

Calgary



The City of Calgary Goods Movement Strategy

Stage 3 Report: Opportunities

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Executive Summary

The City of Calgary is developing a Goods Movement Strategy. The Strategy will help The City support the goods movement industry, Calgary's economy and local communities into the future. It will identify transportation infrastructure improvements and actions that will help Calgary's economy thrive over the next 30 years. It will also help The City support businesses and residents alike through continued improvements to our transportation network. These improvements will help us continue to efficiently move goods to markets in Calgary and beyond.

The Goods Movement Strategy has four stages:

- Stage 1 Foundation establishes the basis for the Strategy.
- Stage 2 Issues and Challenges summarizes and assesses issues and challenges as defined by goods movement stakeholders.
- Stage 3 Opportunities explores potential opportunities to address the identified issues and challenges. Stage 3 also proposes methods for evaluating actions, investments and priorities in the next stage.
- Stage 4 Strategy and Actions draws on the preceding stages to develop a policy framework, within which candidate actions and investments are identified and evaluated. The resultant actions and investments are then detailed, and a plan of priorities, an implementation plan, a monitoring plan and a plan for ongoing collaboration with stakeholders are developed.

This report describes potential opportunities to address the identified issues and challenges. It is part of Stage 3.

The opportunities were based upon a survey of selected Canadian and US jurisdictions, to determine how they addressed certain of the identified issues. This jurisdictional survey was complemented by a review of the practical goods movement literature to identify effective and innovative practices that could be applied in Calgary. Twenty-two topics were examined. They were grouped according to five strategies:

- Collaborate with stakeholders
- Protect and enhance goods movement infrastructure
- Enhance access, parking, loading and enforcement of goods movement regulations
- Plan for a changing future
- Implement performance monitoring and data collection for goods movement



Table ES-1 summarizes the 22 topics and potential solutions that will be considered further in Stage 4. These topics are organized according to the five strategies.

Table ES-1: Summary of topics and potential solutions

Strategy	Topic / potential solution
Collaborate with stakeholders	<ul style="list-style-type: none"> • Technical assistance and regional cooperation <ul style="list-style-type: none"> ○ Continue to provide technical assistance on goods movement planning to neighbouring municipalities and to work cooperatively with regional partners ○ Ensure alignment of goods movement regulations with neighbouring municipalities ○ Work with other agencies to address regional goods movement issues • Freight council <ul style="list-style-type: none"> ○ Implement a regional freight council of public and private sector stakeholders, which has a strong linkage to economic development agencies and emphasizes actions that benefit both public and private sector members ○ Implement an ongoing collaboration process to connect stakeholders and use ad hoc meetings to discuss specific areas of focus • Multi-agency collaboration and consistency on design standards and operational practices that impact goods movement <ul style="list-style-type: none"> ○ Promote common design standards for roundabouts and other infrastructure
Protect and enhance goods movement infrastructure	<ul style="list-style-type: none"> • Management of infrastructure for goods movement <ul style="list-style-type: none"> ○ Examine the feasibility of exclusive or preferential use truck lanes on major roads and highways ○ Implement improved traffic control devices, such as signal coordination and intelligent signage, to improve traffic flow ○ Review traffic incident management procedures ○ Prioritize goods movement on important truck routes and accommodate freight activity within Complete Streets ○ Review effectiveness of snow storm parking bans and road clearance priorities on goods movement • Freight hubs as employment and activity hubs <ul style="list-style-type: none"> ○ Examine feasibility of freight villages or urban logistics centres



Strategy	Topic / potential solution
	<ul style="list-style-type: none"> ○ Develop concept of the airport as a transportation hub ● Transit and other alternatives to reduce traffic congestion and help commuters <ul style="list-style-type: none"> ○ Fund shuttle services to employment centres and consider partnerships with on-demand ride sharing services to serve lower-density areas ○ Implement Smart Commute Programs to provide commuting options at freight generators ● Avoidance of land use planning conflicts <ul style="list-style-type: none"> ○ Apply Ontario's Freight-Supportive Guidelines at all levels of land use and transportation planning ○ Use the Federation of Canadian Municipalities and Railway Association of Canada's Guidelines for New Development in Proximity to Railway Operations when planning along railway corridors ○ Ensure that new development does not interfere with operations at freight generators ○ Maintain industrial land use designations in the lands around freight facilities ○ Examine feasibility of cargo-oriented development around rail hubs ● Enhancing Calgary's attractiveness as a a logistics and distribution hub <ul style="list-style-type: none"> ○ Provide fibre communications and other utilities to potential industrial sites and subsidize access to these sites ○ Consider trade and other initiatives to strengthen Calgary's position as an inland port
<p>Enhance access, parking, loading and enforcement of goods movement regulations</p>	<ul style="list-style-type: none"> ● Improved incorporation of delivery facilities in developments <ul style="list-style-type: none"> ○ Consider off-street loading facilities in new developments where practical ○ Review and update developer mandates, to accommodate changing delivery requirements ○ Investigate measures to reduce delivery times within buildings ● Enhanced supply and use of on-street loading areas <ul style="list-style-type: none"> ○ Establish designated curbside loading zones ○ Develop on-line truck parking reservation system and real-time parking availability apps



Strategy	Topic / potential solution
	<ul style="list-style-type: none"> ○ Improve efficiency of public and private loading spaces ○ Establish time-of-day access control in areas with high levels of pedestrian activity ● Improved courier and truck access and circulation <ul style="list-style-type: none"> ○ Encourage use of alley space for goods movement activities ○ Develop an online commercial vehicle route finder and address GPS data gaps ○ Deploy other strategies to improve truck wayfinding ● Management of trucks travelling to, from or through Calgary <ul style="list-style-type: none"> ○ Plan for truck parking requirements in anticipation of new hours-of-service recording requirements ● Private sector financing of new infrastructure <ul style="list-style-type: none"> ○ Utilize business improvement areas to implement changes ● Construction disruptions <ul style="list-style-type: none"> ○ Consider additional practices to minimize disruptions generated by construction ● Partnerships with the private sector <ul style="list-style-type: none"> ○ Work with the private sector to pilot test delivery solutions
Plan for a changing future	<ul style="list-style-type: none"> ● Impacts of changing technologies <ul style="list-style-type: none"> ○ Update policies and protocols for incorporating new goods movement technologies into transportation plans ○ Pilot technology initiatives that have a freight component (e.g., Smart Cities) ○ Install information technology and communications infrastructure as part of road works ● Changes in distribution and delivery requirements <ul style="list-style-type: none"> ○ Deploy innovations and other approaches to accommodate changing e-commerce habits ● Efficiencies in logistics <ul style="list-style-type: none"> ○ Help promote freight exchanges, to better match loads and avoid empty vehicle trips ● Shifts from trucks to other types of delivery modes



Strategy	Topic / potential solution
	<ul style="list-style-type: none"> ○ Use non-motorized or alternative fuel vehicles for last-kilometre delivery in dense urban centres ● Addressing environmental and climate change impacts <ul style="list-style-type: none"> ○ Consider the potential GHG-reduction actions described in the <i>Goods Movement GHG Reduction White Paper</i> ○ Review existing initiatives that mitigate environmental and climate change impacts on infrastructure to see if additional measures are needed from the goods movement perspective
Implement performance monitoring and data collection for goods movement	<ul style="list-style-type: none"> ● Data collection <ul style="list-style-type: none"> ○ Consider new data collection activities for goods movement ● Information-sharing opportunities <ul style="list-style-type: none"> ○ Support academic research centres in conjunction with the private sector

The potential solutions for the 22 topics will be brought forward for assessment in Stage 4, subject to their acceptance by The City of Calgary project team. The initiatives described in this report have potential relevance to Calgary. However, there may be specific circumstances that would preclude their further consideration.

Several observations can be made about the findings:

- It is evident that some of the individual solutions and practices impact multiple topics – for example, on-street loading impacts Complete Streets, operations and regulations and e-commerce. The need for collaboration and communication spans numerous topics.
- There can also be several ways to address a given topic – for example, several approaches to improving wayfinding are identified.
- Some practices are driven or influenced by the need for private industry to reduce its costs. This is particularly evident in approaches to meet the rapidly changing e-commerce and express delivery markets.
- Several approaches appear to be complementary elements of a broad package of initiatives that aims to better manage goods movement.

Collectively, these inform the development of the framework for the Goods Movement Strategy and its actions. For example, we expect that the Stage 4 development of the Goods Movement Strategy and its actions will cut across several topics and will be made up of packages of complementary actions.



The topics for reducing the carbon footprint of goods movement are the subjects of a paper that was prepared for the ongoing update of The City of Calgary *Community GHG Reduction Plan*. Hence the individual components of this topic will be considered together as a package but will not be evaluated individually.



Table of Contents

1 Introduction	10
1.1 Study Overview	10
1.2 Sources of information	11
1.3 This report	11
2 Effective practices for enhancing goods movement	13
2.1 Introduction and method	13
2.2 List of topics	14
2.3 Strategies to collaborate with stakeholders	16
2.3.1 Continue inter-governmental communication, collaboration and coordination to promote integrated network planning in the Calgary region	16
2.3.2 Continue collaboration and communication with industry and the public	19
2.3.3 Promote multi-agency collaboration and consistency in design and operational standards that impact goods movement	24
2.4 Strategies to protect and enhance goods movement infrastructure	25
2.4.1 Consider ways to improve the management of infrastructure for goods movement	25
2.4.2 Recognize that freight hubs are key employment and activity hubs	35
2.4.3 Investigate additional ways that transit and other alternatives can reduce congestion and help workers get to their jobs	40
2.4.4 Avoid land use plans that conflict with intermodal terminals and key goods movement corridors	42
2.4.5 Enhance Calgary’s attractiveness as a logistics and distribution hub	50
2.5 Strategies to enhance access, parking, loading and enforcement of goods movement regulations	51



2.5.1	Examine ways to better incorporate deliveries in the design of new developments	51
2.5.2	Examine ways to improve the supply and use of public spaces	55
2.5.3	Consider operational and regulatory enhancements to improve access and circulation for couriers and trucks, reduce parking costs and clarify enforcement	63
2.5.4	Examine ways to improve the management of trucks travelling to, from or through Calgary	66
2.5.5	Consider allowing the private sector to finance new network infrastructure	67
2.5.6	Minimize disruptions due to road construction	68
2.5.7	Partner with the private sector to implement goods movement improvements	70
2.6	Strategies to plan for a changing future	71
2.6.1	Examine how changing technologies impact the production and distribution of goods	71
2.6.2	Plan for changes in distribution and delivery requirements	73
2.6.3	Promote further efficiencies in logistics and accommodate on-demand services	77
2.6.4	Examine ways to shift goods from trucks to other modes, to ease urban congestion	78
2.6.5	Consider strategies to address climate change and environmental impacts	80
2.7	Strategies for performance monitoring and data collection for goods movement	83
2.7.1	Consider new data collection activities for goods movement	84
2.7.2	Investigate information-sharing possibilities with the private sector	85

3 Synthesis of opportunities for further consideration 87

3.1	Summary	87
3.2	Conclusion	90

4 Appendices 91

4.1	Jurisdictions interviewed	91
4.2	Jurisdictional survey discussion guide	91

1 Introduction

1.1 Study Overview

Calgary is connected to local, national and international markets in several ways. Major railways, interprovincial and international highways and a large international airport move products to and from businesses in Calgary and all over the world. The Goods Movement Strategy will help The City of Calgary determine what transportation infrastructure improvements need to be made to help Calgary thrive as an economic leader in multi-modal services and solutions over the next 30 years.

The Strategy will also help The City support businesses and residents alike through continued improvements to our transportation network. These improvements will help us continue to efficiently move goods to markets in Calgary and beyond.

The Goods Movement Strategy will:

- Identify and prioritize short, medium and long-term actions and investments in transportation infrastructure to enhance the goods movement network in Calgary.
- Support the Calgary Transportation Plan (CTP) and Municipal Development Plan (MDP).
- Complement other City and regional economic development initiatives.

The City's bylaws related to goods movement will be reviewed and consolidated where appropriate as part of the Goods Movement Strategy. This includes the truck route map and bylaw 60M90.

The Goods Movement Strategy has four stages:

- Stage 1 Foundation establishes the basis for the Strategy, by outlining a vision for goods movement in Calgary, establishing the policy context, inventorying the multi-modal goods movement network, profiling current conditions and trends, explaining the economic importance of goods movement to Calgary and reviewing the available data that can be used to support goods movement analyses. The reader is referred to the Stage 1 report, *State of goods movement in Calgary*, for more information.
- Stage 2 Issues and Challenges summarizes and assesses issues and challenges as defined by goods movement stakeholders. The reader is referred to the Stage 2 report, *Issues and Challenges*, for more information.
- Stage 3 Opportunities explores potential opportunities to address the identified issues and challenges, based on surveys of other jurisdictions and on a review of best practices. Stage 3 also proposes methods for evaluating actions, investments and priorities in the next stage.
- Stage 4 Strategy and Actions draws on the preceding stages to develop a policy framework, within which candidate actions and investments are identified and evaluated. The resultant actions and investments are then detailed, and a plan of priorities, an implementation plan, a monitoring plan and a plan for ongoing collaboration with stakeholders are developed.

This report describes potential opportunities to address the identified issues and challenges. It is part of Stage 3.

1.2 Sources of information

This report is based on two primary sources of information:

- Interviews that were conducted with selected municipal and regional authorities across North America, in order to understand how they approached selected issues.
- Review of the practical literature on these and other issues. These sources comprised:
 - Research reports, notably those of the National Cooperative Freight Research Program (NCFRP) and the National Cooperative Highway Research Program (NCHRP), which are administrated by the Transportation Research Board, which is an arm of the U.S. National Academy of Science / National Academy of Engineering.
 - Talking Freight, a series of webinars on a variety of goods movement topics. The webinars are sponsored by the U.S. Federal Highway Administration. Presentation slides and discussion transcripts are available for reference.
 - Reports on specific topics, prepared by individual agencies and researchers.
 - Published guides and references, generally prepared by industry associations and senior governments.
 - Websites of selected agencies, including those of the surveyed jurisdictions.
 - Reports, information and photographs from the consultant teams' experience or files.

Most of the sources are from Canada and the United States, with some references to practices in Europe and Australia as well. The prevalence of North American citations reflects the relevancy of various practices to Canada and to Calgary specifically.

References are provided for all cited literature sources. Specific attributions are not provided for the jurisdictional surveys, although the source is generally evident from the discussion. In some cases, several jurisdictions made the same comment. However, these jurisdictions are not identified individually.

In addition, stakeholders in the Stage 2 consultation proposed solutions to certain issues. These proposals reflect local solutions – that is, solutions that were not drawn from the jurisdictional surveys or from the literature review. They are recorded throughout this report as well, and are identified as potential solutions identified by stakeholders. More details can be found in the Stage 2 report, *Issues and Challenges*.

1.3 This report

This report describes the findings of Stage 3. It is organized into three chapters, as explained in the following list:

- Introduction (Chapter 1 **Error! Reference source not found.**).
- Effective practices for enhancing goods movement. It describes potential practices and actions that can address the issues raised in previous stages of the Strategy. They are organized into five broad strategies (Chapter **Error! Reference source not found.2**).
- Synthesis of the practices. This list summarizes the findings of the preceding chapter, and will be used as the basis for exploration of their applicability to Calgary as part of Stage 4. (Chapter 3).

Two appendixes accompany the report. Appendix 4.1 lists the nine North American jurisdictions with whom interviews were conducted to examine their approaches for addressing certain issues. Appendix 4.2 presents a generic version of the discussion guide that was used for the jurisdictional interviews.

Note that some of the contents herein are reported using the verbatim comments of the jurisdictional informants. However, some comments have been edited to ensure that the context is understood.

It should be noted that all goods movement modes are considered in the report and in the Strategy generally. However, the focus is on road-based goods movement – motorized and non-motorized road vehicles. This is consistent with the urban focus of the Strategy and the dominance of this mode in urban goods movement. The terms ‘goods movement’ and ‘freight’ are used interchangeably, according to the source of information.

Finally, it should be noted that a discussion of methods to evaluate the practices is also part of the Stage 3 tasks. However, this discussion is being prepared as a separate paper.

2 Effective practices for enhancing goods movement

2.1 Introduction and method

Through a jurisdictional scan of nine North American jurisdictions and a review of the practical goods movement literature, this chapter identifies effective practices for enhancing goods movement that are likely to be applicable to Calgary.

The nine jurisdictions comprised three Canadian locations (Edmonton, Peel Region in the Toronto area and Greater Vancouver) and six US locations (Atlanta, Chicago, Columbus, Kansas City, Salt Lake City and Seattle). The accompanying box explains how these jurisdictions were selected.

The effective practices were drawn from a list of 33 potential opportunities for improvement. These opportunities were identified through stakeholder consultation and analysis in Stage 2, and are described in the Stage 2 Issues and Challenges report.

Several of the identified opportunities concern potential infrastructure and operational improvements that are specific to Calgary. This review focuses on 22 opportunities, or topics, for which other jurisdictions and the literature could provide the greatest insights. Although the strategies in this chapter are generally regarded as effective practices, most involve trade-offs between competing priorities and therefore they are context specific. The 22 topics are listed in the next section.

To identify potential practices, telephone interviews were held with one or more key informants from each jurisdiction. The interview covered 19 topics that stakeholders had identified as issues in Stage 2, and focused on learning about practices that are most

relevant to Calgary's needs and to its specific conditions. The 19 topics are organized under the following seven categories:

Selection of jurisdictions

Nine jurisdictions were selected according to their ability to offer insights into the specific opportunities to improve goods movement in Calgary. Jurisdictions were included based on whether or not they:

- Are considered a leader in goods movement – for example, Peel Region in Ontario.
- Could provide a similar context to Calgary – for example, Edmonton and Salt Lake City both have considered the development of an inland port.
- Are strategically located to serve as a major distribution hub – for example, Atlanta and Kansas City, and/or
- Have a specific goods movement initiative or plan that could be informative – for example, Columbus' *SmartCities* initiative and Seattle's recently completed *Freight Master Plan*.

The jurisdictions also reflect a diversity of populations and geographic areas.

Due to the significantly different context - differing economic structures, densities, governance, labour costs and so on - international jurisdictions other than the US were not considered in the jurisdictional scan, although they were not excluded from the literature review.

The list of contacted agencies is appended in Section 4.1.

1. What policies and plans they have regarding goods movement.
2. How they engage with goods movement stakeholders, other governments and the public.
3. How they protect strategic goods movement infrastructure.
4. How they handle access, parking, loading and enforcement.
5. How they plan for a changing or uncertain future.
6. How they monitor performance and what data they collect.
7. How they prioritize and implement goods movement projects.

A consultation guide was sent to each jurisdiction prior to the interview, in order to help them prepare for the discussion. The consultation guide is appended in Section 4.2. The findings in each of these categories are discussed in the subsequent sections.¹ These findings are complemented by findings from a literature review of the practical literature (e.g. reports from the National Cooperative Highway Research Program [NCHRP] in the US, etc.).

What is an effective practice?

The literature often refers to 'best' practices. However, it is difficult if not impossible to qualify what makes a practice truly best among its peers. Accordingly, this report uses the term 'effective' to connote a practice that, in the consultant's judgment and experience, is best for the specific situation and context. This broader reference also accounts for the findings of the jurisdictional survey, which again focus on specific situations and contexts. The term also makes it clear that the practice must be workable in Calgary, and so recognizes that stakeholders in the subsequent consultation and engagement must be allowed the opportunity to comment on the applicability of specific practices to Calgary and to their own situations.

2.2 List of topics

Table 2-1 lists the 22 topics for which effective practices are described in this report. For convenience, these are grouped under five strategies. The table also lists the report

¹ Item (1) regarding policies and plans is not explicitly identified in this report, but is incorporated, where appropriate, in the discussion. Item (7) regarding project prioritization is discussed separately as part of the paper on evaluation methods that will be provided separately.

section in which the discussion of effective practices can be found. Solutions for each topic are described in the ensuing sections. Key takeaway points summarize the discussions for each solution. These are highlighted in grey. Sidebars, such as the one above, accompany the text at several points.

Table 2-1: List of topics examined in this report

Strategy	Topic	Section
Collaborate with stakeholders	<ul style="list-style-type: none"> • Technical assistance and regional cooperation • Freight council • Multi-agency collaboration and consistency on standards and practices 	Section 2.3
Protect and enhance goods movement infrastructure	<ul style="list-style-type: none"> • Management of infrastructure for goods movement • Freight hubs as employment and activity hubs • Transit and other alternatives to reduce traffic congestion and help commuters • Avoidance of land use planning conflicts • Calgary's role as a distribution hub and inland port 	Section 2.4
Enhance access, parking, loading and enforcement of goods movement regulations	<ul style="list-style-type: none"> • Improved incorporation of delivery facilities in developments • Enhanced supply and use of on-street loading areas • Improved courier and truck access and circulation • Management of trucks travelling to, from or through Calgary • Private sector financing of new infrastructure • Construction disruptions • Partnerships with the private sector 	Section 2.5
Plan for a changing future	<ul style="list-style-type: none"> • Impacts of changing technologies • Changes in distribution and delivery requirements 	Section 2.6

Strategy	Topic	Section
	<ul style="list-style-type: none"> • Efficiencies in logistics • Shifts from trucks to other modes • Environmental and climate change impacts 	
Implement performance monitoring and data collection for goods movement	<ul style="list-style-type: none"> • Data collection • Information-sharing opportunities 	Section 2.7

2.3 Strategies to collaborate with stakeholders

2.3.1 Continue inter-governmental communication, collaboration and coordination to promote integrated network planning in the Calgary region

2.3.1.1 Continue to provide technical assistance to neighbouring jurisdictions and to work cooperatively with regional partners

Several stakeholders in the Stage 2 consultation noted the need for ongoing awareness and education on goods movement topics. These comments mostly concerned to educate the public and political decision-makers. However, informants at several jurisdictions also pointed out the need to share staff-level expertise, data and tools with neighbouring or constituent municipalities, other departments within the same organization and provincial/state or federal governments, to better anticipate and plan for goods movement.

The Calgary Truck Route Committee, Calgary Regional Partnership initiatives and the use of the Regional Transportation Model by neighbouring municipalities are all local examples of technical assistance and cooperation. However, it is important to note that there is no regulatory requirement to share these resources, or for individual agencies to adopt them, although it is expected that some practices likely will be incorporated into the new Regional Growth Management Board. Nonetheless, several other effective practices for sharing knowledge, technical expertise and modelling capabilities across a region can be noted.

One example is Metro, the Metropolitan Planning Organization (MPO) for Portland, Oregon.² Metro coordinated a technical assistant account for cities to use toward routine travel demand modelling,

² Metropolitan Planning Organizations carry out the metropolitan transportation planning processes in US urban areas that have populations of at least 50,000 people. The MPOs work with municipal and state officials to prepare travel demand forecasts, long-range transportation plans and transportation improvement programs for submission to state and Federal authorities as prerequisites for funding. Note that the consideration of freight is a specific requirement of US

forecasting and analytical needs. Metro also added a transportation engineer to its team to help smaller jurisdictions with urban design solutions appropriate for their needs.

