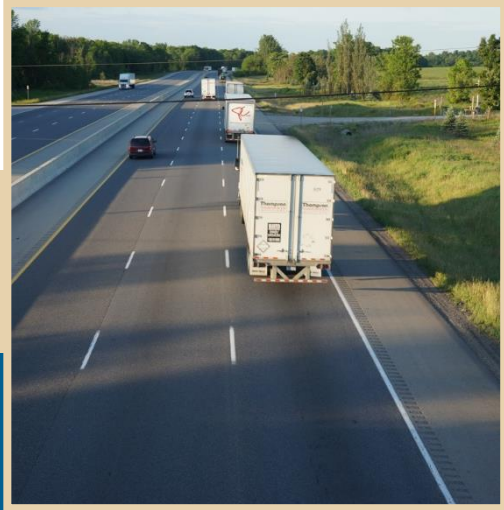
Hamilton



Draft Report

Final Report

Hamilton Truck Route Master Plan Update

IBI

Prepared for City of Hamilton
by **IBI Group**
in association with David Kriger and GLPi

October 26, 2021

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1. Introduction

1.1 Study Objectives

The purpose of this study is to update the Hamilton Truck Route Master Plan (TRMP). The following lists the broad objectives for the study:

Objective 1: Identify the vision and goals of the truck route system to achieve the objectives of the truck route network.

Objective 2: Establish an evaluation process to develop the truck route network which incorporates the City's equity, mobility, sustainability, and economic aspirations.

Objective 3: Satisfy Phases 1 and 2 of the Municipal Class EA process dealing with transportation system problems or opportunities, and alternative planning strategies respectively

Objective 4: Undertake a City-wide approach to consultation, which will be guided by the Council-approved Consultation and Engagement Strategy.

Objective 5: Prepare an updated by-law and schedule that summarizes the recommended truck route network, for consideration by Council.

Objective 6: Recommend policies to prepare for emerging technologies and new design approaches, such as autonomous vehicles, roundabouts, and complete-liveable-better streets.

1.2 Study Principles

The study principles provided guidance that helped shape how the Truck Route Master Plan study was conducted and the types of outcomes that were desired:

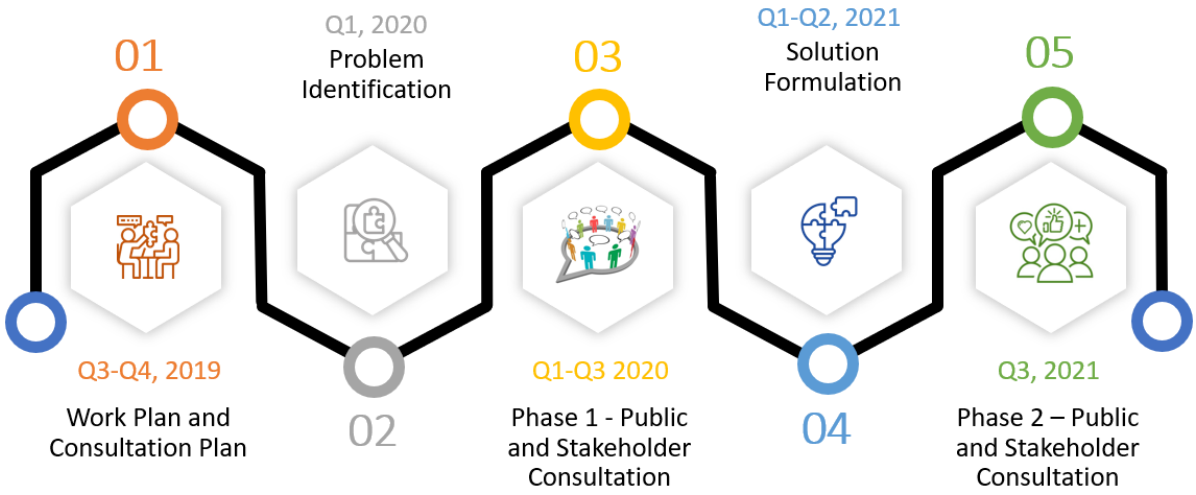
- Create a safer network for all road users, including pedestrians and cyclists.
- Enable goods to be transported economically.
- Have a transparent route selection process.
- Avoid the inequitable distribution of impacts (e.g. public health, emissions, vibrations) on sensitive areas, such as schools, hospitals, parks, residential neighbourhoods, and community destinations.
- Specify routes clearly and intuitively to minimize the need for Police enforcement.
- Enable the plan to adapt to changing conditions.

- Maintain route connectivity and continuity to provide reliable routes.
- Create routes that optimize the use of higher-quality road facilities, and match the relationship of trucks to road category and roadway configuration.

1.3 Study Process

The study process consisted of three stages, with ongoing Stakeholder Engagement, as represented by Exhibit 1.1, together with timelines.

Exhibit 1.1: Study Process



1.3.1 Stage 1: Review of the Relevant Background Material and Problem Identification

The purpose of this task is to review all of the relevant background material to confirm what should serve as specific input to the Truck Route Master Plan (TRMP). Subject matter experts and technical support staff reviewed and summarized the background material, identifying the relevance, importance and applicability to the TRMP Study Review, especially as they relate to identifying the problems and opportunities relating to goods movement to, from, within and through the City of Hamilton. The review also investigated relevant inter-related issues such as public health and safety. The understanding of the problems and opportunities was then enhanced through the study's engagement activities.

It was important that the development of the TRMP Study Review be guided by a clear, coherent and agreed-upon policy basis, which includes the following elements: Vision Statement; Updated Goals and Objectives; and Guiding Principles.

The goods movement Vision Statement is a vital piece of policy that explains the purpose of a truck route network in the context of efficient and effective goods

movement in a vibrant and livable City. Similarly, the goals and objectives of TRMP were updated. These provide direction toward achieving the Vision Statement. Finally, a set of guiding principles are developed in line with the updated goals and objectives, and they are used to evaluate the existing truck route network.

A listing of desirable truck route attributes was explored and presented to City staff, and stakeholders. In order to assess the alternative transportation scenarios, a set of assessment criteria reflecting these desired attributes and the foregoing policy directions were developed for application in Stage 3.

1.3.2 Stage 2: Policy Review and Development

The objective of this stage is to propose policies and actions to ensure that the updated TRMP is integrated with other City policies, while accounting for emerging technologies and trends. The approach is to conduct a focused review of best practices and interviews to identify potential policies and actions, assess their applicability to City of Hamilton, and determine the underlying factors and next steps that are necessary to achieve a successful implementation in the City.

1.3.3 Stage 3: Development of Alternative Solutions and Evaluations

In Stage 3, alternative solutions were developed and evaluated. The network alternatives placed more emphasis or less emphasis on various planning criteria.

Although the tested alternatives were themed to specific objectives of the truck route network strategic vision, they needed to meet basic levels of connectivity and continuity to allow for intuitive routing options and to prevent major operational complications. Therefore, only those that represent a rational truck route network were brought forward for formal evaluation.

The TRMP Study Update report is intended to document all study analysis, findings, and recommendations, as well as the consultation/engagement activity findings. The report includes all policy recommendations, all network improvements and their associated priorities, and the finalized truck route network.

1.3.4 Stakeholder and Public Consultation

The process identified a comprehensive set of needs and concerns by purposefully engaging various affected communities and facilitating dialogue with City of Hamilton residents, the Council Truck Route Sub-committee, adjacent municipalities/provincial agencies and other stakeholders throughout the study. It provided the opportunity for the City citizens and key stakeholders to understand the study scope and purpose, along with study activities and progress. The study

endeavored to provide require a balanced assessment of the needs and objectives of the community, the City and its stakeholders.

The following lists the stakeholder meetings that took place over the course of this study:

- City of Hamilton Truck Route Subcommittee (November 1, 2019);
- Ministry of Transportation and Adjacent Municipalities (January 8, 2020);
- Technical Advisory Committee (February 13, 2020);
- Business Community and Goods Movement Industry (March 17, 2020);
- Goods Movement Community (July 14, 2020);
- Technical Advisory Committee (October 20, 2020);
- Technical Advisory Committee (March 1, 2021);
- Technical Advisory Committee (April 28, 2021);
- Ministry of Transportation and Adjacent Municipalities (June 9, 2021);
- Business Community and Goods Movement Industry (June 11, 2021); and
- Goods Movement Community (June 16, 2021);

Public engagement activities included the following:

- Truck Advisory Focus Group meeting (March 10, 2020);
- Virtual Public Information Centre (September 2, 2020);
- Truck Advisory Focus Group (May 31, 2021); and
- Virtual Public Information Centre (June 24, 2021).

In addition, the City of Hamilton launched a web page at engagehamilton.ca on July 22, 2020 through the end of the study to provide study updates and as the platform for two online public surveys conducted during the study:

- Let’s Talk About Trucks (July 22 to September 14, 2020); and
- Draft Truck Route Network: Advantages, Impediments, Mitigating and Maybes (June 17 to July 30, 2021).

1.4 Study Background

The City’s Strategic Plan vision “To be the best place to raise a child and age successfully” is the overarching principle for undertaking this study, as well as Vision Zero. In support of this undertaking, a robust public and stakeholder engagement strategy ensured the study was well informed of issues, opportunities and concerns.

The development of the Hamilton 2010 Truck Route Master Plan (TRMP) Study resulted in the truck route network currently in place, as shown in Exhibit 1.2.

This plan and the resulting network were developed to be consistent with directions taken in the 2008 Metrolinx release of “The Big Move”, an integrated multi-modal Regional Transportation Plan (RTP) for the GTHA. Subsequent to the RTP, Metrolinx undertook a GTHA Urban Freight study that fed into background reports as part of the 2018 update to the RTP.

The current City of Hamilton TRMP update is an opportunity to address any policy gaps and inconsistencies between these three documents and develop strategies to move people and goods on shared infrastructures effectively.

Aligned with the vision, objectives and desired outcomes associated with the City’s Transportation Master Plan (TMP), Vision Zero and Strategic Plan, the truck route network must satisfy the needs for effective transport of goods and integration with other modes of transportation. An increase in the number of truck-related problem locations, planned implementation of Light Rail Transit (LRT), and embracing the Complete-Liveable-Better (CLB) streets approach by the City also needed to be addressed as part of this study.

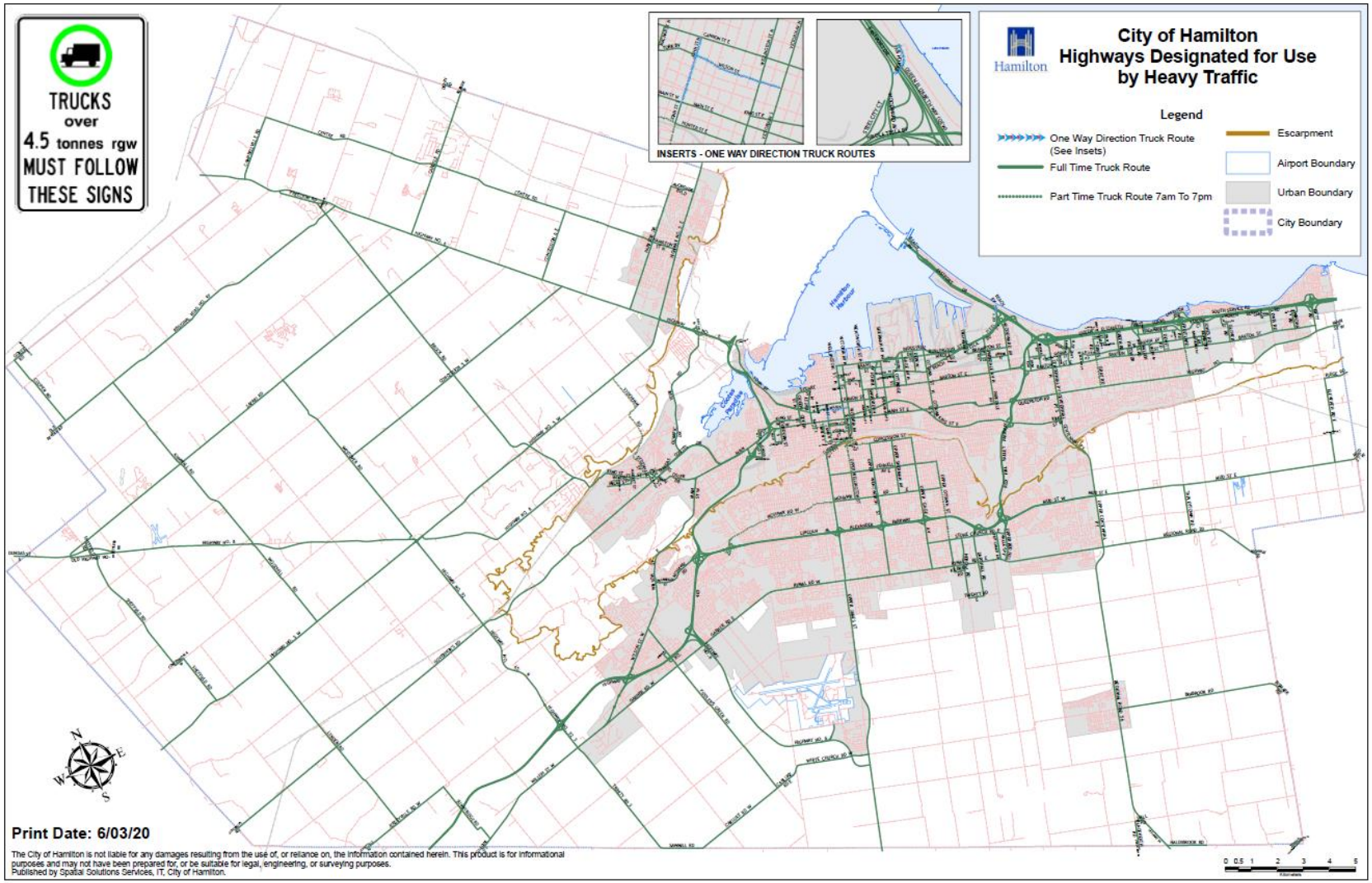
Since the TRMP study was undertaken in 2010, a number of new issues and policy considerations have arisen or are starting to be seen through changing lenses, such as an increased focus on the environment and climate change, an increased focus on road safety through Vision Zero, new port-area facilities, changing rural issues, and social equity issues, among others.

1.5 Report Organization

Following this introduction, this report is organized as follows:

- **Section 2** reviews the vision and goals for the truck route network.
- **Section 3** highlights existing policy and planning documents at the municipal and provincial level, provides an overview on safety analysis, and presents a preliminary list of emerging issues and challenges that need to be considered as part of this project.
- **Section 4** describes the proposed evaluation framework and summarizes concerns raised through the Phase 2 stakeholder engagement.
- **Section 5** provides recommendations for the truck route network, scheduled by-laws, and policies and practices.
- **Section 6** presents supporting policies that work together with the truck route network to manage the movement of trucks in the City.

Exhibit 1.2: Current City of Hamilton Truck Route Network (2010, updated in 2020)



Source: City of Hamilton, 2020

2. Vision and Goals

2.1 Truck Route Network Vision Statement

The vision statement for the City of Hamilton's truck route network was refined over the course of the study based on stakeholder and public feedback to its current wording:

> **A truck route network that supports Hamilton and regional *economic prosperity*, coexisting with a *high quality of life for communities* as well as *environmental and public health*.**

2.2 Truck Route Network Pillars and Goals

The Vision recognizes and supports three pillars of sustainability – economic prosperity, community livability (high quality of life for communities), and environmental and public health, as pictured in Exhibit 2.1[1].

Exhibit 2.1: Truck Route Network Pillars

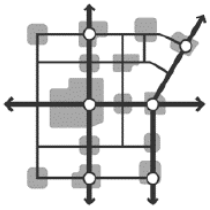
Seven truck route network goals were identified for the truck route network, as listed in Exhibit 2.2. These are organized under the three pillars shown above.

[1] These generally correspond to the three broad goals of the City's 2018 Transportation Master Plan (A Sustainable and Balanced Transportation System; Healthy and Safe Communities; and Economic Prosperity and Growth).

Exhibit 2.2: Truck Route Network Pillars and Goals

Pillar: Economic Prosperity

Economic Aspirations
Develop employment centres, promote freight-friendly land use planning, help ensure direct access to these centres.



Efficient Connectivity
Develop an efficient truck route network that provides direct connections among goods-generating land uses and regionally.

Reliability
Improve travel reliability; design resilience and redundancy into the transportation system in the event of incidents

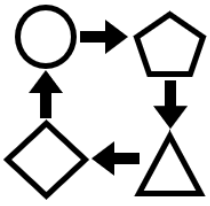
Pillar: Community Liveability

Safety
Apply appropriate design standards and limit conflicts.

Equity
Minimize and distribute impacts of the truck route network away from areas that currently experience societal burdens.

Pillar: Environment and Public Health

Environmental Sustainability and Public Health
Reduce impacts of truck operations to improve environmental, climate change and public health outcomes.



Adaptability
Anticipate emerging trends and new technologies, provides framework for addressing future issues.

3. Background and Problem Identification

This section includes a review the City of Hamilton and adjacent areas policy context relating to the Hamilton truck route network. Problems and opportunities were also identified based a background review and through insights gained through the study's engagement activities. This section also includes a more detailed safety analysis.

3.1 Policy Context

Policy and planning documents relating to goods movement in the City of Hamilton, adjacent municipalities and the Province of Ontario were reviewed to ensure alignment of the City's truck route network and truck route management policies with these initiatives. These are summarized below.

3.1.1 City of Hamilton Policies and Plans

City of Hamilton policy and planning documents that were reviewed are summarized below.

City of Hamilton Strategic Plan: 2016 to 2025 (2016). The Strategic Plan Vision is that the City of Hamilton aspires "to be the best place to raise a child and age successfully." To achieve this, the plan outlines six community priorities:

- community engagement and participation;
- economic prosperity and growth;
- healthy and safe communities;
- clean and green;
- built environment and infrastructure; and
- culture and diversity.

These six strategic priorities were considered and integrated throughout the TRMP update process.

City of Hamilton Official Plans. An Official Plan is a land use planning document that guides development within a municipality. It provides a framework for understanding how infrastructure, such as roads, are to be used and developed. The City of Hamilton maintains two Official Plans covering different areas: **The Urban Hamilton Official Plan (UHOP)** and **Rural Hamilton Official Plan (RHOP)** – both were consolidated in December 2018.

The Goods Movement Network chapter of each plan states that the variety of corridors and facilities within the network make Hamilton an ideal place for a

"goods movement gateway" to link into the wider inter-regional, inter-provincial, and international networks. The following are key policies relating to goods movement network:

> "The goods movement network in Hamilton shall be maintained, protected and enhanced to support Hamilton's economic development strategy" (C4.6.1).
>
> "Heavy truck traffic may be restricted to designated truck routes to minimize negative impacts of truck traffic on local roads." (C4.6.2)

The Official Plans identify the functional road classes of roadways. An important consideration of the TRMP update is to align the truck route network with roadway facilities that are best able physically to accommodate heavy vehicles. Functional road classes are shown in Exhibit 3.1 and in Exhibit 3.2 for rural and urban areas, respectively.

A number of roadways in the rural area are reduced-load roadways from March 1 to April 30 due to physical limitations of the road bed during the spring thaw season. The locations of these are shown in Exhibit 3.3.

Hamilton Transportation Master Plan Update (2018). The Transportation Master Plan (TMP) identifies three broad desired outcomes with respect to the City's transportation system:

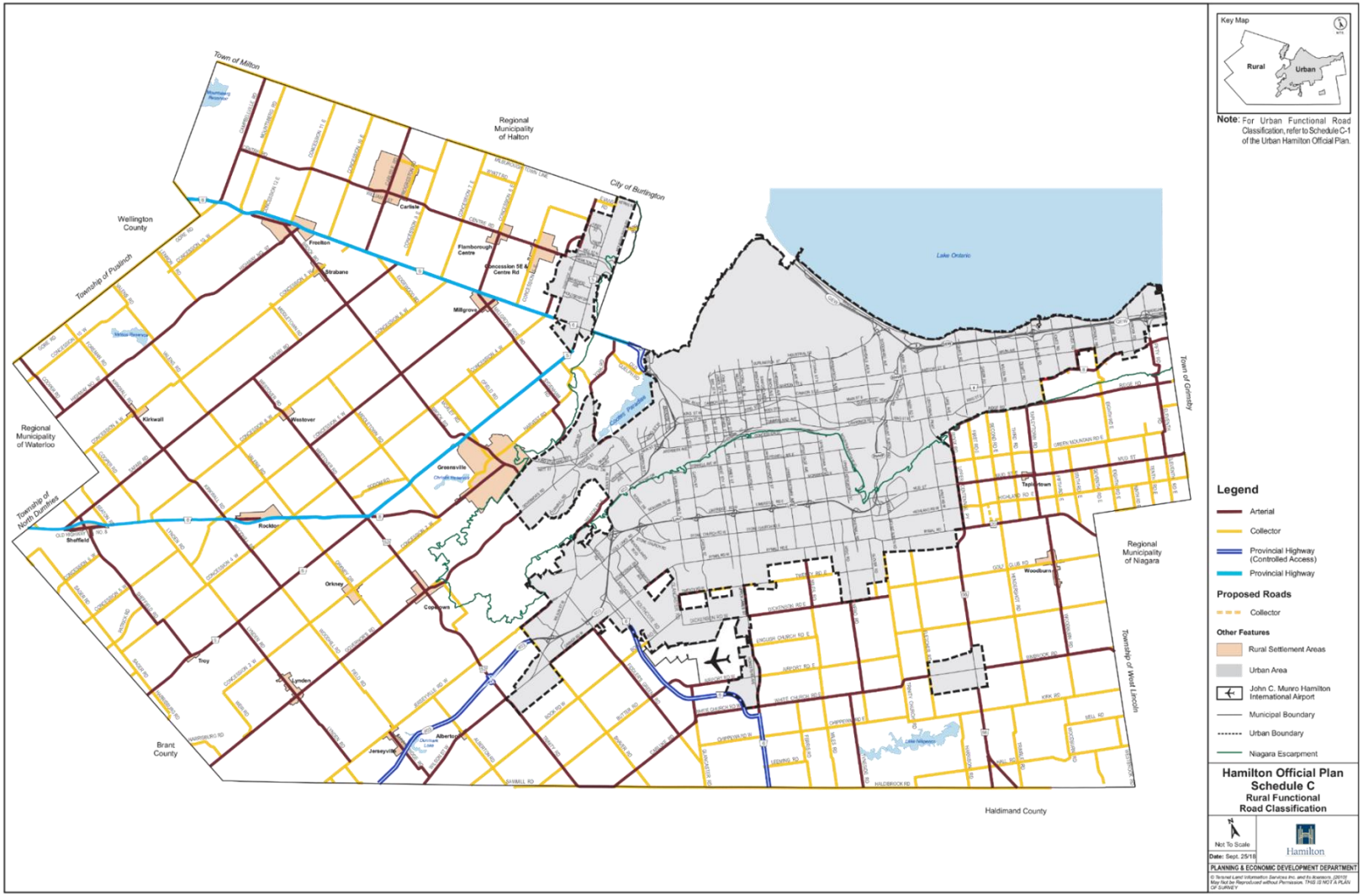
- A Sustainable and Balanced Transportation System;
- Healthy and Safe Communities; and
- Economic Prosperity and Growth.

The TMP update highlights the significance of a reliable goods movement network and freight-supportive land uses for Hamilton's economic growth and prosperity. The TMP update undertook a high-level overview of goods movement policies, supporting actions, and considerations for the integration of goods movement and Complete-Livable-Better (CLB) streets—Complete Streets designs often give much less attention to accommodating trucks and delivery vehicles than to other modes.

The TMP update also recognized the need for updating the 2010 TRMP and the truck route network, conducting a comprehensive review of the truck route network from a connectivity standpoint with other regions in south-central Ontario and beyond.

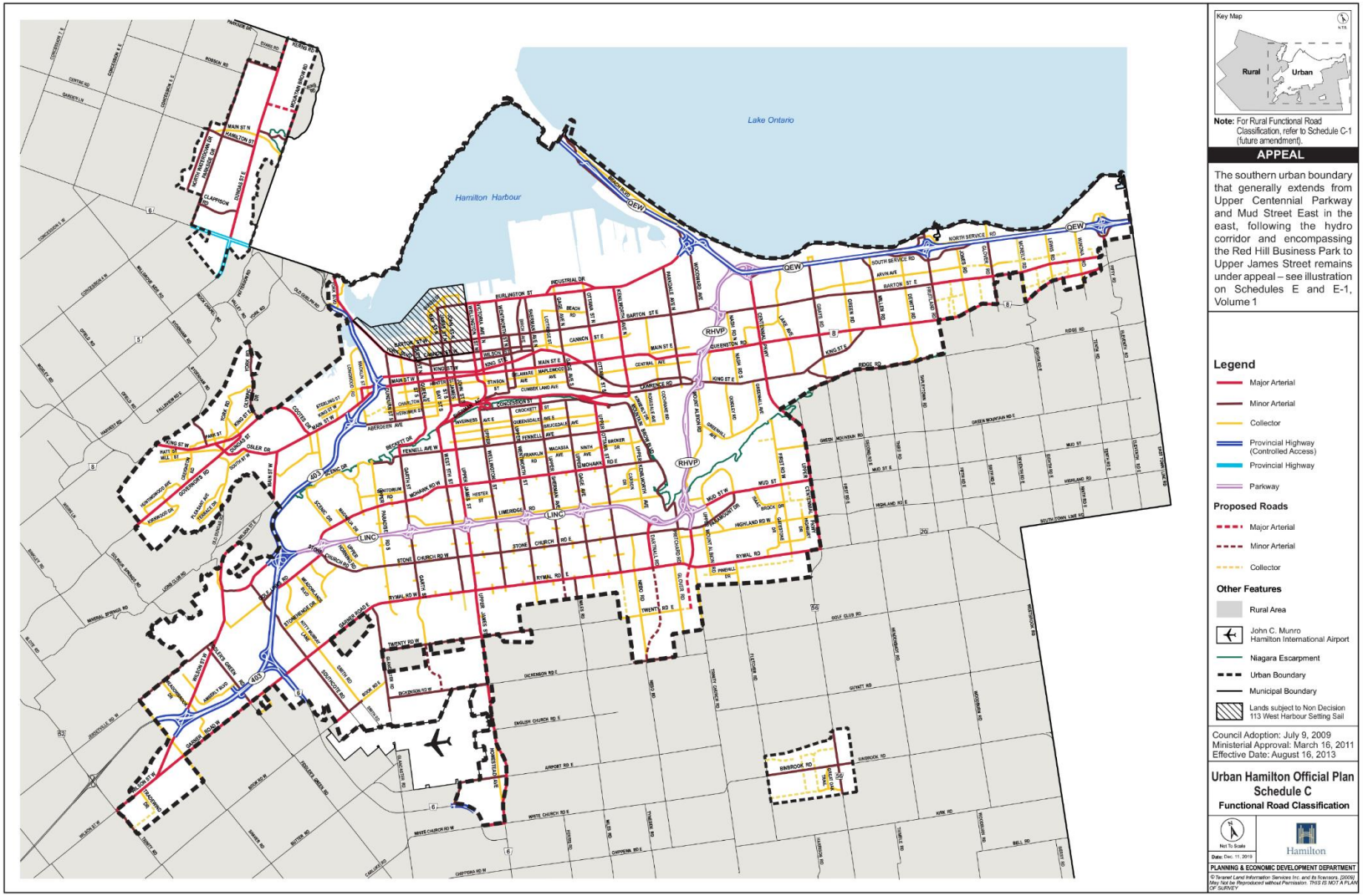
The *Goods Movement Review* was prepared as a background paper to the TMP study. It offered a possible goods movement vision and goals that were used in the development of policy directions for the TRMP update, and outlined issues and gaps that were considered in developing the understanding of needs and opportunities for this study.

Exhibit 3.1: Rural Hamilton Official Plan – Functional Road Classifications Map



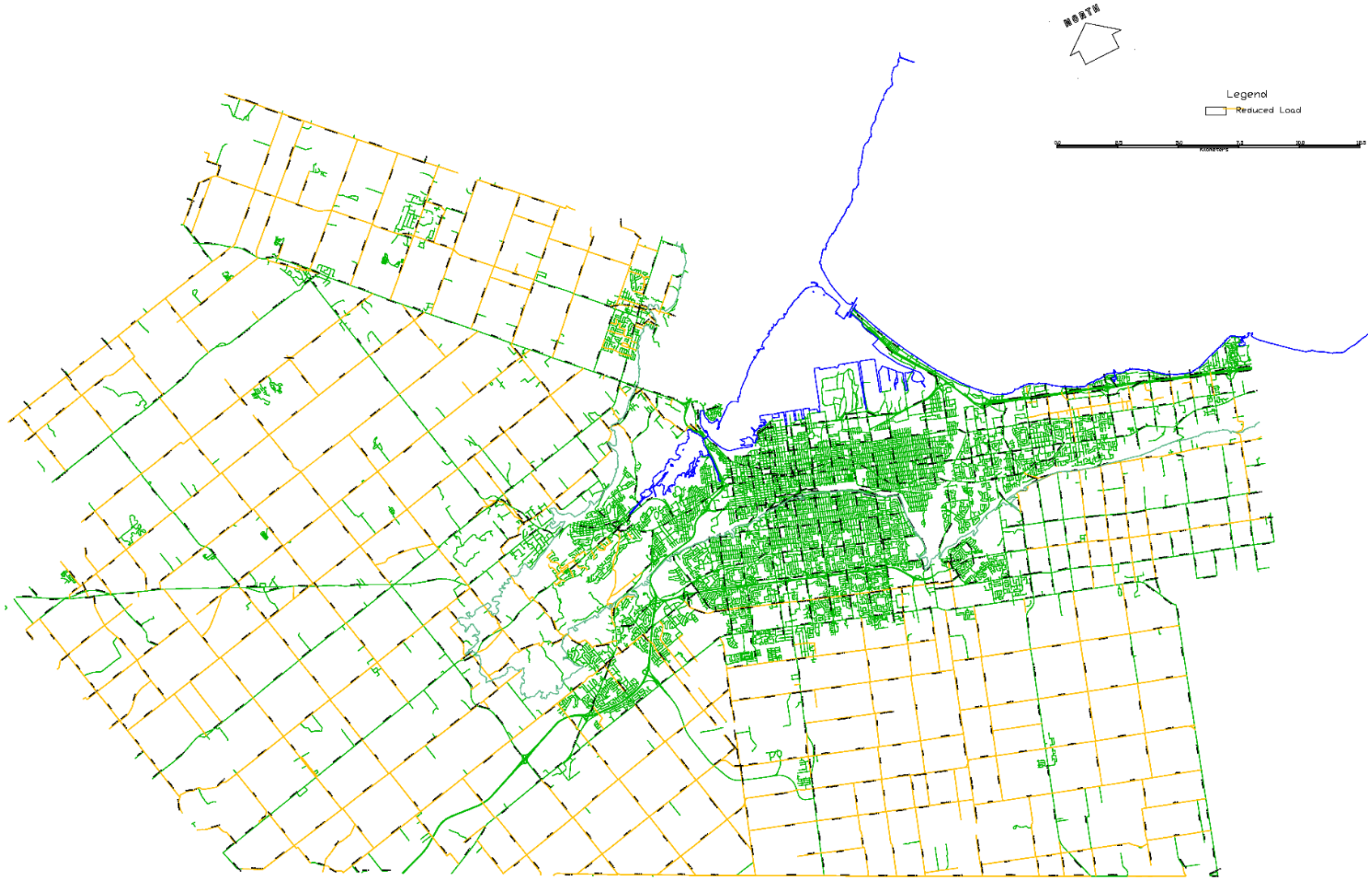
Source: Rural Hamilton Official Plan (2013)

Exhibit 3.2: Urban Hamilton Official Plan: Functional Road Classifications Map



Source: Urban Hamilton Official Plan (2013)

Exhibit 3.3: Reduced Load Roadways in Rural Hamilton (March 1 to April 30)



Source: Hamilton Truck Route Network Webpage (2007, updated based on recent road upgrades)

The *Emerging Technologies Policy Background Report* presented opportunities and risks that the City and Province will need to address. Within the realm of truck movements, connected and automate vehicles present a number of opportunities including safer roadways due to automated monitoring of the driving area, improved system efficiency, improved enforcement of the truck route network and greening technologies from increased fuel-efficient driving.

The *Road Safety Background Paper* was prepared to inform the roadway safety policies and actions within the TMP. The paper recognizes that the City has undertaken a number of initiatives to improve road safety over the past two decades, but that more needs to be done to eliminate injuries and fatalities. It recommends that the City adopt a Vision Zero approach into design guidelines.

The *Complete-Liveable-Better Streets Policy and Framework Background Paper* establishes nine principles for Complete-Liveable-Better CLB roads in Hamilton, a cornerstone to Hamilton achieving its vision for transportation. It outlined the role for different travel modes including goods movement for seven proposed road typologies (separate from functional road classes). The City of Hamilton is currently developing a CLB Design Manual.

The *Cycling Master Plan Review and Update* reviewed the cycling network plan developed in 2009 as part of the TMP. The updated plan calls for the network to expand by 553.7 km, made up of new bike lanes (227.2 km), paved shoulders (195.1 km), signed routes (48.6 km) and multi-use trails (82.7 km).

A challenge with Hamilton's road network is that there are few continuous east-west roads, particularly in the lower city. The few that do exist, such as the King/Main/Queenston corridor and Barton Street, are major transit corridors where accommodating trucks or cyclists can be challenging due to curbside demand of transit vehicles. This has also led to significant overlap between the planned cycling network and the existing truck route network.

Airport Employment Growth District Transportation Master Plan Update (2016). The Airport Employment Growth District (AEGD) comprises 551 net developable hectares of employment lands adjacent to John C. Munro Hamilton International Airport. This plan recommended truck route connections that are all part of the existing truck route network, in additional as well as Dickenson Road and White Church Road, not part of the existing truck route network. The AEGD will become a major employment district in Hamilton and an important consideration in the TRMP update.

Hamilton Goods Movement Study (2005). This study informed the development of the City's 2007 *Transportation Master Plan*. The study noted the City's economic strengths were found in three economic clusters: manufacturing, agricultural, and port-related businesses. All three industries require some levels of goods movement on the road network, on trucks. The plan identifies of short- (5 year), mid- (5 to 10 year), and long-term (10 to 15 year) actions, focused on areas such as establishing the area now known as the AEGD, land use planning, and expanding the labour force. The plan identifies a number of focused transportation improvements. Recommended roadway improvements included:

- Addressing congestion on Highway 403;

- Improving connections between Burlington St. and QEW;
- Increasing Highway 6 capacity; and
- Improving signage to the Port and Airport, particularly along the roadway.

3.1.2 Other Policies and Plans

Additional studies and policies of external agencies that were reviewed include those of the Province and of adjacent municipalities.

Province of Ontario

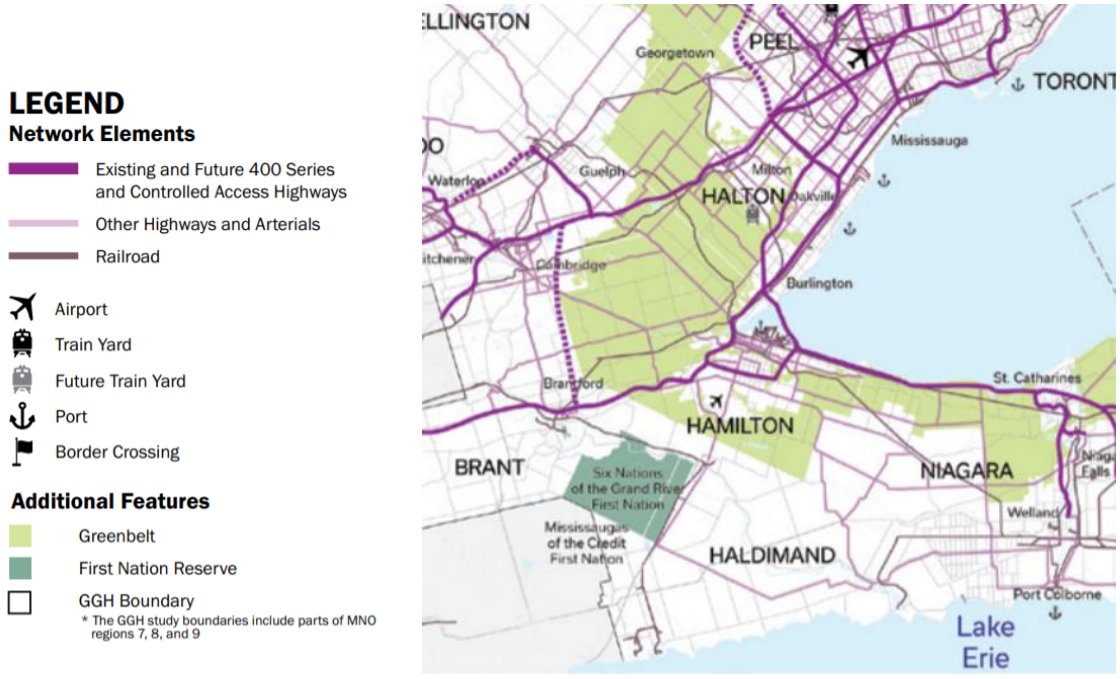
Metrolinx *Strategic Goods Movement Network* (2018). An action arising from the 2010 Regional Transportation Plan led to the development of the 2011 Greater Toronto and Hamilton Area (GTHA) Urban Freight Study. A recommendation of that plan was to develop a *GTHA Strategic Goods Movement Network* (March 2018). The Strategic Goods Movement Network (SGMN) is a continuous network of multi-modal corridors that facilitates the movement of goods, and connects all major intermodal facilities (e.g. rail, marine ports, and airports) via a core network of road and rail links. The Hamilton section of the SGMN is primarily composed of provincial highways, municipal Hamilton parkways, as well as sections of Garner Road East/Rymal Road East, Upper James Street south of The Linc, Dartnall Road, and sections of Highway 52 and Wilson Street that connect to Highway 403. All of the links identified in the SGMN are part of Hamilton's existing truck route network.

***Towards a Greater Golden Horseshoe Transportation Plan* (2021).** The Ministry of Transportation of Ontario released this discussion paper toward the development of a long-term strategy for the Greater Golden Horseshoe. One of their Visions for Mobility for 2051 is: Efficiently Moving Goods Across the Region, toward which a draft map of current, planned and future conceptual strategic goods movement network—the Hamilton-area excerpt of which is included as Exhibit 3.4. The goods movement network identified in Hamilton does not always reflect current or planned truck routes. It is anticipated that the identified strategic network will be refined in further consultation with the City of Hamilton as a result of the TRMP update.

Adjacent Municipalities

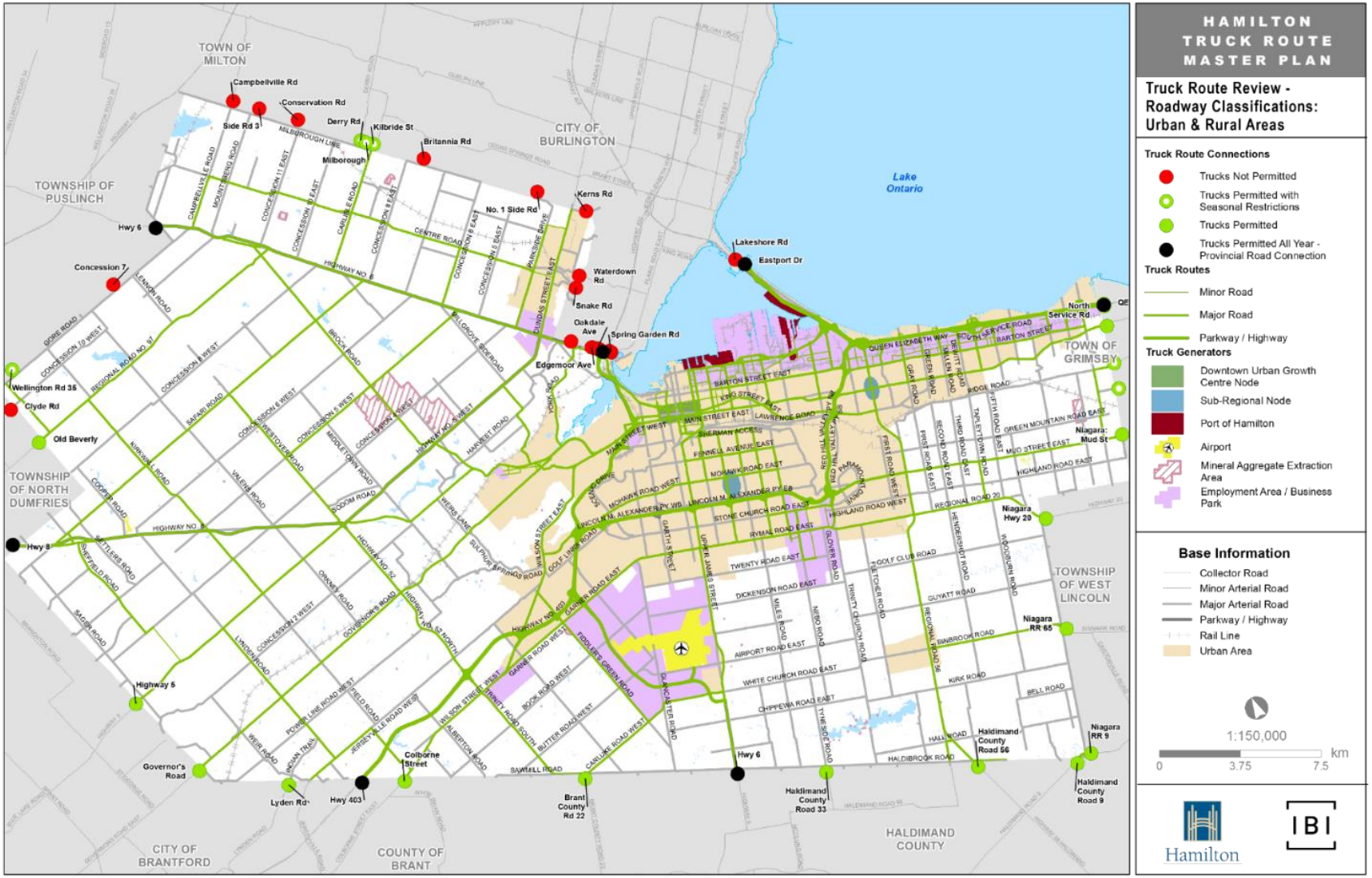
The by-laws, Official Plans and Transportation Master Plans of the twelve jurisdictions that border Hamilton were reviewed towards ensuring consistency with the truck management strategies of these municipalities. Exhibit 3.5 is a map showing the permitted and restricted truck route links to adjacent jurisdictions. All adjacent municipalities use a 4,500-kilogram threshold to define heavy vehicles that are restricted to using the truck routes in their jurisdictions.

Exhibit 3.4: MTO Greater Golden Horseshoe Transportation Plan: Current, Planned and Future Conceptual Strategic Goods Movement Network Elements



Source: Towards a Greater Golden Horseshoe Transportation Plan (MTO, 2021), Map 3 excerpts

Exhibit 3.5: Map of Permitted and Restricted Links to Adjacent Jurisdictions



3.2 Key Issues, Challenges and Opportunities

While trucks provide essential and consumer goods, support local businesses and support services that contribute to community and individual quality of life, the movement of trucks poses a number of challenges as well. Key issues, challenges and opportunities identified through the background review, problem identification, and stakeholder engagement process include the following, which are discussed in turn in the sub-sections below:

- Connecting Key Employment Areas;
- Environment and Climate Change;
- Truck Route Non-Compliance and Enforcement Needs;
- Safety for Vulnerable Road Users;
- Impacts on Nearby Sensitive Land Uses;
- Noise and Vibrations;
- Air Quality Impacts;
- On-Road Truck Parking and Idling Issues;
- Road Maintenance Impacts;
- Rural Issues;
- Hamilton Light Rail Transit;
- Social Equity; and
- Emerging Technologies.

3.2.1 Connecting Key Employment Areas

The City of Hamilton's Transportation Master Plan update highlighted the significance of a reliable goods movement network and freight-supportive land uses for Hamilton's economic growth and prosperity.

The City has identified eleven employment lands, shown in Exhibit 3.6 that are an important focus of connectivity for it truck route network.

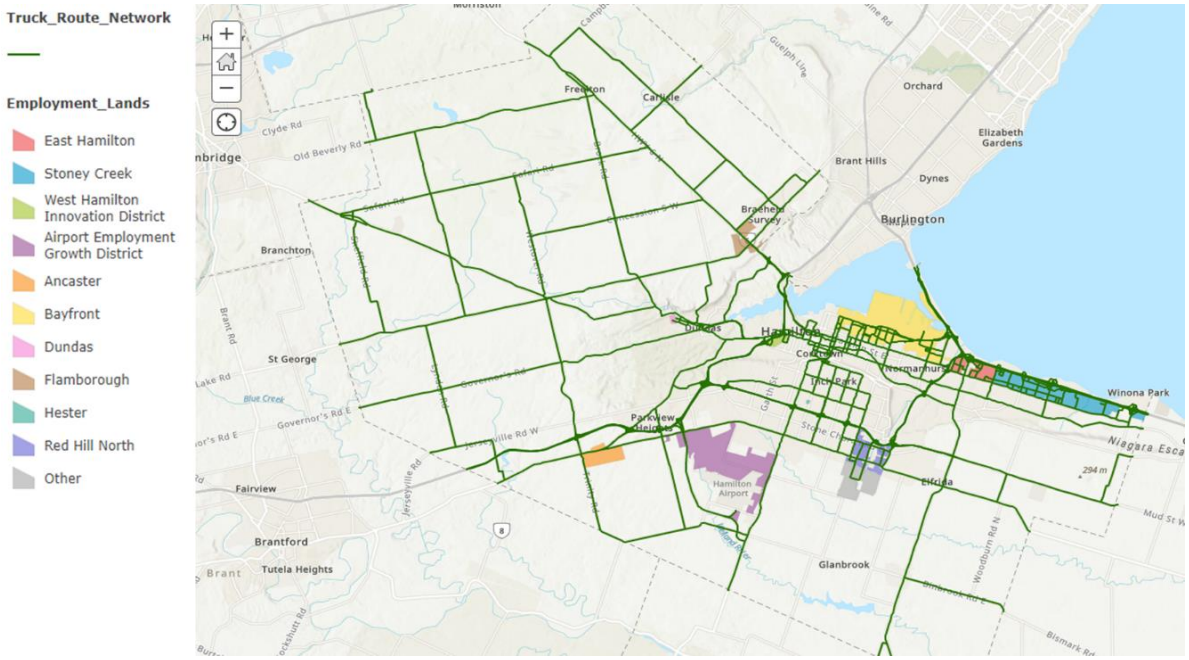
The City's economic strengths include manufacturing, agricultural and port-related businesses – these industries benefit not only the City, but the farms and business throughout the region who bring goods to and from the City rely greatly on Port-area businesses. Exhibit 3.7 shows the relative distribution of truck trip "nodes" (origins and destinations) external to the City of Hamilton and throughout Ontario in the a.m. off-peak period. The inset "heat map" shows the distribution of truck trip nodes. The most common of these, totalling 62% of trips, are indicated in the graphic, and include adjacent Halton Region (28% of external trips), Peel Region (13%), City of Toronto (7%) and Haldimand County (6%).

