

Oakville Urban Mobility & Transportation Strategy



Oakville Urban Mobility & Transportation Strategy

Prepared by:

Steer
1502-80 Richmond St W
Toronto, ON M5H 2A4
Canada

+1 (647) 260 4860
www.steergroup.com

Prepared for:

Town of Oakville
1225 Trafalgar Rd
Oakville, ON
L6H 0H3

23703601

The logo for Steer, featuring the word "steer" in a bold, lowercase, sans-serif font.

Steer has prepared this material for Town of Oakville. This material may only be used within the context and scope for which Steer has prepared it and may not be relied upon in part or whole by any third party or be used for any other purpose. Any person choosing to use any part of this material without the express and written permission of Steer shall be deemed to confirm their agreement to indemnify Steer for all loss or damage resulting therefrom. Steer has prepared this material using professional practices and procedures using information available to it at the time and as such any new information could alter the validity of the results and conclusions made.

Contents

1	Introduction	1
1.1	Overview	1
1.2	Report Organization	2
2	Background	3
2.1	Overview	3
2.2	Oakville’s Existing Context	4
2.3	Existing Travel Patterns	10
2.4	Existing Planning Guidance	17
2.5	SWOT Analysis	22
3	A Unified Direction for Transportation	24
3.1	A New Vision for Oakville’s Transportation Network	24
3.2	Linking Transportation & Land Use	25
3.3	The Cost of Inaction	26
3.4	Goals	28
4	Implications of COVID-19 pandemic	29
4.1	Overview	29
4.2	Charting the Course of the Pandemic	30
4.3	Looking Back, Looking Ahead	32
4.4	Opportunities and Risks	34
5	Initiatives to support mode shift	36
5.1	Overview	36
5.2	Complete Streets & Multi-Modal Transportation Networks	37
5.3	The Fifteen Minute Neighbourhood	54
5.4	Putting it All Together	63
5.5	Travel Demand Management	64
6	Implementation	73
6.1	Overview	73
6.2	Aligned Coordination	73

6.3	Improving Follow-Through	76
6.4	Action Items.....	78
6.5	Monitoring.....	86
7	Direction for Future Studies	88
7.1	Overview.....	88
7.2	Study-Specific Recommendations	89
8	Conclusion	94

Figures

Figure 2-1: South Oakville Zoning	4
Figure 2-2: North Oakville Zoning	5
Figure 2-3: Oakville Transportation Network	6
Figure 2-4: Oakville Transit Network	7
Figure 2-5: Oakville Sidewalk & Trail Network.....	8
Figure 2-6: Oakville Cycling Network	9
Figure 2-7: Destinations of Trips Generated by Oakville – In the GTHA.....	10
Figure 2-8: Trip Purpose by Destination Type All-Day	11
Figure 2-9: Internal Trips by Time of Day and Purpose.....	12
Figure 2-10: Outbound Trips by Time of Day and Purpose.....	12
Figure 2-11: Oakville Trips Mode Split	13
Figure 2-12: Mode of Travel by Purpose and Destination Type	13
Figure 2-13: Trip Distance vs Trip Volume (AM)	14
Figure 2-14: Trip Distance vs Trip Volume (PM)	14
Figure 2-15: Distance travelled by GO Transit Riders in Oakville during Weekday AM Peak Period	14
Figure 2-16: Number of Trips originating from Oakville by Age Group and Purpose	15
Figure 2-17: Average Weekday Trips per Person living in Oakville by Age Group and Purpose	15
Figure 3-1: Mode Priorities	24
Figure 3-2: Transportation - Land Use Feedback Loop (Wegener & Fürst, 1999).	25
Figure 4-1: COVID-19 Scenario Planning.....	30
Figure 4-2: Impact of COVID Scenarios on Economic Impact and Travel Demand Over Time	31
Figure 5-1: Complete Streets	37
Figure 5-2: Road Design & Safety (Top: Before, Middle: Temporary, Bottom: Proposed Permanent).....	40
Figure 5-3: Bike-Box Cycling Configuration at Intersections.....	44
Figure 5-4: 15-Minute Neighbourhoods Depend on a Variety of Mixed Uses	54
Figure 7-1: How the Urban Mobility & Transportation Strategy Fits into the Big Picture.....	88

Photographs

Photograph 1: Downtown Oakville	1
Photograph 2: Kerr Village	2
Photograph 3: Aerial View of Oakville	3
Photograph 4: COVID-19 Restaurant Patios	34
Photograph 5: Halton COVID-19 Vaccination Clinic.....	35
Photograph 6: Montreal St Catherine's St Revitalization	42
Photograph 7: Trail in Oakville.....	43
Photograph 8: Low Profile Concrete Barriers for Bike Lanes.....	45
Photograph 9: RapidTO Priority Bus Lanes	47
Photograph 10: City of New Westminster Public Art Bus Shelter	47
Photograph 11: Oakville Micro-Transit.....	48
Photograph 12: Viva Rapidway Demonstrates End Goal	49
Photograph 13: Electric Cargo Bikes for Last-Mile Delivery	53
Photograph 14: Gastown, Vancouver, British Columbia	55
Photograph 15: Bay-Adelaide Centre, Toronto, Ontario	56
Photograph 16: Downtown Kitchener, Ontario	56
Photograph 17: Stephen Avenue, Calgary	59
Photograph 18: Newmarket, Ontario	61
Photograph 19: Oakridge Centre Redevelopment in Vancouver	62
Photograph 20: City of Toronto School Signage	65
Photograph 21: SFMTA Work Shuttle	66
Photograph 22: Innisfil – Uber Partnership	67
Photograph 23: LA Metro Micro	67
Photograph 24: Toronto Bike Share Program.....	68
Photograph 25: Brampton Transit Electric Bus Charging.....	69
Photograph 26: Regent Park Redevelopment	75

Tables

Table 1: Drivers of Change in the COVID-19 Pandemic	31
Table 2: Impact of the COVID-19 Pandemic Over Time	33
Table 3: Potential Key Performance Indicators	86

Appendices

- A Best Practices Report**
- B COVID-19 Scenario Planning Report**

1 Introduction

1.1 Overview

The Town of Oakville is at a turning point. For much of its history, Oakville has grown around the automobile. A traditionally suburban bedroom community not too dissimilar from its neighbouring municipalities in the Greater Toronto Area (GTA), the town features vast swaths of single-family homes divided by wide, high-speed arterials whose primary objective is moving as many cars as they can, as fast as they can. In this town, and in this region, the car is king.

However, just like its neighbours, the town's roads are quickly filling up, and Oakville expects a further 153,000 residents and 69,000 new jobs by 2051¹. Oakville will soon be choking on congestion without changes in travel behaviours.

In response to this, the Town of Oakville has decided to **grow differently** into the future. By creating viable alternatives to the private automobile, alongside the creation of urban environments in which those alternatives can actually thrive, Oakville will be able to transition to a town that is more sustainable, more livable, and more prosperous than ever before.

Photograph 1: Downtown Oakville



Source: Town of Oakville

¹ Draft Preferred Growth Concept from Halton Region's Regional Official Plan Review, November 2021

Of course, such a goal is not without its challenges. In its 2013 Transportation Master Plan, the Town of Oakville set a 2031 target mode share of 20% transit, 6% active and a further 6% for transportation demand management. However, while the Town has had success in implementing strategies from previous master planning exercises, these mode shares were not increasing at the pace required. Therefore in 2017, the 2031 transit mode share target was revised down to 12%. To ensure that this modified objective is met, a new strategy is required to identify the missing pieces of the puzzle which are preventing Oakville from achieving its mode shift goals.

Previous planning studies have stopped short of focusing specifically on how to **prioritize and encourage the use of certain modes over others**, particularly as it pertains to intensification corridors and growth centres. As well, they did not always fully capture the critical link between land use policies and transportation, nor how they must support each other if either are to be successful.

This Urban Mobility & Transportation Strategy is designed to fill these gaps in the existing body of planning work and present a new vision for the Town of Oakville – as well as how to achieve it. It will do this by focussing on the critical link between land use and transportation, and by identifying initiatives for Oakville to undertake to formally unify them in its policies and procedures.

Photograph 2: Kerr Village



Source: Town of Oakville

1.2 Report Organization

This report is separated into the following sections:

Section 2: Background

A review of Oakville’s existing transportation network and an exploration of current mobility trends, setting the stage for how the transportation landscape may (or must) change in the future.

Section 3: A Unified Direction for Transportation

The presentation of a vision for growth supported by mobility options that reflects past planning work and Oakville’s strategic objectives, alongside associated goals that will bring the vision to life.

Section 4: Implications of the COVID-19 Pandemic

A review of how the pandemic has transformed our society, and what may yet still happen in the future, including the risks and opportunities this poses for the Town of Oakville.

Section 5: Initiatives to Support Mode Shift

A discussion of strategies that Oakville can implement to support the desired mode shift target by linking two key city-building ideas: Complete Streets, and 15-Minute Neighbourhoods.

Section 6: Implementation and Transitional Steps

Ranking and prioritization of the initiatives and future studies discussed in Section 5, as well as recommendations for aligned coordination with relevant stakeholders and ensuring follow-through.

Section 7: Direction for Future Studies

Recommended scope for future studies to ensure continuity between planning documents over time.

Section 8: Conclusions

A summary of the vision, goals, and associated recommendations for achieving tangible mode shift in Oakville.

2 Background

2.1 Overview

To understand where we are going, we first must see where we have been. This section explores Oakville's existing transportation landscape. The analysis is divided into three main lenses:

1. A brief summary of the existing land use context and transportation network for each mode.
2. Travel patterns across the town and wider region using the 2016 Transportation Tomorrow Survey (TTS).
3. A review of key policy documents at the municipal, regional, and provincial level.

From there, a Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis is conducted to assess the performance of the existing network and its potential future performance.

This section will frame the development of a new vision for Oakville in Chapter 3, as well as the required initiatives needed to bridge the gap between the existing network condition and the desired one in Chapters 5 and 6.

Photograph 3: Aerial View of Oakville



Source: Martin Cathrae, Wikimedia Commons

2.2 Oakville’s Existing Context

2.2.1 Land Use

Figure 2-1 shows the zoning for Oakville south of Dundas St and North of Highway 407, subject to Zoning By-Law 2014-014. Oakville is a suburban community. Much of its land area is dedicated to single detached houses, with little space dedicated towards mixed use developments, meaning that residents need to travel far from their homes for work, school, and play. The space around the Queen Elizabeth Way (QEW) and GO Rail Line is dedicated for commercial/employment use or industrial purposes. These are typical office parks or strip malls surrounded by

large parking lots, making walking and cycling challenging due to the distances involved.

The town is crossed by several ravines that connect and divide the various communities, providing residents with easy access to nature. Located along the lakeshore, the town has roughly 15-kilometres of shoreline, though not all of this is publicly accessible.

Downtown Oakville, Kerr Village and Bronte Village, each which predate the town itself, are mixed-use hubs in an otherwise suburban community. Sites such as Midtown and Uptown Oakville aim to introduce intensification and mixed land uses to serve as new hubs within the wider town.

Figure 2-1: South Oakville Zoning

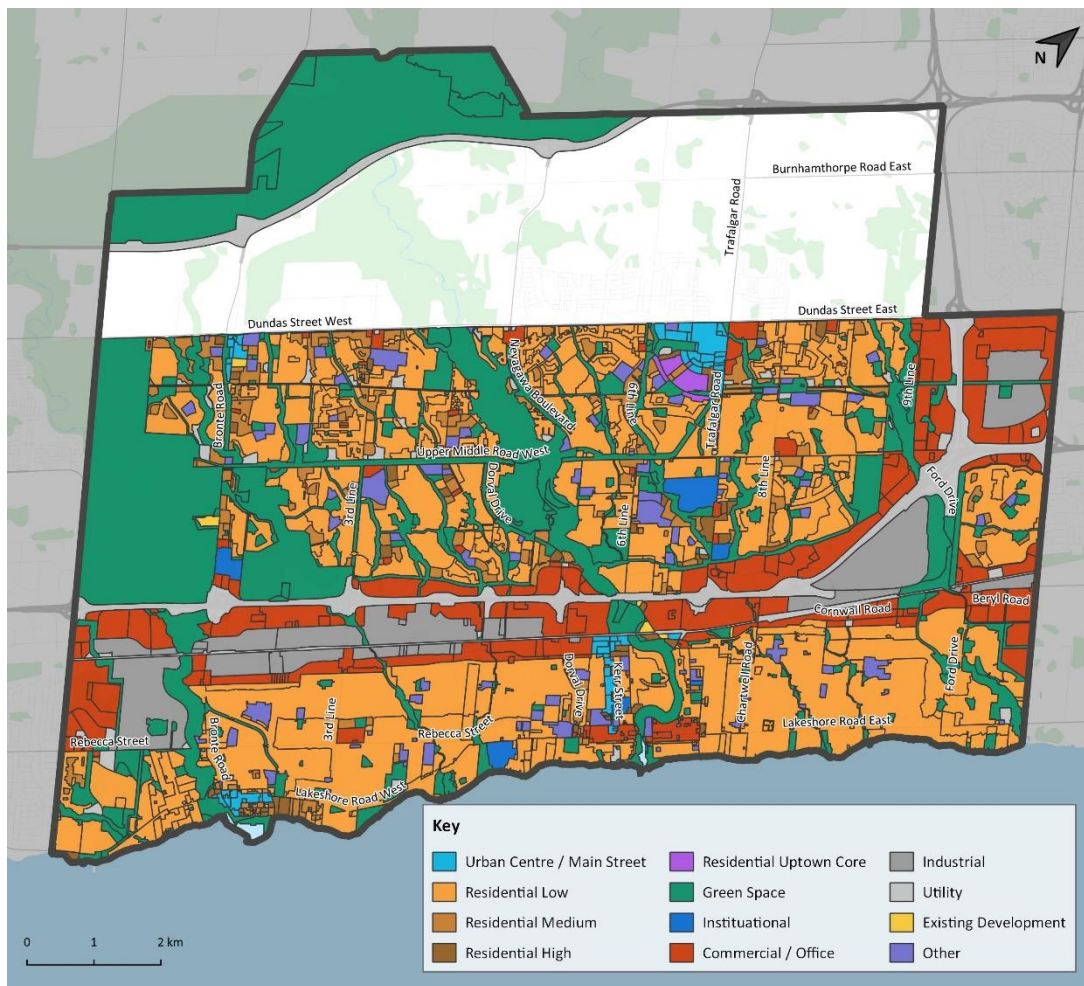


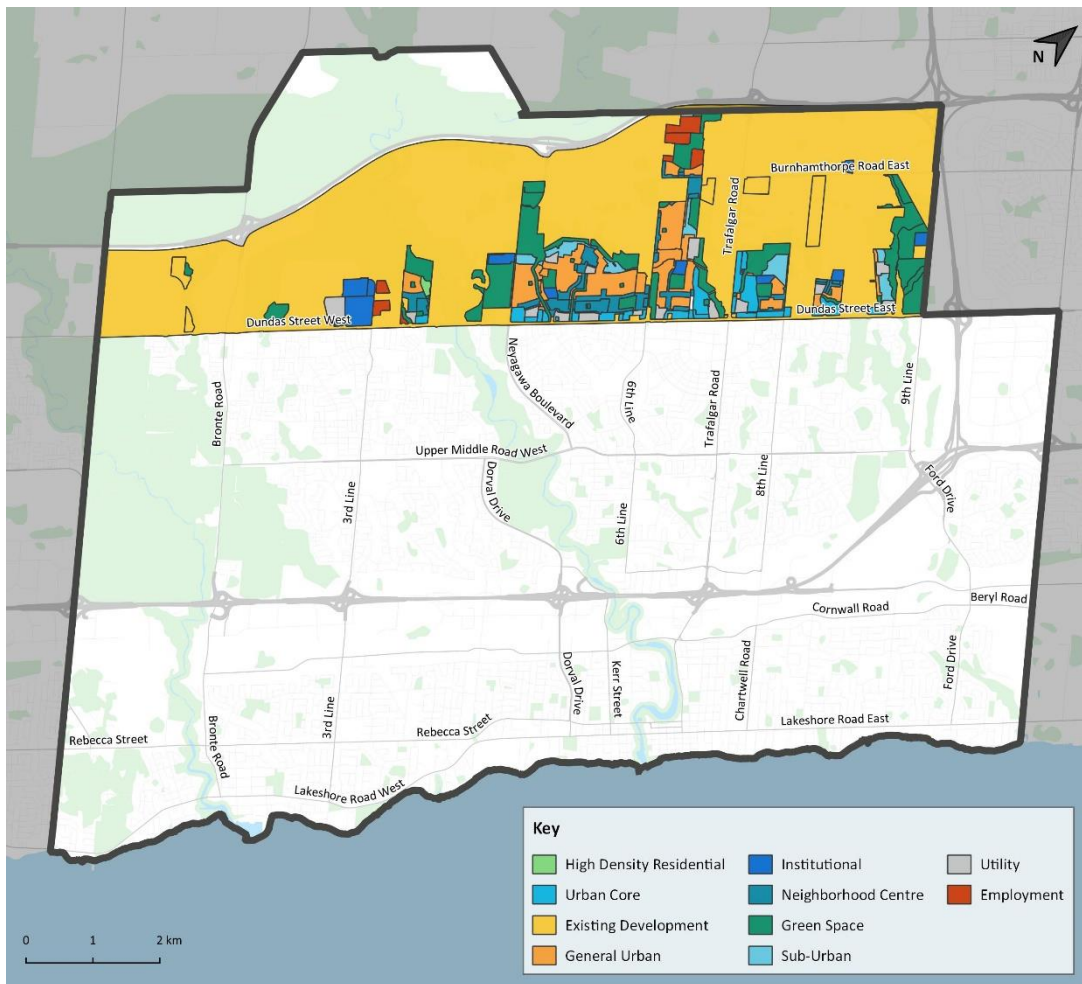
Figure 2-2 shows the zoning for the North Oakville area, which lies north of Dundas St. This area is subject to Zoning By-Law 2009-189 and has slightly different distinctions than the rest of the town. It is the primary location of Oakville’s new greenfield development in the coming years. To date, roughly half of the area has been developed.

North Oakville communities are intended to be designed differently than older subdivisions by providing grid-based street networks in which walking, cycling and transit are

more viable, as well as a variety of mixed uses in closer proximity than the subdivisions of old. It is anticipated that at least 55,000 people and 35,000 jobs will be accommodated in the area.

North Oakville is governed by two Secondary Plans: the North Oakville East Secondary Plan and the North Oakville West Secondary Plan, and are part of the town’s 2006 Official Plan. Recently, the North Oakville West Secondary Plan was brought into the Livable Oakville Official Plan.

Figure 2-2: North Oakville Zoning



2.2.2 Road Network

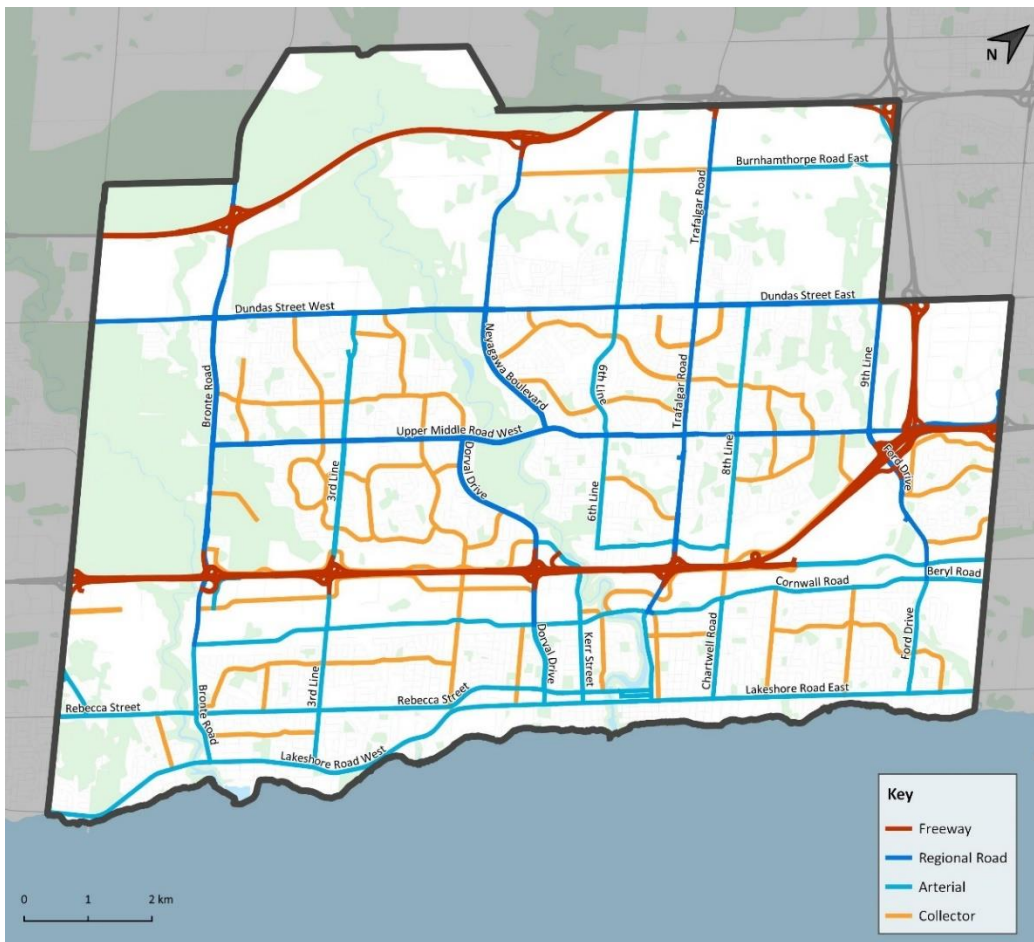
Oakville’s road network is pictured in Figure 2-3. The town is criss-crossed by a network of regional roads which are owned and operated by Halton Region, as well as the Queen Elizabeth Way (QEW) 400-series highway which runs east-west across the town, and Highway 407 which runs just north of it. The road network is heavily auto-oriented, though pedestrian facilities and some cyclist facilities are provided (and will be discussed in further detail in subsequent sections).

The QEW divides Oakville north-south, with limited crossings between major interchanges. Regional roads also serve as division lines across the towns between different communities. The result is that Oakville’s

transportation network divides, rather than unifies the town.

Regional roads are owned by Halton Region, while the QEW is owned by the Province of Ontario, meaning that a large portion of Oakville’s throughfares are beyond the municipality’s direct control. While Oakville can apply pressure at the regional or provincial levels, at the end of the day, decisions regarding these roads are not the Town’s to make. Trafalgar Rd and Dundas St have been identified as urban growth corridors – this will require full support at the regional and provincial levels to ensure alignment of vision between these levels of government. Given the importance of these corridors, without support of Halton Region, this strategy will fail.

Figure 2-3: Oakville Transportation Network



2.2.3 Transit Network

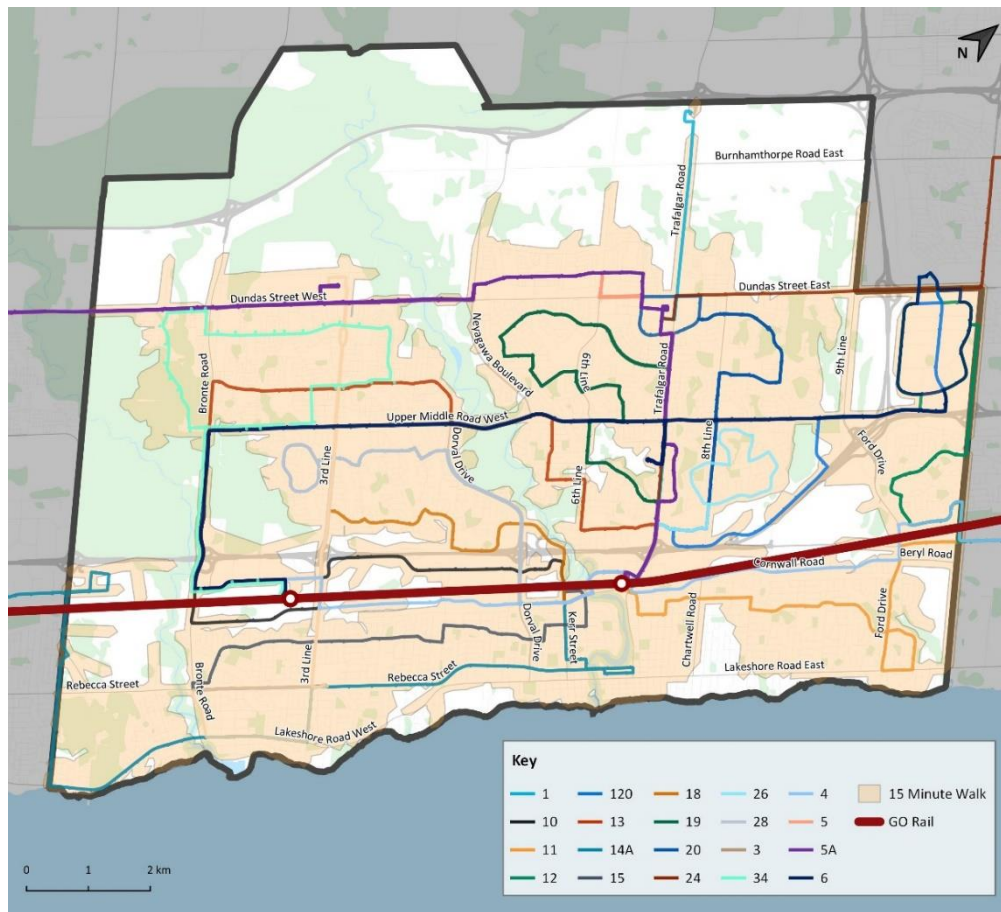
The Town of Oakville is served by Oakville Transit, with 22 main bus routes, four school special routes and four senior special routes. This is shown in Figure 2-5, as well as the coverage of service within a 15-minute walk along the town’s road network. The agency provides door-to-door accessible transit service (care-A-van) for persons with disabilities and operates a Home-to-Hub service that allows residents to be picked up from their homes and dropped off at key hubs within the certain zones of the town (or vice versa).

Cross-municipality connections are available with Mississauga’s MiWay in the east and Burlington Transit in the west. Oakville’s Dundas (5/5A) and Lakeshore (14/14A) routes provide direct rides into Burlington, while the Speer-Cornwall (4), Upper Middle (6), Linbrook (11),

Winston Park (12), South Common (24) and East Industrial (12) routes provides transfer-less rides into Mississauga.

Oakville features two GO Rail stations (Oakville GO and Bronte GO), providing access to and from Downtown Toronto. Local bus service to the Clarkson GO in Mississauga and Appleby GO in Burlington is also provided. On weekdays, trains operate every 15 minutes east of Oakville GO, and every 30 minutes west of it. On weekends, trains operate every 30 minutes. The Province’s GO Expansion program (starting construction in 2022-2023) intends to electrify this route and upgrade service to consistent 15-minute frequency service between Toronto and Burlington. The town is also served by GO Bus service, with stops just south of Highway 407 at Bronte and Trafalgar roads which connect to the Bronte GO and Oakville GO stations, respectively.

Figure 2-4: Oakville Transit Network



2.2.4 Pedestrian Network

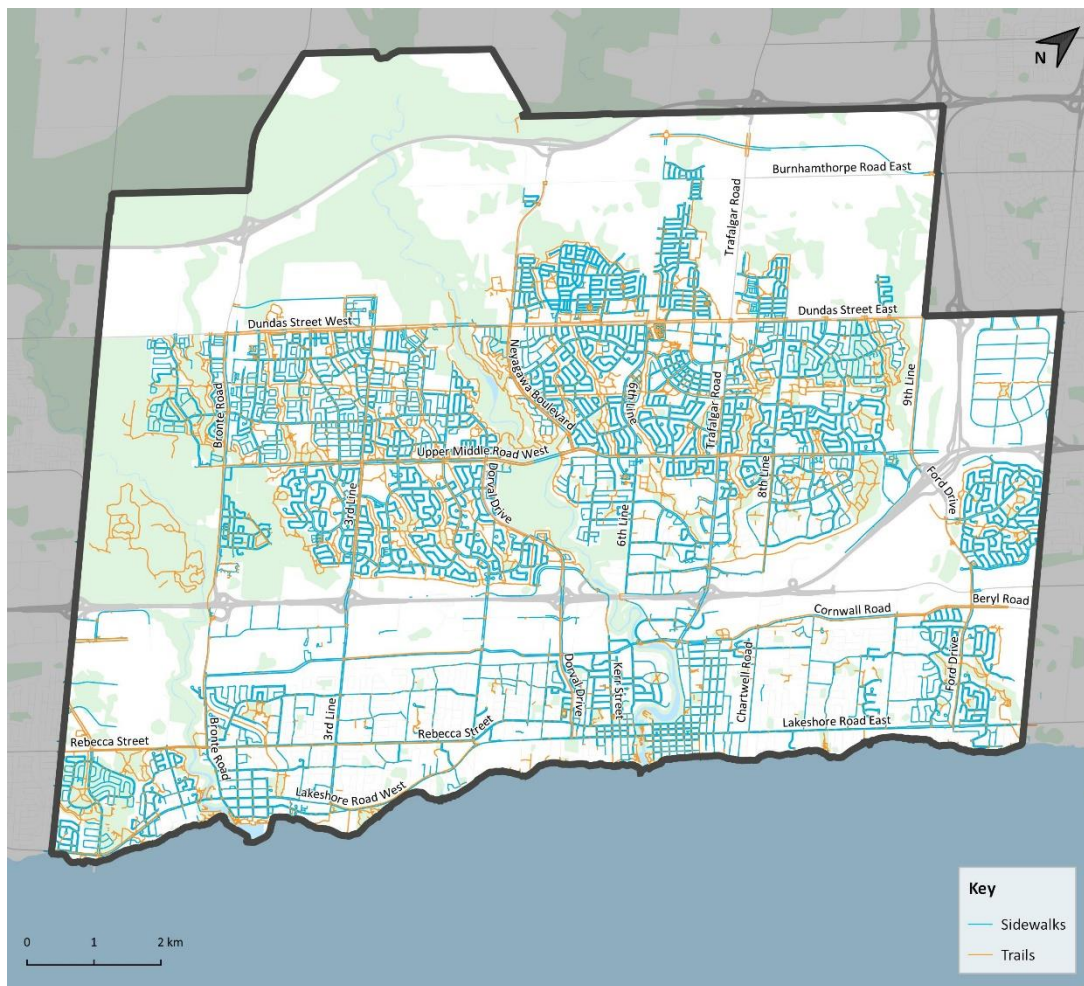
Oakville’s sidewalk and trail networks are shown in Figure 2-5. North of the Queen Elizabeth Way (QEW) in the newer subdivisions, Oakville’s walking network is generally well built out, with sidewalks on both sides of most residential streets and regional roads. South of the highway, the network is more disconnected. Large portions of different neighbourhoods lack sidewalks on either side of the road, owing to their older age and narrower road widths.

Oakville benefits from an extensive trail network. Residents have easy access to nature, and you can travel quite far in the forested areas with minimal street

crossings. This serves as a way to connect the various communities across the ravine system.

Oakville’s land use of single-family homes and single use zoning means that things are spread out. While the infrastructure is largely in place for people to walk, the distances involved mean it is generally not practical to do so. The town is effectively split into four: the QEW highway acts as a barrier between the north and south sides, with limited crossings between 1-2 km apart (15-30 minutes’ walk), while the Sixteen Mile Creek acts as a barrier between the east and west. This makes walking between the four quadrants of the town impractical unless one lives close to a regional road.

Figure 2-5: Oakville Sidewalk & Trail Network



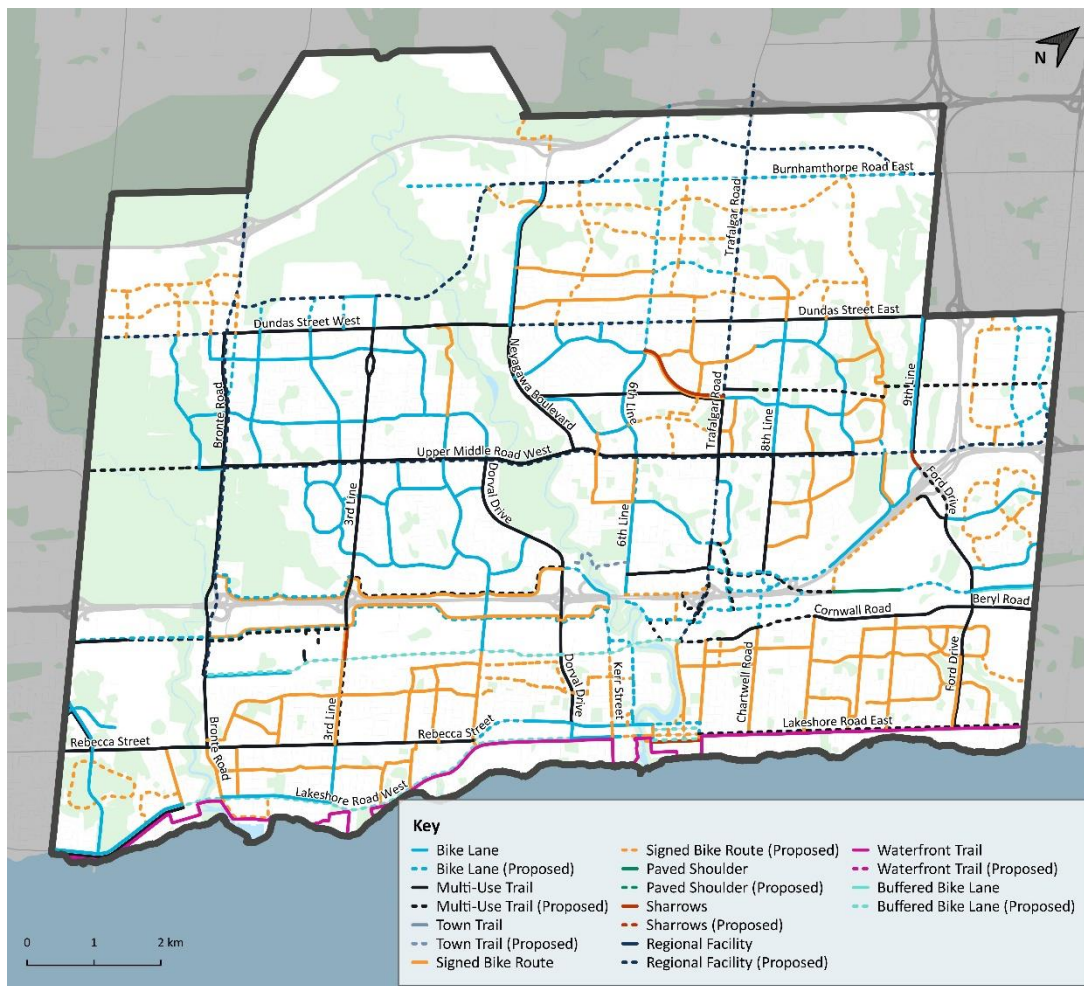
2.2.5 Cycling Network

Oakville has a network of cycling infrastructure in place, with plans to extend it further in the years to come (particularly in north-east Oakville as this area is still developing). This is shown in Figure 2-6 (solid lines are existing, dashed lines are planned). Physical cycling infrastructure is located primarily along the major arterials or collector roads rather than local streets, where they are less necessary. Though not shown on this map, cyclists can also use the trail system discussed previously, which improves the overall connectivity of the network.

A large amount of the cycling network both existing and planned – in particular south of the QEW – is made up of signed routes or sharrows rather than physical infrastructure that separates cyclists from vehicular traffic.

Similar to walking, the feasibility of cycling is a function of the town’s urban form. Things are spread out (including crossings of the QEW, Sixteen Mile Creek and Bronte Creek), which makes cycling impractical for trips that are too long. However, because cyclists can cover more ground faster relative to walking, this limitation is less impactful than for walking trips.

Figure 2-6: Oakville Cycling Network



2.3 Existing Travel Patterns

This section explores the trends for current movement patterns in the Town of Oakville. The 2016 Transportation Tomorrow Survey (TTS), conducted by the University of Toronto, was used for this analysis to answer the following questions:

1. Where are people travelling?
2. Why are people travelling?
3. When are people travelling?
4. How are people travelling?
5. Who is travelling?

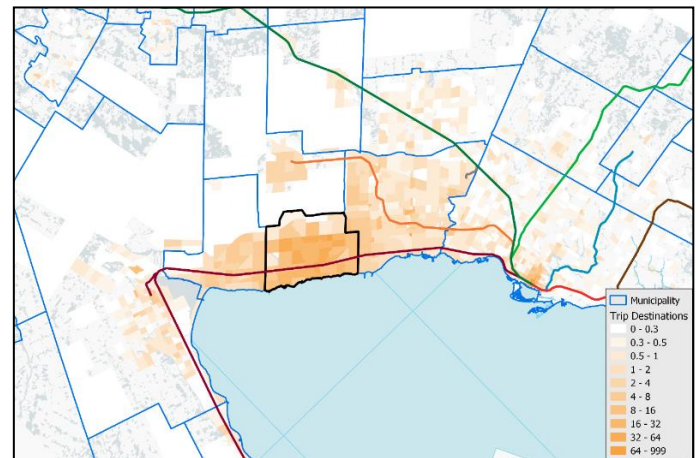
2.3.1 Where are People Travelling?

Figure 2-7 shows the density of trips originating in Oakville to destinations across the Greater Toronto and Hamilton Area (GTHA), with darker colours indicating higher trip densities. Each day, more than 400,000 trips are generated by the Town of Oakville, and a further 170,000 trips are made to Oakville from other parts of the GTHA. Of the trips generated by Oakville, 58% (roughly 237,000 trips) stay within the town, while the remainder (170,000) travel outbound to other parts of the GTHA, meaning that roughly as many trips leave the town as enter. Within Oakville, trips are roughly evenly distributed across the town (south of Dundas St).

High trip densities to Palermo Village, Midtown Oakville, and the Uptown Core are evident. These are three of four primary Growth Areas in the town, and have some of Oakville’s highest land use densities, which naturally leads to higher trip densities.

About 11% of daily trips generated by Oakville head towards other parts of Halton Region (2% to Milton, 8% to Burlington, and 1% to Halton Hills). A further 16% of trips travel to Peel Region (2% Brampton, 14% Mississauga), and 4% travel to Hamilton. Trips to and from Burlington are fairly uniformly distributed across Burlington, while trips between Oakville and Mississauga are concentrated primarily within western Mississauga. Downtown Toronto only absorbs about 3.5% of Oakville’s daily trip generation.

Figure 2-7: Destinations of Trips Generated by Oakville – In the GTHA



Data source: Transportation Tomorrow Survey, 2016 (all-day trips to/from/within Oakville)

Travel patterns differ somewhat in the AM and PM peaks. Here, Downtown Toronto captures about 10% of trips from Oakville in the morning peak and generates about 7% of trips to Oakville in the PM peak, reflecting commuter trends. 18% of trips outbound from Oakville are destined towards Peel in the AM peak, and 18% of trips inbound to Oakville originate from Peel in the PM Peak. 6% of trips generated by Oakville are destined to other parts of Halton, 3% to Hamilton, and 56% to other parts of Oakville. In the PM peak, 58% of trips to Oakville originate from other parts of Oakville, 8% come from other parts of Halton, and 3% come from Hamilton.

Takeaways:

Mobility within Oakville is just as important as mobility between the town and other parts of the GTA. Trip distribution within the town is roughly uniform south of Dundas St, though the development of urban growth areas may further concentrate trips in these zones.

In terms of regional travel, while improving connectivity with GO Transit Services heading to and from Downtown Toronto is important (particularly in the AM and PM peaks), cross-municipal connections to Mississauga and Burlington are perhaps more so, as a larger percentage of daily trips are headed there. As Milton grows in the future, increased travel between Oakville and Milton (which lies just north of the town) may occur.

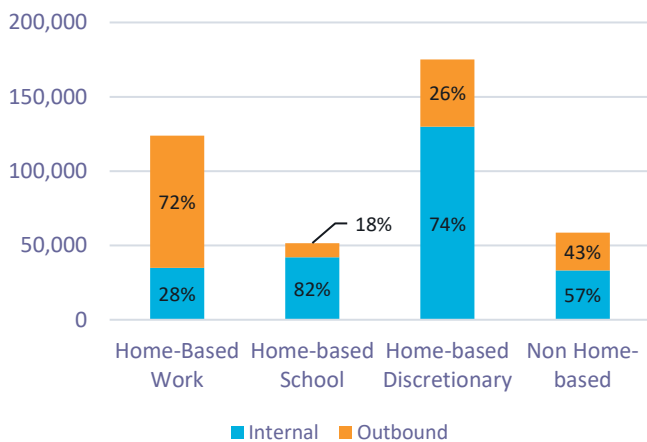
2.3.2 Why are People Travelling?

Figure 2-8 shows the number of trips originating in Oakville by purpose and by destination. Internal trips, in orange, represent trips that start and end in Oakville, while external trips, in blue, represent trips that start in Oakville but end elsewhere in the region.

The four categories of trips are:

- **Home-Based Work (HBW):** trips between residence and place of work (and vice versa)
- **Home-based School (HBS):** trips between residence and place of education (and vice versa)
- **Home-based Discretionary (HBD):** trips between residence and other places (and vice versa)
- **Non-Home-based (NHB):** trips not involving place of residence

Figure 2-8: Trip Purpose by Destination Type | All-Day



Data source: Transportation Tomorrow Survey, 2016 (all-day trips to/from/within Oakville)

Home-Based Work trips make up 30% of all trips generated by Oakville. The majority (72%) of these trips are outbound to other parts of the region. This suggests that only 28% of Oakville residents work in Oakville.

In contrast, the vast majority (82%) of Home-Based School trips generated by Oakville are internal to the town. This is fairly standard, as bussing students to other municipalities

is uncommon. Oakville has one large higher-education campus on Trafalgar Rd (Sheridan College), which serves roughly ten thousand students. The town does not have any university campuses or satellite campuses beyond this; the remaining Home-Based School trips that are external to Oakville (18%) reflect this.

Home-Base Discretionary trips make up 38% of all trips to/from Oakville – the largest share of all trips. 74% of the trips of this type generated by Oakville remain internal to the town, meaning that town residents typically shop, play, and entertain themselves without leaving Oakville. Considering the major draw of Square One not too far east in Mississauga, this proportion of discretionary trips being internal to Oakville is somewhat surprising.

Finally, Non-Home-Based Trips generated by Oakville are roughly split – 57% stay internal to the town, while 43% leave the town.

Takeaways:

Work based trips are primarily outbound, meaning that more residents travel outside Oakville to work than those who stay within the town. All other trip types are primarily internal trips.

Therefore, for commuting purposes during peak hours, Oakville should focus on regional connections, while for off-peak travel, internal connectivity is more important.

Of course, this may change as Oakville develops, especially if urban growth nodes are successful in drawing employment to them. Businesses can benefit from agglomeration when they locate near one another, which can create self-reinforcing positive benefits over time that encourages more work trips to remain in the town.

2.3.3 When are People Travelling?

Figure 2-9 shows the start time of internal trips generated by Oakville (i.e. start and end within the town) across the day, while Figure 2-10 show the start time of outbound trips generated by Oakville (i.e. starts in Oakville but ends elsewhere in the region) across the day.

Figure 2-9: Internal Trips by Time of Day and Purpose

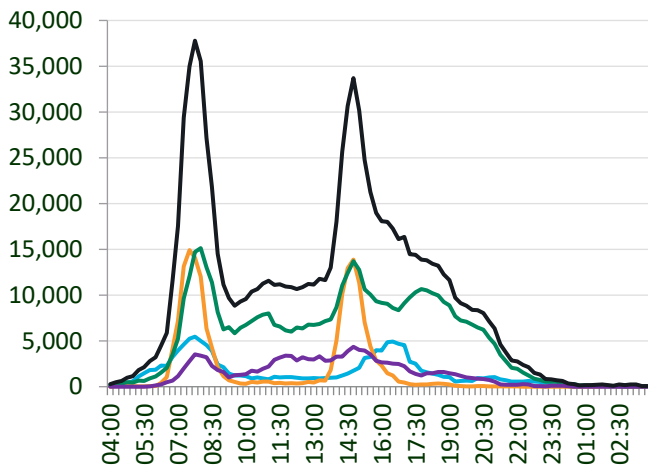
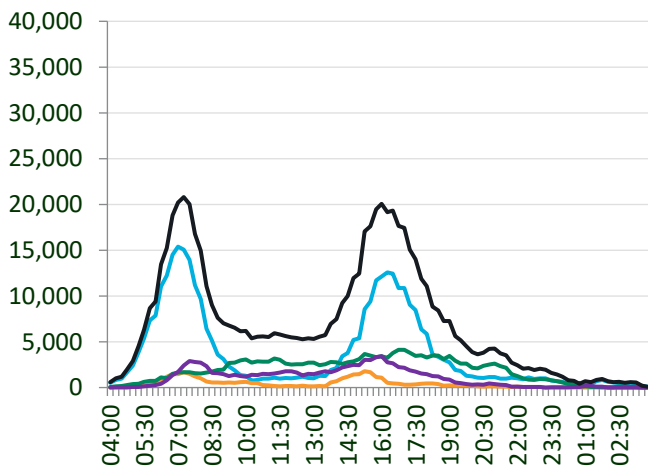


Figure 2-10: Outbound Trips by Time of Day and Purpose



Legend: – All purposes; – Home-based Work; – Home-based School; – Home-based Discretionary; – Non-home-based

Data source: Transportation Tomorrow Survey, 2016

The two figures indicate that travel demand in Oakville has two distinct peaks throughout the day, peaking in the AM at about 7:45, and in the PM at about 4:30.

However, for internal trips, the PM peak tapers off more slowly than the AM, continuing into the evening. Looking at the travel demand by trip purpose explains why. In the AM, the peaks of each trip purpose roughly line up with each other. In contrast, in the PM, Home-Based School trips peak much earlier than Home-Based Work, as schools let out earlier than workplaces. Additionally, the Home-Based Discretionary trips do not have as sharp a peak in the PM period, remaining high for a couple of hours through the evening – these may be “chained” trips, which are conducted on the way home from work. Together, these factors result in a PM peak that is more “stretched out” than the AM peak.

In contrast, outbound trips also have two clear peaks in the AM and PM, but without the tapering off effect in the PM. Looking at the number of trips by trip purpose, it is clear that this is solely due to Home-Based Work trips, following regular commuter patterns. For both Non-Home-Based trips and Home-Based School trips, subtle peaks in the AM and PM are visible (though they top-out later in the AM than work trips, and earlier in the PM); however, this is much less pronounced than the Home-Based Work trips.

As discussed previously, outbound work trips make up 72% of all work trips in Oakville, and this is reflected in these time plots as well. Outbound work trips begin to peak earlier in the morning and afternoon than internal trips. This likely owes to the fact that these trips cover a longer distance, and therefore take more time.

Takeaways:

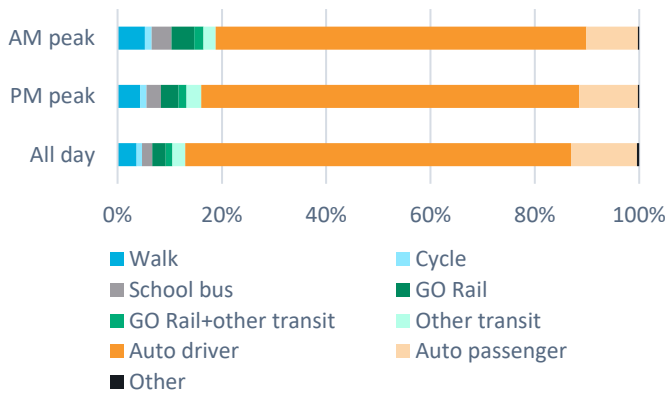
As expected, the highest demand levels that need to be accommodated for are during peak times, particularly for work-based trips. Internal discretionary trips within the town tend to have a longer tapering off during the PM peak, which can drag out the afternoon rush hour.

2.3.4 How are People Travelling?

Figure 2-11 shows the mode split for trips to/from/within Oakville in the AM and PM peak periods, and for the whole day. Auto-based modes dominate Oakville travel. Around three-quarters (74%) of daily trips are made by people driving cars, and more than six out of seven trips (87%) involve a person in a car.

Transit is used for 8.3% of trips, including 2.0% for school bus trips. Excluding school bus trips, Oakville Transit connecting services to GO account for approximately 25% of Oakville Transit trips. Transit and active transportation mode shares are higher during the AM and PM peaks; this is driven by higher use of active modes and school buses for education trips and transit for commute trips (particularly to Downtown Toronto) during these times.

Figure 2-11: Oakville Trips Mode Split



Data source: Transportation Tomorrow Survey, 2016

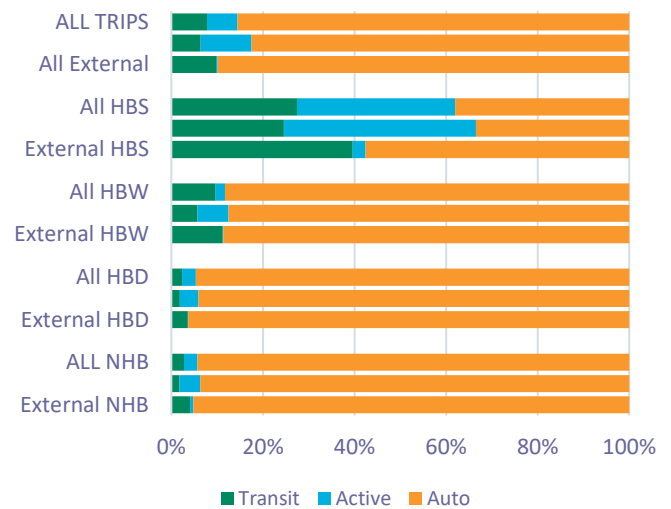
2.3.4.1 Purpose and Destination Type

Figure 2-12 shows the mode of travel for trips to/from Oakville by trip purpose and by destination type – internal (within the town) or external (to/from places outside the town). “Auto” includes auto driver, auto passenger, motorcycles, and taxi/TNCs; transit includes GO Train, local transit, and school bus; “active” includes walking and cycling.

Travel to and from school has the highest proportion of transit and active transportation use out of the four trip types. For internal trips, there is a roughly equal split between auto, transit, and active modes, as these trips

are dominated by K-12 schools, with many students living within walking distance or having access to school buses. External school travel is dominated by trips for post-secondary education. Many post-secondary institutions in the GTHA are served by regional and local transit, while car ownership (or access) can be beyond the reach of post-secondary student populations, again resulting in relatively high transit mode share for this trip type.

Figure 2-12: Mode of Travel by Purpose and Destination Type



Source: 2016 Transportation Tomorrow Survey

For work trips, the transit mode share for external trips (11.2%) is roughly double that for internal trips (5.7%). This makes Oakville unusual compared to other GTHA municipalities. Typically, longer trips (such as to external destinations) have lower transit mode share. However, more detailed analysis revealed that three-quarters of the external work trips using transit were going to/from Downtown Toronto. These trips benefit from the GO Train service, while auto use is impeded by freeway congestion and the high cost of parking in the city.

Discretionary (HBD) and Non-Home-Based (NHB) trips show similar mode splits. They have the highest auto mode shares (around 95%) of any travel market. Similar to Home-Based Work trips (HBW), both have higher active mode shares for internal trips and higher transit mode share for external trips.

2.3.4.2 Distance Travelled

Figure 2-13 shows the distribution of trips by trip length and mode for the weekday AM peak period. About 55% of the trips generated by the Town of Oakville during this period are over 10km, while 32% are under 5km and 10% are under 1km. Trips under 1km are considered walkable, but only 35% of those trips are made by walking, while 45% are by driving. Similarly, trips under 5km are considered bikeable. However, only 2% of those trips are made by bike, while 73% are by driving.

Figure 2-14 shows the distribution of trips by trip length and mode for the weekday PM peak period. About 55% of the trips generated by the Town of Oakville in this period are over 10km, while 29% are under 5km and 4% under 1km. In contrast with the AM, only 15% of walkable trips are made by walking and 70% are by driving. The difference is because fewer students travel in the PM peak period (16:00-19:00) compared to the AM peak period (06:00-09:00). Only 1% of bikeable trips are by bike, while 76% are by driving. In total, only 2% of trips generated in Oakville during the PM peak period use cycling or walking.

Figure 2-15 shows the mode choice distribution of users of Oakville’s GO Rail stations. 89% of people using Oakville’s GO Rail stations (Bronte, Clarkson, and Oakville) travel under 5km to their station, but only 2% of them chose to cycle while 78% chose to drive. About half of people who travel less than 1 km to Oakville’s GO Rail stations choose to walk.

Takeaways:

People in Oakville are not choosing to walk or cycle for trips that are short enough for those modes to be viable. This is especially problematic at GO stations where parking is limited. Future GO Expansion cannot be accommodated fully through parking lot expansion, especially as Midtown Oakville develops. Encouraging mode shift for station access will be important for increases in GO ridership to match increases in service over time.

Figure 2-13: Trip Distance vs Trip Volume (AM)

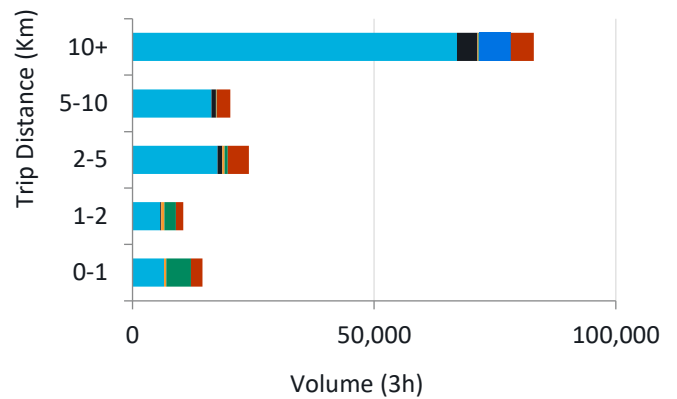


Figure 2-14: Trip Distance vs Trip Volume (PM)

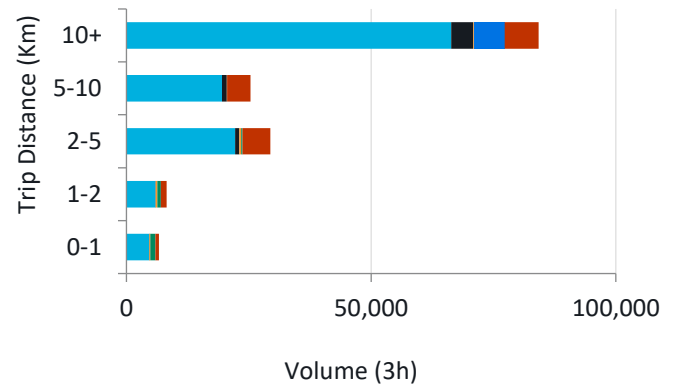
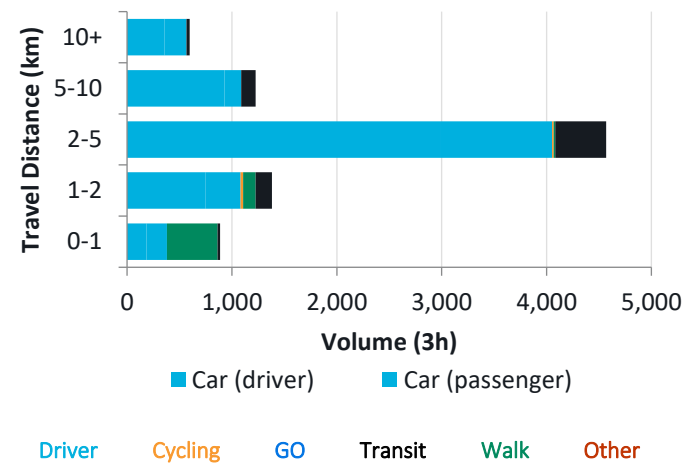


Figure 2-15: Distance travelled by GO Transit Riders in Oakville during Weekday AM Peak Period

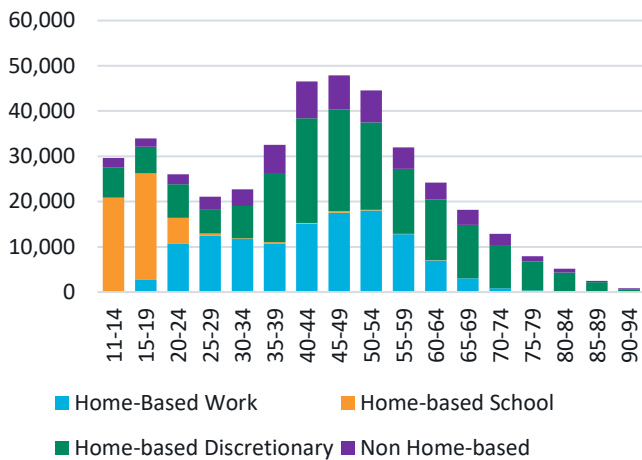


Data source: Transportation Tomorrow Survey, 2016

2.3.5 Who is Travelling?

Figure 2-16 shows the number of trips originating from Oakville by age group and trip purpose. The age groups all span five years, except the first group, as the Transportation Tomorrow Survey only covers ages 11 and older.

