

Report to Civic Works Committee

To: Chair and Members
Civic Works Committee

From: Kelly Scherr, P. Eng., MBA, FEC
Deputy City Manager, Environment & Infrastructure

Subject: Mobility Master Plan Update
Strategies, Mode Share Target Options and Project
Evaluation Frameworks

Date: July 18, 2023

Recommendation

That, on the recommendation of the Deputy City Manager, Environment & Infrastructure, this report on the development of the Mobility Master Plan **BE RECEIVED** for the purpose of providing Municipal Council with information on strategies in development, potential mode share target options and draft project evaluation frameworks for the Mobility Master Plan development.

Executive Summary

Purpose

The purpose of this report is to provide Municipal Council with information currently under consideration for the development of the Mobility Master Plan (MMP). The intent is to solicit initial Council feedback, consult externally, and return to the Civic Works Committee with recommendations at a future date. There are three main items discussed in this report:

- strategies in development
- mode share target options
- draft project evaluation frameworks.

These items are important as they are foundational elements that will determine how the MMP will recommend prioritizing funding for infrastructure projects and programs and identify policy recommendations.

This report will be followed by another report to Civic Works Committee later this year that will make recommendations on these topics for Council approval after further public consultation on the content.

Context

The London Plan identifies that a Transportation Master Plan may be prepared and updated regularly to implement the mobility policies of the plan including supporting sustainable land use, mobility choices and safety. This is particularly prudent now with London's rapid growth and in light of the Council-approved Climate Emergency Action Plan (CEAP). On November 2, 2021, Council approved the general framework for the community engagement program for the development of the Mobility Master Plan and the general scope for the consultant assignment to assist in preparation of the plan. In December 2022, Council approved the MMP Vision and Guiding Principles.

The purpose of this project is to create a new integrated Mobility Master Plan that identifies the mobility policy framework, infrastructure projects and supportive programs with a 25-year horizon. The MMP will build on and supersede the current Smart Moves

2030 Transportation Master Plan (2030 TMP) and the London ON Bikes Cycling Master Plan. The plan is being created using a thorough consultation process, technical analysis, and consideration of The London Plan, Council's Strategic Plan and associated initiatives such as the CEAP.

Creation of the MMP is a three-phase process. Phase 1 was focussed on consultation and listening to Londoners and created the MMP Vision and Guiding Principles. Phase 2 is now underway which overlays technical analysis for the creation of the infrastructure, program and policy recommendations. This report describes the considerations for the creation of the Phase 2 decision-making framework.

Phase 3 will include refinement of the recommended plan including key policy recommendations, implementation phasing and development of a monitoring program to track and measure success.

Linkage to the Corporate Strategic Plan

The completion of the MMP is specifically identified in the new Strategic Plan within the Mobility and Transportation Area of Focus as a strategy to increase access to sustainable mobility options. The completion and implementation of the MMP will advance and support numerous strategies under several Areas of Focus including Wellbeing and Safety, Climate Action and Sustainable Growth, Economic Growth, Culture and Prosperity, Housing and Homelessness and a Safe London for Women, Girls and Gender-Diverse and Trans People.

Analysis

1.0 Background Information

1.1 Previous Reports Related to this Matter

- November 2, 2021, Civic Works Committee, Initiation of the Mobility Master Plan Development
- March 1, 2022, Civic Works Committee, Mobility Master Plan Appointment of Consultant
- April 20, 2022, Civic Works Committee, Appointment of Transportation and Mobility Big Data Provider – Irregular Result
- November 29, 2022, Civic Works Committee, Mobility Master Plan Update

1.2 Mobility Master Plan Process Overview

Development of the MMP has been broken into three phases as illustrated below.

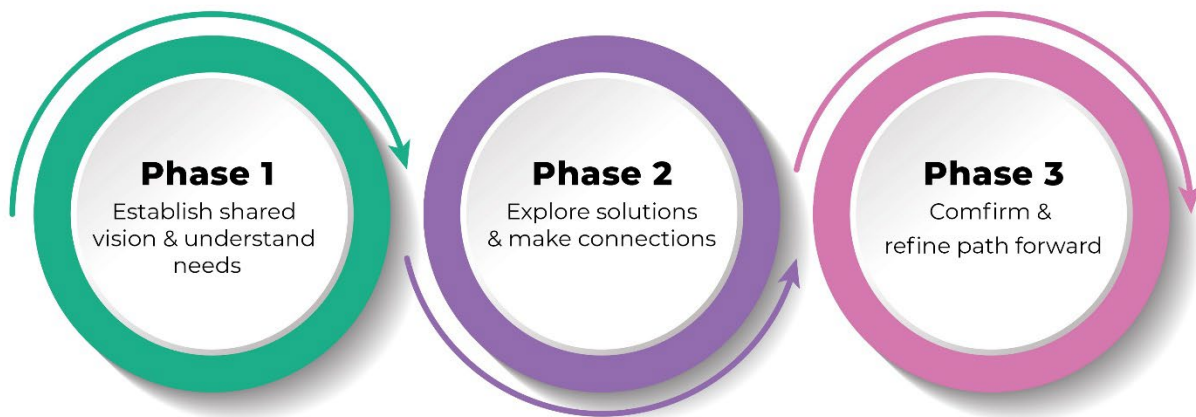


Figure 1: Mobility Master Plan Process

Phase 1 was initiated in April 2022 and included the development of the MMP Vision and Guiding Principles which were approved by Council in December 2022. More information on the Vision and Guiding Principles can be found in Appendix A.

Phase 1 included extensive community consultation to provide a deeper understanding of what the community cares about, uses, has challenges with and wants out of a transportation and mobility system. This information is summarized in the Phase 1 Engagement Summary Report which can be found on the project website at getinvolved.london.ca/mobility-master-plan.

Development of the MMP is now in Phase 2. Key tasks as part of Phase 2 include:

- Development of strategies to achieve the vision
- Confirmation of a mode share target
- Determination of future infrastructure needs based on forecasted population and employment growth and the confirmed mode share target
- Development of Transportation Demand Management (TDM) strategies
- Development of a long list of potential infrastructure projects
- Evaluation of potential projects
- Confirmation of the recommended projects to develop integrated, connected and efficient networks for each mode of mobility

This report provides information on initial Phase 2 activities including the development of strategies to achieve the vision, mode share target options and the draft project evaluation frameworks. Recommendations on these topics will follow through a subsequent report after additional consultation on the content. The direction received from Council at that time will inform the remainder of Phase 2 including the identification of infrastructure projects.

Phase 3 will include refinement of the recommended plan including key policy recommendations, implementation phasing and development of a monitoring program to track and measure success.

Meaningful community consultation will continue through all phases of the development of the MMP.

2.0 Discussion and Considerations

2.1 Strategies in Development to Achieve the Vision

The Council approved vision for the MMP is discussed in Appendix A. One of the key aspects of the vision is to provide Londoner's with choices for how they move around

the city. This is particularly important given London's rapid growth and increasing demands on the mobility system.

To achieve the vision of the MMP, contribute to the vision and key directions outlined in The London Plan, and take action on the Climate Emergency, there is a need to increase the viability of walking, cycling and transit to provide viable options to personal vehicles for everyday needs. This aligns with a planning paradigm shift occurring in London and across Canada to advance the full spectrum of sustainable city building objectives. London's rapid growth can more quickly effect the change that is desired and make London a more liveable city and a more attractive destination for immigration and employment. In London, a greater focus on enabling mobility options is supported by all of the MMP guiding principles.

Within the broader context of sustainably contributing to London's growth, there are eight strategies in development to support achieving the vision of the MMP. The strategies in development are as follows:

1. Use the Mobility System to Support London's Desired Future Land Use
2. Make Transit the Option of Choice for More Trips
3. Make Walking and Cycling Attractive Mobility Options to Meet Daily Travel Needs
4. Strategically Manage Road Capacity at Key Locations
5. Support London's Role as a Regional Hub
6. Put People First on London's Streets
7. Provide a Mobility System that Enables More Equitable Participation in City Life
8. Prepare for Change

The proposed strategies are discussed in greater detail in Appendix B.

2.2 Mode Share and Why it is Important

Mode share is the proportion of all person trips in the city that are made using each mode of mobility. For the purpose of the MMP, the various modes of mobility have been categorized as follows:

- Walking
- Cycling
- Transit
- Personal Vehicle - Driver
- Personal Vehicle - Passenger

Mode share is an important metric which helps inform pressures on the mobility system and how cities should invest in mobility infrastructure. A large percentage of personal vehicle trips leads to more congestion and a lack of sustainability in a growing city. To achieve the vision of the MMP and provide Londoner's more viable options for how they move around, London should strive for a more balanced approach and supporting all types of mobility. For future planning, the total number of people trips that the mobility system needs to accommodate will be determined based on forecasted population and employment growth. Mode share determines what percentage of those trips will be by each mode and the capacity needs of each type of mobility infrastructure.

The influence that mode share has on how investments are prioritized is also an equity issue. Many people do not have access to a personal vehicle and/or are unable to drive. Walking, cycling and transit can be more cost-effective choices for individuals, but are less feasible options in a transportation network dominated by personal vehicles. A lack of affordable, reliable and efficient mobility options is a barrier to many in accessing and maintaining a job, childcare, education, health care, groceries and other everyday needs.

In addition to infrastructure investment planning and equity, mode share also impacts greenhouse gas (GHG) emissions, road congestion and physical and mental health. Why mode share is important is discussed in more detail in Appendix C.

Many factors influence mode share and there is a two-way relationship between mode share and the city's built form. Both factors influence financial and environmental sustainability and the ability to achieve the MMP vision.

Some of the key factors which influence mode share include:

- land use and population and employment density;
- transit service levels; and
- active transportation infrastructure and maintenance.

These mode share factors are discussed in more detail in Appendix C.

2.3 2030 TMP Mode Share Targets and Current Status

There has been mixed success with the walking, cycling and transit targets set in the 2030 TMP. An increase in walking and cycling mode share has been observed while a decrease in transit mode share has been measured. While transit mode share has decreased there has been an increase in the total number of transit trips. This trend has occurred because population growth has outpaced the number of trips.

While comparing the current transit mode share against the interim 2020 target, it is important to recognize that implementation of some of the rapid transit recommendations in the TMP are ongoing and not yet in service. The planning, approvals, funding and implementation of large infrastructure projects is a lengthy process. Currently, the City is completing three major infrastructure projects as part of a rapid transit network. The completion of these projects and provision of the higher-order service in the coming years will make transit a more viable option for many trips. The beneficial impacts to transit mode share from this initiative will begin to be realized in the near-term.

More information on mode share trends and the 2030 TMP mode share targets is provided in Appendix D.

2.4 2050 Mode Share Target Options

The project team has developed a range of three potential 2050 mode share targets for the MMP. These options were developed by conducting analysis of:

- London's current (2019) mode share (23% transit, walk, cycle);
- London's current and planned 2050 population and employment density;
- Key current transit supply and demand metrics in London including annual rides per capita, annual rides per revenue vehicle hour and revenue vehicle hours per capita; and,
- Jurisdictional review of other municipalities.

When compared to the mode share targets in London's 2030 TMP, this range of mode share targets presents a more measured increase in transit use, recognizing the challenge of significantly increasing the share of trips made using transit within the context of existing development patterns and population growth. The growth in transit trips needs to significantly out pace growth in population to increase the share of trips made using transit. Building on the demonstrated trend of increased shares of walk/cycle trips, and given the potential with electric micromobility and London's high proportion of short-distance trips, the mode shares presented are more ambitious for walk/cycle compared to the 2030 TMP.

The range of mode share options presented below are all achievable for London with varying degrees of interventions and corresponding contributions to the Vision. As previously discussed mode share is extremely important for many reasons including that it will determine how final MMP will recommend prioritizing funding for infrastructure projects and programs for each mode of mobility

2.4.1 Mode Share Target Option 1: 25% Walk, Cycle, Transit

Option 1 represents a continuation of current trends set in the 2030 TMP based on the existing policy environment. In this option, London’s projected land use would continue as it is currently planned in The London Plan, including 55% of new units being built outside of the existing built-up area and much of the intensification allocated to Central London and Rapid Transit Corridors. Currently in-progress rapid transit routes are assumed to be in place and transit service and active transportation facilities are assumed to continue to grow at similar rates as currently experienced. Under this option, policies, programs, procedures, or approaches to infrastructure incrementally shift towards enabling and encouraging more sustainable mobility options.