The employment base in the City of Hamilton has been slowly changing. Hamilton's downtown area and other urban centres are focused on commercial, services and institutional industries that are also important to Hamilton, industries that are not dependent on the daily movement of heavy goods as some of

Hamilton's traditional industrial centres. The liveability and attractiveness of these urban centres is challenged by the movement of heavy vehicles through them as they connect to areas of heavy industry.

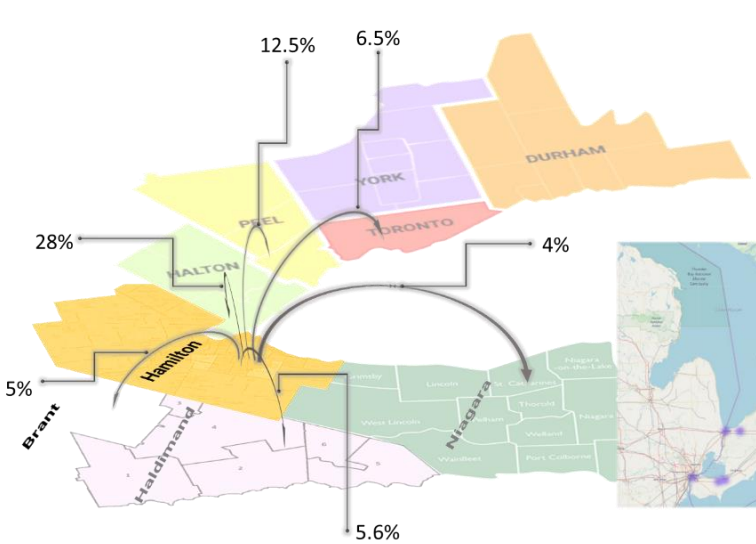
The Province's *A Place to Grow: Growth Plan for the Greater Golden Horseshoe* (2020) anticipates that Hamilton will continue to be an important employment area for the region, with employment growing to 360,000 jobs by 2051.

Exhibit 3.6: City of Hamilton Employment Lands Relative Current Truck Route Network

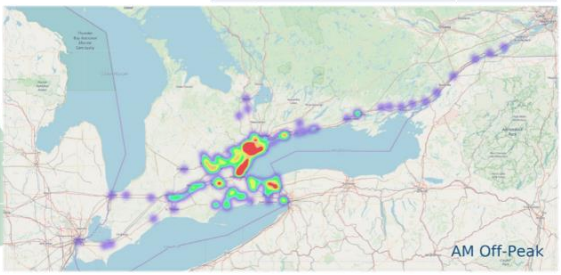


Source: City of Hamilton

Exhibit 3.7: Key External Truck Trip Nodes (2019 Telemetric Data Sample)



External Truck Trips	
Halton Region	28%
Peel Region	12.5%
Toronto	6.5%
Haldimand County	5.6%
Brantford	5%
Niagara Region	4%



Source: City of Hamilton

3.2.2 Environment and Climate Change

Hamilton City Council approved declaring a climate emergency in March 2019. The motion states that the City of Hamilton "has already been impacted by Climate Change through shoreline and escarpment destruction, millions of dollars of infrastructure damages by extreme storm events and increase freeze – thaw cycles destroying our roads and subsurface infrastructure," and directed staff to investigate how to achieve net zero carbon emissions before 2050. The impacts associated with transportation, including truck movements, include CO_2 and other emissions (i.e. air quality), noise, and congestion which can alter driver behaviour and increase vehicle kilometers travelled.

Opportunities to provide direct, reliable truck routes can help reduce truck travel distances and the resulting emissions associated with truck traffic. Innovative policy approaches toward decarbonizing freight could include increasing vehicle load factors through optimized routing and freight matching services, and encouraging sustainable last mile deliveries through urban consolidation centres and low/no-emission delivery vehicles.

Among other environmental concerns, the Niagara Escarpment running through Hamilton is a unique environmental/ geographic constraint to the movement of goods in the City of Hamilton. Concerns around slope stability and steep grades on access roads mean that there are a limited number of truck-appropriate routes between the upper and lower Mountain areas.

3.2.3 Truck Route Non-Compliance and Enforcement Issues

As part of the "Let's Talk About Trucks Survey" in Stage 1 of the study, participants were asked the extent to which they agreed with the statement: "The majority of truck operators comply with the truck route network". Only 18% of participants indicated that they either "Agree" or "Strongly Agree", 39% indicated that they disagree or strongly disagree, 13% were neutral and 30% were not sure or did not respond. Section 3.3 lists specific locations where truck route non-compliance was noted to be a recurring issue.

A related issue is heavy trucks such as double-trailer combinations passing through downtown to reach the Port area from areas west of the City. While these trucks adhere to the current truck route network, many downtown residents and businesses felt that these trucks were "short-cutting" through downtown, and that it is much more appropriate for these heavy trucks to use provincial highways, municipal parkways, and Burlington Street/Industrial Ave to travel to the Port area.

The sentiment that the movement of trucks can only be managed as far as truck route compliance and other regulations (excessive speeds, overloaded axles, improper use of air brakes, etc.) are enforced was commonly expressed during engagement activities. While it is essential to have a truck route network, it is meaningless without enforcement to ensure compliance to the network and to speed limits on it. Clarity of the network and clear signage are also essential.

3.2.4 Road Safety Analysis

Hamilton has adopted the Vision Zero approach to traffic safety, with the goal of zero fatalities or serious injuries on City roadways. Collision data for the 2014 to 2018 time period was analyzed to understand the involvement trucks have in collisions on municipal roadways (Exhibit 3.8).

Exhibit 3.8: Collisions in Hamilton by Collison Class and Truck involvement

Year	Collision Class			
	Fatal Injury	Non-Fatal Injury	Property Damage Only (PDO)	Self-Reportable
No trucks involved/vehicle type not reported				
2014	13	1,730	1,738	4,267
2015	12	1,854	1,696	4,534
2016	9	1,845	1,481	4,653
2017	14	1,605	1,704	5,226
2018	7	1,499	1,622	5,904
Trucks Involved				
2014	3	101	250	---
2015	2	77	223	---
2016	2	93	182	---
2017	2	77	178	---
2018	4	53	206	---
Total	**68**	**8,934**	**9,280**	**24,548**

All truck-involved collisions are included under the following three classes: fatal injury, non-fatal injury or PDO. Collisions in these three classes are more severe in nature and necessitate that a police officer attend and investigate.

The collisions summarized in Exhibit 3.9: City of Hamilton Collisions Involving Trucks by Year and Collision Type represent only the subset of collisions that were attended by police, and it does not reflect the self-reported collisions. Since vehicle type is not available for the self-reported collisions, it is not possible to determine how many, if any, of the 24,538 self-reported collisions may have involved trucks. As a result, **the focus on the analysis will be on the 1,453 collisions where the involvement of trucks can be confirmed.** This may lead to discrepancies in the total number of collisions between different reports (e.g. Vision Zero reporting).

Exhibit 3.9 shows that the total number of collisions involving trucks has generally been trending downward overall, from 354 in 2014 to 263 in 2018, a decrease of 26%. Among these incidents, collisions resulting in a fatality have totaled two to four annually between 2014 and 2018.

For fatal collisions involving trucks, one cyclist fatality was recorded during the five-year analysis period (2018), and each year had at least one truck collision with a pedestrian leading to a fatality (two pedestrians were killed by trucks in 2018). Collisions with vehicles causing fatalities numbered 1 or 2 each year.

Exhibit 3.9: City of Hamilton Collisions Involving Trucks by Year and Collision Type

Collision Type[a] (Trucks only)	Year					Total
	2014	2015	2016	2017	2018	
Property Damage Only	**250**	**223**	**182**	**178**	**206**	**1,039**
Non-Fatal Injury	**101**	**77**	**93**	**77**	**53**	**401**
Pedestrian	6	4	9	4	2	**25**
Cyclist	1	1	0	0	1	**3**
Vehicle[b]	94	72	84	73	50	**373**
Fatality	**3**	**2**	**2**	**2**	**4**	**13**
Pedestrian	1	1	1	1	2	**6**
Cyclist	0	0	0	0	1	**1**
Vehicle[b]	2	1	1	1	1	**6**
Total	**354**	**302**	**277**	**257**	**263**	**1,453**

Notes:
[a] Includes vehicles classified as car carrier, closed truck, construction equipment, dump truck, farm tractor, garbage truck, open truck, other farm vehicles, road maintenance, snowplow, tank truck, tow truck, tractor truck and truck other.
[b] Includes collisions involving other vehicles or with stationary objects (e.g. pole).

Exhibit 3.10 shows that trucks have been involved in approximately 8% of City of Hamilton collisions overall from 2014 to 2018, but have been disproportionately involved with fatal collisions, with nearly one in five fatal collisions involving a truck. Trucks were also over-reported in PDO collisions (11% of total collisions). These findings highlight the need to mitigate risks when trucks share the road with other more vulnerable road users.

Exhibit 3.10: Proportion of City of Hamilton Collisions Involving Trucks (2014 to 2018)

Collision Type	Collisions Involving Trucks[a]	Total Collisions	Trucks as % of Total Collisions
Property Damage Only	1,039	9,280	11.2%
Non-Fatal Injury	401	8,934	4.5%
Fatality	13	68	19.2%
Total	**1,453**	**18,282**	**7.9%**

Note:
[a] Includes vehicles classified as car carrier, closed truck, construction equipment, dump truck, farm tractor, garbage truck, open truck, other farm vehicles, road maintenance, snowplow, tank truck, tow truck, tractor truck and truck other.

3.2.5 Safety for Vulnerable Road Users

A very common theme heard from the public and stakeholders during this study is the need to keep an appropriate level of separation between trucks and vulnerable road users (e.g. pedestrians, cyclists, people using mobility devices). Given the limited number of road corridors appropriately designed for trucks, some current truck route links are shared with designated cycling routes.

Close proximity of heavy trucks to pedestrians and cyclists is extremely concerning. This is especially a concern at intersections when trucks are turning and drivers may not be able to see pedestrians and cyclists at all approaches.

Lack of sidewalks on designated truck routes is a concern that was frequently noted for rural communities such as Carlisle – the lack of a designated space for pedestrians makes sharing the road with heavy trucks especially prohibitive. Ideally sidewalks on routes heavily used by trucks would also have a degree of separation from the roadway for added protection.

Most frequently, engagement participants would state that large trucks should be removed from streets with bike lanes or from streets heavily used by pedestrians, though some suggested moving the bike lanes to other available parallel roads, and still others noted that improved street design that better separates different road users is key. Where trucks and vulnerable road users share the road, there is a need for appropriately protective design of the road corridors for pedestrians/ cyclists (e.g. physical barriers for bike lanes, separation for sidewalks, large trucks in middle lane only, etc.).

3.2.6 Impacts on Nearby Sensitive Land Uses

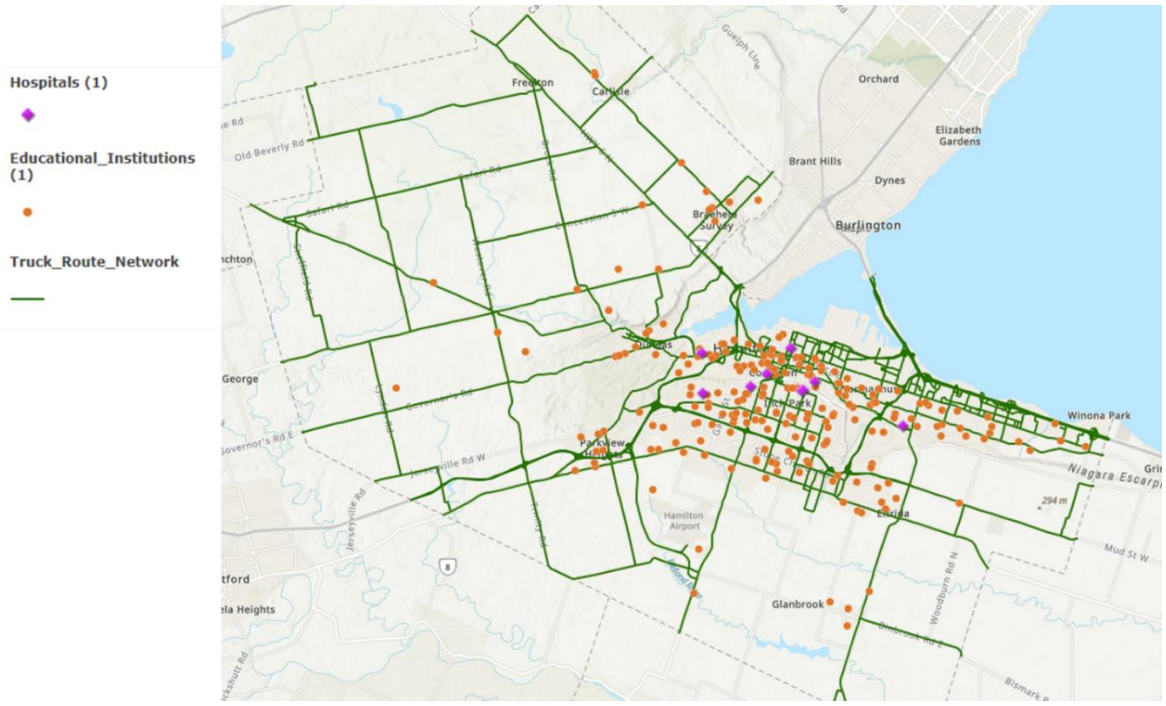
Hamilton residents are especially concerned about the negative impact on heavy truck movements through sensitive areas, particularly community facilities. These include hospitals and schools, as shown in Exhibit 3.11.

Concerns were also expressed about the challenges of having truck routes pass through residential areas. Exhibit 3.12 shows the current truck route network relative to areas of high population density in the City of Hamilton.

There is a desire to have trucks use routes that are well designed for them, for the safety of trucks and of other users, as well as to maintain road infrastructure. Many suggested that the “ring road” system of highways and parkways around the city is much better suited for heavy trucks compared to downtown arterial roads with street-facing housing.

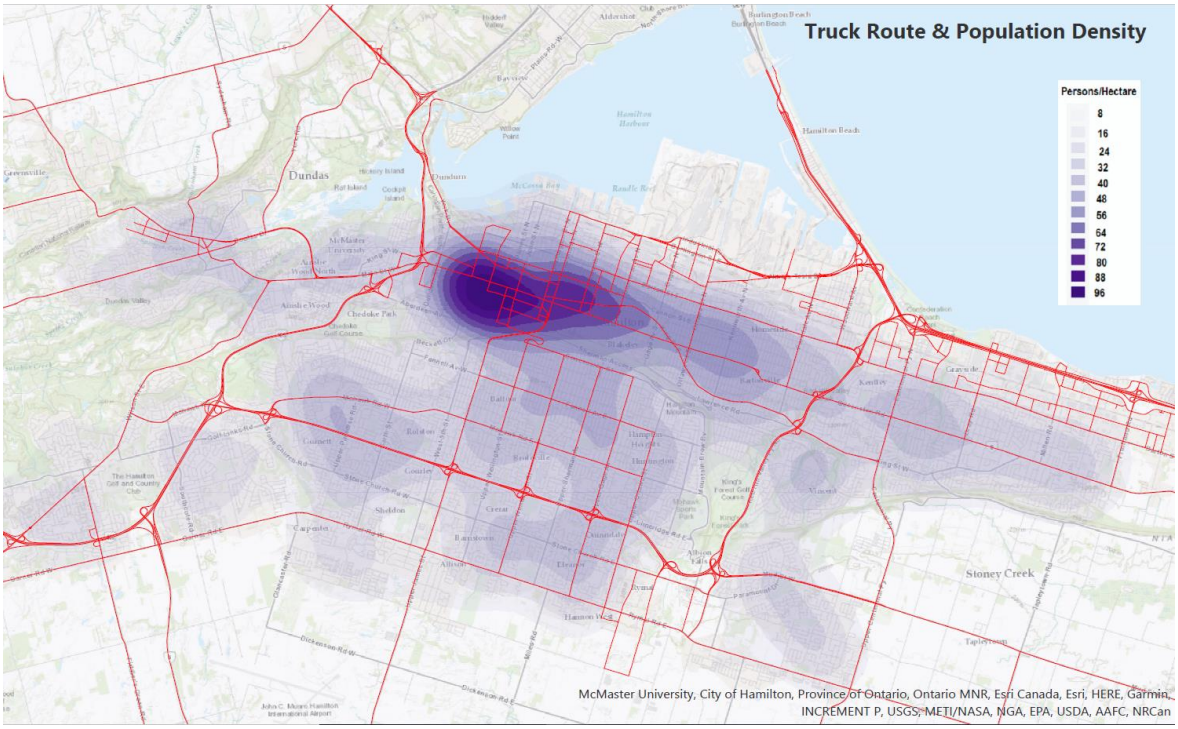
Hamilton has arterial roads with residential land uses (including historic housing) and sensitive land uses fronting them, both in the urban core as well as in small rural communities.

Exhibit 3.11: Existing Truck Routes and Sensitive Land Use



Source: City of Hamilton

Exhibit 3.12: Existing Truck Routes and Population Density



Source: City of Hamilton

3.2.7 Noise and Vibrations

A key negative impact of heavy trucks on a road or community is the resulting noise and vibration. This is especially true when trucks are very heavily loaded, at high speeds, when the road quality is poor, or when trucks brake quickly. Residents who live along truck routes used by heavy trucks at night experience levels of noise and vibration that interrupt sleep, or can also interrupt work or daytime activities. In downtown Hamilton, many residences are built at very close proximity to the arterial and collector roads used by trucks.

Not only truck noise specifically but also traffic noise is a concern. As part of engagement activities for this study, residents who live along The Linc or other heavily-trafficked routes have noted that the City has not done enough to protect residents from the noise impacts of these routes.

3.2.8 Air Quality Impacts

Another negative impact of truck routes is the emissions produced by fossil-fueled vehicles, particularly those powered by diesel fuel. Excessive idling by parked trucks contributes further to this issue.

In addition to air pollution and air pollution, residents near some truck routes also noted that soot deposits were also a concern.

One consideration in developing the truck route network was the risk of moving the air pollution impacts of trucks from one location to another. Given that air pollution can spread, it is also important to reduce emissions overall by reducing truck travel distances and other measures.

The Canadian National Railway noted in 2020 that it is in the process of changing its intermodal truck fleet to electric power, and acquired 50 zero-emission trucks. In addition to reduced emissions, these have the advantage of being quieter as well. As other trucking companies follow suit, air pollution will become less of an issue along truck routes.

3.2.9 On-Road Truck Parking and Idling Issues

In addition to managing the movement of trucks along roads, the parking and idling of trucks also needs to be managed. Specific locations were noted where trucks might park and idle while the driver takes a break, buys a coffee, etc.

The City of Hamilton currently has a 3-minute idling limit by-law.

Due to lack of appropriate curbside loading and unloading space, trucks sometimes park in designated cycling facilities or block sidewalks.

3.2.10 Road Maintenance Impacts

Heavily loaded truck axles degrade road surfaces much more quickly than even high volumes of light vehicles. Limiting trucks on roads significantly reduces the maintenance required on them, and is one reason to limit the number of routes used by trucks, and to focus maintenance efforts on the truck route road links.

3.2.11 Rural Issues

Hamilton has a thriving rural community. The area's primary land use is agricultural, but the area is also host to a number of aggregate extraction and processing facilities. Due to the limited road network, particularly links that can accommodate trucks and farm equipment, there can often be conflicts between slower moving farm vehicles and passenger car traffic; trucks using non-designated routes to bypass congestion; and conflicts between designated truck routes and sensitive receptors such as schools. As well, specific direct connections, such as a Binbrook to Ancaster, are not available in the current truck route network, which can require trucks travelling between the two points to detour into the urban area if they follow designated routes or use non-designated roads.

3.2.12 Hamilton Light Rail Transit

Metrolinx and the City of Hamilton are progressing toward construction of a 14-kilomtre, 17-stop light rail transit service connecting from McMaster University in the west to downtown Hamilton, and as far east as Eastgate in Stoney Creek. The LRT is part of a broad rapid transit strategy for Hamilton referred to as the BLAST Network.

In May 2021, a joint funding announcement whereby the provincial and federal governments committed $3.4 billion to the capital cost of the project. On September 15, 2021, Hamilton City Council ratified a memorandum of understanding with Metrolinx and the Ministry of Transportation (MTO) to move forward with the project.

The relationship of the Hamilton truck route network with light rail transit stations and accesses will be an important consideration in the design of both services.

3.2.13 Social Equity

In February 2019, City Council approved a motion to develop an action plan for the implementation of an equity-diversity-and-inclusion lens framework in the City's policy and program development, practices, service delivery, budgeting, business planning, and prioritization. Therefore, integrating an equity lens within the development of TRMP should be a priority. Equity refers to the fairness with which benefits or impacts are distributed across the population. Of special

concern is the negative impacts associated with the truck route network, including emissions, noise, safety, traffic congestion, vibrations and liveability.

The Victoria Transport Policy Institute notes that transportation equity can be difficult to evaluate because there are various types, impacts, measurement units, and categories of people that can be considered, and notes that "there is no single way to evaluate transport equity"[2]. It identifies three categories of transportation equity:

1. **Horizontal Equity.** This type of equity focuses on the equal distribution of benefits or impacts "between individuals and groups considered equal in ability and need." Within this category, all individuals and groups are equal and should equally bear the unavoidable impacts of the truck route network. This is also known as *fairness* and *egalitarianism.*
2. **Vertical Equity with Regard to Income and Social Class.** This type of equity views different individuals and groups as having different needs and ability, such as income or social class. The distribution of impacts follows a progressive model that reallocates the unavoidable impacts of the truck route network away from socially disadvantaged groups that already face additional societal burdens that may place them at a hindrance. This category is also known as social justice, environmental justice and social inclusion.
3. **Vertical Equity with Regard to Mobility Needs and Ability.** This category is similar to Category 2 but focuses on the distribution of impacts between individuals and groups that differ in physical mobility. This definition supports universal design to ensure that transportation infrastructure, facilities and services meet the needs with different levels of physical abilities, regardless of class, income or social group. This lens tends to focus on universal design and transportation services.

The TRMP update is a strategic planning study and aligns best with category 2. The evaluation framework used in the study aimed to balance the benefits and burdens raised by the truck route network including safety, impact on safety, and sensitive land use (e.g. schools, parks, hospitals).

Through study engagement activities, community groups have identified that burdens appear to be disproportionally placed on communities in the lower city, particularly those along Barton Street, Cannon Street, Victoria Avenue, and Wellington Street.

3.2.14 Emerging Technologies

A number of recent and emerging technologies are making it possible to better manage freight and goods movement. Vehicle telematics and other GPS-based tracking systems are aiding with record keeping, routing, security, and

[2] Victoria Transport Policy Institute, Evaluating Transport Equity (2014)

enforcement around goods movement activities. Autonomous trucks are already in operation and growing in use at private, controlled sites (e.g. ports, mines), and a number of companies are exploring the commercial use of autonomous trucks on public roadways. These types of emerging technologies may offer opportunities to improve the safe and efficient movement of goods in Hamilton; at the same time, they will fundamentally change how goods move. In addition to automated technologies, there are opportunities to explore other emerging policy areas like urban consolidation centres for last-mile deliveries, micro-freight, and zero-emissions vehicles zones, among others.

3.3 Truck Route Hot Spots

Exhibit 3.13 lists the more commonly noted specific locations **on the current truck route** network together with the nature of the issue or concern.

Exhibit 3.14 lists the more commonly noted specific locations **not** currently on the truck route network where there concerns with truck traffic management.

The list of gaps and issues needs reflects input received during engagement activities with the public and stakeholders.

Exhibit 3.13: Top Location-Specific Issues Identified in Current Designated Truck Route Network

No.	Roadway	Start	End	Noise	Safety	Infra-structure Impacts	Speed-ing	Engine Braking	Land Use Conflict	Conflict with Cycling	Truck Parking Issues
1	Milburough Townline	Kilbride Street	Derry Road	X		X					
2	Carlisle Road	Highway 6	Milburough Line	X	X	X					
3	Centre Road	all	-	X			X				
4	Safari Road	Highway 6	Highway 8	X	X		X	X			
5	Westover Road	Highway 5	Safari Road	X	X						
6	Sydenham Road	Highway 5	King Street (Dundas)	X	X				X		
7	Sawmill Road	Calruke Road West	Trinity Road South	X		X					
8	Eleventh Road East	Ridge Road	Mud Street East	X		X					
9	Wellington St. (Dundas)	King Street	Mill Street	X					X		
10	Wilson Street (Ancaster)	Rousseaux Street	403 interchange	X	X				X		
11	King Street	Dundurn Street	Hwy. 403		X					X	
12	Queen Street North	York Boulevard	Main Street West		X				X		
13	Bay Street North	Main Street West	Cannon Street							X	
14	Wellington Street	Burlington Street	Claremont Access		X				X		
15	Wilson Street/York Blvd	Queen Street North	Victoria Avenue North	X	X						
16	Main Street	through downtown	-		X				X		
17	Burlington Street	Wentworth St.	Wellington St.								X
18	Wentworth Street	Rosemary Avenue	Brant Street		X				X		
19	Victoria Avenue North	Burlington Street	Claremont Access		X				X		
20	Upper Wellington Street	Concession Street	Fennell Avenue East	X					X		
21	Barton Street East	Barton BIA		X	X				X		
22	Cannon Street	Sherman Avenue North	Queen Street North	X						X	
23	Parkdale Avenue North	Brampton Street	Mead Avenue								X
24	Parkdale Avenue North	Queenston Road	Barton Street East	X							
25	Barton Street East	Parkdale Avenue	Red Hill Valley Parkway			X					
26	Grays Road	South Service Road	Frances Avenue	X					X		
27	Centennial Parkway	King Street	Mud Street	X		X		X			
28	Millen Road	South Service Road	North Service Road						X		
29	Fruitland Road	Highway 8	Barton Street	X					X		
30	Barton Street	Fruitland Road	Fifty Road						X		

Exhibit 3.14: Top Location-Specific Issues Identified in Routes NOT Currently Part of the Designated Truck Route Network

No.	Roadway	Start	End	Violation of Truck Routes	Infra-structure Impact	Reduced Load Violation/ Issue	Safety
1	Concession 5 Road East	Highway 6 N	Centre Road	X	X	X	
2	Millgrove Side Road	The Entire Length		X			
3	Concession 8	The Entire Length				X	
4	Valens Road	Safari Road	Concession 8 West			X	
5	Sager Road	The Entire Length		X			
6	Jerseyville Road West	The Entire Length				X	
7	Dickenson Road	Nebo Road	Upper James Street	X			
8	Nebo Road	Twenty Road	Chippewa Road	X	X		
9	Trinity Church Road	Rymal Road	White Church Road	X	X		
10	Fifty Road escarpment crossing	Highway 8	Ridge Road	X	X		
11	Eleventh Road East	Mud Street East	Hamilton Boundary Line	X	X		
12	Rock Chapel Road	Highway 5 W	Sydenham Road	X	X		
13	York Road (Dundas)	Olympic Drive	King Street/Cootes Drive	X			X
14	Old Guelph Road	York Road	York Boulevard	X			X
15	Newton Avenue	Main Street West	King Street W	X			
16	Aberdeen Avenue	Queen Street	Longwood Road	X			
17	Hess Street North	Cannon Street	Barton Street	X			
18	Princess Street	Birch Avenue	Sherman Avenue	X			X
19	Gage Avenue	King Street East	Barton Street	X			
20	Lawrence Road	The Entire Length		X			X
21	Glover Road	Rymal Road	Twenty Road	X			
22	Knox Avenue	Brampton Street	Leaside Road	X	X		
23	Paramount Drive	The Entire Length		X			
24	Glover Road (Stoney Creek)	Glover Access Road	Watercrest Drive	X			

4. Truck Route Network Development Process

A core objective of the Truck Route Master Plan Update was to develop a transparent and defensible process for evaluating the truck route network against the City's equity, mobility, sustainability, and economic aspirations. Additionally, the study team endeavoured to do so in a way that would lean heavily on readily-available data, but would also allow for the consideration of public input and institutional knowledge that is not contained within any other dataset.

The process that was ultimately developed, and vetted through public and stakeholder consultation, consisted of a series of steps, starting with the selection of eligible road links, followed by an evaluation of their surrounding environment under several alternative scoring algorithms. These initial steps led to the creation of a draft network. The links forming the draft network where then assessed and subjected to public review to identify locations that might require mitigating measures to better accommodate the anticipated traffic mix. Finally, two forms of the recommended truck route network were presented: one that could be implemented in the near-term, requiring few modifications to existing conditions, and one that reflects future conditions, following the implementation of mitigation and planned roadway expansion. The steps in the truck route network development process are summarized in Exhibit 4.1.

Exhibit 4.1: Truck Route Network Development Process

4.1 Evaluation Framework

The process for evaluating the truck route network alternatives included a spatially-referenced weighted application of decision criteria that are derived from the Stage 1 and Stage 2 outcomes, and consistent with the vision and goals of the truck route network (Section 2). Weights for each criterion were developed to reflect the relative importance of each indicator within each goal/criterion, and so that the total average scores for each criterion would balance with other goals/criteria.

Throughout the evaluation process, the input criteria and data have been managed within a GIS environment. This approach has allowed for the quick and accurate analysis iterations (e.g. sensitivity analysis of relative weightings of decision criteria), which provided the ability to consider a wider range of alternatives than would have been possible using a less automated process. Working within a GIS environment provided the ability to translate the evaluation into map-based visual representations, and it will preserve the related steps in the evaluation process for future uses.

The approach is based on three core factors, which align with the following study principles (Section 1.2):

1. There is a need for a continuous network that connects employment areas and intermodal hubs, within Hamilton, and links them to markets beyond the City. An efficient network will minimize the need for enforcement. It will also remove trucks from local roadways to freeways and parkways, whenever possible, and will be adaptable to changing conditions (Principles 2 to 7);
2. Truck route designations need to comply with the functional road class policies in the UOHP, and RHOP (Principle 7); and
3. The environment, public health, sensitive receptors and vulnerable road users/Vision Zero also need to be central to the evaluation to minimize community impacts (Principles 1, 2 and 6).

The evaluation framework to develop the truck route network involves the following steps:

1. Select Road Links for Assessment;
2. Evaluate Links;
3. Form a Draft Truck Route Network;
4. Address Specific Issues in the Network; and
5. Establish Alternative Truck Route Network Configuration(s).

Each of the five steps of the evaluation process is described in the following sub-sections. The outcomes of each step are described in Section 4.2.

4.1.1 Step 1: Select Road Links for Assessment

The first step of the process is to determine which roadway links will be considered as potential truck route candidates.

Only roadways that are under City of Hamilton jurisdiction are assessed for potential inclusion in the truck route network. All City of Hamilton parkways, arterial roads and collector roads were included in the assessment based on RHOP and UHOP (Section 3.1.1) functional road class designations, with the exception of “stub” road segments that do not connect to another collector road, arterial road or parkway at one end of the road segment.

All provincial highways and freeways that pass through the City of Hamilton currently accommodate heavy truck traffic, and the City of Hamilton has no jurisdiction over the use of such roads. It is assumed that trucks will continue to be allowed on all provincial highways; therefore, such roadways do not need to be evaluated in the framework and they are assumed to be part of the truck route network. It is also assumed that the interchanges and other highway connections will continue to accommodate heavy truck traffic.

Connections to adjacent jurisdictions (Exhibit 3.5: Map of Permitted and Restricted Links to Adjacent Jurisdictions) are assumed to remain as they exist today as well, though the results of the TRMP study may suggest modifications for future discussion between the City and other municipalities.

4.1.2 Step 2: Evaluate Road Links

Each road segment carried forward for assessment in Step 1 is assessed in Step 2. Segments is evaluated segment-by-segment using a set of indicators representing the following criteria, dovetailing with the study pillars and 5 of the 7 study goals (Section 2.2):

Pillar: Economic Prosperity

- Criteria/Goal 1: Efficient Connectivity
- Criteria/Goal 2: Reliability

Pillar: Community Liveability

- Criteria/Goal 3: Safety
- Criteria/Goal 4: Equity

Pillar: Environment and Public Health

- Criteria/Goal 5: Environment and Public Health

Elements of the study goals cannot be fully represented by these segment-by-segment assessment criteria. Some of these aspects are addressed through applying a set of principles in Step 3 in the process. Supporting City-wide policies (Section 6) also work to support the study goals.

Each of the five criteria is quantified through a number of component indicators, as listed in Exhibit 4.2, together with the scoring scheme for each indicator that is applied to each individual analysis segment. The maximum score for any road segment across all indicators for each criterion is 20. The total maximum possible score for any analysis segment across all five criteria is 100.

Exhibit 4.2: Assessment Criteria, Indicators and Scoring

Indicator	Scoring Description	Score	Maximum Score
Criterion 1: Efficiently Connected			
Functional Road Class	Parkway	**6**	**6**
	Major arterial	5	
	Other minor arterial or collector	2	
Truck Volumes	Very High	**14**	**14**
	High	12	
	Medium-High	10	
	Medium	8	
	Medium-Low	6	
	Low	3	
	Very Low	0	
Maximum Possible Score			**20**
Criterion 2: Reliability			
Emergency Detour Route	Provincial Highway Emergency Detour Route	**5**	**5**
	Hamilton Parkway Emergency Detour Route	4	
Barrier Crossing	Major barrier crossing (e.g. Niagara escarpment)	**5**	**5**
	Medium barrier crossing (e.g. Crosses Municipal Parkway or MTO Expressway, Rail Above Grade)	3	
Travel Time Index (TTI)	TTI <1.1	**5**	**5**
	TTI 1.1 - 1.2	3	
	TTI 1.2 - 1.4	1	
	TTI >1.4	0	
Reduced Load	Road has no seasonal load restrictions	**5**	**5**
Maximum Possible Score			**20**
Criterion 3: Safety			
Safety - Maximum Potential for Safety Improve-ment (PSI)	0	**7**	**7**
	0.1 - 2.0	4	
	2.0 - 4.0	3	
	4.0 - 8.0	2	
	>8.0	0	
	No Safety Incident Data	*4*	

Road Uses - BLAST Network	Route is not on BLAST network corridors.	**2**	**2**
Shared Road Uses - Cycling	Segment has no shared designated bike routes	**5**	**5**
	Segment is part of bikeway with partial separation	3	
	Segment is part of signed-only bike route, existing or planned	0	
Pedestrian Density (2011 TZ Pop+Emp) per hectare	Low Density:<15	**6**	**6**
	Medium-Low: 15-30	3	
	Medium Density: 30 – 50	2	
	High Density: 50 – 80	1	
	Very High Density: 80+	0	
Maximum Possible Score			**20**
Criterion 4: Equity			
Low-Income Household Prevalence (%) Overall Hamilton Prevalence: 15.8 %	0% - 8%	**15**	**15**
	8% - 15%	12	
	15% - 20%	10	
	20% - 30%	5	
	30+%	0	
Vulnerable Age Cohort (<19 and 65+) Distribution (%) Overall Hamilton Average: 40 %	0% - 33%	**5**	**5**
	33% - 40%	4	
	40% - 45%	3	
	45%- 50%	2	
	50%+	0	
Maximum Possible Score			**20**
Criterion 5: Environment and Public Health			
Adjacent Zoning (within 20m – excludes 7m centerline road allowance)	Land use fronting the link: <2% residential	**5**	**5**
	2-10% residential	3	
	10-20% residential	2	
	20%+ residential	0	
Sensitive Land Uses and Community Facilities	Segment avoids all sensitive land uses	**15**	**15**
	Segments impacts 1+ Very Sensitive institutions	0	
	Segments impacts 1+ Sensitive institutions	2	
	Segments impacts 1+ Sensitive community facilities	4	
	Segments impacts 1+ Other Community Facilities	8	
Maximum Possible Score			**20**

For Criterion 5, the sensitive land uses considered are as follows:

- Very Sensitive Land Uses:
  - Hospital (adjacent)
  - Elementary or school (adjacent)
- Sensitive Land Uses:
  - Hospital (within 100 m)
  - Elementary or secondary school (within 100 m)
  - Post-secondary school (adjacent)
  - Long-term care (adjacent)
- Sensitive Community Facilities:
  - Major city park
  - Business Improvement Area
- Other Community Centres:
  - City and non-City recreation and community centres
  - Library
  - Places of Worship

Using the scoring from the evaluation of individual links, all links exceeding a minimum threshold score are used to inform an initial truck route network.

To explore how the initial network may change when the importance (i.e., weight) of each criterion is adjusted, alternative network scoring is derived based on four philosophies, each placing greater emphasis on one or more of the criteria described in Exhibit 4.2. For instance, how road segments will score when all criteria are weighted equally, compared to when social equity is weighted the same as the other criteria combined. The four alternative philosophies are as follows:

- Balanced – all criteria/goals are weighted equally;
- Goods Movement Mobility-Focused – a greater focus on goals/criteria that relate to moving goods;
- Community Resiliency-Focused; and
- Public Health-Focused.

The various criterion weighting configurations for the four philosophies are shown in Exhibit 4.3. The weighting of individual goals ranged from 50% to 150% for an overall total of 500% (maximum score 100). In none of the scenarios was the Safety goal/criteria reduced below 100%.

Exhibit 4.3 Alternative Philosophy Scoring

Public Health-Focused

Goal	Weighting
Efficiently Connected	50%
Reliability	50%
Safety	150%
Equity	100%
Public Health	150%
Total	500%

Goods Movement Mobility-Focused

Goal	Weighting
Efficiently Connected	150%
Reliability	150%
Safety	100%
Equity	50%
Public Health	50%
Total	500%

Community Resiliency-Focused

Goal	Weighting
Efficiently Connected	50%
Reliability	50%
Safety	100%
Equity	150%
Public Health	150%
Total	500%

Balanced Network

Goal	Weighting
Efficiently Connected	100%
Reliability	100%
Safety	100%
Equity	100%
Public Health	100%
Total	500%

4.1.3 Step 3: Form a Draft Truck Route Network

Acknowledging that the criteria and indicators available for the Step 2 assessment are not exhaustive and they do not consider all of the information and knowledge available to the process, Step 3 involves a strategic, manual further assessment of the network. Through this exercise, additional links are carried forward to ensure that the network has the following key connections, using the higher-scoring of alternative links when available:

- Access between the nearest provincial freeway and the Hamilton Port as well as the Hamilton International Airport;
- Sufficient connectivity for designated employment areas;
- Sufficient connectivity for aggregate facilities; and/or
- Direct connection with intra-city and inter-regional routes and adjacent truck route systems.

This effort provides a base network which will be advanced to Step 4. This step focuses on the following study principles:

- Enable goods to be transported economically.
- Specify routes clearly and intuitively to minimize the need for Police enforcement.
- Maintain route connectivity and continuity to provide reliable routes.
- Create routes that optimize the use of higher-quality road facilities, and to match the relationship of trucks to road category and roadway configuration.

4.1.4 Step 4: Address Specific Issues

Recognizing that the previous steps, while they may result in a high-scoring, well-connected draft truck route network, not all of the identified links and intersections will be able to accommodate trucks without imposing negative impacts on other road users and adjacent land uses. Therefore, the daft network will be reviewed to identify specific issues and potential mitigation, at a high-level.

The draft network resulting from Step 3 will be compared against the considerations below and the list of gaps and issues identified through stakeholder consultation and concerns reported prior to study commencement (Section 3.3):

- Impact on sensitive receptors (e.g. community facilities, planned land uses);
- Roadway geometry (e.g. sightlines, turning radii);
- Adverse impacts on the economic, social and/or environmental factors;
- Network density within employment areas; and
- Consideration for a two-tiered network based on the size of a vehicle.

Mitigating measures will then be explored to address issues, or alternate routes assigned if issues cannot be adequately addressed. Stakeholder and public consultation will serve a critical role in the step. The additional network knowledge and familiarity possessed by these groups will bring to light potential issues that may have been overlooked or undervalued by the previous segment evaluations and assessments.

This step may incorporate a number of principles depending on the specific issues that are identified.

4.1.5 Step 5: Recommended Truck Route Network

Develop a recommended truck route network that considers identified issues and mitigations. Anticipating the likelihood that the recommended truck route network will include links that are not immediately suitable to accommodate heavy vehicle traffic, Step 5 will generate more than one recommended truck route network. It is probable that the result of Step 5 will be two forms of the recommended truck route network: one that could be implemented in the near-term, requiring few modifications to existing conditions, and one that reflects future conditions, following the implementation of mitigation and planned roadway expansion.

4.2 Evaluation Process Outcomes

While the overall outcome of the evaluation process is the set of recommended truck route networks (i.e., near-term and future-conditions), there is value to providing a high-level summary of each step in the process and the interim outcomes associated therewith. The following sections illustrate the outcomes of each step of the evaluation process and identify some of the key considerations and decisions that were made along the way.

4.2.1 Step 1 Outcomes: Roadways to be Assessed

Section Step 1: Select Road Links for Assessment4.1.1 described the subset of City of Hamilton roadways, along with the provincial highways, that were selected for assessment. The road segments that were assessed can be seen in Exhibit 4.4 through 4.9.

For purposes of this analysis, the roadways considered were split up into analysis segments, with intersections at provincial highways, parkways, and arterial or collector roads demarcating each analysis segment.

4.2.2 Step 2 Outcomes: Scoring of Road Links

Step 2 resulted in scoring of the truck route analysis segments based on the relative scoring of different goals/criteria under the alternative network philosophies.

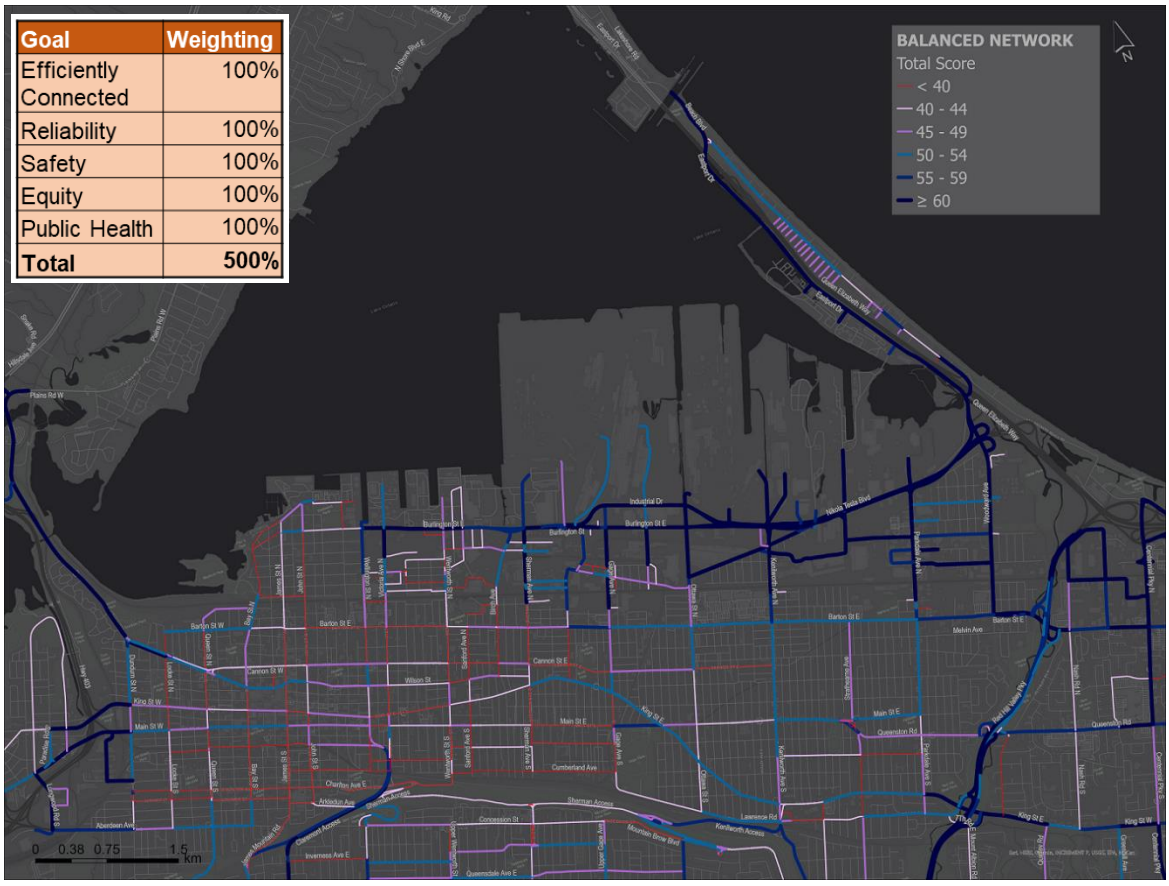
Exhibit 4.4 shows the scoring of every roadway segment put forward for consideration in Step 1. Exhibit 4.5 shows the roadway segments that scored above a guideline of approximately 50 under the “Balanced” Network philosophy. Exhibit 4.6 through Exhibit 4.8 show how the roadway segments scored under the other three alternative philosophies.

