Appendix B:
Review of Similar Projects and Related Studies

PARSONS

Technical Memorandum

To: File
Copy: David Hopper
From: Holly Kerslake

Date: 20 July 2016
Project: TO3188TOB

Re: Downtown Ottawa Truck Tunnel Feasibility
Review of Similar Projects in Other Cities

As identified in the task assignment for this feasibility study a review was undertaken of similar projects in other cities to compare to a potential downtown Ottawa truck tunnel. Although the initial task assignment had identified seven cities this was expanded and a total of 24 tunnel sites were selected and evaluated based on their similarly to the potential downtown Ottawa truck tunnel project.

The following tunnel projects were examined:

1. Port Miami Tunnel
2. Dublin Port Tunnel
3. Blanka Tunnel Complex (Prague)
4. Seattle Alaskan Way Viaduct Replacement Tunnel
5. Oakland Caldecott Tunnel
6. Auckland Waterview Connection Tunnel
7. Brisbane Clem Jones Tunnel
8. Calgary Airport Trail Tunnel
9. Detroit-Windsor Tunnel
10. Louis-Hippolyte Lafontaine Bridge-Tunnel
11. Robertson Tri-Met Tunnel (Portland)
12. New Portsmouth Midtown Immersed Tunnel
13. George Massey Tunnel (Vancouver)
14. Vancouver Trans-Canada Cassiar Connector Tunnel
15. Joseph-Samson Tunnel (Quebec City)
16. Palm Jumeirah Vehicular Tunnel (Dubai)
17. Ville-Marie and Viger Tunnels (Montreal)
18. Wacker Drive Chicago
19. Thorold Stone Road Tunnel
20. Dulles International Airport AeroTrain Tunnel
21. Al Salam Street Tunnel (Abu Dhabi)
22. Fraser Canyon Highway Tunnels
23. East-West Access Road (Algeria)
24. Laerdal Tunnel (Norway)

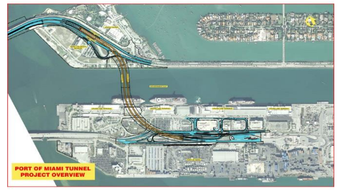
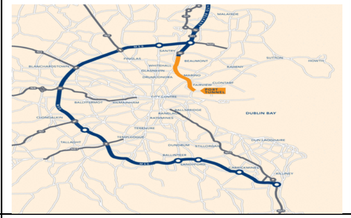
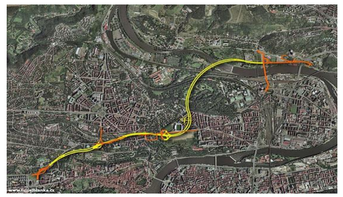
Although the task assignment identifies a preference for the evaluation of tunnels solely used for trucks, no tunnels used exclusively for trucks were found. Therefore all the tunnels examined utilize a combination of truck and vehicular traffic. However, it was individually identified how each type of vehicle is treated, as in some cases truck and vehicular traffic is managed differently.

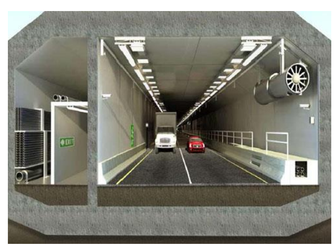
Information was primarily collected via the internet. All websites where information was collected was recorded. In the cases of the “world famous” or high profile tunnels, most information was readily available. In the cases of some of the low profile, smaller, or older tunnel projects, some of the information was not found or missing. Further investigation such as contacting local agencies would need to be completed in order to attempt to obtain the missing information, although it was not felt necessary at this time. In the cases of tunnel projects completed by Parsons (such as the East-West Access Road in Algeria), information was available through Parsons’ records.

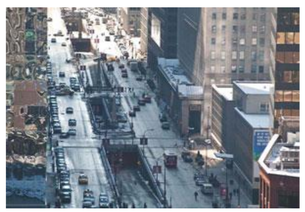
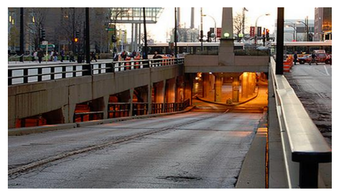
The following criteria were included in the evaluation of each of the tunnels:

Location	City and Country
Length	Length of the Tunnel in Metres
Type	Underwater or Underground (also - where available, depth of tunnel)
AADT	Annual Average Daily Traffic utilizing the Tunnel
Number of Lanes	Total Number of Lanes in the Tunnel
Date Constructed	Start Date of Tunnel Construction and Date of Tunnel Opening
Construction Costs	Total Project Cost in Canadian Dollars
Construction Method	Type of Construction Method Utilized
Problem Being Solved	Initial Issue triggering the need for a Tunnel
Community Impacts	How the tunnel has impacted the surrounding community from an economic or social perspective etc.
Tolling/Other Funding for Operating and Maintenance	Identifies what kind of tolling strategy (if any) the tunnel utilizes and for what types of vehicles this affects
Unforseen Problems	Any construction or operational issues the tunnel has experienced and why
Dangerous Goods Treatment	How vehicles/trucks carrying hazardous goods are managed
Inclusion of Vehicles Other than Trucks Permitted	What types of vehicles are permitted to use the tunnel
Success of the Tunnel	Whether the tunnel is considered a success or not and why
Other Comments	Any other interesting facts or comments found

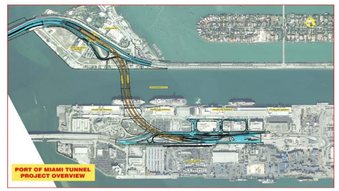
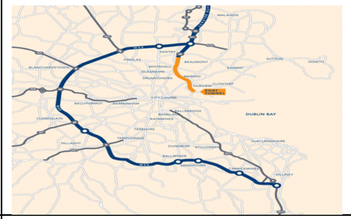
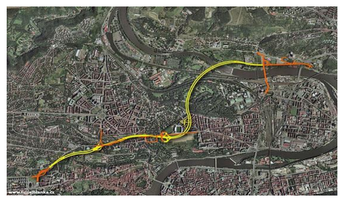
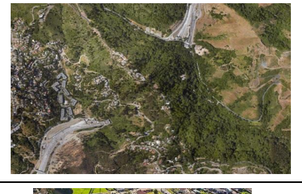
All information was researched and a table containing all relevant information was completed. Example projects were ordered based on similarity to the Downtown Ottawa Truck Tunnel proposed project and quality/quantity of information available.

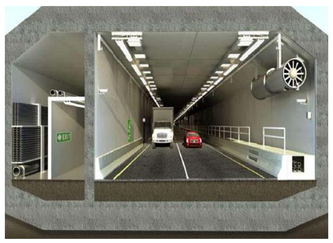
Tunnel Name	Photos		Location	Length	Type	AADT	Number of Lanes	Date Constructed	Construction Costs	Construction Method
Port Miami Tunnel			Miami, Florida, USA	1,300m	Underwater Tunnel Depth (Lowest Elevation) = ~37m	AADT = 7,000 Heavy Traffic = ~16%	4 Lanes (2 per tunnel)	Start of Construction: May 24th, 2010 Opened: August 3rd, 2014	Total Project Cost = $1 Billion (USD) [$745 Million CAD] Design and Construction Costs = $667 Million (USD)	Public-Private Partnership (PPP) 2 Tunnels constructed using a Tunnel Boring Machine (TBM)
Dublin Port Tunnel			Dublin, Ireland		Underground Tunnel Depth (Ground Level to top of Tunnel) = ~21-23m	AADT = 15,000 Heavy Traffic = ~40%	4 Lanes (2 per tunnel)	Start of Construction: June 1st, 2001 Opened: December 20th, 2006	€752 Million (Euro) [$1.1 Billion CAD] Construction Tender Costs = €448 Million (Euro)	Built in 5 Sections using 3 Methods: - Cut and Cover - Tunnel Boring - Pipe Jacking (Under existing Railway)
Blanka Tunnel Complex			Prague City, Czech Republic	6,400m (3 Tunnels)	Underground	Unknown	4 Lanes (2 in each direction)	Start of Construction: 2006 Opened: Expected Early 2015	$37 Billion (Koruna) [$2 Billion CAD] ~$1.5 Billion (USD)	Driven (mined) and Cut and Cover (divided into small sections) Geological Condtions: Generally Rock formed by Sediment (old sea bed)
Seattle Alaskan Way Viaduct Replacement Tunnel			Seattle, Washington, USA	3,200m	Underground	AADT = 110,000	4 Lanes (1 Tunnel, Stacked)	Start of Construction: July 30th, 2013 Opening: Unknown (Under Construction)	$4.25 Billion (USD) [$5.7 Billion CAD]	Single TBM (World's Largest)
Oakland Caldecott Tunnel			Oakland, California, USA	Bores 1 & 2 - 1,100m Bore 3 - 1,149m Bore 4 - 1,033m	Underground	AADT = 160,000	8 Lanes (2 per tunnel)	Start of Construction: Bores 1 & 2 - 1929 Bore 3 - 1960 Bore 4 - 2010 Opened: Bores 1 & 2 - 1937 Bore 3 - 1964 Bore 4 - 2013	Bore 4 = $417 Million (USD) [$560 Million CAD]	Bore 4 - New Austrian Tunneling Method (NATM)
Auckland Waterview Connection Tunnel			Aukland, New Zealand	2,500m Underground, 4,500m Total Length	Underground	AADT (Predicted 2026) = 83,000	6 Lanes (2 Tunnels, 3 Lanes Each)	Start of Construction: 2013 Opening: 2017	$1.7 Billion (NZD) [$1.5 Billion CAD]	Public-Private Partnership (PPP) Earth Pressure Balance TBM

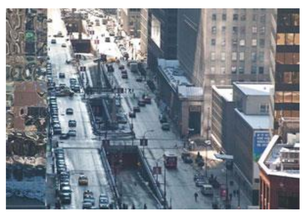
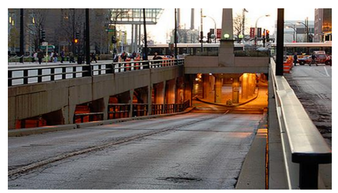
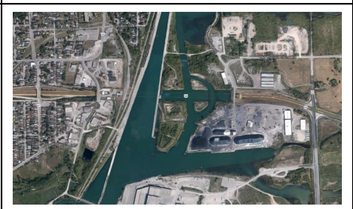
Tunnel Name	Photos		Location	Length	Type	AADT	Number of Lanes	Date Constructed	Construction Costs	Construction Method
Brisbane Clem Jones Tunnel			Brisbane, Australlia	4,800m	Underground and Underwater	AADT = 28,000 *Low due to the high cost of tolls, rated to carry ~60,000 veh/day	4 Lanes (2 per tunnel)	Star of Construction: September 2006 Opened: March 15th, 2010	$3.2 Billion (AUD) [$3.1 Billion CAD]	Public-Private Partnership (PPP) The digging was done using a boring machine.
Calgary Airport Trail Tunnel			Calgary, Alberta, Canada	620m	Underground (under Calgary Airport Runway)	AADT = Designed to accommodate 75,000	6 Lanes (3 in each direction)	Start of Construction: July 2011 Opened: May 25th, 2014	$295 Million (CAD)	Cut and cover method was used prior to the new runway expansion (tunnel was constructed before the runway).
Detroit-Windsor Tunnel			Windsor, Ontario, Canada Detroit, Michigan, USA	1,570m	Underwater Tunnel Depth (Lowest Elevation) = ~23m	AADT = 13,000	2 Lanes (1 in each direction)	Start of Construction: 1927 Opened: November 3rd, 1930	$25 Million (USD) [$33 Million CAD]	Immersed Tube (sections of steel tube floated into place and sunk into a trench dug in the river bottom).
Louis-Hippolyte Lafontaine Bridge-Tunnel			Montreal, Quebec, Canada	1,391m (Tunnel Only) Total Length = 1,800m	Underwater	AADT = 120,000	6 Lanes (2 Tunnels, 3 Lanes Each)	Start of Construction: 1963 Opened: March 11th, 1967	$75 Million (CAD)	Immersed Tube (sections of steel tube floated into place and sunk into a trench dug in the river bottom).
Robertson Tri-Met Tunnel			Portland, Oregon, USA	4710m	Underground LRT Tunnel	N/A	2 Rail Lines (1 per tunnel)	Start of Construction: June 1st, 1993 Opened: September 12th, 1998	$184 Million (USD) [$247 Million CAD]	TBM and Drilling and Blasting First mile of the west end was completed using the conventional mining technique of drilling and blasting due to the loose mixture of materials. East end construction began with a TBM.
New Portsmouth Midtown Immersed Tunnel			Portsmouth, Virginia, USA	1278m	Underwater	AADT = 46,000 (2007)	Existing = 2 Lanes (1 in each direction) New: 2 Lanes (one-way traffic) New tunnel being built adjacent to old tunnel to convert from 2 Lanes to 4 Lanes.	New Tunnel: Start of Construction: mid-2012 Opened: Planned 2017	$2.1 Billion (USD) [2.8 Billion CAD]	The river will be dredged and the tunnel will be constructed separetly on a dry dock. Each piece will then be transported to location using tugboats and dropped in the dredged canel. Once the tunnel is in final place and connected to adjacent tunnels, backfill is layered around the segment. This is repeated for all 11 tunnel segments.
George Massey Tunnel			Vancouver, British Columbia, Canada	629m	Underwater	AADT = ~80,000 (2012)	4 Lanes (2 in each direction)	Start of Construction: March 1st, 1957 Opened: May 23rd, 1959	$25 Million (CAD)	The tunnel is made up of six precast concrete segments. Sections were floated into postion then sunk into a shallow trench that had been dug into the river bed. The trench and tunnel were then covered by a protective layer of rock.

Tunnel Name	Photos		Location	Length	Type	AADT	Number of Lanes	Date Constructed	Construction Costs	Construction Method
Vancouver Trans-Canada Cassiar Connector Tunnel			Vancouver, British Columbia, Canada	724m	Underground	Unknown	6 Lanes (3 per tunnel) Originally opened with 4 Lanes but was designed to accommodate 6 Lanes total (was expanded ~2005).	Start of Construction: Unknown Opened: January 12th, 1992	$115 Million (CAD)	Cut and Cover
Joseph-Samson Tunnel			Quebec City, Quebec, Canada	280m	Underground	Unknown	3 Lanes (dynamic lane reversal technology)	Unknown	Unknown	Unknown
Palm Jumeirah Vehicular Tunnel			Dubai, United Arab Emirates	1,398m	Underwater	Unknown Islands estimated visitors per day is 20,000.	6 Lanes (3 per direction/tunnel)	Start of Construction: 2005 Opened: 2007	$145 Million (USD) [$194 Million CAD]	Cut and Cover with Sheet-Piled Cofferdam to hold back surrounding seawater.
Ville-Marie and Viger Tunnels (Montreal A-720)			Montreal, Quebec, Canada	1,500m	Underground	A-720 AADT=~160,000	6 Lanes (3 per direction/tunnel), plus single lanes for on/off ramps.	Start of Construction: Late 1960's Opened: 1974	Unknown	Cut and Cover
Wacker Drive Chicago			Chicago, Illinois, USA	3500m	Double-decked Highway	AADT = 65,000 Pedestrians = 60,000/day	Upper Deck: 6 Lanes (with Parking - 3 in each direction) Lower Deck: 4 Lanes (2 in each direction)	Start of Construction: ~1909 Opened: 1926 East Extensions: - 1963 - 1975 - 1986-1987 - 2001-2002 (reconst.) - 2010 (reconst.)	$8 Million (USD, 1926) $200 Million (USD) 2001-2002 redesign and reconstruction between Michigan Ave and Randolph St.	2001-2002 Upper Deck Reconstruction: Cast-in-place system, flat-slab, longitudinally post-tensioned, reinforced, high-performance concrete.
Thorold Stone Road Tunnel			Thorold, Ontario, Canada	840m	Underwater Runs under the Welland Canal (near boat locks)	Unknown	4 Lanes (2 per tunnel)	Start of Construction: 1965 Opened: 1967	Unknown	The Canal section of the tunnel was poured during the winter months when the tunnel was drained in order to minimize impacts on shipping. Concrete sections in the shape of tubes were poured in a trench to create the tunnel. During the summer months, each end of the tunnel was constructed.

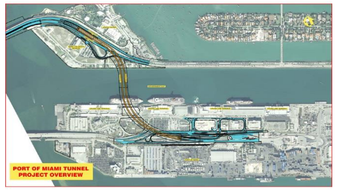
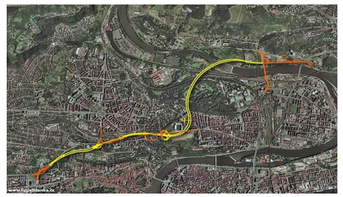
Tunnel Name	Photos		Location	Length	Type	AADT	Number of Lanes	Date Constructed	Construction Costs	Construction Method
Dulles International Airport AeroTrain Tunnel			Dulles Airport, Virginia, USA	6,080m	Underground People Mover	N/A	2 People Mover Lines (1 per tunnel)	Start of Construction: 2004 Opened: January 26th, 2010	$2 Billion (USD) [$2.7 Billion CAD]	Cut and Cover: for sections adjacent to existing infrastructure TBM or NATM: for sections under taxiways and concourses
Al Salam Street Tunnel (renamed Sheikh Zayed Tunnel)			Abu Dhabi, United Arab Emirates	2,400m	Underground (Roadway)	Unknown	8 Lanes (4 per tunnel)	Start of Construction: October 2007 Opened: December 4th, 2012	$360 Million (USD) [$483 Million CAD]	Cut and Cover
Fraser Canyon Highway Tunnels (7 Total)			Fraser Canyon, British Columbia, Canada	7 Tunnels Shortest: 57m Longest: 610m	Underground	Unknown	2 Lanes (1 in each direction, 1 Tunnel)	Start of Construction: 1957 Opened: 1964	Unknown	Unknown (likely dug/blasted based on old photography)
East-West Access Road, Annaba, Algeria			Highway stretching the complete Northern border of Algeria	Total Highway Length = 1,216km 5 Tunnels	Highway/Underground	Unknown	6 Lanes	Start of Construction: 2009 Opened: August 2014	$11.2 Billion (USD) [$15.3 Billion CAD]	12 Tunnels, 70 Viaducts, 60 Interchanges Construction Method Unknown
Lærdal Tunnel			Connects the cities Bergen and Oslo in Norway	24.51km	Underground	AADT = 1,000	2 Lanes (1 in each direction, 1 Tunnel)	Start of Construction: 1995 Opened: 2000	$113.1 Million (USD) [$151.7 CAD]	Drilling and Blasting

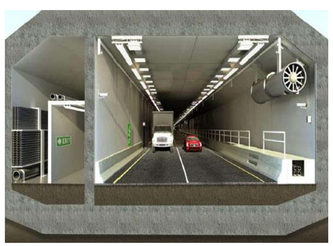
Tunnel Name	Photos		Problem Being Solved	Community Impacts	Tolling/Other Funding for Operating and Maintenance	Unforseen Problems	Dangerous Goods Treament
Port Miami Tunnel			Before the tunnel was opened, the only route for Port Miami traffic was through downtown Miami. As future plans to expand the ports capacity proceeded, there was concern on how the increased truck vehicle traffic would affect already congested downtown Miami's economy and growth. Therefore a tunnel was needed to connect Miami Port traffic directly to the MacArthur Causeway (which connects to I-95 via I-395).	The port has been losing cruise ship and cargo traffic to Port Everglades and Fort Lauderdale over the years due to the port layout and access issues. The new tunnel will help provide better access to the cruise ship and cargo ports, making them a more competetive port in the area. Also, due to the decrease in Port Traffic through downtown Miami, the ecomonic growth and expansion of the downtown core will not be hindered.	No Toll Florida Department of Transportation fully funds the tunnel operation and maintenance.	Miami Access Tunnel (contractor) requested money from a $150 Million (USD) reserve fund as there was an unexpected need to grout the limestone beneath the surface to help the TBM cut more smoothly. The FDOT denied the request for more money to the contractor.	Dangerous goods are prohibited.
Dublin Port Tunnel			To remove heavy goods trucks from the city-centre streets of Dublin as they travel to the surrounding highways from the Dublin Port.	The tunnel construction employed 5000 people.	No Tolls for all commercial vehicles above 3.5 tonnes, buses with more than 25 seats, and vehicles driven by physically disabled drivers that have been adapted for physically disabled drivers. For all other vehicles, tolling ranges from €3 to €10. This is to deter non-commercial vehicles from using this route.	During the hard-rock boring vibration caused some damage to houses in the Marino Area. A total of 241 claims were reimbursed. There was a problem with the height as many critics argued that the 4.65m height isn't enough and rather a 5.5m height would be needed in order to accommodate all sizes of trucks	Dangerous goods are Prohibited (they provide a list of restricted items).
Blanka Tunnel Complex			Relieve heavy traffic through the historic centre of Prague (congestion issues).	Unknown	Unknown	Political disputes (financial) contributed heavily to delays (almost 4 years - was originally to be completed by 2011).	Unknown
Seattle Alaskan Way Viaduct Replacement Tunnel			Replacing the SR-99 Alaskan Way Viaduct, which is a 60-year old double-deck highway that spans Seattles downtown waterfront. Due to a significant earthquake in 2001 (magnitude 6.8), the existing structure sunk several inches and needed significant repairs - which were completed. If the earthquake would have lasted a few seconds longer, engineers say the structure would have collapsed.	The improved transportation and accessibility will help create better economic and social prospects for those living in the area.	Tolled	After 3 weeks for drilling, the project was already 2 weeks behind schedule due to problems with fiberglass near the front of the drill and a labor dispute. In Dec 2013, the TBM struck a steel pipe which had been installed for exploratory drilling in the planning phase of the project. This damaged the TBM, requiring a 37m shaft to be constructed to repair the TBM. This delay lasted over 1 year.	Unknown
Oakland Caldecott Tunnel			To ease traffic congestion and end the process of manually reversing the flow of traffic twice a day along the middle bore.	Unknown	No Toll	Weather conditions can vary greatly from one end of the tunnel to the other. Weather conditions should be taken into consideration for safety reasons.	Due to the Caldecott Tunnel fire in 1982 which killed 7 people, it is illegal to transport hazardous material in a tanker truck through the tunnel except during the hours of 3:00 am and 5:00 am (light traffic times).
Auckland Waterview Connection Tunnel			The tunnels will connect the Southwestern and Northwestern Motorways to complete the Western Ring Route - a 27km long alternative Motorway around the city. In addition, the tunnels will take traffic off local roads.	205 houses had to be demolished. The New Zealand Transportation Agency is working to keep down construction noise, have minimal traffic impacts, and surpress dust and mud to keep residents happy during construction.	No Toll	Unknown	Unknown

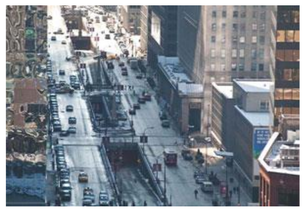
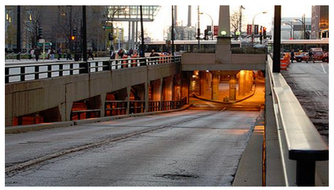
Tunnel Name	Photos		Problem Being Solved	Community Impacts	Tolling/Other Funding for Operating and Maintenance	Unforseen Problems	Dangerous Goods Treament
Brisbane Clem Jones Tunnel			Designed to help alleviate traffic congestion in the downtown core of the Brisbane (Central Business District and Fortitude Valley). Connects to the Airport Link Tunnel which connects to Brisbane Airport, reducing travel times.	Due to the high cost of tolling, only a small reduction (~5%) in vehicles on by-passed areas was observed, while during a free promotion period, a ~10-20% decrease in vehicles in by-passed areas was observed.	Tolling ranges from $1.50 to $9.90 (AUD) Utilizes an Electronic Tolling System (vehicles either use a transponder or license plate technology is implemented)	Due to the high cost of tolling, utilization of the tunnels after opening was signifcantly less than expected. Controversy over environmental hazards from construction and operations. Moreover, the expected air pollution from the ventilation stacks and their proposed locations. Issues due to difficult drilling conditions were encountered (Brisbane Tuff Rock).	Dangerous goods are prohibited. Any vehicles carrying commercial quanities of dangerous goods and specifically any vehicle displaying a dangerous goods placard are prohibited.
Calgary Airport Trail Tunnel			Improved connectivity to Calgary Airport. Built in response to the Calgary Airport Runway expansion which would intersect existing roadways/airport connections.	Improved connectivity between the community and airport. No major impacts as land was previously farm land (issues more related to the airport expansion).	No Toll	5.5 Month delay due to existing soil conditions. 6 Month delay due to electrical scope of work.	Dangerous goods are prohibited.
Detroit-Windsor Tunnel			In the early 1900's, private boats and ferries would carry passangers and freight between Canada and the USA (particularly difficult with ice in the winnter). Therefore, building a tunnel or bridge eased access between the 2 countries.	The tunnel has led to an increase in trade and ease of movement between the 2 countries.	Entering the USA there is a $4.50 (USD) Toll. Entering Canada there is a $4.75 (USD) Toll.	Unknown	All hazardours products are prohibited (oil, gas, paint, fuel) in the tunnel. The tunnel is not dedicated for commercial use.
Louis-Hippolyte Lafontaine Bridge-Tunnel			Constructed to connect the Trans-Canada Highway (was the last link). A tunnel was chosen for half the structure in order to minimize impacts on nearby port operations.	Built in time for Expo-67 which was help in Montreal in 1967.	No Toll	Unknown	Dangerous goods are prohibited.
Robertson Tri-Met Tunnel			When the MAX west line was designed, it was originally planned to run adjacent to the Sunset Highway. However, due to weather condition, public opinion, and environmental concerns, it was determined that the better alignment was a tunnel through the Tualatin Mountains.	Unknown	N/A	Due to unexpected geological conditions (loose layers of silt, gravel, balsalt etc.), the tunnel boring machine did not always work properly, contributing heavily to the project cost moving from $103.7 Million to $184 Million.	N/A
New Portsmouth Midtown Immersed Tunnel			Due to congestion issues, a second tunnel is needed to help increase capacity for east-west travel in Portsmouth across the river.	Reduced travel time and congestion for east-west travel.	Tolling began February 1, 2014 and is expected to continue until April 13, 2017 to help fund the expansion (new tunnel) project. Rates = $1-3 (USD) each way Electronic Tolling (E-Z Pass or License Plate)	Uknown	Dangerous goods are prohibited.
George Massey Tunnel			The tunnel helps to connect the City of Richmond with the Corporation of Delta. At peak rush hour periods, a reversible lane technology is used to help with congestion (dynamic arrows and swing gates).	The tunnel is part of the Vancouver to Tsawwassen Ferry bicycle route. Due to bicycle restrictions, this is argued as a major choking point on the route.	There have been no tolls since 1960.	The tunnel is reaching it's lifespan (~10 years left). The government of BC has decided to replace the tunnel with a new bridge, with construction slated to begin in 2017.	Unknown

Tunnel Name	Photos		Problem Being Solved	Community Impacts	Tolling/Other Funding for Operating and Maintenance	Unforseen Problems	Dangerous Goods Treament
Vancouver Trans-Canada Cassiar Connector Tunnel			The tunnel eliminates at-grade intersections of the Trans Canada Highway and the city street system, and improves traffic flow to and from the Second Narrows Bridge.	The tunnel has led to the removal of the last remaining traffic lights on the Trans Canada.	No Toll	Unknown	Dangerous goods are prohibited. Exceptions may occur at specified times and with written permission.
Joseph-Samson Tunnel			To connect the east side of downtown Quebec City the Riviere Saint Charles Bridge.	Unknown	No Toll	Unknown	Dangerous goods are prohibited.
Palm Jumeirah Vehicular Tunnel			A tunnel was needed in order to connect the spine of The Palm Island to the outter Crescent.	Unknown	No Toll	Unknown	Hazardous loads are not restricted in the tunnel. However, an automatic number plate reader system is utilized which reads the hazardous warning plate on a vehicle when it enters and leaves the tunnel. This system helps emergency services determine what type of emergency they are responding too if an accident was to occur in one of the tunnels.
Ville-Marie and Viger Tunnels (Montreal A-720)			To create a fast and effective way to move through the downtown core of Montreal.	Unknown	No Tolls	On July 31st, 2011 part of the interior roof collapsed. The tunnel was closed for repairs until August 6th, 2011.	Dangerous goods are prohibited.
Wacker Drive Chicago			Originally, the highway was built to help beautify the city and relieve congestion. The highway was built to replace South Water and River Street. Extension were built in later years to extend the highway to the east.	Unknown	No Toll		Unknown
Thorold Stone Road Tunnel			Highway 58 had to be continued so this tunnel was constructed underneath the Welland Canal.	Unknown	No Tolls	During construction, the concrete was poured during the winter months of the year. This has led to over-expansion of the concrete, resulting in some cracking. Extensive work has been done to correct this issue during the summer months of the year, which has had impacts on traffic flow and congestion.	Unknown

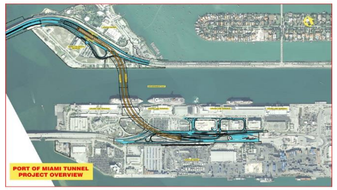
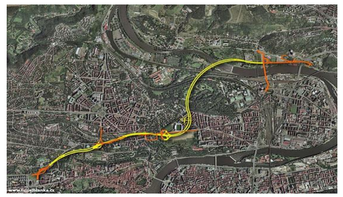
Tunnel Name	Photos		Problem Being Solved	Community Impacts	Tolling/Other Funding for Operating and Maintenance	Unforseen Problems	Dangerous Goods Treament
Dulles International Airport AeroTrain Tunnel			The system was built to replace "mobile lounges" (buses) which moved passengers from the Concourse to the Terminal.	Unknown	N/A		N/A
Al Salam Street Tunnel (renamed Sheikh Zayed Tunnel)			Al Salam Street is the main street in Abu Dhabi Which connects the downtown business sector with the 2 main bridges to the city. Adding a tunnel under the main road helps with congestion and reducing travel times along the corridor.	Unknown	No Toll	Unknown	Dangerous goods are prohibited.
Fraser Canyon Highway Tunnels (7 Total)			To complete the Trans Canada Highway (Highway 1)	Unknown Very rural area.	No Toll	Unknown	Unknown
East-West Access Road, Annaba, Algeria			The project will help reduce travel times and provide better and safer access to the north side of the country, helping to stimulate economic development.	Construction generated over 100,000 jobs.	Tolled. Cost Unknown.	Unknown	Unknown
Lærdal Tunnel			Due to harsh winters, highways and ferries between the two cities could not remain open during the winter. The tunnel provides all-season access between the two cities.	Unknown	No Tolls	Unknown	Unknown

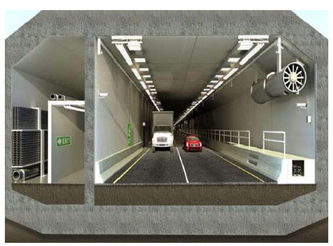
Tunnel Name	Photos		Inclusion of Vehicles Other than Trucks Permitted	Success of the Tunnel	Other Comments
Port Miami Tunnel			Trucks use right lane and cars/other use left lane. Pedestrians and cyclists are prohibited from the tunnel.	The project coincides with other projects which will increase port traffic such as the Port of Miami Deep Dredge Project and Panama Canal Expansion. Much public speculation that the project was unnecessary and a waste of tax payer dollars.	Very similar purpose/problem being resolved to the King Edwards Truck Tunnel in Ottawa.
Dublin Port Tunnel			Tolls for all non-truck/bus traffic to deter other vehicles from using the tunnel.	The tunnel did in the end remove trucks from the streets of Dublin but many problems were encountered during construction including water leaks, cost overruns, height controversy, and house damage.	
Blanka Tunnel Complex			Unknown	Tunnel is still under construction.	Located a few hundred metres from the protected area of Prague Castle.
Seattle Alaskan Way Viaduct Replacement Tunnel			All types of vehicles permitted.	Tunnel is still under construction.	Utilizes the World's Largest Tunnel Boring Machine.
Oakland Caldecott Tunnel			All types of vehicles permitted. Pedestrians and cyclists are prohibited from the tunnel.	Unknown	All four bores cross the Hayward Fault Zone
Auckland Waterview Connection Tunnel			Unknown	Tunnel is still under construction.	10th Largest Tunnel Boring Machine Ever Built.

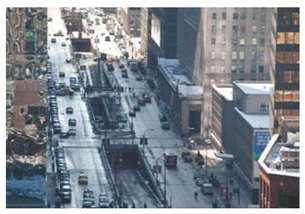
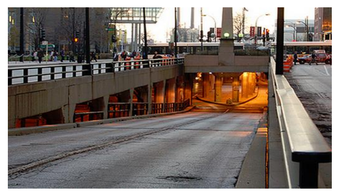
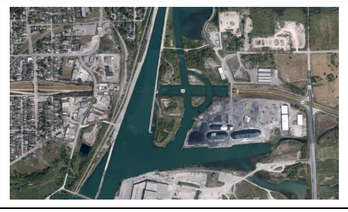
Tunnel Name	Photos		Inclusion of Vehicles Other than Trucks Permitted	Success of the Tunnel	Other Comments
Brisbane Clem Jones Tunnel			Any vehicles are permitted except the following: - Vehicles and loads exceeding 4.6m high - Vehicles carrying commercial quantities of dangerous goods and specifically any vehicle displaying a dangerous goods placard - Mopeds - Tractors - Bicycles	Due to the high toll costs and inherent low demand for the tunnel, the bridge has not been as successful as planned due to extremely low usage. Tunnel was sold in 2013 to Queensland Motorways for $618 Million (AUD), well below the cost of $3.1 Billion (AUD) to build it.	Very similar situation to Hwy 407 in Toronto, Ontario, Canada
Calgary Airport Trail Tunnel			All types of vehicles permitted.	Unknown	
Detroit-Windsor Tunnel			Motorcyles are prohibited in the tunnel. About 13,000 vehicles travel throught he tunnel daily, 98% of them are cars.	Unknown	
Louis-Hippolyte Lafontaine Bridge-Tunnel			All types of vehicles permitted. Pedestrians and cyclists are prohibited from the tunnel.	Unknown	
Robertson Tri-Met Tunnel			N/A	Unknown	The tunnel is constructed through 16 million year old basalt layers - therefore the tunnel curves up/down and side to side in order to follow the best rock construction conditions.
New Portsmouth Midtown Immersed Tunnel			All types of vehicles permitted. Pedestrians and cyclists are prohibited from the tunnel.	Tunnel is still under construction.	
George Massey Tunnel			The tunnel is illegal for cyclists or pedestrians to traverse. Shuttle buses operate to provide access through the tunnel for pedestrians and cyclists (the tunnel is part of the Tsawwassen Ferry Bicycle Route).	Successful. However, 50 years later it does have traffic congestion issues.	The Geroge Massey Tunnel was the first tunnel to use a precast construction method (precast concrete sections) in North America.

Tunnel Name	Photos		Inclusion of Vehicles Other than Trucks Permitted	Success of the Tunnel	Other Comments
Vancouver Trans-Canada Cassiar Connector Tunnel			All types of vehicles permitted. No pedestrians are permitted.	Unknown	
Joseph-Samson Tunnel			All types of vehicles permitted. Pedestrians and cyclists are prohibited from the tunnel.	Unknown	
Palm Jumeirah Vehicular Tunnel			All types of vehicles permitted. Pedestrians and Bicycles are prohibited from the tunnel.	Unknown	Third tunnel in the world to be equiped with Traficon's Incident Detection System (includes: traffic incident detection and flow monitoring, traffic data collection, and pedestrian detection).
Ville-Marie and Viger Tunnels (Montreal A-720)			All types of vehicles permitted.	Unknown	
Wacker Drive Chicago			Unknown	Unknown	
Thorold Stone Road Tunnel			All types of vehicles permitted. There is a walkway in the westbound side for pedestrians.	Unknown	

Tunnel Name	Photos		Inclusion of Vehicles Other than Trucks Permitted	Success of the Tunnel	Other Comments
Dulles International Airport AeroTrain Tunnel			People Mover (AeroTrain)	Unknown	
Al Salam Street Tunnel (renamed Sheikh Zayed Tunnel)			All types of vehicles under 5.5m and under 2.5 tonnes are permitted. Pedestrians and cyclists are prohibited from the tunnel. Cameras are used to detect vehicle height and detect when a vehicle taller than 5.5m has entered the tunnel.	Unknown	
Fraser Canyon Highway Tunnels (7 Total)			All types of vehicles permitted. Cyclists are also permitted.	Unknown	Two of the tunnels having warning lights which cyclists activate prior to entering the tunnel to notify motorists (due to winding road conditions).
East-West Access Road, Annaba, Algeria			Unknown	Uknown	
Lærdal Tunnel			All types of vehicles permitted. Pedestrians and cyclists are prohibited from the tunnel. Tunnel is very rural.	Unknown	Longest Road Tunnel in the World Tunnel is divided into 4 segments: seperated by large mountain caves. The main tunnel utilizes white lights while the caves are different colours to beak routine. They also help with claustrophobia.