The Delaware Valley Regional Planning Commission (DVRPC), the MPO for the Philadelphia region, is notable for its outreach initiatives, all of which are aimed at enhancing the consideration of goods movement in municipal plans. Recent initiatives include *Freight Scans* for the City of Philadelphia and the nine surrounding suburban counties. The scans provide individual agencies with a greater understanding of freight data, trends and plans within their own jurisdiction and with an improved ability to address freight issues. The initiative includes a GIS map that describes major freight transportation facilities, freight generators and other local facilities of interest, all of which can be accessed by agency staff. DVRPC also prepared the *Philadelphia Delivery Handbook*, to help agencies plan for a “delivery-friendly city”³ in light of changing delivery patterns such as increased demands for express delivery and the development of Complete Streets.

The Columbus MPO is working on a tool called *Insight 2050* to document smart growth approaches. Building on this research, the Columbus MPO recently launched a technical assistance program, starting with four suburban municipalities, to show them how they could modify comprehensive plans and zoning to be more reflective of the *Insight 2050* guidance documents. Informants noted that there is a component specifically for freight/industrial areas. However, given the recentness of this element, it is still being refined. There is no regulatory requirement to adopt the approaches.

Similarly, another informant noted that to help manage growth in inappropriate areas, they try to lay out the issues that communities face over the long term as communities grow and develop. These issues might not exist in the initial phases of development, but could become more important over time. As with the approach taken in Columbus, there is no regulatory component to this strategy, so whether individual municipalities choose to follow any of this advice is entirely voluntary.

Key takeaways

- There is an ongoing need to assist neighbouring and constituent jurisdictions with technical expertise and advice regarding ways to meet goods movement needs in planning and design.

metropolitan planning legislation. For more information, see <https://www.transit.dot.gov/regulations-and-guidance/transportation-planning/metropolitan-planning-organization-mpo> and <https://www.planning.dot.gov/mpo.asp>. The US Department of Transportation has designated 384 MPOs. With a small number of exceptions, MPOs should not be construed as a fourth – regional – level of government that own roads or provide transit services. Rather, they are Federally funded bodies or councils that conduct the aforementioned functions for the purpose of securing funding. As such, there are no parallels in Canada.

³ See <https://www.dvrpc.org/Freight/FreightPlanning/CountyFreightScans/> and <https://www.dvrpc.org/Products/16012/>.

- The City of Calgary actively cooperates with neighbouring municipalities and regional partners on transportation planning issues. The City is already sharing data and travel forecasts, among other technical aspects, and perhaps this could be extended to goods movement planning practices or even expertise, conceivably under the auspices of the new Regional Growth Management Board.

2.3.1.2 Ensure alignment of goods movement regulations with neighbouring municipalities

An informant in the jurisdictional scan noted that coordination is needed between bylaws of adjacent municipalities related to freight movement. For example, the City of Edmonton noted that there had been different time-of-day restrictions between certain municipalities – that is, one municipality restricts travel at night whereas the adjacent municipality restricts travel during the day, which resulted in restrictions on the movement of trucks. This constraint can occur even if over-dimensioned permitting is coordinated among neighbouring municipalities, as is the case with Alberta’s TRAVIS multi-jurisdictional permitting system, in which The City of Calgary participates. Although the issue of inter-municipal coordination was not specifically raised in Calgary, it is noted for future consideration.

Key takeaway

- Coordinating the regulations of neighbouring jurisdictions and eliminating regulatory disparities is important to better managing the movement of goods in and around urban areas while also improving private sector operations and costs.
- Alberta’s TRAVIS permitting system potentially could serve as a vehicle for promoting and coordinating consistency in inter-municipal regulations. This potential would have to be investigated further with Alberta Transportation.

2.3.1.3 Work with other agencies to address regional goods movement issues

The Duluth-Superior Metropolitan Interstate Council (MIC) is the MPO for the Duluth, Minnesota – Superior, Wisconsin region. The region has the largest port on the Great Lakes, through which significant quantities of grains, paper products, minerals and other commodities are shipped. MIC has collaborated with local and state governments, the port, railways, representatives of the aforementioned commodity industries and other interests to develop and maintain an active, multi-party collaboration to promote freight improvements in the region. Among MIC’s achievements are:

- Hosting and coordination of a multi-agency Policy Board that focuses on cross-jurisdictional issues, including freight.
- Assisting the port in gaining a key Federal government grant to improve its cargo-handling capacity by renovating an old dock and connecting it to existing roads and rail lines.
- Collaboration to eliminate a disparity in road load limits in neighbouring jurisdictions (i.e., streamlining and coordinating regulations), to better manage the movement of trucks carrying forestry products and keeping them off local roads.
- Collaboration on the redesign of an interchange that facilitates freight movements to the port, by eliminating disparities in load limits and by coordinating support for a Federal government freight fund.

- Coordination of freight needs analyses among the various municipalities.⁴

Key takeaway

- Multi-party collaboration on freight initiatives can result in significant improvements to key goods movement infrastructure, and can provide a unified region-wide voice in support of applications to senior governments for funding.

2.3.2 Continue collaboration and communication with industry and the public

2.3.2.1 *Implement a regional freight council with strong linkage to economic development agencies and with an emphasis on showing relevance to industry*

A common outcome of many goods movement strategies is the development of a freight-focused council or forum. Often, these councils are drawn from temporary public-private committees that have been developed in the goods movement strategy, and so the council is charged with advancing and helping to implement the strategy. The freight council can also identify new initiatives, foster collaboration and help set priorities. In most cases funding is still provided by the public sector, although there are some notable exceptions.

At the same time, freight councils have proliferated across North America, with some urban regions having two or more councils, each with a different approach and interest but often involving the same organizations. As a result, in some locations, the project team has found that outcomes can be diffused and membership fatigue is encountered. A review of goods movement issues in the Greater Toronto and Hamilton Area cautioned that private sector agencies must be able to see the tangible benefits to their own operations in order to maintain their interest and participation, as opposed to merely supporting priorities that might be more important to the public funding agency. Meeting to exchange ideas should not be the sole rationale for forming a council; achieving tangible outcomes is needed.⁵

An effective practice noted in the jurisdictional scan and in the literature, is having an economic development agency lead the freight council. As one informant noted:

If any city can create some kind of freight organization within the economic development world and bridge the gap with the public sector that goes a long way. Helps with understanding what's needed, what's not needed.

For example, in Kansas City, KC SmartPort was created as “a non-profit economic development organization that works to attract freight-based companies, such as manufacturing, distribution and

⁴ Markiewicz, A, 2016, Regional Models of Cooperation Handbook, US Federal Highway Administration, Washington, DC.

⁵ DKCI and CPCS, Regional Transportation Plan Legislative Review Backgrounder: Urban Goods Movement, prepared for Metrolinx, Toronto, July 2016.

warehouses, to the 18-county, bi-state Kansas City region.”⁶ It has been in existence for approximately 12 years. It was noted in the consultations that this organization has really helped the region because it gives a voice to both economic development and public/private processes. The same informant noted:

A lot of problems we’ve had [are] that the public sector moves so slowly. This third-party organization is accepted by the freight community. The Kansas City regional MPO sits on SmartPort’s board of directors. They are on our goods movement committee. They work on a number of studies together [and] help each other in their marketing campaigns. They helped developed SmartPort from one of their studies – it has since grown into its own organization.

Similarly, the Columbus Region Logistics Council, which is run by the Columbus Chamber of Commerce, brings the logistics and freight communities together. It was noted that it is more of a networking forum; however, a framework exists to have more robust technical discussions.⁷

Additionally, in Columbus, to support the development of Rickenbacker airport into a major cargo hub (see box), an advisory committee was put in place and tasked with ensuring that identified projects were completed. Several stakeholders were involved, including the airport authority and smaller townships, and all of these worked together to ensure the projects were completed. They are continuing this approach and launching another study to identify further projects beyond transportation.

One of the challenges noted with engaging the industry and public is that it is often difficult to explain the importance of freight transportation to a layperson, or even sometimes to people working in the manufacturing or distribution sectors. One of the informants noted that it comes down to saying, “Let me tell you why you should care.” Often it must be continually reiterated to members that what the committee or group is doing is benefiting their company or industry. The involvement of private stakeholders is not something that can be taken for granted.

In the Region of Peel, it was noted that they have strong management and political support for their goods movement initiatives, as well as a Goods Movement Task Force that meets quarterly in person. However, even there, it was noted that they have to continue to highlight the importance of goods movement. To ensure continued engagement by industry, if the Region, which coordinates the Task Force, has promised to deliver on actions, then it must ensure that these are delivered. Informants noted that the private sector is comfortable with some long-

History of planning for Rickenbacker airport

In the 1990s, Rickenbacker airport was a military airport and there were rumours that its role would change. Informants noted that all the regional entities – including the City of Columbus and the state - as well as the Governor recognized the potential for logistics related activities. As a result, strategies were put in place in the 1990s to set it up for an air cargo airport and logistics hub. A current study is preparing a 20-year update.

⁶ KC SmartPort.

⁷ For more information, see <https://columbus.org/about/councils/columbus-region-logistics-council/>. Locally, the Columbus networking function appears similar to that played by the Calgary Logistics Council.

term studies, but are also looking for short-term action items, that make immediate and large impact that helps their bottom line.

Although many actions will depend on public sector funding for implementation, certain initiatives can involve the private sector. For example, the Chicago Region Environmental and Transportation Efficiency Program (CREATE) is a multi-billion dollar public-private partnership aimed at improving the heavily congested passenger and freight rail network in the Chicago area. CREATE is supported by local, state and federal governments, the six Class I railways that operate in Chicago, local terminal railways, Amtrak (the US intercity passenger rail provider), the local commuter rail provider and the rail industry association. The initiative comprises 70 projects, including grade separations, network and signalling upgrades and safety enhancements at existing at-grade crossings. Although the magnitude and severity of Chicago's situation are unique, CREATE is an example of how cooperative initiatives have worked to achieve tangible benefits for all participants. For example, the prioritization of grade separations took into account locations where drivers, including those of emergency vehicles, experienced significant delays. Other initiatives considered the shared use of certain rail lines by different railways as a means to ease congestion and the streamlining of the environmental review process for projects that have low environmental risks.⁸

The freight council could also serve as a venue for raising industry issues, propose solutions, develop partnerships to implement the solutions and convey key information to the goods movement industry. For example, one stakeholder observed that safety compliance among some independent truck operators had dropped due to the recent economic downturn that had pressured some of these operators to cut their costs. The freight council could serve as a portal to reiterate to industry the importance of safety compliance, the penalties of non-compliance and so on. Other stakeholders proposed that The City participate in an aggregates industry vehicle registry, which helps the public identify individual aggregates vehicles that had caused damage or which was operating unsafely. The freight council could examine the issue and propose possible outcomes.

Key takeaways

- Build on the advisory groups that have been developed for the Strategy to implement an ongoing freight council.
- The freight council must have a specific mandate; namely, to advance and implement the Strategy. It should also be charged with identifying new needs, updating the Strategy on a timely basis and reviewing priorities.
- The freight council should be managed and led by The City of Calgary. However, to be effective it should be tied to, or perhaps jointly led by, agencies such as Calgary Economic Development, the Transportation and Logistics advisory board or the Calgary Chamber of Commerce. The council should comprise private sector and public sector members across all modes and should have manageable numbers. It could bring in additional interests through sub-committees, if appropriate. Funding for the council could be drawn from its member agencies.

⁸ Final Feasibility Plan Amendment 1, CREATE Program Feasibility Plan and Preliminary Screening Clarification, CREATE, Chicago, 18 July 2012.

- Although its focus necessarily will be Calgary-specific issues, the freight council should ensure that the regional perspective is included in its membership and mandate. This need recognizes that many goods movement issues are regional, as are the potential solutions. It also allows the council to be consistent with the activities and mandates of the future Regional Growth Management Board.
- The freight council must be seen as effective and beneficial to all its participants. As such, it should have a unique mandate, as noted above, and must be seen as delivering what has been promised by the Strategy. It must deliver actions that have immediate impacts as well as long-term benefits. Priorities must be established in terms that are meaningful to all members – meaning the use of such practices as Triple Bottom Line practices used by The City as well as the preparation of quantitative, monetized benefit-cost analyses that will be sought by the private sector to understand how the proposed action will benefit its bottom line.
- The freight council will need to develop mechanisms for funding and delivering actions. It can be assumed that most funding likely will be sourced from the public sector and that, where The City of Calgary is a source of funding, actions must be prioritized among other City initiatives. However, there may be instances in which the private sector should be asked to contribute funds (especially regarding lands, facilities or infrastructure that they own), and the freight council could serve as the basis for developing business cases, overseeing the necessary technical and financial studies, investigating options for funding mechanisms, assessing priorities and so on. Freight council members also could provide services-in-kind in lieu of making financial contributions.
- The freight council could serve as the portal for examining specific topics of importance to the goods movement industry and then as the portal for disseminating findings and other information to the broader goods movement community.
- There is an ongoing need to reiterate the importance of participation to members.
- Political and senior management leadership is important to demonstrate commitment to private sector members.

2.3.2.2 Implement an ongoing collaboration process to connect stakeholders and use ad hoc meetings to discuss specific areas of focus

An ongoing collaboration process allows local entities – neighbourhood residents, commercial establishments and other facility users - to discuss issues, identify needs and find compromises among differing goals and uses, particularly to accommodate freight activity within a smart growth community.

Informants in Seattle noted that the City has a robust planning process, albeit one that involves several iterations of any plans. This robust process is required because, arguably more so than other jurisdictions, they have many significant conflict points between goods movement and passenger movements. For example, they noted that one of Seattle’s busiest bicycle routes is

Highlighting the importance of goods movement to the public
Somewhat related to the engagement process, to highlight the importance of goods movement to the public, another informant noted that they start all public engagements with questions such as, “Who likes their garbage picked up? Who likes receiving deliveries from what they buy online?”

also directly adjacent to the entrances to their port terminals. To help refine solutions that are acceptable

to multiple stakeholders, the City of Seattle has established several councils, including freight advisory and cycling advisory groups. These groups, composed of freight advocates and community leaders, provide design reviews and input (but not direction) on policy.

The Ohio-Kentucky-Indiana Regional Council of Governments (OKI), the Cincinnati MPO, has developed “strong relationships” with private sector goods movement partners. This has led to

... improved freight planning and public private partnerships to implement freight projects. OKI built these relationships through informal meetings and communications, which better suited private industry partners. Rather than setting up regular meetings with a large group OKI decided to meet with partners one-on-one and on an as-needed basis. They found that their private industry partners operate on a much shorter time scale than the public sector and that those partners were not as interested in attending standing meetings about long-range planning. However, private sector partners were interested in working together on projects that reduced freight travel times and facilitated freight movement if engaged when their involvement could make a difference.⁹

Depending on the nature of the issue, ad hoc conferences and seminars to bring together stakeholders may also be useful. In 2015, the Institute of Transportation Engineers, the US Federal Highway Administration and the Delaware Valley Regional Planning Commission conducted the first *Downtown Delivery Symposium* in the US to recognize the importance of balancing the need to get goods to the point of sale with the importance of offering a high quality of life to the citizens of the region’s small, medium and large towns. The workshops allowed stakeholders to discuss their priorities which fed into the preparation of comprehensive (land use) plans, redevelopment plans and transportation studies. DVRPC has since repeated this symposium annually.¹⁰

Recent initiatives in London and New York City aimed at organizing back alley space in dense downtown areas. The purpose was to replace ad hoc delivery and waste pick-up spaces serving neighbouring restaurants and businesses with consolidated spaces. These have resulted in more efficient deliveries and waste pick-ups, and have minimized disruptions to residents especially during the evening and overnight. The relevance to this strategy is that the municipal authorities worked closely with carriers, property owners, restaurants and businesses in order to understand clearly how their operations functioned before working through potential solutions together. As the freight lead at the City of New York notes,

In order to design our streets to accommodate deliveries, provide bike lanes, bus lanes, and plaza spaces, while also increasing safety for users and supporting the economy, we need to

⁹ Markiewicz, A et al., 2016, Regional Models of Cooperation Handbook, US Federal Highway Administration, Washington, DC.

¹⁰ See <https://transportationops.org/blog/conferencesmeetings/philadelphia-downtown-delivery-symposium>.

better understand the activity and constraints of all modes.¹¹

Key takeaways

- To address existing or potential conflicts regarding goods movement, it is important to work with stakeholders from all perspectives and to understand how and why goods are being delivered.
- In order to engage the private sector most effectively, they must see clear benefits to their operations and costs of proposed goods movement initiatives. Differences between private and public-sector planning and decision-making objectives, processes and timeframes also must be recognized and accommodated.
- Hands-on training and symposia on specific goods movement topics enhance practitioner knowledge.
- The City of Calgary could promote the use of its existing bicycle network for use by bicycle couriers.

2.3.3 Promote multi-agency collaboration and consistency in design and operational standards that impact goods movement

2.3.3.1 Promote common design standards for roundabouts and other infrastructure

Roundabouts and other infrastructure are being implemented in municipalities across North America, in order to better manage the movement of vehicles and provide a safer environment for pedestrians, cyclists and other vulnerable travellers. Although the issue of roundabout design was not specifically raised in Calgary – the cited issue referred to common, province-wide standards for the use of low-resistance tires - others have raised the issue of roundabouts elsewhere in Canada. There is a need to ensure that design standards for new road and intersection infrastructure in and around Calgary can accommodate large trucks safely and adhere to common practices across Alberta and elsewhere.¹² Other observers also noted the need to consult industry when new roundabouts are proposed,¹³ especially on truck routes but also on other roads.

Key takeaways

¹¹ Hodge, S, 2016, NYC Urban Freight, [Talking Freight](#) presentation, US Federal Highway Administration, March 16, 2016.

¹² One reference guide is Accommodating Commercial Vehicles in Roundabouts: Discussion Paper, prepared for the Ontario Trucking Association, Toronto, 2010.

¹³ Todd, S of the Specialized Carriers and Rigging Association, 2016, quoted in Oversize and Overweight Freight Shipments, [Talking Freight](#), US Federal Highway Administration, transcript, June 29, 2016.

- Common design and engineering standards among jurisdictions allows other design objectives, such as implementing Complete Streets, to be achieved while maintaining access and a safe use by heavy trucks.
- Consultation with the goods movement industry is important in implementing usable and safe designs and avoiding potential conflicts once the new infrastructure has been implemented.

2.4 Strategies to protect and enhance goods movement infrastructure

2.4.1 Consider ways to improve the management of infrastructure for goods movement

2.4.1.1 *Examine the feasibility of exclusive or preferential use truck lanes on major roads and highways*

An exclusive-use truck lane is a lane, often separated physically by barriers from common lanes, in which trucks are given preferential or exclusive access. Exclusive-use truck lanes were noted in both the literature review and the jurisdictional scan as a strategy to improve truck operations, including the possibility to “increase efficiency, increase reliability, and enhance safety...”¹⁴ There are also some variations on the concept, including:

- Charging trucks a toll for the exclusive use of the lane.
- Allowing some trucks (e.g. couriers) or trucks with better environmental performance (e.g. electric trucks) to use existing shared-use managed lane (e.g. a high-occupancy vehicle or high-occupancy toll lane).¹⁵

There are also several concepts for implementation, including converting an existing mixed-use lane, re-purposing an existing managed lane and building a new exclusive-use truck lane.

Although there are potential travel time, reliability and safety benefits, a 2013 study notes that “[many existing US-based studies using an economic (cost-benefit) rationale] . . . find that the cost to implement these types of truck lanes exceeds their benefits or that there is inconclusive evidence to determine their benefits.”¹⁵ In line with the above, another US-based study notes “proposals for exclusive truck lanes in metropolitan areas are relatively rare.”¹⁶ However, some informants in the jurisdictional scan noted that they are currently being studied in some areas. A 2011 simulation study implementing truck lanes on Highway 401 through Toronto found that these could result in an improvement for travel times for trucks, but would reduce capacity for passenger vehicles.¹⁷ The

¹⁴ Holguin-Veras, J. et al. 2015. NCFRP Report 33: Improving Freight System Performance in Metropolitan Areas: A Planning Guide.

¹⁵ TAC-ATC. Draft Primer on Trucks Lanes in Canadian Urban Areas.

¹⁶ Holguin-Veras, J. et al, 2015, op. cit.

¹⁷ Abdelgawad, H. et al. 2011. Simulation of Exclusive Truck Facilities on Urban Freeways. ASCE *Journal of Transportation Engineering*.

Region of Peel is considering the potential applicability of preferential truck lanes on certain urban arterial roads that have high volumes of trucks. Further study of such a strategy in the Calgary context would be required before determining whether such a strategy represents an effective practice.

As a starting point, the literature identifies some specific strategies to implement the truck lanes, as well as some criteria for consideration – notably, annual average daily traffic (AADT) of greater than 100,000 and a daily truck percentage greater than 25%.¹⁸ However, again, these criteria, based on US situation, are noted as potentially not being appropriate for the Canadian context.¹⁹ Further study would be required.

Key takeaway

- Preferential lanes for trucks could provide a means to improve travel times and journey reliability. However, their implementation is as yet uncommon and most investigations have focused on applications to freeways. Further study is needed to determine their applicability in Calgary specifically.
- It is noted that current Provincial policies preclude tolling.

2.4.1.2 Implement improved traffic control devices to improve traffic flow

Traffic control initiatives aim to improve the flow of traffic by using signs, signals and other devices to monitor and control traffic, with the overall aim of reducing congestion. Regulatory signs are ubiquitous – for example, signs that provide information about speed limits, access restrictions, loading zones and other regulations. However, the effectiveness of such passive signage can be enhanced with real-time traffic information and variable message signs that dynamically update speed limits, expected journey times and other information according to actual conditions. Some of these initiatives are intended to improve the flow of all traffic, meaning that they include trucks but might be calibrated mainly for passenger vehicles. Other initiatives are primarily focused on improving truck flows, although they also can have benefits for other corridor users.²⁰

Another initiative uses adaptive signal technologies, whereby signal timings change depending on relative traffic volumes. According to the US Federal Highway Administration, existing adaptive signal control technologies using traditional sensors, such as pavement loops, can improve travel time by 10 to 50 percent or more.²¹

¹⁸ Fekpe, E. 2014. Implementation of Exclusive Truck Facilities. Canadian Transportation Research Forum Annual Meeting.

¹⁹ Transportation Association of Canada. Primer on Truck Lanes in Canadian Urban Areas.

²⁰ Holguin-Veras, J. et al, 2015, op. cit.

²¹ Federal Highway Administration, Center for Accelerating Innovation, Adaptive Signal Control Technology.

New technologies have further promise. Emerging smart signals use cameras and sensors to respond to traffic patterns in real-time and machine learning to improve performance over time. These systems work best when connected to one another and eventually to vehicles. One study found that large benefits could be achieved with only 35% of vehicles connected to smart signals.²² For example, Pittsburgh's next-generation smart signals have reduced travel time by 25%. These signals are in place at 50 intersections, expanding to 200 of the city's 600 intersections in the near future.²³

Although The City of Calgary has already implemented some of these technologies,²⁴ anecdotally some stakeholders raised concerns about delays in certain areas and suggested mining existing complaints data for possible improvements. There may be other strategies as well to improve the operations of freeways, such as variable speed limits. Though these technologies are not necessarily specific to goods movement, generally speaking improving traffic flow overall can benefit goods movement.

