

Movement of Goods Series

Report #2: Movement of Goods Challenges in the Toronto- Waterloo Corridor

NOVEMBER 2017





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The Board's *Movement of Goods* series, produced with our research partner CPCS, is focused on building an understanding of the Toronto-Waterloo Corridor's (the Corridor) transportation networks and helping guide a multimodal goods movement strategy—a critical piece in making the Toronto region one of the most competitive and sought-after business regions in the world.

Road congestion impedes efficient goods movement to the same degree as the movement of people. It impacts productivity and costs businesses and consumers billions of dollars daily.

The Corridor is Canada's largest and busiest transportation hub. It has one of the fastest growing population bases in North America and a high concentration of manufacturing activity.

In our first report, *Economic Impact of the Movement of Goods in the Toronto Waterloo Innovation Corridor*, we illustrated how vital goods movement industries are to the Corridor. Manufacturing, wholesale & retail, transportation & warehousing, construction and primary industries account for one third of the annual GDP and 39% of jobs in the Corridor; manufacturing alone accounts for nearly 400,000 jobs out of 3.6 million jobs in the Corridor.

Our second report uses a multimodal perspective to identify the challenges hindering our competitiveness.

Readers won't be surprised to see road congestion listed at the biggest pain point. Bottlenecks are most notably visible on the Corridor's 400-series highways, with trucks increasingly unable to make just-in-time deliveries. Truck delays also impact the efficiency of all other transportation networks—air, marine, rail and pipeline.

The consequences of inefficient and unreliable goods movement are significant: from higher costs for our businesses and residents to stifled investment and job creation. They prevent the Corridor's established and emerging industry clusters (nearly a dozen, from food and beverage to automotive and manufacturing) from functioning at their full potential and driving economic growth.

A strategy relying on efficient multimodal connectivity is vital for both local and global business; goods movement industries provide key support for the Corridor's tradeable clusters.

Now more than ever, we need our people, products and services moving faster locally—and globally.

Jan De Silva
President & CEO
Toronto Region Board of Trade



The movement of goods in the Toronto-Waterloo Corridor (the Corridor) faces four key challenges that are hindering business competitiveness, quality of life and economic prosperity:

Road congestion is significant, particularly on some of the busiest truck corridors. Road congestion affects all modes because trucking is critical for connecting shippers and receivers to rail and pipeline terminals, ports and airports.

- Where:**
- Highway 401 from Oshawa to Milton (heaviest around airport) and in Cambridge
 - Other highways, including 404, 427, QEW, 410, 400 and Gardiner
 - *Example: Highway 401 is the most important regional goods movement corridor by volume, and the most congested.*

Land use conflicts arise when incompatible development like residential encroach on existing goods facilities.

- Where:**
- Major transportation facilities such as Pearson Airport, Port of Hamilton, Port of Toronto
 - Manufacturing and distribution facilities such as Redpath Sugar and the Ontario Food Terminal
 - *Example: Dense development along heavy freight rail corridors (such as Canadian Pacific Railway alongside Dupont St.) impacts efficiency and safety.*

Last-mile connectivity—transportation of goods to their final destination—is a challenge beyond just road congestion, because of narrow streets, truck restrictions and conflicts among road users such as bike lanes.

- Where:**
- Urban cores such as Downtown Toronto
 - Rapidly urbanizing areas across the Corridor
 - *Example: A lack of suitable unloading areas in Downtown Toronto, particularly around the King and Bay area, drives up the cost of parking tickets for couriers and trucking companies.*

A lack of a multimodal strategic vision for goods movement exacerbates the other challenges as conflicting policy priorities across all levels of government often mean that funding and political capital are not spent where they would have the greatest benefit for the Corridor.

- Where:**
- Between different levels of government
 - Between different modes of transportation
 - Between the government and private sector
 - *Example: A systematic business case process to align stakeholders behind goods movement priority investments could leverage support from all levels of government.*

These challenges matter because over \$3 billion worth of goods are transported into, out of, through and within the Corridor daily. Nearly a dozen significant goods movement clusters anchored by large manufacturing and distribution facilities are key drivers of this activity. The Corridor is a transportation equipment and manufacturing hub.¹ The Corridor is also the largest distribution hub in Canada and one of the largest in North America. Large retailers and manufacturers serve Eastern Canada and, in many cases, all of Canada, from distribution centres (DCs) in the Corridor. Together with the Corridor's large and growing population, the clusters provide the demand for the Corridor's multimodal goods movement system:

- Two of the top three cargo airports in Canada provide fast connections for higher-value and more time-sensitive goods.
- Three Canadian Port Authorities as well as privately owned ports (e.g. at cement plants) receive bulk, industrial and construction products from the Great Lakes and St. Lawrence Seaway and around the world.
- Pipelines transport crude oil, petroleum products and natural gas from refineries and production fields to businesses and consumers in the Corridor and beyond.
- Rail lines, intermodal terminals and yards for both national railways, CN and CP, as well as shortlines, connect the Corridor with points throughout North America and, via seaports, the world.
- More than a dozen freeways and a dense network of other highways and roads not only connect the Corridor by truck with the rest of North America. They also serve a critical function connecting other modes of transport to businesses and consumers.

INTRODUCTION

The challenge of getting around the congested transportation network of the Corridor (shown in Figure 1) is well known to both residents and visitors. Less directly felt is the effect of traffic congestion on goods movement: slow and unreliable transportation hurts the Corridor's competitiveness by increasing the cost of doing business in the Corridor.

From exporters getting goods to international markets to consumers enjoying stocked grocery shelves, goods movement underpins the high quality of life the Corridor's residents enjoy.

This report is the second in a series of four exploring the importance of goods movement in the Corridor. The first report in this series, released in August 2017, covers the economic impact of goods movement in the Corridor.²

This report provides an overview of the top goods

movement issues in the Corridor. It also describes how goods movement works in the Corridor, including key corridors and facilities, top commodities and key goods movement clusters.

Because at some stage in the supply chain almost all goods move on more than one mode of transportation, this report takes a multimodal perspective. It describes how air, marine, pipeline, rail and trucking interact in moving goods across the Corridor.

Subsequent reports in this series will focus on the following topics:

- the costs and benefits of the movement of goods for businesses and consumers
- proposed policies to improve the movement of goods in the Corridor

FIGURE 1: The Toronto-Waterloo Corridor



GOODS MOVEMENT CHALLENGES IN THE CORRIDOR



As described in the first report, goods movement is the lifeblood of the Corridor. Yet despite its importance, goods movement faces persistent challenges which are hindering business competitiveness, quality of life and the Corridor’s economic prosperity.

Figure 2 describes four key challenges facing the movement of goods in the Corridor. The four challenges go beyond specific regulatory and policy issues unique to a single mode; they reflect common themes identified in extensive Board of Trade consultations. For instance, while road congestion may appear to affect only trucking, it is in fact a critical issue for all modes, since most supply chains rely on trucks at some point, particularly for last-mile

transportation.³ These challenges, along with potential policy solutions, will be the focus of the fourth report in this series.

As public agencies consider how best to balance competing needs and priorities such as passenger mobility, sustainable transportation, urban livability and regional prosperity, it is important to also give proper consideration to the importance of goods movement alongside these other needs.

