authority to issue policy statements and establish land use plans, including the Provincial Policy Statement and the Growth Plan for the Greater Golden Horseshoe, which are described below.

Provincial Policy Statement, 2014

The Provincial Policy Statement (PPS) was issued under Section 3 of the Planning Act and sets out the Provincial Government’s policies on land use
planning. In accordance with the Planning Act, all land use planning decisions must be consistent with the PPS. The PPS applies province-wide and provides policy direction on a range of land use planning matters with the goal of promoting strong communities, a strong economy, and a healthy environment.

The PPS includes policy direction on a range of matters including:

- the use and management of land and infrastructure;
- the protection of significant natural features, including important agricultural areas, wetlands, woodlands and shoreline features;
- the management of aggregate and mineral resources;
- ensuring adequate supplies of land to accommodate projected residential and employment growth; and
- safe, efficient, and appropriate transportation systems.

**Growth Plan for the Greater Golden Horseshoe, 2006**

In June 2006, the Province of Ontario approved the Growth Plan for the Greater Golden Horseshoe (GGH), which along with other provincial policies and legislation, set out the framework for growth and development in the GGH. In accordance with the Growth Plan, all planning and infrastructure decisions within the GGH (including the Region of Waterloo) must conform to the Growth Plan.

The purpose of Growth Plan is to encourage planning for growth in the GGH which is supportive of strong and livable communities, enhances the economy, and protects the natural environment. In essence, the key aims of the Growth Plan are to:

- Revitalize downtowns
- Create complete communities
- Provide a variety of housing options to meet the needs of people of all ages and incomes
- Curb the processes of urban sprawl, in order to protect farmland and important environmental areas
- Reduce traffic gridlock by improving access to a greater range of transportation options.
Other key elements of the Growth Plan are population and employment forecasts. These forecasts are set out by the Province to help municipalities anticipate and plan for growth, and to ensure that growth and development in the GGH is carried out in a comprehensive and coordinated manner. The original Growth Plan forecasted that the population of Waterloo Region would rise to 729,000 by the year 2031. Likewise, the Growth Plan forecasted that the Region would be home to over 366,000 jobs over the same time period. These population and employment forecast are reflected in the Regional Official Plan. Amendment 2 to the Growth Plan, adopted in 2013, revised and extended these original population and employment forecasts to the year 2041. By 2041, the Region is anticipated to have a population of 835,000 and have 404,000 jobs.

To achieve the objectives set out in the Growth Plan and the forecasted population and employment growth, the Growth Plan provides density targets for built-up areas and intensification areas and designates twenty five Urban Growth Centres across the GGH. Within the Region of Waterloo, three Urban Growth Centres have been identified by the Growth Plan: Uptown Waterloo, Downtown Kitchener and Downtown Cambridge. The Growth Plan directs that these areas are to be planned as focal points for investment and to accommodate a significant portion of the respective municipal population and employment growth.

The Growth Plan also sets out a number of policies concerning infrastructure planning and transportation planning. The Growth Plan encourages the planning of transportation systems to provide seamless activity amongst different transportation modes for moving both people and moving goods. The Plan also encourages municipalities to offer a greater level of transportation options to encourage cycling, walking and transit, and directs that public transit will be the first priority for transportation infrastructure planning and major transportation investments by the Province.

The Growth Plan directs that any decisions on transit planning and investment made by the Province will be assessed based on a series of criteria that includes using transit infrastructure to shape growth, placing priority on increased capacity of existing transit systems to support infrastructure areas and generally encouraging a strong focus and reliance on transit for moving forward with the provision of mobility services, at provincial, regional and local levels. To that end, the Growth Plan plans for improved inter-regional transit to
connect the Region’s local Urban Growth Centres as well as to nearby communities, such as the City of Guelph and the City of Brantford. Within the Region of Waterloo, the Growth Plan provides for the introduction of higher order transit, linking the communities of Cambridge, Kitchener, and Waterloo, as indicated in Exhibit 2-2 of the Growth Plan.

**Provincial Coordinated Plan Review, 2015**

In 2015, the Ministry of Municipal Affairs and Housing launched a coordinated review of the Greenbelt Plan, the Niagara Escarpment Plan, the Oak Ridges Moraine Plan, and the Growth Plan for the GGH. To oversee and provide direction for the review, the Government of Ontario appointed an Advisory Panel of six advisers, chaired by former Mayor of Toronto David Crombie. The Advisory Panel completed its work and submitted its report to the Government in December 2015, which set out various recommendations for how the plans might be improved and updated.

Taking their recommendations, the Provincial Government has since proposed amendments to the four plans and is currently undertaking a public consultation process on the proposed changes. Among others, the Province is proposing changes that, if approved, would:

- Increase the intensification target in the Growth Plan to a minimum of 60 percent of all new residential development occurring annually in the existing built-up area
- Increase the designated greenfield area density target in the Growth Plan to a minimum of 80 residents and jobs per hectare
- Require municipalities to plan for density targets around major transit stations which support that type of transit
- Show priority transit corridors in the Growth Plan where municipalities would focus transit-related planning, zoning and development efforts
- Support the development of community hubs by encouraging public services to be located together in existing facilities near strategic growth areas, accessible by active transportation and transit
- Strengthen criteria for settlement area boundary expansions within the GGH
- Require municipalities to identify and protect prime employment areas, such as warehousing, logistics, and manufacturing that require a lot of
land and access to transportation infrastructure, such as highways and railway lines.

**Metrolinx – The Big Move, 2008**

The Big Move is the Province of Ontario’s multi-modal long-range (25 year) regional transportation plan for the Greater Toronto Hamilton Area (GTHA), which provides strategic direction for planning, designing and building a regional transportation in the area.

The Big Move aims to achieve a high quality of life for residents of the GTHA; a sustainable and protected environment; and a strong, prosperous and competitive economy. To achieve these goals, the Big Move employs the following strategies:

- Building a comprehensive regional rapid transit network
- Enhancing and expand active transportation
- Improving the efficiency of the road and highway network
- Creating an ambitious transportation demand management program
- Creating a customer-first transportation system
- Implementing an integrated transit fare system
- Building communities that are pedestrian, cycling and transit-supportive
- Planning for universal access
- Improving goods movement within the GGH and with adjacent regions
- Committing to continuous improvement of the transportation network.

The Big Move also identifies a 25 year plan for Regional Rapid Transit, which includes a series of specific infrastructure and policy improvements for the GTHA, including:

- Construction of a fast, frequent and expanded regional rapid transit network that will bring rapid transit to within two kilometres of every resident of the GTHA
- Implementation of rail transit to the Toronto Pearson International Airport from various directions
- Implementation of a region-wide integrated transit fare system to improve the viability and attractiveness of transit-ridership
- Creation of a system of connected mobility hubs around key transit stations
• Improved customer oriented information system to provide up-to-date standardized information on the full range of transportation alternatives available to them for their particular trip, as well as the status of all the elements of the network
• Development of an investment strategy to provide immediate, stable and predictable funding for short, medium and long term priorities.