The 2019 and projected 2050 mode shares for Option 1 are outlined in Table 5 including a shift from 23% to 25% of daily trips being made by walking, cycling and transit—the Option 1 2050 mode share targets are very similar to the 2019 levels.

Table 1: 2050 Mode Share Target Option 1

Mode	Daily Mode Share (%)	
	2019	2050 Target Option 1
Walking and Cycling	15	16
Transit	8	9
Personal Vehicle – Passenger	16	16
Personal Vehicle – Driver	61	59

What does this mean for Londoners?

- In comparison to 2019, the average Londoner would use transit, walk, and cycle slightly more often and use personal vehicles slightly less.

What does this mean for the mobility system within the context of population growth?

- The number of daily transit trips is expected to increase by 59%;
- The number of walking and cycling trips per day is expected to increase by 62%; and,
- The number of daily car trips is expected to increase by 46%, with significantly increasing congestion levels.

What does London need to do to achieve this?

- Transit revenue vehicle hours (transit service provision) would likely be required to increase 59% compared to 2019 (in line with growing travel demand).
- Continue to implement cycling and pedestrian facilities as well as transportation demand management initiatives at current rates.
- Continue to implement road capacity improvements at a similar rate.

2.4.2 Mode Share Target Option 2: 30% Walk, Cycle, Transit

Option 2 represents a swift change in policies, programs, procedures, infrastructure and land use towards enabling and encouraging a reduced reliance on personal vehicles and an increased use of transit, walking and cycling.

The 2019 mode share and 2050 targets for Option 2 is outlined in Table 6, including a shift from 23% to 30% of daily trips being made using walking, cycling and transit.

Table 2: 2050 Mode Share Target Option 2

Mode	Daily Mode Share (%)		
	2019	2050 Target Option 1	2050 Target Option 2
Walking and Cycling	15	16	18
Transit	8	8	12
Personal Vehicle – Passenger	16	17	15
Personal Vehicle – Driver	61	59	55

What does the Option 2 mode share target mean for Londoners and the mobility system?

Based on the 2016 Household Travel Survey, London residents make a total of approximately 24 trips to and from their home in an average week (a trip to work and back would count as two trips). If the transportation and mobility network was improved based on Option 2, the average Londoner would likely choose to adjust their 24 trips per week in the following ways:

- Take transit for one additional trip a week; and,
- Walk or cycle for one additional trip a week; and,
- Drive their personal vehicle for two less trips a week.

It is important to note that the above trip changes are city-wide averages. How individual Londoners change how they move around the city would vary from person to person. Some Londoners would increase walking, cycling and transit use by more than the average Londoner depending on individual circumstances. There may be little to no change for those with mobility challenges and/or those who already walk, cycle and/or take transit for a large portion of their trips. Conversely, some Londoners may increase their sustainable trips more than the average and the preferred mode switch would be variable by person and circumstances such as weather and seasonality.

What does this mean for the mobility system within the context of population growth?

- The number of daily transit trips would need to increase by 116%;
- The number of walking and cycling trips per day would need to increase by 83%; and,
- The number of daily car trips will increase by 35% (slower than population growth).

What does London need to do to achieve this?

- Transit investment: The provision of transit revenue vehicle hours will need to slightly more than double (about 2.1 times current levels) compared to 2019 with corresponding increases in operating costs. Increasing revenue vehicle hours requires the purchase of more buses and potentially the

expansion of existing storage facilities. Transit service will also have to be more reliable and competitive throughout the city, likely taking the form of a frequent priority network. A transit priority network requires significant capital investment to increase the bus fleet and implement transit priority measures such as queue jump lanes, transit signal priority and dedicated bus lanes.

- **Land Use:** Increasing permitted heights and densities along Rapid Transit Corridors and at Transit Villages to achieve 100-200 people and jobs per hectare^a would help increase the utilization of each hour of transit service. This would create a more cost-effective service and make travel distances walkable/bikeable for more people. Further encouraging transit-supportive densities in greenfield development (greater than 100 people and jobs per hectare) will also be essential. An estimated 25-30% of London's 2050 population would need to live in areas with at least 100 people and jobs per hectare (currently projected to be 16% in 2050 based on the 45% intensification target). This mode share target may be achieved without changes in planned land use, however, more service hours and higher operating costs will be needed to achieve the same level of required ridership along with bolder incentives to shift to active transportation.
- **Cycling and Walking:** Implementing a city-wide grid of protected cycling facilities would be needed to enable and encourage the volume of trips made by bike necessary to meet this target. Sidewalks need to be available, accessible and attractive for city-wide mobility to both encourage more walking trips and enable access to transit. The park pathways system would also need to expand more than currently anticipated.
- **Policies and Programs:** Accompanying infrastructure investments, increases in service levels, and land use changes, robust policies and programs will be required to encourage mode shift. These include policies that limit road expansion and systematically improve the viability of sustainable mobility options by prioritizing those options on many city streets in all neighbourhoods and addressing barriers to their use. Transportation Demand Management programming is also critical in encouraging mode shift, building a culture of sustainable transportation, and encouraging new developments that are built with transportation demand management principles.
- **The Road Network:** Given that the number of daily vehicle trips is still projected to increase 35%, operational improvements to facilitate traffic movement and some targeted capacity increases will be necessary to meet this demand.

2.4.3 Mode Share Target Option 3: 35% Walk, Cycle, Transit

The Option 3 mode share target represents a fundamental shift in how mobility decisions are made in London. Policies, programs, procedures, and approaches to infrastructure and land use must consistently aim to meet growing travel demand largely using transit, walking and cycling and these more sustainable mobility options must be a viable and attractive option for all Londoners across the city.

The 2019 mode share and 2050 target for Option 3 are outlined in Table 7, including a shift from 23% to 35% of daily trips being made by walking, cycling and transit.

^a While some of the lands along Rapid Transit Corridors and at Transit Villages are projected to achieve over 100 people and jobs per hectare, significant lands in these areas are projected to achieve in the 30-100 people and jobs per hectare range or even under 30 in many areas.

Table 3: 2050 Mode Share Target Option 3

Mode	Daily Mode Share (%)			
	2019	2050 Target Option 1	2050 Target Option 2	2050 Target Option 3
Walking and Cycling	15	16	18	21
Transit	8	8	12	14
Personal Vehicle – Passenger	16	17	15	15
Personal Vehicle – Driver	61	59	55	50

What does the Option 3 mode share target mean for Londoners and the mobility system?

If the transportation and mobility network was improved based on Option 3, the average Londoner would likely choose to adjust their 24 trips per week in the following ways:

- Take transit for one or two additional trips a week; and,
- Walk or cycle for one or two additional trips a week; and,
- Drive their personal vehicle for three less trips a week.

As mentioned in Option 2, these are simply averages. How Londoners change how they move around the city would vary from person to person and season to season. Some Londoners may increase how much they walk, cycle and take transit more than the average person, while others may make little to no change.

Impact on the mobility network within the context of population growth includes:

- The number of daily transit trips would need to increase 148%;
- The number of walking and cycling trips per day would need to increase 113%; and,
- The number of daily car trips will increase 26% (slower than population growth).

What does London need to do to achieve this in 2050?

- **Transit investment:** The provision of transit revenue vehicle hours will need to more than double (at least 2.3 times current levels) with corresponding increases in operating costs. Similar to Option 2 increasing revenue vehicle hours will require the purchase of significantly more buses and potentially the construction of additional storage facilities. Also similar to Option 2, transit service will also have to be even more reliable and competitive throughout the city likely taking the form of a frequent priority network with some type of transit priority measures on approximately 45 km of the City's major road network.^b Investments of this magnitude may require additional revenue sources.
- **Land Use:** Increasing permitted heights and densities along Rapid Transit Corridors and at Transit Villages would be necessary to increase the utilization of each hour of transit service. This would create a more cost-effective service and make travel distances walkable/bikeable for more people. In addition, increased building heights and densities would need to be permitted in greenfield developments, as described in Option 2, and an increased intensification target (i.e. more new units being built within the 2016 Built Area) would likely be necessary to achieve these mode share

^b This is a high-level estimate based on LTC's high ridership routes most of which are forecasted to operate on corridors with moderate to high levels of congestion in 2050.

targets. Increasing the proportion of new development that is accommodated within the 2016 Built Area would enable more areas to achieve a density around 100 people and jobs per hectare making transit a more viable option and making transit service provision more cost effective. Initial estimates indicate an intensification target of around 70% may be required to achieve this mode share target, however, the specific intensification target would need to be determined based on additional analysis including consideration of area servicing requirements. An estimated 25 to 40% of London's 2050 population would need to live in areas with at least 100 people and jobs per hectare (currently projected to be 16% in 2050 based on the 45% intensification target). The changes in intensification targets would require amendments to The London Plan. Without these changes in land use policies and permissions, along with bold active transportation incentives and potentially automobile disincentives, revenue vehicle hours and operating costs may need to increase at least 150% from 2019 (with each hour serving less rides than in a more transit-supportive land use scenario).

- **Cycling and Walking:** Like Option 2, implementing a city-wide grid network of protected cycling facilities and providing available, accessible and attractive sidewalks city-wide, particularly for major trip generators, are essential for achieving this target. Additionally, a full network of secondary cycling routes connecting to the primary network would likely be required to enable people of all ages and abilities to cycle almost anywhere in the city on cycling facilities appropriate for the road context. Achieving Option 3 would also likely require reallocating space currently devoted to vehicular traffic to provide space for other modes such as dedicated transit lanes and/or cycling facilities in locations throughout the city. Extensive new and improved or widened pathways would also be required to attract more users.
- **Policies and Programs:** Like Option 2, working towards this target would require significant policy and programming interventions to accompany infrastructure and transit service. In this case however, the City would likely need to implement policies and disincentives to driving to encourage additional mode shift such as limiting the availability of parking, making parking more expensive, converting vehicle lanes to other modes, and/or potentially road user charges.
- **The road network:** With a projected 26% increase in the number of daily vehicle trips, congestion during peak periods is likely to be manageable with operational improvements to facilitate traffic movement and limited targeted capacity increases.

2.5 Climate Emergency Action Plan Goals

Transportation-related GHG emissions are largely a function of the total distances travelled by vehicles and the fuel efficiency of vehicles on the road. Trips that start and end in London account for about half of transportation emissions according to estimates provided by Google's Environmental Insights Explorer. Inbound and outbound trips to and from London account for the other half due to the longer distances travelled and associated higher fuel use.

Electrification will play an important role in reducing emissions. However, the electric vehicle percentage of all vehicles was less than 1% in London at the end of 2022 and the pace of overall vehicle fleet turnover is slow.

The CEAP considerations are discussed in Appendix E and will be further considered throughout the MMP process.

2.6 Draft Project Evaluation Framework

The MMP will provide short and long-term infrastructure project recommendations through to 2050. All transportation related infrastructure projects will be evaluated as part of the MMP process to identify priority networks for infrastructure improvements across all modes.

A draft project evaluation framework has been developed based on the guiding principles which were approved by Council in December 2022 based on community consultation. The draft project evaluation framework can be found in Appendix F.

Once projects are identified for each individual travel mode using the project evaluation framework, they will be combined into one integrated multi-modal network. The goal of this process is to evaluate and prioritize multi-modal project recommendations, within the context of the entire mobility system.

2.7 Next Steps

Following this report, the community will be further consulted on the development of strategies to achieve the vision, mode share target options and the draft evaluation frameworks.

Based on the feedback from this consultation and additional technical review, the project team will report back to the Civic Works Committee and Council later this year to receive direction that will inform the remainder of Phase 2 work and Phase 3.

Confirmation of the mode share targets will allow the project team to determine the extent of walking, cycling, transit and vehicle infrastructure needs based on forecasted capacity needs by mode. Potential projects will then be evaluated based on the project evaluation frameworks. Once projects are identified for each individual mode using the project evaluation frameworks, they will be combined into one integrated multi-modal network. A public engagement event is anticipated in early 2024 to share with the community the proposed plans for each mode.

Consultation is integral to achieving a plan that Londoners can support. Therefore, the project schedule is being adapted to accommodate meaningful consultation in advance of key decisions points. The third and final phase of the project will continue throughout 2024 and will include the development of an implementation plan informed by project prioritization and project cost estimates.