Figure 2-16: Number of Trips originating from Oakville by Age Group and Purpose



Data source: Transportation Tomorrow Survey, 2016

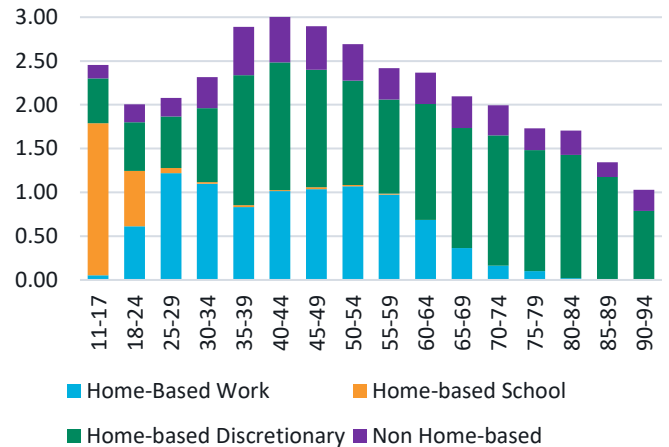
From age 11 to 20, education trips are the most common, as would be expected from the compulsory school age group (11 to 17/18). The proportion of education trips falls significantly each year from age 18 to age 24, and all but vanishing from age 25. This suggests that people are attending post-secondary education for various lengths of time, or that older students are less likely to live (and start their trips) in Oakville.

Work trips account for the majority of trips for people in their twenties and early thirties. The proportion peaks at 73% of trips for people aged 26. The proportion of work trips falls steadily from age 55 onwards, accounting for less than 10% of trips for people aged 70 or over.

From age 35 to 95, discretionary trips are most common, and are generally substantially higher than work trips. These are trips for the business of life – shopping, medical, visiting friends/family, and leisure.

The number of trips made by each group is partly driven by the number of people in that age group. To provide an additional comparison, Figure 2-17 shows the average number of weekday trips per person for Oakville residents by age group and purpose.

Figure 2-17: Average Weekday Trips per Person living in Oakville by Age Group and Purpose



Data source: 2016 Transportation Tomorrow Survey

The chart shows that number of trips per person varies significantly by age. After the end of K-12 education, the daily trip rate increases steadily with age, peaks in the early 40s, then decreases steadily with age. The changes from people’s 20s through to their 50s are largely caused by increase in discretionary and non-home-based trips. This is consistent with those trips being caused by the presence of children in the household. The decrease from people’s 50s to their 70s follows the decrease in work trips, consistent with people retiring or leaving the workforce.

Takeaways:

Understanding what types of trips different age groups make can help tailor services to them. Younger individuals benefit from services that aid their access to school, while after age 16, people need to be able to access their places of employment. Services for older individuals can focus on access to discretionary and other land uses (retail, restaurants, and health care services).

2.3.6 Summary

This analysis of Oakville's travel patterns presents the following conclusions and recommendations for Oakville going forward:

- Similar to other suburban municipalities in the GTA and elsewhere, too many people in Oakville drive when travelling short distances: 70% of trips less than 1 kilometre are by car in the afternoon peak, while the majority of people travel for distances exceeding 10 kilometers, which makes them more dependent on car usage. Significant improvements must therefore be made to both reduce the distance travelled in Oakville and to ensure that those who travel short distances make the best choices for getting around. This can be done by improving short-distance access and opportunity via the walking, cycling and transit networks, as well as neighbourhood built form.
- The majority (58%) of Oakville's travel is to internal destinations, but that still leaves a significant portion (42%) travelling externally. Planning for Oakville's inter-municipal travel should focus on trips to Burlington, Mississauga, and Downtown Toronto. Longer-term planning should also consider the growth in the travel market to/from Milton. These longer-distance commutes are and will be good targets for TDM programs. This planning will require Oakville to work with the relevant municipalities and agencies, to ensure that municipal boundaries do not form a barrier to easy travel by any mode. This cooperation also applies to goods movement which is almost entirely inter-municipal in nature.
- Oakville's transportation system serves internal trips, and hence the majority of school and discretionary trips. However, it also connects people to the wider regional transportation system, which serves the majority of work trips. The variations in destinations by trip purpose should be a major consideration in planning the town's transportation system and its connections to the GTHA. The reasons *why* people travel affect *how* they travel, because their needs for that trip are different. Non-commuter travel often involves a variety of destinations and travel times and

may also include multiple destinations in one trip (trip chaining). These features mean non-commuter travel can benefit from mobility as a service as a means to support non-car use.

- The timing of peaks and troughs in travel demand is a combination of all travel purposes, not just work trips. Travel involving trip chaining (such as that associated with school trips) is more difficult to switch from car-based to sustainable modes unless the destinations are close together. Internal and external travel have very different patterns when those trips occur.
- The reasons people travel varies significantly by age, with work travel only being the most common reason for people aged 22 to 35. Policies targeted at different age groups will need to take into consideration those variations.
- Overall, the analysis shows that Oakville's internal travel is different from its external travel. Internal travel has a higher proportion of car-based and active travel, and more travel for education and non-work-based purposes. External travel has a higher proportion of transit, primarily because of GO Train travel to Downtown Toronto, and a much higher proportion of work travel.
- The Town of Oakville's aspirations to increase transit and active transportation use can build on the existing strong usage for school-based trips as well as high number of work trips to Downtown Toronto, but changes that enable better integration between land use and the transportation system are needed to change behaviours in a sustainable way. The dominance of car use supports the need for significant transformation in the planning and delivery of the transportation system if Oakville is to achieve a mode shift away from car-based uses.

2.4 Existing Planning Guidance

Much work has already been completed at the municipal, regional, and provincial levels to guide future growth in Oakville and the wider GTHA. This section provides a brief review of key policy documents relevant to the development of Oakville's Urban Mobility & Transportation Strategy.

At the provincial level:

- Provincial Policy Statement
- 2041 Regional Transportation Plan

At the regional level:

- Official Plan
- Transportation Master Plan
- Mobility Management Plan

And finally, at the municipal level (i.e. specific to the Town of Oakville):

- Official Plan
- Transportation Master Plan
- Active Transportation Master Plan

A review of each study will allow us to map the common themes across all of them. This information about the policy direction of the Town of Oakville, Halton Region and Province of Ontario will be used to build a unified vision for the town's transportation network in the next section, followed by the initiatives that Oakville can implement to make that vision happen. The Urban Mobility & Transportation Strategy is not re-inventing the wheel, but rather building off a substantial body of work that has come before.

2.4.1 Provincial Guidance

2.4.1.1 Provincial Policy Statement (PPS)

The 2014 Provincial Policy Statement summarizes the Province's policy regarding land use and associated infrastructure, including transportation. Municipal land use policy must conform with the PPS, but the policies of the Provincial Policy Statement represent minimum standards.

The policy statement focuses on the efficient development of land and dictates that growth should first occur in intensification or redevelopment areas, followed by new growth in designated areas.

An update to the PPS went into effect on May 21st, 2020, with the goals of encouraging an increase in housing supply, protecting the environment, reducing barriers and costs for development, and supporting the economy and job creation.

This version of the PPS moves to protect employment and industrial lands from the encroachment within or adjacent to by non-employment sensitive land uses (such as residential housing). The updated PPS also places greater emphasis on ensuring adequate housing stock in the future, upping minimum requirements to accommodate residential growth through the available land supply from 10 years to 15 and extending the planning horizon from 20 years to 25 years. As well, the plan emphasizes the need for increased housing options, further intensification, and transit-oriented development, though at the same time, does increase the flexibility of development on rural lands or expansion of settlement areas under certain conditions.

2.4.1.2 2041 Metrolinx Regional Transportation Plan (RTP)

The Regional Transportation Master Plan provides a blueprint for the GTHA’s transportation network to develop through the year 2041. It is an update to “The Big Move,” which was released in 2008.

The plan envisions an integrated, sustainable, safe, and multimodal transportation system for the Greater Toronto and Hamilton Area that supports a high quality of life, prosperous economy, and a protected environment. The three key goals of the plan include strong connections, complete travel experiences, and sustainable and healthy communities. The five strategies identified to achieve this vision and these three goals include:

- Complete the delivery of current regional transit projects
- Connect more of the region with frequent rapid transit
- Optimize the transportation system
- Integrate transportation and land use
- Prepare for an uncertain future

The outcome of a successful plan rollout would add 1860 km of frequent rapid transit routes, 2000 km of cycling routes, and 1130 km of HOV/HOT lanes to the region. This would result in four times as many residents and twice as many jobs within walking distance to transit, a +0.5% transit mode share across the region, +2.2% active transport mode share across the region, and result in 3 million fewer congested kilometres of travel compared to the ‘Do Minimum’ scenario.

Projects in Oakville outlined by the RTP include:

- LRT/BRT on Trafalgar Rd (priority bus north of Highway 407)
- Priority bus on Dundas, Speers/Cornwall, and Bronte
- GO rail 15-minute two-way all-day service on Lakeshore West line
- Frequent regional express bus on QEW, Hwy 403, Hwy 407
- Proposed HOV lanes on QEW, Hwy 403; in addition to existing segments on QEW in Oakville

2.4.2 Halton Region Guidance

2.4.2.1 Halton Region Official Plan

The Halton Region Official Plan provides high-level direction for land use in Halton Region through to the year 2031. The Planning Act requires that local municipalities' Official Plans and Zoning By-laws be amended to conform with this Plan. Its overarching goal is to enhance the quality of life for all people of Halton, today and into the future.

Planning decisions in Halton are therefore to be based on a proper balance among the following factors:

- Protecting the natural environment
- Preserving prime agricultural areas
- Enhancing economic competitiveness
- Fostering a healthy, equitable society

Halton Region’s transportation objectives include:

- Encouraging regional unity
- Reducing dependency on auto travel while promoting more sustainable forms of transport
- Improving network efficiency with travel demand management and strategies
- Improving accessibility to major areas of employment, retail, government services, culture, and recreation
- Ensuring that land use policy aligns with transportation objectives, and supporting the early introduction of public transit services in new developments, redevelopments, and intensification areas

Oakville has enough undeveloped land to satisfy greenfield development demands into the 2031-2041 period. After this point, the majority of new development within Oakville will be intensification of the existing built-up area (predominantly within the strategic Urban Growth Centres identified in Oakville’s Urban Structure).

The plan identifies higher-order transit facilities on Trafalgar Rd, Dundas St, and Bronte Rd, alongside the Lakeshore West GO Rail line, and specifies a goal of 20% transit mode share by 2031.

2.4.2.2 Transportation Master Plan

The Halton Region Transportation Master Plan to 2031 provides the strategies, policies and tools required to meet Halton Region's transportation needs safely, effectively and cost efficiently. The plan does not introduce a new vision for itself, instead being guided by the Halton Region Official Plan and Metrolinx's Regional Transportation Plan.

The guiding principles of the study include:

- Providing choice for the travel needs of residents
- Healthy communities
- Economic vitality
- Sustainability
- Well-maintained infrastructure

The TMP identifies deficiencies in the future transportation network along key roadway screenlines should the status quo be maintained, resulting in increased roadway congestion alongside increased travel times and delay.

The primary recommendations of the plan focus on road expansion projects to address congestion through 2031. While there is also discussion on improvements to the active transportation network (cycling and walking) and transportation demand management schemes, the study does not focus heavily on these aspects, instead indicating that additional planning is necessary in these areas, to take the load off of the future auto network.

In terms of transit expansion, the plan designates Trafalgar Rd, Dundas St, Speers Rd, and Bronte Rd as transit corridors, with Trafalgar Rd and Dundas St seeing dedicated transit rights-of-way. The plan indicates support for changes to road cross-sections, to better accommodate non-car modes.

Halton Region will be conducting an update of their Regional Transportation Master Plan through their on-going Municipal Comprehensive Review, Official Plan Review, and Integrated Growth Management Strategy.

2.4.2.3 Mobility Management Strategy

The Mobility Management Strategy provides a strategic vision for Halton Region's transportation network over the next 25 years, focussing on the premise of mobility-as-a-service. It envisions a future in which mobility options are no longer clearly divided between roadway and transit, nor are transit options solely defined by fixed-route, fixed-guideway or demand responsive services, but rather, offered as a menu of travel options provided by both the public and private sector.

The goals of the strategy which support the above vision are as follows:

- Access to a full menu of advanced transportation options
- Facilitate the efficient movement of people and goods throughout the region
- Smart growth management through the integration of transportation and land use planning
- Transit as a competitive, viable choice
- Transit network connectivity / access

The individual strategies proposed include:

- Alignment with Metrolinx Big Move and GO Expansion plans
- Coordinated regional urban mobility
- Customer-centric technology-based services
- Intra/interregional transit connectivity
- Integration of mobility options
- Support transit oriented urban growth

Of relevance to Oakville, the strategy supports the development of Oakville's Urban Growth Centres and emphasizing mobility hubs around key GO stations (such as Oakville and Bronte GO). It identifies Transit Priority Corridors along Dundas St, Bronte Rd., Trafalgar Rd, and Speers Rd, as well as a mobility link between Oakville and Milton on Neyagawa Rd.

2.4.3 Town of Oakville Guidance

2.4.3.1 Official Plan (Livable Oakville)

The 2009 Town of Oakville Official Plan applies to all lands within the town except the North Oakville East and West Secondary Plan areas. The Official Plan sets out Oakville’s land use and growth policies through to the year 2031. A review of this plan is currently underway.

The plan identifies the following areas as key nodes or corridors for intensification: Midtown Oakville, Uptown Core, Palermo Village, Kerr Village, Bronte Village and Downtown Oakville. Intensification outside of these areas is subject to policies that are intended to maintain and protect the existing character of those communities.

Development in greenfield areas within the existing settlement area of the town are to be developed in a way that contributes to the creation of complete communities, with a density target not less than 50 residents and jobs combined per gross hectare, measured over the entire greenfield area throughout Halton Region. All lands north of Highway 407 are outside of the urban area, and subject to the Parkway Belt West Plan (1978). Most of these lands are also subject to the Greenbelt Plan (2005) and are restricted to development.

Transportation objectives specified in the plan include:

- Promoting priority measures for transit and HOVs
- Providing a road classification system
- Developing walking/cycling facilities in line with the active transportation plan
- Maximizing mobility and access for persons with disabilities
- Encouraging transit-orientated development
- Supporting efficient land use as complement to sustainable travel

Official Plan Amendment 15 introduced the Town of Oakville’s Urban Structure into Livable Oakville and is now in full effect. The Urban Structure coordinates land use and infrastructure requirements, as well as establishes a framework and policy context for decision making that provides certainty to the planning process. It is also

fundamental in achieving several Provincial interests and guides public and private investment decisions. The Town’s Urban Structure is intended to protect natural heritage, open space, and cultural heritage, maintain the character of residential areas and direct growth to an identified system of nodes and corridors. The OPA also provided for the integration of the North Oakville East and West Secondary Plans into a town-wide Urban Structure within the Livable Oakville Official Plan.

2.4.3.2 Switching Gears (Transportation Master Plan)

Oakville’s 2013 “Switching Gears” Transportation Master Plan provided a guide for developing Oakville’s transportation network through to the year 2031. It envisioned a transportation system that:

- Is safe, efficient, and accessible, with choices in mobility
- Fosters the use and development of a sustainable transportation network
- Provides a public transit system that can be a viable alternative to private auto use
- Provides a network of on- and off-road pedestrian cycling facilities

The plan outlined the Town of Oakville’s and Halton Region’s mode split targets (20% transit mode share and 6% each for active transportation and transportation demand management) and provided strategies for active transportation and transit that were meant to help achieve them.

However, since the plan was approved and implemented, growth in these areas did not increase at a rate that would reach these targets by 2031, and transit operational costs have increased faster than what has been supported by new ridership. As well, there had been changes to the Province’s Development Charges Act in 2015, specifying that Development Charges can only be collected for transit operations required to service new residents, not existing ones. Collectively, this necessitated an update to the TMP, conducted in 2018.

An updated 2031 transit mode share target of 12% was assumed, including 3% local transit and 9% regional

transit. The 6% mode share targets for active transportation and transportation demand management each were maintained. However, the plan did not introduce any significant new strategies on how to achieve these revised targets. New strategies (to be discussed in this report) and investment in increased service levels will be required to achieve these mode share targets.

2.4.3.3 Active Transportation Master Plan (ATMP)

Oakville's 2017 Active Transportation Master Plan Update (a revision of their original 2009 ATMP) envisioned Oakville as a pedestrian and cycling supportive community that encourages active transportation for both utilitarian and recreational travel by:

- Ensuring that every street accommodates pedestrians and cyclists
- Establishes promotional and educational policies and programs
- Developing a town-wide visible and connected active transportation network of on- and off-road facilities
- Recognizes that great places required pedestrian and cycling friendly land development and streetscape design

Spatial analysis conducted found that most of Oakville has a high walkability and bikeability score except in locations of major physical barriers (waterways, highways, valley-lands, etc.). Criteria included proximity to schools and parks, number of street trees, street connectivity, density and variation of businesses, density and volume of sidewalks, slope, population density, and density of existing routes.

Areas with relatively high numbers of cycling and walking trips tended to have high walkability and cycling scores. However, some of these areas which were supposed to be bike and walk friendly, such as North Oakville or Downtown Oakville, had very few numbers of trips per day. These locations were given particular attention in the design of the future active transportation network.

The recommendations of the plan included the identification of target pedestrian and cyclist networks

built off the original 2009 plan (including identification of recommended facility type), within Oakville's existing land use context. They also included twenty-five proposed outreach initiatives to encourage active trips within the existing population and network conditions, and an additional 25 recommendations for the implementation and monitoring process.

Takeaways:

The existing body of planning guidance at the provincial, regional, and municipal levels is clear: there is a need to shift demand away from auto modes towards more sustainable means of transportation, including walking, cycling and transit. This will require investment from all levels of government to achieve and must come alongside a unification of transportation and land use policies. Mode targets will not be achieved with the status quo.

The good news is that these requirements come at a time of major regional transit expansion within the Greater Toronto Area. Projects such as GO Expansion, improved GO Bus service and LRT/BRT on Dundas St and Trafalgar Rd can help encourage the desired growth and mode shift at the key growth nodes and elsewhere within the town. On the other hand, they are regional projects that will attract the lions-share of provincial funds, even though local improvements are just as important.

We are facing a major housing crunch within our region, with an important provincial goal being a steady increase in housing supply. While this can work towards Oakville's intensification goals, it can also lead to a runaway effect in which developers get caught up in a race to build taller and taller buildings with smaller and smaller units, at the cost of creating actual livable neighbourhoods. As well, developments must be proposed with Oakville's mode shift targets in mind. Auto-oriented tall buildings will create the same problems that single family subdivisions have to date. Oakville must therefore ensure controls on new developments so that their strategic aims are met while still ensuring that livable, walkable communities are being produced.

2.5 SWOT Analysis

This section presents an analysis of strengths, weaknesses, opportunities, and threats (SWOT) based on the various trends affecting Oakville’s transportation system. Strengths and weaknesses focus on the existing situation; opportunities and challenges focus on the (potential) future situation.

2.5.1 Strengths

- Oakville has a robust policy foundation in place covering many aspects of the transportation system. Oakville’s Transportation Master Plan supports greater sustainable transport use. Its active transportation plan includes a detailed plan for an extensive well-connected network, plus supportive policy measures. This sets the stage for a change in travel patterns.
- Oakville’s Urban Structure (implemented by Official Plan Amendment 15 and now in full force and effect) focuses growth on mixed-used intensification along key nodes and corridors, as well as near major transit hubs (GO stations). This brings people’s travel destinations closer together (both in and around the Growth Areas) and helps to encourage switching travel involving trip chaining from car-based to sustainable modes.
- Oakville has control over most of the factors that influence internal trips, which form an important part of the trips generated by the town.

2.5.2 Weaknesses

- Oakville’s current urban form and densities are not favorable to active transportation and transit and are very different from those in places where micromobility programs have been successful. Policies for new development will help address this, but most of the existing development will not change significantly.
- Oakville’s ability to influence external trips is limited because those trips involve services and infrastructure provided by others. Given that external

trips account for nearly half of Oakville’s trips, this is a key challenge in delivering any significant change to Oakville’s travel patterns.

2.5.3 Opportunities

- The housing market, as of this writing, is facing supply issues and high demand, meaning that there is strong developer appetite for intensification projects throughout the region, not just in Downtown Toronto.
- The Ontario Land Tribunal (OLT) can uphold and strengthen Oakville’s local planning decisions which can shield them from further appeals from private developers and ensure that Oakville’s vision is implemented as desired.
- The Province’s ongoing transit expansion program provides the opportunity to create dense, walkable developments that are favourable to transit use around key transit nodes, such as Oakville GO station.
- In Downtown Oakville, Kerr Village and Bronte Village, Oakville already has nodes favourable to increased transit and active transport use. These assets can be expanded in the future, rather than needing to start from scratch.
- Existing parking lots, mini-malls and office parks are spaces that can be redeveloped into new complete communities that engrain Oakville’s integrated land use and transportation policies and can serve as new hubs for existing communities.
- The adoption of policies that end the prioritization of private autos (and in turn, focus more on walking, cycling and transit) provides an opportunity to embed significant change in the way Oakville’s transportation system is planned, designed, and delivered. In particular, it could help shift the focus of roads away from the movement of personal vehicles and in turn improve transportation safety.
- The rise of car-sharing services, on-demand transit service and other new mobility options can help reduce the need for car ownership – and hence

reduce the need for parking at homes and destinations throughout the town. This provides an opportunity to decrease parking requirements, which will help achieve Oakville’s density targets for residential and non-residential development.

- The use of autonomous vehicle technology for transit provides an opportunity to deliver much higher levels of service within the existing operating funding envelope.

2.5.4 Threats

- Due to market forces, many municipalities have seen a race to taller and taller buildings will smaller and smaller units, at the cost of creating communities that are desirable to live in.
- The Ontario Land Tribunal (OLT) can overrule Oakville’s local planning decisions in favour of private developer preferences, even when such decisions act against Oakville’s strategic aims.
- Oakville does not own, maintain or have direct control over the regional roads passing through the town – Halton Region does. While Oakville can exert pressure and push for its desires, a difference in vision between local and regional governments can make progress along these routes difficult, if not impossible.
- Follow-through requires effort, but also money. Oakville has conducted many planning studies in the past for improving various modes, but actually approving funds for implementation can stop even the best laid plans in their tracks.
- Intensification can be controversial for existing residents who chose Oakville specifically for its current built form and transportation landscape.
- The use of most new technologies and trends in transportation are strongly influenced by factors beyond the Town of Oakville’s control. Consequently, managing their effects will require a proactive approach. Failing to do so will mean the Town of Oakville will not be able to maximize the benefits, nor minimize any negative effects.

- The attractiveness of new travel options with one traveller per vehicle (such as ridesharing and CAVs) may make it more difficult to increase the use of sustainable travel options.
- The regulatory environment and associated major policy issues for autonomous vehicles are controlled by the Province. This creates a risk that Provincial regulations do not align with Oakville’s goals for its transportation system. Oakville would need to engage with the Province to further its policy aims associated with smart / autonomous vehicles.
- The potential benefits of Mobility as a Service (MaaS) require Oakville and other providers of transportation services and infrastructure to provide the necessary information/data and interfaces.
- The COVID-19 pandemic has shifted travel patterns, and it is unclear if, or when, the pre-pandemic status quo will return. Transit ridership has been particularly impacted by this, which makes avoiding service cuts a challenge, and service expansion not feasible at this time.

Takeaways:

Oakville’s current urban form is not favourable to achieving its mode shift targets. However, the combination of its intensification plans and a hot housing market, as well as major transit investment from the Province of Ontario, provide a strong opportunity in its identified growth nodes (some of which are already existing) to change course from the status quo, and build up from there.

However, Oakville needs support. Residents can embrace intensification, or fight against it. Developers can bring its vision to life or propose something wildly different. Halton Region can support Oakville’s ambitions along the roads that it owns or continue to chase endless road widenings. The Province’s land use tribunal can reinforce Oakville’s strategic decisions or tear them down entirely. In order to achieve its vision, Oakville must reach out to these parties, listen to them, and win them to its side. The only path forward is forward together.

3 A Unified Direction for Transportation

3.1 A New Vision for Oakville’s Transportation Network

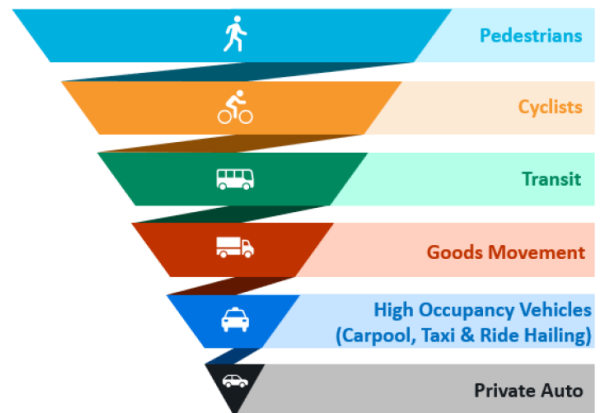
It was mentioned earlier that achieving mode shift away from automobiles to transit, walking and cycling is a major objective for the Town of Oakville. In developing this Urban Mobility & Transportation Strategy, a workshop was held with Town staff to refine this objective into an aspirational vision for Oakville; going forward, this will be the guiding idea behind what the transportation landscape in Oakville should do and be.

“Oakville will enable the efficient movement of people and goods by supporting sustainable travel choices”

This simple statement strikes at the heart of what Oakville wants to accomplish from its transportation network: meaningful mode shift to more sustainable forms of travel to ensure that the network is resilient in the years to come.

The idea is to re-prioritize Oakville’s mobility choices, establishing a hierarchy in which sustainable forms of transportation, such as walking, cycling and transit are given strategic priority in planning and in implementation initiatives (while still reflecting the need for reliable auto-based mobility in the town), as shown in Figure 3-1, to take pressure off the current network, and build a more sustainable future.

Figure 3-1: Mode Priorities



3.2 Linking Transportation & Land Use

The vision presented in Section 3.1 is not really new. It is a refinement and consolidation of the large body of existing planning work discussed in Section 2.3. Oakville, Halton Region, and the Province are united in their desire for mode shift towards more sustainable forms of transport. Many studies across all three levels of government have been completed over the past ten years, more or less unified in their vision. Yet, as its TMP review stated, Oakville’s actual mode shift has not kept up with the target. Why is this the case?

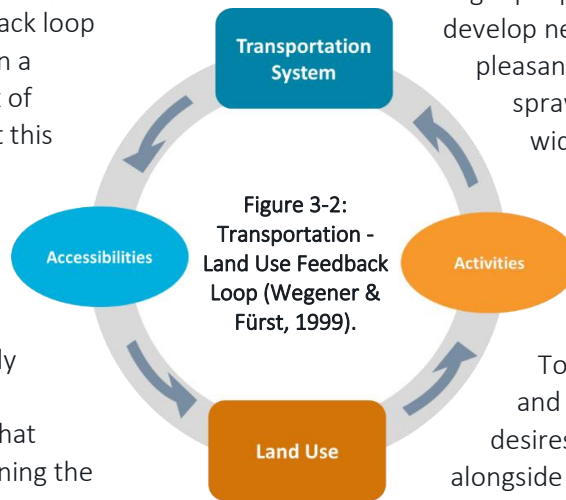
Ultimately, **Oakville's land use and transportation objectives are not in full alignment with Oakville’s land use and transportation contexts.** Transportation and land use policies form a feedback loop

(Figure 3-2). The mix of land uses in a particular area determines the mix of **activities** that take place there, but this then requires a transportation system that can serve them. The ability of the transportation network to do so is a measure of a location’s **accessibility**. However, this can vary considerably by mode, influencing how future developments are designed and what land uses are allowed there, beginning the cycle again.

For example, a neighbourhood of single-family homes creates a wide variety of trips to work, to school, for recreation, or for shopping. However, the single use zoning necessitates a network of wide roads connecting districts of the town, as the different uses are not located in close enough proximity to walk. The creation of these roads makes more and more of the town accessible by car, which encourages more of this type of development, but at the same time discourages other modes for travel because things are now overly spread out. The result is that a vicious cycle has been created, in which the entire town is designed around the car, at the expense of all other transportation options.

This example is essentially Oakville’s situation in a nutshell. Like other suburban municipalities around Toronto, the town developed around the car, with its transportation network designed primarily to ensure that travel by car is easy. However, many of the characteristics that make a town friendly towards cars make it the opposite for more sustainable forms of transportation. Oakville is large and sprawling; neighbourhoods are separated by wide pedestrian-unfriendly arterials, and retail or business districts are located far from the places people live, often spread out between large swaths of surface parking. While using sustainable forms of transport might be technically possible, it usually is not practical due to the town’s chosen built form.

To get people out of their cars, Oakville must develop neighbourhoods that are actually pleasant to traverse without one. Retrofitting sprawling residential neighbourhoods with wider sidewalks and bike lanes does improve the infrastructure condition there, but it does not change the fact that using those modes in that urban topography is not useful for getting to where people need to be. To achieve consistent behavioural change and the mode shift goals that Oakville desires, land use policies must be viewed alongside transportation under a unified lens.



But make no mistake: Oakville is not starting from zero. The Town has already advanced in its pursuit of unified land use and transportation policies in recent years, with eight growth nodes and two growth corridors identified in its Urban Structure and Official Plan, and a considerable amount of planning work completed to guide their intensification. In time, this effort **will** start to pay off. Instead, this document – The Urban Mobility & Transportation Strategy - builds upon the examples Oakville has already put forward. It presents a high-level strategy for unifying land use and transportation policies at the municipal level to support Oakville’s vision for a better tomorrow – at current growth nodes, future ones, and everything in between.

3.3 The Cost of Inaction

Section 2 introduced a wide body of planning guidance at the provincial, regional, and municipal levels regarding future growth alongside the need for intensification and mode shift. Further planning work on this is ongoing at all levels of government, though the major question of “how much intensification should we embrace?” remains.

Halton Region is currently conducting an Integrated Growth Management Strategy (IGMS) as part of their Official Plan Review. The primary objective is to determine where future population and jobs will be distributed in Halton Region between 2031 and 2041.

On June 19, 2019, the IGMS presented eight growth scenarios to Halton Regional Council generally differentiated by the amount of new designated greenfield area being added within Halton Region, ranging from no additional greenfield development to 1000 hectares of new designated greenfield area. From this, four growth concepts were advanced and evaluated in a February 2021 Growth Concepts Discussion Paper.

The paper determined that minimizing the expansion of settlement areas best achieves many of the measures identified in its evaluation framework. On the other hand, it noted the importance of considering market demand – for example, one of the scenarios explored would require an immediate and significant shift in the types of housing being developed in Halton Region towards one where people live in apartment buildings, which may not be realistic or even feasible in the short term.

Oakville’s stance on this has been – and must continue to be – clear. Market forces do need to be acknowledged. However, intensification needs to be embraced and further sprawl must be curtailed in the short term, not the long term. We cannot continue to delay addressing this problem because there is a cost to this delay. The entire region is going to continue to grow, regardless of whether Oakville wants that growth or not. Without planning for the future appropriately, Oakville can expect:

- **Increased pressure on existing infrastructure:** Because suburban communities sprawl out over a large area, they require more roads, more pipes, more electricity cables – more everything, really. The cost of this larger amount of infrastructure then needs to be paid for by a dispersed population. This can result in a gap between how much is needed to operate and maintain the infrastructure, and how much residents can (or are willing to) pay. By continuing to sprawl outwards, Oakville puts its future financial condition in jeopardy.
- **Traffic congestion:** Oakville’s built form makes it challenging to get around without a car. Residential areas are located far away from businesses and shops, meaning they are not practical to walk, cycle or take transit to. There is also an abundance of parking, which encourages travel by car, even for short trips. Oakville is expecting thousands of new residents and jobs in the coming years, and the roads cannot accommodate all that demand – even if they are widened. If no efforts are made to shift Oakville towards other modes, the town can expect increased congestion in the years to come.
- **Restricted flow of goods:** Traffic congestion does not just impact commute times and quality of life of residents. It can also impact their wallets. The more traffic there is, the greater the impact to our supply chain. Deliveries will take longer and be less reliable. The costs associated with this will be passed on to consumers, with increasing severity due to the continued rise of online shopping (which has further exploded in popularity during the pandemic).
- **Isolation of seniors:** Canada’s population is aging. According to the Government of Canada, by 2030, senior citizens will make up 23% of Canadians – up from 18% in 2020. Oakville’s current built form is not favourable to senior citizens, and as such will fail to meet the demands of our aging population over the next decade. In Oakville, residents cannot age-in-place; there are few opportunities for residents to downsize without leaving their current neighbourhood. Worse, there is a risk that senior

citizens who lose the ability to drive or who develop other mobility impairments will become isolated in their homes due to lack of mobility options available to them, and the fact that everything in town is so spread out.

- **Lack of affordable housing:** Our region is in the middle of a housing crunch. Supply is low, demand is high, and prices have soared in response. Young people are struggling to buy homes, and the ones that do find themselves having to move further outwards from the core of the region, regardless of what it will do to their commute times. At the same time, more people than ever before are moving to the region, further straining supply. To confront this crisis, Oakville needs to allow for the development of more units in the space it has available, faster. This requires building denser neighbourhoods that can absorb more of the demand that already exists.
- **Lack of urban options:** In recent years, we have also seen significant demand growth for residences in and around Downtown Toronto. Many people enjoy an urban lifestyle – especially the young. However, increasing numbers find themselves priced out of the City with few comparable options available on the periphery.
- **Damage to the environment:** Our planet is warming, and with that warming comes increased risk and severity of adverse weather events such as forest fires, hurricanes, extreme heat, and flooding. Humanity has only a few decades left, if that, to confront the issue before the damage we have already done becomes irreversible, or worse, leads to a vicious cycle of carbon release via the melting polar regions.

In response to this, Oakville developed and approved a Community Energy Strategy in 2020. Goals included: (1) increasing energy efficiency by at least 40% by 2041, (2) transitioning to carbon neutrality by reducing green house gas emissions by at least 50% by 2041, and (3) return at least \$7 billion in cumulative energy cost savings to the community by

2041. Four strategic directions including home & building efficiency, industrial efficiency, local supply & distribution, as well as transportation efficiency, were approved.

Looking at that last point, we must accept an inconvenient truth: the way we have built our societies is not sustainable. Our cities sprawl outwards. The take up far too much land, require far too much infrastructure, and necessitate long trips for every purpose via single occupancy, gas guzzling cars. To confront these environmental challenges, we must build our cities at a human scale, where walking, cycling and transit are viable options, rather than leaving the car as the only realistic way to get around.

- **Damage to our health:** There is a clear link between amount of time spent sitting and adverse health effects such as obesity, diabetes, and cardio-vascular illness. Because Oakville is a car dependent community, it means that residents need to spend hours in the car each day – driving to work, driving home from work, getting groceries, dropping off or picking up the kids from school, etc. It adds up and contributes to an unhealthy lifestyle. By getting people to shift towards other modes, people can get much of their required levels of activity each day simply by going about their daily lives.

3.4 Goals

To support the vision and assess its success in achieving it, Oakville needs a set of goals or themes, which serve as high-level objectives describing the desired end state. Like the vision, goals are aspirational. However, goals also dig deeper and serve as a way to see that progress is being made over time. Meeting all the goals would achieve the vision. Together, they describe the desired final state of the transportation system. This makes them timeless and useful, even as the world changes. Each goal will then have specific key performance indicators (KPI) to track each one over time. This will be discussed further later in the report.

The goals identified on the right build upon the planning work done by the Province of Ontario, Halton Region and Town of Oakville in the past, and fill in the gaps that have prevented Oakville from achieving its vision to date.

It is recommended to use this report, including the vision and goals it outlines, as an umbrella study for what comes next, so that progress can be tracked over time in a consistent manner.

Takeaways:

To get people out of their cars, Oakville needs to create environments that are pleasant to traverse without one. While this does require improved transportation infrastructure for walking, cycling and transit, the more important element is an improved link between the transportation network and the Town of Oakville’s land use policies, because no matter how wide the sidewalks, few people will choose to walk to or between strip malls and office parks surrounded by a sea of parking.

This section has identified a new vision for Oakville’s transportation network alongside a hierarchy of mode prioritization and seven goals which will be used to track progress of achieving the vision. This will be built upon in later Chapter 6.



Land use and transportation policies and priorities must build off one another, creating a new feedback loop and breaking the cycle of endless sprawl. The transportation network must support the creation of livable communities, and in turn, land use policy must support the development of neighbourhoods in which non-auto-modes can thrive.



Every mode of transport must be viable and competitive in every-day use. The pyramid of priorities must be flipped, to give priority to transit, walking and cycling and break the cycle of endless auto-oriented infrastructure expansion.



The transportation network must unify the Town of Oakville, and wider Halton Region. From Growth Areas to residential neighbourhoods and rural farmland, Halton is one region, and Oakville, one town.



All residents, visitors and workers must be served equitably so that social, ethnic or health status does not impact the quality of travel through the town.



People should be free to move without fear of immediate harm – nor from long term consequences of their travel choices.



The transportation network must meet the needs of today without compromising our ability to provide for ourselves in the future.



The transportation network must support economic prosperity in the Town of Oakville for both existing and future residents.

4 Implications of COVID-19 pandemic

4.1 Overview

Midway through the development of this strategy, the COVID-19 pandemic took hold and upended normal day-to-day life here in Oakville and around the world. The pandemic has transformed how people work, learn, shop, and entertain themselves, and as such, how they travel. Therefore, the strategy was expanded to look at the potential implications of the COVID-19 pandemic.

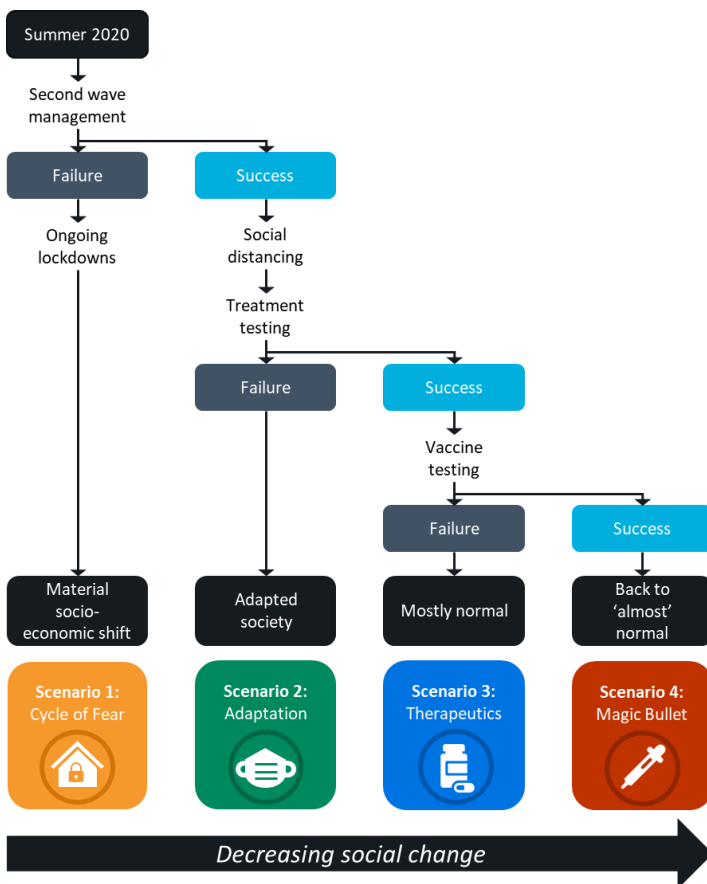
This section includes the following:

1. A review of the scenario planning exercise conducted at the start of the pandemic which tried to chart the likely course the pandemic would take.
2. A review of what actually happened in comparison to the predicted scenarios, and what may yet still happen during the remainder of the pandemic and beyond.
3. A discussion of opportunities and risks that the pandemic presents to Oakville's vision and goals in the coming years.
4. Final conclusions that can be drawn from the pandemic as they relate to Oakville's transportation and land use contexts.

4.2 Charting the Course of the Pandemic

When the pandemic first started to impact our society with the initial lockdown, much was still uncertain (and in many ways, still is), and so an attempt was made to chart the course that the pandemic might take through 2020 and beyond. This is illustrated in Figure 4-1.

Figure 4-1: COVID-19 Scenario Planning



From this, four scenarios were developed which outline different potential outcomes of the pandemic, our response to it, as well as the pace and success of vaccine development:



Cycles of Lockdown

Scenario 1 - A vaccine has not been developed, leading to cycle of lockdowns and peaks of infections over time. This would create a significant, long-term socio-economic shift.



Adaptation

Scenario 2 - A vaccine has not been developed, but a second wave(s) would be contained through lifestyle changes. The mitigation measures currently in place become permanent, leading to an adapted society.



Therapeutics

Scenario 3 - A vaccine has not been developed, but an effective treatment for the disease is available. Any second wave(s) would be contained, allowing a life to mostly return to pre-COVID normal.



Vaccine

Scenario 4 - A successful vaccine is available. The vaccine would prevent or moderate second wave(s), allowing everyday life to return to 'almost' normal.

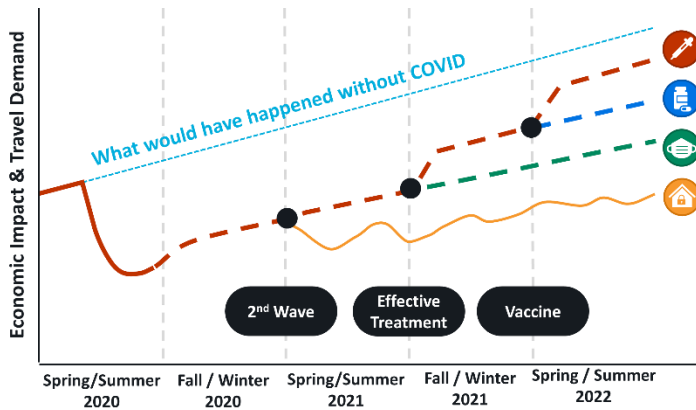
In the short term, all the scenarios were expected to play out in much the same way, because solving the pandemic – whatever the solution might be – would take time to play out.

- **Reduction in economic activity:** Continued fall-out from places of business closing, leading to higher unemployment and lower consumer spending; lower tax revenue for Provincial and Federal government may also limit their discretionary spending.
- **Increased social division:** People will avoid activities that exposes them to large groups, preferring activities they can do with household members only.

- **Dispersal of activities:** People with higher-income jobs are more likely to be able to work at home, lessening their personal risk of catching COVID-19.
- **Reduced public transit demand:** A mix of public perception and actual risk will deter people from using public transit, with people preferring “private” modes (cars and active transportation).
- **Fewer trips per person, and shorter trip lengths:** Reduced commuting and discretionary travel will decrease the number of daily trips per person.

However, in the long term, the outlook was more varied between the scenarios. This is because the variation in the longevity and effectiveness of physical distancing and the scale and duration of economic downturn. These factors were expected in turn to influence both transportation supply and demand, which would result in changes to land use patterns and people’s activities. The long-term potential impact of the four developed scenarios is shown in Figure 4-2, with the cycles of lockdown scenario having the greatest negative impact, and the vaccine scenario seeing us return to (or close to) normal.

Figure 4-2: Impact of COVID Scenarios on Economic Impact and Travel Demand Over Time



The final step of the scenario planning was the identification of thirteen drivers of change, to explore how the pandemic would change our society in the best case (Vaccine) and worst case (Cycles of Lockdown) scenarios. These are defined in Table 1.

A copy of the original Scenario Planning for the COVID-19 pandemic is included as an appendix to this report.

Table 1: Drivers of Change in the COVID-19 Pandemic

Driver	Description
COVID Resolution	Development of (or failure of development of) effective treatment and/or vaccine and how this translates to extended/further lockdowns or other restraints on behaviour
Physical Distancing	Continuation or otherwise of physical distancing, either regulated or through changed behaviours/track & trace
Economy	Length and depth of recessions, currency depreciations (between country impacts)
Transportation supply/capacity	Availability and capacity of transportation modes, either because of economics or physical distancing
Transportation pricing/cost	Price of oil, cost of travel
Transportation policy	Transportation policy measures (e.g. subsidies, regulation, capital investment)
Migration/land-use	Change in migration patterns, change in locations of residence/employment
Employment centres	Businesses rethinking their ‘location strategy’ (e.g. downsizing office accommodation in major cities)
Mode preference	Change in transportation mode preferences due to fear, experience, changed costs/benefits of modes
Teleworking	Willingness for flexible working/working from home
Commuting travel	Changed willingness to travel to work/find jobs (e.g. shorter journeys, longer journeys, but less frequently)
Deliveries of good	Changed number of online order deliveries
Leisure Travel	Willingness of Oakville residents to travel internationally, and number of tourists visiting Canada

4.3 Looking Back, Looking Ahead

More than a year later, we can see how things played out, with the ultimate outcome being a hybrid of some of the proposed scenarios. A review of how the pandemic impacted our society in 2020 and the first half of 2021 is displayed in Table 2. In summary:

- A major recession was avoided due to government stimulus spending, and the stock market remained bullish for much of 2020. However, local businesses have been hit hard, with long stretches of closures to non-essential businesses imposed by public health officials.
- Physical distancing has been encouraged since the start of the pandemic, though compliance has at times proved difficult to encourage or enforce. New research suggests that the need for physical distancing outdoors is less necessary than when indoors.
- Staying at home except for essential trips has been encouraged for a large part of the year, and most office workers have worked from home since March 2020, transforming typical commuter trends. Peak period travel is avoided to reduce crowding.
- Transit ridership remains low, though has recovered somewhat from its lowest point at the start of the pandemic. Additional government spending is still required to keep transit afloat.
- There has been a shift out of urban population centres (such as Toronto) to more suburban housing on the periphery due to crowding concerns and prevalence of working from home.

Adaptation to life with the virus proved difficult, and a second wave was not avoided - nor a third. This left us in cycles of lockdown throughout most of 2021 that continued to disrupt regular society in much the same ways it did throughout 2020.

However, a vaccine *has* been developed, and 74% of the population has already been vaccinated as of October 2021, suggesting that Scenario 4 will be the most likely outcome in the long term. Unfortunately, new variants of the virus have arisen which may reduce vaccine effectiveness, and

the long-term efficacy of the vaccine is still unknown. Therefore, in the long term, it is possible that we will see a hybrid of the therapeutics and vaccine scenarios, in which yearly booster shots are needed, but life more or less goes back to normal. With this in mind, Table 2 on the next page also has a new forecast how the pandemic will change the thirteen drivers in the coming years.

- The pandemic showed many people that working from home was both viable and preferable. Some companies will continue this arrangement, allowing working-from-home to be more common-place in the future, while others will allow for a more flexible working arrangement (i.e. work-from-home 2-3 days per week). This will decrease the load on the transportation network and the need for agglomeration in city centres. However, the magnitude of this is highly dependent on the adoption of flexible working policies, and in the long-term, as the pandemic fades from memory, the original status quo may return.
- Due to crowding concerns, transit was hit particularly hard during the pandemic. As the need for physical distancing lessens, this deterrent towards transit use will disappear. However, shifts that may have occurred towards other modes may prove difficult to undo.
- Pent up travel demand is likely to result in increased tourism demand in late 2021, through 2022. As the vaccine rollout varies by country, travel bubbles between Canada and the US, EU and Oceania are likely to open before more widespread travel with the rest of the world. Reopening of the US-Canadian border has been a priority on both sides of the border and opened from Canada to the US on August 9, 2021, and from the US to Canada on November 8, 2021.
- The pandemic resulted in increased levels of online shopping as in-store retail was closed. This exacerbated a trend towards online shopping that already existed pre-pandemic and will likely persist into the future. However, there may be a push at the local level towards a shop-local mentality, to help businesses hit hard by the pandemic closures.

Table 2: Impact of the COVID-19 Pandemic Over Time

Driver	Description	2020 (Cycles of Lockdown)	2021 (Transition)	Future (Vaccine/Therapeutics)
COVID Resolution	Development of (or failure of development of) effective treatment and/or vaccine and how this translates to extended/further lockdowns or other restraints on behaviour	Repeated lockdowns	Track and trace + self-isolation	Treatment + Vaccination
Physical Distancing	Continuation or otherwise of physical distancing, either regulated or through changed behaviours/track & trace	Mandatory	Encouraged	Back to pre-Covid normal
Economy	Length and depth of recessions, currency depreciations (between country impacts)	Long and deep recession	Recession	Smaller than pre-Covid trend
Transportation supply/capacity	Availability and capacity of transportation modes, either because of economics or physical distancing	PT supply reduced	PT supply maintained	PT reduced
Transportation pricing/cost	Price of oil, cost of travel	Targeted fare discounts	Higher or subsidized fares	Higher or subsidized fares
Transportation policy	Transportation policy measures (e.g. subsidies, regulation, capital investment)	Car, active, targeted PT support	Car, active, targeted PT support	Back to pre-Covid
Migration/land-use	Change in migration patterns, change in locations of residence/employment	High aspiration for dispersal	Moderate aspiration for dispersal	Back to pre-Covid
Employment centres	Businesses rethinking their ‘location strategy,’ e.g. downsizing office accommodation in major cities	Large drop in footfall	Moderate drop in footfall	Back to pre-Covid
Mode preference	Change in transportation mode preferences due to fear, experience, changed costs/benefits of modes	Car, active	Car, active	Back to pre-Covid
Teleworking	Willingness for flexible working/working from home	Highly increased	Highly increased	Moderately to highly increased
Commuting travel	Changed willingness to travel to work/find jobs, e.g. shorter journeys, longer journeys, but less frequently	Highly decreased, peak spreading	Decreased, peak spreading	Marginally decreased
Deliveries of good	Changed number of online order deliveries	Significant increase	Significant increase	Larger than pre-covid trend
Leisure Travel	Willingness of Oakville residents to travel internationally, and number of tourists visiting Canada	Highly decreased, strict border restrictions	Highly decreased, strict border restrictions	Back to pre-Covid, or larger due to pent-up demand.

4.4 Opportunities and Risks

Managing the unique situation for society brings with it some significant risks, but also opportunities that can be capitalized upon.

Opportunities include:

- The pandemic has reset people’s commuting expectations by showing them that working-from-home is viable, or even preferable. Going forward, people may be more open to Transportation Demand Management policies (TDM) because they have already seen first-hand that that they can work.
- Flexible working arrangements in the future can allow for improved efficiency of existing network without infrastructure improvements.
- Reduced auto demand makes re-allocating road space towards other modes less controversial or even desirable.
- The pandemic has demonstrated that converting road/sidewalk space to restaurant patio space during summer months improves street vitality and liveliness (Photograph 4). City of Toronto staff have recommended making their “CafeTO” program permanent in summer months, though no decisions have been made as of October 2021. Oakville could benefit from doing the same.
- Increased focus on “shopping local” can help strengthen urban growth nodes.
- University of Toronto survey suggests 80% of lost riders are happy to return to transit in the future.
- Under-used park & rides or urban parking lots can be converted to transit-oriented developments.
- The pandemic has highlighted inequity in our cities and transportation systems, from network accessibility to vaccine rollout. This is an opportunity to reframe the justification for transit and active transport expansion. Our communities cannot thrive without essential workers, and therefore they cannot thrive without the means for those workers to get to where they need to go. Even at the height of the pandemic, transit was instrumental to getting these people to work even with service cuts, and transit will continue to serve these people long into the future.

Photograph 4: COVID-19 Restaurant Patios



Source: Downtown Oakville BIA

Risks include:

- Urban shift away from cities to suburban housing may continue in the medium term. The future role of cities in our economy is in question.
- Businesses have struggled through the pandemic and many more may still yet close, especially as support programs come to an end. This can weaken urban growth nodes in the short term.
- Maintaining funding for transit until ridership recovers will require sizeable, continuous government subsidies, with an unclear endpoint.
- Demand shifting away from transit back to private autos is contrary to Oakville’s policies and strategic aims. Changing long-term plans based on short-term trends risks continuing down the path of lower density/sprawling development in and beyond the Greater Toronto Area.
- Failing to correctly determine which temporary changes to the transportation system and urban environment should be made permanent. Transit is especially vulnerable, as short-term network changes could have long-term ridership effects (especially due to current fare-box funding shortages).

- Assuming that “working at home” is a viable option for the majority of residents; more generally, failing to take the needs to vulnerable groups into consideration when crafting public policies and transportation services.
- Predicting long-term traffic volume trends is difficult at this stage, particularly in peaks (higher car-based mode share vs. economic effects and working at home).
- Virus variants, changes in vaccine efficacy over time and vaccine hesitancy may yet still prolong the pandemic beyond its expected Fall 2021 end point. International travel (to/from Canada) may not recover with the rest of the economy due to variations in different country’s vaccination progress.

Photograph 5: Halton COVID-19 Vaccination Clinic



Source: Halton HealthCare

Takeaways:

- This is (still) a time of large-scale and rapid change in society. Within a few weeks, the COVID-19 pandemic produced changes in public life and travel patterns of a scale that normally takes decades. Those changes will continue in whole or in part for an extended period, even with the vaccine.
- Preventing and mitigating the negative effects of those changes requires rapid actions. The changes from COVID-19 are already in place and will continue to evolve if no actions are taken. The negative effects could include embedding car-dependent travel habits and land use patterns, contrary to Oakville’s wider strategic aims.
- Oakville has the opportunity to benefit from increased localism at municipal level, as people may rely more on local amenities for everyday life. Oakville has multiple places in the town that can serve as focal points (such as downtown Oakville and Bronte). Further, the nodes and corridors in the Town of Oakville’s OPA 15 will help support this trend.
- Continuous investments into public transit, cycling and walking are needed if Oakville wants to make sustainable modes of transportation attractive and safer especially in the wake of this crisis.
- Local environmental benefits are at risk. Without decisive action, the recent drop in pollution will be a short digression from past historical trend, soon replaced by a return to growth in automobile traffic. This risk is a major concern, given the mounting evidence that pollution probably makes us more vulnerable to future crises.
- Social and urban patterns are important. The geography of inequality – the social divide – is a key determinant of COVID-19 incidence and prevalence. Promoting de-densification could be damaging socially, financially, and from a climate perspective.
- Inaction would affect resilience – strong resilience of the transportation offering in the context of possible rapid fluctuations in demand in the future is required, since future crises are foreseeable.

5 Initiatives to support mode shift

5.1 Overview

This section outlines initiatives that can help Oakville achieve their desired mode shift away from single use vehicles to more sustainable forms of transportation. The recommendations seek to unify land use and transportation policies, in line with the Unified Direction for Transportation discussed in Chapter 3.

- The subsection on transportation focuses on creating a road network that makes every mode viable and competitive. This is achieved by developing **Complete Streets**, which reallocate space on the transportation network to better serve more sustainable modes, rather than just cars. This creates an accessible environment that reflects the specified land use policies and the idea that not every trip will require a car moving forward.
- The subsection on land uses focuses on modifying existing best practices to support the development of holistic **15-Minute Neighbourhoods** which allow residents to live, work and play all within their neighbourhood. This creates human-scaled environments that generate shorter distance trips which can be viably completed regardless of mode.
- The third subsection is focused on **Putting it All Together** – linking the independent transportation and land use recommendations from the previous two subsections into a cohesive toolkit for Oakville to plan its future transportation network.
- The final subsection discusses **Travel Demand Management (TDM)**. Specifically, it discusses social programs that Oakville can conduct or encourage to help shift users to more sustainable forms of transportation, as well as emerging technologies with the goal of making more efficient use of the road network as it exists today. Of course, these policies will only become more viable as the Town executes its vision for a more dense, walkable urban form.

The recommendations outlined in this chapter will then be developed further into guidance for future planning studies in Chapter 7.