**Ministry of Transportation – Transit-Supportive Guidelines, 2012**

To provide guidance on the transit-supportive policies of the PPS and the Growth Plan, the Ministry of Transportation (MTO) released its Transit-Supportive Guidelines, which sets out a broad range of strategies and best practices to support the development of transit-friendly communities.

The Guidelines draw from best practice experiences in Ontario, elsewhere in North America and abroad with the aim of helping municipalities, urban planners, transit planners, and developers, have the tools and guidance needed to be supportive of public transit and developing services and programs to promote transit ridership.

**Ministry of Transportation – Freight-Supportive Guidelines, 2016**

To build on the policies of the PPS and the Growth Plan for the GGH, the MTO released and periodically reviews its Freight-Supportive Guidelines. The purpose of the guidelines is to help municipalities understand the unique demands of freight-intensive uses and help them plan for the vehicles that transport goods through their communities. These guidelines contain a series of site-specific guidelines, transit improvement strategies and implementation tools, which can be used by a range of stakeholders including urban planners, municipal staff, developers and transit agencies.

**Ministry of Transportation – High-Speed Rail Environmental Assessment, ongoing**

In late 2014, the MTO approved the initiation of an Environmental Assessment for a high-speed rail service that would connect Windsor, London, Kitchener-Waterloo and Toronto as part of the Moving Ontario Forward initiative, the government’s long-term transit and infrastructure plan. On October 30, 2015, the Province of Ontario announced David Collenette as a Special Advisor for High-Speed Rail.
Moving Forward – Region of Waterloo Transportation Master Plan Update

Region of Waterloo Plans and Policies

Regional Official Plan, 2015

On June 16, 2009, Region of Waterloo Council adopted the new Regional Official Plan (ROP), which sets out policy direction to direct growth and change throughout the Region over a 20-year planning horizon. Following the approval of the ROP by the Ministry of Municipal Affairs and Housing, the plan was appealed – in its entirety – to the Ontario Municipal Board. Since that time, all outstanding appeals have been resolved, and the ROP is now in full force and effect. As such, all land use planning decisions and local official plans conform to the ROP.

The ROP sets out the broad framework for land use planning in the Region and has policies which direct growth and development, establishes population and employment targets, and protects significant environmental and agricultural resources, with the overall goals of fostering an inclusive, thriving, and sustainable community committed to maintaining harmony between rural and urban areas and fostering opportunities for current and future generations. The ROP also sets out policies, goals and objectives surrounding transportation planning and transit oriented development.

Growth Areas

A key component of the ROP is the establishment/delineation of areas for growth and development throughout the Region. The ROP sets out a Planned Community Structure which is “based on a system of nodes, corridors and other development areas connected by a network of roads, transit routes, cycling paths and pedestrian connections” (ROP, Section 2B). The Region’s Planned Community Structure includes:

- Urban Areas and Township Urban Areas
- Urban Growth Centres
- Major Transit Station Areas
- Reurbanization Corridors
- Major Local Nodes
- Urban Designated Greenfield Areas
- Prime Industrial/Strategic Reserve.

The ROP directs that the majority of growth and development is intended to occur within the Urban Area and Township Urban Area designations, including
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a substantial portion development occurring within the Built-Up area (i.e.,
through redevelopment and intensification). The Urban Area, as shown on
Map 3A of the ROP, contains the primary urban areas of the Cities of
Cambridge, Kitchener and Waterloo and portions of the Township of Woolwich
(including Elmira and St. Jacobs).

The ROP also sets out population and employment forecasts to the year
2031, based on the Growth Plan for the Greater Golden Horseshoe. These
forecasts project that the Cities of Cambridge, Kitchener and Waterloo are to
accommodate the greatest degree of population and employment growth,
while the degree of growth in the Townships is anticipated to be significantly
lower.

Protected Countryside and Countryside Line

One of the most significant changes made by the ROP was the introduction of
a Countryside Line. The Countryside Line represents the long-term boundary
between the existing Urban Area/Township Urban Areas and the countryside.
The purpose of this Countryside Line is to create a hard edge for development,
to limit urban sprawl, to facilitate intensification, and to protect the Region’s valuable agricultural resources and environmentally significant areas.

The ROP also introduces an area known as the Protected Countryside. The Protected Countryside is a broad band of environmental features and agricultural lands which are intended to be permanently protected. This Protected Countryside contains a unique concentration of farmlands, woodlands, watercourses, river valleys and wetlands as well as several significant Regional Recharge Areas. It is noted that wherever the Countryside Line coincides with the Protected Countryside, the Countryside Line represents a permanent boundary/limit for development.

Urban Growth Centres

Map 3A of the ROP also designates Urban Growth Centres, which represents the primary business, civic, commercial and cultural centres of the Region. These Urban Growth Centres are to be the Cities of Cambridge, Kitchener and Waterloo, and will delineate the boundaries of Urban Growth Centres and establish associated policies in their official plans to ensure that development within these areas is in conformity with the policies in the ROP.

Major Transit Station Areas (MTSA)

The ROP also identifies a number of Major Transit Station Areas (MTSA), which are areas within a 600 to 800 metre radius of planned rapid transit stations (ION Station Stops). The ROP directs that MTSAs are to be planned and developed to achieve increased densities that support and ensure the viability of transit and to promote a mix of residential, office, institutional and commercial development, wherever appropriate.

The ROP also directs that area municipalities, where applicable, are to prepare a Station Area Plan for each MTSA to provide direction on how the MTSA is to be developed over time. Of note, Station Area Plans are required to include:

- A comprehensive land use plan that defines the station area’s boundaries, development concept, unique characteristics and minimum density requirements
- Design guidelines and development standards to implement Transit Oriented Development
A parking management strategy for land uses within the station area to maximize reurbanization opportunities, minimize surface parking areas and discourage auto-oriented land uses

A description of the future actions required to implement the Station Area Plan, which may include Regional and/or Area Municipal Community Improvement Plans and associated financial incentive programs, and other appropriate implementation tools.

Reurbanization Corridors
The ROP also identifies a number of Reurbanization Corridors which are along Existing or Planned Transit Corridors, that will link directly to rapid transit and which have potential to accommodate a significant proportion of Reurbanization. These corridors are to be planned and developed to accommodate additional population and employment growth well-served by transit, achieve higher development densities to support the viability of existing and planned transit, provide a mix of uses, and connect and facilitate movement among Urban Growth Centres, MTSA’s and Major Local Nodes.