Conclusion

The report provides Council with an update on the development of the Mobility Master Plan and information currently under consideration. The project to develop the Plan is early in the second of three phases. This report solicits feedback on the decision-making framework for the Phase 2 identification of infrastructure, programs and policies.

The report provides three mode share target options, and related mobility strategies in development. The project team will continue to consult on these topics in the coming months and will provide recommendations to Civic Works Committee later this year. The selection of the mode share target and supporting strategies is important to inform the development of a mobility network that aligns with the goals and objectives of the MMP.

This report also includes information on the draft project evaluation framework which has been developed based on the Mobility Master Plan Guiding Principles. The final evaluation framework will form part of the process to determine and prioritize planned mobility improvements and will be finalized in the coming months with community input.

This report was informed by the Phase 1 Engagement Summary Report which can be found on the project website getinvolved.london.ca/mobility-master-plan.

The project team will continue to progress the development of the Mobility Master Plan using a thorough consultation process, technical analysis, and consideration of The London Plan, Council's Strategic Plan and associated initiatives such as CEAP. Reports to the Civic Works Committee will be submitted to ensure that Council members are engaged and can provide direction to the Mobility Master Plan as it progresses. Recommendations to council on the topics of this report are anticipated later this year. Extensive public consultation and engagement will continue in all phases of this process which is expected to continue throughout 2024.

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Appendix A: Mobility Master Plan Vision and Guiding Principles
Appendix B: Proposed Strategies to Achieve the Vision
Appendix C: Mode Share and Why it is Important
Appendix D: 2030 TMP Mode Share Targets and Current Status
Appendix E: Climate Emergency Action Plan Goals
Appendix F: Draft Project Evaluation Framework

c: Mobility Master Plan Internal Steering Committee
Integrated Transportation Community Advisory Committee

APPENDIX A

Mobility Master Plan Vision and Guiding Principles

The vision for the Mobility Master Plan was approved by Council in December 2022, and is as follows:

In 2050, Londoners of all identities, abilities and means will have viable mobility options to allow them to move throughout the city safely and efficiently, as well as providing connectivity to the region. The movement of people and goods will be environmentally sustainable, affordable, and supportive of economic growth and development.

The vision and guiding principles were developed in alignment with key City of London Plans and Strategies including:

- Council's Strategic Plan
- London's Official Plan which is referred to as The London Plan
- Climate Emergency Action Plan (CEAP);
- Safe Cities London Action Plan;
- Conceptual Framework for Regional Transportation in London; and
- other plans and strategies.

These existing plans and strategies include a number of relevant transportation and mobility policies and objectives, including:

- Growth in the city is more inward and upward with the highest densities directed to the Downtown, Transit Villages and Rapid Transit Corridors
- Designs reflect a complete streets approach which balance the needs of all road users
- People can access neighbourhood amenities and transit within a 10-minute walk
- Transit is affordable, reliable and efficient and can get you where you need to go when you need to be there
- People feel safe moving around the city and do not experience violence, harassment, racism or discrimination
- GHG emissions from transportation are eliminated
- There are sidewalks on both sides of most streets
- There is a connected network of safe and comfortable bike facilities

Feedback collected throughout 2022 confirmed that the vision is in line with Londoners' current needs and aspirations for the future.

Five guiding principles, as shown in Figure A-1, were also prepared to establish the framework for the decision-making process for the development of the Mobility Master Plan. They are proposed to ensure that the policies and actions developed through the Mobility Master Plan work towards achieving the vision. Similar to the vision, the guiding principles were reviewed and refined through community consultation and were approved by Council in December 2022.



Figure A-1: Mobility Master Plan Guiding Principles

APPENDIX B

Proposed Strategies to Achieve the Vision

1. Use the Mobility System to Support London's Desired Future Land Use

The London Plan describes the inextricable relationship between land use and mobility. Where homes, businesses, services, and jobs are located impacts where and how people travel around London. Higher-density development and mixed-use areas that combine residential, commercial, and other land uses are key components of a transportation and mobility network that are supportive of each other. This integration leads to shorter travel distances that, when combined with high-quality transit service and comfortable walking and cycling facilities, makes accessing destinations without a vehicle more viable and enjoyable.

Given the significant GHGs emitted from vehicles, these types of walkable and complete neighbourhoods where Londoners' daily needs are nearby and can be accessed without a vehicle are a key component of the CEAP.

London's future land use will continue to be a mix of areas with varying densities and uses. As such, the MMP needs to explore opportunities that advance the mobility vision within all land use contexts and support the development of compact mixed-use communities.

The MMP will be exploring opportunities that focus on enabling increased density in those areas defined in The London Plan as Transit Villages and along Rapid Transit Corridors, as well as increased density and a greater mix of uses in greenfield areas, in addition to encouraging the provision of context-sensitive multi-modal travel services across all land uses.

2. Make Transit the Option of Choice for More Trips

London Transit plays an essential role in the city's mobility system, serving over 20 million trips annually prior to the COVID-19 pandemic, with ridership having nearly recovered to pre-pandemic levels by 2022. Transit ridership has also increased by 9% between 2011 and 2019.

Despite this, there are challenges to increasing transit ridership that need to be addressed. Challenges include long travel times for cross-city trips, longer travel times by bus compared to personal vehicles, infrequent service on some routes, and buses that are slowed due to congestion on city streets making travel times long and unreliable.

Consistent with other large and growing cities, expanding and improving transit service and associated infrastructure to make it a viable and attractive mobility option for more trips in London will be a key component of moving more people efficiently as London's population continues to grow.

To make transit the option of choice for more trips, potential opportunities will focus on making transit more attractive such as improved frequency, travel time, reliability, and first/last mile connections. Encouraging denser mixed-use development that promotes transit use and developing transportation demand management (TDM) policies and programs to encourage more transit trips will also be considered.

3. Make Walking and Cycling Attractive Mobility Options to Meet Daily Travel Needs

Walking and cycling have an important role to play in London's future mobility system as environmentally sustainable, affordable, space-efficient and healthy travel options. Currently, gaps in London's sidewalk and protected cycling networks make the viability of active mobility inconsistent across the city. As a result, many Londoners do not have access to safe and comfortable mobility options to access daily needs. Mobility options that do not feel safe or comfortable are less attractive to Londoners.

However, approximately 40% of morning peak period car trips in London are 3 km or less. Many of these shorter trips are well-suited to active mobility options, which means there is significant potential to increase active mobility.

To make walking and cycling attractive mobility options, the MMP will explore improved infrastructure and policies that enable both neighbourhood and cross-city walking and cycling, for people of all ages and abilities in all communities. This could include protected cycling lanes, safe intersections, connected and comfortable sidewalks. It would also include transportation demand management programs and supporting the development of compact mixed-use communities to reduce trip distances.

4. Strategically Manage Road Capacity at Key Locations

Despite the goal of decreasing reliance on personal vehicles, a key function of the road network continues to be the efficient movement of vehicles including personal, freight, and service vehicles. Congestion is an issue during peak periods on the major road network and this will continue with forecasted population and employment growth. In addition to slowing goods movement in the city, increased travel time caused by congestion makes access to jobs and services more challenging for those that need to drive and for people taking transit.

The MMP is aiming to be strategic about the design and location of road capacity improvements to create a more sustainable system and create a more livable attractive city. By strategically focussing new capacity towards meeting the needs of new developments and then augmenting the existing and robust road network through targeted initiatives at key locations, London can improve conditions while minimizing the need for costly new major infrastructure.

To strategically manage road capacity, the MMP will also explore transportation demand management opportunities that facilitate options to driving alone that will maximize the efficiency of the existing road network and increase the multi-modal people-moving capacity of corridors.

5. Support London's Role as a Regional Hub

As a regional hub that is home to major healthcare, post-secondary education, employment, recreation and entertainment opportunities, London has an important role in supporting mobility for people from surrounding communities and this demand will continue to increase as London and neighbouring municipalities grow. The recent announcement of new large employment and logistic centers in the region will also impact how people and goods move between and within London, surrounding communities and other locations across the province. As the largest centre in the region with direct connectivity to the provincial freeway network, London and its mobility network will play an important role in supporting this regional development including the movement of people and goods across all modes including transit, road, rail and air. London's VIA Rail train station and London Airport reinforce London's role as a regional

hub by providing services for longer distance trips and connectivity to London from afar. London Airport and CN and CP rail lines also support regional goods movement in and out of the city.

London's services, opportunities and amenities serve residents but also the many communities that surround London, contributing to the city's economic prosperity. In the morning peak period, nearly 10% of all trips in London originate from outside of the city.

While some inter-municipal transit options have recently been created and are growing, these are limited, meaning most of the travel demand coming from outside of London is personal vehicle demand, contributing to traffic congestion and GHG emissions. The mobility system has a role to play in maintaining and strengthening London's role as a regional hub and enabling access to essential services and employment located in the city.

As part of the MMP, opportunities that will be explored include working with other jurisdictions to provide more inter-municipal transit and multimodal mobility options, exploring park and ride facilities for regional travellers, and supporting the planning and development of potential improvements to passenger rail service in Southwestern Ontario.

6. Put People First on London's Streets

London's streets are the backbone of the mobility network, providing far-reaching access to every corner of the city. London's street space is also a scarce resource that is in high demand. Over previous decades, many of London's streets have been designed primarily to serve the movement of vehicles. This has made safe, convenient, and comfortable mobility and access challenging for people moving by other modes. It also creates traffic frustration and dissatisfaction for many residents. To accommodate growing travel demand and to improve efficiency, safety, sustainability and equity, the design of London's streets needs to focus on movement of and access for people using all modes.

Opportunities that will be considered in the next phase of the MMP to put people first on London's streets will focus on identifying mechanisms to consistently implement multi-modal mobility options throughout the city. This could build on London's existing Complete Streets policies, with an emphasis on road safety, personal security and optimizing the people- and goods-moving capacity of London's mobility system.

7. Provide a Mobility System that Enables More Equitable Participation in City Life

The mobility system is critical for providing access to daily needs and enabling full participation in city life. As such, an equitable city needs a mobility system that works for everyone. However, many Londoners face barriers to accessing the city. This has been cited as a contributor to London's lower-than normal labour market participation rate. Barriers can take many forms, for example the mobility options available to each Londoner can dictate what job or recreational opportunities exist within a reasonable travel time. Available mobility options can also influence affordability and not feeling safe while moving around the city.

The MMP is incorporating equity at its core and will seek opportunities to use the mobility system to achieve a more equitable city. Equity considerations will be embedded into the MMP engagement, network, and policy development processes.

Opportunities that will be explored to enable more equitable participation in city life will focus on integrating mobility equity into City policies and processes. This could include consultation, maintenance considerations, and project prioritization and design with the aim of contributing to mobility equity.

8. Prepare for Change

Much has changed since London's last Transportation Master Plan approval in 2013 and society will continue to evolve over the coming decades. Some prominent trends that will shape long-term planning for London's mobility system include climate change, and the continued recovery from the COVID-19 pandemic. London is also experiencing a rapidly increasing and aging population that includes immigration from other communities with more public transportation options. Remote work scenarios and the emergence of new technologies and business models impacting mobility, such as ride-hailing, connected and autonomous vehicles, and zero emission vehicles will also influence the mobility system. Of great importance, with personal vehicles making up 31% of all GHG emissions in London in 2019, the mobility system has a large role to play in both meeting the 2050 net-zero emissions target and becoming more resilient to increasingly extreme weather.

Opportunities will focus on helping London manage a changing mobility landscape in a way that furthers the MMP vision through exploring improved data collection to monitor evolving travel trends, developing policy to promote more climate-resilient infrastructure, and exploring policies and programs to manage the arrival of new technologies and new business models in a way that supports the MMP vision.

APPENDIX C

Mode Share and Why it is Important

Mode share is the proportion of all trips that are made using each mode of mobility. For the purpose of the MMP, the various modes of mobility have been categorized as follows:

- Walking
 - including wheelchairs, mobility scooters or other mobility aids
- Cycling
 - including e-bikes, cargo power-assisted bikes, electric kick-scooters
- Transit
 - including specialized public transit
- Personal Vehicle - Driver
 - including motorcycle
- Personal Vehicle - Passenger
 - including carpooling, taxi, accessible taxi or other ride sharing service such as Uber.