Improving traffic control to give additional priority to trucks is another initiative that could be considered. In Minnesota, a 2012 pilot study examined the implications of providing priority to trucks at intersections, especially where there are only single-lane approaches. Pavement loops were installed upstream of the intersection and fed into a microprocessor – collectively referred to as a “pseudo-detector.” When a truck passes over the pseudo-detector, the green time is extended to avoid having trucks stop and then slowly re-accelerate. The study found that truck-turning priority can improve traffic flow, especially on roads with single-lane approaches, because trucks would otherwise require more time to accelerate and decelerate.²⁵

Another initiative focuses on coordinating traffic signals along corridors that have high truck volumes. This ‘green wave’ allows continuous traffic flow overall intersections along a corridor. This improves system performance and reduces the number of stops, truck travel times and emissions. Even without explicit priority, re-timing signals to account for truck flows can improve traffic flows in areas with high levels of truck traffic.²⁶ The Region of Peel in Ontario is an example of a jurisdiction that has revised the progression of traffic signals along certain corridors that have high truck volumes, for this purpose.

Key takeaways

²² Vittorio Astarita et al (2016), “A cooperative intelligent transportation system for traffic light regulation based on mobile devices as floating car data (FCD).” *American Scientific Research Journal for Engineering, Technology, and Sciences*, 19:1.

²³ Snow, J. 2015. This AI traffic system in Pittsburgh has reduced travel time by 25%. *SmartCitiesDive*.

²⁴ City of Calgary. [Traffic signals: Traffic signal timing and coordination](#).

²⁵ Minnesota Department of Transportation (2012), “Truck Priority Evaluation.”

²⁶ Holguin-Veras, J. et al, 2015, op. cit.

- Using available technologies, adjusting existing traffic control devices or adding new devices to give additional priority to trucks could improve travel time and reduce congestion for all traffic. Adjustments to signal timings along a corridor could be implemented relatively quickly. These technologies could work in combination to further improve travel conditions – for example, a green wave of coordinated traffic signals coupled with an intelligent signage system that alerts drivers to travel times, delays and so on.

2.4.1.3 Review traffic incident management procedures

Stakeholders noted that incidents, such as collisions during snowstorms, can lead to significant congestion, especially on Deerfoot Trail. As well, when such incidents occur, there are few if any alternative routes available, depending on where the incident occurred and when the information is made available to drivers. This type of non-recurrent congestion, though not as frequently quantified as recurring congestion, can lead to significant delays.²⁷

Improved traffic incident management is one strategy that could be considered to address this issue. Traffic incident management is a planned and coordinated program to detect and remove incidents as quickly and safely as possible, restoring traffic flow. If not already implemented in Calgary or by Alberta Transportation, there are a number of specific strategies that could be considered, as shown in

Table 2-2. Though the benefits and costs from these strategies are situation specific, research suggests that for some strategies, the benefits can significantly outweigh the costs.

²⁷ Recurrent congestion refers to the congestion that is caused by the regular daily build-up of traffic during, for example, the peak period. As a result of this regularity, drivers become accustomed to delays of certain magnitudes and durations. Non-recurrent congestion refers to that which is caused by unforeseen or random events, such as an accident, adverse weather or construction. In this situation, drivers cannot anticipate the delays. For more information, see https://ops.fhwa.dot.gov/program_areas/reduce-recur-cong.htm and https://ops.fhwa.dot.gov/program_areas/reduce-non-cong.htm.

Key takeaway

- Traffic incident management measures can reduce delays to trucks and other traffic, especially where there are limited alternate routes.

Table 2-2: Traffic incident management strategies

Category	Potential strategies	Typical benefits
Freeway service patrols.	Specially trained personal with vehicles can provide fuel, minor repairs, clear debris, push vehicles out of travel lanes, etc.	The benefits can outweigh costs by factors of six times or more.
New technologies and approaches to manage incident clearance.	These can include: <ul style="list-style-type: none"> • Screens to minimize rubbernecking, thereby avoiding subsequent accidents. • Drones to photograph sites, thereby minimizing the disruption to other drivers as authorities investigate the incident. 	Screens can offer benefits of \$300,000 per incident, although they can be problematic during adverse weather events. Drones can reduce highway closures by 30-35 minutes, although they can cost \$20,000 to \$60,000.
Improved incident response coordination.	Improved coordination among entities involved in incident response, including emergency services and tow truck operators.	Highly dependent on the situation and existing systems.

Source: Previous CPCS research of multiple sources.

2.4.1.4 *Prioritize goods movement on important truck routes and accommodate freight activity within Complete Streets*

Many Complete Street guidelines accept that, in industrial areas, trucks and other vehicular traffic will have priority over other corridor users. However, it is important to recognize that high truck volumes can be found anywhere in the urban environment.

The City of Calgary's *Complete Streets Guide* recognizes the importance of goods especially on "Industrial Streets" ("though all modes are accommodated, movement of goods has the highest priority")²⁸ and on the primary goods movement network.²⁹ However, it does not speak to providing accommodating goods movement access on supporting facilities in much depth. For example, for Residential Lanes and Alleys the guidelines note performance for goods movement is "not required, or poor performance is acceptable" for all but light commercial vehicles and recycling/waste services, even though lanes and alleys can be vital last kilometre connectors. Clearly, as discussed in section 2.5.1.1 below, accommodating large trucks in all areas is not appropriate although goods, particularly those delivered by couriers, still need to reach all areas in Calgary. This nuance does not appear to be incorporated into Calgary's *Complete Streets Guide*.

The City of Seattle has developed a framework to address these conflict points. In Seattle's Complete Streets policy context, mobility is noted as the policy's second priority, after safety.³⁰ 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."³¹ As defined in 2005, 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. . .³²

A Major Truck Street does not have to be within an industrial area; instead, it can include arterials anywhere in the city that are "significant" to freight activity. On a Major Truck Street:

Because freight is important to the basic economy of the City and has unique right-of-way needs to support that role, freight will be the major priority on streets classified as Major Truck Streets. Complete Street improvements that are consistent with freight mobility but also support other modes may be considered on these streets."

²⁸ At p. 9.

²⁹ I.e. with respect to lane widths, on p. 19.

³⁰ City of Seattle. [Complete Streets in Seattle](#).

³¹ Ibid.

³² *Truck Classification Legend Definitions*, City of Seattle. See <http://www.seattle.gov/transportation/streetclassmaps/trucklegend.pdf>.

In 2016, Seattle also updated its freight network. In doing so, it grouped the city's roads and highways into four categories. The categories are illustrated in Figure 2-1. Seattle network connects 'urban centres,' 'urban villages,' commercial districts and other non-industrial generators, in addition to manufacturing and industrial centres and intermodal terminals. The document also points out that:³³

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.

Moreover, 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."³⁴ To harmonize goods movement needs and the implementation of Complete Streets schemes on individual corridors, one observer proposes three steps:

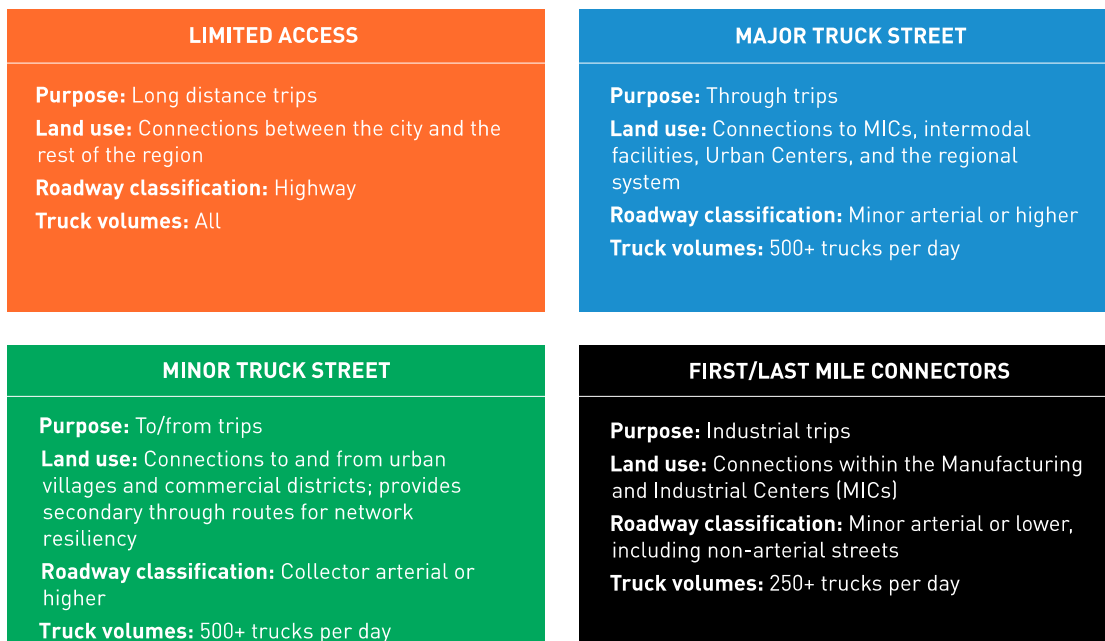
- Plan to support – not eliminate – goods movement from the corridor.
- Ask goods movement operators what they need and what could work for them.
- Think beyond corridor design alone. Examples include the improved use of traffic signals and refined turning bays to better manage truck traffic on a key access to the historical downtown of Savannah, Georgia and the use of lock boxes to reduce the demand for loading spaces and truck trips.³⁵

Figure 2-1: Seattle's freight network designations and criteria

³³ *City of Seattle Freight Master Plan*, City of Seattle, September 2016.

³⁴ Bassok, A. et al., 2013, Smart Growth and Urban Goods Movement, NCFRP Report 24, National Cooperative Freight Research Program.

³⁵ Plumeau, P., 2014, Complete Streets and Goods Movement, Options and Considerations, [Talking Freight](#), May 21, 2014.



Source: Figure 4-3, *City of Seattle Freight Master Plan*, City of Seattle, September 2016.

The sidebar on the next page expands on these steps by outlining some of the challenges for accommodating goods movement in Complete Streets schemes, and how these challenges can be addressed.

Accommodating freight does not necessarily mean designing infrastructure to primarily benefit freight. For example, as noted in the sidebar strategies such as relocating stop bars to enable truck turning movements while minimizing the distances pedestrians must cross the street can be considered (Figure 2-2). Other concepts include moving deliveries to the back of the building and strategically placed on-street loading zones with time restrictions.³⁶

How can Complete Streets accommodate goods movement?

When planners and engineers are considering how to make an existing thoroughfare into a Complete Street, they most often focus on improving accommodations for pedestrians, including those with vision or mobility impairments; cyclists; and transit users when the street is a current or future bus route. Those involved in goods movement are often left out of the Complete Streets design conversation. But goods movement can be an important component of Complete Streets, especially when one of the objectives of the new streetscape is to encourage economic development, which often occurs in the form of neighborhood-scale retail and commercial space. Restaurants and shops will require daily deliveries, and residences and offices may rely on parcel

³⁶ Complete Streets Fact Sheet, 2011, New York State Association of MPOs.

services, making truck traffic an unavoidable part of street life.

Planning for goods movement from the outset will help ensure a successful design that truly accommodates all users.

It is important to distinguish between different types of goods movement when looking at land use plans and urban design. Good planning can lead to the creation of a network of urban truck routes that can best accommodate trucks that are not providing local delivery service, whether they are traveling through the city or going from a factory or warehouse/distribution center to a freeway interchange. Once designated, these routes will be less desirable for Complete Street treatment. Local judgment is still important, as in a situation where a “Main Street” serves as a truck route, but must also accommodate all users. Local deliveries and services like garbage removal are the kind of goods movement that must be addressed in the Complete Streets context. Vehicles may range in size from relatively small parcel service and delivery trucks to tractor-trailers.

While some of our cities were designed with mid-block alleys for rear delivery, most were not. Few neighborhood businesses have on-site loading docks. Most often delivery trucks must compete for curbside space.

Successful Complete Streets projects rely on stakeholder involvement. Outreach to current businesses must include discussion of their delivery needs, with the potential for meeting with their suppliers as well. Find out the type of trucks that are being used, and frequency, duration, and time of day of deliveries. Ask if deliveries can be made in off-hours, when the street is not busy with people. Then consider loading zones. The City of Philadelphia has included loading zone requests in their Complete Streets program. Determine how much curb front is needed, the hours the loading zone will operate, and the duration of stay (typically no more than 30 minutes). Develop an enforcement plan, which is necessary to make loading zones work. Position loading zones so they will have a minimal impact on parking and bus stops. Local stakeholders can often be helpful in determining an acceptable trade-off in the competition for curb space.

Intersection design should be reviewed to ensure that pedestrian crossing distances are short, while still allowing for delivery truck turning movements.

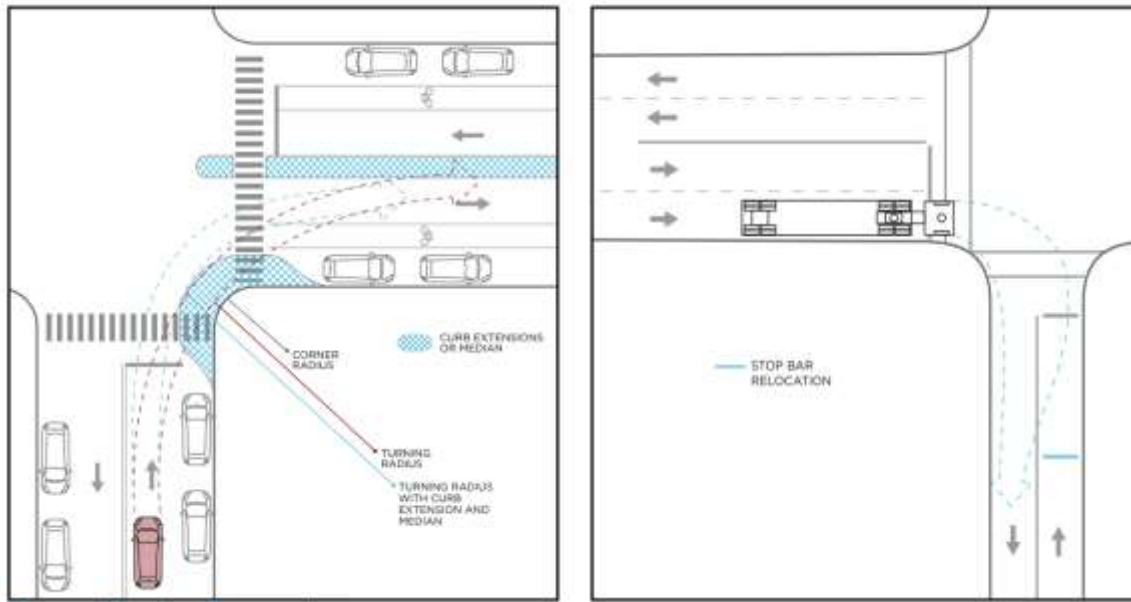
Consider mountable curbs on medians and roundabouts, and marking stop bars further back to allow turning trucks to swing into the opposite lane.

It is important to plan ahead. If the land use objective is for mixed-use development or redevelopment, consider how the street will accommodate additional truck traffic, and work with economic development officials and developers to create off-street delivery areas.

Most importantly, be creative in accommodating goods movement in your Complete Streets designs as you consider the needs of all users. Ignoring goods movement may detract from the ultimate success of the project and its economic development potential.

Source: Complete Streets 2.0 Fact Sheet, 2016, New York State Association of MPOs.

Figure 2-2: Corner design concepts



Source: Figure 30, *Complete Streets Chicago, Design Guidelines*, City of Chicago, 2013.

Other potential solutions include adding loading zones in dense residential areas in addition to conventional commercial loading zones, to accommodate the rapid growth in direct-to-consumer deliveries and thereby reduce illegal parking and disruptions to transit buses and other traffic. Municipalities also can design wider bikeways that support package and food deliveries by bicycle, create reservable loading zones that allow freight companies to ‘park and walk’ instead of driving door-to-door³⁷ and explore off-peak freight delivery incentives for busy mixed-use environments.³⁸

Finally, it can be noted that although many couriers and distributors use a variety of vehicles according to specific customer needs and the location that is being served, the retrofitting of a Complete Streets corridor can have the effect of forcing transporters to use smaller vehicles in that location. This allows an improved manoeuvrability on a now-narrower corridor, and can also improve load efficiency if the smaller vehicle replaces a partially empty large vehicle. On the other hand, it also can increase labour, fuel and operating costs, if the smaller vehicle must make multiple trips that formerly could be made by a large truck in a single trip. Moreover, increased trips to the same destination can mean increased competition for limited loading spaces.³⁹

³⁷ See also Section 2.5.2.2.

³⁸ Roe, M. and C. Toocheck, 2017, *Curb Appeal, Curbside Management Strategies for Improving Transit Reliability*, National Association of City Transportation Officials.

³⁹ Bassok, A. et al., 2013, *Smart Growth and Urban Goods Movement*, NCFRP Report 24, National Cooperative Freight Research Program.

2.4.1.5 *Review effectiveness of snow storm parking bans and road clearance priorities on goods movement*

Stakeholders expressed concerns about using local roads after a snowfall due to the timing of snow clearance. Stakeholders also noted that overnight on-street parking, which is permitted in Calgary, can further impede the ability of delivery vehicles to traverse local roads. The City of Calgary does issue temporary bans on designated snow routes so that it can clear them. The ban is imposed on the designated roads for up to 72 hours. During the ban, vehicle owners must ensure their vehicles are parked elsewhere, and the Calgary Parking Authority provides free overnight parking at its facilities during a ban. However, it should be noted that local roads generally are not designated as snow routes.⁴⁰

Some Canadian cities prohibit overnight on-street parking on all roads throughout the winter. For example, under the City of Ottawa's ban, municipal parking garages are available free of charge to affected residents. Holders of parking permits, which are commonly made available in older parts of the city where residences lack off-street parking, are exempted.⁴¹

Key takeaways

- The need to support and enhance goods movement mobility is not limited to industrial areas or terminals but is pervasive throughout the entire urban region. This means that Complete Streets schemes must accommodate goods movement needs, especially loading access to individual addresses. Schemes should support and manage goods movement – but should not seek to eliminate goods movement from the corridor. The explicit recognition of these needs in Complete Streets policies and guidelines allows the avoidance of potential downstream conflicts.
- Many potential solutions exist. These include the provision of adequate loading spaces on the corridor and ensuring that pedestrian- and bicycle-friendly design treatments can also accommodate trucks. They also can include the development of alternate and complementary solutions that seek to better manage the movement of goods, such as the use of back alley space and loading zone permits.
- The implementation of Complete Streets schemes can effect changes in goods movement, for example by forcing couriers to use smaller vehicles or by encouraging deliveries by bicycle. However, it is essential to consult and work with goods movement industries and local businesses to determine their needs and develop solutions that work for them.
- The City could consider reviewing its on-street parking policies during snowstorms and snow clearance protocols in order to ascertain the impact on the accessibility and circulation of

⁴⁰ See <http://www.calgary.ca/Transportation/Roads/Pages/Road-Maintenance/Snow-and-ice-control/Snow-Route-parking-bans.aspx>.

⁴¹ See *Special Advisory: Winter overnight parking ban in effect*, City of Ottawa, December 12, 2017, <https://ottawa.ca/en/news/special-advisory-winter-overnight-parking-ban-effect-5>.

delivery vehicles on local roads after snowstorms and whether or not the policies should be revised.

2.4.2 Recognize that freight hubs are key employment and activity hubs

2.4.2.1 Examine feasibility of freight villages or urban logistics centres

In clusters with high freight activities, logistics centres have specific design standards to aid unrestricted access to goods vehicles. Table 2-3 describes the main features of this strategy. It was adopted in Orlando, where a new zoning designation for warehousing and logistics was developed. The new designation included design standards for freight-related activities. This allowed for the building of intermodal connections and attracted businesses looking to lower operating costs by taking advantage of conglomeration effects.

Peel Region recently examined the applicability of freight villages. The concentration of goods-generating industries and complementary activities into a campus-style layout was seen as localizing truck movements within a single area, thereby reducing truck traffic on nearby roads as well as the negative impacts of transportation and logistics such as noise, pollution, congestion and road maintenance. Freight villages also could serve as job centres for people seeking employment in freight-related services. The examination investigated several potential sites, with one adjacent to a rail intermodal terminal and near the future end of a planned freeway extension found to be the most feasible site. The impact of a potential inter-regional connector on locational choices, the GTA West Corridor, and of existing employment areas, also was recognized – in other words, existing and planned multi-modal access and designated employment lands were seen as important factors in site selection. Further investigation was proposed, including the development of business cases.⁴²

Table 2-3: Examine feasibility of freight villages or urban logistics centres: Orlando

Costs and benefits	Consolidation reduces urban truck trips and vehicle-miles travelled (VMT) by combining goods from multiple vendors in a single vehicle or by performing multiple activities—product assembly, e-commerce fulfillment, consolidation or deconsolidation of shipments, vehicle and equipment maintenance and repair, etc.—within the freight village. Maintaining a strong freight presence also helps smart growth environments retain jobs and a strong, diverse tax base.
Other considerations, trade-offs and impacts	Freight villages are most successful with an established public-private partnership, but can succeed with exclusively private funding. In many cases, the public entity is the main shareholder, while the private entities own smaller percentages of the venture. However, private companies can benefit from partnering with other companies with similar logistical needs to reduce overall costs.

⁴² Region of Peel Goods Movement Economic Impact Analysis, Draft Report, Region of Peel, November 12, 2015.

Implementation entity (leads, partners)	Public and private sectors: municipal planning department, retail and commercial establishments, logistics operators
Timing of implementation and duration	Unify freight interests among local retail, commercial and trucking entities to help consolidate deliveries. Secure funding, either from private stakeholders or through a public-private partnership.
Lessons learned from implementation	Freight villages should be planned close to communities to facilitate ease of access for workers
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017

Key takeaways

- Freight villages offer the potential to concentrate complementary activities, thereby improving the efficiency of goods movement operations through shorter trips while reducing negative impacts such as noise, pollution, congestion and road maintenance. Freight villages also can serve as job centres for people in transportation, logistics and related industries.
- Freight villages require multi-modal access to enable the efficient movement of goods as well as providing ready access for commuters. Locational choices should account for existing and planned multi-modal networks and employment lands.
- The freight village concept could be considered in The City’s Industrial Land Strategy. However, solid business cases must be made in order to attract private sector industry.

2.4.2.2 Develop concept of the airport as a transportation hub

In many urban areas, important concentrations of employment have arisen around the airport. For example, the airport vicinity around Toronto Pearson International Airport is now the second-largest concentration of jobs in the Greater Toronto and Hamilton Area, after downtown Toronto. The jobs represent industrial sectors that are directly related to airport operations, as well as complementary uses that include transportation, distribution and logistics. To further strengthen these anchors, many urban areas have investigated the idea of establishing an aerotropolis around their airport. The aerotropolis concept involves building a well-connected, multi-use community focused around the airport, thereby allowing manufacturers to have a critical mass of ancillary industries and an easily accessible destination for workers while exploiting the close proximity to the airport to access remote suppliers and markets.⁴³

Much of this development has occurred organically as cities have expanded to encircle their once-remote airports. However, the development in now-mature areas has not always been coordinated. As a result, many cities now recognize the need for improved coordination of plans and, especially, of

⁴³ About the Aerotropolis, <http://www.aerotropolis.com/airportCities/about-the-aerotropolis>.

transportation services and accesses in order to reduce congestion and provide seamless connections for travellers, workers and goods movement alike. As one example, in our consultations authorities in Atlanta noted that an organization had been formed to revitalize the area around the Hartsfield-Jackson Atlanta International Airport. This airport is the world's busiest as measured by annual passenger volumes, but is well below the global (and even domestic) leaders in terms of cargo tonnage carried.