FIGURE 2: Key Goods Movement Challenges in the Corridor

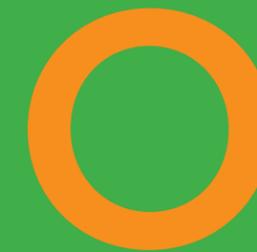
ISSUE	DESCRIPTION
<p>Road Congestion Severe gridlock costs the Corridor’s consumers and businesses real money.</p> 	<p>Many of the Corridor’s roads, including the most important highway corridors, are severely congested. Many corridors are congested not only at peak periods, but throughout the weekday and even on weekends. Congestion is costly in terms of productivity and service quality, especially for the many businesses that rely on just-in-time delivery. Truck drivers have fewer options for when and where to travel: their needs are dictated by the demands of shippers and the economy more broadly. Localized congestion can have outsized effects on particular industries or supply chains, such as congestion around Pearson International Airport. Moreover, because congestion is so pervasive, it threatens the competitiveness not only of parts of the Corridor, but of the Corridor as a whole.</p>
<p>Land Use Conflicts Protecting industrial lands and corridors is important for the Corridor’s economic vitality.</p> 	<p>As the Corridor grows, residential land uses are continuing to expand and put pressure on traditional industrial lands relied on by goods movement industries. For example, land near ports (including Toronto and Hamilton) is increasingly sought after for waterfront residential development. Condominium communities are rising up around facilities like the Redpath Sugar plant in the Toronto harbour and the Ontario Food Terminal in Etobicoke (North America’s third-largest fruit/produce distribution centre, distributing 5.5 million pounds of produce per day, with over 1 million trucks entering the terminal annually). There is not only increasing pressure along the waterfront but on inland rail terminals as well. As coastal ports such as Prince Rupert and the Port of Montreal expand to handle more traffic, the reciprocal inland capacity is increasingly critical to ensure this Corridor remains competitive on a global stage.</p> <p>In general, many of the Corridor’s ports, airports, rail and pipeline terminals, and large manufacturing plants are now surrounded by development, and these facilities are not easily relocated. Truck terminals and distribution centres are also not particularly mobile, certainly in the short or medium term.</p> <p>Conflict-mitigation measures related to noise, dust, hours of operation and other issues constitute additional costs for goods movement industries. These issues are exacerbated where local bylaws are inconsistent. Development may also put pressure on real estate prices, driving away shippers and logistics companies that tend to locate in goods movement clusters.</p> <p>Furthermore, uncertainty around future land uses can discourage goods movement investment. Ensuring that the needs of goods movement industries are properly considered alongside the desire of municipalities for growth is critical if the Corridor is to maintain its economic vitality and high quality of life. If valuable industrial lands are not protected from development pressures, costs increase for businesses and the Corridor becomes less competitive.</p>



FOCUS ON: GOODS
MOVEMENT
BOTTLENECKS
IN THE CORRIDOR

FIGURE 2: Key Goods Movement Challenges in the Corridor Cont'd

ISSUE	DESCRIPTION
<p>Last-Mile Connectivity Goods movement needs to be considered as urban areas continue to densify.</p> 	<p>The “last mile” refers to the transportation of goods to their final destination, for example a retail outlet, manufacturing plant or resident’s doorstep. Although a small part of the transportation picture in terms of distance, the last mile is typically the most costly part of the supply chain. Delivering a bulk shipment to one facility is more cost-efficient than delivering individual packages or shipments to multiple addresses.</p> <p>Last-mile issues include navigating narrow and congested arterial and local roads, finding suitable unloading areas, and contending with route restrictions and other road users such as cars, bicycles, transit vehicles and pedestrians. Urban receivers such as stores and restaurants receive deliveries every day or several days a week and require sufficient lawful unloading space in close proximity to their businesses; yet a shortage of suitable curbside unloading areas is a major pain point for companies delivering in dense urban areas, manifesting most notably in the cost of parking tickets.</p> <p>In an urban setting with limited space for roads and sidewalks, no solution is going to perfectly satisfy all the users competing for that space. Yet conflicts can be reduced when the needs of goods movement vehicles are properly planned for alongside the needs of other users. As roads are redesigned according to complete streets principles, it is important not to forget the fundamental importance of goods movement vehicles. Simply put, without deliveries of goods to stores, hospitals and homes, the Corridor would quickly grind to a halt.</p>
<p>Need for Strategic Vision The Corridor needs a common, coherent suite of goods movement priorities to grow its economic prosperity.</p> 	<p>In a large and growing metropolis like the Corridor, conflicts over priorities are natural, but how they get resolved can have a significant impact on competitiveness, quality of life and prosperity.</p> <p>Despite the importance of goods movement to the economy, goods movement needs and issues have traditionally not been afforded the same level of policy attention, nor public consciousness, as passenger needs. The Corridor is only starting to seriously examine goods movement through a strategic lens, with for example the establishment of multimodal strategic goods movement networks by municipalities and regional bodies. Peel Region has played a leading role with the development of its Goods Movement Strategic Plan, building on its public-private Goods Movement Strategic Task Force.</p> <p>Yet there remain significant gaps. For example, neither the Corridor nor the province has developed a marine policy, unlike Quebec. A lack of long-term policy certainty is not beneficial to goods movement industries’ ability to make investment decisions in the Corridor.</p> <p>Working together across the modes to develop a common vision for goods movement priorities can enhance the Corridor’s ability to access funding from senior levels of government, and advance goods movement interests in support of the Corridor’s economic vitality.</p>



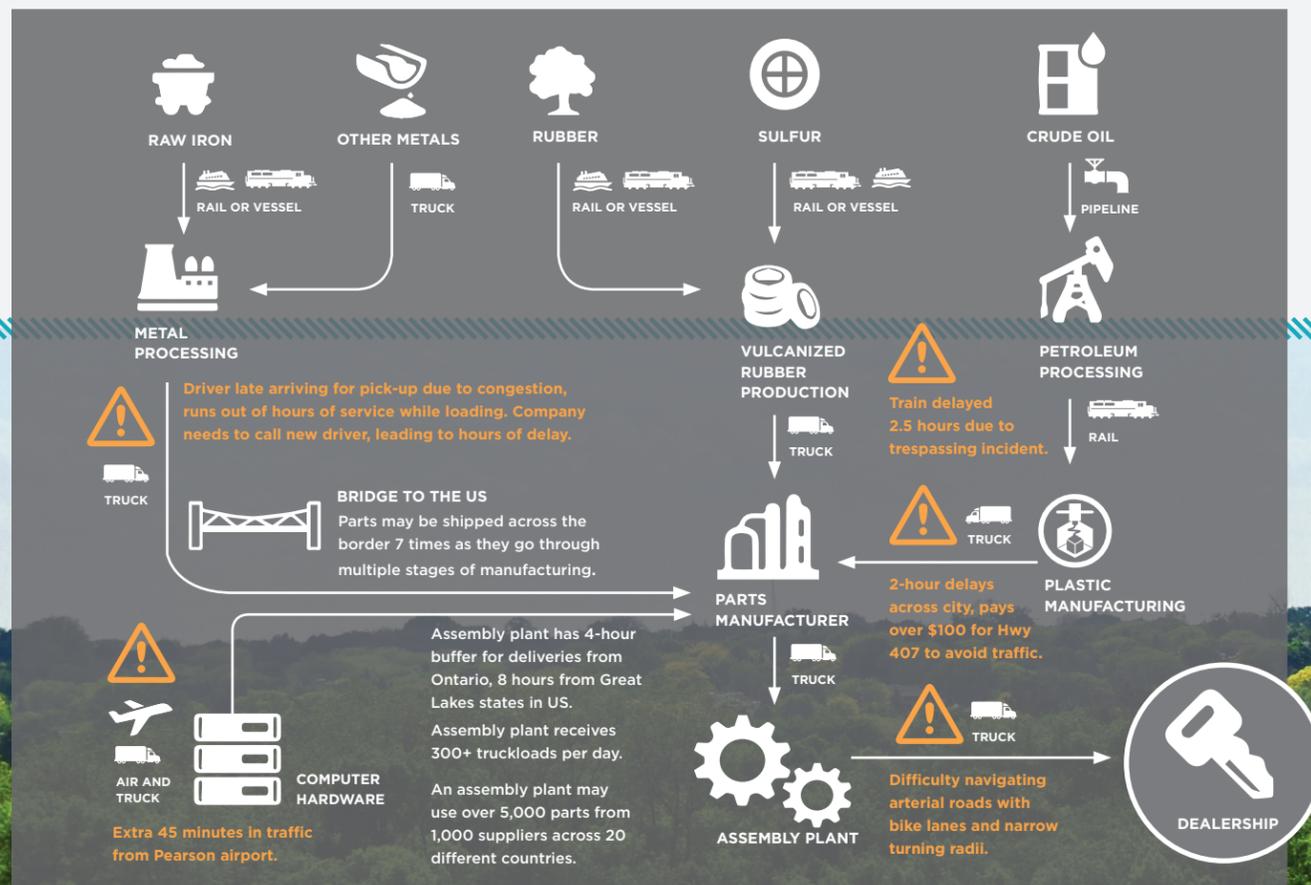
f all the issues in the Corridor, road congestion has received the most attention across the modes from goods movement professionals consulted for this study.