Following the link evaluations, while the approach was effective in highlighting the areas of importance under each philosophy, none of the generated alternatives represented a complete “network.” Since each roadway segment was scored independently from parallel or adjoining links, when the lower scoring segments where removed from the network it resulted many gaps and discontinuities across the city. The assessments also generated draft networks that included road segments that would be overly redundant or otherwise unnecessary if all were to be included in the final truck route network.

Steps 1 and 2 alone do not generate a complete and feasible truck route network, but they do inform the relative benefits and disbenefits of including each road segment in the final road network. Ultimately, the results of the Balanced Network, where each of the five criteria are weighted equally, were carried forward to Step 3.

Exhibit 4.4: "Balanced" Network Philosophy Scoring

Goal	Weighting
Efficiently Connected	100%
Reliability	100%
Safety	100%
Equity	100%
Public Health	100%
Total	**500%**



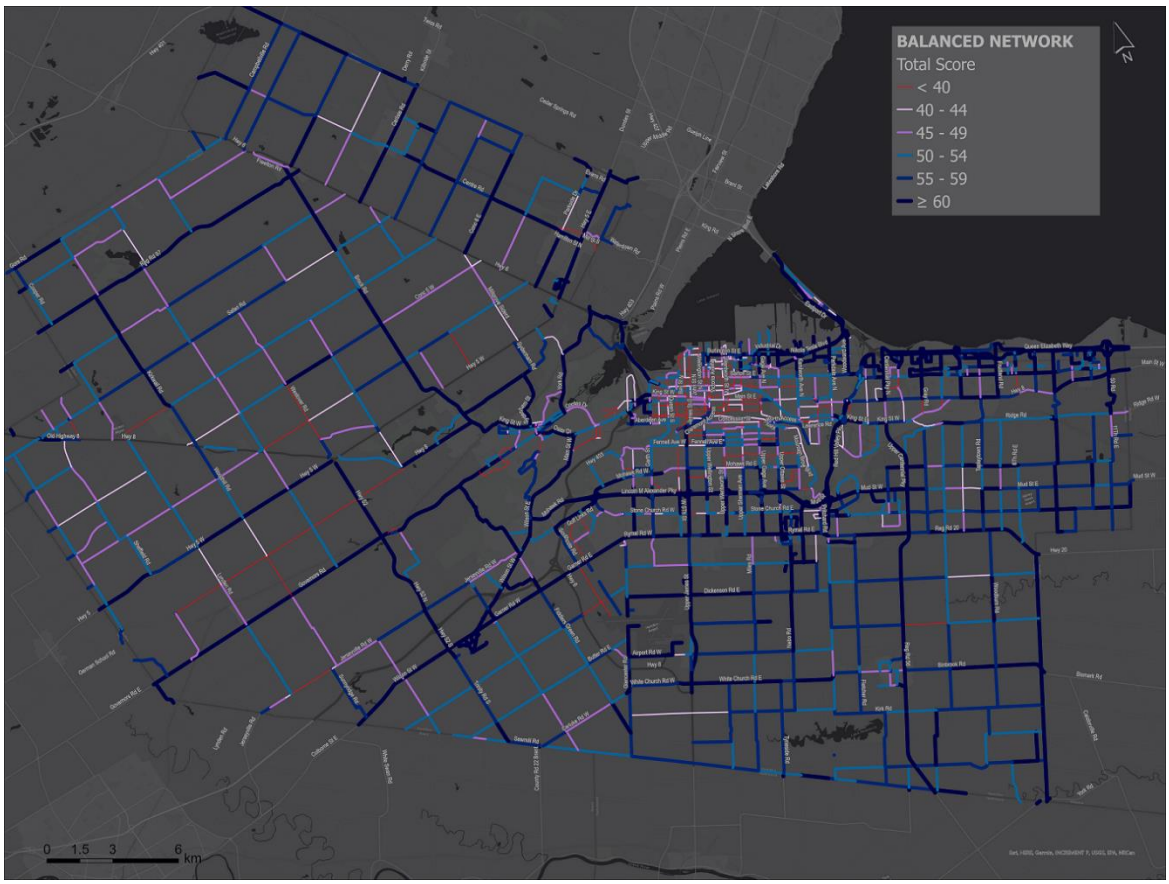


Exhibit 4.5: "Balanced" Network Philosophy – Road Segments Scoring Above 50

Exhibit 4.6: "Goods Movement Mobility" Network Philosophy Scoring

Goal	Weighting
Efficiently Connected	150%
Reliability	150%
Safety	100%
Equity	50%
Public Health	50%
Total	**500%**

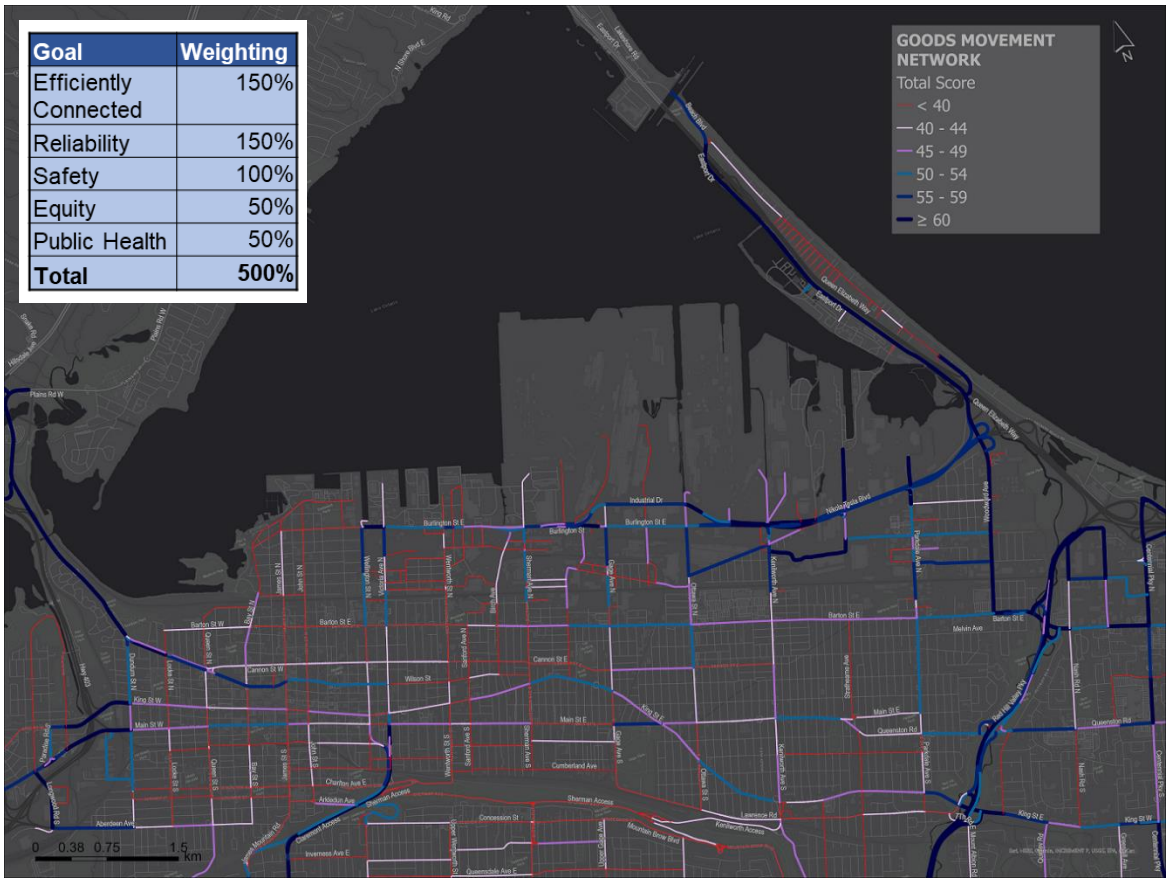


Exhibit 4.7: "Community Resiliency" Network Philosophy Scoring

Goal	Weighting
Efficiently Connected	50%
Reliability	50%
Safety	100%
Equity	150%
Public Health	150%
Total	**500%**

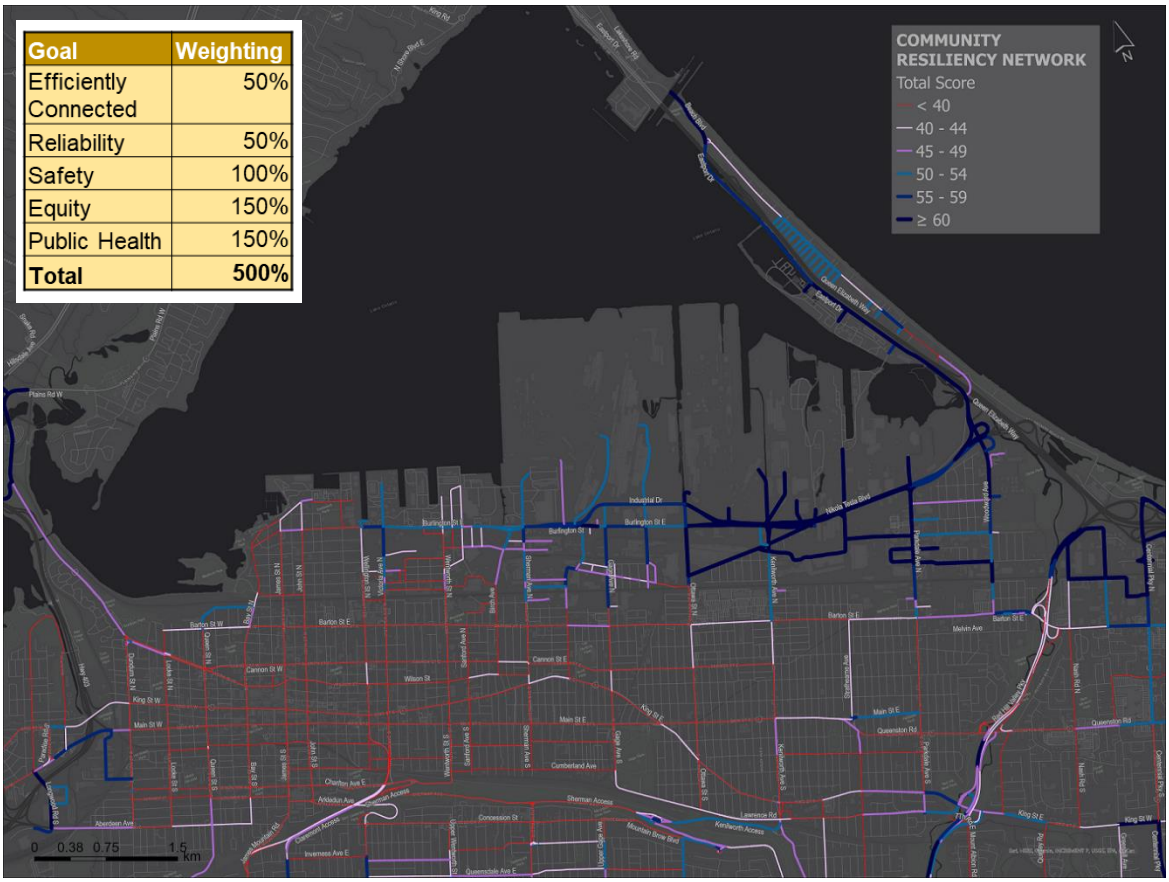
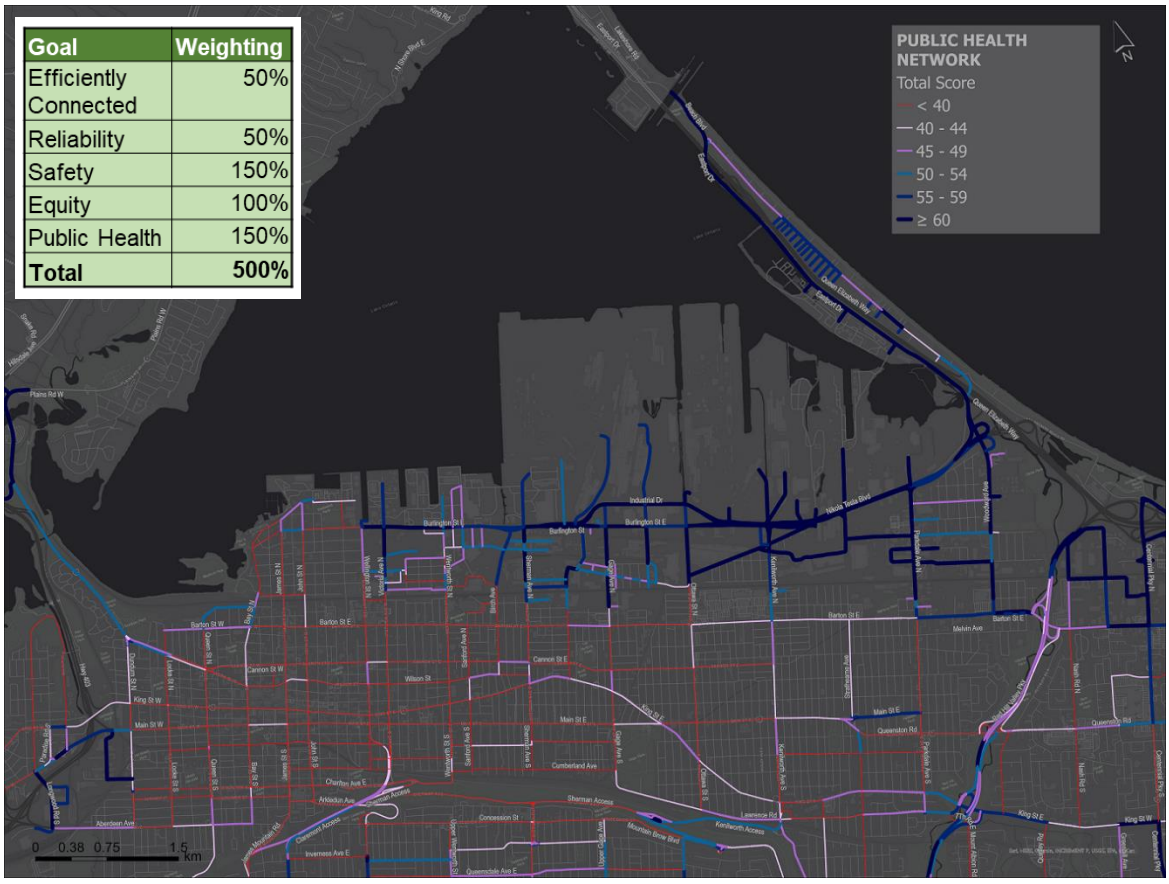
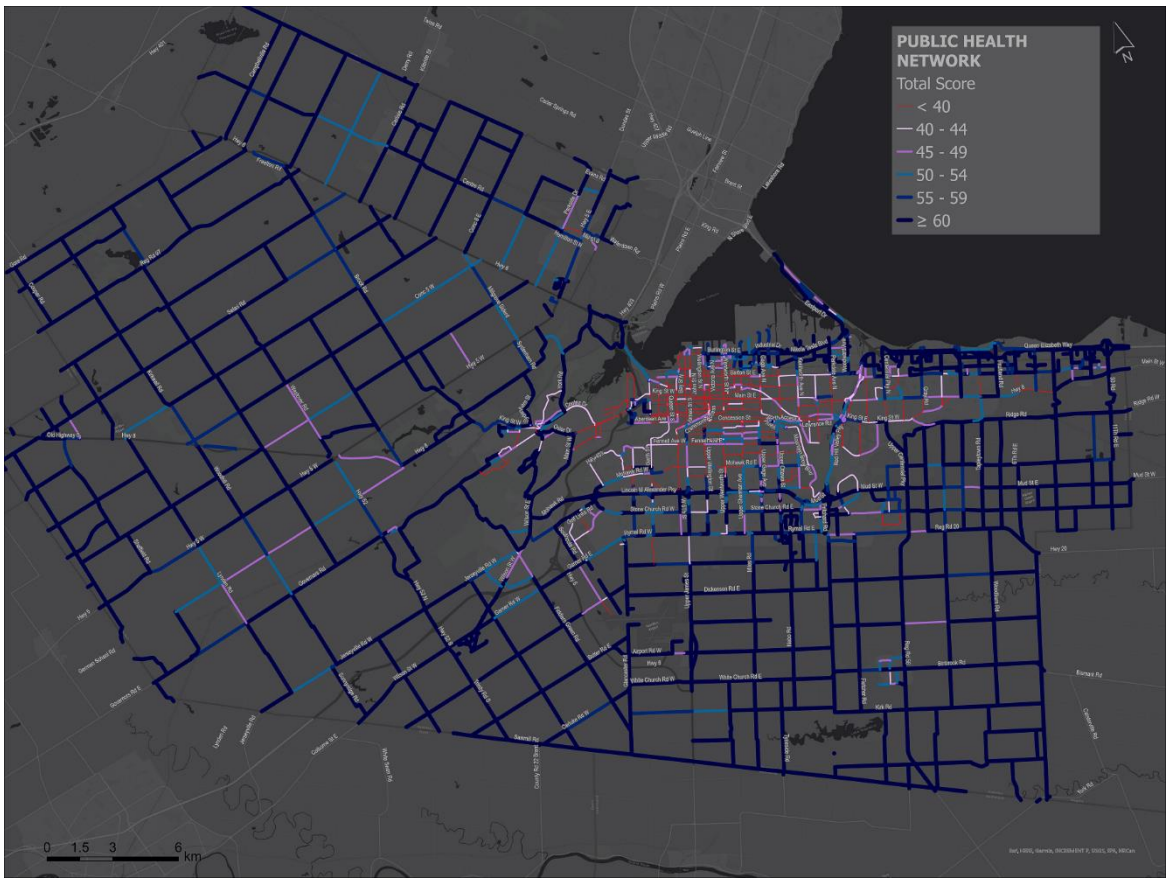


Exhibit 4.8: "Public Health" Network Philosophy Scoring

Goal	Weighting
Efficiently Connected	50%
Reliability	50%
Safety	150%
Equity	100%
Public Health	150%
Total	**500%**





4.2.3 Step 3 Outcomes: DRAFT Truck Route Network

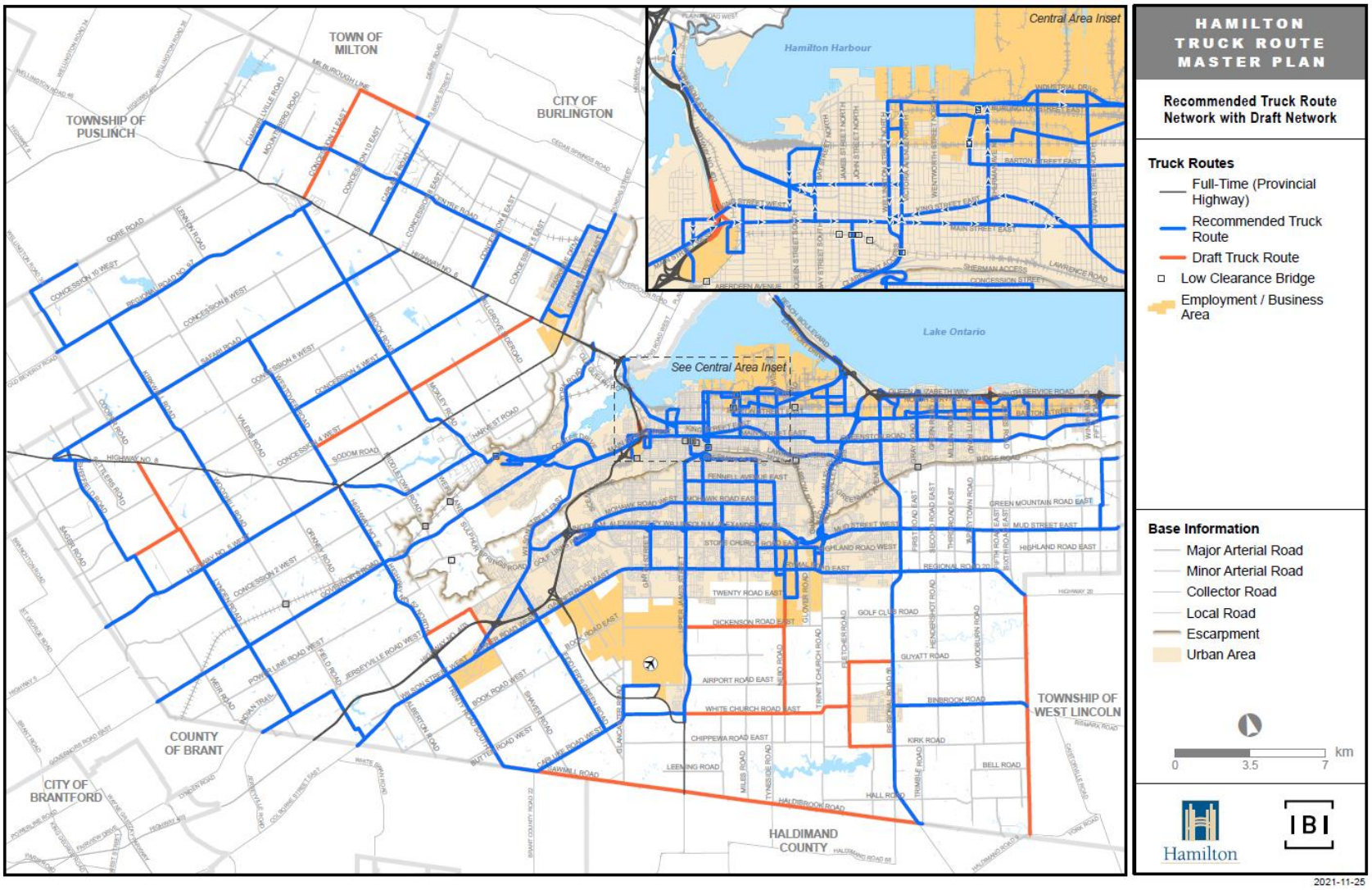
By applying institutional knowledge of city infrastructure and how the existing truck route network has evolved, including areas of historical public concern, the study team followed the principles related to efficient connectivity, network reliability, and spacing to fill gaps in the Balanced Network that was generated in Step 2. These principles include:

1. Provide at least one full-time truck route connection between existing or planned heavy industry and the provincial highway network.
2. Provide sufficient connectivity and truck route network spacing to avoid excessive additional truck travel time compared to the shortest travel distances, and to ensure that a feasible redundant route is available when part of the truck route becomes temporarily unavailable (e.g. due to traffic incidents or construction).
3. Provide one or more truck route connections (full-time or part-time) at each provincial highway or municipal parkway interchange. Where on-highway restrictive signage cannot be installed, provide routes to guide trucks back onto the highway network.
4. Provide at least one full-time truck route connection to each bordering truck route in adjacent municipalities.
5. Maintain the Provincial EDR as part of either the 24-hour or daytime-only truck route – or consider changes to the EDR to more suitable routes if needed.
6. Avoid truck route “spurs” for both the 24-hour network and the full network (e.g. provide truck route connections and/or turn-around loops)
7. Where local roads in industrial zones represent the shortest route to industry locations, they do not need to be included explicitly in the truck route network. Include local roads within industrial zones only when doing so directs heavy vehicles away from nearby sensitive land uses.

Where gaps could be filled by more than one parallel link or route, the study team used the Step 2 segment-by-segment analysis results to select the higher-scoring routes or segments. Road links that were added through applying these principles were considered for daytime-use only (Section 5.1.1) or other mitigating measures to reduce the impacts of trucks on adjacent land uses, etc.

The road segments that form the DRAFT Truck Route network are shown in Exhibit 4.9.

Exhibit 4.9: DRAFT Truck Route Network



The DRAFT Truck Route Network reflects a longer-term solution that would provide the necessary connectivity and resiliency to move heavy vehicle traffic through and within the City of Hamilton. However, the current state of many of the identified road segments and the potential incompatibilities between road users and adjacent land uses along others will require mitigating measures. The evaluation process has accounted for these outcomes and Steps 4 and 5 serve to further identify and proposed mitigation for such issues.

4.2.4 Step 4 Outcome: Issues and Proposed Mitigation

The DRAFT Truck Route Network generated in Step 3 was reviewed to identify potential operational challenges (e.g., tight intersection geometry, lack of pedestrian or cycling facilities, poor pavement conditions or seasonal load restrictions, etc.) and tables of road segments with confirmed or probable issues were produced for links that are part of the current truck route network as well as links that are proposed to be added to the network. Those issues tables are illustrated in Exhibit 4.10 and Exhibit 4.11 for new additions and existing links, respectively. The tables also show the high-level mitigation strategies recommended for each of the identified issues. The tables were shared with the public and stakeholders as part of the Phase 2 engagement process.

Mitigating Measures

Exhibit 4.10 and Exhibit 4.11 list the roadways that are part of the DRAFT Truck Route Network for which operational issues have been identified; segment limits and high-level mitigation are also provided. Mitigation strategies range from improvements to traffic controls (e.g., signs, pavement markings, and signals), to intersection geometric improvements, to segment improvements/upgrades (e.g., dedicated or expanded sidewalks or cycling facilities), to full roadway reconstruction (e.g., to relieve seasonal load restrictions).

Exhibit 4.10: Operational Improvements – NEW Road Segment Additions

Roadway	From	To	Traffic Control Improve-ments	Inter-section Improve-ments	Segment Improve-ments	Road Recon-struction
Proposed Truck Route Additions						
Milburough Line	Carlisle Road	Concession 11 East				X
Concession 4 West	Highway 6	Brock Road	X		X	X
Concession 4 West	Brock Road	Westover Road			X	X
Concession 4 West	Sheffield Road	Lynden Road		X	X	X
Lynden Road	Highway 5	Highway 8		X	X	X
Jerseyville Road	Highway 52	Shaver Road				X
Shaver Road	Jerseyville Road	Garner Road	X		X	X
Sawmill Road / Haldibrook Road	Carluke Road West	Highway 56	X		X	X
Airport Road West	Highway 6	Glancaster Road				X
Glancaster Road	Airport Road	White Church Road				X
White Church Road	Upper James Street	Fletcher Road		X		X
Dickenson Road East	Upper James Street	Nebo Road		X	X	X
Nebo Road	White Church Road East	Twenty Road		X	X	X
Kirk Road	Fletcher Road	Highway 56		X	X	X
Fletcher Road	Binbrook Road	Guyatt Road		X	X	X
Guyatt Road	Fletcher Road	Highway 56		X	X	X
Westbrook Road	Highway 20	York Street				X
Longwood Road South	King Street West	Main Street West			X	
Concession 11 East	Highway 6	Milburough Line		X		X

Exhibit 4.11: Operational Improvements – EXISTING Truck Route Network Links

Roadway	From	To	Traffic Control Improve-ments	Inter-section Improve-ments	Segment Improve ments	Road Recon-struction
Existing Truck Route Segment						
Carlisle Road	Highway 6	Milburough Road			X	X
Centre Road	Campbellville Road	Parkside Drive			X	X
Safari Road	Highway 6	Highway 8			X	
Westover Road	Highway 5	Safari Road			X	
Eleventh Road East	Ridge Road	Mud Street East				X
Wellington Street (Dundas)	King Street	Mill Street	X			
Wilson Street (Ancaster)	Rousseaux Street	Garner Road			X	
King Street	Queen Street	Longwood Road South			X	
Queen Street North	York Boulevard	King Street West		X	X	
Wellington Street	Burlington Street	Claremont Access		X	X	
Cannon Street / York Boulevard	Victoria Avenue North	Plains Road West		X	X	
Main Street	Osler Drive	Queenston Road			X	
Victoria Avenue North	Burlington Street	Claremont Access		X	X	
Barton Street East	Birch Avenue	Sherman Avenue North			X	
Market Street (Dundas)	Mill Street	King Street		X	X	

Concerns Raised Through Phase 2 Stakeholder Engagement

A comprehensive review of the stakeholder engagement and public consultation efforts revealed a number of location specific comments regarding truck hotspots, the draft recommended network, and other related truck issues. A high-level summary of such comments, organized geographically, is presented below.

North West / Flamborough:

- The inclusion of Milburough Line and Concession 11 East, particularly due to geometric conditions, as well as sensitive land uses and environmental features;
- The continued inclusion of Centre Road, particularly segments that pass through the Carlisle community;
- Concession 6 East, particularly segments that pass through the Carlisle community, which lack sidewalks;
- The inclusion of Dundas Street and Parkside Drive, particularly segments that pass through the Waterdown community;
- A proposed shift from Concession 5 West to Concession 4 West in the vicinity of the Millgrove community; and
- The inclusion of Lynden Road, particularly the segment between Highway 5 and Concession 4 West.

South West / Dundas and Ancaster:

- The inclusion of Sawmill Road, given concerns from Brant County staff;
- The draft recommended network within the Dundas Community, particularly concerns regarding Olympic Drive, Cootes Drive, Governors Road, King Street, Hatt Street, and the Brock Street South & King Street intersection; and
- The inclusion of Shaver Road between Jerseyville Road and Garner Road.

South / Glanbrook:

- The inclusion of Dickenson Road East, White Church Road, and Nebo Road;
- The inclusion Haldibrook Road, given concerns from Brant County and Haldimand County; and
- The inclusion of Ridge Road, Mud Street, and Westbrook Road, given concerns from Niagara Region, the Town of Grimsby, and the Town of West Lincoln.

East / Stoney Creek:

- Barton Street, particularly regarding time-of-day restrictions; and

- Gray Road and Fruitland Road, particularly segments north of the Queen Elizabeth Way;

Downtown Hamilton:

- The suitability of designated truck routes which pass through Downtown Hamilton, particularly Queen Street, Victoria Street, Wellington Street, Ottawa Street, King Street, and Main Street, given sensitive land uses, vulnerable road users, and compatibility with the Hamilton LRT;
- The requirement to facility access to the CN Rail Hamilton yard;
- The appropriateness of time-of-day restrictions, speed restrictions, and restrictions on the use of compression release engine brakes; and
- Concerns regarding potential weight classifications as an implementation tool, particularly regarding the Kenilworth Access.

4.2.5 Step 5 Outcomes: Recommended Truck Route Network

Following Step 4, it is clear that a significant investment in infrastructure improvements would be required to realize a truck route network resembling the refined DRAFT Truck Route Network, given all of the identified issues. Ultimately, it was determined that the recommended truck route network be put forward in two stages:

- one that could be implemented in the near-term, requiring few modifications to existing conditions; and
- one that reflects future conditions, following the implementation of mitigation and planned roadway expansion.

The two forms of the recommended truck route network are presented in Exhibit 4.12 and Exhibit 4.13, respectively. Sub-area detail is shown in Exhibit 4.14 through Exhibit 4.21. A listing of proposed changes from the existing Truck Route Network is presented as Exhibit 4.22.