The Aerotropolis Atlanta Alliance is

. . . a non-profit membership organization and a coalition of leading business and community leaders – united in our commitment to making Aerotropolis Atlanta a world-class destination for business, connectivity, and living. Governed by a 26-member board of the district's top private sector leaders, local Mayors, County Commissioners, and Chambers of Commerce, our mission is to improve and sustain the quality of life for those who live, work and play here. The Alliance aims to accomplish this goal through a comprehensive approach to planning and development that includes initiatives to enhance public safety, improve the physical environment, and strengthen the urban amenities that give the area its unique character—the most important of which is the world's busiest airport.⁴⁴

The Alliance has developed a blueprint to enable “Aerotropolis Atlanta [to] be a preeminent location for economic investment in the southeastern US by leveraging its unique advantage of proximity to Hartsfield-Jackson Atlanta International Airport, by expanding the concentration of targeted industries and furthering strategic development while enhancing the area's quality of life.”⁴⁵ The blueprint refers to a number of strategic passenger and freight transportation projects that would enhance Aerotropolis Atlanta's objective.

In addition, as a key strategy of the blueprint, Aerotropolis Atlanta Alliance also developed three collectives to support the development of the area:

- **Economic Development Collective** – Established to develop a unified message for marketing the area to potential prospects and others.
- **Education Collective** – Established to support the goals of the Alliance and the Workforce Collective in the gaps where education is concerned.
- **Workforce Development Collective** – Established to facilitate development and implementation of solutions to bridge Aerotropolis area employers and workforce to increase economic growth and prosperity in the region from within.

Along similar lines, Toronto Pearson International Airport is developing the concept of a “mega” transportation hub, whereby many rapid transit facilities would converge at the airport.⁴⁶ Part of the

⁴⁴ Aerotropolis Atlanta Alliance. [About](#).

⁴⁵ Aerotropolis Atlanta Alliance. 2016. [The Aerotropolis Atlanta Blueprint](#).

⁴⁶ Campion-Smith, B. 2017. Momentum builds for new Pearson airport transit hub. The [Toronto Star](#).

rationale for developing this transportation hub is recognizing that airports are major employment centres, not to mention serving a large number of travelers.⁴⁷

Some urban areas seek to use their airports as the anchor for developing the surrounding green space. For example, the Edmonton International Airport Authority, the City of Leduc and Leduc County (where the airport is located) have developed the Alberta Aerotropolis concept, to build on the large quantity of open space in and around the airport by adding distribution centres, retail activities, offices, hotels and other uses, and complementing the nearby existing Nisku oil and gas industrial concentrations.⁴⁸ Hamilton International Airport, seeking to attract industries from the congested Toronto area to a facility that operates 24 hours a day,⁴⁹ recently opened a multi-tenant 'end-of-runway' distribution centre. This concept brings smaller manufacturers and distributors, who otherwise could not afford their own distribution centres, adjacent to the airport's air courier depots, thereby avoiding congestion on the ground access for time-sensitive shipments. The new distribution centre is part of the Airport Employment Growth District lands, a mainly greenfield area that the City of Hamilton expects to generate 28,000 jobs by 2031.⁵⁰

In 2008, Norfolk Southern Railway (a Class I railway) opened a rail intermodal terminal just south of the Rickenbacker International Airport, thereby providing Columbus with air, rail and highway access and attracting several major retail distributors. The new terminal replaced a nearby site whose capacity had been exceeded, and the proximity to the airport and highways plus the availability of low-cost land and large parcels were key factors in the choice of the new location.⁵¹ Local and state transportation plans have designated the highways as intermodal connectors – that is, as being significant for goods movement. This designation means that future plans will ensure the adequacy of these facilities for carrying freight. Recent growth has resulted in congestion in the area, and in 2017 Norfolk Southern is now expanding its intermodal facility to accommodate additional loads.⁵² The Smart Columbus initiative includes a plan to further enhance this connectivity, and more broadly that of the entire region, through

⁴⁷ Urban Strategies Inc. 2016. Pearson Connects: A Multi-Modal Platform for Prosperity.

⁴⁸ MXD Development Strategists / Stantec, 2015, Alberta Aerotropolis, Aerotropolis Viability Study – Final Report, the Leduc Partnership (Edmonton International Airport Authority, City of Leduc and Leduc County).

⁴⁹ By comparison, Toronto Pearson International Airport has limited overnight flights and its groundside accesses are subject to continued and severe congestion.

⁵⁰ Dillon, 2011, City of Hamilton Airport Employment Growth District, Final Report, Transportation Master Plan, City of Hamilton.

⁵¹ Steele, C.W. et al., 2011, Freight Facility Location Selection: A Guide for Public Officials, National Cooperative Freight Research Program.

⁵² Lopez, D., 2017, Talking Freight: Intermodal Freight Connectors – Issues and Needs, US Federal Highway Administration, session transcript, February 15, 2017.

the development of GPS navigation systems and real-time information on congestion, road weight and clearance restrictions and so on.⁵³

Key takeaways

- Many airports have become the hubs of significant concentrations of employment in sectors that relate directly to airport operations as well as indirectly to the complementary transportation, logistics and manufacturing activities that are attracted to the airport.
- Much of the development growth around airports has been uncoordinated and piecemeal, thereby limiting potential growth and running into constraints, such as traffic congestion. This has led some urban areas to improve the coordination of land use and transportation plans in the vicinity of the airport, to allow for further growth of airport-related and ancillary industries such as transportation, logistics and manufacturing, while providing seamless and congestion-free access for travellers, workers and goods movement.
- There is an opportunity to coordinate the planning and connectivity of transportation and logistics clusters (and other land uses) that are developing rapidly in and around YYC and the CN Conrich intermodal terminal, building on these two hubs, existing land use strategies and the connecting expressway network. This would strengthen the Calgary region's role as western Canada's dominant distribution centre, while attracting additional and complementary businesses and uses.

2.4.3 Investigate additional ways that transit and other alternatives can reduce congestion and help workers get to their jobs

2.4.3.1 Fund shuttle service to employment centres and consider partnerships with on-demand ride sharing services to serve lower-density areas

Consultations with informants echoed the challenge of getting workers to employment centres, particularly in suburban areas where transit access is limited. As one example, a shuttle service was implemented to serve shift workers at the Global Transportation Hub, which is located outside Regina's city limits and beyond its transit service area. As another example, a couple of municipalities around Columbus came together to fund a shuttle service, although the initiative is still being reviewed.

The Greater Mercer Transportation Management Association (TMA) in northern New Jersey is a non-profit organization aimed at reducing congestion. The TMA is supported by employers and governments. The TMA offers a free shuttle – the Z Line – that serves a large Amazon distribution centre and other workplaces in a key (but remote) suburban business park. The shuttle is free to users who have paid a fare on the municipal transit carriers.⁵⁴

⁵³ Columbus Smart City Application, The City of Columbus, 2016.

⁵⁴ Greater Mercer Transportation Management Association, <http://www.gmtma.org>.

Though not specifically related to goods movement, the Town of Innisfil, which is near Barrie, Ontario, has partnered with Uber as part of a pilot to provide alternatives to driving. For certain trips, such as to community centres from selected areas, the Town of Innisfil will subsidize the trip on a variable basis so that the fare is “fixed” from the resident’s perspective. On other trips to/from other areas, the Town of Innisfil will subsidize the trip by \$5. The overall budget for the six-month pilot for the community of 36,000 was \$175,000. The pilot is seen as a more cost-effective substitute to the \$1 million cost of purchasing and operating buses, which also would be able to serve only certain parts of Innisfil, whereas Uber covers the entire town.⁵⁵ Potentially, such a strategy could be considered to improve transportation access for workers to freight areas.

Key takeaways

- Calgary Transit has made significant improvements recently in adjusting schedules to better serve shift workers. In addition, The City also could:
 - Consider partnering with private sector employers to fund or subsidize shuttle buses to connect remote employment centres with transit hubs.
 - Consider funding or subsidizing shuttle buses to serve remote employment centres that lie outside municipal boundaries, coordinated if necessary with cross-boundary transit systems.
 - Consider partnering with on-demand shared ride firms, to enhance the attractiveness of transit or to provide a cost-effective substitute for transit in low-density areas where transit is not cost-effective, through the use of subsidies.

2.4.3.2 *Implement a Smart Commute Program*

Sponsored by Metrolinx, the regional transportation planning agency in the Greater Toronto and Hamilton Area (GTHA), in association with GTHA municipalities, Smart Commute promotes alternatives to driving. The program also engages employers and, although it is focused on the work commute, it also provides options for students travelling to school. The purpose of the program is to help “employers and commuters explore and try out smart travel options such as walking, cycling, transit, carpooling and teleworking.”⁵⁶

Peel Region is one of the municipal partners. Peel’s program complements existing transit services. Peel’s Smart Commute program includes a number of initiatives:

- The Carpool Zone, which is an on-line carpooling/vanpooling ride-matching system to help employees find other commuters who have the same starting point, destination, travel time and work hours.
- Events like the Clean Air Commute.

⁵⁵ Pelley, L. 2017. [Innisfil, Ont., partners with Uber to create substitute for public transit.](#)

⁵⁶ Smart Commute. [What is Smart Commute.](#)

- Clean commuting workshops and lunch-and-learns.
- Emergency Ride programs.
- Incentives and promotions.
- Information on time and money-saving alternatives such as teleworking, shortened work weeks and flex hours.
- Shuttle programs.
- Site studies and surveys to learn how employees feel about commuting.⁵⁷

The program website notes that “[i]n just 5 years, Carpool Zone users have saved over \$10 million and prevented 24,000 tonnes of greenhouse gas emissions (equalling the weight of about 9 million clay/shale bricks).”⁵⁸ It is understood that this program has a very positive benefit-cost ratio, although it does not dramatically impact overall congestion.

Key takeaways

- Consider the expansion of smart commute programs that complement existing transit service and provide alternatives to the drive alone trip. In other cities, many of these programs have been initiated to promote sustainable transportation and reduce greenhouse gases. For the Calgary Goods Movement Strategy, smart commute programs have the additional benefit of addressing expressed problems regarding the ability of carless workers or workers who prefer not to drive to access suburban logistics and manufacturing centres, especially at the start and end of overnight shifts when transit service levels are low.
- These programs generally require coordination or sponsorship by the municipal government in order to function. However, they bring together neighbouring businesses and individual workers to cooperate on providing transportation options.

2.4.4 Avoid land use plans that conflict with intermodal terminals and key goods movement corridors

2.4.4.1 Apply Ontario Ministry of Transportation’s Freight-Supportive Guidelines at all levels of land use and transportation planning

Several informants in the jurisdictional survey referred to the Ontario Ministry of Transportation’s (MTO’s) Freight-Supportive Guidelines as an example of best practice with respect to freight and land use planning. The guidelines, published in 2016,⁵⁹ are aimed at municipalities and provide a comprehensive set of strategies and direction in the area of land use and transportation planning, site design, road design and operations, and implementation strategies.

⁵⁷ Region of Peel. [Smart Commute](#).

⁵⁸ Ibid.

⁵⁹ Ontario Ministry of Transportation, 2016, [Freight Supportive Guidelines](#).

The purpose of these Guidelines is to:

. . . help municipalities, planners, engineers, developers and other practitioners create safe, and efficient freight-supportive communities. . . . The Guidelines include best practices, examples and implementation tools that are applicable to a wide range of communities and municipalities, and also provide direction for long-term, local implementation of freight-supportive policies and practices across Ontario. In this context, the Guidelines are intended to:

Provide direction for land use planning, site design practices and operational procedures that help with the movement of freight;

Assist municipalities in understanding and planning for the various modes and types of vehicles used in the movement of freight; and

Support the overall economic health and competitiveness of Ontario's municipalities.

The purpose of the Guidelines is to assist in the creation of communities, individual developments and transportation networks that are capable of supporting freight industries while integrating and balancing the compatibility of surrounding land uses and the needs of other transportation system users.

The Guidelines describe good practices for incorporating goods movement into policy documents such as official community plans (Official Plans in Ontario) and zoning by-laws, as well as site-development needs; specifically:

- Land use and transportation planning, with strategies for incorporating goods movement considerations into the municipal planning process in balance with other objectives. The Guidelines also describe the “freight audit,” a process to inform planning decisions to enable the safe and efficient movement of goods.
- Site design, with a range of general measures that can be applied to site plans and specific initiatives that are tailored to different land uses. The approach addresses how site design for goods movement can be coordinated with the design for active transportation and transit.
- Road design and operations, which incorporates goods movement into the design and operation of municipal roads.

Tools and actions are provided to help implement the strategies. The guidelines suggest that sustainable freight systems, such as the systems the Guidelines endeavour to encourage, make “positive contribution to the environmental, social and economic sustainability of the communities they serve.”⁶⁰ Some of the specific benefits cited in the document include limiting the impacts of freight on other road users and communities, reducing emissions, and improving mobility of freight.

A 2014 Australian report provided guidelines for planning truck access in industrial areas. Among other considerations, the guidelines noted the need to account for changing vehicle sizes in the development of access plans (for example, the growing use of longer-combination vehicles), the use of consistent

⁶⁰ Ibid.

access standards for both local and arterial roads and the need to examine both road access to the site and access within the site.⁶¹

Large institutions, office buildings and entertainment destinations generate significant volumes of delivery traffic. In addition, building and infrastructure construction generates high volumes of supply and equipment deliveries. To better manage the impacts of these movements, Transport for London requires that applications for new development submit Construction Logistics Plans and Delivery & Servicing Plans that show, respectively, how construction traffic and deliveries made once the facility is in operation, will be mitigated.⁶²

Key takeaways

- There is a need to account for the goods movement perspective at all levels of land use and transportation plan development. This avoids the treatment of goods movement as a secondary consideration to a passenger-oriented plan, instead integrating the movement of goods with that of people and avoiding potential conflicts once the plan has been implemented.
- Although Ontario's guidelines are meant strictly as that – a guideline for municipalities, not a mandatory policy – The City of Calgary could consider promoting freight-supportive planning at all levels of planning, and could promote the use of the Ontario guidelines as a reference. Alternatively, The City could consider developing and adopting its own version of the Ontario guidelines as a policy.

2.4.4.2 Use the Federation of Canadian Municipalities/Railway Association of Canada's Guidelines for New Development in Proximity to Railway Operations (FCM/RAC "Proximity Guidelines")

Stakeholders expressed concern about development along existing rail corridors, which they felt could eventually inhibit rail freight traffic.⁶³ Similar in concept to MTO's Freight-Supportive Guidelines, the FCM/RAC Proximity Guidelines are another source of effective practice related to process, planning and design of development around railway facilities. The purpose of the Proximity Guidelines is to:

. . . provide a set of guidelines that can be applied to mitigate the impacts of locating new development in proximity to railway operations. It is important to note that these guidelines are

⁶¹ Guidelines for Planning and Assessment of Road Freight Access in Industrial Areas, Austroads Research Report AP-R470-14, Sydney, 2014.

⁶² A Pilot Delivery Servicing Plan for TfL's Palestra Offices in Southwark: A Case Study, Transport for London, 2009. Cited in J. Phelan, Strategies to Manage the Environmental Impact of Goods Movement in the City of Toronto, unpublished report, August 29 2014.

⁶³ See Table 3-3, *The City of Calgary Goods Movement Strategy, Stage 2 Report: Issues and Challenges*, February 2018.

not intended to be applied to existing locations where proximity issues already exist, as these locations present their own unique challenges which must be addressed on site specific basis.⁶⁴

As with MTO's Freight-Supportive Guidelines, the Proximity Guidelines cover planning and site design around railway facilities, as well as implementation considerations. Notably, it provides a "Model Review Process for New Residential Development, Infill, and Conversions in Proximity to Railway Corridors," which is intended to ensure application of the Proximity Guidelines.

Key takeaways

- There is a need to account for ways to protect rail corridors from potential encroachment by new development. This minimizes potential safety risks while also maintaining future capabilities for expanding freight service on the corridor.
- Although the FCM/RAC document is a guideline, The City of Calgary could investigate its adoption as a policy or, alternatively, promoting its use at all levels of planning.

2.4.4.3 *Ensure that new development does not interfere with operations at freight generators*

Stakeholders expressed concerns about proposed development under the YYC flight path, which they felt could eventually generate pressures to reduce night-time cargo flights.⁶⁵ None of the jurisdictions interviewed indicated any specific concerns with pressure to develop the lands around their airports. However, informants at the Region of Peel noted that its official community plan has an Airport Operating Area (AOA) schedule that does not allow development in the flight paths for Toronto Pearson International Airport. Further, they noted that there are no pressures from developers to change the AOA restrictions because they understand historically the purpose of the AOA – that is, to allow the airport to function.

More broadly, there is a need to protect industrial areas. As land uses shift from industrial and warehousing to residential and commercial uses, challenges can arise for those businesses that remain. These include increased competition for rights-of-way space, modal conflict, pollution and noise restrictions. The impacts are particularly pronounced in locations that contain a cluster of goods movement activities and are close to major urban activity centres. As well, remaining industries must devote more time traversing the transportation network in order to deliver or pick up goods at existing customers. Other concerns of allowing non-goods land uses from coexisting with goods-generating uses are:

- Speculation on potential development drives up the price of land in industrial areas.

⁶⁴ Dialog and J.E. Coulter and Associates Limited. 2013. Guidelines for New Development in Proximity to Railway Operations. Prepared for the Railway Association of Canada and Federation of Canadian Municipalities.

⁶⁵ See Table 3-3, *The City of Calgary Goods Movement Strategy, Stage 2 Report: Issues and Challenges*, February 2018.

- An inappropriate mix of land uses can drive some warehousing and industrial activities from the urban core. For example, if a warehouse is redeveloped into a condominium, then the remaining neighbouring warehouses may begin to receive noise complaints from off-hours activities that it had been conducting prior to the redevelopment.
- Longer transport distances for goods increase the costs of delivery, including labour and fuel. Some of these costs may be passed onto customers and consumers.
- More delivery vehicles, driving longer distances, create more pollution and noise, and can conflict with other modes.⁶⁶

Informants in Salt Lake City identified some commodities as strategic – for example, coal and crude oil – and have identified certain interstate corridors through the urban area as being critical to ensuring that these commodities can be shipped to local refineries and power plants as well to intermodal rail terminals for onward shipment out of the state. It was noted that the oil and coal are extracted at high-altitude sites. As a result of these high altitudes, many of these sites are not accessible to either rail or pipeline, and the oil and coal must be moved by truck. To mitigate potential impacts, specially lined trucks are used.

The Salt Lake City informants also expressed the need to ensure that industrial and business parks are appropriately designed to allow truck manoeuvrability. They cited the example of a business park that is home to a major consumer ‘big box’ warehouse and to a large courier distribution centre. The internal roads were designed to be narrow, so that trucks “theoretically” could not park on them. However, informants have observed up to 75 trucks lined up on the roads as they wait for the 4:30 am opening of the consumer warehouse. Informants also noted that the nearby courier distribution centre has 3,000 trucks each day.

⁶⁶ Bassok, A. et al., 2013, Smart Growth and Urban Goods Movement, NCFRP Report 24, National Cooperative Freight Research Program.

Key takeaways

- Understanding the implications on nocturnal cargo operations of relaxing development restrictions can help to dissipate pressures for changes.
- The need for this understanding suggests the importance of continuously communicating the need for protection of the airport's functions with respect to nocturnal cargo operations.
- There is a need to protect and separate industrial and logistics land uses from residential and commercial uses. Allowing these uses to co-exist through changes in zoning and redevelopment can generate impacts on the economic and operational viability of the remaining goods-generating uses, while creating conflicts and other externalities with the new uses.
- Accesses to intermodal terminals and other goods-generating activity centres must be maintained and planned, especially if other modal alternatives or routes are not available or viable, and even as the surrounding lands are redeveloped.
- Ensure that industrial and logistics parks and their road systems are designed in order to accommodate and safely store trucks.

2.4.4.4 Maintain industrial land use designations around freight facilities

Peel Region is home to Toronto Pearson International Airport, which is Canada's busiest airport by cargo volume and to the CN Brampton Intermodal Terminal, which is one of Canada's largest rail terminals. The key accesses to the CP intermodal terminal in the nearby City of Vaughan run through Peel, and much of the ancillary industrial and warehousing development has taken place in Peel. Over the years, a significant industrial, transportation and logistics presence has built up around these terminals. There is little developable space near the airport and the CN terminal, while near the CP terminal there is competition for the available lands between industrial and residential uses.

In order to ensure there is complementary land use around these and other freight facilities, as part of its long-term goods movement plan, the Region of Peel has established a goal of locating industrial lands near hubs, and of protecting and permitting industrial land use in that area. In the Region of Peel, in and around the CN and CP intermodal terminals, Peel has tried to ensure there is an industrial land use designation and has protected for these uses. There is limited land for development around the CN Brampton intermodal terminal although, as noted, there is significant land around the CP intermodal terminal, which is now being developed for complementary uses.

Key takeaways

- Reserve the lands around freight facilities for complementary industrial uses. Although this might seem self-evident, anecdotal evidence from some municipalities elsewhere in Canada suggests that there can be political and fiscal pressure for councils to accept proposals for residential developments, if not adjacent to the freight facilities then along the road accesses to these facilities.

2.4.4.5 Examine feasibility of cargo-oriented development around rail hubs

Cargo-oriented development (COD), similar in concept to freight villages, is another strategy to concentrate freight uses in a single area and provide for transit to connect more people to job centres at freight, logistics and manufacturing facilities. An example of this approach is Memphis, Tennessee, whose municipal development plan - termed ‘Blueprint for Prosperity’ - focussed on COD through more robust public transit and infill development around logistics hubs. Table 2-4 lists the attributes of the Memphis approach. The city is home to the central FedEx depot, but also has several Class I railway routes moving millions of cargo containers each year. The City of Memphis then created public transit and infill development to transport workers to the logistics hub.

Table 2-4: Examine feasibility of cargo-oriented development around rail hubs: Memphis

Costs and benefits	This strategy of focusing logistics, warehousing, small-scale manufacturing, and other industries related to the breakdown of rail container shipments in a single area, specifically at existing rail hubs enhances freight efficiency by removing long haul and short haul trucks. By Infill development or revitalizing existing communities, CODs have the added advantage of containing urban sprawl and allowing workers to make shorter commutes via public transit, biking, or walking. The tertiary environmental benefits as a result of decreased congestion, in the form of reduced emissions and wasted fuel from idling vehicles also accrue.
Other considerations, trade-offs and impacts	For this strategy to succeed, it requires collective action by planners and private entities.
Implementation entity (leads, partners)	Public sector: municipal planning department Partners: Private developers, community development groups, local residents
Timing of implementation and duration	Existing local and state building lot depth and setback standards should be reviewed as to how much they can protect or buffer residents from negative aspects of truck delivery.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017

There are a number of examples of this concept, including clusters focused primarily on rail (i.e. an industrial rail park), as shown in Table 2-5. The concept of a “rail-only” industrial park was raised in the consultations as a potential strategy to cluster rail uses in a single area. The intent of doing so is to cluster sufficient businesses generating rail cargo to offset the higher cost (both capital and operating) of providing rail services.