Freight trucks are not included in the mode share because mode share captures person-trips. However, accommodating commercial freight traffic is very important in planning the London road network as the majority of the goods people rely on daily are moved by truck for at least part of their journey. Commercial and industrial activities generate a substantial amount of truck traffic and trucks of all sizes move throughout the city to make deliveries and connect to rail and air providers. The safe and efficient movement of goods is important for the economy and shippers and businesses benefit from reliable travel times. Trucks can benefit from higher use of non-vehicle modes because it helps manage congestion, minimizing travel times.

Road Congestion

Congestion is a common reality for growing cities. While it is a characteristic of a region's economic well-being, it also effects the economy and quality of life. Managing congestion is a goal of the MMP that will be delivered on through a variety of approaches. These include increasing road capacity through infrastructure improvements, making more efficient use of space by supporting sustainable modes, operational measures such as traffic signal improvements and transportation demand management programs such as carpooling and transit incentives.

Personal vehicles take up more space than any other form of travel, as shown in Figure C-1 below. As such, personal vehicles use most of the people-moving capacity of transportation corridors due to the amount of space required to move each individual. Transit, walking and cycling require less space.

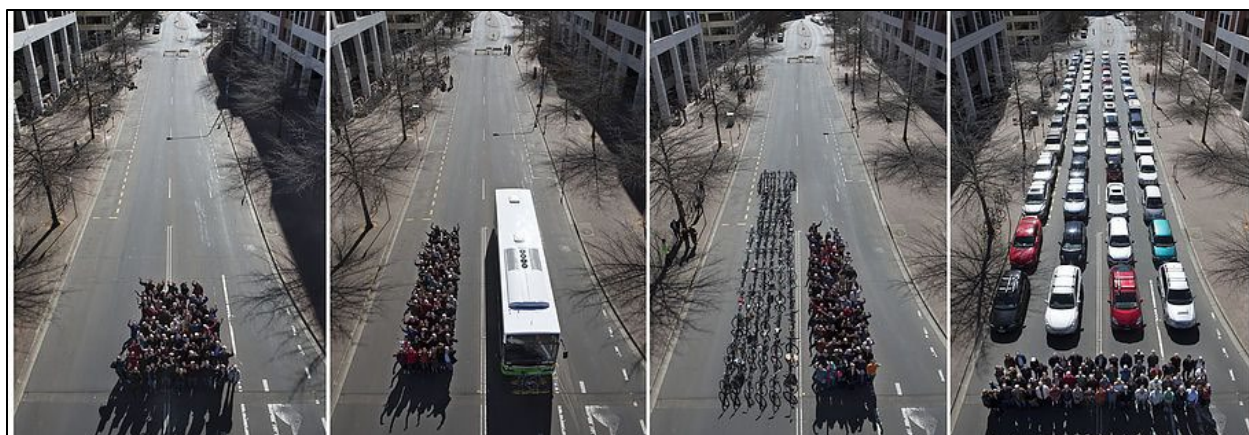


Figure C-1: The space requirements to move 69 people by walking, bus, cycling and personal vehicle

Source: <http://blog.cellbikes.com>

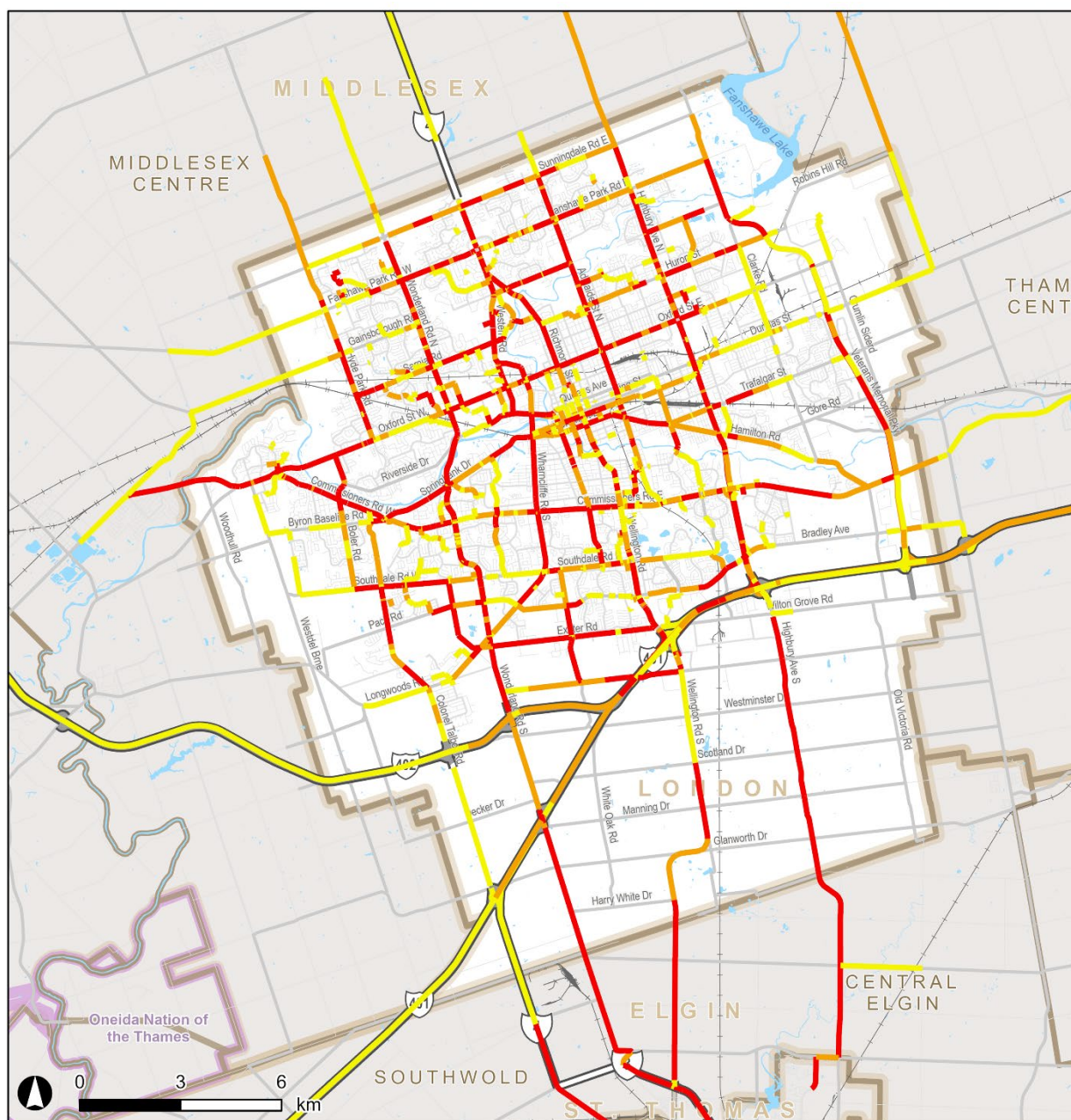
To manage congestion and increase the people-moving capacity of existing streets, London needs to increase the utilization of space-efficient modes by making walking, cycling and transit viable options for more trips. This frees up more space on the roadway for the trips which will remain by personal vehicle, as well as for goods movement.

Widening transportation corridors to accommodate more general traffic lanes is often suggested as a measure to improve traffic congestion. However, numerous studies show that adding new road capacity does not improve congestion beyond the short term. Adding road capacity makes driving more attractive and encourages people to drive further and for more trips. This phenomenon is referred to as “induced demand” and has been the subject of research within economics, transportation and planning professionals across North America where urban road networks have been observed to repeat a cycle of road building followed shortly thereafter by congestion.

Population Growth

As the population continues to grow, so does the number of trips by each mode. If the share, or percentage, of trips by personal vehicle remains the same, the number of personal vehicles on the road will grow, resulting in significantly increased congestion levels beyond what infrastructure expansion and operational measures can accommodate.

Figure C-2, below, illustrates the various levels of road congestion forecasted for 2050 based on how London is currently growing and moving as a city. The forecasted road congestion is based on a mobility network that includes the currently approved Bus Rapid Transit Routes (East London Link, Downtown Loop and Wellington Gateway) and other road projects included in the 20-year budget forecast. The modelling does not include the Rapid Transit projects that were not approved to application for external funding. It also does not include the Wonderland Road widening to six-lanes from Commissioners Road to Sarnia Road based on the recent application of the climate lens to transportation projects and subsequent Council direction to suspend the Discover Wonderland Environmental Assessment subject to the outcome of the MMP.



Legend

- Low Congestion
- Moderate Congestion
- High Congestion

Figure C-2: 2050 Forecasted Road Congestion Based on Currently Approved Project from the Current Transportation Master Plan

GHG Emissions

Mode share also directly impacts London’s ability to meet its climate goals. About 43% of London’s GHG emissions are generated by transportation including personal vehicles, commercial fleet vehicles, and goods movement. Figure C-3 illustrates the trend in transportation-related GHG emissions since 2005 for all transportation as well as for personal vehicles. As per CEAP, London is striving for net-zero emission by 2050 as well as an interim target to reduce community-wide emissions by 65% below 2005 levels by 2030.

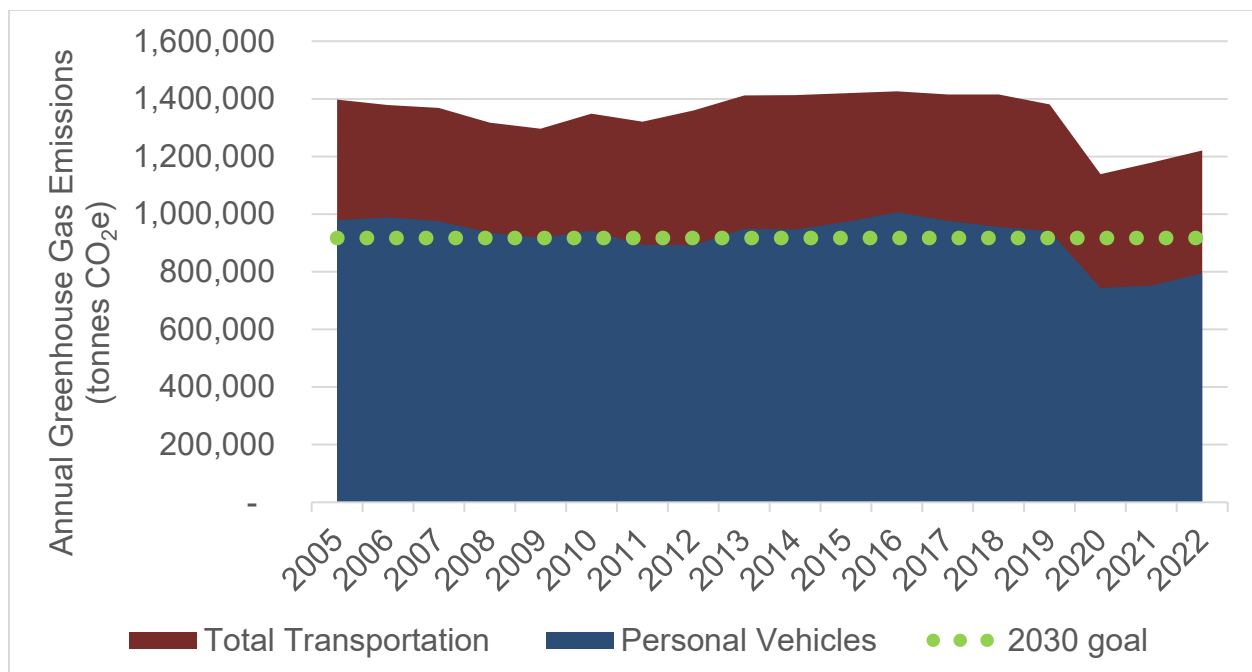


Figure C-3: Annual GHG Emissions from Transportation

The adoption of Electric Vehicles (EVs) and Connected and Automated Vehicles (CAVs) are part of the solution but not the complete solution. The pace of EV adoption in London is slower than the overall pace in Ontario and Canada as a whole. This is an important consideration given the need for significant near-term emission reductions to reach the 2030 emission reduction targets as well as the net-zero emissions goal for 2050. The use of EVs also does not address public health and safety concerns related to automobile dependency, such as road safety for people who walk and bike. The introduction of CAVs is also an evolution. Reducing the number of vehicle trips taken and the distance travelled by personal vehicles, including trips to and from London, remains a priority for local climate action.

To support achieving the CEAP climate goals, the MMP will identify policies and programs to support less reliance on personal vehicles. This could include transportation demand management strategies such as car-pooling and working with employers on corporate transit incentives.