Tunnel Name	Photos		Web LINKS
Port Miami Tunnel			http://www.portofmmiamitunnel.com http://en.wikipedia.org/wiki/Port_Miami_Tunnel
Dublin Port Tunnel			http://dublintunnel.ie/about/ http://en.wikipedia.org/wiki/Dublin_Port_Tunnel http://www.engineersjournal.ie/operations-dublin-tunnel/ http://dublintunnel.ie/hauliers/23_6_2008_Dangerous_Goods_Regs.pdf
Blanka Tunnel Complex			http://www.radio.cz/en/section/curraffrs/massive-blanka-tunnel-has-been-completed-after-years-of-delays http://www.ctta.org/FileUpload/ita/2007/Pdf/CH-178.pdf http://www.satra.cz/en/blanka-tunnel-complex/ http://en.wikipedia.org/wiki/Blanka_tunnel_complex http://www.ita-aites.cz/en/podzemni_stavby/podzemni_stavby_ve_vystavbe/blanka-complex-tunnels-prague.html
Seattle Alaskan Way Viaduct Replacement Tunnel			http://www.wsdot.wa.gov/Projects/Viaduct/About/Tunneling http://en.wikipedia.org/wiki/Alaskan_Way_Viaduct_replacement_tunnel http://www.worldfinance.com/infrastructure-investment/alaskan-way-viaduct-replacement-to-reshape-seattles-future
Oakland Caldecott Tunnel			http://en.wikipedia.org/wiki/Caldecott_Tunnel http://www.caldecott-tunnel.org/
Auckland Waterview Connection Tunnel			http://www.nzta.govt.nz/projects/waterviewconnection/ http://en.wikipedia.org/wiki/Waterview_Connection

Tunnel Name	Photos		Web LINKS
Brisbane Clem Jones Tunnel			http://www.clem7.com.au/content/22338/Working-With-Our-Community http://en.wikipedia.org/wiki/Clem_Jones_Tunnel#Poor_patronage http://www.brisbane.qld.gov.au/traffic-transport/roads-infrastructure-bikeways/tunnels-bridges-transport-links/clem7-tunnel http://www.smh.com.au/business/turning-3b-into-618m-brisbanes-failed-clem7-tunnel-sold-off-20130927-2uihw.html
Calgary Airport Trail Tunnel			http://en.wikipedia.org/wiki/Calgary_International_Airport http://www.calgary.ca/Transportation/TI/Pages/Road-projects/Airport-Trail-Tunnel.aspx http://conf.tac-atc.ca/english/annualconference/tac2013/session10/lin.pdf http://www.pcl.com/projects-that-inspire/pages/airport-trail-underpass.aspx
Detroit-Windsor Tunnel			http://en.wikipedia.org/wiki/Detroit%E2%80%93Windsor_Tunnel http://www.dwtunnel.com/AboutUs.aspx# http://projects.windsorpubliclibrary.com/digi/fleetway/histo.php?lang=en&story=1
Louis-Hippolyte Lafontaine Bridge-Tunnel			http://en.wikipedia.org/wiki/Louis-Hippolyte_Lafontaine_Bridge%E2%80%93Tunnel http://www.montrealroads.com/crossings/lafontaine/ http://www.trucknews.com/features/quebec-to-harmonize-dangerous-goods-regulations/
Robertson Tri-Met Tunnel			http://en.wikipedia.org/wiki/Robertson_Tunnel http://conferences.wsu.edu/forms/bridgeinspectors/presentations13/8a.pdf
New Portsmouth Midtown Immersed Tunnel			http://www.fhwa.dot.gov/ipd/project_profiles/va_midtown_tunnel.aspx https://www.driveert.com/construction/midtown-tunnel/ http://en.wikipedia.org/wiki/Midtown_Tunnel_(Virginia) http://www.tunneltalk.com/Midtown-Tunnel-Dec11-PPP-contract-awarded.php http://www.roadstothefuture.com/Mid_Tunn_Port_Norf_MLK.html https://www.driveert.com/faq/ http://www.dmvnow.com/webdoc/pdf/dmv109.pdf
George Massey Tunnel			http://en.wikipedia.org/wiki/George_Massey_Tunnel#Configuration http://www2.news.gov.bc.ca/news_releases_2013-2017/2013PREM0095-001430.pdf http://engage.gov.bc.ca/masseytunnel/

Tunnel Name	Photos		Web LINKS
Vancouver Trans-Canada Cassiar Connector Tunnel			https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=8&ved=0CD4QFjAH&url=http%3A%2F%2Fwww.tunnelcanada.ca%2Fdocument-load.php%3Fdir%3D1994%26file%3DBruce_et_al_1994.pdf&ei=VKX4VN6bL5alyAS6hoCQAQ&usg=AFQjCNEdndSmvvPiCZFLpi7FBw-SHAurqg&sig2=rP-iZfilrpx_ZhniYW3ypA&bvm=bv.87519884,d.aWw&cad=rja http://en.wikipedia.org/wiki/Cassiar_Tunnel http://www.quickscribe.bc.ca/secure/pdfs/3232.pdf
Joseph-Samson Tunnel			http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=1&file=5021.PDF http://www.nyx-hemera.com/en/projects/item/45-tunnel-joseph-samson-in-quebec-city-canada
Palm Jumeirah Vehicular Tunnel			http://www.parsons.com/projects/Pages/palm-jumeirah-vehicular-tunnel.aspx http://www.designbuild-network.com/projects/palm-jumeirah/ http://www.worldhighways.com/categories/road-highway-structures/features/keeping-tunnels-safe/
Ville-Marie and Viger Tunnels (Montreal A-720)			http://structurae.net/structures/ville-marie-tunnel http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=%2F%2FC_24_2%2FC24_2R43_A.htm http://en.wikipedia.org/wiki/Quebec_Autoroute_720 http://www.montrealroads.com/roads/A-720/
Wacker Drive Chicago			http://en.wikipedia.org/wiki/Multilevel_streets_in_Chicago http://en.wikipedia.org/wiki/Wacker_Drive
Thorold Stone Road Tunnel			http://www.niagarafrontier.com/chrono.html http://en.wikipedia.org/wiki/Thorold_Tunnel http://en.wikipedia.org/wiki/Ontario_Highway_58

Tunnel Name	Photos		Web LINKS
Dulles International Airport AeroTrain Tunnel			http://www.metwashairports.com/file/aerotrain_paper.pdf
Al Salam Street Tunnel (renamed Sheikh Zayed Tunnel)			http://www.parsons.com/Media%20Library/Parsons-in-MENA.pdf http://www.louisberger-france.com/en/news-and-events/76-ouverture-du-tunnel-de-la-rue-al-salam-abu-dhabi http://www.thenational.ae/uae/transport/abu-dhabis-sheikh-zayed-tunnel-project-wins-prestigious-award http://www.thenational.ae/news/uae-news/salam-street-tunnel-renamed-and-now-open-to-the-public http://www.louisbergergroup.com/OurProjects/Middle%20East/Sheikh%20Zayed%20Street
Fraser Canyon Highway Tunnels (7 Total)			http://en.wikipedia.org/wiki/Fraser_Canyon#Tunnels http://www.th.gov.bc.ca/publications/frontiertofreeway/frontiertofreeway.pdf
East-West Access Road, Annaba, Algeria			http://www.cetmo.org/pdf/0.3.Physical%20State%20Trans-Maghreb%20Motorway%20Axis_SUfM.pdf http://en.wikipedia.org/wiki/Algeria_East%E2%80%93West_Highway
Lærdal Tunnel			http://en.wikipedia.org/wiki/L%C3%A6rdal_Tunnel http://basementgeographer.com/laerdal-tunnel-the-worlds-longest-road-tunnel/ http://www.engineering.com/Library/ArticlesPage/tabid/85/ArticleID/60/Laerdal-Tunnel.aspx

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by Sagal Searag, Greg Maloney and Larry McKeown
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. not available for any reference period
.. not available for a specific reference period
... not applicable
0 true zero or a value rounded to zero
0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p} preliminary
^{r} revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E} use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Trucking dangerous goods in Canada, 2004 to 2012

by Sagal Searag, Greg Maloney and Larry McKeown, Environment, Energy and Transportation Statistics Division

Highlights

- The Canadian for-hire trucking industry moved 650 million tonnes of freight in 2012, of which almost 17% consisted of dangerous goods.
- In 2012, crude petroleum products accounted for the largest share of dangerous goods at over one-third (38%), up from one-quarter (25%) in 2004.
- During 2012, the for-hire trucking industry is estimated to have transported approximately four times the dangerous goods by weight than did railways.

Introduction

Recent events have heightened public awareness concerning the transportation of dangerous goods. While economic regulation of Canada's transportation sector has been reduced over the last 25 years, the movement of dangerous goods continues to be carefully regulated. Compared to other freight, shipments of explosives, gases, flammable liquids, flammable solids, oxidizing substances, poisonous and infectious substances, nuclear substances, corrosives and other products pose public safety and environmental risks.[1] The consequences of accidents or spills can be severe, particularly if shipments travel through population centres or fragile ecosystems.[2]

Regulations on the movement of dangerous goods can vary by jurisdiction but generally require accurate classification, appropriate means of containment, and correct marking, labelling and documentation. In Canada, federal legislation currently prohibits the transportation of certain high risk dangerous goods unless an Emergency Response Assistance Plan (ERAP) has been submitted and approved. The plan outlines how specialized emergency response personnel will react to an accident and their overall capacity to respond. As dangerous goods are likely to remain a significant portion of the overall freight moved across the country, there is a recognized need to further enhance the monitoring of these shipments.

For instance, in June of 2014 Transport Canada amended the *Transportation of Dangerous Goods Regulations* to clarify the criteria for displaying safety marks.[3] The regulation now requires safety marks to be displayed on trucks, rail cars and bulk containers used to transport dangerous goods, identifying the type of goods and the nature of the risk posed. And in August, Transport Canada launched the second stage of consultations concerning adequate railway third party liability insurance in order to cover, among other costs, the spill of contaminants and environmental damage related to railway operation.[4]

Surface transportation (i.e., road and rail excluding pipelines) is estimated to move almost 95% of the total tonnage of dangerous goods in Canada with trucking accounting for the largest share.[5] The possibility that accidents might occur at any time or any location

1. Dangerous goods are defined by the *Transportation of Dangerous Goods Act, 1992* as products, substances or organisms in any of these nine classes. Based on their inherent nature, these goods are further classified from Packing Group I indicating great danger to Packing Group III indicating minor danger.
2. For example, estimated costs to clean-up the 2010 spill of diluted bitumen into Michigan's Kalamazoo River basin now exceed $1-billion; De Souza, M., 2014, "The pipeline proposals feeding Harper's oil grid," *Power & Influence: The Business Issue*, Vol. 3, no. 3, Hill Times Publishing.
3. Government of Canada, 2014, *Regulations Amending the Transportation of Dangerous Goods Regulations (Part 4, Dangerous Goods Safety Marks)*, P.C. 2014-684, June 12, 2014, SOR/2014-159, *Canada Gazette*, Vol. 148, no. 14, July 2, 2014.
4. Transport Canada, 2014, *Comprehensive Review of the Third Party Liability and Compensation Regime for Rail*, TP 15242 E, www.tc.gc.ca/media/documents/policy/Discussion-Paper-Compensation-Liability.pdf (accessed September 19, 2014).
5. Provencher, M., 2010, *The Movement and Handling of Dangerous Goods in Canada for the Year 2008*, Transport Canada, Transport Dangerous Goods Directorate, Ottawa.

between the origin and destination raises questions concerning the nature of these types of shipments. To provide some perspective, this study examines the dangerous goods transported by the Canadian for-hire trucking industry from 2004 to 2012, focusing on tonnage, types of goods and average distance per shipment.

Increasing weight shipped

In 2012, the combined weight of all commodities moved by Canadian for-hire trucking establishments reached over 650 million tonnes, a record amount culminating from steady growth experienced following the 2009 economic downturn (Chart 1). A key portion of these shipments in 2012 consisted of dangerous goods at just over 107 million tonnes (17% of all goods), up from the 81 million tonnes (or 14%) trucked in 2004. This represents an increase of 32% since 2004, almost twice the rate of growth of the industry's overall shipments (17%) during this same period.

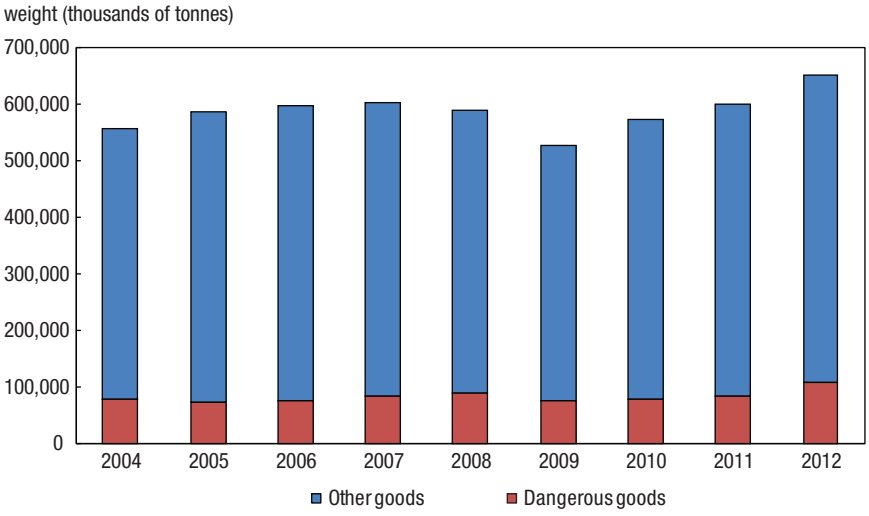
What you should know about this study

Statistics Canada's Trucking Commodity Origin and Destination Survey (TCOD) targets large (annual revenue > $1.3 million) establishments in the Canadian for-hire trucking industry (North American Industry Classification System 484). It excludes foreign-based trucking establishments operating in Canada and non-trucking establishments with their own fleets (i.e., private trucking). As such, TCOD estimates should be considered as a lower boundary of total trucking activity in Canada. For comparison, for-hire trucking establishments in the United States accounted for just 58% of dangerous goods trucked by weight in 2012, but averaged over 4.5 times the distance shipped.

Over the study period, the number of target establishments ranged roughly from 2,100 to 2,900; in 2012, 92% of 2,196 establishments responded to the survey. Statistics Canada interviewers visit each establishment and, using a systematic sample of shipping documents, record information on the origin and destination of shipments as well as the weight and type of goods. The coefficient of variation (CV) by weight was calculated at less than 5% for all types of shipments in 2012.

Commodities are classified to a Standard Classification of Transported Goods (SCTG) aggregation, which includes about 500 groups. In many cases, all commodities in a group are considered dangerous while, in other groups, some are dangerous and others are not. In the second case, an algorithm based on Transport Canada information is used to apply a flag that reflects the likelihood that the shipment includes dangerous goods. In 2012, 97% of shipments by weight flagged as dangerous goods were classified to SCTG groups in which all goods are dangerous, such as Petroleum products. In comparison, shipments of Glues and prepared glues were considered as dangerous 18% of the time.

Chart 1
Total goods trucked by type, Canada, 2004 to 2012



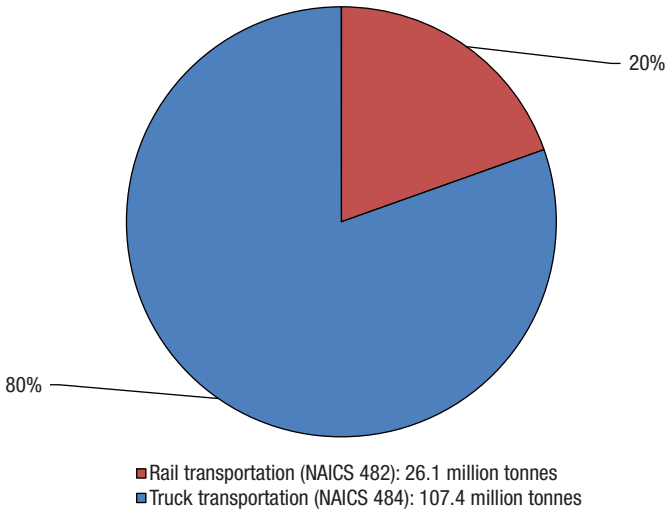
Source: Statistics Canada, Environment, Energy and Transportation Statistics Division, Trucking Commodity Origin and Destination Survey (survey number 2741), various years.

Road versus rail

Recent derailments have served to increase the level of scrutiny associated with the movement of dangerous goods by rail.[6] However, a larger tonnage of dangerous

6. See for example, Winter, J., 2014, "Safety in Numbers: Evaluating Canadian Rail Safety Data," *SPP Communiqué*, Vol. 6, no. 2, University of Calgary, The School of Public Policy.

Chart 2
Surface transportation[1] of dangerous goods in Canada, 2012



1. Excluding pipelines.
Note: NAICS: North American Industry Classification System.
Sources: Statistics Canada, Environment, Energy and Transportation Statistics Division, Trucking Commodity Origin and Destination Survey (survey number 2741) and Monthly Railway Carloadings Survey (survey number 2732), 2012.

goods is transported by truck. In 2012, the for-hire trucking industry handled approximately four times the dangerous goods by weight than did the mainline railways (Chart 2).[7] In the United States, but including private trucking carriers, about 93% of the more than 1.6 billion tons of dangerous goods transported by surface moved by truck.[8]

Despite carrying more dangerous goods by weight, the consequences of an accident by truck are limited to a small number of trailers on a per truck basis. And moreover, the average shipments by truck involve shorter distances.[9] Shipments of dangerous goods by truck and rail would be therefore more comparable on a per tonne-kilometre basis. However, it should also be noted that most accidents and spills of dangerous goods occur during handling rather than during actual transit.[10]

The top four dangerous goods

Although the top four dangerous goods trucked by weight remained the same over the study period, they accounted for almost 80% of the total by 2012, up from 71% in 2004 (Chart 3). The increase was driven largely by the trucking of crude petroleum products, which more than doubled to reach over 40 million tonnes by 2012, accounting for more than one-third (38%) of the total.

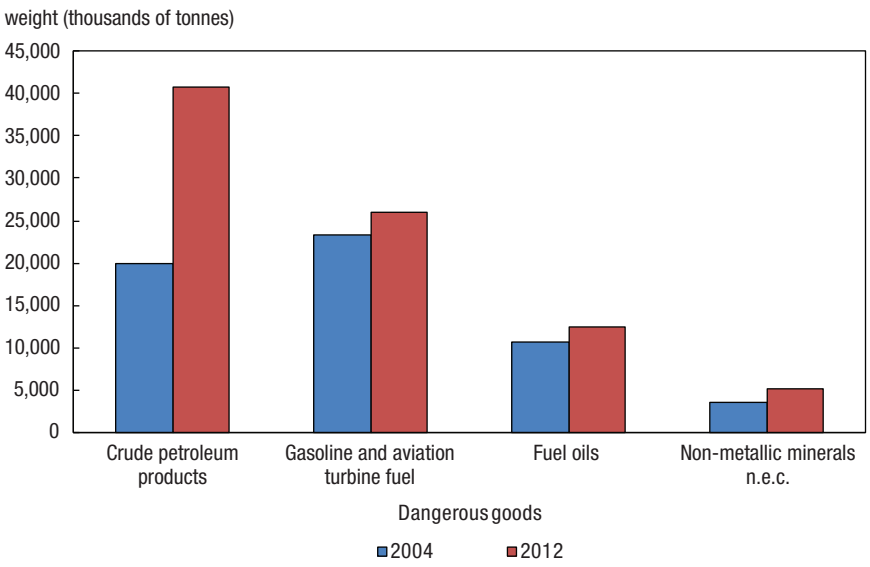
Over the same period, shipments of gasoline and aviation turbine fuel rose 11% to 26 million tonnes, while fuel oils increased 16% to 12.4 million tonnes and non-metallic minerals (such as sulphur) rose 43% to 5.2 million tonnes. Fertilizers and fertilizer materials (including nitric acid, sulphonitric acids and ammonia), the fifth largest category of dangerous goods trucked in 2012 at 2.6 million tonnes, increased by approximately 180% over the study period.

Average distance

An interesting factor is the distance that dangerous goods travel to reach their destination. From 2004 to 2012, the average distance of all shipments trucked in Canada was estimated to have increased from 608 to 632 kilometres. However, shipments of dangerous goods declined from an average of 316 to 269 kilometres. This decline reflects an increase in energy-related shipments, particularly crude petroleum products since, on average, shipments of these products travelled about one-third (35%) of the distance than did other dangerous goods (Table 1).

7. The rail proportion is estimated from the Monthly Railway Carloadings Survey based on the U.N. dangerous good designation identified by Standard Transportation Commodity Codes for revenue-generated freight moved by the two mainline freight railways only.
8. U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, U.S. Census Bureau, 2015, *Hazardous Materials, 2012 Commodity Flow Survey* (Draft, January), Washington.
9. In the United States, the average distance per hazardous material shipment by for-hire truck was 150 miles versus 808 by rail (2012 U.S. Commodity Flow Survey).
10. Provencher, M., 2010, *The Movement and Handling of Dangerous Goods in Canada for the Year 2008*, Transport Canada, Transport Dangerous Goods Directorate, Ottawa.

Chart 3
Top four dangerous goods trucked in Canada, 2004 and 2012



Source: Statistics Canada, Environment, Energy and Transportation Statistics Division, Trucking Commodity Origin and Destination Survey (survey number 2741), various years.

A shorter average distance for trucking crude petroleum products is partly tied to extraction areas in Alberta and Saskatchewan and proximity to trans-loading facilities.

For Alberta, the oil sands region in the north of the province has limited rail service and pipeline access. Consequently, heavy oil is often trucked to feeder pipelines which serve consolidation points in the Edmonton area for rail and further southeast for pipeline.[11] In 2012, shipments of crude petroleum products were trucked an average distance of 95 km in Alberta.

For Saskatchewan, although its Bakken region in the south of the province has extensive rail coverage, there has been insufficient feeder pipeline infrastructure. Although the majority of crude is shipped out of the region by rail, it must first be trucked to a rail loading facility. On average, crude petroleum products were trucked a distance of 118 km in Saskatchewan.

Table 1
Average distance trucked by type of shipment, Canada, 2012

Shipment type	kilometres
Dangerous goods	
Crude petroleum products	110
Other dangerous goods	313
Non-dangerous goods	665
All shipments	632

Source: Statistics Canada, Environment, Energy and Transportation Statistics Division, Trucking Commodity Origin and Destination Survey (survey number 2741), 2012.

Provincial perspectives

By province of origin, Alberta accounted for almost half of the national total weight of dangerous goods transported by truck in 2012 (Chart 4). The province also experienced the largest growth, increasing by over 19 million tonnes from 2004 to 2012. Again, this growth was driven largely by crude petroleum products as shipments of these products that originated in Alberta more than doubled from almost 15 million tonnes in 2004 to over 30 million tonnes by 2012.

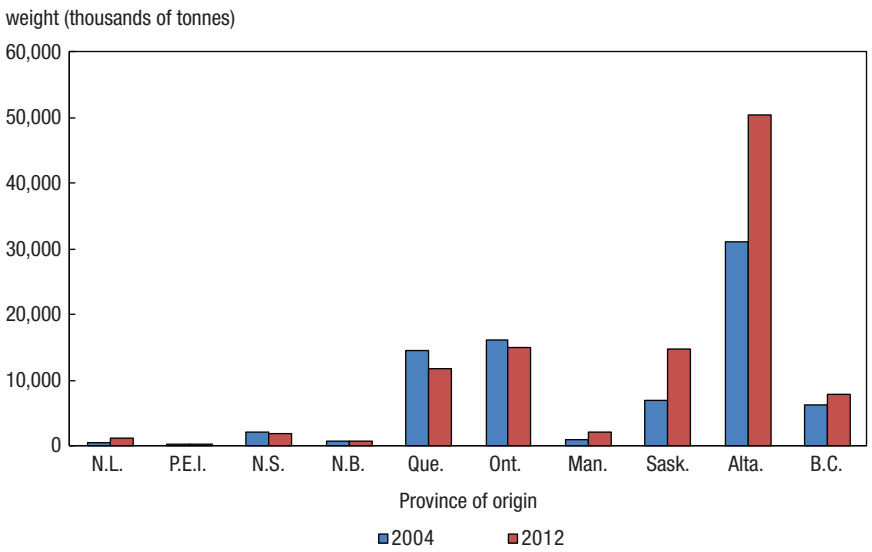
Similarly for Saskatchewan, crude petroleum products shipped by truck rose from about 5 million tonnes to over 9 million tonnes. Combined with increased shipments of gasoline and aviation turbine fuel as well as fuel oils, fertilizers and fertilizer materials, the weight of dangerous goods shipped in the province reached 14.7 million tonnes by 2012.

Over the study period, British Columbia and Manitoba experienced some growth in shipments while Ontario and Quebec both experienced a decline in the tonnage of dangerous goods transported by truck.

Although provincial patterns of dangerous goods shipped by truck will evolve, crude petroleum products in the west are likely to continue driving national estimates by weight. In Alberta for instance, total crude oil production per month

11. See Cairns, M., 2013, *Crude Oil By Rail - Parts I and II: Potential for the Movement of Alberta Oil Sands Crude Oil and Related Products by Canadian Railways*, Canadian Transportation Research Forum Proceedings (June 10 to 12, 2013), pages 412 to 433, Halifax.

Chart 4
Dangerous goods trucked by province of origin, 2004 and 2012



Source: Statistics Canada, Environment, Energy and Transportation Statistics Division, Trucking Commodity Origin and Destination Survey (survey number 2741), various years.

has risen from an average of 9.3 million cubic metres in 2010 to 12.5 million cubic metres during the first half of 2014,[12] largely from synthetic crude oil and crude bitumen extraction. And truck-to-rail delivery is now considered as a medium term alternative to access those areas not served directly by pipelines.[13]

12. Statistics Canada, CANSIM table 126-0001 (accessed October 5, 2014).
13. Ricciotti, L., 2013, "Railcars and trucks make a comeback as methods for shipping oil," *Alberta Oil Magazine*, www.albertaoilmagazine.com/2013/02/railcars-trucks-make-oil-comeback/ (accessed September 28, 2014).

TRANS

A Joint Technical Committee on Transportation Systems Planning
Un Comité technique conjoint sur la planification de systèmes de transport

1999/2000 INTERPROVINCIAL ROADSIDE TRUCK SURVEY REPORT

ENQUÊTE ROUTIÈRE INTERPROVINCIALE SUR LE CAMIONNAGE 1999/2000 RAPPORT

McLean Transportation Engineering Consultants Ltd

Ottawa · OCTranspo · Ontario · National Capital Commission / Commission de la Capitale nationale · Transports Québec · MTO · Ville de Gatineau

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1999/2000 INTERPROVINCIAL ROADSIDE TRUCK SURVEY

REPORT

ENQUÊTE ROUTIÈRE INTERPROVINCIALE SUR LE CAMIONNAGE 1999/2000

RAPPORT

Prepared for / Préparé pour

TRANS

A Joint Technical Committee on Transportation Systems Planning /
Un Comité technique conjoint sur la planification des systèmes de transport

By / Par

McLean Transportation Engineering Consultants Ltd

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EXECUTIVE SUMMARY

Background

In the autumns of 1999 (October) and 2000 (September) surveys, co-ordinated by TRANS, were undertaken to establish a comprehensive database on interprovincial truck travel characteristics in the National Capital Region. Surveys were carried out only on the Chaudière and Macdonald-Cartier bridges as the movement of “heavy trucks” is prohibited on the remaining three bridges - the Alexandra, Portage and Champlain bridges. The roadside surveys were part of a broader national roadside survey program led by Transport Canada with participation of the provinces.

The purpose of this study was the development of "a good understanding of the interprovincial movement patterns, origins, destinations and characteristics of heavy trucks in the National Capital Region" and the satisfaction of the TRANS mandate "to furnish high quality and meaningful transportation data required for transportation planning and decision making in the National Capital Region". In this context, the study was undertaken to establish a comprehensive database of information regarding the characteristics of trucks crossing the Ottawa River and thus provide a basis for future studies and analysis. *In meeting this objective, this study does not directly address specific transportation issues but rather provides TRANS Agencies with a database for this purpose. Detailed analysis of the comprehensive data base would be necessary to assess the impact of new*

SOMMAIRE

Contexte

En octobre 1999 et en septembre 2000, une enquête, coordonnée par le groupe TRANS, a été réalisée dans le but de constituer une base de données complète au sujet du transport interprovincial de marchandises par camions qui traversent la rivière des Outaouais. L’enquête routière a été effectuée seulement sur les ponts Chaudière et Macdonald-Cartier puisqu’il est interdit aux poids lourds de circuler sur les trois autres ponts (Alexandra, Portage et Champlain). Cette enquête s’inscrivait dans un programme d’étude national dirigé par Transports Canada, en collaboration avec les provinces.

Cette étude visait à brosser un tableau de la situation en ce qui a trait aux itinéraires, aux points de départ, aux destinations et aux caractéristiques des camions, poids lourds, dans la région de la capitale nationale. Elle permettait aussi à TRANS de réunir des données pertinentes et de qualité pouvant faciliter la planification et la prise de décisions concernant le transport dans la région de la capitale nationale, conformément au mandat qui lui avait été confié. Dans ce contexte, l’enquête avait pour but de constituer une base de données exhaustive au sujet des camions qui franchissent la rivière des Outaouais, et d’établir ainsi un point de départ pour des études et des analyses ultérieures. *Compte tenu de cet objectif, le rapport ne traite directement d’aucun enjeu précis en matière de transport mais fournit aux organisms de TRANS les données*

or improved infrastructure on interprovincial truck traffic, and would be a prerequisite for reaching any meaningful conclusions regarding future interprovincial transport needs.

The database, which is available for future studies, provides significant information regarding the movement of heavy trucks across the Ottawa River, historical heavy truck trends, their composition in the traffic stream and their associated travel patterns.

Roadside driver interview surveys gathered specific data on the characteristics of the trucks, the travel patterns, including detailed information on the trip origins and destinations and the commodity/goods carried. The surveys revealed that approximately 3,450 trucks cross the Ottawa River on a daily basis. Trip characteristics were obtained from a sample of 14.3% of the vehicles and this sample was considered to be of sufficient magnitude and strength to allow expansion of the data by bridge and by certain time periods.

Truck Classification

The classification system applied three key categories of trucks (heavy trucks) as follows:

- 2 axle trucks - which represent trucks with six wheels such as tow trucks, large (3/4 ton, 1 ton) pick-up trucks, small vans, small dump trucks etc. defined as "heavy trucks";

nécessaires permettant de se pencher sur la question. Il faudrait procéder à une analyse détaillée de la base de données exhaustive afin d'évaluer les effets de la construction ou de la modernisation d'infrastructures sur le transport interprovincial par camion, analyse qui devrait être effectuée avant de pouvoir tirer de conclusions significatives sur les besoins futurs du transport interprovincial.

La base de données, qui pourra servir pour de futures études, contient des renseignements importants sur la circulation des poids lourds qui traversent la rivière des Outaouais, sur l'évolution de la situation au fil des ans, sur la place des poids lourds dans le flot de circulation et sur leurs itinéraires.

Les camionneurs interrogés ont fourni des données précises sur les caractéristiques de leurs véhicules et sur leurs itinéraires, y compris leurs points de départ et leurs destinations et la nature de leurs cargaisons. L'enquête a révélé qu'environ 3 450 camions franchissent chaque jour la rivière des Outaouais. Les caracteristiques des déplacements ont été obtenues à partir d'un échantillon de 14.3% des camions. Ceci constitue un échantillon de taille et d'importance suffisantes pour effectuer une expansion des résultats par pont et par période de la journée.

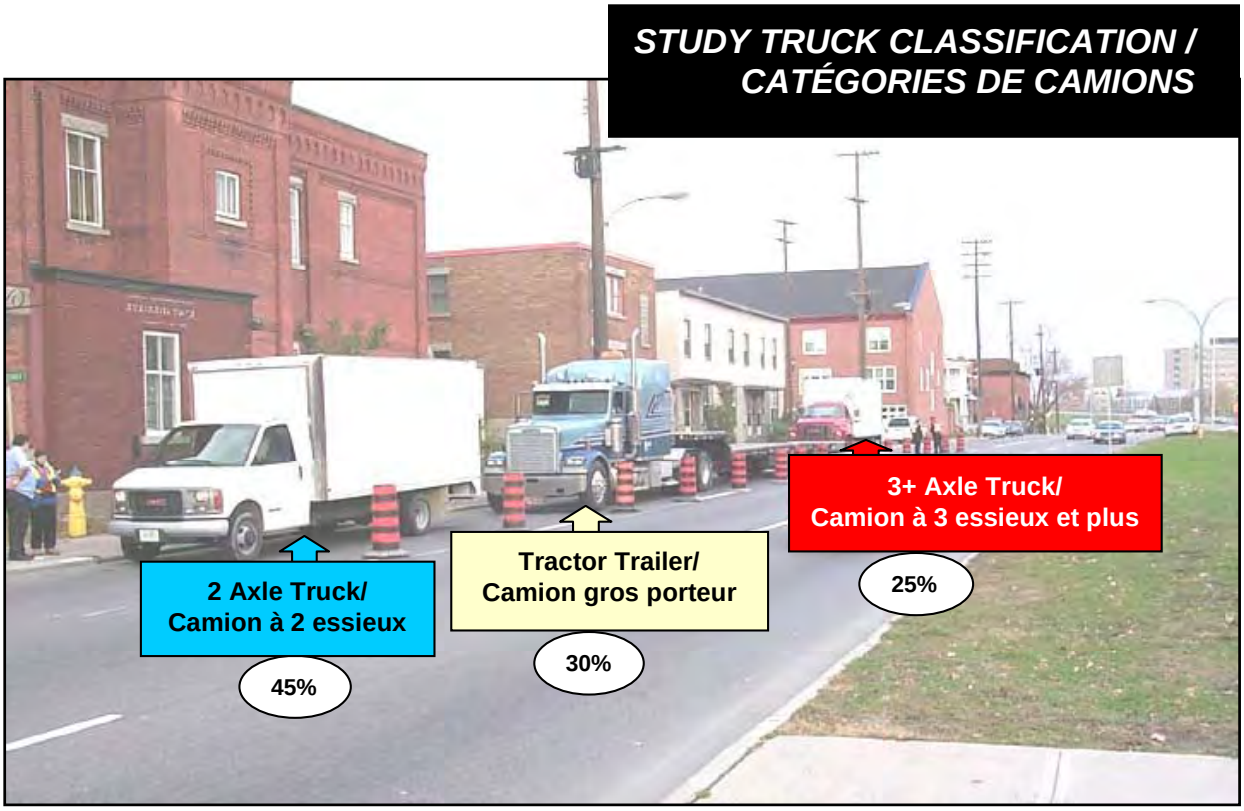
Catégories de camions

Le système de classement prévoyait trois catégories de poids lourds:

- 3+ axle trucks - which represent medium size trucks such as large dump trucks, straight trucks, concrete mix trucks etc. which are also defined as "heavy trucks";
- tractor trailer trucks - which represent the largest trucks such as tractor-trailer trucks, flat-bed trucks etc.

Of the total of approximately 3,450 trucks observed over a 24 hour period as crossing the Ottawa River, there were 1,550 2 axle (45%), 880 3+ axle (25%) and 1,020 tractor trailer (30%) trucks.

- camions à deux essieux – comprenant notamment les camions à six roues comme les dépanneuses, les grosses camionnettes de trois quarts de tonne à une tonne, les petits camions et les petits camions à benne, considérés comme des poids lourds;
- camions à trois essieux et plus – comprenant notamment les camions de taille moyenne comme les gros camions à benne, les camions porteurs et les camions malaxeurs, considérés aussi comme des poids lourds;



- camions gros porteurs – comprenant notamment les camions les plus gros, comme les semi - remorques et les camions à plate-forme.

Truck Volumes

Daily heavy truck volumes crossing the Ottawa River were, in 2000, approximately 3,450, which is 5% higher than the recorded ten year average (3,285). For comparative purposes overall traffic levels crossing the Ottawa River on all five bridges are about 200,000 vehicles per day (traffic counts undertaken in 2000 indicate an average one way volume of approximately 94,000 vehicles).

Truck movements are more predominant during the mid-day hours than in the commuter peak hours. The mid-day peaking phenomenon may be attributed to the need to meet the expectations of the business day and quite possibly trucker attempt to avoid the commuter peak periods. The tractor trailer trucks (which represented about 30% of all interprovincial truck trips) reported longer trip lengths and consequently were, as a category, responsible for approximately 50% of the total trip distance travelled by all trucks. In contrast, the 3+ axle trucks (representing 25% of the truck trips) were responsible for 20% of the distance travelled by all trucks while the 2 axle trucks (45% of interprovincial truck trips) were associated with 30% of the distance travelled by trucks.

Most truck traffic across the Ottawa River occurs between 06:00 and 21:00. Approximately 95% of the 3+ axle trucks, 93% of the 2 axle trucks and 80% of the tractor trailer crossings of the Ottawa River have occurred by 21:00. This suggests that the tractor trailer vehicles tend to be more spread out across the 24 hour period than the other two categories of trucks.

Les quelques 3 450 camions qui franchissent quotidiennement la rivière des Outaouais se répartissent comme suit: 1 550 camions à deux essieux (45%), 880 camions à trois essieux ou plus (25%) et 1 020 gros porteurs (30%).