These facilities can be developed by the public and/or private sector. For example, the Global Transportation Hub (GTH) is overseen by an authority created by the Province of Saskatchewan. The authority can develop land under its control, but only for the purposes of certain permitted uses, notably transportation and logistics.⁶⁷ The Global Transportation Hub, illustrated in Figure 2-3, was developed around the relocation of CP’s intermodal terminal from downtown Regina – that is, its development was integrated with that of the intermodal terminal. Its anchor tenant is the Loblaws grocery chain, whose GTH distribution centre’s coverage is all of Canada from Northern Ontario west. The Casper, Wyoming Industrial Rail Park is adjacent to Casper’s airport, and can also handle unit trains to serve this

⁶⁷ The Global Transportation Hub Authority Act

commodity-rich area.⁶⁸ The Glacier Rail Park, now being developed, will result in an improved grid road system in Kalispell, Montana, thereby relieving local congestion. The park is also expected to attract new manufacturing and other industrial developments with the availability of large-sized serviced lots. The park is connected to the Burlington Northern Santa Fe Railway, providing direct Class I rail access to the US West Coast, the central US and Canada.⁶⁹ Like Glacier Rail Park, the Saskatoon, Mission and Earthway parks are now under development by private developers. Table 2-5 provides references for further details about each development.

Table 2-5: Examples of industrial transportation hubs and industrial rail hubs

CentrePort Canada, Winnipeg, Manitoba	http://www.centreportcanada.ca/available-properties/centreport-canada-rail-park
Global Transportation Hub, Regina, Saskatchewan	http://thegth.com/
Saskatoon Transportation Link, Saskatoon, Saskatchewan	http://saskatoontransportationlink.com/
Levelland Industrial Rail Park, Levelland, Texas	http://www.golevelland.com/industrial-rail-park
Casper Industrial Rail Park, Casper, Wyoming	http://www.granitepeakindustries.com/companies/casper-industrial-rail-park/
Glacier Rail Park, Kalispell, Montana	http://www.kalispellcoreandrail.com/glacier-rail-park.html
Mission Rail Park, San Antonio, Texas	http://www.missionrailpark.com/
Earthway Rail Park, Elkhart, Indiana	https://www.northlandcorp.in.com/earthway/

Figure 2-3: Global Transportation Hub, Regina

⁶⁸ Casper Industrial Rail Park, <http://granitepeakind.wpengine.com/companies/casper-industrial-rail-park/>.

⁶⁹ Glacier Rail Park, <http://www.kalispellcoreandrail.com/glacier-rail-park.html>.



Source: DKCI. Photo taken in October 2012, looking south and showing the newly completed Loblaws distribution centre (the major tenant in the structure). At the time of this photo, the CP intermodal terminal, running east - west just to the south of the structure, was still under construction and opened in January 2013.⁷⁰

Key takeaways

- Consider the development of rail-focused industrial areas. The key attraction is the direct connection to a rail terminal that can be set up to handle intermodal traffic, unit trains and so on, according to local needs. In addition, the rail access provides direct linkages to transcontinental suppliers and markets.
- Highway access remains essential. Some of these facilities are relatively new, with some of the greenfield examples cited here still being under development. As a result, their long-term viability from initial start-up may be dependent on several factors. These factors are local economic conditions, the presence of a critical mass of logistics providers and competition from other similar facilities in nearby or overlapping market areas.
- The successful examples suggest that focusing the industrial area around an existing intermodal rail terminal that is connected to the Class I rail network provides the best chance of success. Because these terminals are often, though not always, located within a built-up environment, other services such as transit access for facility workers can be more easily supported.

⁷⁰ 12-13 Annual Report, 2013, Global Transportation Hub Authority, Regina.

2.4.5 Enhance Calgary's attractiveness as a logistics and distribution hub

2.4.5.1 Provide fibre communications and other utilities to industrial sites and subsidize access to these sites

The jurisdictional surveys asked about industrial strategies and incentives for attracting businesses.

The Region of Peel noted that it has guidelines and policies in place regarding the provision of fibre optics to make sure those utilities are made available. Informants indicated that the major telecoms are typically good at providing high-speed fibre optics, and the Region ensures sites are provided transportation, water and wastewater services. The Region of Peel has lower development charge rates for industrial development compared with residential rates. Historically, the Region of Peel has provided lower development charge rates for industrial and warehousing uses as an incentive for industries to develop in Peel.

For other than rail grade separations, Peel does not typically ask the private sector to pay for access improvements, the rationale being that if they are locating in the Region they will subsequently be paying taxes. Instead, Peel asks, "how we can help them?" For example, the Region of Peel will provide or subsidize road accesses to the CN and CP terminals, although the Region does not finance any improvements within the actual terminal sites.

Most US informants could not comment on development incentives, because such incentives typically are the domain of their agency's economic development arm. However, in Columbus, it was noted that most of the incentives are in the form of reduced taxes, although occasionally transportation improvements are made to accommodate certain businesses.

Key takeaways

- Consider the role of service incentives, such as fibre optics, as a means of attracting new industrial development. At the same time, these considerations must be balanced against other incentives including taxation, and against their potential effectiveness compared with incentives offered by neighbouring jurisdictions.
- Consideration also could be given to adopting common guidelines across the Calgary region, for the common benefit of attracting new industry and the direct and indirect jobs they create to the region.

2.4.5.2 Consider trade and other initiatives to strengthen Calgary's position as an inland port

Stakeholders proposed that The City, working with the federal government and others, review ways to ensure the seamless clearance of incoming goods at the airport. Stakeholders also proposed:⁷¹

- Examining the feasibility of loading and unloading containers in Calgary as opposed to near the Port of Vancouver.

⁷¹ See Table 5-2, *The City of Calgary Goods Movement Strategy, Stage 2 Report: Issues and Challenges*, February 2018.

- Promoting the ample supply of lands in Calgary to prospective businesses given the relatively small supply in Vancouver.
- Examining opportunities to refill inbound containers with food products and other Alberta-sourced goods for export, rather than shipping them back to the port empty.
- Educating the public and others on the economic importance of Calgary as a distribution hub.

Key takeaway

- Working with the federal and provincial governments, goods movement industry associations and academia, The City could examine ways to further advance Calgary's potential as an inland port.

2.5 Strategies to enhance access, parking, loading and enforcement of goods movement regulations

2.5.1 Examine ways to better incorporate deliveries in the design of new developments

2.5.1.1 Consider off-street loading facilities in new developments where practical

With the growth of e-commerce and the increasing use of ridesharing services such as Uber and Lyft, several informants noted that there is increasing competition for curbside space. In order to offset the need for curbside space by goods movement, one strategy noted in the literature was to enhance development requirements to ensure that new buildings have sufficient loading zone capacity.

In Seattle, informants noted that key components of urban goods movement are in private hands, including building loading and unloading zones. An inventory of Seattle's loading zones found that 85% of the city's buildings do not have any off-street loading zones, and are therefore relying on the public right-of-way for loading. Informants at the City of Seattle noted that such a ratio is not sustainable into the future. As a result, the City of Seattle is developing a sustainable building concept in which all buildings must accommodate loading in the building footprint.

Seattle's strategy involves the provision of off-street loading, which allows vehicles a safe and legal place to load and unload out of the way of other transportation modes. Details are provided in Table 2-6. For example, the City of Seattle requires new developments to provide off-street truck loading areas and while still reserving some on-street parking for commercial vehicles. Seattle also allows vehicles holding a City Commercial Vehicle Loading Zone permit to occupy alleys for loading or unloading, up to 30 minutes.⁷² Philadelphia requires buildings to have sufficient off-street loading

⁷² The City of Calgary offers a Street Use Permit, which allows purchasers to use City road rights-of-way, including alleys, for loading or unloading materials and equipment, among other uses. The permit can be purchased on a daily basis, and is not required for short temporary stops. More details can be found at <http://www.calgary.ca/Transportation/Roads/Pages/Traffic/Permits/Street-use-permits.aspx>. However, this is not the same as Seattle's City Commercial Vehicle Loading Zone permit, which is purchased on an annual basis, can be used in specially designated loading zones in several parts of

zones, calculated according to the size of the building, which is mandated in the municipal Zoning and Planning Code.⁷³

Table 2-6: Consider off-street loading facilities in new developments where practical: Seattle

Costs and benefits	Off-street loading facilities eliminate the conflicts that can result with other vehicles and pedestrians when trucks park on the street or make curbside deliveries. Vehicles with valid City Commercial Vehicle Loading Zone permits can directly access facilities.
Other considerations, trade-offs and impacts	Off-street loading facilities may not be practical for brownfield developments and may be possible in certain building configurations. Consolidating loading docks shared across multiple businesses may be a cost-effective solution. The design of off-street loading docks must be such that it does not compromise the safety or access for other users. This may potentially increase land requirement and cost of development, depending on space for freight on the property. Some alleys might not be able to accommodate larger trucks.
Implementation entity (leads, partners)	Public sector: municipal planning and/or buildings department.
Timing of implementation and duration	Ongoing, through the establishment of new regulations for buildings of a certain size or anticipated use. The new regulations would ensure the development of off-street facilities and integration of truck deliveries with minimal conflict with the street or sidewalk.
Lessons learned from implementation	Consider off-street loading docks where practical in new buildings, and encourage them in substantial renovations of existing buildings. Off-street loading facilities can include internal loading bays, designated alleyways, or other flexible spaces designated for freight during certain times of the day.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017.

Key takeaways

- There is a need to ensure an adequate supply of off-street loading space in new developments in light of competing demands for the available on-street spaces. Alleys and other flexible spaces can be deployed as well.
- The City could consider developing a sustainable building concept in which all buildings must accommodate loading in the building footprint, as part of The City’s development approval process. The City could consider incorporating this concept as a requirement for its development permit process.

the city, and is intended only for a short stop at any given location. More details can be found at <https://www.seattle.gov/transportation/permits-and-services/permits/parking-permits/commercial-vehicle-load-zone-permits>.

⁷³ Delaware Valley Regional Planning Commission. 2017. Philadelphia Delivery Handbook.

2.5.1.2 Review and update developer mandates to accommodate changing delivery requirements

The strategy in the preceding section deals primarily with the *adequacy* of off-street parking for loading and unloading. By comparison, this complementary strategy is concerned primarily with minimizing the impact and disruption from goods movement activities when delivering, and in particular to support additional off-peak delivery.

Off-peak delivery

Off-peak delivery (OPD) occurs when delivery companies make deliveries to residences and businesses in the evenings and overnight, i.e. outside of the periods when traffic is busiest. We have not raised OPD as a specific strategy, as it is largely outside The City of Calgary's direct control. However, certain enablers such as ensuring that buildings are designed to minimize the disruptions caused by OPD, are within The City of Calgary's influence.

This strategy requires municipal agencies mandating developers to design buildings to minimize potential noise penetration, light pollution and other potential effects of freight transportation and outdoor activities. Similar frameworks can be used for incentivizing landowners in brownfield settlements to adopt such measures within a defined time period. An example of this is Anaheim, CA, which included specific planning requirements within the environmental report section of a transit-oriented development (TOD) project. Measures included requiring residential units to have solid-core exterior doors and minimum sound class ratings on all windows and exterior walls to help alleviate noise problems while the windows are shut. A corresponding strategy adopted by Anchorage, Alaska required inputs of motor carrier representatives in the site plan review to help avoid potential hindrances on safe motor vehicle operation once the plans are approved and the facilities are developed. Details of potential developer mandates are listed in Table 2-7.

There is also a need to periodically update development standards to reflect new needs. For example, the District of Columbia reworked its building/plan permits, construction permits and permits to use public space in order to improve the consideration of loading through such features as mandating 30-foot loading berths and internal site access and making available the use of a rear alley access if the alley space permits. Permit applicants also were required to submit data on the number and dimensions of loading facilities, the prescribed used and known tenant information, delivery frequency and truck size based on use and truck manoeuvring design templates and diagrams. The District also uses data and surveys on loading space use to develop site-specific models that forecast the demand for on-street loading space. Finally, authorities noted that the introduction of on-street bicycle lanes provides an opportunity to review and adjust curbside needs in order to meet demand.⁷⁴

Table 2-7: Review and update developer mandates to accommodate freight activity: Anaheim

⁷⁴ Cleckley, E., 2015, *How to create an efficient urban freight system?*, Philadelphia Delivery Symposium, Delaware Valley Regional Planning Commission et al., Philadelphia, 2015.

Costs and benefits	<p>This strategy helps reduce conflict between residents and logistics operators by prescribing building elements to reduce the negative aspects of freight transportation.</p> <p>Logistics operators can continue to conduct business in residential areas without the quality of life of residents being compromised.</p> <p>Such measures also enable practices such as off-hour delivery to occur with minimal disturbance to local residents.</p>
Other considerations, trade-offs and impacts	The design of such features including surface parking lots should ensure that freight circulation routes and driveways are segregated from customer automobile traffic to the extent possible.
Implementation entity (leads, partners)	<p>Lead - Public sector: municipal planning department</p> <p>Partners - Private developers, municipal public works, community development department, local residents, MPO or state planning agencies (advisory)</p>
Timing of implementation and duration	Ongoing, through a review of existing local and state building design standards. The review would determine how these standards can protect or buffer residents from the negative aspects of truck delivery.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017

One informant in the jurisdictional survey noted that the City of Vancouver requires loading zones to be able to accommodate a 53-foot truck. With the growth in more express delivery (e.g. couriers) and pressure on new development, there was pressure to provide only the in-and-outs for couriers, not the long-truck loading bays. The argument was that there are no large trucks in downtown Vancouver.

Key takeaways

- Building design should account for changing delivery requirements while also minimizing disturbances and other impacts of goods movement. Standards and requirements also might change as new vehicle types, delivery frequencies and other parameters associated with changes in consumer and business purchasing occur. The standards and requirements also should account for varying land uses and building purposes, as well as for whether the building is part of a greenfield development or is situated in an established area.
- Building design should also account for secure sites for OPD, where appropriate to the use of the building. The City could consider reviewing its bylaws and regulations to ensure that there are no regulatory impediments to OPD.
- Changes are best effected in consultation with the goods movement industry, businesses and building owners.
- The City could consider developing site-specific models that forecast the demand for on-street loading space.

2.5.1.3 Investigate measures to reduce improve delivery times within buildings

As noted in Section 2.5.1.1, in Seattle many existing buildings did not have loading zones that allow for off-street loading and unloading. Moving forward, the City of Seattle is developing a self-sustaining building concept. However, for existing buildings the City is researching tools to optimize loading and unloading by reducing time to pass through security and improving wayfinding within buildings.

To carry out this study, the collection of data on existing private sector loading facilities and how deliveries are made was indicated as being important considerations. With respect to existing private sector loading facilities, the study inventoried existing private sector loading zones areas. With respect to understanding how deliveries are made, the City of Seattle engaged academic researchers to carry out time and efficiency studies on deliveries, in which students followed drivers on delivery. They found, for example, that in some locations almost one third of the time spent delivering within the building was taken up with finding a security guard to unlock a freight elevator or to clear security.

These data could lead to strategies to encourage building owners to implement mechanisms for reducing the time delivery drivers spend in buildings. Some of the changes could also include new design features on public rights-of-way to facilitate goods movement. For example, NCFRP Report 33 highlighted installing curb cuts at key locations (e.g. adjacent to on-street loading zones) to facilitate cart access from the street to the sidewalk and into the building, particularly when a loading zone is located midblock.⁷⁵ However, the benefits of such a design feature would be site specific – including being influenced by building access – and could conflict with pedestrian accesses to the sidewalks.

Key takeaway

- Design and operational techniques for improving deliveries within buildings, between the entry to the building and the ultimate origin/destination, can improve the overall efficiency of goods movement by reducing the amount of time drivers and their vehicles must spend at a given site.
- The City could consider working with developers and industry associations such as BILD Calgary Region and the Building Owners and Managers Association of Calgary in order to review and perhaps update currently used techniques.

2.5.2 Examine ways to improve the supply and use of public spaces

2.5.2.1 Establish designated curbside loading zones

This strategy designates curbside loading zones for deliveries in areas of high freight activity during specific hours of the day, thereby reducing obstructions on pedestrian-oriented sidewalks. Given New York City's high density and competition for parking space, the New York City Department of Transportation established delivery windows to make curb space available for delivery trucks, resulting in reductions in double-parking and traffic congestion. For example, a section of Church Avenue in Brooklyn south of Prospect Park has defined delivery window spaces between 7 AM and 12 PM or

⁷⁵ *Philadelphia Delivery Handbook*, op. cit. See also Section 2.3.1.1 for more information.

between 7 AM and 3 PM, and it can be noted that these windows include the morning commuter peak period. Some of the elements of this strategy are shown in Table 2-8.

Table 2-8: Establish designated curbside loading zones: New York City

Costs and benefits	Curbside loading zones and increasing enforcement to check delivery vehicles keeps sidewalks free. Reduces double-parking by trucks and encroaching on sidewalks or bicycle lanes.
Other considerations, trade-offs and impacts	Reduces street parking that would otherwise be used by residents or visitors to the area. Such curbside loading zones should be clearly marked for both pedestrians and drivers to follow. Safety precautions for pedestrians in these areas need to be factored in.
Implementation entity (leads, partners)	Public sector: municipal public works, municipal planning department
Timing of implementation and duration	Ongoing, by: Identifying high-traffic locations that serve local business' needs for such loading zones to be designated. Establishing new regulations for curbside delivery space with safe and seamless integration of truck deliveries with minimal conflict with the street or sidewalk.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017

Within urban neighborhoods, Barcelona, Spain and Cologne, Germany, have allowed lanes that are reserved for buses only during peak commuting hours to be used for curbside commercial vehicle parking during the middle of the business day so as to increase capacity.⁷⁶

It is recognized, however, that the key challenge for implementing additional loading areas for freight is identifying *where* these high-priority areas are, given the multiple competing uses for curbside space. Doing so ties back to the preceding strategies; that is, understanding where demand for curbside space is highest (and lowest). Some guidelines are also noted in the *Philadelphia Delivery Handbook*, such as designating loading zones at the end of a block, rather than midblock. Finally, authorities in the District of Columbia noted that the introduction of on-street bicycle lanes provides an opportunity to review and adjust curbside needs in order to meet demand.⁷⁷

⁷⁶ NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, National Cooperative Highway Research Program, Washington, DC, 2017.

⁷⁷ Cleckley, E., 2015, *How to create an efficient urban freight system?*, Philadelphia Delivery Symposium, Delaware Valley Regional Planning Commission et al., Philadelphia, 2015.

Key takeaway

- The designation of curbside loading areas, even if only for specified delivery times, coupled with increased enforcement of their use can augment the supply of on-street parking and promote greater efficiency in deliveries and in space utilization.

2.5.2.2 Develop on-line parking reservation system and real-time parking availability apps

In both the jurisdictional scan and literature review, several strategies were noted to improve the visibility of the availability of loading zones for deliveries.

In Columbus, the Smart Columbus initiative includes the incorporation of real-time data into an app that drivers can use to see when and where are the best time to stop and unload. The app is also intended to indicate delivery zone availability and it will include an advanced reservation capability for these limited spaces.⁷⁸

In the jurisdictional scan, it was also noted that such an app could go one step further and allow drivers to reserve a delivery zone in advance. NCFRP Report 33 notes:

Vehicle parking reservation systems make it possible for drivers to reserve curbside parking space. The program requires stakeholder coordination as well as strict enforcement. Intelligent Transportation Systems (ITS) usually are needed to help with the allocation and use of parking spots. In Toyota City, Japan, a pilot test allowed truckers to reserve parking spaces using cell phones. The parking area was remotely monitored using cameras. The pilot was deemed a success because it led to a 56% reduction of parked vehicles on the street for loading/unloading (PIARC 2012). However, no information is available about any research that investigated the potential for unintended consequences of this program, such as increased congestion due to other vehicles without access to the system circling around searching for a parking spot.⁷⁹

Likely, a related benefit of such a system is that it would also provide data to the public sector to better locate commercial loading zones in line with demands.

Some US cities have enhanced the management and efficiency of their on-street loading zone systems. The sidebar on the next page describes the recent system implemented by the District of Columbia. This program includes a paid permitting system.⁸⁰

⁷⁸ L. Rosencrance, *In Columbus smart city initiative, transportation takes the wheel*, *IoT Agenda*, November 6, 2017, <http://internetofthingsagenda.techtarget.com/feature/In-Columbus-smart-city-initiative-transportation-takes-the-wheel>.

⁷⁹ Holguin-Veras, J. et al, 2015, op. cit.

⁸⁰ Sources: *Commercial Loading Zone Management Program*, 2017, US Federal Highway Administration and Cleckley, E., 2015, *How to create an efficient urban freight system?*,

Several initiatives have underscored the importance of consulting industry and businesses. For example, as part of a bus route improvement on a Brooklyn corridor, New York City authorities asked local businesses their preferences for on-street loading zones with varying levels of restrictions while also monitoring demands, with closer locations having shorter time restrictions. The City was then able to develop a system that balanced the needs of businesses with other users.⁸¹

Commercial Loading Zone Management Program – District of Columbia

In 2015, the District of Columbia launched its Commercial Loading Zone Management Program. The Program aimed at improving the management and use of the District's 500+ curbside loading zones, thereby alleviating congestion caused by double-parked commercial vehicles for which on-street spaces were not available while also improving goods movement efficiency. Through extensive consultation with couriers, trucking companies and business improvement districts, the Program identified issues (with the lack of loading spaces and occupied loading zones being most prominent). Data on loading demand, location, duration of use, conflicts and so on were collected, and before-and-after data were used to evaluate the impacts of a pilot test on a downtown Washington commercial street.

The Program introduced paid permitting for the use of the spaces, making annual and daily passes and pay-per-use permits available. The passes are payable through an online registry and the pay-per-use permits (never more than \$5 US per hour) can be paid at meters or by phone on the spot. Trucks can use the space up to 2 hours. Enforcement and fines also were increased.

The cited benefits include a more efficient use of the available space, reduction in congestion, increased compliance and improved carrier/courier control of costs. The initiative has developed extensive data on loading demands and characteristics that have been incorporated into freight trip generation models, which are to estimate businesses' delivery needs at a block face level and, more generally, to uniformly evaluate curbside loading zone needs and to right-size loading zone space requirements.