Physical and Mental Health

In addition to the points above, increasing the percentage of trips by walking and cycling also supports a healthy lifestyle. Being physically active at any age has many physical and mental health benefits, such as lowering the risk of several chronic diseases (heart disease, stroke, high blood pressure, osteoporosis and certain types of cancer), obesity, reduced stress and improved mental health.

According to Statistics Canada, in 2018/2019 only 49% of adults and 44% of children and youth in Canada were getting the recommended level of physical activity to achieve optimal health benefits.

Equity

Reducing reliance on personal vehicles to make other modes of mobility more viable options, also relates to equity. Many people do not have access to a personal vehicle and/or are unable to drive. This limits their mobility options and what is accessible to them.

Based on Stats Canada, in 2019 the average household expenses were:

- \$22,400 – shelter
- \$10,400 – food

- \$1,700 – public transportation
- \$2,400 – health care
- \$3,600 – clothing
- \$11,200 - vehicle

In that same time-period the average after-tax income of 25 to 34-year-olds in Ontario was \$43,500. A quarter of people were making \$26,000 or less. Mobility costs (public transportation and/or vehicle costs) represent a significant portion of personal expenses.

Walking, cycling and transit can be more cost-effective choices for individuals but are less feasible and attractive in a transportation network dominated by personal vehicles. A lack of affordable, safe, reliable and efficient mobility options is a barrier to many in accessing and maintaining a job, childcare, education, health care, groceries and other everyday needs.

Infrastructure Planning

Mode share is an important metric which helps inform how cities invest in mobility infrastructure. Historically, transportation master plans have recommended improvements based on the forecasted vehicular demand. It is a process which is primarily driven by demand rather than a vision.

To achieve the vision of the MMP, future mobility needs will need to be determined within the context of achieving transformational goals and focus on the actions which support achieving them. The MMP process is primarily driven by the vision, with consideration for demand.

The London Plan and MMP Vision aims for a more attractive livable city based on policies that support walkable neighbourhoods, safe and connected cycling facilities, reliable and efficient transit, managing road congestion, and achieving London's climate goals. To achieve those goals, London needs to achieve a balanced approach to investing in all types of mobility infrastructure. The total number of people trips that the mobility system needs to accommodate will be determined based on forecasted population and employment growth. Mode share determines what percentage of those trips will be by each mode and the capacity needs of each type of mobility infrastructure.

Infrastructure planning within the context of achieving the Vision also helps manage the financial profile of capital growth programs.

Factors Influencing Mode Share

Current Mode Share

Current mode share is the baseline for how Londoners move around the city today and how much change is required to achieve a new target. The MMP baseline year for future comparisons is 2019, which is before the onset of the COVID-19 pandemic. The daily mode share in 2019 is shown in Table C-1 below.

Table C-1: 2019 Daily Mode Share

Mode	2019 (%)
Walking and Cycling	15
Transit	8
Personal Vehicle – Passenger	16
Personal Vehicle – Driver	61

The 2019 base year represents typical travel patterns prior to the significant fluctuations in travel witnessed immediately after the start of the pandemic where there was a significant decline in travel in general and transit ridership in particular. This serves as a stable baseline from which to plan.

The influences of the pandemic are being considered. While travel demand has largely recovered (pre-pandemic transit ridership has nearly returned and people are moving around the city in higher numbers), changes brought about by COVID-19 continue to influence travel. Among the more significant changes is the continuing trend of working from home. The future travel demand forecasts used to propose MMP mode share targets assume a continuation of some level of work from home for industries where that is feasible. While the population is forecasted to increase by 58% between 2019 and 2050, daily trips are estimated to increase by 49%.

It will be critical to monitor work from home and other trends throughout the life of the MMP. If travel demand increases faster than expected, it will be important to factor that into mobility planning.

Active Transportation Infrastructure

High quality walking, cycling and transit infrastructure encourages greater use of these modes. On the other hand, adding capacity for personal vehicles can encourage people to drive more and make the experience for those using active modes more difficult and unsafe.

Sidewalks play a crucial role in making communities more walkable. Without accessible sidewalks many are limited in how far they feel comfortable walking and what they can access.

The London Plan policy is that most streets shall have sidewalks on both sides, with some exceptions and this is a requirement for all new neighbourhoods. However, there are many existing neighbourhoods with limited sidewalks, in particular the ones built in the 1950's to 1980's. Sidewalks built in this era were designed with a focus on the personal automobile resulting in far fewer sidewalks, more meandering streets and wider roads. Currently there are over 400 kms of urban and neighbourhood streets with no sidewalks.

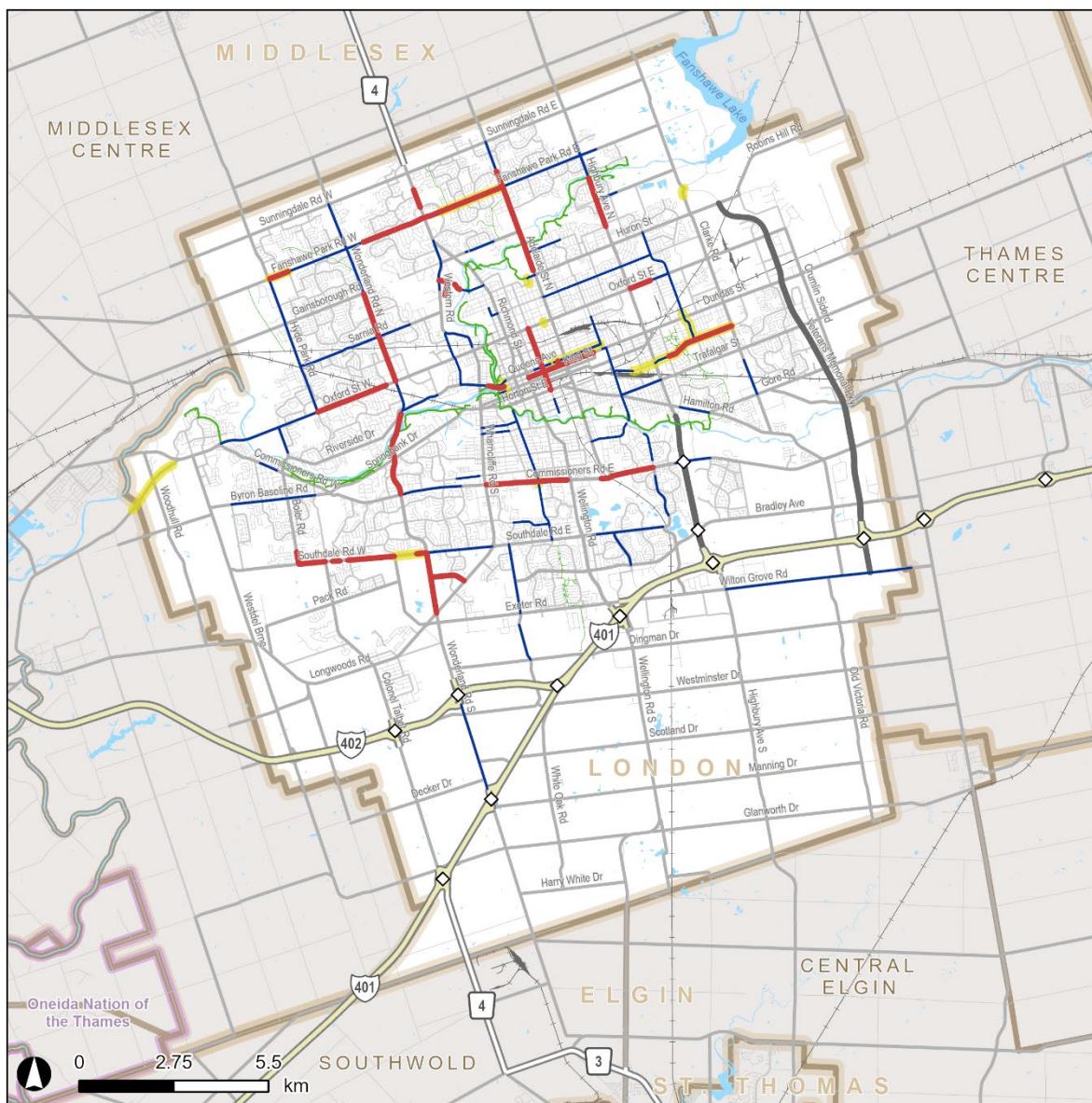
Sidewalks are being constructed in these neighbourhoods through local road reconstruction projects, infrastructure lifecycle renewal projects, and through the New Sidewalk Program, which is informed by community requests. In support of these projects and programs, the City is preparing neighbourhood connectivity plans as a guide for the priority installation of new sidewalks in legacy areas of the city with limited sidewalk connectivity. Staff have developed a community engagement strategy to guide communities in thinking holistically about pedestrian connectivity in their neighbourhood.

The lack of sidewalks on major roads to developing greenfield areas is also an issue. An example is the lack of walking connectivity between Victoria on the River to the rest of the city. Adding sidewalks to streets like Commissioners Road East and/or Hamilton Road may require the road to be upgraded from a rural cross section with deep ditches to an urban cross section with curbs and storm sewers. The timing of road reconstruction projects like this may be influenced by other needs such as servicing and other coordinated improvements. Providing safe walking and cycling connectivity to new neighbourhoods separated from the existing network can be a challenge.

MMP feedback from Londoners indicates that the sidewalk network is not expanding fast enough.

With respect to cycling infrastructure, the London Plan policy is to plan for and create a continuously linked cycling network throughout the city. Many people shared that they want to bike more but feel unsafe doing so. A recent poll found that fear is the biggest obstacle to cycling more for 48% of Ontarians (Source: Crestview Strategies, April 2023). There is a strong desire for more separation between people on bikes and drivers.

Currently, London's network includes 35 km of protected and in-boulevard bike lanes as shown in red on Figure C-4. These bike facilities have a physical separation between the bike lane and traffic such as a concrete curb.



Base data obtained from Land Information Ontario, GeoHub © Queen's Printer for Ontario, 2022. 2022-09-23.

Legend			
◇ Interchanges	Municipal Roads	Route Type	Thames Valley Parkway
—+— Railway	— Expressway	— Protected Bike Facility	Additional Cyclable Trails
Provincial Roads	— Arterial	— Bike Lane	Facilities Under Construction in 2022
— Freeway	— Collector		
— Arterial Highway	— Local/Private		

Figure C-4: Cycling Facilities in London

Plans are in place to implement 35 km more protected cycling facilities over the next five years. There is more cycling as a result of new infrastructure. The core cycling network has seen 50% year-over-year growth, with an average of 600 riders a day riding on the new lanes on Colborne and Dundas Streets in recent months.

Although London has made progress in recent years, the cycling network remains disconnected and has some important gaps to fill. Currently only 23% of residents are within 500 m of a protected bike lane and those protected bike lanes still do not extend far enough for many trips due to gaps in the network.

London enjoys 45 km of pathways along the main spine of the Thames Valley Parkway (TVP) along with 140 km of secondary pathways which are also continuing to grow based on the 2016 Cycling Master Plan. The TVP is well used.

Due to the high volumes and varying uses, demand exists for parts of the TVP to be widened or twinned.

Maintenance of Active Transportation Infrastructure

Winter maintenance of existing sidewalks and cycling facilities directly impacts how people choose to move around the city. It can be a challenge for many to walk or cycle in the snow and ice. Every bus trip starts and ends with a walk, so sidewalk winter maintenance also impacts transit use.

Every winter, many Londoners share that snow and ice are a barrier to moving around the city. In 2019, Civic Administration completed a review of winter maintenance program supports which outlined options for improved winter maintenance on sidewalks and streets. The current Provincial Minimum Maintenance Standards (MMS) for sidewalks is 8 cm of snow accumulation before equipment is deployed and it allows 48 hours after the snowfall ends to clear the sidewalk. Council directed additional funding to improve this sidewalk threshold to 5 cm. This was reaffirmed in the 2023 budget update. It was a decision supported by many Londoners, however many public voices indicate that further improvements are needed.

Civic Administration also receives many requests related to winter maintenance of cycling facilities. The pathway system is also an important recreation and mobility connection for people walking and cycling, and staff have heard desires for improved winter maintenance of it as well. On-street bike lanes are subject to the provincial Minimum Maintenance Standards (MMS) that require snowplowing. Pathways and in-boulevard bike facilities are not subject to the MMS. The current City standard is that pathways, including parts of the Thames Valley Parkway, are treated similar to sidewalks and cleared once 5 cm of snow has accumulated and within 48 hours after snowfall has ended. To mitigate negative environmental impacts, pathways are generally not salted or sanded. In-boulevard cycling facilities are not currently plowed.