Congestion results in late and unreliable deliveries, and these inefficiencies get passed on to businesses and consumers in the form of higher prices. These inefficiencies can even discourage investment and job creation in the Corridor.

Despite being the most important truck artery in the Corridor, Highway 401 between Milton and Ajax is also the most congested. Truck speeds drop to an average 60 kph in the peak hour (4:00 - 5:00 pm) along this 99-km stretch, including an average 42 kph around Pearson Airport (compared to speed limits of

100 kph).The worst part of the bottleneck-401 around Dixon Road- has average peak speeds of 20 kph, affecting over 1,500 trucks in the peak hour. All this congestion leads to higher transport costs, lost productivity, wasted fuel, and increased greenhouse gas emissions.

FIGURE 3: The Complex Global Supply Chain of the Corridor's Automotive Sector: Showing Freight Pain Points



CORRIDOR	GREATEST DELAY INTENSITY*
Highway 401 - East of airport	147
Highway 404 - At 401 interchange	88
Highway 427 - North of 409 interchange	62
Queen Elizabeth Way - At 403 merge	42
Highway 410 - North of 401 interchange	42
Highway 400 - At 401 interchange	37

*measured in hours of daily truck delay per road-km-refers to specific section of corridor where truck delay is greatest (sum of both directions).

FIGURE 4: Top Trucking Bottlenecks in the Corridor

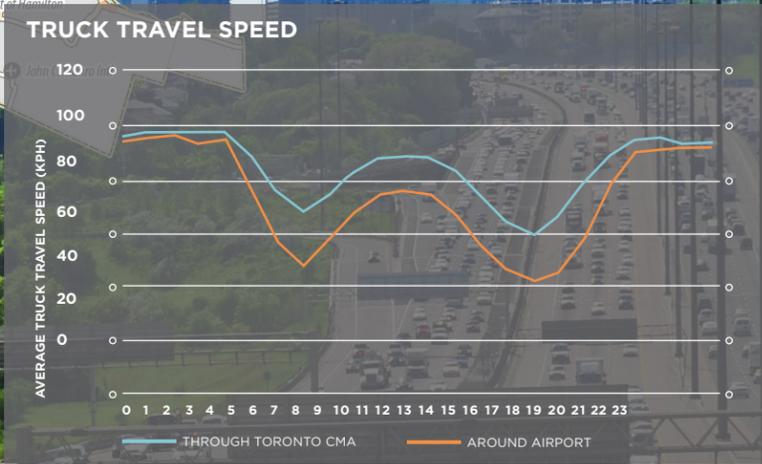
Major Pain Point: Road congestion remains the number one pain point for the movement of goods.

Highway 401 has the greatest truck congestion of all highway corridors. Traversing Highway 401 across the Corridor at 5 pm adds 54 minutes to 90 minutes to the average trip (depending on the weekday), according to data provided by an automobile manufacturer in the Corridor.



"In 2017 GM introduced a new program to build trucks at our Oshawa plant. Congestion has a pronounced impact on managing just-in-time deliveries, forcing us to spend more on adding extra inventory to our supply chain to avoid production downtime."

Shawn McMahon, Global Supply Chain Manager, GM Oshawa



HOW DOES UNRELIABILITY AND DELAY IN THE MOVEMENT OF GOODS AFFECT BUSINESSES AND CONSUMERS?

Whether for manufacturers or retailers, modern supply chains function on a "just-in-time" basis, meaning that goods are shipped and received only as they are needed. This practice reduces waste and increases efficiency, by decreasing inventory carrying costs and reducing risks of spoilage and product obsolescence.

Shippers such as manufacturers and retailers generally attempt to minimize their total logistics cost, of which the direct cost of transportation—the amount paid to carriers such as trucking companies or railroads—is only one component. In an extreme case, a late shipment of a critical part or input can result in an entire manufacturing process being temporarily shut down—a huge loss for a manufacturer. Similarly, for a retailer, late shipments can result in stock-outs and the loss of customers to competitors.

Because businesses prepare for transportation unreliability, most of the time this burden is not catastrophic, but it is still significant. For shippers, this can mean having to carry excess inventory, which

decreases efficiency and raises costs across the board. For carriers, traffic congestion can mean non-optimal routing and increased costs of labour, capital and fuel. Delay and reliability impacts can vary widely by industry. For example, one US study found that the value of reliability (i.e. the value of one standard-deviation difference in travel time) varies by commodity from \$17 to \$177 (USD) per shipment-hour, and \$1.38 to \$10.20 per ton-hour.

Where congestion is pervasive, all of these costs are passed through the supply chain in one form or other, resulting in higher end prices for consumers and businesses. The impacts of travel time unreliability on businesses and consumers in the Toronto-Waterloo Innovation Corridor will be explored further in the third report in this series.

Source for Value of reliability: Jin and Shams (2016), "Examining the Value of Travel Time and Reliability for Freight Transportation to Support Freight Planning and Decision-Making." Florida Department of Transportation.

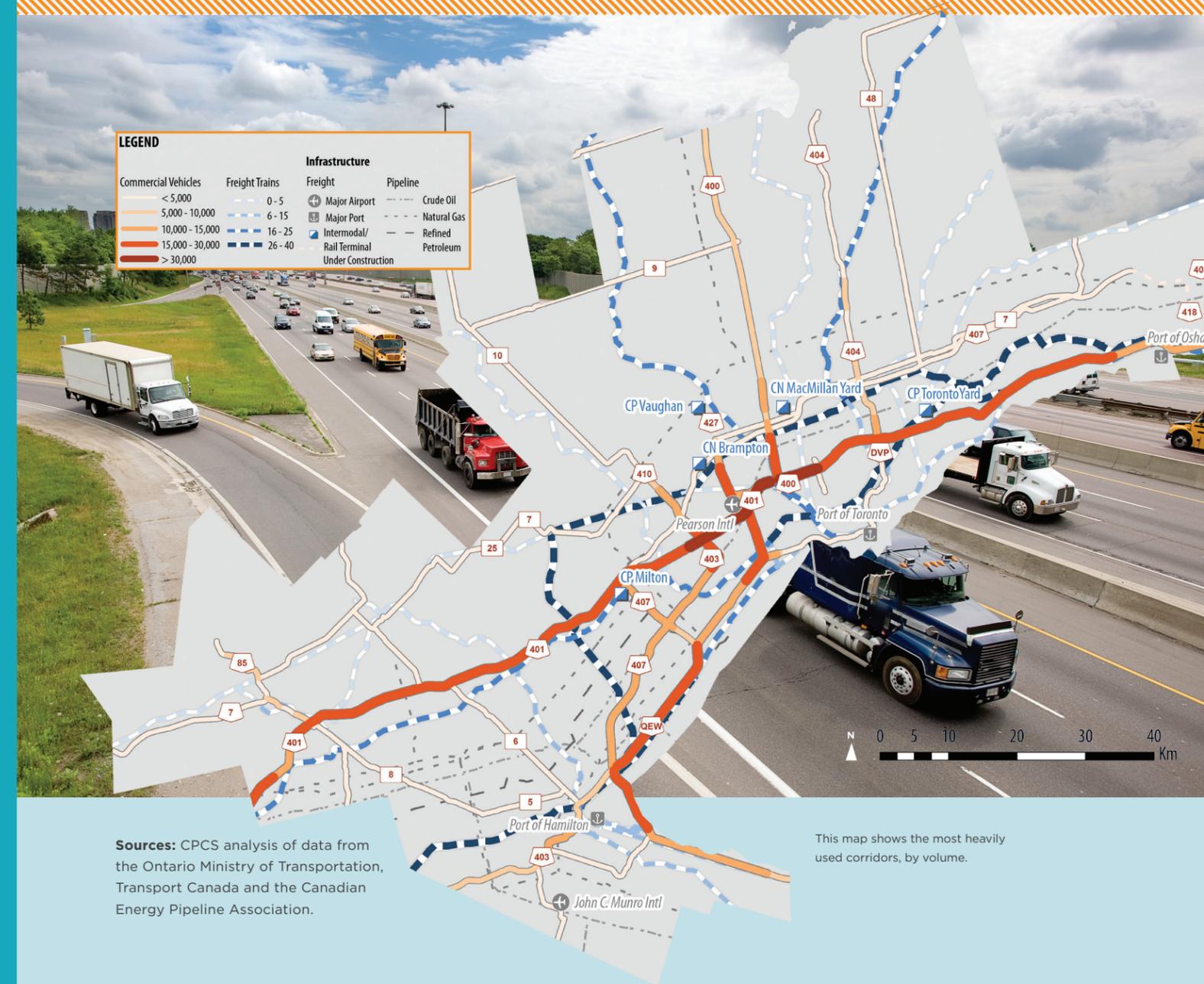
Map Source: CPCS analysis of data from the Ontario Ministry of Transportation. Note: Map shows delay intensity (hours of delay relative to uncongested speeds, per kilometre).