Volumes des camions

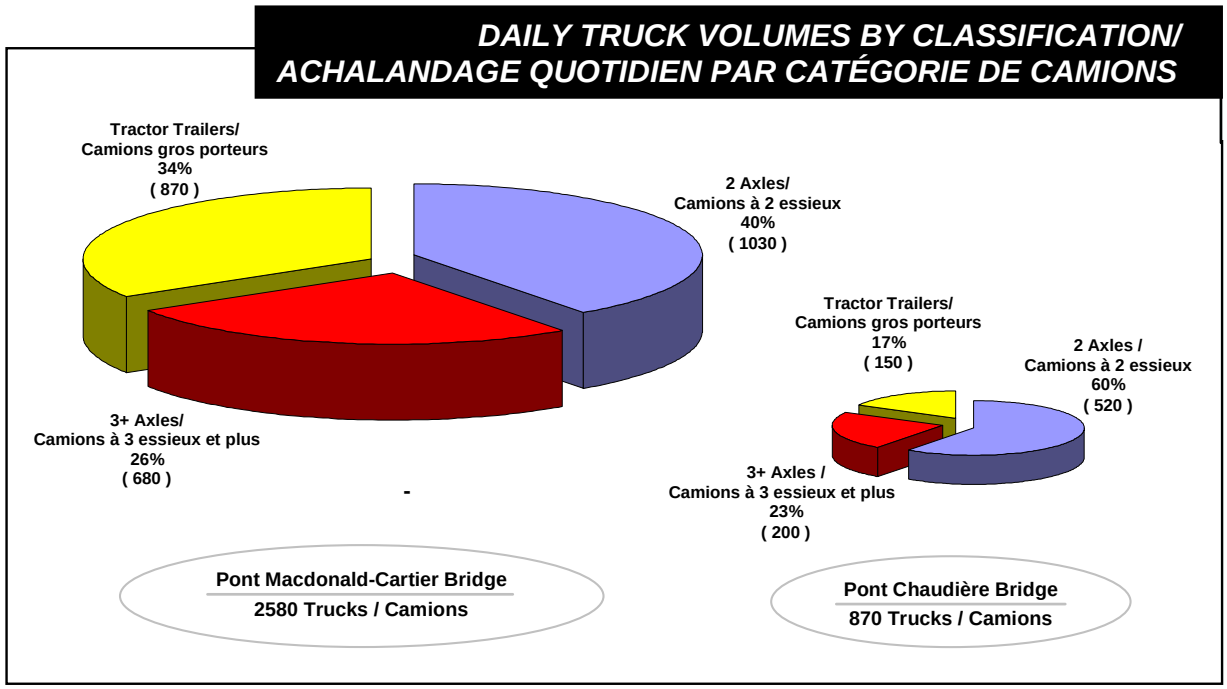
En 2000, environ 3 450 camions poids lourds franchissaient la rivière des Outaouais chaque jour, ce qui constituait une légère augmentation de 5% par rapport à la moyenne enregistrée il y a dix ans (3 285). À des fins de comparaison, au total, près de 200 000 véhicules empruntent chaque jour les cinq ponts qui enjambent la rivière des Outaouais (les relevés effectués en 2000 indiquent quelque 94 000 véhicules en moyenne dans une direction).

La circulation des camions est plus dense au milieu de la journée que pendant les heures de pointe. L'heure de pointe qui se forme ainsi en milieu de journée peut être attribuée au besoin de se conformer aux heures d'ouverture des commerces, et peut-être aussi aux efforts des camionneurs pour éviter les heures d'arrivée et de départ des navetteurs. Ce sont les gros porteurs (environ 30% des déplacements interprovinciaux de camions) qui effectuent les trajets plus longs, parcourant à eux seuls près de 50% des distances couvertes par des camions, toutes catégories confondues. Les camions à trois essieux ou plus (25% des déplacements interprovinciaux de camions) en parcourent 20% et les camions à deux essieux (45% des déplacements interprovinciaux de camions) en parcourent 30%.

The Macdonald-Cartier bridge carried a total of 2,580 trucks per day with, by far, the largest number of the tractor-trailers (870). When compared with the other two classes of trucks the tractor trailers represented about 34% of the total trucks on that bridge. On the Chaudière bridge, which carried approximately 870 trucks per day in total, the 2 axle truck is the largest vehicle class of truck (520) and dominates the composition (60%) of the truck stream.

La plupart des camions franchissent les ponts de la rivière des Outaouais entre 06h00 et 21h00. Environ 95% des camions à trois essieux ou plus, 93% de ceux à deux essieux et 80% des gros porteur les franchissent avant 21h00.

Ces statistiques portent à croire que les déplacements des gros porteurs s'échelonnent davantage sur une période de vingt-quatre heures que les deux autres catégories de camions.



Chaque jour, 2 580 camions passent sur le pont Macdonald-Cartier, dont 870 gros porteurs, ce qui représente de loin le plus grand nombre de camions. Comparativement aux deux autres catégories de camions, les gros porteurs constituent environ 34% de la circulation de camions sur ce pont. Sur le pont Chaudière, où circulent environ 870 camions par jour, ce sont les camions à deux essieux (520) qui sont les plus nombreux et qui représentent la

Travel Patterns

Local trips between the two cities on each side of the Ottawa River are understandably the largest component of travel, about two-thirds (2,300 trips) of all truck trips.

A review of the remaining trips revealed that 975 (28%) of the trucks made "inter-regional" trips (either an origin or a destination outside the National Capital area), while 175 (5%) of the trucks made a "through" trip (neither an origin nor a destination within the National Capital area).

The key characteristics of the trip patterns are:

- the dominance of the Hull district, part of the new City of Gatineau as an attractor/generator of truck trips (1,360); more than fifty percent of these truck classes are the smaller 2 axle category;
- the distribution of generated and attracted trips to/from the nine remaining "districts" varies from 400 to 930 truck trips;
- the variability of the truck classifications from “district to district” is evident; although the two eastern "districts" one on each side of the Ottawa River, which also include origins and destinations outside the National Capital area (e.g. Montreal), have a large proportion of tractor trailer trucks.

The daily distribution of trips (“all trucks”) clearly indicates the strength of the Hull district as compared with each of the other three districts (Aylmer, Gatineau West and Gatineau East) on the Québec side of the Ottawa River.

Itinéraires

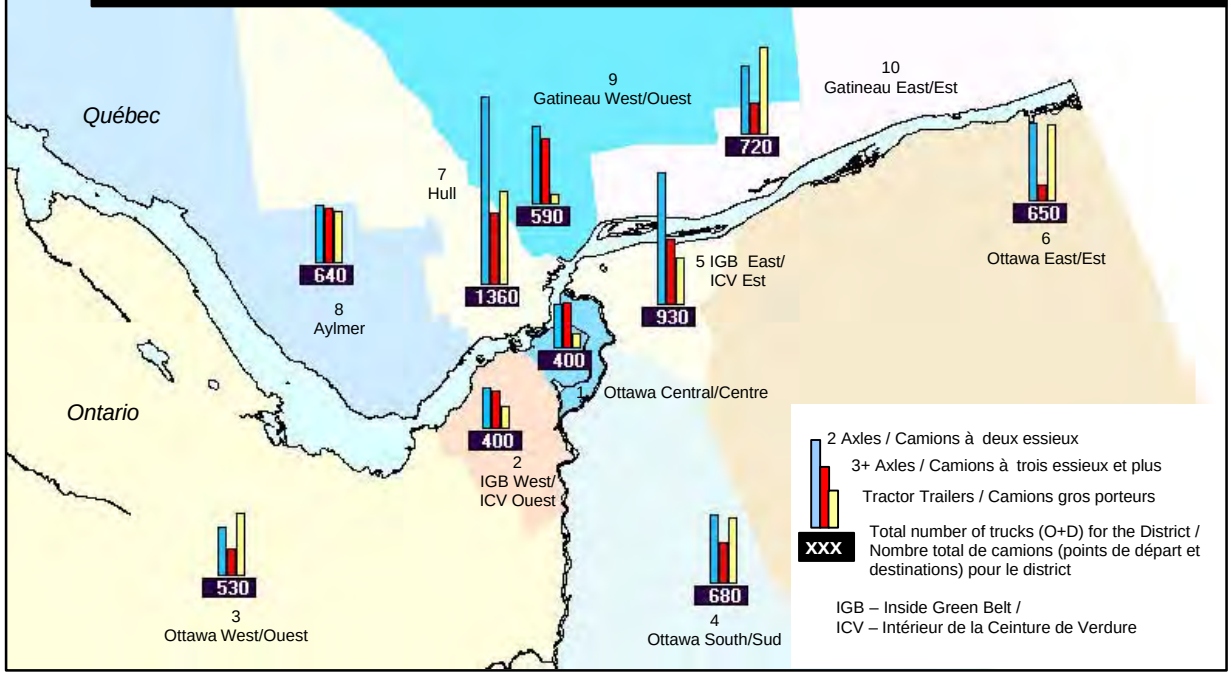
Naturellement, les deux tiers (2 300) des déplacements des camions s’effectuent entre les deux villes qui se trouvent de chaque côté de la rivière.

L’examen des autres itinéraires permet de constater que 975 camions (28%) effectuent des déplacements interrégionaux (c’est-à-dire dont le point de départ ou la destination se trouve à l’extérieur de la région de la capitale nationale-RCN) et que 175 camions (5%) ne font que traverser la région (c’est-à-dire que ni leur point de départ, ni leur destination ne se trouvent dans la RCN). Principales caractéristiques des itinéraires:

- C’est dans le district de Hull, dans la nouvelle ville de Gatineau, qu’on compte le plus grand nombre de points de départ et d’arrivée (1 360); il s’agit, dans plus de cinquante pour cent des cas, de petits camions à deux essieux.
- Dans les neuf autres districts, le nombre de points de départ et d’arrivée varie entre 400 et 930.
- La disparité des catégories de camions d’un district à l’autre est évidente; toutefois, les deux districts “Est” situés de part et d’autre de la rivière des Outaouais, qui comprennent également des points de départ et d’arrivée à l’extérieur de la région de la capitale nationale (ex. Montréal), accueillent un pourcentage élevé de gros porteurs.

La répartition des itinéraires quotidien, toutes catégories de camions confondues, montre clairement l'importance du district de Hull par rapport aux trois autres districts (Aylmer, Gatineau-Ouest et Gatineau-Est) du côté québécois de la rivière des Outaouais.

DAILY DISTRIBUTION OF ORIGINS-DESTINATIONS BY CLASSIFICATION/ RÉPARTITION QUOTIDIENNE DES POINTS DE DÉPART ET DES DESTINATIONS PAR CATÉGORIE DE CAMIONS



Commodities

The five most frequently reported commodities carried by trucks crossing the Ottawa River are:

- construction materials (475 trips)
- food and beverage (415 trips)
- general merchandise (360 trips)
- paper and paper products (310 trips)
- wood and wood products (195 trips)

Cargaison

Voici les cinq types de marchandises transportées le plus souvent par les camions qui franchissent la rivière des Outaouais:

- matériaux de construction (475 déplacements)
- aliments et boissons (415 déplacements)

While “construction materials” tops the list of goods carried, paper and wood products if taken together as a single group would become the prominent group of commodities.

The movement of various commodities across the Ottawa River was identified from the survey results and some key characteristics are:

- for construction materials, while widely distributed, an Aylmer to Ottawa Central trip pattern represented approximately 50 percent of the origins/destinations for that pairing;
- for general merchandise, a widely dispersed trip pattern was expected and no single prominent origins/ destinations pairing emerged;
- for paper/paper products, the dominant interchange of trips exists between Hull and Ottawa (both East and West) and between Gatineau East and Ottawa South;
- for wood/wood products, Aylmer and Gatineau West trips to Ottawa South stand out to the exclusion of other pairings as the primary movements for these commodities.

Most frequently reported commodities in the “Petroleum/Chemicals” category were gasoline and furnace fuel. Other notable petroleum / chemicals commodities included propane, oxygen and other gases.

Detailed information regarding the flow of commodities on each of the two bridges was collected as part of truck roadside survey. On the Macdonald-Cartier bridge, for example, the various commodities for each of 3 truck types indicate that the 1,030 2 axle trucks on

- fournitures générales (360 déplacements)
- papier et produits de papier (310 déplacements)
- bois et produits du bois (195 déplacements)

Bien que les matériaux de construction dominent cette liste, le papier et le bois formeraient la catégorie la plus importante s’ils étaient considérés comme un seul groupe.

L’étude a permis de déterminer l’itinéraire de diverses marchandises qui franchissent la rivière des Outaouais. Voici quelques-unes des caractéristiques principales:

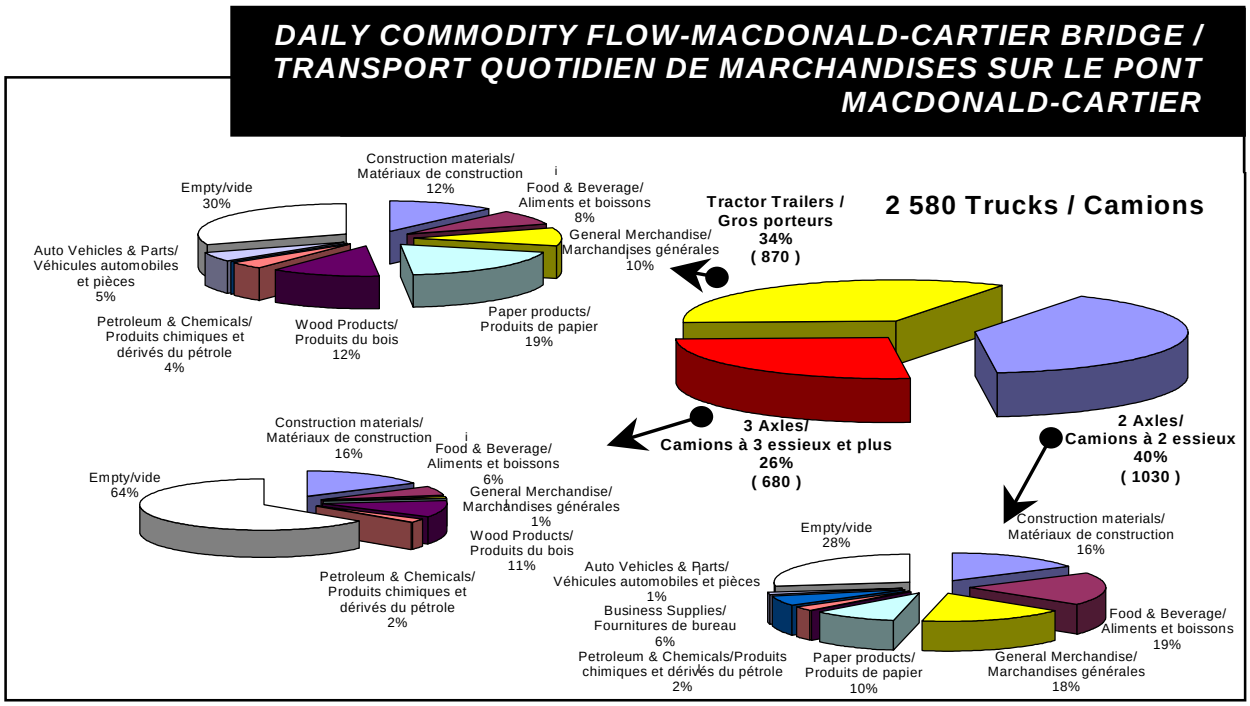
- matériaux de construction: bien que les itinéraires soient répartis sur l’ensemble de la RCN, les déplacements entre Aylmer et Ottawa-Centre représentent à eux seuls environ la moitié des trajets.
- fournitures générales: les points de départ/destinations sont très dispersées et aucun point de départ ou d’arrivée ne se distingue de façon particulière.
- papier et produits de papier: la plupart des déplacements s’effectuent entre Hull et Ottawa (tant Est que Ouest) et entre Gatineau-Est et Ottawa-Sud.
- bois et produits du bois: les déplacements s’effectuent pour la plupart d’Aylmer et de Gatineau-Ouest à destination d’Ottawa-Sud, à l’exclusion des autres districts.

Les cargaisons, le plus souvent relevées dans la catégorie “produits chimiques/dérivés du pétrole”, étaient l’essence ou combustible de chauffage. Les autres produits chimiques ou

this bridge carry mainly food and beverage (19%), general merchandise (18%) and construction materials (16%). The 680 trucks in the 3+ axle classification, carry mainly construction materials (16%) and wood products (11%), while tractor trailers (870) carry predominantly paper products (19%), wood products (12%) and construction materials (12%).

dérivés du pétrole les plus souvent présents dans les cargaisons étaient le gaz propane, l'oxygène et d'autres gaz.

Les informations detaillées concernant le flot des cargaisons sur chacun des deux ponts étaient recueillis durant l'enquête routière. Sur le pont Macdonald-Cartier, par exemple, les différentes cargaisons pour chacune des trois sortes de camions, indiquent



que 1 030 camions à 2 essieux transportent sur ce pont essentiellement l'aliment et la boisson (19%), fournitures générales (18%) et les matériaux de construction (16%). Les camions à 3 essieux et plus (680), transportent essentiellement les matériaux de construction (16%) et des produits de bois (11%). Les camions gros porteurs (870) transportent principalement des produits de papier (19%), produits de bois (12) et des matériaux de construction (12%).

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1.0 BACKGROUND

In the autumns of 1999 (October) and 2000 (September), several types of surveys, co-ordinated by TRANS, were undertaken to establish a comprehensive database on interprovincial truck travel characteristics in the National Capital Region. Surveys were carried out on the Chaudière and Macdonald-Cartier bridges as the movement of “heavy trucks” is prohibited on the remaining three bridges - the Alexandra, Portage and Champlain bridges.

The roadside surveys, which were undertaken, were part of a broader national roadside survey program led by Transport Canada with participation of the provinces.

TRANS undertook an extensive amount of work in organizing and establishing the database for this project and prepared numerous data tabulations establishing relationships among the various components of the database. Coding of the origins and destinations to the traffic zone system currently in use and applying preliminary expansion factors to some of the data were also undertaken by TRANS.

The purpose of this study was the development of "a good understanding of the interprovincial movement patterns, origins, destinations and characteristics of heavy trucks in the National Capital Region" and the satisfaction of the TRANS mandate "to furnish high quality and meaningful transportation data required for transportation planning and decision making in the National Capital Region". In this context, the study was undertaken to establish a comprehensive database of information regarding the characteristics of trucks crossing the Ottawa River and thus provide a basis for future studies and analysis. In meeting this objective, this study does not directly address specific transportation issues but rather provides TRANS Agencies with a database for this purpose. The database, which is available for future studies, provides significant information regarding the movement of heavy trucks across the Ottawa River, historical heavy truck trends, their composition in the traffic stream and their associated travel patterns.

In the establishment of the database of truck characteristics and patterns, it was relevant to investigate various relationships and rationalize them as appropriate for practical application in transportation planning activities. It was also necessary to identify and rationalize other relationships, which are valuable in transportation planning activities. These relationships are important in the background analytical work necessary to assess the impacts of a future Ottawa River crossing on the movement of goods between the two regions on each side of the Ottawa River.

Once all relationships were identified, the appropriate data tabulations were prepared and evaluated. When the findings were complete and valid, this report, which explains the process and the reliability of the findings, was prepared. The details of the work are described in this report.

The consultant acknowledges the invaluable assistance of the TRANS Agencies' staff in the establishment of the survey database as well as the ongoing assistance in preparing tabulations and the provision of advice in the preparation of this report.

2.0 STUDY METHODOLOGY

The methodology/key tasks that were involved in carrying out the project involved a collaborative effort on the part of the TRANS Agencies' staff and the consultant. The results are described in this report. The methodology included the preparation of several tabulations and graphical representations of the relationships among various elements of the data, which were collected. This culminated in the information, which was deemed to be the most useful, and the most effective means of presenting the findings from the analysis.

3.0 1989 TRUCK SURVEY

A National Capital Region Goods Movement Study, undertaken by Delcan in 1989, produced a report for TRANS in May 1991.

In the 1989 Region-wide survey, truck origin-destination characteristics were collected for the movement of goods on a Region-wide basis, including the movement of goods across the Ottawa River.

The 1989 survey differed from the 2000 survey in two key aspects:

- As part of the 1989 survey, licence plate information (characters) was recorded for 2,964 trucks. From these trucks, a sample of 700 trucks for which registry information was available was drawn to attempt to obtain trip itineraries for this sample. Complete information was obtained for 96 trucks. From the study information, it has been determined that a total of 5,955 "local" ("internal/internal"), (plus an indeterminate number of "external") truck trips was estimated as having crossed the Ottawa River. Thus, the sample of 96 trucks represented a sampling rate of approximately 1.6% of the universe of approximately (more than) 6,000 trucks. As a point of comparison, the truck survey in the autumn of 2000 obtained data on 495 trucks in a universe of 3,450 trucks (a sample size of 14.3%) observed as having crossed the Ottawa River.

- For the purposes of the 1989 survey, vehicles were classified as light trucks (2 axles/4 wheels), medium trucks (2 axles/6 wheels) and heavy trucks (single unit/3+ axles). Any registered commercial vehicle qualified as a candidate to be included in the survey. In comparing the previous survey with the current survey, the inclusion of two axle/four wheel trucks in the previous survey skewed the results considerably. Of importance is the lack of compatibility between the classification system used in the 1989 study and the classification system used in the 1999/2000 surveys. The 2 axle/4 wheel truck classification which was included in the 1989 survey is currently a much larger component of the vehicle fleet as a consequence of the increased popularity of SUVs (sport utility vehicles) and vans as a means of personal transport. The 1999/2000 survey applied a more realistic classification system which excluded the 2 axle/4 wheel truck from the scope of the survey.

The current study is significantly more focussed, having been designed to provide more detailed origin-destination information on the flow of trucks across the Ottawa River.

In summary, aside from other problems related to the sample size, comparisons between the 1989 and 1999/2000 surveys would be difficult, particularly since the in-scope vehicles established for each survey are significantly different.

4.0 1999/2000 SURVEY PROGRAM and METHODOLOGY

In this section of the report, the survey program and the methodologies applied in the application of the data are described.

4.1 Historical Vehicle Data

The Regional Municipality of Ottawa-Carleton (predecessor of the City of Ottawa) had undertaken, annually, traffic counts along major travel corridors to establish trends related to vehicle classifications/occupancy. With the exception of the years between 1995 and 1998 inclusive, in which years data were collected for an eight hour period, these data have been collected for one 12 hour period (07:00 to 19:00) each year. These traffic classification and vehicle occupancy data were available to supplement the data collected as part of the 1999/2000 survey to create a comprehensive database. A significant part of the on-going traffic count program includes the collection of information on interprovincial travel on an annual basis.

From the vehicle classification and occupancy surveys for the Chaudière and Macdonald-Cartier bridges, the historical data are, to varying degrees, relevant and have been applied when appropriate.

4.2 Driver Interviews

The purpose of the driver interview surveys was to gather specific data on the characteristics of the trucks, the travel patterns, including detailed information on the trip origins and destinations and the commodity/goods carried. The roadside driver interview surveys were carried out by trained surveyors (under contract to the Ministry of Transportation of Ontario) familiar with the form of data collection programs of the type applied in this study. Survey crews were stationed on the south side of the Ottawa River - on King Edward Avenue in the vicinity of Boteler Street and on Booth Street south of the Ottawa River Parkway Bridge over Booth Street - and interviewed drivers of candidate trucks.

Illustrations of a typical survey station set-up and lane closures are provided in EXHIBIT 1 - ILLUSTRATION OF SURVEY STATION.

EXHIBIT 1
ILLUSTRATION OF SURVEY STATION

Driver interviews were conducted on separate days for northbound and southbound traffic movements. The surveys were undertaken as follows:

DIRECTION/YEAR	1999	2000
	Midnight to midnight (24 hours)	07:00 to 07:00 (24 hours)
NORTHBOUND	October 25th & 28th	September 6th & 7th
SOUTHBOUND	October 26th & 27th	September 7th & 8th

From the interview surveys, each record in the database contains responses collected from the questionnaire used in the 2000 survey (a modified version of the questionnaire that was used in the 1999 survey). In the 1999 survey, the origins and destinations of the truck trip were recorded using a "macro" description whereas in the 2000 survey, trip origins and destinations were recorded in very precise and specific terms in order to apply the existing "traffic zone" system to yield valid origin-destination information. Consequently the roadside surveys carried out in 2000 have been used exclusively to establish trip patterns and trip tables for future analysis.

A comprehensive description of the database fields is provided in Appendix A[1]. The following sections and database fields from the interview surveys are considered to be relevant, in varying degrees, to the purpose of the study, as identified in the Terms of Reference as:

> the development of "a good understanding of the interprovincial movement patterns, origins, destinations and characteristics of medium and heavy trucks in the National Capital Region" and the satisfaction of the TRANS mandate "to furnish high quality and meaningful transportation data required for transportation planning and decision making in the National Capital Region".

A - the direction of travel of the truck;
B - the configuration of the truck (number of tires/axles);
C - additional descriptors identifying the configuration/body style of the truck (tractor trailer, straight truck, van, dangerous goods placards etc.);
F - commodity information such as cargo on board, capacity (available/used), category and amount, origin/destination, dangerous goods etc.;
H - information on characteristics including number of stops, trip origin/destination details, trip start/end date/time etc.;
J - information on axle groupings of trucks etc.

Electronic "boards" were used to record the responses by the drivers. That is, there are no paper records of the responses.

4.3 Vehicular Traffic Classification Count Observations

Observers were stationed at the locations described earlier and recorded all (100%) of the trucks passing the station.

The purpose of the separate classification counts undertaken as part of the project was to provide the identification of vehicles by classification (type), in order to derive expansion factors for application in the study and ensure that the results of the surveys were consistent with the results of the historical on-going program of collecting vehicle classification data.

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[1] Appendix A – Survey Database Fields

As part of the data collection program, truck classification counts were undertaken:

BRIDGE/YEAR	1999	2000
	05:00 to 22:00 (17 hours)	07:00 to 07:00 (24 hours)
Macdonald-Cartier	October 25th to 28th	September 6th to 8th
Chaudière	October 25th to 28th	September 6th to 8th
Cumberland/Masson Ferry		September 5th to 8th

A graphical representation of the various types of vehicles that are classified in this study as "Trucks" (Heavy Trucks) is provided in Appendix B[2]. This truck classification system was used by the (former) Regional Municipality of Ottawa-Carleton and is consistent with that used in the Outaouais Region.

The classification system applied by the observers was detailed. It was later refined to present information by three key categories of trucks (heavy trucks) as follows:

- **2 axle trucks** - which represent trucks with six wheels such as tow trucks, large (3/4 ton, 1 ton) pick-up trucks, small vans, small dump trucks etc. which create very few traffic operational problems, but are defined as "heavy trucks";
- **3+ (3 or more) axle trucks** - which represent medium size single unit trucks such as large dump trucks, straight trucks, concrete mix trucks etc. which contribute to environmental concerns (noise, vibration) but do not create undue traffic operational concerns; although these are also defined as "heavy trucks";
- **tractor trailer trucks** - which represent the largest trucks such as tractor-trailer trucks, flat-bed trucks etc. which contribute to both environmental concerns and traffic operational concerns due to the time headway utilization (in starting from a stopped position) and the large turning radius (particularly in the case of right turns).

Trucks with four wheels are not included in the study and are considered to be light trucks. These include small (1/2 ton) pick-up trucks, such as the Toyota Tacoma/Chevrolet Sonoma, or the Jeep, or any SUV etc.

[2] Appendix B – Heavy Truck Classification System

A further illustration of the classification of trucks is provided in EXHIBIT 2 - STUDY TRUCK CLASSIFICATION. In this study, trucks with the "truck id", as indicated in Appendix "B" - 1, and 3, are included in the survey. (Note - these trucks have six wheels and are considered to be "heavy" trucks based on the truck classification system discussed earlier).

4.4 Automatic Traffic Recorder (ATR) Counts

Automatic traffic recorders are devices, which record impulses from tires or vehicle masses passing the site of the detecting devices (road tubes, cable loops in the pavement, etc.). The impulses are translated into vehicle counts and, in some cases, into a count of vehicles, by classification (e.g. various sizes of trucks). The sensitivity of automatic traffic recorders is affected by the number of lanes of traffic included in a survey. When road tubes are used to record vehicles in four or more lanes, results can be quite variable.

The intended purpose of undertaking traffic counts, using automatic traffic recorders during the period 12:00, October 17, 1999 to 07:00, October 31, 1999 (fourteen days) was to ensure representativeness of the classification counts, which were undertaken during a limited period of time (four days). In 2000, traffic volume information was not collected using automatic traffic recorders as part of the program.

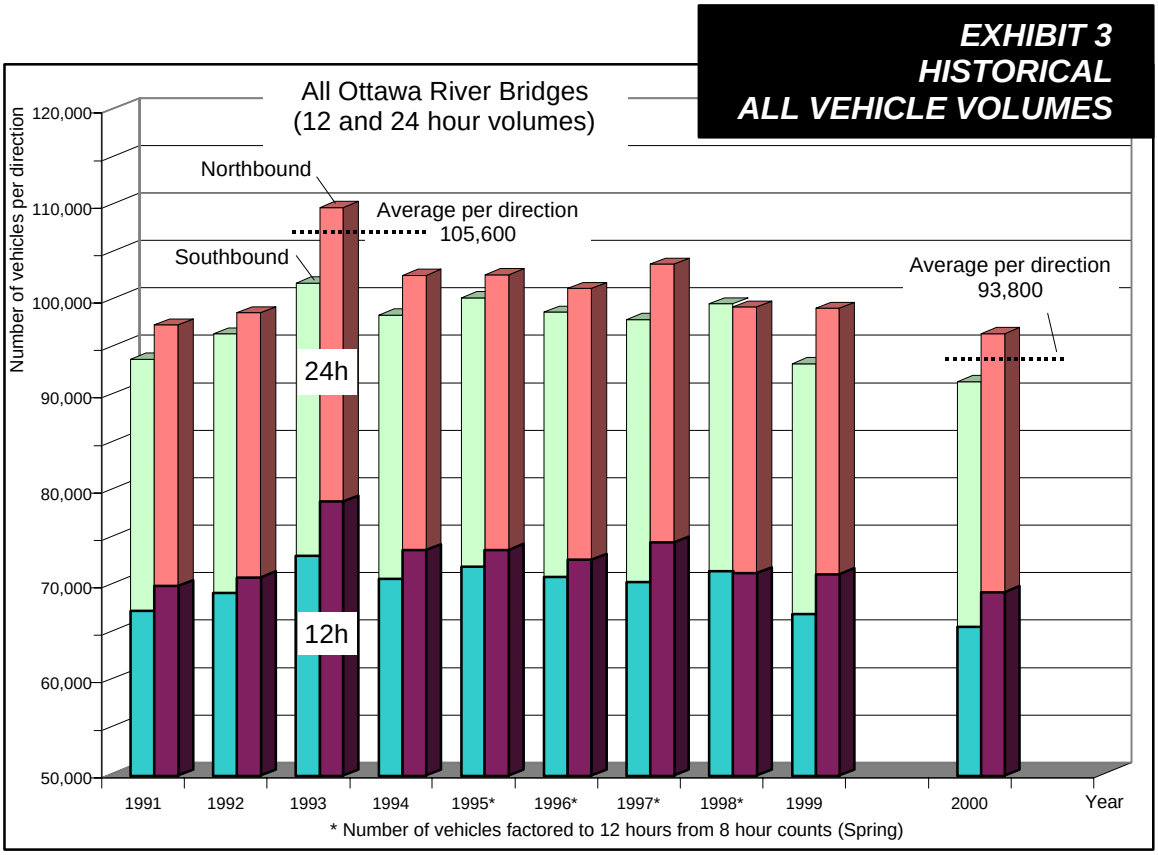
5.0 KEY RELATIONSHIPS

In this section of the report, the key relationships identified in respect to the historical data, the truck count characteristics and the travel patterns are discussed.

5.1 Historical traffic volumes

From the historical (1991 to 2000) vehicle classification (light trucks, heavy trucks, passenger cars, buses, taxis, bicycles and others) and occupancy surveys, data are available, by direction of traffic flow across the Ottawa River bridges by time period (8 or 12 hours, morning and afternoon peak periods/hours). This enabled the preparation of profiles for various periods of the day.

"All vehicle" historical volumes are presented for each direction of travel (northbound and southbound), for all five bridges across the Ottawa River in EXHIBIT 3 - HISTORICAL ALL VEHICLE VOLUMES for 12-hour periods (07:00-19:00) and for 24-hour periods (note that the 12 hour data for 1995 to 1998 have been factored from 8 hour data and the 24 hour data are factored from 8 or 12 hour data).



Factors that were established in the early 1980's from the on-going traffic survey counts conducted by the former Regional Municipality of Ottawa Carleton suggested

that 12 hour traffic volumes could be factored by 1.39 to represent a daily 24 hour volume. This factor has been applied in several studies (including those undertaken by TRANS) to all vehicles including trucks. In comparison, the data collected in the 2000 surveys determined that an appropriate factor for trucks crossing the Ottawa River would be 1.27 and this value has been applied in factoring 12 hour historical truck traffic counts to derive 24 hour values.

One element to consider in evaluating the data which are presented in this section is the time of year at which the data were collected - in the annual program, data are collected in May/June whereas the data collected for this survey were collected in late October, 1999 and in early September, 2000.

As illustrated in Exhibit 3, daily (24 hour) “all vehicle” traffic volumes, in 2000, were at a level similar to that which was experienced 10 years earlier (1991). After a steady growth in the first half of the decade, a modest decline was experienced in the latter half.

At the peak (1993), there were, in the 24 hour period, approximately 105,600 vehicles (average for each direction) crossing the river, while, in 2000, there were approximately 93,800 vehicles (average for each direction - a decline of approximately 12% from the peak (average for each direction) crossing the river.

Relevant to this project are the data for the Chaudière and Macdonald-Cartier bridges, which are bridges on which “heavy trucks” are allowed. “Heavy trucks” are prohibited on the Alexandra, Portage and Champlain bridges.

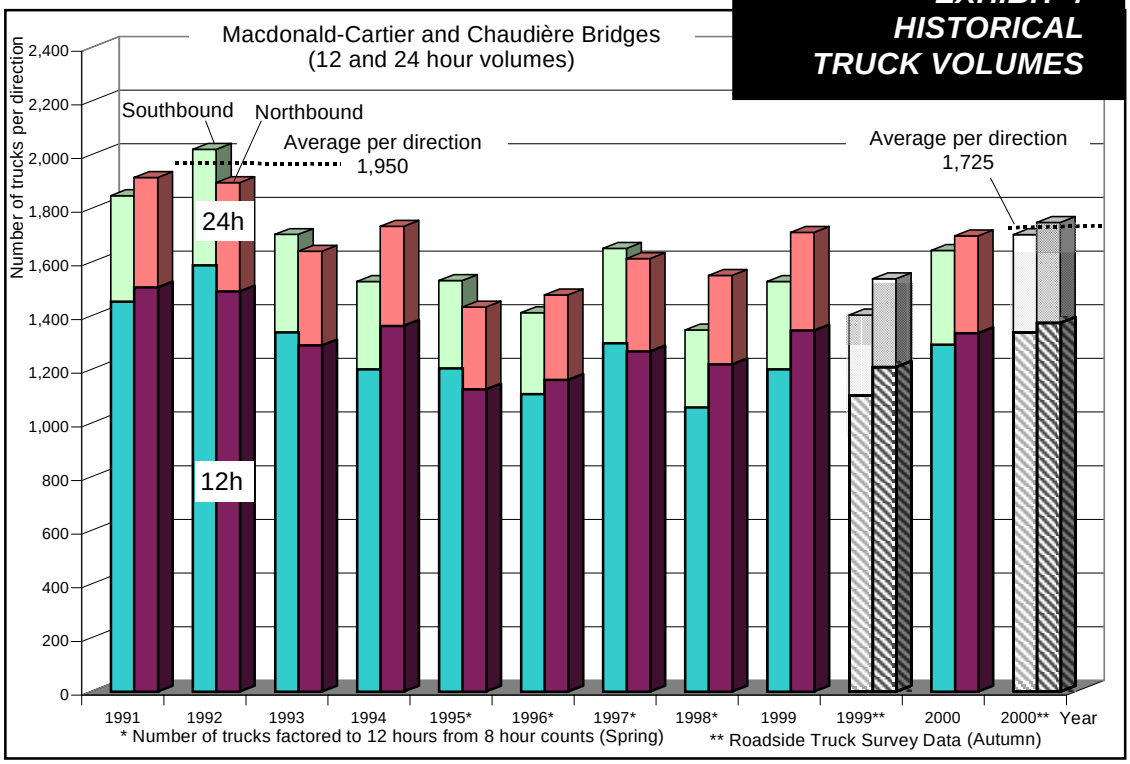
EXHIBIT 4 - HISTORICAL TRUCK VOLUMES presents the historical truck data for the Macdonald-Cartier and the Chaudière bridges collectively.

As illustrated in Exhibit 4, daily (24 hour) truck traffic volumes were, in both the spring and autumn of 2000, at a level slightly lower than that which was experienced 10 years earlier (1991). The lowest level of approximately 1,400 trucks (average number for each direction) occurred in the mid-1990s.

After a steady decline in the first half of the decade, a modest growth was experienced in the latter half. At the peak (1992), there were, in the 24 hour period, approximately 1,950 trucks (average for each direction) crossing the river, while, in the surveys in the autumn of 2000, there were approximately 1,725 trucks (average for each direction) - a decline of approximately 10% from the peak truck traffic crossing the river.

The profiles for the truck volumes may appear to be more pronounced because of the relatively low numbers when compared to the "all vehicle" values.

EXHIBIT 4
HISTORICAL
TRUCK VOLUMES



A summary of relevant data for two way truck traffic on the two bridges combined, for the 24 hour period and the morning and afternoon peak hours is provided in TABLE 1 - CURRENT AND HISTORICAL TWO WAY TRUCK TRAFFIC VOLUMES.

INFORMATION SOURCE	NUMBER OF TRUCKS CROSSING THE OTTAWA RIVER*		
	24 HOURS	MORNING COMMUTER PEAK HOUR	AFTERNOON COMMUTER PEAK HOUR
2000 SURVEY, AUTUMN	3,450	205	170
2000 ANNUAL SURVEY, SPRING	3,335	215	170
5 YEAR AVERAGE (1996-2000)	3,120	235	180
10 YEAR AVERAGE (1991-2000)	3,285	250	210

* - Ottawa river crossing includes the Macdonald-Cartier and Chaudière Bridges, as heavy trucks are prohibited on the Alexandra, Portage and Champlain bridges.

The 24-hour truck volume levels observed in the autumn of 2000 compare reasonably well with previous counts undertaken over the past ten year period.