The condition of sidewalks and some cycling facilities is also a concern for many residents. Currently about 2% of sidewalks are considered in poor to very poor conditions. That is equivalent to approximately 30 km of sidewalk. This can be a challenge and safety concern for those with visual impairments, balance concerns, and those using wheelchairs or other mobility aids.

Transit Service Levels

Increasing transit service often leads to substantial increases in ridership because the service is more useful for everyone. Longer operating hours and more frequent buses means passengers can travel when they want to, wait less, and have the freedom to change their plans.

Land Use, Population and Employment Density and Location

Areas with high concentrations of people and jobs result in destinations that are closer together and require shorter trips. Short trips are more conducive to walking and cycling. Concentrating people and jobs closer also makes providing transit service more efficient and effective as there are more people destined for these areas.

Directing population and employment growth along Rapid Transit Corridors and in Transit Villages supports higher-order transit service, which benefits the entire transit network. Dispersed pockets of people and jobs are less efficiently served by transit.

Land use composition and growth distribution are major influencing factors on mode use. Increasing density and encouraging a varied range of land uses (combining residential, commercial, and other land uses) are essential to making walking, cycling, and transit trips viable. Neighbourhoods with these characteristics tend to reduce the amount residents need to drive as origins and destinations are closer together. Research indicates that each 10% increase in population density typically reduces the 'per capita vehicle km travelled' (VKT) by 1 to 3%. Dense mixed-use neighbourhoods are even more effective, typically reducing VKT by 5 to 15% compared to single-use neighbourhoods.^c

Table C-2 presents guidelines on transit service by population and employment density. These should be considered as guidelines for future development and should not be taken as required thresholds for certain levels of service. The densities noted below are consistent with The London Plan density targets for Protected Major Transit Station Areas. Providing service that exceeds these thresholds is often warranted and beneficial for growing transit ridership. However, lower densities combined with higher levels of service means more transit service is required per capita to serve these areas.

Table C-2: Transit Supportive Density Guidelines

Land Use Type	Density (People and Jobs Per Hectare)	Transit service type(s) that these densities are most conducive to
Very High Density	More than 200	<ul style="list-style-type: none"> • Rapid Transit (headways under 5 mins)
High Density Urban	100-200	<ul style="list-style-type: none"> • Rapid Transit • Frequent Transit (bus every 10 mins)
Low Density Urban	50-100	<ul style="list-style-type: none"> • Frequent Transit • Local Transit (bus every 30 mins)
High Density Suburban	30-50	<ul style="list-style-type: none"> • Local Transit • Demand-responsive transit connecting to hubs
Low Density Suburban	10-30	<ul style="list-style-type: none"> • Demand-responsive transit connecting to hubs
Very Low Density	Less than 10	<ul style="list-style-type: none"> • No service

Source: Metrolinx. 2017. Transit Needs and Opportunities – Background Paper for Regional Transportation Plan Review.

Trip Length

There are already many short trips in London – nearly 40% of all trips within London are 3 km or less and an additional 32% are between 3 and 7 km as per Table C-3. Most of these trips are currently made by personal vehicles, with vehicle-oriented land use being a significant contributing factor. Building more compact and active mobility friendly communities and investing in a connected network of sidewalks and protected cycling facilities can help support the use of walking and cycling for some of these shorter trips. From a GHG perspective, longer distance trips are important and are typically best suited to transit or carpooling.

^c Victoria Transport Policy Institute. TDM encyclopedia – More efficient land use management.

Table C-3: Trip Length Distribution for Daily Trips Within London (2019)

Trip Distance	Proportion of Daily Trips (%)
0-3 km	38
3-7 km	32
7-15 km	26
15 km+	4

Source: London Travel Demand Model

APPENDIX D

2030 TMP Mode Share Targets and Current Status

Peak Period vs. Daily Mode Share

The current 2030 TMP proposed weekday peak period mode share targets. The peak period represents the morning and afternoon “rush hours” and are the busiest travel times of the week.

The MMP is proposing to use daily targets, which means that the targets would apply to all trips throughout the entire day. This is the preferred approach for the MMP because people travel at all times of the day and a daily target provides guidance for mobility decisions that will benefit everyone, not just those that travel during peak periods. Working towards an ambitious daily target means maximizing the number of walking, cycling and transit trips by providing Londoners with quality walking, cycling and transit options that enable access to a wide variety of destinations throughout the city, rather than only focusing on typical peak period trips. Working towards a daily target can be more financially sustainable and also means building more compact communities that provide more amenities and destinations closer to home.

The 2030 TMP mode share target for 2020 and mode share trends are summarized in Table D-1 below. For the 2030 TMP mode share targets, only peak period mode share information was presented in the 2030 TMP. Daily mode shares have been estimated based on factors between daily and peak period mode shares from the 2016 Household Travel Survey. Additionally, mode share totals from the 2030 TMP do not add up to 100% due to the inclusion of an “Other” category.

Given the significant impact that the COVID-19 pandemic had on travel patterns in 2020, 2019 data has been used to assess progress towards the 2030 TMP target. The 2019 mode share was estimated using the London Travel Demand Model. The model was updated to reflect 2019 conditions from the previous 2016 version that was developed based on the 2016 Household Travel Survey. This update included adding 2019 population and employment, updating the transportation network to reflect projects completed between 2016 and 2019, and including transit service changes to reflect service in 2019. The model was also calibrated to 2019 conditions using City of London traffic counts, LTC boarding data and ‘big-data’ travel demand data.

Table D-1: 2030 TMP Mode Share Target for 2020 and Mode Share Trends

Mode	2009 Actual (%)		2020 Target from 2030 TMP (%)		2019 Actual (%)	
	Peak Period	Daily	Peak Period	Daily	Peak Period	Daily
Walking and Cycling	9	9	11	10	17	15
Transit	13	11	15	14	9	8
Personal Vehicle - Passenger	11	14	68	75	12	16
Personal Vehicle - Driver	63	63			62	61

Note: Only peak period mode share target information was presented in the 2030 TMP with personal vehicle drivers and passenger combined. Daily mode shares have been estimated based on factors between daily and peak period mode shares from the 2016 Household Travel Survey. Additionally, mode share totals from the 2030 TMP do not add up to 100% due to the inclusion of an “Other” category.

Walking and Cycling Trends

As shown in Table D-1, an increase in walking and cycling trips was observed between 2009 and 2019. Active transportation data collection during this ten-year period was a growing and evolving action for the City of London. Improvements to active transportation data collection methods were likely able to capture more active transportation trips, leading to a higher proportion of total trips made using active modes.

Other available data on walking and cycling trends was also reviewed to provide insight on increased walking and cycling trends. Between 2010 and 2018, EcoCounter automatic counters were introduced on pathways and on-street bike lanes. The technology was first tested and, by 2018, the program had expanded to eleven locations city-wide. Many locations did not have sufficient data to make year-over-year claims about active transportation patterns. However, the EcoCounter data generally indicates that active travel grew year over year in London.

Transit Trends

As shown in Figure D-1, the total number of trips taken by transit increased from 2011 to 2019. While the total number of trips has increased, the average number of trips per person (trips per capita) has been declining. This trend has occurred because population growth has outpaced the number of trips.

The 4% decline in the number of trips per capita is comparable with the transit daily mode share decline from 12% to 9% from 2009 to 2019.

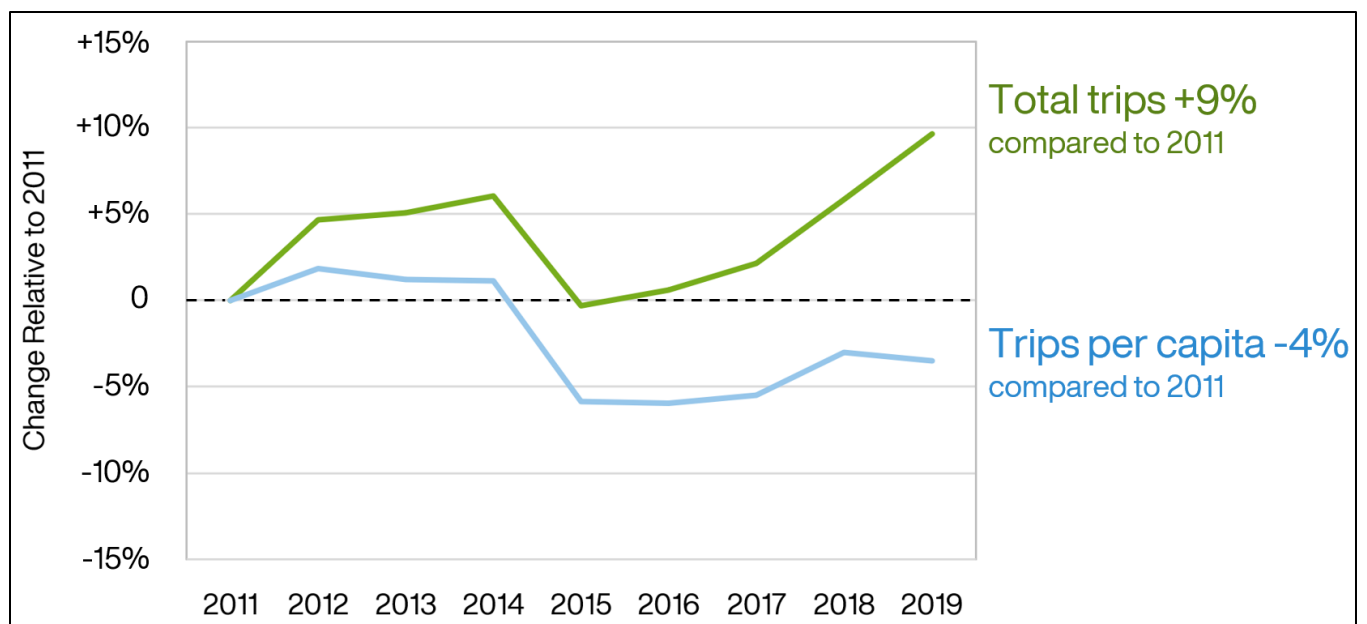


Figure D-1: Change in Transit Demand, 2011 to 2019

Source: CUTA Statistics

Note: Data from 2020 and 2021 have been excluded to illustrate trends prior to COVID-19.

Along with the increase in the total number of trips, the total number of revenue vehicle hours has also been increasing as shown in Figure D-2. The increase in revenue vehicle hours has slightly exceeded population growth (revenue vehicle hours per capita). Areas benefitting from the increased service included targeted higher frequency service on high ridership routes to reduce the frequency of crush capacity conditions to improve service.

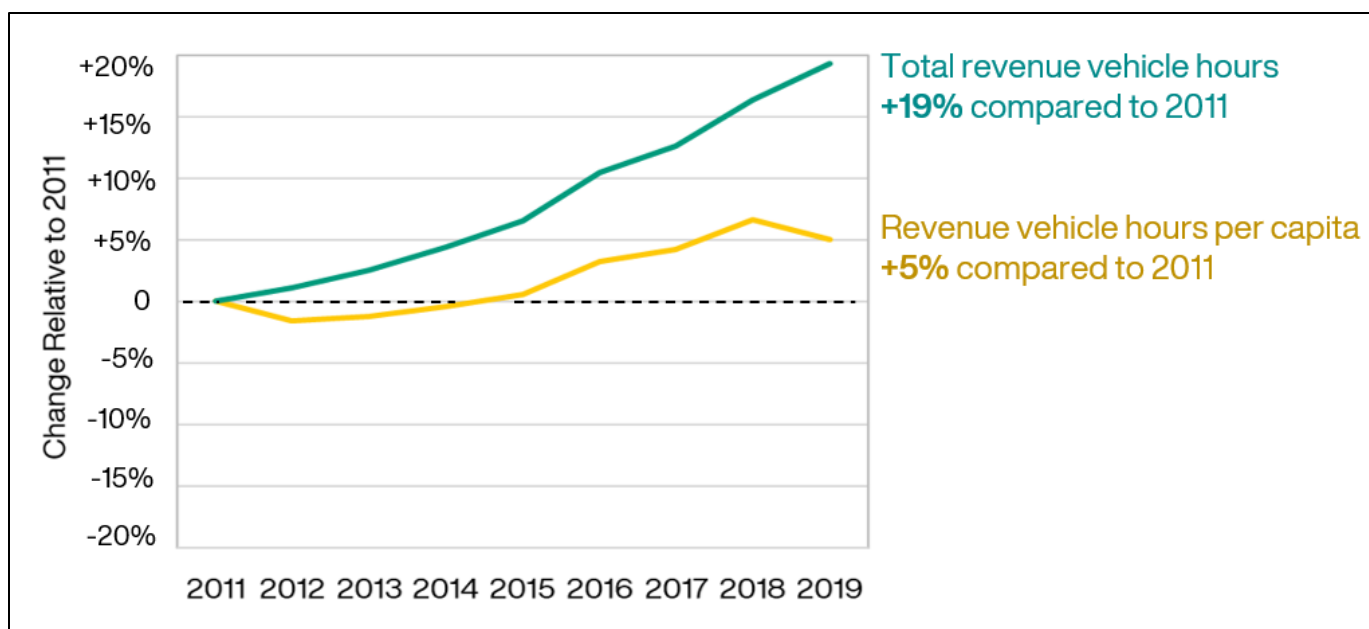


Figure D-2: Change in Transit Supply, 2011 to 2019

Source: CUTA Statistics

To have achieved the 2020 transit mode share target set in the 2030 TMP, total number of transit trips needed to have more than doubled from 2009 to 2020. Actual transit trips increased 28% between 2009 and 2019^d as shown in Figure D-3.