Major Local Nodes
Major Local Nodes represent existing or planned clusters of development at key intersections of Transit Corridors. These Major Local Nodes are to be planned to accommodate additional population and/or employment growth supportive of current and planned transit service.

Prime Industrial/Strategic Reserve Lands
The ROP also includes a series of Prime Industrial/Strategic Reserve areas which are intended to accommodate future industrial development in areas well serviced by Regional roads and the Provincial highway system. Prime Industrial/Strategic Reserve areas include lands within close proximity to the Region of Waterloo International Airport, as well as the intersection of Highway 401 and Regional Road 97 in North Dumfries. Both of these areas have been planned for future employment uses, and are well-suited for freight-dependent uses (i.e. warehousing, distribution etc.).

Transit Oriented Development Policies
Section 2.D.2 of the ROP sets out Transit Oriented Development Policies which are to be applied by the Region and area municipalities in their review of development applications for properties on or near sites that are served by
existing or planned rapid transit, or higher frequency transit. These include (among others):

- Creating an interconnected and multi-modal street pattern that encourages walking, cycling or the use of transit and supports mixed-use development
- Supporting a more compact urban form that locates the majority of transit supportive uses within a comfortable walking distance of the transit stop or MTSA
- Providing an appropriate mix of land uses, including a range of food destinations, that allows people to walk or take transit to work and also provides for a variety of services and amenities that foster vibrant, transit supportive neighbourhoods
- Promoting medium and higher density development as close as possible to transit stops to support higher frequency transit service and optimize transit rider convenience

Providing access from various transportation modes to transit facilities, including consideration of pedestrian, bicycle parking, and where applicable, passenger transfer and commuter pick-up/drop off areas.

Region of Waterloo Strategic Plan 2015-2018

The Region of Waterloo’s Strategic plan defines central priorities set by the Regional Council and the Plan articulates the Region’s Vision: “Waterloo Region a community where people matter and ideas grow”, core values as well a 5 focus areas and strategic objectives. Those that pertain to Moving Forward include:

Focus Area 2: Sustainable Transportation

2.1 Create a public transportation network that is integrated, accessible, affordable and sustainable.

2.2 Improve inter-city rail transportation services to and from Waterloo Region.

2.3 Build infrastructure for, and increase participation in, active forms of transportation (cycling and walking.)

2.4 Optimize road capacity to safely manage traffic and congestion.
Focus Area 3: Environment and Sustainable Growth

3.3 Enhance efforts to improve air quality.

Active Transportation Master Plan (2014)

In February 2014, the Region of Waterloo approved “Walk Cycle Waterloo Region”, which is its Active Transportation Master Plan (ATMP). The ATMP builds upon the direction of the RTMP, and sets out a plan to increase the number of trips made by transit, walking and cycling. The ATMP was developed in co-operation with the Area Municipalities, and was designed to work together with local plans that focus on walking and cycling.

The key goal of the ATMP is to increase the portion of walking and cycling trips to 12% by 2031, as set out in the RTMP. The Plan provides that, combined with the Region’s ongoing efforts to increase transit use, achieving this goal will help reduce the need for road expansions over the next 20 years and help to create a more compact, vibrant and liveable community.

To meet the goals set out in the ATMP, the plan sets out action plans for improving the existing transportation network, encourage walking and cycling through the use of strategic signage, winter maintenance, encouraging behavioural shifts, and to monitor performance on the implementation of the ATMP.

Context Sensitive Regional Transportation Corridor Design Guidelines, 2013

Established to guide the boulevard and road design of transportation corridors in the Region, the Context Sensitive Regional Transportation Corridor Design Guidelines were created to reflect the varying contexts of regional roads.

The principle goals of the Regional Transportation Corridor Guidelines are to:

- Establish a well-defined and descriptive hierarchy for the Regional Transportation Corridors that acknowledges the variation and uniqueness of Waterloo Region and responds to the diversity of adjacent land uses
- Establish guidelines for the safe, convenient and comfortable movement of goods and people including access management
- Provide an integrated framework for operational (road) and urban design (boulevard) components that can adapt to a variety of conditions
• Enhance, develop, promote and integrate sustainable and active forms of transportation (public transit, cycling and walking) by the provision of a comfortable built environment

• Become a reference for the Region and Area Municipalities in the preparation of corridor studies, land use plans, road improvement projects, Class EA’s and development proposals.

The detailed design recommendations will be referenced by Moving Forward when considering policies and programs that are aligned and impacted by the function and design of roads.

**Climate Change Action Plan, 2013**

ClimateActionWR, the Climate Change Action Plan for the Region of Waterloo, was developed by Sustainable Waterloo Region, a collaboration of local organizations that are focused on climate change mitigation. ClimateActionWR directs our community's collaborative efforts to reduce greenhouse gas (GHG) emissions by six percent from 2010 levels by 2020.

ClimateActionWR completed a community-scale GHG emissions inventory for Waterloo Region in 2010. Transportation is identified as the largest source of GHG emissions in the Region, contributing to 40% of all GHG emissions and 65% of nitrogen oxides and volatile organic compounds which contribute to smog.

**Region of Waterloo Pedestrian Charter**

In 2005, Regional Council adopted a pedestrian charter which sets out a vision of creating an urban environment that is conducive and safe for walking. The Charter encourages the use of public transit, decreasing car-dependency, eliminating conflicts between vehicles and pedestrians, improving air quality, and green tourism.

**Active and Safe Routes to School Program**

The Region of Waterloo Public Health and Emergency Services Department promotes the use of active transportation for children on their daily trip to and from school in collaboration with community partners. The Active & Safe Routes to School (ASRTS) program key goals include working together to increase physical activity in children, reducing traffic congestion, reducing vehicle emissions around school sites, and supporting independence in school-aged children across Waterloo Region.
**TravelWise Program**

TravelWise is a Regional Transportation Management Association (TMA) that offers TDM services (online carpool matching software, discounted transit passes, emergency ride home reimbursement service, promotions, etc.) to employees at participating workplaces. The goal of TravelWise is to introduce and encourage sustainable commuting solutions that reduce the overall number of employees driving alone to work. Operating as a public-private partnership, the Region works with organizations/employers across the Region to provide innovative strategies that encourage taking transit, cycling, walking and carpooling to work.

**ITS Strategic Plan and Communications Study**

The Intelligent Transportation System (ITS) Strategic Plan for the Region of Waterloo provides a vision for the use of innovative technologies to support more efficient use of transportation infrastructure, services and systems in the Region of Waterloo. The Region's ITS Strategic Plan includes the replacement of all existing signal control systems, among other ITS elements. Supporting the exchange of data between these ITS roadside elements and the Traffic Management Centre will be an Internet Protocol (IP) communications network, replacing the existing copper network and encompassing the new elements. The Communications Study gathered requirements from stakeholders and identified and assessed existing wireless and wired communications systems deployed throughout the Region, identified new ITS applications and elements, and then proposed an appropriate network architecture along with their cost-benefit analysis to support the ITS elements outlined in the ITS Strategic Plan.