Exhibit 4.12: Recommended Truck Route Network – Near-Term

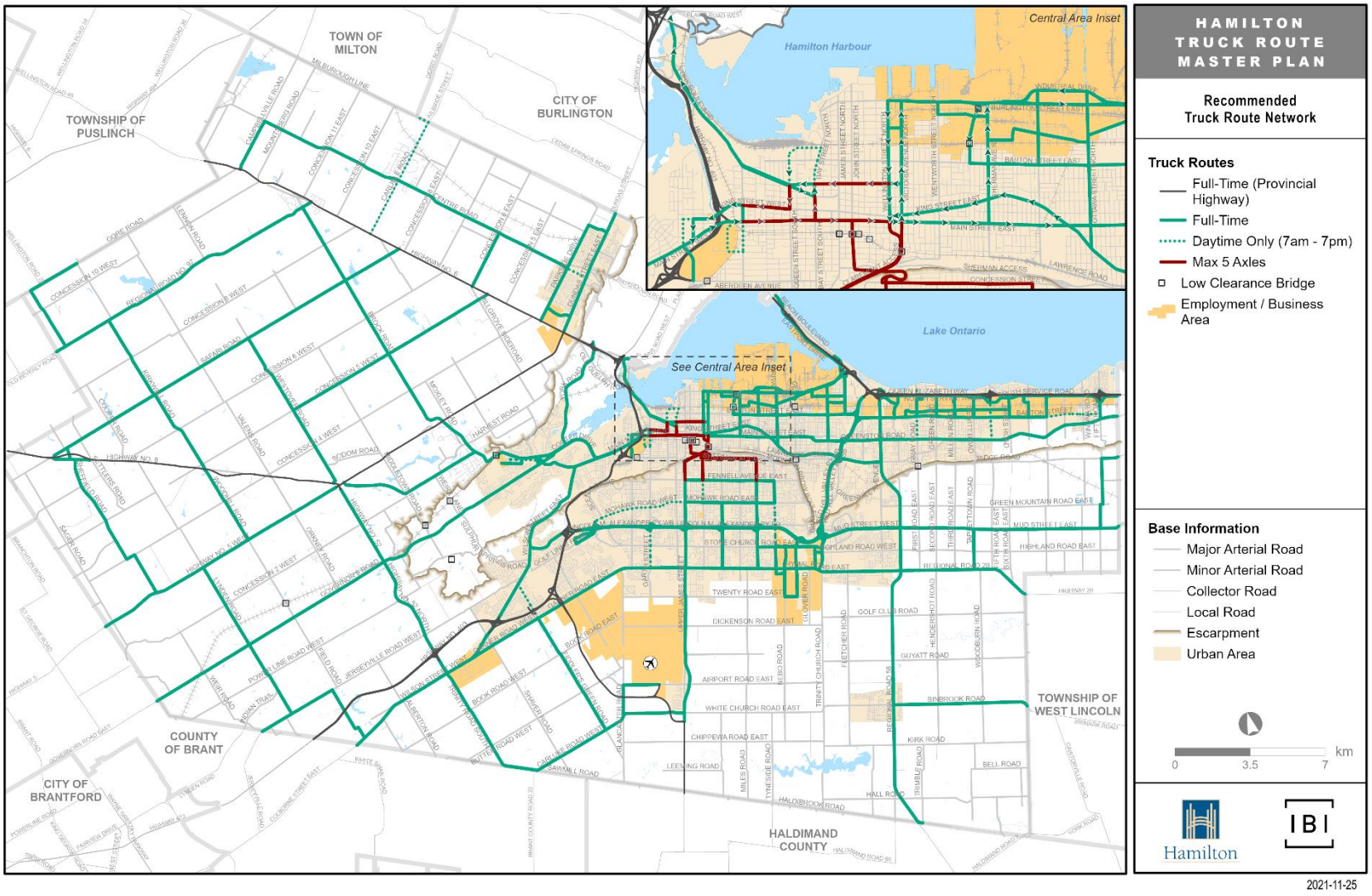


Exhibit 4.13: Recommended Truck Route Network - Future Conditions

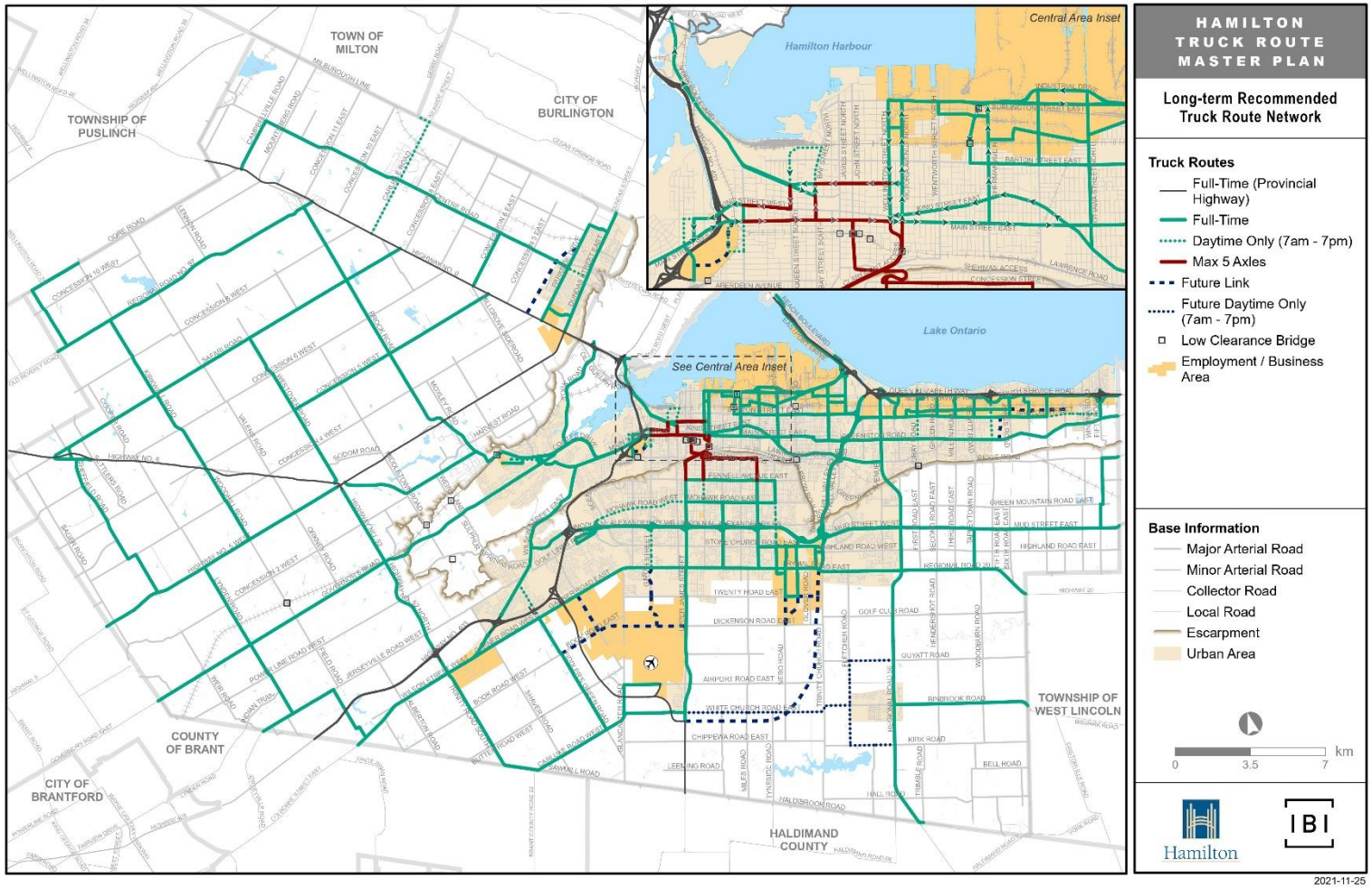


Exhibit 4.14: Recommended Truck Route Network: Northwest

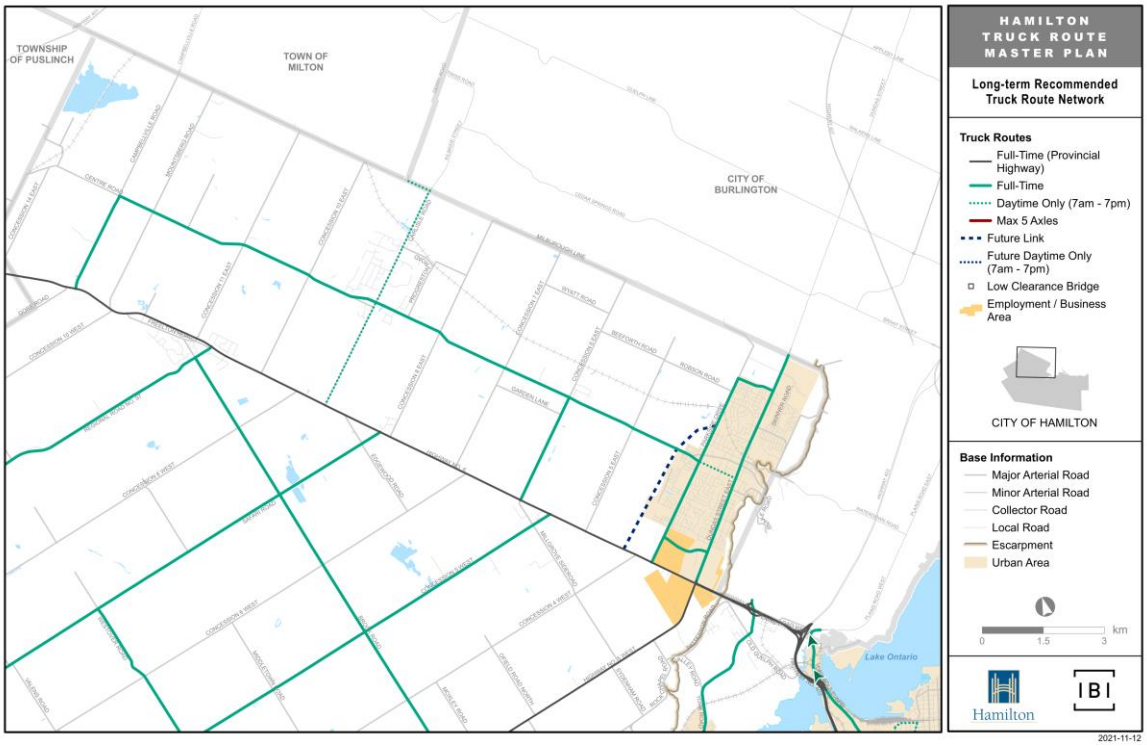


Exhibit 4.15: Recommended Truck Route Network: Southwest

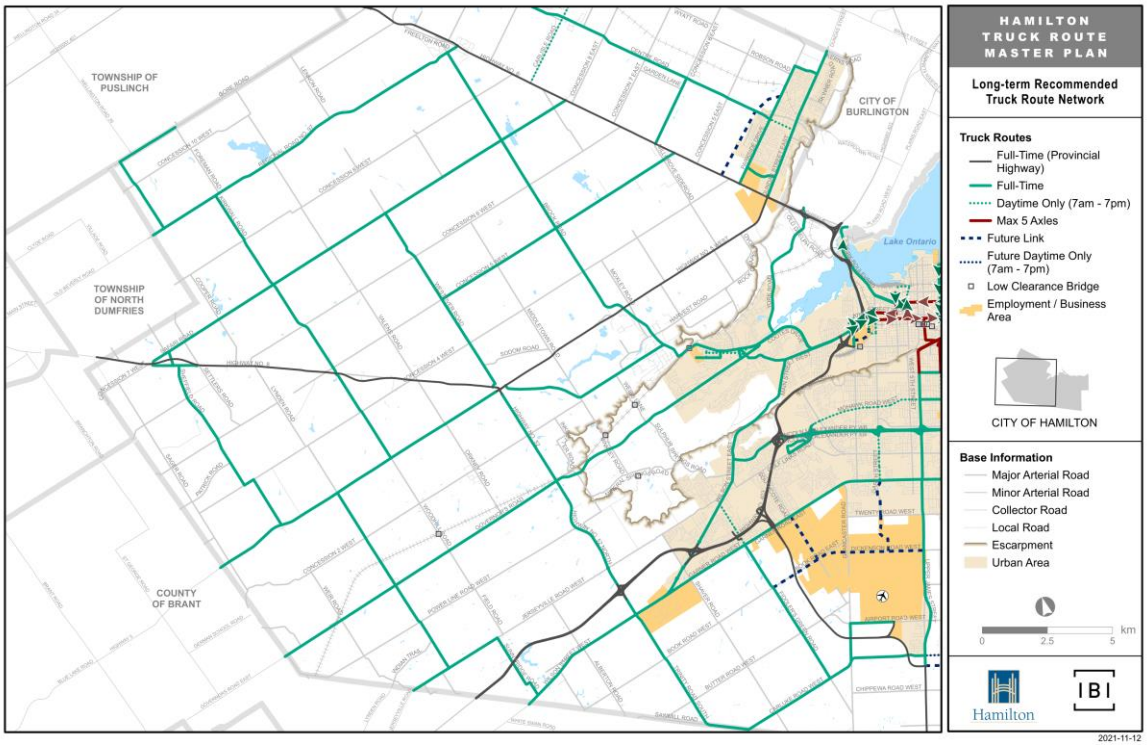


Exhibit 4.16: Recommended Truck Route Network: Dundas

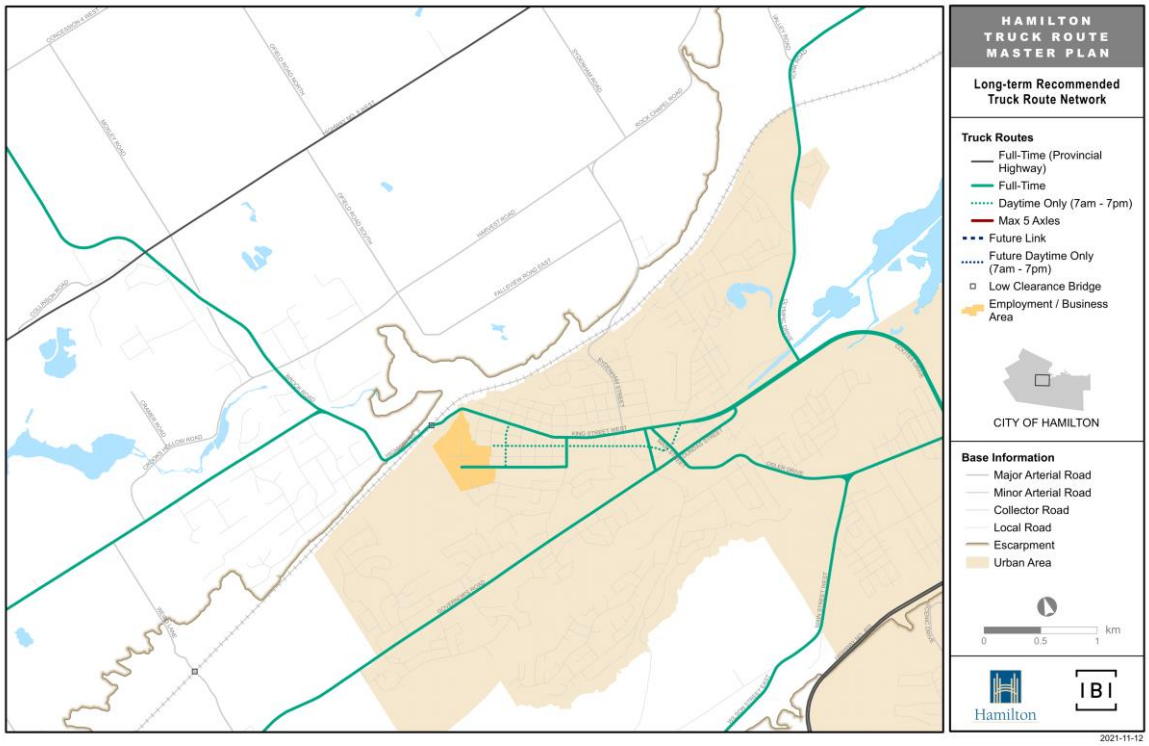


Exhibit 4.17: Recommended Truck Route Network: Southeast

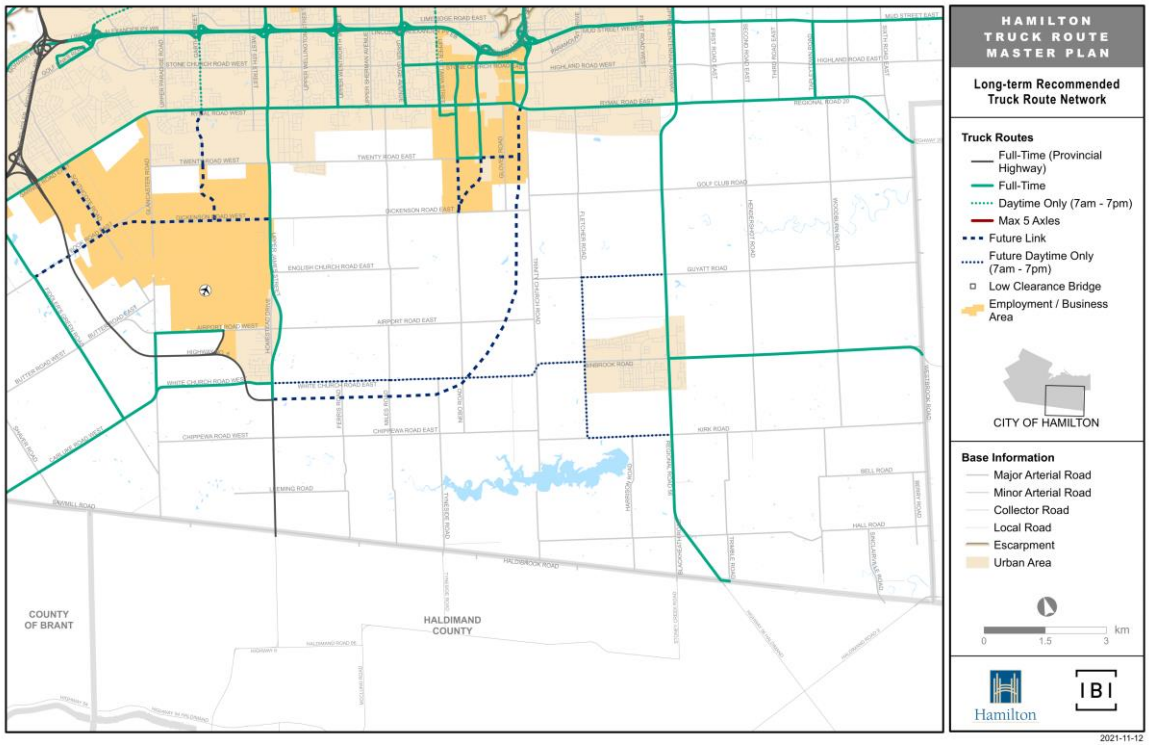


Exhibit 4.18: Recommended Truck Route Network: Binbrook

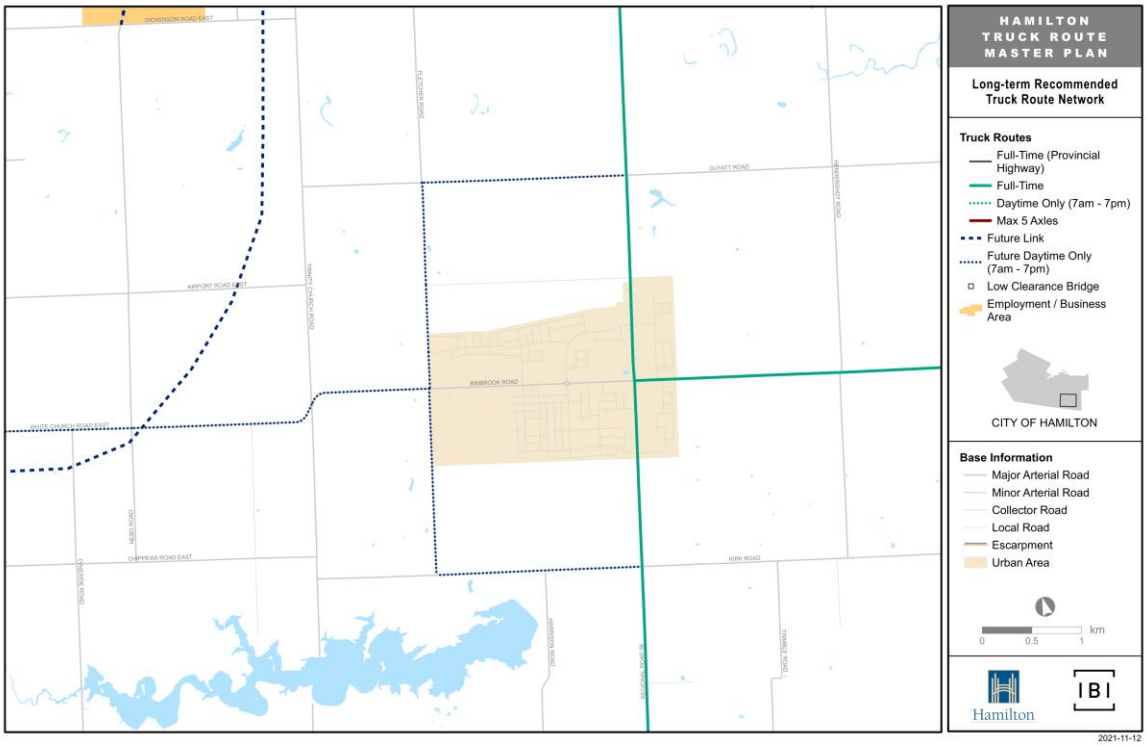


Exhibit 4.19: Recommended Truck Route Network: Northeast

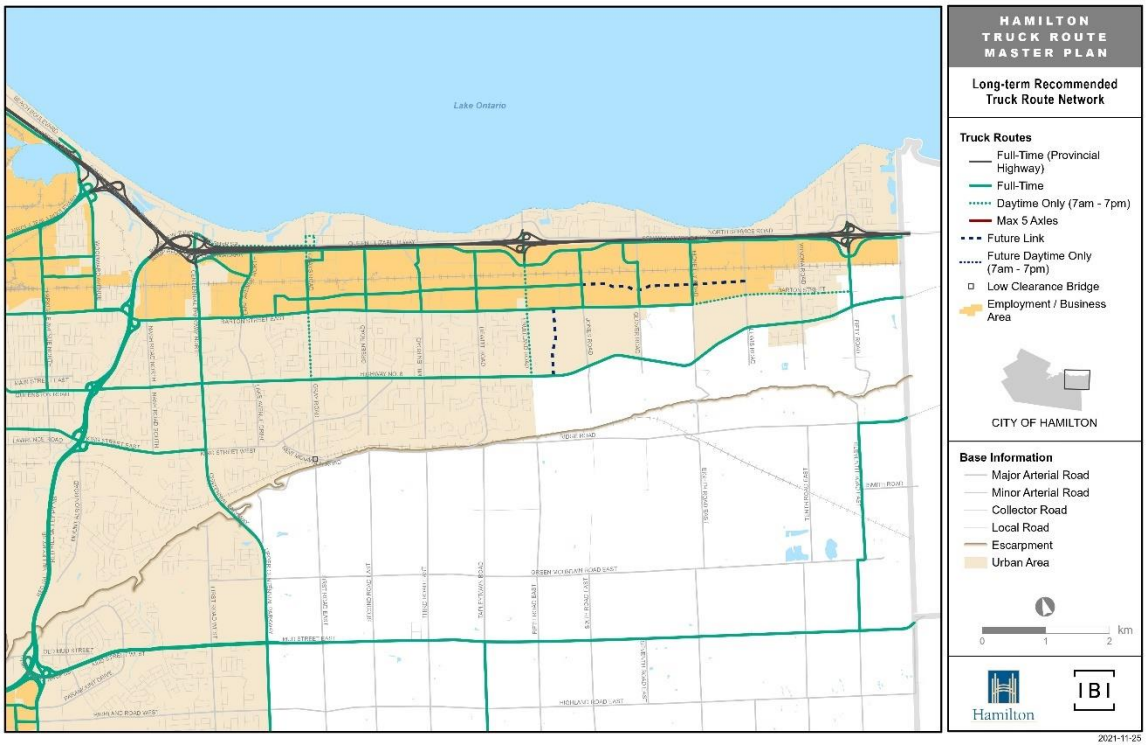


Exhibit 4.20: Recommended Truck Route Network: Downtown Hamilton (East)

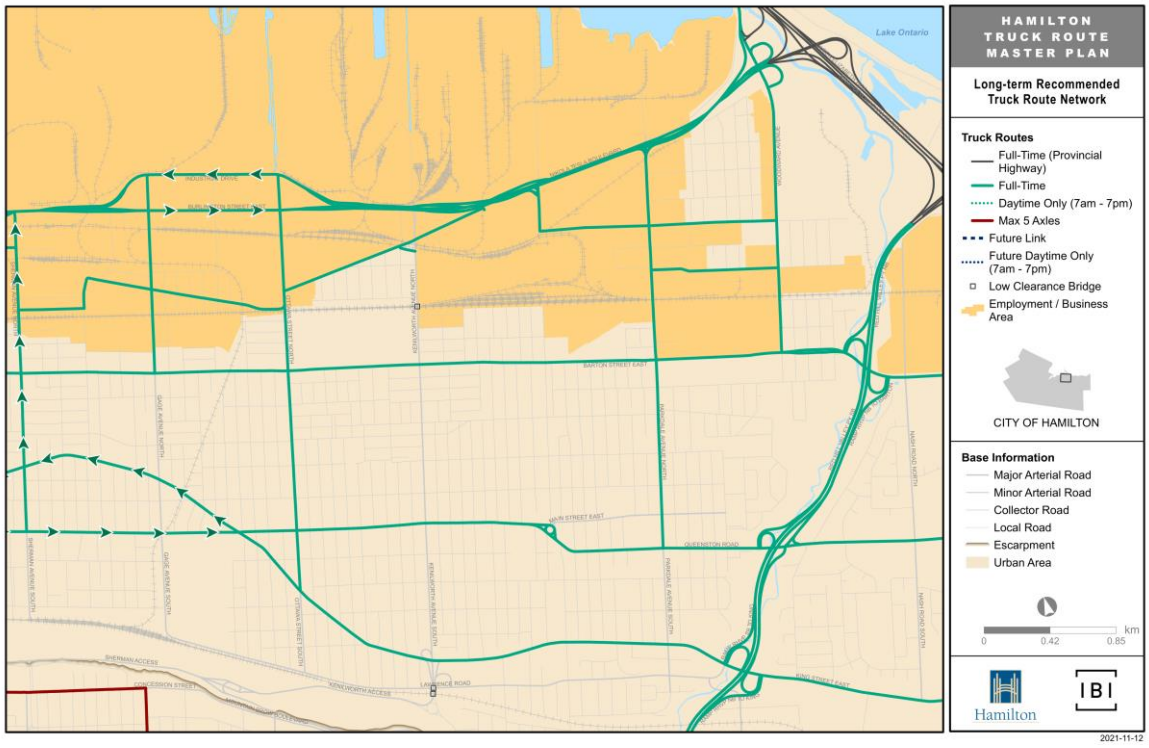


Exhibit 4.21: Recommended Truck Route Network: Downtown Hamilton (West)

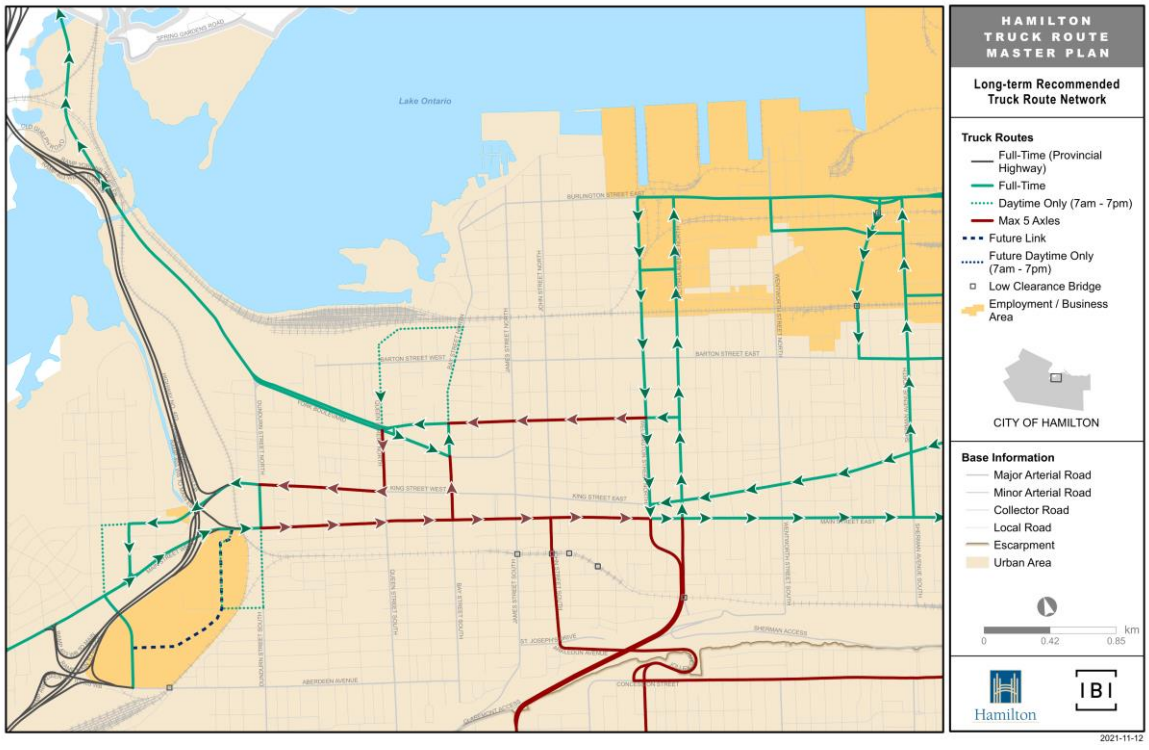


Exhibit 4.22: Recommended Truck Route Network Additions

Roadway	From	To	Justification
Short-Term Truck Route Additions			
King Street West	King Street West	Longwood Road South	Provides connectivity between downtown Hamilton and McMaster Innovation Park.
Longwood Road South	King Street West	Main Street West	Provides connectivity between downtown Hamilton and McMaster Innovation Park.
Mohawk Road	Lincoln M. Alexander Parkway	Stone Church Road	Provides connectivity between the Meadowlands commercial area and local Parkways.
Golf Links Road	Stone Church Road	Legend Court	Provides connectivity between the Meadowlands commercial area and local Parkways
Legend Court	Golf Links Road	Martindale Crescent	Provides connectivity between the Meadowlands commercial area and local Parkways
Martindale Crescent	Legend Court	Golf Links Road	Provides connectivity between the Meadowlands commercial area and local Parkways
Garth Street	Rymal Road West	Lincoln M. Alexander Parkway	Provides network redundancy and connectivity to a local Parkway interchange.
Glancaster Road	Carluke Road East	Airport Road West	Provides network redundancy and direct connectivity between AEGD employment lands and local Parkways
Airport Road West	Glancaster Road	Highway 6 Ramp	Provides network redundancy and direct connectivity between AEGD employment lands and local Parkways
Highland Road West	Pritchard Road	Upper Red Hill Valley Parkway	Provides connectivity between employment uses and local Parkways
Long-Term Truck Route Additions			
White Church Road East	Upper James Street	Trinity Church Road	Provides network redundancy and direct connectivity between AEGD employment lands and municipalities to the south and east.
Binbrook Road	Trinity Church Road	Fletcher Road	Provides network redundancy and direct connectivity between AEGD employment lands and municipalities to the south and east.
Fletcher Road	Kirk Road	Guyatt Road	Provides network redundancy, direct connectivity between AEGD employment lands and municipalities to the south and east, and provides for a bypass of the Binbrook area.
Guyatt Road	Fletcher Road	Regional Road 56	Provides network redundancy, direct connectivity between AEGD employment lands and municipalities to the south and east, and provides for a bypass of the Binbrook area.
Kirk Road	Fletcher Road	Regional Road 56	Provides network redundancy, direct connectivity between AEGD employment lands and municipalities to the south and east, and provides for a bypass of the Binbrook area.

5. Truck Route Network Implementation

While the analytic process described in the preceding sections was used to determine which roads to include in the recommended truck network, when and how the network is implemented is an equally important consideration and is discussed in this section.

5.1 Implementation Strategies

Based on feedback from various stakeholder engagement activities, the following implementation strategies were identified to facilitate goods movement while minimizing impacts to sensitive land uses and other road users.

1. Implement time- of-day restrictions;
2. Consider focusing on larger trucks;
3. Implement additional downtown restrictions;
4. Implement operational Improvements; and
5. Pair network changes with mitigation measures.

5.1.1 Implement Time-of-Day Restrictions

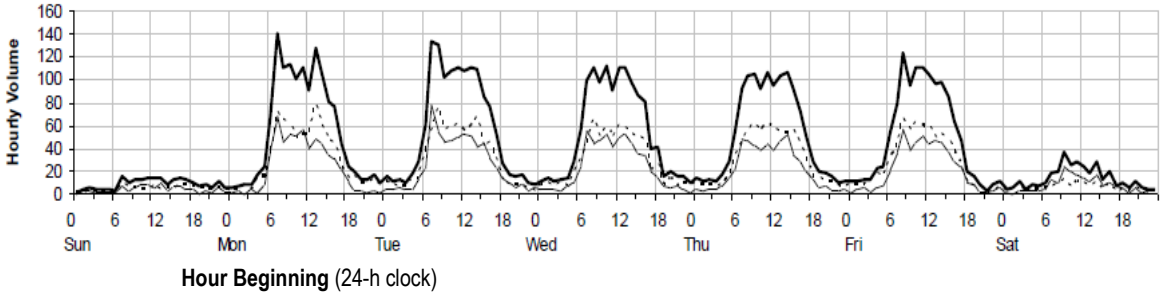
Presently, where time-of-day restrictions currently are in place on truck routes in the City of Hamilton, they generally permit truck activity in the daytime period of 7 a.m. to 7 p.m. and prohibit truck traffic outside of these hours.

Sample one-week hourly truck traffic volume profiles in the City, shown in Exhibit 5.1 (Industrial Avenue and Burlington Avenue at Depew Street), show that the majority of truck trips or truck traffic volumes, at least in the port area, tend to occur within the daytime period of approximately 6 a.m. to 6 p.m., with peaks in the weekday morning and mid-day periods.

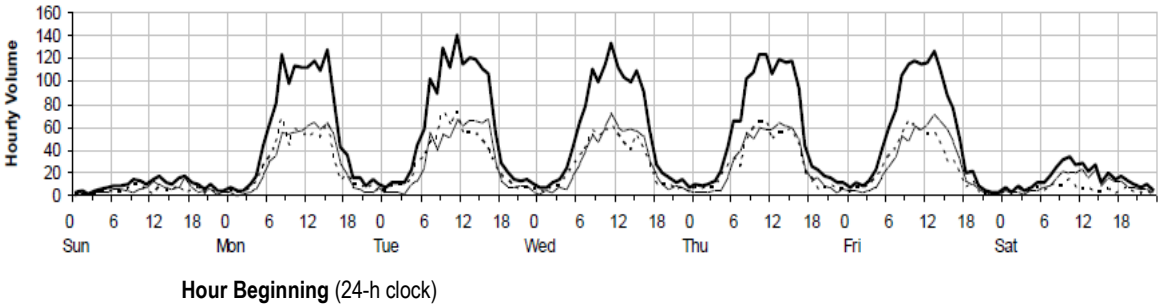
The City of Hamilton's current 7 p.m. to 7 a.m. restrictions impact truck travel timing or routing slightly more than a 6 p.m. to 6 a.m. restriction would, given that truck volumes increase quickly early in the morning and drop off considerably by approximately 6 p.m. However, time period restrictions should be consistent throughout the City (allowing 7 a.m. to 7 p.m. or 6 a.m. to 6 p.m. travel consistently), as time-of-day restrictions are most easily understood and enforced when they are consistent. Changing this standard allowable time period would need to be supported by a clear benefit to doing so, and would also require updating signage throughout the City as a result.

Exhibit 5.1: Sample One-Week Hourly Truck Traffic Profiles

A. Industrial Drive Westbound at Depew Street (November 2019)



B. Burlington Avenue Eastbound at Depew Street (November 2019)



Legend:

- Single-Unit Trucks: straight trucks or truck tractors without a trailer
- Multi-Unit Trucks: truck vehicle and trailer combinations
- Total Trucks

Source: Processed traffic counts conducted as part of the Ministry of Transportation of Ontario's Commercial Vehicle Survey

An overnight-restricted implementation strategy can offer quality-of-life and public health advantages by reducing truck volumes near sensitive land uses in the overnight period where truck noise and vibrations can impact sleep and the enjoyment of evening activities for nearby residents, hospital patients, etc. Conversely, daytime truck traffic restrictions, permitting truck travel in the overnight period only, would be advantageous to other sensitive land uses such as schools, where activity takes place during daytime hours.

However, there are also disadvantages to consider in implementing time-of-day restrictions. While the majority of the truck activity occurs during daytime, overnight restrictions would mean that truck operators cannot make use of quieter traffic in the overnight period to make their deliveries more efficiently, without further contributing to daytime traffic congestion and impacting daytime activities in the community. Conducting overnight deliveries where possible is a strategy that the Ministry of Transportation of Ontario has been supportive of.

Where overnight truck route restrictions are in place, delivery vehicles would be permitted to deviate from the full-time truck route network and use the overnight-restricted route to reach a property as long as the overnight-restricted route is part of the shortest possible path from a full-time designated route. This may result in instances where trucks are perceived to be in violation of the truck route network.

5.1.2 Consider Focusing on Larger Trucks

Presently, the City of Hamilton Traffic By-law defines a “truck” as any combination of vehicle and trailer with a gross weight that is in excess of 4500 kilograms, excluding municipal vehicles such as buses, firefighting equipment, public utility vehicles, and authorized emergency vehicles. This definition encompasses tractor-trailer combinations and large rigid trucks such as dump trucks and waste collection vehicle, but also includes smaller vehicles typically used by couriers and small businesses.

A review of stakeholder and public engagement revealed that, in general, concern regarding trucks was primarily associated with larger vehicles, likely due to their increased visibility and the increased noise, vibration, and compatibility concerns. While there was interest expressed by stakeholders and the public in dealing primarily with bigger trucks (as opposed to smaller vehicles such as delivery vans), there was also resistance to raising the weight limits at which trucks are required to follow the truck route network (i.e., the by-law definition of what constitutes a “heavy vehicle”). Concern that some larger trucks – particularly those which are much larger than a typical automobile but well below a conceptual raised weight limit - would use roads where they are currently not permitted to travel was a major barrier to advancing this potential implementation initiative. Therefore, the focus was shifted to downtown restrictions on larger trucks and enforcement based on number of axles.

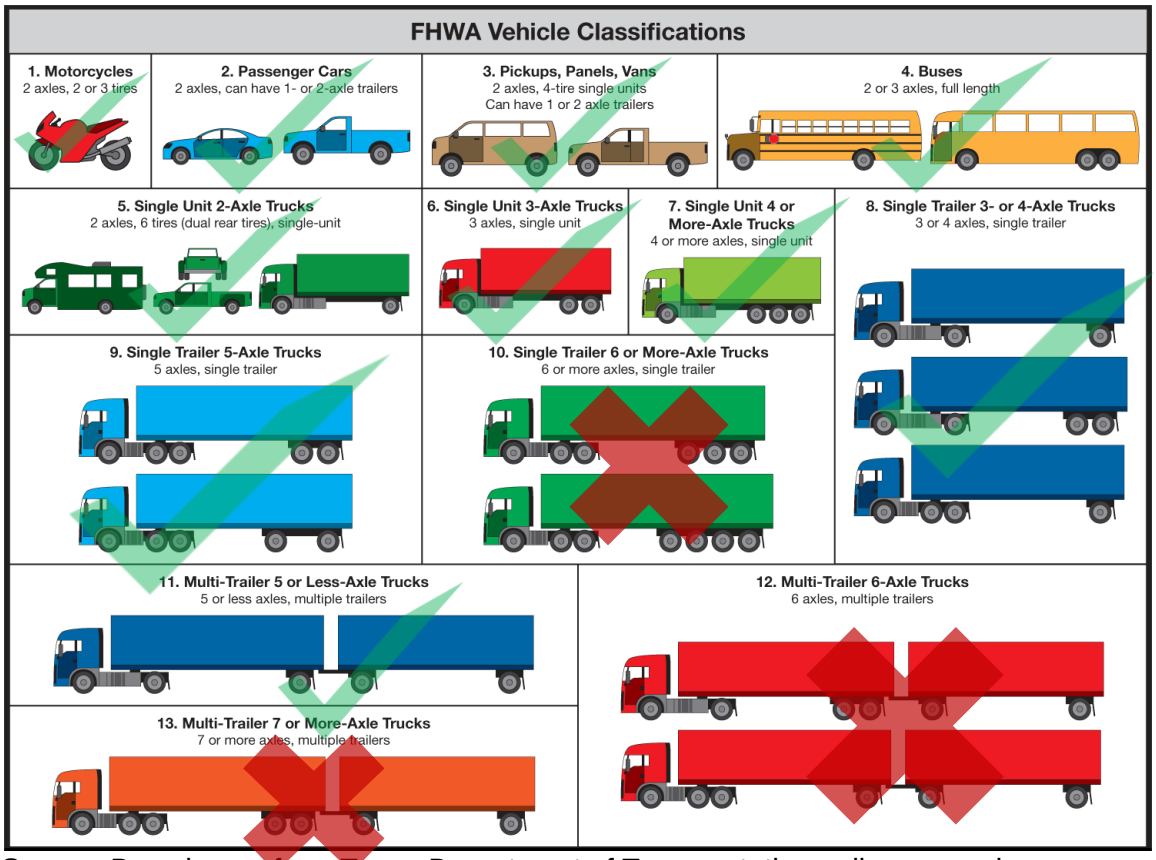
Based on feedback, no changes are proposed to the definition of a truck under the Hamilton Traffic By-law. However, it should be noted that courier vehicles have an increased presence in residential neighbourhoods due to the prevalence of online shopping for consumer goods and every household item. As a result, while many of these vehicles would be defined as trucks and would be required to follow the truck route network, the nature of typical delivery routes is likely to result in significant portions of the day spent away from the network. This can lead to the perception that compliance is poor.

5.1.3 Implement Additional Downtown Restrictions for Very Large Heavy Trucks

Given that downtown Hamilton has a high density of pedestrians and other vulnerable road users, and land uses and activities that are sensitive to heavy trucks passing through the area, a zone in which especially large trucks are restricted was also identified; this zone extends to the Claremont Access and truck route segments in Upper Hamilton north of Fennell Avenue East. While road segments in this zone are part of the truck route network, the truck network segments in this zone are limited to trucks with a maximum of five axles only.

Exhibit 5.2 illustrates which vehicle classes according to the US Federal Highway Administration (FHWA) categorization would be allowed or not allowed on the maximum 5-axle truck route network segments.

Exhibit 5.2: FHWA Vehicle Classifications: Vehicles Allowed and Not Allowed on Maximum 5-Axle Downtown Truck Route Network Segments



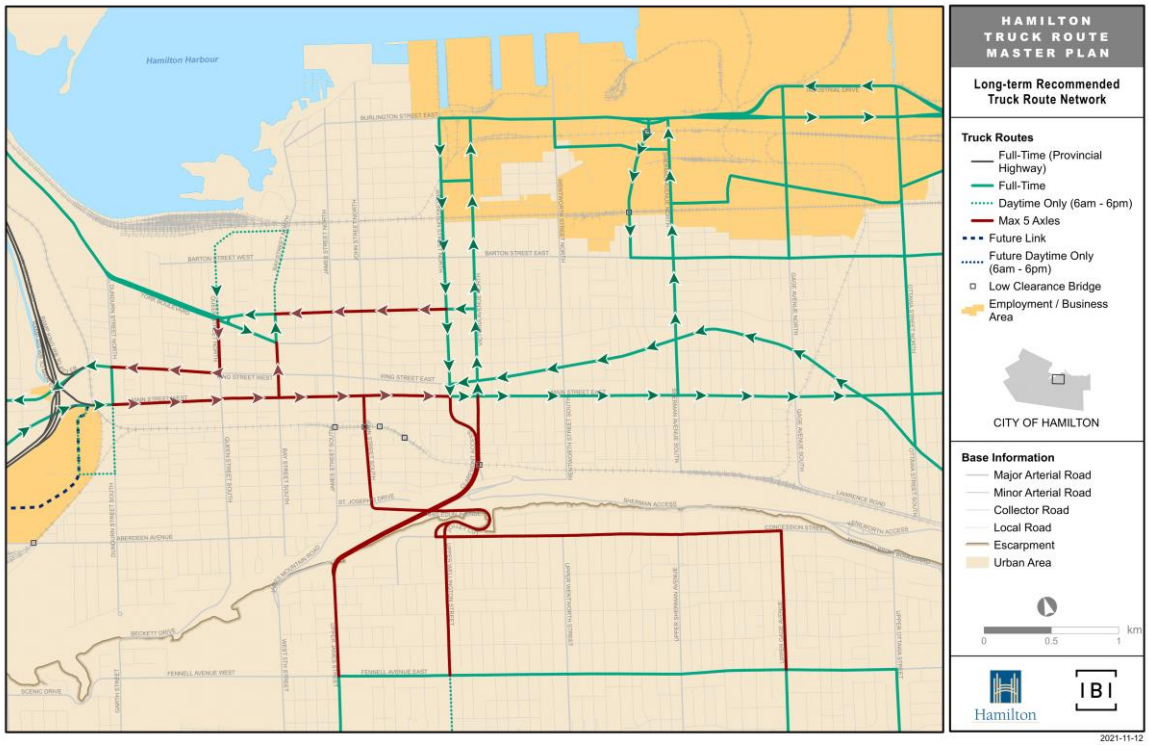
Source: Base image from Texas Department of Transportation online manuals <http://onlinemanuals.txdot.gov/txdotmanuals/tri/classifying_vehicles.htm>.

As shown in Exhibit 5.2, vehicles in FHWA classes 1 through 9 as well as 11 would be permitted to use the maximum 5-axle truck route network segments, subject to any other restriction in place. Vehicles in FHWA classes 10, 12 or 13 would be prohibited from using these segments. Effectively this allows all vehicles except for very heavy single-trailer combinations and almost all double-trailer combinations. Vehicles in FHWA category 11—multi-trailer vehicles with 5 axles or less—are technically allowed but are very uncommon.

The proposed maximum-5-axles zone is defined to ensure that very large heavy vehicles still have a connected network and have turning or turn-back options. The maximum-5-axles zone is roughly bounded by Barton Street to the north, Wellington Street to the east, Fennell Avenue to the south, and Dundurn Street to the west, and results the maximum 5-axle restrictions placed on the links shown in Exhibit 5.3.

Due to these additional restrictions, any vehicle with six or more axles may need to use alternate routes around the City, such as The Linc and Red Hill Expressway, instead of travelling through the downtown. These additional restrictions come with significant trade-offs for selected very heavy truck trips in terms of increased travel times, increased travel distances and resulting greenhouse gasses, particularly for those traveling to or from west or northwest of the City.

Exhibit 5.3: Additional Downtown Restrictions: Maximum 5 Axles Links



The impacts of requiring the alternate routing are summarized in Exhibit 5.4 for selected origin-destination pairs. (As a result, special truck travel permits may be provided for selected businesses who may be especially impacted by these additional restrictions.)

In order to effectively implement this restriction, designated truck routes must be present to guide larger trucks away from the downtown boundary and towards alternate routes. This can lead to increased instances of trucks turning within urban intersections, which has been identified as key concern regarding compatibility with other road users. Because of the necessity to provide alternate routes at the boundary, changes to the size of the maximum-5-Axles zone may require additional truck route links be designated.

5.1.4 Implement Operational Improvements

As noted in Section 4.2.4, public and stakeholder engagement revealed various concerns regarding compatibility of trucks with other road users. Exhibit 5.5 lists the roadways that are part of the proposed Truck Route Network for which operational issues have been identified; segment limits and high-level mitigation are also noted. Mitigation strategies include improvements to traffic controls (e.g., signs, pavement markings, and signals), intersection geometric improvements, segment improvements/upgrades (e.g., dedicated or expanded sidewalks or cycling facilities), or full roadway reconstruction (e.g., to relieve seasonal load restrictions).

Exhibit 5.4: Travel Time Comparison: Downtown vs. Outer City Routing

Access From	Common Origin Point	Destination	Route	Trip Length (km)	Mid-Day Trip Time (min)	Marginal Cost/Trip (Length)*	Marginal Cost/Trip (Time)**	Fuel Consumed (Litres / trip)	GHG Emissions (kg)
North (GTA)									
Current routing:	Hwy 401 / Hwy 427 (Etobicoke)	Wellington St. / Burlington St.	Hwy 427 / 403 / York / Wilson (Cannon) / Victoria (Wellington)	61.70	45.00	$69.72	$53.82	23.70	63.71
Potential alternate routing:	Hwy 401 / Hwy 427 (Etobicoke)	Wellington St. / Burlington St.	Hwy 427 / QEW / Nikola Tesla / Burlington	62.50	41.00	$70.63	$49.04	24.01	64.54
Difference:				**0.80**	**-4.00**	**$0.91**	**-4.78**	**0.31**	**0.83**
West (London/Windsor)									
Current routing:	Hwy 403 /Hwy 401 (Woodstock)	Wellington St. / Burlington St.	HWY 403 / Main (King) / Victoria (Wellington)	76.50	53.00	$86.45	$63.39	29.39	79.00
Potential alternate routing:	Hwy 403 / Hwy 401 (Woodstock)	Wellington St. / Burlington St.	Lincoln Alexander / QEW / Nikola Tesla / Burlington	93.80	61.00	$105.99	$72.96	36.04	96.86
Difference:				**17.30**	**8.00**	**$19.55**	**$9.57**	**6.65**	**17.86**
Northwest (Guelph/Kitchener)									
Current routing:	Hwy 6 / Hwy 7 (Guelph)	Wellington St. / Burlington St.	HWY 403 / York / Wilson (Canon) / Victoria (Wellington)	55.30	50.00	$62.49	$59.80	21.24	57.11
Potential alternate routing:	Hwy 6 / Hwy 7 (Guelph)	Wellington St. / Burlington St.	QEW / Nikola Tesla / Burlington	70.00	57.00	$79.10	$68.17	26.89	72.29
Difference:				**14.70**	**7.00**	**$16.61**	**$8.37**	**5.65**	**15.18**
East (Niagara)									
Current routing:	Hwy 406 / QEW (St. Catharines)	Wellington St. / Burlington St.	Nikola Tesla / Burlington	48.30	30.00	$54.58	$35.88	18.56	49.88
Potential alternate routing:	Hwy 406 / QEW (St. Catharines)	Wellington St. / Burlington St.	Nikola Tesla / Burlington	48.30	30.00	$54.58	$35.88	18.56	49.88
Difference:				**0.00**	**0.00**	**$0.00**	**0.00**	**0.00**	**0.00**

***** The average marginal cost of $1.13/kilometer ($1.82/mile), which includes costs due to fuel, equipment, maintenance, insurance, permits, licenses, tires, tolls and driver wages and benefits (Source: American Transportation Research Institute)

****** The average marginal cost of $1.196/minute ($71.78/hour), which includes costs due to fuel, equipment, maintenance, insurance, permits, licenses, tires, tolls and driver wages and benefits (Source: American Transportation Research Institute)

Exhibit 5.5: Operational Improvements Required for Proposed Truck Route Network

Roadway	From	To	Traffic Control Improve-ments	Inter-section Improve-ments	Segment Improve ments	Road Recon-struction
Existing Truck Route Segment						
Carlisle Road	Highway 6	Milburough Road			X	X
Centre Road	Campbellville Rd	Parkside Drive			X	X
Safari Road	Highway 6	Highway 8			X	
Westover Road	Highway 5	Safari Road			X	
Eleventh Road East	Ridge Road	Mud Street East				X
Wellington Street (Dundas)	King Street	Mill Street	X			
Wilson Street (Ancaster)	Rousseaux Street	Garner Road			X	
King Street	Queen Street	Longwood Road South			X	
Queen Street North	York Boulevard	King Street West		X	X	
Wellington Street	Burlington Street	Claremont Access		X	X	
Cannon Street / York Boulevard	Victoria Avenue North	Plains Road West		X	X	
Main Street	Osler Drive	Queenston Road			X	
Victoria Avenue North	Burlington Street	Claremont Access		X	X	
Barton Street East	Birch Avenue	Sherman Avenue North			X	
Market Street (Dundas)	Mill Street	King Street		X	X	
Proposed Truck Route Additions						
Lynden Road	Highway 5	Jerseyville Road		X	X	X
Jerseyville Road	Sunnybridge Rd	Misener Road				X
Airport Road West	Highway 6	Glancaster Road				X
Glancaster Road	Airport Road	White Church Road				X
White Church Road	Upper James Street	Fletcher Road		X		X
Dickenson Road East	Upper James Street	Nebo Road		X	X	X
Kirk Road	Fletcher Road	Highway 56		X	X	X
Fletcher Road	Binbrook Road	Guyatt Road		X	X	X
Guyatt Road	Fletcher Road	Highway 56		X	X	X
Longwood Road South	King Street West	Main Street West			X	

5.1.5 Pair Network Changes to Mitigation Measures

While several categories of identified mitigation measures are intended to reduce conflicts between trucks and other road users (e.g. the provision of sidewalks, enhanced traffic control measures, etc.), many identified measures are intended to address infrastructure and geometric constraints such as seasonal load restrictions, sightlines, and curve radii. Where these constraints exist, consideration was given to delaying the designation of certain segments until after infrastructure and geometric constraints have been addressed.

In addition, a review of the City's long-term strategic plans and goals identified a number of future road network expansion projects in Stoney Creek, Waterdown, the east Mountain, and the Airport Employment Growth District. It is assumed that these roads would, in general, be designated as truck routes upon their completion to augment or replace nearby existing segments. The recommended short-term and long-term truck route networks are presented in Exhibit 4.12 and Exhibit 4.13 in Section 4.2.

5.2 Signage

As revised signage will be required to implement the recommended truck route network, an order of magnitude signage requirement estimate was conducted based on the following principles:

- At intersections (signalized and unsignalized) where truck routes intersect, up to 4 signs are required (one for each potential approach) to permit or restrict turns, as needed.
  - Approximately 124 signalized intersections and 87 unsignalized intersections
- At signalized intersections along a single truck route, up to 2 signs are required (one for each through route approach) to permit or restrict turns, as needed.
  - Approximately 333 signalized intersections
- At unsignalized intersections where truck a single truck route changes direction, up to 2 signs are required (one for each through route approach) to notify road users of the correct turn
  - Approximately 43 locations

Based on these principles, approximately 2,000 signs at approximately 287 locations may be required[3] to sign the recommended truck route network. It should be noted that many routes proposed to be retained may be adequately signed. Therefore the majority of signage installations are expected to be related to new routes or route changes, as well as locations which would qualify for signs

[3] Including a 25% contingency.

but where none are present. Based on the above analysis, the distribution of truck routes across the city, and a weighted assessment which considers the magnitude of truck route network changes across various areas of the city, it is estimated that approximately 530 new signs at 178 locations will be required to implement the recommend truck route network. Based on an assumed cost of $500 per new sign, this translates to an order of magnitude cost of $300,000[4].

5.3 By-Law

The existing truck route network is governed by City of Hamilton By-Law No. 01-215 (the “traffic by-law”), with individual segments designated in Schedule 27. A revised schedule, consistent with the short-term recommended truck route network, to be prepared by the City staff.

In order to implement the proposed Maximum 5-Axle Zone, it is recommended that the following definition be added as a new definition in Section 1 of the Traffic By-law:

> "large heavy vehicle" means a heavy vehicle possessing more than five axles, whether those axles are lifted or lowered in contact with the road surface;

In addition, it is recommended that the following subsection, as well as an appropriate schedule defining the boundaries of the proposed zone, be added as a new Section 56 (8) of the Traffic By-law:

> Notwithstanding Section 56 (2), no person shall drive or permit to be driven any vehicle included in the definition of a large heavy vehicle heavy truck within the area prescribed by Schedule XX, provided that this provision shall not apply to any vehicle operating under the authority of a permit issued pursuant to Section 55.

[4] Inclusive of an approximate 15% contingency.

6. Supporting Policies

Identifying a truck route network is one critical element of managing the movement of trucks in the City of Hamilton. However, other supporting measures and policies are also required.

Eighteen recommended supporting policies are listed below under their primary Pillar and Goal – these are numbered and identified with shading. Additional potential complementary policies that would also be valuable to pursue are also listed.

A detailed review of potential policies and actions used in other jurisdictions toward development of this list of actions is included as Appendix B.

6.1 Pillar: Economic Prosperity

6.1.1 Goal: Economic Aspirations

Port of Hamilton

Growth at the Port of Hamilton demonstrates the demand for marine goods movement and related industries. It is a major regional freight generator of provincial and federal interest.

1. Work toward reliable road access between the Port of Hamilton's Piers/ related industries and the provincial highway network.

Complementary Policies:

- Identify opportunities for off-street staging to avoid on-street truck queues awaiting port access.
- Work with businesses/ports to encourage combined loads, reduce heavy truck volumes.
- Develop a regular commercial vehicle data collection program near the Port.
- Deploy technology to minimize wait time at points of entry, and to consider access fees.

Hamilton International Airport (HIA) and Airport Employment Growth District (AEGD)

The growth plans for the Hamilton International Airport area will make the area a major employment and cargo hub, and advance planning for truck movement can proactively deal with anticipated issues.

2. Ensure reliable road access between the airport/AEGD and provincial highways as well as major employment centres in Hamilton and vicinity.

Complementary Policies:

- Ensure that development policies in the vicinity of the airport and beneath the flight paths do not impede HIA's use as a 24/7 cargo/courier hub.
- Ensure direct, unimpeded (and secure) access between the AEGD and other end-of-runway industries and HIA's cargo/courier handling facilities.
- Consider the need for truck storage/staging areas near the AEGD.
- Support the development of alternative fuel infrastructure in the vicinity of HIA.

Curbside Space for Loading/Unloading

The demand for curbside space for loading/unloading is growing. However, trucks sometimes park in appropriate locations to load/unload, e.g. in bike lanes, due to lack of availability of space. Opportunities exist to address these issues and find solutions to support all curbside users.

Complementary Policies:

- Review curbside management policies, especially in areas that have high volumes of deliveries.

Off-Street Loading

There are opportunities to review how off-street loading is managed to reduce confusion around the competing demands for curbside space**.**

Complementary Policies

- Review off-street parking policies for short- and long-term delivery requirements to account for evolving needs.

Public Awareness of the Benefits of Goods Movement

The trucking industry generally has a poor public perception in spite of the purposes it serves.

Complementary Policies:

- Develop a profile of the economic importance of goods movement in Hamilton.
- Establish awareness and education programs on the importance of goods movement as part of a broad, ongoing outreach program.

- Establish a citizen – industry committee, managed by City staff, to jointly identify problems and seek effective solutions.

6.1.2 Goal: Efficient Connectivity

Long Combination Vehicles (LCVs)

LCVs offer an opportunity to move goods more efficiently, including reduced emissions, reduced vehicles, and decreased costs. However, LCVs are difficult to accommodate on roads outside of 400-series highways.

Complementary Policies:

- Ensure facilities are available for LCVs to transfer trailers within 2 km of the QEW and Hwy 403, with appropriately designed and maintained access routes.
- Ensure that policies to enable LCVs in Hamilton are in place, consistent with MTO's requirements while meeting local needs.
- For future planning, LCV-generating industries should be located close to the 400-series highways.

6.1.3 Goal: Reliability

Managing Provincial Highway Network Incidents

Several provincial highways intersect the City of Hamilton, and City of Hamilton roads carry provincial highway traffic when any provincial highway incidents occur. Some routes identified as provincial Emergency Detour Routes are not part of the current or proposed City of Hamilton truck route network.

3. Work with the Ministry of Transportation of Ontario to clarify Emergency Detour Routes (EDRs) on City of Hamilton roads, and to clarify the role of non-truck-route road segments identified as EDRs in highway incident-related emergency response.

Customized Truck Route Specifications

The City of Hamilton has a wide range of roads with different geometries, that connect different types of traffic generators, and have different types of adjacent contexts, constraints and sensitivities. A standard single threshold heavy vehicle weight or characteristic may not be sufficient to define the truck route limitations needed to manage heavy vehicle traffic effectively throughout the city. However, too many variations within the truck route network will be confusing and difficult to enforce.

4. Consider the following variations on heavy vehicle limits on the City of Hamilton truck route network, where such distinctions may be needed

to adequately manage truck traffic on specific routes, intersections, etc., while ensuring that overall connectivity and route redundancy are maintained for different road users:

- time-of-day restrictions;
- different upper or lower vehicle weight limits;
- maximum number of axles;
- maximum loading per axle;
- seasonal weight restrictions;
- maximum vehicle lengths; and
- lane-specific heavy vehicle restrictions.

The above variations should be applied sparingly and with as much consistency across the truck route network as possible, and must be reflected in the Heavy Vehicle Route bylaw. Any unique specifications must also be very clearly marked with roadside signage and identified with truck route information such as truck route maps.