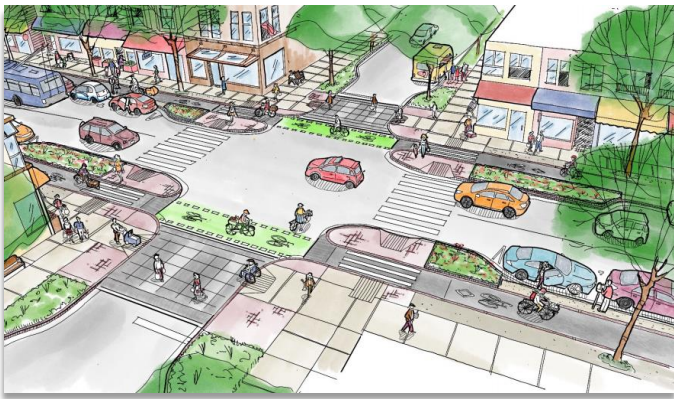
5.2 Complete Streets & Multi-Modal Transportation Networks

Oakville’s current transportation network prioritizes automotive travel. Other modes of travel are secondary, and Oakville’s mode share reflects that. To change course and get people moving in different ways, Oakville needs to design streets that make them pleasant and practical to use without a car.

Adopting a **Complete Streets** approach is a way to accomplish this. The Complete Streets approach reframes how we design our streets. It requires that streets be designed in a way that enables safe, comfortable, and convenient travel for all ages and abilities, **no matter what mode they choose to use**. This is done by reallocating space from auto modes to walking, cycling and transit, on both existing and future streets. The result is that sustainable modes become just as viable and attractive as cars are.

Improved balance between modes is the desired outcome, but not the process to get there. To make a shift towards more sustainable modes of transport, Oakville needs to **actively prioritize** those modes, closing the gap between automobiles and other uses that has grown over years of auto-centric transportation and land use planning. Otherwise, the status quo will continue, simply because auto demand is – currently – so much higher. Without action, it always will be.

Figure 5-1: Complete Streets



Source: City of Vancouver Complete Streets Policy Framework

This section is split into the following subsections, each discussing a specific element of how to make streets work right for each mode:

1. **Auto Elements**, which makes the case that it is okay to shift priority away from the solely-auto focused paradigm that has dominated Oakville for so long, and how to do so.
2. **Pedestrian Elements**, which outlines street improvements to improve the pedestrian environment and metrics to measure those improvements.
3. **Cycling Elements**, which outlines improvements to the cycling environment and metrics to measure those improvements, including the introduction of a bike share service.
4. **Transit Elements**, which explores how to improve transit service through both street and operational improvements, and how to build the case for future BRT service on Dundas St and Trafalgar Rd.
5. **Parking**, which critically examines how Oakville deals with its parking supply, and how the supply can be “Right-Sized” and used more efficiently in the future.

5.2.1 Auto Elements

Cars will always be an important part of Oakville’s transportation network and Oakville will always need to accommodate them. However, the Town of Oakville and Halton Region must accept a crucial point: they will never solve congestion. There will always be someone new who fills up space on the road, regardless of whether that space was created by paving a new lane, or by having some drivers switch to buses. In fact, it is well established that the expansion of congested roadways does not reduce congestion – it just increases the number of people on those roadways. This is called **induced demand** (see Explanatory Box 1 for details).

Explanatory Box 1: What is “Induced Demand?”

Induced demand is a fundamental concept of transportation planning that has been observed in real world situations across North America and elsewhere, but it is not immediately intuitive until you think about it and understand why it occurs.

Imagine you are driving on a congested (i.e. busy and slow) arterial road through your town. You may think, “Man, this road cannot accommodate all these cars. The town really should widen it.” The problem is that when the capacity of a road goes up, the demand for that road goes up too. In other words, it gets busier to match the increase in space, while travel times stay about the same. This does not happen immediately – it may take a year or two, but before you know it, you have the same level of congestion that you started with.

So why does this happen? Ultimately, more people want to use our roads at any given time than the number who actually do. Widening a road encourages people who currently take other routes to switch the newly widened road. Plus, people who currently are *not* making trips - or are using other modes – see the newly widened road and decide to make a switch too. And why wouldn’t they? When the road first opens, it probably is faster than it was before. But when everyone makes this same decision, the road inevitably fills up, cancelling out the initial travel time gains and leaving drivers and the Town of Oakville back at square one.

This creates a trap, wherein cities and towns endlessly chase an unattainable goal via roadway expansion. This instead continues to make their transportation networks less and less attractive to other forms of transport, encourages more and more sprawl, and thereby leads to

even more roadway expansion. Instead, Oakville should consider the following points:

- **Re-evaluate how traffic impacts are analysed:** Current transportation impact analyses relies on Levels of Service, (A to F), which represent the amount of delay that drivers experience at each intersection. However, there are two fundamental flaws with this approach:
 - **This biases greenfield developments over developments in dense cores.** Levels of service scores in dense urban cores are generally lower than those in suburban neighbourhoods due to higher traffic volumes and a tighter grid-based road network. This means that multi-family development (such as duplexes, apartment buildings, etc.) can have a large, localized impact to LOS scores, even though residents of that development will have greater options of mode choice. On the other hand, greenfield developments contribute far more miles of auto travel to the regional and municipal road networks, but their impacts to LOS at specific intersections are more diffuse. This makes greenfield, suburban developments appear to have less of an impact on the transportation network than they actually do.
 - **This biases auto travel over other modes.** The factors that result in an improved auto experience for drivers (such as number of lanes, road width, traffic speed, and signal timing) result in a worsened experience for other modes by increasing wait times, crossing distances, and lowering safety and comfort of travel.

Understanding how the auto environment will be impacted by a development is important, but this must be looked at holistically in the context of all modes. Therefore, **we recommend the introduction of a multi-modal levels of service approach for future traffic impact studies**, so that the impact to all modes can be examined, compared against each other and prioritised, depending on the environment in which the development exists in. The City of Ottawa’s Multi-

Modal Levels of Service (MMLoS) Guidelines are a good starting point. They examine the infrastructure present on the street to determine a service level for each mode, without the need for any pedestrian or cyclist counts (which may not be available or would require funding).

The result is that in a new greenfield development, the existing auto levels of service methodology can continue to hold the most sway (though, no longer the only), while in an urban core, priority might be given to pedestrians, cyclists and transit based on strong pedestrian/cyclist LOS performance, even if auto scores are less than ideal. In dense urban cores, it is highly unlikely that the Town of Oakville will be able to achieve LOS C conditions for autos everywhere, and so it should be willing to accept lower scores, on the condition that they are offset by improvements to the pedestrian, cyclist, and transit realms instead. Lower performance of auto modes alongside improvements to cycling, walking and transit can help drive behaviour change.

- **Aim for a “Complete Streets” Approach:** Right-of-way space is limited, and the current paradigm is to prioritize cars as much as possible. However, by reallocating space to other modes, those modes become more attractive and useful. It is important to remember that the concept of induced demand also works in the other direction – a **strategic** removal lanes of traffic will not cause gridlock. Auto drivers will always find a way to redistribute their trips, and by providing more space to other modes, some of those users will chose to switch.
- **Maximize volume of people, not just cars:** The goal of a transportation network is to move as many people as possible – **not** as many cars as possible. If improving pedestrian, cyclist and transit infrastructure causes those volumes to increase, this can outweigh an impact (in terms of volume or speed) to vehicular traffic, so long as the overall change to the number of people being accommodated by the network is positive.

- **Adopt a Vision Zero (or Similar) approach to road design:** As discussed in Explanatory Box 2, road safety is highly dependent on road design. Lowering speed limits is a good option in the short term, but may require additional enforcement, as our roads still *feel* like they are safe to drive fast on when you are in the driver’s seat. In the short-term, changes like painting lines on the ground (Figure 5-2) can have a big impact to the perceived and real safety of a road and demonstrate the benefit of more permanent changes. In the long term, changes to road design standards are necessary, shifting away from purely auto focused cross sections to ones that reflects all road users. This changes the safety strategy from *reactive* (enforcement) to *proactive* (prevention). Getting from point A to point B slightly faster is not worth the price of a human life.

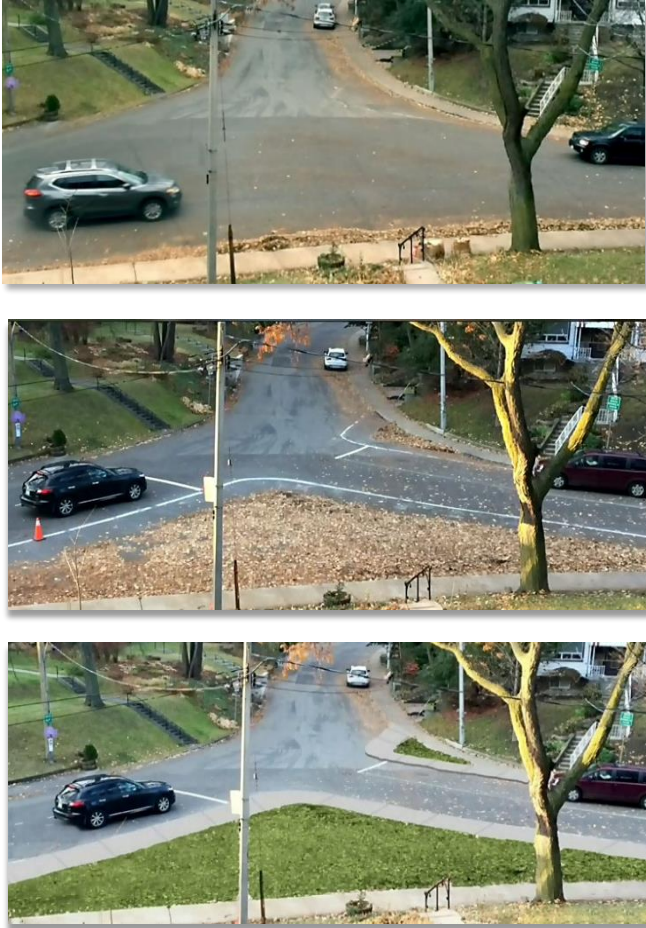
Explanatory Box 2: Road Safety – Not Just an Enforcement Problem

Traditionally, speed limits are determined by calculating the 85th percentile speed that cars travel at on a given road. Speed limits can then be revised up or down based on local context. However, this is a very auto-focused methodology that fails to capture the impact that speed has on other modes, because the speed that make drivers *feel* safe is probably a lot faster than the speed that would make pedestrians and cyclists *be* safe.

In recent years, there has been a push to lower speed limits to improve safety for pedestrians and cyclists. After all, the faster cars are travelling, the more severe an accident will be, and the most likely it will be fatal. This initiative should be supported. However, in the long term, it is not enough to simply lower the speed limit, as all roads have de-facto “design speeds” that drivers will feel most comfortable travelling at. For example, if you take an 80 km/hr regional road and drop the speed limit to 40 km/hr, without changing anything else about the road’s geometry, compliance will be a major problem. Cars will continue to drive at the speed that they feel most comfortable travelling.

To really reduce speeds on our roads, the streets themselves must be redesigned. This impacts the entire road cross section – not just the pavement that cars drive on. Elements such as road widths, lane widths, building setbacks, the presence of on street parking, the surface treatment of the road, boulevard width and sidewalk setback all contribute to the feeling “the right” speed to travel at, regardless of what the posted speed limit might be.

Figure 5-2: Road Design & Safety (Top: Before, Middle: Temporary, Bottom: Proposed Permanent)



Source: Dave Meslin, Facebook

- Remember that regional roads are just as much a part of Oakville as the local roads:** Trafalgar Rd and Dundas St are identified in the Town of Oakville’s Urban Structure as Growth Corridors. They will play a central role in the intensification of Oakville and the shift towards more sustainable modes. By repurposing them into main streets where possible, eventually the case can be made to downside the auto elements in favour of a more multi-modal approach.

This has been seen in Toronto’s North York Centre, in which a 6-lane arterial road (Yonge St) was gradually converted into a major main street, using the subway as a draw for new developments. Recently, the

ReImagine Yonge project has recommended the reduction of one lane in each direction for the expansion of sidewalks and addition of bike lanes. By using a similar approach, Oakville can reimagine their own regional roads to be better ingrained in the town’s urban fabric over time.

However, unlike the above example in Toronto, Oakville does not own these roads. While Oakville can and should make its case and try to win Halton Region to its side, at the end of the day, the decision is theirs, not Oakville’s. That said, given the importance of these corridors to the Town of Oakville’s Urban Structure, intensification plans and mode shift targets, **without Halton Region’s full and proactive support, this strategy will not succeed.**

- Congestion Pricing:** Congestion pricing can be introduced as a deterrent to on-peak travel. However, the primary examples of this are either freeways, or urban cores in major cities, which do not apply to Oakville’s local context. While Oakville could consider congestion pricing in some of its centres (such as Midtown Oakville) in the future, it is not recommended at this point as this could prevent those areas developing to their full potential. Oakville can review options for this in the future.

Takeaways:

A multi-modal focus is necessary via a Complete Streets approach to prioritize more sustainable modes on our streets. We want to maximize the volume of people being moved, not just cars.

Due to the principle of induced demand, vehicular congestion can never be solved completely, and Oakville should not fall into the trap of trying to prove otherwise. Oakville’s current methodology for assessing traffic (and the impacts to traffic from new developments) fails to capture this fact, biases suburban developments over urban ones, and does not assess other modes such as walking, cycling and transit. A new Multi-Modal Level of Service Framework is recommended.

Future Studies:

- Strategic Planning Action Items: 2, 3, 4, 12
- Aligned Coordination Action Items: 1

5.2.2 Pedestrian Elements

5.2.2.1 Pedestrian Levels of Service

There is no one accepted methodology for evaluating the pedestrian environment in our cities. For congested main streets in urban cores, an acceptable approach is outlined in Transport for London’s Pedestrian Comfort Level Guidance, in which comfort is purely a function of effective sidewalk width (excluding barriers such as street furniture, lamps, garbage bins, etc.) and pedestrian volumes over time. However, this requires data that Oakville may not have available, and is more suited for highly urban streets – it can be considered as an option in the future where applicable.

For more suburban environments like Oakville, the City of Ottawa’s Multi-Modal Level of Service (MMLOS) Guidelines can be used as an assessment of both perceived comfort and safety for active transportation users along road segments and at intersections.

- Along road segments, in addition to sidewalk width, pedestrian comfort is tied directly to the vehicular environment; sidewalks that have greater separation from the road are perceived more favorably, as are sidewalks adjacent to roads with lower speed and/or lower traffic volumes, as well as sidewalks not adjacent to on-street parking.
- At intersections, pedestrian comfort is a function of the experience pedestrians have while crossing the road. That is, the crossing distance, wait time (as a function of cycle length), whether there is an island refuge or not, the permissibility of left and right auto turns while pedestrians are crossing, and the type of crosswalk paving.

Of course, Ottawa’s MMLOS guidelines are reflective of local infrastructure, rather than network wide considerations. They do not consider the connectivity of pedestrian spaces and the desirability of walking: for example, they do not consider the difference between walking along an urban street with street facing stores versus a suburban shopping district with large parking lots between each building. The former is a more friendly

pedestrian experience than the latter, which is why the pedestrian experience is so closely tied to land use. To get people walking, we need to provide places they would like to walk to. It is not enough to simply improve the built form of pedestrian infrastructure, though it is certainly beneficial to do so. In other words, strong pedestrian levels of service guidance must be tied directly back to Oakville’s intensification goals. It is therefore recommended that Oakville adopt a customized version of Ottawa’s Pedestrian Levels of Service standards (or anything similar) which better incorporates land use policies into the evaluation.

5.2.2.2 Quick Wins

Oakville can use these guiding principles in improving pedestrian comfort levels throughout the town. Some of these can be “quick-wins,” that can be implemented easily (note that on regional roads, this will require support from Halton Region to implement):

- Traffic signal phasing can give more time for pedestrian crossings, reduce wait time, and reduce the number of conflicting left and right auto movements. Advance walk signals can also be implemented, as the City of Toronto has been doing in the past year.
- Lowering speed limits improves pedestrian comfort and safety.

Oakville has already made progress on this. The recently completed Neighbourhood Traffic Safety Program has recommended a 40 km/hr speed limit on local and minor collector roads by changing the town’s default speed limit to 40 km/hr from 50 km/hr; a final decision on this has been deferred until after the results of three 40 km/hr neighbourhood zone pilot studies are known. The Neighbourhood Traffic Safety Program has also recommended automated speed enforcement, a revised definition of Community Safety Zones and an introduction of a qualitative assessment method to determine their necessity. It also identified new locations for traffic calming and pedestrian crossovers. The Town of Oakville is currently conducting a Vision Zero Study, with a report to council due in 2022.

5.2.2.3 Long Term Enhancements

Enhancements requiring physical infrastructure or land use designation changes include the following items. Note that on regional roads, this will require support from Halton Region to implement:

- Pedestrian Safety (Vision Zero or Similar Program):** Adoption of policies and design standard changes that make Oakville roads safer for pedestrians will encourage more people to get out and walk. Vision Zero (or similar) strategies include physical roadway changes, education, and enforcement regarding the rules of the road, improvements to car design, and increasing the number of road crossing points for pedestrians (including transit users) and cyclists.

As explained in Explanatory Box 2, to really reduce speeds on our roads in the long term, the streets themselves must be designed (or re-designed) for lower speeds. Oakville must review its road design standards and re-orient them away from the singular lens of maximizing auto throughput.

Traffic Calming strategies such as reducing the number of lanes, narrowing lane widths, or changing surface treatments of the roadway and crosswalks, all help contribute to lower speeds, shorter crossing distances and improved pedestrian comfort and safety. Raised crosswalks (along minor streets) or the use of different surface treatments for crosswalks (along major streets) can also act as traffic calming and give priority to pedestrians at key crossing locations. Tactile surfaces at crossings can assist in making streets more accessible, even to those with mobility impairments.

Another issue is sidewalk width relative to sidewalk traffic. In some parts of Toronto, sidewalks are so narrow that pedestrians choose to jaywalk to bypass slower moving people. Along heavily trafficked areas (or areas that anticipated to become more heavily trafficked in the future), wider sidewalks and sidewalks that are more separated from the road are recommended.

A similar situation can occur along major arterials with long cycle times – at a certain point, people get impatient and that starts to outweigh the risk. This is not acceptable and must be accounted for when designing pedestrian facilities in areas of high auto traffic.

- Placemaking:** It is not enough to put the infrastructure in place. People need to be given a reason to walk. By including street furnishings such as seating, lighting, greenery alongside worthwhile destinations such as shops, cafes, or public institutions, as well as public art or installations, streets can be transformed into destinations that people actually want to spend time in. In particular, the pandemic has demonstrated that on-street patios bring a sense of life to our streets and can serve as a draw during summer months.

The operational cost and impacts of leaving pedestrian infrastructure in place all year would need to be considered. In Downtown Oakville, furnishings are to be left in place throughout the winter, but this can interfere with road clearing activities. Therefore, an appropriate maintenance plan and budget to make sure benches and bike racks are available and in good shape year-round would be required.

Photograph 6: Montreal St Catherine's St Revitalization



Source: City of Montreal

Additionally, the way roads are designed can have an outsized impact on the identity of a neighbourhood. Stone pavers (as was done at Lakeshore Rd and George St) instead of asphalt, alongside flushed (or no) curbs can give streets the sense of a shared space, rather than being auto throughfares – this is currently planned for St Catherine St in Montreal (Photograph 6), and the Downtown Yonge St Revitalization in Toronto (albeit without flushed curbs).

- **Connectivity:** Ensuring adequate sidewalk coverage and frequent crossings allows walking to be a viable option for road users, so that they do not have to walk far out of their way to get to where they need to go. Large portions of neighbourhoods south of the QEW lack sidewalks, and highway crossings are limited. A sidewalk gap analysis study is currently planned. The Neighbourhood Traffic Safety Program has also identified potential locations for more controlled crossing opportunities in the future.

Photograph 7: Trail in Oakville



Source: Town of Oakville Instagram

- **Improved integration with trail network:** Oakville benefits from an extensive trail system running between many of its neighbourhoods (Photograph 7). However, the integration between the trail system and the sidewalk network can be improved. There are instances of multi-use trails penetrating a neighbourhood and duplicating the sidewalk, without actually being connected to it. Some transit stops are connected to the sidewalk, but not the multi-use path, losing the ability of the multi-use path to

enhance access. An example of this occurs near the intersection of Upper Middle Rd and Third Line. There is a trails plan for North Oakville, and the pedestrian safety study includes potential new crossing locations based on these trail locations and facilitating the pedestrian connections between them. Future master planning work should continue to consider the trail network holistically, as well as its connections to the street, sidewalk and cycling networks.

- **Wayfinding:** In certain neighbourhoods, providing signage and maps identifying things people can discover in a 15-minute walk can help encourage them to switch to non-auto-modes for certain trips that they may not have known were possible to complete without a car. This is most appropriate for dense areas of mixed land use (residential alongside office and/or retail). It is likely not worth the investment in areas cars are already necessary for access (such as business parks or strip malls).

Takeaways:

A pedestrian level of service/comfort assessment should be introduced alongside Oakville’s existing auto traffic impact guidelines, to better capture the impact of new developments and municipal works projects on pedestrian movement in the town. This can be based on the City of Ottawa’s MMLOS guidelines or anything similar, though there is room for improvement upon it.

Pedestrian quick wins include changes to traffic signals (increased walk times, advance walk signals) and lowering speed limits, or improving speed compliance through technology. In the long term, it is not enough to just lower speed limits – streets need to be designed with lower speeds in mind, so that drivers naturally opt for lower speeds. This presents a trade-off. Such a decision can be seen to cause delays to traffic by some drivers; however, it is balanced out by the potential for significant improvements to the pedestrian experience.

Improving pedestrian infrastructure is a start, but streets also need to be places where people would actually want to walk, through the addition of shops, restaurants, and other attractions. This will be talked about further in the next section.

Future Studies:

- Strategic Planning Action Items: 2, 3, 4, 12, 16, 17

5.2.3 Cycling Elements

5.2.3.1 Cycling Levels of Service

Similar to pedestrians, there is no one accepted methodology for analyzing the cycling environment in a transportation network. The City of Ottawa’s MMLoS Guidelines offers one approach and offers several considerations for creating strong cycling infrastructure.

- Along road segments, the most important factor is the presence of cycling facilities. Importantly, the guidelines make a clear distinction between physically separated bike lanes, and separated bike lanes, in which physically separated bike lanes (through a physical curb or other barrier) are the gold standard for ensuring adequate cyclist safety along our roads. Where physically separated facilities are not present, the type of auto environment directly adjacent to the bike lanes becomes relevant. Faster speeds and higher volumes of traffic make for an increasingly unpleasant riding experience, and in commercial areas, the frequency of bike lane blockages is of critical importance, as these blockages can force cyclists into making unsafe manoeuvres to bypass them.
- At signalized intersections, the key factors impacting the cyclist experience are the number of lanes that need to be crossed when making a left turn, and the speed of auto traffic in these lanes. Here, the gold standard is left turn bike boxes that allow cyclists to cross without interacting with traffic (Figure 5-3), or two-stage crossings along the crosswalk, ideally with a left-turn bike box in place. For right turns, the cycling environment is a function of auto turning speed, presence of a left turn lane, and whether or not the turning lane is introduced to the left or right of the bike lane (if present).

Figure 5-3: Bike-Box Cycling Configuration at Intersections



Source: City of Waterloo

Just as in the case of pedestrians, Ottawa’s guidance does not take built form into account. It does not consider whether a street is a place cyclists actually want to bike to. It is recommended that Oakville adopt a customized version of Ottawa’s Cyclist Levels of Service standards (or anything similar) that better incorporates land use policies into the evaluation.

As well, distances in Oakville can be large, whereas cyclists generally prefer shorter length trips, relative to auto trips. The focus must therefore be on key nodes or development areas where the strengths of active transportation can shine and ensuring connectivity between them.

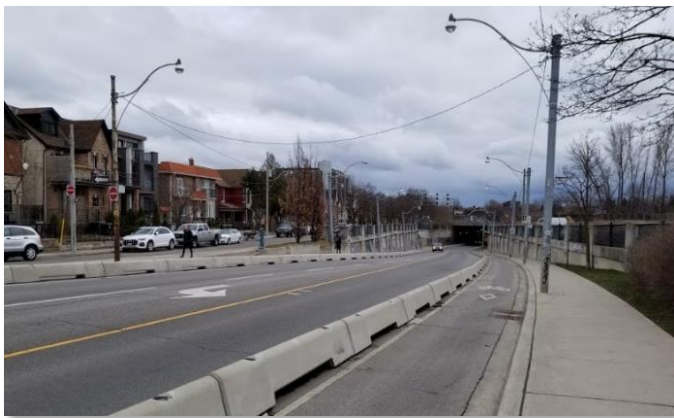
5.2.3.2 Quick Wins

From this, several recommendations can be made to improving the cycling environment in the short term. Some of these have already been planned as part of Oakville’s Active Transportation Master Plan, as identified in Section 2, and will be expanded on further in the future (note that on regional roads, this will require support from Halton Region to implement). Most recently, the Town of Oakville is rolling out their first on-road protected bike lanes on Speers Road as of Fall 2021, separated from traffic by a curb. Phase Two, from Fourth Line to Dorval Drive will begin in 2022. Obviously, adding separated bike lanes is a significant road work, which takes time.

Therefore, in the short term:

- Non-protected bike lanes can be upgraded to protected (or new bike lanes introduced) using low-profile concrete barriers. These have begun being used in Toronto in place of less durable bollards or flex posts, and greatly improve cyclist experience without having to rebuild the entire road. An example of this is shown in Photograph 8. Regardless of permanence, budgeting for proper winter maintenance would be required.
- Paint bike boxes at signalized intersections to allow for safer left turns.
- Narrow road lanes and reduce speeds to introduce cycling lanes or widened curb lanes for signed cycle routes.
- Use surface treatments such as rumble strips at right-turns or wherever auto paths intersect the path of a cyclist, to raise awareness and encourage drivers to watch their surroundings.

Photograph 8: Low Profile Concrete Barriers for Bike Lanes



Source: Steer

- Add secure bicycle parking at key nodes. Oakville has added 15 secure bike parking spots at 300 Church St, monitored by security 24 hours per day. A pilot to add bike corrals is in place on Bronte Rd near Marine Drive and on Kerr St throughout summer and fall 2021. A “Bike to Bus” initiative along Third Line allows cyclists to bike to twelve bus stops along that street and park

at one of the bike racks before boarding to complete their trip. Programs like this to expand ease and security of bike parking throughout the town should be encouraged.

5.2.3.3 Long Term Enhancements

In the long-term, Oakville should consider the following items. Note that on regional roads, this will require support from Halton Region to implement:

- **Continued Infrastructure Improvements:** Expansion of permanent protected cycling lanes (such as the recently completed work on Speers Rd) and multi-use pathways will be conducted in line with the Transportation Master Plan, with an emphasis on expanding service coverage and filling in gaps in the existing cycling network (to prevent cyclists from being sent from cycling lanes onto busy streets). Left turn two-stage bike boxes as well as dedicated cyclist traffic signals can be provided at signalized crossings to reduce conflicts between cyclists and cars.

Winter maintenance must be considered. It is unlikely that bike lanes would be removed for the winter, so plowing will be necessary. An appropriate maintenance plan and budget to make sure bike lanes are plowed and bike racks are available and in good shape year-round is therefore required.

- **Bike share program:** Bike share programs can break down barriers to entry for new cyclists. It requires no equipment on the user’s part, nor do they have to worry about their bikes being stolen. By making neighbourhoods easier to traverse by active transportation, Oakville can reduce traffic congestion and localized pollution while encouraging healthier forms of travel. Generally, these bike share programs would start in the densest part of a community already friendly to cyclist travel, and then expand out from there (as seen in Toronto). However, to be truly useful, they need adequate coverage across a wide range as riders need to be able to hop on and go, and they need to be able to deposit their bike when they get to their destination. Oakville has a planned pilot

linking Sheridan College with Oakville GO Station, as a starting point. Another option might be to focus south of the QEW at first, as a way to link Downtown Oakville with Kerr Village and Bronte Village. This could be linked up with (or expanded from) the proposed pilot to Sheridan College. A feasibility study will be required for this. Private dock-less bike systems are not recommended as they can lead to excessive road clutter, with little municipal oversight.

- **Wayfinding:** Signage can help cyclists in a similar fashion to pedestrians by identifying destinations within a certain distance that can be easily completed without a car. Signage is also of particular importance for cyclists to convey the locations of dedicated cycling infrastructure, which cyclists gravitate to (and which can convince non-cyclists to make a switch).

Takeaways:

A cyclist level of service/comfort assessment should be introduced alongside Oakville’s existing auto traffic impact guidelines, to better capture the impact of new developments and municipal works projects on cyclist movement in the town. This can be based on the City of Ottawa’s MMLOS guidelines or anything similar, though there is room for improvement upon it to better capture the impact of land use and built form.

Cyclist infrastructure can be implemented without a full rebuild of the road, using a combination of paint and low-rise concrete bollards such as those used recently in Toronto. Longer term improvements include increasing the size and connectivity of the network, eliminating gaps where possible and upgrading low-tier infrastructure such as sharrows into higher-tier facilities. A bike share program can also be explored, first in and between the urban growth areas, then expanding outwards from there. Wayfinding can be used for cycling education and to encourage new cyclists, as the presence of bike lanes draws in cyclists from nearby corridors without them.

Future Studies:

- Strategic Planning Action Items: 2, 3, 4, 12
- Feasibility Studies / Business Cases Action Items: 3

5.2.4 Transit Elements

5.2.4.1 Transit Levels of Service

Transit should be included in any future Multi-Modal Levels of Service Assessment. There is no one recognized way to perform a Transit LOS review, however a starting point can be the City of Ottawa’s MMLOS Guidelines. The methodology is meant for corridors with existing or planned rapid transit but can be applied to regular routes as well. Here, Transit Level of Service is based on:

- Exposure to traffic congestion delay caused by automotive traffic.
- Average transit travel speed relative to the posted speed limit.
- Presence of bus / HOV lanes.
- Number of driveways along corridor and approximate crossing volume.
- Signal delay at intersections.

There are some limitations with this methodology. For one, it does not distinguish different types of land uses, and whether transit is operating in a built form conducive to it, or one heavily biased towards auto travel. It also does not capture frequency of service, quality of bus lane implementation (HOV vs fully separated), number of connections, quality of infrastructure, ride experience and how transit is engrained in the street. As part of developing a new MMLOS framework, Oakville is encouraged to expand on Ottawa’s MMLOS work, or anything similar.

5.2.4.2 Street Design

Transit belongs on our streets, and its presence there should not be an afterthought. Oakville can improve the transit experience through infrastructure improvements that re-orient street infrastructure and operation around transit movement, rather than solely optimizing for auto traffic. Note that on regional roads, this will require support from Halton Region to implement. This includes:

- **Livable public spaces:** The creation and support of vibrant, walkable main streets makes transit more viable along their length and puts residents in close range of transit. In turn, transit can be used as a tool to strengthen main streets by reducing the reliance of cars and the necessity of parking for economic success. Instead, space can be reallocated to on-street patios, parkettes and installations, with transit serving as the major access points along the spine. Future growth around this spine can further improve ridership.
- **Improved rider experience:** HOV/transit lanes as shown in Photograph 9 (either all-day, or during peak periods) can have a significant impact on transit’s desirability by removing the vehicles from general traffic. Further enhancements such as queue jumps, transit signal priority, and auto-turning restrictions all help to improve transit speed and frequency, making them more attractive to new users.

Photograph 9: RapidTO Priority Bus Lanes



Source: City of Toronto

- **Placemaking:** Bus stops serve as the connections between our streets and the transit network and shelters are a crucial amenity for improving customer experience. Historically these have been lacking - Oakville can consider new bus shelters that are more akin to rail platforms, which provide real-time bus-arrival time information, wayfinding and signage, improved lighting, seating,

heating/weather separation and public art. For non-rapid services, this can be cost prohibitive, but may be beneficial in specific locations. For example, the City of New Westminster has implemented some shelters that combine utility with public art – this is shown in Photograph 10.

Photograph 10: City of New Westminster Public Art Bus Shelter



Source: City of New Westminster

- **Improved connections:** Transit should be accessible for all road users regardless of age or ability. Pedestrian clearways should be wide, and tactile walking strips should be introduced where beneficial. Transit stations should have a supply of secure bike parking, and bike share stations should be located near major transit stops or stations where possible. Transit connections between major growth areas and employment centres will be crucial to the success of these nodes.

5.2.4.3 Transit Operations

Improved transit operations can also be used to encourage mode shift towards transit and should be implemented in parallel with the previously discussed street improvements.

Oakville Transit has tested or implemented several of these initiatives – this is presented as a comprehensive framework to both support existing work and inspire new ideas. This includes:

- **Route Layout:** Oakville is largely a town of cul-de-sac subdivisions, and there are limited opportunities to establish a true grid-based transit network beyond

the existing regional roads that cut across the town. Network reviews have been conducted in the past to identify routes that could be made more efficient within the road network that Oakville has to work with. For example, transit routes that meander or cross over themselves (forming a loop), should be avoided where they greatly increase travel time without adding significantly more riders. Focus has also been given to key trip generators or attractors, such as Oakville GO, Sheridan College, and Downtown Oakville; namely, ease of access to them from various parts of the town, and ease of transfer between them. While still a critical aspect of the service, changes have also worked to improve cross-town connections that reduce the need to travel through the GO station. As the town’s growth areas develop further, future reviews can repeat these steps to adapt routes where necessary to an urbanizing environment.

- **Service Frequency and Span:** There is a direct relationship between frequency of service and ridership because more frequency buses make it more convenient for people to take transit. Other municipalities have had success with a “Frequent Transit” network along major roads, which prioritize certain routes as high frequency, which are fed by less busy collectors.
- **Service Reliability:** Users value reliability over absolute travel time saving, and reliability benefits can represent 12-13% of transport user benefits in the economic assessment of new transport infrastructure projects according to Metrolinx’s Business Case Guidance. Ensuring that route timetables are realistic and consistent will go a long way to making transit more dependable for its userbase.
- **Service Coverage:** Not all parts of Oakville have equal transit coverage, but not everywhere needs it. Oakville Transit can continue to balance the costs of providing transit service to new parts of the town alongside growth expectations and equity concerns. New technologies, discussed next, can help augment this without implementing full new routes.

- **New Technologies:** Transit is constantly evolving, and the future of transit does not necessarily need to be more of the same. Innovations in the transit sector, such as micro-transit services, can be used to expand service coverage beyond the fixed route network (Photograph 11). Oakville’s Home-to-Hub service already provides transit service to areas of the town not suited for a fixed-route service, and this can be expanded in the future by increasing the number of hubs or by increasing hub catchment area. Should ridership in these areas be built up over time, a more permanent route can be provided. Oakville’s care-A-van service also provides point-to-point accessible service for residents with disabilities or mobility impairments. From initial services like Home-to-Hub and care-A-van, an integrated family of services can be built up over time.

Photograph 11: Oakville Micro-Transit



Source: Town of Oakville

- **Inter-service Connections:** Metrolinx is currently undertaking GO Expansion, with all-day, two-way, fifteen-minute frequency GO Train service coming to most GO Train routes alongside electrification of track infrastructure, new trains and upgraded stations. Currently, GO station access is predominantly by car, even for residents who live close by. However, current GO growth plans far exceed the capacity of station parking lots, meaning that future riders will have to find other ways to get to the station. This is an excellent opportunity for Oakville Transit to capitalize

on. Stations such as Oakville GO will also become future development hubs with significant residential and employment growth, further cementing the importance of serving these nodes. Improved connections at municipal boundaries with Mississauga and Burlington should also be considered as a sizeable portion of trips from Oakville each day are to these adjacent municipalities. Oakville should continue to advocate for fare integration across the region to allow for more seamless, cheaper connections with these agencies.

5.2.4.4 Setting the Stage for BRT

The 2041 Regional Transportation Plan lists Trafalgar Road as a potential BRT/LRT route between Oakville GO Station and Highway 407, with a priority bus route continuing on northwards to Milton. However, the project is not expected to be completed until 2041; a long-term, 20-year horizon. Given the importance of the corridor to Oakville’s development, Oakville can benefit from “quick-wins” that set the stage (and help build the case) for a successful BRT implementation down the line.

Photograph 12: Viva Rapidway Demonstrates End Goal



Source: York Region Transit

This is similar to the approach used by York Region in the early 2000s. Their Viva express-bus network began in 2005, introducing certain qualities of a BRT service while

still operating in mixed traffic, rather than dedicated bus lanes. The implementation of a more premium, faster transit service allowed Viva to offer measurable benefits to transit riders and build up their ridership a full decade before the roll-out of their Rapidway network (Photograph 12). It also allowed them to construct the Rapidway in phases over time, as the actual service was already in place and could continue running through construction. This is in contrast to having to complete the entire system before buses could start running.

A 2011 paper at the University of Toronto demonstrates the success of this implementation strategy. The introduction of Viva in 2005 – before the development of the Rapidway – was followed by a large increase in ridership on the two busiest corridors in York Region, with 60% of these riders being new, rather than diverted from other routes¹. In particular, Viva saw a doubling of transit mode share amongst post-secondary students¹.

Other municipalities have likewise had major successes, with Brampton’s Züm taking a similar approach to York Region, with a fully separate branding that reflects a more premium service, starting in 2012. As a direct result, Brampton Transit avoided the pre-COVID transit ridership stagnation that was seen in other parts of America; between 2015 and 2016, Brampton Transit’s ridership grew 9.2%, and then grew a further 19% by October of the next year². In Mississauga, MiWay’s MiExpress service has provided a comparable starting point for the City’s rapid transit infrastructure expansion, including the Mississauga Transitway, and the conversion of Route 103 Hurontario Express to a Light-Rail spine for the City; the former implementation has been a significant success for the City, with weekday ridership growing 70% since the opening of the transitway³.

¹ Forsey, R. D. (2011). *En Ex Post Evaluation of the Ridership Impacts of the Viva Bus System*. Toronto: Department of Civil Engineering, University of Toronto.

² Marshall, S. (2018, 01 08). *The secret behind Brampton’s transit success*. (tvo) Retrieved 01 26, 2020, from <https://www.tvo.org/article/the-secret-behind-brampton-transit-success>

³ Shinuda, J. (2016, 12 6). *MiWay Celebrates Huge Ridership Growth in Mississauga*. (insauga) Retrieved 01 26, 2021, from <https://www.insauga.com/miway-celebrates-huge-ridership-growth-in-mississauga>

In modelling future express services after those that have come before, Oakville should therefore consider the following attributes that have made these neighboring BRT-lite services so successful:

- Longer distances between stops, to improve travel time and allow for quicker long-distance trips, strategically placed to match the location of future LRT/BRT stations.
- Transit signal-priority at all traffic lights to improve travel time and reliability of services.
- Headway-based-schedules with busses coming at least every 15 minutes, to enable riders to “show up and go;” rather than needing to check the schedule in advance and needing to time their arrival.
- All-door boarding and off-vehicle fare payment systems to speed up transit dwell times at each stop.
- Improved bus shelters with rapid-transit-esque features such as live arrival time information, to help reduce the perceived stigma of “waiting for the bus.” (Figure 5-2)
- HOV Lanes to improve travel times and reliability, and separate transit from most normal traffic (particularly during peak times), without having to construct dedicated new lanes.

Figure 5-2: Viva Curbside Bus Stop Example



Source: Entro / York Region Transit

Takeaways:

Oakville’s spread-out built form and non-grid street network makes providing desirable transit services a challenge. Oakville Transit has already studied many of the ideas presented here and continue to evaluate many of them on an ongoing basis. However, follow-through requires investment, and this has at times been difficult to secure without existing ridership to match. The challenge is worth the effort however – if Oakville is to shift more people towards transit, transit services must be as convenient, frequent, reliable, and fast as possible. As Oakville intensifies at key nodes and along major corridors, it is transit that will play the most critical role in linking these new communities to each other and the wider region.

Through innovative services such as the Home-to-Hub and care-A-van programs, Oakville Transit has demonstrated that the future of transit is not necessarily just more of the same. Programs such as this can have a big impact, from humble beginnings, and can be expanded as ridership demands. While the Trafalgar BRT is still a ways off, it can set the stage for the future BRT services with BRT-lite, as other cities in the region (such as Vaughan, Brampton, and Mississauga) have demonstrated.

Future Studies:

- Strategic Planning Action Items: 2, 3, 4, 5, 6
- Feasibility Studies / Business Cases Action Items: 1, 2

5.2.5 Parking

Like other suburban municipalities, Oakville has an abundance of parking, with most major retailers and employment buildings being surrounded by large lots that rarely overflow. It is often the case that suburban municipalities find it hard to separate themselves from parking, because everyone drives. However, much of this parking often sits empty, and could be better served through other uses, because even parking lots have an opportunity cost. It is important to remember that the presence of parking is not what draws people to an area; it is only to accommodate the people that choose to come once they are there. Parking is a means to an end, not the end itself.

“Nobody goes to a city because it has great parking.”

- Michael Kodransky, global research manager for the Institute of Transportation and Development Policy.

As a suburban community, it is true that Oakville will always need some level of parking supply, but as it currently stands, Oakville subsidizes auto travel by providing more parking than is necessary at a value below what that land is actually worth. The idea is not to eliminate all parking everywhere, but to “right-size” conditions in the town, adding parking where it is needed, and taking it away where the town could do without, unlocking the potential in the excess land that results.

Oakville has a further study underway that is specifically focused on Oakville’s parking supply, demand, and the overall strategy it wishes to take. Some recommendations to form an early vision for Oakville’s parking strategy are as follows; many of these can be implemented quite quickly, as they do not need significant physical infrastructure to build.

- **“Right-sizing,” not “Down-sizing”** – Most municipalities have parking minimums that specify the minimum number of parking spaces per unit of a development (i.e. number of residences, gross floor area, etc.). However, parking minimums are often far too aggressive for what is actually needed,

encourages urban sprawl, and fails to encourage users to walk, cycle or take transit. Evidence shows that given the choice, developers would prefer to provide fewer parking spaces, and this cost saving is often passed along to the consumer. With expansions in transit and active transportation infrastructure, residents will have greater choice in how to get around and will not need as much parking as before. Therefore, to encourage this shift, Oakville should implement parking maximums as a replacement for their current standards.

- **Parking Lot Orientation:** Large parking lots make it difficult to encourage pedestrian movement as buildings end up too spaced out for anything other than driving to be time effective and practical. By orienting buildings along the roadway, with parking provided either underground or in the building’s rear, drivers remain accommodated while also opening up an area to active forms of transportation and transit.
- **Unlocking Land Development Opportunities:** The reduction or elimination of surface parking lots can open up large swaths of land to new development, without encroaching on existing communities. Often seen in Toronto (and downtown Mississauga) in the redevelopment of malls or plazas, auto-oriented parking lots end up being replaced by dense, walkable communities that are destinations in their own right, rather than effective “dead zones” in the City’s urban form.
- **Out of sight and out of mind:** The best parking is the parking you cannot see at street level – it is there if you need it, but it is not the focal point while you are enjoying the neighbourhood. Underground parking achieves this best; however, there is a risk that in the future, if parking requirements go down (due to mode shift and/or technological change), there will be a lot of space that cannot be repurposed. Above ground parking may provide opportunities for this parking space to be repurposed in the future. However, it does come at a cost. Parking garages are often ugly and do not contribute positively to a neighbourhood’s urban form. Many American cities suffer from a sea of

above ground parking garages that take away from otherwise pleasant communities, because all they are for is storing cars, rather than providing mixed uses that actually draw people in. If Oakville does choose to pursue this route, it is suggested that high quality building cladding be used to hide the parking garage from the outside and ensure that the first few levels of the building are used for retail or office space. To preserve space on the street for the things that matter (like shops, patios, street furniture), entrances to underground parking lots should ideally be located behind buildings, rather than on the main street.

- **Smart Technologies:** New technologies make it easier to use the existing parking supply more efficiently. Tools such as automatic parking enforcement, advance reservation systems, and live parking availability updates can be implemented along town streets and at private parking lots to increase lot utilization and reduce the need for larger lots. Work is underway to implement this in Downtown Oakville.
- **Parking Demand Management:** The provision of free parking is a subsidy to drivers, and its removal or reduction can serve as an encouragement to switch to other modes of transport. On the other hand, it could drive away business from commercial areas, and could result in backlash from the community. A localized approach is recommended, starting with the locations where demand already exceeds supply. In 2019, the Town of Oakville launched a two-year paid parking program in Bronte Village's commercial shopping district. A report to council has recently been completed.

Takeaways:

Parking is one of the greatest obstacles to Oakville's strategic aims. Excessive parking results in spread out urban landscapes where the only practical way to get around is by car. Suburban municipalities often struggle to separate themselves from parking. However, nobody goes to a city because it has great parking. The parking is just a means to an end. By reallocating space away from parking, Oakville can create spaces people actually want to travel to and spend time in, where other modes such as walking, cycling and transit are actually viable.

Therefore, Oakville should abolish all parking minimums. If developers believe they can sell properties without parking, they should be allowed to. Frankly, Oakville should want them to, as it forwards the Town's own strategic aims for modal shift. To that end, parking maximums should be considered.

Cars will always be a part of Oakville's story, and so parking will be too. However, Oakville can utilize new technologies to "right size" their parking and manage demand through other means beyond supply. The parking that does exist should be out of sight, and out of mind.

Future Studies:

- Strategic Planning Action Items: 2, 3, 4, 7

5.2.6 Freight & Goods Movement

Freight movement is an inevitable part of urban life. People consume and collect physical goods of all kinds, and all those goods must move from producers to people. As a result, transportation planning in Oakville must consider the needs of goods movement as well the needs of people movement.

The municipal and regional road networks are used for both goods movement and people movement. Congestion from personal travel causes delivery delays and increased costs to consumers, while increased goods movement causes increased commute times due to more trucks on the road. Therefore, while shifting goods movement trips to other modes is not really feasible in the grand scheme of things, how and when goods are moved does have an indirect impact on how people choose to get around.

In particular, the rise of online shopping has increased the number of goods vehicle trips to residential areas. However, those goods vehicles can visit multiple houses, and online shopping often takes the place of in-person shopping trips. This results in fewer vehicle trips overall. Further, the more deliveries a goods vehicle makes, the more efficient its trips will be. This is because a delivery vehicle can make multiple deliveries during a vehicle trip, whereas a person driving to a shop can only make one 'delivery' per vehicle trip. On the other hand, the growth of online shopping threatens Oakville's commercial districts and works against the Town's strategic aims of building complete communities.

Goods movement demand is primarily driven by market forces outside the control of municipalities, but there are several potential measures municipalities can implement to help manage that demand. These include:

- Promoting colocation of logistics firms
- Defining truck routes and intermodal connections
- Reserving some on-street parking for commercial vehicles
- Providing local businesses information about construction closures/detours

- Restricting or coordinating deliveries to downtown cores during peak traffic time
- Mandating or encouraging off-peak commercial deliveries in congested areas
- Supporting / encouraging the use of last-mile delivery with electric cargo bikes or drones as shown below

Photograph 13: Electric Cargo Bikes for Last-Mile Delivery



Source: Cycle Toronto & FedEx

The Town of Oakville conducted a Goods Movement Study that was reported to Council in 2016. The Study's recommendations covered the Heavy Truck Route Network, policy, shared corridors, e-commerce, land use planning, intermodal goods movement, and congestion/operations. The Goods Movement Study also emphasized the need for Oakville to collaborate with other levels of government, as the decisions made by public and private entities can all affect goods movement in Oakville.

Takeaways:

Congestion impacts goods movement and results in higher prices for consumers. This provides further rationale for shifting non-essential trips away from the road network towards other modes. Freight and goods movement are largely done via the arterial/region road networks and highway, both of which are generally out of the Town of Oakville's direct control. Strong collaboration with other levels of government is required.

Future Studies:

- Strategic Planning Action Items: 10
- Aligned Coordination Action Item: 3

5.3 The Fifteen Minute Neighbourhood

To initiate substantial mode shift, we need to look beyond infrastructure and technology. Oakville has long been a town designed around the car. Unfortunately, many of the characteristics that make a town friendly towards cars make it the opposite for more sustainable forms of transportation. Oakville is large and sprawling; neighbourhoods are separated by wide pedestrian-unfriendly arterials, and retail or business districts are located far from the places people live, often spread out between large swaths of surface parking. While using sustainable forms of transport might be technically possible, it usually is not practical due to the town’s chosen built form.

In previous studies, such as Oakville’s Active Transportation Master Plan, the Town of Oakville has looked into ways to improve pedestrian and cycling infrastructure, as well as develop community outreach programs, to encourage people to switch to different forms of transportation. These plans have all identified the need for a unified land use-transportation lens but have stopped short of providing a strategy and action plan to accomplish this, which will have a significant impact on the success of Oakville’s mode shift initiatives.

To get people out of their cars, Oakville must develop neighbourhoods that are actually pleasant to traverse without one. Retrofitting sprawling residential neighbourhoods with wider sidewalks and bike lanes does improve the infrastructure condition there, but it does not change the fact that using those modes in that urban topography is not useful for getting to where people need to be.

Instead, a new path for Oakville is the idea of the “15-Minute Neighbourhood,” (Figure 5-4) in which people can work, live and/or play all within a distance that is feasible to walk, cycle or take transit (i.e. 15 minutes). This enables people to conduct many of their daily activities without needing a car for short trips such as going to school, work, or the grocery store. Rather than a spread-out neighbourhood where everything must be done by car, 15-Minute Neighbourhoods give people real choices in what mode they can take, because every mode is actually viable.

It is important to remember that many of Oakville’s existing residents like things just the way they are. These are people who chose Oakville specifically for that traditional suburban lifestyle, and they may resist changes to it. The good news is that Oakville is large. It can be different things to different people, in different parts of the town. In fact, it will need to be since it simply would not be possible to revamp everything at once. Therefore, we will take a two-pronged approach. Key urban growth nodes and corridors will see the development of true 15-Minute Neighbourhoods which can serve as major destinations within Oakville, and as the foundation for future growth. At the same time, existing neighbourhoods can be retrofitted (where appropriate) with a light touch, to include *elements* of a 15-Minute Neighbourhood, without drastically changing the spirit of what is there currently.



Figure 5-4: 15-Minute Neighbourhoods Depend on a Variety of Mixed Uses

5.3.1 The Components of a 15-Minute Neighbourhood

The following elements make for a successful 15-Minute Neighbourhood:

- **Complete Communities:** Central to the idea of a 15-Minute Neighbourhood are a variety of mixed uses, in contrast to the single use zoning that dominates most of Oakville. This does not mean that factories will go up next to preschools, but that the concentration of uses that make up the average person’s daily life, from living, shopping, working, and playing, should be placed in close proximity. This variety of mixed uses gives life to a neighbourhood by allowing for the comings and goings of people throughout the day, rather than solely commuter trends seen in exclusively residential districts.
- **Choice:** Each neighbourhood will have a different mix of land uses. Not every node has to fit every use case, and some may struggle to attract certain types of land uses (such as employment), depending on market conditions. In fact, even if a “perfect” community is developed, people will still sometimes travel elsewhere to shop, work, or socialize. However, this is not anti-ethical to the idea of 15-Minute Neighbourhoods. The goal of a 15-Minute Neighbourhood is not to force residents to fulfill all their daily needs nearby, but to ensure that do not *have* to travel elsewhere for every daily need.
- **Neighbourhood Spines:** A neighbourhood’s retail destinations should be established along a specific main street (or multiple streets) to create a strong core/spine to the neighbourhood and allow retailers to benefit from agglomeration. This ensures that all residents have equal access to the neighbourhood’s amenities, and that residents do not need to walk far between them. It also ensures that the neighbourhood is a destination in its own right, and not just a hub for residents.
- **Density, Not Necessarily Tall Buildings:** It is a common misconception that the density implied by a 15-Minute Neighbourhood requires tall buildings akin to Downtown Toronto. This misconception is often used

to roadblock intensification plans in suburban communities. However, mid-rise development can be equally effective in providing dense, livable mixed-use 15-Minute Neighbourhoods. Though not frequently seen in Ontario, this is the common approach used in older European city cores, which have become some of the most desirable places to live on the planet.

- **An (Old) New Way of Developing Suburbs:** In fact, even low-rise development (such as townhomes) can be developed into complete 15-Minute Neighbourhoods. Older neighbourhoods in Toronto such as Little Italy and Leslieville are strong examples of this. Here, streets of townhomes are bookended by main streets with strong transit, cycling and pedestrian infrastructure. Parking is provided on street or in laneway garages behind the homes. The streets themselves are one-way and narrow (encouraging slower driving speed by design), and buildings are not setback too far from the road, preventing things from feeling “spread out,” thereby encouraging active modes. Most importantly, wherever you are on the residential street is just a short walk from a transit connection and main street, meaning you never *have* to drive, but its still possible if you want to.

Photograph 14: Gastown, Vancouver, British Columbia



Source: Wikimedia Commons

- Avoid Dead Zones:** Dead zones on main streets should be avoided by ensuring that retail units are small but numerous. This gives the street vitality: the variety of shops means that people come and go at all hours of the day. In contrast, large podium lobbies can be attractive, but they take up a lot of space, often for a single land use type, resulting in less interesting street. This is seen a lot in commercial business districts (Photograph 15), which see a lot of activity in the morning, at lunch and in the afternoon, but can be dead at all other times. Similarly, underground parking lot entrances should be placed off-main street, to give more space to street activity and the shops that bring it to life.
- Diversity:** Neighbourhoods should strive for a mix of ages, income levels and demographics. This means including cheaper, smaller units (bachelors and single bedroom units), as well as larger units for families. On the first floor, live-work units can also encourage a more dynamic street frontage and increased levels of activity.

Photograph 15: Bay-Adelaide Centre, Toronto, Ontario



Source: Brookfield

- Connectivity:** Unlike suburban neighbourhoods, buildings should be located closer together, with parking lots located either behind or underground, to ensure that the neighbourhood can be served by active modes of transportation and transit. Block sizes should be small to allow for multiple routes through

the neighbourhood and plenty of crossing opportunities. Grid based road networks are ideal as they are most effective for providing high quality transit infrastructure and make for easier pedestrian and cyclist movement.

Photograph 16: Downtown Kitchener, Ontario



Source: ExploreWaterloo

Takeaways:

15-Minute Neighbourhoods are ones where residents can fulfil most or all their daily needs, including work, school, and shopping, within about a fifteen-minute walk. This enables trips to be made without the need for a car, in contrast to the current land use regime in which homes are quite far from other land uses, necessitating auto travel for nearly every trip purpose. These neighbourhoods should be built using a main street as a spine, which serves as a destination for all residents, and even some visitors.

15-Minute Neighbourhoods are flexible. They do not require every land use, but the more the better. They also do not require tall buildings, or even mid-rise buildings, though some level of density is certainly ideal. Each neighbourhood can implement the features of a 15-Minute Neighbourhood that fit, and that are practical for that location. Given that short trips are encouraged, and viable, strong walking, cycling and transit services are a necessity.

Future Studies:

- Strategic Planning Action Items: 1
- Aligned Coordination Action Item: 5, 7

5.3.2 Implementing a 15-Minute Neighbourhood

The following are key recommendations that the Town of Oakville should consider for implementing 15-Minute Neighbourhoods:

- Prioritization of Nodes:** Given Oakville’s scale, it is not going to be possible, practical nor even desirable to try and revamp the entire town to fit the mold of the 15- Minute Neighbourhood. Focus can be given to key development nodes or corridors that can best be served by more sustainable modes of transportation and build out from there. Effectively, this step has already been completed. Oakville’s Urban Structure established eight key development nodes (Downtown Oakville, Kerr Village, Bronte Village, Midtown Oakville, Uptown Oakville, Palmero Village, Hospital District and Bronte GO), as well as two key development corridors (Dundas St and Trafalgar Rd). Efforts to retrofit existing neighbourhoods in smaller ways can also be explored using the principles of 15-Minute Neighbourhoods, without disturbing the existing stability of the communities that exists there.
- Ensuring Connectivity with Other Nodes:** Attention needs to be given not just to the nodes themselves, but to the connections between them. As mentioned, it is unlikely that every resident will fulfill all their needs within the confines of the neighbourhood – particularly for work. Strong transit service is the most effective way to achieve this. Thankfully, 15-Minute Neighbourhoods act as hubs of activity in the town, meaning that routing transit services through them, or using them as transit hubs (including for Oakville’s Home-to-Hub service), makes practical sense. In doing so, residents have easy ways to travel across the town from their doorstep. Connections between growth nodes and GO stations are of particular importance to give residents quick access to Downtown Toronto.
- Town Leadership:** Once the key nodes and areas of retrofit have been identified, Oakville must establish a firm understanding of the types of land uses that must be grouped together for an effective 15-Minute Neighbourhood (such as: retail, office and residential,

in addition to parkland, schools, community centres, libraries, and other municipal services). The more that common destinations are not contained within the neighbourhood, the more likely that residents will still need to drive to get to them, regardless of whether the neighbourhood is walkable or not.

