Interprovincial Truck Mobility Data Collection

For the National Capital Region

June 2024

National Capital Commission
Commission de la capitale nationale

Canada


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1 Introduction

Commercial vehicle activity plays a vital role in sustaining our society and economic system by facilitating the delivery of goods and services essential for everyone's well-being. Recognizing commercial vehicle activity's significance and following one of the short-term recommendations of the Long Term Integrated Interprovincial Crossings Plan (LTIICP), the National Capital Commission (NCC) has undertaken data collection efforts, in collaboration with municipal, provincial and federal partners, to enhance the understanding of interprovincial commercial vehicle movement and inform transportation planning studies in the National Capital Region. These data collection initiatives are essential not only for adapting to the post-pandemic's "new normal," but also for ensuring efficient and effective transportation infrastructure to meet evolving needs.

This document provides a summary of the data collection methods and several highlights and trends that were observed. The analysis includes summaries of interprovincial traffic volumes and trip origins and destinations for commercial vehicles (CVs), more specifically, trucks. To support the technical analysis, further definitions and maps are provided in Appendix A for reference. Throughout the document, trends are identified relative to the data summarized in the 2007 Interprovincial Roadside Truck Survey.

TRANS Partners' Participation

The TRANS Committee is comprised of the following member agencies: the National Capital Commission (NCC), the Ministry of Transportation of Ontario (MTO), the City of Ottawa (including OC Transpo), Ministère des Transports et de la Mobilité durable du Québec (MTMD), the Ville de Gatineau and the Société de Transport de l'Outaouais (STO).

This report was prepared in part based on transport data collected in collaboration with the TRANS Committee. The NCC would like to acknowledge the collaboration of TRANS, with special thanks to the TRANS sub-committee that provided valuable guidance to the interprovincial truck study.

1.1 Definitions

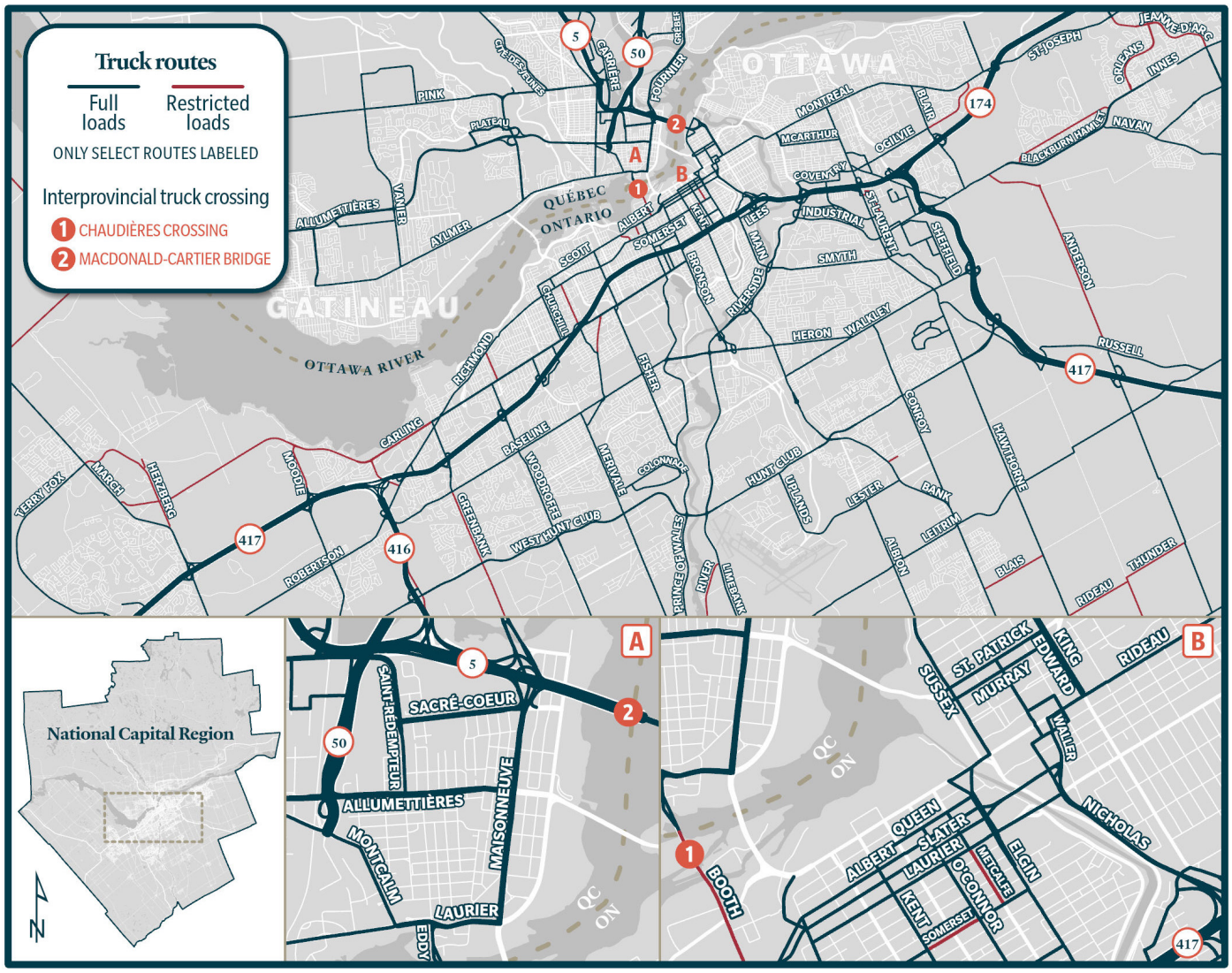
1.1.1 National Capital Region

The National Capital Region, as presented in this document, refers to the regional boundary as currently defined by the TRANS committee, which differs slightly from the National Capital Region boundary as defined by the *National Capital Act*. This geography is particularly relevant to the origin-destination information using the TRANS districts limits, and to remain comparable with previous studies. A map showing the limits of the National Capital Region is available in Appendix A.1.

1.1.2 Truck Classifications

In Canadian transport studies, vehicles are commonly classified in 13 classes as defined by the American Federal Highway Administration, shown in Appendix A.2. In this report, the CVs (or trucks) are defined as classes 5 to 13, with classes 5 to 7 being single-unit trucks (SUTs), and classes 8 to 13 being articulated trucks (ATs).

FIGURE 1 - NATIONAL CAPITAL REGION TRUCK ROUTES (MAY 2024)

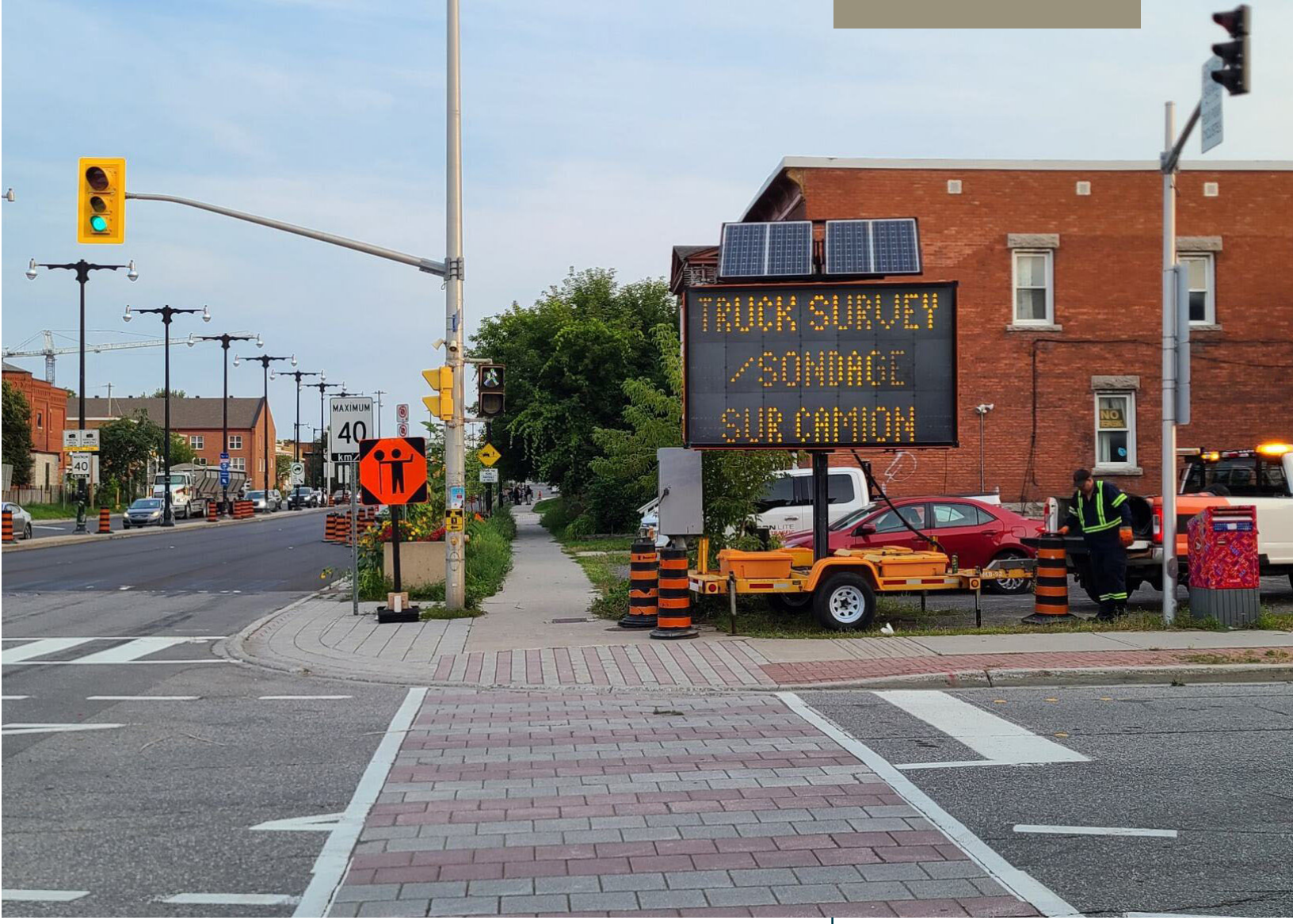


1.1.3 Truck Routes

Truck routes, shown in Figure 1 and Appendix A.3, are a subset of the road network on which trucks are permitted to travel without or with partial restrictions. Historically, two interprovincial crossings have been part of the truck route network, the Macdonald-Cartier Bridge and the Chaudières Crossing. In recent years, only the Macdonald-Cartier bridge was part of the truck route, with Chaudières being closed from early 2022 and fully re-opened in November 2023. The Chaudières Crossing is currently open for trucks. There are four other interprovincial bridges in the National Capital Region; however, one is limited to pedestrians and cyclists and the remaining three, while serving personal vehicles, transit, and active modes, are prohibited to trucks.