Note that some of the above customizations have been incorporated into the recommended truck route network.

Complementary Policies:

- Ensure that the City's Complete-Liveable-Better Streets policies account explicitly for ways to manage the movement of large vehicles, in ways that are appropriate to the context and to the volumes of large vehicles on candidate corridors.

Redundancy

Planning for redundancy in the truck route network can proactively manage truck flows in case issues arise.

5. Incorporate redundancy in the defined truck route network to allow for access or use by emergency vehicles, as well as by trucks generally, even in the event of road construction and maintenance or other road closures.

Complementary Policies:

- Continue to deploy small- or medium-sized City of Hamilton emergency vehicles to allow more flexibility in circulating on narrower urban streets.
- Consider the deployment of traffic signals and other traffic control devices that give priority to emergency vehicles throughout the City's network.

Route Clarity

Determining which roads are allowable truck routes is not always clear to truck drivers or to community members.

6. Work with the Ministry of Transportation of Ontario to include the City of Hamilton's truck route network and other municipal truck route networks on provincial platforms and apps such as Ontario511 and route-finding apps.

Complementary Policies:

- Consider reviewing the existing directional signs for effectiveness, placement and legibility.

Oversize and Overweight Vehicles / Dangerous Goods

Oversize/Overweight Vehicles and those carrying dangerous goods require special consideration and permits.

7. Ensure that an oversize/overweight vehicle routing is maintained through the City of Hamilton (through geometric design considerations, etc.). Given the intermittent frequency of the oversize/overweight routes, the network does not necessarily have to be entirely on the truck route network.

Complementary Policies:

- Subject to need, consider investigating ways to streamline the over-dimension vehicle permitting process, alone or with adjoining municipalities.
- Subject to need, consider revisiting the City's policies for designating dangerous goods routes.

Ongoing Regional Connectivity

A forum for ongoing conversations about regional truck route networks can help the network adapt as needs change in adjacent municipalities, etc.

Complementary Policies:

- Consider the need for and feasibility of a Regional Goods Movement Committee or possibly a Hamilton-specific Committee. Either way, any initiative should be considered under the leadership of the City, i.e., the regional network would be central to the City's interests.

6.2 Pillar: Community Liveability

6.2.1 Goal: Safety

Complete-Liveable-Better (CLB) Streets

The City's new CLB policy calls for roads to support all road users, including goods vehicles, cyclists and pedestrians. However, current CLB guidelines do not provide the specific guidance for heavy truck volumes that would be needed for trucks and other road users to coexist more safely.

8. Ensure that CLB guidelines account for truck mobility appropriately to different environments and truck contexts (e.g. major truck routes, minor truck routes), with safety for all road users as the top priority.

Vulnerable Road Users

Collisions involving trucks tend to result in more serious injuries, posing risks to vulnerable road users.

9. Lower the speed limits on selected segments of the truck route network that are adjacent to sensitive land uses where the risk of collisions with vulnerable road users is considered to be high.

Complementary Policies:

- Initiate a safety and awareness campaign for vulnerable road users on how to travel safely around large vehicles.
- Work with the goods movement industry on new technologies that can help reduce risks to all travellers.

Roundabouts

Roundabouts can be an effective and safe intersection design option but need to take in consideration larger vehicles, as there are concerns about trucks in roundabouts encroaching into other lanes, and the resulting need to manage the truck path.

Complementary Policies:

- Consider reviewing the City's design policies for roundabouts, especially with respect to accommodating large vehicles.

Independent Operators

Some independent operators may be less prone to maintain their vehicle during economic downturns.

Complementary Policies:

- In consultation with the HPS and OPP, the City should investigate the existence/extent of the problem and the need for further enforcement and driver education.

High-Vision Truck Cabs

Use of high-vision truck cabs can increase the field of view for truck operators and increase safety for all road users.

Complementary Policies:

- Consider a policy that mandates the use of high-vision cabs and other safety equipment for City-owned vehicles.

6.2.2 Goal: Equity

Vulnerable Neighbourhoods

There is an opportunity to make the impact of truck traffic on vulnerable neighbourhoods more equitable.

Complementary Policies:

- Introduce a standard Truck Operation Monitoring Framework as part of the development application approval process for industries that:
  a) are major freight generators that rely on trucking; and
  b) may adversely impact the nearby residential community or sensitive lands.

  The Framework would require criteria, thresholds or guidelines to establish what types of industries would be subject to the requirement.

6.3 Pillar: Environmental and Public Health

6.3.1 Goal: Environmental Sustainability and Public Health

Air Quality

The emissions produced by diesel trucks are affecting public health and the environment.

10. Develop a structured system to assess and quantify the extent of air quality problems in Hamilton
11. Examine the feasibility of alternative air quality control measures and restrictions in all or parts of the city.

Complementary Policies:

- Encourage the adoption of electric trucks.
- Explore the provision of electric vehicle charging stations not only in residential areas but in selected industrial/commercial areas as well.
- Together with provincial and federal governments and other municipalities, consider working towards the development of more stringent air quality emission standards for urban areas.

Noise and Vibrations

The noise and vibration produced by trucks has negative impacts on residents working and living along truck routes.

12. Implement overnight restrictions for heavy trucks on routes facing residential or mixed-use area, where alternative connecting heavy truck routes are available. (This has been incorporated in the recommended truck route network.)
13. Lower speed limits of truck network road segments adjacent to residential areas and sensitive land uses to reduce noise and vibrations. (Increased safety to vulnerable road users is an associated benefit.)
14. Consider the truck route network noise and vibration implications of sub-standard surfaces when prioritizing road maintenance projects. .

Complementary Policies:

- Continue to explore ways to reduce use of engine brakes by truck drivers.
- Review the need for noise mitigation (e.g. installation of noise barriers) for residences and sensitive land uses unduly affected by the ambient noise of City of Hamilton parkways and heavy-traffic arterials.
- Continue to require detailed noise impact assessments for developments generating significant volumes of truck traffic when the site is not adjacent to a truck route, according to pre-defined thresholds, criteria and guidelines.

Excessive Idling

The public and stakeholders have expressed concerns with excessive idling of trucks, with associated air quality impacts.

15. Strengthen the enforcement of excessive idling.
16. Provide convenient off-road rest areas for heavy trucks along major truck routes to avoid the need to park roadside.

Complementary Policies:

- Review the City of Hamilton's idling bylaw, e.g. consider reducing the idling limit from 3 minutes (e.g. Toronto has an idling limit of 1 minute).

Climate Change Resiliency

Climate change poses significant risks to infrastructure, particularly truck routes. Climate-related events to truck routes will have an impact on the movement of goods in Hamilton.

17. As part of the City's Climate Emergency, actively consider the necessary policies, etc., to ensure that truck route infrastructure is protected and/or is otherwise adapted to mitigate climate change impacts.

6.3.2 Goal: Adaptable

Road Design Guidelines

There is an opportunity to review the City's road design guidelines to better accommodate other modes of transportation, while not precluding trucks.

18. City road design guidelines should design for safe truck movements along the truck route network, including ascending and descending grades, speed limits, lane restrictions – distinguishing between design vehicles and control vehicles.


HOLLYWOOD
DO NOT BLOCK INTERSECTION
1502
1520
D2
FOOD EQUIPMENT
BAKEWARE
COOKWARE
RNR
PATIENT TRANSFER SERVICE

Appendix A: Detailed Policy Framework and Background

The information in this Appendix was prepared in 2020 as part of interim study report, and is based on current policies and understanding of study issues at the time of writing.

Appendix A: Detailed Policy Framework and Background

To gain an understanding of the complexities involved with truck routing through and within the City of Hamilton, a number of policy documents were reviewed. The following sections provide an overview of each document and note the relevant key takeaways for consideration.

A.1 City of Hamilton Policy Documents

Existing City of Hamilton policy and planning documents that where reviewed include the:

- City of Hamilton Strategic Plan: 2016 to 2025 (2016);
- The Hamilton Urban Official Plan and Hamilton Rural Official Plan (both consolidated December 2018);
- Hamilton Transportation Master Plan Update (2018) and its background reports;
- Airport Employment Growth District Transportation Master Plan Update (2016);
- Truck Route Master Plan (2010); and
- Hamilton Goods Movement Study (2005).

These documents outline out the City's Vision (i.e. strategic plan), City-building policies (i.e. official plans) and specific transportation and goods movement policies (e.g. master plans).

A.1.2 City of Hamilton Strategic Plan: 2016 to 2025

Overview: The Strategic Plan was approved by Council in June 2016, and states that the City of Hamilton aspires "to be the best place to raise a child and age successfully." To achieve this, it outlines six community priorities: community engagement and participation, economic prosperity and growth, healthy and safe communities, clean and green, build environment and infrastructure, and culture and diversity. These priorities are the result of the *Our Future Hamilton: Communities in Conversation* initiative, during which over 55,000 people answered the question, "What is your vision for the future of Hamilton?" (Exhibit A.1).

Relevance: It is important to ensure that the six strategic priorities are considered and integrated throughout the TRMP update process. Exhibit A.1 identifies how each priority area can be incorporated.

A.1.2 Hamilton Official Plans

Overview: An Official Plan is a land use planning document that guides development within a municipality. It provides a framework for understanding how infrastructure, such as roads, are to be used and developed. The City of Hamilton maintains two Official Plans:

- *Urban Hamilton Official Plan* (UHOP), which applies to lands within the urban areas. UHOP was adopted in July 2009, and came into effect in August 2013; and
- *Rural Hamilton Official Plan* (RHOP), which applies to lands within the rural area. RHOP was adopted in September 2006, and came into effect in March 2012.

The areas where each plan is in effect are shown in Exhibit A.2. While they are two separate plans, many of the core policies (e.g. Goods Movement Network) are identical between the two documents.

Exhibit A.1: Priority Areas, Desired Outcomes from the *Hamilton Strategic Plan* and Planned Integration into TRMP Update

Priority	Desired Outcome	Integration into the TRMP Study
Community Engagement & Participation	Has an open, transparent and accessible approach to City government that engages with and empowers all citizens to be involved in their community.	Residents and businesses will be consulted and involved in making decisions that impact them. The Consultation and Engagement Strategy has received approval from City Council.
Economic Prosperity & Growth	Has a prosperous and diverse local economy where people have opportunities to grow and develop.	All businesses rely on trucks to move goods at some point, from manufacturers shipping and receiving products to marketing firms that are receiving printed materials through a courier. The network will support business activities and support planned employment growth areas in Hamilton.
Healthy & Safe Communities	Is a safe and supportive city where people are active, healthy, and have a high quality of life.	Consideration will be given to avoiding areas with a high density of vulnerable users (e.g. seniors), sensitive receptors (e.g. schools), and unprotected cycling facilities.
Clean & Green	Hamilton is environmentally sustainable with a healthy balance of natural and urban spaces.	Council declared a “Climate Emergency” in March 2019. Ways to reduce emissions associated with trucks will be explored, such as electric trucks or urban consolidation centres.
Built Environment & Infrastructure	Is supported by state-of-the-art infrastructure, transportation options, buildings and public spaces that create a dynamic city.	The study will aim to move goods efficiently by truck, while recognizing that many corridors in Hamilton are also planned to support other modes, such as cycling and rapid transit. Reducing impacts, both safety and quality of life, will be considered.
Culture & Diversity	Is a thriving, vibrant place for arts, culture, and heritage where diversity and inclusivity are embraced and celebrated.	The plan will aim to not unduly impact any group or groups of people in Hamilton. Instead, the study will try to balance competing needs to ensure that neighbourhoods and communities can thrive and provide opportunities for interaction.

Exhibit A.2: Policy Areas of the *Urban Hamilton Official Plan* and *Rural Hamilton Official Plan*

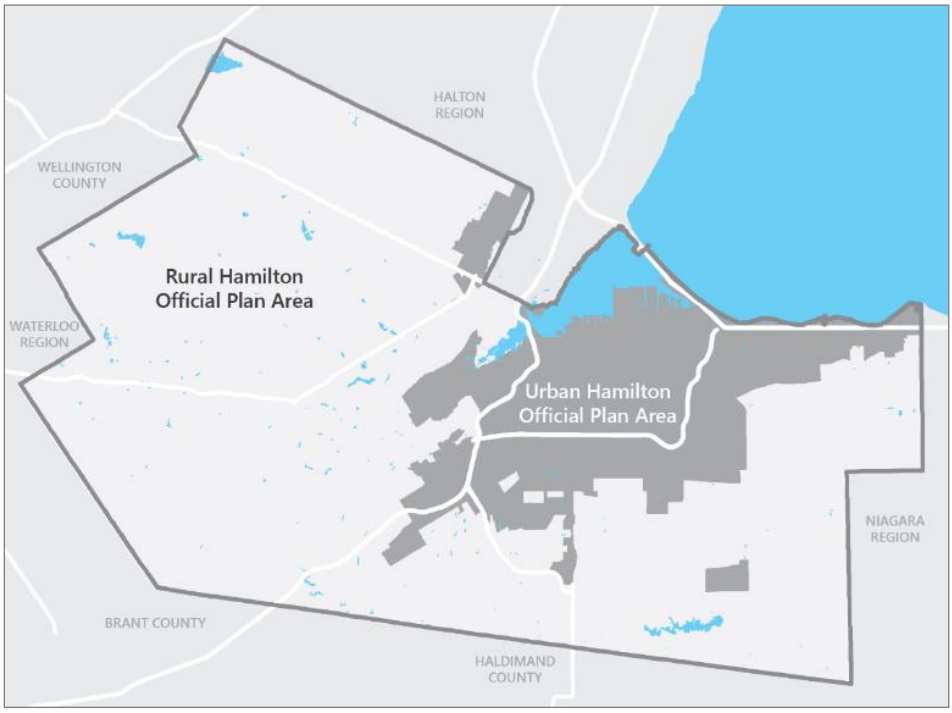


Image Source: Created using Hamilton Open Data

Goods Movement Network

Overview: The Goods Movement Network chapter notes that the following corridors and facilities form Hamilton's goods movement network:

- Provincial highways;
- The road network;
- Rail corridors and facilities;
- John C. Munro Hamilton International Airport; and
- The Port of Hamilton.

The plan states that the variety of corridors and facilities within the network make Hamilton an ideal place for a "goods movement gateway" to link into the wider inter-regional, inter-provincial, and international networks. Within the chapter, a key policy states:

> "The goods movement network in Hamilton shall be maintained, protected and enhanced to support Hamilton's economic development strategy" (C4.6.1).

Policy C4.6.2 of both plans permits the City to implement a truck route network, stating:

> "Heavy truck traffic may be restricted to designated truck routes to minimize negative impacts of truck traffic on local roads."

Relevance: The goods movement network content highlights three considerations for this study:

1. The policy notes the need to "maintain" the goods movement network. The issue of pavement quality on some roadways has been mentioned during

conversations with the trucking industry. The TRMP should give consideration to road maintenance levels, particularly if poor quality roads lead truck drivers to divert from the designated network.

2. The policies identify major freight generators that need to be connected: the airport, the port, and the rail yards. The TRMP needs to ensure that there are links provided to all of these sites.

3. **The Official Plan states that trucks need to be restricted to designated truck routes to minimize negative impacts from truck traffic on local roads**. This speaks to the need to protect road infrastructure that is not built to withstand heavy truck loads, but also highlights the need to avoid truck traffic on local roads with sensitive adjacent land uses, whenever possible. Community concerns have been raised about truck traffic throughout the City, including downtown, on the Mountain, the outlying areas and the countryside. The TRMP will need to consider how trucks are perceived in all of these communities to align with the intent of the policy.

Urban Hamilton Official Plan Roadways

Overview: The UHOP states that the road network will "provide a reasonable level of service while balancing the needs of all road users and vehicles, for the efficient movement of people and goods."

It also outlines a functional road classification framework and the associated operational policies. Those policies relevant to the TRMP are summarized in Exhibit A.3.

Exhibit A.3: Summary of Municipal Functional Road Classification Policies in the *Urban Hamilton Official Plan*

Class	Function and Relevant Policies	Truck Restrictions
Parkways	Carry relatively high volumes of intra-municipal and inter-regional traffic through the City: C.4.5.2.b.i	No restrictions noted.
Major Arterial	Carry relatively high volumes of intra-municipal and inter-regional traffic through the City in association with other types of roads: C.4.5.2.c.i	No restrictions noted.
Minor Arterial	Carry moderate volumes of intra-municipal and inter-regional traffic through the City in association with other types of roads: C.4.5.2.d.i	No restrictions noted.
Collector	Equally shared between providing direct land access, and the movement of moderate volumes of traffic within and through designated Employment or Neighbourhood Areas: C.4.5.2.e.i.	Trucks will generally be restricted from collector roads, except in designated Employment Areas: C.4.5.2.e.v
Local	Provide direct land access, while the secondary function shall be to enable the movement of low volumes of traffic to collector roads: C.4.5.2.f.i	Trucks shall be restricted from local roads, except for local deliveries and in Employment Areas: C.4.5.2.f.iv

Relevance: The UHOP functional classification policies provide direction on what links can and cannot be considered as part of the truck route network. All Parkways, Major Arterials

and Minor Arterials will be considered within the context of the TRMP, and Collector and Local links will only be considered within Employment Areas, except when needed for local deliveries.

Rural Hamilton Official Plan Roadways

Overview: The RHOP provides a functional roadway classification hierarchy for municipal roadways (listed in Exhibit A.4) and the assignment of roadways within the designated area. Unlike its urban counterpart, the rural structure only has three classes of roadways, and there are no policies that explicitly restrict truck access within any class.

Exhibit A.4: *Rural Hamilton Official Plan* – Summary of Municipal Functional Road Classification Policies

Class	Function and Relevant Policies	Truck Restrictions
Arterial	Carry relatively high volumes of intra-municipal and inter-regional traffic through the rural area in association with other types of roads: C.4.5.2.b.i Paved shoulders may be provided to accommodate farm vehicles and equipment: C.4.5.2.b.v	No restrictions noted.
Collector	Equally shared between carrying moderate volumes of intra-municipal and inter-regional traffic through the rural area, and providing direct land access: C.4.5.2.c.i	No restrictions noted.
Local	Providing direct property access, while the secondary function is to move low volumes of traffic to collector roads.	No restrictions noted.

It should be noted that many of the roadways in the rural area are reduced-load roadways from March 1 to April 30.

Relevance: Based on the roadway classification policies, any roadway within the rural area can potentially be part of the truck route network. When comparing the existing network to the of the rural roadway classification, it is apparent that existing links in the area tend to be those classified as arterial roads. Consideration will also be needed regarding seasonal reduced-load roadways to ensure that the network provides adequate truck route alternatives year-round.

A.1.3 Hamilton Transportation Master Plan Update (2018)

The Transportation Master Plan (TMP) is a City-wide planning document that outlines how the transportation network will meet the demands of the 2031 planning horizon. The plan was endorsed by City Council in August of 2018. The discussion below highlights two elements of the TMP and discusses how they relate to the TRMP update.

Master Plan Report

Overview: The TMP's Vision is to:

> "provide a comprehensive and attainable transportation blueprint for Hamilton as a whole that balances all modes of transportation to become a healthier city. The success of the plan will be based on specific, measurable, achievable, relevant and programmed results."

The plan identifies three desired outcomes for the future transportation system:

1. **A Sustainable and Balanced Transportation System** that will enable the achievement of Hamilton's economic, social and environmental goals;
2. **Healthy and Safe Communities**, enabled by a transportation system that encourages active lifestyles, provides safe movement of people, and reduces dependence on (single-occupant vehicles) (SOVs); and
3. **Economic Prosperity and Growth,** enabled by a transportation system that provides efficient access for industries and businesses to markets, employees, suppliers and customers.

A key component of the plan is the adoption of complete-liveable-better (CLB) streets. CLB streets are an approach to right-of-way-design that aims to balance "the needs of all uses and users, regardless of age, ability or mode of transportation in an equitable manner." It represents a shift from traditional street design approaches that focus on traffic throughput. It should be noted that the CLB streets do not supplant the functional road classifications in the UHOP and RHOP, but provide additional multi-modal design guidance.

The plan notes that in a survey of goods movement stakeholders, 90% of them identified that the current network accommodates trips "well" or "good with some issues". In terms of selecting a preferred route, 37% of them identified that "safe and efficient travel" was the most important factor to them. The TMP notes that through consultation with BIAs and the public, they heard that there is "difficulty in balancing the goods movement needs of business stakeholders, and it is recognized that this will be an ongoing challenge to work on various appropriate solutions."

It identifies an update to the TRMP, this study, as one of its short-term actions.

Relevance: The TMP places a heavy emphasis on the health and safety of residents, while trying to balance travel demand. Within the context of the TRMP, it is apparent that incorporating public health and environmental considerations will be central to the success of the TRMP in supporting the desired TMP outcomes. The importance of transportation to economic prosperity will also come to be a major factor, particularly for planned development in employment areas.

Goods Movement Review Background Paper

Overview: The *Goods Movement Review* (September 2015 by David Kriger Consultants Inc.) was prepared as a background paper to the TMP study. The paper summarizes the policy context of goods movement in Hamilton, including municipal, provincial and federal policies, and explores three topics areas: updated policy for goods movement in Hamilton for consideration within the TMP update; opportunities and issues within the existing truck route network; and how to integrate goods movement into Complete Streets.

The first topic explores updated TMP Goods Movement policy in terms of a Vision, Goals, and Policies and Actions. Building on Halton and Metrolinx' vision statements, it offers a possible goods movement vision statement for consideration within the TMP update process:

> The City's multi-modal transportation network is **safe**, **economical**, **reliable**, **efficient**, and **environmentally sustainable**.

> Within Hamilton, goods movement is widely recognized as an essential contributor to the economic, social, and environmental well-being of residents and workers, and to the promotion of a strong and vibrant economy.

Like Halton's vision statement, the draft vision includes five key words that are meaningful to goods movement stakeholders:

- **Safe**, for all users;
- **Economical**, to build and maintain, as well as use;
- **Reliable,** through the inclusion of network redundancy if a link is blocked and it has adequate capacity;
- **Efficient,** through direct and fast connections with and between goods-generating land uses and the broader transportation network; and
- **Environmentally sustainable,** in that goods can use technologies, modes and logistical practices to minimize adverse environmental impacts.

The paper also recommends six goals to support the vision:

- "Support the development of a road network that provides direct connections between goods-generating land uses and the major multi-modal transportation system and inter-modal terminals.
- Support the economic aspirations of the City's key inter-modal hubs – the Port of Hamilton and Hamilton International Airport – through the continued development of these hubs as key employment centres.
- Remove bottlenecks and aims to provide congestion-free journeys for the movement of passengers and goods, maintaining adequate levels of service for all users as the City's population and employment grows.
- Promote freight-friendly land use planning, consistent with Official Plan goals.
- Work with other municipal and senior governments to ensure that the City is well connected with other regions in south-central Ontario and into the United States; in particular, to provide the appropriate connections and eliminate bottlenecks beyond the City's boundaries.
- Ensure that the private sector goods movement community is engaged throughout all planning and policy development processes, so that their needs can be met and so that they also can contribute meaningfully to the development and implementation of solutions, to the common benefit of all."

The second topic of the paper is a review of the existing truck route network, identifying specific issues to address as part of the TRMP update, as listed in Exhibit A.5. The plan also recommends using GPS trace data to provide insights into how trucks use the network.

Exhibit A.5: Summary of Topics to Address in TRMP Update, as Noted in the *Goods Movement Review Background Paper*

Issue	Location	Description
Connection	Red Hill Business Park (ORC Lands) to the Airport	Need to identify a truck route in order to connect the Red Hill Business Park (ORC Lands) along the Nebo Rd./Glover Rd. corridors, which are designated as a business park in the Urban Official Plan. The closest existing route, White Church Rd., is a truck route for specific users only.
Gap	South Glanbrook	Similar to the above point, examine additional truck route links among corridors in the general area bounded by Upper James St. in the west, Upper Centennial Pkwy. in the east, Rymal Rd. in the north, and White Church Rd. in the south. This gap makes it challenging to access Hwy. 65 to Niagara.
Connection	Truck Routes through Lower City	Only two corridors traverse the entire Lower City and connect to the provincial freeways: Main St. – Queenston Rd. King St. – Cannon St. – King St. (reverts to Cannon St. from Victoria St. and Queen St.). There are some partial east-west routes, but these also stop at the CBD: Barton St. east of Wellington St. Burlington St. connects to the QEW, but stops at Wellington St. It also identified the need to consider north-south routes in the downtown.
Gap	Port-to-Rail Connections	There is a need to consider how best to serve the former Stelco industrial lands at the Port of Hamilton, north of Industry Dr./Burlington St. Existing heavy industrial activities and new types of employment need to be served.
Connection	Future N-GTA Corridor	There is a need to consider truck routes to serve the eventual Niagara to GTA corridor from Highway 403 into Niagara.
Connection	Airport to Port	Need to maintain connections with each other, the major transportation network and other goods-generating centres.

The final topic of the paper discusses how truck routes, rapid transit and Complete Streets can be integrated. With respect to rapid transit, it notes that there can often be incompatibilities between truck routes and rapid transit corridors, and that many design issues (e.g. turning movements) will only become apparent once detailed planning and design is underway. Using the Hurontario LRT as an example, it suggests that parallel routes need to be provided to provide access to new generators that may otherwise be encumbered by operational or design restrictions imposed by rapid transit.

From a Complete Streets perspective, the paper provides six recommendations to incorporate goods movement into complete streets guidelines:

- Allow for a broad designation of “major truck streets”;
- Develop guidelines for designating “major truck streets”;
- Accommodate curbside and other operational improvements;
- Ensure urban design accounts for couriers/express delivery;
- Develop guidelines for LRT corridors; and
- Incorporate freight-friendly practices in land use plan development.

It notes that many Complete Streets designs have given less attention to accommodating trucks and delivery vehicles than to other modes. It notes that a number of Complete Streets design elements can pose issues for goods movement including curb extensions (can block truck access), roundabouts (can be difficult to manoeuvre), and curb-side bike lanes (creates a conflict when operators have to cross lanes when making deliveries). To overcome this, the paper discusses design-focused recommendation that the City should incorporate when it develops complete-liveable-better streets guidelines.

Relevance: The background paper provides three insights for the TMRP Update:

- It suggests a vision, goals and policies for goods movement within Hamilton that should be considered when developing policy for the Truck Route Master Plan and network;
- It outlines some key issues to explore, including existing deficiencies within the network (e.g. south Glanbrook) and other emerging network considerations (e.g. N-GTA Corridor); and
- It suggests design-specific elements that should be examined as part of the Stage 2 policy design work, and should be considered by the City as it develops its complete-liveable-better streets guidelines.

Emerging Technologies Policy Background Report

Overview: New technologies are disrupting how people and goods move. This background paper discusses emerging transportation technologies and how the City can prepare to respond to them:

- **The Sharing Economy** uses peer-to-peer and on-demand systems to allow people to use mobility when they need it. The sharing economy has created new a new “shared market” for transportation infrastructure and services, including carshare, bikeshare, micro-transit and transportation network companies (TNCs). In the longer-term, the shared economy may impact how automobile ownership rates.
- **The Internet of Things (IoT)** is the automated machine-to-machine transfer of data through networks between devices. From a transportation perspective, the new data may be used to influence better travel choices within cities. The report notes that the IoT is an enabler for a number of related services, including:
- **Smart Cities,** which can leverage the IoT to “address transportation problems and envision bold new solutions that could change the face of transportation in Hamilton.”
- **Mobility-as-a-Service** (MaaS), wherein ownership of transportation assets (e.g. automobiles, bikes) is replaced with on-demand, integrated solutions that allow travellers to borrow assets as needed (e.g. bikeshare, carshare.) It notes that there has been a trend within the auto industry to partner with established MaaS service providers or to develop their own.
- **Big Data**, that can be used to improve the quality of city services and increase responsiveness. This can be done by using data to find answers that enable cost and time reductions, new product development, system optimization and to

inform smart decision making. While storing and analyzing data is not a new concept, big data looks beyond traditional structured data sources (e.g. data that can stored in a traditional database), and instead looks to using unstructured data sources that have traditionally been overlooked. A key concept of big data is that it's not how big the data source is, it's how you use it.

- **Connected and Autonomous Vehicles,** which are discussed as an opportunity to improve roadway safety. Connected vehicles share data between vehicles, infrastructure and mobile devices to give drivers the information they need to drive more safely. Autonomous vehicles rely on real-time systems and analysis to sense their environment and navigate without human input, such as cruise control, pre-collision braking, parking assist, and adaptive cruise control. It references the Society of Automotive Engineers (SAE) Levels of autonomy (Exhibit A.6) and discusses that near-fully self-driving cars and trucks are being tested on public roads around the world.
- **Drones for Freight Delivery** can leverage the IoT to make short-distance deliveries of goods. The paper notes that DHL, Amazon and UPS have conducted pilots of them. It notes that challenges and opportunities that these technology face include regulatory use issues in urban areas, availability of delivery space in multi-story buildings, perceived or real safety and security concerns, and land use changes due to smaller urban freight distributions centres.

Exhibit A.6: Society of Automotive Engineers (SAE) Levels of Autonomy[5]

Level	Name	Steering and Acceleration	Monitoring of Driving Environment	Fall-Back Performance of Dynamic Driving Task	System Capability (Driving Mode)
Human driver monitors the driving environment					
0	No automation	Human driver	Human driver	Human driver	n/a
1	Driver Assisted	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Automation	System	Human driver	Human driver	Some driving modes
Automated driving system monitors the driving environment					
3	Conditional Automation	System	System	Human driver	Some driving modes
4	High Automation	System	System	System	Some driving modes
5	Full Automation	System	System	System	All driving modes

The report documents a number of initiatives that the City, Province and other municipalities have undertaken to support emerging technologies. Examples include

[5] Adapted from City of Hamilton Transportation Master Plan Review and Update: Emerging Technology Policy Background Paper (n.d.)

Hamilton's new automated traffic management systems, the City of Toronto commissioning a discussion paper on the immediate policy issues of emerging technologies, and MTO AV testbeds on public roads. The report identifies a key role for Metrolinx to "watch for emerging trends, and to consider their potential impact on transportation in the GTHA."

Relevance: Emerging technologies present opportunities and risks that the City and Province will need to address (Exhibit A.7). Within the realm of truck movements, connected and automate vehicles present a number of opportunities including safer roadways due to automated monitoring of the driving area, improved system efficiency, improved enforcement of the truck route network and greening technologies from increased fuel-efficient driving.

One opportunity is truck cooperative truck platooning, wherein a number of trucks equipped with specialized equipment to communicate together drive as one group. In January 2019, MTO launched a pilot to allow the testing of cooperative truck platooning with a driver present in each vehicle, under specific conditions, along specified routes, the closest to Hamilton being on Hwy. 403 from Oak Park Road (Brantford) to Oxford Road 55 (Woodstock). MTO states that cooperative platooning has the potential to improve traffic flows while driving economic growth and investment.

In contrast, connected and automated trucks due pose a risk to cause disruption of the labour force, similar to what has been seen in the taxi industry with the rise of transportation networking companies like Uber and Lyft. Similarly, jurisdictions need to begin to plan for a future with automated trucks and what steps they need to prepare for them. For instance, the City of Toronto has developed an interdivisional Connected and Automated Vehicle Working Group, that prepared an Automated Vehicle Tactical and Readiness Plan, including on the potential uptake of automated goods movement vehicles.

Exhibit A.7: Risks and Opportunities of Emerging Technology[5]

Opportunities	Risks
• Safer roadways • Improved incident and emergency response • System efficiency • Dynamic pricing • Parking efficiencies (lower parking requirements – more developable space) • Greener technologies with less environmental impacts • Dynamic messaging (traveller information) • Improved enforcement • Providing and facilitating convenient modal choices for citizens	• Labour force disruption • Cyber security • Not being prepared • Competition to traditional local transit service • AV induced sprawl • No-occupancy vehicles • Decrease participation in active transportation

Road Safety Background Paper

Overview: The Road Safety Background Paper was prepared to inform the roadway safety policies and actions within the TMP. It discusses why road safety is such an important component of transportation planning, design and operations. Providing safe streets is supportive of the City's vision "to be the best place to raise a child and age successfully" by enabling opportunities for people to be active, healthy and have a high quality of life.

The plan notes that the City adopted the Hamilton Strategic Road Safety Program in 2007, which established the following vision:

> To make roadways throughout the City of Hamilton the safest throughout North America and to address safety for ALL road users, including vulnerable road users such as seniors and children and to reinvest Red Light Camera (RLC) revenue into safety initiatives in the Community.

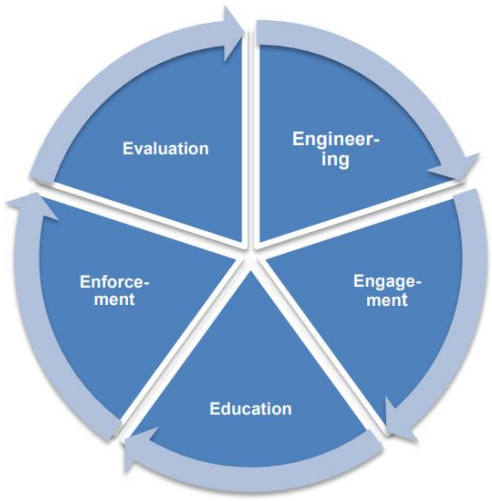
It notes that there are approximately 3,680 collisions each year in Hamilton, of which 11% involve vulnerable road users, which in the context of this analysis includes pedestrians and cyclists. From an ethical and societal cost perspective, any fatality or sever injury is unacceptable. The paper explores the safety in numbers theory which states that as the number of cyclists and pedestrians on the road increase, these vulnerable road users will feel safer and more secure. The decrease in collisions is a result of improved infrastructure and from motorists adjusting their behaviour when more active travellers are on the road, which may include decreasing speed, checking blind spots and making eye contact.

The paper recognizes that the City has undertaken a number of initiatives to improve road safety over the past two decades, but that more needs to be done to eliminate injuries and fatalities. It recommends that the City adopt a Vision Zero approach into design guidelines. Vision Zero is a proactive approach to road safety with the goal of zero fatalities or serious injuries on road, and places safety over transportation operations and convenience. The elements of Vision Zero are summarized in Exhibit A.8.

The overall approach focuses on addressing:

- Fatalities and serious injuries;
- Flaws in the transportation system as cause of collisions;
- Perfecting road systems for imperfect human behaviour; and,
- Safety initiatives to reduce societal costs.

Exhibit A.8: Elements of Vision Zero



Engineering: the design, construction and operation of roadway assets including roads (including pedestrian and cycling facilities), bridges, culverts and tunnels. There are many design measures to improve safety ranging from low cost (e.g. leading pedestrian green) to high cost solutions (e.g. variable speed limits, Jersey jug intersection)

Engagement: enhanced community engagement is needed to create a safe roads culture and improve community safety.

Education: targeted and collaborative campaigns to address safety for all road users.

Enforcement: the strategic use of automated and manual enforcement resources to maximize compliance with traffic laws (e.g. speeding).

Evaluation: data-driven approach to identify challenges on the local road network.

Source: Adapted from City of Hamilton Transportation Master Plan Review and Update: Road Safety Policy Background Paper (n.d.)

The report recommends that the City:

- Integrate the goals and principles of Vision Zero into the CLB streets design manual and Engineering Guidelines;
- Establish a Vision Zero Task Force that includes multiple partners, leaders, public and private businesses, school boards and public health as a subcommittee to the Hamilton Strategic Road Safety Committee;
- Implement a comprehensive collision data collection system integrating multiple modes of transportation and overlaying built environment data; and,
- Apply speed reduction techniques through the implementation of CLB streets as well as through other opportunities such as the introduction of protected cycling facilities.

Relevance: Roadway deaths are one of the largest public health and injury prevention problems, and one that can be addressed through thoughtful design and planning. Understanding where safety concerns exist, based both on data and through public consultation, will play an important role in developing the truck route network. As part of the ongoing development of the City's CLB design manual, the City should explore using different design vehicles based on the roadway typology.

Complete-Liveable-Better Streets Policy and Framework Background Paper

Overview: The City adopted a Complete-Liveable-Better (CLB) streets approach through the TMP update, its customized approach to complete streets. The approach "recognizes that no one-size-fits-all solution is appropriate for right-of-way design as different streets

can have different priorities." The report establishes nine principles for CLB roads in Hamilton:

- **Balanced:** Hamilton's streets will balance users' needs based on the vision for the street including planned ROW width, land use, densities and functional classification. Street design will prioritize the movement of people and goods. Streets will be designed to promote economic well-being of both businesses and residents. The City recognizes that some streets will be "more complete" than others, depending on the emphasis on walking, cycling, transit and goods movement.
- **Context Sensitive:** Hamilton's streets will be designed to be context sensitive. Not only infrastructure within the ROW but also adjacent land uses, primary function, natural features, local and regional destinations and built form, which vary along the street's length will be used to determine the final design of the street. Design excellence will be pursued throughout all corridor components from building face to building face.
- **Public:** The City recognizes that its streets provide an important public space opportunity. Planning and design decision will balance the desire to create an inviting, inclusive, healthy public realm that is people oriented while meeting the functional transportation needs of the street.
- **Place-Making:** Hamilton's streets are part of a place-making network that recognizes the unique characteristics of their respective neighbourhoods. They provide civic spaces that encourage social interaction and offer opportunities for public art, wayfinding and street furniture.
- **City-Building:** In its simplest form, Complete-Livable-Better Streets contribute to connecting a network of complete communities that offer opportunities for people of all ages, abilities and incomes to live, work and play within their own neighbourhood. Multiple modes, beyond the private automobile, will provide options for accessing various services and amenities.
- **Safe and Accessible:** Hamilton's streets will be planned and designed to accommodate people of all ages, abilities and incomes will be examined against the principles of Crime Prevention Through Environmental Design.
- **Green:** Hamilton's streets form as much as 20 to 30 percent of land within the city. They will be used as an opportunity to showcase sustainable design. Opportunities including low-impact green technologies and methods such as pervious pavements, bioswales, rain gardens to manage stormwater and provide shade, and contemporary planting techniques, will be encouraged as well providing an opportunity for alternative forms of transportation that are environmentally friendly.
- **Realistic:** The ability to realize a network of Complete-Livable-Better Streets will be based on a clear and accountable decision-making process and a realistic, specific, measurable, achievable and cost-effective implementation plan.
- **Cost Effective:** The City of Hamilton recognizes that its streets play a key role in economic growth and provide a physical framework for successful urban development. Streets will be designed with an understanding and appreciation of

costs associated with a street's lifecycle including design, operation and maintenance. Materials and the device type will be chosen appropriately to promote long term benefits and fiscal responsibility (e.g. lifecycle costs).

The plan also establishes a CLB Streets Typologies framework that is intended to better meet the context sensitive nature of the road network. It is not meant to supplant the City's functional road classification. An extensive typology toolkit is included, which identifies the primary transportation function, how different modes are accommodated within each one, and preliminary design guidance for road and boulevard elements. The primary function and role of goods movements within each typology is shown in Exhibit A.9.

Exhibit A.9: Primary Transportation Functions and Role of Goods Movement in CLB Typology Toolkit[6]

Typology	Primary Transportation Function	Role of Goods Movement
Urban Avenues	Transit priority, active transportation priority, vehicular movement	Limited goods movement corridor. Ideally restricted to off-peak and/or weekends.
Transitioning Avenues	Transit priority, active transportation priority, vehicular movement	Supports goods movement.
Main Streets	Active transportation supportive, transit supportive, vehicular movement	Limited goods movement corridor. Ideally restricted to off-peak and/or weekends.
Connectors	Goods movement priority, transit priority, active transportation supportive, vehicular movement	Primary goods movement corridor.
Neighbourhood Streets	Vehicular movement, active transportation supportive	Does not support goods movement.
Rural Road	Vehicular movement, goods movement, active transportation supportive, agricultural movement *The toolkit identifies that this includes roads in industrial areas within the urban boundary.*	Primary goods movement corridor.
Rural Village	Vehicular movement, active transportation supportive	Supports goods movement.

Relevance: CLB streets are a cornerstone to Hamilton achieving its vision for transportation in Hamilton and is fundamental to achieving the vision. As of April 2020, a separate study is underway to develop CLB Design Guidelines. It will be important to coordinate between the two studies to understand what emerging recommendations from that work may impact the suitability of different roadways being selected for truck routes.

Cycling Master Plan Review and Update

Overview: The Cycling Master Plan Review and Update (CMP) was the first review of 2009's Shifting Gears: Hamilton Cycling Master Plan. The review integrates the proposed CLB typologies developed as part of the TMP (Exhibit A.10). Generally, all the roadway typologies are expected to provide dedicated cycling facilities, with the exception of

[6] Adapted from City of Hamilton Transportation Master Plan Review and Update: Road Safety Policy Background Paper (n.d.)

Neighbourhood Streets, which will not support goods movement, and Rural Road (including industrial roads) which could either provide a dedicated facility (multi-use trail) or a paved shoulder.

Exhibit A.10: Potential Cycling Facility by CLB Street typology

Typology	Potential Cycling Accommodation
Urban Avenues	Dedicated cycling facility (e.g. bicycle lane, cycle track, multiuse trail)
Transitioning Avenues	Dedicated cycling facility (e.g. bicycle lane, cycle track, multiuse trail)
Main Streets	Dedicated cycling facility (e.g. bicycle lane)
Connectors	Dedicated cycling facility (e.g. multi-use trail, cycle track, bicycle lane)
Neighbourhood Streets	Shared on-road facility (e.g. range of bicycle boulevard treatments)
Rural Road (including industrial roads)	Paved shoulder for cycling or multi-use trails
Rural Village	Dedicated cycling facility (e.g. bicycle lane, shared on-road facility or multi-use trail)

The 2009 CMP cycling network and project prioritization framework were reviewed and updated based on consultation activities undertaken as part of the TMP. The updated plan calls for the network to expand by 553.7 km, made up of new bike lanes (227.2 km), paved shoulders (195.1 km), signed routes (48.6 km) and multi-use trails (82.7 km). Project prioritization is also reviewed and update using a weighted formula based on continuity, safety, demand, cost and property requirements. The projects and their prioritization are shown in Exhibit A.11 (Full City) and Exhibit A.12 (Urban Area).

From a safety perspective, there were 6.47 collisions per 100,000 bike trips, based on 2010 to 2015 data. Highlights of cycling safety data reveals that:

- Intersections continue to be the most dangerous element of any cycling trip; 63% of all reported collisions occur at intersections;
- The total number of reported collisions involving cyclists has increased slightly from an average of 155 per year (1998-2007) to 160 per year (2011-2015) at the same time as cycling ridership is increasing; the collision rate is therefore relatively stable. It is also recognized that the reporting of collisions may be an inconsistent practice;
- The annual average cycling fatality frequency has decreased from an average of 1.2 per year (1998-2007) to 0.6 per year (2011-2015) even as cycling ridership increases; therefore, a trend in the direction of Vision Zero; and
- The City also monitors reported “dooring”. Between 2011 and 2015, the annual average “dooring” occurrence was 3.4 such collisions per year being reported.

Similar to the Road Safety Policy Background Paper (see above), the CMP supports adoption of a Vision Zero approach and the safety in numbers theory.

Exhibit A.11: Existing and Planned Cycling Master Plan Network - Full City.

Refer to Cycling Master Plan for project numbering.

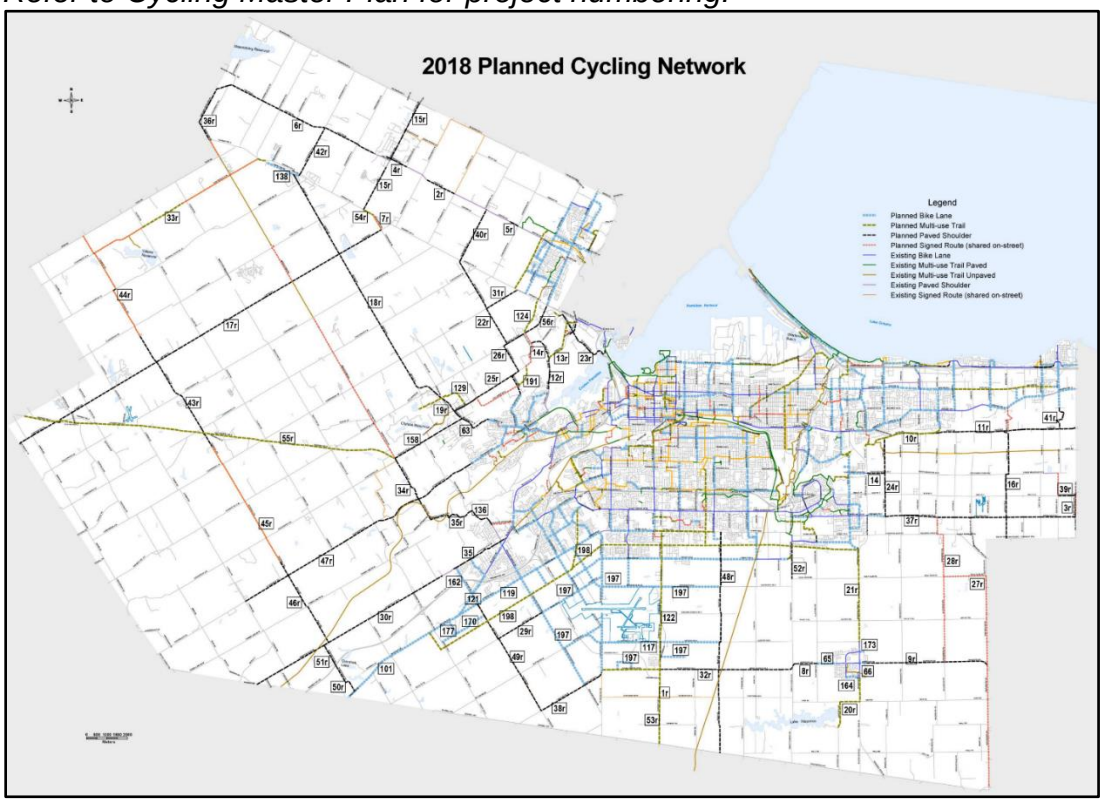


Image Source: Hamilton Transportation Master Plan: Cycling Master Plan Review and Update (2018)

Exhibit A.12: Existing and Planned Cycling Master Plan Network - Urban Area.