Following from this, Oakville should then prescribe the type of built form and land uses it wants to see in each neighbourhood. This need not be the same across all the focus areas but must be mandated and incentivized early through a master planning process, or else the industry will follow its own trends without Oakville’s input, either taking the same shape as what has been observed in Downtown Mississauga and Downtown Vaughan (tall buildings), or in North Oakville (failure to deliver on promise of mixed-use developments in neighbourhood centres).

Oakville must ensure that its policies and design standards allow for the type of communities it wants. A review of zoning is a must, alongside elements like minimum street widths, building setbacks and heights, lot coverages, parking provisions, etc. Policies or standards that reinforce the status quo of suburban development must be changed.

- Delivery of Town Infrastructure:** Industry will deliver on some of the promises of 15-Minute Neighbourhoods by developing mixed use spaces (retail, residential & office, as well as potential public-private spaces adjacent to each development). However, the Town of Oakville has a part to play in this as well. The transportation piece was discussed in the previous section, but in terms of land use, Oakville must consider the placement of schools, community centres, parkland, and other municipal services (fire, police, medical). One option is to explore public-private partnerships, so that some of these services (such as schools) can be bundled into new developments (for example, placing a school in the podium of a new residential tower). Otherwise, land for these services should be set aside from the start, to prevent a scenario in which a new development node is overdeveloped and underserved.

Takeaways:

Not everywhere in Oakville can, nor needs to become a 15-Minute Neighbourhood. In fact, many of Oakville’s residents like things just the way they are. 15-Minute Neighbourhoods can be implemented at Oakville’s pre-defined growth nodes.

Everywhere else, a gentler implementation can be provided where it fits. Remember that 15-Minute Neighbourhoods do not need to have tall buildings, or even mid-rise ones. Oakville has a role to play in implementing 15-Minute Neighbourhoods, such as changing their land use policies and street design standards to allow them. Winning over the developers who will build them is another matter and will be discussed in Chapter 6.

Future Studies:

- Strategic Planning Action Items: 1
- Aligned Coordination Action Item: 5, 7

5.3.3 Key Nodes

Oakville has already taken steps along this path in developing 15-Minute Neighbourhoods, stemming from the 2009 Town of Oakville Official Plan (Livable Oakville). The plan directs intensification and urban development to six growth areas:

- Palermo Village
- Midtown Oakville
- Uptown Core
- Downtown Oakville
- Bronte Village
- Kerr Village

More recently, Oakville’s Urban Structure Review identified two additional strategic growth areas:

- Bronte GO station
- The hospital district

Each of these growth areas offers different perspectives on how to implement a 15-Minute Neighbourhood.

5.3.3.1 Nodes from Scratch

Five of the growth areas can be viewed as closer to “blank slates” that are more flexible in the form that they take (though at this point all have advanced planning work completed or have begun implementation). The five different growth areas offer different perspectives on how to implement a 15-Minute Neighbourhood:

- **Palermo Village:** The 86-hectare Palermo Village is meant to be a transit-supportive, pedestrian oriented mixed-use community directly adjacent to Glenorchy Conservation Area, at the intersection of Dundas St West and Bronte Rd. It is currently envisioned as medium and high density residential surrounding a main street district along Old Bronte Rd, then tapering off to traditional lower density residential suburban developments. This area has also been identified for a transit terminal for connections to other parts of the town.
- **Midtown Oakville / Oakville GO Station:** A Metrolinx identified Mobility Hub, Oakville GO Station will benefit from the ongoing GO Expansion works that will see electrified all-day, two-way, 15-minute frequency GO service on most GO Train routes, which makes it a strong location for future development that can directly feed into the upgraded transit services, and act as a hub for local transit connectors. Unlike the other two examples, Oakville GO Station is essentially a blank slate for Oakville to reimagine. The mobility hub is separated into three districts. In the east, the Chartwell District will focus on Office Employment with buildings between 2-6 storeys. The centre Trafalgar District will also focus on Office Employment, but with taller buildings between 6-12 storeys. The west Lyons District will focus on high density residential and urban retail, with buildings between 6-20 storeys.
- **Uptown Core:** The 114-hectare Uptown Core neighbourhood at the intersection of Dundas St West and Trafalgar Rd demonstrates a mix of different methods of constructing a 15-Minute Neighbourhood. The 2009 Uptown Core Review Study separates the

neighbourhood into different districts, including quiet town-home lined residential streets, commercial “main-streets,” as well as more urban mid-rise neighbourhoods. It will provide residents a mix of built form, and allows them to enjoy a quiet suburban life style while still being within walking distance of the things they need day-to-day. This is a similar approach to large parts of downtown Toronto, such as Little Italy, in which main streets such as College St, Dundas St and Queen St bookend quiet residential streets lined with town homes.

- **Bronte GO:** Bronte GO has been identified as a Major Transit Station Area. The station will benefit from improved service on the Lakeshore West GO line in the years to come, making it a strong candidate for intensification, like Oakville GO. The area is currently surrounded by a mix of industrial, commercial and office land uses, with residential neighbourhoods at the southern edge. The proposed development concepts included a finer grained grid-based street network. The plan calls for a large mixed use urban core around the station, with office and business employment taking up most of the eastern portion of the site, around the Third Line corridor. Most of the site is dedicated to low mid-rise buildings, with tall buildings permitted only directly adjacent to the station, and low rise providing a buffer between the station area and the residential district to the south. 18,600 jobs and 8200 residents (net density of 240 people and jobs per hectare) are anticipated.
- **Hospital District:** The Hospital District Area Specific Plan provides a development framework for the Town of Oakville’s Hospital District. Centred around the Trafalgar Memorial Hospital, the area is intended to be a mixed use, pedestrian friendly and transit-oriented community. It is divided into five precincts, including office-focused (and urban office park), transitional (mixed use), complementary (life sciences focused), innovation (mixed use) and institutional (the hospital itself). A fine-grained street network around the existing hospital is proposed. The area will accommodate 10,600 jobs and 6,800 residents.

The following are recommendations for these areas:

- **Ground Level Matters:** Particularly in areas of high-density growth, it is crucial that new developments add to the street level environment through small retail frontages, rather than large lobbies or parking entrances. It is not enough to place a high concentration in a small area; the Town of Oakville must give them reasons to get out and walk.
- **Avoid “districting”:** A common approach in secondary planning is to divide neighbourhoods into districts. This is certainly helpful for organization within the secondary plan. However, it risks again starting to over-separate uses (albeit not to the scale of traditional suburban residential districts). The main-street approach is better (Photograph 17), with residential housing just off main streets. A 15-Minute Neighbourhood does not mean everything should be 15-Minutes away in a different district of the neighbourhood.

Photograph 17: Stephen Avenue, Calgary



Source: Calgary Herald

5.3.3.2 Existing Nodes

Of the six growth areas, three are existing urban communities, notable for their small-town feel, grid-based street networks and walkable urban environments. These already serve as examples of 15-Minute Neighbourhoods, and so the goal is to allow for gentle growth alongside encouraging sustainable forms of transportation, while still ensuring that the identity of these neighbourhoods is maintained and protected.

- **Downtown Oakville:** The Town is setting out to revitalize Downtown Oakville, by creating an attractive, active, animated, and vibrant neighbourhood along Lakeshore Road with a strong cultural focus. Downtown Oakville already has an urban built form, with a grid-based road network and tight building spacing. Given this, the Downtown Oakville Strategic Action Plan means to build upon what is there, rather than starting fresh, unlike the other growth areas. It features 12 strategic initiatives. Of most relevance:

- Developing a pedestrian friendly and bicycle friendly downtown
- Construct gateways identifying entry into the downtown from all four directions
- Connect the downtown to the rest of the community
- Ensure adequate parking
- Create a downtown transit hub
- Encourage development of more (and different types of) accommodation

From this, the Downtown Transportation and Streetscape Study included provisions for the following items:

- Wider boulevards
- New cycling lanes and routes
- Flexible streets
- A redesigned Towne Square (on hold pending approval of 2022 capital budget)
- High-quality furnishings to redefine the public realm

The Lakeshore Road reconstruction is now complete, including elements such as the flexible street design on George St, the addition of a two-metre marketing zone in front of each storefront and new commercial loading zones. Free Wi-Fi, automatic traffic counters and electric vehicle charging stations have also been added. In addition, conversion of one-way streets to two-way operation (on Thomas Street, Dunn Street, George Street, Randall Street, Church Street and Navy Street) has been completed.

- **Bronte Village:** Like Downtown Oakville, Bronte Village already has a dense, walkable urban form with small blocks and a grid-based street network. Established in 1834, it is one of Ontario’s oldest communities, and benefits from a scenic harbourfront location and access to the Waterfront Trail system. The Bronte Village Growth Area Review looked at the existing built context of the village, recent development activities, growth area boundaries and zoning regulations, as well as the transition to stable residential neighbourhoods directly adjacent. Like Downtown Oakville, the goal is to ensure Bronte Village remains a vibrant community with a thriving commercial area and a variety of housing opportunities. Key directions from this study included:
 - Revisions to the growth area boundaries and modifications to certain zoning elements
 - Continue to support comprehensive developments (4-6 storeys high) along Lakeshore Road
 - Continue to require commercial uses on the main street, and flexible uses on side streets
 - Provide a framework for evaluating development applications within the village to ensure that qualities important to the character of the village are incorporated
 - Providing a minimum planned density target
- **Kerr Village:** The Kerr Village, located along Kerr St and Lakeshore Rd W is a vibrant, walkable community by the lake, with a tight grid-based street network and mixed-use built form. Like Bronte Village and

Downtown Oakville, the guiding principles here are not to reinvent the wheel, but to allow gentle growth while still accommodating the cultural identity of the existing neighbourhood. The Kerr Village Growth Area Review provided the following recommendations:

- Extend the growth area boundary in the Lower Kerr Village District
- Eliminate the Central Business District Designation
- Modifications to bonusing regulations
- Strengthen and enhance existing urban design policies
- Provide a minimum planned density target

The following additional recommendations should be considered for these three growth nodes:

- **Preserve and protect the main street:** One of the strongest assets that Downtown Oakville, Bronte Village and Kerr Village have are their main streets, with a variety of mixed uses that forms a central spine to their neighbourhood. Its crucial that future developments not degrade this urban street-wall.
- **Gentle growth:** Residents will not be favorable to large scale developments on their small-town style main street. Introducing developments that gradually scale up the neighbourhood can allow the neighbourhood to maintain its culture and heritage. “Missing middle” developments (duplex, triplex, etc.) can be used as a buffer between higher growth areas and the existing neighbourhoods adjacent. New developments on parking lots are favourable as they only add to the neighbourhood, rather than take away. Heritage buildings and existing local businesses should be respected and preserved.
- **Strengthen Connections:** Each of these villages should be seen as key destination nodes, and their access should reflect that. Oakville has a strong foundation in place here: the 14/14A bus connects the three villages to Oakville GO station, with 15-minute frequency during peak hours. As these areas continue to densify, strengthening transit connections through increased service frequency will be crucial to these

area’s success. Bike share though Downtown Oakville, Kerr Village and the lakeshore may also be beneficial given the scenic location, particularly in summer.

Photograph 18: Newmarket, Ontario



Source: Great Places in Canada

Takeaways:

Oakville is already on its way to developing 15-Minute Neighbourhoods at key growth nodes. Some of these nodes are existing communities which demonstrate the old way of designing towns and suburbs, with dense grid-based street networks anchored by a main street. Inspiration should be drawn from them. Each of these areas can be gently up zoned over time, building on the foundation in place, while not negatively impacting the neighbourhoods existing character.

The other nodes are closer to blank slates, governed by some form of precinct plan. Continued work is needed to ensure they fulfil their promises and ambitions. Districting should be avoided, and the interaction between the buildings and the street at ground level is critical for their success. Ensuring these nodes have some level of office employment is tough due to economic conditions. This will be discussed further in Chapter 6.

Future Studies:

- Strategic Planning Action Items: 1
- Aligned Coordination Action Item: 5, 7

5.3.4 Nodes for Retrofit

More challenging is retrofitting existing nodes. Changes that are too ambitious may be rejected outright by residents, and some neighbourhoods by their very design are anti-ethical to anything other than single family homes and car use. The following recommendations can help Oakville pick the right locations for retrofit, and how to best go about it:

- **Think local:** New developments need to respect what is there. Allowing businesses to take over homes on a quiet residential street will please no one, and so mixed-use developments will need to be limited to plazas, parking lots or green fields that can be redeveloped. Increasingly common is the redevelopment of shopping mall parking lots such as Yorkdale, Cloverdale, Square One, and Oakridge Centre (shown in Photograph 19). Retro-fit nodes should ideally have strong transit connections (i.e. be located along a bus route, or at the intersection of multiple routes) and be within walking distance to residents either via the sidewalk or trail system.
- **Make compromises:** Not every 15-Minute Neighbourhood will have the perfect mix of uses, walking, cycling and transit connections. However, by starting to introduce elements of a 15-Minute Neighbourhood, Oakville can up-zone areas over time to include more diversity of use.
- **Encourage walking and cycling:** Replacing one shopping plaza with another will not get people out of their cars. New developments need to prioritize walking and penalize driving. They are meant to serve the adjacent neighbourhoods, and so people driving two minutes to cover a distance they could walk in five should be discouraged, whether by limiting parking or charging for parking, while walking should be encouraged by strong connections to the adjacent neighbourhood.

Two examples of neighbourhoods that can be retrofitted include:

- **Third Line & Dundas St:** The Hospital District growth area is located on the northern side of this intersection. The two plazas at the south side of the intersection can be redeveloped into mixed use nodes. If there is appetite to reduce the width of Dundas St, this segment could be turned into a main street. Regional roads should serve as spines for the community, not barriers between different parts of it.
- **Eighth & Upper Middle:** The Upper Oakville Shopping Centre can be redeveloped into a large-scale mixed-use development with on-foot connections to the adjacent neighbourhoods.

Photograph 19: Oakridge Centre Redevelopment in Vancouver



Source: QuadReal

Takeaways:

15-Minute Neighbourhoods do not need to have tall or mid-rise buildings. Nor does every 15-Minute Neighbourhood need to have a perfect mix of land uses. 15-Minute Neighbourhoods can be any neighbourhood, with a bit of work. The key is to think local, make compromises, and encourage active modes and transit wherever possible. The perfect place to introduce elements of 15-Minute Neighbourhoods into existing communities is strip malls or office parks, which have a large amount of under-utilized land that can be repurposed into something more productive.

Future Studies:

- Strategic Planning Action Items: 1
- Aligned Coordination Action Item: 5, 7

5.4 Putting it All Together

We have discussed recommended improvements to transportation infrastructure, and recommended changes to land use policy. However, how does it all fit together? There are still two main issues left to solve.

Attempting to accommodate every mode perfectly on every street is somewhat of a paradox, because elements that make one mode perform better can often make another mode perform worse. For example:

- To make a street better for cars, speed limits must be raised, the number of lanes increased, and/or the distance between intersections be lengthened. However, this would make the road less safe and convenient for cyclists and pedestrians. Plus, since everything is so spread out, transit service becomes less convenient and practical relative to cars.
- In contrast, to make a street better for pedestrians, the opposite is needed via the reduction of vehicular speeds, reduction of road widths, and the increase in the frequency of crossings, as well as the creation of a dense surrounding built form that is pleasant to walk in. However, this slows down cars and transit vehicles, and elements to reduce speed such as surface treatments or raised crosswalks can cause issues for transit operations and cyclists.
- To make a street better for cyclists, cycling facilities are necessary. However, these can conflict with bus stops, posing a hazard to boarding or alighting passengers. As well, cyclists moving at high speeds can conflict with pedestrians, especially in spaces meant to be heavily pedestrianized.
- To make a street better for transit, transit vehicles must be separated from traffic to the greatest extent possible. This can mean restricting/limiting auto access or moving transit to its own lanes. However, doing so can increase road widths, or make transit harder to access (such as if it is in a centre median).

Beyond that, there is also the question of when is a street a street, and when is a street a place? In other words,

which streets in Oakville should be a way for moving people to a destination, and which streets should be a destination in itself? When a street is a street, transit and high-speed cycling can be strengthened alongside existing auto travel, while walking is less likely. But when a street is a place, walking should be king, assisted by lower speed local transit and low speed cycling where appropriate, with only essential room for cars.

This strategy has established the need for Oakville to be proactive in prioritizing pedestrians, cyclists, and transit over auto drivers, to achieve a balance between modes that does not yet exist. However, even sustainable modes can come into conflict with each other. And the truth is that cars will always be a part of Oakville's story in some capacity, and they need to continue to be accommodated, though not at the level they have been.

There is no one-size-fits-all solution; every street is different. A way to decide what goes where (and why) is required. Oakville does already have a road classification system, but it is heavily auto-oriented. Roads are classified based on expected auto volumes, speeds, and road widths. This does not capture the multi-modal city-building approach we have introduced here, nor does it capture the need to change how modes are prioritized in the town.

Instead, **a multi-modal multi-use road classification system is necessary.** This classification system can be developed as part of the Transportation Master Plan update, Official Plan Review, or the proposed Multi-Modal Levels of Service Framework (which is recommended to be based off of Ottawa's MMLOS Framework, or anything similar). The benefits include:

- Will help Oakville identify "gaps" in the pedestrian, cycling and transit networks where infrastructure for these modes is missing, are not at the level they need to be or is too heavily skewed towards cars.
- Will give a network-wide understanding of how mode priority objectives are being implemented at the network level across the entire town, allowing it to ask tough questions and let it change course if need be (i.e. "What percentage of roads are pedestrian

deficient? What percentage of roads continue to be too auto focused? Where can targeted changes be made to make the most difference, quickly?”)

- Create a new road structure topology based around active/sustainable modes and city building, rather than the movement of cars.

How will it work? There are three key questions to answer sequentially:

1. What are the current or planned land uses and built form in the area?
2. Based on step 1, is the street a street, or is the street a place?
3. Based on steps 1 and 2, what modes should be prioritized there? Ideally, this will be some combination of pedestrians, cyclists, and transit, though to prevent overly wide rights-of-way, only two of the three may be able to be given full focus. Other modes (such as the car) will still be accommodated, but not in their most ideal configuration.
4. The **Multi-Modal Levels of Service Framework** can be used to evaluate the multi-modal performance of each street, to ensure that conditions on the ground match the road classification requirements. In this case, lower scores on certain modes would be acceptable, so long as the mode being prioritized is strong, with the understanding that it is not feasible for every mode to get perfect scores on every street.

Takeaways:

Oakville must prioritize modes on each street based on the land use and built form that exists there. To that end, a new multi-modal way of classifying streets is required, and a new framework for evaluation levels of service for different modes is too. Collectively, these two tools can be used to evaluate how Oakville is living up to its mode priorities across the network over time.

Future Studies:

- Strategic Planning Action Items: 1, 2, 3, 4, 6, 7, 12
- Aligned Coordination Action Item: 1

5.5 Travel Demand Management

Travel Demand Management can be used to directly encourage behaviour change by providing incentives (or disincentives) to certain behaviours. This allows municipalities to take some of the strain off existing infrastructure by **reducing** the need to travel, **re-moding** people onto other forms of transport, **rerouting** them away from congested areas, and **re-timing** them away from peak periods.

5.5.1 Social Programs

The term “Travel Demand Management” is broad subject matter, and some elements (such as improving the viability of other modes) have already been discussed in other areas of this report. Instead, this section focuses on specific social initiatives (targeted at commuters who travel during peak times) that can be implemented for low cost without significant infrastructure investments or advanced technologies, by leveraging Oakville’s relationships with local businesses and developers. Potential TDM strategies are listed below. Note that Oakville operates the “Smart Commute,” TDM program which already includes some of the items listed here.

- **Financial incentives** that either increase the cost of non-sustainable modes (Charging for workplace parking is the most common approach) or subsidize part or all the cost associated with a sustainable mode, either for an introductory period or an ongoing basis (This could include free transit passes, subsidised bike purchase, or reduced parking fees for carpoolers).
- **Employer-led commuter programs** that identifies and markets practical ways for staff to use more sustainable forms of transportation, such as Smart Commute in Oakville, and gives them incentives for doing so. This can include ride-matching and emergency ride home systems (discussed further below), employer provided transit passes, elimination of free parking, addition of showers and changing rooms to encourage cycling, flexible schedules, and allowance for remote working.

- **Ride-matching:** Matching employees with other people who work and the same location who live close by. Those people can then carpool with minimal increase in their journey time, while still saving money and avoiding needing to drive every day.
- **Emergency ride home:** Offering employees who take a sustainable mode of travel reimbursement for their ride home by taxi or ride-hailing (typically up to a set amount) in the event of an emergency. In an emergency, this provides commuters who use these modes reassurance that they will get home as quickly as if they drove to work.
- **Safe Routes to School Planning** (such as the one piloted by the City of Toronto in 2018), including new road markings, sidewalk activity, stencils, and signage (Photograph 20) alongside parental outreach to convince families that walking or cycling to/from school is both safe, fun, and a healthy way to travel.

Photograph 20: City of Toronto School Signage



Source: City of Toronto

- **Developer mandates** such as giving all residents in a new development a free transit pass for certain lengths of time or mandating the availability of communal bikes for every “x” many people in a development.

- **Gamification:** Promoting sustainable travel through workplace or a long-term commuting program that uses non-financial incentives.
- **Marketing and Outreach** can be used to try to convince auto drivers to make a switch *even just once*, so that they can see the benefits and feasibility for themselves.

5.5.2 Mobility as a Service (MaaS)

The term “Mobility as a Service” (MaaS) is the concept of people changing from traveling using things they own (particularly cars) to travelling using services provided by others. A key part of that concept is the ability to choose a mode of transport for each trip individually.

Transportation services can be provided by the public or private sector - the freedom of choice allows travellers to select the most appropriate mode(s) for each trip, maximizing the personal benefits.

MaaS requires that travellers have timely information about their travel options (including access arrangements, journey times, and price). Almost all public transit providers in Canada make their schedule data available for third parties to use, including Oakville Transit. Various smartphone apps combine information about public transit with other mobility options, such as bike share or ride-sourcing.

To be effective, MaaS also requires an easy way to pay for those different options. The Presto smartcard already provides a common payment platform for the GTHA’s transit service providers, and is moving towards supporting “open payment,” whereby credit cards, debit cards and smartphone systems such as Apple Pay can be used to pay transit fares. The Town of Oakville can support the adoption of third-payment payment mechanisms by making it a licence condition for new operators, and by ensuring its own transportation services support it.

There are multiple types of mobility-as-a-service. Each will be discussed in further detail in turn:

- Car Share Services

- Van Pool Services
- Ride-Hailing Services
- Micro-mobility.

5.5.2.1 Car Share Services

In a car share program, the vehicle is driven by the traveller, but is rented by them from a third party. These programs include traditional car rental companies (who own a fleet of vehicles) catering for longer-term rentals (at least a day), newer short-term car sharing services (allowing cars to be hired typically by the hour) and peer-to-peer systems.

Benefits include reduced necessity of vehicle ownership and correspondingly, reduced residential parking requirements. That said, this type of MaaS does not reduce vehicular trips on the road – it only shifts ownership of the vehicle to a third party. As well, the vehicles still need to be parked somewhere, and the utility of the service is highly dependent on access.

5.5.2.2 Van Pool Services

Van pool services involve shared use of a vehicle that is between a car and bus in size, typically with 7-15 seats. In the most common model, the van is used by people working at a single location, picking people up from either their homes or designated pick-up point(s). Van pool service providers provide the vehicle and associated maintenance activities, but the costs are split between the users of the vehicle.

In North America, large-scale vanpooling programs are typically organized and promoted by a local government entity (including transit agencies). For example, LA Metro coordinates over 1,300 services across the Greater Los Angeles area, focused on those areas with limited fixed-route transit service. Similarly, San Francisco's SFMTA agency has implemented a work-shuttle program after a success 18-month pilot (Photograph 21). The public sector entity may or may not choose to subsidise the service.

Photograph 21: SFMTA Work Shuttle



Source: San Francisco Municipal Transportation Agency

Employees may also choose to organize and pay for vanpooling services directly. These services are normally termed “employee shuttles” but offer similar functionality to vanpools. In the GTHA, employee shuttles are generally used to link an employment site with a major transit hub.

Within Oakville, vanpooling (or employee shuttles) would be most effective if they linked the transit hubs (GO station or other transit terminals) with large employment sites not currently well-served by local transit. A privately-run service that is open to the public would be classified as “public transit” with all the regulatory issues associated with that; employee shuttles do not face those issues.

5.5.2.3 Ride-Hailing Services

With ride-hailing services, travellers rent a vehicle and driver for their trip. Ride-hailing services include traditional taxi companies, plus transportation network companies (TNCs) such as Uber and Lyft. Since February 2017, the Town of Oakville has required TNC companies to obtain a business licence and operate within rules set-out by a town bylaw (number 2016-083).

Ride-hailing has a high cost per trip compared with other modes, because of the need to pay a driver. However, ride hailing's app-based approach to booking makes the service easy to use and hence more attractive than a traditional taxi that require a phone call to book. This ease

increases use and reduces demand on other modes. Like car-sharing, it can also lessen the need to own a car and decrease parking requirements in residential areas.

Unfortunately, many cities with established ride-hailing services have seen a decline in transit use, leading to an increase in vehicle traffic. However, the number of ride-hailing trips exceeds the reduction in transit trips, suggesting that it is not only the transit mode that is impacted. The amount of the decline depends on the quality of the transit service and the quality/price of local taxi services.

Ride-hailing services can be used as public transit in areas with very low density, such as rural areas. The City of Hamilton’s “TransCab” service provides subsidized taxi rides between rural areas and the ends of its fixed-route transit system. This provides a cost-effective compromise between fixed-route service and using subsidized taxis for the whole trip. The Town of Innisfil provides subsidized Uber rides for trips within the municipality (Photograph 22). However, its use for commuting travel resulted in high costs to the town. Consequently, the recently capped the number of subsidized trips per use each month, so the service is primarily used for non-commuting purposes.

Photograph 22: Innisfil – Uber Partnership



Source: Town of Innisfil

In urbanized areas (even low-density suburbs), demand levels are high enough that some form of shared-ride service is more appropriate. One such service is LA Metro’s Metro Micro service offering on-demand service within several zones of LA County (Photograph 23). Oakville

Transit’s “Home-to-Hub” service is a similar successful example of this. This provides on-demand transport from people’s homes in low-density or developing areas to a transit hub, where passengers can connect to fixed-route services. Its service area includes North Oakville, where residential development is not yet fully built out. Once this area is developed, fixed-route service may be more appropriate, taking advantage of the Home-to-Hub ridership as a base.

Photograph 23: LA Metro Micro



Source: LA Metro

5.5.2.4 Micromobility

The term “micromobility” refers to the use of small, lightweight vehicles that are hired by a traveller for individual trips. The vehicles include pedal bikes, e-bikes, electric scooters, and electric skateboards. They are most useful for short trips.

Rental programs are typically either “dock-based” or “dockless.” In a dock-based system (such as Toronto’s bikeshare program, shown in Photograph 24), vehicles are stored in fixed locations. Users must pick-up and return the vehicles to those locations. In a dockless system (such as Calgary’s program), vehicles can be stored anywhere there is appropriate parking and a way to secure the bike. Dockless systems generally require a smartphone app for users to locate vehicles to use; dock-based systems allow the user to rent vehicles via an app or by paying at the docking facility. The flexibility and lower start-up costs of dockless systems is offset by the requirement for a smartphone.

Photograph 24: Toronto Bike Share Program



Source: Bike Share Toronto

Micromobility services provide a way for people to make short trips faster than walking without the need to own (and park) a bicycle. Areas that generate much more trips than they attract at certain times of day may require vehicles to be redistributed back into that area (and vice versa). Dockless systems may result in vehicles being left where they cause issues to pedestrians, particularly those using mobility aids or who have visual impairments.

Micromobility programs are most successful in areas that have a mix of uses (which shortens trip distances), high densities (which increases travel demand), and good cycling networks (which makes it easier to use micromobility vehicles). A low mode share for auto travel before the program is created also facilitates micromobility use, as people are more likely to be open to new travel modes. Micromobility can complement transit (particularly higher-order transit) by providing an option for first-mile/last-mile trips.

Oakville’s current urban form and densities are significantly different from those in places where micromobility programs have been successful. However, the Town of Oakville’s land use policies are resulting in mixed-use intensification in key areas. These areas would be natural targets for any micromobility programs in Oakville, particularly as they grow further.

5.5.3 New Technologies

5.5.3.1 Alternative Energy Sources

Electric Cars

The gasoline-powered internal combustion engine has been the mainstay of personal vehicles for over a century. They have enabled unprecedented mobility in our populations and growth of our cities. However, the past 10-20 years have seen an increase in interest in and need to shift towards vehicles powered through alternative energy sources to combat the growing climate crisis.

This will take time, and the wider take-up of electric vehicles depends on technology advances and the policies of higher levels of government. However, Oakville can and should still exert some influence on their local usage to encourage adoption, such as building electric vehicle chargers at municipal lots and encouraging others to do the same. Toronto’s Electric Vehicle Strategy contains several examples of best practice. It includes actions to increase charging availability by:

- Providing incentives for charging infrastructure in the form of rebates or tax incentives
- Providing financing options for charging infrastructure installation on private property
- Monetizing GHG reductions from charging infrastructure via carbon offset credits
- Requiring 20% of parking spaces in new mid/high-rise residential and commercial buildings to have EV charging
- Mandating 100% EV-ready infrastructure in new buildings
- Developing a workplace EV charging program for City-owned facilities

Electric Bikes

Electric bikes use a battery-powered motor to supplement the user’s pedal power, enabling them to travel faster and with less physical exertion – particularly up hills. Because they are primarily human-powered, they are classified as

bicycles, and are subject to the same restrictions by default. E-bikes are currently prohibited on all multi-use trails and park trails in Oakville; however, this varies by municipality. The mix of policies is likely to create confusion for potential e-bike users, particularly those wishing to travel across municipal boundaries.

Their use on multi-use trails may cause issues where they travel significantly faster than a conventional bicycle. However, if the speed of e-bikes is no higher than conventional bikes, then the risk they pose to other road and trail users is unlikely to be meaningfully higher than conventional bikes. Allowing e-bikes wherever conventional bikes are allowed would help encourage a shift to cycling from other modes.

Bike-share programs in North America that make electric bike available have typically seen them used for longer trips than conventional bicycles, making them a particularly attractive option in lower-density areas such as much of Oakville.

Electric Busses

Electric buses too are becoming a viable option for replacing conventional diesel-power buses. Multiple transit agencies in Canada have taken delivery of electric buses for revenue service, including the TTC, Edmonton Transit, and Brampton Transit.

Oakville Transit has committed to fleet electrification. Successful implementation would have little direct effect on passenger experience, and hence is unlikely to trigger any changes in travel patterns but would serve to make Oakville Transit a more sustainable option for getting around town.

Electric buses can either charge while out of service at the garage (which is the model Edmonton and the TTC are using), or via pantographs at the endpoints of routes during regular service (which is the model Brampton is

trying – shown in Photograph 25). The latter is known as “en-route charging.”

- At-garage charging simplifies the charging arrangements and maximizes service planning flexibility. However, it limits the amount of time each bus can spend in service. (The exact duration will depend on battery capacity and use of heating/air conditioning.) At a typical garage, the peak power requirements could exceed 10 megawatts.
- En-route charging allows for small batteries for a given route length and use of heating/air conditioning. The power requirements at each charging point are lower, simplifying electrical hook-up. However, it limits flexibility in service planning, as new routes may trigger the need for new (or relocated) charging equipment.

Photograph 25: Brampton Transit Electric Bus Charging



Source: Brampton Transit

Electric buses have higher purchase costs but lower operating costs than diesel buses. The lower operating costs arise from cheaper energy and simplified maintenance. According to Edmonton’s Electric Bus Feasibility Study, the City found that lifecycle costs of electric buses using at-garage charging was just 0.5% higher than diesel-fueled buses; the lifecycle costs of electric buses using en-route charging was 29% higher than diesel-fueled buses.⁴ At-garage charging, and en-

⁴ *Electric Bus Feasibility Study*, page 1:10. Marcon/City of Edmonton, June 2016. https://www.edmonton.ca/projects_plans/transit/electric-buses.aspx

route charging can potentially both use pantographs. This would allow longer routes to use en-route charging if needed.

The capital cost premium of electric buses is expected to fall further as battery technology and manufacturing processes continue to improve. Higher world oil prices (and hence higher diesel prices) would also make electric buses more financially favourable.

To conclude, potential actions for Oakville are as follows:

- Oakville can reduce local atmospheric pollution, noise levels and GHG emissions from auto travel through supporting greater use of EVs (and to a lesser extent, hybrids).
- Oakville can influence the use of electric vehicles, through policies such as the provision of charging points at municipally owned destinations and requiring them in new development. Oakville can also advocate for suitable actions by the Provincial or Federal government.
- Oakville can maximize the investment in its cycling network by allowing e-bikes and e-scooters, subject to consideration of the (different) risks posed by e-bikes and e-scooters to other users of those facilities.
- Continue to progress to full bus fleet electrification.

5.5.3.2 Autonomous / Smart Vehicles

Autonomous vehicles are coming, and they will transform how our transportation network operates. However, much is still uncertain, not least of which is timing. This section discusses the potential opportunities and risks of autonomous vehicles, and what Oakville can do to prepare for them.

Potential opportunities of autonomous vehicles include:

- Increasing road capacity and safety because vehicles can more efficiently and are in constant communication with one another.
- Reduced negative environmental effects (from more efficient driving).

- Enhanced mobility for existing non-drivers (from not requiring a driver's licence to use car).
- Increased productivity (from use of in-vehicle time for economically productive activities).
- Self-parking elsewhere to reduce parking demand in locations where space is at a premium. If autonomous vehicles all park in a remote lot, then that would remove the need for residential and non-residential parking alike. This would facilitate Oakville's desires for intensification, both by freeing up land for other purposes, and reducing the cost of new buildings.
- Significant cost savings to transit operators allowing more frequent, far reaching service.
- Augmenting transit as a solution to the first and last mile problem by improving current ride hailing and ride sharing services. The presence of autonomous cars may also change how our streets are designed, how much parking is required on our streets, and how and when people travel.
- Autonomous and connected vehicles would lower the operating costs of goods movement for companies and consumers. Autonomous goods vehicles would have longer operating hours (subject to regulatory changes) and reduced staffing compared to conventional goods vehicles. Connected vehicle technology could also allow trucks to communicate with each other to form more aerodynamic platoons (multiple closely spaced vehicles) to save on fuel.

On the other hand, there are several potential risks to Oakville and its strategic aims:

- Autonomous vehicles risk working against Oakville on their goals to encourage mode shift. This is because it is uncertain how autonomous vehicles will play out. It is dangerous to assume that autonomous vehicles will solve our traffic problems, and therefore we should do nothing to solve them ourselves, because this is far from guaranteed.
- At full rollout, autonomous vehicles may increase the capacity of our roads because vehicles can move

more efficiently on them. However, this could lead to induced demand, resulting in even more people driving. As well, given that autonomous vehicles could theoretically travel without any occupants, the result could be an increase in total vehicle-kilometres travelled. For example, if there is no parking at a users' destination, then they could return to their origin point and park there, while if they do not park at their users' origins or destinations, then they would either need to circulate endlessly in traffic or park elsewhere.

On the other hand, full rollout could end up taking decades, and it is unclear what percentage of uptake is needed to start seeing capacity benefits. Therefore, this could be a moot point for the foreseeable future.

- Additional space requirements for pick-up/drop-offs, or risk increasing road blockages.
- Modify its regulations for parking minimums and policies for curb space allocation to allow for changes in parking patterns that CAVs bring, particularly if usage of shared self-driving cars (SSDCs) becomes significant.

Autonomous or not, our roads will still have an upper limit on their capacity, and even if autonomous vehicles temporarily improve the function of our roads, **this will not last**, as new drivers emerge. At the end of the day, giving extensive road space for cars does not make for livable communities, and this will not change in the era of autonomous cars. Oakville must continue to remind itself of the type of community it wants to become: one for people, not for cars.

Therefore, Oakville can:

- Undertake a formal planning study for emerging technologies to develop multiple scenarios that may arise, and how Oakville can adapt to them. The future is uncertain, but by being prepared, Oakville can use new developments in urban mobility to its advantage, rather than being caught off guard.
- Engage with the Province to further its policy aims associated with smart / autonomous vehicles.

5.5.3.3 Open Data

The amount and availability of relevant data has steadily increased as the use and capabilities of technology have expanded. This trend is likely to continue in the future. "Open Data" is the term used when data created by the public sector is made available to third parties. The data must be available to all, under a licensing system that allows its re-use.

The Town of Oakville provides an "Open Data Catalogue" on its website. Datasets include geospatial information, recreation programs, election results, energy consumption at town facilities, development permits, municipal budgets, and transit schedules. These items include details behind municipal actions and help promote transparency in the decision-making process.

Within the GTHA, many municipalities have open data platforms. Those that do include Toronto, Hamilton, Peel Region, Durham Region, York Region, Ajax, Brampton, Burlington, Markham, Milton, Mississauga, Newmarket, Pickering, and Oshawa. The Province of Ontario and the federal government also all maintain open data platforms; Halton Region does not.

The provision of Open Data – especially live data - helps individuals and private entities create additional value from information created the public sector. For example, allowing third parties to have access to Oakville Transit's schedule data has resulted in multiple travel planning apps being available. This supports transit use by making it easier to plan transit trips. Oakville Transit also collects real-time information on its bus locations (and expected arrival times by stop) but does not make the data available for third party use.

Potential actions for Oakville are as follows:

- Oakville can continue to make more data created and collected by the municipality available as Open Data, both for static and real-time information.
- Oakville can continue to draw on the open data of other public sector entities to support all aspects of

the planning, delivery, use and operation of its transportation system.

- Oakville can set licensing conditions that require private transportation operators to share usage data.
- Oakville can coordinate with other public sector governments and agencies to ensure consistency in data schemas, formatting, and quality.

Takeaways:

Social programs can be used to reduce demands on existing infrastructure. Due to the shift from working from home brought on by the pandemic, now is an excellent time to implement them, as people are more malleable to change, and have been forced into a real- life experiment proving that working from home is viable, or even desirable.

New technologies also present opportunities to reduce auto demand and make more efficient use of our roads. However, the outcomes of many are uncertain, and municipal leadership is required to make sure that these companies play by its rules.

Caution is required when considering autonomous cars. They will allow us to make more efficient use of our roads, but the principle of induced demand still holds, and our roads will still have an upper limit on capacity. Abandoning mode shift targets due to thinking that autonomous vehicles will solve our congestion problems will end badly. Beyond that, autonomous or not, auto dependence does not build the type of environment Oakville wants to be in the future.

Future Studies:

- Strategic Planning Action Items: 8, 9, 10
- Aligned Coordination Action Items: 4, 6

6 Implementation

6.1 Overview

So far, this strategy has been high level and aspirational in nature. However, it will take a lot of effort, political willpower, and funding to bring the ideas presented here to fruition.

This section provides a high-level guide for implementing this strategy and includes discussion on:

- **Aligned Coordination:** Proving to people that this strategy has worth and should be pursued.
- **Improving Follow Through:** Convincing decision makers of each specific investment's worth.
- **Action items:** A list of studies to complete, and areas to ensure aligned coordination between the Town and stakeholders. This strategy is just the beginning. Identifying specific infrastructure improvements is not the point of the document; rather, these things will be identified by future planning work.
- **Monitoring:** A framework to keep track of Oakville's progress towards its desired vision by introducing measures of success for each of its strategic goals.

6.2 Aligned Coordination

6.2.1 Winning Over Developers

Oakville can mandate the type of land uses or built form it wants in an area, but for varying reasons, private industry may not engage. Worse, private industry can propose something counter to Oakville's strategic goals, and then prevail at the Ontario Land Tribunal (OLT), like the Town's experience in North Oakville. Typically, this conflict occurs due to either economic obstacles, policy & standards obstacles, or a mixture of the two. Some of these challenges have been observed in North Oakville, which is discussed in Explanatory Box 3.

Outreach to local developers is recommended to hear their concerns, understand their needs, and determine the best way to get them to cooperate in building a better Oakville. Internally, Oakville can develop an incentivization policy that reflects the results of this outreach and revise their design standards and policies to ensure that developers can embrace Oakville's vision.

6.2.1.1 Economic Obstacles

Developers need to make a profit, and they will chase the type of the developments that are most likely to achieve that. This tends to be residential development, especially given the hot residential market and the impacts to office use due to the COVID-19 pandemic, as of this writing. In fact, many developers try to avoid committing to employment uses in their proposals, as it can be difficult for them to gain financing without a tenant already signed on prior to construction.

To counter this, Oakville must offer incentives which encourage developers to play ball by offsetting some of the economic factors working against its vision. This could include:

- Fast tracked applications
- Lower developer charges / tax incentives
- Grants or rebates
- Becoming an active participant in land development market through private-public partnerships (Such as Toronto’s Regent Park redevelopment, shown in Photograph 26)
- Buying and holding land until a suitable proposal is presented
- Use of Community Improvement Plans
- In multi building projects (or for developers with multiple individual building projects), allow for flexibility in office, retail & residential space requirements and their phasing of implementation. For example, allowing a developer to build a primarily residential first phase, followed by a more balanced second phase. However, be aware that this flexibility can be abused, with little recourse possible should the developer renege on promises made.

It is recommended that Oakville develop an Economic Incentives strategy which explores and formalizes the above recommendations, either on its own or as part of the Town’s planned Development Charges Background Study or Community Benefit Charge Study.

Explanatory Box 3: What’s Going on in North Oakville?

North Oakville is a work in progress. Due to market forces, to date, much of the development has been residential. There is the sense that it is developing as a car dependent community, because so far, it has been.

This has led to some growing pains, like residents finding that they do not have enough parking to meet their needs. This was originally by design, with the hopes that it would encourage residents to use other modes. Yet, because of the phasing of how the neighbourhoods have developed thus far, residents are still finding cars a necessity. Much of the new development applications the Town of Oakville is receiving is residential, which brings concerns that similar challenges will continue in the future.

However, the area is planned to accommodate a significant amount of Oakville’s growth in the next 20 years, and this is just the beginning. There is time to get things back on track, and in fact, Oakville is already starting to see some of the mixed-use transit-oriented development that was envisioned. The Town must stay the course – its vision and the planning work it has developed to support that vision is solid, and worth fighting for.

The economic reality today is that developers will always want to prioritize residential developments before and over other land uses. It is also true that rulings at the Ontario Land Tribunal can allow rejected developments to move forward, despite Oakville’s strategic aims. However, the economic incentives discussed here, paired with phasing requirements can be used to build more positive relationships with developers and encourage them to build mixed use developments *first*, or at least in tandem with residential components, for a more balanced roll-out.

At the same time, the Town must continue to improve multi-modal infrastructure in North Oakville and to other parts of the town, so that those options can grow with the community. In other words, Oakville must build for the community it wants to have, rather than the incomplete form the community is in currently.

6.2.1.2 Policy & Standards Obstacles

On the other hand, some developers *will* want to support and progress Oakville’s planning vision, but red tape can get in the way. Often without even fully realizing it, municipalities create a framework of policy and design standards that restrict the very types of developments

that they want to encourage. Through its Official Plan, Oakville should therefore conduct a thorough review of:

- Zoning – in terms of use type, size, and what kinds of buildings are allowed where. Allowances for increased mixed use and “missing middle” developments should be provided so that developers do not have to apply for a zoning variance every time they want to build one.
- Design standards – elements of residential streets including minimum right-of-way widths, building setbacks, lot coverage, building height, boulevard & sidewalk widths, road treatment and speed limits should all be reassessed. Often these policies were developed with maximum throughput of cars in mind, and do not fully capture the needs of other modes and the interactions between them.
- Parking Standards - If developers are confident, they can sell units without parking, Oakville should let them, especially as this encourages residents to adopt other modes of transport. Parking minimums should be abolished entirely, and Oakville can explore implementing parking maximums instead.

Photograph 26: Regent Park Redevelopment



Source: Toronto Community Housing

6.2.2 Winning Over Residents

Intensification can be a tough sell for existing residents, many of whom chose Oakville specifically for a traditional suburban lifestyle. To proceed, Oakville will need to win over its constituents.

The Town already conducts outreach activities for all new studies such as Secondary Plans, Official Plans and Transportation Master Plans, to give residents a chance to have their voices heard. It may be beneficial for the town to be more proactive in communicating the benefits of intensification, and how Oakville plans to do it differently. It can also pilot new transportation projects before full implementation – sometimes just painting some lines on the ground can present surprising benefits and help make the case for more permanent change.

Key points are:

- Investments in roadway infrastructure are not the only way to improve congestion. By investing in a multi-modal approach, the Town is striving to reduce the need for a car for every trip, reducing strain on the road network.
- Intensification does not need to mean 50 storey towers, and the Town will fight for a more European influenced gentle density while respecting the current heritage value of its existing neighbourhoods, rather than the approach taken by other municipalities in the region.
- Improving walking and cycling infrastructure is better for safety, and better for our health.
- Creating mixed use land uses helps businesses and commercial districts thrive, and makes for an Oakville that is more enjoyable to spend time in.

Therefore, an outreach or marketing plan to be consistent across studies is recommended.

6.2.3 Winning Over Halton Region

Without Halton Region’s support, this plan will fail. Trafalgar Rd and Dundas St are fundamental pillars of Oakville’s Urban Structure and this strategy. They are

fundamental to Oakville’s growth, and they are fundamental to achieving its mode shift targets. The Town of Oakville wants - and needs - Halton Region to be an active participant in making these plans a reality. But Halton Region’s views on the role of some of its roads will need to evolve to match what has been proposed.

Oakville is trying to achieve the targets and policies that higher levels of government have set for it. To that end, Oakville must continue to push for alignment between the Town of Oakville and Halton Region at all levels. The results will be worth it, and the cost of failure is high.

Takeaways:

Oakville cannot achieve its vision on its own. Collaboration with third parties is a necessity.

To developers, Oakville can create incentives to draw in the type of communities it wants, with a phasing structure that does not result in residential first, mixed-use later. At the same time, it must ensure that its policies and design standards support its vision and allow developers to do so on their own.

To residents, Oakville must try to convey the merits of a new way of doing things. The goal here is to their benefit: less time spent in the car, and more livable communities. It does not mean Oakville will become a sea of tall buildings.

The wide body of planning guidance from all three levels of government is consistent and clear, regarding the need to intensify and shift towards more sustainable modes of transportation. Oakville is merely seeing that through. To do so, the Town of Oakville must have Halton Region’s support. Without it, this strategy and all of the Town of Oakville’s efforts thus far will fail.

Future Studies:

- Strategic Planning Action Items: 1, 13, 14, 15
- Aligned Coordination Action Items: 1, 7

6.3 Improving Follow-Through

It can be hard transitioning from a study to real world application, whether due to lack of political will or lack of funding. Even the best laid plans will fall flat without both. Indeed, the Town of Oakville (and in particular, Oakville Transit) has already studied many of the ideas in this report. The problem is follow-through. Therefore, we suggest a new tool for the planning process in Oakville: Business Cases.

“A Business Case is a comprehensive collection of evidence and analysis that sets out the rationale for why an investment should be implemented to solve a problem or address an opportunity. Each Business Case is developed using the same guidance to ensure a flexible but consistent and comparable approach across a wide range of investments. Investments include a range of policies, initiatives, and programs that require expenditure.”

- *Metrolinx Business Case Guidance*

A Business Case is like a feasibility study. The key difference is that it focuses not just on financial costs of implementing (and maintaining) a project, but also the *strategic and economic benefits* of doing so. Often, transit projects struggle to show their worth from a pure financial perspective, but when looked at under a more wholistic lens, it becomes clear that the economic activity they would generate would be greater than the funds required to implement them.

Typically, business cases start with framing the problem meant to be solved and outlining different alternatives that could address them. Each project is then analyzed under four key lenses:

1. Strategic Case: How does the investment achieve strategic goals and objectives?
2. Economic Case: What are the investments overall value to society?
3. Financial Case: What are the financial implications of delivering the investment?

4. Deliverability and Operations Case: What risks and requirements must be considered for delivering and operating the investment?

The business case approach can be applied at all stages of the project life cycle:

- The Preliminary Business Case: An initial feasibility study, to establish the problem to be solved and to determine the optimal solution to be carried forward
- Design Business Case: An evaluation of proposed design options, identifying efficiencies that can lower cost and improve performance
- Post-In-Service Business Case: Retrospective evaluation of built infrastructure to learn from for future investments

This section uses Metrolinx’s Business Case Framework as an example. However, there are many others to draw inspiration from. Ultimately, every organization should tailor business cases to their scale and need. After all, Oakville is not designing multi-billion-dollar subway projects.

Business cases can be optional, recommended or required at varying levels of investment that makes sense for that specific organization. Similarly, the level of analysis conducted in each business case should be relative to level of investment, risk, strategic importance, and anticipated difficulty in achieving funding.

More specifically, business cases can be considered for the following types of projects.

- Infrastructure improvements or major purchases (examples include roadway widenings, bus lanes, bike lanes, fleet improvements)
- Policy changes (examples include congestion pricing, parking pricing, speed reductions or changes to enforcement)
- Service enhancements (examples include increased bus frequency or new routes, changes to fare structure, bike share services, TDM schemes)

This approach presents some strong benefits:

- A consistent, quantifiable and transparent methodology and final metric (Benefit-Cost-Ratio) for comparing different courses of action to any given transportation challenge
- Allows decision makers to make more informed decisions by holistically capturing the costs and benefits (including economic and strategic) of implementing a project, both looking into the future, and in retrospect
- Allows Oakville to “Speak the same language” as upper levels of government

Takeaways:

It is recommended that Oakville explore Metrolinx’s Business Case Guidance, available for free on their website, or any comparable guidance from other governmental agencies. This can be adapted into a full framework (or, less formally used to improve the Town’s process of conducting feasibility studies to better capture economic and strategic benefit, if desired) to suit the needs of the Town of Oakville based on the scale and types of municipal projects that could benefit from such an approach.

Any framework developed should be universal across the Town; differences between parts of the town (such as North Oakville) would be captured in each business case under the Strategic Case.



6.4 Action Items

Key action items are listed below that will allow Oakville to move forward on the initiatives listed in this section. Their priority (Low, Medium, and High) is provided, as well as their alignment with the goals set out earlier in this report. Most action items touch on every goal in some way, but the main focuses are highlighted. Depending on the Town of Oakville’s preference, some items can be bundled together into larger master planning documents or done separately. A timeframe is given for each recommendation: short (1-2 years), medium (2-5 years) and long (5-10 years).

This section is separated into three areas of focus:

- Strategic planning documents which will guide Oakville’s development
- Business cases for specific planning projects to demonstrate the need for funding and implementation to decision makers
- Opportunities for aligned coordination with stakeholders to advance Oakville’s strategic aims

6.4.1 Strategic Planning Documents

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
1	Official Plan	Formalize the vision of 15-minute neighbourhoods within the Town's Official Plan and seek council direction to begin incorporating the principles of 15-Minute Neighbourhoods into Town policies.	●○○		5.3 5.4 6.2.1
2	Transportation Master Plan	Advance the prioritization of non-auto modes, in contrast to previous editions of the TMP, and introduce the necessity for a Complete Streets approach (to be refined into actual policy in a separate guide document). Active transportation and Transit will be bundled into the main TMP document.	●○○		5.2.1 5.2.2 5.2.3 5.2.4 5.4 5.5

 Integrated
  Viable
  Connected
  Equitable
  Healthy & Safe
  Sustainable
  Prosperous

●○○ Short Term ●●○ Medium Term ●●● Long Term

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
3	Complete Streets Framework	Develop a “Complete Streets” guide to formalize how to shift limited right-of-way away from auto-centric design towards walking, cycling and transit depending on land use and built form contexts.	●●○		5.2.1 5.2.2 5.2.3 5.2.4 5.2.5 5.4
4	Multi-Modal Levels of Service Framework	Develop a framework to capture the multi-modal impacts & benefits of new developments. A suggested starting point is the Ottawa MMLOS Guidelines (or anything similar), though Oakville is encouraged to expand on this, filling in gaps and better tying it to urban built form, land use and complete street-principles. The framework should re-orient Oakville away from prioritizing auto levels of service at the cost of everything else.	●●○		5.2.1 5.2.2 5.2.3 5.2.4
5	Business Case Framework	Explore adopting a formal business case approach to help prove the benefits of the financing, operation, and maintenance of new infrastructure to decision makers. The Metrolinx Business Case Guidance can be used as a starting point, though development of standards specific to the town is encouraged.	●●○		5.2.2 5.2.4

Integrated
 Viable
 Connected
 Equitable
 Healthy & Safe
 Sustainable
 Prosperous

●○○ Short Term
 ●●○ Medium Term
 ●●● Long Term

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
6	Transit Service Review	Separately from the more long-range planning and physical infrastructure focus of the TMP, conduct a shorter term (5-year) comprehensive review focused on service levels, operations, and maintenance.	●●○		5.2.4
7	Parking Strategy	Conduct a parking strategy to right-size the parking supply while still ensuring that Oakville's parking needs are met. Explore new technologies that can allow Oakville to utilize the existing parking supply more efficiently. This is underway.	●○○		5.2.5
8	Transportation Demand Management Strategy	Conduct a Transportation Demand Management (TDM) strategy to explore ways to further evolve and build on the Smart Commute Program with the goal of reducing or redirecting transportation demand on the existing network. This may be bundled with the next TMP.	●●○		5.5.1 5.5.2
9	Emerging Technologies Strategy	Develop a formal strategy for the adoption of new technologies and how they will impact the transportation network. A key focus should be on scenario planning as the future is ever uncertain. This may be bundled with the next TMP.	●●○		5.5.3





Integrated
 Viable
 Connected
 Equitable
 Health & Well-Being
 Sustainable
 Prosperous

●○○ Short Term
 ●●○ Medium Term
 ●●● Long Term

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
10	Goods Movement Strategy	Modernize the Town’s Goods Movement Strategy at regular intervals. The last one was done in 2016. A revision post pandemic would be beneficial to see if pandemic shopping trends (and supply chain constraints) have reverted to normal, or are maintained, and what impacts this might mean for the town. This may be bundled with the next Transportation Master Plan.	●●●		5.2.6
11	Year-round Maintenance & Asset Management Strategy	Maintenance, tracking, operations and funding planning for street furniture and other infrastructure.	●○○		5.2.2 5.2.3 5.2.4
12	Vision Zero (or Similar) Strategy	Expanding on the Neighbourhood Traffic Safety Program, Oakville can consider how road safety is interrelated with land use planning, road design, mode choice, education, and technology under a Vision Zero (or similar) context, with the goal of making our roads safer for all users.	●○○		5.2.1 5.2.2 5.2.3 5.2.4
13	Economic Incentives Strategy	To combat market forces, Oakville must explore expanding incentives to get the type of development it envisions. It is strongly recommended that Items 13-15 are looked at holistically.	●○○		6.2.1

Integrated
 Viable
 Connected
 Equitable
 Healthy & Safe
 Sustainable
 Prosperous

●○○ Short Term
 ●●○ Medium Term
 ●●● Long Term

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
14	Development Charges Background Study	Development charges assist in providing growth related infrastructure required to service future development by establishing a viable capital funding source. This study will update Oakville’s current fee structure. It is strongly recommended that Items 13-15 are looked at holistically.	●○○		6.2.1
15	Community Benefit Charge Study	Mixed use land development is important and have been the focus on this strategy, but other amenities such as parks, community centres, etc. are just as important for creating livable environments. Fees extracted from developers can be used to pay for such benefits. This study will update Oakville’s current fee structure. It is strongly recommended that Items 13-15 are looked at holistically.	●○○		6.2.1
16	Pedestrian Charter Update	An update to the 2009 Pedestrian Charter is planned. This will serve as Oakville’s statement of commitment to building an improved pedestrian experience in the town, and is a chance to highlight the steps that have been taken thus far.	●●○		5.2.2
17	Sidewalk Gap Analysis	Oakville is aware of the gaps in its sidewalk network, particularly south of the QEW. This study will identify the gaps as well as which ones would provide the most benefit to close.	●●○		5.2.2


 Integrated
  Viable
  Connected
  Equitable
  Healthy & Safe
  Sustainable
  Prosperous

●○○ Short Term ●●○ Medium Term ●●● Long Term

6.4.2 Feasibility Studies / Business Cases

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
1	Trafalgar BRT-Lite / BRT Business Case	<p>Conduct updated business case for a BRT-Lite (with consideration for an eventual upgrade to full BRT) service along Trafalgar Rd reflecting up-to-date land use forecasts.</p> <p>Metrolinx Dundas BRT Initial Business Case was released in 2020 and work is progressing.</p>	●●○		5.2.4
2	On-Demand Transit Service Business Case	<p>Study expansion of Home-to-Hub across different parts of Oakville, or town-wide. Explore true on-demand micro transit service.</p>	●○○		5.2.4
3	Bike Share Business Case	<p>Conduct a feasibility study / business case for a bike share program (or other forms of micromobility) in key areas, and gradually build out from there, expanding on the planned pilot linking Sheridan College with Oakville GO Station.</p>	●●○		5.2.3

Integrated
 Viable
 Connected
 Equitable
 Healthy & Safe
 Sustainable
 Prosperous

●○○ Short Term
 ●●○ Medium Term
 ●●● Long Term

6.4.3 Aligned Coordination

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
1	Regional Road Network	The regional road network is just as much a part of Oakville as its local roads, and the Town has identified Trafalgar Rd and Dundas St as growth corridors. They are critical for the success of this strategic and Oakville’s growth and mode shift objectives. Oakville must work towards closing the gap between the Region’s vision for their regional roads, and its own.	● ○ ○		5.2.1 6.2.3
2	Fare Integration	Co-fares between GO and Oakville Transit are provided, and passengers can transfer between Oakville Transit and MiWay or Burlington Transit with some restrictions. Metrolinx is conducting planning work for fare integration across the region. Oakville should continue to push for improved, seamless travel across the region.	● ○ ○		5.2.2
3	Goods Movement	Much of the region’s good movement is out of Oakville’s direct control. However, Oakville should strive to have a seat at the table in discussions pertaining to rail, plane, and truck deliveries (particularly truck), as the impacts do trickle down to the local level on final delivery.	● ● ○		5.2.6

Integrated
 Viable
 Connected
 Equitable
 Healthy & Safe
 Sustainable
 Prosperous

● ○ ○ Short Term
 ● ● ○ Medium Term
 ● ● ● Long Term

No.	Task	Description	Timeline	Alignment with Goals	Cross Reference
4	Emerging Vehicles	Allowing emerging technologies to counter mode shift efforts should be avoided at all costs. It is unlikely that these technologies will fix our congestion problems in the short term, if ever, and regardless, car-oriented development does not fit the mold of the type of town Oakville wants to be.	● ○ ○		5.5.3
5	Municipal Control	Oakville’s strategic aims can be undermined or strengthened by OLT rulings. The Town should therefore push for increased municipal autonomy in local planning, particularly as it pertains to land use mix, building height, and the interaction between the building and street at ground level.	● ○ ○		5.3.2 6.2.1
6	Open Data	Explore options to expand Open Data offering – particularly live data - and encourage Halton Region to create one.	● ● ○		5.5.2
7	Stakeholder Groups	Oakville can mandate or encourage specific urban forms or land use mixes, but there are no guarantees that industry will bite. Outreach to local firms to hear their voices, concerns and aspirations can help to bridge the gap between the two conflicting groups and identify ways the Town can encourage developers to get on its side.	● ○ ○		6.2.1 6.2.2 6.2.3

Integrated
 Viable
 Connected
 Equitable
 Healthy & Safe
 Sustainable
 Prosperous

● ○ ○ Short Term
 ● ● ○ Medium Term
 ● ● ● Long Term

6.5 Monitoring








This strategy is a transition point for the Town of Oakville. A lot of work has already been completed by the Town, and more needs to be done to bring it closer to its vision of a transportation network where all modes are viable, supported by progressive land use policies where they can thrive. To keep up momentum, Oakville must track the progress of this strategy over time and across multiple projects.