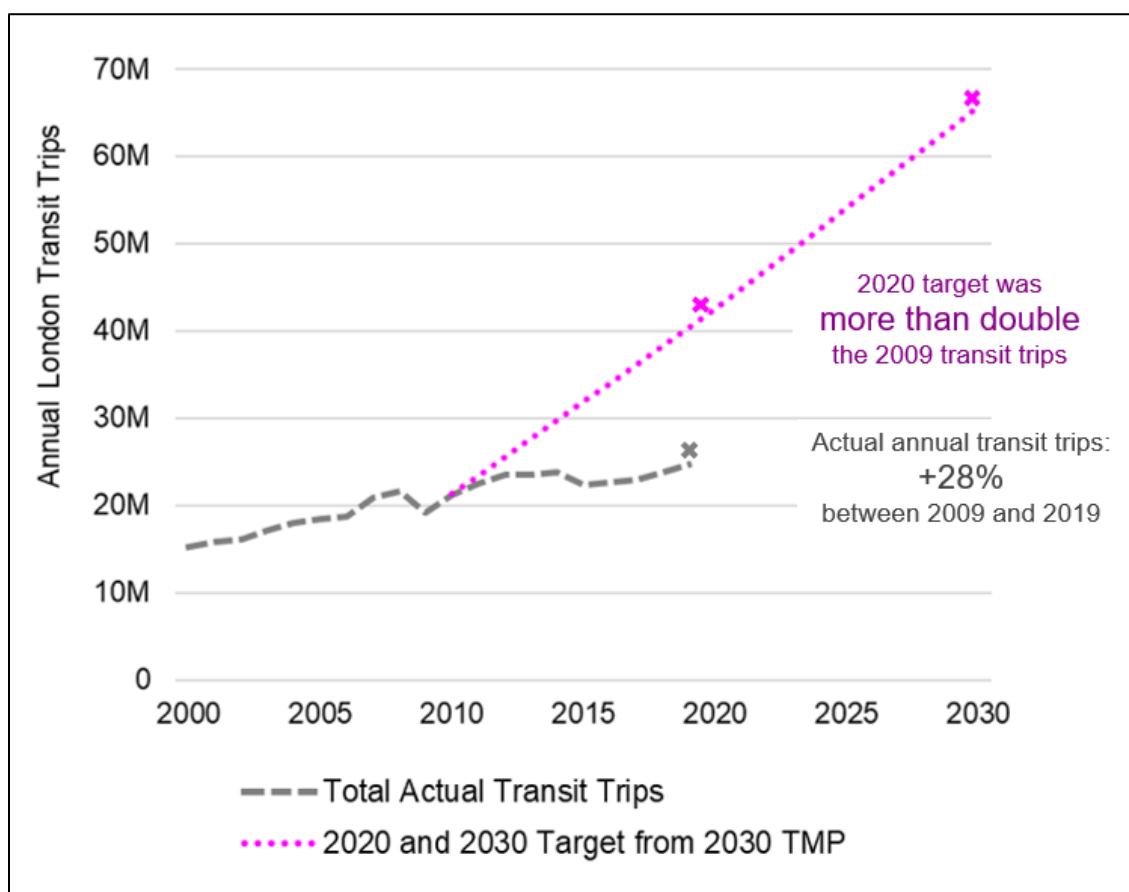


Figure D-3: Forecast London Transit Ridership for 2030 TMP Mode Share Targets

Source: CUTA Statistics; London Travel Demand Forecasting Model

Note: Given the significant drop in transit use in 2020 due to the COVID-19 pandemic, 2019 actual CUTA ridership statistics were used to assess progress towards the 2020 target, rather than 2020 actual CUTA ridership statistics.

^d Given the significant drop in transit use in 2020 due to the COVID-19 pandemic, 2019 actual CUTA ridership statistics were used to assess progress towards the 2013 TMP target

Infrastructure Implementation

While comparing the current transit mode share against the interim 2020 target, it is important to recognize that implementation of some of the rapid transit recommendations in the TMP are ongoing and not yet in service.

The 2030 TMP was finalized in 2013. One of the foundational recommendations to grow transit use was to implement a rapid transit network that could provide a viable mobility alternative for more Londoners. The planning, approvals, funding and implementation of large infrastructure projects is a lengthy process. Currently, the City is completing three major infrastructure projects as part of a rapid transit network. The completion of these projects and provision of the higher-order service in the coming years will make transit a more viable option for many trips. The beneficial impacts to transit mode share from this initiative will begin to be realized in the near-term.

The construction of infrastructure to support walking and cycling has a much shorter lead time and is more conducive to phasing. The increased construction of sidewalks, cycling facilities and pathways to support walking and cycling based on the 2016 Cycling Master Plan and annual programs such as the New Sidewalk Program and Infrastructure Renewal Program may have contributed towards the success in exceeding the active modes target. Similar to rapid transit, active transportation has benefitted from significant provincial and federal funding since the completion of the 2013 TMP. Another positive contributor to the positive walking and cycling trend may be the introduction of complete streets standards and walkable communities for healthy lifestyles as part of recent residential and mixed use developments.

Land Use - Intensification Targets

The mixed success with the walking, cycling and transit targets may also be a function of shifts in London's land use pattern and growth distribution over the past ten years to develop compact mixed-use communities.

The pace at which the recommendations of the 2030 TMP were assumed to be implemented was ambitious, however progress is underway. The 2030 TMP helped inform the development of The London Plan. The London Plan included extensive community consultation and confirmed many of the mobility policies. It was approved by Council in 2016 and became fully in force and effect in May 2022.

The London Plan currently targets 45% of all new housing units to be built within the 2016 Built Area (as defined in The London Plan – Our City). The remaining 55% of units are planned to be built in greenfield sites within the Urban Growth Boundary, but outside of the 2016 Built Area. As shown in Figure D-4 below, the average intensification rate since 2016 is 39.2%, which is approaching the 45% intensification target.

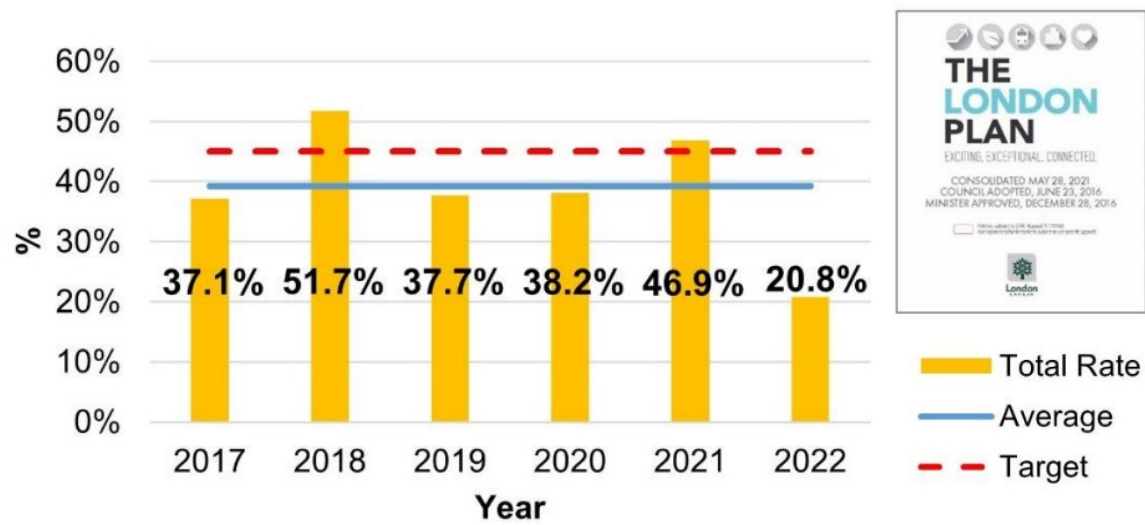


Figure D-4: Intensification Rate

While Central London and areas along Rapid Transit Corridors and Transit Villages can anticipate future intensification, these areas are geographically limited as currently planned and therefore may not achieve enough of the desirable densities noted in Table C-2 depending on future planning goals and supporting analysis. Larger geographic areas of continuous high-density development may be needed to reach the desired density to sustain transit service in an efficient manner. Future development will be directed by The London Plan policies that support intensification around planned Rapid Transit Corridors. New zoning regulations are also being developed to implement those policies and to help realize The London Plan goals. While The London Plan place types were developed to align land use and mobility objectives, higher intensity may be considered in some areas through future London Plan updates to ensure the land use pattern supports rapid transit investments. Ontario's Bill 23 will also contribute by facilitating development with infill and slightly higher densities.

APPENDIX E

Climate Emergency Action Plan Goals

Transportation-related GHG emissions are largely a function of the total distances travelled by vehicles and the fuel efficiency of vehicles on the road. Any measure taken that reduces the number of vehicle trips taken will reduce emissions. This can be accomplished by walking, cycling, taking transit, carpooling, working from home, virtual meetings, trip chaining, etc. Improving vehicle fuel economy, along with low emission fuels and zero emission vehicles, will also reduce emissions. The Mobility Master Plan will be focussing on measures that reduce the proportion of personal trips that are conducive only to motor vehicle use and instead facilitating sustainable options.

The CEAP has the following 2030 Milestone Outcomes related to transportation emissions which will be considered throughout the MMP process:

Table E-1: CEAP 2030 Milestone Outcomes – Transportation Related

Expected Result	2030 Milestone Outcome
Walkable, Complete Neighbourhoods	Ensure the majority of Londoners live within an easy walk of their daily needs.
Increased Active Transportation and Transit	Strive to reduce the annual number of in-town personal vehicle trips per person in London by 30-50% from 2019 levels (around 550 trips per person)
More Zero Emission Vehicles	Strive for at least 50% of the km travelled on London's roads to be by zero emissions vehicles.

Impact of the COVID Pandemic on Transportation Emissions

The work-from-home measures taken for the COVID pandemic had a significant impact on transportation energy use in 2020 and in 2021 which continued in to 2022 with the total volume of fuels sold at gas stations being 15% lower in 2022 than it was in 2019. On a per-person basis, this works out to be about 20% lower.

Prior to COVID-19, vehicle ownership in London had grown by over 4% every year on average between 2010 and 2019, much faster than London's overall population growth. As of December 2019, there were almost 292,000 light-duty vehicles registered in London – an increase of almost 89,000 since 2010. When compared to London's population, vehicle registration increased from 557 vehicles for every 1,000 people in 2010 up to 711 vehicles in 2019. However, as of December 2022, the number of light-duty vehicles registered in London dropped to about 268,000 vehicles. This works out to 617 vehicles for every 1,000 people.

Google's Environmental Insights Explorer tool has provided data up to 2021, which identified a 27% increase in the amount of cycling from 2019 to 2021. This is consistent with other Ontario cities along with the emerging popularity of electrically assisted bicycles (e-bikes) and other forms of micromobility such as electric kick-scooters (e-scooters).