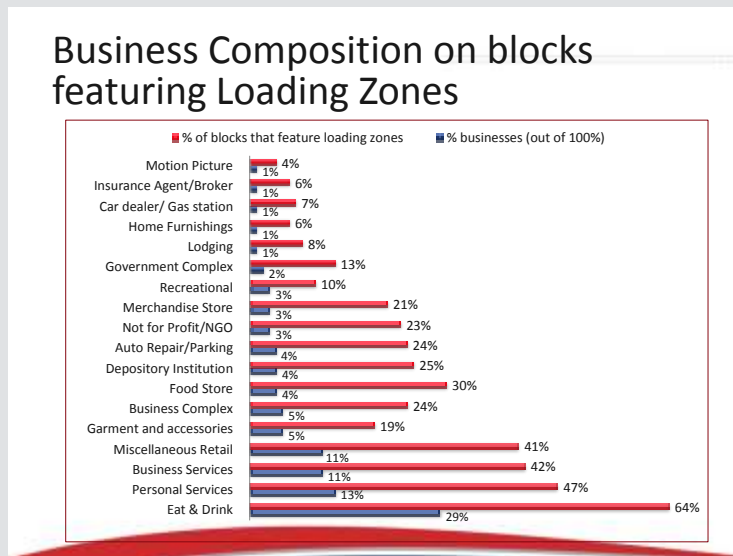
Authorities cited the in-depth consultation with carriers, couriers and businesses as being key to ensuring that goods movement needs are met and, ultimately, to ensuring the Program's success. This consultation and an accompanying survey were instrumental in establishing demand. For example, Figure 2-4 shows the eating/drinking establishments and personal services were located on blocks that had loading zones – i.e., loading zones were a factor in their viability and choice of location. As well, a key message to stakeholders was the importance of loading in supporting the local economy, noting facts such as one-quarter of the District's annual tax revenues, or \$16.3 billion, are generated within 200 feet of existing loading zones, and that

Philadelphia Delivery Symposium, Delaware Valley Regional Planning Commission et al., Philadelphia, 2015.

⁸¹ Roe, M. and C Toocheck, 2017, *Curb Appeal, Curbside Management Strategies for Improving Transit Reliability*, National Association of City Transportation Officials, Washington, DC.

130,000 jobs representing 16% of all District jobs are “directly or tangentially affected by truck freight.”

Figure 2-4: Business types and loading zones: District of Columbia



Source: Cleckley, E, 2015, *How to create an efficient urban freight system?*, Philadelphia Delivery Symposium, Delaware Valley Regional Planning Commission et al., Philadelphia, 2015.

Key takeaways

- Schemes to improve the management of existing on-street loading spaces can offer reductions to congestion while improving the efficiency of goods movement and reducing operating costs to couriers and carriers.
- Close collaboration with industry and businesses is vital to identifying workable solutions that meet user needs.
- Some cities have introduced paid permits as a means to more effectively manage the available on-street supply of loading spaces.

2.5.2.3 Improve efficiency of public and private loading spaces

Currently, in Calgary, most delivery companies have a single distribution centre to cover the entire region. Given the proliferation of e-commerce activity, stakeholders noted that in the future, there can be a move towards a more “hub-and-spoke” distribution network. At the limit, in such a network, there may be mini-distribution hubs in each neighbourhood that transloads cargo into smaller vehicles (including bike delivery vehicles or potentially vehicular or aerial drones in the future). Possibly, these areas might also include lockers to pick up deliveries.

Likewise, in the literature, the concept of staging areas was also noted as a possible strategy to deliver to areas where there are not sufficient loading zones to enable goods movement activity. The typical challenge with developing these staging areas includes finding sufficient land in an already congested

urban area.⁸² In addition, typically, they are not economically viable without sufficient density, as additional handling increases costs.

Improvements to the use of public space have been cited as increasing the viability of businesses and their attraction to the public. For example, loading and waste pick-up areas behind restaurants and stores in central London have been consolidated, making deliveries and pick-ups more efficient while also making the vicinities more attractive to patrons of these establishments. In turn, vehicle movement has been reduced, air quality has improved and, in some locations, retail sales and property values have increased.⁸³

Where wide sidewalks exist, some agencies have demarcated sidewalk space for couriers and other small vehicles that are serving large, multi-tenant offices in dense urban cores. These have the advantage of moving vehicles off the street while causing minimal disruptions to pedestrian flow. As Figure 2-5 shows, the courier vehicles are also removed from the adjacent bus lanes. The designated spaces also can encourage park-and-walk activity among couriers.

Figure 2-5: Use of designated sidewalk space for couriers: Perth, Australia



Source: DKCI.

⁸² Ibid.

⁸³ Hodge, S., 2015, *Highlighting Best Practices, New York City & London Peer Exchange*, Philadelphia Delivery Symposium, Delaware Valley Regional Planning Commission et al., Philadelphia, 2015.

Key takeaway

- The more efficient use of public and private spaces can provide ways to better manage deliveries and pick-ups while also enhancing the attractiveness of the area to patrons and increasing the economic viability of businesses and properties.

2.5.2.4 Establish time-of-day access control in areas with high levels of pedestrian activity

Sections 2.5.2.1 and 2.5.2.2 describe strategies for managing curbside loading areas. This strategy considers time-specific access for trucks in areas where there is significant foot traffic. Trucks are allowed to access the streets directly next to pedestrian malls/markets and make deliveries directly to vendors during the designated times of day – for example, in the morning before stores open, after which they park on adjacent streets and must deliver goods by hand. This strategy was implemented, for example, to serve a local market in Cincinnati, Ohio, which addresses several site-specific characteristics of goods movement - see left image in Figure 2-6 and details in Table 2-9:

- Most deliveries use general street parking spaces, despite the availability of some designated curbside loading zones.
- Many of the loading zones are not located to allow easy access to businesses.
- As revitalization continues, street parking may not be as easily available in the future.
- Construction vehicles often block traffic, and larger vehicles have difficulty navigating narrow streets.

Clear parameters of usage encourage compliance with the designated locations and times of use, as shown in the right image in Figure 2-6. There are some areas in Calgary where this strategy is already implemented, namely Stephen Avenue walk.

Table 2-9: Time of day access control: Cincinnati

Costs and benefits	During regular hours which see higher footfalls in public places, such as around lunch, area is available for pedestrian use, while giving delivery companies and vendors options on the best way to access goods during designated hours.
Other considerations, trade-offs and impacts	As a neighbourhood grows, stricter enforcement may be required to maintain these parking spaces available for commercial use. The City of Cincinnati is examining the use of floating zones, where commercial loading and unloading is allowed during the day and regular parking is allowed in the evening to allow greater flexibility and shared use of valuable and in-demand on-street parking spaces. The City of Cincinnati is also discussing increasing the number of metered parking locations in each neighbourhood in order to better control parking issues and encourage the use of nearby parking structures by automobiles.
Implementation entity (leads, partners)	Municipal planning departments, local businesses, local residents, freight industry

Timing of implementation and duration	Ongoing: Issues were identified and measures were initiated in The City of Cincinnati's 2002 Over-the-Rhine Comprehensive Plan and through the creation of the Cincinnati Center City Development Corporation (3CDC) in 2003 to drive the vision.
Lessons learned from implementation	Time-of-day access control allows trucks to make deliveries during early morning hours while allowing the streets to remain open to pedestrians during prime hours. Loading zones are more likely to be used if they are placed strategically near businesses. In addition, metered parking may encourage trucks to use the loading zones instead of parking spaces.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017

Key takeaway

- Time-of-day curbside management can be used to ensure access to areas that have high volumes of foot traffic.
- This strategy is already implemented in some areas of Calgary. However, The City may wish to consult with the Calgary Parking Authority to determine the need or feasibility of implementing the strategy elsewhere.

Figure 2-6: Time of day access control examples



Hand delivery after the AM peak period in Findlay Market, Cincinnati

Source: NCHRP Report 844, Guide for Integrating Goods Movement by Commercial Vehicles in Smart Growth Environments, 2017



Goods movement priority locations and times, London

Source: Hodge, S., 2015, *Highlighting Best Practices, New York City & London Peer Exchange*, Philadelphia Delivery Symposium, Delaware Valley Regional Planning Commission et al., Philadelphia, 2015.

2.5.3 Consider operational and regulatory enhancements to improve access and circulation for couriers and trucks, reduce parking costs and clarify enforcement

2.5.3.1 Encourage use of alley space for goods movement activities

One of the concerns noted during the consultations in Calgary is that delivery drivers are often ticketed for making deliveries in alleys, when designated on-street delivery spaces are not available. In Seattle, informants noted that facilitating the increased use of alleys for goods movement deliveries is a priority. To this end, as noted in section 2.5.1.1, the City of Seattle has allowed commercial vehicles to occupy alleys for periods of up to 30 minutes. As noted elsewhere in this report other cities, such as New York City, the District of Columbia and London, have promoted improvements to alley space in order to better manage the existing, permitted use of this space.

Key takeaways

- Many municipalities allow the use of alleys for deliveries.
- Alley space can be used effectively for courier and truck deliveries, in order to improve site access and efficiency of goods movement while reducing costs.

2.5.3.2 Develop an online commercial vehicle route finder and address gaps in GPS data as they relate to truck routes

Several informants have developed web tools that inform carriers, businesses and the general public about routes, local conditions and goods movement trends. For example, TransLink is developing some initiatives to improve goods movement wayfinding across Metro Vancouver. TransLink is moving away from providing static PDF and paper maps and is developing a commercial vehicle route planner, i.e. a Google Maps-type system that is user friendly for the goods movement industry. A beta version of the app is available for downloading to smartphones.

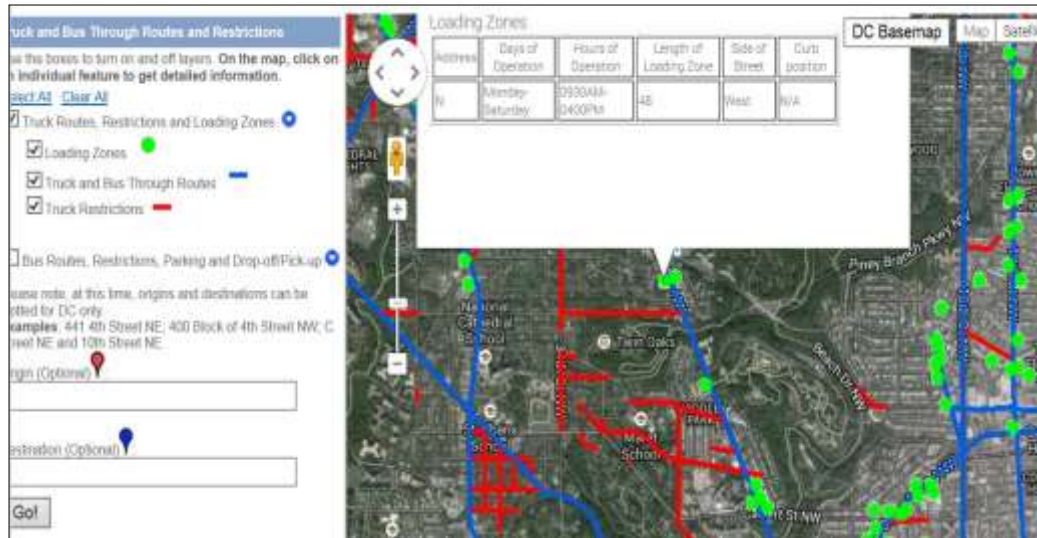
In Columbus, the *Mid-State Freight* app provides several statistics, as well as a map that shows the location of key goods movement infrastructure, a map of system performance (an index of road travel time reliability), planned network improvements and trends in goods movement modes. The last compares these trends with other similarly sized cities in the United States.⁸⁴ New York City has developed a truck route app that drivers can download to their smartphones: this is “much more user friendly [than previous versions of the map] because we want to make it easier for the drivers to find their way legally to and from destinations.”⁸⁵ Peel Region’s *Freight 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

⁸⁴ The app can be found at <https://apps.morpc.org/midstatefreight/>.

⁸⁵ Hodge, S, 2016, Freight Shipments and the Changing Last Mile, *Talking Freight*, transcript, March 16, 2016.

and incidents.⁸⁶ The District of Columbia's interactive freight map, which shows loading zones, truck restrictions and bus routes, is illustrated in Figure 2-7. Note that the loading zone attributes are shown, including address, days and hours of operation, length and side of street are shown.

Figure 2-7: Interactive freight map – District of Columbia



Source: Cleckley, E, 2015, *How to create an efficient urban freight system?*, Philadelphia Delivery Symposium, Delaware Valley Regional Planning Commission et al., Philadelphia, 2015.

Key takeaways

- Web tools offer user-friendly ways to keep truckers informed on the most optimal routes and other information that helps them pre-plan routes and also make en-route adjustments as conditions change. The pervasiveness of mobile phones makes these tools convenient ways to make key information available.
- A web tool could be especially useful for drivers of over-dimensional loads and dangerous goods.
- The web tools also inform the general public about goods movement trends, system components and system performance. Taken together, this information also can be used to illustrate the importance of goods movement to the public.
- The City could consider developing a web-based commercial vehicle route planner, or perhaps investigate applying a web-based tool that was developed by another agency.

⁸⁶ The online map can be found at <http://www.peelregion.ca/planning-maps/freight/>.

2.5.3.3 *Deploy other strategies to improve truck wayfinding*

There are other strategies to improve truck wayfinding other than improving data within their guidance systems. For example, some drivers who primarily serve local markets might be less likely to refer to a GPS system, so other strategies might be more appropriate. Moreover, there can be gaps in the available GPS data and mapping tools.

For example, in addition to developing a route guidance app, TransLink is also considering whether to also allow the data to be downloaded so that truck dispatchers could use the data on their own software, such as ProMiles/TruckMiles and Bentley. Some of the routing tools are part of the electronic logging devices that truck drivers use for hours-of-service compliance.

Along similar lines, in order to avoid having trucks turn around on small, local roads, an informant in Columbus noted that they have been investigating how truck routes in their jurisdiction are incorporated into GPS routing software such as Google Maps. Further, the Smart Columbus initiative will include the development of a platform to help drivers of oversize loads plan their routes.⁸⁷

The City of Edmonton's Goods Movement Strategy proposes to "develop a transportation systems management strategy to coordinate the delivery of technology-based tools including Intelligent Transportation Systems in support of Key Goods Movement corridors with regional considerations." The Strategy also proposes to "Improve on-road communication and way-finding for truck drivers" by:

31. Review and improve truck route and height restriction sign placement to ensure sufficient time allowance for drivers to make alternate route choices.

32. Collaborate with leaders in industry and academia to identify an on-road electronic communication project alerting truck drivers of road restrictions.⁸⁸

NCFRP Report 33 also identified the use of variable message signs to display "real-time" information on access to multi-use lanes, a concept which would potentially be extended to displaying real-time information on road load limits, travel times along competing routes, etc.⁸⁹

Stakeholders noted that additional signs on the highways approaching Calgary could be used to direct drivers to Stoney Trail as a faster, though lengthier alternative to other routes such as Highway 1/16th Avenue. Stakeholders also noted the need for improved directional signage on Stoney Trail to key goods movement facilities such as the airport, which they saw as helping to divert drivers from other congested routes.

It may also be possible to consider integrating other real-time data into such a platform. For example, the US Department of Transportation, in the context of the Los Angeles area, investigated a concept for

⁸⁷ The City of Columbus. [Smart Columbus](#).

⁸⁸ City of Edmonton, 2014, Edmonton Goods Movement Strategy.

⁸⁹ Holguin-Veras, J. et al, 2015, op. cit.

a “Freight Advanced Traveler Information System.” The concept includes information related to public sector infrastructure, such as freeway and arterial speeds, as well as information related to private-sector infrastructure, such as terminal queue lengths. The implementation of this concept would require extensive public- and private-sector coordination.⁹⁰

Key takeaways

- In addition to online route maps other, complementary initiatives can be used to aid wayfinding. These include digital techniques to improve the quality of maps and the information provided, downloadable data to help dispatchers plan their routes, use of changeable message signs to convey key information and reviews of existing signage to ensure that the placement of the signs provides sufficient time for drivers to react.
- Working with Alberta Transportation, The City could consider implementing additional changeable messages signs along the approaches to Calgary and at certain locations along Stoney Trail in order to guide drivers to use Stoney Trail instead of other congested routes.

2.5.4 Examine ways to improve the management of trucks travelling to, from or through Calgary

2.5.4.1 *Plan for truck parking requirements in anticipation of new hours-of-service electronic recording requirements*

The external truck origin-destination survey, conducted in the summer of 2017 for the Strategy, demonstrated that a significant volume of long-distance truck traffic travels to, from and through Calgary.⁹¹ Complementary services have been established in and around Calgary to serve these external trips.

Truck drivers are required to meet hours-of-service regulations, but some US informants, in particular, noted that there were not enough truck parking spaces for them to park. In addition, as of December 2017, in the US truck drivers are required to use electronic logging devices (ELDs): among other impacts, compared with paper logs these will provide more precise indications of drivers’ compliance with hours-of-service regulations, which in turn mean that drivers must be able to find a safe parking space nearby. Informants indicated that the ELDs will increase demand for parking spaces, especially around key logistics hubs, likely because drivers will now need to be more conservative in terms of their time allowance to reach a rest area. Transport Canada has indicated that ELDs will not be required in Canada until 2020, with existing recording devices permitted until 2022.⁹² Nonetheless, some Canadian provinces, including British Columbia and Ontario, are examining the implications on the truck parking supply. Informants in Salt Lake City, which is a major regional distribution hub just as Calgary has become for western Canada, noted the importance of having an adequate supply of truck parking areas to meet the

⁹⁰ Cambridge Systematics. 2012. Freight Advanced Traveler Information System.

⁹¹ External Truck Origin/Destination Survey Summary Report, prepared for The City of Calgary, September 2017.

⁹² Canada to require ELDs by 2020, [Truck News](http://trucknews.com), trucknews.com, December 18, 2017.

growing demand: existing stops are full by Friday night or Saturday morning.

Several of the US informants indicated that they were studying the adequacy of truck parking in their jurisdiction, or are constructing new truck parking lots. One jurisdiction noted that ideally the public sector could incentivize or encourage one of the large truck stop operators to come build a large full-service rest stop. Informants in Salt Lake City suggested that unused properties close to warehousing districts could be paved, in order to alleviate shortages.

Qualitatively, some of the potential reasons of well-placed truck parking include:

- Encouraging compliance with hours-of-service regulations.
- Minimizing inappropriate parking, such as along the side of a road.
- Reducing the time and vehicle-km travelled to travel to/from the rest stop and finding parking, as well as the “buffer” time required to find parking.⁹³
- Enabling the success of inland ports.

Some of the challenges can include the capital cost required for the investment, given that the pavement and structural costs for constructing a space that can support a heavy truck are significantly greater than those that are needed to support an automobile, and finding and locating sufficient land for the lot.

Key takeaway

- Plan now to ensure that the truck parking supply is adequate to meet new hours-of-service reporting requirements.
- Consider using properties near the concentration of warehouse and distribution centres as places to establish parking for trucks that serve these centres.

2.5.5 Consider allowing the private sector to finance new network infrastructure

2.5.5.1 Utilize business improvement areas to implement changes

Although the legal structure would vary between jurisdictions, a business improvement area (BIA) is a concept in which a group of area businesses agrees to a new fee or additional taxation in a designated area to fund various improvements. In Atlanta, informants noted that they have seen use of the concept of a BIA (known as community improvement districts, or CIDs) to help fund transportation projects in industrial areas. For example, around the Hartsfield-Jackson Atlanta International Airport, Aerotropolis Atlanta CIDs fund transportation projects and studies, crime reduction strategies (e.g. private security patrol), and area beautification. These studies included, for example, studying transit access and freight clusters around the Hartsfield-Jackson Atlanta International Airport:

⁹³ One US-based study found that the average driver could be forgoing over 9,300 additional revenue-earning miles each year, at a cost of US \$4,600 per driver, because of the time uncertainty.⁹³

American Transportation Research Institute. 2016. Managing Critical Truck Parking Case Study – Real World Insights from Truck Parking Diaries.

The CIDs partnered with the Aerotropolis Alliance, Hartsfield-Jackson Atlanta International Airport (ATL), Fulton and Clayton Counties, and the cities of Hapeville, East Point, College Park, and Forest Park to apply for funding from the Atlanta Regional Commission, the Atlanta MPO, to further study the Freight Cluster around the airport, as identified in the Commission's Freight Mobility Plan. This study will examine the existing and future projected conditions of freight movement around the airport, and identify improvements that will facilitate continued movement of all kinds of cargo in and through the airport area. The study is anticipated to begin in 2018.⁹⁴

Informants noted that these areas are very helpful for representing and speaking on behalf of the private sector interests in industrial areas, often more so than the companies themselves. Obviously, such an initiative would need to be driven by the private sector, but highlights one tool for raising revenues to fund freight transportation improvements.

Duke Heights in Toronto is a large industrial and manufacturing area that has more than 2,500 businesses and 30,000 workers. Duke Heights is bounded by two expressways, to which it is connected by several arterials. One of these arterials is Finch Avenue West, which traverses the area and along which an at-grade light rail line is planned. In recognition of current parking and other constraints and of the need to accommodate truck traffic around the new light rail line, the Pembina Institute and the City of Toronto are currently working with the Duke Heights Business Improvement Area to develop a transportation management association to better manage goods movement. Proposed initiatives include examining ways to consolidate loads among neighbouring businesses.⁹⁵

Key takeaway

- Collaborations with business improvement areas can be used to improve the efficiency of goods movement in these goods-generating areas, as well as potential partnering on the funding of capital improvements.

2.5.6 Minimize disruptions due to road construction

2.5.6.1 Consider additional practices to reduce disruptions during road reconstruction or rehabilitation

Like many of the other issues raised, addressing the issue of minimizing construction timelines and disruptions to the public and businesses is much broader than goods movement itself. Although there are general industry guidelines, best practices for dealing with construction timelines can be project specific and occur at many different stages. The strategies below are largely drawn from NCHRP Synthesis 413: Techniques for Effective Highway Construction Projects in Congested Urban Areas⁹⁶ and the Federal Highway Administration's, Design and Construction Strategies:

⁹⁴ [Aerotropolis Atlanta CID.](#)

⁹⁵ <http://www.pembina.org/freightforum>.

⁹⁶ Warne, T. 2011.

- Different procurement strategies: For larger projects, alternative finance and procurement approaches (e.g. design-build-finance, etc.) can be used to provide incentives for on-time completion. For smaller projects, liquidated damages and other incentives can be used as incentives for on-time completion.
- Effective communication: Effective communication and engagement with stakeholders, including effectively working with the media and providing early notifications of pending construction, are keys to ensure that the disruptions due to construction are taken into account by the public. The use of social media, such as through push notifications, to alert drivers to changed routes and closures could also be effective.
- Early and ongoing coordination with utilities: Utility conflicts are a frequent source of cost and schedule overruns, so early coordination work is vital to minimizing schedule delays.
- Coordinate multiple road and utility projects at once: To avoid extended delays, multiple projects could be coordinated to be completed at once.
- Greater use of off-peak work: “Night work/off-peak work involves scheduling work at periods of lower traffic volumes, to reduce traffic disruption, as well as worker exposure to traffic and driver exposure to work zones.”⁹⁷ However, such a work schedule would likely incur greater costs and may not be appropriate in all circumstances.
- Accelerated construction: “Accelerated construction uses various techniques and technologies to help reduce construction time while enhancing/maintaining safety and quality.”⁹⁸
- Road Closure and Lane Closure: “Road closure is an approach designed to eliminate the exposure of motorists to work zones and workers to traffic by temporarily closing a facility for rehabilitation or maintenance.”⁹⁹

For some of these strategies, the benefits likely outweigh any modest cost – for example, effective communication. However, other strategies would be project-specific and require further analysis prior to implementation.