GOODS MOVEMENT
CORRIDORS: WHERE
ARE GOODS MOVING?

The Corridor is traversed by significant road, rail and pipeline corridors, shown together with key air and marine ports in Figure 5. The highway corridor with the highest truck volumes is Highway 401, followed by 427, QEW, 400 and 403/410. In 2016 trucks travelled an estimated 2.8 billion km in the Corridor, 59% on freeways (400-series and equivalent).⁴ Unlike passenger vehicles, truck volumes peak around 11 a.m. coinciding with the fact that many shippers traditionally begin delivery runs early in the morning and conclude these in the afternoon.⁵ The most notable rail corridors are CN's and CP's transcontinental main lines which traverse the Corridor east to west and north to south.



FIGURE 5: Multimodal Goods Movement Network and Goods Movement Volumes



GOODS MOVEMENT FACILITIES:
WHERE ARE
GOODS HANDLED?

“Clogged roads complicate the movement of goods to and from [Pearson] airport. For air cargo, which is selected for its speed, the time spent on the ground moving to and from the airport is a key factor in an airport’s successful support of supply chains.”

Howard Eng, President & CEO, Greater Toronto Airports Authority (GTAA)

AIR

Two airports in the Corridor—Toronto Pearson International and Hamilton’s John C. Munro International—are respectively the number one and number three airports nationally for goods movement (Figure 6).

Commodities transported by air tend to be high-value and time-sensitive, such as courier shipments, pharmaceuticals, food products, luxury goods and specialized machinery and equipment.

Capacity Utilization: With only 50% of capacity used in the short term (based on warehouse space), and considerable potential to expand existing infrastructure in the future, there are no hard constraints on air cargo capacity in the Corridor.

Major Pain Points: Ground transportation. Good road connections are critical to air cargo supply chains—yet the Corridor’s largest airport—Pearson International—is adjacent to its largest truck bottleneck.

Source: Greater Toronto Airports Association (GTAA) for Transport Canada, “Needs Assessment Study: Pickering Lands,” 2010. Toronto Pearson International Airport, “Toronto Pearson Fast Facts” (2017). Consultations with GTAA.

FIGURE 6: Air Transportation Facilities in the Corridor

FACILITY	DETAILS
Toronto Pearson International Airport	<ul style="list-style-type: none"> • 379,000 tonnes of loaded/unloaded cargo, in 2016 • Ranked #1 nationally • 43% of national air cargo originating in or destined to international locations
John C. Munro Hamilton International Airport	<ul style="list-style-type: none"> • 123,000 tonnes of loaded/unloaded cargo, in 2016 • Ranked #3 nationally • 14% of national air cargo originating in or destined to Canada <p>Source: Transport Canada, “Transportation in Canada 2016: Addendum”.</p>



MARINE

Marine ports in the Corridor handle primarily bulk commodities shipped on the Great Lakes, such as steel industry raw materials and products, agricultural products such as grain, liquid products such as asphalt and oil, and other raw materials such as sand, stone and salt. There are three federally owned Canadian

Port Authorities in the Corridor (Figure 7): Hamilton, Toronto and Oshawa; Hamilton is the largest in Ontario. A number of smaller private marine facilities, such as St. Mary's Cement plant in Clarington and CRH (Holcim) cement plant in Clarkson, handle specific products, often for a single company.

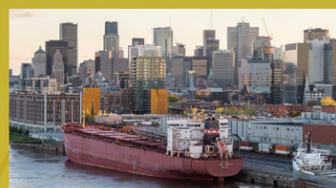
Capacity Utilization:

The St. Lawrence Seaway, connecting the Corridor's ports with Montreal and the Atlantic as well as with Lake Erie and the Upper Great Lakes, only operates at around 50% capacity.

Major Pain Points:

The Corridor's Ports are diversifying and expanding import and export opportunities for businesses in the Corridor. However, ports are running out of land for development as growing cities crowd in around them.

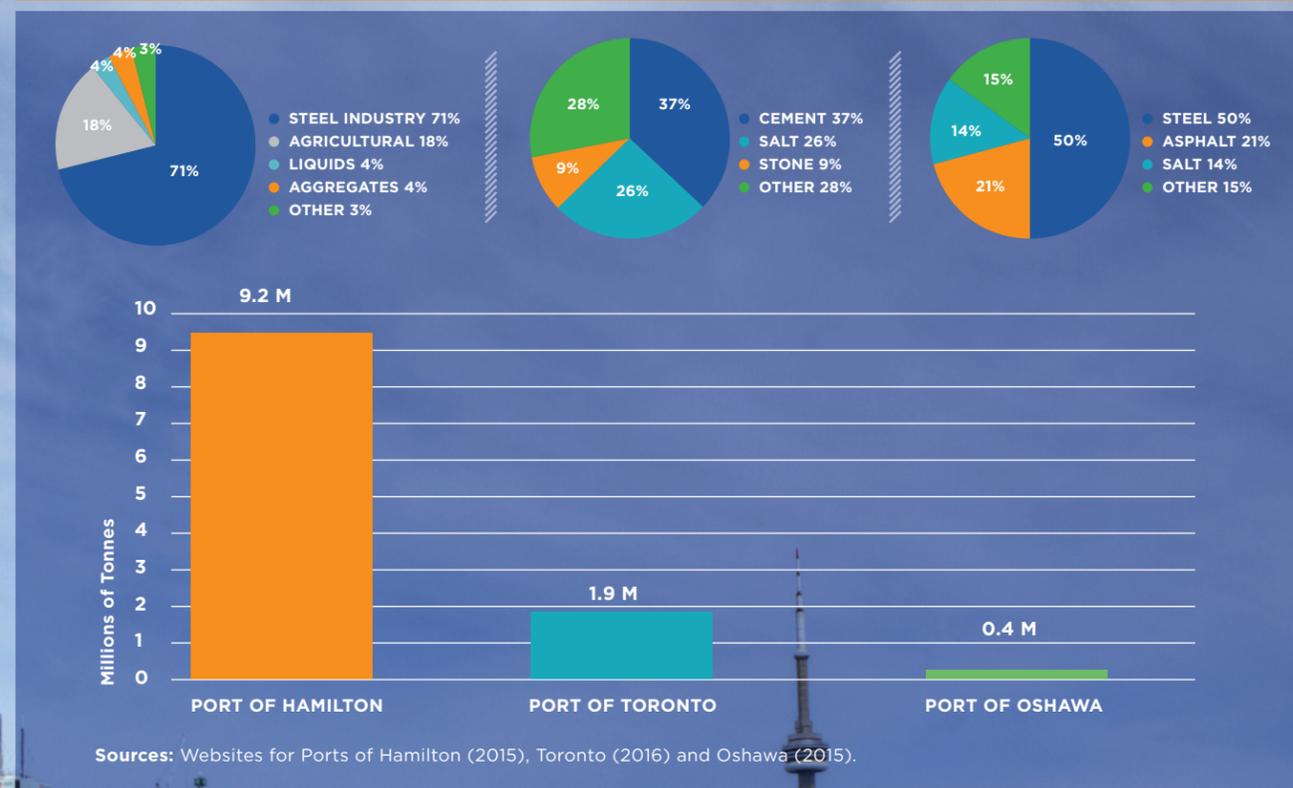
Source: Source: Consultations with Port of Hamilton (2017).



“The St. Lawrence Seaway is only running at half its capacity... Marine is a critical mode of transportation that’s not being maximized today.”