Refer to Cycling Master Plan for project numbering.

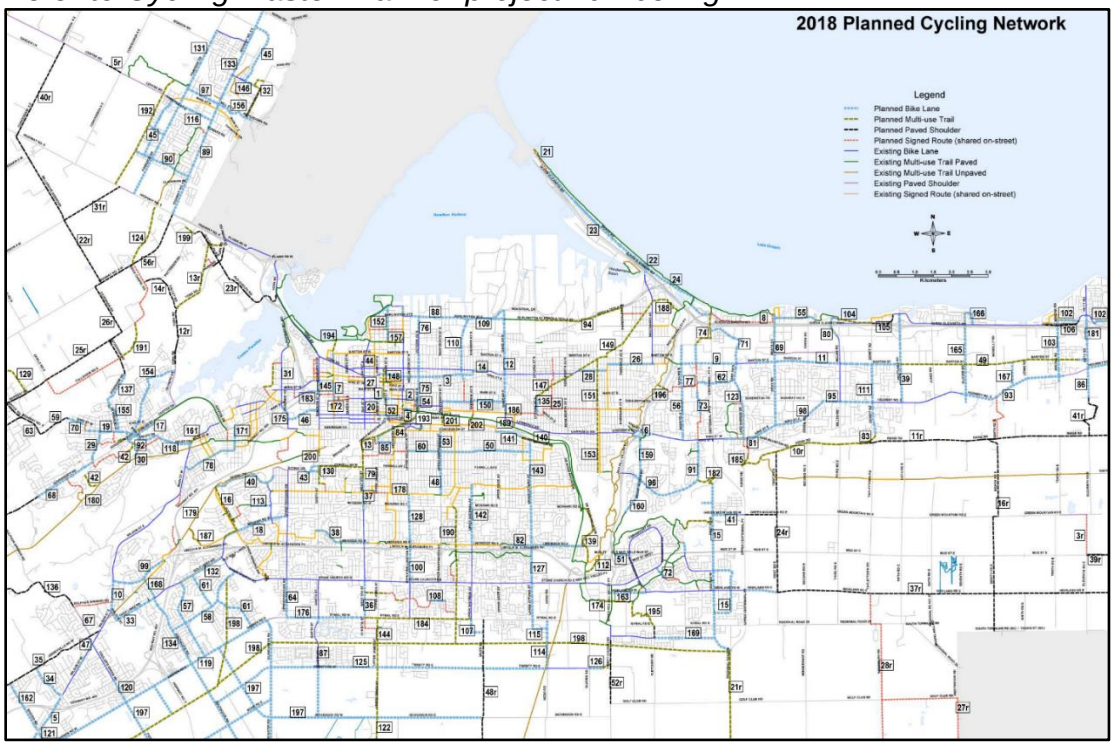


Image Source: Hamilton Transportation Master Plan: Cycling Master Plan Review and Update (2018)

Relevance: A challenge with Hamilton's broken grid road network is that there are few continuous east-west roads, particularly in the lower city. The few that do exist, such as the King/Main/Queenston corridor and Barton Street, are major transit corridors where accommodating trucks or cyclists can be challenging due to curbside demand of transit vehicles.

This has led to significant overlap between the planned cycling network and the existing truck route network. The community has raised concerns about the mismatch between truck routes and cycling facilities being located on the same road, such as on Cannon Street and King Street over Highway 403. Development the truck route network needs to take where cycling facilities are planned. However, given the limited road options in various areas in the city, conflicts between truck routes and cycling routes may remain.

Airport Employment Growth District Transportation Master Plan Update (2016)

Overview: The Airport Employment Growth District (AEGD) comprises 551 net developable hectares of employment lands adjacent to John C. Munro Hamilton International Airport. The lands are intended to offer a range of employment-related land uses, including prestige industrial, light industrial airport-related business and institutional development. It is anticipated that carriers may be interested in the AEGD given its proximity to the airport, which operates all-day and has no flight restrictions.

A Transportation Master Plan Update was undertaken in 2016 for the area to identify the necessary transportation infrastructure improvements required to support the 24,000 jobs that are expected to locate in the area. The plan recommends truck route connections (Exhibit A.13). All of the proposed connections in the area (e.g. Highway 6, Garner Rd., Carluke Rd., Upper James St.) are part of the existing network. However, it should be noted that the suggested routes on Dickenson Road and White Church Road are not part of the existing truck route network.

Relevance: The AEGD will become a major employment district in Hamilton, and given the expected land use, is anticipated to generate large volumes of truck traffic. The proposed truck route network in this plan provides guidance to the study team about how to meet the needs of the future businesses in this area.

Exhibit A.13: Airport Employment Growth District Transportation Master Plan: Truck Route Network

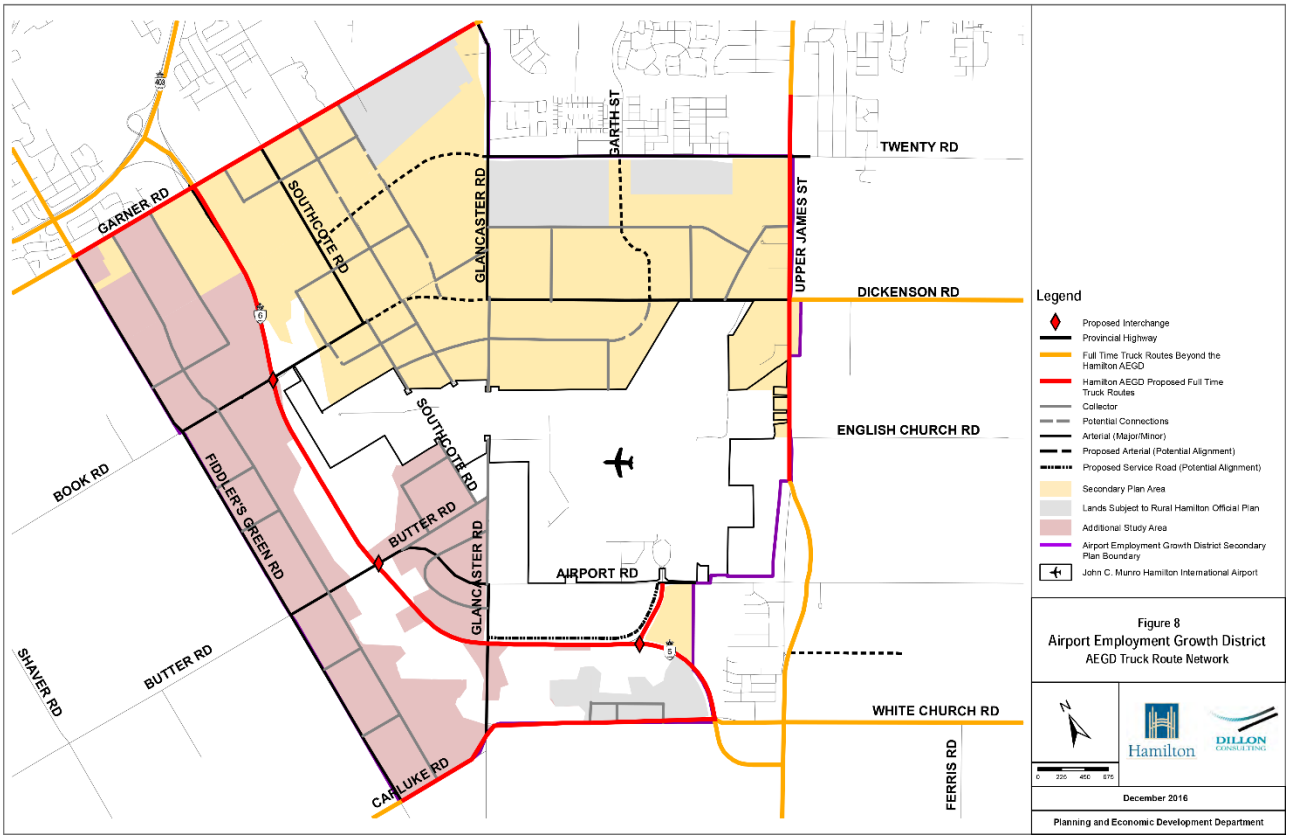


Image Source*: Airport Employment Growth District Transportation Master Plan Update* (2016)

A.1.5 Hamilton Goods Movement Study (2005)

Overview: The *Goods Movement Study* was used to inform the development of the City's 2007 *Transportation Master Plan*. The study noted the City's economic strengths were found in three economic clusters: manufacturing, agricultural, and port-related businesses. All three industries require some levels of goods movement on the road network, on trucks. The plan identifies a number of short- (5 year), mid- (5 to 10 year), and long-term (10 to 15 year) actions, focused on areas such as establishing the area now known as the AEGD land use planning, and expanding the labour force.

The plan identifies a number of focused transportation improvements (Exhibit A.14). Roadway improvements that are identified in the study include:

- Addressing congestion on Highway 403;
- Improving connections between Burlington St. and QEW;
- Increasing Highway 6 capacity; and
- Improving signage to the Port and Airport, particularly along the roadway.

Relevance: The study identifies policy improvements that should be investigated during Phase 2 of the TRMP study. Many of the recommended improvements, with the exception of connections between Burlington St. and the QEW, are issues that cannot be directly dealt with through network development. These are generally policy issues (e.g. signage), or topics that should be lobbied for to the Provincial government (e.g. freeway expansion).

Exhibit A.14: Goods Movement Study: Recommended Strategic Improvements

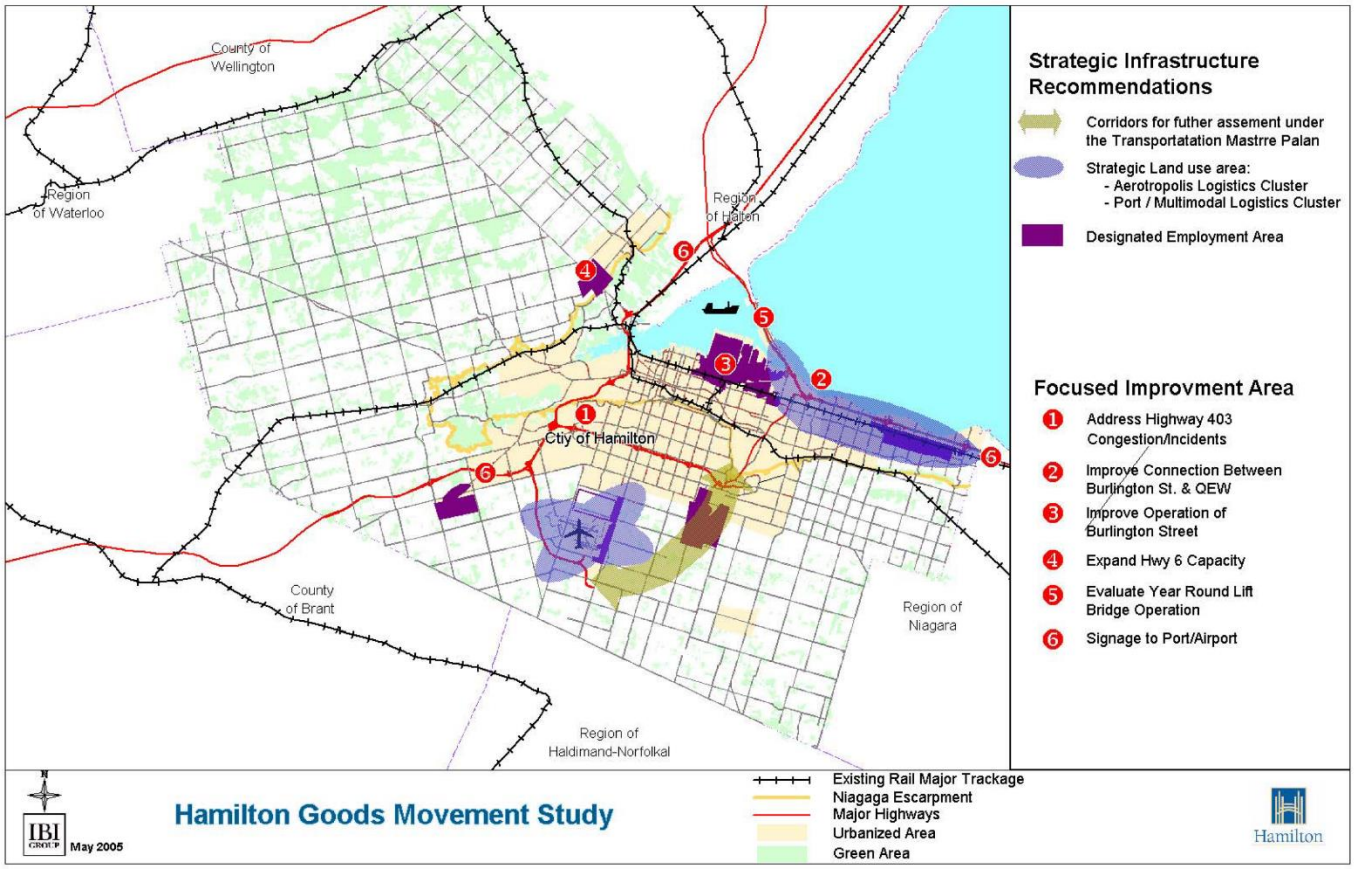


Image Source: Hamilton Goods Movement Study (2005)

A.1.4 Hamilton Truck Route Master Plan Study (2010)

Overview: The 2010 *Hamilton Truck Route Master Plan Study* provides a comprehensive, consolidated update to the truck route network. Furthermore, it provides recommendations for future action, policies for truck route signage, and a methodology for dealing with truck route network issues in the future.

The plan undertakes an extensive review of the (then) existing truck route network and identifies a set of links to be added and removed based on geographic sub-regions of Hamilton. The plan discusses how to manage the network, including considerations of time-of-day/time-of-year restrictions, engine break signage, enforcement, and restrictive signage policies.

In addition to network modifications, it contains recommendations, including:

- That all new arterial roads be included in the truck route network, unless reasonable justification can be provided to not do so;
- That improvements be made to existing roads, specifically White Church Road/Binbrook Road, to allow all trucks to use the link;
- No new part-time truck routes should be added, unless a full-time alternative would result in discontinuities;

- Existing restrictive signage should be grandfathered, and new restrictive signage on links that do not form the network should only be installed per the following process:
  - City of Hamilton staff to confirm history of complaints for the area;
  - City of Hamilton staff to perform field observations;
  - If there is a demonstrated need, install additional permissive signage to reinforce the designated routes;
  - If there is a demonstrated need, area to be targeted for police enforcement. City of Hamilton staff to liaise with police to monitor results of targeted enforcement; and
  - If all other treatments fail to improve the situation, implement restrictive signage.
- That enforcement should be handled by the Hamilton Police Services;
- The "Specified Users" classification should be removed from the network and By-law; and
- That signage explaining the permissive system should be posted at municipal borders and online.

Relevance: The study provides an overview on the evaluation methodology and considerations that went into creating the network and policies that are, primarily, in place today. The plan provides a foundation for the TRMP; however, the methodology and recommendations will need to be considered against the City's updated policy framework and stakeholder feedback.

A.2 External Other Studies

Additional studies and policies, published by external agencies that were reviewed include the following:

- Metrolinx Strategic Goods Movement Network (2018); and
- By-laws, Official Plans and Transportation Master Plans of the twelve jurisdictions that border Hamilton.

A.2.1 Metrolinx' *GTHA Strategic Goods Movement Network* (2018)

Overview: An action out of the 2010 Regional Transportation Plan led to the development of the 2011 Greater Toronto and Hamilton Area (GTHA) Urban Freight Study. A recommendation of that plan was to develop a *GTHA Strategic Goods Movement Network* (SGMN) (prepared by CPCS and David Kriger Consultants Inc. for Metrolinx, March 2018). The SGMN is a continuous network of multi-modal corridors that facilitates the movement of goods, and connects all major intermodal facilities (e.g. rail, marine ports, and airports) via a core network of road and rail links.

The Hamilton section of the SGMN (Exhibit A.15) is primarily composed of provincial highways and freeways (i.e. QEW, 403, Hwy. 5, Hwy. 6, Hwy. 8). It does include both municipal Hamilton parkways, as well as sections of Garner Rd. E./Rymal Rd. E., Upper James St. south of The Linc, Dartnall Rd., and sections of Hwy. 52 and Wilson St. that

connect to Highway 403. All of the links identified in the SGMN are part of Hamilton's existing truck route network.

Exhibit A.15: Metrolinx Strategic Goods Movement Network: City of Hamilton

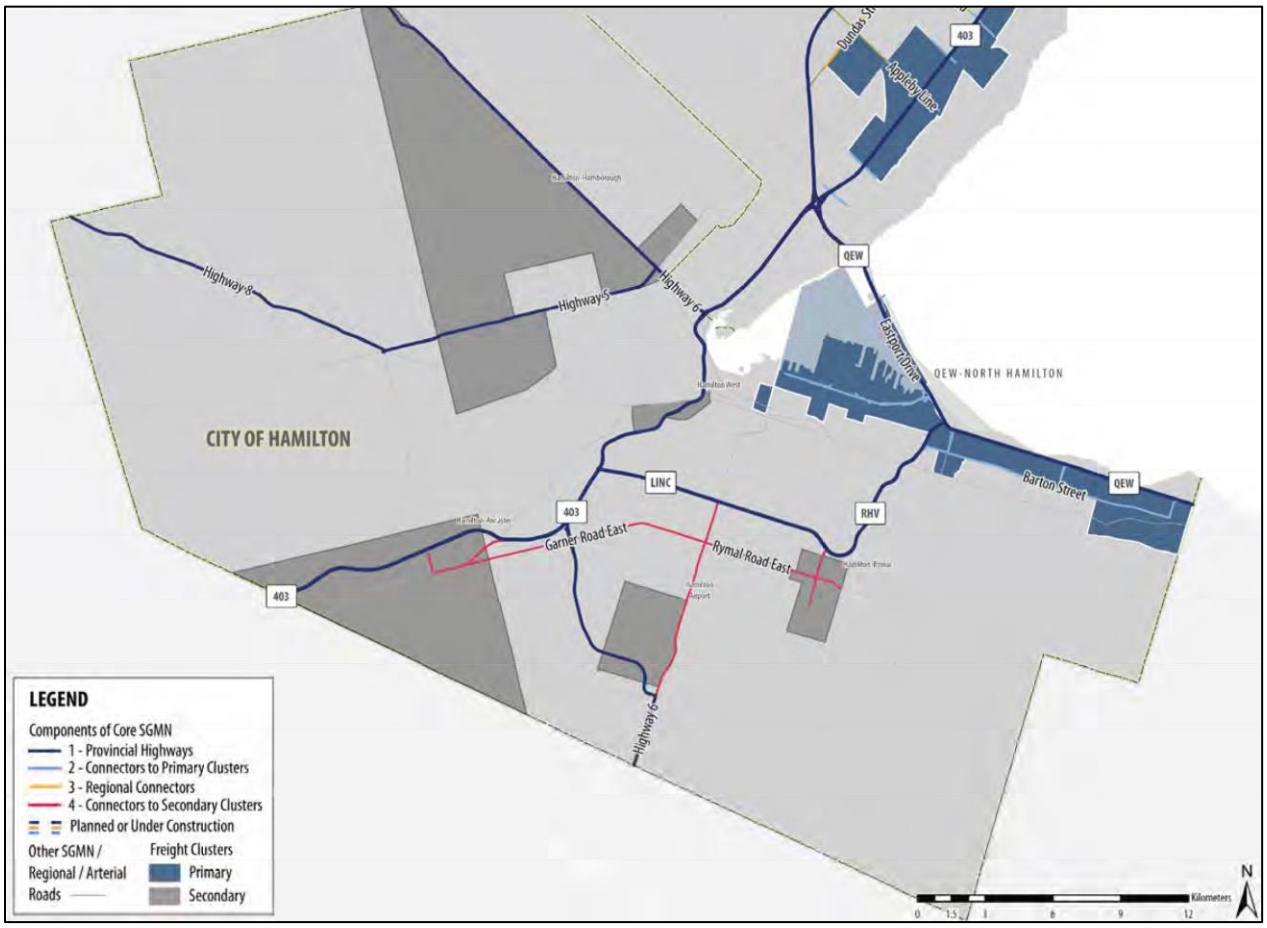


Image Source: *GTHA Strategic Goods Movement Network* (2018, Appendix B) - image quality as in original document

Relevance: The SGMN provides direction to the TRMP of regionally-significant links that should be incorporated into Hamilton's local network. While many of these links are provincially-controlled, the inclusion of municipal parkways and south mountain roadways shows that these roads are important to connect to secondary freight clusters in these locations. The TRMP should consider this within the development of the truck route network.

A.2.2 Truck Route Connections to Adjacent Jurisdictions

By-laws and policy documents of adjacent jurisdictions were reviewed to determine inter-municipal roadways that permit or restrict trucks. This is important to maintain regional consistency in the network and prevent "spurs" or "dangling links" at municipal borders. The results are summarized in Exhibit A.16 and shown in map form in Exhibit 3.5 (main report).

The review shows that both restrictive and permissive policies are in effect among the jurisdictions reviewed. In the Hamilton area, restrictive systems are dominant, particularly among the more urban and industrialized municipalities (e.g. Burlington, Milton, Waterloo Region). However, permissive networks are more common among rural and agricultural

municipalities, which may indicate the challenge of installing restrictive signage on rural roadways (e.g. Brant County, Haldimand County).

Anecdotal evidence from police has indicated that enforcement can be challenging at times as truck operators travelling between municipalities are not aware whether they should look for permissive or restrictive signage when navigating.

Exhibit A.16: Permitted and Restricted Links to Adjacent Jurisdictions

Jurisdiction	System	Permitted/Restricted Links	Reference Policy/Document
Ministry of Transportation of Ontario (MTO)	N/A	Permitted: All Provincial Highways (Hwy. 5, Hwy. 6, Hwy. 8, Hwy. 403, QEW)	N/A
Halton Region	Restrictive	Restricted: Derry Rd*; Campbellville Rd	Traffic and Parking By-Law 1984-1; consolidated to 29-18. (Schedules 24-26)
City of Burlington	Restrictive	**Restricted:** Lakeshore Rd; Spring Garden Rd, Hillsdale Ave, Oakdale Ave; York/Old York Rd; Snake Rd; Waterdown Rd; Kerns Rd; No. 1 Side Rd; Britannia Rd*; Kilbride St*	Traffic By-Law 86-2007, as amended by By-Law number 66-2008 (Schedule 16)
Town of Milton	Restrictive	**Restricted:** Conservation Rd, Side Road 3	Traffic and Parking By-Law 1984-1 (Schedule 25) and Staff Report ENG-008-08: Proposed No Heavy Traffic Regulations
Wellington County	Permissive	**Permitted:** County Road 35*	Official Plan Policy 12.5.3.a: “major roadways are expected to provide and serve high volumes of traffic including truck traffic”
Puslinch Township	Restrictive	**Restricted:** All (all Township roads have load restriction from Jan. 1 to Dec 31.)	By-Law 25/04 places a reduced load period on all of the Township’s highways and roads from January 1 to December 31
Region of Waterloo	Restrictive	**Restricted:** None	Traffic and Parking By-Law 16-023 (Schedule 19).
Township of North Dumfries	Restrictive	**Restricted:** Clyde Rd (east of Rd 27A)	Traffic and Parking By-Law 2559-13
Brant County	None	No links are explicitly restricted or permitted. However, a number of connecting County roads have Seasonal Load Periods, including Sawmill Rd, Lockie Rd, Glen Morris Rd, McLean School Rd, Howell Rd, Bethel Church Rd, and Jerseyville Rd.	Traffic By-law 182-05 identifies Reduced Load Periods.

Jurisdiction	System	Permitted/Restricted Links	Reference Policy/Document
Haldimand County	Permissive	**Permitted:** County Road 33; County Road 56; County Road 9	Heavy Truck By-Law No. 2079/19 (Schedule A)
Niagara Region	Restrictive	**Restricted:** None	Based on discussion in TMP, all arterial roadways allow trucks unless restricted.
Township of West Lincoln	Restrictive	**Permitted:** Ridge Road*	Official Plan Policy 14.5.3.b: Township Arterials are to "carry heavy volumes of inter-municipal traffic. Per OP Schedule F: No Township Arterial travel to Hamilton.
Town of Grimsby	Restrictive	**Restricted**: Kemp Rd*	Heavy Motor Vehicle Traffic By-law 16-34 (Schedule Y and Z)

* Indicates seasonal load restrictions (dates vary).

Appendix B: Detailed Public and Private Policy Review

The information in this Appendix was prepared in Fall 2020 as part of interim study report, and is based on current policies and understanding of study issues at the time of writing.

Appendix B: Detailed Public and Private Policy Review

B.1 Public Sector Policy Review

Exhibit B.1: Public Sector Policy Review

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
ECONOMIC PROSPERITY							
GOAL: ECONOMIC ASPIRATIONS							
1	Port Land Use Plans The growth at the Port of Hamilton demonstrates the demand for marine goods movement. However, access from the Port to Hwy. 403 requires travelling through residential areas or longer routes around the city.	The Port of Hamilton was identified as a major origin and destination for trucks, and an important terminal for bulk goods. Concerns were raised about trucks idling while they wait to enter the terminal. Stakeholders suggested that trucks going	**Port of Hamilton, Hamilton, Ontario**: An attribute that makes the Port of Hamilton such an enviable port and logistics hub is its proximity and direct connections to Ontario's 400-series freeway system. The Hamilton-Oshawa Port Authority (HOPA) will continue to work with the City and the Province to ensure that these connections continue to be robust and efficient goods movement corridors. The Port's primary access corridors include Eastport Drive in the east and Burlington Street/Nikola Tesla Boulevard in the central-west, both of which function well as primary port service routes and carry the vast majority of the trucks that service Port tenants and terminals. Research on best practices revealed a number of approaches that may be beneficial. These include signage at the terminals and on-roadway, identifying preferred routes, developed in consultation with area neighbours and implemented in partnership with the City, or maps for distribution and education and awareness initiatives to drivers, fleet managers, owners and facility managers.	Port of Hamilton Land Use Plan, Hamilton Oshawa Port Authority (2017)	• Coordination between City and HOPA	Based on the land use plans, the City needs to consider: • How to best accommodate goods movement from Highway 403 west corridor to port areas through downtown Hamilton; and, • Appropriate treatment required for employment lands which separate the port from the remainder of the city, as these lands may re-develop into other employment or non-employment uses.	The City should work with large goods movements generators (businesses/ports) to encourage the combination of loads to reduce the number of empty backhauls to minimize the number of heavy vehicles and more efficiently use inbound and outbound truck capacity. Develop a regular CV data collection program near the Port to support current and future transportation

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
		to/from HPA should only be accessing it via Burlington Street and Nikola Tesla Boulevard.	**Port of Vancouver Land Use Plan:** The Port of Vancouver is the largest port on Canada's west coast. The plan sets the goal for "Port Metro Vancouver [as] a leader in ensuring the safe and efficient movement of port-related cargo, traffic and passengers throughout the region." It states that it will aim to "[p]reserve, maintain and improve transportation corridors and infrastructure critical to moving goods and passengers to and through the port." Land-based truck goods movement is a key success factor for the Port, with provincial highways, regional roads and bridges, and municipal truck routes all having a role to play in facilitating the movement of goods by trucks. The Port states it will develop a "Smart Fleet Trucking Strategy" to help reduce the GHG intensity due to port operations. The plan recognizes that port operations will impact on- and off-site, including truck traffic, noise and emissions. The plan states that these impacts will be included in their Project Review Process, which most physical works on port lands go through.	Land Use Plan, Port Metro Vancouver (October 28, 2014)	• Co-operation with road authorities to create a coordinate truck network • Commitment to review new projects to offset impacts, when possible	The City should encourage the HOPA to develop a formal project review process, if one does not exist, which has mandatory community consultation for all major projects.	operation and infrastructure investment decisions, including queueing and staging near Port entrances by the time of day, and GPS trip traces and travel delay/times. Deploy technology to minimize wait time at points of entry (access) or to schedule arrival time windows. If demand warrants, consider implementing access fees to manage time of day distribution. More broadly, work with senior governments to examine the feasibility of Smart Port technology to enable more exact scheduling of intermodal exchange of commodities between ships and trucks, to reduce waiting and storage time.
			New York Port Master Plan 2050: The New York Port Authority oversees four containerized ports in the New York City Area. Forecasted growth is expected to exceed capacity by 2050 if nothing is done. To increase capacity, the plan calls for significant improvements to Port facilities. From a transportation perspective, while the plan calls for new and realigned roadways to help support increased truck demand, it anticipates that most growth will be accommodated through new and expanded ExpressRail intermodal hubs. These hubs will have satellite terminals where containerized goods will be switched between trucks and rail before moving to one of the waterside ports. It is expected this will reduce containerized shipments at the port facilities, though trucks transporting bulk goods are still anticipated to travel to the ports directly.	Port Master Plan 2050, The Port Authority of NY & NJ (July 2019)	• Capacity along Class 1 rail lines • Port Authority has jurisdiction for many of the roads serving their sites	The City can encourage the Port to investigate investing in rail-based transportation of goods to and from their facilities to reduce local truck traffic. To do its part, the City should consider protecting the rights-of-way of existing and defunct spur lines. One challenge to the New York approach is that much of the goods travelling through Hamilton Port are bulk goods that are not suitable for containerization.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
			Port of Montreal Major Projects: Montreal's port is a major cruise and transshipment facility, spanning 26 kilometres of waterfront along the island's southside. Each day, 2,500 trucks enter its facilities, primarily along local roads adjacent to residential areas between the highway and port. To solve this, the Port has worked with the City and Province to extend two roads (Assumption Boulevard and Souligny Avenue) to provide direct access between the port and expressway. The project has received $45.8 million in federal funding. The Port has also launched a $37.5 million freight mobility to reduce delays and decrease idling near Port facilities, which includes: • Construction of a railway bridge at the exit of the truck gate to eliminate traffic conflicts between trains and trucks • Development of an Intelligent Transport System for port trucking in collaboration with the City of Montreal, making it possible to better understand the origins and destinations of trucks beyond Port territory • Deployment of a series of variable message signs to keep truck drivers informed in real-time • Development of solutions with our partners to modulate truck traffic at entry points based on actual activity on the terminals The project received $18.5 million from the National Trade Corridor Fund. Planning started in 2020, and works will commence in 2021.	Major Projects, Port Montreal (2020).	• Lands protected for future roadway expansion that reduces impact to the adjacent community • Combination of physical infrastructure and technological improvements to address different issues at one time	The City and Port should work together to modulate truck traffic at entry points, to reduce the number of trucks idling on adjacent roads. There may be an opportunity to investigate a satellite staging facility.	Enforce idling restrictions. To manage queuing issues on the public right-of-way, identify opportunities for off-street staging in the vicinity of the Port accesses, elsewhere in the City, or strategically along the 400-series highways at the entrance to the City (which also could serve as truck parking areas with ancillary support services). The intent is to use these areas to allow trucks to queue, from which they can then travel to their destination when scheduled.
			Port of Halifax Infrastructure Plan: The Port of Halifax is the largest in eastern Canada, and manages eight facilities (terminals) for bulk, containerized and cruise ships. The largest of the port's facilities is the South End Container Terminal, located on the south end of the Peninsula and south of downtown. Given its location, trucks have to travel through downtown Halifax to reach the terminal (see the 'Equity' section of this table for more discussion on this topic.) The Port Authority initiated an Infrastructure Plan study to determine the required improvements to accommodate the increasingly popular ultra-class container vessels. These ships are too large for the Port Authority's existing terminals, and they are too tall to travel under one of the Halifax harbour bridges. This makes the South End Container Terminal the only existing facility that the new vessels can physically access. The Infrastructure Plan calls for the South End Container Terminal to be expanded northward and for three terminal slips to be filled in to create a single ultra-class container vessel facility. Other	Infrastructure Expansion Plan, Port of Halifax (2017)	• Ability to maximize the use of existing facilities • Foresight to remain competitive in a global market	The City should work with the Port to establish new facilities, particularly those that generate large truck volumes (e.g. bulk goods) to locate in areas that can be efficiently accessed from higher road facilities, that may not require going through downtown.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
			terminals under the Port's control are being considered to accommodate smaller vessels that will be displaced. Another option contemplated is moving the terminal across the harbour to Dartmouth. It was estimated that it would cost $1.4 billion to construct a new terminal, the necessary road and rail connections, and other enabling infrastructure. As well, the facility would not likely open until early-to-mid 2030s, meaning that Halifax would be at a competitive disadvantage.				

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
2	Airport Area Land Use Plans The growth plans for the Hamilton International Airport area will make the area a major employment and cargo hub, and preplanning for truck movement can proactively deal with anticipated issues.	The airport is an underutilized asset. Stakeholders identified that the airport is a major growth area and requires safe and reliable access (e.g. lighting and capacity on Hwy. 6)	**Hamilton International Airport (HIA):** **Airport Ground Access** It is recommended that: • The City of Hamilton initiate acquiring lands required to accommodate the eventual extension of Dickenson Road to Book Road. • The City of Hamilton develop a new service road to be located north of the New Highway 6 right-of-way between the Terminal Access Road and Butter Road. This road will be required when Runway 06-24 is extended. Note that the AEGD TMP identifies the proposed service road to Glancaster Road. • The City of Hamilton develop a new road that would be intended to access future airside and airport commercial developments located east of the current airport boundary and west of Existing Highway 6. • The City of Hamilton construct a direct link to the Red Hill Creek Parkway/Lincoln Alexander Parkway intersection to improve road access between the Airport and the QEW (from the east). • The City of Hamilton continues development work to provide rapid transit to the Airport via the A-Line corridor. • Hangar Road be reconstructed to accommodate traffic access and provide proper stormwater drainage. • The East Cargo Road be realigned to accommodate the development of commercial lands located immediately east of Apron III. **Non-Airside Commercial** It is recommended that: • The concept (Figure 6.1) for the development of Non-Airside Commercial land uses be implemented, covering the lands south of Airport Road and North of Highway 6, west of Highway 6 Ramp. • The City of Hamilton proceeds with final amendments to the Urban Official Plan and completion of Secondary Plans to support the rezoning of lands identified under the Airport Employment Growth District as 'Airport Related Business (ARB) and Airport Related Commercial (ARC). • The City of Hamilton proceed with the development of infrastructure required to support land uses identified under the Airport Employment Growth District.	John C. Munro Hamilton International Airport Master Plan, HIA (2011)	• Coordination between City and airport • Coordination between City and MTO • Coordination between City and businesses/ developers	The City should continue to work with the airport to achieve the joint vision for the area as a major employment and cargo hub.	Ensure reliable road access between the airport/AEGD and the 400-series highways and other highways, the Port of Hamilton, and major employment centres within Hamilton and nearby communities in the airport's market area (the Niagara Peninsula, south-central Ontario and beyond), where 'reliable access' is measured in terms of congestion-free travel times, a high level of service 24/7 and direct connectivity. Ensure that development policies in the vicinity of the airport and beneath the flight paths do not impede HIA's use as a 24/7 cargo/courier hub (notably, residential or other development that is not compatible with the night-time operations associated with cargo/courier flights). Ensure direct, unimpeded (and secure) access between the AEGD and other end-of-runway industries and

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
			Louisville International Airport Master Plan: Louisville Airport is a hub for UPS and FedEx and is the seventh busiest cargo airport (by tonnage) in the world. The Master Plan recognizes that truck traffic will increase dramatically as freight going through the airport grows. The plan notes that truck volumes and traffic will change over the coming decades, including more cargo trucks, a growing number of fuel trucks as aircraft operations growing, exacerbated truck arrival/departure peaking as larger planes become more common and need to be offloaded quickly, and the need for layover facilities for truckers. Since 2004, the airport has delivered several projects in the plan, including new roadways for truck use to avoid pinch points and access cargo facilities more efficiently.	Louisville International Airport Master Plan Update, PB Aviation (December 2004)	• Similar to HIA in that it is a courier hub • Consideration for all types of trucks that serve the airport • Layover facilities to proactively deal with rest issues	As the AEGD and Hamilton Airport grow and mature, the City should undertake regular truck counts and surveys to understand truck traffic, and to update forecasts for the area regularly, and adjust the truck route network in the area as needed.	HIA's cargo/courier handling facilities. This might require additional, dedicated and secure accesses between these cargo generators and the airport grounds. Consider the need for truck storage/staging areas near the AEGD to enable rapid loading/unloading and dispatch of trucks. Support the development of alternative fuel infrastructure to encourage the use of low- / zero-carbon vehicles and delivery vans (e.g., rapid charging EV stations).
			Hamilton Airport Economic Growth District: The Airport Employment Growth District (AEGD) is a planned development area of 551 net developable hectares of employment land per the Secondary Plan. The Secondary Plan is bounded by Garner Road East and Twenty Road West to the north; Upper James Street to the east; Whitechurch Road West to the south; and Fiddler's Green Road to the west. These areas have been planned to be a business and logistics park that effectively integrate with and complements the existing John C. Munro Hamilton International Airport. • 8.10.14 Significant transportation network improvements are required prior to the development of much of the Airport Employment Growth District. Development shall proceed in accordance with the phasing policies of Section B.8.16 of this Secondary Plan. • 8.10.16 The City shall encourage the completion of the proposed Highway 6 interchanges by the Province at Book Road, Butter Road, and south of the airport when the need is justified.	Urban Hamilton Official Plan, Volume 2, Chapter B, City of Hamilton (September 2013)	• Coordination between City and developers	With airport-related logistic businesses expected to be attracted to the AEGD, providing timely, reliable and direct routes to/from the area and the provincial highway network and municipal parkway system will be essential to achieving this area's aspirations.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
3	Curbside Loading/ Unloading The demand for curbside space is growing. Opportunities exist to address these issues and find solutions to support all curbside users.	Concerns were raised about delivery vehicles being parked in on-street bike lanes.	**Toronto, Ontario**: The Curbside Management Strategy implementation plan has identified 18 tactics (quick wins, as well as short- and medium-term initiatives) that Transportation Services proposes to undertake to improve how curbside space is managed immediately and over the next several years. Quick Wins: • Convert 'Advisory' Courier Loading Zones to Designated Delivery Vehicle Parking Zones • Explore Delivery Vehicle Staging Zones (by Permit Only) through a Pilot Short-Term Tactics • Support the Expanded Use of Off-Peak Deliveries • Improve Curbside Signage Legibility • Improve Messaging of Stopping, Pick-up/Drop-off, Loading & Deliveries and Parking Regulations and Promote Off-Street Parking • Explore Changes to Commercial Laneways to Support Off-Street Loading and Deliveries in Key Areas Medium-Term Tactics: • Explore a Courier/Delivery Vehicle Permit	City of Toronto Curbside Study, City of Toronto (2017)	• Appropriate street use for the context • Priority is equitably distributed to road user groups • Accessibility to curbside is provided • Policy effectiveness • Value for money • Efficiency in implementation: • Safety for road users • Overall reduction in curbside use	Hamilton should consider reviewing its curbside management policies, particularly in areas with high volumes of delivery trucks. The success will be dependent on the availability of suitable staging areas, the curbside signage limited by OTM, availability of laneways in the downtown area, and the enforceability and legislative authority to issue courier/delivery vehicle permits.	Review curbside management policies, especially in areas that have high volumes of deliveries.
			Barcelona, Catalonia: Barcelona introduced a road sharing program in the city's commercial centre, that allocates curbside based on the time of day. Variable message signs are used to designate the users allowed to use the curbside and the respective times: general traffic between 8:00 and 10:00 am and 5:00 and 9:00 pm (covering the commuter peak periods); 10:00 am to 5:00 pm for deliveries, and 9:00 pm to 8:00 am for residential parking.	Ottawa Goods Movement Backgrounder, City of Ottawa (April 2019)	• Hours traffic hours and overlapping peaks	If Hamilton considers this type of program, the City will need to: • Consult with trucking firms, retailers and stakeholders to identify corridors, • Require signage and demarcations; and, • Enforcement, both on goods movement and ensuring that vehicles parked overnight are removed.	
			Brooklyn, New York City: NYC DOT surveyed Nostrand Avenue merchants to ask where they would prefer loading zones with varying levels of restrictions. The options (and results) were: one loading zone per block with a 1-hour time limit (33%); a spot in front of a particular business with a 15-minute time limit (46%); or a spot on a side street available all day (11%). NYC DOT was able to deploy delivery zones to best balance businesses' needs with other street users.	B44 SBS on Nostrand Avenue Progress Report, NYC DOT (June 2016)	• Occupancy targets • Stakeholder satisfaction	If Hamilton considers an area-specific approach, it will need to: • Determine the availability of "around the block" loading may be limited; and, • Engage BIAs. There is a risk that overall opinion may differ from individual businesses as to how to allocate the curbside space.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
			Washington, D.C.: Implemented an access permit application on the Transportation Online Permitting System (TOPS). Annual and day permits allow commercial vehicles to park in loading zones during designated time frames for up to 2 hours; annual permit holders can park in metered spaces between 10:00 am – 2:00 pm. The periods help commercial users complete their routes more quickly and efficiently, decreasing congestion for others. Types of permits available include: • Annual permits for one calendar year—a cost-effective option for large carriers. Each carrier registers with TOPS and applies for as many permits as they have vehicles that utilize loading zones. Each carrier must pay for the first 75 vehicles, after which each additional vehicle is free. • Day permits for 24 hours—for carriers that do not frequent the D.C. area. However, very few carriers have used the day pass since the program launched. In the future, DDOT will consider whether it is in the City's and users' best interest to continue offering this option. If a driver does not obtain a vehicle permit in advance, then they must pay for the space upon parking. Instructions are posted on the loading zone signs that direct drivers to use the Parkmobile service to pay by phone or by using an app.	Commercial Loading Zone Management Program, District of Columbia Department of Transportation (n.d.)	• Easy of use obtaining permits • Incentives to choose permits versus pay-as-you go • Enforcement which encourages compliance	A permitting system in Hamilton could help improve the use of curbside space during peak periods in high demand areas, such as the James/King area. However, based on the Washington experience, this would be best suited to carriers that make regular and frequent trips to the same area. To implement this type of system, the City would need to: • Inventory existing loading zones and collect data on their use; • Coordinate with the police and By-law enforcement about enforcing loading zone changes; • Offer multiple methods of payment and investigate new forms of payment as they become available; and, • Engage with carriers, downtown receivers, and local BIAs to determine locations and logistics.	
3	Evolving off-street loading needs There are opportunities to review how off-street loading is managed to reduce the demand for curbside space.	No comments	**Toronto, Ontario**: Simcoe Place, at 200 Front Street West, is an example of a large building with best practices. Most deliveries are made to the loading dock and utilize the freight elevator. The staff on-site record and documents all incoming deliveries. Hand-delivered pieces are not subject to such scrutiny. The building management provides three dedicated underground parking spots for couriers. In addition, public parking is free for the first 30-minutes. The provision of three dedicated underground parking spots for couriers frees up the loading docks for larger freight delivery vehicles. Parcels and packages are delivered to a centralized facility on the main floor of the building. This guarantees that couriers spend the least amount of time in the buildings, therefore occupying the designated parking spots for a brief time. However, packages are still picked-up by couriers from the tenants directly.	Challenges Facing Express Delivery Services in Canada's Urban Centres, Ryerson University, December 2009	• Willingness of landlords to take on this role • Willingness of tenants to utilize centralized mail rooms over individual service	Parking policies should be considered as part of the City's Parking Master Plan. Centralized mail delivery processes offer an opportunity to reduce the amount of time that delivery vehicles need to be parked/stopped. Providing off-street space reduces conflicts with other curbside demands while still meeting the needs of tenants. This model requires centralized and hands-on property management – typically seen in large multi-tenant or single-occupant buildings. This may not be feasible in a smaller scale and mid-rise developments where the landlord is less hands-on.	Review off-street parking policies for short- and long-term delivery requirements to account for evolving needs.

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			Calgary, Alberta: Action 4.1 of the Calgary Goods Movement Strategy is to "[p]romote the inclusion of off-street delivery facilities into new or re-constructed non-residential developments: Due to the growth in courier and express delivery demand and increase use of active transportation for deliveries, ensuring that an adequate supply of off-street loading space in new development and other changing delivery requirements be accommodated is recommended. To achiever this, the City will: • Ensure that building design standards are kept current to respond to changing delivery requirements. These standards improve the efficiency of deliveries on the site and within the building, while minimizing disturbances and inconvenience to occupants of the building and its neighbours. • Support the use of flexible spaces, such as alleys, as spaces for delivery vehicles. • Promote the use of off-peak deliveries and to reduce peak congestion, by reviewing current bylaws that may limit these of off-peak deliveries and working with private sector stakeholders to conduct pilot projects to alleviate potential concerns and obstacles."	The Calgary Goods Movement Strategy, City of Calgary (December 2018)	• Awareness of off-street loading facilities. • Shift to off-peak delivery • Willingness of property developers to accommodate loading spaces	Parking policies should be considered as part of the City's Parking Master Plan. Specific concerns that may be considered related to this scenario include: • Parcel size may preclude the inclusion of off-street loading facilities; • Inability to accommodate truck turning movements on site; • Overlapping peak hours may result in delivery vehicle volume increasing before AM peak hour volumes have decreased; and, • Many alleys and laneways do not permit easy turnarounds by large vehicles.	
			Seattle, Washington: New developments are required to provide off-street loading areas while also reserving some on-street parking for commercial vehicles. Seattle permits smaller vehicles to use alleys to load and unload without disrupting vehicle or pedestrian traffic on nearby streets and sidewalks.	Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, NCHRP Report 844, National Cooperative Highway Research Program, Transportation Research Board, Washington, DC, (2017)	• Availability of property to accommodate on-site loading in urban areas • Prescience of alleys and laneways	Parking policies should be considered as part of the City's Parking Master Plan. In this situation, property size may preclude the inclusion of off-street loading facilities, causing an inability to accommodate truck turning movements on site. As well, many alleys and laneways do not permit easy turnarounds by large vehicles.	