1.1.4 King Edward-Rideau-Waller-Nicholas (KERWN)

The KERWN corridor is a municipal route in Ottawa passing through the National Capital's core area and connecting Highway 417 on the Ottawa side to Highway 5 on the Gatineau side (Appendix A.4). Most of the interprovincial trucks travel along the truck route from the intersection of Laurier/Nicholas to King Edward Avenue and across the Macdonald-Cartier Bridge to Highway 5 in Gatineau, referred to as the King-Edward-Rideau-Waller-Nicholas (KERWN) route. The volume of trucks on Highway 5 is not generally considered a problem as the road was designed to accommodate high vehicular volumes and is highly separated from the adjacent communities. However, a similarly higher-order roadway was never constructed in Ottawa, creating an environment where high volumes of truck traffic travel along King Edward Avenue and through the Ottawa core, an area with high levels of pedestrian and cyclist activity.



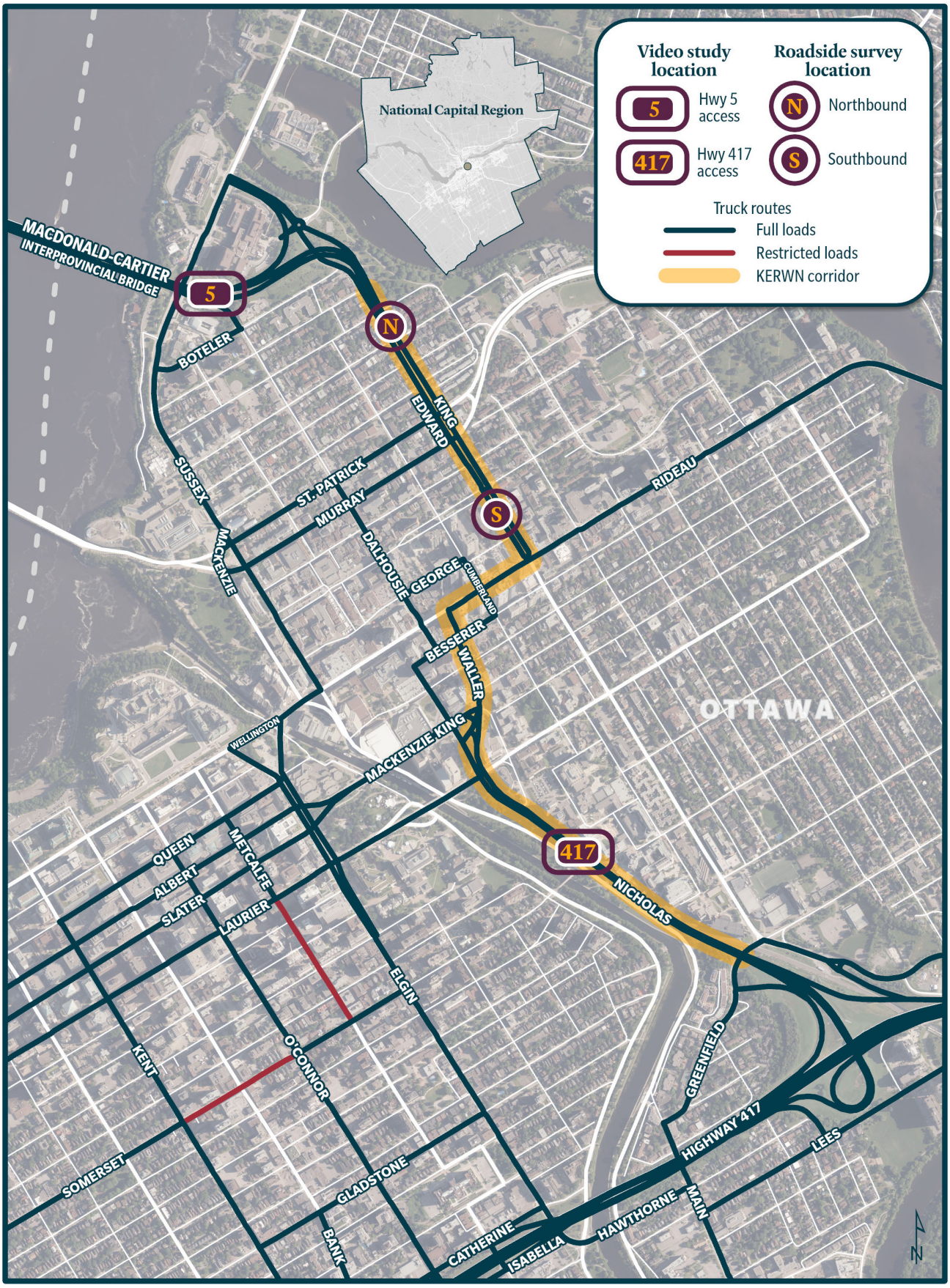
2 Data Sources

The information and analysis presented in this report is based on multiple data sources collected between 2018 and 2024. The sources considered and collection methods include the following:

- **A roadside commercial vehicle survey** included 618 trucks and was conducted on a voluntary basis over a two-week period between August 21 and September 1, 2023. This data included information on trip patterns, trip purpose and cargo. The northbound and southbound survey locations are shown in Figure 2.
- **A video study** was conducted on the KERWN corridor on weekdays between September 14 and 22, 2023. The surveys were carried out between 9 am and 6:30 pm, for a total of 24 hours per direction. This data set was used to understand truck movement throughout the corridor by determining the proportion of local trips and the proportion of interprovincial hazardous materials transport compared to other types of cargo. The video survey locations on either end of the corridor are shown in Figure 2.

- **Roadside Survey: 618 trucks surveyed**
- **Truck Video Study: 10,000 trucks captured**

FIGURE 2 - ROADSIDE AND VIDEO TRUCK SURVEY LOCATIONS



- **Geotab ITS** aggregate commercial vehicle GPS trajectory data was also obtained, including eight months of data between 2021 and 2023 covering the entire National Capital Region. This data provides a portrait of the commercial vehicle trip patterns in the National Capital Region.
- **Traffic counts** were collected through a variety of means:
    - One full week of vehicle counts collected on the Macdonald-Cartier Bridge between June 4 and 10, 2023.
    - 24-hour weekday counts collected several times a year by Public Services and Procurement Canada at the five vehicular interprovincial crossings between 2019 and 2024. This provides hourly volumes for small vehicles, trucks, pedestrians and cyclists.
    - Intersection traffic counts completed in the City of Ottawa and Ville de Gatineau in 2018–2019 and 2022–2023 (avoiding peak pandemic years) on other arterial truck routes in the National Capital Region.

Where applicable, the new data is compared with results from the 2007 Interprovincial Roadside Truck Survey conducted by TRANS.

3 Interprovincial Truck Volumes

The interprovincial vehicle and truck volumes for a typical weekday have been collected on a regular basis over a multi-year period on the interprovincial bridges in the National Capital Region. This section presents the variation of interprovincial truck volumes over a multi-year period, throughout a typical weekday, and across various truck routes.

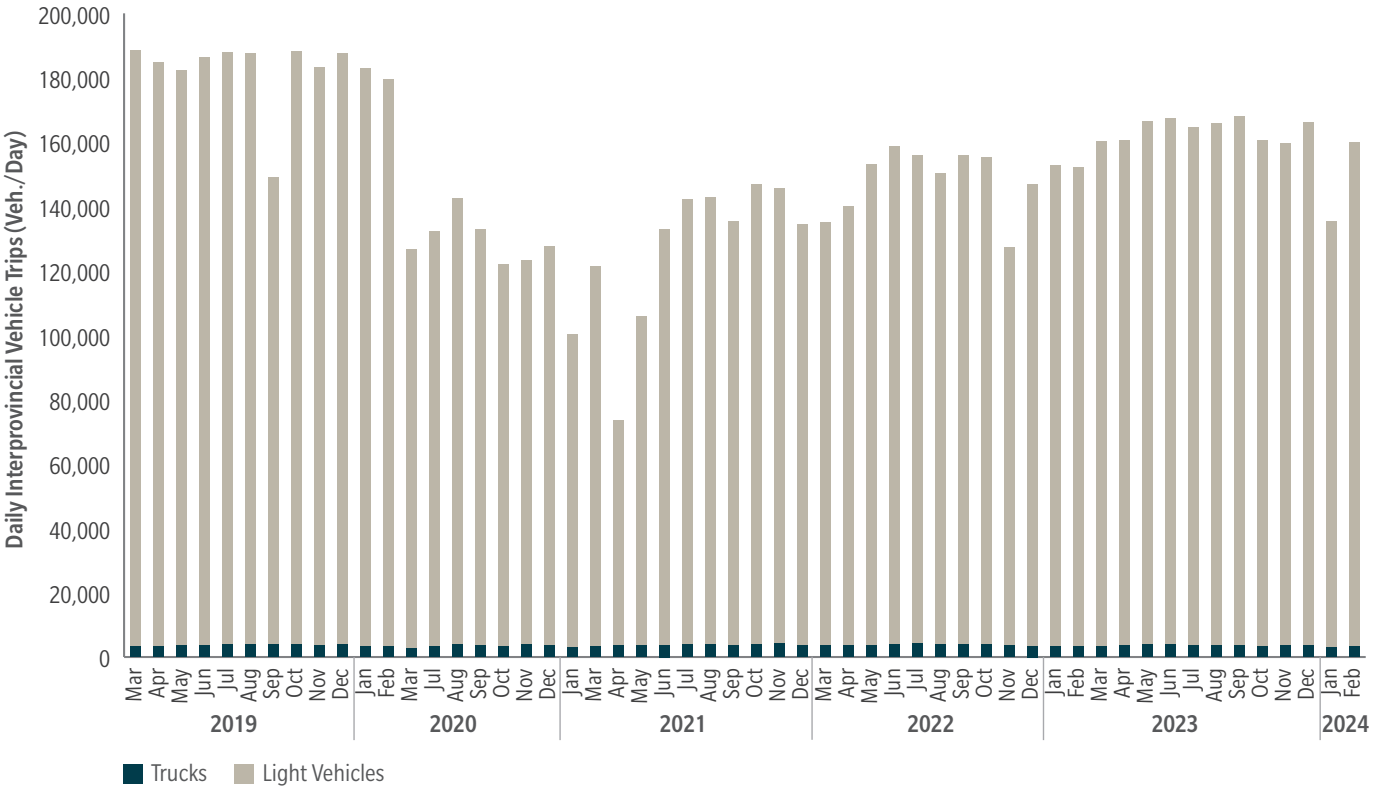
3.1 Current Interprovincial Vehicle Volumes

On a typical weekday in 2023, interprovincial vehicle volumes often surpassed 160,000 vehicles, as shown in Figure 3. Meanwhile truck volumes were observed to be approximately 3,500 trucks per day, or 2% of the daily interprovincial vehicle traffic. In terms of size, about 30% of the interprovincial trucks are ATs.