**Area Municipal Policies**

The Region of Waterloo is a two-tier municipality for land use planning purposes. The Region leads with broad land use planning policy as set out in the Regional Official Plan, and the Area Municipalities implement and expand upon this policy direction to address local issues in their own Official Plans and other municipal plans, including transportation plans. This section provides a high-level overview of the Area Municipal planning and transportation planning framework of the Region.
City of Cambridge

City of Cambridge Official Plan, 2012
On May 7, 2012 Cambridge City Council approved a new Official Plan, which was subsequently approved by the Region of Waterloo on November 21, 2012. The Official Plan was then appealed, in its entirety, to the Ontario Municipal Board, and as such some portions of the Official Plan remain under appeal.

The purpose of the City’s Official Plan, as set out in Section 1.1 of the Plan, is to provide a long range, comprehensive land use strategy for areas located within the municipal boundaries of the city. The plan also establishes the framework for land use decisions public works investment/projects within the City of Cambridge over a 20 year planning horizon.

The Official Plan directs that, at a minimum, 45% of all residential development within the City will occur within the existing built-up area of the City. The Plan directs that the majority of this growth will occur in the Urban Growth Centre, Community Core Areas, City Nodes, Regeneration Areas, Reurbanization Corridors and Major Transit Station Areas.

The Official Plan also sets out the transportation planning policy framework for the City, to achieve the following objectives:

- Provide a safe, sustainable, effective, accessible and energy efficient transportation system, using a wide range of travel modes to move people and goods
- Reduce dependence on the automobile by increasing the number of people using public transit, walking and cycling
- Protect rail corridors to allow for the provision of improved passenger and freight rail service
- Encourage the appropriate land use for discontinued rail corridors

City of Cambridge Bikeway Network Master Plan, 2008
The City of Cambridge approved a Bikeway Network Master Plan in July 2008, which delineates existing cycling routes within the City roads on Regional roads within the City. The Bikeway Network Master Plan also sets out the City’s policies for the design, funding, implementation, maintenance and promotion of cycling routes.
City of Cambridge Corporate Sustainability Plan, 2011

The Corporate Sustainability Plan acts as a guide for long-term sustainability of the Corporation of the City of Cambridge. It provides a framework for future master plans and secondary plans to balance the City’s fiscal responsibility with cultural (including heritage), economic, environmental and social interests. The Plan includes a three year action plan, and a long-term sustainable decision-making process, and a reporting tool.

City of Cambridge Trails Master Plan, 2010

The Trails Master Plan provides an update to the City of Cambridge Multi-Use Trails Study (1996) and Trail Maintenance Manual (1999). The Plan reviews the previous trails network, assesses the need for new trails and improvements to existing infrastructure, and establishes new guidelines for the design, funding, maintenance and engagement of trails. The proposed network plan includes a central ‘spine’ trail along the Speed and Grand Rivers, new connections to be prioritized if they connect to this central trail, and connectivity between Cambridge’s communities. Network crossings of barriers such as busy streets and improved wayfinding and safety designs are also recommended.

City of Kitchener

City of Kitchener Official Plan, 2014

On June 30, 2014 the City of Kitchener adopted a new Official Plan, which was subsequently approved by the Region (with modifications) on November 19, 2016. As of December 2014, the Official Plan remains, in its entirety, under appeal before the Ontario Municipal Board.

The purpose of the Official Plan is to provide a framework for decision-making on land use matters, to guide the growth and development of the city to the year 2031, to establish an urban structure and land use framework in the City, and to provide guidelines which the City can use to evaluate the appropriateness of future developments.

The Official Plan directs that new residential development occurring within the Built Boundary will be counted towards the achievement of the Regional intensification target of 45%. Further, the plan sets out intensification targets for five year periods, starting in 2011. From 2026-2031, the plan sets a 70% intensification target for the City as a whole. The plan directs that the majority
of this intensification will occur in the City’s Urban Growth Centre, Major Transit Station Areas, City Nodes, Community Nodes, Urban Corridors and Arterial Corridors.

The Official Plan also recognizes the relationship between transportation and land use, and recognizes its integrated transportation system as an essential component of the city’s urban structure and an important factor in shaping the form and character of growth in the city. The Plan sets out the following objectives for its transportation system:

• To develop, support and maintain a complete, convenient, accessible and integrated transportation system that incorporates active transportation, public transit and accommodates vehicular traffic
• To promote and encourage walking and cycling as safe and convenient modes of transportation and ensure that the pedestrian and cycling networks are integrated with other modes of transportation
• To have a walkable and transit-supportive community
• To have an integrated transportation system which facilitates the convenient movement of persons between residences, places of employment, shopping areas, cultural and recreational facilities and community resources
• To promote land use planning and development that is integrated and conducive to the efficient and effective operation of public transit, and encourages increased ridership of the public transit system
• To increase the efficiency of existing transportation infrastructure and facilities through improvements, restoration, and maintenance, prior to investing in new infrastructure and facilities
• To collaborate with the Province, Region and other agencies to create an integrated transportation system that can accommodate current and anticipated transportation needs.

With respect to transit, the Official Plan directs that “the City will endeavour to ensure an arrangement of development and streets whereby the maximum walking distance to a transit stop will not exceed 450 metres for 95% of residences, places of employment and community facilities”.

Moving Forward – Region of Waterloo Transportation Master Plan Update
Kitchener Transportation Master Plan, 2013
In June 2013, the City of Kitchener approved its Transportation Master Plan, which will guide the city as it strives to manage growing transportation demand. The master plan sets out several objectives, including the following:

- Developing guiding transportation policies for subjects ranging from traffic control through to parking requirements, road noise mitigation and truck route management
- Providing planning direction to the year 2031 with short term, medium term, and long term goals
- Providing transportation planning direction for enhanced alternative modes of transportation
- Describing how to develop an integrated system that supports Regional bus and planned rapid transit
- Describing how to develop a city that is less reliant on cars.

The plan also sets out policies, goals and objectives on matters relating to travel safety, active transportation, transportation demand management, traffic management, parking supply and management, goods movement and traffic control.

City of Kitchener Transportation Demand Management Strategy, 2011
In 2011, the City of Kitchener adopted a Transportation Demand Management Strategy with the goal of minimizing traffic congestion, improving air quality, reducing greenhouse gas emissions, reducing vehicular parking demand, and improving public health in the long-term.

The Transportation Demand Management Plan is based on a multi-year capital program that will phase in numerous initiatives over five years, which may include:

- Subsidized corporate Grand River Transit passes
- Carpool matching
- Guaranteed ride home program
- Pilot telework program, which incorporates Web conferencing tools to avoid the need for city employees to move between facilities
- Carbon tracking tool
• Outreach programs;
• Marketing, educational and promotional events.