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1	Public awareness of the benefits of goods movement	No comments	**Regional Plan Association (RPA), metropolitan New York City area:** The RPA released a brochure entitled, *Why Goods Movement Matters; Strategies for Moving Goods in Metropolitan Areas* (2016). The brochure provides a public-facing explanation of the importance of goods movement, how it works (at a high level), challenges and, finally, several approaches to managing urban goods, focusing on sustainable practices. The brochure is high-level by design and well-illustrated.	Why Goods Movement Matters; Strategies for Moving Goods in Metropolitan Areas, Regional Planning Association, New York City (2016)	• Uptake of awareness and education programming	Establishing and maintaining a dialogue with the public is vital. The objectives are to: • Increase the public's awareness of the importance of goods movement and the realities of how it operates to serves customers on demand; and, • Provide a means for the public to express its concerns to City and industry staff, then engage with them to identify problems and work together to a common understanding if not always to a solution. Goods movement information could augment the discussion and raise the profile of goods movement with the public and the media.	Establish awareness and education programs on the importance of goods movement as part of a broad, ongoing outreach program Establish a citizen – industry committee, managed by City staff, to jointly identify problems and seek resolution or, at least, an understanding Develop a profile of the economic importance of goods movement in Hamilton
			Various, Pembina Institute, Toronto: Pembina has put together many short reports on promoting sustainable goods movement. Recent reports examine the use of cargo bicycles, microhubs for last-mile deliveries and e-commerce. The reports, blogs and media releases provide useful introductions to sustainable urban freight topics.	Delivering Last-Mile Solutions, Pembina Institute, Toronto (2019)			
			***Philly Freight Finder*, Delaware Valley Regional Planning Commission (DVRPC), Philadelphia:** The *Freight Finder* is an online map that presents various aspects of freight in the metropolitan Philadelphia region. Maps and layers include the location of freight-generating activity centres, freight sector employment, freight network performance indicators, trade patterns, freight profiles of the metropolitan region's nine counties, and more.	*Phillly Freight Finder*, Delaware Valley Regional Planning Commission, Philadelphia			

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GOAL: EFFICIENTLY CONNECTED (Last Mile)							
2	Long Combination Vehicles (LCVs) LCVs offer an opportunity to move goods more efficiently, including reduced emissions, removing vehicles, and decreasing costs.	No comments	**Ministry of Transportation Ontario:** The Ministry has an LCV program aimed at supporting the efficient movement of goods across the province and beyond. To operate in the program, carriers must have a proven record of safe operations and at least five years of experience in the industry. Drivers must meet licencing requirements, complete additional training and have a safe driving record, including no driving-related Criminal Code convictions in the previous 36 months. MTO maintains the Primary LCV Network, which can be used by all licenced LCVs. The network generally consists of controlled access, multi-lane, divided highways under their control. To operate off the Primary Network, a carrier must apply for a permit from MTO and the local road authority. The permit allows an LCV to travel on a set route between a fixed origin and destination. The origin and destination are generally limited to sites within 5 km of the nearest interchange with the Primary Network. As part of the application, the carrier must submit an Engineering Assessment, which must demonstrate that the LCV can safely be accommodated on the roadways listed and will not have adverse impacts on traffic conditions. LCVs operating in Ontario are required to meet an extensive list of operating and equipment requirements. These include: • Not exceeding 90 km/h at any time, and maintaining a functional and accurate speed recording device; • Not detouring from the approved LCV roadways due to road closures, unless it is only pulling one trailer; • Holiday operating restrictions (e.g. reduced hours on the last day of long weekends, no operations on Canada Day, Christmas Day, Boxing Day or New Year's day); and, • Not operating in winter weather when roadway conditions are reduced or any time when visibility is reduced to less than 500 metres.	LCV Program Conditions, MTO (November 8, 2019)	• Support for LCVs from municipalities, MTO and industry • Availability of LCV supportive roadways • Connections to the MTO Primary LCV Network	Based on available information, there are no LCV permits for origins or destinations in Hamilton. The City should discuss with industry to determine what barriers they are facing to using them. In areas of Hamilton where the City could support LCV operations, geometric design guidelines should be reviewed to ensure that they can accommodate the larger vehicles. Consider permitting LCVs in the AEGD, given the size and type of future developments. This must be align with MTO's requirements, including origins and/or destinations being located within 5 km of the nearest primary LCV network interchange (i.e. Hwy. 403 and Garner Road). This is primarily the western and northern areas of the district.	Ensure that policies to enable LCVs in Hamilton are in place, consistent with MTO's requirements and meeting local needs (e.g. time-of-day restrictions). Ensure that the planning of future employment areas accounts for potential growth in the demand for LCVS, meaning that the City should consider locating likely LCV-generating industries close to the 400-series highways.
			Ottawa Region: The MTO LCV Program Conditions restricts LCVs from travelling on sections of Highways 416 and 417 through Ottawa. The restrictions apply Monday through Friday from 7:00 am to 9:30 am and from 3:30 pm to 6:00 pm. LCVs only pulling one trailer are still permitted. The MTO Program Conditions included similar restrictions on freeways in the Greater Toronto Area until November 2019, when it was removed.	LCV Program Conditions, MTO (November 8, 2019)	• Support for time restrictions from public and private partners	Given that stakeholders raised noise concerns during Phase 1 of engagement, the City should apply time of day restrictions to any applications for LCVs if the routes may impact sensitive receptors or if localized congestion is identified by staff.	

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			Peel Region: The Region participated in MTO's LCV pilot program from August 2009 to November 2010, with 16 of the approved 37 origin-destination sites in Ontario located in Mississauga and Brampton. Staff reported that during the pilot period, 21,315 LCV trips were made (6.97 million km), which avoided 21,315 truck trips. One collision was reported, but it was deemed there was no fault associated with the LCV. The locations of approved origins and/or destinations are generally within 2 km of a 400-series highway and are all in industrial areas (primarily near the airport). Through a review of the required engineering assessment and field observations, no operational concerns were identified by traffic operations staff and that Peel Regional Police. Region staff supported the LCV pilot initiative, noting several economic, safety and environmental benefits. Since then, the Region has encouraged the use of LCVs in Peel. Action #5 of the G*oods Movement Strategy Plan 2017-2021*'s calls for the Region to "expand and encourage the use of long combination vehicles," which is tied to the desired outcome of improving the efficiency and productivity of goods movement.	Staff Report PW-A-2-1 (January 18, 2011) Goods Movement Strategy Plan 2017 – 2021, Region of Peel (March 2017)	• Encouragement form staff, elected officials and industry • Availability of LCV supportive roadways	In areas of Hamilton where the City could support LCV operations within the necessary proximity to the 400-series highway, geometric design guidelines should be reviewed to determine if they can accommodate the large vehicles. This would likely be industrial areas, such as the Bayfront, Red Hill Business Park, and the emerging AEGD.	
GOAL: RELIABLE							
1	Multi-Tiered Networks	No comments	**Greater Toronto and Hamilton Area:** Metrolinx developed the GTHA Strategic Goods Movement Network (SGMN) as part of the 2018 update to the Regional Transportation Plan. (More details below). The GTHA SGMN referred to the City of Toronto's desire for a two-tiered network, which recognized that there are relatively few large trucks in the congested urban core. Responding to this *de facto* situation, the City of Toronto proposed developing a strategic goods movement network that catered to small- / medium-sized vehicles, would be contained entirely within the municipality and would link to the GTHA SGMN. At this time, the City has not acted on this proposal.	GTHA Strategic Goods Movement Network, Metrolinx (2018)	• Allow for the possibility of a two-tiered truck route system: one to cater to trucks of all sizes to connect to the 400-series highways, key	The development of a two-tiered system could divert large trucks from roads and areas where they are not desired. However, it should be noted that the City of Regina recently completed a bypass, which effectively diverts the need for many heavy trucks to traverse the city's core. In addition, a major generator – the CP intermodal terminal – has been relocated from its core location to the Global	Investigate the feasibility of introducing a two-tiered truck route network in Hamilton, keeping in mind the key generators of heavy truck activity.

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			City of Regina: The *Regina Traffic Bylaw* and *Truck Route Map* account for a two-tiered truck network: - Pick Up and Delivery Vehicle Routes or areas allow heavy vehicles up to 4 axles and trailer lengths of up to 8.6 metres, with larger vehicles allowed generally as the most direct route to a pick-up or delivery point (among other conditions). - Heavy or Long Combination Vehicle Routes or areas allow heavy vehicles with 4 or more axles and trailer lengths greater or equal to 8.6 metres, with larger vehicles allowed generally as the most direct route, via a Pick Up and Delivery Vehicle Route, to a pick-up or delivery point (among other conditions). The bylaw also designates a dangerous goods route.	The Regina Traffic Bylaw 9900 (amended to May 27, 2020) and Truck Route Map (May 9, 2019)	generators and the regional road network; and another that focuses on roads that primarily serve intra-urban deliveries • Use the City's new CLB policy to implement road treatments that help govern these uses accordingly	Transportation Hub outside the city. It can also be noted that the Pick Up and Delivery Vehicle Routes also largely apply to residential or non-industrial areas (including the CBD), and that these are areas nonetheless surrounded by or within close access to a designated Heavy or LCV Route or Provincial highway. As well, various industrial areas close to or adjoining the core are accessible to heavy vehicles and LCVs, and a large-area petro-chemical industrial area in the city's northeast quadrant has no restrictions. In other words, local conditions -Regina largely has a grid network, is traversed by several Provincial highways and has clearly defined industrial areas – could limit the replicability of a two-tiered system in Hamilton. An alternative treatment could be to apply Complete Streets principles in corridor design that are appropriate to the context and the volume of large vehicles. Large vehicles *can* circulate where required but can only do so under carefully controlled road design and operations. Many municipal Complete Streets policies, as well as references such as NACTO's *Urban Street Design Guide*, use this approach.	Ensure that the City's CLB policies account explicitly for ways to manage the movement of large vehicles, in ways that are appropriate to the context and to the volumes of large vehicles on candidate corridors.
3	Truck-Only Roadways	No comments	Several municipalities have studied the potential of truck-only lanes. These studies mostly focus on expressway applications, which tend to include significant portions of long-haul truck traffic (through traffic) in the vehicle mix, hence benefits could be significant for all expressway users. A notable proposal in the Atlanta region included tolls for the use of the truck-only lane. The trucking community accepted the proposal, understanding the monetary benefits of reduced travel time, improved safety and so on. However, the proposal ultimately was not implemented.		• Reduction in travel times and collisions for trucks and all vehicles, and improved travel time reliability	Hamilton could consider the feasibility of a truck-only lane or truck-only road in critical locations. However, the cited experience elsewhere in Canada suggests that their applicability on urban roads could be limited to very specific situations.	Consider investigating the feasibility of truck-only lanes or truck-only roads as one means of managing truck traffic in critical locations.

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			A 2014 **Transportation Association of Canada** (TAC) research report studied the feasibility of truck lanes in Canada. The report noted that although some truck-only lanes exist in the United States, the conditions and magnitude of the needs differ from those in Canada. The report reviewed several factors that should be considered in determining the viability of a truck lane – in particular, the report noted that other options for managing truck traffic should be considered first.	*Primer on Truck Lanes in Canadian Urban Areas*, TAC (2014)	• Usage of the lane (uptake)	The City could investigate the feasibility and utility of implementing a truck-only lane on its urban expressways, perhaps also including the local Provincial expressway system (in conjunction with MTO).	
			Waller Street in downtown **Ottawa** is the only known truck-only road in Canada. This short section of road (less than 0.5 km) is a one-way link between a nearby bridge to Gatineau, Québec and Highway 417. The link was introduced as part of the large-scale reconstruction of the area's road network to accommodate Ottawa's bus rapid transit network (now converted to an underground LRT at this location).				
			Peel Region: At Council's direction, staff investigated the feasibility of introducing a truck lane restriction pilot study at Highway 50 and Derry Road, based on concerns about traffic congestion and safety. Both roads have high volumes of heavy truck traffic. Subsequent modelling analyses found that the proposed restrictions would not yield significant travel time savings or traffic safety improvements. Field surveys found that trucks generally operate safely on these corridors. Staff concluded that experience has "demonstrated that truck lane restrictions are not the most appropriate mitigation tactic to address congestion and safety concerns," and "education and outreach were recommended to address concerns with truck traffic and safety." As a result, the pilot was not implemented.	Report to Regional Council, Feasibility of a Truck Restricted Lanes Pilot Project on Regional Road 5 (Derry Road) and Regional Road 50 (Highway 50), Peel Region (meeting of March 29, 2018)			

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1	Redundancy Planning for redundancy in the network can proactively manage truck flows in the case issues arise. However, redundancy can lead to more routes being approved adjacent to sensitive receptors.	Hamilton Fire identified the need for truck detour routes near freeways in the event of major incidents or closures.	**Greater Toronto and Hamilton Area:** Metrolinx developed the GTHA Strategic Goods Movement Network as part of the 2018 update to the Regional Transportation Plan. The network is a four-level hierarchy consisting of 1) Provincial Highways, 2) Connectors to Primary Freight Clasts, 3) Regional Connections, and 4) Connectors to Secondary Clusters. Within the development framework, redundancy is closely tied to reliability to provide carriers and shippers confidence that goods can be delivered when needed. Redundancy in the network is captured in *Step 3 – Support Reliability for the Primary Clusters and Provincial Highways*. Specifically, the principle of this step aims to provide at least one redundant connection between freight clusters and the nearest 400-series highway, while principle three focuses on providing redundant connections between parallel 400-series highways. The report notes that conflicts may emerge between trucks and planned rapid transit corridors. It suggests network planning to provide redundancy (e.g. separating truck and transit corridors), and design mitigation measures to reduce the conflict if they are required to be accommodated along the same corridor.	GTHA Strategic Goods Movement Network, Metrolinx (2018)	• Identify strategic corridors to protect them in future master planning exercises • Ensure redundancy in the truck route network for emergency vehicles, as well as for trucks generally	Many of Hamilton's major goods movement corridors (e.g. freeways, highways) lack redundant routes in case incidents occur. Hamilton should consider having truck detour routes for major goods corridors. Planning a redundant route for the Toronto-bound QEW poses challenges as the most direct parallel routes are in Burlington. The availability of year-round, redundant routes in rural areas is limited parallel along some corridors (e.g. Hwy. 6, 8, 403).	Ensure redundancy in the truck route network to allow for access or use by emergency vehicles, as well as by trucks generally. Consider the deployment of small- / medium-sized emergency vehicles to allow more flexibility in circulating on narrower urban streets. Consider the deployment of traffic signals and other traffic control devices that give priority to emergency vehicles throughout the City's network (i.e., not just on truck routes).
			New Westminster, BC: In March 2014, the City of New Westminster requested that TransLink remove three streets within the City from the regional truck route network, stating that the routes were negatively impacting livability on the adjacent neighbourhoods. Anecdotal evidence from local councillors and residents suggested that truck traffic increased following the introduction of tolls on the nearby Port Mann Bridge, and trucks were avoiding paying by using local roads. TransLink choose to retain the links to maintain redundancy in the network, especially in the event that Port Mann Bridge is shut down.	New Westminster request for truck route changes rejected, New Westminster Chronicle, Theresa McManus (July 29, 2014)	• Desire to maintain network redundancy in a limited area	Significant changes to Hamilton's truck route network could have broader implications on neighbouring roadways, such as in Burlington and MTO freeways. Consultation with these stakeholders should be undertaken prior to finalizing the plan to understand their concerns.	

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			Peel Region: During the consultation for the Strategic Goods Movement Network Study, the Region recognized that network redundancy was a top priority of carriers and businesses. The Region prepared two networks as part of the consultation: a Truck Mobility Focus network, which assumes no truck restrictions and provides significant redundancy, and a Community Development Focus, which aims to reduce the impact on residential neighbourhoods, transit corridors, and planned nodes, but with reduced redundancy. Ultimately, the preferred concept was a hybrid of the two networks. The report notes that many corridors, such as Hurontario, Dundas and Queen, are planned as future rapid transit corridors, and that compatibility issues may arise.	Strategic Goods Movement Network Study: Technical Report, Region of Peel (April 25, 2013)	• Took networks at the extremes of to determine what stakeholders could support • Delivery plan has actions to identify and prioritize improvements and monitor the usage	Investigate how to best provide redundancy in the network, while balancing the needs of trucks and communities. The needs will change as nodes and corridors evolve.	
3	Seasonal Load Restrictions Climate change is changing freeze-thaw cycles. This poses an issue to reducing damage on rural roads.	It was identified that some operators avoid rural roads due to their poor condition and lack of comfort	**Zorra Township:** The rural township starts their seasonal load restrictions on February 15 of each year, instead of the typical March 1 date.	By-Law No. 21-03, Township of Zorra (May 6, 2003)	• Municipal by-law and signage to support earlier restrictions	Review local environmental data to determine if an earlier start to the load restrictions may be appropriate to protect the integrity of the road network.	The City should establish a framework to consider goods movement in the rural road rehabilitation process. This framework would address increased deterioration, wider gravel shoulders, and other improvement along rural truck routes. The City should develop specific policies addressing agricultural and aggregate/mining-related goods movement during the spring thaw. Review how the City's asset management accounts for heavy truck volumes in assessing the priorities for rural road rehabilitation.
			Ottawa: The City's Traffic and Parking By-law states their official reduced load period will extend from March 1 to May 15 of each year. However, the General Manager of Transportation Services is authorized to erect reduced load signage before/after these dates in response to weather and ground conditions.	By-Law No. 2017-301, City of Ottawa (June 2018).	• Empowers staff to respond to extraordinary weather events.	Consider revising reduced load by-law to grant authorized staff the ability to adjust the reduced load restrictions dates in response to conditions.	
			Durham Region: The 2017 *Transportation Master Plan* developed a Strategic Goods Movement Network (SGMN). Among other uses, the SGMN is being used to help prioritize Regional road expansion and rehabilitation projects to remove load restrictions and upgrade pavement conditions, among other improvements (Action 83).	2017 Transportation Master Plan, Action 83.	• Implemented upgrades of rural roads that are currently in poor condition	Consider giving higher priority to preferred rural roads to remove load restrictions and upgrade pavement conditions, where 'preferred' refers to roads that *should* be used by heavy trucks instead of alternate rural routes.	
			Peel Region: The 2013 *Peel Strategic Goods Movement Network* was used to inform priority-setting in the Region's annual asset management program to identify, among other things, rural roads and intersections that warrant upgrades in order to eliminate seasonal load restrictions, poor geometries and poor pavement conditions.	2013 Peel Strategic Goods Movement Network	• Implemented upgrades of rural roads that are currently in poor condition		

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2	Route signage / legibility	No comments	**TransLink, Vancouver:** In July 2020, TransLink released its *Truck Route Planner*, an online tool to help commercial vehicle drivers and dispatchers plan trips. The driver must input the vehicle dimensions and trip origin and destination. The app then identifies one or more 'optimum' routes for the trip, accounting for the vehicle dimensions, municipal by-laws (other than Provincial highways, road jurisdictions are shared between TransLink and its 21 municipalities), height clearances, bridge weight load limits and major road closures on truck routes. The app also shows parking locations, ancillary services such as Cardlock fuel stations, restaurants, hotels and washrooms, and other information such as the location of inspection stations, restrictions, advisories, temporary road closures and industrial areas. The *Planner* is meant as a pre-planning tool – i.e., it is not based on real-time traffic conditions and is not to be used while the operator is driving. It is also intended for use on local / TransLink roads; other (non-app) tools are available for the Provincial highway network.	TransLink, Truck Route Planner.	• Uptake and frequency of usage by truck drivers and dispatchers • Driver assessment • Choice of routes used, given possible options (i.e., are the selected routes ones that could alleviate conflicts, congestion and so on?)	Hamilton could develop a similar app to address 'driver bewilderment,' especially given that the Port and HIA (if not also other freight generators) serve the Niagara Peninsula and south-central Ontario. TransLink's recent initiative provides a current reference, in addition to being able to provide O-D routing. Other apps, separate from this issue/opportunity, have been developed to help drivers find available on-street parking spaces to minimize drivers circulating in congested central areas. Some cities have implemented parking reservation systems, with eligible trucks (trucks that have purchased permits) to use an app to reserve a space for a specified time and location. In the meantime, there may still be a need for improved 'physical' signage on the City's roads. To address this, the City could review its signs, cover placement, legibility, usefulness/effectiveness and so on.	Consider developing a wayfinding app, perhaps linked to other applications (MTO, Peel), and perhaps developed jointly with adjacent municipalities, using TransLink's current app as a basis. Consider reviewing the existing directional signs for effectiveness, placement, legibility and so on.
			Peel Region: Peel's *Freight Information Hub* provides similar information to TransLink's *Planner*, with the critical difference that it is not a route planner. The *Information Hub* is an interactive online map that provides information on road restrictions, road quality, closures, venues of interest to the trucking community (such as truck stops, weigh stations and motels that have trailer parking) and freight-oriented destinations, such as warehouses and distribution centres, quarries, intermodal rail terminals and Toronto Pearson International Airport. The map can be refreshed to show up-to-date road closures and incidents, although it is not a real-time map.	Peel Region Freight Information Hub.			

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3	Oversize / overweight / dangerous goods	No comments	Policy topics regarding **over-dimension vehicle permitting** could relate to: • Ability to streamline over-dimension vehicle permitting to allow a single, regional approach. This benefits the applicant, who otherwise must apply to each jurisdiction. It also satisfies the relevant jurisdictions because it ensures that the applicant has paid for and received a permit across the entire route and that the route meets the requirements of each jurisdiction (regulatory, height/width/loading requirements, time of day use and so on). **Alberta's TRAVIS** is a province-wide portal that uses this approach. Most municipalities are members. **British Columbia** was investigating the feasibility of this approach, at least for the Lower Mainland. • Ensuring regulatory consistency between neighbouring jurisdictions. For example, in the Edmonton region, until recently, some adjoining municipalities had conflicting time-of-day use (daytime only in one municipality and night-time only in the neighbouring municipality). • Use of GIS and other routing databases to quickly identify potential routes for over-dimensioned vehicles. **Saskatchewan** introduced such a system in 2017, using available databases. The system identifies geometric and load constraints, as well as construction locations. However, the system covers only provincial highways, meaning that it cannot route off the highways. The data are also static, meaning that real-time information cannot be deployed. Also, from experience, policy topics concerning **dangerous goods movement** could relate to: • The potential need to revisit current dangerous goods route designations. • Criteria and guidelines for designating dangerous goods routes. The City of **Calgary** has a well-defined guideline, as one example. • Possible concerns from other City departments and emergency services regarding the performance of the City's dangerous goods route network and whether some problems could be pre-empted through improved road design (drainage, geometric design, etc.). This was noted as an issue in the **Calgary Goods Movement Strategy**.		• Number of permit requests and associated revenues • Compliance with regulations and routing • Assessment of how up-to-date the City's dangerous goods route policy is	The City might want to examine the need for a common portal for over-dimension vehicle permitting, perhaps with neighbouring municipalities, depending on the frequency and ODs of requests. It can be noted that MTO tested a GTA-wide centralized permitting system. Participants indicated that the pilot was successful. However, the system was eventually dropped due to cost. Depending on the need, the City might want to investigate the feasibility of using available databases on network characteristics (geometries, load restrictions, etc.) to see if these could be deployed to streamline the response burden.	Subject to need, consider investigating ways to streamline the over-dimension vehicle permitting process, alone or with adjoining municipalities. Subject to need, consider revisiting the City's policies for designating dangerous goods routes.

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2	Regional Connectivity	No comments	**Peel Region Goods Movement Task Force:** Peel's Task Force has been active since 2009 and is widely recognized as Canada's most active and successful freight council. Its mandate is to: • "Develop a common vision for goods movement in the Peel area, • Bring together key stakeholders to guide future improvements to the goods movement system; and • Plan for the implementation of short, medium and long-term improvements to the goods movement network." (Source: Peel Goods Movement Task Force website; see next column for citation) Managed by Regional staff, the Task Force comprises the lower tier municipalities, senior governments, academia (including McMaster University), multi-modal infrastructure and port owners, police, chambers of commerce, industry associations and representatives of transportation, logistics, retail and other industries. Non-government organizations make up the largest proportion of members. The Task Force has been active in developing and acting on two iterations of a Regional goods movement strategy, among other initiatives: for example, the initial (2012) strategy had 23 action items, all of which have now been completed.	Peel Goods Movement Task Force (n.d.)	• Measurable outcomes (i.e., not just a 'talk shop') • Ongoing participation.	A freight committee has the advantage of [a] giving freight stakeholders a venue to voice concerns and exchange ideas with [b] direct access to City staff. However, to be effective, the committee must ensure that stakeholder inputs are taken into account in City planning, design, engineering, operational, etc. decisions – i.e., stakeholders must see practical outcomes from their participation. Using the committee as a means of accessing City staff could avoid voicing concerns only via City Council – i.e., seeking practical solutions rather than an issue becoming politicized at the outset. (Of course, Council would still have its due process for decisions: this approach does not eliminate that process.) We recommend that a freight council for Hamilton, should it proceed, include representation from local industry, local carriers, the Port, HIA and railways – i.e., the private sector should be well represented. The City should also consider whether or not it wants to include political representation. The City's comment looks to a regional body, perhaps coordinated with MTO or the Smart Freight Centre. We recommend that the City focus on its own needs. The one existing regional body is Metrolinx's Urban Freight Forum (UFF), which has operated for several years. As an upper-tier municipality, Hamilton is a member. However, UFF operates with a region-wide perspective – meaning that the types of issues that are typically important to a municipality are not generally covered. The UFF has also been dormant in recent years, pending a reallocation of transportation	Consider the need for and feasibility of a Regional Goods Movement Committee or possibly a Hamilton-specific Committee. Either way, any initiative should be considered under the leadership of the City – i.e., it should be central to the City's interests.
			Greater Vancouver Urban Freight Council, TransLink: Inaugurated in 2017, the Council was a recommendation of TransLink's 2017 *Regional Goods Movement Strategy*, which was part of TransLink's multi-modal *Regional Transportation Strategy*. The Council's purpose is to: • "champion and help facilitate priorities identified in the Regional Goods Movement Strategy, • coordinate related initiatives among partners, and • exchange knowledge and information on urban freight issues." (Source: BCTA *Bulletin*, 27 February 2017) Council members were drawn from all levels of government, the marine port, airport, local developers, a citizens' group, industry associations, academia and ICBC (the government insurer). Almost unique among Canadian and US freight forums, the Council does not have representation from the transportation and logistics or other freight-generating industries, apart from industry associations. TransLink administers the Council. The Council's first initiatives examined the feasibility of centralized oversized vehicle permitting and the development of a regional road network strategy.	TransLink Regional Goods Movement Strategy (2017)			

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			Calgary Goods Movement Advisory Group: This new group, inaugurated in 2019, was a recommendation of the 2018 Calgary Goods Movement Strategy. The Advisory Group has representation from the private sector, the public sector (The City of Calgary, which hosts the Group, but also the Province of Alberta and two adjoining municipalities), academia and industry associations. The Advisory Group is unique in that its chair and vice-chair are City Councillors: although the City manages the initiative, the Councillors can provide linkage to Council priorities, funding and decisions while also ensuring political initiatives can be included for consideration in the Advisory Group's work program (i.e., the Councillors are engaged but are not setting the outcomes).	Calgary Goods Movement Strategy (2018)		planning responsibilities between Metrolinx and MTO. The Smart Freight Centre is oriented towards research. The Centre includes MTIL as one of its academic partners; hence there is a local context. As a research initiative, the Smart Freight Centre is not an appropriate platform for a freight committee, which must deal with prosaic, day-to-day industry issues among a range of stakeholders. Instead, the Smart Freight Centre could be engaged by the freight committee to provide specific background research – some US committees support academic research, as does Peel Region through the Smart Freight Centre.	
COMMUNITY liveability							
Goal: Safe							
1	Vulnerable road users Collisions involving trucks tend to result in more serious injuries, posing risks to vulnerable road users.	Safety and comfort concerns along truck routes. Individuals were particularly concerned about older people, children and those with mobility issues.	Transport Canada offers an evidence-based list of countermeasures that can be used to reduce the risk of conflict between heavy commercial vehicles (4,500+ kg) and vulnerable road users (defined as pedestrian and cyclists). The report notes that despite advances in technology, conflicts between the two groups often result in serious injuries or death. The countermeasures were developed based on data from Canada and the USA and were found to be effective to reduce conflicts, and fit into eight categories: • Automated enforcement; • Communications, awareness and education; • Intersection design and traffic control; • Roadway and cycling infrastructure; • Rules of the road; • Side guards and side skirts; • Speed; and, • Visibility and conspicuity.	Safety Measures for Cyclists and Pedestrian Around Heavy Vehicles: Summary Report, Transport Canada (June 2018)	• Evidenced-based practices	Awareness and enforcement countermeasures should be contemplated for inclusion of the final Master Plan Study report. Design and operational adjustments should be considered by City staff for busy truck routes with a high level of pedestrian and/or cyclist activity.	

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			Vancouver: Translink is committed to ensuring that the transportation system is designed and managed with safety as a top priority. It notes that heavy commercial vehicles (HCVs) are primarily not at fault in casualty collisions and that other road users tend to now know how to operate around them. Safety concerns raised by stakeholders relate to trucks imposing presence on the road, which can make it intimidating and stressful to share the road. The strategy identifies actions to improve safety among road users: • 2.1.1. Make awareness of how to safely operate around HCVs, a key component of driver's licence training courses and examinations for non-commercial drivers in British Columbia. • 2.1.2. Make pedestrian and cyclist safety awareness a key component of driver's licence training courses and examinations for commercial vehicle drivers in British Columbia • 2.1.3. Deliver public education campaigns targeting drivers, pedestrians, and cyclists to help raise awareness about how to safely operate around HCVs. • 2.1.4. Increase resources to traffic enforcement focused on targeting dangerous automobile drivers, who are at fault in 65% of casualty collisions involving an HCV. • 2.1.5. Work with industry and regulators to encourage uptake of Advanced Driver Assistance Systems (ADAS) such as pedestrian and cyclist collision avoidance systems for HCVs to help minimize the chances of collisions with vulnerable road users, and monitor ongoing research about the benefits, costs, and overall effectiveness of equipment such as side guards to reduce the severity of collisions when they do occur.	Moving the Economy: A Regional Goods Movement Strategy for Metro Vancouver, Translink (June 2017)	• Target education and awareness to all road users on how to interact with trucks • Incorporates both human-focused and technology solutions	Initiate a safety and awareness campaign on how to travel safely around large vehicles. Work with industry on new technologies that can help reduce risks to all travellers.	

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2	Roundabouts Roundabouts provide are an effective and safe intersection design option but need to take in consideration larger vehicles.	Concerns about trucks in roundabouts encroaching into other lanes. Roundabouts are not safe for trucks to use.	**TAC Roundabout Design Guide:** The presence of trucks and other large vehicles does not preclude a road authority from considering roundabouts. Failing to consider trucks in the design can lead to damage to vehicles and fixed objects. General treatments that can be considered to accommodate trucks include traversable truck aprons and larger diameter central island. These measures help to increase the entry and the circulating width of the design vehicles, provided they do not detrimentally impact the safety and operations for other road users. **Single-Lane Roundabouts** Three methods to accommodate large vehicles in single-lane roundabouts include: • Widening the circulatory roadway to accommodate the swept path; • Provide a truck apron outside of the circulatory roadway, to avoid off-tracking over the central island; and, • Providing a truck apron around the central island side enough to accommodate off-tracking. **Multi-lane Roundabouts** When a multi-lane roundabout is planned, the designer needs to determine if the design vehicle can overlap or straddle the adjacent lane(s) when travelling through the intersection. There are three methods to accommodate larger design vehicles within the circulatory roadway: • Case 1: Design vehicle overlap or straddle adjacent lanes on entry, around the circulatory roadway, and on exit; • Case 2: Design vehicle maintains their own lane on entry, but straddle adjacent lanes around the circulatory roadway and on exit; and, • Case 3: Design vehicle stay in their own lane on entry, within the circulatory roadway, and upon entry.	Canadian Roundabout Design Guide, Transportation Association of Canada (January 2017)	• Selecting a representative design vehicle • Property availability • Truck volumes	Review how design vehicles are selected for roundabouts to ensure that large trucks can be effectively accommodated, as needed. Consider incorporating TAC Roundabout Design Guidelines into City design standards, as appropriate, to ensure that they reflect best practices.	Consider reviewing the City's design policies for roundabouts, especially with respect to the safe accommodation of large vehicles

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			Ontario Trucking Association Roundabout Discussion Paper: As the number of roundabouts in Ontario continues to expand, commercial vehicle operators are required to manoeuvre through them more frequently. Designers need to properly account for commercial vehicle traffic to reduce the risk of vehicle damage and damage to fixed objects. A review of existing roundabouts determines that most were inadequate at accommodating WB-20 and A-Train LCV truck configurations, particularly single-lane roundabouts. Four treatments are suggested to accommodate commercial vehicles: • Widened entry and exit lanes: On single-lane roundabouts, add extra turning space on the entry/exit lane to make it easier to manoeuvre; • Truck aprons: a mountable paved area on the central island can accommodate off-tracking without compromising the deflection of smaller vehicles. When used, they should be designed to accommodate trucks and discourage passenger vehicle use; • By-pass lanes: introduce right-turn by-pass lanes with a larger turning radius to make it easier to manoeuvre; and, • Gates for passing through traffic: have gates through a roundabout to permit large vehicles to travel straight through the roundabout.	Accommodating Commercial Vehicles in Roundabouts: Discussion Paper, Ontario Trucking Association (December 2010)	• Selecting a representative design vehicle • Property availability	Review existing roundabouts with heavy truck volumes to determine if operational improvements may be appropriate. Explore incorporating the recommended treatments into City design standards, as appropriate, to ensure that they reflect best practices.	
2	Use of independent couriers / truckers. Some independent operators may be less prone to maintain their vehicle during economic downturns.	No comments	**Calgary:** During economic downturns, competition and cost-cutting by truck carriers have been observed to occur more frequently, particularly among small and independent truck owners. These actors may not have the necessary resources to dedicate to maintain vehicles, posing safety risks to road users.	Calgary Goods Movement Strategy, City of Calgary (December 2018)	• Need for enforcement and education	The City should encourage the Hamilton Police Service and Ontario Provincial Police to undertake more frequent compliance campaigns to educate and enforce safety requirements among large, small and independent truckers.	In consultation with the HPS and OPP, the City should investigate the existence/extent of the problem and the need for further enforcement and driver education.

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3	Use of high-vision cabs.	No comments	Various municipalities have mandated the requirement for their fleets to be equipped with high-vision cabs, and the procurement of 'green' trucks. The City of Montréal, for example, uses small, green waste removal trucks. Some private sector fleets have initiated safety initiatives for their fleets. Lafarge Canada, a major cement provider, has implemented its *Cycling Safety Strategy.* This multi-part initiative that includes the deployment of additional mirrors, under-vehicle guards, warning signs and driver training. Following a review into cycling fatalities in 2012, the Office of the Chief Coroner of Ontario proposed the mandatory installation of under-vehicle guards for trucks. However, this recommendation has not been regulated, although several fleets have acted on it.	Lafarge Canada: https://www.lafarge.ca/en/cycling-safety Cycling Death Review, Office of the Chief Coroner of Ontario, June 2012	• Deployment of vehicles with high-vision cabs in large fleets. • Deployment of vehicles with other safety equipment.	The City could review its commercial vehicle fleets, including emergency services, to assess the feasibility of introducing (additional) cyclist/pedestrian safety equipment, driver training and potentially smaller vehicles.	Consider a policy that mandates the use of high-vision cabs and other safety equipment on City-owned vehicles.

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
GOAL: equitable							
1	Equity of impacts of truck network on neighbourhoods The impact of trucks on disadvantaged neighbourhoods is inequitable.	The impacts from truck operations is having a disproportionate impact on disadvantaged neighbourhoods, and is inequitable. Need to reduce impacts on neighbourhoods caused by trucks.	**Barrio Logan, San Diego:** The Barrio Logan neighbourhood is wedged between San Diego Port area to the south and Interstate 5 to the north. The neighbourhood is considered an "environmental justice" community by the State of California. For years, residents raised concerns about the impact of truck traffic congestion between the Port and interstate. Further study identified that the interstate interchanges could not meet future truck demands, and increasing their capacity was limited due to geometric constraints. Without a change, the congestion in the neighbourhood would increase. It was decided to route trucks around Barrio Logan incrementally to relieve the localized congestion and address reliability concerns. Before, during and after the transition, air quality monitoring revealed significant improvements to community air quality; however, the rerouting resulted in longer trips, which increased the net emissions produced. The researchers raised three issues for consideration when examining local truck routes: • There is a philosophical question about the trade-off between local emissions and regional emissions. In the study, longer trip distances due to rerouting trucks meant higher overall emissions, despite localized improvements in Barrio Logan; • Local diesel truck impacts on sensitive communities may be mitigated by merely rerouting, instead of constructing new infrastructure. This need not compromise transport operational efficiency, but may also not result in a regional air quality benefit; and, • Community-led processes can be useful when communication channels between citizens, industry, government, and other regulators are open. The potential for their use should be explored further.	Mitigating Diesel Truck Impacts In Environmental Justice Communities: Transportation Planning and Air Quality in Barrio Logan, San Diego, The U.C. Davis-Caltrans Air Quality Project, Alex Karner et al. (November 2008)	• Rerouting trucks improves local air quality but increased overall regional emissions • Rerouting was done outside of the traditional planning process	Rerouting trucks from sensitive areas will result in localized improvements (e.g. air quality). However, these local improvements are offset by higher regional emissions. Similarly, the charge to remove the truck routes was driven by technical constraints (e.g. unable to increase interchange capacity) and community advocacy outside of traditional planning processes. The City should consider using non-traditional planning methods to resolve issues as much as possible before initiating traditional regulatory ones.	Consider introducing a standard Truck Operation Monitoring Framework as part of the development application approval process for industries that a) are major freight generators that rely on trucking and b) may adversely impact the nearby residential community or sensitive lands. The Framework would require the development of criteria, thresholds or guidelines to establish what types of industries would be subject to the requirement. Consider designating certain streets as Major or Minor Truck Streets, with a corresponding categorization of Complete-Liveable-Better treatments. The intent is to ensure that

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			Mira Loma Village, Jurupa Valley, California: Mira Loma Village is a small residential enclave surrounded by Eastern Los Angeles' main warehouse and freight centre. The community is adjacent to the main road that connects warehouses and distribution centres to State Hwy. 60. In 2014, the City initiated an Environmental Impact Report to determine whether local roads around the enclave should limit trucks over 16,000 lbs (7,250 kg) as per the California Environmental Quality Act (CEQA). This included micro-modelling of traffic, air quality and noise, which found more noise, higher emissions and lower traffic levels of service on alternative routes. In 2019, the City approved restricting trucks on two roads, with restrictions made for pick-up trucks and local deliveries. To do so, they were required to issue a "Statement of Overriding Considerations," which needed to state they believed the benefits of the truck restriction overweighed the "significant and unavoidable impacts from the proposed ordinance." One complicating factor was that under CEQA, any public organizations that may be impacted, in this case, the City of Ontario (shared intersection) and CalTrans (freeway operator), has the right to ask for mitigation measures to reduce impacts they may face. The staff report indicated that these would total up to $1,083,000. Ultimately, the City of Ontario waived their 'fair share funding ($748,000) while the City is liable for 'fair share funding' to CalTrans ($335,000) if they choose to improve the interchanges.	Minutes of The Regular Meeting of The Jurupa Valley City Council, Jurupa Valley City Council (October 3, 2019)	• Comprehensive study to understand the implications of small network changes • Supportive residential, political and industrial stakeholders	Should Hamilton choose to modify truck routes after an updated network is developed, it will be important to conduct a thorough analysis to understand the broader trade-offs, including setting clear priorities for what matters most. For instance, improved equity and liveability considerations in one area may be offset by higher emissions, more noise, and increased congestion in other locations.	trucks can be safely managed in key corridors (notably, access to the Port).

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			Halifax: The Port of Halifax, Atlantic Canada's largest port, is located at the South End of the city. There is no direct higher order roadway link from the freeway system to the Port, requiring 500 trucks per day to travel on downtown roads to reach the port. Trucks through downtown have been a contentious issue as officials plan for mixed-use intensification in the area. The City's 2017 Integrated Transportation Master Plan identified several alternatives to reduce or remove truck traffic, including trucks in rail corridors, a rail shuttle from a satellite terminal, a truck ferry and relocating the terminal. Ultimately, the City received $47.5 million in funding from Transport Canada in 2019 to move forward with improvements to create a rail shuttle between the Port in the South End and a satellite container facility located on the North End. The project involves double-tracking an existing rail corridor through the west side of the city and extending tracks to reach the satellite facility. It is expected that the project can reduce up to 70 to 80% of trucks travelling on surface streets, reducing the impact on neighbourhoods and businesses. Bulk goods will still need to travel directly to the port, whereas containerized goods can be shifted to an offsite location. The additional operational costs and time required to handle containers are unknown. In recent media reports, the City has not confirmed if they plan to remove the downtown truck route as some trucks, most notably refrigerated containers, will not use the rail shuttle. Similarly, the rail corridor has been proposed to be part of a potential commuter rail line in the Halifax area, and it's unclear if the two projects can coexist.	Integrated Mobility Plan, City of Halifax (Dec. 2017)	• Numerous studies to investigate alternatives to road-based goods movement • Availability of a rail corridor and off-site yard to shift trucks away from the Port • Large volume of containerized goods travelling through the Port which can be shifted to rail	Halifax is facing many of the same concerns around the impact of trucks on their downtown. Halifax's proposed solution results from twenty years of study to explore intermodal solutions, including new truck roadways, rail shuttles, and port relocation. A large portion of the goods coming through Hamilton's port (e.g. grain) are not containerized, which means they still need to travel to the terminal directly, which is still occurring in Halifax	
			City of Seattle – Major Truck Streets: Many Complete Street guidelines have different schemes for different environments. For example, in Complete Street schemes in industrial areas, trucks and other vehicular traffic often have priority over other corridor users. In other areas, the reverse applies. However, high truck volumes can be found anywhere in the urban environment. Accommodating large trucks in all areas is not appropriate, but goods still need to reach all parts of a city. This need can generate conflicts in the designation of a Complete Street in a given environment. In Seattle, several streets carry significant truck volumes through the downtown to the port area. This generated conflicts on how these downtown streets, some of which are key cycling corridors, should be categorized for Complete Streets improvements. The City developed a framework to address these conflicts: In Seattle's Complete Streets policy, mobility is noted as the policy's	Complete Streets in Seattle, Seattle Department of Transportation (n.d.) Truck Streets in Seattle, Seattle Department of Transportation (n.d.)	• Ability to accommodate all road users safely and maintain mobility • Ensure that trucks are properly and safely accommodated in specific designated corridors	The Seattle designation of various CBD streets as Major Truck Streets was controversial, especially with the city's cyclists. However, in the end, it recognized the reality of having to ensure access to the port but in ways that could better manage truck traffic. Simultaneously, the City has been active in implementing its Center City Bike Network Plan to provide safe access within the CBD and extend connectivity with other parts of the city's bicycle network.	

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			second priority, after safety. Consistent with these two priorities, on streets that have been designated as “Major Truck Streets,” the policy requires that design and operational improvements “support” all modes and “are consistent with freight mobility. Thus, several downtown streets were designated as Major Truck Streets. A Major Truck Street is “… an arterial street that accommodates significant freight movement through the city, and to and from major freight traffic generators. The street is typically a designated principal arterial…Major Truck Streets generally carry heavier loads and higher truck volumes than other streets in the City…” A Major Truck Street can be anywhere in the city. These designations appear in Seattle’s freight network. There are four categories: Major Truck Streets are streets that connect ‘urban centres’ (including the CBD), intermodal facilities and the regional road/highway network, and can be minor arterials or higher roads. Minor Truck Streets as those that connect ‘urban villages’ and commercial districts and can be collector arterials or higher. (Seattle has three categories of arterials.) The other two categories are limited access highways and first/last mile connectors within manufacturing and industrial areas. The designation points out that “designating a street as part of the freight network will not necessarily change its overall function, design or character. Rather, the designation underscores the importance of ensuring that goods movement can be accommodated on that street in a safe manner.”				