Ian Hamilton, President & CEO of the Hamilton

FIGURE 7: Marine Transportation Facilities in the Corridor



PIPELINE

The Corridor's pipelines carry natural gas, crude oil and refined products such as gasoline and jet fuel (Figure 8). Wholesalers and retailers such as Imperial Oil (Esso), Suncor (PetroCanada) and Shell operate distribution terminals in several locations along the pipelines. These businesses load tanker

trucks with gasoline or diesel fuel to supply customers, including gas stations throughout the Corridor. A branch line provides jet fuel to Pearson Airport. In addition, pipelines fuel the Corridor's gas-fired power stations and deliver natural gas for heating and industrial processes to customers in the Corridor.

Capacity Utilization:

Pipeline capacity to supply the Corridor with natural gas, gasoline, diesel and aviation fuel has been expanding to meet demand. 74% of Ontario's refined oil (gasoline, diesel, aviation fuel etc.) is supplied by Ontario refineries. 99.7% of crude oil comes to these refineries from Western Canada (2015).

Major Pain Points:

Nationally, crude oil pipeline capacity remains a political challenge, and some crude moves by rail in response to this constraint.

Source: Ontario Ministry of Energy, "Fuels Technical Report: Module 1" (2017). National Energy Board, "Canada's Pipeline Transportation System 2016: Pipeline Capacity."



“While pipeline capacity has been increasing, supplemental crude oil transport by rail has been required since 2012 to move growing supply to market.” National Energy Board

FIGURE 8: Pipeline Transportation Facilities in the Corridor

OPERATOR	DETAILS
Enbridge	<ul style="list-style-type: none"> Line 9 (Sarnia to Montreal) transports 300,000 barrels of crude oil daily through Hamilton's Westover Station Additional crude oil pipelines connect Hamilton to Nanticoke (117,000 barrels per day), West Seneca, NY (74,000) and Sarnia (180,000)
Trans-Northern	<ul style="list-style-type: none"> Pipeline transports 172,900 barrels of refined fuel products daily into the Corridor from Montreal and Nanticoke Branch lines connect to Pearson Airport and Clarkson (Mississauga) Pump stations/distribution terminals serving the Corridor are located at Bronte Station, Clarkson and Keele & Finch
Union Gas (Enbridge)	<ul style="list-style-type: none"> Natural gas pipeline from Dawn Hub (near Chatham-Kent) connects the Corridor to Western Canadian and US supply basins
TransCanada	<ul style="list-style-type: none"> Delivers natural gas from Western Canada, with connecting pipeline from US <p>Sources: Canadian Energy Pipeline Association, "About Pipelines Map" (online tool); websites for Enbridge, Trans-Northern, Union Gas and TransCanada.</p>

RAIL

Containerized commodities destined for the Corridor—everything from consumer products to industrial machinery—are shipped from East or West Coast ports such as Vancouver and Montreal and from the United States and Mexico via the integrated North American rail network. The Corridor is home to the largest intermodal terminals in Canada for both national railways, CN and CP, giving businesses in the Corridor quick and direct access to imported products. The availability of containers also provides an opportunity for the Corridor’s exporters to cost-effectively reach national, North American and global markets.

Railways are also important for shipping bulk commodities such as grain and

chemicals, and heavy commodities such as motor vehicles. For example, CN ships imported automobiles by rail from East Coast ports to its autoport at MacMillan Yard in Vaughan, for distribution to dealerships in the Corridor. Additionally, both CN and CP’s transcontinental main lines pass through the Corridor, which means that all commodities shipped cross-country pass through the Corridor at some point (Figure 9). There are also a number of shortline railways connecting to shippers, most of which run up to a few trains per day. This rail infrastructure is a critical lifeline to the east, west and south coast ports, allowing the Corridor’s businesses to effectively compete in international markets.

“CN’s Brampton Intermodal Terminal is nearing capacity. It is Canada’s busiest intermodal terminal with annual volumes rising 56% from 607,000 container units in 2009 to 949,000 container units in 2016. It is currently operating at close to its optimal operating capacity. While CN has substantially invested in their Brampton Intermodal Terminal to address capacity constraints over the last 10 years, in an environment where populations and the demand for goods continue to rise, more inland container capacity is required. To create more capacity and address this spreading demand, CN has expressed interest in developing a second intermodal terminal on lands they own in Milton. This second intermodal hub is expected to add 450,000 containers of annual capacity to the GTHA system. In the absence of this intermodal terminal, the Corridor would be restricted in its ability to serve the growing needs of Canada’s exporters and importers, and would result in a shift of long-haul freight traffic from intermodal rail to trucking, exacerbating congestion on the Corridor’s already-gridlocked 400-series highways such as 401.” CN

FIGURE 9: Rail Transportation Facilities in the Corridor

OPERATOR	DETAILS
Canadian National	<ul style="list-style-type: none"> • Mainline north of Steeles connects Eastern Canada to Southwest Ontario and the US • Mainline north from Richmond Hill connects Eastern Canada to Western Canada • Intermodal terminal in Brampton handles 40% of CN’s intermodal traffic • MacMillan Yard in Vaughan is one of the largest freight classification yards in Canada
Canadian Pacific	<ul style="list-style-type: none"> • Mainline north of Dupont connects Eastern Canada to Western Canada and the US • Intermodal terminal in Vaughan is CP’s largest in Canada • CP Expressway in Milton offers short-haul trailer-on-flatcar service between Toronto and Montreal • Classification yard in northeast Toronto <p>Sources: Railway Association of Canada, “Canadian Rail Atlas” (online tool).</p>

Capacity Utilization:

With traffic up more than 50% since 2009 to 949,000 container units in 2016, CN’s Brampton Intermodal Terminal is nearing capacity, and CN is planning to expand to a new intermodal terminal in Milton.

Major Pain Points:

Intermodal rail is important for both imports and exports—but terminal capacity is being squeezed. Development is also encroaching on some of the Corridor’s most important rail lines.

Source: Source: Canadian International Freight Forwarders Association (CIFFA), letter to the Milton Hub Panel, 2017. Consultations with CN.



TRUCK

Trucks are the “Swiss Army knife” of goods movement, serving virtually all markets and types of commodities in some form. Trucks are ubiquitous throughout the supply chain, transporting everything from dense, low-value raw materials (such as aggregate and salt) to oversize-overweight freight, to food and consumer products. Trucks also provide last-mile connectivity for other modes, transporting containers to and from

intermodal terminals, air cargo to and from airports, and fuels from distribution terminals. Trucks are also extensively used by courier and messenger businesses for pickup and delivery.

Most trucks on the road are not simply passing through the Corridor, but supporting the regional economy, loading or unloading locally. In fact, only 13% of truck tonnage passes through the Corridor without stopping (Figure 10).⁶

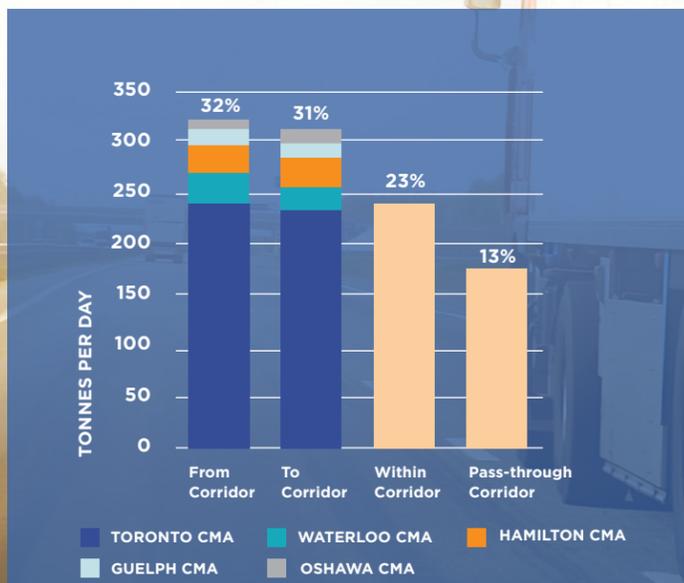
“[Trucks] are carrying everything you can possibly imagine from consumer goods to food and agricultural products, manufacturing inputs, finished goods and raw materials into and out of the GTHA every day... It’s difficult and only getting worse... Congestion is costly from a productivity standpoint and also from a service standpoint.” Jonathan Blackham, Director, Policy & Public Affairs at the Ontario Trucking Association.