Further, the historical data for the two bridges (Macdonald-Cartier and Chaudière) crossing the Ottawa River have been tabulated for each bridge separately, for the two bridges and for all bridges, and are provided in Appendix C[3]. From the historical traffic volume information, time period relationships have been determined for the peak hour/peak period, peak hour/12 hour and peak hour/24 hour relationships. These are provided, in detail, in Appendix D[4].

The most relevant information has been extracted and displayed in TABLE 2 – RATIO OF PEAK HOUR TO 24 HOUR TRAFFIC VOLUMES 1991 to 2000. The values for trucks are followed by the values for all vehicles (in parenthesis).

TABLE 2
RATIO OF PEAK HOUR TO 24 HOUR TRAFFIC VOLUMES
1991 to 2000

BRIDGE	COMMUTER PEAK/24 HOUR RATIO FOR TRUCKS (ALL VEHICLES)				
	FOR BOTH DIRECTIONS	MORNING		AFTERNOON	
Macdonald-Cartier	Range	7%-11%	(8%-10%)	5%-8%	(9%-10%)
	Weighted Average	8%	(9%)	7%	(9%)
Chaudière	Range	6%-9%	(8%-11%)	3%-8%	(7%-10%)
	Weighted Average	7%	(9%)	6%	(9%)

xx% - trucks, (yy%) - all vehicles

A review of the information in Table 2 and in Appendix D indicates that:

- For **truck** classifications

  - in all cases, the most stable relationships are the commuter peak hour/24-hour relationships. The weighted averages for commuter peak hour/24-hour range from 6 to 8%.

[3] Appendix C – Summary of Historical Ottawa River Crossing Truck Traffic Volumes
[4] Appendix D – Time Period Relationships

- the range in the relationships is similar to the “all vehicle” relationships but is, in general less variable than the "all vehicle" relationships when considered by direction;
- the relationship of the peak hour/24 hour, when the directions are considered individually or in combination, is quite inconsistent with the conventional "rule of thumb" relationship [the “rule of thumb” suggests that the peak hour can be represented by 10% of the AADT (ANNUAL AVERAGE DAILY TRAFFIC)]; and

- For **all vehicle** classifications,

- in all cases, the variations in the relationships are reasonably confined;
- the average of the relationships over 10 years has been identical and therefore has been consistent particularly when both directions are considered;
- the relationship of the peak hour/24 hour, when both directions are considered, is consistent (although not precisely the same as) with the conventional "rule of thumb" relationship which suggests that the peak hour can be represented by 10% of the AADT.

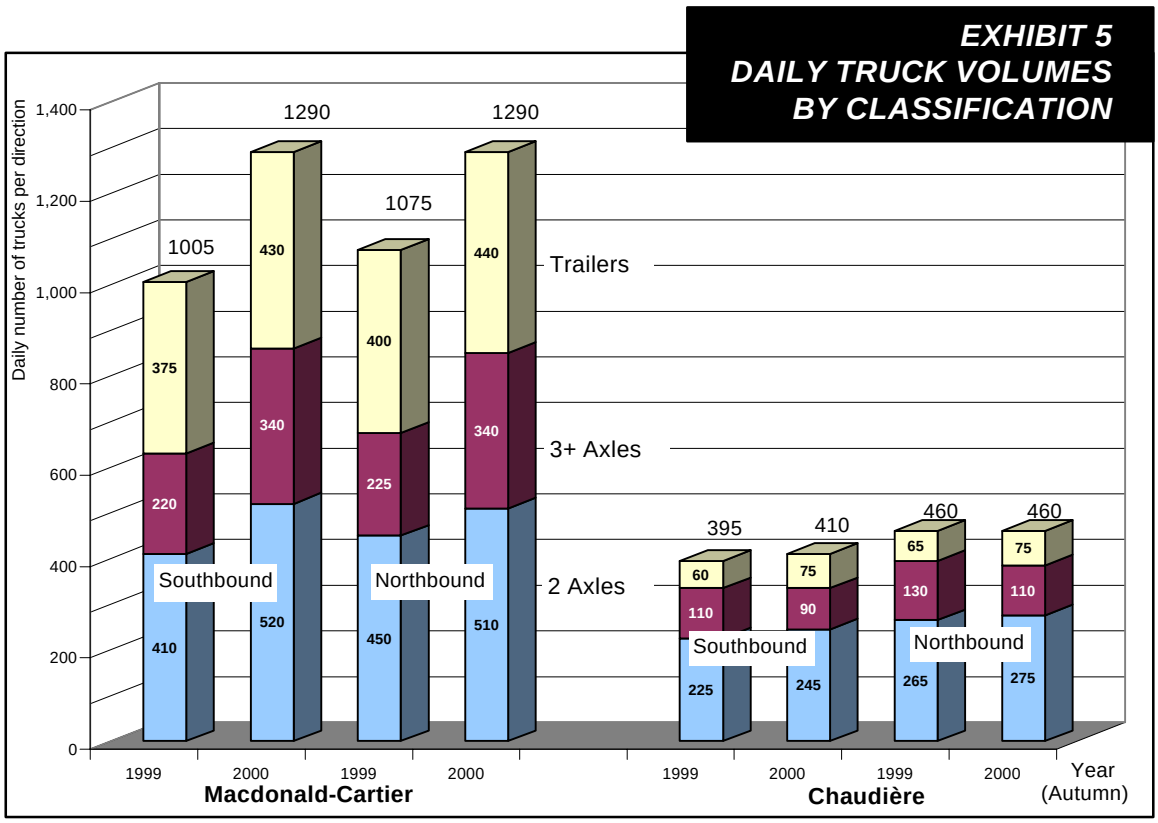
5.2 Truck Classification and Characteristics

The candidate trucks were grouped into sub-classifications (2 axle, 3+ axle [3 or more axle] trucks and tractor trailers as described in Section 4.3.

Of the total of approximately 3,450 trucks, observed over 24 hour period as crossing the Ottawa River, there were 1,550 2 axle (45%), 880 3+ axle (25%) and 1,020 tractor trailer (30%) trucks.

Information on truck volumes as obtained from the classification counts in 1999 and 2000 is presented, by direction, for each of the Macdonald-Cartier and Chaudière bridges, in EXHIBIT 5 – DAILY TRUCK VOLUMES BY CLASSIFICATION.

For the Macdonald-Cartier Bridge, the volume of trucks was significantly higher (approximately 24%) in 2000 than was the case in 1999; however, the 2000 truck volumes are considered to be more representative for planning purposes (see comparative analysis in Table 1) than the 1999 truck volumes. Truck volumes, averaged over the two days, were consistent in terms of the direction of travel and composition (2 axle, 3+ axle and tractor trailers). For the Chaudière Bridge, truck volumes in 1999 and 2000 were reasonably consistent in magnitude, by direction and by composition. As would be expected, the foregoing characteristics are also apparent when the volumes from both bridges are combined.



The data from the Masson/Cumberland ferry, when included with the totals from the two bridges, had a minimal impact in terms of the total number of trucks (65 in each of the northbound and southbound directions) as well as in the 2 axle truck classification (10 in each direction). There is a disproportionate impact in the 3+ axle (30 in each direction) and tractor trailer (25 in each direction) classifications which would suggest that the smaller vehicles have less propensity to use the ferry probably due to its rural location.

The recorded number of trucks, by hour of the day, is presented, graphically, in EXHIBIT 6 - HOURLY TRUCK VOLUMES, MACDONALD-CARTIER BRIDGE and in EXHIBIT 7 - HOURLY TRUCK VOLUMES, CHAUDIÈRE BRIDGE.

It is clear, from the exhibits, that truck movements are more predominant during the mid-day hours than in the commuter peak hours. The mid-day peaking phenomenon is more apparent on the Chaudière Bridge than on the Macdonald-Cartier Bridge. It is postulated that this is attributable to the attraction of the Chaudière Bridge for short trips (Central Hull to Ottawa) in particular those made by smaller trucks. The need to meet the expectations of the business day no doubt contributes to this phenomenon. These characteristics also reinforce the historical trend, which indicates that the relationship between the peak hour and the 24-hour volumes is lower for trucks than for mixed traffic. The composition of the truck traffic stream is discussed in some detail in Sections 8.1 and 8.3.

EXHIBIT 6
HOURLY TRUCK VOLUMES
MACDONALD-CARTIER BRIDGE

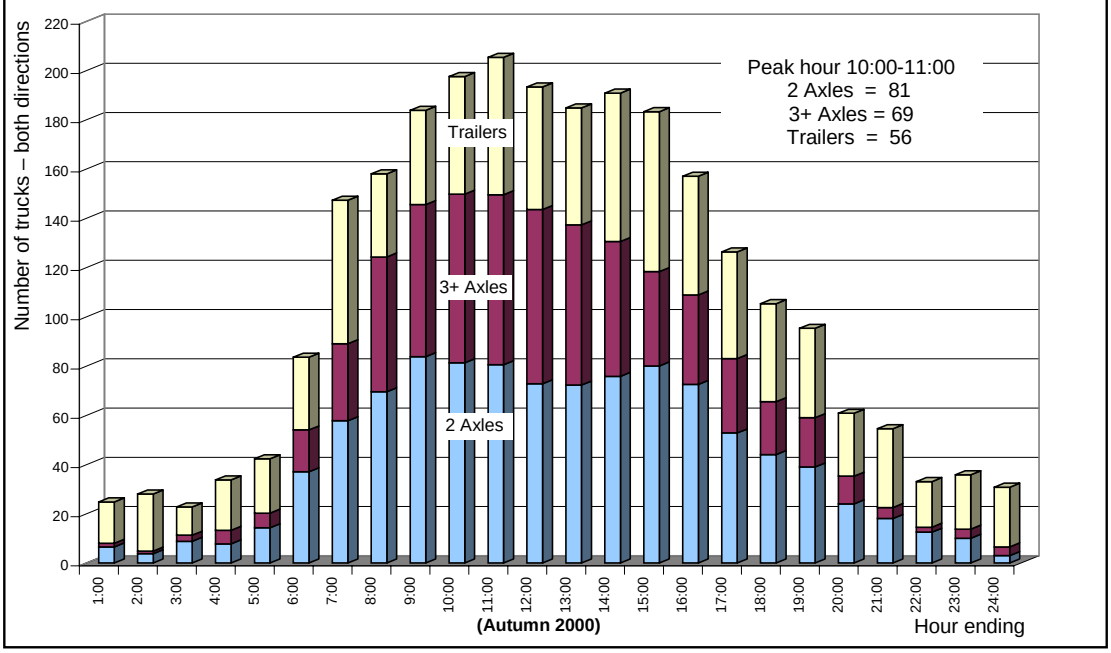
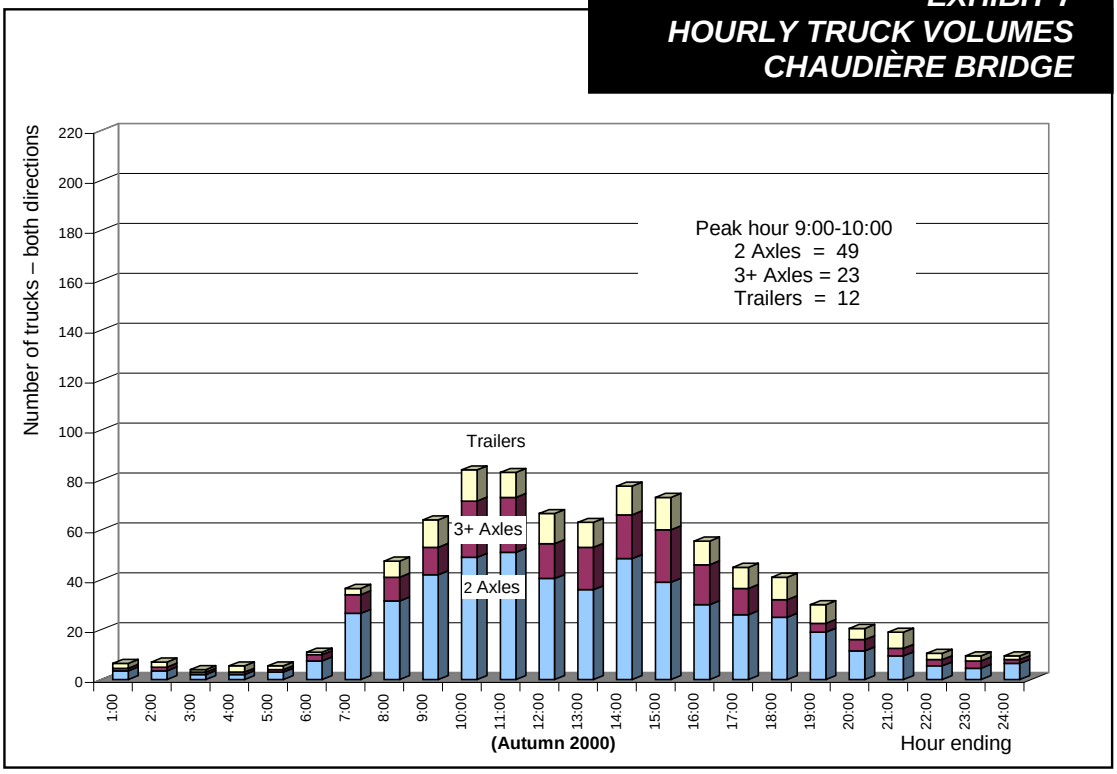
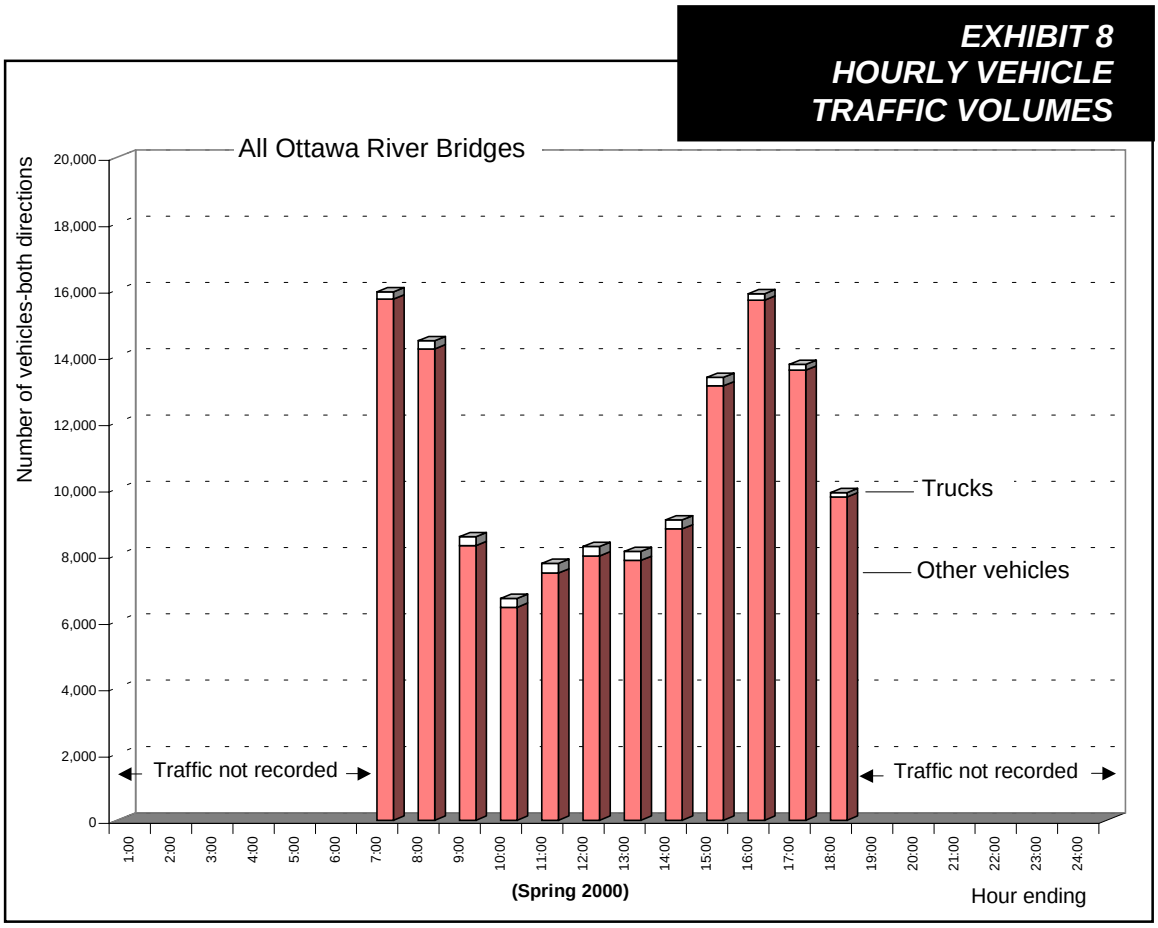


EXHIBIT 7
HOURLY TRUCK VOLUMES
CHAUDIÈRE BRIDGE



In EXHIBIT 8 - HOURLY VEHICLE TRAFFIC VOLUMES, for all Ottawa River Bridges illustrates the typical daily peak traffic periods in the morning and afternoon and more significantly, the relatively small proportion of trucks in the total traffic stream, particularly during the peak traffic periods.



5.3 Automatic Traffic Recorder (ATR) Counts

As indicated earlier, there are significant challenges in collecting classification data using automatic traffic recorders. The "all vehicle" survey data collected in 1999 are available from the TRANS Agencies; however the survey results were not considered to be sufficiently reliable to be subjected to any form of analysis.

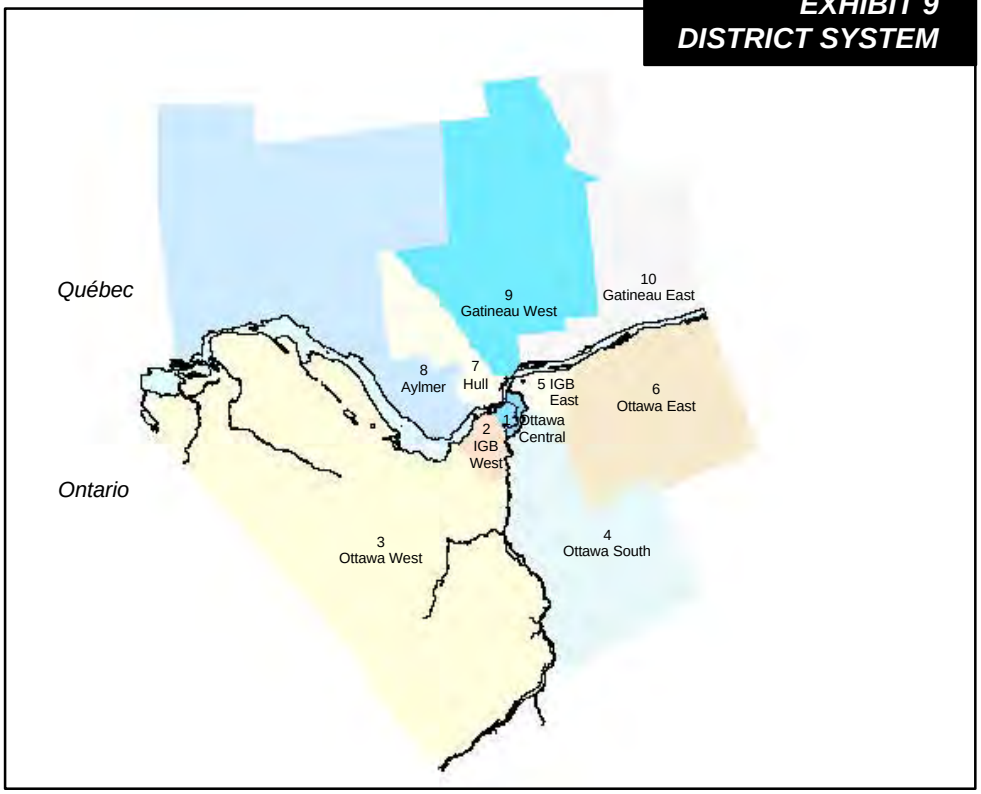
No truck counts (by ATR) were taken as part of the Interprovincial Roadside Truck Survey in 2000. Any ATR data, which are available, were obtained from the annual traffic count program undertaken by the Regional Municipality of Ottawa-Carleton.

6.0 ZONE/DISTRICT SYSTEM

In this report, reference is made to the "National Capital area". This "area" closely replicates, but does not precisely follow, the boundaries of the new cities of Ottawa and Gatineau and Municipalité Régionale des Collines de l'Outaouais (MRC) or the boundaries of the National Capital Region.

The traffic zone system, which has been in use for more than 10 years in the National Capital area, is comprised of 258 zones (including 15 "external" zones) and all origin-destination information was coded to this 258-zone system. This zone system has been respected in the development of a "district" system in all of the analyses, which have been undertaken in the context of this study. The "district" system was established to allow the recognition of relevant geographical characteristics and the presentation of relevant travel patterns and is illustrated in EXHIBIT 9 - DISTRICT SYSTEM. The zones, which comprise each of the "districts", are identified in Appendix E[5]. The "districts" have been identified by a geographical reference. The preface "**IGB**" identified with some "districts" connotes a "district" which is "**I**nside **G**reen **B**elt".

EXHIBIT 9
DISTRICT SYSTEM



[5] Appendix E – Traffic Zones Comprising the Districts

There are ten “districts” in the current version of the “district” system. External traffic zones in what can be considered to be “remote” areas (e.g. Montreal and contiguous areas in Quebec) have been incorporated into one of the “districts”. In the presentation of the result of the analysis, this factor must be borne in mind. Modifications to the “district” system can be achieved with little effort for any study related to Interprovincial truck traffic.

The “district” system was utilized to create origin-destination matrices for all trucks as well as each of the individual classifications of 2 axle, 3+ axle and tractor trailer trucks.

7.0 DATA EXPANSION

Drivers of 549 trucks were interviewed and the survey yielded 495 (in-scope) valid (and completed) responses representing the characteristics of 3,450 trucks - a sample size of 14.3%. The data were considered to be of sufficient magnitude and strength to allow expansion by bridge and by certain time periods. The methodology and expansion factors are discussed in the following.

7.1 Expansion Methodology

The interview survey data are available for the morning and afternoon peak hours and peak periods as well as for the 07:00 to 19:00 [day] and 19:00 to 07:00 [night] and for the 24 hour period. In order to determine the efficacy of utilizing the peak hour or peak period (as distinct from the 12 or 24 hour) data and applying a relationship factor (as discussed in Section 5.1) to establish origin-destination trip tables for transportation planning purposes, two analytical processes have been applied.

Origin-destination tables, based on the "district" system were prepared to compare, using percentages, the results produced by the "day" data, the "night" data and the full 24 hour data. These tabulations were prepared for all trucks and, individually, for 2 axle trucks, 3+ axle trucks and tractor trailers. These tabulations are provided in Appendix F[6] and Appendix G[7].

Out of a potential of 100 origin-destination pairs, there were:

- for all trucks, of which there were 47 pairs, there were 42 pairs in which the values for the "day + night" and the "24 hour" were the same;
- for 2 axle trucks, of which there were 42 pairs, there were 38 pairs in which the values for the "day + night" and the "24 hour" were the same;

[6] Appendix F – “District” Comparison of Trucks by Number

[7] Appendix G – “District” Comparison of Trucks by Percent

- for 3+ axle trucks, of which there were 36 pairs, there were only 22 pairs in which the values for the "day + night" and the "24 hour" were the same;
- for tractor trailer trucks, of which there were 44 pairs, there were only 28 pairs in which the values for the "day + night" and the "24 hour" were the same;

Since peak hour (normally the afternoon peak hour) values are typically used for transportation planning and road design principles, it is essential to ensure that the peak hour (in particular, the afternoon peak hour) values provide representative information for these purposes.

It became apparent that the use of the afternoon peak period matrix would yield less reliable results than would the use of the 24 hour period accompanied by the application of a factor to estimate the peak period values. The reliability of this procedure is enhanced by the consistency in the relationships between the peak period and the 24-hour period as determined from the results of the analysis presented earlier (Section 5.1).

It is apparent that the use of the values derived for all trucks by summing the two twelve hour survey periods 07:00 to 19:00 [day] and 19:00 to 07:00 [night]) would yield sufficiently reliable results to which a factor to estimate the peak period values could be applied.

In the final analysis, acceptable sampling rates were achieved by considering the utilization of the data by bridge and by direction for either one time period (24 hours) or two time periods (07:00 to 19:00 and 19:00 to 07:00) combined. Intuitively, it was collectively considered that the utilization of a process in which the two time periods were factored separately and combined to provide a strong sample would be the superior of the two methods.

7.2 Expansion Factors

Survey expansion factors were required to expand the interview sample to the universe of the trucks observed crossing the Ottawa River. Initially, expansion factors were developed based on grouping the trucks by bridge, by direction of travel, by vehicle type and by time period. The results indicated a very low (as small as 1%) sampling rate for certain classifications of vehicles during certain time periods. A sampling rate of 5% would be considered to be acceptable. This was as a consequence of, for example,

- the necessity to discontinue the survey during some peak traffic periods due to the congestion being created by the survey procedures, resulting in very few, and, in some cases, no, interviews;

- certain types of trucks (e.g. 3+ axle trucks such as those used for construction materials, empty dump trucks) being directed away from the interview stations on the perception that an interview of the driver was unnecessary. This was, in particular, relevant on the Macdonald-Cartier Bridge.

Based on the proportion of empty 3+ axle trucks, a further examination of this classification of truck was undertaken. TABLE 3 - SUMMARY OF 3+ AXLE TRUCKS BY BODY TYPE AND CARGO provides detailed information on the 3+ axle trucks in terms of the body type and whether or not cargo was being transported. A significant number of the 3+ axle trucks are comprised of the dump truck/ tractor cab body types.

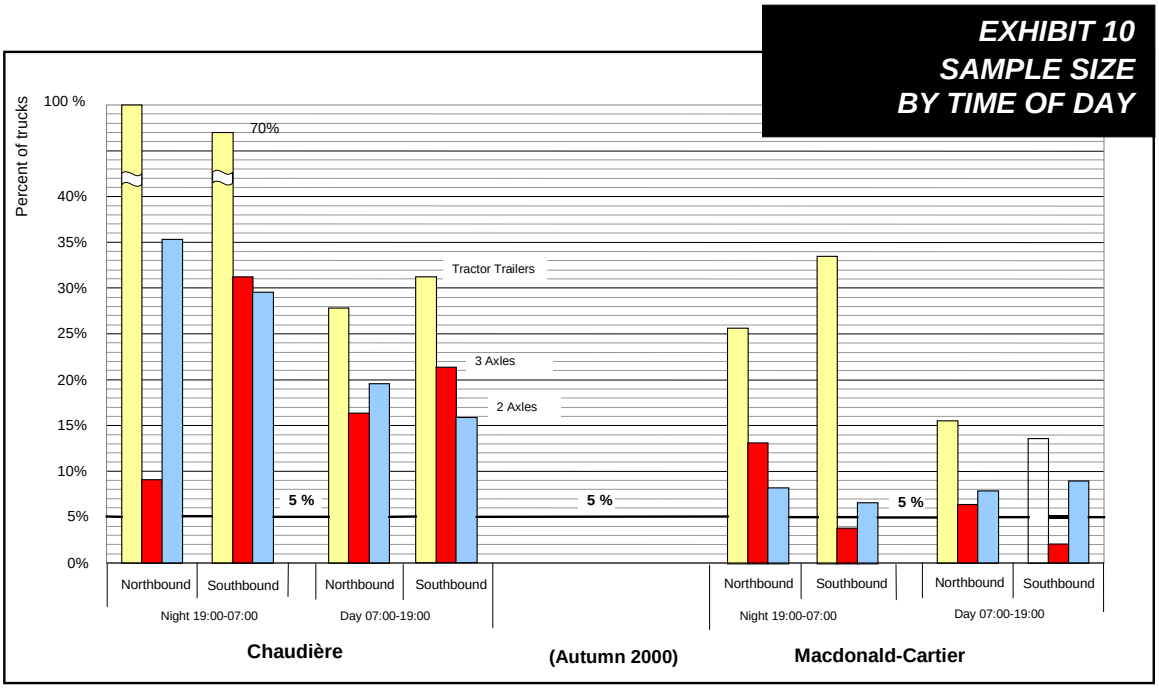
TABLE 3
SUMMARY OF 3+ AXLE TRUCKS
BY BODY TYPE AND CARGO

TRUCK BODY TYPE	WITH CARGO	EMPTY	TOTAL
DUMP TRUCK	65	225	290
FLATBED	90	85	175
TANKER	40	10	50
VAN – not refridgerated	50	-	50
VAN – refridgerated	20	25	45
CONTAINER CARRIER	10	25	35
FLOAT	-	50	50
TRACTOR CAB (only)	-	95	95
OTHER	-	65	25
TOTAL	340	540	880

By utilizing longer time periods for the development of the expansion factors, it was possible to achieve better sampling rates and thus provide more reliable results. Following on from the foregoing, the use of the two twelve hour survey periods (07:00 to 19:00 [day] and 19:00 to 07:00 [night]) was examined. Sample sizes for the two periods differ. There were significantly more trucks included in the 07:00 to 19:00 survey period while the sample size from the 19:00 to 07:00 survey period was significantly greater.

The expansion factors are presented graphically, for the three vehicle classifications for each bridge, in the form of the sample size for two 12 hour time periods (07:00 to

19:00 [day] and 19:00 to 07:00 [night]) in EXHIBIT 10 - SAMPLE SIZE BY TIME OF DAY. The large sample size for tractor trailers during the night period on the Chaudière Bridge can be attributed to the small number of tractor trailers using the bridge during this period.



The numerical values for the expansion factors are provided in TABLE 4 - EXPANSION FACTORS BY BRIDGE, BY DIRECTION AND BY TIME OF DAY.

TABLE 4

BRIDGE	PERIOD	NORTHBOUND			SOUTHBOUND		
		2 Axles	3+ Axles	Tractor Trailer	2 Axles	3+ Axles	Tractor Trailer
MACDONALD - CARTIER	Day (07:00–19:00)	12.8	15.7	6.5	11.2	48.2*	7.4
	Night (19:00–07:00)	12.1	7.6	3.9	15.0	26.0*	3.0
CHAUDIÈRE	Day (07:00–19:00)	5.1	6.1	3.6	6.3	4.7	3.2
	Night (19:00–07:00)	2.8	11.0	1.0	3.4	3.2	1.4

* - Sampling rate less than 5%

The complete analysis, in tabular as well as in graphical form, is provided in Appendix H[8] in which the expansion factors are presented graphically, for the three vehicle classifications for each bridge, in the form of the sample size for various time periods (24 hours, 12 hours (07:00 to 19:00 and 19:00 to 07:00) the morning peak period [06:00 to 10:00], the afternoon peak period [15:00 to 19:00], the mid-day period [10:00 to 15:00] and the night period [19:00 to 06:00].

Generally speaking, the sample size is adequate particularly in the case of the tractor-trailer classification which is considered to be of the greatest significance of the three truck classifications in the context of this study.

The 3+ axle trucks have the lowest sample size (as low as 2% for the southbound direction). The three axle category, in particular the dump and tractor-trailer (without a trailer) type trucks, dominate the "empty" trucks identified in the survey and were, subjectively, considered to form a large part of the trucks (affected by the exclusion actions discussed earlier in this section).

The "empty" 3+ axle truck aspect has been discussed earlier in Section 7.2 (Table3).

8.0 TRIP CHARACTERISTICS AND PATTERNS

In this section of the report, the vehicle types, inter-regional/external travel, origin-destination information and vehicle loading and commodities are examined to establish trip characteristics and patterns.

8.1 Vehicle Types

As indicated earlier, of the total of approximately 3,450 trucks per day observed in the surveys as crossing the Ottawa River, there were 1,550 2 axle (45%), 880 3+ axle (25%) and 1,020 tractor trailer (30%) trucks.

EXHIBIT 11 - DAILY TRUCK VOLUMES BY CLASSIFICATION illustrates the variation in the number of trucks on the two bridges for the three classifications of trucks.

The Macdonald-Cartier bridge carries, by far, the largest number (870) and proportion (34%) of the tractor-trailer classification of truck. The 2 axle truck dominates the composition (60%) on the Chaudière bridge.

[8] Appendix H – Survey Expansion Factors

EXHIBIT 11
DAILY TRUCK VOLUMES
BY CLASSIFICATION

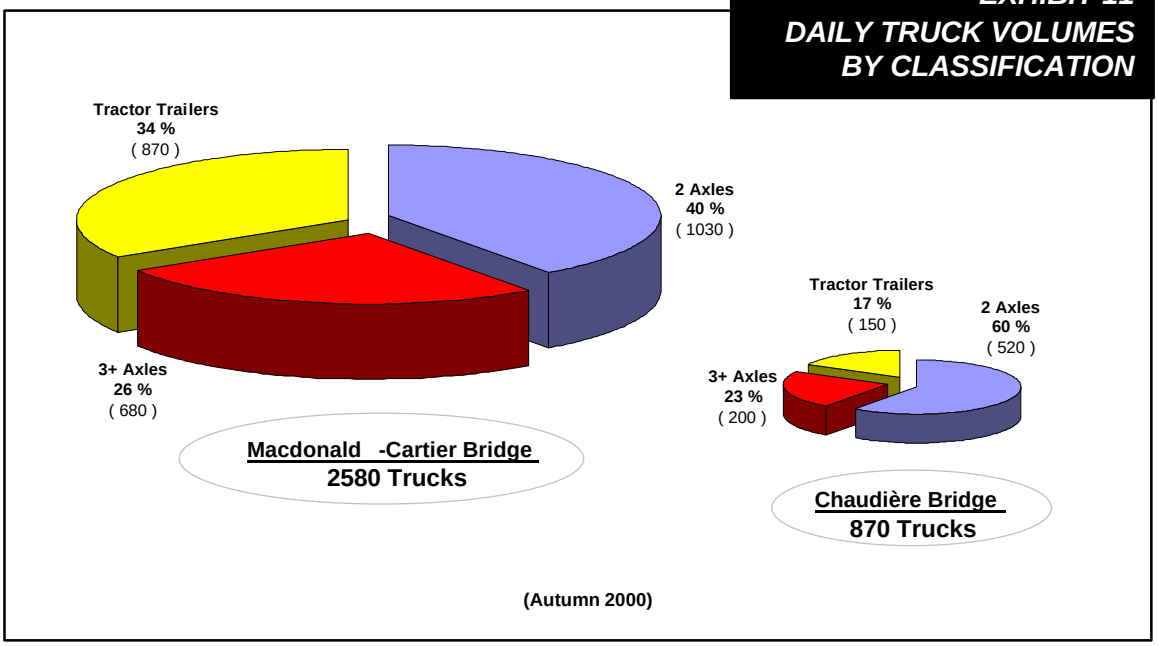
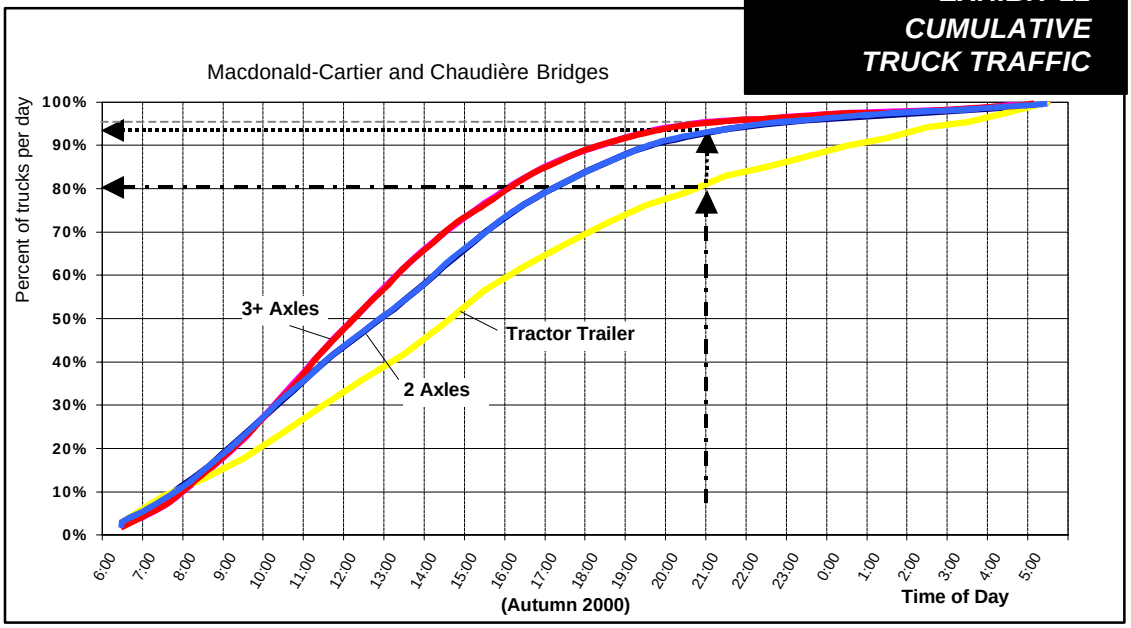


EXHIBIT 12 - CUMULATIVE TRUCK TRAFFIC illustrates the profile of the truck travel, for all trucks (by each classification) crossing the Ottawa River, over the course of the day, commencing with the 06:00 time point. By 21:00, 95% of the 3+ axle trucks, 93% of the 2 axle trucks and 80% of the tractor trailer crossings of the Ottawa River have occurred.

EXHIBIT 12
CUMULATIVE
TRUCK TRAFFIC



In TABLE 5 -TRUCK TRAVEL COMPOSITION AND TRIP DISTANCE, an analysis of travel, by truck classification, is provided. Data in the table indicate that the composition of the trucks on the network, for trucks crossing the Ottawa River, is attributable to 2 axle trucks to the extent of 45%, to 3+ axle trucks to the extent of 25% and to tractor trailer trucks to the extent of 30%. The tractor trailer trucks (which represent only 30% of the total trucks have the longest trip lengths with 50% of the total trip distance compared to 3+ axle trucks with 20% of the total trip distance and 2 axle trucks with 30% of the total trip distance.