Figure 3 indicates a small decrease in post-pandemic vehicle trips when comparing 2019 and 2023 volumes. By comparison, Figure 4 shows that truck trips have remained relatively stable during the same five-year period.

Trucks are required to follow the regional truck routes, which include the interprovincial routes of Chaudières Crossing and the Macdonald-Cartier Bridge. It should be noted when considering a five-year period, that the Chaudières Crossing was impacted by construction during most of 2022 and 2023, and trucks were prohibited from the crossing during this time.

FIGURE 3 - INTERPROVINCIAL BI-DIRECTIONAL DAILY (24 HR) ALL-VEHICLE TRAFFIC COUNT



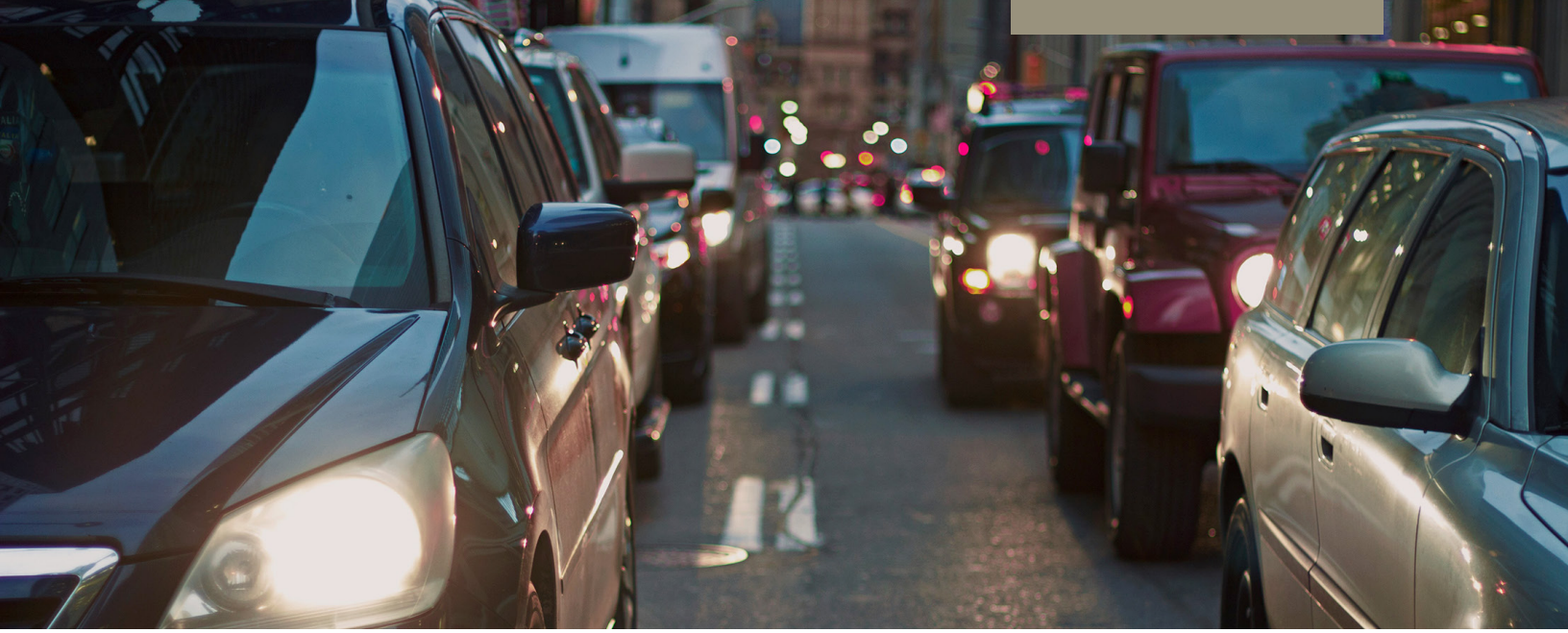
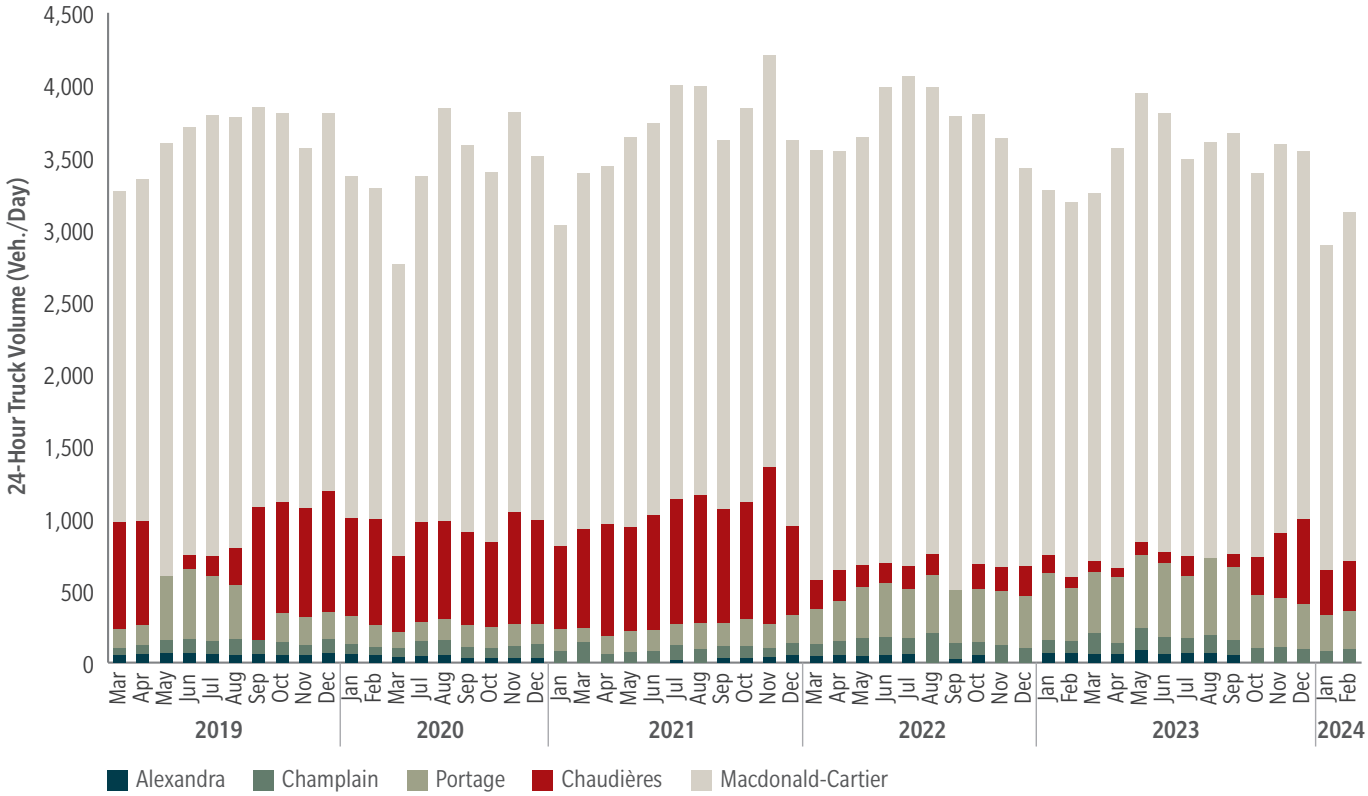


FIGURE 4 - WEEKDAY INTERPROVINCIAL BI-DIRECTIONAL TRUCK TRAFFIC COUNT (24 HR)