Planning Around Rapid Transit Stations (PARTS) Initiative, 2013
Building on the direction of the Regional Official Plan and the City of Kitchener Official Plan, the City of Kitchener initiated its Planning Around Rapid Transit Stations (PARTS) project in 2013. The key purpose of the PARTS project is to provide direction for development in and around planned ION (Regional Light Rail Transit) station stops. The project also has the aims of ensuring stability within these areas, and ensuring that these areas are developed in a way that is transit supportive.

Once completed, the project will see station area implemented for each of the five planned station areas. These plans will address matters including: recommended land use schedules, policies and initiatives to enhance pedestrian and cycling connections, transportation demand management measures, public realm and streetscape improvements, public art opportunities.

Kitchener Pedestrian Charter, 2005
In 2005, the City of Kitchener adopted a Pedestrian Charter to ensure that walking is a safe, comfortable and convenient mode of urban travel for pedestrians. As signatories to the Charter, the City commits to (among others):

• Upholding the right to safe, convenient, direct and comfortable walking conditions
• Providing a walking environment within the public right-of-way and in public parks
• Supporting and encouraging the planning, design and development of a walking environment that meets the travel needs of pedestrians
• Providing and maintaining infrastructure that gives pedestrians safe and convenient passage
• Setting policies that reduce conflict between pedestrians and other users of the public right-of-way.

City of Kitchener Cycling Master Plan, 2013
The City of Kitchener approved its Cycling Master Plan in 2010. The plan sets out broad goals for cycling in the city, including the goal to install over 100
kilometers of bikeways in the city. The plan delineates the city’s existing bikeway network as well as bikeways to be implemented over time. The Plan also sets out policies to support making Kitchener a bicycle-friendly city, and related practices and programs to further those policies into action. Key objectives of the Cycling Master Plan include the following:

- Attracting new cyclists
- Strengthening existing bicycle policies
- Creating a bikeway network on city streets
- Increasing bicycle parking availability and options
- Expanding programs to support bicycling.

**City of Kitchener Long-Term Parking Strategy, 2011**

The Long-Term Parking Strategy develops series of recommendations for the management and supply of public parking by the City of Kitchener, with a focus on reducing auto dependency and supporting development and employment growth in the downtown. The study’s specific Long-Term Parking Recommendations include:

- Continue with annual monthly parking rate increases in excess of inflation to i) reduce demand and support TDM measures; ii) to more closely align parking rates with the true costs of structured parking; and iii) establish a user pay funding model that is more in line with total cost recovery to support future capital expenditures.

- Monitor long-stay parking supply and demand on a bi-annual basis. Establish policies that encourage a parking inventory where demand should always exceed supply.

- Anticipate increased intensification of existing office space within the City Centre District by exploring public-private partnership opportunities for a future municipal parking structure on Lot 3 (Charles Street and Water Street).

- Anticipate the conversion of industrial space to office space in the Warehouse District by review parking requirements of the zoning bylaw to capture increased parking demand resulting from higher intensity uses.

- Through the Redevelopment Strategy for City-Owned Downtown Lands, assess redevelopment opportunities for surface parking lots and assess all implications (such as revenue, parking supply, parking demand, etc.).
• Review the parking requirements of the zoning bylaw to more accurately reflect the current modal split.

City of Waterloo

City of Waterloo Official Plan, 2012

City of Waterloo Council adopted a new Official Plan for the City in April 2012, which was subsequently approved (with modifications) by the Region in November 2012. Two appeals remain before the Ontario Municipal Board, but the remainder of the Official Plan is in full force and effect.

The Official Plan directs land use growth and change in the City over a 20-year planning horizon and focuses on a number of areas, including (among others) arts, culture, city form, the economy, environment and energy, land use, and transportation networks.

The Official Plan provides that by 2029, the City of Waterloo will have a population of 138,000 (excluding post-secondary students who reside temporarily in the Region) and 88,000 jobs. To accommodate this growth, the Official Plan directs that the majority of new growth will occur in the existing Urban Area Boundary, primarily within or adjacent to designated Nodes and Corridors, Uptown Waterloo (Urban Growth Centre), and Major Transit Station Areas. All remaining growth will occur in vacant lands including designated Greenfield Areas.

The City’s Official Plan also sets out the land use policy framework for transportation planning in the City. Specifically, the Official Plan sets out policies to support a transportation system that:

• Provides for the safe and convenient movement of goods and people with varying degrees of mobility within and to/from Waterloo
• Increases the opportunities for, and removing the disincentives to, walking, cycling and transit
• Is multi-modal and provides choice
• Provides connectivity between various modes of transportation
• Includes a local neighbourhood transportation system that is safely and adequately connected to the higher-order network throughout the City
• Is accessible
• Enables reduced dependency on non-renewable energy.

The Official Plan also sets out policies in support of transit ridership and alternative and active modes of transportation.

City of Waterloo Transportation Master Plan, 2011

The City of Waterloo approved its first Transportation Master Plan in April 2011, which guides the planning and decision-making around transportation, with the overarching goal of making Waterloo "truly accessible for all." The Plan is premised on four key principles: accessibility, choice, sustainability, and fiscal responsibility.

While the TMP recognizes the significance of the cars/personal vehicles in both the existing and future system of the City, the plan advocates for the development of a multi-modal transportation system of walking, cycling and transit in addition to car-travel. The Plan also recognizes the importance of freight-dependent uses and the unique transportation demands that they have.

The Transportation Master Plan addresses all modes of transportation in the City of Waterloo under its jurisdiction, including: road transportation, cycling facilities and pedestrian infrastructure. The TMP also provides an implementation strategy for the coordination and integration of the transportation system to guide the City’s decision-making process to the year 2031. The transportation system recommended by the TMP integrates the transportation infrastructure requirements of existing and future land use, with the community planning vision and objectives of the City for growth management, public safety, affordability, economic vitality and quality of life developed through the City's Official Plan.

City of Waterloo Strategic Plan 2015-2018

The City of Waterloo’s Strategic plan defines central priorities for the City of Waterloo and the pivotal actions to reach those goals. Of the six primary goals of the Plan, the first is its multi-modal Transportation Goal: “The city is a fully connected integrated community through its multi-modal transportation network”.

Key objectives for multi-modal transportation:

• Maintain and improve existing networks
• Improve access to public transit routes through a robust series of linked transportation networks
• Create hubs around ION station areas that support opportunities to live, work, learn and play
• Expand the active transportation network by completing trails, adding bike lanes, providing cycling facilities and creating more walkable communities, while promoting use of the network to the community
• Liaise with the Province of Ontario to enhance the transportation network with the Greater Toronto Area (GTA).