TABLE 5
TRUCK TRAVEL COMPOSITION AND TRIP DISTANCE

TRUCK CLASSIFICATION	TRUCK TRIPS[(1)]	TRIP DISTANCE[(2)]
2 AXLE	45%	30%
3+ AXLE	25%	20%
TRACTOR TRAILER	30%	50%

[(1)] As determined from the classification counts
[(2)] As determined by assigning truck trips to the road system

8.2 Trip Tables

Origin-destination trip tables, based on the "district" system, were prepared solely for the purposes of the analysis presented in this report in order to test the sufficiency of the base data in the context of the "district" system described earlier. The results of this application are discussed in this section of the report. The objective of the analysis is for the foregoing purpose only. The application of the data for any subsequent transportation planning activity and/or project can be undertaken with a much finer level of detail, particularly in terms of the zone and "district" system which can be applied. The determination in this regard will be the responsibility of the agency/firm/person undertaking the activity.

8.3 Travel Patterns

In approximate terms, there was a total of 3,450 trucks per day in 2000, of which 2,580 used the Macdonald-Cartier bridge - 1,290 northbound and 1,290 southbound - and 870 used the Chaudière bridge - 460 northbound and 410 southbound.

Three trip types are identified:

- a **"local" trip** which is also called an "internal/internal" trip which has both an origin and a destination within the "National Capital area". A trip from Hull to the west end of Ottawa would be a "local" trip;
- a **"through" trip** which is also called an "external/external" trip which has both an origin and a destination outside the "National Capital area". A trip from Montreal to Maniwaki which crosses the Ottawa River would be a "through" trip;
- an **"inter-regional" trip** which is also called either an "internal/external" or an "external/internal" trip which, in the case of an "internal/external" trip, has an origin within the "National Capital area" and a destination outside the "area" ("internal/external") and, in the case of an "external/internal" trip has an origin outside the "National Capital area" and a destination within the National Capital area ("external/internal"). A trip from Gatineau to Montreal (crossing the Ottawa River) would be an "internal/external" trip and a trip from Kingston to Gatineau would be an "external/internal" trip with both trips classed as an "inter-regional" trip;

An overview of the trip characteristics reveals that 2,300 (67%) of the trucks per day made "local" trips (an origin and destination generally within the National Capital area), 975 (28%) of the trucks made "inter-regional" trips (either an origin or a destination outside the National Capital area), while 175 (5%) of the trucks made a "through" trip (an origin and destination outside the National Capital area). The tabulations of the trips for each bridge separately by direction and by truck classification are provided in Appendix I[9].

EXHIBIT 13 - DAILY TRUCK COMPOSITION BY CLASSIFICATION - MACDONALD-CARTIER BRIDGE and EXHIBIT 14 - DAILY TRUCK COMPOSITION BY CLASSIFICATION - CHAUDIÈRE BRIDGE illustrate the variation in the trip patterns of trucks on each of the two bridges for the three classifications of trucks.

The key characteristics identified are:

- 60% of the truck traffic on the Macdonald-Cartier bridge are "local" trips (i.e. 40% of the trips have at least one end outside the limits of the National Capital area) while the trucks on the Chaudière bridge are predominantly (87%) "local" trips (internal/internal);
- tractor trailer trucks are dominant on both the Macdonald-Cartier bridge and the Chaudière bridge in the "through" trip type as well as, but in a less prominent way, in the "inter-regional" trip type indicating the fact that the tractor trailer is used for the longer trips;

[9] Appendix I – Trip Characteristics

- the two axle truck is the most prominent classification for "local" trips, particularly on the Chaudière bridge.

EXHIBIT 13
DAILY TRUCK COMPOSITION
MACDONALD-CARTIER BRIDGE

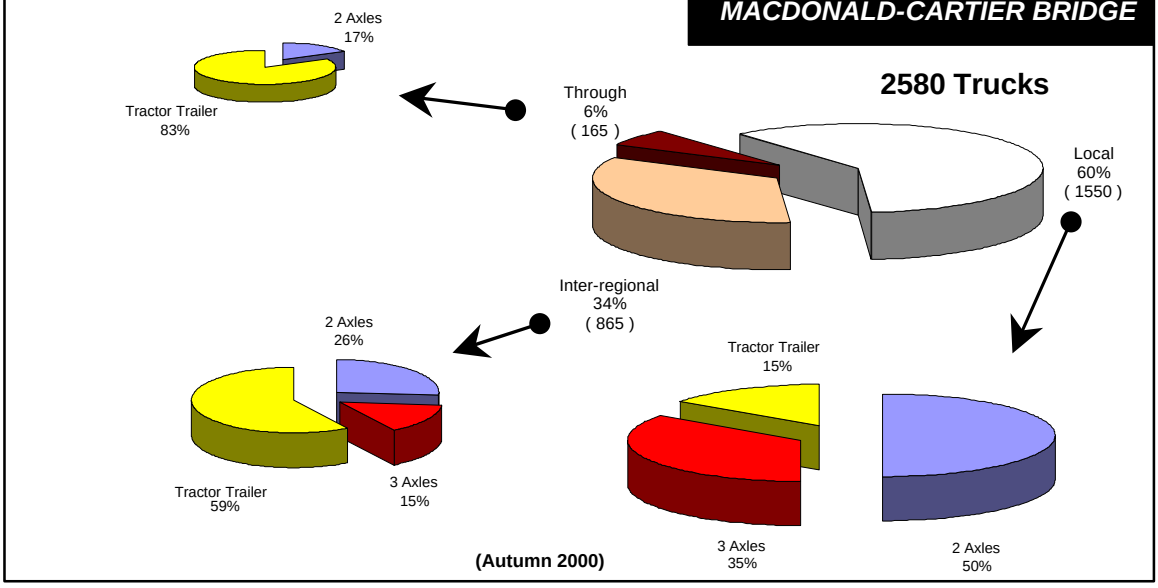


EXHIBIT 14
DAILY TRUCK COMPOSITION
CHAUDIÈRE BRIDGE

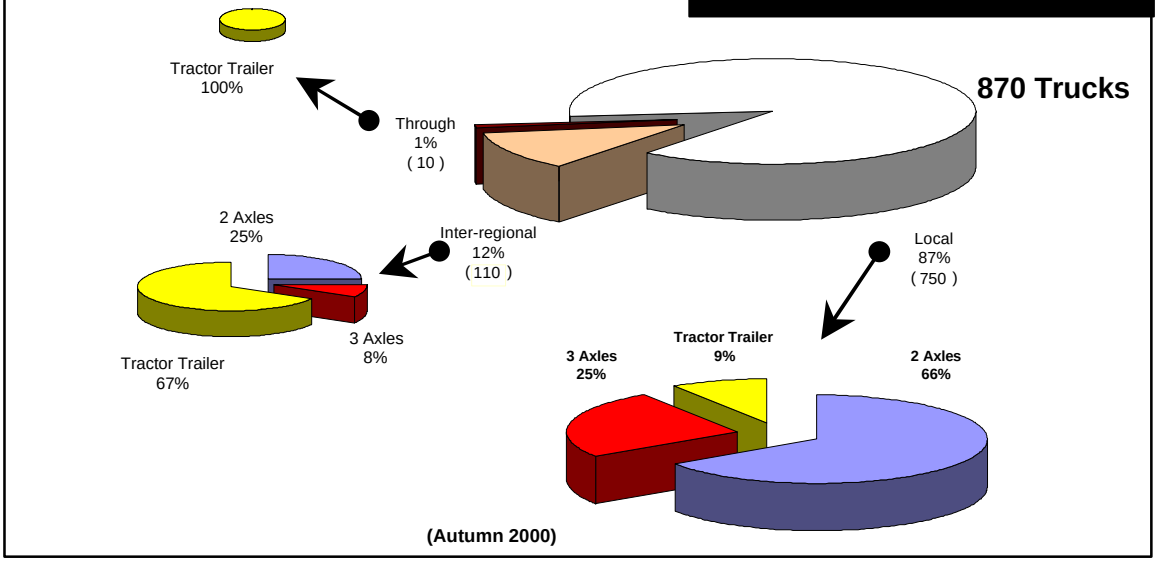
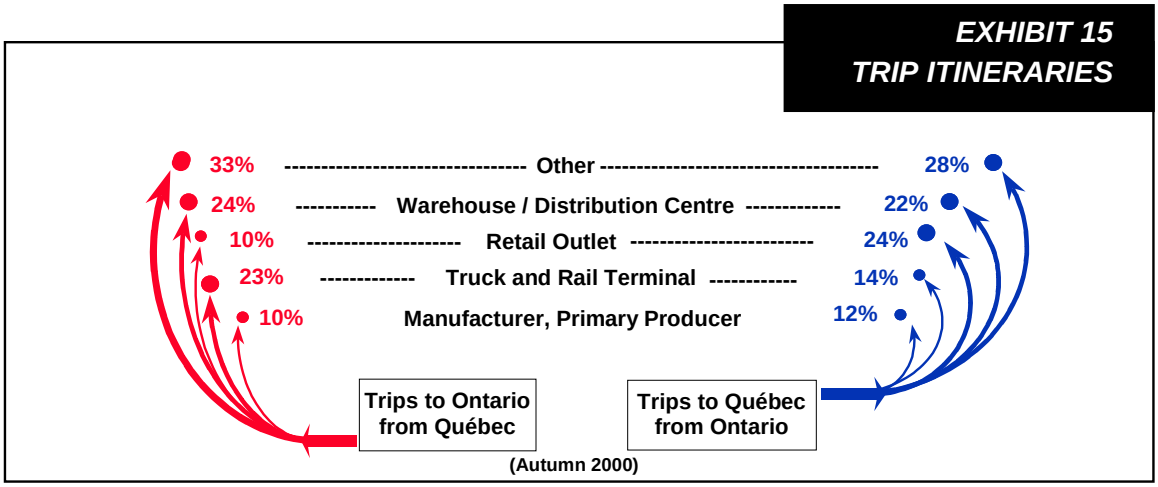


EXHIBIT 15 - TRIP ITINERARIES provides the trip end (destination) facility for, in one case on the left of the exhibit, the trips ending in Ontario and in the other case on the right of the exhibit, the trips ending in Québec. With the exception of the imbalance in the retail trip ends (10% ending in Ontario and 24% ending in Québec) and the truck/rail terminal trip ends (23% ending in Ontario and 14% ending in Québec), the end point of trips is, more or less, in an equilibrium condition.

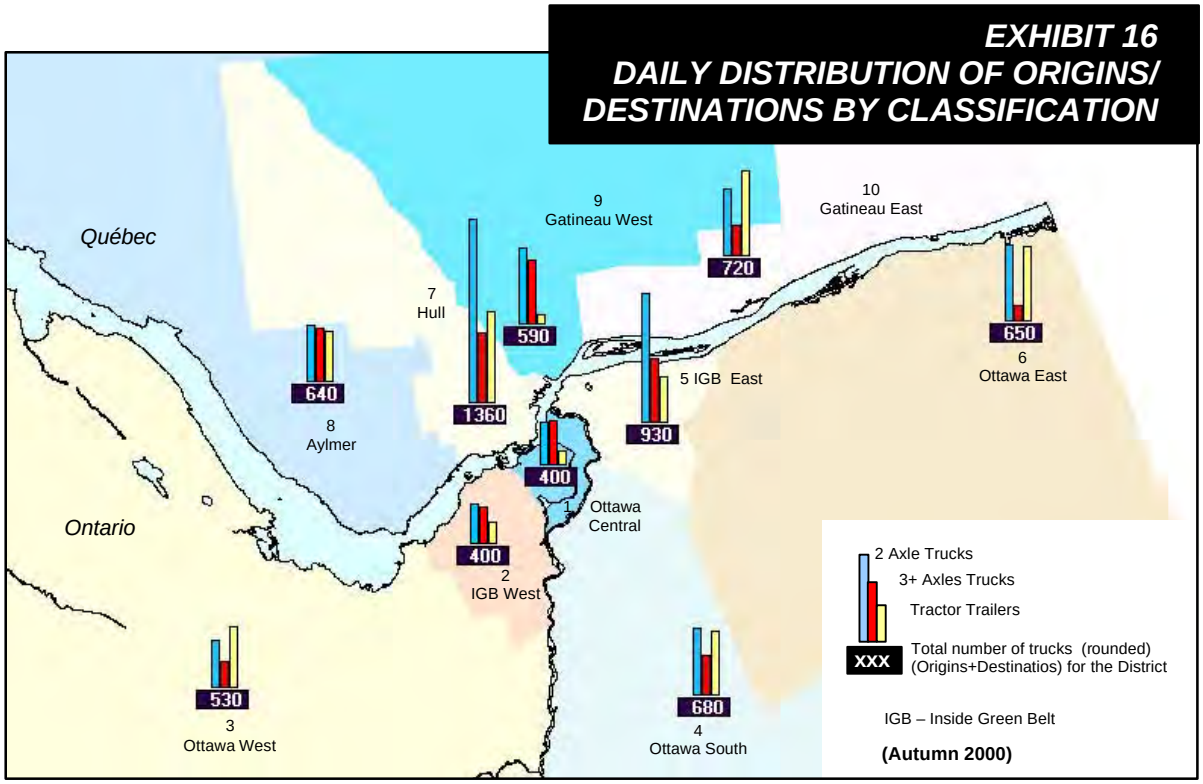


8.4 Origin-Destination Patterns

The most relevant relationships from a transportation planning perspective are the vehicle size and the origin/destination information for the various time periods. Using this information a database was prepared which is as valid and useful as possible and can be applied at the traffic zone system level (258 zones).

As discussed earlier, a 10 district system (an aggregate of the 258 zone system) has been established to present origin/destination information in as clear a format as possible. In this context, origins/destinations beyond the National Capital area have been included in the adjacent district. For example, the “Hull” District includes origin/destinations from a large area extending northerly along Highway 5 and likewise “Ottawa East” includes origin/destinations for a large portion of eastern Ontario as well as areas of Québec east of the Québec-Ontario border (e.g. Montreal).

As an overview of the origins and destinations of all trucks, EXHIBIT 16 - DISTRIBUTION OF ORIGINS/DESTINATIONS BY CLASSIFICATION illustrates the distribution, by "district", of all of the origins/destinations recorded in the survey. There is a reasonably balanced distribution, ranging from a low of 400 (Ottawa Centre and IGB West) to a high of 1360 (Hull) origins/destinations, based on the "district" system which has been applied in the study.



The key characteristics as portrayed on the exhibit are:

- the dominance of the Hull District as an attractor/generator of truck trips (1,360 Origins and Destinations);
- the distribution of generated and attracted trips to/from the nine remaining "districts" varies from 400 to 930 truck trips;
- the variability of the truck classifications from "district to district" is evident; although the two eastern "districts" one on each side of the Ottawa River, which also include origins and destinations outside the National Capital area (e.g. Montreal), have a large proportion of tractor trailer trucks.

Additional data and information are presented, graphically, in Appendix J[10] for the northbound and southbound trips individually.

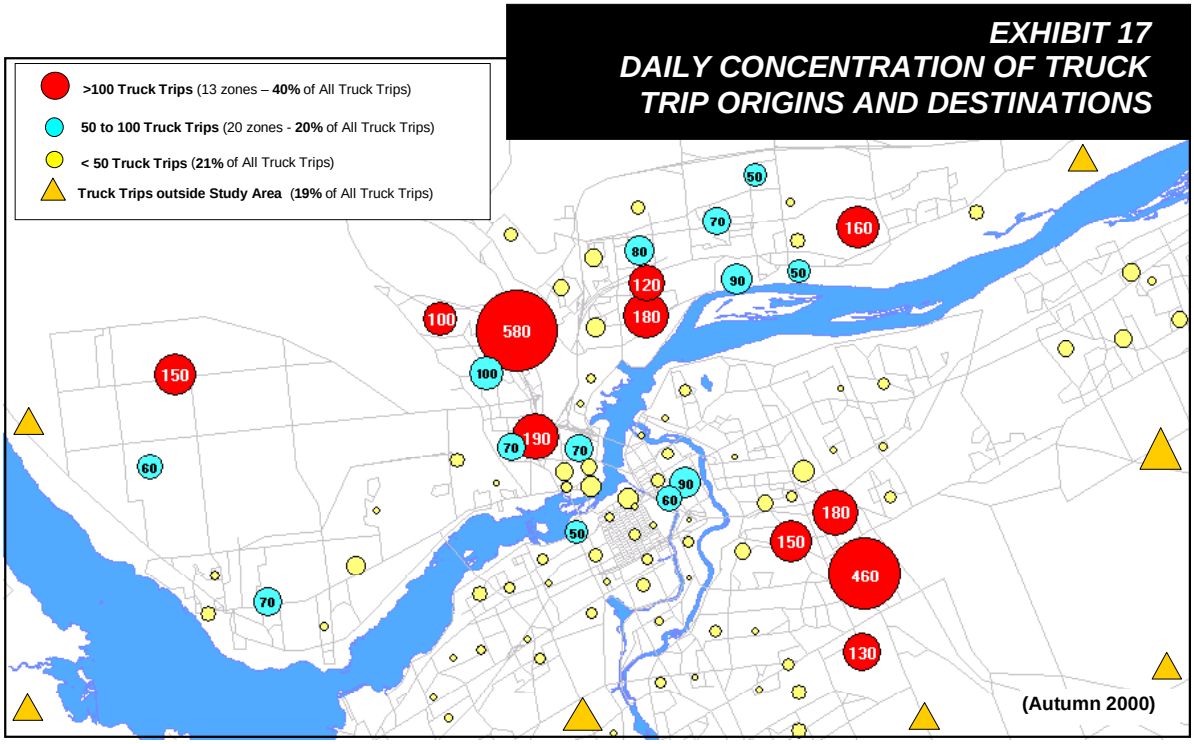
The concentration of the origins and destinations for individual traffic zones is portrayed in EXHIBIT 17 DAILY CONCENTRATION OF TRUCK TRIP ORIGINS AND DESTINATIONS. As would be expected truck trip ends (at least one) are

[10] Appendix J – Origins and Destinations of Truck Trips by Direction

focussed in lands used for industrial purposes - notably in the Industrial Avenue area, in business parks in Ottawa and in the industrial areas of the former cities of Aylmer, Hull and Gatineau.

Thirteen of the 220 urban traffic zones account for approximately 40% of all truck trip ends and a further twenty urban traffic zones account for a further 20% of all truck trip ends.

The data are presented, in tabular form, in Appendix K[11].



Daily Origin-Destination desire lines for all trucks as well as for each truck type are presented in the following four, four-panel exhibits:

- EXHIBIT 18 - DAILY ORIGIN-DESTINATION DESIRE LINES, ALL TRUCK TRIPS (AUTUMN 2000).

- EXHIBIT 19 - DAILY ORIGIN-DESTINATION DESIRE LINES, 2 AXLE TRUCK TRIPS (AUTUMN 2000).

[11] Appendix K – Concentration of Truck Trip Ends

- EXHIBIT 20 - DAILY ORIGIN-DESTINATION DESIRE LINES, 3+ AXLE TRUCK TRIPS (AUTUMN 2000).

- EXHIBIT 21 - DAILY ORIGIN-DESTINATION DESIRE LINES, TRACTOR TRAILER TRIPS (AUTUMN 2000).

On each of these four-panel exhibits, each panel illustrates the desire lines (daily) for trucks to and from each of the four "districts" on the north side of the Ottawa River from and to each of the six "districts" on the south side of the Ottawa River in the autumn of 2000. The information is also provided, numerically, in Appendix L[12].

The "all trucks" trip patterns (Exhibit 18) highlight the role of Hull as a major generator/attractor of truck trips when compared with Aylmer, Gatineau West and Gatineau East. The exhibit also presents trip interchanges with each of six districts on the Ottawa side of the Ottawa River.

Two axle truck patterns (Exhibit 19) are similar to the patterns of "all trucks" with downtown Hull again dominating the generation and attraction of trips. East Gatineau trips have an orientation to the eastern "districts" in Ottawa.

Three axle trucks (Exhibit 20) seem to have an "affinity" for the corresponding "districts" on the opposite side of the river. That is, west "districts" on the north side of the Ottawa River attract trips to/from west "districts" on the south side of the Ottawa River. Similarly, east "districts" on the north side attract trips to/from east "districts" on the south side of the Ottawa River.

For tractor trailers (Exhibit 21), Hull again has the largest number of trips with strong interchanges with Ottawa East and Ottawa West. Gatineau East and, to a slightly less extent, Aylmer, are also prominent with strong interchanges with Ottawa East, Ottawa West and Ottawa South.

The Ottawa Central "district" serves as a destination for the fewest number of tractor trailer trips.

More detailed comments are provided in Appendix M[13].

[12] Appendix L – Tabulations of Trip Origins-Destinations by Truck Classification
[13] Appendix M - Detailed Comments on Trip Origins and Destinations

EXHIBIT 18
ORIGIN-DESTINATION DESIRE LINES
ALL TRUCK TRIPS (AUTUMN 2000)

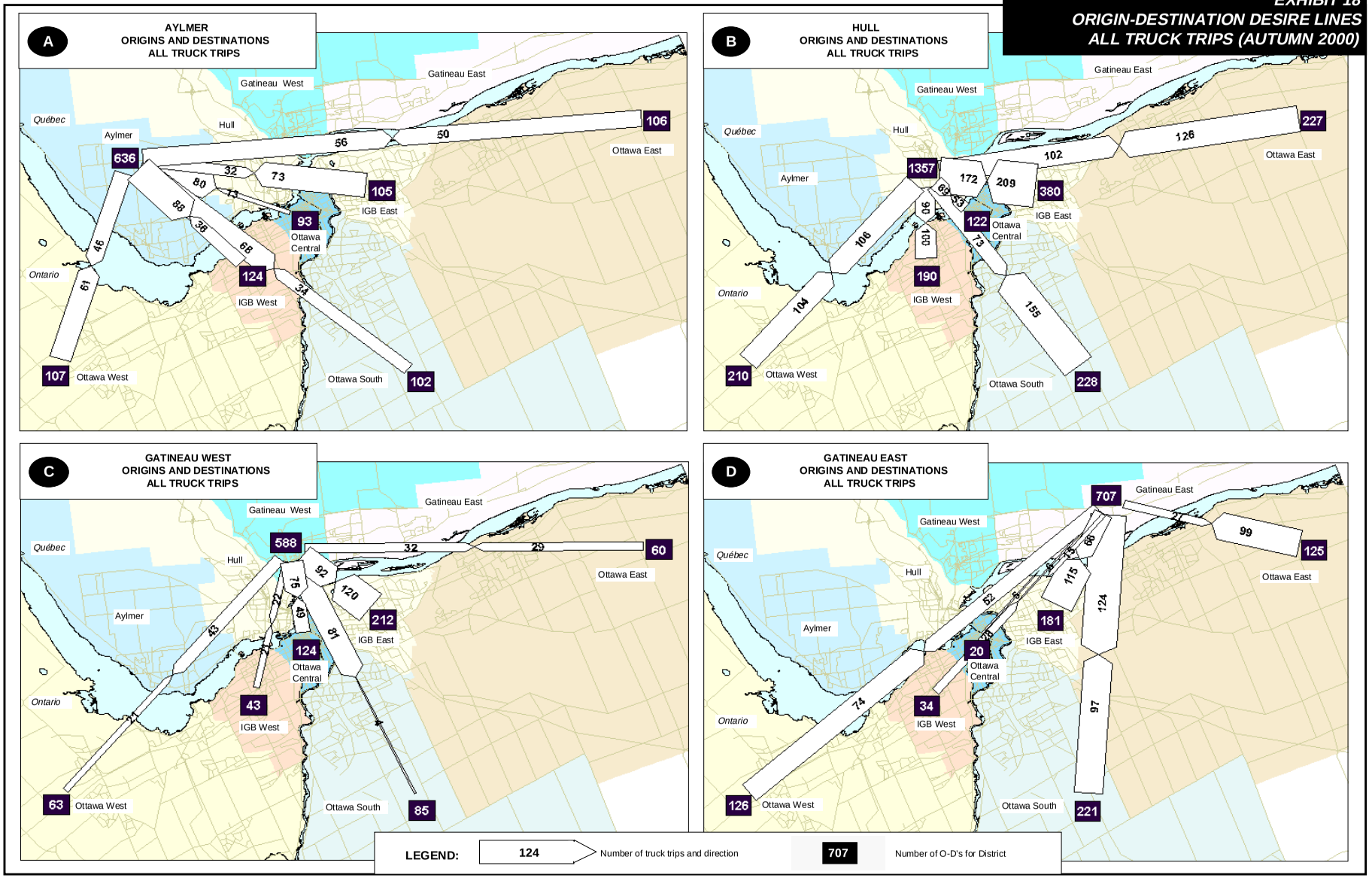


EXHIBIT 19
ORIGIN-DESTINATION DESIRE LINES
2 AXLE TRUCK TRIPS (AUTUMN 2000)

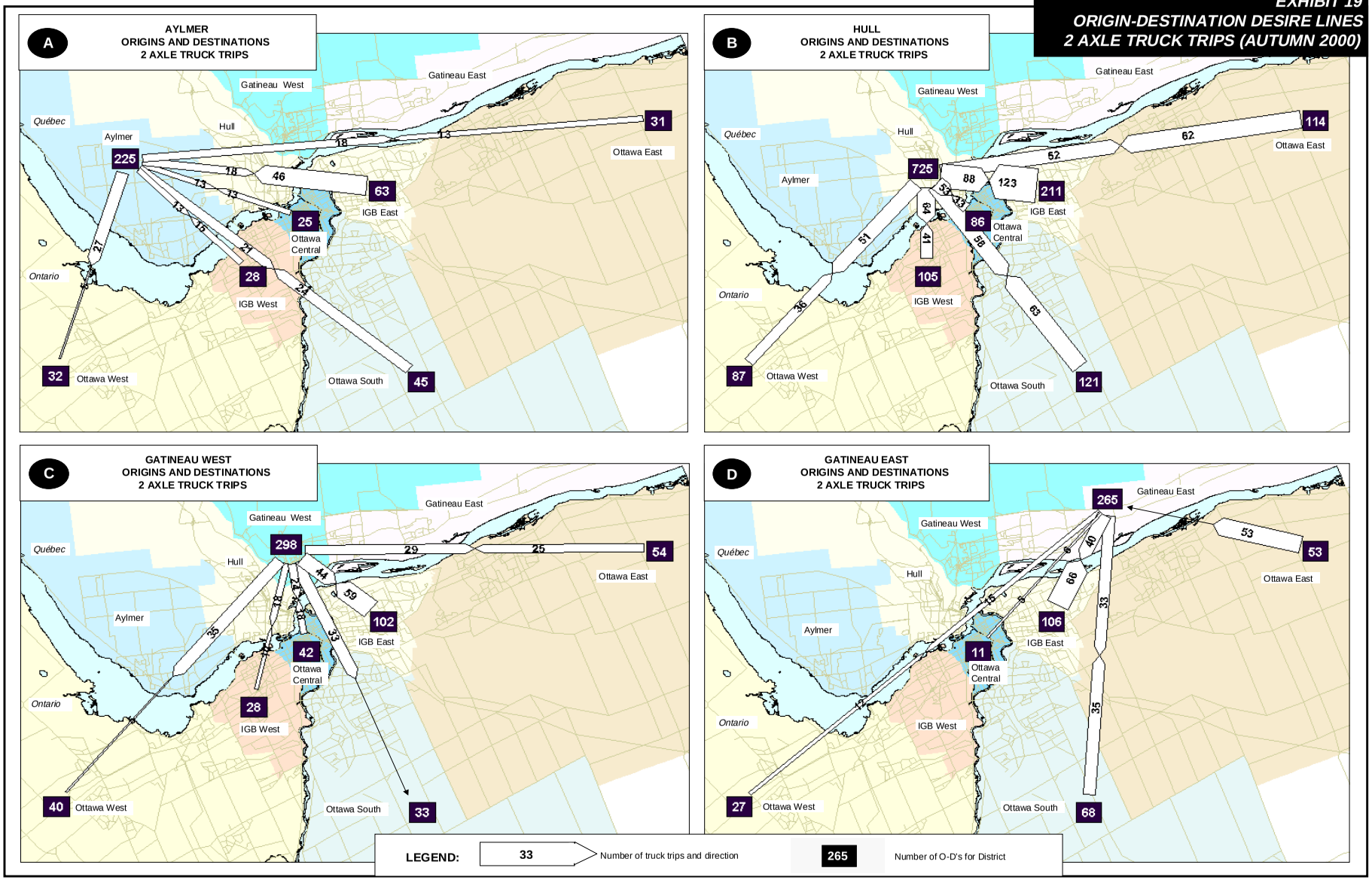


EXHIBIT 20
ORIGIN-DESTINATION DESIRE LINES
3+ AXLE TRUCK TRIPS (AUTUMN 2000)

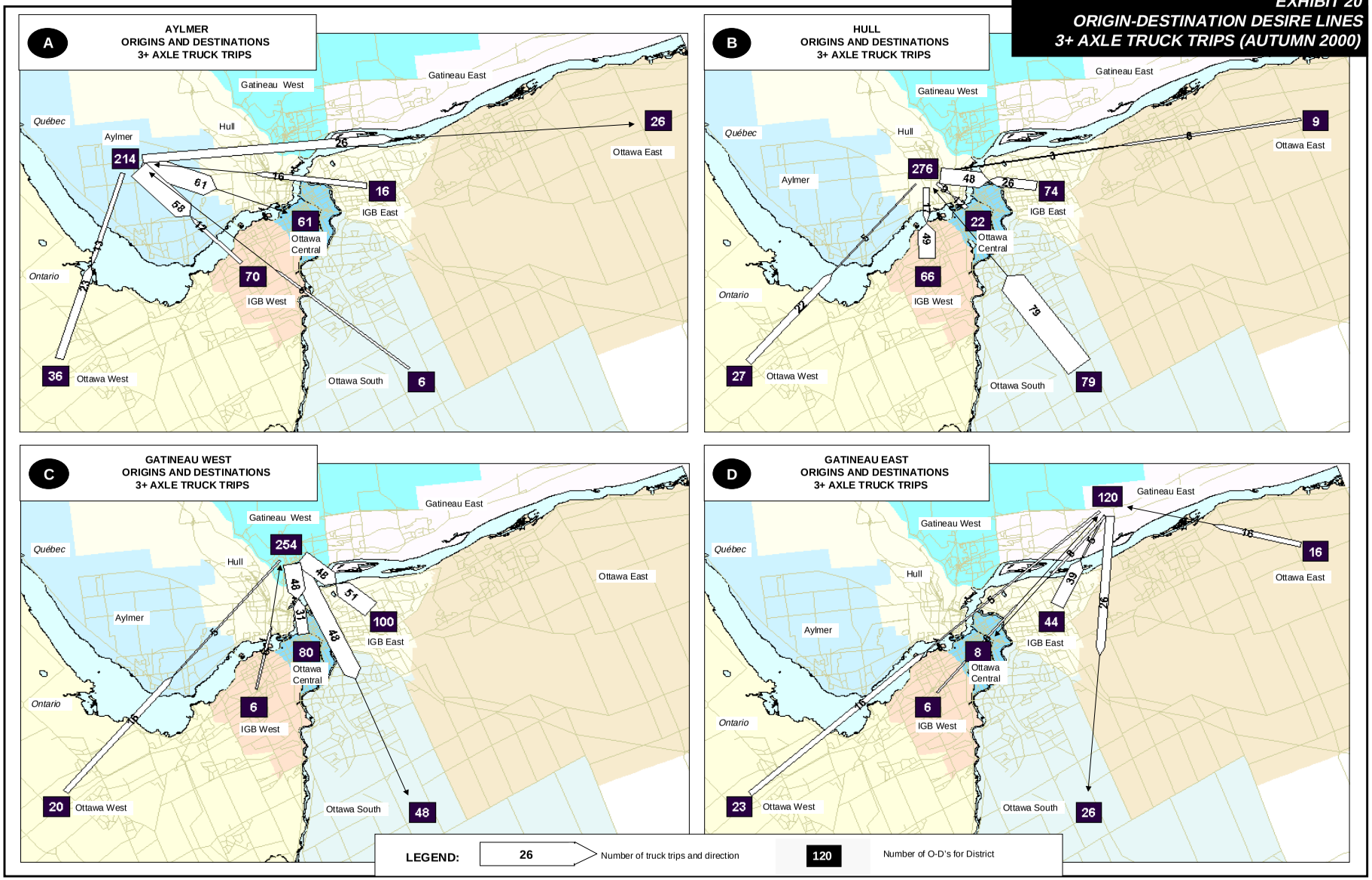
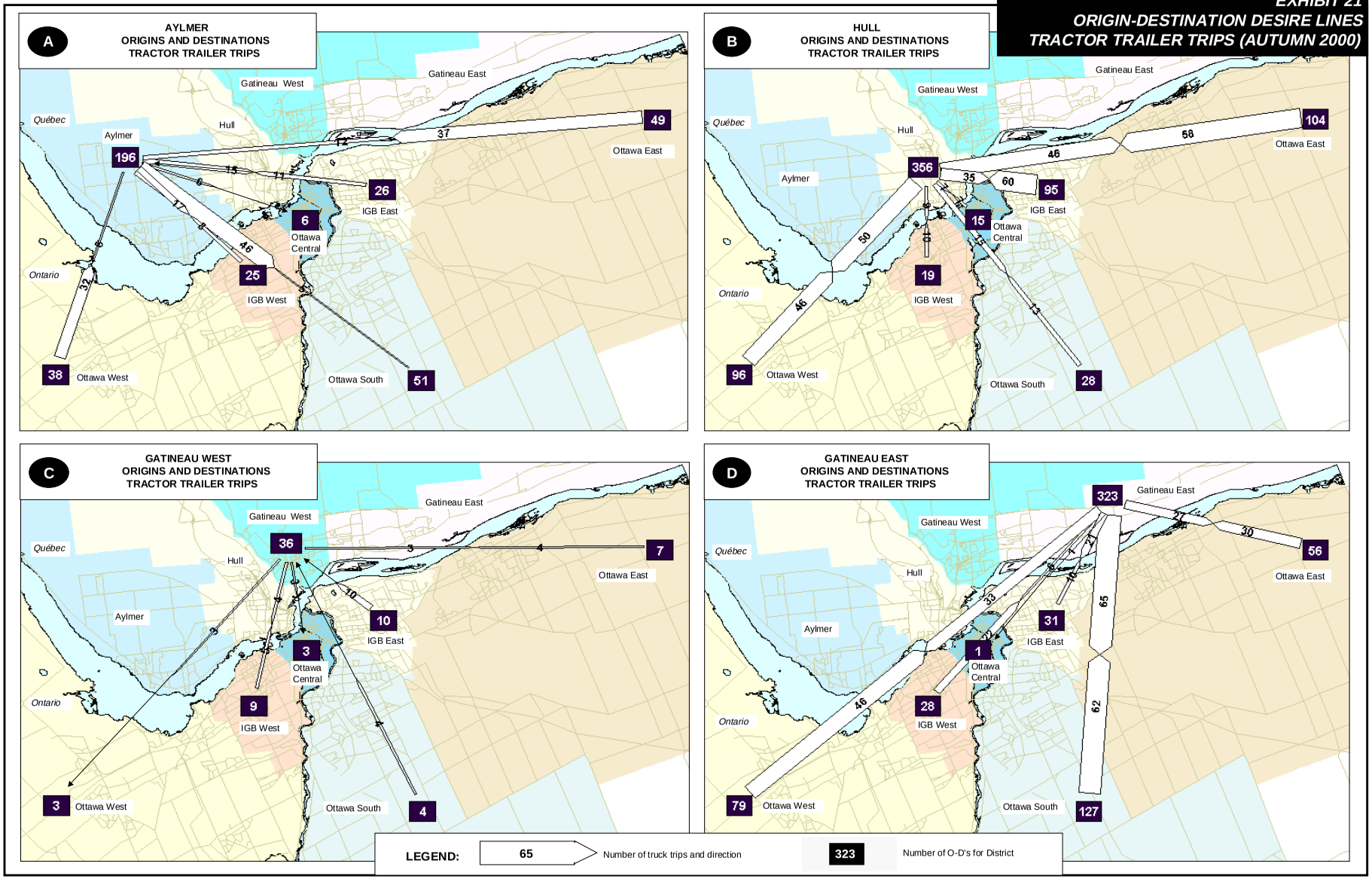


EXHIBIT 21
ORIGIN-DESTINATION DESIRE LINES
TRACTOR TRAILER TRIPS (AUTUMN 2000)



8.5 Vehicle Loading and Commodities

The survey reported that 2,075 trucks were carrying goods while 1,375 trucks were empty for a total of 3,450 trucks per day.

Of those drivers responding to the type of commodity carried, 185 different commodities were identified. The commodities were grouped into eight categories. A complete listing of the commodities and the group with which the commodity is categorized is provided in Appendix N[14].

A graphical and numerical representation of the frequency with which a particular commodity was identified as having been carried is provided, subdivided into the three truck classifications, in EXHIBIT 22 – GOODS CARRIED PER DAY.

Also indicated on Exhibit 22 are the distributions of the truck classification/commodity by time of travel [day (07:00 to 19:00) and night (19:00 to 07:00)].

The five most frequently reported commodities as illustrated in Exhibit 22 for all trucks are:

- construction materials (475 trips)
- food and beverage (415 trips)
- general merchandise (360 trips)
- paper and paper products (310 trips)
- wood and wood products (195 trips)

Origin-destination trip tables have been prepared for those commodities for which it was deemed likely to provide some defined pattern of desire lines - construction materials, general merchandise, paper/paper products and wood/wood products.

The exclusion of the "food and beverage" category was based on the expected widely dispersed trip patterns associated with this category. The purpose here is to highlight significant differences among the trip patterns associated with the major commodity groups and is not intended to influence the perception of anyone who will conduct a more thorough analysis of the data.