Capacity Utilization: The Corridor’s road and highway system is well over capacity in many areas and at many times of day. Performance has suffered as a result. On Highway 401 around the airport, trucks manage an average speed of only 40 km/h on weekdays at 4 pm, while speed limits are 100 km/h.

Major Pain Points: The Corridor’s most important truck corridor-Highway 401-is the most heavily congested, and many other freight corridors are as well.

Source: MTO iCorridor and Commercial Vehicle Survey data (2016).

FIGURE 10: Truck Tonnage Through Corridor



Source: CPCS analysis of Ontario Ministry of Transportation Commercial Vehicle Survey (2012).

FIGURE 11: Truck Trip Generators in the Corridor and Daily Truck Trips to Destinations Outside the Corridor



According to provincial truck survey data, the area west of the airport generates the greatest concentration of truck trips in the Corridor.

Source: CPCS analysis of Ontario Ministry of Transportation Commercial Vehicle Survey (2012).

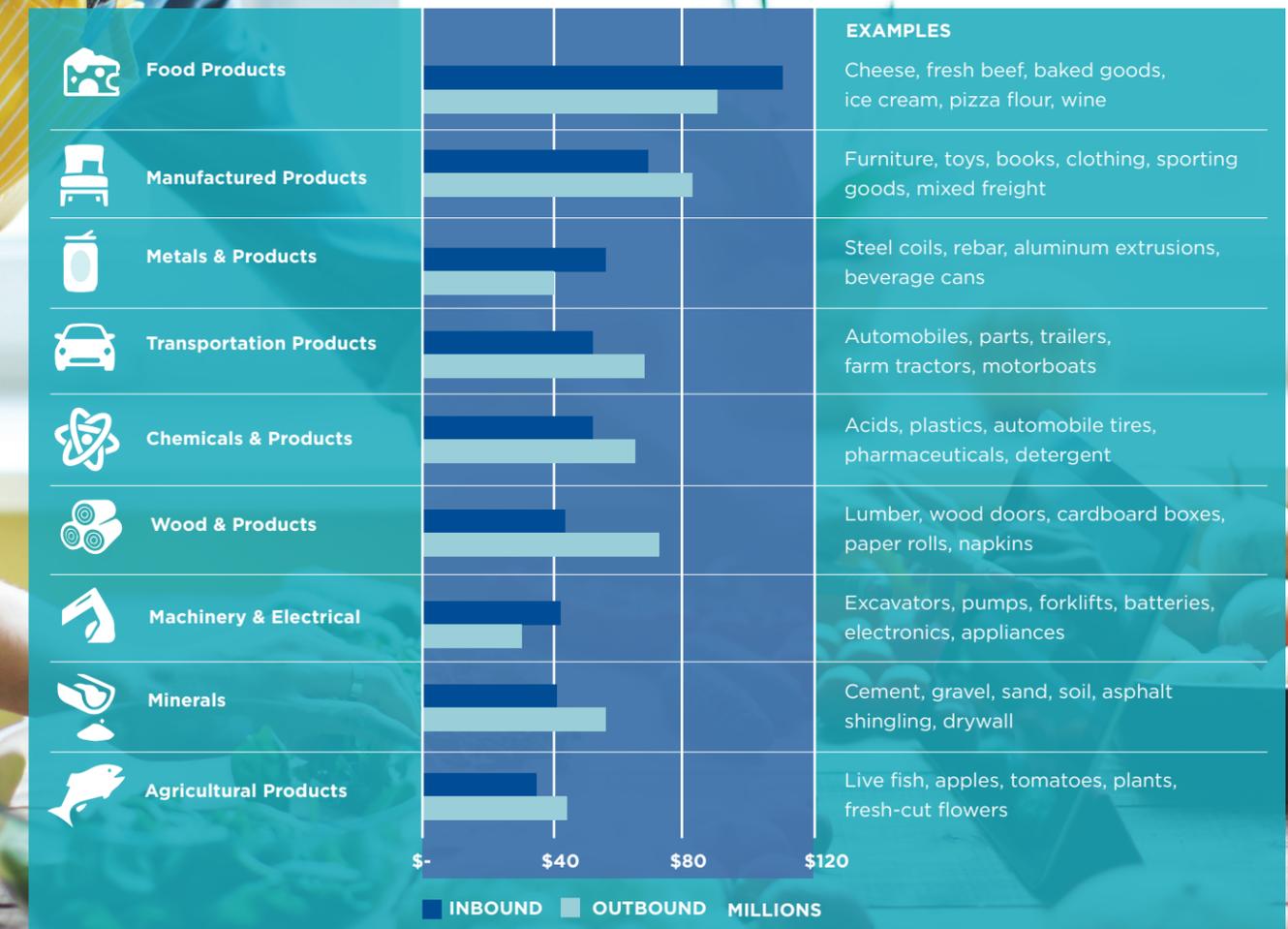
COMMODITIES:
WHAT'S MOVING?

\$ \$3 billion of commodities are trucked through the Corridor every day. The top inbound and outbound commodities are shown in Figure 12. Outbound flows are indicative of manufacturing, but also distribution activity within the Corridor. For example, manufactured products may come into the Corridor by intermodal rail and be shipped from distribution centres to customers across Ontario or Canada (these flows are reflected only in “outbound” in Figure 12).

As is clear from the variety of commodity types, shippers have a variety of priorities and interests when it comes to goods movement. For example,

some shipments are sensitive mostly to cost (sand, aggregates), others time (fresh fruit and vegetables), and still others reliability (critical equipment and parts).

FIGURE 12: Commodities Trucked to and from Corridor, by Daily Value



Source: CPCS analysis of Ontario Ministry of Transportation Commercial Vehicle Survey (2012)



GOODS MOVEMENT CLUSTERS: WHAT ARE THE KEY ATTRACTORS AND GENERATORS OF GOODS MOVEMENT?



The automotive and parts manufacturing supply chain is complex and integrated across national borders