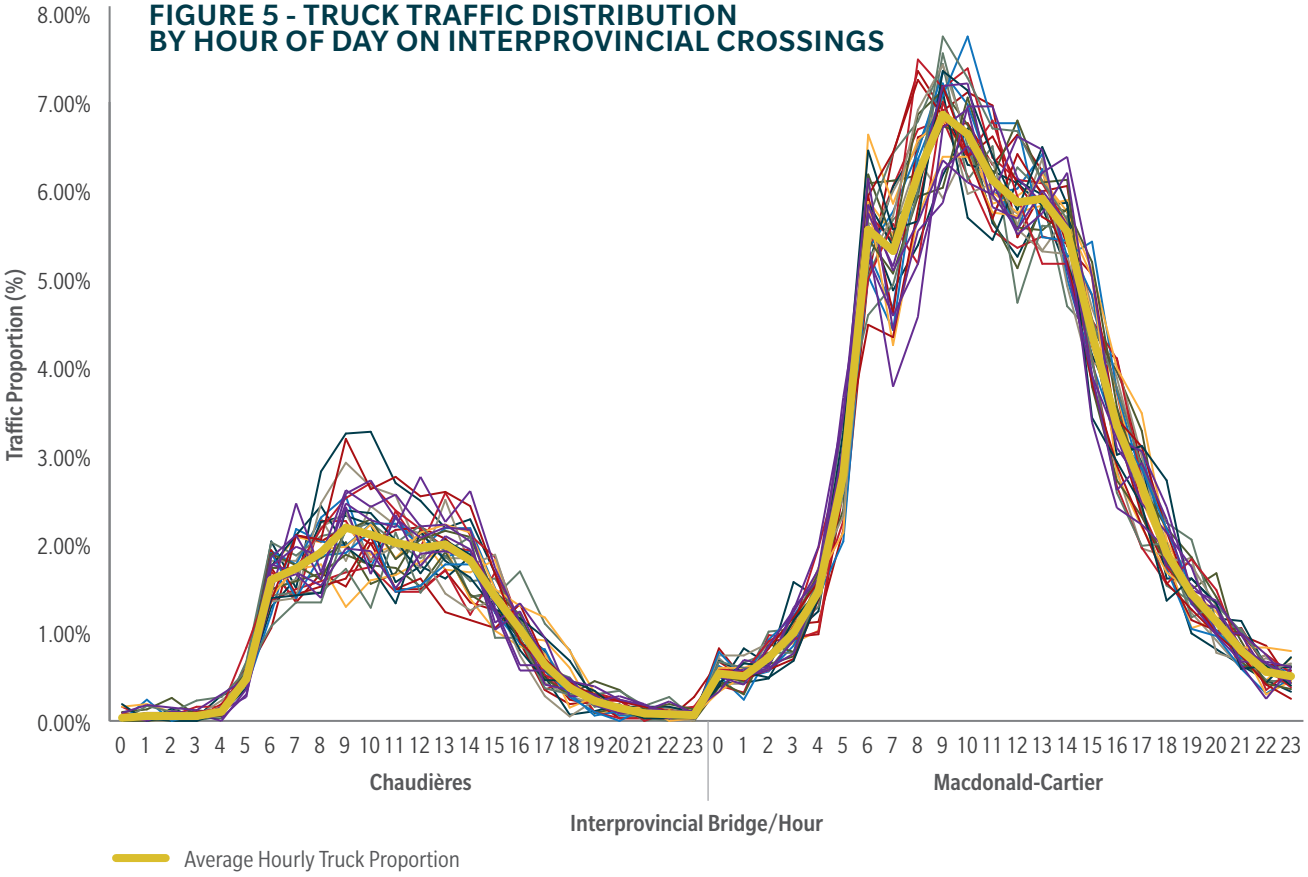


As shown in Figure 4, 72% of interprovincial truck traffic in 2019–2021 used the Macdonald-Cartier Bridge and 19% used the Chaudières Crossing. Given that the other three vehicular bridges are not permitted for truck crossing, the observed truck traffic on these bridges is significantly lower at around 9% of the interprovincial total, with the majority being medium-sized trucks. With consideration to truck size, a higher proportion of articulated trucks (90%) typically used the Macdonald-Cartier Bridge in the same period, and only 2% of articulated trucks used routes not designated as a truck route. With the re-opening of the Chaudières Crossing in 2024 to truck traffic, the proportion of truck traffic on Chaudières has begun to increase in recent months. In comparison with historical data from the last 25 years, it was noted that the daily interprovincial truck traffic has remained stable.

3.2 Main Commercial Vehicle Activity Hours

The daily distribution of truck activity based on multiple traffic counts collected between September 2019 and December 2021 are shown in Figure 5. This chart highlights that typically 85% of interprovincial truck travel occurs between 6 am and 6 pm, and that although there is some variability for different days, the general trend remains the same.

FIGURE 5 - TRUCK TRAFFIC DISTRIBUTION BY HOUR OF DAY ON INTERPROVINCIAL CROSSINGS



... truck volume on KERWN corridor connecting to the Macdonald-Cartier Bridge is typically between two to four times that of many other arterial roads in the region.

... 33% of the total truck traffic on KERWN had origins or destinations in the vicinity of the KERWN corridor.

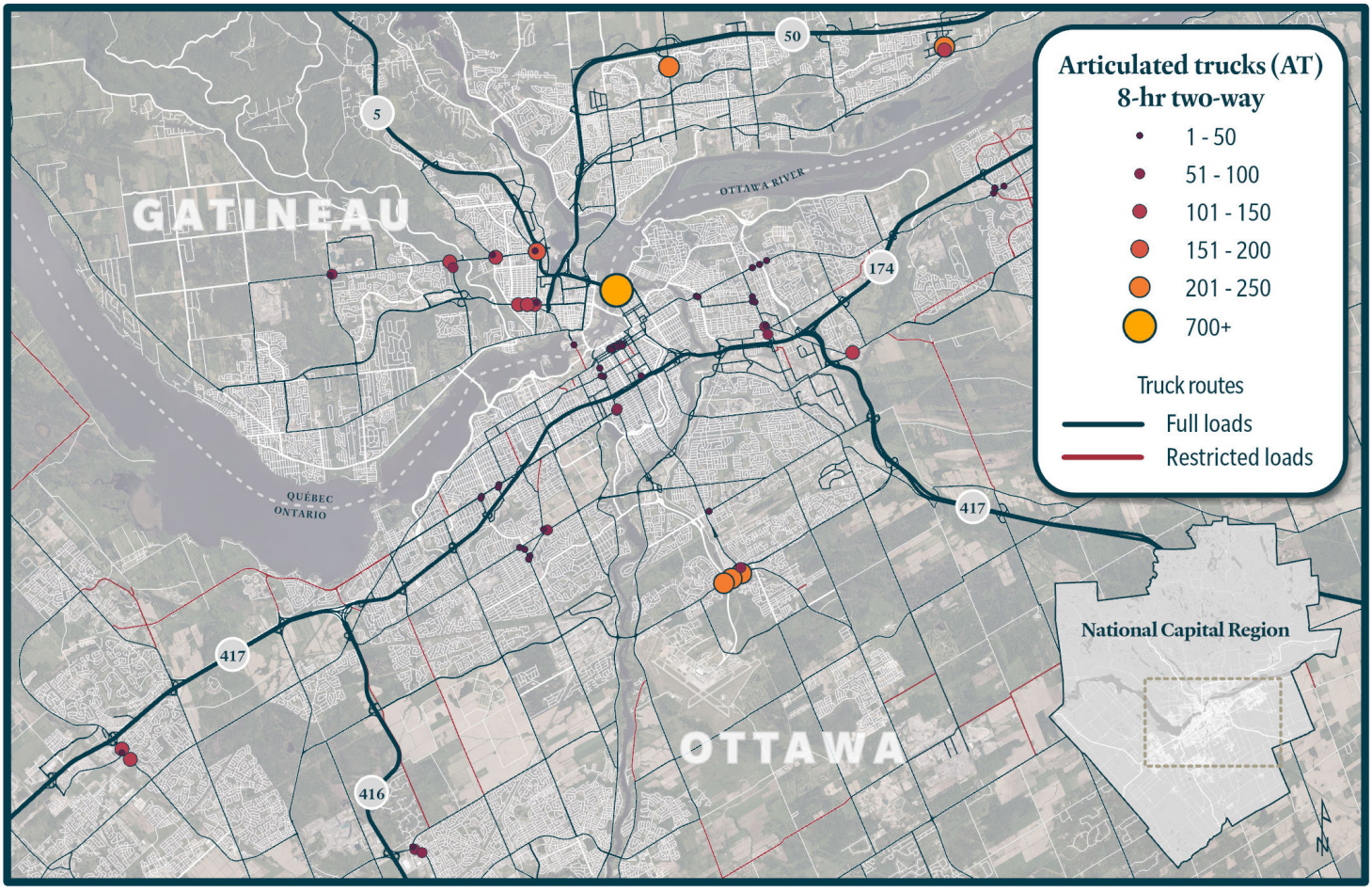
3.3 Truck Volume on KERWN

The volume of trucks on the KERWN corridor was reviewed relative to truck volumes collected on a variety of other arterial roads in the region both in the core and suburban areas. This data was collected in 2023 when the Chaudières Crossing was closed to trucks and therefore is estimated to be approximately 15% higher than observed in other years. The data, shown in Figure 6, shows the truck volume on the KERWN corridor connecting to the Macdonald-Cartier Bridge is typically between two to four times that of many other arterial roads in the region.

Even when considering a redistribution of some trucks to the Chaudières Crossing, this highlights that the challenge with KERWN is not limited to the context of a high pedestrian environment in the urban core but also that the volume of trucks exceeds what would be anticipated in many other communities in this region.

The truck traffic on KERWN was studied to isolate the local truck traffic from the regional interprovincial truck traffic. This analysis was carried out based on video data collection undertaken at both ends of the corridor in September of 2023. The results showed that 33% of the total truck volume had origins or destinations in the vicinity of the KERWN corridor.

FIGURE 6 - ARTICULATED TRUCK COUNTS OVER AN 8-HOUR PERIOD IN THE NATIONAL CAPITAL REGION 2018–2019, 2022–2023



These findings are consistent with the *2013 Interprovincial Crossings Environmental Assessment Study Truck Analysis Report*, which identified 35% local trucks based on surveys conducted in October of 2011. The results also indicated that most of the local truck trips were smaller, single-unit trucks and 87% of the articulated trucks continued through the corridor without stopping.

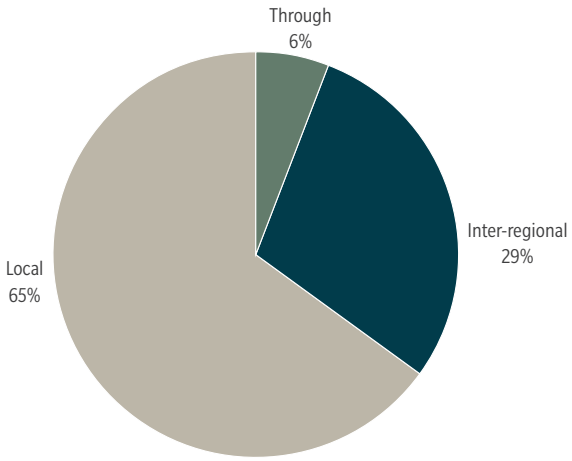
4 Origin-Destination Profile

The origin and destination data summarized in this section is generated from a combination of the roadside truck survey undertaken in 2023 and Geotab ITS aggregated GPS trajectory data.

4.1 Local and Through Travel

Consistent with the 2007 Interprovincial Roadside Truck Survey, the trips have been separated into local trips (both origins and destinations within the National Capital Region), inter-regional trips (National Capital Region to/from external districts), and through trips (those travelling between districts external to the National Capital Region). As shown in Figure 7, only **6% of interprovincial truck trips are travelling through the region while the majority (65%) are local trips to the National Capital Region.** It should be noted that estimating the proportion of local, inter-regional, and through trips using the roadside survey results appeared to overestimate local trips and underestimate longer trips due to the sampling bias introduced by the voluntary nature of the survey. The proportions extracted from the Geotab ITS database are expected to be more randomly selected and include less bias.

FIGURE 7 - LOCAL, INTER-REGIONAL AND THROUGH TRUCK TRIPS DISTRIBUTION (GEOTAB)



4.2 Travel Breakdown

The interprovincial truck trips have been summarized in Figure 8 at the TRANS district level, as shown in Appendix A.1. **All of Alta Vista, Hull Periphery, Pointe-Gatineau, Gatineau East and Hunt Club appear in the top six districts for truck origins and destinations.** This is consistent with findings from the 2007 study except for Pointe-Gatineau not being in the top six as a destination at that time.