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SUSTAINABILITY							
GOAL: Environmental Sustainability and Public Health							
1	Public Health – Air Quality The emissions produced by diesel trucks are hurting public health and the environment.	Residents, BIAs and environmental groups raised trucks' emissions as a major concern from a public health and climate change perspective.	**California Truck and Bus Regulation:** In 2008, the California Air Resources Board (CARB) adopted the Truck and Bus Regulation for heavy vehicle diesel emissions. The regulation applies to all public and private diesel vehicles weighing more than 14,000 lbs (6,350 kg) that operate in California and is more stringent than federal laws. The regulation requires all vehicles to have a particulate matter engine filter by 2012 and must not have a model year engine older than 2010. Pre-1994 model year engines were required to comply by 2015, and other engines must be replaced progressively until all comply by 2023. Starting in 2020, owners must demonstrate they comply to register their vehicle with the DMV. Exemptions are made when there are other regulations in place for specific vehicle classes or exceptional circumstances, where retrofitting is not possible. The motivation for the regulation is to reduce particulate matter produced by diesel exhaust. CARB has identified particulate matter as a toxic air contaminant and estimates that the regulation will save 9,400 within the 11-year phase-in period, saving an estimated $48 to $69 billion in healthcare costs. It faced extension opposition from the Federal Government and industry groups but was permitted following legal challenges.	Truck and Bus Regulation Program Overview, California Air Resources Board website (n.d.)	• Legal authority to enact stricter regulations • Strong enforcement mechanism to support compliance • Direct links to public health outcomes	The legal authority to regulate on-road vehicle emission standards is granted to Environment Canada through the *Canadian Environmental Protection Act.* Since 1988, there has been regulatory co-operation between Environment Canada and the US Environmental Protection Agency to develop and adopt harmonized emission standards, apart from California. The City could work with the Province to establish a provincial low emitting emission standard, possibly using CARB's standards. Vehicles that meet the standard could be granted certain privileges over others, such as priority truck routes or allowing them to travel past sensitive receptors.	Together with provincial and federal governments and other municipalities, consider working towards the development of more stringent air quality emission standards for urban areas Consider assessing and quantifying the extent of air quality problems in Hamilton and examining the feasibility of alternative control measures, restrictions and the like in all or parts of the city.
			Paris Low Emission Zone: Paris was the first city in France to establish a low emission zone (LEZ) to reduce air pollution. The LEZ restricts access according to a vehicle's classification in France's Crit'Air system, which is tied to the European Union's Euro emission standards. The restrictions apply weekdays from 8:00 to 20:00. As of 2020, diesel trucks must meet the Class 3 standard (Euro 4 for diesel trucks, Euro 2/3 for gas and hybrid trucks). The requirement will become progressively more stringent until 2024 when all diesel trucks are banned, and by 2030 only battery-electric and hydrogen fuel cell vehicles will be permitted. It is estimated that the LEZ accelerates NOx's decline in the area by 7 to 10 years. The LEZ encompasses the City within the Orbital Road (Boulevard Périphérique). Vehicles must register to receive a CRIT'Air Class sticker before entering, which simplifies enforcement for police. Trucks that enter without a sticker can receive a 135 Euro fine.	Paris Low Emission Zone, Urban Access Regulations in Europe (n.d.) Impacts of the Paris low-emission zone and implications for other cities, The Real Urban Emissions Initiative (2020)	• Public subsidy for green vehicles (e.g. free parking, charging stations) • Active police enforcement • Financial assistance for small companies	Hamilton could advocate developing a national or provincial tiered emission standard, which can be used to implement LEZs in municipalities. If Hamilton wants to establish as LEZ, defining a clear timeline and requirements for each step is important to signal to industry how to plan their fleet. However, incentives to scrap older vehicles and shift to zero-emissions vehicles could reduce the amount of lead time to implement more advanced LEZ stages.	

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			Near-Road Air Pollution Pilot Study Pilot: A team of researchers led by the University of Toronto undertook a two-year study of near-road emissions using six stations in Toronto and Vancouver. The study finds that emissions at the stations were more strongly correlated with the number of large diesel trucks on the road than the number of cars. Major non-freeway truck routes had emissions levels comparable to those seen beside Highway 401, despite carrying less than one-tenth of vehicle traffic. To address this, recommendations include: • Target highly polluting trucks, including developing new technologies to allow on-road or roadside identification and testing quickly. The report notes that there are typically 3,000 roadside inspections by the MTO Vehicle Emission Enforcement Unit despite 260,000 registered that 4,500 kg, or an enforcement rate of less than 1.2%. It estimates high polluting trucks may make-up 10 to 20% of all vehicles; • Eliminate tampering with vehicle system emissions; • Repair, retrofit, retire or relocate older trucks; • Recognize and reward low emitters. Governments should create standards and processes to recognize vehicles that are low emitting; and, • Incorporate traffic early in facility siting. Increased and earlier consideration should be given to truck traffic when siting facilities for society's more vulnerable members, such as playgrounds, hospitals, daycares, schools and retirement homes. A tool should be developed to alert urban planners when in-depth assessment may be required for a candidate site.	Near-Road Air Pollution Pilot Study Report, Southern Ontario Centre for Atmospheric Aerosol Research (2019)	• Long-term monitoring stations near and away from roadways • Recognition that facilities that new facilities for vulnerable people should be located away from truck routes	The City should develop guidelines for where and how to site development for society's most vulnerable members when a parcel is located along a truck route (e.g. playgrounds, hospitals, daycares, schools and retirement homes). Further investigation of the potential health impacts on users/occupants should be required to demonstrate how impacts can be mitigated through design. The City should advocate for increased resources to MTO's Vehicle Emission Enforcement Unit, which inspects approximately 1.2% of all heavy vehicles registered in Ontario annually. The City should be an active partner in advocating for new programs to remove high polluting engines from roads and offer incentives to low emitting trucks to support its Climate Emergency Declaration. In the recent posting of *O. Reg. 457/19 Vehicle Emissions* to the EBR in fall 2019, other municipalities and advocacy organizations submitted comments on changes to roadside enforcement methods by none appear to have been submitted by the City.	
1	Public Health – Noise and Vibration The noise and vibration produced by trucks is having negative impacts on residents working and living	Residents report negative impacts on liveability due to truck noise and vibrations on their residence, including loss of sleep, homes shaking, and loss of outside enjoyment.	**Switzerland:** A study looked at self-reported noise exposures found higher odds of high annoyance in populations exposed to moderate truck traffic than those exposed to light or heavy truck traffic. The paper concludes that there is an inverse relationship between truck volumes and health-related quality of life..	Impact of road traffic noise annoyance on health-related quality of life: results from a population-based study, Journal of Quality of Life Research, Dratva et al. (2010)	• Truck-related noised has an inverse relationship with annoyance	Consider restricting the development of sensitive receptors and residential buildings along major truck routes. Alternatively, review noise-reducing design requirements for development along truck routes.	Consider requiring a detailed noise impact assessment for developments generating significant volumes of truck traffic when the site is not adjacent to a truck route, according to pre-defined thresholds, criteria and guidelines .

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	along truck routes.		**Road Surface Materials:** At higher speeds, the primary source of noise is rubber tire on pavement. This study compared the typical noise generated by operating a vehicle on concrete pavement surfaces against asphalt pavement surfaces. The data finds that open-graded asphalt pavement with small aggregate size is the quietest pavement type. In particular, it notes there can be as much as a 14 dBA difference between the noisiest and quietest pavement under similar conditions, with concrete cement surfaces typically the nosiest option. As sound level (dBA) is measured on a logarithmic scale, a difference of 14 dBA will be perceived as being 3x louder.	An Introduction to Tire/Pavement Noise of Asphalt Pavement, R. Bernhard et al., Purdue University (n.d.)	• Roadway surface materials impact noise generation	Review pavement design selection along roads travelling through residential areas. Typically, concrete surfaces have a lower lifecycle cost when there are large truck volumes compared to asphalt. The City should determine if restrictions on concrete surfaces are appropriate along truck routes near sensitive receptors, even if there are large truck volumes.	
			Halifax: Researchers measured noise levels in two Halifax neighbourhoods: a predominantly single-family dwelling, residential area, and a mixed-use, urban neighbourhood with multi-story buildings. Using data collected in the field, noise in the residential area was loudest near major roads, and quieter further away. Generally, noise in this residential area was found to follow general traffic patterns. In comparison, the mixed-use area was revealed to have statistically significantly higher environmental noise levels than the residential area. The authors attribute the higher overall noise in the mixed-use area to the continual presence of vehicular and pedestrian traffic, as well as background noise generated by institutional and industrial noise, such as delivery trucks and ventilation systems. The paper suggests instituting municipal “environmental noise standards and policies to protect the health of residents and preserve the urban environmental quality” and to policies to and initiatives to integrate traffic restrictions in residential areas and school zones.	Noise Levels Associated with Urban Land Use, Journal of Urban Public Health, G. King et al. (December 2012)	• Mixed-used urban areas were found to be noisier than residential neighbourhoods	Consider integrating environmental noise standards and policies, particularly within mixed-use areas, to protect the health of residents and preserve liveability.	
			Calgary: The City produces a ‘What are Traffic Vibrations’ brochure to educate residents, including information on what causes it, how vibrations are transferred, and what they can do to minimize annoyance and reduce rattling. In cases of excessive vibration, the City has a program where an inspector will review the condition of nearby roads to determine the cause of traffic vibrations and make a recommendation for repairs based on severity. In situations where there is no apparent cause for vibrations, they may install a seismograph to measure vibrations and make further recommendations.	What are Traffic Vibrations, City of Calgary (n.d.)	• Complaints-driven process • Program in place and promoted to identify sources	Hamilton could produce educational materials on the causes of traffic vibrations and what steps individuals can do to minimize them. Consider establishing a program similar to Calgary, where an inspector will review the road surface conditions and prioritize repairs if there are severe issues or install as seismograph if there is no apparent cause.	

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1	Truck idling There are issues with trucks idling in the community.	Stakeholders identified concerns idling along specific roadways while waiting to make a delivery (e.g. Burlington Street/Nikola Tesla Blvd.) and when purchasing food (e.g. Tim Hortons).	**Toronto:** The City of Toronto's idling by-law applies to vehicles and boats not propelled by oars. It prohibits any vehicle or boat from idling more than one minute in a sixty-minute period. Exemptions are made for: • Emergency vehicles involved in operational or training activities, and other vehicles assisting during an emergency activity; • Armoured vehicles where a person remains inside the vehicle, or the vehicle is being loaded or unloaded; • Vehicles where a medical doctor certifies that for medical reasons the person requires the temperature or humidity be maintained with a certain range; • Ferry boats operated by the City of Toronto; • Transit vehicles, including tour buses and private coaches, while passengers are embarking or disembarking; • Utility vehicles while they are in the course of being used for their basic function; • Boats, unless the boat is at anchor or tied to a dock; • All vehicles and boats that are required to remain motionless in events were the operator has no controls (e.g. traffic, weather conditions, mechanical difficulties); and, • Vehicles or boats engaged in a parade, race of event authorized by Council. Individuals found guilty of contravening the by-law can face a fine, as provided in the *Provincial Offences Act,* of no more than $5,000. Prior to 2010, the by-law permitted idling up-to three minutes during a sixty-minute period.	Toronto Municipal Code Chapter 517, City of Toronto (July 8, 2010)	• Enforceability • Appropriate exemptions	Toronto limits idling to one minute within a sixty-minute period, while Hamilton permits idling up-to three consecutive minutes, but with no additional timeframe. Hamilton could explore reducing the maximum time allowed and add a time frame if idling is a significant concern.	Consider reviewing the effectiveness of and compliance with the city's idling policy and then update the policy, if appropriate, and/or take other actions to improve its effectiveness, such as increased enforcement, etc.

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			City of Mississauga: Similar to Toronto, the City's idling by-law applies to both vehicles and boats. Vehicles and boats are permitted to idle continuously for no more than three minutes. Exemptions are provided for: • Emergency vehicles or other vehicles assisting in an emergency activity; • Armoured vehicles where a person remains inside the vehicle, or the vehicle is being loaded or unloaded; • Utility vehicles while they are in the course of being used for their basic function; • Boats not anchored or tied to a dock; • Motionless vehicles where a situation is outside the control of the driver (e.g. weather, traffic, emergency); • Transit vehicles at a stopover location or while passengers are embarking or disembarking; • Transit vehicles where the ambient temperature outside if more than 27 degrees Celsius or less than 5 degrees Celsius. • Vehicles transporting people who are carrying documentation certified by a medical doctor that for medical reasons, the person requires temperature or humidity within a certain range; and, • Vehicles with a heating or refrigeration system necessary to preserve cargo contained within. The by-law is administered through the *Provincial Offenses Act.* The City of Brampton's idling by-law (By-Law 133-2011, April 27, 2011) has the same three-minute threshold and identical exemptions. However, it explicitly mentions that it also applies to those roadways under the jurisdiction of Peel Region.	By-Law 194-09 (June 24, 2009)	• Enforceability • Appropriate exemptions	Mississauga only provides temperature-related exemptions for medical reasons and transit vehicles, while Hamilton provides it to all vehicles. Hamilton could consider updating its idling by-law to align with this more limited exemption.	

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1	Climate Change Resiliency Climate change poses significant risks to infrastructure, particularly truck routes. Climate-related events to truck routes will have an impact on the movement of goods in Hamilton.	Roadways need to be reliably available to support goods movement. The City has declared a Climate Emergency. Climate change events have impacted key truck routes. The frequency of these events is accelerating.	**Engineers and Geoscientists BC:** The association for professional engineers prepared *Developing Climate Change–Resilient Designs for Highway Infrastructure In British Columbia – Interim (2016)* in response to potential impacts of climate change regarding the BC Ministry of Transportation and Infrastructure design standards. The guidelines establish a standard of practice to addressing climate change. The main steps are: • **Define the Project:** establish the context in which climate risks can be evaluate and adaptation measures can be integrated into the design; • **Climate Change Vulnerability Risk Assessment:** risk assessment is not new in engineering but impacts of climate change need to be integrated into risk assessment (e.g. frequency of storm events). • **Identify and Incorporate Adaptation Options:** the guidelines note that "adaptation" refers to any action that reduces the vulnerability of infrastructure to climate change; not necessarily only physical improvement but other options like enhanced maintenance, phasing opportunities, or alternative siting. • **Document Process and Decisions:** proper document of key information associated with incorporating climate change resilience into the infrastructure design process needs to be recorded.	Developing Climate Change–Resilient Designs for Highway Infrastructure in British Columbia Interim, Engineers and Geoscientists of BC (2016)	• Clear framework for adapting designs to adapt for climate change	The City should review its practices for incorporating climate change in the engineering and design of new and renewed roadway infrastructure. This could include incorporating conducting a climate change vulnerability risk assessment to identify potential risks could be mitigated.	As part of the City's Climate Emergency, actively consider the necessary policies, etc., to designate critical transportation infrastructure and then to protect it and/or otherwise mitigate or adapt to climate change impacts.
			Public Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol: PIEVC Protocol was released in 2008 and has been applied to assess climate risks and vulnerabilities across a wide range of infrastructure systems in Canada, including roads. Engineers Canada encourages the use of the protocol for all infrastructure projects. The Protocol is based on historic climate information to forecast the nature, severity and probability of climate change. It determines the adaptive capabilities of individual infrastructure components throughout its design, operation and maintenance, and estimates the severity of climate impacts on infrastructure to enable the identification of high-risk components and the nature of the climate change threat. This information can be used to inform engineering judgment on what components require adaptation as well as how to adapt them.	PIEVC Protocol, Public Infrastructure Engineering Vulnerability Committee (2008)	• Need to assess climate change impacts before design work • Assess potential risk and mitigations strategies	The Protocol outlines an approach that the City could consider integrating into its asset management and design practices. It could be piloted on a small number of roadways that are truck routes.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
GOAL: Adaptable							
1.	Implications of varying truck sizes and types on the local environment Roadway policy design can be leveraged to influence the truck's size that can comfortably use a specific route.	Concerns about large trucks travelling through residential and main street commercial areas.	The City of Vancouver, BC, offers insight into how off-street loading requirements can be used to manage deliveries and vehicle sizes downtown and throughout the city. As described below, Vancouver's parking by-law promotes the use of smaller trucks for deliveries, the use of its pervasive downtown back/side lane system for deliveries and off-hours deliveries: • "The City's Parking By-Law generally has low or non-existent requirements for accommodating large trucks. The large majority of loading requirements are Class B spaces (3m x 8.5m) with larger Class C (17m x 3.5m) required for larger manufacturing, warehouse, hospital, and retail and similar uses. This means that smaller vehicles are more often used for deliveries throughout Vancouver. • In the downtown, and other parts of the City, Class C requirements may be relaxed due to geometric constraints on access from lanes and manoeuvring space requirements. Often the City looks for loading demand studies or loading management plans with developments that propose relaxations. • There are not very many large big-box retailers in the downtown. Where these exist, they are required to provide sufficient loading, and many stores use smaller tractor-trailer combinations when loading downtown, more in line with a WB-12 [33' trailer], than a WB-17 or 20 [53' trailer].	Ottawa Goods Movement Backgrounder, City of Ottawa (April 2019)	• Ability of developers to provide on-site loading spaces • Documentation requirements for loading relaxations • Availability of alternative loading spaces • Responsiveness to changes in delivery practices	Need to ensure that multiple developers are not relying on the same off-site loading spaces/zones, or if they are, that the spaces aren't required at the same time. Should investigate on-street loading spaces with Downtown Hamilton Parking Strategy update.	
			Metrolinx: Although the focus on heavy truck movement is appropriate for the development of a region-wide SGMN, as noted above, it is recognized that in some parts of the GTHA, especially in the denser urban cores such as downtown Toronto, small- and medium-sized truck movement can exceed heavy truck activity. However, the design and planning needs associated with the small and medium-sized trucks, while important, tend to be more localized, focusing on smaller geographies and individual roads and streets.	GTHA Strategic Goods Movement Network, Metrolinx (2018)	• Determining where small-truck policies should apply and where large truck policies should apply. • Determining the "default" set of policies	Need to link policies with short-term and long-term development and redevelopment trends to plan the network to accommodate changes adequately.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
1	Integration with Complete-Livable-Better (CLB) streets The City's new CLB policy calls for roads to support all road users, including goods vehicles, cyclists and pedestrians.	Streets need to be designed to accommodate all road users. Existing roads are designed to prioritized trucks and cars over other modes. Introducing bike lanes and routes on truck routes is counter-intuitive and increases safety risks between goods vehicles and other road users.	**NACTO:** Design for the most vulnerable street user rather than the largest possible vehicle. While designs must account for the challenges that larger vehicles may face, these infrequent challenges must not dominate the safety or comfort for most daily users. The selection of design vehicle influences the physical characteristics, safety, and operations of a roadway. • Adopt a new design vehicle that is a frequent user of urban streets: the delivery truck (DL-23). Package delivery trucks commonly travel on city streets and have an inside turning radius of 22.5 feet and an outside turning radius of 29 feet; and. • All truck routes should be designed to permit the safe and effective operation of trucks. Designation of freight routes should be considered in coordination with mapping of the primary bicycle, transit, and pedestrian corridors, and the analysis of key access routes, bridge hazards, and industrial or commercial land uses. Pair truck route programming with enforcement to ensure that oversize vehicles are not diverting off-network.	*Urban Street Design Guide*, NACTO (2014)	• Determining the appropriate design vehicle for the context • Determining the appropriate control vehicle for the context • Enforceability	Vulnerable road user safety should be the top priority in roadway design. As the City develops its CLB guidelines, it should make sure that street typologies accommodate truck routes design measures to make sure that trucks can safely travel on designated truck routes and discourage the use of roads that are the same typology but not truck routes. The City should also recognize, develop and incorporate the designation of a truck freight network, similar in concept to the City of Seattle, as a means to better managing truck traffic on certain corridors.	Ensure that CLB guidelines account for truck mobility appropriately to different environments and contexts, always with safety for all road users as the top priority. Consider developing a freight network that allows various streets to be designated according to their use by trucks. Accordingly, it can be used to inform the CLB treatment that is appropriate for a given designation.
			New York State: Freight carriers are critical to supporting community needs, giving access to material goods to support the quality of life and economic vitality, and remove unwanted materials. Emergency service providers protect community health, safety and prosperity. This guide recognizes that there is a need for goods movements and emergency service operations in liveable communities. Among other goals, this guide aims to identify design, regulatory and operational strategies to address challenges and to introduce demand management strategies toward reducing freight and emergency trips. A few considerations include the following: • Select appropriate design vehicles, noting the difference between a design vehicle and a control vehicle. A control vehicle is an occasional road user only and may be permitted to encroach on infrastructure used by other modes to save space overall, e.g. mounting a curb to navigate a tight turn rather than providing overly large curb radii. • A number of approaches could be implemented to ensure adequate turning paths for large freight where space is limited and could be considered as pilot treatments: clearly identifying potential conflict areas with bike lanes, asymmetrical median noses, mountable or flush curbs to be mounted at crawl speed, dedicated signal phases, etc. • The frequency and severity of conflicts between large vehicles and vulnerable roadway users can be managed through roadway design elements (e.g. bike boxes and two-	*Complete Streets Considerations for Freight and Emergency Vehicle Operations*, Prepared for New York State Energy Research and Development Authority (2018)	• Understanding that freight carriers and emergency response vehicles contribute to community prosperity and quality of life.	While community groups in Hamilton would generally advocate removing trucks from community routes, there also needs to be recognition that freight carriers and emergency response vehicles contribute to community prosperity and quality of life. Some routes will need to serve trucks among other road users. Appropriate design vehicles and control vehicles need to be identified for each street. Innovative design features can be implemented to accommodate truck turns, reduce conflicts, and allow space for parking and deliveries.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
			phase turn queue boxes, paint/texturing of conflict areas), signal phase design (e.g. leading signals for non-motorized travellers), curbside and on-vehicle equipment and technologies (e.g. convex safety mirrors) and education programs to inform both vehicle operators and vulnerable roadway users. • Speeds can be reduced without impacting operations or safety (e.g. mini roundabouts with mountable centre islands) facilitating left turns for large vehicles. • Network connectivity and redundancy can assist emergency responders. For instance, wide bike lanes can be used with extreme caution by emergency vehicles to bypass congestion. • Options to provide adequate parking space for vehicle parking, loading and delivery include offset bus and bicycle lanes, mountable sidewalks or sidewalk cutouts, building delivery management, commercial meter pricing and flexible curb regulations.				
			Chicago: The design vehicle influences several geometric design features, including lane width, corner radii, median nose design, and slip lane design. It is critical not to use a larger design vehicle than necessary, due to negative impacts such as turning speed, yielding behaviour and crossing distances. Likewise, using a design vehicle that is too small may result in frequent instances of trucks driving over curbs on street corners, endangering pedestrians. Nevertheless, it is best to err on the side of too small than too large in an urban setting. Delivery Van These policies and procedures introduce a new design vehicle: Delivery Van (DL-23). It is based on the mail or package truck commonly used in Chicago. For design purposes, it is 23 feet long, 8.5 feet wide (10 feet with mirrors), and 10 feet high. Its turning radii is 29 feet outside, 23.3 feet centerline, and 22.5 feet inside. Policy Design vehicle selection is to be made as per the roadway typology of the receiving street at an intersection. • Thoroughfare: WB-50 • Connector: BUS-40 • Main Street: SU-30 • Neighborhood Street: DL-23 • Service Way: DL-23 A larger vehicle may be used if a vehicle classification study identifies that a particular vehicle making a specific turning movement is larger than the vehicle specified above.	Complete Streets Chicago: Design Guide, Chicago Department of Transportation (2013)	• Determining the appropriate design vehicle for the context • Determining the appropriate control vehicle for the context	As Hamilton develops its CLB guidelines, it should consider developing clear street typologies for major roads and identify an appropriate design vehicle for each. As Chicago demonstrates, a one-size-fits-all approach to design and control vehicles can result in over- or under-designed roadways.	

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
			Control Vehicle: To ensure that access for Emergency Medical Service (EMS) vehicles, fire engines, moving trucks, and sanitation vehicles are not precluded, CDOT will use control vehicles. A control vehicle utilizes all traversable parts of an intersection, including driving over curbs and across centerlines. In addition, fire engines typically drive over break-a-way signs and other obstacles. The design and control vehicles work in tandem: the design vehicle keeps an intersection compact for everyday use, the control vehicle allows access by necessary vehicles.				
			Boston: The smallest feasible curb radii should be selected for corner designs. Small curb radii benefit pedestrians by creating sharper turns requiring motorists to slow down, increasing the size of waiting areas, allowing greater flexibility in the placement of curb ramps, and reducing pedestrian crossing distances. Small curb radii may be more difficult for large vehicles to negotiate, however on-street parking or bicycle lanes may provide the larger effective radii to accommodate the appropriate design vehicle. A variety of strategies can be used to maximize pedestrian safety while accommodating large vehicles, including: • Adding parking and/or bicycle lanes to increase the effective radius of the corner; • Striping advance stop lines on destination streets to enable large vehicles to make the turn by encroaching into the adjacent roadway space; • Varying the actual curb radius over the length of the turn so that the radius is smaller as vehicles approach a crosswalk and larger when making the turn; • Installing a textured, at-grade paving treatment to discourage high-speed turns while permitting turns by larger vehicles; and, • Restricting access and operational changes prohibiting certain movements.	Boston Complete Streets Design Guidelines, Boston DOT (2013)	• Determining the appropriate design vehicle for the context • Determining the appropriate control vehicle for the context	The Boston guidelines offer a variety of strategies to increase pedestrian safety in the presence of larger vehicles. As part of the CLB guidelines, the City should consider explicitly identifying similar measures.	

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			The implementation of Complete Streets, if not well planned, can lead to conflicts such as lane widths being too narrow for trucks and truck turning radii, sometimes coming in conflict with pedestrian curb extensions and traffic calming treatments. Although many guidelines provide general indications of ways to serve all corridor users, from the perspective of goods movement, the key difficulty is "considering site-specific requirements and treating every block and intersection for its specific needs." To harmonize goods movement needs and the implementation of Complete Streets schemes on individual corridors, one observer proposes three steps: • Plan to support – not eliminate – goods movement from the corridor; • Ask goods movement operators what they need and what could work for them; and, • Think beyond corridor design alone – for example, by making capacity and signal timing modifications at upstream intersections that are better suited to handle truck traffic in order to divert that traffic before it reaches the shared corridor.	*Report 24: Smart Growth and Urban Goods Movement*, National Cooperative Freight Research Program (2013), *Complete Streets and Goods Movement, Options and Considerations*, Talking Freight (May 21, 2014), and *City of Ottawa Goods Movement Backgrounde*r, City of Ottawa (2019)	• Maintaining goods movement capability in areas away from major truck routes • Block specific design elements – move away from one-size-fits-all programming • Buy-in from goods movement operators	As described above, the City of Seattle recognized there needs to be a balance supporting desirable goods movement (delivery to end-user) from undesirable goods movement (through trucks) to support vibrant neighbourhoods. Hamilton could consider through truck restrictions on sensitive corridors. Hamilton could use signal timing and intersection treatments to steer larger vehicles away from sensitive corridors.	
			The destination of goods impacts the choice of whether to use large or small vehicles. For example, a fully loaded truck may go to only one customer, or it may make multiple stops along a route, delivering to an assortment of customers. Given the complexity involved in truck routing decisions, in some cases, smaller delivery vehicles would necessitate additional truck trips. If a truck restriction policy were only implemented in one specific area—for example, a downtown core—the relative attractiveness (in terms of cost) of shopping in that area may be reduced compared with other retail areas that do not have such a restriction. Indeed, such a restriction may be similar to cordon or congestion tolling, which is effective either in specific locations or under systemwide implementation. Were there to be a shift away from shopping or other activities in dense urban areas, such a result would be counterproductive to the desired outcomes of smart-growth or growth-management principles. In other words, great care should be given to ensure that goods can be moved into dense urban areas, rather than imposing additional costs on those movements.	*Report 24: Smart Growth and Urban Goods Movement*, National Cooperative Freight Research Program (2013)	• Determining the appropriate design vehicle for the context • Determining the appropriate control vehicle for the context	If restriction policies are put in place, consideration should be given to the possible wider implications.	

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1	Road design guidelines There is an opportunity to review the City's road design guidelines to better accommodate other modes of transportation, while not precluding trucks.	Roads are being designed to prioritize trucks and cars over pedestrians, cyclists and others.	**Toronto, Ontario**: Curb radii are determined using various design controls such as vehicle types, turning volumes, and road classifications. The guidelines provided should be used with experiential knowledge and sound engineering judgement to determine appropriately sized curb radii. Applying standard curb radii at all intersection corners would be an unsound design given varying characteristics of intersection corners across the City. Design vehicles are typically the largest frequent vehicle type manoeuvring a right turn at an intersection corner. The turning movement of design vehicles is frequent, and the design should allow for turns to be made with relative ease. Control vehicles are typically the largest vehicle type required to manoeuvre a right turn at an intersection corner. Control vehicles make up a small fraction of all vehicles, and manoeuvre turns at intersection corners at a relatively low frequency. Control vehicles use more space than design vehicles to manoeuvre right turns. For frequent truck turns, a WB-20 design vehicle is used. Otherwise, the design vehicle is a MSU. If a residential street is involved, then the design vehicle is an LSU or smaller.	*Curb Radii Guideline,* City of Toronto (2017)	• Determining the appropriate design vehicle for the context • Determining the appropriate control vehicle for the context	As the City's new CLB guidelines are developed, consider giving special consideration to what design and control vehicles govern for different road typologies. Where the control vehicle is smaller than the design vehicle, there may need to be an education component to demonstrate that larger vehicles are still allowed to turn, even if they have to enter the opposing lane while making a left or right turn.	City's road design guidelines should consider safe truck movements while ascending and descending grades. Speed limits, lane restrictions, and engine brake considerations should be considered.
			NACTO: Design for the most vulnerable street user rather than the largest possible vehicle. While designs must account for the challenges that larger vehicles, especially emergency vehicles, may face, these infrequent challenges must not dominate the safety or comfort for most daily users. The selection of design vehicle influences the physical characteristics, safety, and operations of a roadway. • Adopt a new design vehicle that is a frequent user of urban streets—the delivery truck (DL-23). Package delivery trucks commonly travel on city streets and have an inside turning radius of 22.5 feet and an outside turning radius of 29 feet; and, • All truck routes should be designed to permit the safe and effective operation of trucks. Designation of freight routes should be considered in coordination with mapping of primary bicycle, transit, and pedestrian corridors, as well as through the analysis of key access routes, bridge hazards, and industrial or commercial land uses. Pair truck route programming with enforcement to ensure that oversize vehicles are not diverting off-network.	*Urban Street Design Guide*, NACTO (2014)	• Determining the appropriate design vehicle for the context • Determining the appropriate control vehicle for the context	Design guidelines need to be context-specific and based on what the intended purpose of the corridor is.	

B.2 Private Sector Best Practices

Exhibit B.2: Private Sector Best Practices

Rank	Issue/ Opportunity	Related Engage-ment Findings	Policy Example	Policy Reference	Application Success Factors	Considerations for Application in Hamilton	Potential Policy Direction for City of Hamilton
ECONOMIC PROSPERITY							
GOAL: ECONOMIC ASPIRATIONS							
2	Crowdshipping The growth in crowdshipping, particularly among food delivery, is placing new demands on curbside space.	No comments	Crowdsourcing is on-demand shipping. Customers use 'Uber-like' apps to bypass traditional brokerages in securing a pick-up from an independent driver who transports the goods by their mode. The extent to which crowdshipping serves as a disruptive technology for traditional brokerages and large fleet operators is not clear. However, although some analysts suggest that crowdshipping will be most effective in niche markets, such as short-distance or short-duration trips. Although crowdshipping can lower delivery costs and times, it does not necessarily result in a full load. Businesses such as Uber Connects, Uber-Eats and Skip The Dishes demonstrate some of the aspects of crowdshipping.	Towards Road Freight Decarbonisation; Trends, Measures and Policies, International Transport Forum (December 2018)	• Willingness of consumers to choose crowd shipping over legacy freight carriers • Availability of local depots to dispatch parcels	Crowdshipping-type models, such as Uber Eats and Skip the Dishes, are placing additional demand for curbside space in urban areas. Many of these deliveries are made in personal vehicles, whose purpose in goods movement is not evident to enforcement officials. These deliveries often take place outside the regular workday, when other drivers feel that on-street loading regulations do not apply. Consideration should be given to reviewing loading zone bylaws to determine if these types of operations are permitted, or review if it would be appropriate to let them be.	Ensure existing on-street loading areas are enforced adequately at all times of the day. Monitor loading space utilization, durations, and the types of vehicles used. Monitor the need for short-term on-street parking/loading spaces. Assess site development policies to assess how well off-street loading requirements handle and accommodate courier deliveries.
			ShipperBee: A Guelph-based crowdshipping firm for mid- and long-distance shipments. A shipper indicates that their order needs to be picked-up. A local first-mile driver picks-up the packages and takes it to a "hive," a locker where packages are consolidated. Once a bundle of packages are consolidated at the hive, a middle mile driver transports the packages to a hive near the destination. Finally, the last mile local driver delivers the packages to the final destination. The company claims that by tapping into empty truck space and avoiding large consolidation centres, the model reduces CO_2 emissions by 73% per parcel.	ShipperBee website (2020)	• Willingness of consumers and businesses to choose crowd shipping over legacy freight carriers	Provide short-term curbside spaces near consolidation lockers.	

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GOAL: EFFICIENTLY CONNECTED (Last Mile)							
3	Proliferation of Distribution/ Fulfillment Centres Distribution Centres tend to generate significant truck traffic, and they should be located in areas that can accommodate the demands.	No comments	The growth in business-to-consumer (B2C) and business-to-business (B2B) e-commerce has led to an increase in the number of final deliveries being made directly to consumers from distribution centres (DCs), as opposed to retail stores. This has led to "mega DCs" located that fulfill orders in the local area and supply smaller DCs in smaller markets. Retailers' ability to provide quick and reliable service across an increasingly large catchment reduces the demand for goods purchased from physical stores and shopping centres. In the past, most trucks were limited to serving these larger centres. The growing B2C e-commerce market means that distribution is often moving towards small to mid-sized vehicles in areas that typically didn't see much truck traffic.	Ottawa Goods Movement Backgrounder, City of Ottawa (April 2019)	• Reliable access to a large population	To date, Hamilton does not have a large proliferation of DCs. However, the demand could change quickly with market conditions - for example, one of the major distributors might want to take advantage of HIA's 24/7 cargo access to implement a new DC that serves Hamilton, Niagara Region and nearby communities. Given the large volume of truck traffic these facilities tend to generate, it may be worth reviewing municipal zoning to limit them to areas that can accommodate them and not negatively impact sensitive receptors. Review policies to consider how to supply cost-effective commuting alternatives to driving.	Ensure that zoning, land use and transportation policies anticipate the potential introduction of DCs.
COMMUNITY liveability							
2	Urban Distribution (Consolidation) Centres (UDCs) UDCs provide a method to increase the efficiency of last mile deliveries and remove trucks from the streets.	Support for using green vehicles for making last mile deliveries.	**Lyon, France**: The Cordeliers UDC is located in central Lyon, a dense shopping district where space is limited and expensive. When the City of Lyon was reorganizing a public carpark, they fitted 300 m^2 for a UDC, including charging stations for four electric vehicles. Following a competitive bidding process, a preferred operator was selected, and the City entered an agreement at a below-market rate. The operator had previously delivered luxury goods within the central area from a suburban facility and was familiar with the market. The operator now delivers a variety of non-perishable goods to the central shopping district and in greater Lyon and shares the space with a food e-commerce provider that uses the facility at the opposite time. The central area's close location has reduced CO_2 emissions from vehicles by 14 tonnes per year and reduced travel times by 20%. However, the cost of breaking larger deliveries into smaller vehicles (bulk breaking) is at a 23% cost premium, which is primarily offset by the below-market rate to rent the site.	Urban Logistics Spaces: What Models, What Uses, And What Role for Public Authorities? D. Patier, F. Toilier (April 26, 2017), as described in Ottawa Goods Movement Backgrounder, City of Ottawa (April 2019)	• A public-private partnership with a financial incentive from the City • Restrictive vehicle emission measures • Experienced logistics provider that is familiar with the local market	Establishing a UDC requires public leadership and likely subsidies, and an established partner that is familiar with the local market. Incentives and support from the public sector include land, facilities, vehicle charging stations and financial contributions. The City could offer publicly owned space or a facility to support a UDC. The City should undertake consultation with retailers, industry and shippers to determine if there is demand for a UDC. If there is interest, undertake a business case study. As an alternative, as new residential and commercial buildings are developed, especially in the UGC, the City could encourage a developer to plan one or more floors of parking to be outfitted for a future UDC potentially. Given the potential for autonomous vehicles to reduce parking demands, repurposing parking structure space to a UDC-type facility would maximize the utility of new structures in the future.	Investigate the demand for an urban distribution centre in Hamilton and, in particular, what support is required from the City to enable a UDC In conjunction with local and international couriers, investigate the demand for and feasibility of establishing mobile UDCs in Hamilton and, in particular, what support is required from the City to enable these.

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			Kyoto-Osaka-Kobe Region, Japan: Since 1989, a group of 11 department stores have partnered to deliver goods to consumers through a privately operated UDC model. While the department stores are competing for sales, the shared use of storage space and deliveries offers a cost saving measure, creating a strong business for all actors involved. The program has reduced vehicle-kilometres travelled and labour hours required to make shipments.	Cooperative Freight Transport Systems, City Logistics: Mapping the Future, T. Yamada (2015), as described in Ottawa Goods Movement Backgrounder, City of Ottawa (April 2019)	• Large volume of packages being shipped daily • Shipper incentivized by direct cost savings	Private UDCs models require a strong business case to succeed without public subsidy. The City's potential role in this type of model is unclear, although making land available could be a possibility. Generally, this model succeeds when the shipper is also delivering goods and can save costs by using the UDC.	
			DHL CityHub: CityHub is a mobile UDC concept used in select cities in the Netherlands, Belgium and Germany. The CityHub is a customized van trailer that can carry up to four containers. The trailer is brought near to the central areas are then loaded onto DHL Cubicycles (electric cargo bikes) for containers up to 125 kg, or onto StreetScooters (smaller electric vans) if the delivery is heavier. The customized trailers allow containers to be transferred from the trailer onto the receiving vehicle in under a minute. This makes it efficient to transport containers from the distribution centre to the transfer location. The containers match a standard shipping pallet's dimensions, making them easy to handle throughout the supply chain. The initiative has helped DHL replace 60% of inner-city vehicle routes in some countries with cargo bicycles.	DHL Expands Green Urban Delivery with City Hub For Cargo Bicycles, DHL (January 3, 2017) and cited in Ottawa Goods Movement Backgrounder, City of Ottawa (April 2019)	• Availability of land to use as transfer points • Cost savings	CityHub is a private sector response to constraints being introduced by municipalities and changing traffic/parking conditions. The City can support this type of initiative by regulating its operations but has a minimal role in introducing this service type.	
2	Trend toward Smaller, Low-Carbon Vehicles Smaller, low-emission vehicles reduce or eliminate many of the negative impacts associated with large truck operations.	Concerns were raised about large trucks travelling on local roads and suggested that smaller vehicles are generally not seen as a concern. Concerns were raised about the emissions produced by	**UPS:** UPS operates a fleet of 34 electric cargo bikes to make inner-city deliveries in over 30 cities in Germany, Belgium, France, Italy, Austria and the Netherlands. Delivery people pick-up packages throughout the day from mobile depots as opposed to urban consolidation centres. The compact design of the bike, at just 1 metre wide, makes them ideally suited for inner-city use, particularly in areas where automobiles are prohibited. The bikes reduce congestion, noise, emissions, and the time spent searching for a suitable parking spot. The bikes have a capacity of 1.5 m^3 and can carry loads weighing up to 150 kgs. In 2017, UPS launched an electric-assist cargo bike to serve the York University in Toronto. The university is near UPS's distribution centre. No information is available on the outcome of the pilot, or if it is still in operation.	UPS Nimmt 34 Neue e-Lastenrader In Betrieb, UPS Germany (June 6, 2018)	• Corporate objective to reduce global emissions • Density of bikeable trips in central areas that can be difficult to serve with large vehicles	Review the existing by-laws to determine if electric cargo bikes are permitted to use roadways, trails and other City travel corridors. Review if updating the City's bike parking requirements in some areas to require cargo bike parking in commercial developments make sense. This would enable tenants that may need to make local deliveries to do so by bike.	Review relevant policies to update as appropriate to ensure they enable the safe operation of small, low-/zero-carbon vehicles. These policies could range from design standards for bicycle lanes to plans for the city's bicycle network to liabilities and so on (i.e., more than transportation policies).

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		goods movement vehicles.	**New York City:** The NYC Department of Transportation launched the Commercial Cargo Bicycle Pilot program in December 2019. The program clarifies operating parameters for electric cargo bikes used for commercial programs in Manhattan, south of 60th Street. The six-month pilot is being delivered in partnership with DHL Express, Amazon and UPS. Over 100 cargo bikes are estimated to be involved. The objectives of the pilot are to cut congestion, speed up deliveries and reduce emissions. Each bike can carry up to 300 lbs. Companies participating in the program are required to ensure walkways are kept clear when the cargo bikes are parked, have a unique identifier on all bikes, not exceed 12 mph (19 km/h), provide a safety training for cargo bike operators, and store bikes inside company facilities. The pilot has brought some controversy as only businesses involved in the pilot can use electric-assist bicycles. Due to COVID-19, the current status of the pilot is unknown.	Mayor de Blasio Announces Commercial Cargo Bike Program to Reduce Delivery Congestion, New York City Press Office (December 4, 2019)	• Standardization of operating parameters from the City • Delivery partners have existing distribution facilities in the area	Monitor the lessons learned from the New York pilot, and determine if a similar pilot could be supported in Hamilton.	Consider partnering with the courier industry and others to pilot test a cargo bicycle program in Hamilton.
			DHL StreetScooter: As part of its effort to reduce emissions, DHL operates over 11,000 electric small- and mid-sized electric trucks. The vehicles have a range of 200 km and have a load capacity of 1,275 kg. The vehicles are recharged using power from renewal sources, meaning no emissions are produced. Each electric vehicle is expected to save 1,900 litres of fuel and eliminate 5 tonnes of CO_2 emissions against a comparable internal combustion engine vehicle. DHL aims to reduce all logistics-related emissions to zero by 2050 and convert 70% of its fleet to clean solutions by 2025. DHL also delivers packages through electric bikes, manual bikes, electric scooters and on foot.	DHL Electro Mobility Press Package, DHL (n.d.)	• Corporate objective to reduce global emissions • The vehicle manufacturer is a subsidiary of the company	Continue to lead by example by introducing more hybrid and electric vehicles into the City's fleet.	
			City of Toronto: The City of Toronto is undertaking a pilot program to use three cargo bikes at Allan Gardens for seasonal park maintenance in summer 2019. Staff estimate the pilot will avoid 0.42 tonnes of CO_2 emissions, save $400 in fuel, and be cheaper to purchase ($2,000 to $10,000) than motorized utility vehicles ($15,000). The program is expected to offer several benefits, including improved air quality, cost savings, operational efficiencies and improved health. Staff are required to complete a three-day Can-Bike Level 4 course. The pilot responds to a motion from City Council to explore how the City could use cargo bikes.	Staff Report GL4.14, City of Toronto (March 27, 2019)	• Defined pilot area that does not involve the use of roadways • Elected official leadership to explore opportunities for cargo bikes	Examine areas of the City's operations where cargo bikes may be able to replace automobiles. Undertake a pilot to test its viability.	

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			Montreal: The City of Montreal partnered with local mobility think tank Jalon Mtl, to launch Project Colibri in September 2019. Jalon coordinates a pilot to test various methods of delivering parcels by electric cargo bikes in collaboration with voluntary partners: Chasseurs Courrier; Courant Plus; La roue libre; LVM Livraison; and, Purolator. The program operates out of a new multi-modal hub in downtown Montreal, on the site of the former central bus terminal.	City of Montreal Press Released (September 12, 2019)	• Public sector funding to support the initiative	Monitor the results of the Montreal pilot project and determine if it may apply to Hamilton.	
GOAL: Adaptable							
1	Emerging goods movement technologies New technologies are emerging that can reduce some of the impacts associated with truck operations, including emissions, costs, vehicle volumes and safety compliance.	Support for using new technologies to remove trucks from the roadways.	**Autonomous Vehicles:** Observers consider long-haul trucking to be the component of freight transport that is most automatable. The vehicles tend to operate in simpler environments and (relatively) fewer conflicts. In most scenarios, it is expected that fleet operators will adopt autonomous trucks before individuals due to lower purchasing costs and operating savings associated with economies of scale. The necessary artificial intelligence systems to enable complete autonomy of vehicles are still in development. As well, uptake of these vehicles will depend on cost, reliability and savings to fleet operators, while broader issues like liability, insurance, regulation and public acceptance are outside the control of operators. Autonomous vehicles will reduce operator wages and fuel consumption, which account for 43% and 21% of industry-wide costs in the US in 2016.	Autonomous Vehicle Implementation Predictions, Victoria Transport Policy Institute (2018)	• Clear regulatory framework, supported by a business case for adoption	Hamilton should consider establishing an inter-departmental CAV working group to understand how municipal plans and policies can adapt to the arrival of autonomous trucks.	The City should explore deployment of image detection systems on municipal vehicles (buses, waste collection, etc.) to detect and log road defects and automatically generate maintenance work orders.
			Cooperative Truck Platooning Systems (CTPS): a level 1 automation technology, CTPS enables two or more tractor-trailers to travel closely together using sensors and wireless communications. This reduces aerodynamic drag, reducing fuel use (operating costs) and emissions. The distance, speed, acceleration and braking are controlled by the CTPS, and drivers can leave the platoon at any time. A driver must still be behind the wheel of the vehicle. CTPS are best suited for long-haul operations on a controlled or limited access highway. Typically, a truck will join a platoon once it enters the highway, leave it once it approaches its exit, and then operate independently for the first/last leg of their journey.	The Road to Cooperative Truck Platooning Systems Deployment in Canada, Transport Canada (October 24, 2018)	• Penetration rate of trucks with CTPS	Support the use of CTPS on trucks operating on appropriate roadways.	

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			Amazon Prime Air: Amazon has begun testing various types of drones to make last-mile deliveries. The drones are proposed for rapid deliveries: those that need to be delivered within 30 minutes. The drones can handle orders that are up to 5 lbs (2.25 kg), fit in a box and are being delivered within 16 km of a fulfillment centre. The first delivery was done in December 2016 in Cambridge, England. There were plans to expand use in 2019, but that has not happened as of winter 2020.	Amazon Prime Air, Amazon (n.d.)	• Fulfillment centre located within 16 km • Supportive regulatory environment	Should Hamilton choose to embrace drone delivery, it should consider provisions for drones within development guidelines and streetscape design. The City would also have to work with senior governments to review regulatory requirements, liabilities and so on. Some of the applicable restrictions have been relaxed during the pandemic to enable the long-distance delivery of supplies to remote communities. Now that the precedent has been established, it is conceivable that these relaxations might warrant further investigation once the pandemic has eased.	
			Electronic Logging Devices (ELDs): ELDs will be required in Canadian trucks by the end of 2020. These systems monitor the hours-of-service constraints that truck drivers are subject to. Once these hours are met, a driver must pull over and rest. These new constraints will tighten the timeframe within which drivers can seek safe and secure parking locations. Many provinces and US states have undertaken studies suggesting that more rest parking sites will be needed along highways and in urban areas.	Ottawa Goods Movement Backgrounder, City of Ottawa (April 2019)	• Automated enforcement • Availability of rest facilities	The City should work with MTO and carriers to determine if there are locations in Hamilton that could be used as parking sites. This can help the City get proactively ahead of potential issues with trucks being forced to recover in undesirable locations.	