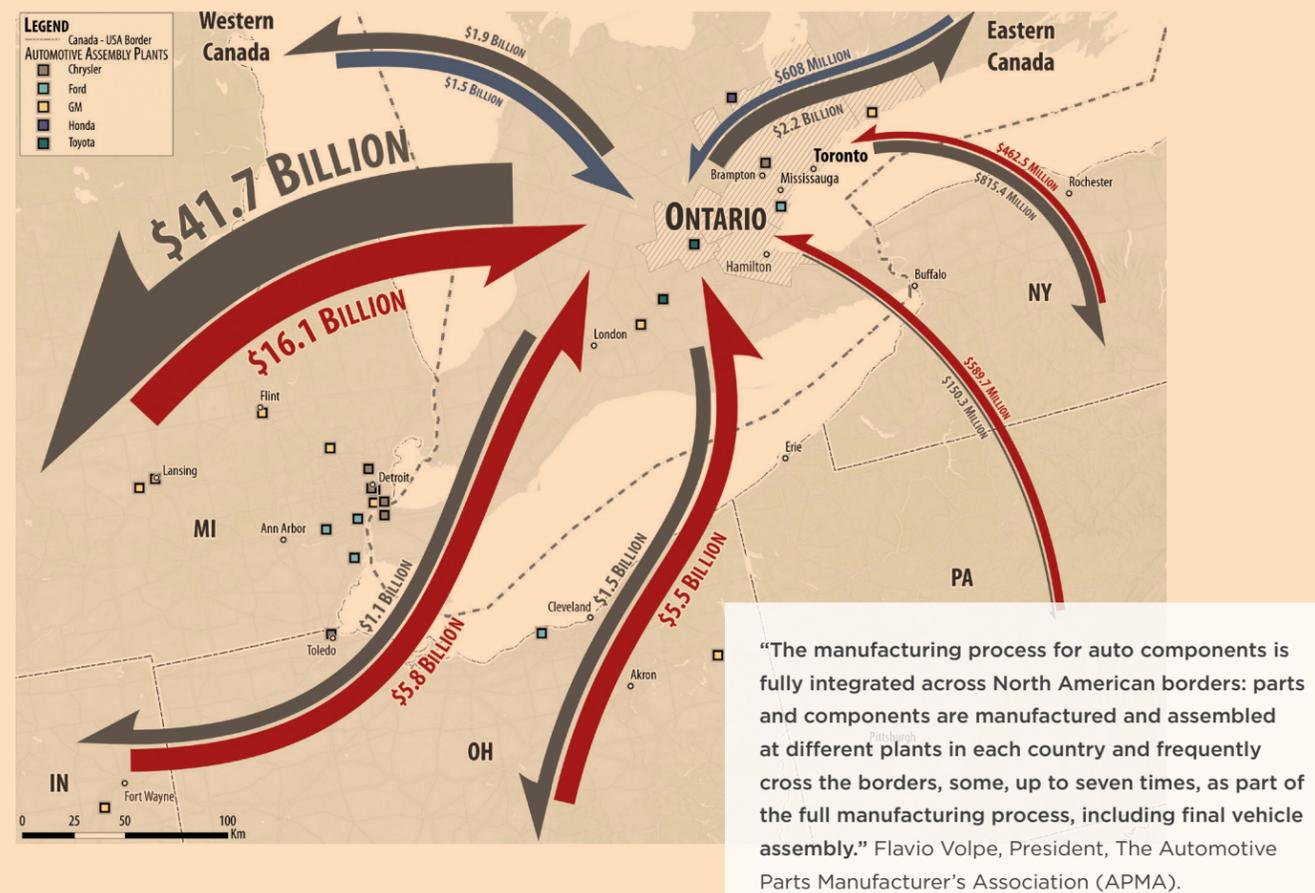
MANUFACTURING FACILITIES

Vehicle assembly plants dominate the ranks of the largest manufacturing facilities. The Corridor is home to numerous multinational automakers, as shown in Figure 13. These plants are supported by an extensive network of automotive parts manufacturers and suppliers. Food manufacturing is another significant industry within the regional manufacturing sector.

DISTRIBUTION CENTRES

The Corridor is home to the largest concentration of distribution centre (DC) activity in Canada, and one of the largest in North America. Whereas in the past manufacturers and retailers would require large warehouses to store inventory, modern supply chains use networks of DCs to rapidly and efficiently route products “just in time” from manufacturers to distributors, retailers and increasingly homes and businesses.

FIGURE 13: Value of Automotive Flows to and from Ontario



As the Corridor grows, new DCs of up to one million square feet or larger are breaking ground in the northwest part of the Corridor. Some of these companies—such as Canadian Tire and Home Depot—are outgrowing existing DCs in more central parts of the Corridor, while others—such as Amazon—are emerging businesses newer to the Corridor.

Figure 14 displays the location of goods movement facilities of over 300,000 square feet. The darkest parts of the map are those with the greatest concentration of such facilities (measured in facility square footage per land area). Additionally, the colours draw attention to the age of the facilities, with blue indicative of facilities built in the last 10 years. Clearly evident is an ongoing shift in goods movement activity to the north and west of the Corridor.

Peel Region has the greatest volume of goods movement facilities over 300,000 square feet, at 40% of the total in the Corridor. Halton, York, Durham and Toronto each have

between 10% and 15%, while Waterloo and Wellington have a combined 11%.

Figure 14, along with CVS data and past studies,^{7,8} help draw attention to several distinguishable goods movement clusters in the Corridor. These clusters are summarized in Figure 15, along with a few notable businesses within each cluster.

The blue shades show a shift in goods movement facilities to the north and west over the last decade in search of low-cost, developable land

FIGURE 14: Intensity of Goods Movement Facilities over 300,000 Square Feet (Under Roof)



Source: CPCS repository of freight facilities. Note: does not include retail facilities (e.g. malls).



GOODS MOVEMENT CLUSTERS

FIGURE 15: Goods Movement Clusters in the Corridor

REGION	CLUSTER	THE CORRIDOR	NOTABLE BUSINESSES
West	Pearson Airport - South Brampton	Pearson Airport, CN Intermodal, Highways 401, 407, 409, 427, 410	Chrysler, Walmart, Canadian Tire, Canada Post, Coca-Cola, PepsiCo, Molson, O-I Canada, Indigo, Unilever, Winners, Best Buy, Interport Sufferance Warehouse
	401 Milton-Meadowvale	CP Expressway, Highways 401 & 407, the Proposed CN Milton Logistics Hub	Lowe's, Whirlpool, Sobeys, Manheim, Amazon, Walmart
	QEW-Halton	QEW, 407	Ford Motor, Suncor, CRH Canada, UPS
	Hamilton	Port of Hamilton, Munro Airport, QEW, 403, RHVP, Linc.	ArcelorMittal Dofasco, Stelco, National Steel Car, Maple Leaf, Canada Bread Company
	Kitchener-Cambridge-Waterloo	Highways 401, 7, 8	Toyota, Loblaw, AG Simpson, Home Hardware
	Guelph	Highways 401, 6	Linamar, Polycon, Nestle Waters, Hitachi
Central	427 North	CP Intermodal, Highways 427, 407	Canadian Tire, FedEx, Home Depot, Sears, Costco, Sobeys, HBC
	401-400	CN MacMillan Yard, Highways 400, 407, 401	UPS, LG, Toys"R"Us, Esso, Shell, Suncor
	QEW-427	Highways 427, QEW, Gardiner	Metro, Ontario Food Terminal, Campbell Soup
	Markham-North Scarborough	CP Toronto Yard, Highways 404, 401, 407	Owens-Corning, Atlantic Packaging, HBC
East	401-Durham	Port of Oshawa, Highways 401, 412, 407	General Motors, St Marys, Gerdau, Loblaw, LCBO, Sobeys

Source: CPCS analysis.

FOCUS ON DOWNTOWN TORONTO: WHAT'S MOVING DOWNTOWN?

Analyzing the geographic distribution of the largest goods movement facilities provides an important, but not complete, picture of activity in the Corridor. Ultimately, all goods make their way to an end consumer, be it a business or household.

The densest concentration of employment and population in the Corridor is in downtown Toronto, home to over 500,000 jobs and 250,000 residents. Downtown employment is dominated by office jobs (65% of employment), followed by institutional (14%), retail and service-sector jobs. Downtown employment grew by 15.7% between 2011 and 2016, while in the same period residential population increased by 20.2%⁹—a trend that is likely to continue spurring demand for goods movement due to increasing home deliveries.

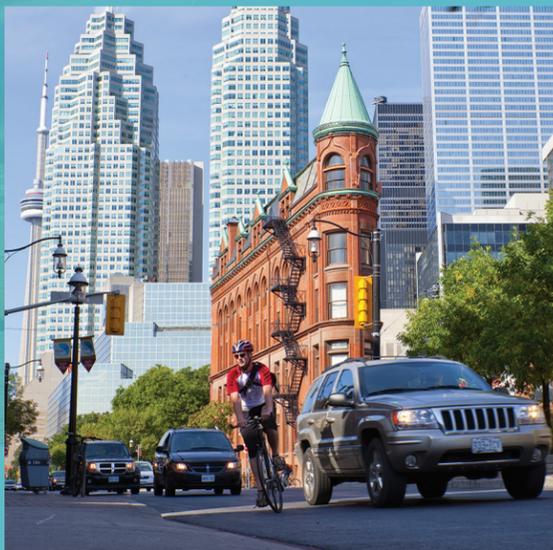
Despite the absence, for the most part, of industrial and manufacturing land uses, large

volumes of goods movement vehicles need to access downtown Toronto every day. Indeed, these growth trends emphasize the importance of policies and strategies that enable goods to be delivered to dense, urban settings in a safe, efficient and environmentally friendly manner. Although downtown Toronto is the most notable example, ensuring the right balance between goods movement needs and other drivers of quality of life is an important issue along the Corridor, including in other nodes such as Hamilton, Kitchener-Waterloo, and the Airport employment cluster.