Truck activity levels and patterns in urban areas are closely linked to the availability and geographical distribution of commercial, industrial, and institutional activities or land uses. For instance, trucks often travel from distribution centres in industrial zones to shopping centres in commercial areas. Meanwhile, in Ottawa Centre and Ottawa Inner Area, truck activity is primarily associated with the delivery of goods to businesses in the mixed-use commercial zones prevalent in these districts. Figure 9 and Appendix A.5 show a map of the National Capital Region, highlighting areas with high potential for generating truck trips on both sides of the Ottawa River, as well as the proportion of trips associated with those areas. This highlights the correlation between land use and truck activity but also illustrates that areas generating more interprovincial truck trips are typically situated closer to the existing interprovincial crossings.

FIGURE 8 - TRUCK TRIP ORIGINS AND DESTINATIONS BY TRANS DISTRICT

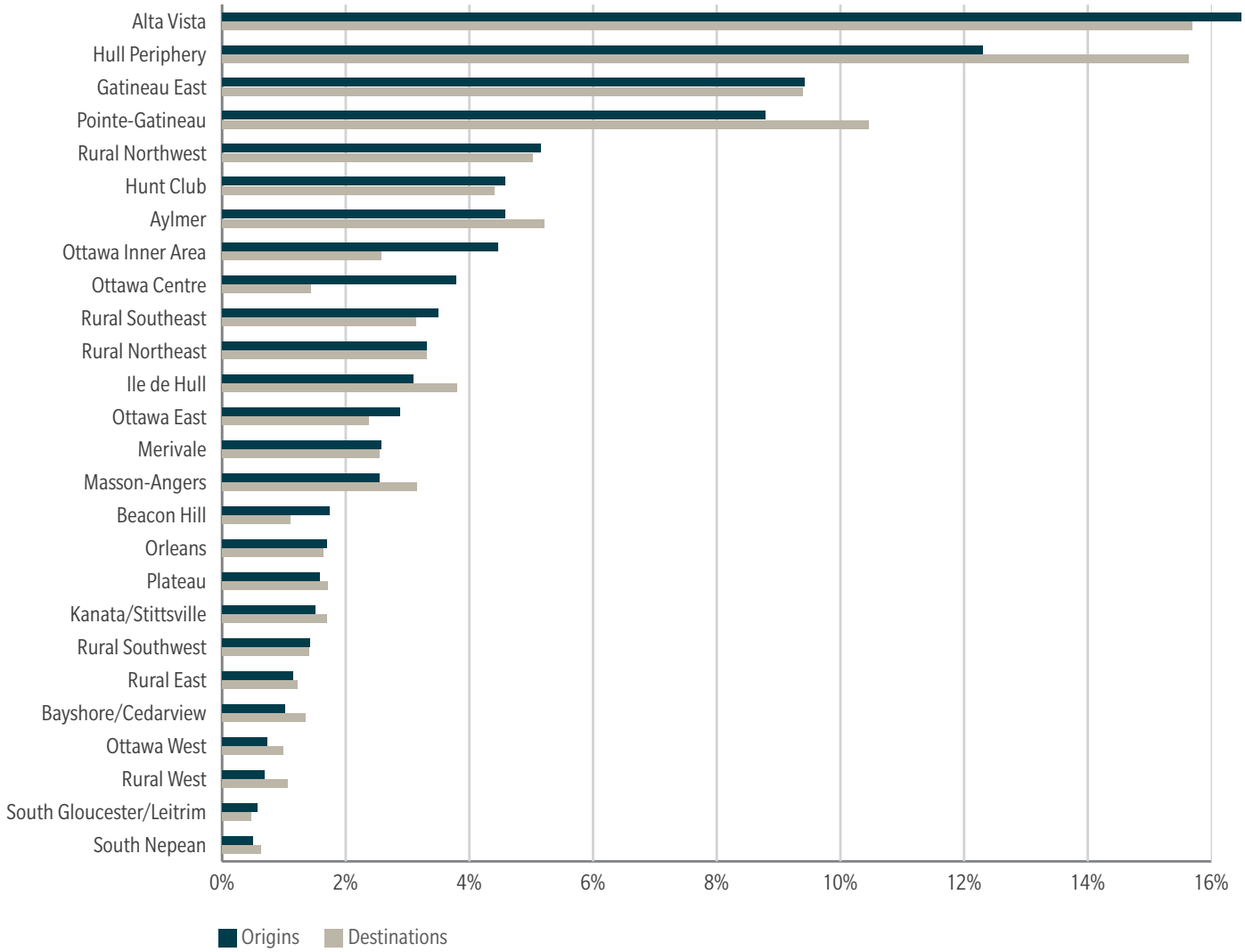


FIGURE 9 - TRUCK TRIP GENERATION - LAND USE RELATIONSHIP

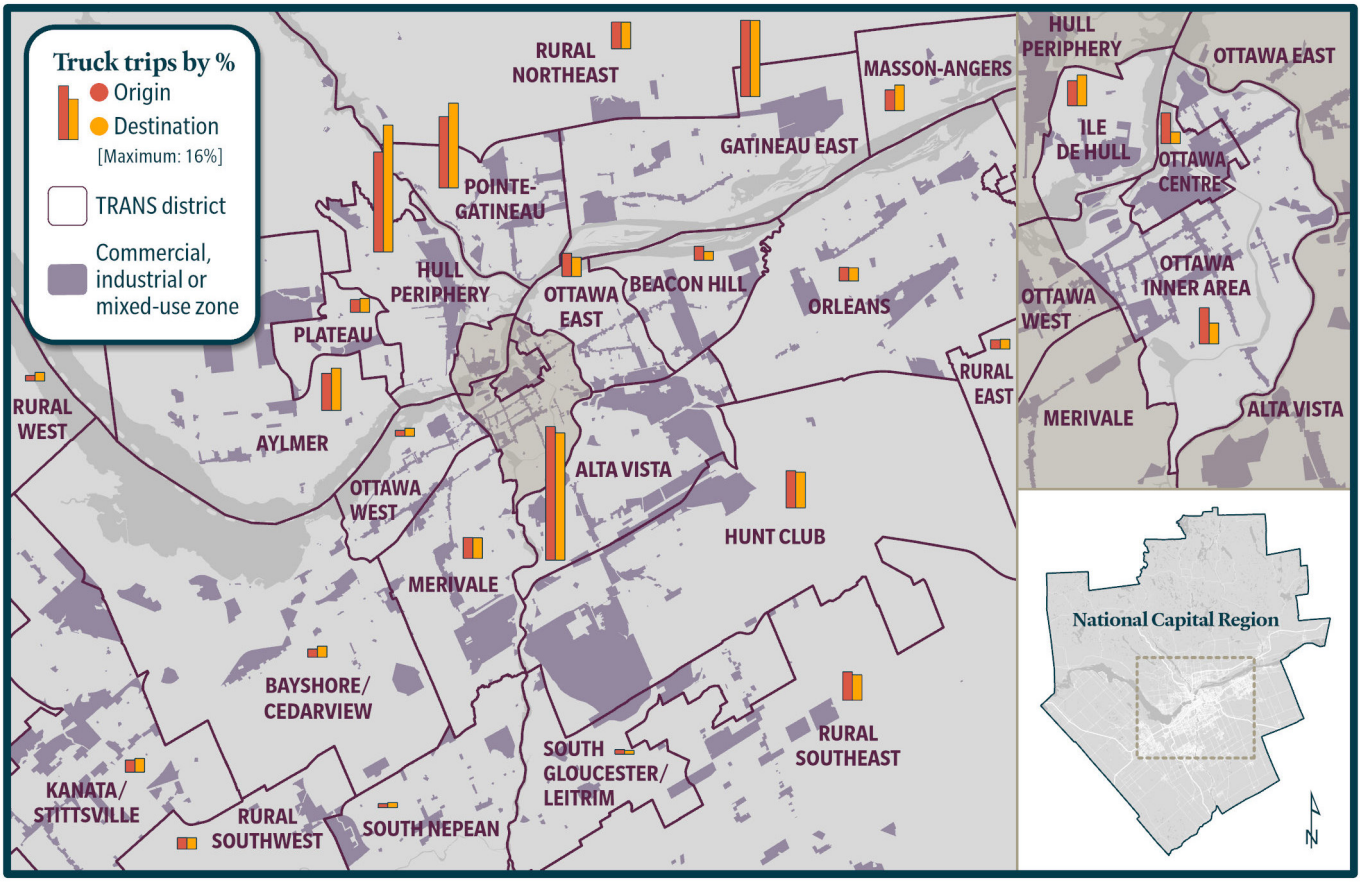
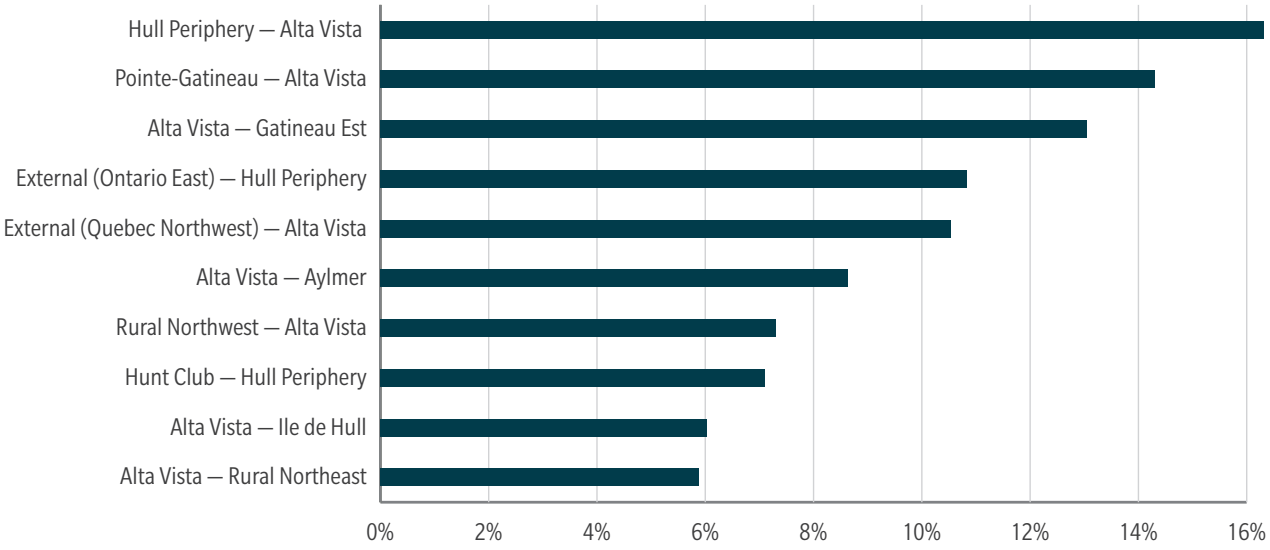


FIGURE 10 - MOST SIGNIFICANT TRUCK DESIRE LINES BY TRANS DISTRICT



With consideration to major desire lines for truck traffic (Figure 10), only Alta Vista–Hull Periphery and Gatineau East–Alta Vista were also in the top five from 2007. Based on the origin-destination data, approximately one quarter of the interprovincial truck trips start and end east of the Gatineau and Rideau rivers. Moreover, there is significant truck activity east of these two rivers, with more than 75% of the trucks either starting or ending their trips on the eastern side.