Key takeaway

- Several measures, ranging from effective communications to increased use of off-peak hours and accelerated construction with full road closure, can reduce delays and minimize disruptions that are caused by construction.
- The City already deploys many of these measures, but The City could review their specific impact on goods movement operations and consider whether additional measures or enhancements to existing measures are warranted.

⁹⁷ US Federal Highway Administration. [Design and Construction Strategies](#).

⁹⁸ Ibid.

⁹⁹ Ibid.

2.5.7 Partner with the private sector to implement goods movement improvements

2.5.7.1 Work with the private sector to pilot test new delivery solutions

Partnerships between government agencies and private sector companies to pilot test delivery solutions can reduce investment costs and risks for both parties, while at the same time fostering collaboration. Several examples of this strategy exist. For example, the European Union is pilot testing delivery solutions in major cities. In Berlin, Germany, an urban freight laboratory has been developed in a central community with residential and mixed-use business and retail activity. The site consists of lockers for parcel storage and electric-assisted bicycles for delivery. In the United States, DVRPC, the Philadelphia MPO, recently completed its *Philadelphia Delivery Handbook*, which documents best practices and a complete streets checklist for last-mile freight delivery considerations.¹⁰⁰ Key attributes are listed in Table 2-10.

Table 2-10: Work with private sector to pilot-test new delivery solutions

Costs and benefits	Both parties collaborate on the solution but at the same time reduce their relative investment in time and resources as compared to testing projects on their own. Government agencies can draw upon private sector expertise for developing innovative solutions while private companies benefit from the collaboration with the public sector, and delivery solutions can be tested in current, real-world situations.
Other considerations, trade-offs and impacts	Financing and manpower may prove to be a challenge for some public agencies. Private sector companies may have inhibitions about their technology becoming public knowledge too soon.
Implementation entity (leads, partners)	Lead - Private and public sector: municipal planning agency, education/research Institution. Partners - Logistics operators, state DOTs, MPOs, municipal public works, research institutions, advocacy groups, consultancies, public or private grant/loan financing organizations.
Timing of implementation and duration	Municipal agencies may need to undertake public procurement process to identify companies suitable for the initiative. Alternatively, these may be collaborations based on initiatives proposed by the private sector.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017

Key takeaway

- Initiatives to improve the efficiency of goods movement and delivery can be costly to implement, and so pilot tests can be deployed to assess their operational viability. Collaborations between the public and private sectors can reduce costs and risks, while also establishing partnerships for future initiatives.

¹⁰⁰ See Section 2.3.1.1 for more information on the *Handbook*.

- The freight council, described in Section 2.3.2.1, provides an important means for proposing opportunities to test delivery solutions and for engaging private sector and other potential partners.

2.6 Strategies to plan for a changing future

2.6.1 Examine how changing technologies impact the production and distribution of goods

2.6.1.1 *Update policies and protocols for incorporating new goods movement technologies into transportation plans*

The City of Calgary's *The Future of Transportation in Calgary* reviews potential new technologies that affect the mobility of Calgarians and the transportation sector in general.¹⁰¹ Echoing this, a number of jurisdictions indicated that they were likewise developing a “technology policy” document.

Though not focused entirely on freight, informants in Seattle noted that they are developing a protocol for evaluating innovative solutions (e.g. vehicles on sidewalks). Seattle's *New Mobility Playbook* notes that there are a number of “upsides” to new technologies, but that there are also a number of possible downsides. As a result, they have developed several principles and related “plays” to hopefully react and shape the implementation of new technologies to maximize the potential upsides, but minimize the potential downsides. Their five plays comprise:

- PLAY 1: Ensure new mobility delivers a fair and just transportation system for all.
- PLAY 2: Enable safer, more active, and people-first uses of the public right of way.
- PLAY 3: Reorganize and retool SDOT to manage innovation and data.
- PLAY 4: Build new information and data infrastructure so new services can “plug-and-play.”
- PLAY 5: Anticipate, adapt to, and leverage innovative and disruptive transportation technologies.¹⁰²

In other words, the City of Seattle is attempting to shape the implementation of new technologies, rather than merely responding to them.

Seattle's document explicitly mentions freight. One of the strategies is to “work with the University of Washington's Urban Freight Lab to understand the impacts and benefits of e-commerce and other emerging shared goods delivery models in Seattle (Strategy 2.3).”¹⁰³ Leveraging academic institutions for goods movement research is a related strategy noted in section 2.7.2.1.

¹⁰¹ City of Calgary. 2017. *The Future of Transportation in Calgary*.

¹⁰² Seattle Department of Transportation. 2017. [New Mobility Playbook](#).

¹⁰³ Seattle Department of Transportation. 2017. [New Mobility Playbook](#).

Stakeholders noted the need to ensure that regulations keep pace with new technological developments, so that the uptake of a viable technology is not restricted by out-of-date bylaws or regulations.

Key takeaway

- Technology policy documents provide insight and establish a systematic, data-driven approach to anticipating new technologies. The City could review its current technology policy documents in order to ensure that they account for new and emerging goods movement technologies. This review could also examine applicable bylaws and regulations to ensure that they do not unduly inhibit the uptake of these technologies. The City also could establish a protocol for evaluating freight innovations that are proposed as part of transportation or land use plans.
- Collaborating with academia provides an opportunity for leveraging and testing research.

2.6.1.2 Pilot technology initiatives that have a freight component (e.g. Smart Cities)

The City of Columbus is developing a number of technology initiatives related to freight as part of its *Smart Columbus* initiative. The City has received a total of US \$50 million in grants from the US Department of Transportation, which the *Smart Columbus* initiative won over 76 other municipal applicants, and from the private sector. The City has been able to leverage these funds into US \$500 million through additional private investment.

The *Smart Columbus* initiative is implementing several improvements to improve freight:

- Improving reliability of freight by installing signals that prioritize truck movement along freight corridors.
- Providing truckers with real-time information on parking availability and truck routes.
- Demonstrating the potential for automated and connected freight vehicles to make freight movements safer and more efficient.

The initiative is being implemented through additional communications and data analysis infrastructure, including:

- Connected transportation network: "... dedicated short range communications (DSRC) technology along 50 miles of roadway, at 175 traffic signals, and on 3,000 vehicles";
- Integrated Data Exchange (IDE): "The IDE is a dynamic platform that integrates data from deployed smart technologies and community partners offering an open-source information portal intended to facilitate better decision-making and problem solving for all users."¹⁰⁴

Note that no new hard infrastructure is being implemented as part of this initiative.

In a similar initiative, in December 2017 Infrastructure Canada launched a national Smart Cities Challenge. The Challenge "encourages communities to adopt a smart city approach to improve the

¹⁰⁴ City of Columbus. Smart Columbus Overview.

lives of their residents through innovation, data and connected technology.” The Challenge is open to Canadian communities of all sizes.

Stakeholders suggested that The City could consider testing truck platoons, which have been tested elsewhere in Canada and, more extensively, in the United States.¹⁰⁵

Key takeaway

- Smart City and similar high-technology competitions can spur innovation in data- and technology-driven solutions for better managing goods movement.
- The City could consider participating in tests of new technologies while at the same time examining the potential implications on existing regulations and bylaws.

2.6.1.3 Install information technology and communications infrastructure as part of road works

Informants noted that as roads are reconstructed in Chicago, local authorities are trying to ensure that it includes information technology and other infrastructure – for example, fibre and the flexibility to enable vehicle-to-infrastructure communication. Although the timing of a widespread implementation of vehicle-to-infrastructure (and other vehicle and infrastructure) communications is uncertain, authorities are at least taking advantage of reconstruction opportunities to prepare for future deployment of the technologies on a broad scale.

Key takeaway

- Use opportunities for reconstruction and other upgrades in order to install fibre and other advanced information technologies in order to prepare for the future deployment of vehicle and infrastructure communications technologies.

2.6.2 Plan for changes in distribution and delivery requirements

2.6.2.1 Deploy innovations and other approaches to accommodate changing e-commerce habits

A number of observers have noted the importance of understanding changing consumer purchase characteristics in order to be able to anticipate goods movement needs and develop effective responses.

¹⁰⁵ See, for example, A. German, *Truck Platooning Research in Canada*, Official Newsletter of the Canadian Association of Road Safety Professionals, Issue 4, 2017.

Figure 2-8 describes these patterns succinctly, and establishes the demands for diversity, information, flexibility, service and environmental quality – while wanting delivery to be free; that is, available everywhere at any time and at no cost.¹⁰⁶

One result of the rapid growth in e-commerce volumes has been increased strains in existing delivery networks, in part also generated by rising labour costs. As a result, couriers and retailers have begun to experiment with lower-cost alternatives that also impact goods movement. These include self pick-up, wherein the customer purchases a product online and then picks it up at a central store or depot of his or her choice, hence avoiding the cost to the delivery company of delivering the product to the purchaser's home. Distributors are also considering the use of automation within their warehouses, in order to reduce the costs of labour. Some retailers are experimenting with drones for deliveries, while others are considering the use of driverless vehicles to deliver fast food.¹⁰⁷ However, there remain significant barriers to the broader use of these technologies: for example, with current technology, many drones can carry only a single parcel and then must be re-charged before they can make another delivery.¹⁰⁸

There are also concerns that the current low-cost – i.e., free – delivery is not sustainable. Although the share of e-commerce purchases will continue to grow, demand could be tempered as costs to consumers rise. In the United States, the United States Postal Service has “subsidized the rise of e-commerce by systematically underpricing the cost of parcel deliveries,” thereby allowing large distributors such as Amazon to transport products to post offices from their warehouses and use the postal service for last-kilometre delivery. However, the postal service is under increasing financial pressure to raise its own prices, and some observers expect that e-commerce delivery costs will rise accordingly.¹⁰⁹

¹⁰⁶ Source: Strauss-Wieder, A, 2016, *The Changing Last Mile: The Consumer, The Click and The Delivery*, *Talking Freight* presentation, US Federal Highway Administration, March 16, 2016.

¹⁰⁷ For example, tests are now evaluating the use of driverless cars to deliver pizza, by Ford and Domino's Pizza and by Toyota and Pizza Hut. See <http://www.cbc.ca/news/technology/dominos-pizza-ford-self-driving-car-1.4266349> and <http://www.businessinsider.com/toyota-pizza-hut-team-up-for-self-driving-pizza-delivery-2018-1>.

¹⁰⁸ Howard, C, 2017, *The new bazaar*, Special Report on e-commerce, *The Economist*, October 28, 2017.

¹⁰⁹ Ibid. The Canadian situation is not known. However, because large distributors such as Amazon also operate in Canada and because a growing proportion of e-commerce purchases are made across international borders, it can reasonably be anticipated that any changes in the cost models of American distributors will also be felt in Canada.

Figure 2-8: Consumer purchasing characteristics that influence deliveries

The Empowered Consumer

- We demand a diverse selection that is always in stock.
If the item is not in stock or at the price we want, we'll find it somewhere else.
- We are informed.
- We require flexibility –
 - Order on line, through the mail, on the phone, or in stores.
 - Take home from stores, delivered to the house or office, delivered to someone else.
 - An equally flexible return policy.
- We demand service.
- We care about the environment.
- We want delivery to be free.

NIJTPA

Images included: A green recycling symbol, a 'PC' website screenshot, a '24/7' sign, and fresh produce.

Source: Strauss-Wieder, A, 2016, The Changing Last Mile: The Consumer, The Click and The Delivery, [Talking Freight](#) presentation, US Federal Highway Administration, March 16, 2016.

Another example of cost-reducing innovations is the use of designated locker stations. Deliveries from e-commerce purchase are made to designated locker locations rather than the customer's location and are then retrieved by the customer – see the left image in Figure 2-9 for an example and Table 2-11 for details.

The locker location could be at pre-designated area such as office buildings, grocery stores, convenience stores and other retail locations. Upon pick-up, customers retrieve their orders by entering a unique code on the locker touch screen. For example, Amazon continues to expand its Amazon Locker services in many cities throughout the United States. Retailers may also be looking to leverage these lockers for returns as well.¹¹⁰ While this is primarily a private sector initiative, the public sector could have a role in terms of facilitating such a system by planning for central locations within neighbourhoods, or requiring new condos to have sufficient lockers to accommodate online deliveries.

Smart Centres, a major Canadian shopping centre developer, has introduced pick-up depots at selected suburban locations in municipalities across Canada, including Calgary and Airdrie. Customers can purchase a consumer product online from a range of large retail chains, from which it is delivered to one of the shopping mall depots where the customer can then pick it up at his or her convenience. According to the developer, the pick-up points have the advantage of reducing distribution costs while increasing the utilization of delivery vehicles that already are travelling to the malls and also potentially

¹¹⁰ Ellis, J. 2017. Online Retailers Are Desperate to Stem a Surging Tide of Returns. [Bloomberg](#).

increasing customer foot traffic in the mall (i.e., exposure to the mall’s retailers); and some of the malls have been selected for these depots because they are under-utilized and have space available for customer parking. An example is provided in the right image in Figure 2-9. Again, although this is mainly a private sector initiative, there can be implications on zoning: one municipality noted that the use of the shopping mall for this purpose could change its effective designation to that of a distribution centre if traffic, loading and parking demands changed significantly, and in turn could require reconsideration of future site plan approval requirements.¹¹¹

Figure 2-9: Examples of new package pick-up services



Amazon pick-up locker service

Source: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, NCHRP Report 844, 2017



Penguin Pick-Up, South Oakville Mall, Ontario

Source: DKCI, 2015

Table 2-11: Make deliveries at lockers rather than directly to residences

<p>Costs and benefits</p>	<p>In dense urban areas, delivery vehicles encounter constraints with respect to access hours and parking, which in turn may limit space available for residents and non-freight uses, especially for parking. It may also restrict the right-of-way for the period of the delivery time.</p> <p>Lockers can provide a secure central location for consumers to pick up their packages at their convenience, without the need for a car or delivery signature. These services can help reduce truck traffic, congestion, and emissions in urban areas.</p>
<p>Other considerations, trade-offs and impacts</p>	<p>This option is more suitable for items that are small in size and can fit into a locker. Despite the high success rate of delivery lockers in some urban areas, this delivery option requires sufficient volume for the private company to invest as the cost of maintaining lockers and leasing the locker location may be expensive. Further, a fair bit of data regarding order and delivery pattern is required for a private company to be able to exercise the option.</p>

¹¹¹ DKCI, 2016, *Goods Movement Strategy, Final Report*, Town of Oakville, Ontario.

Implementation entity (leads, partners)	Private Sector – private companies; however, locations of these lockers could be planned for by the public sector.
Timing of implementation and duration	Ongoing. A similar concept, Bento Box, was piloted in Berlin, Germany. Bento Box used bicycles for the last-mile segment after packages were deposited in a consolidation centre.
Lessons learned from implementation	Unifying freight interests among local retail, commercial, and trucking entities can help consolidate deliveries. Secure funding either from private stakeholders or through a public-private partnership.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017.

Key takeaways

- Understanding consumers’ motivations and behaviour in making e-commerce purchases and generally increasing the demand for express delivery is critical to anticipating and developing responses to the resultant goods movement challenges.
- To reduce rising costs, couriers and retailers are already deploying alternative technologies and practices. This means that business solutions and solutions developed by the public sector could work together synergistically to meet the rising demands and challenges.

2.6.3 Promote further efficiencies in logistics and accommodate on-demand services

2.6.3.1 Help promote freight exchanges, to better match loads and avoid empty vehicle trips

To help minimize the number of trips made while empty, one specific strategy noted in MTO’s freight supportive guidelines is to promote the use of freight exchanges. The purpose of a freight exchange is to help operators “match” trips and loads, the benefits of which would include fewer truck trips and lower operating costs for truck operators. Though developing a freight exchange would be a private sector initiative, the MTO’s Guidelines suggest that “[m]unicipalities should also seek opportunities to promote freight efficiency through promotion/ awareness–building activities for freight exchanges. Examples include advertising load matching services on changeable message signs and links on municipal websites.”¹¹²

The Duke Heights transportation management association initiative, described in section 2.5.5.1, is a related initiative.

Key takeaway

- Freight exchanges, which minimize empty truck trips through load matching, can help to improve the efficiency of goods movement and local deliveries. The private sector, or perhaps the freight council, could take up this initiative.

¹¹² Ontario Ministry of Transportation. Freight-Supportive Guidelines.

The City could consider reviewing the policies, regulations and bylaws that would impact the development of these exchanges.

2.6.4 Examine ways to shift goods from trucks to other modes, to ease urban congestion

2.6.4.1 Use non-motorized or alternative fuel vehicles for last-kilometre delivery in dense urban centres

Especially in dense urban areas, non-motorized delivery vehicles such as cargo bicycles for trips that do not require a full commercial vehicle could reduce emissions and urban congestion. Usually operated on a hub-and-spoke pattern, the vehicles are fed by a consolidation centre or a larger vehicle that remains on the periphery while the non-motorized vehicle covers the last kilometre of delivery in a dense urban area. Because of this additional handling, this strategy is likely only plausible in very dense areas where parking is at a premium, which may not be the case in most of Calgary.

Examples include Revolution Rickshaws in New York City and B-Line in Portland, Oregon, which use a non-motorized vehicle service. Revolution Rickshaws, illustrated in the left image of Figure 2-10, provides hourly and route cargo delivery services in and between Manhattan and Brooklyn, for clients such as Quinciple, Murray's Cheese and City Harvest, as well as customized local delivery services to customers and between a retailer's various locations. In Portland, B-Line uses cargo cycles to make deliveries to customers from companies such as Office Depot, Portland Roasting Coffee and Guayakí teas. Table 2-12 summarizes the attributes of these two initiatives. In late October 2017, UPS Canada announced pilot tests of cargo bicycles to deliver packages in and around the York University campus in suburban Toronto. The bicycles, shown in the right image of Figure 2-10, can hold up to 408 kilograms and 50 parcels.

Figure 2-10: Cargo bicycles – New York City and Toronto



Revolution Rickshaw in New York City

UPS Canada cargo bicycle in Toronto

Source: www.revolutionrickshaws.com

Source: UPS launches cargo bike in Canada, [Canadian Shipper](#), October 31, 2017.

Many couriers and distributors have converted some or all of their urban fleets to electric and hybrid vehicles – a Calgary example is shown in

Figure 2-11. Many companies have switched to these vehicles in order to reduce their carbon footprints. However, the switch to these (smaller) vehicles also can be triggered by the introduction of a Complete Street corridor, which can result in the corridor becoming more difficult for larger vehicles to manoeuvre (see also Section 2.4.1.4).¹¹³ Measures of success commonly include the fuel, GHGs and air pollutants that have been avoided by the switch to non-motorized or alternative fuel vehicles.

Table 2-12: Use of non-motorized vehicles in dense urban centres for last mile delivery: New York and Portland

Costs and benefits	Apart from reducing congestion, non-motorized vehicles emit virtually zero emissions and easily maneuverable on smaller roads and alleys. They also are cheaper to own and maintain than traditional diesel-powered trucks. Private companies offering such services save on vehicle running and maintenance cost although would spend on an increased number of drivers of such vehicles.
Other considerations, trade-offs and impacts	Such vehicles may not be conducive for delivery of all kinds of goods. They suffer from limited scalability, speed, and ability to cater to large freight volume.
Implementation entity (leads, partners)	Private sector: logistics operators
Timing of implementation and duration	For this model to be successful, a review of the customer base, type of goods, and delivery routes in compact or dense areas and smart growth communities is required.
Reference sources	NCHRP Research Report 844: Guide for Integrating Goods and Services Movement by Commercial Vehicles in Smart Growth Environments, 2017

¹¹³ Bassok, A. et al., 2013, Smart Growth and Urban Goods Movement, NCFRP Report 24, National Cooperative Freight Research Program.

Figure 2-11: Hybrid electric delivery van in Calgary



Source: DKCI

Key takeaways

- Non-motorized and alternative fuel vehicles can be used to deliver goods in dense urban centres. Many courier and distributor fleets have converted significant portions of their urban delivery fleets to hybrid, electric and other alternative fuel vehicles. However, there are opportunities for other firms to adopt and expand the take-up of these vehicles.

2.6.5 Consider strategies to address climate change and environmental impacts

2.6.5.1 Consider strategies to reduce the carbon footprint from goods movement

This section discusses potential strategies to reduce greenhouse gas emissions from goods movement. Two points should be noted:

The City of Calgary Goods Movement Strategy
Stage 3 Report: Opportunities

- The topic was raised by the Strategy’s Internal Advisory Group (IAG), not by industry. The IAG comprises City staff from a range of departments, business units and responsibilities.
- As a prelude to the Strategy, a consultant team member prepared an inventory of 30 potential GHG-reduction measures that could be applicable to goods movement. The inventory was prepared to support The City’s updated *Calgary Community GHG Reduction Plan*, and will inform later stages of the Goods Movement Strategy. **Table 2-13** lists the 30 measures. They are grouped into six categories for convenience. The table describes each measure / action, its potential GHG impact and the degree to which The City can influence its take up.¹¹⁴

Table 2-13: Potential GHG-reduction measures

No.	Category / Sub-Category	Measure / Action	Potential GHG Impact	Level of City Influence
Land Use Planning and Transportation Infrastructure / Operations				
1.	Smart Freight land use planning	Freight-friendly land use planning (avoidance of leap-frogging, proximity to networks, site access, parking and loading, ...)	Medium	Direct control (planning and approvals) / direct influence (development approvals)
2.	Smart Freight land use planning	Cargo-oriented development, freight hubs	Medium	Direct control (planning and approvals) / direct influence (development approvals)
3.	Smart Freight land use planning	Reduce truck VKT (network directness, urban consolidation centres, ...)	Medium	Direct control (planning and approvals) / direct influence (development approvals)
4.	Transportation infrastructure / operations	Reduce congestion and delay on goods movement corridors, through signal synchronization, turn capacity, ...)	High	Direct control
Vehicle Emission and Fuel Technologies				
5.	Renewable fuel	Biofuel – diesel	High	No influence, except perhaps to engage the Province or other provinces
6.	Renewable fuel	Green diesel	High	No influence
7.	Emissions reduction technologies	Various	Low-medium	No influence
Alternative Propulsion / Engine Technologies				
8.	Alternative propulsion / engine technologies	Hybrid-electric	Medium-high	Indirect influence (as a fleet owner)
9.	Alternative propulsion / engine technologies	Electric	Medium-high	Indirect influence (as a fleet owner; potentially also providing charging stations)
10.	Alternative propulsion / engine technologies	Natural gas (CNG and LNG)	Medium	Indirect influence (as a fleet owner)

¹¹⁴ DKCI, Goods Movement GHG Reduction White Paper, The City of Calgary, December 2016.