There are several keyways the Town can monitor the success of this strategy over the long term. They are a combination of one-off victories, and long-term tracking:

- **Completion of follow-on strategic planning documents and feasibility studies / business cases** in their recommended timeframe (Table 6.4.1 and Table 6.4.2), to continue to advance the strategic direction outlined here. Ideally, these studies should include the vision and goals outlined here, so all follow-on work is consistent over time.
- **Tracking of Key Performance Indicators (KPI) over time.** KPI should be related back to the goals established earlier in the strategy, which in turn link back to the overarching vision. KPI should be simple, quantitative, measurable, and realistically attainable. Table 3 provides recommended KPI to track on an annual basis. A summary report at regular intervals (annual or biannual recommended) outlining the KPI relative to their targets should be conducted and circulated, with gaps identified and causes explored. However, the specific targets for each KPI should be determined in follow on studies (Official Plan and TMP).
- **Success of efforts to coordinate with other levels of government.** Has Oakville had its voice heard? For each case (Table 6.4.3), we suggest developing a master spreadsheet tracking elements like date of meetings, attendees, stances taken, and decisions made, and whether Oakville was able to influence the discussion in its favour (and why). This can be reviewed over time, so that internal strategy can be

adjusted if necessary. In the end, the metric of success is a simple yes or no – did Oakville get what it needs, or not?

Table 3: Potential Key Performance Indicators

Goal	Potential Key Performance Indicators
 <p>Integrated</p>	<ul style="list-style-type: none"> • Ratio of mixed-use gross floor area (or retail/office gross floor area in residential neighborhoods) to purely residential gross floor area / number of units. • Ratio of new units in intensification areas to units in greenfield areas. • Average ratio of parking to number of units in new developments
 <p>Viable</p>	<ul style="list-style-type: none"> • Walking, cycling and transit mode share • Number of cars per household • Linear kilometres of new cycling infrastructure • Number of Jobs within 30 minutes travel by sustainable modes.
 <p>Connected</p>	<ul style="list-style-type: none"> • Percent of population within 30 minute transit time to urban growth node or corridor. • Travel time between urban growth nodes via sustainable modes • Walk Score
 <p>Equitable</p>	<ul style="list-style-type: none"> • Resident survey feedback • Care-A-van ridership
 <p>Health & Well-Being</p>	<ul style="list-style-type: none"> • Road-related Deaths and Serious Injuries per Thousand Residents • Walking & cycling mode share
 <p>Sustainable</p>	<ul style="list-style-type: none"> • Green house gas emissions from the transportation sector (or comparable metric, such as gasoline/diesel sales in Oakville)
 <p>Prosperous</p>	<ul style="list-style-type: none"> • Credit card transaction data value in mixed use developments and urban centres

In particular, Oakville needs Halton Region's participation and support for this plan to be successful, because the regional roads are fundamental spines of the city. Without them, this strategy will fail. Oakville and Halton Region have not always seen eye to eye on the role of regional roads in the town. This needs to change. In five years, if Oakville can say that it has been able to get Halton Region on its side, they will have made a lot of progress towards the overall success of this strategy.

- The strategy has been clear on the need to eliminate parking minimums across the town, to end the long running subsidy on auto travel. This point – simply a success or a failure - is critical to the success of this strategy.
- At the end of the day, this strategy requires Oakville to do things differently. Several of the recommended follow-on projects are **fundamental**. Oakville needs a Complete Streets Framework. It needs a Multi-Modal Levels of Service Framework and a new road classification system. It needs an economic incentives program to offset market forces and encourage developers to build the types of developments it wants. And it could benefit from a business case framework, or similar, to help justify future transportation projects. So, the question then becomes, five years from now – have these tools been developed, and are they actively being used? Are they engrained in new development applications? Are they engrained in internal processes and being used in subsequent secondary plans, corridor studies and other strategies? The tools suggested herein need to be embraced by staff and council, and then mandated.

Takeaways:

There are four ways to track the success of the Urban Mobility & Transportation Strategy:

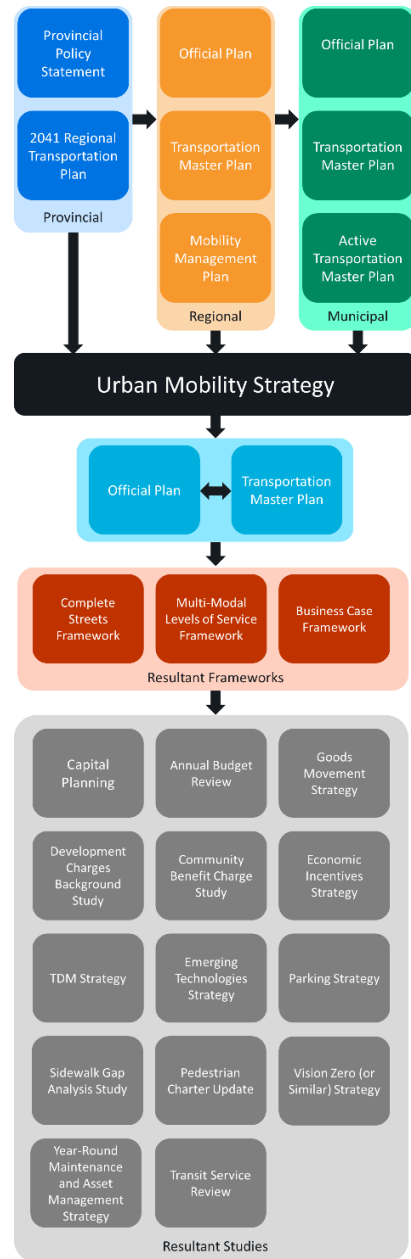
- Completion of the recommended follow-on studies
- Success in convincing Halton Region and other relevant third parties to support the Urban Mobility & Transportation Strategy
- Specific, measurable, and realistic KPIs, suggested for each of the seven goals
- Success of eliminating parking minimums across the town
- Success of engraining the tools suggested by the Urban Mobility & Transportation Strategy into Oakville's planning paradigm

7 Direction for Future Studies

7.1 Overview

This section will provide guidance and direction for some of the key future studies identified in the previous section. The overall “big picture” is outlined in Figure 7-1, showing this Urban Mobility & Transportation Strategy’s role in bridging the gap between past studies and future work.

Figure 7-1: How the Urban Mobility & Transportation Strategy Fits into the Big Picture



7.2 Study-Specific Recommendations

7.2.1 Official Plan & Transportation Master Plan

At the heart of this strategy will be the connection of land use and transportation, implemented via a Complete Streets approach to transportation planning, and a 15-Minute Neighbourhood approach to land use and network planning. Oakville’s Official Plan and Transportation Master Plan must therefore act as the bedrock upon which everything else is placed. It is recommended that these studies be conducted in parallel, or even as part of one large mega project, rather than be isolated endeavours to ensure that linkage is maintained.

The next **Official Plan** review should consider:

- Development of different urban typologies and their associated built form.
- Explore the missing middle (duplex, triplex, townhomes) that can act as a bridge between Oakville’s existing suburban neighbourhoods and more dense urban cores.
- Revision to zoning bylaws mandating & encouraging clustering of specific land uses in specified 15-Minute neighbourhoods.
- Relaxation of zoning bylaws to allow for limited additions of retail and or office space into existing communities, and identification of where this might best fit.
- Provisions to support development of main streets, including strong street walls and hidden parking. What happens at street level is as important, if not more important than how tall the building is.
- Changes to parking bylaws and developer requirements reflective of Oakville’s parking strategy (to be discussed later).

The next **Transportation Master Plan** update should:

- Update the understanding of Oakville’s transportation and demographic landscape.

- Update or reconfirm Oakville’s vision for its transportation network and the goals that will achieve this.
- Confirm alignment with Official Plan on growth nodes, corridors, and employment areas.
- Develop a multi-modal road classification system.
- Create a framework for monitoring implementation.

Oakville will be bundling the active transportation and transit components into the next master plan at the same level of detail they would be as standalone documents. This is to prevent having numerous studies referring to other studies, and to ensure all the modes are looked at holistically.

The **pedestrian component** of the Transportation Master Plan should consider:

- Conduct a best practice review of pedestrian infrastructure design using case studies from other towns and cities.
- Identification of key destinations for pedestrians (transit stops, schools, etc.) and assess access to them on a town-wide level. Recommend infrastructure improvements to allow improved access to these sites.
- Diving deeper, assess current pedestrian provisions at key growth nodes and along key growth corridors, and recommend improvements that will support Oakville’s land use policies.
- Identification of neighbourhoods that can be retrofitted to be more walkable, through the addition of new infrastructure, and the modification of land use policies at key nodes.
- Develop a comprehensive Vision Zero strategy (or similar) & funding strategy.
- Identify cross-neighbourhood barriers to pedestrian travel and explore ways to improve the pedestrian experience specifically along and across regional roads.

- Oakville is aware of the gaps in its sidewalk network, particularly south of the QEW. A Sidewalk Gap study is planned, though this could be incorporated into the TMP if desired.

The **cyclist component** of the Transportation Master Plan should consider:

- Analyze current cycling demands and trends and estimate future cycling demand that can be captured from other modes.
- Develop a framework for the identification and prioritization of new cycling infrastructure based on evaluation criteria that maximizes cyclist safety and ties directly back to Oakville’s long term planning objectives.
- Identification of long-term cycle network by classification and timeframe / priority.
- Identification of where non-linear cycling facilities could be added.
- Formalize the vision of a bike share system.
- Development node and station access plans to ensure that all major transit hubs and intensification areas serve and encourage bike ridership.

The **transit component** of the Transportation Master Plan should consider:

- The role that transit plays within the context of 15-Minute Neighbourhoods and the connections between urban growth nodes.
- A Complete Streets lens identifying how to bring transit to the forefront of our streets.
- Identification of potential express routes and potential BRT-lite services along future BRT corridors.
- Review best practices from other nearby municipalities, including successes, failures, and ways to innovate.
- Review innovative technologies that can improve transit service or operations. Explore the potential

expansion of the Home-to-Hub program across Oakville, as well as van-pooling services.

- Identification of long-term capital projects, with an early understanding of their capital costs.

7.2.2 Complete Streets Framework

- Explore best practices from other similarly sized municipalities and towns.
- Make the case for why the plan is necessary.
- Develop minimum standards for accommodating each mode, regardless of what else is happening on the street.
- Link back to the road classification system developed in the TMP.
- For each classification, create ideal roadway cross sections and intersection layouts that best accommodate the relevant combination of modes.
- For each classification, provide room for variances to account for local differences.
- For each classification, identify how roadways can be designed flexibly, so that Oakville is not tied in to one specific design for the entire life of the road, but can adapt to changing requirements in the future.

7.2.3 Multi-Modal Levels of Service Framework

Oakville should restart work on updating their traffic impact study standards to better capture the multi-modal impact of new developments. The most critical piece of this is the development of a new set of multi-modal levels of service metrics with guidelines on how to calculate them.

This strategy has suggested the Ottawa MMLOS methodology as a good starting point. However, it does have gaps and is better suited for suburban developments. Ultimately, the MMLOS framework needs to fit its local needs, and so “off-the-shelf” frameworks should not be used without extensive modifications or confirmation that it is indeed the right fit. Expanding on this for use in more-dense neighbourhoods by capturing

the link between transportation, land use & built form would allow it to be used across Oakville and better fulfill the Town’s strategic goals. If desired, the Town can also explore other methodologies and draw inspiration from multiple sources to help fill any gaps in the Ottawa approach.

7.2.4 Business Case Framework

Business cases can assist in achieving funding for major expenditures, including infrastructure expansion, policy change and serve improvements. This is because they capture not just financial cost, but economic and strategic benefit.

Metrolinx’s business case guidance is available to the public online, as are business case frameworks from other organizations. The Town of Oakville is encouraged to explore developing a framework that fits its own local needs and scale. Alternatively, and less formally, it can bring in some principles from business cases into its current practice of feasibility studies.

7.2.5 Transit Service Review

The next regular Operational Service Review can be undertaken to improve transit service with limited physical infrastructure changes. Like previous plans, this iteration should examine the following elements:

- Review travel patterns within the Town of Oakville.
- Examine bus route layouts and service coverage.
- Analyze service reliability and identify ways to improve them.
- Analyze ridership profiles to assess frequency and crowding.
- Explore improve connections with other transit services.
- Review bus fleet and required maintenance.

7.2.6 Parking Strategy

Oakville is currently conducting a comprehensive parking strategy that critically examines the role of parking in its

community and how it fits in the picture of 15-Minute Neighbourhoods and Complete Streets.

The strategy should seek to chart a course beyond the status quo to ensure that parking provisions of future developments fits within the planned land use context and reflects the shifting of mode choice priorities. To achieve this, the parking strategy should:

- Identify if any of the existing parking demand can be shifted towards other modes of transport and how this behaviour can be encouraged – particular in urban growth nodes.
- Work towards abolishing parking minimums and explore implementing parking maximums.
- Determine how parking demands can best be managed without negatively impacting the urban form of each growth area and the feasibility of each option. Set standards for parking lot orientation relative to the rest of the built environment (i.e below or above grade, behind buildings rather than adjacent to the street, etc.)
- Research new parking supply management and enforcement technologies, their use and efficacy in other municipalities, and assess their feasibility in Oakville and where they might best be implemented.
- Assess the current parking inventory and ways to right-size.

7.2.7 TDM Strategy

Oakville has a success TDM program in place through Smart Commute. A future TDM strategy can look to expand on this. In particular, the pandemic has given thousands of people a taste of working from home, which they otherwise may not have tried (or been allowed to try). Figuring out how to capitalize on this and keep it going in some hybrid form can make a significant difference in the long term. Items to consider include:

- Identification of education and outreach initiatives to bring more employers, schools, and communities into the TDM sphere.

- Explore ways to capitalize on COVID-19 working-from-home.
- Add new initiatives, incentives or subsidies to Smart Commute based on successes elsewhere.
- Improve TDM requirements in development applications.
- Link up with other strategies that have a role in TDM beyond social programs (parking strategy, bike share & micromobility programs, transit service review).

The TDM Strategy may be bundled with the next Transportation Master Plan.

7.2.8 Emerging Technologies Strategy

The Emerging Technologies Strategy should reflect the fact we are in a time of profound change in the transportation sector, but also that the future is uncertain. This includes:

- Develop an updated understanding on the current state of new technological advancements in the transportation sector, where they have been applied, the successes and failures that have been had and the risks that may arise from them.
- Develop scenarios that vary in timeline and impact and assess how Oakville's transportation network will react to and accommodate each.
- For each scenario, identify what Oakville will need to do to successfully accommodate each scenario in terms of policies and procedures, new infrastructure, and modifications to existing services.

The Emerging Technologies Strategy may be bundled with the next Transportation Master Plan.

7.2.9 Goods Movement Strategy

Refresh the Goods Movement Study that was conducted in 2016. It should:

- Consider how online shopping has changed after the pandemic, and whether things have gone back to as they were before or stabilized in a new normal.

- Identify risks to the supply chain in the face of increasing congestion and risks to offset this.
- Develop first/last mile strategies to reduce delivery traffic in neighbourhoods and urban areas.
- Explore ways to green supply chain operations in Oakville.
- Determine how goods movement plays into new road classification system and Complete Streets Framework. What is the role of delivery vehicles on our streets and how can they be accommodated?
- Link with TDM strategy to get auto drivers off the road, clearing the way for goods movement activities that cannot be diverted to other modes.

7.2.10 Year-Round Maintenance and Asset Management Strategy

Many of the recommendations in this report call for additional street infrastructure / furniture. This comes at an upfront cost, but also requires year-round maintenance – especially in the winter, when items can be damaged by weather, or weather clearing operations. This strategy will look for funding opportunities, and explore the full life cycle of these assets, including operations and maintenance requirements. The Town is encouraged to think not only about cost, but also the benefits these assets would provide.

7.2.11 Vision Zero (or Similar) Strategy

The Neighbourhood Traffic Safety Program has identified key changes to Oakville's transportation network to implement in the short to medium term. However, this strategy has identified the importance of road design on public safety. At the same time, it has identified the need for the design of our streets to better accommodate Oakville's design-built form the modes needed to serve them (walking, cycling, transit). Therefore, the Vision Zero (or similar) strategy should explore permanent physical infrastructure changes under this multi-modal, city-building lens. The Complete Streets Strategy, alongside the new road classification system and MMLOS

framework will design new street topologies for Oakville. Vision Zero, or similar must be engrained in all of it.

The strategy can also explore other aspects of Vision Zero, some of which already have been by the Town:

- Explore opportunities for education and outreach to local communities, encouraging drivers to slow down, wear seatbelts or helmets and avoid aggressive driving.
- Link up with the TDM & Digital Strategy and other mode shift initiatives to identify ways to reduce total auto miles driven in the town.
- Explore changes to local laws placing more responsibility on the driver when things go wrong.
- Continue to identify locations for traffic calming, signal modifications, new signage, and automatic enforcement.

7.2.12 Economic Incentives Strategy & Other Development Charges Studies

Oakville must produce a plan to incentivise developers into making the types of neighborhoods it wants to see. Just as important is the phasing, to prevent all the mixed-use components being delayed to later phases (and potentially dropped entirely). Recommended strategies to explore were discussed in Section 6.2.1.

Oakville is planning a Development Charges Background Study and Community Benefit Charge Study. Development charges assist in providing growth related infrastructure required to service future development by establishing a viable capital funding source. Community Benefit Charges help pay for critical components of making neighbourhoods livable, like community centres and parks. These studies will review Oakville's current fee structure.

It is strongly recommended that these elements be considered holistically, as economic incentives provided to developers may have an impact on the fee structure, and vice versa.

7.2.13 Pedestrian Charter Update

The Town is planning to update its Pedestrian Charter, which was adopted by the Town in June 2009. The original charter provides a strong vision for pedestrian movement in the Town. The update should:

- Vocalize the need to actively prioritize – not just support – pedestrian movement through the Town
- Highlight the tools and steps Oakville is taking to *proactively* change things on a systematic level (such as: new road classification system and the multi-modal evaluation framework)
- Re-emphasize the connection of pedestrian movement to design. That is, the built form of our communities (human scale versus sprawl), and the configuration of our transportation infrastructure (auto-oriented design versus multi-modal).
- Highlight the trail system as a key asset of the Town, for improved integration with the rest of the network.

8 Conclusion

The Town of Oakville has long developed around the private automobile. Its urban form – and therefore the mode choice of its residents – reflects that. Now, Oakville is at a turning point in its development. If things do not change, the Town will not be able to accommodate the demands of the future that come from existing within a growing region, nor will it be able to adapt to an evolving transportation landscape and respond to a changing climate.

Already, Oakville has taken steps to bring about a brighter tomorrow. The Town has established an Urban Structure to govern its intensification, making sure that it will grow smartly in the right areas which would most benefit from that growth. Eight Urban Growth Centres and two growth corridors have been identified, and an extensive body of planning work has already been completed to bring them to life. Some of these centres are already in progress, but continued efforts will be needed to keep them on track.

This Urban Mobility & Transportation Strategy sought to provide a unified direction for the transportation landscape in Oakville – one that would encompass all the growth areas that have already been established, as well as future ones, and even all other parts of the town where growth and change need to be more subtle. The recommendations may differ by area, but the overall vision does not.

For Oakville to achieve its mode shift targets, it needs to actively prioritize those modes. It needs to provide the infrastructure to accommodate them, just as it has for automotive travel, to ensure safe, efficient, sustainable, and accessible mobility for all people. The key role of the transportation network is to move people – not just cars.

For Oakville to achieve its mode shift targets, it needs to develop a human-scale urban form in which those modes are viable and can thrive in. At its current scale, Oakville is too spread out for more sustainable modes to be viable, due to the prevalence of single use zoning that separate residents from key destinations, as well as stringent parking minimums which result in destinations that sprawl and require cars to travel through and between.

Therefore, we have proposed that Oakville concentrate on building complete **15-Minute Neighbourhoods** with mixes of land uses that can accommodate the day-to-day needs of its residents, so that they no longer need to hop in a car for every little thing. In parallel, we have proposed that Oakville adopt a multi-modal **Complete Streets** focus to its transportation network so that every mode is competitive, accessible, and a pleasure to use. The development of new methodologies to classify and evaluate streets will be critical, to achieve balance between the various modes by actively prioritizing the ones (walking, cycling and transit) who have not been given proper focus until now.

Implementing the strategy will be a challenge. Economic forces mean that developers may not always agree completely on what should be built in Oakville, but economic incentives may help to offset the influences of the market that are beyond Oakville's direct control. Many of the roads in Oakville, including both growth corridors, are not owned by the Town. These are critical spines to Oakville's future development, and so the Town of Oakville needs Halton Region's support to reach these corridor's full potential. Otherwise, this plan will not be successful.

This Urban Mobility & Transportation Strategy is not static and will take continued efforts to see it through. It will take time, but Oakville's efforts **will** pay off, so long as the Town continues to fight for the future it believes in. In the end, with this plan, and future ones, Oakville will be able to switch gears towards a town that is more resilient, livable, and prosperous than ever before.

Control Information

Prepared by

Steer
1502-80 Richmond St W
Toronto, ON M5H 2A4
Canada
+1 (647) 260 4860
www.steergroup.com

Prepared for

Town of Oakville
1225 Trafalgar Rd
Oakville, ON
L6H 0H3

Steer project/proposal number

23703601

Client contract/project number

Author/originator

Jordan Talker

Reviewer/approver

Dennis Fletcher / Carmen Correa Lafuente

Other contributors

Dennis Fletcher
Tom Willis
Francois Tomeo

Distribution

Client: Geoff Abma

Steer:

Version control/issue number

V3.0

Date

2022-01-27

steer

Oakville Urban Mobility and Transportation Planning Strategy: Best Practice Review



Report
March 2020

Oakville Urban Mobility and Transportation Planning Strategy: Best Practice Review

Prepared by:

Steer
1502-80 Richmond St W
Toronto, ON M5H 2A4
Canada

+1 (647) 260 4860
www.steergroup.com

Prepared for:

Town of Oakville
1225 Trafalgar Road
Oakville ON
L6H 0H3

Client ref: 9889-OP
Our ref: 23703601

Steer has prepared this material for Town of Oakville. This material may only be used within the context and scope for which Steer has prepared it and may not be relied upon in part or whole by any third party or be used for any other purpose. Any person choosing to use any part of this material without the express and written permission of Steer shall be deemed to confirm their agreement to indemnify Steer for all loss or damage resulting therefrom. Steer has prepared this material using professional practices and procedures using information available to it at the time and as such any new information could alter the validity of the results and conclusions made.

The logo for Steer, featuring the word "steer" in a bold, lowercase, sans-serif font.

Contents

1	Introduction.....	1
2	Technology and Trends in Transportation	2
2.1	Mobility as a Service (MaaS)	2
2.2	Smart Vehicles and Cities.....	8
2.3	Alternative Vehicle Energy Sources	14
2.4	Management of Freight Transportation	22
2.5	Complete Streets.....	25
2.6	Vision Zero.....	29
2.7	Open Data	31
2.8	Transportation Demand Management	32
2.9	Summary	34
3	Trends for Current Movement Patterns	0
3.1	Where.....	0
3.2	Why	3
3.3	When.....	5
3.4	Who.....	7
3.5	How	9
3.6	Summary	14
4	Lessons from Other Jurisdictions	15
4.1	Milton Keynes, England.....	15
4.2	Gent, Belgium.....	16
4.3	Copenhagen, Denmark.....	19
4.4	Two-Tiered Municipalities.....	20
4.5	Other Jurisdictions in the GTHA	21
5	Strengths, Weaknesses, Opportunities and Challenges.....	23
5.1	Strengths	23
5.2	Weaknesses.....	23
5.3	Opportunities	24
5.4	Challenges	24
	Bibliography.....	25

Figures

Figure 3.1: Trips generated by the Town of Oakville during Weekday Peak Periods.....	0
Figure 3.2: Destinations of Trips generated by Oakville - In Oakville.....	1
Figure 3.3: Destinations of Trips generated by Oakville – In the GTHA	2
Figure 3.4: Trip Purpose by Destination Type All-Day	4
Figure 3.5: Time of Travel (All Purposes and Destinations).....	5
Figure 3.6: Time of Travel by Trip Purpose (Internal Trips)	5
Figure 3.7: Time of Travel by Trip Purpose (All Destinations)	5
Figure 3.8: Time of Travel by Trip Purpose (External Trips)	5
Figure 3.9: Number of Trips originating from Oakville by Age Group and Purpose.....	7
Figure 3.10: Average Weekday Trips per Person living in Oakville by Age Group and Purpose	8
Figure 3.11: Oakville Trips Mode Split.....	9
Figure 3.12: Mode of Travel by Purpose and Destination Type	10
Figure 3.13: Distance travelled by Mode in Oakville during Weekday Peak Periods.....	12
Figure 3.14: Distance travelled by Go Transit Riders in Oakville during Weekday AM Peak Period	13
Figure 3.15: Gent Circulation Plan.....	17

Tables

Table 2.1: Commercially-Available EVs in Canada as of Mid-2019.....	16
Table 2.2: Summary of Best Practices, Current Situation and Potential Next Steps in Oakville	0

1 Introduction

The Town of Oakville's Strategy for Urban Mobility and Transportation Planning will explore the current advances in urban mobility and transportation planning, and examine ways in which to advance the prioritisation of walking and cycling, transit users and good movements ahead of the private automobile. It will also support the vision outlined in the Town's Official Plan for a transportation network with multiple options for the movement of people and goods within Oakville and to/from the GTHA.

The Strategy will ultimately create a multi-pronged approach for moving people and goods throughout the municipality. It will help the Town set the future direction on integrating land use and transportation policies. This will support growth in non-auto modes, create a more livable town, reduce the need for further road widenings, and deliver other social, environmental and economic benefits.

This report provides the first major step towards delivering that Strategy by reviewing what the future may hold for the transportation sector, and what that could mean for Oakville, in terms of opportunities, challenges and risks. This report is divided into three chapters:

- **Technology and trends in transportation:** background and emerging directions;
- **Trends for current movement patterns:** covering where, why, when, who and how people travel to/from/within Oakville, plus lessons from other jurisdictions;
- **Lessons from other jurisdictions:** around the world and locally; and
- **Strengths, weaknesses, opportunities and challenges:** summarizing the key factors affecting Oakville's transportation system, and the steps the Town may need to take.

The material and findings in this report will be used to inform the Strategy itself. Following this report, the project team will:

- Collate context and direction from other transportation-related plans;
- Established a unified future direction for transportation;
- Devise a set of initiatives to support mode shift;
- Set the direction for other transportation-related studies by the Town (including the Official Plan); and
- Develop an implementation plan and define transitional steps.

This material will all be brought together into the final Strategy Report, which will include this report as an appendix.

2 Technology and Trends in Transportation

2.1 Mobility as a Service (MaaS)

2.1.1 Background and Emerging Directions

General Concepts

The term “mobility as a service” (MaaS) is the concept of people changing from traveling using things they own (particularly cars) to travelling using services provided by others. A key part of that concept is the ability to choose a mode of transport for each trip individually. Thus, it includes methods of travel such as taxis/ride-sourcing, bike share, car share and public transit.

MaaS requires that travellers have timely information about their travel options (including access arrangements, journey times, and price). This in turn means service providers must make that information available to potential users, ideally in a way that can be aggregated into a common platform (such as through smartphone app). To be effective, MaaS also requires an easy way to pay for those different options.

Under MaaS, transportation services can be provided by the public or private sector. The freedom of choice allows travellers to select the most appropriate mode(s) for each trip, maximizing the personal benefits.

Elements of MaaS are already in place, but significant gaps remain. On the information front, almost all public transit providers in Canada make their schedule data available for third parties to use. Various existing smartphone apps combine information about public transit with other mobility options, such as bike share or ride-sourcing.

However, some private transportation service providers have not supported making their data available. The two largest ride-sourcing companies in North America (Uber and Lyft) no longer allow third parties to obtain information or book trips. The private company Motivate operates bikeshare programs in multiple North American cities, and used to allow third parties to obtain information or book trips. However, since being bought by Lyft, this is no longer the case.

On the payment front, it is currently unusual for transportation service providers to allow payment via third parties. This means, for example, an app that allows travel planning across all mobility options cannot then allow users to pay for their chosen mode. New providers of non-transit transportation services have a strong incentive to allow third-party payments, as it helps support early adoption in places their services are new. This incentive will reduce as they become more established. Transit agencies are also more established, and hence their incentive is lower, but still present.

The Presto smartcard already provides a common payment platform for the GTHA's transit service providers. Presto is moving towards supporting "open payment", whereby credit cards, debit cards and smartphone systems such as Apple Pay can be used to pay transit fares. However, it is not available for other transportation services, nor can it be integrated into third party apps.

Overall, it is likely that third-payment payment mechanisms will become more common, with new non-transit transportation service providers leading the way. The Town can support the adoption of third-payment payment mechanisms by making it a licence condition for new operators, and by ensuring its own transportation services support it.

Some elements of MaaS are in place, but significant gaps remain, particularly regarding payment for services. The data/information components required for MaaS will fall primarily on the public sector (as transportation infrastructure owners) and transportation service providers (including transit agencies).

Car Share Services

In a car share program, the vehicle is driven by the traveller, but is rented by them from a third party. These programs include traditional car rental companies (who own a fleet of vehicles) catering for longer-term rentals (at least a day), newer short-term car sharing services (allowing cars to be hired typically by the hour) and peer-to-peer systems. In the peer-to-peer systems, cars are individually owned, with the rental process typically facilitated by a third-party app or website. They can be short-term (under one day) or long-term (one day or more). Existing car share systems are mostly 'fixed' systems, where the vehicle is returned to a specific place. Some companies are experimenting with 'floating' systems, where vehicles can be left in any parking space. The wider effects of the two systems are likely to be similar. Car share provides travellers with convenient access to an automobile for short periods, without the need to own it.

A 2016 study¹ by Innovative Mobility Research found that car-sharing was associated with lower vehicle ownership and lower car use. Transit use and walking were unaffected or increased. Across the five cities studied, each car-sharing vehicle in operation reduce the number of personally-owned vehicles by between four and nine.

There are number of car share services operating in the GTHA. Short-term services include ZipCar, Enterprise CarShare and Car2GO; long-term services include Enterprise Rent-A-Car, Avis, Discount and Hertz. In Oakville, only long-term services are available in multiple locations. Short-term services are limited to Sheridan College In the GTHA, short-term services are widely available in Toronto. Outside Toronto, availability is limited to a few high-density areas, post-secondary campuses and GO stations (including Oakville GO but not Bronte GO).

Easy access to car share services makes it easier for households to have no (or fewer) vehicles. Household members can use other modes for most trips, and then use car share for the occasional

¹ *Impacts of car2go on Vehicle Ownership, Modal Shift, Vehicle Miles Traveled, and Greenhouse Gas Emissions: An Analysis of Five North American Cities*, Martin & Shaheen, 2016.
http://innovativemobility.org/wp-content/uploads/2016/07/Impactsofcar2go_FiveCities_2016.pdf

trips they cannot do with those other modes. Lower car ownership would reduce the amount of residential parking required. This would help the Town meet its density targets, both by reducing the land required for parking (freeing up land for other uses), and by reducing the cost of building new housing.

Care hare services require space for vehicles to be parked when not in use. The Town could require new large-scale residential development to reserve a portion of its parking supply for car share vehicles.

For these effects to occur in Oakville, the town needs a sufficiently good transit and active transportation network that those modes can be used for most trips. Evidence from stakeholders and previous studies indicates that Oakville is not yet at that point.

Car-sharing services can reduce the number of personally-owned vehicles, and hence the amount of residential parking required. This would help the Town meet its density targets.

Car-share services in Oakville are generally difficult to find and limited to more traditional long-term car rental services (one day or more).

Van Pooling Services

Van pool services involve shared use of a vehicle that is between a car and bus in size, typically with 7-15 seats. In the most common model, the van is used by people working at a single location, picking people up from either their homes or designated pick-up point(s).

Van pool service providers provide the vehicle and associated maintenance activities; the costs are split between the users of the vehicle. (Capital costs are covered by a monthly charge.) The service provider will also help match potential users and vanpools.

In North America, large-scale vanpooling programs are typically organized and promoted by a local government entity (including transit agencies). For example, LA Metro coordinates over 1,300 services across the Greater Los Angeles area, focused on those areas with limited fixed-route transit service. The public sector entity may or may not choose to subsidise the service.

Employees may choose to organize and pay for vanpooling services directly. These services are normally termed “employee shuttles”, but offer similar functionality to vanpools. The primary practical difference is that vanpool programs are open to the public, while employee shuttles are restricted to employees and paid for by employers. In the GTHA, employee shuttles are generally used to link an employment site with a major transit hub.

Within Oakville, vanpooling (or employee shuttles) would be most effective if they linked the transit hubs (GO station or other transit terminals) with large employment sites not currently well-served by local transit. A privately-run service that is open to the general public would be classified as “public transit” with all the regulatory issues associated with that; employee shuttles do not face those issues.

Van-pool services are most effective for employment sites with large numbers of workers where conventional transit is not an effective option. Within Oakville, they could be used to provide direct shuttle services to/from transit hubs (such as GO stations).

Ride-Hailing Services / Transportation Network Companies

With ride-hailing services, travellers rent a vehicle and driver for their trip. Ride-hailing services include traditional taxi companies, plus transportation network companies (TNCs) such as Uber and Lyft. Since February 2017, the Town of Oakville has required TNC companies to obtain a business licence and operate within rules set-out by a Town bylaw (number 2016-083). Oakville requires TNC vehicles to 7 years or less in age (the same as Toronto and Mississauga)²

Ride-hailing has a high cost per trip compared with other modes, because of the need to pay a driver. Transit benefits from a much higher number of passengers per driver; other modes of travel do not require the traveller to pay for a person's time. However, TNC's app-based approach to booking makes the service easy to use and hence more attractive than a traditional taxi that require a phone call to book. This ease increases use and reduces demand on other modes. TNC use is highest in cities with strong transit networks that already have low car ownership. Some taxi firms are following the lead of TNCs by providing their own apps, as well providing information via text message to waiting passengers. These measures improve the customer experience. However, TNCs benefit from more extensive marketing of their services (including media publicity) and the ability to use their app in multiple municipalities.

It has become standard practice for ride-hailing service providers to employ "surge pricing". This practice sees prices raised during times of peak demand (such around major sporting events or on New Year's Eve). The idea is that higher prices will encourage more drivers to make their services available. The disadvantage is that users pay more at precisely the times their need is highest. It also means that users cannot know the cost of their trip for certain in advance – a particular issue for trips home.

Many cities with established TNC services have seen a decline in transit use, leading to an increase in vehicle traffic. However, the number of TNC trips exceeds the reduction in transit trips. The amount of the decline depends on the quality of the transit service and the quality/price of local taxi services. (Good local transit and/or taxi services mean there is less incentive to switch to TNCs.) The cost of TNCs means that they are not generally option for commuting, meaning that non-commuting trips are the most likely to switch from transit. This also implies that the extra traffic generated by TNC use will be during the times these trips occur, which are typically outside peak travel times.

The fact that the number of TNC trips is typically greater than the reduction in transit trips implies that TNCs are also attracting trips from non-transit modes, including auto travel. This implies that the presence of TNCs helps household have fewer or no cars: people can use transit or active transport for most trips, and use TNCs for those trips where an individual car is deemed necessary. Like car share, this means less residential parking is required. It also means less non-residential parking is required, as the TNC vehicle is not parked at the destination (unlike car share). These two outcomes would both help the Town meets its density targets.

² *Vehicle requirements: Greater Toronto Area.* Uber, retrieved Nov 2019.
<https://www.uber.com/en-CA/drive/toronto/vehicle-requirements/>

As with car share, for this effect to occur in Oakville, the town needs a sufficiently good transit and active transportation network that those modes can be used for most trips. Evidence from stakeholders and previous studies indicates that Oakville is not yet at that point.

Ride-hailing services can be used as public transit in areas with very low density, such as rural areas. The City of Hamilton’s “TransCab” service provides subsidized taxis rides between rural areas and the ends of its fixed-route transit system. This provides a cost-effective compromise between fixed-route service and using subsidized taxis for the whole trip

The Town of Innisfil provides subsidized Uber rides for trips within the municipality. However, its use for commuting travel resulted in high costs to the town. Consequently, the recently capped the number of subsidized trips per use each month, so the service is primarily used for non-commuting purposes.

In urbanized areas (even low-density suburbs), demand levels are high enough that some form of shared-ride service is more appropriate. Oakville Transit’s “home-to-hub” service is a successful example of this. This provides on-demand transport from people’s homes in low-density to a transit hub, where passengers can connect to fixed-route services. Its service area includes north Oakville, where residential development is not yet fully built out. Once this area is developed, fixed-route service may be more appropriate, taking advantage of the home-to-hub ridership as a base.

The existence of ride-hailing services supports lower household car ownership where sufficiently good transit and active transportation networks exists. Ride-hailing services attract trips from all motorized modes, including auto and transit.

Micromobility

The term “micromobility” refers to the use of small, lightweight vehicles that are hired by a traveller for individual trips. The vehicles include pedal bikes, e-bikes, electric scooters, and electric skateboards. They are most useful for short trips.

Rental programs are typically either “dock-based” or “dockless”. In a dock-based system (such as Toronto’s bikeshare program), vehicles are stored in fixed locations. Users must pick-up and return the vehicles to those locations. In a dockless system (such as Calgary’s program), vehicles can be stored anywhere there is appropriate parking and a way to secure the bike. Dockless systems generally require a smartphone app for users to locate vehicles to use; dock-based systems allow the user to rent vehicles via an app or by paying at the docking facility. The flexibility and lower start-up costs of dockless systems is offset by the requirement for a smartphone.

Examples of micromobility within Canada can be found in:

- Calgary (dockless e-bikes and e-scooters);
- Edmonton (dockless bicycles, e-bicycles and e-scooters – *upcoming*);
- Hamilton (hybrid dockless/dock-based bikeshare);
- Toronto (dock-based bikeshare);
- Montreal (dock-based bikeshare, dockless e-scooters);

- Winnipeg (dock-based bikeshare); and
- Vancouver (dock-based bikeshare).

Micromobility services provide a way for people to make short trips faster than walking without the need to own (and park) a bicycle. Areas that generate much more trips than they attract at certain times of day may require vehicles to be redistributed back into that area (and vice versa). Dockless systems may result in vehicles being left where they cause issues to pedestrians, particularly those using mobility aids or who have visual impairments.

Micromobility programs are most successful in areas that have a mix of uses (which shortens trip distances), high densities (which increases travel demand), and good cycling networks (which makes it easier to use micromobility vehicles). A low mode share for auto travel before the program is created also facilitates micromobility use, as people are more likely to be open to new travel modes. Micromobility can complement transit (particularly higher-order transit) by providing an option for first-mile/last-mile trips.

Oakville's current urban form and densities are significantly different from those in places where micromobility programs have been successful. However, the Town's land use policies are resulting in mixed-use intensification in key areas. These areas would be natural targets for any micromobility programs in Oakville, particularly as they grow further.

Micromobility has been most successful in dense urban areas, and Oakville's land use policies are encouraging the growth of such areas.
Dockless micromobility systems have become more common but are no means universal.

2.1.2 Potential Actions for Oakville

Potential actions for Oakville are as follows:

- Oakville can actively decide which MaaS-enabled effects it wishes to encourage and grow, and implement policies to enable and support them. It can do this both as an individual municipality and as part of wider regional efforts.
- Oakville is both an infrastructure owner and a transportation service operator. It can provide access to the right data and interfaces to take advantage of the benefits of MaaS. It would need to work with other owners and operators, as the Town's infrastructure and services interact with those of others.
- Oakville can capitalize on the positive effects of TNCs and car-share services (such as lower car ownership, lower parking demand, and greater development densities), providing that a sufficiently good transit and active transportation network is in place.
- Oakville can maximise the success of any potential micromobility program by focusing those services in any existing or future dense/mixed-use areas, and expanding in line with demand and new development.

2.2 Smart Vehicles and Cities

2.2.1 Background and Emerging Directions

Definitions

The term “smart vehicles” is used for vehicles where the traditional approach of a driver controlling a vehicle based on the world they see around them is supplemented or replaced by a computer.

An *autonomous* vehicle “uses a combination of sensors, controllers and onboard computers, along with sophisticated software, [that] allows the vehicle to control at least some driving functions, instead of a human driver”³. MTO has adopted the SAE International definitions for describing the levels of vehicle automation. This covers the following:

- **Level 0:** No automation, human driven.
- **Level 1:** Driver assistance. Automation of single task, such as cruise control.
- **Level 2:** Ability to help the human drive, with oversight and human supervision. Can maintain speed, slow down to avoid other cars, and stay in lane. However, any irregularities or trouble requires the human to take over. (Tesla’s “Autopilot” is considered Level 2 automation.)
- **Level 3:** Vehicles make decisions. For example, the car may decide to pass another vehicle rather than braking too quickly. Still requires human oversight for changes in weather or road conditions. There are currently no Level 3 automated vehicles on the road.
- **Level 4:** Vehicle handles any situation by itself, albeit in a controlled environment (such as a campus or downtown) with enhanced conditions and mapping. No human oversight required.
- **Level 5:** Vehicle handles all driving tasks in all conditions. It does not have a steering wheel or pedals for human operation.

A *connected* vehicle “may be able to communicate with its occupants, other vehicles and road users, the surrounding transportation infrastructure, [and] internet-based applications and other entities”³. For example, a vehicle could transmit information about its intended route, the infrastructure could reply with information about congestion, and the vehicle could then re-route accordingly.

Autonomous vehicles don’t have to be connected vehicles. However, secure transmission of critical information about the road environment (such as speed limits, one-way requirements, or turn restrictions) is necessary to prevent malicious spoofing. A study by authors at the Ben-Gurion University of the Negev⁴ showed how projecting an image of a speed limit sign could fool an existing vehicle that advises the driver of the current speed. Something that looks exactly like a real traffic sign but conveys information that is obviously incorrect only to a human could cause an autonomous vehicle to behave incorrectly or dangerously. Secure information transmission alleviates this risk.

³ *Automated and connected vehicles*. Transport Canada, retrieved Nov 2019

<https://www.tc.gc.ca/en/services/road/innovative-technologies/automated-connected-vehicles.html>

⁴ *MobilBye: Attacking ADAS with Camera Spoofing*. D. Nassi et al, 2019. <https://arxiv.org/abs/1906.09765>

Much of the discussion around smart vehicles is focused on vehicles that are both autonomous and connected, known as “connected autonomous vehicles” (CAVs).

Anticipated Major Effects

Autonomous vehicles have a number of potential benefits:

- Improved safety (by reducing the effects of human error);
- Improved traffic flow (by allowing vehicles to travel closer together);
- Reduced negative environmental effects (from more efficient driving);
- Reduced parking at some locations (from cars being able to drive themselves to a parking area separate from the users’ origin/destination);
- Enhanced mobility for existing non-drivers (from not requiring a driver’s licence to use car); and
- Increased productivity (from use of in-vehicle time for economically-productive activities).

Given that autonomous vehicles could travel without any occupants, the result could be an increase in vehicle-kilometres travelled. If there is no parking at a users’ destination, then they could return to their origin point and park there. Similarly, if autonomous vehicles do not park at their users’ origins or destinations, then they will either need to circulate endlessly in traffic or park elsewhere. The latter situation would generate a need for remote parking somewhere in (or close to) the urban area. The most likely situation would be some combination – circulating when the user is outside their vehicle for brief periods, and parking elsewhere (whether at home or remotely) when the user is outside their vehicle for long periods.

Any situation where the autonomous vehicle does not park where the user exits the vehicle would increase vehicle-kilometres, and any increase in vehicle-kilometers would reduce or reverse the benefits described above. However, if the autonomous vehicle parks elsewhere, then this could serve to reduce parking demand in locations where space is at a premium. Currently, a person driving to work requires two parking spaces – one at their home and one at their workplace. An autonomous vehicle that returns home would eliminate the need for workplace parking. Similar arguments apply to other land uses. If autonomous vehicles all park in a remote lot, then that would remove the need for residential and non-residential parking alike. This would facilitate Oakville’s desires for intensification, both by freeing up land for other purposes, and reducing the cost of new buildings.

The use of autonomous vehicles also has implications for curbspace management. If autonomous vehicles are not parked when the user boards/alights, then they will perform pick-ups and drops-offs much like a taxi. If buildings are located close to the street, then this activity will take place at the curb. Where buildings are not located close to the street, then this could take place off-street or at the curb (depending on the local environment). Either situation implies that at least parking space would need to be reallocated for pick-up/drop-off. Where no on-street parking or off-street areas exist close to buildings, then pick-up/drop-off could impede the movement of vehicles (including bikes and transit). Oakville will need to identify these specific areas and ways to mitigate this issue.

The timing and magnitude of these (dis)benefits is not yet certain. They will depend on how the technology matures and comes to market. It is also heavily dependent on rules and regulations

from all levels of government regarding the use of and requirements autonomous vehicles. Further, it also depends on the ownership model (as discussed in the ‘Owned vs Shared’ section below).

Overall, the effects of autonomous vehicles are likely to be extensive, with the potential to transform how cars are used for personal travel and how land is allocated for parking. (This study is not the appropriate place to conduct a detailed examination of those effects.)

Autonomous vehicles promise substantial benefits, but these have yet to be realized. They also have significant potential disbenefits, which may need to be mitigated through proactive government policy-making.

Implementation

It is unlikely that autonomous vehicles (SAE Level 3 or higher) will be widespread use in Ontario in the short-term (under ten years), but could be a viable mass-market option in the medium-term (under 20 years).

The provision of connected infrastructure for use by CAVs would require significant investment by existing road infrastructure operators, including the Town, Region and Province. It is not yet clear whether connected infrastructure would be required on all roads, or just major roads – but both would require close collaboration between the Town and the Region. Given the cross-boundary nature of road use, the relevant standards and protocols for connected infrastructure would need to be set at a Provincial or national level.

The systems for supplying information could be provided by the Town, Region, or both – but either scenario would require close cooperation between the Town and the Region. A similar situation exists with traffic signals today. In time, the relevant hardware and software would likely become commoditized – much like traffic signal hardware or paint for road markings are today.

The majority of potentially-connected infrastructure in Oakville is the responsibility of the Town. However, any connected infrastructure would need to use standards developed at the Provincial or national level to allow vehicles to operate across multiple municipalities and jurisdictions.

Regulation

Like normal vehicles, the regulation of smart vehicles in Canada is primarily a matter for the provincial governments. In Ontario, autonomous vehicles up to SAE Level 3 can be driven on Ontario roads since the start of 2019. Testing of levels 3-5 is also permitted by authorized users.⁵ Other provinces have been similarly cautious in their approach. In the USA, 39 states have enacted some form of legislation or executive order relating to autonomous vehicles, generally covering legal definitions and regulation.⁶

⁵ *Ontario’s Automated Vehicle Pilot Program*. MTO, retrieved November 2019.
<http://www.mto.gov.on.ca/english/vehicles/automated-vehicles.shtml>

⁶ *Autonomous Vehicles*. National Conference of State Legislatures, October 2019.
<http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx>

Given their current legal status in Ontario and elsewhere in North America, fully autonomous vehicles will only become a mass-market option with changes to the existing laws and regulations. It is reasonable to expect the Province to maintain jurisdiction over all vehicle use, including smart vehicles. Access to secure information about the road environment for autonomous vehicles (i.e., making them connected vehicles) may require Provincial regulations. Infrastructure providers (such as municipalities) would need to upgrade accordingly.

The regulation of autonomous vehicles will be primarily by the federal and provincial governments.

Transit

Drivers form a significant part (50-75%) of the operating costs for transit. Consequently, using autonomous (driverless) buses would result in significant costs savings, assuming that those vehicles had no on-board staff. (Drivers perform duties other than driving the vehicle, including helping secure some types of mobility devices, fare enforcement, and monitoring passenger behaviour; a driverless system would require some other way for these functions to be performed.) If these savings are re-invested into better service, the result would be a more attractive transit system at the same municipal funding level. Higher transit use would also increase farebox revenue, further helping the financial benefits.

Oakville Transit's cost-recovery ratio for conventional transit services is 32%⁷. Assuming a conservative 50% of its costs are related to drivers, then switching to driverless buses (with the same level of service and farebox revenue) would increase its cost-recovery ratio to 64%. Alternatively, driverless buses could allow Oakville Transit to double service levels while keeping the same total operating cost. This increase in service levels would result in significant ridership increases and higher farebox revenue, resulting in a virtuous cycle of improvements to service and increases in ridership.

In practice, a driverless system would still require new roles such as roving fare inspectors, operations monitors, and staff to attend to on-board issues. The number of such staff would require careful study to quantify precisely, but could be 10-20% of the existing number of drivers. The cost of these staff would reduce the financial savings and extra potential service that could be deployed. However, those benefits would still be substantial.

Switching to driverless buses would obviously result in the loss of driver jobs. Oakville Transit currently employs 171 drivers. (For comparison, the Town employs about 1,000 people). A switch to driverless buses could take place by allowing existing buses to become life-expired, taking about ten years. Local transit agencies typically have turnover rates of 10-15% (including retirements), implying 65-80% of drivers would be likely to leave their jobs in that time period. If savings are invested into service increases, then the number of non-driver jobs would increase, in

⁷ *Canadian Conventional Transit Statistics*. CUTA, 2017. (This figure excludes Oakville's Care-A-Van paratransit service.)

addition to the new jobs described above. This combination of attrition, retirements and new roles means it is unlikely that significant compulsory jobs losses would be required.

Driverless transit vehicles could also be used in demand-responsive applications. However, it is unlikely that flexible on-demand autonomous vehicles would replace fixed route transit service with good performance. This is because higher capacity vehicles have a lower operating cost per passenger, even without a driver.

For paratransit services (such as Oakville's Care-A-Van), the driver also has assists passengers with boarding and alighting. A driverless paratransit vehicle would still require a person to carry out these duties, and hence the financial savings would be limited.

Driverless transit vehicles offer the potential for significantly better service levels for the same municipal subsidy.

Goods Movement

Autonomous goods vehicles would have longer operating hours (subject to regulatory changes) and reduced staffing compared to conventional goods vehicles. Connected vehicle technology could also allow trucks to communicate with each other to form platoons (multiple closely-spaced vehicles). The aerodynamic effects of this would reduce fuels costs⁸.

As a result, autonomous and connected vehicles would lower the operating costs of goods movement companies. The lower operating costs could result in an additional demand, particularly at the local/home delivery level.

Autonomous goods vehicles could also deliver safety benefits. Compared with cars, there are fewer goods movement vehicles and their drivers are better-trained, which reduces the potential gains from safety improvements. However, the vehicles are typically much larger, increasing the severity of incidents and hence the potential gains from safety improvements. Consequently, further research is needed into the magnitude of these benefits compared with autonomous cars.

As goods movement in Ontario is almost exclusively the domain of private companies (the exception being Canada Post), any investment autonomous goods vehicles would be on the basis of those companies' assessments of the costs and benefits. Further regulatory changes will also be required.⁹

⁸ *Heavy Truck Cooperative Adaptive Cruise Control: Phase Two Final Report*. Auburn University / American Transportation Research Institute, 2017.

<https://truckingresearch.org/2017/04/12/heavy-truck-cooperative-adaptive-cruise-control-evaluation-testing-and-stakeholder-engagement-for-near-term-deployment-phase-two/>

⁹ *Identifying Autonomous Vehicle Technology Impacts on the Trucking Industry*. Short, J. & Murray, D., 2016
<http://atri-online.org/wp-content/uploads/2016/11/ATRI-Autonomous-Vehicle-Impacts-11-2016.pdf>

The primary potential benefits of smart goods vehicles will be lower operating costs for private operators and consumers, and increased safety for the public. However, increasing demand for deliveries is and will generate more goods movement traffic.

Owned vs Shared

The introduction of autonomous vehicles could create a market for users to rent them on as-needed basis from a fleet owner (shared self-driving cars or SSDCs). The effects of an individual trip made by an autonomous vehicle would be the same regardless of ownership. However, the availability of SSDCs for use on per-trip basis could result in a mode shift towards car travel (because using a car doesn't require owning one) or away from car travel (because SSDCs are present as a 'backup' for when other modes don't work).