4.3 Analysis of Distance Travelled

As identified in Section 4.1, most interprovincial truck trips in the National Capital Region are local truck trips which have both an origin and destination within the region. Figure 11 shows the truck travel distances for local truck trips. **The majority (62%) of local truck trips travel between 10 and 35 km, similar to the 66% identified in 2007.** By comparison, Figure 12 shows that 60% of inter-regional or through truck trips travel between 100 and 500 km, slightly less than the 81% identified in 2007.

FIGURE 11 - DISTRIBUTION OF AVERAGE DISTANCE TRAVELLED FOR LOCAL TRUCK TRIPS

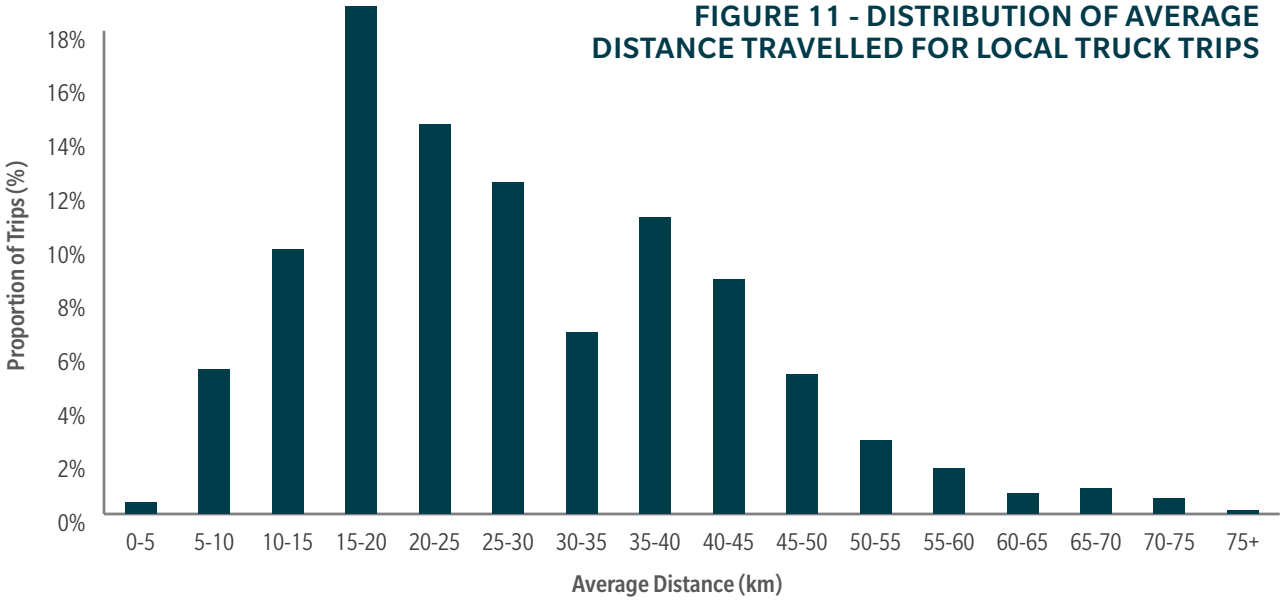
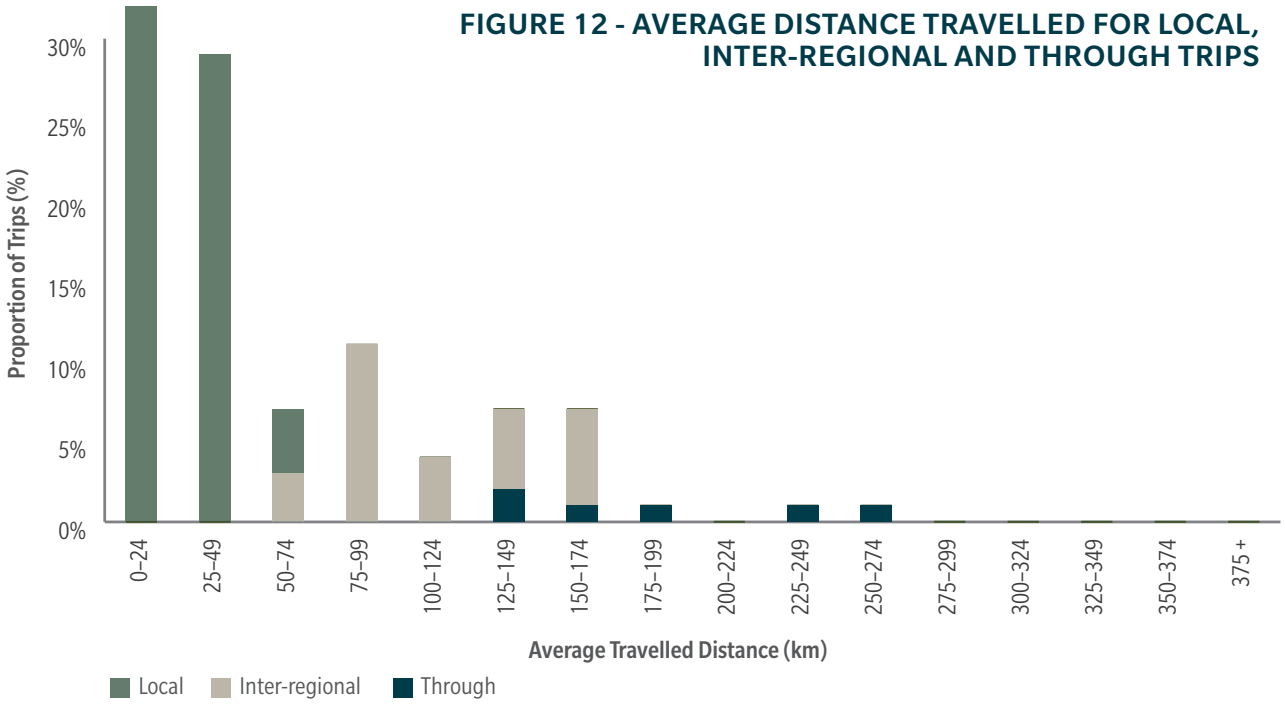


FIGURE 12 - AVERAGE DISTANCE TRAVELLED FOR LOCAL, INTER-REGIONAL AND THROUGH TRIPS



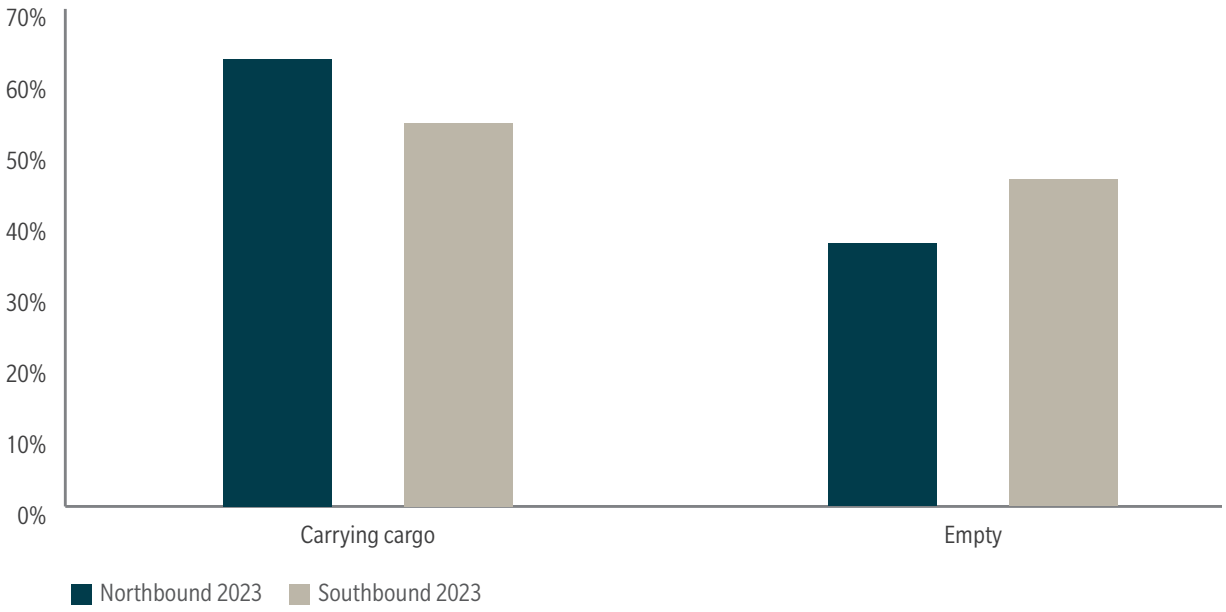
5 Types of Goods

5.1 Truck Load Analysis

As part of the roadside truck survey, drivers were asked to identify their cargo by category and availability of space. As shown in Figure 13, approximately **30% to 50% of interprovincial trucks were identified to be travelling without any cargo and designated as empty in both the southbound and northbound directions.**

This is a notable change from the 2007 Interprovincial Roadside Truck Survey, as the southbound direction carried more empty trucks than trucks carrying cargo. This change indicates a higher level of economic activity on both sides of the river, rather than the predominant pattern of trucks crossing into Gatineau, discharging cargo then returning empty. Extension of the A50 in Gatineau towards Montreal would also have influenced this balance.