TYPES OF GOODS MOVEMENT DELIVERIES DOWNTOWN



- Food and consumer products deliveries to retailers
- Food and beverage deliveries to restaurants
- Parcel, courier and office supplies deliveries to businesses
- Bike deliveries of meals and documents to offices
- Shredding services to offices
- Food, laundry and similar services to hotels and event venues
- Deliveries of supplies to hospitals and universities
- Ready-mix cement, equipment and construction materials deliveries to job sites
- Parcel deliveries to homes and condo buildings
- Waste and recycling pickup from homes and businesses



THE TORONTO REGION BOARD OF TRADE'S ADVOCACY ON THE GARDINER EXPRESSWAY



In 2015, the Board of Trade supported the “hybrid” solution for the Gardiner East Environmental Assessment. The Board was concerned that removing this critical artery through downtown Toronto would disrupt the vital connection between the Don Valley Parkway and the Gardiner, would negatively impact the continuous movement of goods across Toronto and increase commute times by up to 10 minutes, given that proposed transit projects to ease congestion had yet to receive approval and committed funding. The Board’s position was that the “hybrid” solution, which was successfully selected by the City of Toronto, would help support economic growth by facilitating development of the Unilever lands and Portlands more generally and continue to facilitate deliveries of fresh produce in and out of the Ontario Food Terminal. The Board recommended the development of transit linkages throughout the Portlands and consideration of international best practices in funding specific transit routes.

Sources: Press release: “Toronto Region Board of Trade supports ‘hybrid’ and recommends additional transit linkages.” May 2015.

“The proposed hybrid option maintains the vital connection between the Don Valley Parkway and the Gardiner and allows the continuous movement of goods, services and traffic across Toronto that is essential to our economy. The effect of removing the Gardiner has the potential to impact all road users well beyond the study area,”
Elliott Silverstein, Manager Government Relations, CAA SCO.



PORTRAIT OF A DELIVERY IN THE CORRIDOR



Despite leaving its distribution centre (DC) at 6:30 a.m., a truck loaded with food products gets stuck in commuter traffic on the eastbound Highway 401 in Mississauga. The Gardiner Expressway is not any better, and by the time the truck arrives at its first receiver in Leslieville the time is 8:15 a.m.—an effective door-to-door speed of 30 km/h. After unloading on a side street to avoid blocking rush-hour traffic, the driver heads to the second destination along Queen Street, navigating cautiously around streetcars, cyclists and pedestrians. Lane closures and accidents force a detour, and seeing two other trucks already waiting to unload, the driver opts to return later to the second destination. Off to an establishment uptown, and there is more waiting to unload as widespread congestion has thrown off everyone’s schedules. Returning to complete the skipped delivery means circling back, wasting time and fuel. There’s no avoiding p.m. rush hour traffic in returning to the DC, and the driver makes it back at 7 p.m., narrowly avoiding exceeding the 13-hour provincial hours of service limits.



PORTRAIT OF DELIVERIES TO FIRST CANADIAN PLACE



Downtown office complexes often share underground loading facilities that serve multiple towers located within a single city block—which can be home to tens of thousands of workers and more than a hundred retailers and restaurants. On a daily basis, two hundred trucks –delivering everything from food to consumer goods, office supplies, parcels and mail; and taking away waste, recycling and shredded paper—rely on a single 15-bay loading facility. Arriving trucks turn into large but narrow truck elevators, travel several floors down, are turned on a giant rotating concrete disk as necessary, and back into available bays.

This complex underground system helps solve what is a major issue for trucks downtown—finding curbside space to unload. Yet there remain challenges—most significantly road congestion. Peak and midday traffic on important corridors like Richmond Street makes it hard for trucks to arrive at reliable intervals. Whereas trucks would once queue to enter the facility, new bike lanes and increased police ticketing mean that a truck arriving when the elevators are busy will be waved all the way to Jarvis street. It is not uncommon for this to happen two or three times for a single truck, meaning frustration and schedule slippage for drivers, not to mention wasted fuel, increased pollution and effectively more trucks on congested downtown streets. Because of turn restrictions and heavy bicycle and pedestrian volumes, a “trip around the block” can actually be much more circuitous than it sounds.

Goods movement in the Corridor is facing four critical challenges that are hindering our business competitiveness, quality of life and economic prosperity. If these challenges are not addressed, the Corridor's future prosperity and status as a leading global city will be at risk:

Road congestion is the biggest problem for the movement of goods in the Corridor. Making matters worse is that some of the busiest truck routes are the worst congestion bottlenecks. Road congestion does not just affect trucks, it cascades through the whole supply chain. Trucking is critical for connecting shippers and receivers to rail and pipeline terminals, ports and airports. The failure of governments to provide fast and reliable highways for the efficient, safe and environmentally friendly movement of goods is a problem that needs to be solved.

Land use conflicts occur as the Corridor grows and movement of goods facilities are encroached upon by incompatible development, leading to additional mitigation costs and operational challenges for movement of goods facilities. Municipalities continue to allow residential development that threatens the future of some of our most important multimodal movement of goods infrastructure. This needs to change.

Last-mile connectivity, beyond road congestion, is a challenge because of narrow streets, truck restrictions and conflicts with other road users such as cars, bikes and pedestrians. Trucks deliver most of the daily necessities to our stores and restaurants, yet in urban areas in the Corridor delivery and unloading needs seem to rank well behind other priorities such as bike lanes. Municipalities need to stop using parking tickets as a cash grab and focus on addressing last-mile issues.

A lack of strategic planning for goods movement exacerbates the other challenges as conflicting policy priorities across all levels of government often mean that funding and political capital are not spent where they would have the greatest benefit for the Corridor. Money is wasted on projects with no business case, while projects that could have a real impact on congestion are postponed or not even studied.

As employment and population continue to grow in downtown Toronto and across the Corridor, it is important that policies and strategies give adequate consideration to the supply chains that keep our factories running and our shelves stocked. The fourth report in this series will explore potential policies to improve goods movement in the Corridor.



FIGURE 16: Goods Movement Facts and Figures





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ENDNOTES

1. Canada's automotive industry is increasingly concentrated in southern Ontario, both in the Windsor-Essex region and along the London-to-GTHA corridor. Source: Brendan Sweeney, Automotive Policy Research Centre, "A Profile of the Automotive Manufacturing Industry in Canada, 2012-2016" (2017). Food manufacturing is the second largest manufacturing employer in the GTA and largest in the country—see Food & Consumer Products of Canada, "The Greater Toronto Area Food and Beverage Cluster" (website)
2. "Economic Impact of Goods Movement in the Toronto-Waterloo Innovation Corridor"
3. Last-mile connectivity is transportation of goods to their final destination.
4. CPCS analysis of data from Ontario Ministry of Transportation for 2012-Commercial Vehicle Survey (CVS). All CVS data annualized and inflated to 2016. The km-travelled estimate is likely conservative, since the data do not cover all local and collector roads and the Ministry of Transportation methodology may underestimate truck trips on the non-highway corridors for which data are available.
5. Data provided to CPCS by the Ontario Ministry of Transportation -average hourly traffic volumes from 56 sites in the Greater Toronto and Hamilton Area (Tuesday-Thursday 2012).
6. This may be conservative, as it is likely the "Within Corridor" total is underestimated, due to the Ontario Ministry of Transportation Commercial Vehicle Survey count locations being mostly along the periphery of the Corridor and near key intermodal facilities. For example, truck trips from distribution centres within the Corridor to receivers in the Corridor are likely significantly undercounted.
7. CPCS, forthcoming study for Metrolinx, "Strategic Goods Movement Network in the GTHA"
8. McMaster Institute for Transportation & Logistics, "Truck Freight Generators and Attractors in the Province of Ontario." March 2014.
9. Downtown Toronto employment data from City of Toronto, "Toronto Employment Survey 2016." Definition of downtown is as described in the source document. Population data from Statistics Canada 2016 Census, analyzed by CPCS.



**TORONTO
REGION
BOARD OF TRADE**

ABOUT THE TORONTO REGION BOARD OF TRADE

Founded in 1845, Toronto Region Board of Trade is the chamber of commerce for Canada's largest urban centre, connecting more than 12,000 members, business professionals and influencers throughout the Toronto region. The Board fuels the economic, social and cultural vitality of the entire Toronto region by fostering powerful collaborations among business, government, thought leaders, and community builders. The Toronto Region Board of Trade's vision is to make Toronto one of the most competitive and sought after business regions in the world. Learn more at bot.com and follow us at [@TorontoRBOT](https://twitter.com/TorontoRBOT).

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