The key characteristics for individual commodities are as follows:

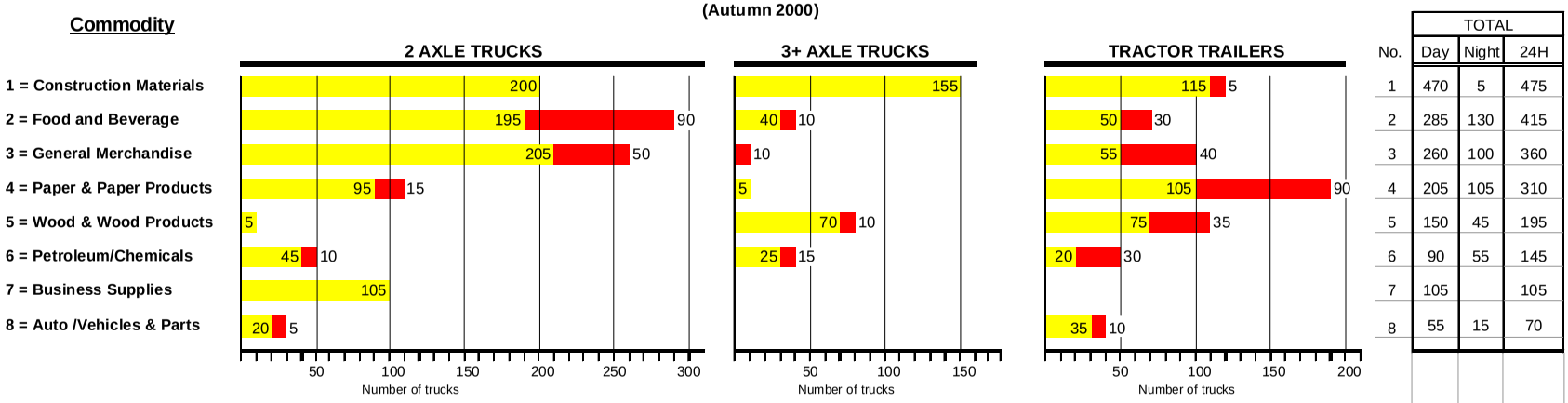
- for construction materials, the dominance of the Aylmer to Ottawa Central trip pattern;

[14] Appendix N – Categories of Commodities

:

EXHIBIT 22
GOODS CARRIED PER DAY

GOODS CARRIED
Ottawa River Crossing by Truck Type
(Autumn 2000)



	2 AXLE TRUCKS			3+ AXLE TRUCKS			TRACTOR TRAILERS			TOTAL		
No.	Day	Night	(24H)	Day	Night	(24H)	Day	Night	(24H)	Day	Night	24H
1	200			155			115	5		470	5	475
2	195	90		40	10		50	30		285	130	415
3	205	50		10			55	40		260	100	360
4	95	15		5			105	90		205	105	310
5	5			70	10		75	35		150	45	195
6	45	10		25	15		20	30		90	55	145
7	105									105		105
8	20	5					35	10		55	15	70
Trucks with Commodities	**870**	**170**	**1040**	**295**	**45**	**340**	**455**	**240**	**695**	**1620**	**455**	**2075**
Trucks without Commodities	385	125	510	465	75	540	240	85	325	1090	285	1375
Total Trucks	1255	295	1550	760	120	880	695	325	1020	2710	740	3450

LEGEND:

Commodity groupings

1 = Construction Materials (drywall,concrete, windows, trusses)
2 = Food and Beverage (processed food and beverage)
3 = General Merchandise (mixed freight, furniture, boxes)
4 = Paper & Paper Products (paper, newsprint, toilet paper)
5 = Wood & Wood Products (lumber, logs, chip board)
6 = Petroleum/Chemicals (gasoline/fuel/salt/lime)
7 = Business Supplies (printing supplies, office furniture, government records)
8 = Auto/Vehicles & Parts (cars, auto parts, tires)

Day time (7:00 - 19:00)
Night time (19:00 - 7:00)

- for general merchandise, the expected widely dispersed trip patterns;

- for paper/paper products, the dominant interchange of trips between Hull and Ottawa (both East and West) and between Gatineau East and Ottawa South;

- for wood/wood products, the dominance of the Aylmer and Gatineau West trips to Ottawa South.

Additional information on commodity patterns is presented in Appendix O[15].

EXHIBIT 23 -DAILY COMMODITY FLOW - MACDONALD-CARTIER BRIDGE and EXHIBIT 24 -DAILY COMMODITY FLOW - CHAUDIÈRE BRIDGE illustrates commodity flow for each bridge, by the three truck classifications and by the type of commodity carried (including "empty" trucks). Of particular interest is:

- the proportion of tractor trailers in the truck stream on the Macdonald-Cartier Bridge (34%) compared to the Chaudière Bridge (17%);

- the approximately equal proportions of 3+ axle trucks in the truck stream on each of the Macdonald-Cartier Bridge and Chaudière Bridge;

- the proportion of trucks carrying petroleum/chemical products hauled by 3+ axle trucks is 13% and by tractor trailers is 11% on the Chaudière Bridge;

- the proportion of the tractor trailer trucks hauling paper products is 19% on the Macdonald-Cartier and 17% on the Chaudière Bridge;

- the proportion of tractor trailer trucks carrying wood products on the Macdonald-Cartier Bridge is 12%;

- the proportion of the empty trucks, notably the 3+ axle trucks is 64% on the Macdonald-Cartier and 54% on the Chaudière Bridge, as discussed in Section 7.2.

[15] Appendix O – Trip Origins and Destinations for Specific Commodities and Detailed Comments

EXHIBIT 23
DAILY COMMODITY FLOW
-MACDONALD-CARTIER BRIDGE

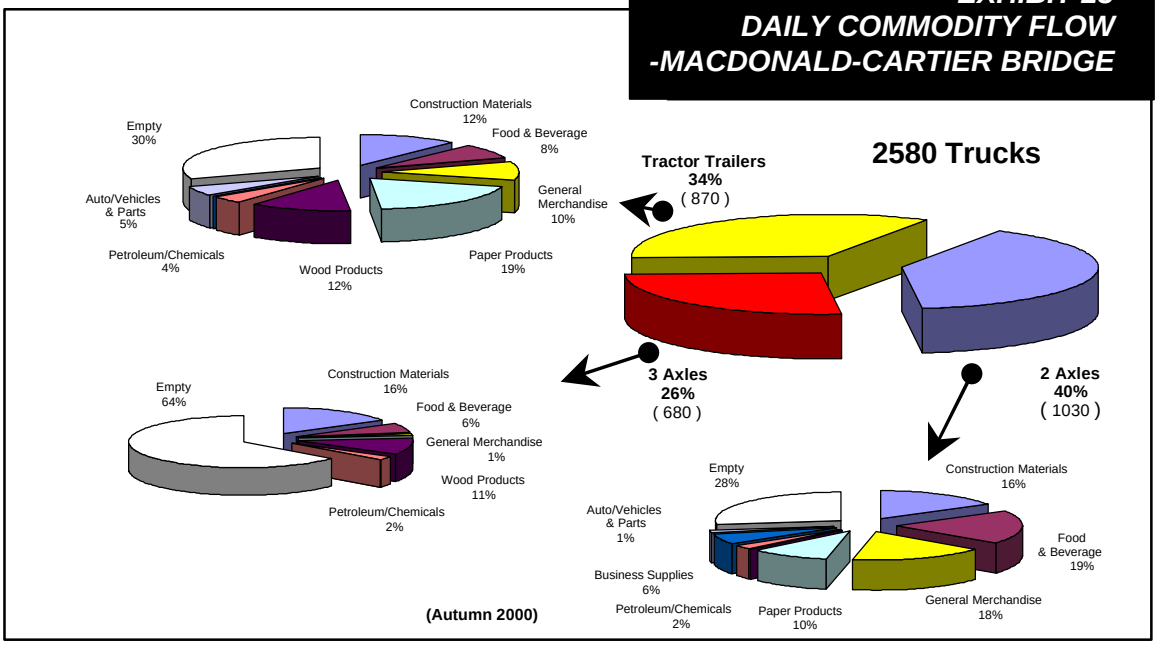
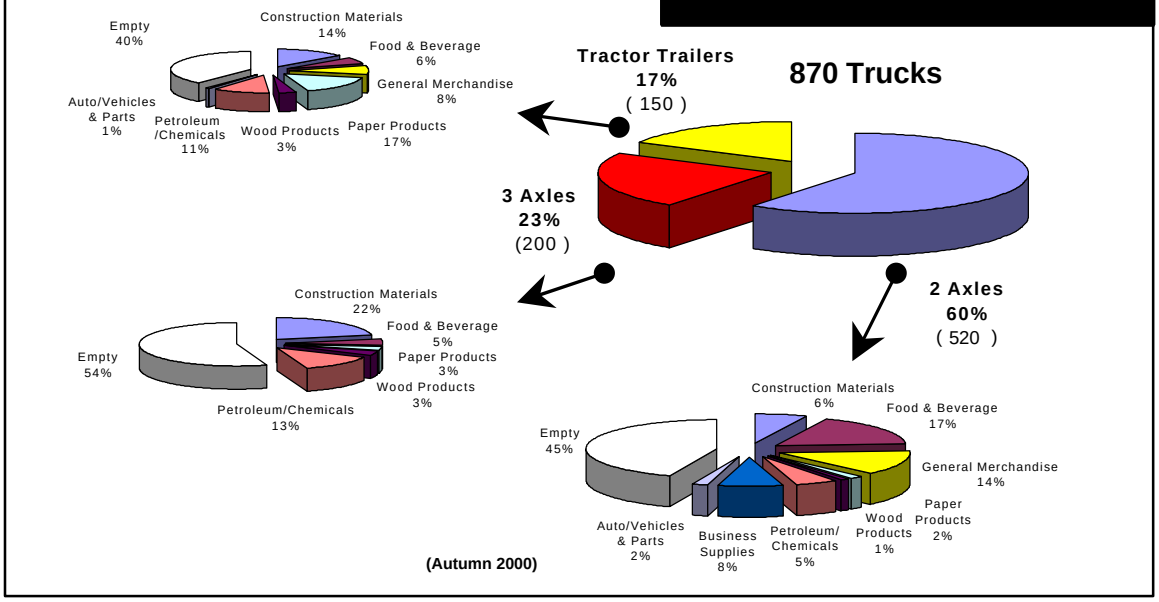


EXHIBIT 24
DAILY COMMODITY FLOW
-CHAUDIÈRE BRIDGE



9.0 SUMMARY

Information in this report is presented at the most aggregate level with the purpose of developing a good understanding of the interprovincial trip patterns, origins, destinations and characteristics of trucks in Canada's Capital Region. This report is not intended to deal with specific interprovincial transportation issuess. Detailed analysis of the comprehensive data base would be necessary to assess the impact of new or improved infrastrucure on interprovincial truck traffic, and would be a prerequisite for reaching any meaningful conclusions regarding future interprovincial transport needs.

The 1999 / 2000 Interprovincial roadside truck survey provides:

- An effective database of high quality, strong and meaningful information for application in future transportation planning activities;
- The basis for a more thorough understanding of interprovincial truck movements;
- An efficient means of evaluating costs and benefits in assessing alternative solutions to interprovincial truck travel issuess;
- A thorough understanding of the interprovincial movement patterns, origins and destinatioons, and characteristics of heavy trucks in the National Capital Region.

10.0 LIST OF APPENDICES

The **1999/2000 Interprovincial Roadside Truck Survey Technical Appendices** have been bound separately and contain the following:

Appendix A Survey Database Fields

Appendix B Heavy Truck Classification System

Appendix C Summary of Historical Ottawa River Crossing Truck Traffic Volumes

Appendix D Time Period Relationships

Appendix E Traffic Zones Comprising the Districts

Appendix F "District" Comparison of Trucks by Number

Appendix G "District" Comparison of Trucks by Percent

Appendix H Survey Expansion Factors

Appendix I Trip Characteristics

Appendix J Origin and Destination of Truck Trips by Direction

Appendix K Concentration of Truck Trip Ends

Appendix L Tabulations of Trip Origins-Destinations by Truck Classification

Appendix M Detailed Comments on Trip Origins and Destinations

Appendix N Categories of Commodities

Appendix O Trip Origins and Destinations for Specific Commodities and Detailed Comments

TRANS

A Joint Technical Committee on Transportation Systems Planning
Un Comité technique conjoint sur la planification de systèmes de transport

1999/2000 INTERPROVINCIAL ROADSIDE TRUCK SURVEY
TECHNICAL APPENDICES

ENQUÊTE ROUTIÈRE INTERPROVINCIALE SUR LE CAMIONNAGE 1999/2000
ANNEXES

McLean Transportation Engineering Consultants Ltd

Ottawa · OCTranspo · Ontario · National Capital Commission / Commission de la Capitale nationale · Transports Québec · STO · Ville de Gatineau

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1999/2000
INTERPROVINCIAL ROADSIDE TRUCK SURVEY

TECHNICAL APPENDICES

Prepared for

TRANS

A Joint Technical Committee on Transportation Systems Planning

By

McLean Transportation Engineering Consultants Ltd

June 2002

LIST OF APPENDICES

Appendix A: Survey Database Fields

SURVEY DATABASE FIELDS-DETAILED INFORMATION

(Same as 1999 NRS)

Answer Output Database

Note: This version of the description includes the field and answer changes made in July 1999 when the questionnaire was shortened.

Each record in the answer output database contains the answers collected from one questionnaire. The fields of the database, which is named STUDY.DBF, are explained in the table at the end of this appendix. For each field the table lists the following information.

Reference — A cross-reference between the field and other documents.

- Questionnaire — A code of format "c.nn" that denotes the question on the 1999 Questionnaire to which the field corresponds, where:
  - "c" is the section of the questionnaire (e.g., section “B” is the "Scope" section); and
  - "nn" is the question number in the section (e.g., .”01”, “02”, etc.).

Field — Field specification.

- Name — A code of format “aaabbbbbbb”, where:
  - “aaa” is the number of the question on the 1999 Questionnaire to which the field corresponds (the same number “c.nn” as discussed above except that the “.” is not included); and
  - “bbbbbbb” represents 1 or more words that describe the related question and the field contents. The following rules are applied when creating “bbbbbbb”.
    - A word is presented in full or as a short form, the short form being:
      - the first 1 letter;
      - the first 3 letters; or
      - the first 6 letters.
    - “S” as the last letter usually means that the field marks the “status” of the contents of another field.
    - “D” as the last letter usually means that the field contains a hand-written “description” that has been entered because the predetermined list of answers does not capture the actual answer.
    - “U” as the last letter usually means that the field records the “units of measurement” that apply to the contents of another field.
- Type — Type of information stored ("N"=numeric; "C"=character; "L"=logic; “D”=Date).
- Length — Length of the field (total number of digits or characters (including the “.” used for floating point numbers but excluding the “/” that appears in dates).
- Decimals — Number of digits after the decimal point (valid only for a numeric field).

• Index	Whether the field is used in an index ("N"=no; "Y"=yes).
Information	A description of the field and the values that can legitimately appear in the field.
Whether Question Depends on Previous Answers	Flags cases where the question pertaining to the field is conditional. The question may be active (asked) or inactive (skipped) depending on the answers to previous questions. *The actual dependency relationships are described in Appendix F.*
Whether Answer is Checked for Plausibility	Flags cases where the answer in numeric fields is checked for plausibility against criteria. *The actual plausibility checks are described in Appendix G.*

Following are notes on various aspects of the table.

Concerning Field Order: The order in which the fields are listed in the table matches the order of the questions on the questionnaire to which the fields relate. The software internal fields (fields used by the software that are not related to particular questions) are listed at the beginning of the table.

Concerning Answer Codes: There are several codes used in answers that are reserved for specific situations (to the extent possible). These are listed below.

Reserved Answer Codes		
Code		**Meaning of Answer**
When Field is Numeric	**When Field is Alphanumeric**	
95		Other (the answer is not one of the choices specifically identified by the question).
96	X	Not Applicable (the question was not asked because it was not applicable).
97	T	Terminated (driver terminated interview before this question could be asked).
98	R	Refused (driver refused to answer this question).
99	D	Don't Know (driver/surveyor did not know the answer to the question).

Concerning the Usability of the Record: The state of a record is marked by answers stored in 2 fields. These answers are used to identify whether the record contains a valid observation for the NRS.

- QTYPE -- This marks whether the record was generated by a "live" questionnaire (actual observation of a truck that is part of the NRS data collection) or by a "practice" questionnaire (completed for training purposes).
- QSTATUS -- This marks whether the record was "study usable" (questionnaire completed by answering the necessary questions (specifically the "Confirm Completion" screen was reached)), "abandoned (questionnaire not completed by surveyor's choice to use "abandonment" button) or "failure" (questionnaire not completed because of computer malfunction).

Concerning Date and Time Stamp Fields. Certain fields contain dates and times that are entered automatically by the QS using values from the handheld computer's internal clock. Values are entered into these fields only during the original entry of answers session with the

questionnaire. During subsequent editing of answers sessions with the questionnaire the date and time fields are not changed by the QS and can not be changed by the surveyor, with the exception of the A05QSDATE, A06HOUR, and A06MIN field values. The date and time stamp fields are described below.

- A05QSDATE, A06HOUR, A06MIN -- These contain the date/time at which the questionnaire was started. Specifically, the date/time at which the QS reached the first screen of the Scope section of the questionnaire (the screen that asks if the truck is a cargo type, etc.). The purpose of this date/time is to mark when the truck was observed. The values are automatically entered by the QS, but the values can be edited by the surveyor during the original entry of answers session or during subsequent editing of answers sessions.
- PA05QSDATE, PA06HOUR, PA06MIN -- These permanently contain the first values that were automatically entered by the QS to A05QSDATE, A06HOUR and A06MIN.
- QEDATE, QEHOUR, QEMINUTE -- These contain the date/time at which the original entry of answers session ended. Specifically, the date/time at which the QS passed the “Confirm Completion” screen.
- ISTDATE, ISTHOUR, ISTMINUTE -- These contain the date/time at which the driver interview started. Specifically, the date/time at which the QS reached the first screen of the Interview Start section of the questionnaire (the screen that asks for the driver's participation/refusal).
- IENDDATE, IENDHOUR, IENDMINUTE -- These contain the date/time at which the driver interview ended. Specifically, the date/time at which the QS exits the driver interview sections of the survey, by the surveyor either (1) pressing the *End Survey* button option on any of the screens or (2) pressing the *Next Screen* button after completing the last screen (the screen that asks about the driver's recent training).

Concerning Geographic Coordinates Format

- Longitude -- Longitude is expressed in decimal degrees. The values range from -180 to +180. A positive value denotes a location west of the prime meridian. A negative value denotes a location east of the prime meridian.
- Latitude -- Latitude is expressed in decimal degrees. The values range from -90 to +90. A positive value denotes a location in the northern hemisphere. A negative value denotes a location in the southern hemisphere.

Concerning Out-of-Scope Trucks: Trucks in the scope of the NRS are "heavy cargo trucks", which are defined as trucks:

- of a type normally used to move cargo from one point to another point;
- that meets the definition of *commercial vehicle* under the National Safety Code (meaning a truck, tractor or combination thereof with a registered gross vehicle weight greater than 4,500 kilograms).

Concerning the size of a heavy truck, the following two practical definitions will be used.

- To facilitate visual identification, heavy trucks will consist of *trucks that have 6 or more tires*.
- To facilitate identification by automatic vehicle classifier equipment that use vehicle length as the basis for differentiating between sizes of vehicle, heavy trucks will consist of *trucks that are longer than 20 feet*.

Therefore, trucks are out of the scope of the NRS for the following reasons.

- Light trucks of 4,500 kilograms or less, which is defined as any straight truck with 4 tires (with or without a trailer).
- Non-cargo type trucks, which include:
    - mobile machines (any straight truck without a trailer that has a permanently attached machine (i.e., the truck exists to move the machine around) -- examples include:
        - crane
        - drill rig
        - seismic rig
        - boom/cherry picker/ladder
        - curb/road/sidewalk cutter
        - concrete pump
        - rock crusher
        - carnival ride
    - emergency truck -- examples include:
        - fire truck
        - ambulance
        - police vehicle
    - service truck -- examples include
        - hydro truck
        - road painter
        - snow plow
        - road sweeper
    - a tow truck (with or without vehicle) that moves a vehicle by means of a sling/hook mounted at the back (i.e., some of the vehicle's wheels are on the road)

But, if any of the above listed trucks has a trailer attached that can be used to carry cargo, then the truck **is** a cargo truck for the purposes of the NRS. For example, a hydro service truck that is pulling a trailer loaded with telephone poles is a cargo truck.

Note that cargo truck includes:

- any tractor pulling a trailer regardless of the trailer (for example the trailer could be a permanently attached machine);
- a concrete mixer; and
- a sewer cleaning truck if it has a holding tank.

Concerning Definition of a Trip -- Refer to Reference 6.

Concerning Border Crossings -- Refer to Reference 6.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
Z. **Software Internal Fields** (not related to questions on the Study Questionnaire)							
		QID	C	8	0	N	Questionnaire IDentifier -- Uniquely identifies one questionnaire among all questionnaires generated on all computers used in the NRS.
		QSTATUS	C	1	0	N	Questionnaire STATUS -- Marks whether the "necessary" questions were completed in the original entry of answers session. S = Study usable (completed) A = Abandoned (not completed -- "abandon" button used) F = Failure (did not pass "Confirm Completion" screen)
		QTYPE	C	1	0	N	Questionnaire Type -- Marks why the questionnaire was entered. L = Live (actual observation of a truck for the NRS) P = Practice (training)
		DISTATUS	C	1	0	N	Driver Interview STATUS -- Marks whether all the driver interview questions were asked (conversely whether the driver terminated the interview). A = All questions asked I = Incomplete interview (driver terminated before all questions asked)
		DILAST	C	3	0	N	Driver Interview LAST questions completed -- Identifies the last screen of questions completed before the driver terminated the interview. blank = not applicable (driver interview not terminated) ccc = section letter and tab number for the last screen with all answers completed (e.g., "F02")
		PA01JUR	C	4	0	N	Permanent copy of the original value of A01JUR
		PA02SITE	C	8	0	N	Permanent copy of the original value of A02SITE
		PA02DCSSEL	C	75	0	N	Permanent copy of the original value of A02DCSSEL
		PA04DIRECT	C	1	0	N	Permanent copy of the original value of A04DIRECT
		PA05QSDATE	D	8	0	N	Permanent copy of the original value of A05QSDATE
		PA06QSHOUR	N	2	0	N	Permanent copy of the original value of A06QSHOUR
		PA06QSMIN	N	2	0	N	Permanent copy of the original value of A06QSMIN
		QEDATE	D	8	0	N	Questionnaire End DATE -- When questionnaire completed. Format: YYYYMMDD. *See description of date and time fields that precedes this table.*
		QEHOUR	N	2	0	N	Questionnaire End HOUR -- When questionnaire completed. Format: 24 hour clock. *See description of date and time fields that precedes this table.*
		QEMINUTE	N	2	0	N	Questionnaire End MINUTE -- When questionnaire completed. *See description of date and time fields that precedes this table.*

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
		ISTDATE	D	8	0	N	Interview STart DATE - When driver interview section of questionnaire started. Format: YYYYMMDD. *See description of date and time fields that precedes this table.*
		ISTHOUR	N	2	0	N	Interview SSart HOUR - When driver interview section of questionnaire started. Format: 24 hour clock. *See description of date and time fields that precedes this table.*
		ISTMINUTE	N	2	0	N	Interview STart MINUTE - When driver interview section of questionnaire started. *See description of date and time fields that precedes this table.*
		IENDDATE	D	8	0	N	Interview END DATE - When driver interview sections of questionnaire completed. Format: YYYYMMDD. *See description of date and time fields that precedes this table.*
		IENDHOUR	N	2	0	N	Interview END HOUR - When driver interview sections of questionnaire completed. Format: 24 hour clock. *See description of date and time fields that precedes this table.*
		IENDMINUTE	N	2	0	N	Interview END MINUTE - When driver interview sections of questionnaire completed. *See description of date and time fields that precedes this table.*
		XOBSERV	L	1	0	N	Questionnaire Observations Section: F (or 0) = not started T (or 1) = partially or completely filled in
		XSCOPE	L	1	0	N	Scope Section Results -- Whether truck is in-scope. F (or 0) = not-in-scope T (or 1) = in-scope
		XWEIGHTS	L	1	0	N	Questionnaire Weights and Measures Section: Same answers as for *Questionnaire Observations Section*
A. **Identification** Section							
A.01		A01JUR	C	4	0	N	JURisdiction -- Province/territory in which DCS is located. *The codes are listed in Appendix H.*
A.02		A02SITE	C	8	0	N	SITE ID -- Unique identifier assigned to the DCS. *The codes are listed in Appendix H.* **Note**: Identifier is filled automatically by the computer when DCSSEL is selected from the pick-list.
A.02		A02DCSSEL	C	75	0	N	DCS SELector -- Specification of the DCS that is used for selection (the pick-list entry). Format: DCS name + traffic direction description.
A.02		A02DCSLON	N	11	6	N	DCS LONgitude -- Longitude of the DCS. *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer when DCSSEL is selected from the pick-list.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
A.02		A02DCSLAT	N	11	6	N	DCS LATitude -- Latitude of the DCS. *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer when DCSSEL is selected from the pick-list.
A.03		A03SURVEY	C	3	0	N	SURVEYor - ID assigned to the surveyor filling-in the questionnaire. Unique at the DCS.
A.04		A04DIRECT	C	1	0	N	DIRECTion -- Direction of traffic being interviewed at DCS. N = Northbound E = Eastbound S = Southbound W = Westbound
A.05		A05QSDATE	D	8	0	N	Questionnaire Start DATE -- When questionnaire started. Format: YYYYMMDD. *See description of date and time fields that precedes this table.*
A.06		A06QSHOUR	N	2	0	N	Questionnaire Start HOUR -- When questionnaire started. Format: 24 hour clock. *See description of date and time fields that precedes this table.*
A.06		A06QSMIN	N	2	0	N	Questionnaire Start MINute -- When questionnaire started. *See description of date and time fields that precedes this table.*
.							
B. **Scope** Section							
B.01		B01CARTYP	C	1	0	N	CARgo TYPe truck -- Whether the type of truck or type of truck body is capable of carrying cargo or usually used for carrying cargo. Y = Yes N = No **Note**: "N" marks an out-of-scope truck. **Note**: *See description of out-of-scope trucks that precedes this table.*
B.02		B02OOSTYP	C	20	0	N	Out-Of-Scope truck TYPe blank = not applicable (truck is cargo type) something = description of the non-cargo type truck **Note**: *See description of out-of-scope trucks that precedes this table.*
B.03		B03STR4T	C	1	0	N	STRaight truck with 4 Tires -- Whether truck is a straight truck with 4 tires (with or without a trailer). Y = Yes N = No **Note**: "Y" marks an out-of-scope truck.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
B.04		B04AXLOOS	N	2	0	N	AXLes on Out-Of-Scope truck -- Number of axles on the truck if it is out-of-scope (all axles on the straight truck/tractor and trailers). 2 to 12 = number of axles 96 = not applicable (truck is in-scope)
C. **Observations** Section							
C.01		C01CONF	N	2	0	N	CONFiguration of truck -- Type of configuration. 1 = tractor & 1 trailer 2 = tractor & 2 trailers 3 = tractor & 3 trailers 4 = straight truck 5 = straight truck & trailer 6 = tractor only 95 = other **Note**: Type "6" applies only if the tractor is "bob tail". If a tractor is towing/carrying other tractors or if tractor is towing/carrying trucks or if a tractor is carrying a trailer piggyback, then the type is "95". **Note**: Type "95" covers: tractor towing/carrying other tractors; tractor towing/carrying a truck; and tractor carrying a trailer piggyback. **Note**: A jeep/booster used to support heavy loads is treated as part of the trailer.
C.02		C02CONFD	C	20	0	N	CONFiguration Description blank = not applicable (truck fits a predefined configuration) something = description of the "other" configuration
C.03		C03HITCH	C	1	0	N	HITCH -- Type of connection used to join the 1st and 2nd trailer in a truck train (a tractor pulling 2 or 3 trailers). A = "A" train B = "B" train C = "C" train X = not applicable (not truck train)
C.04		C04CAB	C	1	0	N	CAB style -- Type of the driver cab. C = Conventional (long nose or cab after engine) O = cab-Over-engine

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
C.05		C05BODY1	N	2	0	N	BODY #1 style -- Classification of the style or intended freight or intended use of the 1st cargo unit of the truck. The 1st cargo unit is either: a straight truck; the first trailer pulled by a tractor; or a tractor without a trailer. 1 = van -- not refrigerated 2 = van -- refrigerated 3 = container carrier 4 = van -- soft sided 5 = flatbed 6 = stake/rack 7 = float 8 = tanker 9 = hopper 10 = dump 11 = chip 12 = garbage truck 13 = vehicle carrier 14 = animal carrier 15 = none (applies only when the truck consists of a "bob tail" tractor, that is a tractor neither pulling a trailer nor towing/carrying other tractors) 95 = other **Note**: Concerning the assignment of unusual body styles: • a flatbed or stake/rack with a mounted loading crane as a "flatbed" or "stake/rack" • a deckless frame used to carry logs/polls as a "stake/rack" • a glass carrier as "other" • a boat carrying frame as "other" • a permanently attached machine as "other" • a concrete mixer as "other" • a sewer cleaner as "other" (a sewer cleaning truck: would be in-scope if it had a holding tank; would be out-of-scope if it was only a pump) • a pick-up truck box as "other"
C.06		C06BODY1D	C	20	0	N	BODY #1 style Description blank = not applicable (1st cargo unit fits predefined style) something = description of "other" style of 1st cargo unit

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
C.07		C07BODY2	N	2	0	N	BODY #2 style -- Classification of the style or intended freight or intended use of the 2nd cargo unit of the truck. The 2nd cargo unit is either: the trailer pulled by a straight truck; or the 2nd trailer pulled by a tractor. 1 = van -- not refrigerated 2 = van -- refrigerated 3 = container carrier 4 = van -- soft sided 5 = flatbed 6 = stake/rack 7 = float 8 = tanker 9 = hopper 10 = dump 11 = chip 12 = garbage truck 13 = vehicle carrier 14 = animal carrier 15 = none (no such unit on the truck) 95 = other **Note**: *See note under BODY #1 style.*
C.08		C08BODY2D	C	20	0	N	BODY #2 style Description blank = not applicable (2nd cargo unit fits predefined style or no 2nd cargo unit) something = description of "other" style of 2nd cargo unit
C.09		C09BODY3	N	2	0	N	BODY #3 style -- Classification of the style or intended freight or intended use of the 3rd cargo unit of the truck. The 3rd cargo unit is the 3rd trailer pulled by a tractor. 1 = van -- not refrigerated 2 = van -- refrigerated 3 = container carrier 4 = van -- soft sided 5 = flatbed 6 = stake/rack 7 = float 8 = tanker 9 = hopper 10 = dump 11 = chip 12 = garbage truck 13 = vehicle carrier 14 = animal carrier 15 = none (no such unit on the truck) 95 = other **Note**: *See note under BODY #1 style.*

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
C.10		C10BODY3D	C	20	0	N	BODY #3 style Description blank = not applicable (3rd cargo unit fits predefined style or no 3rd cargo unit) something = description of "other" style of 3rd cargo unit
C.11		C11LIGHTS	C	1	0	N	LIGHTS on -- Whether the headlights are on. Y = Yes N = No X = not applicable **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.
C.12		C12SLEEP	C	1	0	N	SLEEPer -- Whether the tractor/straight truck has a sleeper (a compartment immediately behind the driver cab that contains a bed). Y = Yes N = No
C.13		C13DROME	C	1	0	N	DROME -- Whether the tractor has a drome (a box for carrying cargo that is mounded on a tractor in front of the fifth wheel). Y = Yes N = No
C.14		C14REFLEC	C	1	0	N	REFLECTive markers -- Whether the truck has reflective markers on the back and sites (reflective tape on the edges that increases truck visibility at night). Y = Yes N = No
C.15		C15UNDER	C	1	0	N	UNDER-ride guard -- Whether the truck has a rear under-ride guard (beam that prevents a car from sliding under the back of the truck). Y = Yes N = No
C.16		C16DGP1	N	2	0	N	Dangerous Goods Placard #1 -- If there is at least 1 dangerous goods placard or placard holder, what is on/in the 1st placard/placard holder. 1 to 9 = class marked on placard 10 = placard holder is empty. 11 = no such placard or holder. 95 = other class (not 1 through 9) 96 = not applicable 99 = unable to determine class **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
C.17		C17DGP2	N	2	0	N	Dangerous Goods Placard #2 -- If there are at least 2 dangerous goods placards or placard holders, what is on/in the 2nd placard/placard holder. 1 to 9 = class marked on placard 10 = placard holder is empty. 11 = no such placard or holder. 95 = other class (not 1 through 9) 96 = not applicable 99 = unable to determine class **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.
C.18		C18DGP3	N	2	0	N	Dangerous Goods Placard #3 -- If there are at least 3 dangerous goods placards or placard holders, what is on/in the 3rd placard/placard holder. 1 to 9 = class marked on placard 10 = placard holder is empty. 11 = no such placard or holder. 95 = other class (not 1 through 9) 96 = not applicable 99 = unable to determine class **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.
C.19		C19FLPJURS	C	1	0	N	Front Licence Plate JURisdiction Status -- Whether the identity of the jurisdiction (Canadian province/ territory; U.S. state; Mexico) that issued the front licence plate of the straight truck or tractor is available. Y = Yes N = No (unable to read)
C.19		C19FLPJUR	C	4	0	N	Front Licence Plate JURisdiction -- The jurisdiction that issued the front licence plate. blank = not available (see status field) cccc = jurisdiction code *The codes are listed in Appendix H.* **Note**: If a truck has 2 or more places, select according to the following reules. • first choice -- a plate issued by the province in which the DCS is located. • second choice -- the left most plate (driver side plate) if plates are arranged horizontally, and the top plate if plates are arranged vertically.
C.20		C20FLPNUMS	C	1	0	N	Front Licence Plate NUMber Status -- Whether the number on the front licence plate is available. Y = Yes N = No (unable to read) X = not applicable **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
C.20		C20FLPNUM	C	7	0	N	Front Licence Plate NUMber -- The number on the front licence plate. blank = not available (see status field) ccccccc = number
C.21		C21RLPJURS	C	1	0	N	Rear Licence Plate JURisdiction Status -- Whether the identity of the jurisdiction (Canadian province/ territory; U.S. state; Mexico) that issued the rear licence plate on the last trailer of the truck is available. Y = Yes N = No (unable to read) X = not applicable **Note**: "Not applicable" if no trailer or because the question was not asked after being eliminated from the questionnaire.
C.21		C21RLPJUR	C	4	0	N	Rear Licence Plate JURisdiction -- The jurisdiction that issued the rear licence plate. blank = not available/applicable (see status field) cccc = jurisdiction code *The codes are listed in Appendix H.*
C.22		C22RLPNUMS	C	1	0	N	Rear Licence Plate NUMber Status -- Whether the number on the rear licence plate is available. Y = Yes N = No (unable to read) X = not applicable **Note**: "Not applicable" if no trailer or because the question was not asked after being eliminated from the questionnaire.
C.22		C22RLPNUM	C	7	0	N	Rear Licence Plate NUMber -- The number on the rear licence plate. blank = not available/applicable (see status field) ccccccc = number
C.23		C23COMNAMS	C	1	0	N	COMpany NAMe Status -- Whether there is a truck company name on the driver door of the straight truck or tractor. Y = Yes N = No X = not applicable **Note**: "Not applicable" if jurisdiction containing the DCS does not require that the question be asked.
C.23		C23COMNAM	C	50	0	N	COMpany NAMe -- Truck company name on the driver door. blank = not applicable (see status field) something = company name

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
C.23		C23COMID	C	10	0	N	COMpany name ID -- Unique identifier assigned to the record containing the company name. blank = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the company name is selected from the pick-list.
C.24		C24LOCH1	N	2	0	N	LOCation of Hitch #1 -- Point on the straight truck or tractor where the 1st trailer connects. 2,3,...,7 = sequence number assigned to the axle group related to the connection 96 = not applicable (no trailers) **Note** The location point is identified by specifying the axle group above which or immediately after which the trailer hitch or king pin connects.
C.24		C24LOCH2	N	2	0	N	LOCation of Hitch #2 -- Point on the first trailer where the 2nd trailer connects. 3,4,...,7 = sequence number assigned to the axle group related to the connection 96 = not applicable (no 2nd trailer)
C.24		C24LOCH3	N	2	0	N	LOCation of Hitch #3 -- Point on the second trailer where the 3rd trailer connects. 4,5,...,7 = sequence number assigned to the axle group related to the connection 96 = not applicable (no 3rd trailer)
C.25		C25AXLAG1	N	1	0	N	AXLes in Axle Group #1 -- Number of axles in the 1st group of axles on the truck. 1,2,... = number of axles **Note**: Axle groups are numbered sequentially, beginning at the front of the truck. **Note**: An axle group consists of 1, 2, 3 or 4 axles. Each axle on the truck is assigned to a group. Two or more axles are assigned to the same group if they are closely spaced, and attached to the truck in such a way that each axle is carrying approximately the same load. Each axle on the truck is assigned to a group, though
C.25		C25AXLAG2	N	1	0	N	AXLes in Axle Group #2 -- Number of axles in the 2st group of axles on the truck. 1,2,... = number of axles
C.25		C25AXLAG3	N	2	0	N	AXLes in Axle Group #3 -- Number of axles in the 3rd group of axles on the truck. 0 = not applicable (no 3rd group) 1,2,... = number of axles
C.25		C25AXLAG4	N	2	0	N	AXLes in Axle Group #4 --Same answers as for *AXLes in Axle Group #3.*
C.25		C25AXLAG5	N	2	0	N	AXLes in Axle Group #5 --Same answers as for *AXLes in Axle Group #3.*
C.25		C25AXLAG6	N	2	0	N	AXLes in Axle Group #6 --Same answers as for *AXLes in Axle Group #3.*