Throughout the MMP process the CEAP goal of striving to reduce the annual number of in-town personal vehicle trips per person in London by 30 to 50% from 2019 levels will be further considered. The detailed mobility modelling being undertaken for the MMP will provide an opportunity to consider what may be feasible and to build strategies to achieve. As a comparison, the estimated number of personal vehicle trips per person was 13% lower in 2021 during the pandemic.

The Role of In-Boundary vs Inbound and Outbound Trips on Transportation Emissions

Trips that start and end in London account for about half of transportation emissions according to estimates provided by Google's Environmental Insights Explorer. Inbound and outbound trips to and from London account for the other half due to the longer distances travelled and associated higher fuel use.

For inbound and outbound trips, personal vehicles account for virtually all of the trips taken. London currently has regional bus service and inter-community bus services connecting London with surrounding communities and other major provincial centres. VIA Rail has limited rail service between London and Toronto and GO Transit provides services between London and Toronto. Many of London's employers draw employees commuting in from regional communities such as Ilderton, Ingersoll, St. Marys, St. Thomas, Strathroy, and Woodstock. Many Londoners also commute to work to large employers in Ingersoll, Woodstock, Waterloo Region, and even the Greater Toronto and Hamilton Area. London residents are also expected to supply talent to new regional employers such as Amazon and Volkswagen near St. Thomas.

As a result, City of London programs promoting carpooling, transit and working from home will play an important role for reducing these inbound and outbound trips, including the future launch of a Transportation Management Association to serve Londoners and London's employers.

Given that about half of transportation-related GHG emissions are for in-town trips, encouraging mode shifts towards more walking, cycling, and taking transit will play an important role in reducing emissions alongside trip-reduction measures such as carpooling and working from home.

Pace of Transportation Electrification

Electrification will play an important role in reducing emissions. However, the pace of overall vehicle fleet turnover is slow. On average, new model year vehicles represent about 8 to 9% of all vehicles registered in London, with the average age of vehicle registered today being around eight years old. About 10% of vehicles registered today are over 15 years old.

As of the end of 2022, there were almost 2,100 electric vehicles registered in London, which represents 0.8% of all registered vehicles. In terms of new vehicles, 3.2% of new 2022/23 Model Year vehicles registered in London were electric vehicles. This is below the rates seen across Canada. As of the third quarter of 2022, Ontario's EV market share of 6.0% was below the national average of 7.7% and far behind British Columbia and Quebec at 15.6% and 11.8% respectively. London's EV market share was lower than Ontario's share due to the low availability of EVs in smaller markets like London.

Given these trends, mode share improvements remain an important means for reducing transportation emissions in the near term.

Impact of Electric Micromobility

As noted earlier, the emerging popularity of e-bikes and e-scooters are expected to increase the number of trips and the distance of trips taken by these modes. To support this, in 2023, the City of London joined the Province of Ontario's pilot project to test the use of privately-owned e-scooters, as well as cargo e-bikes for both personal use as well as commercial use.

Impact of a Warmer Climate

With climate change, winters are expected to be warmer in the future. As outlined in Canada's Climate Atlas, the number of Icing Days (days where the temperature does not exceed 0°C) in London over the 2021-2050 period are expected to drop to 42 days per year from the historical level of 59 days over the 1976-2005 period. As a result, there will be more winter days where conditions will be favourable for safe walking and cycling.

The changing climatic conditions also highlights the importance of resiliency of transportation infrastructure and ensuring that it is designed and built to withstand these changing conditions.

APPENDIX F

Draft Project Evaluation Framework

In addition to identifying robust policies, programs, and actions, the MMP will be developing short and long-term road, transit, and cycling infrastructure project recommendations through to 2050. At the master-planning level, only capital infrastructure projects that play a strategic role in the mobility system by adding people-moving capacity to accommodate projected growth are evaluated. This is because of the long-term strategic nature of the MMP.

As such, rehabilitation, maintenance, upgrade or amenity projects that do not change capacity or operational improvements that may impact capacity (i.e. traffic signal timing) are not included in the MMP infrastructure project evaluation. However, policies or actions in the MMP can be developed to guide these other infrastructure and operational projects that will also be an important part of the future mobility system.

Infrastructure Projects to be Evaluated

A list of all existing and newly identified potential capacity-related infrastructure projects will be evaluated as part of the MMP process to inform the creation of priority networks for infrastructure improvements. This list will include already documented capacity-related infrastructure projects (i.e. from the 2030 TMP, 2019 Development Charges Background Study, etc.) and additional projects identified through the MMP study process to address capacity-related issues/gaps. Types of projects that will be evaluated as part of the MMP are listed in Table F-1. Walking is not included in this detailed evaluation process because most sidewalks have sufficient capacity to accommodate future demand and there are existing policies that are implementing sidewalks on streets that currently lack them. The MMP will work to identify key connectivity gaps in the network and help to identify priority areas.

Table F-1: Types of Capacity-Related Infrastructure Projects to be Evaluated

Roads	Transit	Cycling
<ul style="list-style-type: none">• New roads/bridges• Widening of existing roads/bridges• Inter-regional links	<ul style="list-style-type: none">• Rapid transit• Transit priority corridors• Isolated priority measures• Inter-regional transit links	<ul style="list-style-type: none">• New cycling facilities• Upgraded cycling facilities (i.e. converting from a shared facility 'sharrow' to a separated or protected facility bike lane)• New and upgraded multi-use trails

Draft Evaluation Framework

The MMP Guiding Principles and London's identified mobility needs serve as the basis for evaluating projects, supporting a clear connection from the City's policy direction and needs to the recommended networks. Projects will be scored based on one to three key indicators per Guiding Principle for each mode, depending on available data. Each of the five guiding principles are being weighted equally.

Projects will be scored in two phases:

1. **Benefit Score:** Evaluation against four of the five guiding principles including Environmentally Sustainable, Equitable, Healthy and Safe, and Integrated, Connected and Efficient.

2. **Cost Score:** Combining the benefit score with the lifecycle cost of the project (the Financially Sustainable Guiding Principle)

This two-staged approach sets a minimum threshold for the benefit score, preventing the pursuit of low-value investments. The benefit score threshold will be determined once project scores are available to enable calibrations with the range of actual results.

Once projects are scored, additional analysis on network-wide considerations, feasibility and phasing will be conducted to determine final MMP project recommendations.

Infrastructure recommendations will be developed by evaluating them under a “target” scenario. The “target” scenario represents London’s desired future and enables the MMP to identify projects, policies and programs to achieve that. Specifically, the target scenario is one where London’s mode share target is achieved.

Projects in each category will be assessed relative to other projects in the same category to account for the significant difference in cost and impact of each of these types of projects (i.e. inter-regional road links will be evaluated against other inter-regional road links).

The draft scoring frameworks per mode are listed below:

Table F-2: Draft Capacity-related Road Infrastructure Project Scoring Framework

Guiding Principle	How can a road infrastructure project advance this guiding principle?	Key Indicator
Benefit Score		
Integrated, connected and efficient	Travel time savings	Travel time on the road link in the peak period
	Facilitate goods movement	Heavy trucks in maximum peak period, adjacent to freight trip generators, and/or near rail facilities
Environmentally sustainable	Minimize the impact on natural heritage	Impact on natural heritage
	Potential for Induced Demand & GHG emissions	Projects that encourage people to make more or longer trips by driving will score lower
Equitable	Improve access for equity denied populations	Directly serves an equity denied population, with minimal or no negative impact (i.e. significant property impacts, loss of neighbourhood green space etc.)
	Provide services useful to people whose trip originates in an area with an equity denied population	Number of people using the project who live in an area with an equity denied population
Healthy and safe	Promote sustainable mode use	Integrates walking, cycling and/or transit facilities/features directly into the project
	Address a known/existing road safety issue	City of London Potential Safety Improvements (PSI) score

Guiding Principle	How can a road infrastructure project advance this guiding principle?	Key Indicator
Cost Score		
Financially sustainable	Provide good value for the financial investment	Lifecycle cost per point

Table F-3: Draft Capacity-related Transit Infrastructure Project Scoring Framework

Guiding Principle	How can a transit infrastructure project advance this guiding principle?	Key Indicator
Benefit Score		
Integrated, connected and efficient	Encourage increases in transit ridership	Number of additional riders who are expected to use the transit corridor in 2050 relative to today
	Travel time savings and reliability	Travel time on the road link in the peak period
	Provides good access to diverse destinations	Directly serves a variety of destinations including: <ul style="list-style-type: none"> • Downtown, Transit Villages, Institutional (including educational and health care institutions) and the Airport • Rapid Transit Corridor • Urban Corridor, Shopping Area, Main Street • Green Space, Heavy Industrial, Light Industrial, Commercial Industrial, Future Industrial Growth
Environmentally sustainable	Minimize the impact on natural heritage	Impact on natural heritage
Equitable	Improve access for equity denied populations	Directly serves an equity denied population, with minimal or no negative impact (i.e. significant property impacts, loss of neighbourhood green space etc.)
	Provide services useful to riders whose trip originates in an area with an equity-denied population	Number of riders using the project who live in an area with an equity-denied population
Healthy and safe	Promote sustainable and accessible mode use	Integrates walking and/or cycling facilities/features directly into the project
	Address a known/existing road safety issue	City of London Potential Safety Improvements (PSI) score
Cost Score		
Financially sustainable	Provide good value for the financial investment	Lifecycle cost per point

Table F-4: Draft Cycling Impact Analysis Scoring Framework

Guiding Principle	How can a cycling infrastructure project advance this guiding principle?	Key Indicator
Benefit Score		
Integrated, connected and efficient	Improve and expand cycling network reach and connectivity	The number of links that connect on either end of proposed link or midway through the link
	Serve areas of current or potential high-cycling-demand	Population and employment density within a 250 m buffer of the facility;
	Improves inter-modal connectivity	Connects with local or regional transit facilities
Environmentally Sustainable	Minimize the impact on natural heritage	Impact on natural heritage
	Encourage a shift towards cycling for short-distance trips (2 km or less)	Number of existing 3 km or less personal vehicle trips, within a 250 m buffer of the facility (personal vehicle trips weighted based on the size of the buffered area)
Equitable	Improve access for equity denied populations	Directly serves an equity-denied population, with minimal or no negative impact (i.e. significant property impacts, loss of neighbourhood green space etc.)
Healthy and safe	Provide good access to diverse destinations	Number of trip generators within a 250 m buffer of the facility (a preliminary list of destinations includes rapid transit stations, schools, parks, public facilities (i.e. libraries, community/recreation centres, etc.)
	Potential to improve safety in equity-denied neighbourhood	Collision History
	Project provides illumination or other personal security measures where none currently exist	The distance of cycling facilities that are illuminated or new measures
Cost Score		
Financially Sustainable	Provide good value for the financial investment	The cost of cycling projects is considered as part of a feasibility review when specific facility types are considered

Cycling project evaluation requires a slightly different considerations than for road or transit infrastructure projects. This is because of the scale and breadth of the cycling network (200+ links typically considered as part of a candidate cycling network) and the need to focus on implementation considerations (i.e. the feasibility of building an appropriate cycling facility along a given corridor).

Some additional considerations for cycling project evaluation include:

- Cycling facility feasibility review: Appropriate classes of cycling infrastructure must be identified for the roadway context (i.e., shared,

designated, or separated). The overall goal of the feasibility review is to identify the lowest impact approach to building appropriate and attractive cycling infrastructure.

- **Cycling network lens:** Cycling network spacing targets will help to inform the selection of links city-wide. The desired grid spacing of the network can be established on a gradient (i.e., denser spacing target within downtown area, lower target within suburban areas, denser grid within equity-denied neighbourhoods etc.) or can be uniform across the city. Specific targets will be developed in subsequent phases of cycling network development work. In general, the cycling network should:
 - Create a connected network;
 - Be visible and quickly accessible to promote and enable the viability of cycling;
 - Connect residents to school, work, and recreation, transit; and,
 - Attract new riders by providing a network of all ages and abilities facilities such as bicycle boulevards, protected bike lanes, cycle tracks and multi-use paths.

Developing an Integrated Multi-Modal Network

Once projects are identified for each mode, these will be combined into one multi-modal network. The goal of this is to evaluate and refine multi-modal project recommendations, within the context of the whole mobility system.

The multi-modal network evaluation includes two components:

- Integrating projects across all modes into one multi-modal network, providing appropriate connections between modes and determining/resolving conflicting projects where necessary; and,
- Evaluating the performance of the entire system and identifying any remaining gaps.