Example initiatives:
• Advocate for two-way GO Transit train service
• Complete the WaterLoop (an interior trail loop)
• Work with the Region of Waterloo to enhance King Street streetscape in uptown Waterloo and University Avenue gateway opportunities
• Complete Columbia Street West redesign
• Move to create additional complete streets, including Northdale
• Complete station area plans, identify implementation funding
• Implement high priority initiatives in the transportation master plan
• In developing areas, upgrade city roads to urban standards
• Encourage growth of an electric vehicle charging station network

Township of North Dumfries

Township of North Dumfries Official Plan
The Township of North Dumfries undertook a review of its Official Plan in 2013, and an update to the plan was approved by the Region of Waterloo on August 21, 2014. The Official Plan is the Township’s central planning document that guides decisions on a wide range of issues, including land use, housing, infrastructure, environmental protection, resource management and other planning matters. The Official Plan represents Township Council’s vision for growth and change in the township to the year 2031.

The Official Plan directs that by 2029, the Township will have a population of 16,000 and will have 8,400 employment opportunities. The Official Plan
directs that the majority of this growth will be directed to the built-up area, which includes the Ayr Urban Area and the Highway 401/Regional Road 97 Employment Area. The remainder of growth will being directed to the Township Rural Areas and existing Rural Employment Areas.

The Highway 401/Regional Road 97 Employment Area is located at the intersection of Highway 401 and Regional Road 97, and has been designated to accommodate freight-supportive uses given its location to these important transportation corridors. Uses in this area are generally limited to privately serviced logistics and warehousing uses that require close access to the Highway 401 to efficiently move goods into and out of the region.

The Official Plan also sets out broad policies guiding transportation planning in North Dumfries. The plan sets out a road hierarchy, which includes Provincial Highways, Regional Roads, and Township Roads. The Plan also directs that the Township will endeavor to implement Transportation Demand Management Strategies and that the Township will implement the recommendations of the Regional Cycling Master Plan and Transportation Master Plan in the review of development applications.

Township of Wellesley

Township of Wellesley Official Plan

The Township of Wellesley adopted its current Official Plan in 2004, which was subsequently updated through Official Plan Amendment No. 7 (OPA 7) in 2015. The purpose of OPA 7 was to bring the Township’s Official Plan into conformity with the Region of Waterloo Official Plan. The Official Plan provides the policy framework guiding development in the Township and its effects on the social, economic and natural environment to the year 2031.

The main purposes of the Official Plan are to:

- Establish a policy framework for maintaining and enhancing the township’s resources while promoting the development of a livable and sustainable community
- Provide a legal framework guiding public and private decisions relating to the development and the provision of roads, watermains, sewers, community infrastructure and other services within the Township
• Reflect local initiatives and circumstances unique to the Township as a whole and of specific areas within the Township in particular
• Provide a policy framework for establishing Zoning By-Laws
• Build on and implement the land use policies and plans of the Region and the Province.

The Official Plan directs that by 2029, the Township will have a population of 12,000 and will have 4,100 jobs. To accommodate this growth, the Plan directs that the majority of new growth will be directed to the Wellesley Urban Area which is intended to accommodate a broad range and mix of land uses and serve as the primary focus for population and employment growth in the Township to the year 2031.

The Official Plan also sets out land use policy direction with respect to the Township’s existing and planned transportation network. The Plan provides that the Township will provide and maintain a road network that is integrated with Provincial and Regional roads, to accommodate current and anticipated traffic volumes so as to ensure the efficient movement of people and goods throughout the Township. The Plan also recognizes the road hierarchy, which includes Regional Roads and Township Roads.

The Official Plan also directs that the Township will endeavour to ensure that roads within the Township will be properly designed to provide for the safe integration of horse-drawn and motorized vehicles with the road right-of-way, recognizing unique transportation realities and needs of a significant portion of the population of the Township.

Township of Wilmot

Township of Wilmot Official Plan

The Council of the Township of Wilmot adopted the Township Official Plan on July 21, 2003, which was subsequently approved by the Region on July 7, 2004. The Official Plan outlines Council’s long-term policy direction to guide development within the Township and sets out strategies and policies to allow the Township to manage change towards a desired future. The Plan sets out population and household forecasts for the Township to the year 2016. By 2016, the Official Plan forecasted a population of 22,300 distributed amongst 8,000 households. The Plan directs that the majority of this growth will be directed to its two Urban Areas, being Baden and New Hamburg.
The Official Plan sets out a goal with respect to transportation, being to promote the continued development and coordination of an integrated transportation network that is safe, efficient, environmentally sensitive, and which balances the needs of cyclists, pedestrians, motor vehicles and rail users.

The Official Plan also sets out policies for transportation planning in the township, which directs the township to:

- Apply Provincial and Regional conditions/criteria on development applications with respect to the operation of the respective road networks as part of development approvals under the Township’s jurisdiction
- Require site plan and plan of subdivision designs to have regard for the needs cyclists, pedestrians and future transit for access to the site
- Provide for the design and construction of an integrated road system.

The Plan also recognizes, describes and sets out policy-direction with respect to the Township’s road hierarchy, which includes Provincial Highways, Regional Roads, Primary Township Roads and Local Township Roads.

**Township of Woolwich**

**Township of Woolwich Official Plan**

The Township of Woolwich adopted its Official Plan on October 24, 2000, which was subsequently approved by the Region on May 8, 2002. The purpose of the Official Plan is to set out development policies intended to guide the Township's future development to the year 2016. By 2016, the Plan projects that the Township will have a population of 24,600 distributed amongst 8,500 households.

This Plan directs the majority of forecasted growth to the Elmira, St. Jacobs and Breslau Urban Areas, while limited growth is directed to areas within the existing boundaries of the Service and Residential Settlements and Industrial/Commercial designations.

The Official Plan recognizes the importance of an integrated transportation system. The Plan recognizes the existing road hierarchy comprised of Provincial Highways, Regional Roads and Township Roads, and directs that Township Council will encourage opportunities for the expansion of transit into the Township and opportunities to promote active transportation.
The Official Plan also sets out policy direction with respect to the Waterloo Regional Airport. Specifically, the Plan sets out policies to protect the ongoing and undisturbed use of the airport and to ensure that matters such as building heights, noise and proximity of buildings are regulated to minimize potential negative impacts.
Appendix B. Report – A Driverless Future –
It’s not just about the cars
What are connected and autonomous vehicles?

Connected Vehicles (CVs) are vehicles that are connected to infrastructure, mobile devices, and other CVs and are capable of sharing information with each other to optimize their function and performance.

Autonomous Vehicles (AVs) interpret the world around them and navigate roads without human intervention. Driverless cars are fully autonomous vehicles.

Connected and Autonomous Vehicles (CAVs) are capable of synergizing the abilities of both the autonomous and connected components and will be the vehicles of the future.