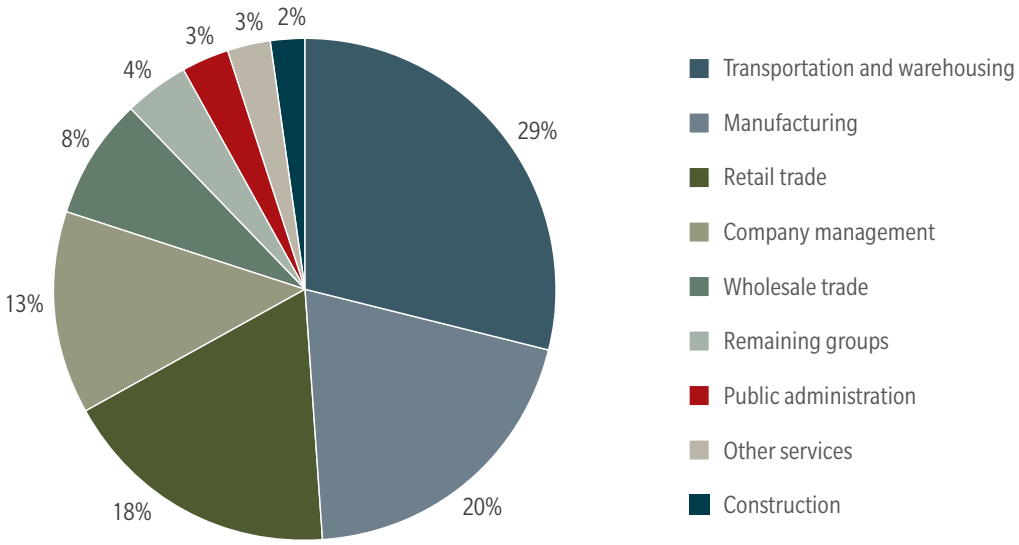
FIGURE 13 - CARGO CAPACITY OF INTERPROVINCIAL TRUCKS



5.2 Industries

Various industries and services are represented in the interprovincial trucking volumes. While there isn't enough information to categorize nearly one-third of the trucks, **the top five industries are: transportation and warehousing, manufacturing, retail trade, management of companies, and wholesale trade**, as seen in Figure 14. It should be noted that this information represents the industry distribution among the sampled group of trucks.

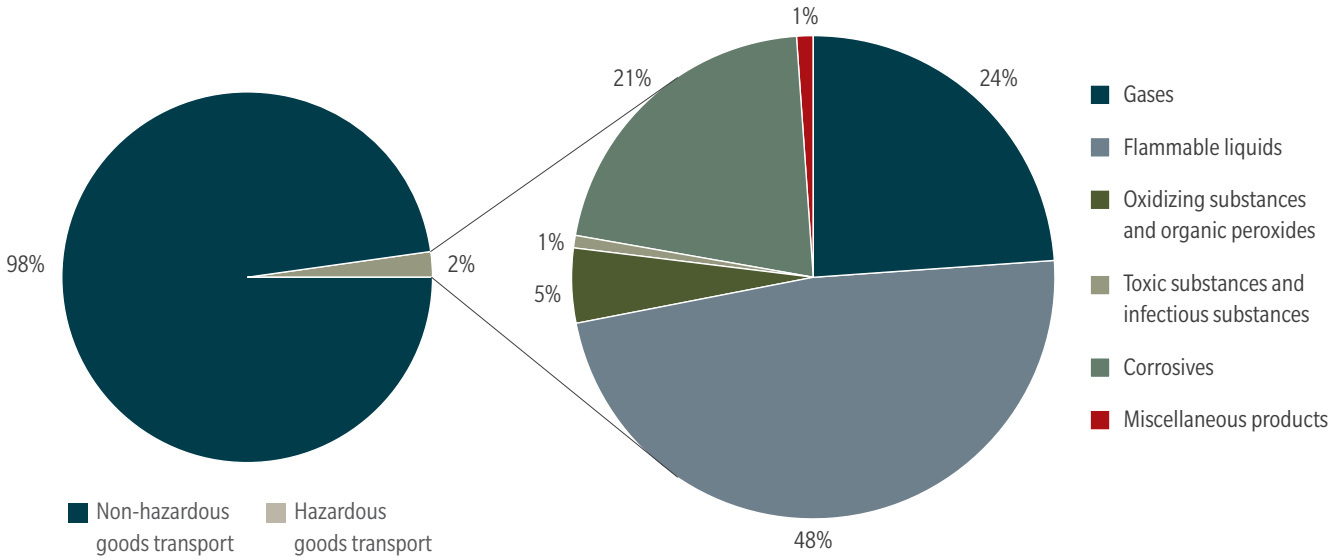
FIGURE 14 - INDUSTRIES USING INTERPROVINCIAL BRIDGES



5.3 Hazardous Materials

The video study undertaken in September of 2023 included an analysis of trucks displaying hazardous material signage. **The proportion of trucks carrying hazardous goods** was observed to range between 0% and 3% over the days that videography was taken, with an **overall average of 1.7%**. The types of hazardous goods being transported is shown in Figure 15, with nearly half being flammable liquids (e.g. gasoline, diesel, etc.).

FIGURE 15 - PROPORTION AND TYPES OF INTERPROVINCIAL HAZARDOUS MATERIALS TRANSPORT (SEPTEMBER 2023)



Conclusion

Interprovincial commercial vehicle mobility in the National Capital Region is being studied and quantified by various stakeholders through both direct and indirect methods. Acting on a short-term recommendation from the Long-Term Integrated Interprovincial Crossings Plan (LTIICP), the National Capital Commission (NCC) has begun collecting data to better understand interprovincial commercial vehicle movement and support transportation planning studies in the National Capital Region. In 2023, a new interprovincial roadside truck survey was conducted to update the data from the 2007 Interprovincial Roadside Truck Survey by TRANS. This document compiles the new survey results, GPS trajectory data from Geotab ITS, a video study, and regular interprovincial bridge counts to establish current travel patterns.

On a typical weekday, approximately 3,500 trucks cross the Ottawa River in the National Capital Region, accounting for about 2% of all interprovincial traffic. Most of these truck trips (72%) use the Macdonald-Cartier Bridge, 19% use the Chaudières Crossing, and the remaining trucks use the three other bridges that are not part of the designated truck route network.

The reliance on the Macdonald-Cartier Bridge to connect to Highway 5 in Gatineau results in the KERWN corridor accommodating 2 to 4 times more trucks than other major arterial truck routes in the region. Despite 72% of interprovincial truck trips crossing the Macdonald-Cartier Bridge and heading to or from the KERWN corridor, only 33% of those trucks have origins or destinations in its immediate vicinity.

Due to the National Capital Region's position relative to other major freight hubs like the regions of Toronto and Montreal, only 6% of interprovincial trucks travel through the region without stopping. In fact, the movement of goods between the greater regions of Montreal and Toronto generally occurs on the more direct Highway 401/Highway 20 corridor, located outside the National Capital Region. Moreover, 65% of the trips have local origins and destinations, and TRANS districts generating the most truck trips remain largely unchanged since the 2007 survey.

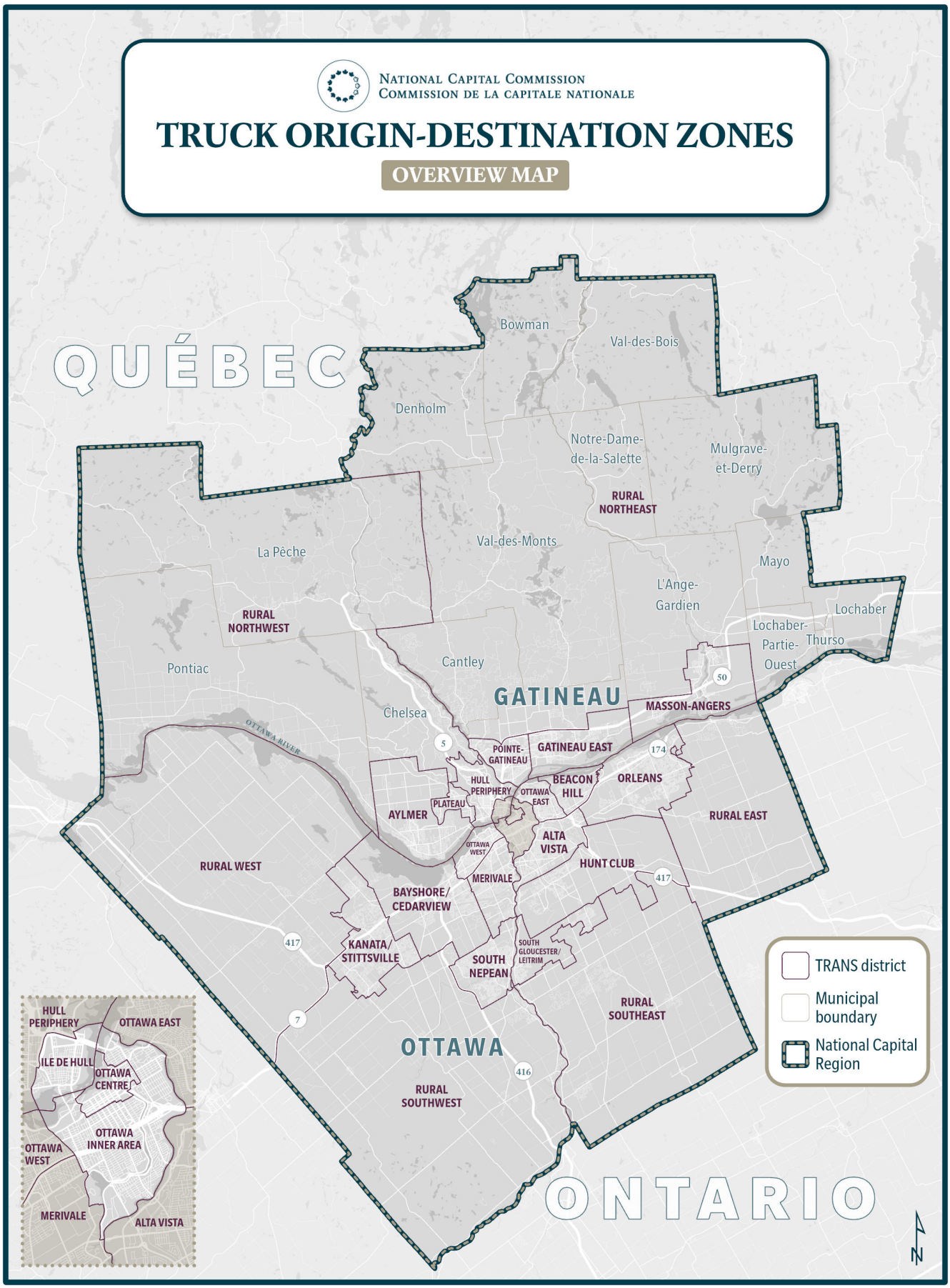
Based on the origin-destination data, approximately one quarter of the interprovincial truck trips start and end east of the Gatineau and Rideau rivers, and more than 75% of the trucks have at least one trip end (origin or destination) east of these rivers.