The City of Calgary Goods Movement Strategy
Stage 3 Report: Opportunities

Table 2-13: Potential GHG-reduction measures

No.	Category / Sub-Category	Measure / Action	Potential GHG Impact	Level of City Influence
Vehicle and Other Technologies				
11.	Anti-idling	On-board idle reduction equipment	Low-medium	Indirect influence (potential), through the support of driver / fleet owner awareness
12.	Anti-idling	Use waste heat to eliminate need for diesel auxiliary power units and unnecessary engine idling	Low-medium	No influence
13.	Anti-idling	Off-board (truck stop)	Low-medium	Indirect influence, through the supply of appropriate lands and through zoning designations
14.	Low rolling resistance tires	Low rolling resistance tires	Low-medium	No influence
15.	Weight reduction	Lightweight materials and accessory load reduction	Low-medium	Indirect influence (as a fleet owner)
16.	Aerodynamics (drag reduction)	Truck and trailer aerodynamics	Low-medium	No influence
17.	Refrigeration	Cold-plate refrigeration / hybrid refrigeration	Low-medium	No influence
18.	Limiting speed	Electronically-regulated speed / driver performance monitoring	Low-medium	Potential indirect influence, by encouraging the Province to consider mandated truck speed limits
19.	Increase load utilization	Load bars / deck trailers and side loading	Low-medium	No influence
Education and Awareness				
20.	Driver training / awareness	Training programmes, performance monitoring, incentives	Low-medium	Indirect influence (as a fleet owner) / no influence (except possibly publicizing training programmes)
21.	Awareness (culture of sustainability)	Corporate sustainability reports, carbon reporting, measuring carbon footprints	Low	No influence, except for its own corporate reporting as a fleet owner
22.	Education / training for all stakeholders	Staff / customer training, responsible sourcing	Low	Indirect influence, as a corporation that sources its own goods and services
23.	Resources	Resources / knowledge for fleet managers	Low	No influence

Table 2-13: Potential GHG-reduction measures

No.	Category / Sub-Category	Measure / Action	Potential GHG Impact	Level of City Influence
Operations and Logistics				
24.	Operations	Dynamic routing, DSD routing, ...	Low-medium	Indirect influence, as a fleet owner / potential direct control (as potential ITS implementer)
25.	Operations	Preventative maintenance	Low	No influence, except as a fleet owner
26.	Operations	Recycling initiatives	Low	No influence, except as a fleet owner
27.	Logistics	Load efficiency / load bundling, GPS monitoring, local delivery plans, ...	Low-medium	No influence, except as a fleet owner
28.	Logistics	Improved delivery / courier parking	Low-medium	Direct influence, in setting urban design guidelines
29.	Logistics	Off-peak delivery	Low-medium	Direct control, regarding the relevant City bylaws
30.	Logistics	Long-combination vehicles, platooning	Low-medium	Direct control, in the provision of permits

Source: DKCI, Goods Movement GHG Reduction White Paper, The City of Calgary, December 2016.

2.6.5.2 Review existing environmental and climate change mitigation measures

Stakeholders noted the need to continue to anticipate and mitigate potential environmental and climate change impacts on the goods movement infrastructure. In particular, they noted:¹¹⁵

- The mitigation of environmental impacts is a key component of the plans and designs of transportation infrastructure improvements. For example, roadway curbing was added to sections of Stoney Trail in order to minimize the risk of runoff spilling into environmentally sensitive areas, and the new S.W. Stoney Trail section will incorporate these and other features as well. However, not all roads have mitigation treatments, which can result in additional costs of having to mitigate the impact after a spill or other incident occurs.
- In addition to spills, it is recognized that oil will run off a vehicle when it rains. However, not all roads in Calgary have measures to contain spills or runoff, including some roads in industrial areas. The City has implemented wastewater containment – oil-water separators in some locations that have large volumes of truck activity, to intercept runoff and spills before they reach natural waterways.
- There may be a need to account in more depth for the potential risks of increased truck activity, especially the movement of dangerous goods, in the development of road and intersection improvements. For example, improvements that prohibit left turns from fuel trucks into gasoline

¹¹⁵ See Table 3-2, *The City of Calgary Goods Movement Strategy, Stage 2 Report: Issues and Challenges*, February 2018.

stations may result in the truck having to take a more circuitous route in order to make a right turn into the site, thereby increasing its exposure to potential accidents.

- There are concerns about the potential impacts of climate change on pavement infrastructure. For example, it is expected that higher average temperatures could increase the susceptibility of roads to damage from heavy trucks - for example due to increased pavement rutting.

Key takeaways

- There are several initiatives that can reduce the carbon footprint of goods movement. These range from short-term operational practices and awareness and educational programs that trucking firms can implement, to the deployment of fuel reduction, alternative fuel and vehicle technologies and long-term planning to improve the fuel efficiency of transportation and logistics.
- The City already considers ways to mitigate potential environmental hazards in the planning and design of transportation corridors, and The City is currently preparing a Climate Resilience Plan to address the impacts of climate change. However, The City could consider a further review of these mitigation initiatives that looks specifically at the goods movement perspective, to see if additional measures are needed.

2.7 Strategies for performance monitoring and data collection for goods movement

2.7.1 Consider new data collection activities for goods movement

Table 2-14 summarizes some of the goods movement data sources collected by the jurisdictions studied. Truck counts were the most frequently mentioned source of goods movement data, though some jurisdictions mentioned that they were increasingly leveraging truck GPS data and other sources for their analyses.

Table 2-14: Data sources mentioned during jurisdictional scan

Date Type	Description
Personal vehicle and truck GPS data	<ul style="list-style-type: none"> • Jurisdictions indicated that they were increasingly leveraging GPS data to understand vehicle and truck movements, including exploring uses of this near real-time data. • Sources of these data mentioned included INRIX and StreetLight Data.
Truck origin destination surveys	<ul style="list-style-type: none"> • Some jurisdictions (notably Ontario) undertake a commercial vehicle roadside survey to understand truck trips (e.g. origins and destinations, commodities transported, etc.). • Informants noted that being able to tell stakeholders and politicians the value of goods being transported is an important element of raising the profile of goods movement.
Economic and land use data	<ul style="list-style-type: none"> • Informants noted that existing travel demand forecasts often assume truck traffic as some fraction of vehicle traffic, because there is not a separate truck trip generation function. • Although an origin-destination survey is the most complete way to identify truck trips, economic data (e.g. jobs in a given area) could be used to help forecast truck trips.
Truck counts	<ul style="list-style-type: none"> • Many jurisdictions indicated that truck counts were the main data source that they used to understand freight activity. • Some jurisdictions installed permanent count locations near major freight generating hubs; for example, the Region of Peel has 15 such counters and are expanding these as an element of their own goods movement strategy.
Air quality monitoring	<ul style="list-style-type: none"> • Some jurisdictions explicitly monitor air quality and include it as a measure within its transportation plans.

Source: Watt Team summary.

Depending on the circumstances, informants noted that they calculate and monitor a number of performance measures, either on an ongoing or project-specific basis, including:

- Number of trucks per day.
- Goods volumes and values.
- Vehicle-km travelled.
- Greenhouse gas emissions reduced.
- Safety (incidents involving trucks).

Likely, the most unique performance measure identified in the consultation was the development of an “uncertainty index”. The purpose of the uncertainty index is to understand not only average travel time/speed on a given road, but also distribution of speeds (e.g. what is the travel time on the worst day of the month relative to the average day). As many goods movement industries value reliability – e.g. couriers must size their fleet not to accommodate the average day, but rather something closer to the worst day – the reliability of travel times is an important consideration.

Informants in Salt Lake City also noted the use of the pavement index, which the state department of transportation uses to ensure that roads that support trucks are maintained to a higher level of service.

Key takeaways

- It is important to recognize that simply using auto volumes and speeds as proxies for truck activity is inadequate and misleading, given the significant differences between auto and truck characteristics. As a result, it is necessary to collect data specific to goods movement and trucking.
- Agencies have collected a wide range of data, which they use for planning and for monitoring system performance. Although origin-destination surveys are the most complete data source, new GPS sources are available commercially and can provide robust information on trip routing, itineraries and delays. Complementary data, such as those relating to economic and demographic characteristics and to network performance, also are important for understanding and planning for changes in goods movement activity.
- The City could consider the use of its pavement index as a means to assess the supportability of roads, back alleys and so on to support truck movements.

2.7.2 Investigate information-sharing possibilities with the private sector

2.7.2.1 Support academic research centres in conjunction with the private sector

Informants from Seattle noted is that freight is often not integrated into urban planning, because most of the data are held privately. To this end, the City of Seattle is supporting a recently created research centre at the University of Washington – the Urban Freight Lab – to research pressing urban freight needs. According to a press release, the Seattle Department of Transportation is providing US \$285,000 over three years to support the research centre.¹¹⁶ The lab also has five founding industry members: Charlie's Produce, Costco, Nordstrom, UPS and the United States Postal Service.

The informants also noted that the lab acts as a broker of data, which has helped in terms of building relationships vis-à-vis information sharing. Informants noted that another of the objectives of participating with the lab is to create a culture of innovation. This includes bringing in unique perspectives on relevant issues, such as liability considerations for pedestrians on sidewalks in the event of a drone accident (should drones be implemented).

¹¹⁶ Langston, J. 2016. [As online retailing booms, new Urban Freight Lab to work with industry, SDOT on delivery challenges.](#) UW News.

The Region of Peel also indicated that they have established a good relationship with universities, focusing on research and innovation. In particular, they are in the process of establishing a Smart Freight Centre (with the Region of Peel, University of Toronto, York University and McMaster University). The Region of Peel is contributing \$1.2 million over five years, which the four universities are matching. Although the research agenda is still a work in progress, it is expected to focus on data analysis and employing innovative technologies.

Key takeaway

- The City is currently collaborating on research on various topics with Mount Royal University and the University of Calgary. The City could consider further collaborations with academia to address specific goods movement and logistics research needs and coordinate the collection and analysis of data.

3 Synthesis of opportunities for further consideration

3.1 Summary

Table 3-1 summarizes the 22 topics and potential solutions that will be considered further in Stage 4. These topics are organized according to five categories, as before.

Table 3-1: Summary of topics and potential solutions

Strategy	Topic / potential solution
Collaborate with stakeholders (section 2.3)	<ul style="list-style-type: none"> • Technical assistance and regional cooperation <ul style="list-style-type: none"> ○ Continue to provide technical assistance on goods movement planning to neighbouring municipalities and to work cooperatively with regional partners ○ Ensure alignment of goods movement regulations with neighbouring municipalities ○ Work with other agencies to address regional goods movement issues • Freight council <ul style="list-style-type: none"> ○ Implement a regional freight council of public and private sector stakeholders, which has a strong linkage to economic development agencies and implements actions that benefit all members ○ Implement an ongoing collaboration process to connect stakeholders and use ad hoc meetings to discuss specific areas of focus • Multi-agency collaboration and consistency on design standards and operational practices that impact goods movement <ul style="list-style-type: none"> ○ Promote common design standards for roundabouts and other infrastructure
Protect and enhance goods movement infrastructure (section 2.4)	<ul style="list-style-type: none"> • Infrastructure and other strategies <ul style="list-style-type: none"> ○ Examine the feasibility of exclusive or preferential use truck lanes on major roads and highways ○ Implement improved traffic control devices, such as signal coordination and intelligent signage, to improve traffic flow ○ Review traffic incident management procedures ○ Prioritize goods movement on important truck routes and accommodate freight activity within Complete Streets ○ Review effectiveness of snow storm parking bans and road clearance priorities on goods movement • Freight hubs as employment and activity hubs <ul style="list-style-type: none"> ○ Examine feasibility of freight villages or urban logistics centres ○ Develop concept of the airport as a transportation hub

Strategy	Topic / potential solution
	<ul style="list-style-type: none"> • Transit and other alternatives to reduce traffic congestion and help commuters <ul style="list-style-type: none"> ○ Fund shuttle services to employment centres and consider partnerships with on-demand ride sharing services to serve lower-density areas ○ Implement Smart Commute Programs to provide commuting options at freight generators • Avoidance of land use planning conflicts <ul style="list-style-type: none"> ○ Apply Ontario’s Freight-Supportive Guidelines at all levels of land use and transportation planning ○ Use the Guidelines for New Development in Proximity to Railway Operations when planning along railway corridors ○ Ensure that new development does not interfere with operations at freight generators ○ Maintain industrial land use designations in the lands around freight facilities ○ Examine feasibility of cargo-oriented development around rail hubs • Enhancing Calgary’s attractiveness as a logistics and distribution hub <ul style="list-style-type: none"> ○ Provide fibre communications and other utilities to potential industrial sites and subsidize access to these sites ○ Consider trade and other initiatives to strengthen Calgary’s position as an inland port
<p>Enhance access, parking, loading and enforcement goods movement regulations (section 2.5)</p>	<ul style="list-style-type: none"> • Improved incorporation of delivery facilities in developments <ul style="list-style-type: none"> ○ Consider off-street loading facilities in new developments where practical ○ Review and update developer mandates, to accommodate changing delivery requirements ○ Investigate measures to reduce delivery times within buildings • Enhanced supply and use of on-street loading areas <ul style="list-style-type: none"> ○ Establish designated curbside loading zones ○ Develop on-line truck parking reservation system and real-time parking availability apps ○ Improve efficiency of public and private loading spaces ○ Establish time-of-day access control in areas with high levels of pedestrian activity • Improved courier and truck access and circulation <ul style="list-style-type: none"> ○ Encourage use of alley space for goods movement activities ○ Develop an online commercial vehicle route finder and address GPS data gaps ○ Deploy other strategies to improve truck wayfinding

Strategy	Topic / potential solution
	<ul style="list-style-type: none"> • Management of trucks travelling to, from or through Calgary <ul style="list-style-type: none"> ○ Plan for truck parking requirements in anticipation of new hours-of-service recording requirements • Private sector financing of new infrastructure <ul style="list-style-type: none"> ○ Utilize business improvement areas to implement changes • Construction disruptions <ul style="list-style-type: none"> ○ Consider additional practices to minimize disruptions generated by construction • Partnerships with the private sector <ul style="list-style-type: none"> ○ Work with the private sector to pilot test delivery solutions
Plan for a changing future (section 2.6)	<ul style="list-style-type: none"> • Impacts of changing technologies <ul style="list-style-type: none"> ○ Update policies and protocols for incorporating new goods movement technologies into transportation plans ○ Pilot technology initiatives that have a freight component (e.g., Smart Cities) ○ Install information technology and communications infrastructure as part of road works • Changes in distribution and delivery requirements <ul style="list-style-type: none"> ○ Deploy innovations and other approaches to accommodate changing e-commerce habits • Efficiencies in logistics <ul style="list-style-type: none"> ○ Help promote freight exchanges, to better match loads and avoid empty vehicle trips • Shifts from trucks to other types of delivery modes <ul style="list-style-type: none"> ○ Use non-motorized or alternative fuel vehicles for last-kilometre delivery in dense urban centres • Addressing environmental and climate change impacts <ul style="list-style-type: none"> ○ Consider the potential GHG-reduction actions described in the <i>Goods Movement GHG Reduction White Paper</i> ○ Review existing initiatives that mitigate environmental and climate change impacts on infrastructure to see if additional measures are needed from the goods movement perspective
Implement performance monitoring and data collection for goods movement (section 2.7)	<ul style="list-style-type: none"> • Data collection <ul style="list-style-type: none"> ○ Consider new data collection activities for goods movement • Information-sharing opportunities <ul style="list-style-type: none"> ○ Support academic research centres in conjunction with the private sector

3.2 Conclusion

We propose to bring forward the solutions for the 22 topics for assessment in Stage 4, subject to their acceptance by The City of Calgary project team – in other words, in our assessment, the initiatives described in this report have potential relevance to Calgary; however, there may be specific circumstances that would preclude their further consideration.

Several observations can be made about the findings:

- It is evident that some of the individual solutions and practices impact multiple topics – for example, on-street loading impacts Complete Streets (section 2.5.2), operations and regulations (section 2.5.3) and e-commerce (section 2.6.2), among other topics. One topic in particular cuts across a large number of topics: this is the need for collaboration and communication, which is detailed in section 2.3.2 but is also referenced in several other discussions as being critical to the success of the associated initiative.
- There can also be several ways to address a given topic – for example, sections 2.5.3.2 and 2.5.3.3 present several approaches to wayfinding.
- Some practices are driven by, or are at least influenced by, the need for private industry to reduce its costs. This is particularly evident in approaches to meet the rapidly changing e-commerce and express delivery markets, as described in section 2.6.2.
- Finally, several approaches appear to be complementary elements of a broad package of initiatives that aims to better manage goods movement – several of the cited New York City and Philadelphia initiatives fall under this category.

Collectively, these inform the development of the framework for the Goods Movement Strategy and its component actions. For example, we expect that the Stage 4 development of the Goods Movement Strategy and its component actions likely will similarly cut across several topics and likely will be made up of packages of complementary actions.

We note also that the topics for reducing the carbon footprint of goods movement are the subjects of another ongoing City of Calgary initiative, and hence the 30 individual topics will be considered together as a package but will not be evaluated individually.

4 Appendices

4.1 Jurisdictions interviewed

Jurisdiction	Agency with whom the interview was conducted
Edmonton, Alberta	The City of Edmonton
Peel Region, Ontario	The Regional Municipality of Peel
Greater Vancouver, British Columbia	TransLink
Atlanta, Georgia	Atlanta Regional Commission *
Chicago, Illinois	Chicago Metropolitan Agency for Planning *
Columbus, Ohio	Mid-Ohio Regional Planning Commission *
Kansas City, Missouri / Kansas	Mid-America Regional Council *
Seattle, Washington	City of Seattle, Department of Transportation
Salt Lake City, Utah	Utah Department of Transportation

* Agency is the designated Metropolitan Planning Organization for the jurisdiction.

4.2 Jurisdictional survey discussion guide

A generic copy of the survey discussion guide follows.



THE CITY OF CALGARY

GOODS MOVEMENT STRATEGY

INTERVIEW GUIDE – JURISDICTIONAL SURVEY

Calgary is a fast-growing distribution and manufacturing centre in western Canada. To support Calgary's economy and the wellbeing of its residents, **The City of Calgary is developing a Goods Movement Strategy**. The Strategy will:

- Identify and prioritize short, medium and long-term actions and investments in transportation infrastructure to enhance the goods movement network in Calgary.
- Support the Calgary Transportation Plan (CTP) and Municipal Development Plan (MDP).
- Complement other City and regional economic development initiatives.

As well, The City's bylaws related to goods movement will be reviewed and consolidated where appropriate as part of the Goods Movement Strategy.

The City has appointed a consulting team to develop the Strategy. The team is led by the Watt Consulting Group, in association with David Kriger Consultants and CPCS.

Stakeholders across Calgary's goods movement community have identified a series of issues that the Strategy should consider. The consulting team is now reaching out to other selected urban authorities across North America and elsewhere to identify potential solutions to these issues. **We are looking to understand the effective practices (strategies, policies and practices) that your organization has implemented to support goods movement in your jurisdiction.**

This interview guide is meant to help participants prepare for the interview. To this end:

- **The questions / topics below are guidelines only**, to help the discussion. The discussion is meant to be open-ended.
- The questions are indicative of the areas of interest to The City of Calgary. Some points might not apply to your particular organization or might be of lesser importance, so they can be omitted.
- Information gathered will be shared with The City of Calgary and will be used to inform Strategy reports.

Participation in this interview is voluntary.

The information collected via this interview is being collected under the authority of section 33 (c) of the provincial Freedom of Information and Protection of Privacy (FOIP) Act. The information will be used for the purpose of The City of Calgary Goods Movement Strategy. You may receive future correspondence and emails pertaining to this project. If you have any questions regarding the

collection and use of this information, please call our 311 Operations Centre at 403-268-2489 or e-mail foip@calgary.ca.

I. Policies and plans

1. What policies and plans does your organization have regarding goods movement? (e.g., truck route policy, freight-friendly land use, congestion management, asset management, funding, ...) Which goods movement modes do the policies and plans cover?

II. Engagement with stakeholders

2. How does your organization work with other municipalities and levels of government:
 - a. to promote an integrated network plan for goods movement?
 - b. to manage the growth of goods-generating industries at the urban fringe?
 - c. to promote consistency in standards and regulations (such as truck route regulations, over-dimension vehicle permitting and vehicle load limits)?
3. How does your organization communicate and collaborate with industry and with the public on goods movement plans and initiatives?
4. Do you have an active freight forum or freight council? If so, what are its objectives and how has it achieved these objectives?

III. Protecting strategic goods movement infrastructure

5. Many airports and rail terminals have become key employment and activity hubs. Is this the case in your community? If so, what plans and policies has your organization developed for these hubs – for example, plans for goods movement to, from and within these areas by all modes, and in ways for getting commuters to their jobs at these 24/7 operations.
6. In some communities, there are pressures to develop lands near airports, rail terminals, rail corridors, industrial parks and quarries for residential and commercial uses. Does your organization have strategies to manage this development, so as not to constrain growth at and access to these existing terminals and industrial lands? In particular, as applicable:
 - a. How does your organization manage land use designations and zoning for these lands?
 - b. What other rules and regulations do you have in place to protect the land uses – for example, restricting development beneath airport flight paths?
7. What utilities and services do you supply for new industrial lands? – for example, fibre optics, transit service, ...

- a. Do you have an industrial growth strategy?
- b. Are any incentives given to industrial developers, other than the provision of utilities and services?

IV. Access, parking, loading and enforcement

8. Loading requirements are changing with the rapid growth in on-line purchasing and in the use of express delivery. How has your organization accommodated these changes in building design standards and loading requirements, or in the development review and approval process?
9. How has your organization managed the supply and location of on-street loading areas, especially on streets where bicycle lanes have been implemented?
 - a. How have you integrated goods movement loading/access into Complete Streets schemes?
 - b. What operational and regulatory enhancements have you put in place to improve access and circulation for couriers and trucks?
 - c. Have you been able to reduce infractions and parking tickets for couriers and trucks?
10. How effectively has your organization been able to enforce your existing trucking regulations – for example, determining whether a heavy truck is legitimately travelling on a restricted road?
 - a. How could the regulations be enhanced or clarified in order to improve enforcement?
 - b. How often do you review your truck route network and regulations?
11. In greenfield areas, how do you ensure that the road network is designed and protected for goods movement, especially as the rise in e-commerce increases truck activity in residential areas?

V. Project prioritization and implementation

12. How has your organization prioritized actions to improve goods movement? (e.g., cost-benefit analysis, incorporating goods movement as an explicit factor in asset management, ...)
13. In particular, how has your organization determined the need for implementing road-rail grade separations? How have you implemented these grade separations?
14. Does the private sector contribute to the cost of implementing infrastructure and other actions to improve goods movement? If so, how?

VI. Planning for a changing future

15. Automation, connected vehicles, drones and other new technologies are all on the horizon, but the implications on goods movement are far from certain. How are you preparing for emerging trends and needs in goods movement? How do you maintain flexibility in your infrastructure plans in the face of these uncertainties?
16. What initiatives have you taken to reduce the carbon footprint of goods movement?

VII. Performance monitoring and data

17. What performance measures does your organization use to monitor the effectiveness of your goods movement initiatives?
18. What data do you collect to support goods movement planning, forecasting and performance monitoring? (e.g., counts, travel time surveys, origin-destination surveys,)

VIII. Closing

19. Do you have any other goods movement success stories, effective practices, or innovations in which your organization has been involved?

Thank you!