When are they coming?

<table>
<thead>
<tr>
<th>Level</th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
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<tbody>
<tr>
<td>L1</td>
<td>ASSISTED</td>
<td>ADAPTIVE CRUISE CONTROL</td>
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<td></td>
<td></td>
<td>AUTONOMOUS BRAKING</td>
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<tr>
<td>L2</td>
<td>PARTIAL AUTONOMY</td>
<td>ADAPTIVE CRUISE CONTROL &amp; LANE KEEPING ASSIST</td>
<td>PARK ASSIST</td>
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<tr>
<td>L3</td>
<td>CONDITIONAL AUTOMATION</td>
<td>AUTO PILOT: TRAFFIC JAM</td>
<td>AUTO PILOT: HIGHWAY</td>
<td>AUTO PILOT: CAV PLATOONS</td>
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<td>AUTO PILOT: PARKING</td>
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<tr>
<td>L4</td>
<td>HIGH AUTOMATION</td>
<td>SITUATIONAL HUMAN INTERVENTION</td>
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<tr>
<td>L5</td>
<td>FULL AUTOMATION</td>
<td>COMPLETELY DRIVERLESS</td>
<td>WIDE-SCALE DOOR TO DOOR ON-DEMAND SERVICE</td>
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SOURCE: IHS, 2014
The prospect of Connected and Autonomous Vehicles (CAVs) represents a transformation in the way the world moves. CAVs will also be a significant disruptor to established practices across multiple industries. As potentially defining elements of integrated mobility systems in the cities of tomorrow, they are likely to have considerable influence on how we live, work, play, move, and interact.

The best way to predict the future is to create it.

Where are CAVs being considered today?

**USA**
Many states have now legalized the testing of AVs on their roads. In Pittsburgh and San Francisco, driver-present autonomous Uber vehicles have been introduced and can be requested by passengers.

**Ontario**
Since January 2016, Ontario has allowed AVs to be tested on its roads. A new development in Ottawa is looking at an internal self driving car service.

**Helsinki**
Plans to eliminate the need for car ownership by 2025 by promoting on-demand transit that is envisioned to eventually be a fully autonomous system.

**Switzerland & Netherlands**
Autonomous minibuses operate along a fixed route. Service began at the start of 2016.

**Singapore**
Currently operates driver-present autonomous taxis and will be rolling out driverless buses in 2017.

**Japan**
Plans to have Robot Taxi roll out this year in a test community. Plans to have Robot Taxi service for the 2020 Olympic games in Tokyo.
CAVs could have both positive and negative implications for many aspects of urban life

1. TRAFFIC SAFETY

90% of accidents are caused by human error¹

20% to 30% of all collisions involve driver distraction²

33,147 motor vehicle fatalities in Canada and the USA in 2014³

1 person killed every 25 sec around the world (1.25M annually) due to a vehicle-related accident⁴

$10 billion annually economic loses related to health care costs and lost productivity caused by traffic collisions in Canada⁵

Annual Traffic Fatalities in Canada and the USA⁶

- 5,172 Pedestrians
- 22,694 Automobile Occupants
- 4,484 Motorcycle Drivers/Passengers
- 755 Cyclists

Potential Gains

+ CAVs could eliminate or reduce the severity of 90% of traffic related fatalities.

Potential Pains

→ The transition period when both CAVs and non-CAVs are on the road could make matters worse before it makes them better. CAVs will also need to make morally complex decisions that will be controversial.

Potential Ways to Leverage the Gains

+ Design infrastructure to consider the operating parameters of CAVs
+ Segregate of CAVs and non-CAVs in the early stages of infiltration

¹. STANFORD LAW SCHOOL, 2013 - HTTP://CYBERLAW.STANFORD.EDU/BLOG/2013/12/HUMAN-ERROR-CAUSE-VEHICLE-CRASHES
². ALBERTA TRANSPORTATION, 2011 - HTTP://DISTRACTEDDRIVING.CAA.CA/EDUCATION/
³. TRANSPORT CANADA, 2014 - WWW.TC.GC.CA/MEDIA/DOCUMENTS/ROADSAFETY/CMYCS2014_ENG.PDF
⁴. WORLD HEALTH ORGANIZATION, 2016 - WWW.WHO.INT/MEDIACENTRE/FACTSHEETS/FS358/EN/
⁵. WWW.CAA.CA/DISTRACTED-DRIVING/
⁶. IIHS - WWW.IIHS.ORG/IIHS/TOPICS/T/GENERAL-STATISTICS/FATALITYFACTS/STATE-BY-STATE-OVERVIEW
2. TRANSPORTATION EFFICIENCY

Congestion causes a 35% increase in travel time in Vancouver and 31% additional travel time in Toronto\(^1\)

17.2% of Canadian commuters take 45 mins or more to get to work\(^2\)

The average Canadian commuter lost 79 hrs in 2014 due to traffic delays\(^3\)

Conventional transit service is inefficient in low-density areas

### Potential Gains

+ Commute time could be used more effectively (working, sleeping, entertainment, socializing).

+ CAVs could improve public transportation services and decrease auto ownership by enabling more efficient, user-friendly, and low cost on-demand transportation services, even in low demand areas.

+ CAVs can platoon and become more space efficient which can increase traffic throughput and road capacity by up to 30% and reduce travel times.

### Potential Pains

- CAVs could increase vehicle kilometres travelled (VKT) as people could tolerate longer commutes, live further from their workplace (exurban sprawl), and travel more often.

- Short trips by on-demand CAV services could replace trips made by active transportation and public transit.

- High rates of personal CAV ownership could perpetuate the status quo in parking, ownership, and land use patterns.

### Potential Ways to Leverage the Gains

+ Create synergies by integrating CAV technology, emerging on-demand transportation services, public transit, and other shared mobility options.

+ Leverage CAVs to improve public transportation service before they become widely available and affordable as personal automobiles.

+ Develop infrastructure and invest in the development of an integrated mobility system.

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1. TOMTOM, 2014 - WWW.TOMTOM.COM/EN_CA/TRAFFICINDEX/?PID=7969333A%2F
3. TOMTOM, 2014 - WWW.TOMTOM.COM/EN_CA/TRAFFICINDEX/?PID=7969333A%2F
3. LAND USE EFFICIENCY

It is estimated that there are between 4 and 8 parking spots or up to 1,300 square feet of parking for every automobile in North America. On average, automobiles are parked 95% of the time.¹

Up to 50% of the urban land surface in some North American cities is dedicated to transportation.²

### Potential Gains

- CAVs that are providing on-demand transportation services will contribute to a decrease in vehicle ownership. This will reduce the total number of cars in urban areas that are sitting idle, resulting in a reduced demand for parking space.