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
C.25		C25AXLAG7	N	2	0	N	AXLes in Axle Group #7 --Same answers as for *AXLes in Axle Group #3*.
C.25		C25AXLAG8	N	2	0	N	AXLes in Axle Group #8 --Same answers as for *AXLes in Axle Group #3*.
C.25		C25AXLALL	N	2	0	N	AXLes ALL -- Total number of axles on the truck. 1,2,...,12 = Number of axles
C.26		C26UPAG1	N	1	0	N	UP axles in Axle Group #1 -- Number of axles that are lifted (raised so they are not in contact with the ground) in the 1st group of axles on the truck. 0 = no axles are lifted 1,2,... = number of axles lifted
C.26		C26UPAG2	N	1	0	N	UP axles in Axle Group #2 -- Same answers as for *UP axles in Axle Group #1*.
C.26		C26UPAG3	N	2	0	N	UP axles in Axle Group #3 -- Number of axles that are lifted in the 3rd group of axles on the truck. 0 = no axles are lifted or not applicable (no 3rd group) 1,2,... = number of axles lifted **Note**: To decide whether "0" means "no axles lifted" or means "not applicable", check *C25AXLAG3* to determine if the 3rd axle group exists.
C.26		C26UPAG4	N	2	0	N	UP axles in Axle Group #4 -- Same answers as for *UP axles in Axle Group #3*.
C.26		C26UPAG5	N	2	0	N	UP axles in Axle Group #5 -- Same answers as for *UP axles in Axle Group #3*.
C.26		C26UPAG6	N	2	0	N	UP axles in Axle Group #6 -- Same answers as for *UP axles in Axle Group #3*.
C.26		C26UPAG7	N	2	0	N	UP axles in Axle Group #7 -- Same answers as for *UP axles in Axle Group #3*.
C.26		C26UPAG8	N	2	0	N	UP axles in Axle Group #8 -- Same answers as for *UP axles in Axle Group #3*.
C.26		C26UPALL	N	1	0	N	UP axles ALL -- Total number of axles that are lifted on the truck. 0 = no axles are lifted 1,2,...,9 = number of axles lifted
D. **Interview Start** Section							
D.01		D01AGREE	C	1	0	N	AGREEs to interview -- Whether driver agrees to participate in an interview. Y = Yes N = No
D.02		D02REFUSE	C	40	0	N	REFUSE -- Reason given by driver for refusing to be interviewed. blank = not applicable (driver agreed to interview) something = reason for refusing

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
D.03		D03LANG	C	1	0	N	LANGuage of driver -- Driver's choice for the language of the interview. E = English F = French
E. **Interview Part 1 - Vehicle Profile** Section							
E.01		E01TBS	C	1	0	N	Truck Base Status -- Whether an answer is available. Y = Yes (driver identified a base) N = No base (driver's answer) R = driver Refused to answer T = driver Terminated interview before question asked **Note**: The base is the place in Canada, U.S. or Mexico where the straight truck or tractor is usually garaged or serviced, or the operating centre to which it is assigned. Some trucks may not be based at a specific place.
E.01		E01TBJUR	C	4	0	N	Truck Base JURisdiction -- The jurisdiction in which the truck base is located. blank = not applicable (see status field) something = jurisdiction code *The codes are listed in Appendix H.*
E.01		E01TBPLA	C	50	0	N	Truck Base PLAce -- The name of the place in which the truck base is located. blank = not applicable (see status field) something = place name
E.01		E01TBID	C	11	0	N	Truck Base ID -- Unique identifier assigned to the record containing the place name. blank = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the place is selected from the pick-list.
E.01		E01TBLON	N	11	6	N	Truck Base LONgitude -- Longitude of the place. 0 = not applicable (see status field) something = longitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer, but only if the place is selected from the pick-list.
E.01		E01TBLAT	N	11	6	N	Truck Base LATitude -- Latitude of the place. 0 = not applicable (see status field) something = latitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer, but only if the place is selected from the pick-list.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
E.02		E02LIFTS	C	1	0	N	LIFT Status -- Whether the answer is available for the total number of liftable axles on the truck. Y = Yes (driver answered "1 or more") N = None (driver answered "no lift axles") D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked **Note**: Liftable axles are counted whether they are currently raised (off the ground) or lowered (on the ground).
E.02		E02LIFT	N	1	0	N	LIFT -- Total number of liftable axles. 0 = none or not available (see status field) 1,2,... = total number of liftable axles
E.03		E03LENT1S	C	1	0	N	LENgth of Trailer #1 Status -- Whether the answer is available for the length of the 1st trailer. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable (no such trailer)
E.03		E03LENT1	N	5	2	N	LENgth of Trailer #1 -- Length of the 1st trailer. 0 = not applicable (see status field) something = length **Note**: Units of measurement are defined in field *E06LENTU*.
E.04		E04LENT2S	C	1	0	N	LENgth of Trailer #2 Status -- Same answers as for *LENgth of Trailer #1 Status*.
E.04		E04LENT2	N	5	2	N	LENgth of Trailer #2 -- Same answers as for *LENgth of Trailer #1*.
E.05		E05LENT3S	C	1	0	N	LENgth of Trailer #3 Status -- Same answers as for *LENgth of Trailer #1 Status*.
E.05		E05LENT3	N	5	2	N	LENgth of Trailer #3 -- Same answers as for *LENgth of Trailer #1*.
E.06		E06LENTU	C	1	0	N	LENgth of Trailer Units -- Units in which the length of the trailers are measured. F = Feet/inches (digits before the decimal point are feet; digits after the decimal point are inches) M = Metres X = not applicable (no trailers or no measurements) T = driver Terminated interview before question asked

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
E.07		E07LENC1S	C	1	0	N	LENgth of Container #1 Status -- Whether the answer is available for the length of the 1st container carried by the truck. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if no such container or because the question not asked after being eliminated from the questionnaire.
E.07		E07LENC1	N	5	2	N	LENgth of Container #1 -- Length of the 1st container. 0 = not applicable (see status field) something = length **Note**: Units of measurement are defined in field *E10LENCU*.
E.08		E08LENC2S	C	1	0	N	LENgth of Container #2 Status -- Same answers as for *LENgth of Container #1 Status*.
E.08		E08LENC2	N	5	2	N	LENgth of Container #2 -- Same answers as for *LENgth of Container #1*.
E.09		E09LENC3S	C	1	0	N	LENgth of Container #3 Status -- Same answers as for *LENgth of Container #1 Status*.
E.09		E09LENC3	N	5	2	N	LENgth of Container #3 -- Same answers as for *LENgth of Container #1*.
E.10		E10LENCU	C	1	0	N	LENgth of Container Units -- Units in which the length of the containers are measured. F = Feet/inches (digits before the decimal point are feet; digits after the decimal point are inches) M = Metres X = not applicable (no containers or no measurements) T = driver Terminated interview before question asked
E.11		E11TACHOG	C	1	0	N	TACHOGraph -- Whether there is a tachograph on-board the truck. Y = Yes N = No R = driver Refused to answer T = driver Terminated interview before question asked **Note**: A tachograph is a mechanical device that records truck speed, engine speed and distance travelled. It operates by drawing thin lines on a circular card, each card covering 24 hours.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
E.12		E12LOG	C	1	0	N	electronic drive LOG -- Same answers as for *TACHOGraph*. **Note**: An electronic drive log is a device that automatically records the hours of oepration of the vehicle in some type of memory. Usually it has a keyboard so the driver can enter events that occur.
E.13		E13COMPUT	C	1	0	N	COMPUTer -- Same answers as for *TACHOGraph*. **Note**: A computer that is adapted to the environment of the driver cab. It is used to enter information on the events of the day.
E.14		E14TAG	C	1	0	N	electronic vehicle identification TAG -- Same answers as for *TACHOGraph*. **Note**: An electronic vehicle identification tag is a magnetically encoded device that can be read by equipment located in the roadway or at the roadside. The tag contains information about the identity of the truck and the load.
E.15		E15SATELL	C	1	0	N	SATELLite -- Same answers as for *TACHOGraph*. **Note**: Satellite based communications use a transmitter-receiver that is usually curcular in shape, approximately 15 to 30 centimetres in diameter, and located on the roof of the driver cab, ovten behind the wind deflector. It is used by a carrier to track the location of its truck. If equipped with a keyboard and screen in the cab, the driver can send and receive information.
E.16		E16CELLPH	C	1	0	N	CELLular telePHone -- Same answers as for *TACHOGraph*. **Note**: This covers standard cellular telephones. There may or may not be an antenna mounted on the truck.
E.17		E17PAGER	C	1	0	N	PAGER -- Same answers as for *TACHOGraph*. **Note**: This covers standard pagers
E.18		E18RADIO	C	1	0	N	company RADIO -- Same answers as for *TACHOGraph*. **Note**: Company radio means a two-way radio that operates on a private frequency dedicated to the company. It is used for voice messages between the driver and dispatcher.
E.19		E19MASTER	C	1	0	N	tripMASTER -- Same answers as for *TACHOGraph*. **Note**: A TripMaster provides the driver with information about the best route for a trip.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
E.20		E20OTHER	C	1	0	N	OTHER electronic equipment Whether there is other electronic equipment on-board the truck. Y = Yes N = No R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire. **Note**: Other electronic equipment covers communications, information or recording equipment **except** electronics equipment that has to do with the operation of the engine, transmission, suspension or other vehicle systems, radar detectors or CB radios.
E.21		E21OTHERD	C	20	0	N	OTHER electronic equipment Description blank = not applicable (no "other") something = description of the "other" electronic equipment
E.22		E22MSAS	C	1	0	N	Manual Slack Adjustors Status -- Whether there are manual slack adjustors on the truck. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked
E.23		E23MSAU1	C	1	0	N	Manual Slack Adjustors on Unit #1 -- Whether there are manual slack adjusters on the 1st unit of the truck (straight truck or tractor). Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if no manual slack adjusters on truck or if driver refused/ doesn't know previous answer whether manual slack adjusters on truck.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
E.24		E24MSAU2	C	1	0	N	Manual Slack Adjustors on Unit #2 -- Whether there are manual slack adjustors on the 2nd unit of the truck (first trailer). Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if no 2nd unit on truck or if no manual slack adjusters on truck or if driver refused/ doesn't know previous answer whether manual slack adjusters on truck.
E.25		E25MSAU3	C	1	0	N	Manual Slack Adjustors on Unit #3 -- Whether there are manual slack adjustors on the 3rd unit of the truck (second trailer). Same answers as for *Manual Slack Adjustors on Unit #2*.
E.26		E26MSAU4	C	1	0	N	Manual Slack Adjustors on Unit #4 -- Whether there are manual slack adjustors on the 4th unit of the truck (third trailer). Same answers as for *Manual Slack Adjustors on Unit #2*.
E.27		E27MSADK	C	1	0	N	Manual Slack Adjustments Driver Knowledge -- Whether the driver knows how to make manual slack adjustments. Y = Yes N = No R = driver Refused to answer T = driver Terminated interview before question asked **Note**: All drivers are asked, even drivers of trucks without manual slack adjusters.
E.28		E28MSACP	C	1	0	N	Manual Slack Adjustment Company Policy -- Whether the truck company allows a driver to make manual slack adjustments. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked **Note**: All drivers are asked, even drivers who do not know how to make manual slack adjustments.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
E.29		E29ALBS	C	1	0	N	Anti-Lock Brakes Status -- Whether there are anti-lock brakes on the truck. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked
E.30		E30ALBU1	C	1	0	N	Anti-Lock Brakes on Unit #1 -- Whether there are anti-lock brakes on the 1st unit of the truck (straight truck or tractor). Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if no anti-lock brakes on truck or if driver refused/ doesn't know previous answer whether anti-lock brakes on truck.
E.31		E31ALBU2	C	1	0	N	Anti-Lock Brakes on Unit #2 -- Whether there are anti-lock brakes on the 2nd unit of the truck (first trailer). Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if no 2nd unit on truck or if no anti-lock brakes on truck or if driver refused/ doesn't know previous answer whether anti-lock brakes on truck.
E.32		E32ALBU3	C	1	0	N	Anti-Lock Brakes on Unit #3 -- Whether there are anti-lock brakes on the 3rd unit of the truck (second trailer). Same answers as for *Anti-Lock Brakes on Unit #2.*
E.33		E33ALBU4	C	1	0	N	Anti-Lock Brakes on Unit #4 -- Whether there are anti-lock brakes on the 4th unit of the truck (third trailer). Same answers as for *Anti-Lock Brakes on Unit #2.*

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
E.34		E34ASS	C	1	0	N	Air Suspension Status -- Whether there is air suspension on the truck. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked
E.35		E35ASU1	C	1	0	N	Air Suspension on Unit #1 -- Whether there is air suspension on the 1st unit of the truck (straight truck or tractor). Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if no air suspension on truck or if driver refused/ doesn't know previous answer whether air suspension on truck.
E.36		E36ASU2	C	1	0	N	Air Suspension on Unit #2 -- Whether there is air suspension on the 2nd unit of the truck (first trailer). Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if no 2nd unit on truck or if no air suspension on truck or if driver refused/ doesn't know previous answer whether air suspension on truck.
E.37		E37ASU3	C	1	0	N	Air Suspension on Unit #3 -- Whether there is air suspension on the 3rd unit of the truck (second trailer). Same answers as for *Air Suspension on Unit #2*.
E.38		E38ASU4	C	1	0	N	Air Suspension on Unit #4 -- Whether there is air suspension on the 4th unit of the truck (third trailer). Same answers as for *Air Suspension on Unit #2*.
F. **Interview Part 2 - Commodity Information** Section							
F.01		F01CARGO	C	1	0	N	CARGO -- Whether the truck is carrying cargo. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
F.02		F02CAPUSE	N	2	0	N	CAPacity USEd -- How much of the truck's cargo capacity is used. 1 = ¼ full 2 = ½full 3 = ¾full 4 = full 96 = not applicable 97 = driver terminated interview before question asked 98 = driver refused to answer 99 = driver does not know the answer **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.03		F03SPACE	C	1	0	N	SPACE -- Whether the truck is fully loaded because the space limit has been reached. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if truck is not full or if truck is empty or if unknown whether cargo is on-board or if driver refused/ doesn't know previous answer on capacity used.
F.04		F04WEIGHT	C	1	0	N	WEIGHT -- Whether the truck is fully loaded because the weight limit has been reached. Same answers as for *SPACE*.
F.05		F05PICKUP	C	1	0	N	PICK-UP -- Whether the cargo was picked up at one address (location). Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.06		F06DELIVE	C	1	0	N	DELIVEred -- Whether the cargo will be delivered to one address (location). Same answers as for *PICK-UP*.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
F.07		F07SHIPS	C	1	0	N	SHIPments Status -- Whether the number of shipments on-board is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: A shipment is a load going from one shipper to one receiver, and may consist of one commodity or several commodities. **Note**: A load consisting of one commodity is may or may not be a single shipment. It is multiple shipments if the load was collected from more than one shipper or if the load will be delivered to more than one receiver. **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.07		F07SHIP	N	4	0	N	SHIPments -- Number of shipments. 0 = not applicable (see status field) something = Number
F.08		F08AMOACS	C	1	0	N	AMOunt of All Cargo Status -- Whether a measurement of the amount of all cargo on-board is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.08		F08AMOAC	N	6	0	N	AMOunt of All Cargo -- The weight or volume of all cargo on-board. 0 = not applicable (see status field) something = amount **Note**: Units of measurement are defined in field *F09AMOACU*.
F.09		F09AMOACU	N	2	0	N	AMOunt of All Cargo Units -- Units in which the amount of cargo is measured. 1 = kilograms 2 = pounds 3 = litres 4 = gallons 96 = not applicable (see status field) 97 = driver Terminated interview before question asked

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
F.10		F10ONECOM	C	1	0	N	ONE COMmodity -- Whether the cargo consists of one commodity. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.11		F11CATC1S	C	1	0	N	CATegory of Commodity #1 Status -- Whether the category of the 1st largest commodity on-board is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: Size ("large") is measured by amount of the commodity. **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.11		F11CATC1	C	40	0	N	CATegory of Commodity #1 -- Description of the category of the 1st largest commodity. blank = not applicable (see status field) something = description
F.12		F12AMOC1S	C	1	0	N	AMOunt of Commodity #1 -- Whether a measurement of the amount of the 1st largest commodity is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.12		F12AMOC1	N	6	0	N	AMOunt of Commodity #1 -- The weight or volume of the 1st largest commodity. 0 = not applicable (see status field) something = amount **Note**: Units of measurement are defined in field *F13AMOC1U*.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
F.13		F13AMOC1U	N	2	0	N	AMOunt of Commodity #1 Units -- Units in which the amount of the 1st largest commodity is measured. 1 = kilograms 2 = pounds 3 = litres 4 = gallons 96 = not applicable (see status field) 97 = driver Terminated interview before question asked
F.14		F14OC1S	C	1	0	N	Origin of Commodity #1 Status -- Whether the origin of shipment of the 1st largest commodity is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: The origin is the place in the world where the shipper put the cargo on the transportation system. The waybill or the bill of lading should list the origin. **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.
F.14		F14OC1JUR	C	4	0	N	Origin of Commodity #1 JURisdiction -- The jurisdiction in which the shipment origin is located. blank = not applicable (see status field) something = jurisdiction code *The codes are listed in Appendix H.*
F.14		F14OC1PLA	C	50	0	N	Origin of Commodity #1 PLAce -- The name of the place in which the shipment origin is located. blank = not applicable (see status field) something = place name
F.14		F14OC1ID	C	11	0	N	Origin of Commodity #1 ID -- Unique identifier assigned to the record containing the place name. blank = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the place is selected from the pick-list.
F.14		F14OC1LON	N	11	6	N	Origin of Commodity #1 LONgitude -- Longitude of the place. 0 = not applicable (see status field) something = longitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer, but only if the place is selected from the pick-list.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
F.14		F14OC1LAT	N	11	6	N	Origin of Commodity #1 LATitude -- Latitude of the place. 0 = not applicable (see status field) something = latitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer, but only if the place is selected from the pick-list.
F.15		F15DC1S	C	1	0	N	Destination of Commodity #1 Status -- Same answers as for *Origin of Commodity #1 Status*. **Note**: The destination is the place in the world where the receiver will remove the cargo from the transportation system. The waybill or the bill of lading should list the destination.
F.15		F15DC1JUR	C	4	0	N	Destination of Commodity #1 JURisdiction -- Same answers as for *Origin of Commodity #1 JURisdiction*.
F.15		F15DC1PLA	C	50	0	N	Destination of Commodity #1 PLAce -- Same answers as for *Origin of Commodity #1 PLAce*.
F.15		F15DC1ID	C	11	0	N	Destination of Commodity #1 ID -- Same answers as for *Origin of Commodity #1 ID*.
F.15		F15DC1LON	N	11	6	N	Destination of Commodity #1 LONgitude -- Same answers as for *Origin of Commodity #1 LONgitude*.
F.15		F15DC1LAT	N	11	6	N	Destination of Commodity #1 LATitude -- Same answers as for *Origin of Commodity #1 LATitude*.
F.16		F16DGOB	C	1	0	N	Dangerous Goods On-Board -- Whether there are dangerous goods on-board. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if truck is empty or if unknown whether cargo is on-board.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
F.17		F17DGC1CS	C	1	0	N	Dangerous Goods Commodity #1 Class Status -- Whether the class of the 1st largest dangerous goods commodity is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer answer X = not applicable blank = not applicable **Note**: "Not applicable=X" if no dangerous goods on-board or if truck is empty or if driver refused/ doesn't know previous answer whether dangerous goods on-board. **Note**: "Not applicable=blank" because the question was not asked until being added to the questionnaire software.
F.17		F17DGC1C	N	3	1	N	Dangerous Goods Commodity #1 Class -- The class of the 1st largest dangerous goods commodity. 0.0 = unknown* or not applicable something = class *Dangerous goods classes are listed in Appendix H.* **Note**: * See note under *Dangerous Goods Commodity #1 UN number*. **Note**: Size ("large") is measured by amount of the commodity. **Note**: "Not applicable" if no dangerous goods on-board or if truck is empty or if unknown whether cargo is on-board or if driver refused/ doesn't know previous answer whether dangerous goods on-board or if interview terminated.
F.18		F17DGC1UNS	C	1	0	N	Dangerous Goods Commodity #1 UN number Status -- Whether the UN number of the 1st largest dangerous goods commodity is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer answer X = not applicable blank = not applicable **Note**: "Not applicable" if no dangerous goods on-board or if truck is empty or if driver refused/ doesn't know previous answer whether dangerous goods on-board. **Note**: "Not applicable=blank" because the question was not asked until being added to the questionnaire software.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
F.18		F18DGC1UN	C	8	0	N	Dangerous Goods Commodity #1 UN number -- The UN number of the 1st largest dangerous goods commodity. blank = not applicable something = number or the word "UNKNOWN"** *Dangerous goods UN numbers are listed in Appendix H.* **Note**: ** The computer program requires that a "UN Number" or a "Class" be entered if the answer to *Dangerous Goods On-Board* is "Yes". If neither the UN number nor the class is known, the surveyors are been directed to enter "UNKNOWN" in the UN number field. **Note**: "Not applicable" if no dangerous goods on-board or if truck is empty or if unknown whether cargo is on-board or if driver refused/ doesn't know previous answer whether dangerous goods on-board or if interview terminated.
G.	**Interview Part 3 - Carrier Information** Section						
G.01		G01CTYPE	N	2	0	N	Company TYPE -- Type of trucking company. 1 = for-hire 2 = private 97 = driver Terminated interview before question asked 98 = driver Refused to answer 99 = driver Doesn't know the answer **Note**: A for-hire trucking company earns its money by transporting cargo belonging to someone else. A private trucking company is part of a parent company such as a retailer or a manufacturer, and exists to transport cargo belonging to the parent company.
G.02		G02PRIFH	C	1	0	N	PRIvate company carrying cargo For-Hire -- Whether the private trucking company is carrying cargo for-hire on this trip. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer X = not applicable **Note**: A private trucking company is mainly engaged in transporting the cargo of its parent company, but on occasion will carry cargo on a for-hire basis (to minimize empty mileage). **Note**: "Not applicable" if trucking company is for-hire or if truck is empty or if unknown whether cargo is on-board or if driver refused/ doesn't know previous answer on company type or if interview terminated.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
G.03		G03CDS	C	1	0	N	Company Dispatch centre Status -- Whether an answer is available. Y = Yes (driver identified a base) N = No dispatch centre (driver's answer) R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire. **Note**: The dispatch centre is the trucking company office that coordinates the driver's work (provides instructions on where to pick-up and deliver cargo; tracks the progress of the cargo). It is located in Canada, U.S. or Mexico. A driver does not necessarily deal with a dispatch centre.
G.03		G03CDJUR	C	4	0	N	Company Dispatch centre JURisdiction -- The jurisdiction in which the dispatch centre is located. blank = not applicable (see status field) something = jurisdiction code *The codes are listed in Appendix H.*
G.03		G03CDPLA	C	50	0	N	Company Dispatch centre PLAce -- The name of the place in which the dispatch centre is located. blank = not applicable (see status field) something = place name
G.03		G03CDID	C	11	0	N	Company Dispatch centre ID -- Unique identifier assigned to the record containing the place name. blank = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the place is selected from the pick-list.
G.03		G03CDLON	N	11	6	N	Company Dispatch centre LONgitude -- Longitude of the place. 0 = not applicable (see status field) something = longitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer, but only if the place is selected from the pick-list.
G.03		G03CDLAT	N	11	6	N	Company Dispatch centre LATitude -- Latitude of the place. 0 = not applicable (see status field) something = latitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer, but only if the place is selected from the pick-list.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H. **Interview Part 4 - Trip Information** Section							
H.01		H01TRITYP	C	1	0	N	TRIp TYPe -- Whether the trip is a linehaul or a peddle run. P = Peddle run L = Linehaul R = driver Refused to answer T = driver Terminated interview before question asked **Note**: A linehaul trip transports the entire cargo load from one point to another point. A peddle run makes stops for cargo pick-up and delivery between its first cargo pick-up point and last cargo delivery point. *See discussion of trip definition that precedes this table.*
H.02		H02TRISTOS	C	1	0	N	TRIp STOps Status -- Whether the number of stops on the peddle run is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if not a peddle run or if driver refused previous answer on trip type.
H.02		H02TRISTO	N	2	0	N	TRIp STOps -- Number of stops on the peddle run. 0 = not applicable (see status field) something = number
H.03		H03SECOND	C	1	0	N	SECOND -- Whether there is a second driver on-board the truck, so that the trip is being driven by a driver team. Y = Yes N = No R = driver Refused to answer T = driver Terminated interview before question asked
H.04		H04TOS	C	1	0	N	Trip Origin Status -- Whether an answer is available. Y = Yes (driver identified a base) D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked **Note**: The trip origin is a location in Canada, U.S. or Mexico. *See discussion of trip definition that preceeds this table.*
H.04		H04TOJUR	C	4	0	N	Trip Origin JURisdiction -- The jurisdiction in which the trip origin is located. blank = not applicable (see status field) something = jurisdiction code *The codes are listed in Appendix H.*

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.04		H04TOPLA	C	50	0	N	Trip Origin PLAce -- The name of the place in which the trip origin is located. blank = not applicable (see status field) something = place name
H.04		H04TOID	C	11	0	N	Trip Origin ID -- Unique identifier assigned to the record containing the place name. blank = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the place is selected from the pick-list.
H.04		H04TOLON	N	11	6	N	Trip Origin LONgitude -- Longitude of the place. 0 = not applicable (see status field) something = longitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer, but only if the place is selected from the pick-list.
H.04		H04TOLAT	N	11	6	N	Trip Origin LATitude -- Latitude of the place. 0 = not applicable (see status field) something = latitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer, but only if the place is selected from the pick-list.
H.05		H05TOADDS	C	1	0	N	Trip Origin ADDress Status -- Whether the trip origin address is available or needed. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if origin place does not require that the question be asked or if driver refused/ doesn't know previous answer on origin place.
H.05		H05TOADD1	C	40	0	N	Trip Origin ADDress line #1: blank = not applicable (see status field) something = part of address
H.05		H05TOADD2	C	40	0	N	Trip Origin ADDress line #2: Same answers as for *Trip Origin ADDress line #1*.
H.05		H05TOADD3	C	40	0	N	Trip Origin ADDress line #3: Same answers as for *Trip Origin ADDress line #1*.
H.06		H06TDS	C	1	0	N	Trip Destination Status -- Same answers as for *Trip Origin Status*. **Note**: The trip destination is a location in Canada, U.S. or Mexico. *See discussion of trip definition that preceeds this table.*

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.06		H06TDJUR	C	4	0	N	Trip Destination JURisdiction -- Same answers as for *Trip Origin JURisdiction*.
H.06		H06TDPLA	C	50	0	N	Trip Destination PLAce -- Same answers as for *Trip Origin PLAce*.
H.06		H06TDID	C	11	0	N	Trip Destination ID -- Same answers as for *Trip Origin ID.*
H.06		H06TDLON	N	11	6	N	Trip Destination LONgitude -- Same answers as for *Trip Origin LONgitude*.
H.06		H06TDLAT	N	11	6	N	Trip Destination LATitude -- Same answers as for *Trip Origin LATitude*.
H.07		H07TDADDS	C	1	0	N	Trip Destination ADDress Status: Same answers as for *Trip Origin ADDressStatus.*
H.07		H07TDADD1	C	40	0	N	Trip Destination ADDress line #1: Same answers as for *Trip Origin ADDress line #1.*
H.07		H07TDADD2	C	40	0	N	Trip Destination ADDress line #2: Same answers as for *Trip Origin ADDress line #2.*
H.07		H07TDADD3	C	40	0	N	Trip Destination ADDress line #3: Same answers as for *Trip Origin ADDress line #3.*
H.08		H08LSS	C	1	0	N	Last Stop Status -- Whether an answer is available on the location of the last stop made before the DCS. Y = Yes (driver identified a base) D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked **Note**: The last stop is a location in Canada, U.S. or Mexico. *See discussion of trip definition that preceeds this table.*
H.08		H08LSJUR	C	4	0	N	Last Stop JURisdiction -- The jurisdiction in which the last stop was made. blank = not applicable (see status field) something = jurisdiction code *The codes are listed in Appendix H.*
H.08		H08LSPLA	C	50	0	N	Last Stop PLAce -- The name of the place in which the last stop was made. blank = not applicable (see status field) something = place name
H.08		H08LSID	C	11	0	N	Last Stop ID -- Unique identifier assigned to the record containing the place name. blank = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the place is selected from the pick-list.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.08		H08LSLON	N	11	6	N	Last Stop LONgitude -- Longitude of the place. 0 = not applicable (see status field) something = longitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer, but only if the place is selected from the pick-list.
H.08		H08LSLAT	N	11	6	N	Last Stop LATitude -- Latitude of the place. 0 = not applicable (see status field) something = latitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer, but only if the place is selected from the pick-list.
H.09		H09NSS	C	1	0	N	Next Stop Status -- Same answers as for *Last Stop Status*. **Note**: The next stop is a location in Canada, U.S. or Mexico. *See discussion of trip definition that preceeds this table.*
H.09		H09NSJUR	C	4	0	N	Next Stop JURisdiction -- Same answers as for *Last Stop JURisdiction*.
H.09		H09NSPLA	C	50	0	N	Next Stop PLAce -- Same answers as for *Last Stop PLAce*.
H.09		H09NSID	C	11	0	N	Next Stop ID -- Same answers as for *Last Stop ID*.
H.09		H09NSLON	N	11	6	N	Next Stop LONgitude -- Same answers as for *Last Stop LONgitude*.
H.09		H09NSLAT	N	11	6	N	Next Stop LATitude -- Same answers as for *Last Stop LATitude*.
H.10		H10EPS	C	1	0	N	Entered Province crossing Status -- Whether the trip entered the province/ territory containing the DCS from another jurisdiction. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable (not entering province/ territory) T = driver Terminated interview before question asked **Note**: The border crossing could be domestic (between Canadian jursidictions) or international (between Canada and the U.S.). **Note**: *See discussion of border crossings that precedes this table.*

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.10		H10EPPLA	C	60	0	N	Entered Province crossing PLAce -- Description of the border crossing. blank = not applicable (see status field) something = description **Note**: Crossing could be between Canadian two jurisdictions or between a Canadian and a U.S. jurisdiction. **Note**: Description consists of name of facility or jurisdiction and place or jurisdiction and highway number from the perspective of either side of the border).
H.10		H10EPID	C	10	0	N	Entered Province crossing ID -- Unique identifier assigned to the border crossing. 0 = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the location is selected from the pick-list.
H.10		H10EPLON	N	10	6	N	Entered Province crossing LONgitude -- Longitude of the border crossing. 0 = not applicable (see status field) something = longitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer, but only if the location is selected from the pick-list.
H.10		H10EPLAT	N	10	6	N	Entered Province crossing LATitude -- Latitude of the border crossing. 0 = not applicable (see status field) something = latitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer, but only if the location is selected from the pick-list.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.11		H11LPS	C	1	0	N	Leaving Province crossing Status -- Whether the trip will leave the province/ territory containing the DCS for another jurisdiction. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable (not leaving province/ territory) T = driver Terminated interview before question asked **Note**: The border crossing could be domestic (between Canadian jursidictions) or international (between Canada and the U.S.). **Note**: *See discussion of border crossings that precedes this table.*
H.11		H11LPPLA	C	60	0	N	Leaving Province crossing PLAce: Same answers as for *Entered Province PLAce*.
H.11		H11LPID	C	10	0	N	Leaving Province crossing ID -- Same answers as for *Entered Province ID*.
H.11		H11LPLON	N	10	6	N	Leaving Province crossing LONgitude -- Same answers as for *Entered Province LONgitude*.
H.11		H11LPLAT	N	10	6	N	Leaving Province crossing LATitude -- Same answers as for *Entered Province LATitude*.
H.12		H12EC1S	C	1	0	N	Entered Canada crossing #1 Status -- Whether the trip entered Canada from the U.S. at a crossing in a province/ territory other than the province/territory containing the DCS. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable (no such crossing) T = driver Terminated interview before question asked **Note**: *See discussion of border crossings that precedes this table.*
H.12		H12EC1PLA	C	60	0	N	Entered Canada crossing #1 PLAce: Same answers as for *Entered Province PLAce*.
H.12		H12EC1ID	C	10	0	N	Entered Canada crossing #1 ID -- Same answers as for *Entered Province ID*.
H.12		H12EC1LON	N	10	6	N	Entered Canada crossing #1 LONgitude -- Same answers as for *Entered Province LONgitude*.
H.12		H12EC1LAT	N	10	6	N	Entered Canada crossing #1 LATitude -- Same answers as for *Entered Province LATitude*.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.13		H13EC2S	C	1	0	N	Entered Canada crossing #2 Status -- Whether the trip entered Canada from the U.S. at a 2nd crossing in a province/ territory other than the province/territory containing the DCS. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable (no such crossing) T = driver Terminated interview before question asked **Note**: *See discussion of border crossings that precedes this table.*
H.13		H13EC2PLA	C	60	0	N	Entered Canada crossing #2 PLAce: Same answers as for *Entered Province PLAce*.
H.13		H13EC2ID	C	10	0	N	Entered Canada crossing #2 ID -- Same answers as for *Entered Province ID*.
H.13		H13EC2LON	N	10	6	N	Entered Canada crossing #2 LONgitude -- Same answers as for *Entered Province LONgitude*.
H.13		H13EC2LAT	N	10	6	N	Entered Canada crossing #2 LATitude -- Same answers as for *Entered Province LATitude*.
H.14		H14LC1S	C	1	0	N	Leaving Canada crossing #1 Status -- Whether the trip will leave Canada for the U.S. at a crossing in a province/ territory other than the province/territory containing the DCS. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable (no such crossing) T = driver Terminated interview before question asked **Note**: *See discussion of border crossings that precedes this table.*
H.14		H14LC1PLA	C	60	0	N	Leaving Canada crossing #1 PLAce: Same answers as for *Entered Province PLAce*.
H.14		H14LC1ID	C	10	0	N	Leaving Canada crossing #1 ID -- Same answers as for *Entered Province ID*.
H.14		H14LC1LON	N	10	6	N	Leaving Canada crossing #1 LONgitude -- Same answers as for *Entered Province LONgitude*.
H.14		H14LC1LAT	N	10	6	N	Leaving Canada crossing #1 LATitude -- Same answers as for *Entered Province LATitude*.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.15		H15LC2S	C	1	0	N	Leaving Canada crossing #2 Status -- Whether the trip will leave Canada for the U.S. at a 2nd crossing in a province/ territory other than the province/territory containing the DCS. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable (no such crossing) T = driver Terminated interview before question asked **Note**: *See discussion of border crossings that precedes this table.*
H.15		H15LC2PLA	C	60	0	N	Leaving Canada crossing #2 PLAce: Same answers as for *Entered Province PLAce*.
H.15		H15LC2ID	C	10	0	N	Leaving Canada crossing #2 ID -- Same answers as for *Entered Province ID*.
H.15		H15LC2LON	N	10	6	N	Leaving Canada crossing #2 LONgitude -- Same answers as for *Entered Province LONgitude*.
H.15		H15LC2LAT	N	10	6	N	Leaving Canada crossing #2 LATitude -- Same answers as for *Entered Province LATitude*.
H.16		H16UM1S	C	1	0	N	Us/Mexico crossing #1 Status -- Whether the trip will cross the U.S./Mexico border. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer X = not applicable (no such crossing) T = driver Terminated interview before question asked **Note**: *See discussion of border crossings that precedes this table.*
H.16		H16UM1PLA	C	60	0	N	Us/Mexico crossing #1 PLAce: Same answers as for *Entered Province PLAce*.
H.16		H16UM1ID	C	10	0	N	Us/Mexico crossing #1 ID -- Same answers as for *Entered Province ID*.
H.16		H16UM1LON	N	10	6	N	Us/Mexico crossing #1 LONgitude -- Same answers as for *Entered Province LONgitude*.
H.16		H16UM1LAT	N	10	6	N	Us/Mexico crossing #1 LATitude -- Same answers as for *Entered Province LATitude*.
H.17		H17HWYS	C	1	0	N	HighWaY route Status -- Whether the highways on the trip route are available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" if jurisdiction containing the DCS does not require that the question be asked. **Note**: "Yes" is triggered if something has been entered in H17HWY1.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.17		H17HWY1	C	40	0	N	HighWaY route line #1: blank = not applicable (see status field) something = highway description.
H.17		H17HWY2	C	40	0	N	HighWaY route line #2: blank = none or not applicable (see status field) something = highway description.
H.17		H17HWY3	C	40	0	N	HighWaY route line #3: Same answers as for *HighWaY route line #2*.
H.17		H17HWY4	C	40	0	N	HighWaY route line #4: Same answers as for *HighWaY route line #2*.
H.17		H17HWY5	C	40	0	N	HighWaY route line #5: Same answers as for *HighWaY route line #2*.
H.17		H17HWY6	C	40	0	N	HighWaY route line #6: Same answers as for *HighWaY route line #2*.
H.17		H17HWY7	C	40	0	N	HighWaY route line #7: Same answers as for *HighWaY route line #2*.
H.18		H18PTOD	C	1	0	N	Previous Trip Origin and Destination -- Whether the origin and destination of the previous trip were the same as the origin and destination of the current trip. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.
H.19		H19PTHWY	C	1	0	N	Previous Trip HighWaYs -- Whether the highways used on the previous trip were the sme as the highways used on the current trip. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if previous trip origin or destination different or if driver refused/ doesn't know previous answer on previous trip origin/ destination or if previous question was not asked.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.20		H20TSDATES	C	1	0	N	Trip Start DATE Status -- Whether the date on which the trip started from the trip origin is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.
H.20		H20TSDATE	D	8	0	N	Trip Start DATE blank = not applicable (see status field) something = date Format: YYYYMMDD.
H.21		H21TSHOURS	C	1	0	N	Trip Start HOUR Status -- Whether the hour during which the trip started from the trip origin is available. Y = Yes D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked X = not applicable **Note**: "Not applicable" because the question was not asked after being eliminated from the questionnaire.
H.21		H21TSHOUR	N	2	0	N	Trip Start HOUR blank = not applicable (see status field) something = hour Format: 24 hour clock.
H.22		H22TSINT	C	1	0	N	Trip Start cargo INTerlined -- Whether the cargo picked-up at the trip start was received from another trucking company. Y = Yes N = No D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked. **Note**: "Not applicable" if no cargo on-board or because the question was not asked after being eliminated from the questionnaire. **Note**: The interlining could be accomplished by transferring the cargo itself from one truck to another, or by transfering the trailer containing the cargo from one company to another.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
H.23		H23TSFAC	N	2	0	N	Trip Start FACility -- The type of facility at which the trip started. 1 = Truck Terminal - Your Carrier 2 = Truck Terminal - Another Carrier 3 = Rail Terminal 4 = Marine Terminal 5 = Airport Terminal 6 = Primary Producer 7 = Manufacturer 8 = Warehouse/Distribution Centre 9 = Retail Outlet 95 = Other 97 = driver Terminated interview before question asked 98 = driver Refused to answer 99 = driver Doesn't know the answer
H.24		H24TSFACD	C	20	0	N	Trip Start FACility Description blank = not applicable (see status field) something = description of "other" type of facility
H.25		H25TEDATES	C	1	0	N	Trip End DATE Status -- Whether the date on which the trip will end at the trip destination is available. Same answers as for *Trip Start DATE Status*.
H.25		H25TEDATE	D	8	0	N	Trip End DATE -- Same answers as for *Trip Start DATE*.
H.26		H26TEHOURS	C	1	0	N	Trip End HOUR Status -- Same answers as for *Trip Start HOUR Status.*
H.26		H26TEHOUR	N	2	0	N	Trip End HOUR -- Same answers as for *Trip Start HOUR.*
H.27		H27TEINT	C	1	0	N	Trip End cargo INTerlined -- Same answers as for *Trip End cargo INTerlined.*
H.28		H28TEFAC	N	2	0	N	Trip End FACility -- Same answers as for *Trip Start FACility*.
H.29		H29TEFACD	C	20	0	N	Trip End FACility Description -- Same answers as for *Trip Start FACility Description.*
I. **Interview Part 5 - Driver Information** Section							
I.01		I01DBS	C	1	0	N	Driver Base Status -- Whether an answer is available. Y = Yes (driver identified a base) N = No base (driver's answer) R = driver Refused to answer T = driver Terminated interview before question asked **Note**: The base is the place in Canada, U.S. or Mexico where the driver lives.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
I.01		I01DBJUR	C	4	0	N	Driver Base JURisdiction -- The jurisdiction in which the driver base is located. blank = not applicable (see status field) something = jurisdiction code *The codes are listed in Appendix H.*
I.01		I01DBPLA	C	50	0	N	Truck Base PLAce -- The name of the place in which the driver base is located. blank = not applicable (see status field) something = place name
I.01		I01DBID	C	11	0	N	Driver Base ID -- Unique identifier assigned to the record containing the place name. blank = not applicable (see status field) something = identifier **Note**: Identifier is filled automatically by the computer, but only if the place is selected from the pick-list.
I.01		I01DBLON	N	11	6	N	Driver Base LONgitude -- Longitude of the place. 0 = not applicable (see status field) something = longitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Longitude is filled automatically by the computer, but only if the place is selected from the pick-list.
I.01		I01DBLAT	N	11	6	N	Driver Base LATitude -- Latitude of the place. 0 = not applicable (see status field) something = latitude *Format defined in description of geographic coordinates that precedes this table.* **Note**: Latitude is filled automatically by the computer, but only if the place is selected from the pick-list.
I.02		I02OWNER	C	1	0	N	OWNER -- Whether driver owns the straight truck or tractor. Y = Yes N = No R = driver Refused to answer T = driver Terminated interview before question asked