Trucks crossing the river carry cargo 60% of the time, a slight increase from the 2007 survey. These trucks primarily serve the logistics, manufacturing and retail trades, with less than 2% transporting hazardous goods (mainly flammable liquids and gases).

While transportation characteristics and trip-making have changed significantly since the COVID-19 pandemic, trucking volumes have been largely resistant to these changes. Most adjustments have been limited to increased use of the Macdonald-Cartier Bridge during work on the Chaudières Crossing. As logistics and e-commerce continue to expand, with new facilities emerging throughout the region, future surveys will aim to build upon these data sets.

Appendix A

Reference Maps and Definitions



A.1 – NATIONAL CAPITAL REGION GEOGRAPHY AND TRANS DISTRICTS

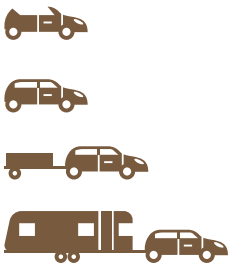
Vehicle Classes

Class 1

Motorcyles

Class 2

Passenger cars

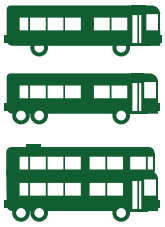


Class 3

Four tire, single unit

Class 4

Buses



Class 5

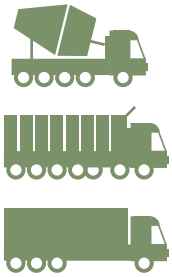
Two axle, six tire, single unit

Class 6

Three axle, single unit

Class 7

Four or more axle, single unit



Class 8

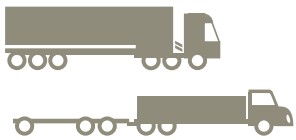
Four or less axle, single trailer

Class 9

Five axle tractor, semi-trailer

Class 10

Six or more axle, single trailer



Class 11

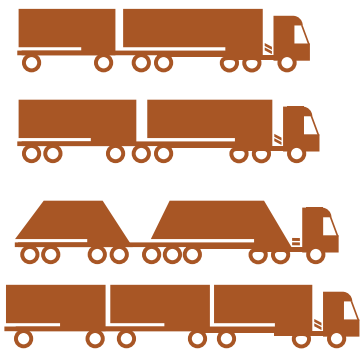
Five or less axle, multi-trailer

Class 12

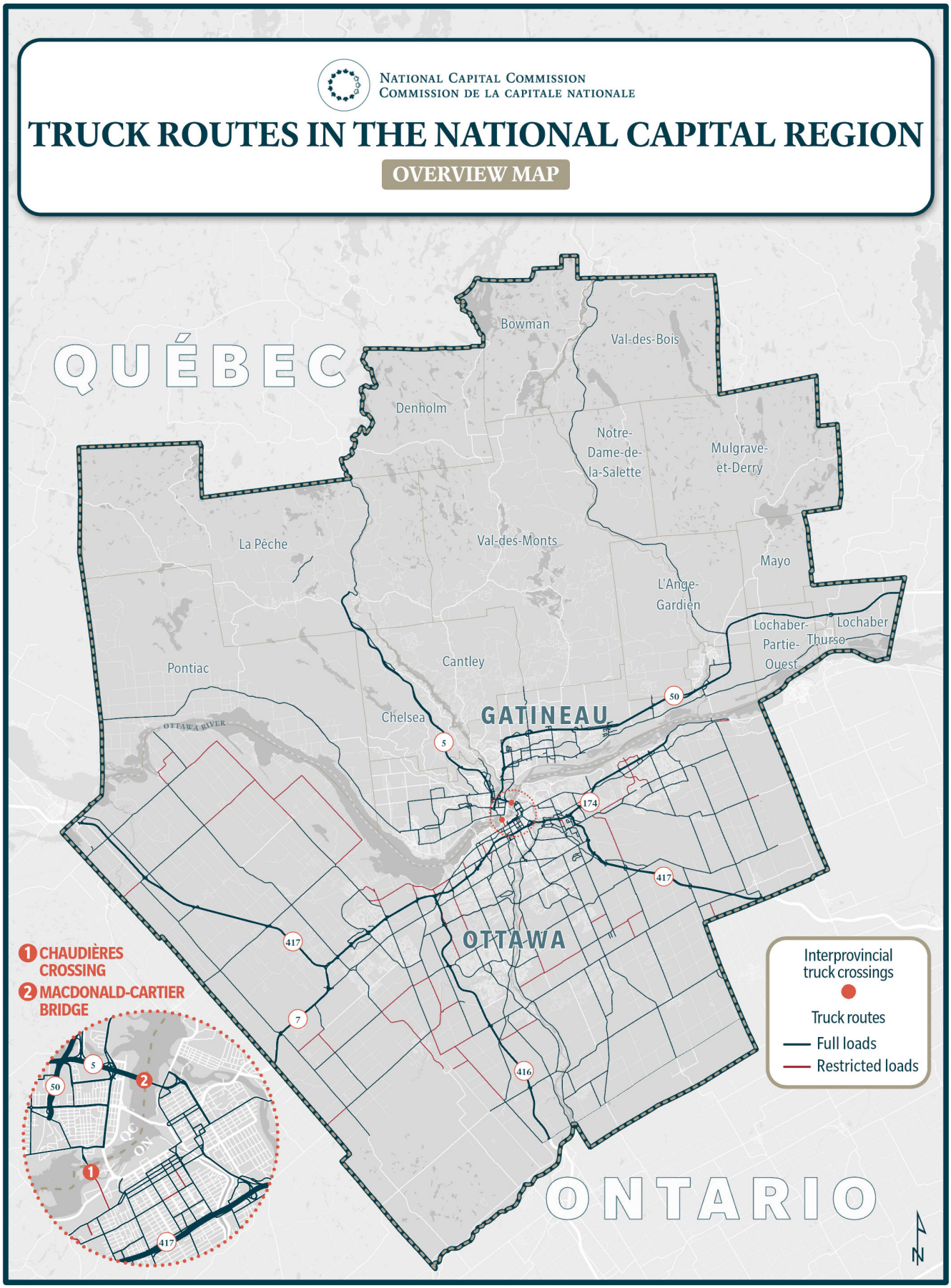
Six axle, multi-trailer

Class 13

Seven or more axle, multi-trailer

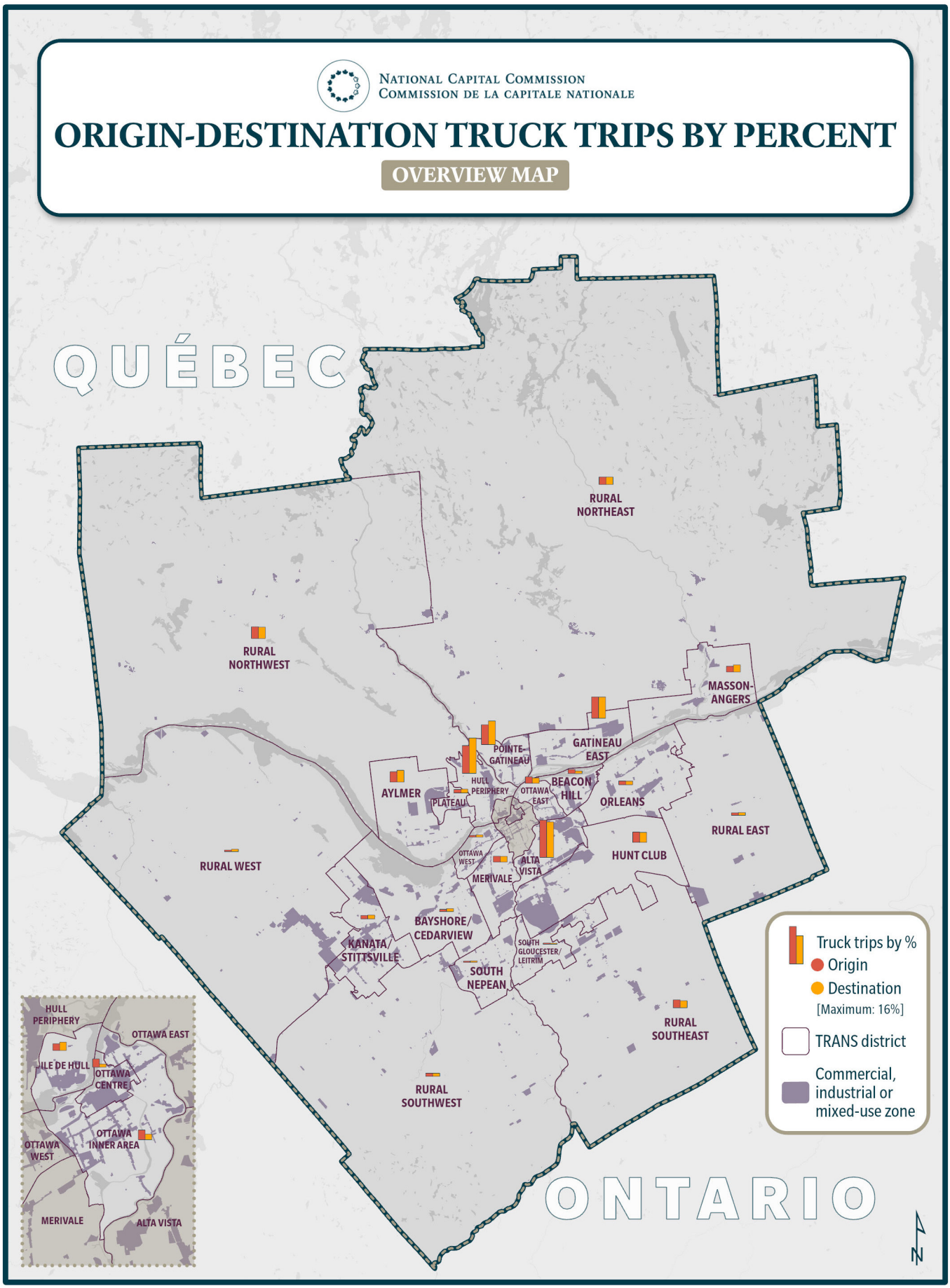


A.2 – FHWA VEHICLE CLASSIFICATION



A.3 – TRUCK ROUTES MAP

A.4 – KERWN CORRIDOR MAP



A.5 – LAND USE AND INTERPROVINCIAL TRUCK TRIPS RELATIONSHIP

National Capital Commission
Commission de la capitale nationale

Canada