The effects would be similar to the provision of taxis/rideshare, but the lower cost of SSDCs would magnify the effects (positive or negative). More generally, shared cars distribute their costs across a larger user-base and reduce the cost of personal mobility.

The use of SSDCs for individual trips would remove the need for parking at users' origins and destinations and create the need for fleet parking elsewhere (as discussed in a previous section). This could free up land for parking in economically important areas. (For example, 40% of the land in downtown Winnipeg is devoted to parking.¹⁰) This would support greater densities and reduce the pressure on greenbelt lands.

High use of shared vehicles would shift parking needs away from travellers' origins and destinations but could also result in more vehicle-kilometers travelled.

2.2.2 Potential Actions for Oakville

Potential actions for Oakville are as follows:

- Oakville can initiate long-term planning and monitor developments for CAVs in order to be suitably prepared, including investigating the potential benefits and issues that arise from autonomous vehicles.
- Oakville can modify its regulations for parking minimums and policies for curbspace allocation to allow for changes in parking patterns that CAVs bring, particularly if usage of shared self-driving cars (SSDCs) becomes significant.
- The regulatory environment and associated major policy issues for autonomous vehicles are controlled by the Province. Oakville can engage with the Province to further its policy aims associated with smart vehicles.

¹⁰ *Eliminate Surface Parking Lots*. Downtown Winnipeg BIZ, retrieved November 2019.
<https://downtownwinnipegbiz.com/topic/involvement/>

2.3 Alternative Vehicle Energy Sources

The gasoline-powered internal combustion engine has been the mainstay of personal vehicles for over a century, with diesel-powered engines handling the bulk of freight movement since the demise of the coal-fired steam locomotive. The past 10-20 years have seen an increase in the interest in and use of vehicles powered through alternative energy sources. This term covers any energy source for a vehicle that does not purely use traditional petroleum-derived fuels. It includes vehicles powered in whole or part by batteries, fuel cells, propane, natural gas, and biofuels.

Currently in Canada, personal electric vehicles have the greatest availability and use; certain niche vehicles that use non-traditional petroleum-derived fuels are also commercially available.

2.3.1 Background and Emerging Directions

Electric Vehicles – General

Electric vehicles (EVs) use electric motors powered by an on-board battery. They convert more of their energy to movement than a gasoline-powered vehicle (60% of energy from the grid vs. 20% of the energy in the fuel for a gasoline-powered vehicle). Their greater energy efficiency and simpler mechanics also mean EVs have much lower operating costs than gasoline-powered vehicles.

Pollutants from EVs are limited to those associated with electricity generation, as there are no pollutants emitted directly by the vehicle. In 2019, Ontario's electricity was generated by a mix of nuclear (61%), hydro (25%), gas/oil (6%) and renewables (8%)¹¹. Consequently, EV use in Ontario results in low GHG emissions, and very low emissions of non-GHG pollutants.

EV use is primarily affected by vehicle range (or perceived range), vehicle cost, time to charge, and availability of charging locations. There are trade-offs between these factors – a vehicle with a long range requires fewer places to charge, but more time. A high range allows most users to charge at home overnight; a low range requires access to charging points at other locations for quick charges.

The wider take-up of electric vehicles depends largely on higher levels of government, but Oakville can still exert some influence on their local usage. For example, the uptake of electric vehicles in Canada has been dictated by the price and quality of vehicles produced by the private sector, coupled with provincial subsidies for new vehicles.

However, municipalities could support their uptake and use through requiring new development to include charging points (or future proofing designs to allow for future installation of charging points), providing charging points at municipally-owned facilities, and encouraging others to do

¹¹ *Yearly Energy Output by Fuel Type*. Independent Electricity System Operator (IESO), Retrieved Nov 2019. <http://www.ieso.ca/power-data/supply-overview/transmission-connected-generation>

the same. Toronto's Electric Vehicle Strategy¹² contains a number of examples of best practice. It includes actions to increase charging availability by:

- providing incentives for charging infrastructure in the form of rebates or tax incentives.
- providing financing options for charging infrastructure installation on private property
- monetizing GHG reductions from charging infrastructure via carbon offset credits
- requiring 20% of parking spaces in new mid/high-rise residential and commercial buildings to have EV charging
- mandating 100% EV-ready infrastructure in new buildings
- developing a workplace EV charging program for City-owned facilities.

In addition, the Strategy also recommends further study of policies to increase EVs in shared mobility (such as taxis and TNCs), through a mix of incentives and regulatory requirements.

Electric Vehicles – Cars

Table 2.1: lists EVs that are commercially-available in Canada as of mid-2019. The table shows that most of these EVs have ranges of 200-400km, with the lower amount being ample for most people's daily travel needs. TTS data implies that over 99% of Oakville residents travel less than 200km per day.

Prices of EVs are now comparable to similar mid-range or high-range vehicles. Only at the lowest price points (under \$30,000) are no EVs available. Ontario recently removed the \$14,000 EV rebate and a \$1,000 rebate for residential charging equipment. Sales of EVs in Ontario declined 58% from mid 2018 to mid-2019, compared with 23% growth nationally¹⁴.

¹² Approved in January 2020; available at <https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/reports-plans-policies-research/electric-vehicles/>

Table 2.1: Commercially-Available EVs in Canada as of Mid-2019

Car	Base price	Battery (kWh)	Range (km)	Efficiency (km/kWh)
Audi e-tron	\$90,000	95	328	3.5
BMW i3	\$51,000	42.2	172	4.1
Chevrolet Bolt	\$44,800	60	383	6.4
Ford Focus Electric	\$35,000	33.5	185	5.5
Hyundai Kona EV	\$45,000	64	415	6.5
Hyundai IONIQ	\$37,800	28	200	7.1
Jaguar i-Pace	\$89,800	90	377	4.2
Kia Soul EV	\$42,600	30	182	6.1
Kia Niro EV	\$45,000	64	383	6.0
Nissan LEAF	\$40,700	40	241	6.0
Nissan LEAF Plus	\$44,000	62	363	5.9
smart Fortwo EV	\$29,100	16.7	101	6.0
Tesla Model 3	\$45,000	54	402	7.4
Tesla Model S	\$107,000	100	507	5.1
Tesla Model X	\$113,600	75	383	5.1
Volkswagen e-golf	\$36,700	35.8	201	5.6

Sources: <https://motorillustrated.com/list-of-electric-vehicles-available-in-canada-in-2019/26677/> and <https://www.caa.ca/electric-vehicles/hybrid-electric-vehicles-available-in-canada/>

NB: Tabulated values are for current base model. Range is US EPA standard.

With normal use, EVs can be fully-recharged from a standard domestic electrical outlet overnight. Charging equipment designed for domestic use can fully charge most vehicles overnight, or top-up after a day's normal use in a few hours. Non-domestic high-power chargers can provide an EV with a near-complete charge in under an hour. These high-power chargers are typically provided at commercial locations near major road corridors. According to MTO, there are over 1,400 such charging points available in Ontario (as of July 2018).¹³

As of mid-2019, electric vehicles account for 3.3% of all personal vehicle sales in Canada¹⁴, up from 2.2% for 2018¹⁵. There are around 120,000 electric vehicles on the road in Canada, a 34% increase

¹³ *Charging electric vehicles*. MTO, retrieved Nov 2019.

<http://www.mto.gov.on.ca/english/vehicles/electric/charging-electric-vehicle.shtml>

¹⁴ *Electric Vehicle Sales in Canada – Q2 2019*. Electric Mobility Canada, August 2019.

https://emc-mec.ca/wp-content/uploads/Sales-Report-2019-Q2_revised.pdf

¹⁵ *Electric Vehicle Sales in Canada – 2018*. Electric Mobility Canada, February 2019.

<https://emc-mec.ca/wp-content/uploads/EMC-Sales-Report-Rapport-de-ventes-M%C3%89C-2018.pdf>

from mid-2018¹⁴. As of 2018, there are approximately 23.1m cars registered in Canada¹⁶, implying about 0.5% of registered cars are EVs. The number of new EVs being sold has been rising steadily. However, there is an inevitable lag before those vehicles are available in the second-hand market, where many people buy their vehicles.

The main impediments to greater EV use are the lack of second-hand EVs or low-priced new vehicles, as well as the need to install charging equipment at home.

Electric Vehicles – Bikes and Scooters

Electric bikes use a battery-powered motor to supplement the user's pedal power, enabling them to travel faster and with less physical exertion – particularly up hills. Because they are primarily human-powered, they are classed as bicycles, and are subject to the same restrictions by default. E-bikes are currently prohibited on all multi-use trails and park trails in Oakville. Across the GTHA, there is a mix of municipalities with similar policies (such as Brampton, Burlington and Hamilton) and those that allow e-bikes wherever conventional bicycles are allowed (such as Milton, Mississauga and Toronto). The mix of policies is likely to create confusion for potential e-bike users, particularly those wishing to travel across municipal boundaries.

Their use on multi-use trails may cause issues where they travel significantly faster than a conventional bicycle. If the speed of e-bikes is no higher than conventional bikes, then the risk they pose to other road and trail users is unlikely to be meaningfully higher than conventional bikes. Allowing e-bikes wherever conventional bikes are allowed would help encourage a shift to cycling from other modes.

Bike-share programs in North America that make electric bike available have typically seen them used for longer trips than conventional bicycles, making them a particularly attractive option in lower-density areas such as much of Oakville.

Electric bikes (whether provided by users or a bike share program) make cycling a more attractive option, but Oakville's current restrictions may limit the potential effects.

Electric scooters use a battery-powered motor only, with no human power involved. They are deemed to be a motor vehicle under Ontario's Highway Traffic Act, and are not currently allowed to be operated on roads in Ontario as they do not meet federal vehicle and provincial requirements for on-road use. MTO started a five-year pilot program in January 2020 to evaluate their potential use. The regulations for the pilot program¹⁸ allow vehicles with maximum speed under 32km/hr to be used by people aged 16. Municipalities must pass a bylaw to allow e-scooters on their roads, bikeways or multi-use trails.

¹⁶ Table 23-10-0067-01: Vehicle registrations, by type of vehicle. Statistics Canada. Retrieved Nov 2019. <https://doi.org/10.25318/2310006701-eng>

¹⁸ Kick Style Electric Scooter (e-scooters). MTO, August 2019. <https://www.ontariocanada.com/registry/view.do?postingId=30207&language=en>

The design of e-scooters typically resembles a moped rather than a bicycle. Because they are self-powered, they can carry more weight in the form of batteries, and hence have longer range. However, this greater weight in turn increases the potential negative effects if the e-scooter collides with a person or another vehicle. Consequently, the risks posed by e-scooters using cycling facilities are greater than those posed by e-bikes. The Province's policy framework supports this distinction, and the Town can do likewise. More generally, cyclists and the general public are likely to regard e-scooters as not being bicycles, and hence 'should' not be allowed bike-only facilities.

E-scooters will only be able operate in Oakville with explicit approval by Council. The Town should carefully consider the potential effects on public safety and accessibility by users and non-users alike before deciding whether to permit them.

Electric vehicles – Buses

Electric buses are becoming a viable option for replacing conventional diesel-power buses. Multiple transit agencies in Canada have taken delivery of electric buses for revenue service. These include the TTC (which has 60 electric buses delivered or awaiting delivery) and Edmonton Transit System (which will have 40 electric buses by the end of 2020 and 50 by end of 2021). Brampton Transit is currently partnering with CUTA to trial eight electric buses from two manufacturers and four different charging systems.

Electric buses can either charge while out of service at the garage (which is the model Edmonton and the TTC are using), or via pantographs¹⁹ at the end-points of routes during regular service (which is the model Brampton is trialing). The latter is known as "en-route charging".

En-route charging allows for small batteries for a given route length and use of heating/air conditioning. The power requirements at each charging point are lower, simplifying electrical hook-up. However, it limits flexibility in service planning, as new routes may trigger the need for new (or relocated) charging equipment.

At-garage charging simplifies the charging arrangements and maximizes service planning flexibility. However, it limits the amount of time each bus can spend in service. (The exact duration will depend on battery capacity and use of heating/air conditioning.) At a typical garage, the peak power requirements could exceed 10 megawatts²⁰.

Electric buses have higher purchase costs but lower operating costs than diesel buses. The lower operating costs arise from cheaper energy and simplified maintenance. Based on a 2015 trial, the City of Edmonton found that the lifecycle costs of electric buses using at-garage charging was just 0.5% higher than diesel-fueled buses; the lifecycle costs of electric buses using en-route charging

¹⁹ A pantograph is an apparatus mounted on the roof of a vehicle to convey electricity from an overhead structure to the vehicle.

²⁰ Edmonton Transit System is using Proterra Catalyst 40 ft buses with a battery capacity of 660kWh, and state each takes up to four hours to charge, for a power requirement of 115kW per bus. This means a garage with 87 buses would require 10MW if all were charging at the same time.

was 29% higher than diesel-fueled buses.²¹ At-garage charging and en-route charging can potentially both use pantographs. This would allow longer routes to use en-route charging if needed.

The capital cost premium of electric buses is expected to fall further as battery technology and manufacturing processes continue to improve. Higher world oil prices (and hence higher diesel prices) would also make electric buses more financially favourable.

Oakville Transit is currently participating in a pilot project for electric buses. Information from this and other municipalities will help inform choices on which technology to use and when to switch from diesel buses. Successful implementation would have little direct effect on passenger experience, and hence is unlikely to trigger any changes in travel patterns.

The lower operating costs and environmental benefits of electric buses suggest they are likely to replace diesel-powered for new vehicle purchases for most transit agencies within the next decade. A key consideration will be the requirements and options for associated charging infrastructure.

Hybrids

Hybrid vehicles use both an on-board battery and internal combustion engine for power. The battery is charged when the engine is idling or during braking, and is also used to power an electric motor that supplements the engine's power. This significantly improves fuel efficiency.

Plug-in hybrids (PHEVs) allow the battery to be charge by the user (rather than just the engine). In some cases, the vehicle can drive using battery power alone, with the engine used as backup. The engine may be described as a 'range extender' in such cases.

Hybrids typically have higher costs than comparable internal combustion and electric vehicles, but combine many of the advantages of each.

The price premium of hybrids is likely to limit their uptake.

Hydrogen

Hydrogen-powered vehicles combine it with oxygen in a fuel cell to produce electrical power, with water/steam as the only waste produce. Fuel cells are a proven technology, but their use in vehicles is not yet common.

Using hydrogen in fuel cells saves weight compared to the batteries used in EVs. However, the hydrogen must be highly compressed to fit within the available space on a car or truck. Hydrogen is also more flammable than gasoline, requiring the storage tank to have suitable protection

²¹ *Electric Bus Feasibility Study*, page 1:10. Marcon/City of Edmonton, June 2016.
https://www.edmonton.ca/projects_plans/transit/electric-buses.aspx

against vehicle collisions. Both these factors create significant engineering challenges, and add to the vehicle weight.

The primary benefit of hydrogen-powered vehicles would be the quick re-fueling time – comparable to filling a fuel tank with gasoline or diesel, and much quicker than charging a battery. As a result, they would be particularly appealing for trucks and freight, where vehicle downtime must be minimized. This requires refueling points to be available at a scale similar to today's gas stations.

Currently, almost all (96%) of the world's hydrogen production comes from fossil fuels (such as methane). This results in CO₂ emissions²² (reducing a key advantage of hydrogen), and the resulting hydrogen has to be made purer for use in fuel cells. Direct electrolysis of water creates sufficiently-pure hydrogen, but costs about four times as much to produce (\$10.30/kg vs. \$2.27/kg).²³ Taking into consideration the efficiency of the overall system in converting hydrogen from direct electrolysis into vehicle movement, this implies an energy cost of \$1.44/MJ. For comparison, an internal-combustion vehicle fueled by gasoline costing \$1.20/litre has an overall energy cost of \$0.85/MJ.²⁴

Ongoing research into using a thermochemical copper–chlorine (Cu–Cl) cycle to produce hydrogen suggest a production cost similar to that of methane-sourced hydrogen,²⁵ which has an overall energy cost of \$0.31/MJ. This is substantially cheaper than gasoline-fueled internal-combustion engines.

Hydrogen produced from electrolysis essentially functions like a battery: electricity is used to create hydrogen, which is then stored in the vehicle and used to create electricity. As such, it is an energy *storage medium*, not an energy *source*. The resulting GHG emissions depend primarily on how the original electricity is generated, which would be low in Ontario.

Greater use of hydrogen-powered vehicles would require extensive provision of refuelling stations, covering (at least) a significant part of the province. Their use would reduce the atmospheric and noise pollution associated with trucks, but the wear-and-tear on local roads from road freight would not be significantly affected.

The main impediment to widespread use of hydrogen-powered vehicles is the lack of refueling points.

²² Taking into consideration the efficiencies of fuel cells and internal combustion engines, the GHG emissions from cars using methane-sourced hydrogen are about half that of those using gasoline.

²³ *Hydrogen production by PEM water electrolysis – A review*. Kumar & Himabindu, Dec 2019. Materials Science for Energy Technologies Volume 2, Issue 3, Pages 442-454. <https://doi.org/10.1016/j.mset.2019.03.002>

²⁴ These calculations assume use in automobile. Comparing hydrogen use in a truck with diesel use in a truck would result in a similar price ratio.

²⁵ *Recent Canadian advances in nuclear-based hydrogen production and the thermochemical Cu–Cl cycle*. Naterera et al., 2009. International Journal of Hydrogen Energy, Volume 34, Issue 7, Pages 2901-2917. <https://doi.org/10.1016/j.ijhydene.2009.01.090>

Biofuels

Most gasoline and diesel used in Canadian vehicles is sourced from crude oil. However, hydrocarbon-based fuels can also be created from (recently-harvested) plant material. The result is known as a “biofuel”. The CO₂ taken in when the plants grew will be the same CO₂ released when the fuels are burnt, reducing the overall GHG effects. These fuels can be used as direct replacements for conventional fuels, if the biofuel is chemically identical. Otherwise, the biofuel must be either mixed with conventional fuel, or changes to the engine are required.

In Ontario, gasoline must contain an average of 5% bioethanol, rising to a minimum of 10% in 2020. This can be used in today’s cars with no changes to the engine. By contrast, cars in Brazil typically run off a fuel containing 85% bioethanol, which requires different engine design to work efficiently. Introducing such a requirement in North America would require coordination across many jurisdictions.

Biofuels provide means to reduce GHG emissions from cars, but cannot eliminate it.

2.3.2 Potential Actions for Oakville

Potential actions for Oakville are as follows:

- Oakville can reduce local atmospheric pollution, noise levels and GHG emissions from auto travel through supporting greater use of EVs (and to a lesser extent, hybrids)
- Oakville can influence the use of electric vehicles, through policies such as the provision of charging points at municipally-owned destinations and requiring them in new development. Oakville can also advocate for suitable actions by the Provincial or Federal government.
- Oakville can maximize the investment in its cycling network by allowing e-bikes and e-scooters, subject to consideration of the (different) risks posed by e-bikes and e-scooters to other users of those facilities.
- Oakville Transit can use the information from electric bus pilot and other municipalities to inform choices on which technology to use and when to switch from diesel buses.

2.4 Management of Freight Transportation

2.4.1 Background and Emerging Directions

Freight movement is an inevitable part of urban life. People consume and collect physical goods of all kinds, and all those goods must move from producers to people. Further, industry turns one form of physical good into another, and even office-based employment requires physical goods. The people and employment of Oakville are no exception. As a result, transportation planning in Oakville must consider the needs of goods movement as well the needs of people movement.

The municipal road network is used for both goods movement and people movement. Consequently, congestion from personal travel will affect goods movement; efforts to decrease car use can help speed up goods movement.

Goods movement demand is primarily driven by market forces outside the control of municipalities. However, there are a number of potential measures municipalities can implement to help manage that demand. These include:

- Promoting collocation of logistics firms;
- Defining truck routes and intermodal connections;
- Reserving some on-street parking for commercial vehicles;
- Providing local businesses information about construction closures/detours;
- Restricting or coordinating deliveries to downtown cores during peak traffic time; and
- Mandating or encouraging off-peak commercial deliveries in congested areas.

The Town of Oakville conducted a Goods Movement Study that was reported to Council in 2016. Transportation planning in many municipalities covers only the movement of people; by examining the issues and potential solutions for goods movement in Oakville, the Town is an example of best practice. The Study's recommendations covered the Heavy Truck Route Network, policy, shared corridors, e-commerce, land use planning, intermodal goods movement and congestion/operations. The details in those recommendations provide a solid foundation for the Town's goods movement planning.

The Goods Movement Study also emphasized the need for the Town to collaborate with other levels of government. This need is even stronger for goods movement than it is for the movement of people. For example, assembly plants like Ford's will have parts come from/go to across North America. Similarly, the food bought in Oakville's supermarkets could come from virtually anywhere in the globe. By contrast, the proportion of people's trips from Oakville to outside Ontario each day will be negligible for planning purposes.

Goods movement can utilise roads (controlled by municipalities at various levels and the provinces), railroads (run by private companies and regulated by the Federal government), aviation (run by private companies using facilities typically owned by the public sector) and waterways (run by private companies and regulated by the Federal government). The decisions made by public and private entities can all affect goods movement in Oakville. This demonstrates the need for the Town to work effectively with a range of private and public sector entities, including those serving areas beyond Oakville's boundaries.

Effects of online shopping

The rise of online shopping has increased the number of goods vehicle trips to residential areas. However, those goods vehicles can visit multiple houses, and online shopping often takes the place of in-person shopping trips. This results in fewer vehicle trips overall. Further, the more deliveries a goods vehicle makes, the more efficient its trips will be.²⁶ This is because a delivery vehicle can make multiple deliveries during a vehicle trip, whereas a person driving to a shop can only make one 'delivery' per vehicle trip.

Drones

The commercial use of drones for delivery (without line-of-sight operation) in Canada currently requires special permission from Transport Canada in the form of a Special Flight Operations Certificate (SFOC).²⁷ Potential benefits of drone delivery could include:

- **Lower costs and better service:** drones could represent a solution to reduce misplaced deliveries and consolidate parcel drop-offs while reducing operator and vehicle costs²⁸. Drones could also provide more flexibility in delivery times.²⁹
- **Lower emissions:** drones could have lower GHG and CAC emissions (per package) than traditional delivery vehicles
- **Healthcare improvements:** Patients could benefit from efficiencies in emergency and healthcare (such as delivery of medical supplies between hospitals);

In the context of commercial applications, the most common services are currently drones providing a 10-30-minute aerial delivery service for lightweight (generally up to 2.5kg) consumables. Current examples include³⁰:

- **Canada Post** is currently exploring the deployment of drones in Canada's remote and rural regions.
- **Canadian UAVs** is conducting a long-range pipeline survey in Western Alberta to prove the feasibility and capability of using a ground-based radar system.
- **Drone Delivery Canada** is exploring using drones for the safe delivery of food and medical services in Moosonee, Ontario.

²⁶ *Why Cyber-Monday doesn't mean delivery gridlock Tuesday*. Joe Cortright, 2019.

<http://cityobservatory.org/cyber-monday-delivery-gridlock/>

²⁷ *Get permission to fly your drone outside the rules*. Transport Canada. Retrieved Feb 2020.

<https://www.tc.gc.ca/en/services/aviation/drone-safety/get-permission-fly-drone-outside-rules.html>

²⁸ A Cost Analysis of Amazon Prime Air (Drone Delivery). Sudbury Hutchinson, 2016. Journal for Economic Educators, vol. 16(1). <https://ideas.repec.org/a/mts/jrnlee/v16y2016i1p1-12.html>

²⁹ Analysis of the potential demand of automated delivery stations for e-commerce deliveries in Belo Horizonte, Brazil. De Oliveira et al, 2017. Research in Transportation Economics, Volume 65

<https://doi.org/10.1016/j.retrec.2017.09.003>

³⁰ *Drone innovation and collaboration*. Transport Canada. Retrieved Feb 2020.

<https://www.tc.gc.ca/en/services/aviation/drone-safety/drone-innovation-collaboration.html>

- **ING Robotic Aviation** is conducting a trial to perform infrastructure surveys in western Canada with support from key partners.

As the market matures, technology, regulation and use of drones will evolve and potentially transform further benefits and applications. Although commercial drones could represent many benefits for a municipality like Oakville, the use of them also represents challenges, including:

- **Safety:** avoiding potentially dangerous interference with passenger aircraft and medical helicopters, as most of the commercial drones operate at lower altitudes, typically around 400 feet;
- **Privacy:** ensuring collection of any personal data by drones is done with transparency regarding the drone owner;
- **Employment:** considering the effects (positive and negative) on employment;
- **Visual and noise pollution:** limiting the negative effects from drone operations above and around people and buildings.
- **Drop-off locations:** providing a place for drones to leave packages that is both secure and accessible

Therefore, there is an opportunity for Oakville to start shaping the reflection and ground-rules on how drone systems should be developed and integrated which would depend on what technology is available, its business case and a reflection on what would be socially acceptable by the people.

Oakville could shape its vision for drones to mitigate the downsides and maximizing the expected benefits. Stakeholder engagement will be a key resource to shape this vision as it will give the Town a better perspective on potential uses, development and tech/infrastructure challenges.

Goods movement is an inevitable and growing part of modern life, requiring a proactive approach by municipalities to maximize its benefits and mitigate its negative effects. Oakville's goods movement policies should include a strong focus of goods movement related to residential areas, including commercial uses that serve local residents.

2.4.2 Applications to Oakville

Potential applications and effects for Oakville are as follows:

- Oakville's industry and employment are concentrated near a major freeway (the QEW). Oakville focus its efforts on the roads closest to the QEW, which have the greatest need for goods movement management.
- The Town's growth plans include high-density residential development, which will need to allow for home delivery and other personal goods needs. Oakville can ensure that development include appropriate facilities for residents.
- Current Transport Canada regulations and practical considerations mean that Oakville is unlikely to see drones being used for home deliveries in the short-term.

2.5 Complete Streets

2.5.1 Background and Emerging Directions

Complete Streets are:

“Streets that are designed to be safe for everyone: people who walk, bicycle, take transit, or drive, and people of all ages and abilities. A Complete Streets policy ensures that transportation planners and engineers consistently design and operate the entire street network for all road users, not only motorists.”

Source: Complete Streets for Canada

The term Complete Streets can therefore apply to the physical infrastructure in a street, or to the policies that result in that infrastructure. Both policy and infrastructure changes can apply to the whole street network, to individual neighbourhoods, or to specific street segments. A wider approach helps satisfy competing needs by varying the focus between streets; a narrower focus helps with ease of delivery.

The 2016 update to the Province’s *Growth Plan for the Greater Golden Horseshoe* included a Complete Streets Policy. This made Ontario the first province in Canada to include Complete Streets in province-wide policy documentation. Currently, 43 municipalities in Ontario include a Complete Streets approach in their land use or transportation plans.³¹ Three health units also recommend a Complete Streets approach as a way to improve public health.³¹ Across Canada, numerous other municipalities have examples or policy documents supporting Complete Streets, including all the top twenty largest municipalities. In the USA, a National Complete Streets Coalition has been formed to aid local and state agencies develop complete street programs.

The creation of Complete Streets requires balancing the needs of different users, as well as external factors such as public health, quality of life, and social equity. Although the approach can be applied to all streets, this does not mean every street should be changed. Even when changes are made, every street will have its unique characteristics that dictate what a ‘complete’ version will look like. Some of the common ingredients that may be added include good sidewalks, frequent crossing points, appropriate bikeways, comfortable transit stops, carefully-located parking and loading areas, greenery, landscaping, and more.

Further, the trips that use any individual street segment will include multiple types of trips for a wide variety of people. For example, a street with retail needs to serve workers commuting to those shops, customers travelling there to buy items, goods vehicles delivering (or picking up) those items, and people travelling through the street segment on their way to other destinations.

Like all transportation infrastructure, streets exist to enable other (non-transportation) activities. Homes, workplaces, shops and other amenities all contribute to place-making. Streets also form a significant part of the public space in a municipality, and are places where people spend time and

³¹ *Where are Complete Streets in Canada?* Complete Streets for Canada, retrieved November 2019. <https://www.completestreetsforcanada.ca/locations/>

interact with one another. The balance between a street segment's role as a 'place' and its role in 'movement' is a key part in deciding the appropriate facilities.

Changes to street cross-sections

The amount of space available within a municipal transportation right-of-way is finite, and hence the municipality must actively choose how to allocate that space between transportation modes, and between transportation and non-transportation uses. In making that choice, the municipality prioritises certain uses/modes over others. For example, if space is available for a bus-only lane, then the municipality's choice between a bus-only lane and general traffic lane indicates the relative priority of car and bus users.

General traffic lanes typically occupy the majority of space allocated to transportation. Consequently, ensuring the right number of lanes has the biggest effect on how much space can be allocated to other modes (including walking, cycling and transit).

The "level of service" (LOS) translates traffic volumes to a letter grade from A to F. The lowest traffic flows have a grade of A; the highest have a grade of F. The association in many people's minds of between LOS and school grades means they associate lower traffic levels as having a "good" grade. This creates the perverse effect that a more efficient allocation of lanes (where demand is close to capacity) gets a "worse" grade than an inefficient one.

Use of volume-capacity ratios rather than LOS grades allows discussion to be framed around what allocation is both sufficient (the volume-capacity ratio is under 100%) and efficient (but not too far below 100%). Oakville's Transportation Master Plan frames road capacity discussion in terms of volume-capacity ratios, demonstrating an example of best practice. By avoiding an excessive number of traffic lanes, the street cross-section can include more/better non-auto transport facilities.

There is a risk that planning for existing and expected traffic volumes means that people's travel habits (and choice mode) remain the same. Changing the street cross-section can induce a mode shift and change what is needed. For example, changing a general traffic lane to a bus-only lane would result in people switching from car to bus, and can also make more efficient use of road space (in terms of the number of people moved). Potentially, the reduced number of traffic lanes could be right for the reduced traffic levels, even if it wasn't right for the former traffic volumes.

More generally, the extent to which traffic levels are used to justify spending money on changes to the road network (or not changing it) indicates the relative priority given to car users compared to other modes.

A practice Oakville has avoided is the provision of four-lane streets without turn lanes. In those situations, left-turning vehicles end up blocking a lane of traffic, resulting the same effective traffic capacity as 2-lane road with either a centre left-turn lane or left-turn lanes at intersections. The latter configuration also avoids vehicles frequently changing lanes (improving safety for all users) and frees up space for other uses (such as bike lanes or landscaping). Oakville has numerous examples of such streets, demonstrating an example of best practice.

This process is more the number of lanes or the presence of a particular facility; also about their design. Wider traffic lanes result in higher speeds, and whether this is seen as a positive or

negative depends on the municipality's priorities. Slower traffic speeds improve safety for all road users by reducing the likelihood and severity of collisions. (This approach is also compatible with Vision Zero, discussed in the next section.) On minor residential roads, narrower lanes act as form of traffic calming. Changes to lane width can be done through re-striping (rather than removing road surface). This can result in all relevant roads in a municipality being changed in a short period.

Existing Oakville policies

The 2013 Transportation Master Plan, *Switching Gears*, included a recommendation that the Town "adopt a road design and Complete Streets policy" as one of its roadway network strategies (section H.5). It also included specific recommendations for changes to the Town's roadway design standards (Appendix 5B) in support of that policy. The 2018 TMP Review did not discuss this recommendation, but it is assumed to still apply

The 2009 Active Transportation Master Plan (ATMP) included a recommendation that the Town "develops and adopts a Complete Streets strategy to inform and guide urban design, streetscape design and road design in Oakville". The 2017 ATMP Update does not mention Complete Streets.

Despite the recommendations in the TMP and 2009 ATMP, the Town has not yet adopted a Complete Streets strategy.

The Town's Official Plan mentions the need to "balance" the needs of various modes (paragraph 8.1.2d), and to "maximize mobility and access for persons with disabilities" (paragraph 8.1.2e). These needs both align with the aims of Complete Streets.

The project objectives for this study mention the Town's "direction to implement a mobility hierarchy which ensures pedestrians, cyclists and transit users take precedent over private vehicles". This is consistent with the aims of Complete Streets.

Creating a safe pedestrian/cycling network

A necessary part of Complete Streets is appropriate provision of safe facilities for pedestrians and cyclists. Those facilities also enable and support the use of active transportation for short trips – without those facilities, use of active transportation becomes difficult or impossible. Consequently, efforts to increase walking and cycling must start with infrastructure.

The Town of Oakville has an Active Transportation Master Plan that was created in 2009 and updated in 2017. The 2017 update states that Oakville currently has 1,031km of sidewalks plus another 457km of other active transportation facilities. These include a mix of regional routes, local routes, connections to transit, crossing points, and supportive amenities.

The 2017 update developed expanded network based on safety, connectivity and accessibility. It also considered the diverse needs of users and the broader principles of Complete Streets. It recommends an additional 383km of sidewalks plus another 323km of other active transportation facilities. It also contains information on design and implementation, including timing, processes and tools.

By having a detailed plan for an expanded walking and cycling network, the Town of Oakville is already demonstrating an example of best practice. The implementation of active transportation

facilities is generally the Town's control. The main exceptions are cycling facilities that use roadspace on Regional roads, and crossing points over Provincial freeways. (In the former case, Oakville's Active Transportation Plan generally aligns with Halton's 2015 Active Transportation Plan.) As a result, implementation primarily depends on suitable municipal funding and resources.

The Complete Streets approach offers a framework for balancing the needs of different users in line with wider strategic aims for the transportation system.

2.5.2 Potential Actions for Oakville

Potential actions for Oakville are as follows:

- Oakville can implement a Complete Streets strategy, in line with the recommendations in the 2013 Transportation Master Plan and 2009 Active Transportation Master Plan.
- The Town's current policy framework includes land use plans, the transportation master plan, and various mode-specific plans (including transit and active transportation). Complete Streets cover all these areas (and more). Oakville can implement the elements of a Complete Streets approach only if it coordinates and balances the aims of these various plans.
- Trips to places within Oakville include transportation facilities where the Town outside the Town's direct control (such as GO stations and freeway interchanges). Oakville can implement a Complete Streets approach through active engagement with the relevant parties.
- Oakville can frame discussions about congestion on its roads in terms of volume-capacity ratios – and hence efficiency.
- Oakville can implement the recommend infrastructure and other elements of 2017 Active Transportation Plan.

2.6 Vision Zero

2.6.1 Background and Emerging Directions

Vision Zero is “a philosophy of road safety that eventually no one will be killed or seriously injured within the road transport system”.³² The Canadian Council of Motor Transport Administrators identifies the following principles:³³

- **Ethics:** human life and health are paramount and take priority over mobility and other objectives of the road traffic system;
- **Responsibility:** providers and regulators of the road traffic system share responsibility with users;
- **Safety:** road traffic systems should take account of human fallibility and minimize both the opportunities for errors and the harm done when they occur; and
- **Mechanisms for change:** providers and regulators must do their utmost to guarantee the safety of all citizens; providers and regulators must cooperate with road users; all three must be ready to change to achieve safety.

Canadian municipalities that have adopted Vision Zero include Toronto, Montreal, Ottawa, Edmonton, Mississauga, Vancouver, Brampton, Hamilton, Surrey, London, and Peel Region. Policies pursued under Vision Zero can include:

- Changes to roadway and intersection layouts and their associated design standards;
- Education and enforcement regarding the rules of the road;
- Improvements to car design (for both occupants and people struck by the car); and
- More and better road crossing points for pedestrians (including transit users) and cyclists.

Elements of Vision Zero affect all aspects of the planning and delivery of the transportation system. This ranges from site plans for commercial developments and intersection design to network planning and transportation strategy.

Recent research indicates that the historic trend of decreasing road casualty rates (per vehicle-km) has levelled off³⁴. This means that decreasing road deaths and injuries requires lowering auto-based travel. Further, higher usage of walking and cycling are associated with lower risks for those modes. The implementation of Vision Zero elements combined with vehicle travel reduction strategies (such as transport pricing, dense mixed-use development and transportation demand management programs) helps encourage mode shift away from auto-based travel. This in turn improves transportation safety.

³² *Vision Zero - An ethical approach to safety and mobility*. Tingvall & Haworth, 1999.
<https://www.monash.edu/muarc/archive/our-publications/papers/visionzero>

³³ *Canada's Road Safety Strategy (RSS) 2025*. Canadian Council of Motor Transport Administrators, 2016.
<https://roadsafetystrategy.ca/files/RSS-2025-Report-January-2016-with%20cover.pdf>

³⁴ *A New Traffic Safety Paradigm*. Todd Litman, Victoria Transport Policy Institute, 2019.
<https://www.vtpi.org/ntsp.pdf>

Successful implementation of Vision Zero requires all transportation-related planning and delivery to incorporate its aims at every stage.

The adoption of Vision Zero (or formalization of all transport safety initiatives under a single similar program) by Oakville requires applying the underlying philosophy to all transportation-related decisions.

2.6.2 Potential Actions for Oakville

Potential actions for Oakville are as follows:

- Oakville's Transportation Master Plan (Switching Gears, 2013) makes reference to safety in the context of active transportation, goods movement, and traffic calming. The 2018 Review made no significant changes. Oakville can adopt Vision Zero or a similar aim to provide a high-level goal to support more detailed strategies and actions.
- Oakville can also apply the principles of Vision Zero without formally adopting it as policy. This would improve safety through how the Town plans and delivers transportation.
- Oakville can work to have the principles of Vision Zero applied to transportation facilities not controlled by the Town. This covers both publicly owned transportation facilities and privately-owned key destinations. Examples include Regional roads, Provincial Highway interchanges, GO Transit stations, shopping malls, schools, hospitals and office parks.
- Oakville can take advantage of major changes to a corridor (such as a major road rehabilitation project) to improve the roadway design. This applies to roadways maintained by the Town or the Region.
- The aims of Vision Zero are set out in mode-neutral terms. However, the risks associated with each mode (both for users and non-users) are different. Consequently, both the changes required and the benefits of making those changes will vary by mode. Oakville can maximize those benefits by taking the differences in needs into consideration during planning.
- The aims of Vision Zero are also set out in a way that covers all people. However, certain groups of people (such as the young, seniors, and people with disabilities) are exposed to greater risks than the general population. Transportation facilities with high concentrations of these groups have a stronger need for change, and higher benefits from making those changes. Oakville can maximize those benefits by taking the differences in needs into consideration during planning.

2.7 Open Data

2.7.1 Background and Emerging Directions

The appropriate use of data is a vital part of:

- Planning and delivering the right transportation system;
- Changing how the transportation system is used to fulfil wider goals;
- Supporting the efficient and effective operation of the transportation system; and
- Enabling and assisting users of the transportation system.

The amount and availability of relevant data has steadily increased as the use and capabilities of technology have expanded. This trend is likely to continue in the future. “Open Data” is the term used when data created by the public sector is made available to third parties. The data must be available to all, under a licensing system that allows its re-use.

The Town of Oakville provides an “Open Data Catalogue” on its website. Datasets include geospatial information, recreation programs, election results, energy consumption at Town facilities, development permits, municipal budgets, and transit schedules. These items include details behind municipal actions, and help promote transparency in the decision-making process.

Within the GTHA, many municipalities have open data platforms. Those that do include Toronto, Hamilton, Peel Region, Durham Region, York Region, Ajax, Brampton, Burlington, Markham, Milton, Mississauga, Newmarket, Pickering, and Oshawa. The Province of Ontario and the federal government also all maintain open data platforms; Halton Region does not.

The provision of Open Data helps individuals and private entities create additional value from information created in the public sector. For example, allowing third parties to have access to Oakville Transit’s schedule data has resulted in multiple travel planning apps being available. This supports transit use by making it easier to plan transit trips. Oakville Transit also collects real-time information on its bus locations (and expected arrival times by stop), but does not make the data available for third party use.

Open Data facilitates transparency in municipal governance and allows third parties to create and add value around municipal services. Open Data can also help support the planning and use of the transportation system, including greater use of sustainable modes.

2.7.2 Potential Actions for Oakville

Potential actions for Oakville are as follows:

- Oakville can continue to make more data created and collected by the Town available as Open Data, both for static and real-time information.
- Oakville can continue to draw on the open data of other public sector entities to support all aspects of the planning, delivery, use and operation of its transportation system.
- Oakville can set licensing conditions that require private transportation operators to share usage data
- Oakville can coordinate with other public sector governments and agencies to ensure consistency in data schemas, formatting and quality

2.8 Transportation Demand Management

2.8.1 Background and Emerging Directions

Definition and Example Programs

Transportation Demand Management (TDM) is the practice of deploying travel behaviour change strategies in support of a mode shift away from single-occupant vehicles. It does not typically require the provision of new transportation infrastructure or significant new services. However, it may be used to maximise the change in travel behaviour when new infrastructure and services are created. TDM programs are typically focused on commuters, as changing one person's travel choice will change a large number of trips. Examples of strategies and programs include:

- **Ride-matching:** Matching employees with other people who work and live at the same location who live close by. Those people can then carpool with minimal increase in their journey time, while still saving money and avoiding needing to drive every day.
- **Emergency ride home:** Offering employees who take a sustainable mode of travel reimbursement for their ride home by taxi or TNC (typically up to a set amount) in the event of an emergency. This provides commuters who use these modes the reassurance that they will get home as quickly as if they drove to work in an emergency situation.
- **Employer research:** Conducting assessments in partnership with employers to identify travel behaviours, attitudes and needs of its employees. This typically uses a mix of surveys and site evaluations. Employers can use the results to tailor their workplace policies.
- **Financial incentives:** These fall into two groups:
 - *Increasing the cost of non-sustainable modes.* Charging for workplace parking is the most common approach.
 - *Subsidising part or all of the cost associated with a sustainable mode,* either for an introductory period or an ongoing basis. This could include free transit passes, subsidised bike purchase, or reduced parking fees for carpoolers.
- **Gamification:** Promoting sustainable travel through workplace or a long-term commuting program that uses non-financial incentives.
- **Marketing campaigns:** Promoting sustainable travel through targeted information and advertising.

Two other strategies are discussed in more detail in the next sections – congestion pricing and parking management.

TDM programs can be highly cost-effective ways of changing people's travel behaviour. A 2015 review by Metrolinx of its SmartCommute TDM programs³⁵ found the program cost about \$4m/year, and reduced single occupancy vehicle (SOV) travel by approximately 40 million vehicle-kilometres travelled (VKT). The reduced VKT yields economic benefits from reduced emissions and health improvements (from active transportation use). When quantified, this produced a benefit:cost ratio of 6:1, extremely high for a transportation project. Despite this, Metrolinx ended its support for SmartCommute, including in Halton Region.

³⁵ *Smart Commute Workplace Program Business Case Review.* Metrolinx, 2015.

http://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/benefits_case_analyse.s.aspx#smartcommute

Congestion Pricing

Congestion pricing is the practice of charging vehicles to use the road with the aim of reducing usage. It differs from road tolling, which is the practice of charging vehicles to recover part or all the operating and capital costs (and potentially make a profit in the case of private operators.)

London (UK) introduced a congestion charge 2003. The charge is levied on all vehicles entering a specific area, except those owned by people living within the area. The revenue goes towards improved bus services, to offer a better alternative to driving. Prior to the charge, bus service costs were roughly equal to fare revenue. The increase in bus service was expected to increase costs by more than farebox revenue, with the congestion charge revenue making up the difference. However, the congestion charge was more effective at deterring driving than expected, resulting less revenue and the government having to start subsidizing bus services. London's experience demonstrated the effectiveness of a congestion in an area with viable alternative travel choices. It also demonstrated the dangers in relying on congestion charge revenue for funding sustainable modes.

Various attempts to introduce a congestion charge in New York City have been made in recent years. The City's government approved a proposal in 2008, but the New York State government did not pass the required legalisation. The State government put forward its own plans in 2017, this time with opposition from the City government. An amended version of those plans was passed into law in 2019, with the congestion charge taking effect in late 2020 or in 2021. The experience in New York (City) demonstrates that implementing a congestion charge is most easily done with strong support from all levels of government.

In general, congestion charges have introduced in the downtown cores of large metropolitan areas. Those areas typically have a range of alternative options for travel other than driving. They also primarily target people travelling *into* the area, with local residents receiving exemptions or discounts.

Parking Management

All trips made by auto start and end in a parking spot. The high use of auto in Oakville creates high demand for parking spaces at homes, workplaces and other destinations in Oakville. The provision of large amounts parking has two major effects on the urban area. Firstly, the provision of parking also supports the use of cars. People's mode choice of a car or other modes will be influenced by the ease of use and cost of parking

Secondly, it consumes land that could otherwise be used for other purposes. This limits density and economic development. The available land within Oakville's urban area is finite, and hence land consumed by parking has an opportunity cost. Further, the use of land for parking strongly affects the overall urban form and character of an area.

Parking policies and practices provide a way for municipalities like Oakville to proactively control the amount and form of parking. Parking can considered as a valuable resource requiring careful management, rather than a commodity to be made freely available.

As is typical for urban municipalities, Oakville requires new development to include a minimum amount of parking. This is based on the number and type of residential units, or the size and type of non-residential floorspace. However, in areas where on-street parking is not available (or highly limited), then developers will be motivated to provide sufficient parking regardless of the minimum required. Failure to do so would mean they are unable to sell/lease units, or that commercial tenants would be unable to sustain their business. Consequently, parking minimums may not be necessary where developers would supply sufficient parking anyway.

Parking minimums may also result in too much parking being provided. Oakville is trying to change people's travel from driving to other modes. Any success in these efforts will reduce parking demand. Further, changes in when and how often people travel will also affect parking demand. However, minimum parking requirements may prevent surplus parking provision from being transformed into other uses.

Finally, measures that restrict parking or increase its cost will make driving a less attractive options, supporting a shift to other modes. Conversely, over-cautious developers may supply excessive amounts of parking and hence encourage car travel. Parking maximums (which limit the amount of parking) are a way to ensure the right amount of parking is provided, particularly when coupled with on-street parking controls. They yield the biggest benefits in areas where high densities are allowed, as the land made available then results in the most amount of potential development.

Parking fees (particularly at workplaces) are a very simple method to discourage people from driving. They can be easily varied by day or time depending on local circumstances. Where they are varied, it may cause some people to change when they travel. Even if the mode doesn't change, this can still help displace car travel from peak periods, reducing congestion and emissions.

2.8.2 Potential Actions for Oakville

Potential actions for Oakville are as follows:

- Oakville can invest in TDM programs as a cost-effective way to change commuter's travel modes.
- Oakville can encourage a region-wide approach to congestion pricing that advances mutual goals, ideally in conjunction with other measures to maximise public support.
- Oakville can consider whether parking minimums are still an appropriate way of managing the supply of parking, and whether parking maximums are appropriate in its Growth Areas.

2.9 Summary

Table 2.2 summarizes the best practices described in the previous sections as well as the current situation and potential next steps in Oakville.

Table 2.2: Summary of Best Practices, Current Situation and Potential Next Steps in Oakville

Trend	Best practices	Current Situation in Oakville	Potential Next Steps
<p>Mobility as a Service (MaaS)</p>	<ul style="list-style-type: none"> • Ideal is that travel by any method can be planned and paid for through common platforms, without requiring any form of personal vehicle ownership • Micromobility has been most successful in dense urban areas; dockless micromobility systems have become more common but are no means universal 	<ul style="list-style-type: none"> • Presto smartcard provides a common payment platform for the GTHA’s transit service providers. Third-payment mechanisms for transportation services not yet available • Car-share services limited to more traditional long-term car rental services • Town’s open data efforts provide static but not real-time transit schedule information 	<ul style="list-style-type: none"> • Work with other transportation owners/operators in planning and delivery of smart infrastructure • TNCs/car-share • Focus potential micromobility programs on and around existing or future dense/mixed-use areas
<p>Smart Vehicles and Cities</p>	<ul style="list-style-type: none"> • Fully autonomous vehicles not yet commercially available • Driverless transit vehicles offer the potential for significant cost savings/better service levels 	<ul style="list-style-type: none"> • Regulation primarily up to Provincial and Federal governments • Potentially-connected infrastructure in Oakville is the responsibility of the Town, but also Region and Province 	<ul style="list-style-type: none"> • Initiate long-term planning, monitor developments and investigate potential benefits/issues in detail • Modify parking regulations to allow for charges in parking patterns from CAV use • Engage with Province to ensure future policies and regulations align with Town’s aims
<p>Alternative Vehicle Energy Sources</p>	<ul style="list-style-type: none"> • Battery electric vehicles are the most widespread type of alternative energy vehicles • A wide variety of electric cars are commercially available, forming a small but growing part of auto sales • Electric buses are a practical but higher-cost option that is starting to see adoption by transit agencies • Electric bikes 	<ul style="list-style-type: none"> • Ontario has relatively low adoption rates; anecdotal input from staff indicates Oakville higher than an average • Oakville Transit is participating in a pilot electric bus program alongside several other GTHA municipalities • E-bikes are prohibited on Oakville’s off-road cycling facilities; e-scooters are not permitted on any public transport facility 	<ul style="list-style-type: none"> • Increase charging availability at new developments and Town-owned facilities • Allow e-bikes on all parts of cycling network • Use results of electric bus pilot and other municipalities to inform decisions on adopting electric buses

Trend	Best practices	Current Situation in Oakville	Potential Next Steps
<p>Management of Freight Transportation</p>	<ul style="list-style-type: none"> • Proactive approach to maximize benefits and mitigate negative effects of goods movement • Drones emerging technology • Currently Transport Canada regulations limit commercial use for goods movement 	<ul style="list-style-type: none"> • Goods Movement Study (2016) examined issues and potential solutions; extensive recommendations • Coordination with Region and Province required, as goods movement uses all parts of road network 	<ul style="list-style-type: none"> • Focus efforts on roads closest to the QEW, which have greatest need for goods movement management • Ensure high-density residential development incorporates facilities for home delivery • Current Transport Canada regulations and practical considerations mean that Oakville is unlikely to see drones being used for home deliveries in the short-term
<p>Complete Streets</p>	<ul style="list-style-type: none"> • Complete Streets approach offers a framework for balancing the needs of different users in line with wider strategic aims for the transportation system • Approach should be applied to all aspects of allocating space within the transportation right-of-way 	<ul style="list-style-type: none"> • Good road design practices include using two-lane roads with left-turn lanes rather than four-lane roads and using of V/C ratios rather than LOS for road capacity analysis • Recommendations in the TMP and 2009 ATMP to adopt a Complete Streets approach not yet implemented • Detailed plans for AT network in place but implemented is slow 	<ul style="list-style-type: none"> • Adopt Complete Streets approach through Council endorsement • Alternatively, ensure underlying principles are incorporated into strategic documents and decision-making processes • Implement AT network plans
<p>Vision Zero</p>	<ul style="list-style-type: none"> • Philosophy of road safety that no one will be killed or seriously injured within the road transport system • Adopted by municipalities across Ontario and Canada • Incorporated into all aspects of the planning and delivery of the transportation system • The implementation of Vision Zero elements combined with vehicle travel 	<ul style="list-style-type: none"> • No formal adoption, but also clear the safety concerns are incorporated into decision-making processes 	<ul style="list-style-type: none"> • Adopt Vision Zero through Council endorsement • Alternatively, ensure underlying principles are incorporated into strategic documents and decision-making processes • Develop vehicle reduction strategies to improve transportation safety

Trend	Best practices	Current Situation in Oakville	Potential Next Steps
	<p>reduction helps encourage mode shift away from auto-based travel. This in turn improves transportation safety.</p>		
Open Data	<ul style="list-style-type: none"> • Making data that is collected or owned by the city available to third parties at no cost and without restriction on re-use • Requiring private transportation operators to share usage data 	<ul style="list-style-type: none"> • Oakville’s Open Data Catalogue provides wide range of transportation-related and other datasets • Oakville Transit’s real-time data notable absence 	<ul style="list-style-type: none"> • Continue to make more data created and collected by the Town available as Open Data. • Continue to draw on open data provided by others in planning, delivery and operations. • Coordinate to ensure consistency in data schemas, formatting and quality
Transportation Demand Management	<ul style="list-style-type: none"> • Using behaviour change strategies to support of a mode shift away from single-occupant vehicles without the provision of new infrastructure or significant new services • Successful practices include ride-matching, emergency ride home, employer research, financial incentives, gamification and marking campaigns. • Congestion charging most successful when targeting people driving <i>into</i> a dense urban core 	<ul style="list-style-type: none"> • SmartCommute program (which included Halton Region) had benefit:cost ratio of 6:1; no longer funded by Metrolinx • Oakville’s travel patterns suggest that congestion pricing applied to other geographic areas would yield greater benefits • Policies for parking minimums in Oakville are typical for similar municipalities 	<ul style="list-style-type: none"> • Invest in TDM programs as a cost-effective way to change commuter’s travel modes • Support a region-wide approach to congestion pricing that advances mutual goals • Reduce or eliminate parking minimums; adopt parking maximums in Growth Areas

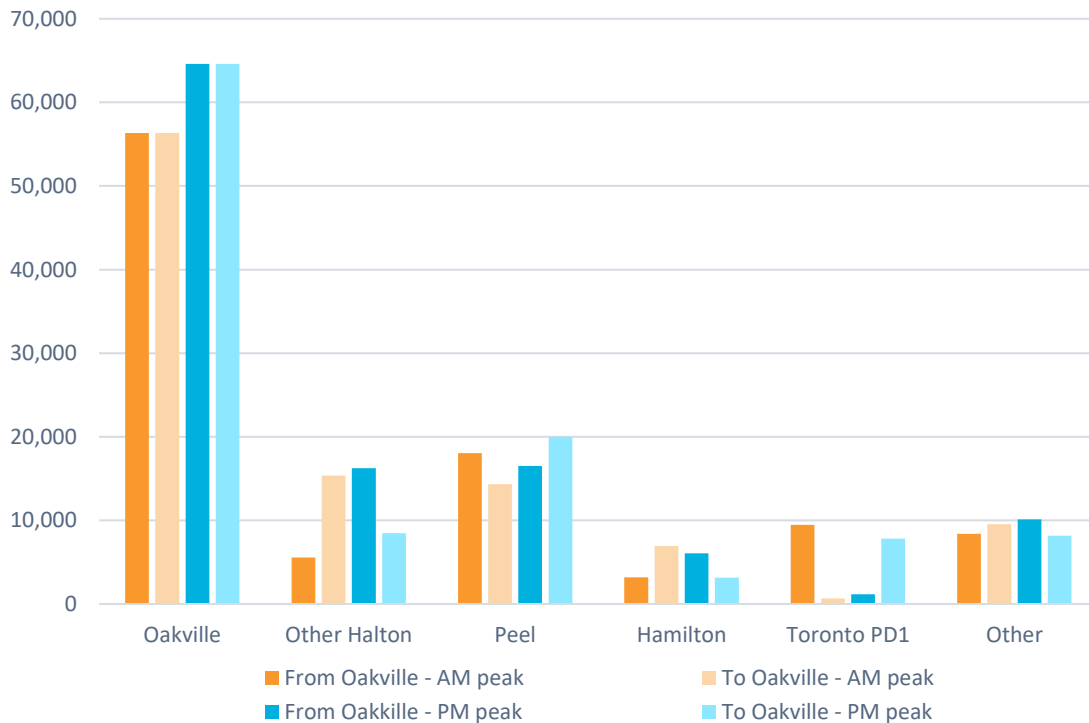
3 Trends for Current Movement Patterns

3.1 Where

Transportation, at its heart, is a way of getting people from an origin to a destination. People travel to reach their destination, not just for the sake of travelling. Consequently, understanding *where* people travel (or will travel) forms the foundation for all transportation planning.

Figure 3.1 shows the number of trips generated by Oakville during the weekday AM (06:00-09:00) and PM (16:00-19:00) peak periods by origin and destination area. In total, around 100,000 trips are generated in each period.