- Land that was previously used for parking could be re-purposed for other uses (housing, retail, recreational, etc.).

### Potential Pains

- Personal CAV ownership could further promote urban sprawl.

- While parking space may be reduced, there may be an increased need for curb-side street space.

### Potential Ways to Leverage the Gains

- Land use policy can include restricting access to newly converted on-street parking space by allocating it to specified commercial or recreational uses, such as delivery bays, enlarged footpaths, or bicycle tracks.

- Freed-up space in off-street parking could be used for urban logistics purposes, such as distribution and charging centres, or for recreation, affordable housing or urban agriculture.

- New suburban neighbourhoods need to be designed with sustainability principles - co-working, on-site flood prevention, on-site power generation and agriculture, social networks, and on-demand mobility.
4. INFRASTRUCTURE AND TRANSIT SPENDING

$123B
Infrastructure
Deficit
There is an estimated $123 Billion infrastructure deficit across Canada\(^1\).

79%
On average, more than 79% of the useful life of the currently available public infrastructure has been exhausted\(^2\).

Billions
of dollars in transit investment
Canadian cities are asking higher levels of government for billions of dollars in transit and roadways investment to increase transportation network capacity.

0.41 : 1
The average ratio of revenues to operating expenses from 49 of the largest transit agencies across North America\(^3\).

Potential Gains

+ CAVs will require less road space per vehicle, thus increasing the capacity of existing roads and highways.

+ Publicly regulated demand-responsive CAV services will be able to provide a lower price point and better service to dramatically improve transit in areas with low transit demand.

+ Demand-responsive CAVs could reduce the need for car ownership and promote alternative transportation modes.

Potential Pains

- More Vehicle Kilometers Travelled (VKT)

- More infrastructure and more expensive (connected infrastructure) is required to support CAVs and non-CAVs.

- Labour shortages and union/public backlash against job automation

Potential Ways to Leverage the Gains

+ Incorporate CAVs into strategic assessments for capital investments in infrastructure. Potential for new scenario planning incorporating new ways of utilizing existing infrastructure based on CAV specs and requirements

+ Re-purpose infrastructure that becomes underused for more green space, parks, or other uses

+ Ensure that the projects built today will not be made redundant by the advent of CAVs in the near term

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1. WWW.ACE.C.A/FILES/ADVOCACY/VI/PUBLIC%20INFRASTRUCTURE%20UNDER%20INVESTMENT%20-%20THE%20RISK%20TO%2OCANADA%2E20%99%20ECONOMIC%20GROWTH_2010.PDF
2. WWW.RCCA.O/RESEARCH/FILES/RCCA%20INFRAFUND%20DEFICIT%20JUN%2006.PDF
3. FAREBOX RATIOS AROUND THE WORLD” WIKIPEDIA, 2016
Leveraging the gains while avoiding the potential pains

Cities need to address how the technology integrates into the broader mobility ecosystem. The rise of driverless cars is happening in parallel with three important urban mobility developments: a transit renaissance, the rise of shared mobility, and the emergence of on-demand technologies.

**On their own:**

<table>
<thead>
<tr>
<th>Technology</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Driverless Cars</td>
<td>= More Suburban Sprawl</td>
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<tr>
<td>Rapid Transit</td>
<td>= More Traditional Transit</td>
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<tr>
<td>Shared Vehicles</td>
<td>= More Ridesharing</td>
</tr>
<tr>
<td>On-Demand</td>
<td>= More Hail Services</td>
</tr>
</tbody>
</table>

**Combined:**

**Reduction or improvement in:**

- Pollution
- Congestion
- Cost
- Convenience
- Space Use

**Results:** safer, cleaner, faster, cheaper, more convenient, and less land needed for highways and parking.
Positive scenarios of a combined urban ecosystem

**Driverless Cars On Their Own:**

- **Empty Zombie Cars Circling Around**
- **More Pollution**
- **More Congestion**
- **Inefficient Use of Transit**
- **Reduced Revenue Sources for Cities**
- **Cars Returning Empty**
- **Longer Commutes & Higher Transportation Costs**
- **More Suburban Sprawl**

**A Healthy Urban Ecosystem**

- **Reduced Downtown Congestion**
- **Optimal Utilization of Transit**
- **Walkable, Compact, Resilient Neighborhoods**
- **Transit Stations at Community Hubs**
- **Preservation of Nature & Farmland**
- **Reuse of Parking for Community-Supportive Uses**
- **On-Demand Dynamic Routing**
- **Shared Mobility & Reduced Transportation Cost**

**Rapid Transit:**
Shared driverless cars could bring people to transit stations and then pick up new passengers for the ride home, reducing the demand for parking at the station or your destination, and reducing congestion on highways.

**Shared Mobility:**
Driverless cars could be shared by many instead of owned by a single household, reducing the cost of ownership, the number of cars on the road, pollution etc.

**On-Demand Technology:**
Apps that allow for real-time pickup with pricing that’s integrated into your transit ticket. Instead of monitoring how bad traffic is or how much your taxi fare is going to be, you know that you always have mobility at your fingertips.
Sample policies that could contribute to a healthy urban ecosystem

This positive scenario will only happen if correct policies, initiatives, and incentives are put in place by the public sector. Actions like:

» Revamping parking regulations, including eliminating minimum parking standards and provisions to futureproof new parking investments

» Overlaying zoning and incentives for the redevelopment of parking structures and surface parking into community-supportive uses, such as micro-housing, urban agriculture and neighbourhood facilities

» Developing strategies for the reuse of street parking and excess road space, such as priority boarding areas on sidewalks for shared, on-demand services, pop-up open spaces, and alternative modes of transportation

» Implementing congestion pricing on major highways and in major shopping/employment areas targeted primarily at no occupancy and single occupancy driverless car trips

» Implementing progressive taxation by commute distance for single occupancy, single ownership driverless cars as a gradual move away from gas taxation

» Converting park-and-ride facilities to a higher and best use, such as compact housing and mixed-use community hubs with direct transfers between shared driverless services and rapid transit

» Integrating function and fare of private sector transit on-demand services with public transit, including incentives for provision of driverless carsharing as first-last mile provider
How can CAVs be leveraged to help achieve city building objectives?

1. Identify the opportunities and risks that CAVs pose for current strategic directions and city building objectives.

2. Closely monitor the applications of this technology and develop metrics for evaluating performance and solution potential.

3. Develop a framework and implementation strategy for how to leverage CAVs.

There are many possible directions that a city could take to prepare for this technology, from effective policy and proactive design, to complete avoidance. But one thing is for certain: CAVs are coming and they will transform the urban landscape in the near future.

Recognizing both the pains and the gains that this transformation presents, city builders have the opportunity to identify and maximize the benefits, while mitigating the risks. The only way to achieve this is through thoughtful design, sound policy development, proactive planning, and effective governance.
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