Figure 3.1: Trips generated by the Town of Oakville during Weekday Peak Periods



Data source: Transportation Tomorrow Survey, 2016

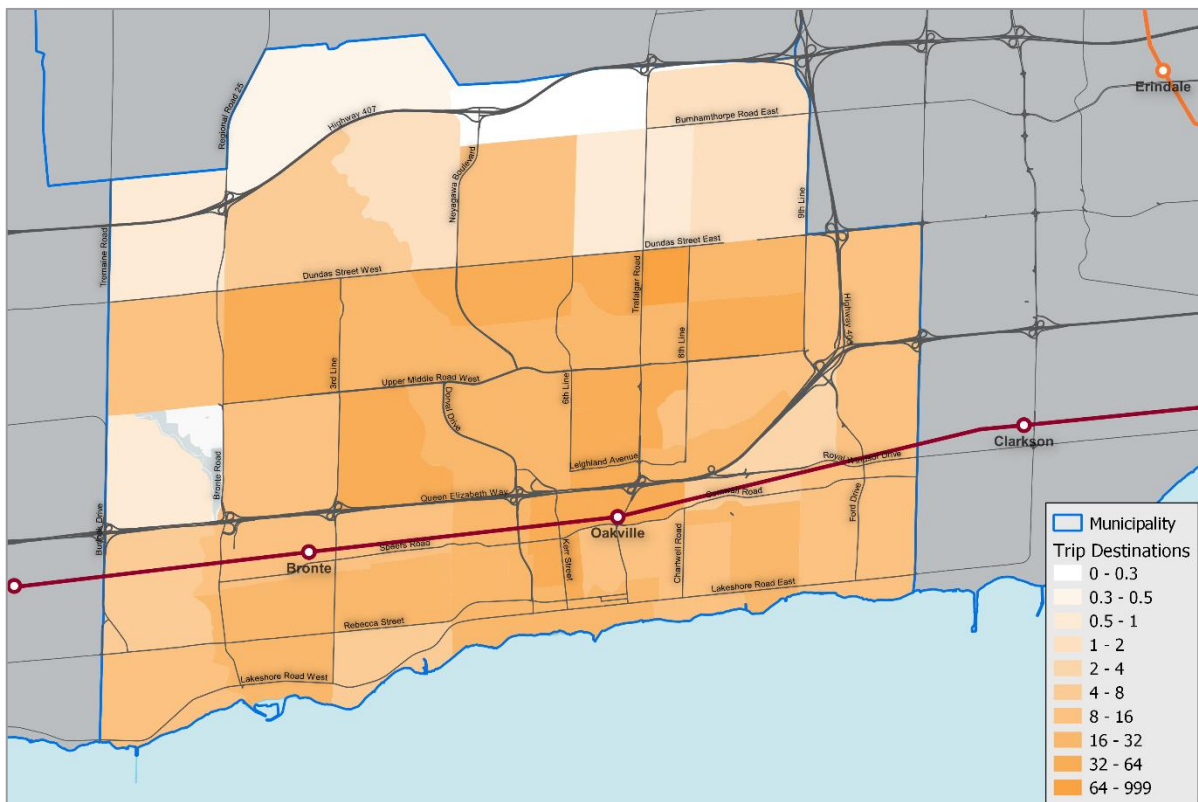
The data in chart shows that just over half (56%) of trips of trips generated by Oakville remain in the town. Around a third (31%) go to the rest of Halton or adjacent areas, while downtown Toronto (PD1) only accounts for 4.5% of trips - the same as Hamilton.

In the AM peak period, the majority of trips involving Peel and Toronto are outbound (from Oakville); the majority of trips involving the rest of Halton, Hamilton and other areas are inbound (to Oakville). The opposite is true in the PM peak period.

Internal Trips – Within Oakville

Figure 3.2 shows the density of trips to destinations within Oakville, with darker colours indicating higher trip densities. This includes trips for all purposes and by residents and non-residents alike.

Figure 3.2: Destinations of Trips generated by Oakville - In Oakville



Data source: Transportation Tomorrow Survey, 2016 (all-day trips to/from/within Oakville)

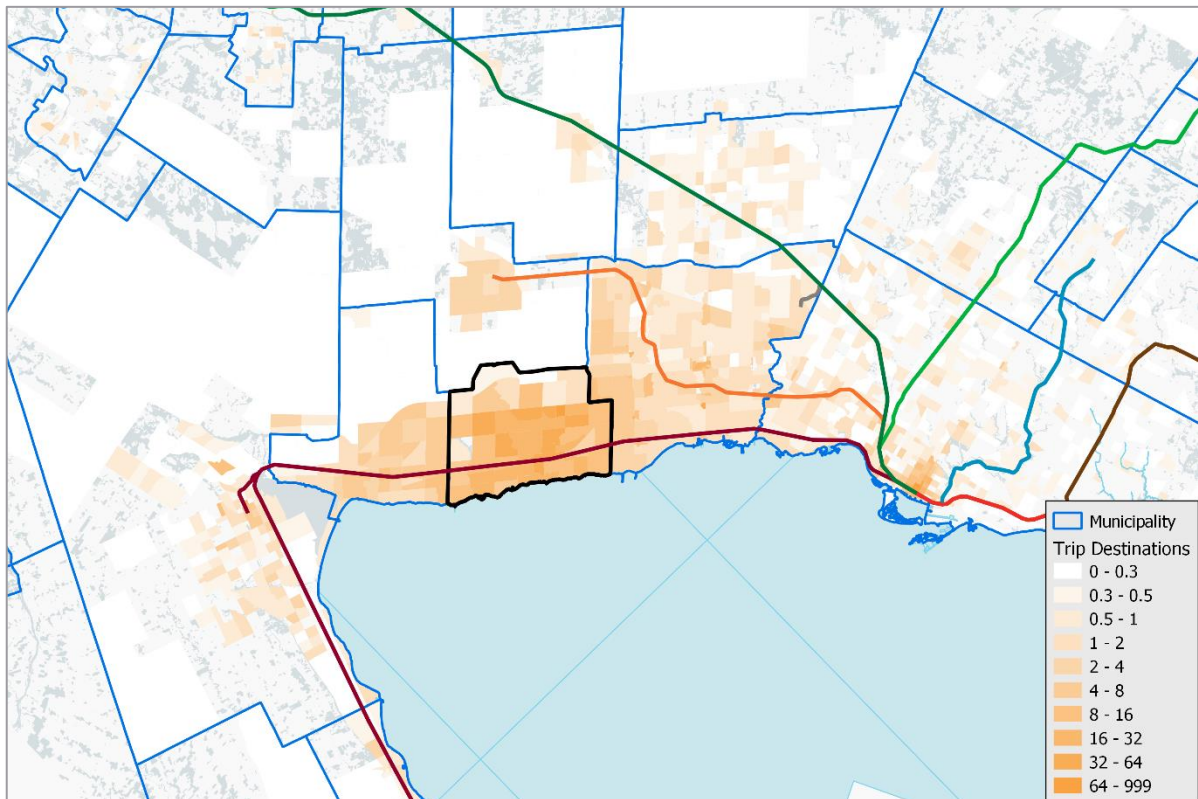
The map shows high trip densities to Palermo Village, Midtown Oakville, and the Uptown Core. These are three of four primary Growth Areas in the town (the other being around Bronte GO station). These areas have some of Oakville’s higher land use densities, which naturally leads to higher trip densities. They also have a mix of uses, rather than being focused solely on employment or residential. Mixed-use tends to generate more trips, as people take advantage of the close proximity to amenities.

External Trips – Outside of Oakville

Oakville forms part of the Greater and Toronto Hamilton Area. This provides its residents with the opportunity to travel beyond its boundaries to work, study, or access amenities. Similarly, Oakville’s businesses and amenities attract employees, customers and users from beyond its boundaries. Consequently, it is useful to understand where Oakville residents are travelling to, and where people travelling to Oakville for work or other purposes are travelling from.

Figure 3.3 shows the density of trips originating in Oakville to destinations across the GTHA, with darker colours indicating higher trip densities.

Figure 3.3: Destinations of Trips generated by Oakville – In the GTHA



Data source: Transportation Tomorrow Survey, 2016 (all-day trips to/from/within Oakville)

The map shows that Burlington and Mississauga have the highest concentration of trips outside of Oakville. This is to be expected: they are the urban areas closest to Oakville, and people prefer to make short trips than longer ones for any given purpose. Trips from Oakville go to all parts of Burlington, implying Burlington residents work in Oakville, Oakville residents work in Burlington, and residents of both municipalities travel between them for other purposes.

By contrast, trips from Oakville are concentrated on the western parts of Mississauga. Given Mississauga’s land use, this implies travel between the two municipalities is primarily by Mississauga residents working or doing other activities in Oakville.

There is a concentration of trips to downtown Toronto, which are supported by the GO Train service. However, there are relatively few trips to the rest of Toronto – even places with direct GO

Train service. This is probably because the employment and other amenities in those places do not serve a wide enough area to include Oakville.

The density of trips to Hamilton is lower than to Brampton or Toronto, despite Hamilton being closer. This may be caused by the costs of housing: people who work in Hamilton can live in places that are both closer and cheaper than Oakville.

These observations reflect existing travel patterns. However, the number of people and jobs in both Oakville and its neighbours is expected to grow over the next 25 years. In general, it is reasonable to expect that Oakville's new residents will travel to similar places for work, education and other purposes as existing residents. Similarly, trips to Oakville by non-residents are generally likely to come from similar areas.

The transportation system in Oakville has been developed to primarily accommodate east-west travel. As a result, growth in travel to Hamilton, Burlington, Brampton and Mississauga will involve improvements to existing facilities and services.

By contrast, growth in Milton will generate north-south travel for Oakville. Milton is expected to have significant population and employment growth over the next 25 years. This will greatly increase the amount of travel between Milton and its neighbours, including Oakville. Consequently, Milton's growth will have a significant effect on the geographic distribution and number of trips to/from Oakville.

Shorter-term planning for Oakville's inter-municipal travel should focus on trips to/from Burlington, Mississauga and downtown Toronto. Longer-term planning should also consider the growth in travel to/from Milton.

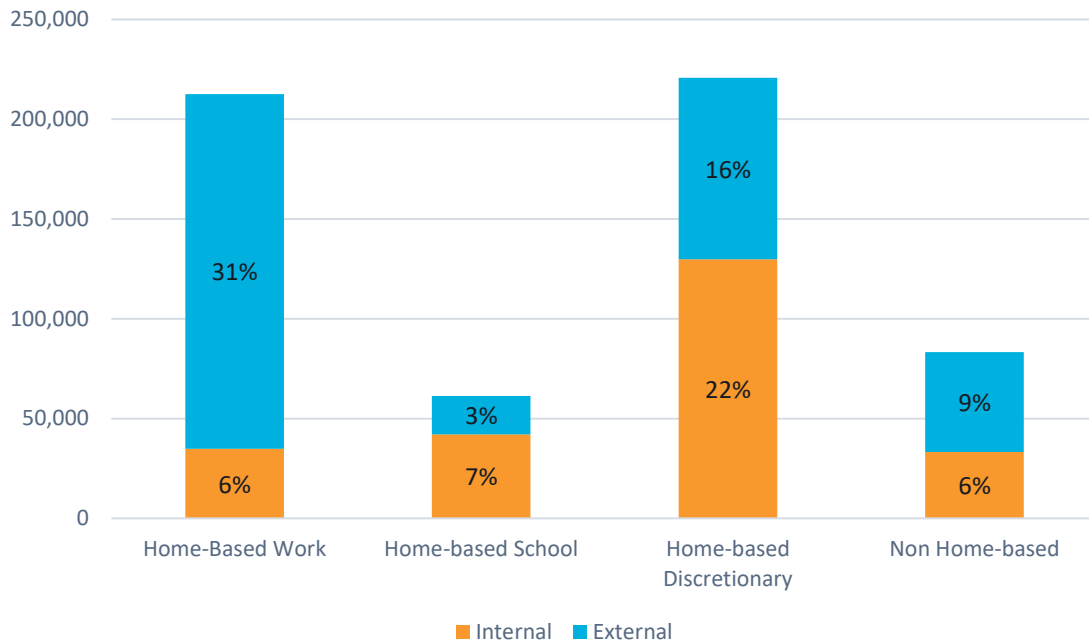
3.2 Why

The reasons *why* people make a trip are what generate the need to travel in the first place.

Figure 3.4 shows the number of trips originating in Oakville by purpose and by destination – either within Oakville (internal, in orange) or outside of Oakville (external, in blue). The labels are the percentage of all trips originating in Oakville. The four categories of trips are:

- Home-Based Work: trips between residence and place of work (and vice versa)
- Home-based School: trips between residence and place of education (and vice versa)
- Home-based Discretionary: trips between residence and other places (and vice versa)
- Non Home-based: trips not involving place of residence (and vice versa).

Figure 3.4: Trip Purpose by Destination Type | All-Day



Data source: Transportation Tomorrow Survey, 2016 (all-day trips to/from/within Oakville)

The chart shows that the biggest number of trips were for the business of life (home-based discretionary), with trips to/from employment (home-based work) very close behind. Together, these trip purposes account for 75% of all trips originating in Oakville

The majority of education (home-based school) and home-based discretionary trips are within the town, indicating that these needs are primarily fulfilled within Oakville. By contrast, most home-based work trips are to external destinations. Overall, the chart shows that external trips (58%) outnumber internal trips (42%). This results from land use in Oakville being dominated by residential uses, resulting in many residents travelling outside the town for work and (to a lesser extent) other needs.

The Town’s transportation system serves internal trips (and hence the majority of school and discretionary trips), but also connects people to the wider regional transportation system (which serves the majority of work trips). The variations in destinations by trip purpose should be a major consideration in planning the Town’s transportation system and its connections to the GTHA.

3.3 When

The time *when* people travel plays an important role in the planning of transportation infrastructure and services. Infrastructure (such as roads and sidewalks) are typically designed around peak demand, while the provision of services (such as transit) can be varied by time of day to match supply with demand.

Figure 3.5 shows the number of trips starting or ending in Oakville by time of day; Figure 3.7 splits this out by trip purpose. Figure 3.6 and Figure 3.8 show the start time of internal and external trips, respectively, by trip purpose. All charts other than Figure 3.5 have same scale on the vertical axis.

Figure 3.5: Time of Travel (All Purposes and Destinations)

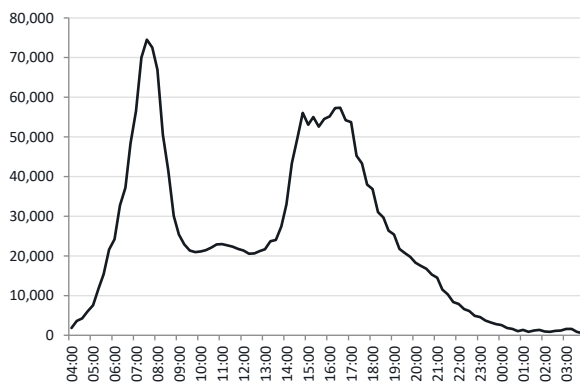


Figure 3.6: Time of Travel by Trip Purpose (Internal Trips)

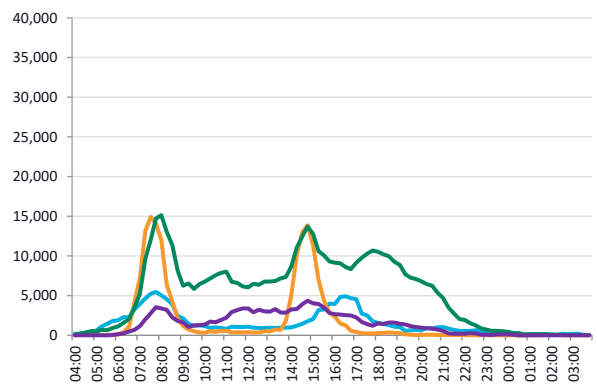


Figure 3.7: Time of Travel by Trip Purpose (All Destinations)

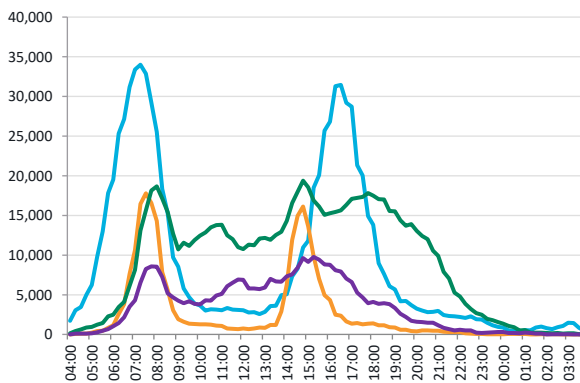
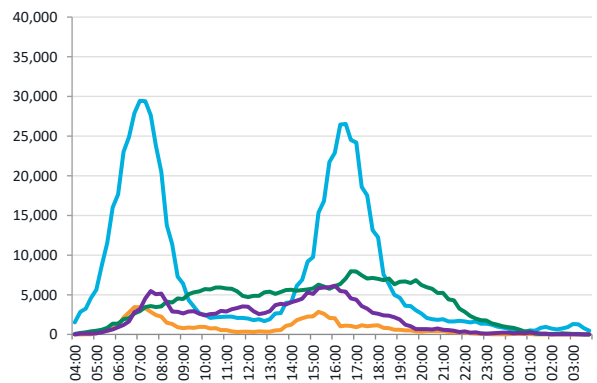


Figure 3.8: Time of Travel by Trip Purpose (External Trips)



Legend: – All purposes; – Home-based Work; – Home-based School; – Home-based Discretionary; – Non-home-based

Data source: Transportation Tomorrow Survey, 2016

Figure 3.5 shows the highest travel demand occurs for trips starting 07:45-08:00. The AM peak is more concentrated than PM peak: there is higher demand, but in a much shorter period. The highest demand in the AM is a single point, while the highest demand in PM stretched over a two-hour period.

Comparing the start times by trip purpose (Figure 3.7) helps explain this pattern. All four trip purposes have peaks around the same time in the morning. In the PM, school trips (yellow), non-

home-based trips (purple), and work trips (blue) have different peaks. Discretionary trips (green) have no clear peak in the PM period.

Both work and school trips have two clearly-defined peaks, reflecting that people making these trips to/from Oakville all have similar start and end times for their activity. The pattern of work trips is consistent with '9-5' working, although the time of the AM peak implies a long commute.

By contrast, the pattern for discretionary and non-home-based trips has multiple peaks and troughs. Both show small peaks that coincide with school trips, implying trip chaining by people going to places of education³⁶ (either because they attend, or are transporting someone who does).

Comparing internal trips (Figure 3.6) and external trips (Figure 3.8) reveals they have very different patterns. Internal trips have a significant proportion of school and discretionary trips, and it is these that dictate the peak travel times for internal trips. By contrast, external travel is dominated by work trips. Further, external work trips have a much earlier peak in the AM than internal work trips – again, consistent with a long commute. This in turn implies that the time external work trips arrive back in Oakville will be significantly later than internal work trips.

External school trips have a later PM peak than internal school trips, which is consistent with external school trips having a higher proportion of travel to post-secondary institutions. The link between discretionary travel and school travel is evident for internal travel, but not external travel.

The timing of peaks and troughs in travel demand is a combination of all travel purposes, not just work trips. Travel involving trip chaining (such as that associated with school trips) is more difficult to switch from car-based to sustainable modes, unless the destinations are close together. Internal and external travel have very different patterns in when those trips occur.

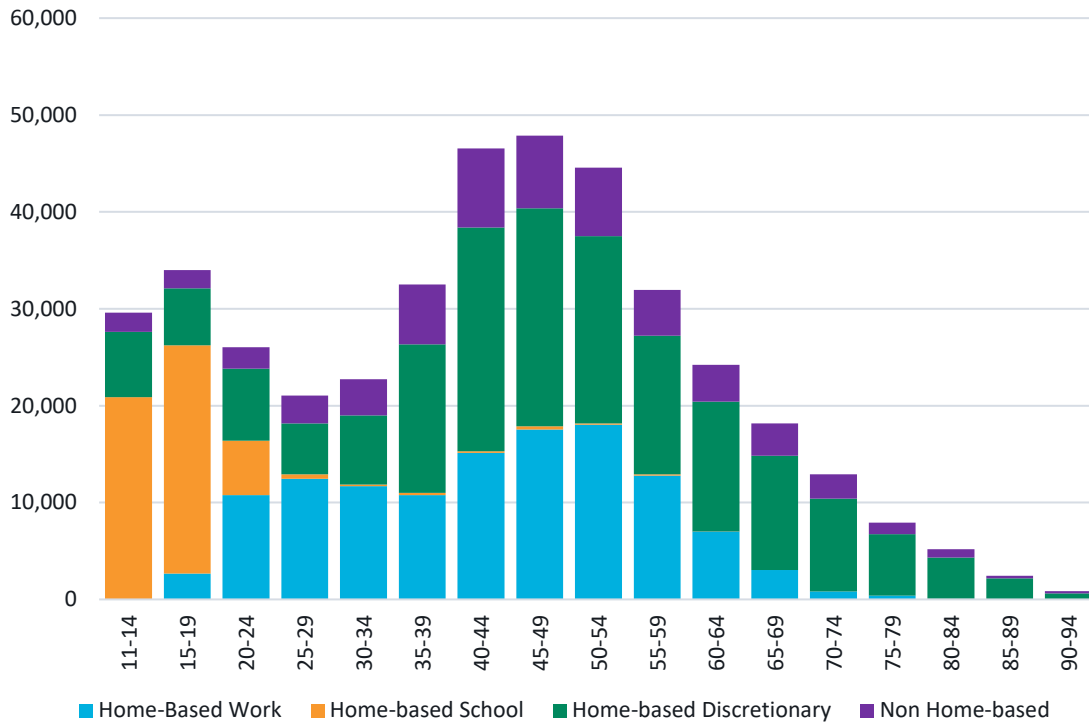
³⁶ If someone travels home → shop, shop → school and school → home, then TTS records these trips as home-based discretionary, non-home based and home-based school trips, respectively.

3.4 Who

Transportation planning revolves around the movement of people. Understanding *who* those people are will help ensure that planning meets their needs.

Figure 3.9 shows the number of trips originating from Oakville by age group and trip purpose. The age groups all span five years, except the first group.³⁷

Figure 3.9: Number of Trips originating from Oakville by Age Group and Purpose



Data source: Transportation Tomorrow Survey, 2016 (all-day trips to/from/within Oakville)

From age 11 to 20, education trips are the most common. This is to be expected for compulsory school age (11 to 17/18³⁸). More detailed analysis of the data shows the proportion of education trips falling significantly each year from age 18 to age 24, and all but vanishing from age 25. This suggests that people are attending post-secondary education for various lengths of time, or that older students are less likely to live (and start their trips) in Oakville.

Work trips account for the majority of trips for people in their twenties and early thirties. The proportion peaks at 73% of trips for people aged 26. The proportion of work trips falls steadily from age 55 onwards, accounting for less than 10% of trips for people aged 70 or over.

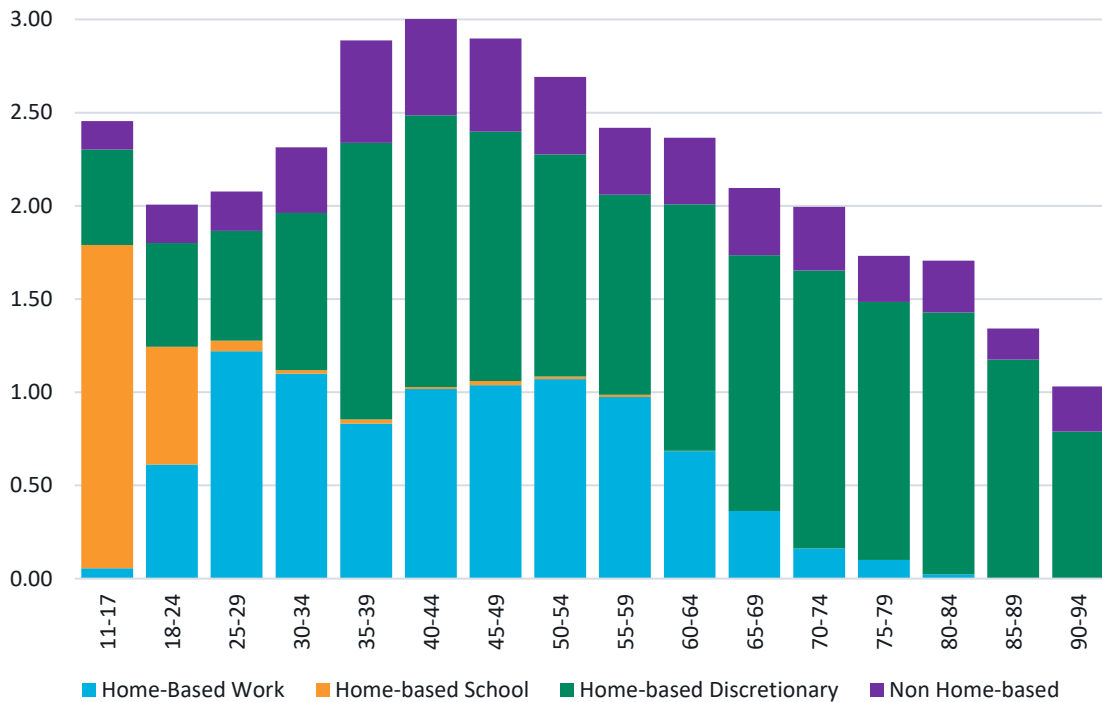
³⁷ The Transportation Tomorrow Survey only covers trips made by people aged 11 or higher.

³⁸ The Transportation Tomorrow Survey is conducted in the autumn; people in their final year of high school be either 17 or 18.

From age 35 to 95, discretionary trips are most common, and are generally substantially higher than work trips. These are trips for the business of life – shopping, medical, visiting friends/family, and leisure.

The number of trips made by each group is partly driven by the number of people in that age group. To provide an additional comparison, Figure 3.10 shows the average number of weekday trips per person for Oakville residents by age group and purpose.

Figure 3.10: Average Weekday Trips per Person living in Oakville by Age Group and Purpose



Data source: 2016 Transportation Tomorrow Survey

The chart shows that number of trips per person varies significantly by age. After the end of K-12 education, the daily trip rate increases steadily with age, peaks in the early 40s, then decreases steadily with age. The changes from people’s 20s through to their 50s are largely caused by changes increase in discretionary and non-home-based trips. This is consistent with those trips being caused by the presence of children in the household.

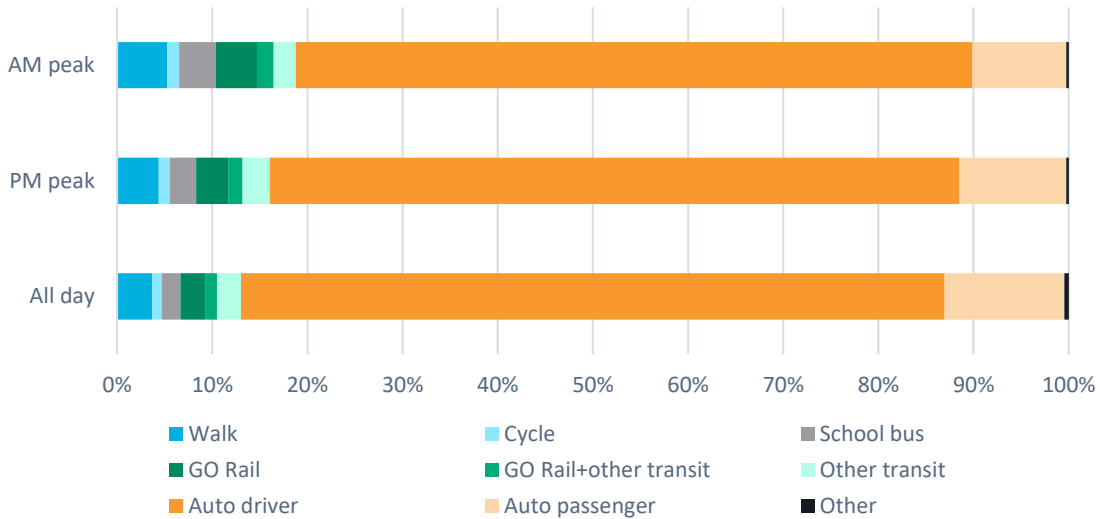
The decrease from people’s 50s to their 70s follows the decrease in work trips, consistent with people retiring or leaving the workforce.

The reasons people travel vary significantly by age, with work travel only being the most common reason for people aged 22 to 35. Policies targeted at different age groups will need to take into consideration those variations.

3.5 How

The Town of Oakville aims to increase the use of sustainable travel modes, and decrease the use of single-occupant vehicles. Understanding *how* people currently travel will reveal the magnitude of the task to be addressed. Figure 3.11 shows the mode split for trips to/from/within Oakville in the AM and PM peak periods, and for the whole day. Transit trips have been split into those using just GO Rail, those using just other transit modes, and those using both.

Figure 3.11: Oakville Trips Mode Split



Data source: Transportation Tomorrow Survey, 2016 (trips to/from/within Oakville)

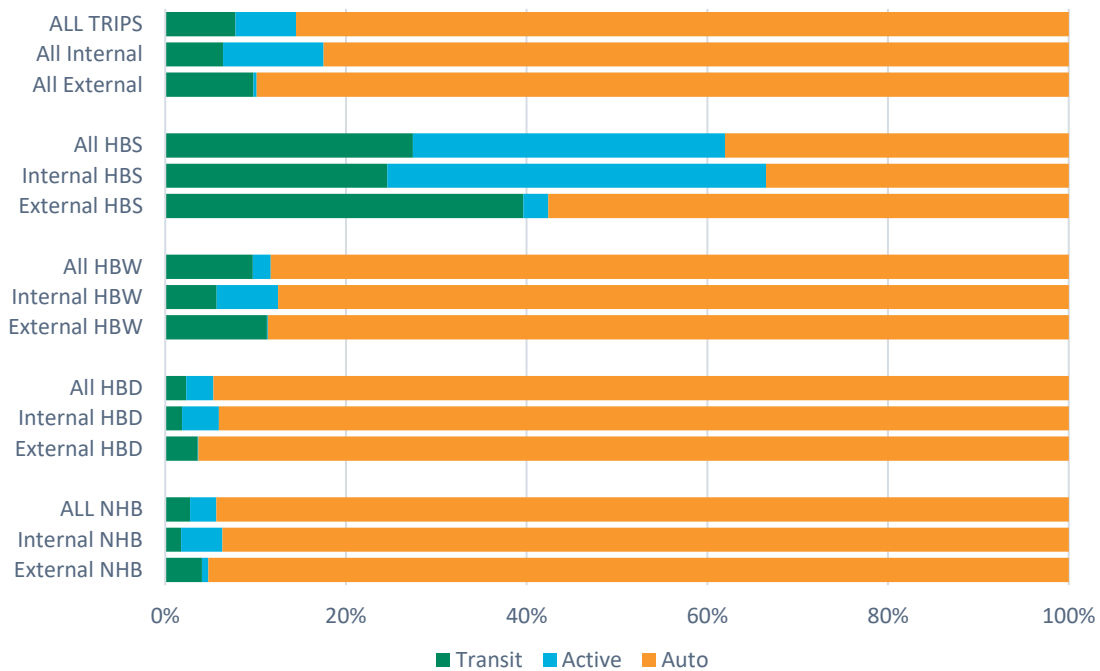
The chart shows auto-based modes dominate Oakville travel. Across the whole day, around three-quarters (74%) of trips are made people driving cars (“auto driver”), and more than six out of seven trips (87%) involve a person in a car. Transit is used for 8.3% of trips, including 2.0% for school bus trips. Excluding school bus trips, around half of transit trips to/from/within Oakville involve GO Rail.

The chart and underlying data show that use of transit and active modes is highest in the AM and PM Peak periods, with all other times having significantly higher use of auto-based modes. This is driven by higher use of active modes and school buses for education trips and transit for commute trips (particularly to downtown Toronto) during these times.

Purpose and Destination Type

Figure 3.12 shows the mode of travel for trips to/from Oakville by trip purpose and by destination type – internal (within the town) or external (to/from places outside the town). “Auto” includes auto driver, auto passenger, motorcycles, and taxi/TNCs; transit includes GO Train, local transit, and school bus; “active” includes walking and cycling. Trip purposes are home-based school (HBS), home-based work (HBW), home-based discretionary (HBD) and non-home-based (NHB).

Figure 3.12: Mode of Travel by Purpose and Destination Type



Source: 2016 Transportation Tomorrow Survey

The chart shows that auto dominates Oakville travel, accounting for 88% of trips. This holds across all purposes, except school travel.

For school travel, there is a roughly equal split between auto, transit and active modes for internal trips. These trips are dominated by K-12 schools, with many students living within walking distance or having access to school buses. External school travel is dominated by trips for post-secondary education. Many post-secondary institutions in the GTHA are served by regional and local transit. This and the cost of car ownership result in a high transit mode share.

For work trips, the transit mode share for external trips (11.2%) is roughly double that for internal trips (5.7%). This makes Oakville unusual compared to other GTHA municipalities. Typically, longer trips (such as to external destinations) have lower transit mode share. More detailed analysis revealed that three-quarters of the external work trips using transit were going to/from PD1 (downtown Toronto). These trips benefit from the GO Train service, while auto use is impeded by freeway congestion and the cost of parking.

Discretionary (HBD) and non-home-based (NHB) trips show similar mode splits. They have the highest auto mode shares (around 95%) of any travel market. Both have higher active mode shares for internal trips and higher transit mode share for external trips.

The Town’s aspirations to increase transit use can build on the existing strong usage for school-based trips and work trips to downtown Toronto. The dominance of car use for other markets supports the needs for significant change in the planning, funding and delivery of the transportation system if the Town is to achieve a mode shift away from car-based uses.

Distance Travelled

Figure 3.13 and Figure 3.14 show the distance travelled by mode in Oakville during weekday peak periods. During the AM peak period, the figures show the following

- 55% of the trips generated by the Town of Oakville are over 10km, while 32% are under 5km and 10% under 1km;
- Trips under 1km are considered walkable; only 35% of those trips are made by walking and 45% are by driving.
- Trips under 5km are considered bikeable; only 2% of those trips are made by bike while 73% are by driving
- 89% of people using Oakville's GO Rail stations (Bronte, Clarkson and Oakville) travel under 5km to their station, but only 2% of them chose to cycle while 78% chose to drive.
- Just under half of people using Oakville's GO Rail stations and travelling less than 1km walk

During the PM peak period, the figures show the following

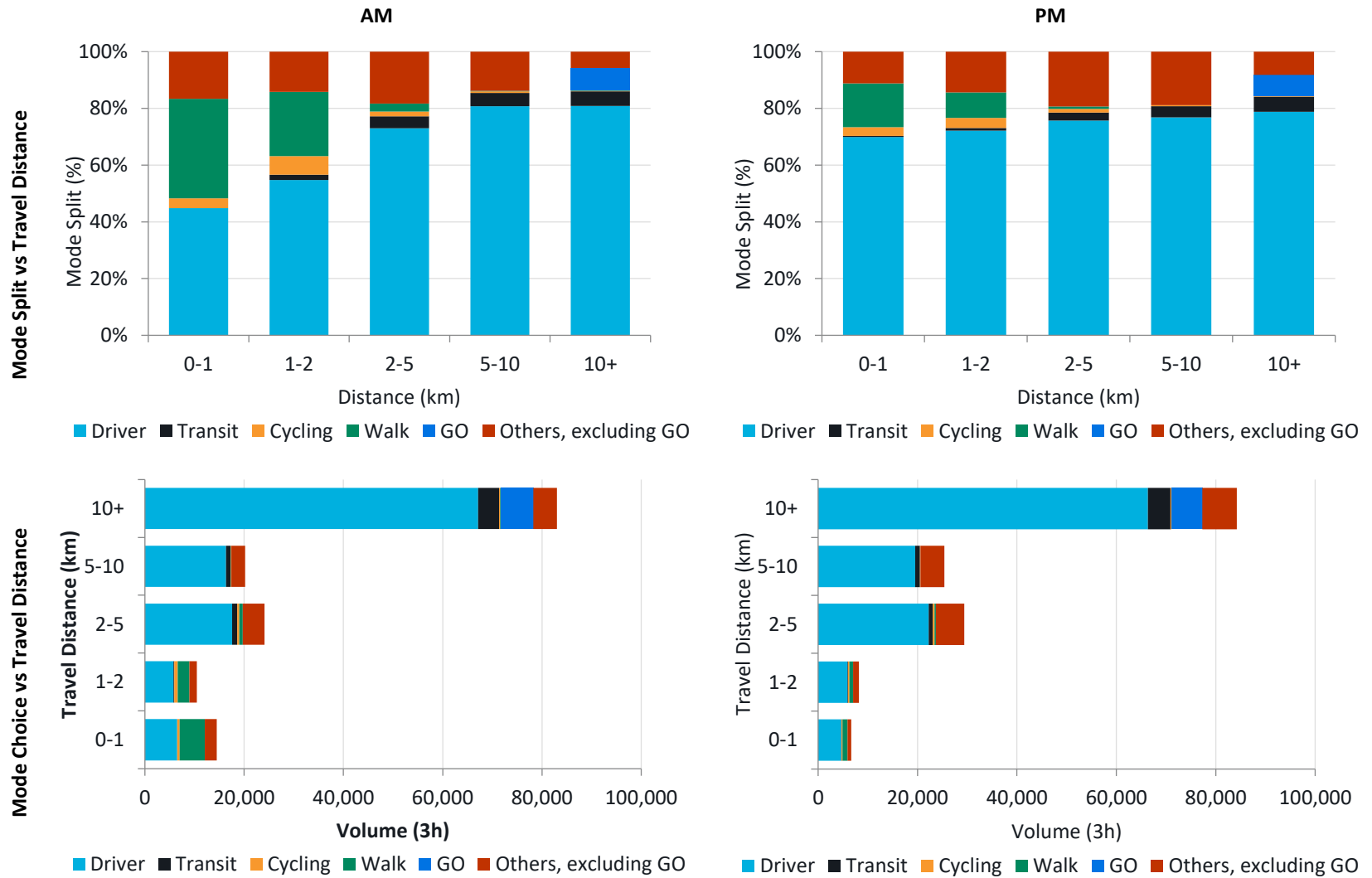
- 55% of the trips generated by the Town of Oakville are over 10km, while 29% are under 5km and 4% under 1km;
- Only 15% of walkable trips are made by walking and 70% are by driving. The difference with the morning is because fewer students travel in the PM peak period (16:00-19:00) compared to the AM peak period (06:00-09:00);
- Only 1% of bikable trips are by bike, while 76% are by driving
- In total, only 2% of trips generated in Oakville use cycling or walking.

The numbers show that the proportion of walkable trips (under 1km) is low, and that the proportion of walkable trips done by walking is also low. Addressing the former issue requires changes to land use patterns, so that people have a greater range of potential destinations within walking distance. Land use policies prescribe mixed-use intensification for Oakville's Growth Areas, and this will increase the proportion of walkable trips in and around those areas. However, other built-up areas elsewhere in Oakville will continue to have a low proportion of walkable trips if existing land use policies continue.

Increasing the number of walkable trips done by walking requires the provision of a high-quality pedestrian network. This includes sidewalks, ample and suitable crossing points, and greater pedestrian connectivity between residential and non-residential areas.

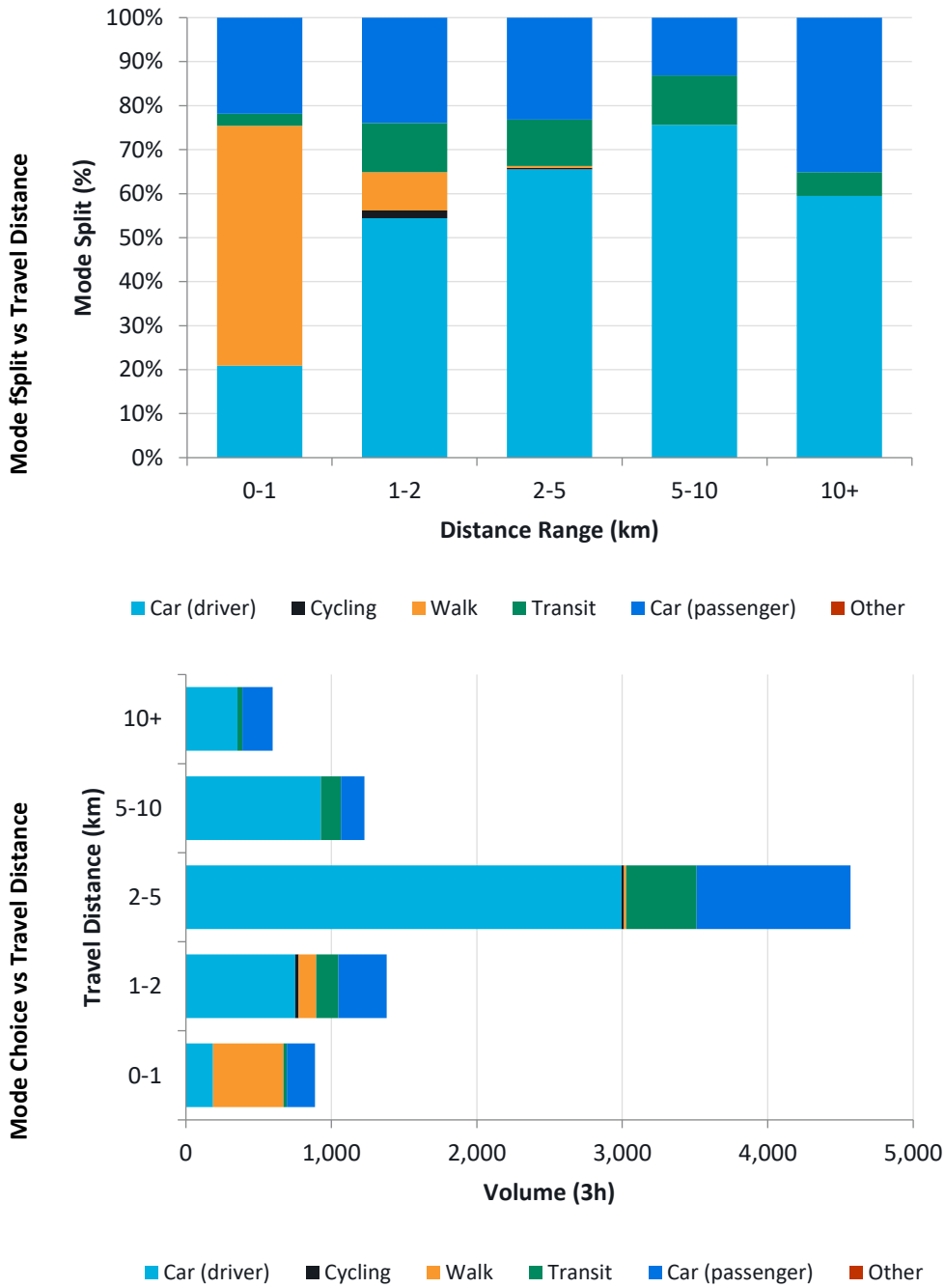
In order to change trends and behaviours, integration between land use and transportation will be required to make people reduce the distance they need to travel and make more sustainable choices to travel these short distances.

Figure 3.13: Distance travelled by Mode in Oakville during Weekday Peak Periods



Data source: Transportation Tomorrow Survey, 2016

Figure 3.14: Distance travelled by Go Transit Riders in Oakville during Weekday AM Peak Period



Data source: Transportation Tomorrow Survey (Bronte, Clarkson and Oakville stations), 2016

3.6 Summary

Too many people in Oakville drive when travelling short distances: 70% of trips less than 1 kilometre are by car in the afternoon peak, while the majority of people travel for distances exceeding 10 kilometers, which makes them more dependant on car usage. Significant improvements must therefore be made to reduce the distance traveled in Oakville and ensure that those who travel short distances make the best choices for getting around. These changes will increase the attractiveness of any micromobility programs (see section 2.1) and enhance the benefits of implementing a Complete Streets approach (section 2.5)

The majority (58%) of Oakville's travel is to external destinations. Planning for Oakville's inter-municipal travel should focus on trips to Burlington, Mississauga and downtown Toronto. Longer-term planning should also consider the growth in the travel market to/from Milton. These longer-distance commutes are and will be good targets for TDM programs (section 2.8). This planning will require Oakville to work with the relevant municipalities and agencies, to ensure that municipal boundaries do not form a barrier to easy travel by any mode. This cooperation also applies to goods movement (section 2.4), which is almost entirely inter-municipal in nature.

The Town's transportation system serves internal trips, and hence the majority of school and discretionary trips. However, it also connects people to the wider regional transportation system, which serves the majority of work trips. The variations in destinations by trip purpose should be a major consideration in planning the Town's transportation system and its connections to the GTHA. The reasons *why* people travel affect *how* they travel, because their needs for that trip are different. Non-commute travel often involves a variety of destinations and travel times, and may also include multiple destinations in one trip (trip chaining). These features mean non-commute travel benefits from mobility as a service (section 2.1) as a means to support non-car use.

The timing of peaks and troughs in travel demand is a combination of all travel purposes, not just work trips. Travel involving trip chaining (such as that associated with school trips) is more difficult to switch from car-based to sustainable modes, unless the destinations are close together. Internal and external travel have very different patterns in when those trips occur.

The reasons people travel varies significantly by age, with work travel only being the most common reason for people aged 22 to 35. Policies targeted at different age groups will need to take into consideration those variations.

Overall, the analysis shows that Oakville's internal travel is different from its external travel. Internal travel has a higher proportion of car-based and active travel, and more travel for education and non-commute purposes. External travel has a higher proportion of transit, primarily because of GO Train travel to downtown Toronto, and a much higher proportion of work travel.

The Town's aspirations to increase transit and active transportation use can build on the existing strong usage for school-based trips and work trips to downtown Toronto, but changes that enable better integration between land use and the transportation system are needed to change behaviours in a sustainable way. The dominance of car use supports the need for significant transformation in the planning and delivery of the transportation system if the Town is to achieve a mode shift away from car-based uses.

4 Lessons from Other Jurisdictions

4.1 Milton Keynes, England

Context

Milton Keynes has a population of 230,000, and is located within the commuter belt of London (UK). Unlike many UK cities, Milton Keynes has extensive parallels with North American cities. It is built on a grid system, and major internal roads run between communities, rather than through them. It also has grown considerably over the last 50 years, with considerable further growth plans currently being consulted on.

The Plan

The population is expected to rise by 24% from 2011 to 2031, along with a similar increase in employment. Without action, car travel would increase to a level beyond the current road network capacity, and there is no desire to expand existing roads. As a result, the town's transport plan aims to increase the proportion of trips done by sustainable modes.

The town's transport masterplan contains a broad mix of planned improvements. These include infrastructure enhancements for all sustainable modes, transit service improvements, better information provision, and policy changes to support design urban form and land use patterns

Results

Lower vehicle speeds have been implemented on many roads to reduce accident rates. There is a separate network (around 200km) of walk and bike routes that runs throughout the town, called the 'Redways'. The equivalent form of infrastructure in Ontario is known as a multi-use trail (when away from the road network) or a multi-use path (when running parallel to a road). The Redways support a cycling mode share of 4%, relatively high by UK standards, and substantially higher than the 1% cycling mode share for trips within Oakville. This illustrates the importance of dedicated infrastructure in supporting cycling.

However, focusing pedestrian movement on the Redways means that major roads are dominated by car traffic and do not have a pleasant pedestrian environment. This hinders pedestrian access to/from bus stops and destinations on these roads. This shows that even with excellent off-road facilities, there is still a need to accommodate all users in the design of major roads and streets.

Most of the town's rail demand is from three stations on the London-Birmingham line, which offers frequent service to various major cities. The high frequency and competitive journey times compared to car travel are key part of the demand. Employment in the town is mostly concentrated near these stations, which promotes transit use by people commuting into Milton Keynes.

Key lessons for Oakville

Like Oakville, Milton Keynes has extensive out-commuting, but also has employment that draws in trips from adjacent communities. It demonstrates that a mix of inter-municipal and local transit is necessary to support Oakville's commuting by both residents and workers. Milton Keynes also demonstrates the need for pedestrian facilities to support transit use.

4.2 Gent, Belgium

Information related to this case study are provided by Eltis, Europe's main observatory on urban mobility⁴⁵, the City of Gent⁴⁶, The Guardian newspaper⁴⁷ and Cadence Magazine⁴⁸.

Context

Gent is a growing port city in northwest Belgium, at the confluence of the Leie and Scheldt rivers, with a population of close to 250,000, where the pressure of motorised traffic on the city keeps on growing.

Over a period of 10 years, more than 8,000 extra cars were registered in the city. This resulted in significant pressure on street parking and traffic jams on the roads entering the inner city. Also, prior to the implementation of the plan, the City of Ghent recorded that 40% of its rush hour car traffic was due to through traffic – cars not even beginning or ending their journeys in Gent, but merely passing through.

Gent's broader mobility plan has set out clear targets with regards to the modal split it wants to achieve by 2030. These are:

- Car usage reduced from 55 to 27 per cent;
- Cycling increasing from 22 to 30 per cent;
- Public transport usage increasing from 9 to 20 per cent;
- Walking increasing from 15 to 18 per cent.

⁴⁵ *Gent's Traffic Circulation Plan (Belgium)*. Eltis - The Urban Mobility Observatory, October 2017.
<https://www.eltis.org/discover/case-studies/gents-traffic-circulation-plan-belgium>

⁴⁶ *The Circulation Plan*. City of Ghent, retrieved January 2020.
<https://stad.gent/en/mobility-ghent/circulation-plan>

⁴⁷ *How a Belgian port city inspired Birmingham's car-free ambitions*. Carlton Reid, January 2020.
<https://www.theguardian.com/environment/2020/jan/20/how-a-belgian-port-city-inspired-birmingham-car-free-ambitions>

⁴⁸ *Ghent – Changing the Whole Circulation Plan Overnight: a Strong Political Decision*. Cadence Magazine, retrieved January 2020.
<https://www.cadencemag.co.uk/ghent-changing-the-whole-circulation-plan-overnight-a-strong-political-decision/>

The Plan

The circulation plan was implemented in April 2017. It was inspired by the Van Der Berg traffic circulation plan implemented in Groningen, the Netherlands in the 1970s.

Groningen's plan divided the city-centre into four sections, forcing car drivers who travel from one section to another to take the city's inner ring-road, instead of driving through the local streets. This measure aimed to make motorists' circulation more complicated and to promote other modes of transportation, like cycling.

Gent took this approach a step further by enlarging the city's pedestrian area and creating six distinct sections with no automobile accessibility between them without using the ring-road. illustrates the concept.

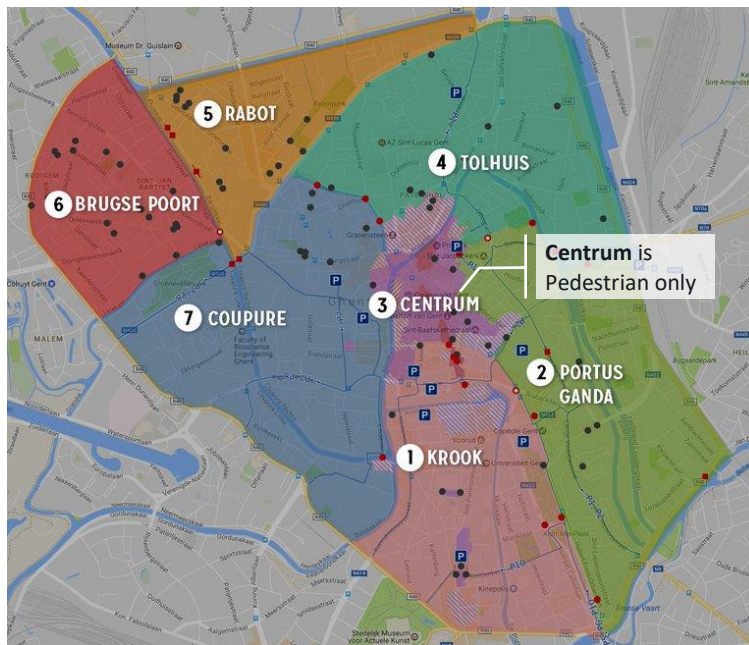
In summary, the following measures were implemented:

- Whoever wants to move from one sector to the other needs to make use of the inner city ring, as it is now forbidden for cars to drive through several streets. Exceptions are made for cars with special permits, buses, and taxis. Cameras with license plate recognition technology have been placed at three crucial points to ensure that this is enforced.
- Some streets changed direction or were cut for cars (not for busses and taxis).

This is worthwhile, since:

- The city center remains accessible. Not only pedestrians, cyclists and public traffic benefit. Cars that absolutely need to be in the city center can also reach their destination faster. Suppliers, health care providers or elderly people can get to the underground car park easier.
- The Plan keeps the city center livable. Cyclists, pedestrians, trams and busses confiscate less limited available public space than cars.

Figure 4.1: Gent Circulation Plan



Source: Copenhagenize Design Co, 2018

Results

Despite clear goals for local quality of life, the implementation of this ambitious circulation plan has not been a smooth road. In the face of scathing critics, Council stood firm, and does not regret this political choice to improve living conditions in the city. While leaders of local political parties and some inhabitants opposed to the plan complain about congestion in some streets, a survey conducted by the City revealed that many inhabitants living inside the ring-road consider the streets quieter, with more space for bicycles. People from 25 to 34 years old are the most satisfied.

A noticeable impact of this measure comes from some inhabitants who were quite reticent to this plan, but have already changed their routines by adopting new mobility habits. Generally speaking, 25% of Ghent inhabitants made a decision to change their mobility habits by purchasing an (e-)bike, subscribing to the local public transport or starting car-sharing.

The plan is already having significant impacts on transportation choices. In a year, the impacts of the plan are: 25% increase in bicycle users, 8% increase in public transportation ridership, 12% decrease in car traffic during the rush hour, even 29% less cars on the most important routes within the ring road and 58% in the residential streets. Moreover, 6 interviewed inhabitants out of 10 consider cycling as safer than before. This plan highlights that marketing and public engagement campaigns alone are not enough to make people change their transportation habits, but it is necessary to create the urban conditions which will incentivize changed behaviour.

Although some local shopkeepers worry about decreased revenue, the number of pedestrians in the city-centre did not decline since the adoption of the circulation plan. On the contrary, counters reveal a slight increase in pedestrian mode share from 2% to 10% from August to October 2017 compared with 2016. In order to more accurately evaluate the impacts of this plan, the City has recently decided to increase the number of pedestrian counter locations. In addition to changes in pedestrian traffic, Gent's police found the number of traffic accidents have decreased by 25% in the city-centre since the plan implementation.

Key lessons for Oakville

Oakville's Growth Area's would benefit from similar strategies to that employed in Gent's urban centre. This means prioritizing cycling and walking over travelling by motorized modes. Access by motorized modes remains possible, but within constraints so that walking and cycling are the better options for most travelers. This would be effective because of the presence of a mix of land uses that result in a high proportion of short-distance trips.

4.3 Copenhagen, Denmark

Context

Copenhagen is the capital city of Denmark, and is home to about 520,000 people. The city set a target to become CO₂-neutral by 2025. One of the main goals in its development plan is that no more than one third of trips that start and/or stop in Copenhagen should be by car, with bikes and public transport accounting for the rest. Including pedestrians, the target is for 75% of all trips to be on foot, by bike or via public transport.

The Plan

In 1910, Copenhagen inaugurated its first bicycle lane. Since then, most of the lane network and infrastructure dedicated to this means of transport has been developed during the last 25 years. Currently, all metro and bus stations have parking for bicycles and the city has extensive signage for cyclists. The center of Copenhagen has a greater number of bicycles than citizens: 520,000 inhabitants and 560,000 bicycles and it is expected that by 2025 the city will become the first capital in the world with neutral carbon dioxide emissions.

As of 1962, parking in 18 town squares has been eliminated to give space to more life in the city. The expansion of the system of car-free spaces in the city has had some great advantages: Residents have had time to develop a completely new urban culture, discover and develop new opportunities; car owners have had time to get used to the idea of not driving and parking in the city center, and using public transport and bicycle; as a result, people have had time to change their habits and patterns of mobilization.

Results

Gradual investments in bicycle infrastructure have been made over the years. Investments have resulted in a steady increase in the number of cyclists since the 1970s. The city – physically smaller than the city of Vancouver and where the average temperature in winter can be around 0°C – now has almost 400km of separated bike lanes; some including priority traffic signals, designed to allow cyclists to cross the city at a comfortable pace without hitting a red light. And those lanes are the first ones to be cleared after a snowfall. The city also has linked up with 22 nearby municipalities to build a set of "cycle superhighways," spanning more than 300km, to link downtown neighbourhoods with the region's suburbs: Some corridors will reach more than 20 kilometres.

Currently Copenhagen is one of the cities in the world known for the use of the bicycle as the main means of transport for its inhabitants as well as tourists. According to a report from 2017 about

Copenhagen has made a sustained policy effort to encourage cycling as a routine mode of transport, including a network of safe, separated bike routes that span the city and now extend beyond it. The Danish capital has an important lesson for cities looking at cycling: It is entirely possible to get ordinary citizens – and their kids – on two wheels.

"The basic tool is to create safe and convenient infrastructure," explains Marie Kastrup, bicycle program manager for the City of Copenhagen. "You create infrastructure where cyclists can go easily and quickly from A to B."

The Globe and Mail, May 2018

nine out of 10 Danes have a bicycle for their mobility needs, and only four out of 10 have a car. Annually, in Copenhagen, inhabitants travel by bicycle about 1.2 million km, which is equivalent to two round trips to the moon, while only covering 660,000 km by metro.

Information related to this case study was derived in part from articles written by Maria Camila Ariza and published by Ciudades Sostenibles in 2019,⁴⁹ and Alex Bozikovic published by The Globe and Mail in 2018.⁵⁰

Key lessons for Oakville

Copenhagen's history demonstrates car-orientated travel patterns can be replaced by extensive bicycle usage with the provision of a comprehensive and safe network for cyclists. Oakville is in a position where it can do likewise. Its urban area is small enough that most is within cycling distance of the Growth Areas, employment and other key amenities. Both Copenhagen and Oakville have a wide range weather conditions throughout the year, including snow in winter. This demonstrates that cycling in Oakville can be a year-round way of travelling.

4.4 Two-Tiered Municipalities

Oakville is part of the Region of Peel. This means that responsibility for transportation is split between two tiers of municipal government. In Oakville, the Region is responsible for major roads, and the Town is responsible for transit, active transportation and other roads. Each government has its own strategic aims for transportation. This creates the potential for conflicting practise in how they plan, design and operate their respective transportation facilities and infrastructure. For example, the Region's desire for good traffic flow on its major roads results in widely-spaced intersections. This is at odds with the Town's desire to support pedestrians (and hence transit use) through providing closely-spaced crossing points.

A two-tier municipal government is in place in many other locations in Ontario, and hence it is useful to examine examples of the two tiers working together. The first example is the Züm BRT service in Brampton. The City of Brampton wished to reconfigure the layout around intersections on certain Regional roads to allow buses to use far-side stops. The City's original desire was to remove channelized right-turns (and the associated islands) so that buses could use the right-turn lane as a through lane. The Region wished to keep the channelized right-turns to allow for smooth traffic flow. A compromise was reached whereby the design of the islands was altered to permit through movement by buses while retaining a safe crossing point for pedestrians. The result was an effective road layout that helped support a highly-successful BRT service.

⁴⁹ *Sustainable urban transport: what can we learn from Copenhagen?* Maria Camila Ariza, María Camila Quinter, Keisgner E. Alfaro; 2019. <https://blogs.iadb.org/ciudades-sostenibles/en/sustainable-urban-transport-what-can-we-learn-from-copenhagen/>

⁵⁰ *What Canada can learn from Copenhagen: The best city for cycling.* Alex Bozikovic, 2018. <https://www.theglobeandmail.com/life/health-and-fitness/fitness/what-canada-can-learn-from-copenhagen-the-best-city-for-cycling/article29363711/>

Another example is the Dundas BRT corridor, running from Ancaster to Kipling subway station in Toronto. The City of Mississauga's creation of the a Transitway had demonstrated the effectiveness of increasing the speed of transit vehicles. Dundas St (a Regional road) was identified by the City of Mississauga as a key corridor for BRT services, which was then reflected in Metrolinx's Regional Transportation Plan. The wider Dundas corridor (beyond Mississauga) was studied by Metrolinx, working with all the relevant municipalities.

Where Oakville wishes to implement transportation projects on Regional roads, it should aim to link those projects to the Region's own policies aims wherever possible. Any implementation will require working in close cooperation between the two governments for all levels of staff and decision-makers. It is almost inevitable that both sides will need to compromise of certain policies. The Town can also generate broader political support within the Region by considering the effects (positive and negative) a project will have on Oakville's neighbours. This can then translate into direction from Regional Council, using Oakville's eight (out of 24) councillors as a base.

4.5 Other Jurisdictions in the GTHA

The way Oakville will grow in the future will not be the same as the way it has grown in the past. Growth is switching from primarily being in greenfield sites that expand the urban area, to places within the existing urban area. This new development typically features higher densities and a greater mix of uses than the past development that exists today. This change has been prompted by a mix of policy and lack of space for new greenfield development within the town's boundaries.

This change in growth is not unique to Oakville. Other municipalities are undergoing (or have undergone) this switch driven by similar circumstances. Within the GTHA, these municipalities include Mississauga, Richmond Hill and Ajax. The recurring theme from other jurisdictions is that municipalities who make deliberate choices in their policies and actions are more likely to achieve their wider goals for transportation.

Maximize Benefits of Controllable Changes

For some of the trends, municipalities are able to control how they occur within their local area. These include car share, bike share, and ride-sourcing. These trends bring *potential* for significant benefits, helping to advance the wider future goals for their transportation system. For these, municipalities need to focus on maximizing the benefits of those changes. They also need to actively decide on relevant (new) policies and future actions. Inaction results in municipalities missing out on the benefits, or being unable to manage the negative effects.

Manage Effects of Non-Controllable Changes

Not all trends are primarily within control of municipalities. These include automatous vehicles and alternative vehicle energy sources. Other trends cannot be controlled by lower-tier municipalities to all parts of the transportation system within their boundaries (such as Vision Zero-inspired infrastructure changes to Regional roads). Municipalities like Oakville still have the ability to help facilitate the positive effects and mitigate the negative effects.

For example, the uptake of electric vehicles in Canada has been dictated by the price and quality of vehicles produced by the private sector, coupled with provincial subsidies for new vehicles.

However, municipalities could support their uptake and use through requiring new development to include charging points, providing charging points at municipally-owned facilities, and encouraging others to do the same.

Improve Existing Practices

The final group of trends relate to internal policy matters, such as freight management, Complete Streets, and Vision Zero. These trends provide a way for municipalities to change and improve their internal practices for planning, designing and delivering transportation. Where those trends are adopted into formal policy, municipalities are more likely to embrace and fully implement them.

5 Strengths, Weaknesses, Opportunities and Challenges

This chapter presents an analysis of strengths, weaknesses, opportunities and challenges (SWOC) based on the various trends affecting Oakville’s transportation system. Strengths and weaknesses focus on the existing situation; opportunities and challenges focus on the (potential) future situation.

5.1 Strengths

- Oakville has a robust policy foundation in place covering many aspects of the transportation system. The Town’s transportation master plan supports greater sustainable transport use. Its active transportation plan includes a detailed plan for an extensive well-connected network, plus supportive policy measures. This sets the stage for a change in travel patterns.
- The Town’s land use planning (through the Official Plan) focuses growth on mixed-used intensification, including near major transit hubs (GO stations). This brings people’s travel destinations closer together (both in and around the Growth Areas), particularly for non-commute purposes. This helps switch travel involving trip chaining from car-based to sustainable modes.
- The Town has control over most of the factors that influence internal trips, which form an important part of the trips generated by the Town. They represent a key way to deliver significant change to Oakville’s travel patterns.

5.2 Weaknesses

- Oakville’s current urban form and densities are not favorable to short trips and are very different from those in places where micromobility programs have been successful. Policies for new development will help address this, but most of the existing development will not change significantly.
- Any form of “smart infrastructure” will require the Town to deploy systems and standards that are compatible with those used elsewhere. It is also currently difficult to assess the potential benefits and costs.
- The Town’s ability to influence external trips is limited because those trips involve services and infrastructure provided by others. Given that external trips account for nearly half of Oakville’s trips, this is a key challenge in delivering any significant change to Oakville’s travel patterns.

5.3 Opportunities

- The adoption of the Vision Zero and/or Complete Streets approaches provides an opportunity to embed significant change in the way Oakville's transportation system is planned, designed and delivered. In particular, it could help shift the focus of roads away from the movement of personal vehicles and in turn improve transportation safety.
- The rise of car-sharing services and other new mobility options can help reduce the need for car ownership – and hence parking and people's homes and destinations. This provides an opportunity to decrease parking requirements, which will help achieve the Town's density targets for residential and non-residential development.
- The use of autonomous vehicle technology for transit provides an opportunity to deliver much higher levels of service within the existing operating funding envelope.
- The primary (potential) benefits of alternative vehicle energy source are lower operating costs for users; the primary benefit for Oakville and wider society is decreased atmospheric pollution and greenhouse gas emissions. There is an opportunity to realize benefit for both groups by supporting their use across all modes (not just cars).

5.4 Challenges

- The use of most new technologies and trends in transportation are strongly influenced by factors beyond the Town's control. Consequently, managing their effects will require a proactive approach by the Town. Failing to do so will mean the Town will not be able to maximize the benefits, nor minimize any negative effects.
- The attractiveness of new travel options with one traveller per vehicle (such as ride-sharing, ride-sharing and CAVs) may it more difficult to increase the use of sustainable travel options.
- The regulatory environment and associated major policy issues for autonomous vehicles are controlled by the Province. This creates a risk that Provincial regulations do not align with the Town's goals for its transportation system. The Town would need to engage with the Province to further its policy aims associated with smart vehicles.
- The potential benefits of Mobility as a Service (MaaS) require Oakville and other providers of transportation services and infrastructure to provide the necessary information and interfaces.

Bibliography

- *Impacts of car2go on Vehicle Ownership, Modal Shift, Vehicle Miles Traveled, and Greenhouse Gas Emissions: An Analysis of Five North American Cities*. Martin & Shaheen, 2016.
http://innovativemobility.org/wp-content/uploads/2016/07/Impactsofcar2go_FiveCities_2016.pdf
- *Vehicle requirements: Greater Toronto Area*. Uber, retrieved Nov 2019.
<https://www.uber.com/en-CA/drive/toronto/vehicle-requirements/>
- *Automated and connected vehicles*. Transport Canada, retrieved Nov 2019
<https://www.tc.gc.ca/en/services/road/innovative-technologies/automated-connected-vehicles.html>
- *MobilBye: Attacking ADAS with Camera Spoofing*. D. Nassi et al, 2019.
<https://arxiv.org/abs/1906.09765>
- *Ontario's Automated Vehicle Pilot Program*. MTO, retrieved November 2019.
<http://www.mto.gov.on.ca/english/vehicles/automated-vehicles.shtml>
- *Autonomous Vehicles*. National Conference of State Legislatures, October 2019.
<http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx>
- *Canadian Conventional Transit Statistics*. CUTA, 2017.
- *Heavy Truck Cooperative Adaptive Cruise Control: Phase Two Final Report*. Auburn University / American Transportation Research Institute, 2017.
<https://truckingresearch.org/2017/04/12/heavy-truck-cooperative-adaptive-cruise-control-evaluation-testing-and-stakeholder-engagement-for-near-term-deployment-phase-two/>
- *Identifying Autonomous Vehicle Technology Impacts on the Trucking Industry*. Short, J. & Murray, D., 2016
<http://atri-online.org/wp-content/uploads/2016/11/ATRI-Autonomous-Vehicle-Impacts-11-2016.pdf>
- *Eliminate Surface Parking Lots*. Downtown Winnipeg BIZ, retrieved November 2019.
<https://downtownwinnipegbiz.com/topic/involvement/>
- *Yearly Energy Output by Fuel Type*. Independent Electricity System Operator (IESO), Retrieved Nov 2019.
<http://www.ieso.ca/power-data/supply-overview/transmission-connected-generation>
- *Toronto's Electric Vehicle Strategy*. City of Toronto, 2019.
<https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/reports-plans-policies-research/electric-vehicles/>
- *Charging electric vehicles*. MTO, retrieved Nov 2019.
<http://www.mto.gov.on.ca/english/vehicles/electric/charging-electric-vehicle.shtml>
- *Electric Vehicle Sales in Canada – Q2 2019*. Electric Mobility Canada, August 2019.
https://emc-mec.ca/wp-content/uploads/Sales-Report-2019-Q2_revised.pdf

- *Electric Vehicle Sales in Canada – 2018*. Electric Mobility Canada, February 2019. <https://emc-mec.ca/wp-content/uploads/EMC-Sales-Report-Rapport-de-ventes-M%C3%89C-2018.pdf>
- *Table 23-10-0067-01: Vehicle registrations, by type of vehicle*. Statistics Canada. Retrieved Nov 2019. <https://doi.org/10.25318/2310006701-eng>
- *Kick Style Electric Scooter (e-scooters)*. MTO, August 2019. <https://www.ontariocanada.com/registry/view.do?postingId=30207&language=en>
- *Electric Bus Feasibility Study*, page 1:10. Marcon/City of Edmonton, June 2016. https://www.edmonton.ca/projects_plans/transit/electric-buses.aspx
- *Hydrogen production by PEM water electrolysis – A review*. Kumar & Himabindu, Dec 2019. *Materials Science for Energy Technologies* Volume 2, Issue 3, Pages 442-454. <https://doi.org/10.1016/j.mset.2019.03.002>
- *Recent Canadian advances in nuclear-based hydrogen production and the thermochemical Cu–Cl cycle*. Naterera et al., 2009. *International Journal of Hydrogen Energy*, Volume 34, Issue 7, Pages 2901-2917. <https://doi.org/10.1016/j.ijhydene.2009.01.090>
- *Why Cyber-Monday doesn't mean delivery gridlock Tuesday*. Joe Cortright, 2019. http://cityobservatory.org/cyber-monday-delivery_gridlock/
- *Get permission to fly your drone outside the rules*. Transport Canada. Retrieved Feb 2020. <https://www.tc.gc.ca/en/services/aviation/drone-safety/get-permission-fly-drone-outside-rules.html>
- *A Cost Analysis of Amazon Prime Air (Drone Delivery)*. Sudbury Hutchinson, 2016. *Journal for Economic Educators*, vol. 16(1). <https://ideas.repec.org/a/mts/jrnlee/v16y2016i1p1-12.html>
- *Analysis of the potential demand of automated delivery stations for e-commerce deliveries in Belo Horizonte, Brazil*. De Oliveira et al, 2017. *Research in Transportation Economics*, Volume 65. <https://doi.org/10.1016/j.retrec.2017.09.003>
- *Drone innovation and collaboration*. Transport Canada. Retrieved Feb 2020. <https://www.tc.gc.ca/en/services/aviation/drone-safety/drone-innovation-collaboration.html>
- *Where are Complete Streets in Canada?* Complete Streets for Canada, retrieved November 2019. <https://www.completestreetsforcanada.ca/locations/>
- *Vision Zero - An ethical approach to safety and mobility*. Tingvall & Haworth, 1999. <https://www.monash.edu/muarc/archive/our-publications/papers/visionzero>
- *Canada's Road Safety Strategy (RSS) 2025*. Canadian Council of Motor Transport Administrators, 2016. <https://roadsafetystrategy.ca/files/RSS-2025-Report-January-2016-with%20cover.pdf>
- *A New Traffic Safety Paradigm*. Todd Litman, Victoria Transport Policy Institute, 2019. <https://www.vtpi.org/ntsp.pdf>
- *Smart Commute Workplace Program Business Case Review*. Metrolinx, 2015. http://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/benefits_case_analyses.aspx#smartcommute
- *Transportations Tomorrow Survey 2016*. Transportation Information Steering Committee
- *Gent's Traffic Circulation Plan (Belgium)*. Eltis - The Urban Mobility Observatory, October 2017. <https://www.eltis.org/discover/case-studies/gents-traffic-circulation-plan-belgium>
- *The Circulation Plan*. City of Ghent, retrieved January 2020. <https://stad.gent/en/mobility-ghent/circulation-plan>

- *How a Belgian port city inspired Birmingham's car-free ambitions.* Carlton Reid, January 2020. <https://www.theguardian.com/environment/2020/jan/20/how-a-belgian-port-city-inspired-birminghams-car-free-ambitions>
- *Ghent – Changing the Whole Circulation Plan Overnight: a Strong Political Decision.* Cadence Magazine, retrieved January 2020. <https://www.cadencemag.co.uk/ghent-changing-the-whole-circulation-plan-overnight-a-strong-political-decision/>
- *Sustainable urban transport: what can we learn from Copenhagen?* Maria Camila Ariza, María Camila Quinter, Keisgner E. Alfaro; 2019. <https://blogs.iadb.org/ciudades-sostenibles/en/sustainable-urban-transport-what-can-we-learn-from-copenhagen/>
- *What Canada can learn from Copenhagen: The best city for cycling.* Alex Bozikovic, 2018. <https://www.theglobeandmail.com/life/health-and-fitness/fitness/what-canada-can-learn-from-copenhagen-the-best-city-for-cycling/article29363711/>

Complex questions.
Powerful answers.

Explore steergroup.com or visit one of our 20 offices:

Bogotá, Colombia	Los Angeles, USA	San Juan, Puerto Rico
Bologna, Italy	Manchester, UK	Santiago, Chile
Boston, USA	Mexico City, Mexico	São Paulo, Brazil
Brussels, Belgium	New Delhi, India	Toronto, Canada
Leeds, UK	New York, USA	Vancouver, Canada
Lima, Peru	Panama City, Panama	Washington DC, USA
London, UK	Rome, Italy	

steer

To Geoff Abma

Memo

Cc

From Steer

Date 9 September 2020

Project Strategy for Urban Mobility and Transportation Planning Project No. 23703601

Assessment of COVID-19 Impacts

Introduction

The Town of Oakville is creating a Strategy for Urban Mobility and Transportation Planning. During the development of this strategy, the COVID-19 pandemic took hold. This pandemic has already had a major effect on how people travel, as well on the economy and society more widely.

Currently, there are many unknowns relating to COVID-19:

- **Will/when there be a medical resolution?** We do not know whether or when there will be a medical resolution to COVID-19. There is no guarantee of an effective treatment or vaccine in the short-medium term.
- **Will herd immunity be established?** We do not know whether surviving COVID-19 creates immunity. Even if it does, we do not know for how long and hence whether herd immunity will build in populations
- **Will future waves be seasonal?** We do not know whether COVID-19 will be seasonal with potentially stronger waves in winter months, similar to flu.

Given these uncertainties, the scope of work for the Strategy was extended to examine and assess the short-term and long-term effects of COVID-19 on Oakville's transportation system. This includes both how it will be used (demand) and the effects on the services and infrastructure the Town provides (supply).

This memo presents the results of that analysis, covering what the future might look like, the potential effects, and resulting considerations for the development of the Strategy.

What could the future look like?

This section summarises the "Business as usual" (BAU) baseline – what was expected (before COVID) to happen to Oakville's transportation system. It then presents a set of scenarios for the management of COVID and medical advances.

"Business as usual" baseline (without COVID)

The 2013 Transportation Master Plan (TMP) and 2018 Review described the expected path for Oakville's transportation system. This section summarises their description of the current and expected future state, with full details available in those documents.

Changes to transportation demand

Land use is fundamental driver of demand for the transportation system. Future changes to land use will have a significant effect on future changes to overall travel demand. Once north Oakville is built out, future growth in Oakville will come through intensification at various nodes and corridors. The 2018 Update summarises Oakville’s planned land use changes as follows:

“The Livable Oakville Plan (the town’s Official Plan) ... identifies nodes and corridors, or Growth Areas, as key areas of the town at the focus for transit-oriented mixed-use development and areas for intensification. These locations include Midtown Oakville (also the provincially designated Urban Growth Centre in Oakville), Uptown Core, Palermo Village, Ker Village, Bronte Village, Downtown Oakville, Trafalgar Road Corridor (QEW to Dundas Street) and the corridors along Dundas Street and Speers Road. Additionally, Nodes and Corridors are identified from the North Oakville East Plan to include the Trafalgar, Dundas, and Neyagawa Urban Core Areas.”

Source: 2018 TMP Update, §3.1 Projected Land use

The population and employment forecasts used in the 2018 Update are shown in Table 1. They show significant growth, with employment growing faster than population. This implies that the transportation system will have to accommodate more travel and could also have a greater proportion of internal trips.

Table 1: 2018 Update Best Planning Estimates Population and Employment Forecast for Oakville

	2017	2027	2031	% growth 2017 to 2031
Population	197,684	240,044	246,400	25%
Employment	97,233	120,987	123,360	32%

Source: 2018 TMP Update “Derived by Watson & Associates Economist Ltd/ from Halton Region Best Planning Estimates, 2011”

While the 2013 TMP did not assess trip purposes, the analysis did find a high degree of self-containment with the majority of peak period trips originating in Oakville being internal trips. It also reported a short average trip length, with more than 60 percent of trips less than 10km. The growth in Oakville’s population and employment to 2031 is broadly similar to the GTHA as a whole. This suggests that the proportion of internal trips and short trips would be likely to remain roughly the same.

Mode split trends

Figure 1 shows the existing mode share reported in the 2018 Review for trips in the AM and PM Peak Periods going from and to Oakville in 2011.

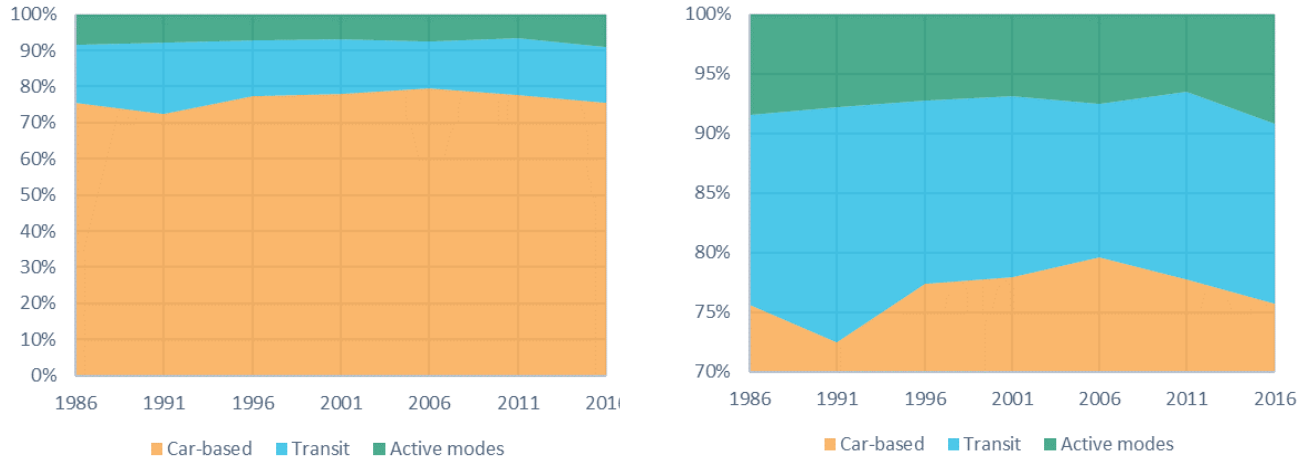
Figure 1: TMP Review Modal Share Summary

Mode	AM Peak Period		PM Peak Period	
	Outbound	Inbound	Outbound	Inbound
2011 TTS				
Automobile	77.6%	86.0%	92.2%	85.8%
Transit	2.3%	2.5%	1.9%	1.6%
Walk/Cycle	6.5%	6.9%	3.1%	2.9%
GO Rail only	7.0%	0.2%	0.4%	5.5%
Joint GO and Public Transit	3.2%	0.3%	0.4%	2.4%
Other	3.4%	4.1%	2.1%	1.7%
Total	100%	100%	100%	100%

Source: Oakville TMP Review, Table 1: Modal Share Summary

To set these figures in context, Figure 2 shows the trends for mode share from 1986 to 2016 for AM peak trip originating in Oakville. They show a consistent pattern of high car use. Recently, car-based modes have declined from 80% in 2006 to 76% in 2016.

Figure 2: Mode share trends (trips originating in Oakville, AM Peak)



Source: Transportation Tomorrow Survey. (“AM peak” is trips starting 0600-0859)

The 2018 Review examined six scenarios for future mode split¹, summarised in Table 2. These scenarios were intended as policy-driven targets to guide the planning of Oakville’s transportation system, rather than predictions for mode split would result from the plans for Oakville’s transportation system. The “TDM” figure refers to the reduction in trip rates compared with existing conditions.

Table 2: Mode Split Target Scenarios

Scenario	Baseline	A	B	C	D	E
Active Transport	3%	6%	6%	6%	6%	6%
TDM (demand reduction)	3%	6%	6%	6%	6%	6%
Local transit	1%	1%	3%	1%	3%	6%
Regional transit	3%	3%	4%	7%	9%	10%
Auto	90%	84%	81%	80%	76%	72%

Source: 2018 TMP update, Appendix B

As part of the mode split scenario analysis, the 2018 Review extensive road modelling of each scenario for the 2031 horizon year. The outputs included link-level and screenline performance, screenline lane deficiencies, and PM peak hour volumes and volume/capacity ratios by road segment.

¹ The transit mode shares in each scenario varied by origin and destination; the summary given in the 2018 Update for local and regional transit is presented here.

The 2018 Update recommended the adoption of Scenario E (highlighted in bold in Table 2), which has the highest transit mode share and lowest auto mode share of any of the scenarios.

Changes to transportation supply

A key output from the 2013 TMP and 2018 Review was the planned changes to the Town's transportation supply through to 2031, including its roads, transit, cycling and walking networks.

The road network serving Oakville is the responsibility of three levels of government, each with their own plans:

- **Province (MTO):** addition of HOV lane on QEW; additional general-purpose lanes on Hwy 403; new north-to-east and east-to-north ramps on Hwy 403/QEW interchange; rehabilitation and replacement of various structures.
- **Region:** widening of various roads within Oakville, including Ninth Line, Winston Churchill Blvd, Burloak Dr, Tremaine Rd, William Halton Parkway; new bridge and road segments for William Halton Parkway; new road segment for North Service Rd.
- **Town:** various arterial road widenings; grade separations at various rail crossings; reconstruction of various roads from rural to urban standards.

Transit in Oakville is provided by the Province (through GO Transit) and the Town:

- **Province (GO Transit/Metrolinx):** The Regional Transportation Plan includes frequency improvements to the GO Rail service; LRT/BRT on Trafalgar Rd; Priority bus on Dundas, Speers/Cornwall and Bronte; and frequent regional express bus on QEW, Hwy 403 and Hwy 407
- **Town:** Improving GO Train connectivity with increased frequencies in peak periods; transitioning "Home-to-Hub" service in north Oakville to conventional service; and improving services to Sheridan College.

Active transportation facilities are the responsibility of the Town, with the exception of cycling facilities on Regional roads. The Town's 2017 Active Transportation Master Plan (ATMP) update includes expanding the network for cycling facilities to more neighbourhoods and linking disconnected sections of the network. The new facilities will be mostly signed routes, with some bike lanes and trails. The Town's ATMP incorporates the recommendations of Halton Region's 2015 Active Transportation Master Plan on Regional roads.

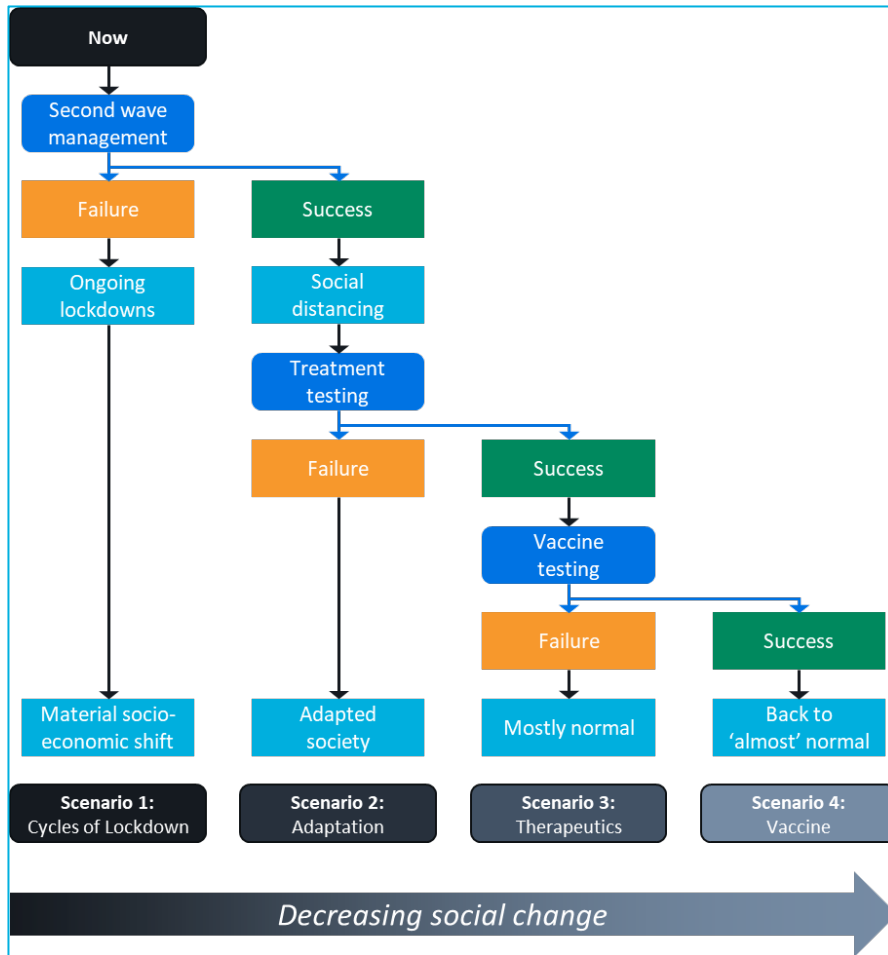
The ATMP update's planned pedestrian network includes sidewalks on both sides of almost all streets (which are in place on most existing streets).

Overall, the planned changes to transportation supply in Oakville all involve steady evolution that builds on the existing network and services. Those changes are in line with the wider aims to accommodate growth in travel and also encourage mode shift away from car use.

Develop alternative scenarios

The flow-chart in Figure 3 illustrates four scenarios under consideration, which vary based on the progress made in treatments and vaccines.

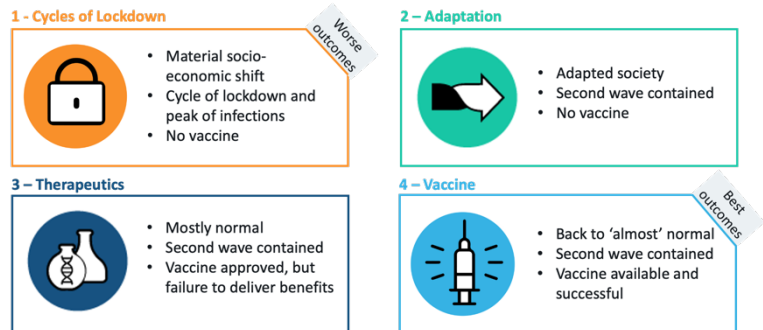
Figure 3: Potential COVID Scenarios



Source: Steer analysis, adapted from UK Government Office for Science “Futures Toolkit”

The four scenarios are as follows:

- **Scenario 1: Cycles of Lockdown.** This scenario would have no vaccine, with a cycle of lockdowns and peaks of infections. This would create a significant socio-economic shift.
- **Scenario 2: Adaptation.** This scenario would have no vaccine, but second wave(s) would be contained. The mitigation measures currently in place become permanent, leading to an adapted society
- **Scenario 3: Therapeutics.** This scenario would have no vaccine but would have effective treatment available for disease. Any second wave(s) would be contained, allowing a life to mostly return to pre-COVID normal.
- **Scenario 4: Vaccine.** This scenario requires a successful vaccine to be available. The vaccine would prevent or moderate second wave(s), allowing everyday life to return to ‘almost’ normal.



What effects would each scenario have?

Scenario influences and effects

In assessing the potential effects, Steer examined the following factors that could both cause and be affected by changes to the transportation system and its use as a result of COVID-19.

- **Economy:** Duration and intensity of a recession, currency depreciations (between country impacts)
- **Social Distancing:** Continuation or otherwise of social distancing, either regulated or through changed behaviours/track & trace.
- **Transport pricing/cost:** Price of oil, cost of travel.
- **Transport supply/capacity:** Availability and capacity of transport modes because of economics or social distancing.
- **Mode preference:** Public perception/fear, medical evidence, changed costs/benefits of each mode
- **Transport policy:** Transport policy measures (e.g. subsidies, regulation, capital investment).
- **Migration/land-use:** Change in migration patterns, change in locations of residence/employment
- **Teleworking:** Willingness for flexible working/working from home
- **Commuting travel:** Willingness to travel to work or move for a new job.
- **Business travel:** Changed requirements from business to attend meetings, conferences and such.

For each of the factors, the variation between scenarios was examined to identify short-term and long-term commonalities and differences. The short-term effects (first two to three years) under all four scenarios is expected to be similar:

- **Recession:** continued fall-out from places of business closing, leading to higher unemployment and lower consumer spending; lower tax revenue for Provincial and Federal government may also limit their discretionary spending.
- **Dispersed activities:** people will avoid activities that exposes them to large groups, preferring activities they can do with household members only.
- **Social division:** people with higher-income jobs are more likely to be able to work at home, lessening their personal risk of catching COVID. Those jobs are less likely to be affected by people's desire to avoid going out (and spending money).
- **Private not public transport:** a mix of public perception and actual risk will deter people from using public transit, with people preferring "private" modes (cars and active transportation).
- **Fewer trips/person:** Reduced commuting and discretionary travel will decrease the number of daily trips per person.

The longer-term effects are expected to show more variation between scenarios. This is because the variation in the longevity and effectiveness of social distancing and the scale and duration of economic downturn. These factors in turn will influence both transportation supply and demand, which in turn will result in changes to land use patterns and people's activities.

Table 3 shows the key differences between the effects of Scenarios 1 and 4; the effects of Scenarios 2 and 3 would fall between these two extremes.

Table 3: Key differences between scenarios

Area	Scenario 1: Cycles of Lockdown	Scenario 4: Vaccine
Lifestyle	<ul style="list-style-type: none"> • Social distancing becomes embedded • Localisation • Dispersal 	<ul style="list-style-type: none"> • Drift back to pre-COVID norms
Economy	<ul style="list-style-type: none"> • Long deep recession • Slow recovery • Structural change • Increased societal division 	<ul style="list-style-type: none"> • Short recession • Economy returns to trend • “Lost years”
Demand	<ul style="list-style-type: none"> • Growth in car use (tempered by economic performance) • Large drop in public transit • Large growth in active transport • Large growth in online and associated local goods movement 	<ul style="list-style-type: none"> • Modest growth in car • Drop in public transit use followed by slow recovery at best • Modest growth in active transport • Modest growth in online and associated local goods movement
Supply	<ul style="list-style-type: none"> • Road capacity increases more urgent • Significant reduction in bus/rail services • Pressure for better pedestrian and cycling connectivity and unfractured 	<ul style="list-style-type: none"> • Manageable pressures on road network • Modest reduction in bus/rail services • Pressure for better pedestrian and cycling connectivity and unfractured
Land Use	<ul style="list-style-type: none"> • Big drop in city centre retail, offices, leisure • Increased interest in edge of town 	<ul style="list-style-type: none"> • Less city centre retail, offices, leisure • Increased interest in edge of town

Source: Steer analysis, adapted from UK Government Office for Science “Futures Toolkit”

The following sections provide additional information on each of these areas. In all cases, the magnitude and duration of these effects is highest under Scenario 1 and lowest under Scenario 4.

Lifestyle

The longer that travel restrictions and social distancing and social distancing effects are in place, the more significant the behavioural changes will be. Lifestyles would become more oriented towards activities with household members, and more focused on the local area.

Working at home is a viable option for some job types, and completely infeasible for others. (The proportion of Oakville residents unable to work at home is discussed in the ‘Transportation demand’ section, below.) Jobs that must be done in-person are more likely to have lower pay. Similarly, groups of people who are more vulnerable to COVID would be more affected by restrictions than those without.

The 2016 Census showed that 8.9 percent of adults and 12.4 percent children in Oakville live in low-income households², compared with 13.4 percent and 18.4 percent for Ontario. Oakville is often regarded as a prosperous community but this only increases the risk that the needs of low-income groups are not properly considered.

² Using Statistics Canada’s “Low income measure”

The emerging evidence suggests that older people are vulnerable for COVID and its effects. Young people would increasingly accept (or possibly ignore) the risk of catching the virus; older and more vulnerable people travel less and only for essential purposes. Oakville's population skews a little younger than Ontario: 27 percent are aged under 0-19 and 15 percent are aged 65 or older, compared with 22 percent and 17 percent respectively for Ontario.

Overall, there would be a growing divide between people who are vulnerable to the virus (or the economic effects) and those who are not.

Economy

Under all scenarios, there would be a major economic shock and a significant rise in unemployment. Any business where control measures reduce the number of customers that can be served will have a reduction in revenue. Hospitality, food and beverage, in-person retail and the supply chains for these sectors will be most affected. This would lead to an increase in business failure. The resulting unemployment will then have wider supply-side effects on all businesses. Further, the provincial, territorial and Federal governments would see a reduction in tax revenue. This would potentially reduce their spending and associated employment.

The effects on people would vary considerably. The sectors most affected tend to have a high proportion of low-paying jobs, and also a greater proportion of young people. This means low-income groups would see their income drop significantly more than high-income groups, creating and exacerbating social divisions. Although 'normal' recessions have similar effects, the magnitude would be greater because people's ability to spend money in those sectors would be constrained by both financial and personal health concerns.

The duration and magnitude of the economic downturn will depend heavily on the duration and extent of restrictions that affect the ability of businesses to operate. It will also depend on people's willingness to visit businesses where people congregate. The economic effects would extend beyond the duration of these restrictions, with the economy highly unlikely to bounce back to pre-COVID norms.

The ability of the provincial, territorial and Federal governments to mitigate the economic downturn will depend on the strength of the pre-COVID economy and political will. As of the 2018-19 fiscal year, Ontario had the second-highest debt-to-GDP ratio of Canada provinces³ and the Province has invested heavily in additional COVID relief program, almost doubling the projected 2020-2021 deficit to close to \$40 billion. This may indicate that Ontario's ability to take on additional debt to provide future economic stimulus is limited.

In Ontario, municipalities are legally prohibited from running operating deficits. Their operating income comes from a mix of property tax revenues, user fees, and Provincial funding. Property tax revenue (by design) is relatively immune to economic downturns. User fees play a particularly important role for transit and are discussed in the 'Transport supply' section following. They are less important for other modes. The level of Provincial funding will depend entirely on the Province's political decisions, as

³ *Canadian Federal and Provincial Fiscal Tables*, page 12. RBC Economics, July 2020.

http://www.rbc.com/economics/economic-reports/pdf/canadian-fiscal/prov_fiscal.pdf

discussed in the previous section. If it is decreased, municipalities will have to choose between spending cuts and property tax increases (or a combination of the two).

Overall, there would be a major economic shock and unemployment in all scenarios. The negative effects would primarily depend on duration and extent of restrictions and would extend beyond when those restrictions are lifted.

Transport demand

The effects on transportation demand will steadily increase in line with the magnitude and duration of changes to everyday life arising from COVID. Without a quick return to 'normal' (Scenario 4), there will be both a reduction in total travel demand and a change in mode split.

In general, there would be a switch from public (transit) to private (car-based and active) modes of transportation. This is because public transit involves spending time in close proximity to other people, which is likely to be seen as risky behaviour.

Longer journeys would tend to switch from transit to car-based modes; shorter journeys would tend to switch to active transportation, particularly walking. Given the Town's policies to move people away from car-based travel, this implies Oakville should aim to improve walking and cycling in any way.

Oakville has just over half (56 percent) of its trips take place within the town; about a third of trips (32 percent) are a bikeable distance (less than 5km). This means there is strong potential for much greater active transportation use. Ensuring good walking connections around trip attractors and good inter-municipal connections (especially for cycling) would help with this.

Currently, car-based modes are used for a high proportion of Oakville's trips (87 percent drive or auto passenger). This in turn limits how much they could increase and hence limit the extra roadway demand that would be created. The higher mode share may be offset by lower travel demand (discussed below).

School travel would be a travel market with even stronger potential for mode shift. Pre-COVID, around 25 percent of school trips by those aged 11-17 were by school bus. School bus use would have similar issues to public transit. Generally, there will be a small decrease in the total number of students travelling to school as some parents elect to home school or exercise the virtual learning option. Of those that do travel, it is likely that fewer will want to use schools bus transportation. Given more than 95 percent of Oakville's households have a car, this would likely result in a shift from school bus to drive-and-drop-off. However, Oakville also has the highest cycling use for school travel of any GHTA municipality (6.8 percent of school trips by those aged 11-17). This implies that good conditions for cyclists already exist, and that targeted efforts would help mitigate the additional drive-and-drop-off trips.

Commuting travel would be decreased, both as a result of higher unemployment and more people working at home. However, working at home is not an option for all job types. Table 4 shows the percentage of employed people by the National Occupation Classification (NOC) code⁴ of their job in

⁴ The NOC framework can be explored at <https://noc.esdc.gc.ca/Structure/Hierarchy/d13e35cc7011427da6f4d64baf60ee1e>

Oakville in Ontario. The figures in brackets exclude management occupations (NOC #0). The figures in brackets are the percentage of non-management occupations.

Table 4: Employment National Occupation Classification (NOC) code in Oakville and Ontario

NOC #	Description	Oakville	Ontario
0	Management occupations	18% (--)	11% (--)
1	Business; finance and administration	19% (23%)	16% (18%)
2	Natural and applied sciences and related	10% (12%)	7% (8%)
3	Health	6% (7%)	6% (7%)
4	Education; law and social; community and government services	12% (14%)	12% (13%)
5	Art; culture; recreation and sport	4% (5%)	3% (4%)
6	Sales and service	22% (26%)	23% (26%)
7	Trades; transport and equipment operators and related	7% (8%)	13% (15%)
8	Natural resources; agriculture and related production	1% (1%)	2% (2%)
9	Manufacturing and utilities	3% (3%)	5% (6%)

Source: Statistics Canada. Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001.
<http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E>

Examining the detailed classification suggests that most people in NOC #0 (Management occupations), #1 (Business; finance and administration) and #2 (Natural and applied sciences and related) would be able to work at home. Close to half (46 percent) of Oakville’s workers are in these three groups, compared with a third (35 percent) of Ontario’s workers.

Alternatively, workers in management occupations may be able to work at home only if the people they manage also can work at home. Assuming managers are distributed between NOC areas in the same proportion as non-managers, then the figures in brackets can be used. This implies that just over a third (35 percent) of Oakville’s workers #1 (Business; finance and administration) and #2 (Natural and applied sciences and related), compared to a quarter (26 percent) of Ontario’s workers.

Oakville residents who work in office jobs in PD1 would have a strong likelihood of working at home. This would reduce GO Train use from Oakville. Since trips to GO stations are a key market for Oakville Transit, transit would carry fewer people to the GO stations, from a combination of lower GO Train use, decreased desire to transit generally, and lower parking demand at the stations making park-and-ride more attractive. The latter factor would also create a shift from auto passenger to auto driver as the access mode for GO Train.

The number of **discretionary and leisure trips** would decrease and would also be more likely to be to local destinations. This is a result of both social distancing and the economic downturn. Demand at Town-operated leisure facilities (if open) would need to be monitored to ensure appropriate provision is in place. The same factors in combination with government-imposed restrictions would also decrease long-distance and international travel. However, this would have only minor effects on the Town’s transportation system.

Overall, the trend would be for lower travel demand (fewer trips per person). Transit usage in Oakville would be lower from a combination from decreases in key travel markets and mode shift towards active transportation and car-based modes.

For **goods movement**, the ongoing trend for greater online shopping and associated home delivery would accelerate. Oakville does not currently have any of the large-scale distribution warehouses and current land use policies and development patterns suggest this would remain the case. Increased local goods delivery would result in additional goods vehicle traffic from adjacent municipalities (particularly Oakville). These would be vehicles suitable for deliveries on local residential roads.

Conversely, the economic downturn and move away from bricks-and-mortar shops would reduce deliveries to those businesses in Oakville. The delivery vehicles used for those deliveries are typically much larger. Consequently, Oakville is likely to see more but smaller goods vehicles on its roads.

Transport supply

The Town's 2018 TMP Review examined a number of options for future mode split, choosing "Scenario E", which included growth in active transportation, TDM measures to reduce total travel demand, and high growth in both local and inter-regional transit. The car-based mode share was used to inform the requirements for future the road network.

For **car-based** travel, the Town's current plans for transportation assume a shift away from car-based travel to other modes. However, overall road demand was still expected to increase as result of higher total travel demand. Consequently, the Town has plans in place for additional road capacity, as detailed in the 2013 TMP and 2018 Review. If the expected mode shift away from car-based travel is not as strong as planned and no mitigating measures are in place, then those road capacity increases would be needed sooner. On the other hand, greater working at home may reduce traffic volumes in peak periods, delaying the need for road capacity increases. The Town will need to monitor traffic volumes (through existing data collection programs) to inform the changes in timing.

Road network modelling was carried out for all the various mode split options in the TMP Review. Under those options, the split between non-car modes did not affect the modelling process. Consequently, the TMP Review mode split option with the expected *car* mode share will already have suitable information about the future state of the road network.

Under all four COVID Scenarios, **public transit** usage (and hence revenue) would decrease, particularly in Scenarios 1 and 2. This would mean either higher municipal spending on local transit, higher fares, or lower service levels (or some combination thereof). The Town of Oakville's 2020 budget⁵ for Oakville Transit had an operating expenditure of \$9.3m, and other revenues of \$2.0m. This meant the required municipal subsidy was \$24.1m. If farebox revenue decreased 50 percent and service levels (and hence expenditure) remained the same, then the required municipal subsidy would be \$28.7m, equivalent to an extra \$22 per resident.

Rather than simply increasing subsidies, sustained lower ridership would likely result in a reduction in service levels – both by Oakville Transit, and by other transit agencies in the GTHA. This would involve longer headways or switching fixed-route service to some form of on-demand service or both. For

⁵ <https://www.oakville.ca/assets/general%20-%20town%20hall/2020-Approved-Operating-Capital-Budgets.pdf> page 201.

example, DRT in Durham has switched its network to a mixed of fixed-route services (operating at close to pre-COVID headways) and demand-responsive service in areas not served by these services. The intention is to re-introduce fixed-route service if and when demand and other considerations justify it.

As discussed in the previous section, the Town would have the opportunity to support greater **active transportation** use. Investing in active transportation infrastructure (particularly crossing points and bikeways) would be a key component of this.

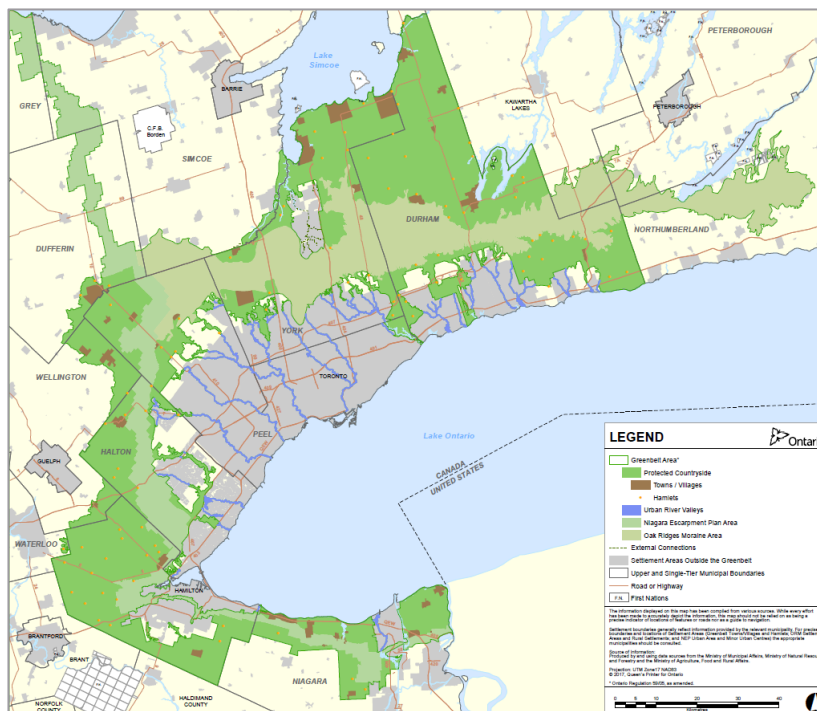
Overall, the effects would be accelerated timelines for road infrastructure investment, reduced public transit supply, and potentially improved active transportation infrastructure.

Land use

If the effects of COVID are sufficiently prolonged (particularly under Scenarios 1 or 2), then the principal effect will be a less city-centric society. Teleworking means people would be able to live further away from jobs that were based in city centres. Those businesses would place increased weight on the cost of office space rather than employee access. Similarly, the rise in e-commerce means people would place less value in living close to bricks-and-mortar stores. This will tend to create a more sprawled urban area.

This trend would have implications across the Greater Golden Horseshoe area, requiring coordination and planning above the local municipal level. The Province already has the ability to do this through the *Places to Grow Act*; the actions taken would be driven primarily by political considerations. Absent any action, the current rules regarding land use in the GGH under that Act would still apply and help curb sprawl within the GGH, but development could ‘leapfrog’ the greenbelt to areas such as (southern) Niagara Region, Brant County/Brantford, Waterloo Region, Wellington County/Guelph and (southern) Northumberland County. The existing greenbelt area is shown in Figure 4 for reference.

Figure 4: GGH Greenbelt



Source: Ontario Regulation 59/05, Schedule 1: Greenbelt Area
 12 of 15
www.steergroup.com

There are two potential directions at both the local and wider level: either significant massive reinforcement of car-based sprawl, or a trend towards urban areas being made up of multiple liveable neighbourhoods focused on amenities within walking or cycling distance. Oakville's travel patterns are currently heavily car-based, and it could end up trapped in that pattern. Alternatively, Oakville could push heavily for shift towards active transportation for neighbourhood-level trips, coupled with land use strategies that maximize the number of people with walk access to amenities. The latter would have been a key strategy for the Town in a non-COVID world.

Around two-thirds (66 percent) of Oakville's employed residents work outside the town. Stakeholder feedback indicate that Oakville is regarded as good place to live in and commute from. Its desirability as place to commute from is driven in part by the proximity (and travel time) to jobs. Greater levels of working at home would make that a less important factor in people's consideration of where to live. Conversely, Oakville local amenities and other features will play a greater part in Oakville's desirability.

As the 905-area became a greater proportion of the GTHA, there was a rise in suburban office parks. Recent years have seen this growth stall, with new office space primarily being created in downtown Toronto. Any reduction in demand for office space in the GTHA will only decrease the change of large-scale office development in Oakville. The future of existing suburban office parks is less certain. However, Oakville does not significant amounts of this land use, and hence wouldn't be significantly affected by these changes.

Overall, the location of activities and associated land-uses would tend to become more dispersed without policy intervention to support local travel.

What do we need to consider for the development of the strategy?

Summary of scenario effects

For lifestyle and economy, there will be a stark contrast between those affected and those with minimal disruption. This will widen existing social divisions, especially if public policy does not adequately consider the needs to vulnerable populations. The effects on lifestyle and the economy will continuing past the removal of restrictions in Scenario 1 (and potentially Scenario 2). In the other scenarios, restrictions will remain in place indefinitely, creating a fundamental shift in the way society and the economy operates.

Under all scenarios, travel demand will be lower as a result of economic effects, changes in working habits, increased online shopping, and people's desire to limit time in public spaces. Census results imply Oakville has a higher proportion of people able working at home, accentuating the effects. There will be a shift from transit to active transportation for short trips, and to car-based modes for long trips. Oakville Transit will be affected by the reduction in commutes to PD1 (and hence trips to GO stations). The short-term trend will be fewer auto trips in the peak period, but higher auto mode share. The long-term effects depend actions taken by government and wider lifestyle and economic effects. Scenario 1 would see the closest return to pre-COVID travel patterns, but some effects will remain permanent. Scenarios 2-4 would see progressively larger-scale and longer-term changes.

Changes to transport supply are primarily under the control of the Town. There will be a need for adjusted service levels and delivery methods for public transit on an ongoing basis in response to rapidly changing world developments. The Town will need to balance providing a basic level of service, financial

constraints, and the desire for long-term growth. There is a risk the latter is not given proper weight. The Town should place higher priority on active transportation investment (either temporary or permanent measures) to mitigate lower transit use. Longer-term, monitoring of peak traffic levels will reveal how the timelines for road investment should be revised.

The effects on **land use** take place over the long-term, and hence would be more significant in Scenarios 3 and 4 than in Scenarios 1 and 2. There would be tendency at the regional (Greater Golden Horseshoe) level towards greater sprawl as a significant portion of people are able to live further from their jobs. By contrast, the municipal level will see a trend towards localism, with people choosing to focus on local amenities. This means the region will become more poly-nodal (with a large number of small focal points rather than a small number of large focal points). Oakville’s desirability as a place to live will depend more on its local amenities (and ease of access to them) than a place to commute from (and access to far-away job centres).

Common opportunities and challenges

There are number of opportunities and challenges that are common to all scenarios, and these are summarized in Table 5.

Table 5 – Summary of Opportunities and Challenges

Area	Opportunities	Challenges
Roads and traffic	<p>Reduced auto demand makes re-allocating road space less controversial, for:</p> <ul style="list-style-type: none"> • traffic calming and safety improvements • transit signal priority and HOV lanes • bike lanes • streetscape improvements 	<ul style="list-style-type: none"> • Demand shifting from transit to car-based modes are result of health fears • Avoiding car use becoming further embedded on Oakville’s travel patterns • Predicting long-term traffic volume trends is difficult at this stage, particularly in peaks (higher car-based mode share vs. economic effects and working at home).
Transit	<ul style="list-style-type: none"> • UofT survey shows 80% of ‘lost’ riders happy to return to transit in future • Under-used P&R can be converted to other uses (including development) • Potential for local transit changes 	<ul style="list-style-type: none"> • Increased required public funding in short-term to maintain basic service • Balancing long-term demand and supply levels/methods to maintain acceptable financial performance
Active transportation	<ul style="list-style-type: none"> • Reduced auto demand makes re-allocating road space less controversial 	<ul style="list-style-type: none"> • Making active transportation a more attractive option for short trips • Expanding perception of “short trips”
Public space	<ul style="list-style-type: none"> • Creating neighbourhoods where people can access all of most basic, day-to-day needs within a short walk of their home 	<ul style="list-style-type: none"> • Accommodating public desire for outdoor rather than indoor activities, particularly for Town-operated facilities and during winter periods
Goods movement	<ul style="list-style-type: none"> • Less auto demand reduces potential delays for deliveries 	<ul style="list-style-type: none"> • If delivery trips increase, congestion, pollution and accidents can worsen

Most significant risks

Managing the unique situation for society brings with it some significant risks:

- Embedding Oakville’s car-orientated travel patterns, contrary to Oakville’s policies and strategic aims (and Halton and Province); allowing lower-density/sprawling development in and beyond GGH
- Assuming that “working at home” is a viable option for the majority of residents; more generally, failing to take the needs to vulnerable groups into consideration when crafting public policies.
- Failing to correctly determine which temporary changes should to the transportation system and urban environment should be made permanent. Transit is especially vulnerable, as short-term network changes could have long-term ridership effects
- Changing long-term plans based on short-term trends and then producing outcomes that are contrary to the Town’s strategic aims for its transportation system.

Conclusions

1. **This is a time of large-scale and rapid change in society.** Within a few weeks, the COVID-19 pandemic produced changes in public life and travel patterns of a scale that normally takes decades. Under all scenarios, those changes will continue in whole or in part for an extended period. No-one responsible for creating public policy (in transportation or other fields) has had to deal with anything like this before.
2. **Preventing and mitigating the negative effects of those changes requires rapid actions.** The changes from COVID-19 are already in place and will continue to evolve if no actions are taken. The negative effects could include embedding car-dependent travel habits and land use patterns, contrary to Oakville’s wider strategic aims. This memo has also described some of the other potential negative effects. Quick and decisive action is needed to deliver the changes Oakville wants.
3. **Town has opportunity to benefit from increased localism at municipal level.** Within municipalities, this memo has described how people will rely more on local amenities for everyday life. Oakville has multiple places in the town that can serve as focal points (such as downtown Oakville and Bronte). Further, the nodes and corridors in the Town’s OPA 15 will help support this trend.
4. **Continuous investments into good quality public transit infrastructure and services,** in addition to cycling and walking infrastructure, are needed if Oakville wants to make sustainable modes of transportation attractive and safer especially in the wake of this crisis.
5. **Local environmental benefits are at risk.** Without decisive action, the recent drop in pollution will be a short digression from past historical trend, soon replaced by a return to growth in automobile traffic. This risk is a concern, given the mounting evidence that pollution probably makes us more vulnerable to crises.
6. **Social and urban patterns are important.** It is increasingly clear that the geography of inequality – the social divide – is a key determinant of COVID-19 incidence and prevalence. Promoting de-densification could be damaging socially, financially, and from a climate perspective
7. **Inaction would affect resilience** – strong resilience of the offering in the context of possible rapid fluctuations in demand in the future is required, since future crises are foreseeable