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
I.03		I03CONTRA	C	1	0	N	CONTRAct -- Whether the driver-owner of the truck has a contract with a trucking company to haul cargo for that company. Y = Yes N = No R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if the driver is not the owner of the truck or if the driver refused to answer the previous question on truck ownership.
I.04		I04EMPLOY	C	1	0	N	EMPLOYer -- What type of company is the employer of a driver-non-owner. C = Trucking Company L = Leasing Agency O = Other R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if the driver is the owner of the truck or if the driver refused to answer the previous question on truck ownership.
I.05		I05OTHER	C	20	0	N	OTHER -- Description of the employer type if it was classified as "Other". blank = not applicable something = description
I.06		I06AGES	C	1	0	N	AGE Status -- Whether the driver's age is available. Y = Yes R = driver Refused to answer T = driver Terminated interview before question asked
I.06		I06AGE	N	2	0	N	AGE 0 = not applicable (see status field) something = age in years
I.07		I07DRITOTS	C	1	0	N	DRIving TOTal Status -- Availability of how many years the driver has driven a truck for a living. Y = Yes L = yes -- Less than 1 year D = driver Doesn't know the answer R = driver Refused to answer T = driver Terminated interview before question asked
I.07		I07DRITOT	N	2	0	N	DRIving TOTal 0 = none or less than 1 or not available (see status field) something = years of driving

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
I.08		I08DRICONS	C	1	0	N	DRIving CONfiguration Status -- Availability of how many years the driver has driven the observed configuration of truck for a living. Y = Yes L = yes -- Less than 1 year D = driver Doesn't know the answer R = driver Refused to answer X = not applicable T = driver Terminated interview before question asked **Note**: "Not applicable" if truck configuration is **not** a tractor or a tractor-trailer combination.
I.08		I08DRICON	N	2	0	N	DRIving CONfiguration 0 = none or less than 1 or not available or not applicable (see status field) something = years of driving
I.09		I09NSCRTR	C	1	0	N	National Safety Code Requirements TRaining -- Whether in the past 3 years the driver has received at least 1 day of training on the requirements of the National Safety Code. Y = Yes N = No R = driver Refused to answer T = driver Terminated interview before question asked **Note**: Training could cover topics such as: licences necessary; maintaining an hours of service log; and performing a daily vehicle trip inspection.
I.10		I10NSCRSP	C	1	0	N	National Safety Code Requirements SPonsor -- Whether the driver's employer sponsored the training. Y = Yes N = No X = not applicable R = driver Refused to answer T = driver Terminated interview before question asked **Note**: The driver's employer sponsored the training if the employer paid the cost of the training outside of working hours or if the training occurred during working hours while the driver was being paid. **Note**: "Not applicable" if no training or if driver refused previous answer whether training received or because the question was not asked after being eliminated from the questionnaire.

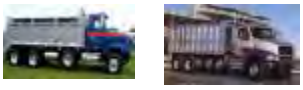
Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
I.11		I11DGHTR	C	1	0	N	Dangerous Goods Handling TRaining -- Same answers as for *National Safety Code Requirements TRaining*. **Note**: Training could cover topics such as: documents and safety markings necessary; handling characteristics of the product; and responding to an emergency.
I.12		I12DGHSP	C	1	0	N	Dangerous Goods Handling SPonsor -- Same answers as for *National Safety Code Requirements SPonsor*.
I.13		I13DSTR	C	1	0	N	Driving Skills TRaining -- Same answers as for *National Safety Code Requirements TRaining*. **Note**: Training culd cover topics such as: recognizing unsafe practices; handling characteristics of the vehicle configuration; and driving techniques to increase efficiency. **Not** included is vehicle maintenance training.
I.14		I14DSSP	C	1	0	N	Driving Skills SPonsor -- Same answers as for *National Safety Code Requirements SPonsor*.
I.15		I15BSTR	C	1	0	N	Business Skills TRaining -- Same answers as for *National Safety Code Requirements TRaining*. **Note**: Training could cover topics such as: dealing with customers; tracking and analysing costs and revenues; and understanding contracts.
I.16		I16BSSP	C	1	0	N	Business Skills SPonsor -- Same answers as for *National Safety Code Requirements SPonsor*.
I.17		I17EEUTR	C	1	0	N	Electronic Equipment Usage TRaining -- Same answers as for *National Safety Code Requirements TRaining*. **Note**: Training could cover topics such as: purpose and use of communications and information recording equipment.
I.18		I18EEUSP	C	1	0	N	Electronic Equipment Usage SPonsor -- Same answers as for *National Safety Code Requirements SPonsor*.
J. **Weights and Measures** Section							
J.01		J01COUS	C	1	0	N	COUnt of axle groupings weighed Status -- Whether the axles are weighted in groups that are the same as, or different from the groups recorded in C25AXLAG1 through C25AXLAG8. M = Modified (weighed groupings of axles different from recorded axle groups) S = Same (weighed in same groupings) X = not applicable (no weight information available)

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
J.01		J01COUAG1	N	1	0	N	COUnt of Axles in weighed Grouping #1 -- How many axles are in the 1st grouping to be weighed. 1,2,... = number of axles (including lifted axles) **Note**: The number of axles includes any axles in the grouping that are lifted at the time of the weighing.
J.01		J01COUAG2	N	1	0	N	COUnt of Axles in weighed Grouping #2 -- Same answers as for *COUnt of Axles in weighed Group #1*.
J.01		J01COUAG3	N	2	0	N	COUnt of Axles in weighed Grouping #3. How many axles are in the 3rd grouping to be weighed. 1,2,... = number of axles 96 = not applicable (no 3rd group)
J.01		J01COUAG4	N	2	0	N	COUnt of Axles in weighed Grouping #4 -- Same answers as for *COUnt of Axles in weighed Group #3*.
J.01		J01COUAG5	N	2	0	N	COUnt of Axles in weighed Grouping #5 -- Same answers as for *COUnt of Axles in weighed Group #3*.
J.01		J01COUAG6	N	2	0	N	COUnt of Axles in weighed Grouping #6 -- Same answers as for *COUnt of Axles in weighed Group #3*.
J.01		J01COUAG7	N	2	0	N	COUnt of Axles in weighed Grouping #7 -- Same answers as for *COUnt of Axles in weighed Group #3*.
J.01		J01COUAG8	N	2	0	N	COUnt of Axles in weighed Grouping #8 -- Same answers as for *COUnt of Axles in weighed Group #3*.
J.02		J02WEIS	C	1	0	N	WEIght Status -- Whether the weight of the truck is available. Y = Yes N = No
J.02		J02WEIAG1	N	5	0	N	WEIght for Axles in Grouping #1 -- Weight of the 1st grouping of axles to be weighed. 0 = not applicable (see status field) something = weight **Note**: Units of measurement are defined in field *J02WEIU*.
J.02		J02WEIAG2	N	5	0	N	WEIght for Axles in Grouping #2 -- Weight of the 2nd grouping of axles to be weighed. 0 = zero or not applicable something = weight **Note**: Units of measurement are defined in field *J02WEIU*. **Note**: "Zero" means that all axles in the grouping are lifted. **Note**: "Not applicable" if no such grouping or if weight not available (see status field).
J.02		J02WEIAG3	N	5	0	N	WEIght for Axles in Grouping # 3 -- Same answers as for *WEIght for Axles in Groupint #2*.
J.02		J02WEIAG4	N	5	0	N	WEIght for Axles in Grouping # 4 -- Same answers as for *WEIght for Axles in Groupint #2*.
J.02		J02WEIAG5	N	5	0	N	WEIght for Axles in Grouping # 5 -- Same answers as for *WEIght for Axles in Groupint #2*.
J.02		J02WEIAG6	N	5	0	N	WEIght for Axles in Grouping # 6 -- Same answers as for *WEIght for Axles in Groupint #2*.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
J.02		J02WEIAG7	N	5	0	N	WEIght for Axles in Grouping # 7 -- Same answers as for *WEIght for Axles in Groupint #2*.
J.02		J02WEIAG8	N	5	0	N	WEIght for Axles in Grouping # 8 -- Same answers as for *WEIght for Axles in Groupint #2*.
J.02		J02WEIALL	N	6	0	N	WEIght of ALL axles -- Total weight of the truck. 0 = not applicable (see status field) something = weight **Note**: Units of measurement are defined in field *J02WEIU*.
J.03		J03WEIU	C	1	0	N	WEIght Units -- Units in which the weight of the truck is measured. K = Kilograms P = Pounds X = not applicable (no measurements)
J.04		J04MS	C	1	0	N	Measurement of length Status -- Whether the measurements of the truck length are available. Y = Yes N = No
J.04		J04MFB	N	6	2	N	Measurement for Front Bumper -- Reading on the measuring tape for the location of the front bumper. 0 = not applicable (see status field) something = reading on tape **Note**: Units of measurement are defined in field *J04MU*.
J.04		J04MAXL1	N	6	2	N	Measurement for Axle #1 -- Reading on the measuring tape for the location of the 1st axle. 0 = not applicable (see status field) something = reading on tape **Note**: Units of measurement are defined in field *J04MU*.
J.04		J04MAXL2	N	6	2	N	Measurement for Axle #2: Same answers as for *Measurement for Axle #1*
J.04		J04MAXL3	N	6	2	N	Measurement for Axle #3 -- Reading on the measuring tape for the location of the 3rd axle. 0 = not applicable something = reading on tape **Note**: Units of measurement are defined in field *J04MU*. **Note**: "Not applicable" if no such axle or if measurement not available (see status field).
J.04		J04MAXL4	N	6	2	N	Measurement for AXLe #4: Same answers as for *Measurement for AXLe #1*.
J.04		J04MAXL5	N	6	2	N	Measurement for AXLe #5: Same answers as for *Measurement for AXLe #1*.
J.04		J04MAXL6	N	6	2	N	Measurement for AXLe #6: Same answers as for *Measurement for AXLe #1*.
J.04		J04MAXL7	N	6	2	N	Measurement for AXLe #7: Same answers as for *Measurement for AXLe #1*.

Answer Output Database Fields							
Reference		**Field**					**Information**
Questi-onnaire		**Name**	**Type; Length; Decimals; Index**				
J.04		J04MAXL8	N	6	2	N	Measurement for AXLe #8: Same answers as for *Measurement for AXLe #1*.
J.04		J04MAXL9	N	6	2	N	Measurement for AXLe #9: Same answers as for *Measurement for AXLe #1*.
J.04		J04MAXL10	N	6	2	N	Measurement for AXLe #10: Same answers as for *Measurement for AXLe #1*.
J.04		J04MAXL11	N	6	2	N	Measurement for AXLe #11: Same answers as for *Measurement for AXLe #1*.
J.04		J04MAXL12	N	6	2	N	Measurement for AXLe #12: Same answers as for *Measurement for AXLe #1*.
J.04		J04MBB	N	6	2	N	Measurement for Back Bumper -- Reading on the measuring tape for the location of the back bumper. 0 = not applicable (see status field) something = reading on tape **Note**: Units of measurement are defined in field *J04MU*.
J.05		J05MU	C	1	0	N	Measurement Units -- Units in which the truck length is measured. M = Metres F = Feet/inches (digits before the decimal point are feet; digits after the decimal point are inches) X = not applicable (no measurements)
J.06		J06WEICHES	C	1	0	N	WEIght CHEck Status -- Whether the check of truck weight against the minimum and maximum criteria for that configuration is active. Y = Yes N = No blank = not applicable **Note**: "Not applicable" because the question was not asked before being added to the questionnaire software.
K. **Early Interview Termination** Section							
K.01							See Software Internal Fields section of table.
K.02							See Software Internal Fields section of table.

Appendix B: Heavy Truck Classification System

Truck ID	Truck Description	
1	Tow truck with 2 axles	
2	Tow truck with 3 or more axles	
3	¾ or 1 ton pick-up truck with 2 axles	
4	Single unit with 2 axles. Cube van, step van, small dump trucks. Some types include soft drink companies, cabs without trailers & flat-bed tow trucks.	
5	Single unit with 3 axles. Includes dump trucks, cabs without trailers, garbage trucks, flat-bed trucks with hydraulic arms.	
6	Single unit truck with 4 or more axles	
7	Single unit truck with “pup”. Usually a 3 or 4 axle truck pulling a 2 or 3 axle pup. Also includes some single flat-beds with attached trailer	
8	Single trailer with 4 or less axles.	
9	Single trailer with 5 axles	
10	Single trailer with 6 or more axles	
11	Multi-trailer with 5 or less axles	
12	Multi-trailer with 6 axles	
13	Multi-trailer with 7 or more axles	
14	Other truck style. If a particular heavy truck does not fit any of the above-noted configurations, indicate by #14 on your field sheet.	

Note: This truck classification system was used by the former Regional Municipality of Ottawa-Carleton and is consistent with that used in the Outaouais Region.

Appendix C: Summary of Historical Ottawa River Crossing Truck Traffic Volumes

Heavy Trucks on the Macdonald-Cartier Bridge

	HEAVY_TRUCKS_Southbound (12H)				(24H)	HEAVY_TRUCKS_Northbound (12H)				(24H)
YEAR	2A	3A	TT	Southbound	Southbound	2A	3A	TT	Northbound	Northbound
1991				1071	1360				1083	1375
1992				1133	1439				1017	1292
1993				1004	1275				887	1126
1994				890	1130				1024	1300
1995*				848	1077				730	927
1996*				806	1024				826	1049
1997*				981	1246				887	1126
1998*				823	1045				920	1169
1999				872	1107				940	1194
1999**	323	173	295	791	1005	354	177	315	846	1075
2000				988	1255				980	1245
2000**	409	268	339	1016	1290	398	268	346	1012	1285

List of count dates

Year	Date	Day
1991	22. May	Wednesday
1992	23. June	Tuesday
1993	16. June	Wednesday
1994	21. June	Tuesday
1995	22. June	Thursday
1996	4. June	Tuesday
1997	4. June	Wednesday
1998	2. June	Tuesday
1999	2. June	Wednesday
2000	1. June	Thursday

Heavy Trucks on the Chaudière Bridge

	HEAVY_TRUCKS_Southbound (12H)				(24H)	HEAVY_TRUCKS_Northbound (12H)				(24H)
YEAR	2A	3A	TT	Southbound	Southbound	2A	3A	TT	Northbound	Northbound
1991				382	485				423	537
1992				456	579				474	602
1993				335	425				403	512
1994				311	395				339	431
1995*				356	452				396	503
1996*				303	385				336	427
1997*				317	403				381	484
1998*				236	300				299	380
1999				329	418				405	514
1999**	177	87	47	311	395	209	102	51	362	460
2000				304	386				355	451
2000**	193	71	59	323	410	217	87	59	362	460

List of count dates

Year	Date	Day
1991	22. May	Wednesday
1992	23. June	Tuesday
1993	16. June	Wednesday
1994	21. June	Tuesday
1995	22. June	Thursday
1996	4. June	Tuesday
1997	3. June	Tuesday
1998	2. June	Tuesday
1999	2. June	Wednesday
2000	1. June	Thursday

Heavy Trucks on the Macdonald-Cartier and Chaudière bridges

	HEAVY_TRUCKS_Southbound (12H)				(24H)	HEAVY_TRUCKS_Northbound (12H)				(24H)
YEAR	2A	3A	TT	Southbound	Southbound	2A	3A	TT	Northbound	Northbound
1991				1453	1845				1506	1913
1992				1589	2018				1491	1894
1993				1339	1701				1290	1638
1994				1201	1525				1363	1731
1995*				1204	1529				1126	1430
1996*				1109	1409				1162	1475
1997*				1298	1649				1268	1610
1998*				1059	1345				1219	1548
1999				1201	1525				1345	1708
1999**	500	260	343	1102	1400	563	280	366	1209	1535
2000				1292	1641				1335	1695
2000**	602	339	398	1339	1700	614	354	406	1374	1745

Heavy Trucks on the all 5 bridges

	HEAVY_TRUCKS_Southbound (12H)				HEAVY_TRUCKS_Northbound (12H)			
YEAR	2A	3A	TT	Southbound	2A	3A	TT	Northbound
1991				1681				1741
1992				1771				1834
1993				1514				1522
1994				1473				1636
1995*				1346				1366
1996*				1252				1300
1997*				1444				1440
1998*				1195				1369
1999				1347				1486
2000				1411				1456

Source of data: Annual Classification and Occupancy Counts
* Number of vehicles factored to 12 hours from 8 hour counts
** Roadside Truck Survey Data

Appendix D: Time Period Relationships

TIME PERIOD RELATIONSHIPS FOR ALL VEHICLES

RELATIONSHIP/ BRDIGE	DIRECTION OF TRAVEL-MORNING			DIRECTION OF TRAVEL-AFTERNOON		
	NORTHBOUND	SOUTHBOUND	BOTH NB&SB	NORTHBOUND	SOUTHBOUND	BOTH NB&SB
Peak Hour/Peak Period						
Macdonald-Cartier	43%-47%	47%-52%	46%-50%	44%-47%	42%-46%	43%-46%
Chaudière	43%-48%	43%-52%	43%-49%	41%-48%	39%-46%	40%-47%
Peak Hour/12 Hours						
Macdonald-Cartier	6%-8%	16%-19%	11%-13%	17%-19%	8%-9%	12%-14%
Chaudière	9%-11%	13%-18%	11%-14%	13%-16%	7%-11%	10%13%
Peak Hour/24 Hours						
Macdonald-Cartier	5%	11%-14%	8%-10%	12%-14%	5%-6%	9%-10%
Chaudière	6%-8%	10%-13%	8%-10%	9%-11%	5%-8%	7%-10%

TIME PERIOD RELATIONSHIPS FOR TRUCKS

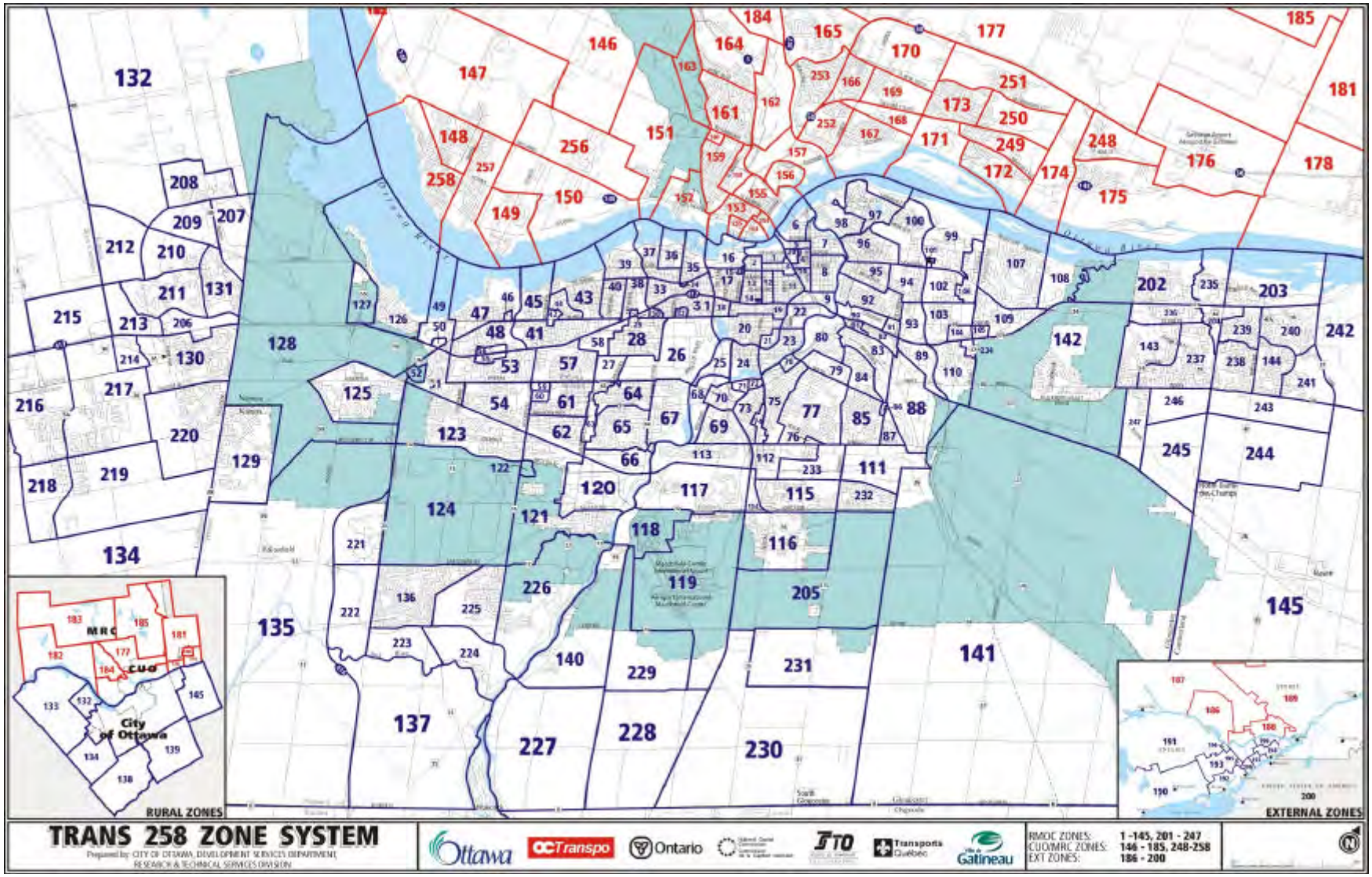
RELATIONSHIP/ BRDIGE	DIRECTION OF TRAVEL-MORNING			DIRECTION OF TRAVEL-AFTERNOON		
	NORTHBOUND	SOUTHBOUND	BOTH NB&SB	NORTHBOUND	SOUTHBOUND	BOTH NB&SB
Peak Hour/Peak Period						
Macdonald-Cartier	37%-47%	35%-67%	36%-58%	33%-48%	38%-53%	39%-48%
Chaudière	33%-53%	34%-46%	34%-47%	31%-52%	33%-51%	36%-51%
Peak Hour/12 Hours						
Macdonald-Cartier	8%-12%	7%-18%	8%-14%	7%-10%	5%-11%	7%-10%
Chaudière	7%-14%	7%-12%	7%-12%	5%-11%	4%-10%	5%-11%
Peak Hour/24 Hours						
Macdonald-Cartier	6%-10%	6%-14%	6%-11%	5%-8%	4%-9%	5%-7%
Chaudière	5%-11%	6%-10%	6%-9%	4%-9%	3%-8%	4%-8%

Appendix E: Traffic Zones Comprising the Districts

LIST OF TRAFFIC ZONES BY DISTRICT

DISTRICT	TRAFFIC ZONES								
1 Ottawa Central	1	2	3	4	5	6	7	8	9
	10	11	12	13	14	15	16	17	18
	19	20	21	22	23	24	25	201	
2 IGB* West	26	27	28	29	30	31	32	33	34
	35	36	37	38	39	40	41	42	43
	44	45	57	58	59	60	61	62	63
	64	65	66	67	120				
3 Ottawa West	46	47	48	49	50	51	52	53	54
	55	56	121	122	123	124	125	126	127
	128	129	130	131	132	133	134	135	136
	137	138	190	191	192	193	194	195	206
	207	208	209	210	211	212	213	214	215
	216	217	218	219	220	221	222	223	224
	225	226							
4 Ottawa South	68	69	70	71	72	73	74	75	76
	77	78	79	80	84	85	87	111	112
	113	114	115	116	117	118	119	139	140
	196	197	200	205	227	228	229	230	231
	232	233							
5 IGB East	81	82	83	86	88	89	90	91	92
	93	94	95	96	97	98	99	100	101
	102	103	104	105	106	107	108	109	110
	234								
6 Ottawa East	141	142	143	144	145	189	198	199	202
	203	204	235	236	237	238	239	240	241
	242	243	244	245	246	247			
7 Hull	151	152	153	154	155	156	157	158	159
	160	161	162	163	164	184	254	255	
8 Aylmer	146	147	148	149	150	182	183	186	187
	256	257	258						
9 Gatineau West	165	166	167	168	169	170	177	185	252
	253								
10 Gatineau East	171	172	173	174	175	176	178	179	180
	181	188	248	249	250	251			

*IGB - "Inside Green Belt"


TRANS 258 ZONE SYSTEM
RURAL ZONES
EXTERNAL ZONES
RMOC ZONES: 1 -145, 201 - 247
CUO/MRC ZONES: 146 - 185, 248-258
EXT ZONES: 186 - 200
City of Ottawa
MRC
CUO

Appendix F: District Comparisons of Trucks by Number

TOTAL NUMBER OF ALL TRUCKS (12 HOURS_DAY)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center			3	13	3		50	13	49	5	**137**
2-IGB West							86	31	20	16	**153**
3-Ottawa West	4					6	72	45	21	54	**201**
4-Ottawa South						4	143	28		49	**223**
5-IGB-East	11					6	178	50	109	89	**444**
6-Ottawa East		7	11	22	22	19	92	42	13	80	**308**
7-Hull	69	63	100	50	159	48					**490**
8-Aylmer	77	81	33	35	32	11					**269**
9-Gatineau West	72	18	16	66	77	29					**277**
10-Gatineau East	11	3	45	65	63	15				6	**208**
TOTAL	**244**	**172**	**208**	**251**	**356**	**138**	**620**	**208**	**212**	**300**	**2709**

IGB-Inside Green Belt

TOTAL NUMBER OF 2A TRUCKS (12 HOURS_DAY)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center							31	13	18	5	**66**
2-IGB-West							38	15	10		**64**
3-Ottawa West							33	5	5		**43**
4-Ottawa South							51	18		23	**92**
5-IGB-East	5						120	28	59	51	**263**
6-Ottawa East					22	13	56	13	13	38	**155**
7-Hull	53	49	51	40	81	22					**296**
8-Aylmer	13	6	24	6	18	11					**78**
9-Gatineau West	24	18	11	18	29	29					**127**
10-Gatineau East	6		11	18	40						**75**
TOTAL	**100**	**73**	**97**	**81**	**190**	**75**	**329**	**92**	**105**	**117**	**1260**

TOTAL NUMBER OF 3A+ TRUCKS (12 HOURS_DAY)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center							12		31		**44**
2-IGB-West							38	12	6	6	**62**
3-Ottawa West							22	16	16	16	**69**
4-Ottawa South							79	6			**85**
5-IGB-East	6						18	16	44	31	**115**
6-Ottawa East							6			16	**22**
7-Hull	9	14	5		48						**76**
8-Aylmer	58	58	9								**124**
9-Gatineau West	48		5	48	48						**149**
10-Gatineau East	5		5		5						**14**
TOTAL	**126**	**72**	**23**	**48**	**101**		**175**	**50**	**97**	**69**	**761**

TOTAL NUMBER OF TRACTOR TRAILERS (12 HOURS_DAY)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center			3	13	3		7				**26**
2-IGB-West							10	4	4	10	**27**
3-Ottawa West	4					6	16	24		39	**89**
4-Ottawa South						4	13	4		26	**46**
5-IGB-East						6	39	6	6	6	**65**
6-Ottawa East		7	11	22		6	29	29		26	**131**
7-Hull	7		44	11	30	25					**117**
8-Aylmer	6	17		29	15						**67**
9-Gatineau West											
10-Gatineau East		3	30	47	18	15				6	**119**
TOTAL	**17**	**28**	**88**	**122**	**65**	**63**	**115**	**67**	**10**	**113**	**688**

TOTAL NUMBER OF ALL TRUCKS (12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center			1	1			3				**6**
2-IGB West							14	5	1	12	**31**
3-Ottawa West							32	16		20	**68**
4-Ottawa South							12	7	4	48	**71**
5-IGB-East						8	31	23	11	26	**99**
6-Ottawa East	1			6	3		34	8	16	19	**86**
7-Hull		27	6	23	13	54		3			**125**
8-Aylmer	3	7	13	33		45					**100**
9-Gatineau West	3	4	27	15	15	3					**67**
10-Gatineau East	4	3	6	59	3	12					**87**
TOTAL	**11**	**41**	**53**	**136**	**34**	**121**	**126**	**61**	**32**	**125**	**741**

IGB-Inside Green Belt

TOTAL NUMBER OF 2A TRUCKS (12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center							3				**3**
2-IGB West							3				**3**
3-Ottawa West							3			12	**15**
4-Ottawa South							12	6		12	**30**
5-IGB-East							3	18		15	**36**
6-Ottawa East							6		12	15	**33**
7-Hull		15		18	7	30					**70**
8-Aylmer		7	3	15		7					**32**
9-Gatineau West			24	15	15						**54**
10-Gatineau East			3	15							**18**
TOTAL		**22**	**30**	**63**	**22**	**37**	**29**	**23**	**12**	**54**	**293**

TOTAL NUMBER OF 3A+ TRUCKS (12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center											
2-IGB West							11				**11**
3-Ottawa West								8			**8**
4-Ottawa South											
5-IGB-East						8	8		8	8	**30**
6-Ottawa East											
7-Hull		3				3					**6**
8-Aylmer	3		3			26					**32**
9-Gatineau West											
10-Gatineau East	3			26							**29**
TOTAL	**6**	**3**	**3**	**26**		**37**	**19**	**8**	**8**	**8**	**117**

TOTAL NUMBER OF TRACTOR TRAILERS (12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center			1	1							**3**
2-IGB West								5	1	12	**18**
3-Ottawa West							29	9		8	**46**
4-Ottawa South								1	4	36	**41**
5-IGB-East							20	5	4	4	**33**
6-Ottawa East	1			6	3		28	8	4	4	**54**
7-Hull		9	6	4	6	21		3			**49**
8-Aylmer			6	18		12					**36**
9-Gatineau West	3	4	3			3					**13**
10-Gatineau East	1	3	3	18	3	12					**40**
TOTAL	**5**	**16**	**19**	**47**	**12**	**48**	**78**	**30**	**13**	**63**	**331**

TOTAL NUMBER OF ALL TRUCKS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center			5	14	3		53	13	49	5	**142**
2-IGB West							100	36	21	28	**185**
3-Ottawa West	4					6	104	61	21	74	**270**
4-Ottawa South						4	155	34	4	97	**293**
5-IGB-East	11					14	209	73	120	115	**543**
6-Ottawa East	1	7	11	28	25	19	126	50	29	99	**395**
7-Hull	69	90	106	73	172	102		3			**615**
8-Aylmer	80	88	46	68	32	56					**369**
9-Gatineau West	75	22	42	81	92	32					**344**
10-Gatineau East	15	6	52	124	66	27				6	**295**
TOTAL	**255**	**213**	**261**	**387**	**390**	**259**	**745**	**270**	**244**	**425**	**3450**

IGB-Inside Green Belt

TOTAL NUMBER OF 2A TRUCKS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center							33	13	18	5	**69**
2-IGB West							41	15	10		**67**
3-Ottawa West							36	5	5	12	**58**
4-Ottawa South							63	24		35	**122**
5-IGB-East	5						123	46	59	66	**298**
6-Ottawa East					22	13	62	13	25	53	**188**
7-Hull	53	64	51	58	88	52					**366**
8-Aylmer	13	13	27	21	18	18					**110**
9-Gatineau West	24	18	35	33	44	29					**181**
10-Gatineau East	6		15	33	40						**93**
TOTAL	**100**	**95**	**128**	**145**	**212**	**112**	**358**	**115**	**117**	**172**	**1553**

TOTAL NUMBER OF 3A+ TRUCKS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center							12		31		**44**
2-IGB West							49	12	6	6	**73**
3-Ottawa West							22	23	16	16	**77**
4-Ottawa South							79	6			**85**
5-IGB-East	6					8	26	16	51	39	**146**
6-Ottawa East							6			16	**22**
7-Hull	9	17	5		48	3					**83**
8-Aylmer	61	58	13			26					**157**
9-Gatineau West	48		5	48	48						**149**
10-Gatineau East	8		5	26	5						**43**
TOTAL	**132**	**75**	**27**	**74**	**101**	**37**	**193**	**57**	**105**	**77**	**878**

TOTAL NUMBER OF TRACTOR TRAILERS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center			5	14	3		7				**29**
2-IGB West							10	8	5	22	**45**
3-Ottawa West	4					6	46	32		46	**135**
4-Ottawa South						4	13	5	4	62	**87**
5-IGB-East						6	60	11	10	10	**98**
6-Ottawa East	1	7	11	28	3	6	58	37	4	30	**185**
7-Hull	7	9	50	15	35	46		3			**166**
8-Aylmer	6	17	6	46	15	12					**102**
9-Gatineau West	3	4	3			3					**13**
10-Gatineau East	1	6	32	65	21	27				6	**159**
TOTAL	**22**	**44**	**107**	**169**	**77**	**111**	**193**	**97**	**23**	**176**	**1019**

TOTAL NUMBER OF ALL TRUCKS (24 HOURS)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center			5	13	3		50	13	45	5	**134**
2-IGB West							89	37	21	29	**176**
3-Ottawa West	3					5	110	63	19	68	**268**
4-Ottawa South						3	142	38	5	104	**291**
5-IGB-East	11					19	213	75	122	120	**561**
6-Ottawa East	3	5	8	25	29	18	133	46	30	95	**391**
7-Hull	65	88	98	73	164	105		5			**599**
8-Aylmer	71	80	51	68	27	85					**383**
9-Gatineau West	70	25	59	72	84	34					**343**
10-Gatineau East	17	8	47	135	63	30				5	**304**
TOTAL	**240**	**206**	**267**	**386**	**370**	**299**	**737**	**277**	**242**	**426**	**3450**

IGB-Inside Green Belt

TOTAL NUMBER OF 2A TRUCKS (24 HOURS)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center							33	13	17	5	**67**
2-IGB West							41	14	9		**64**
3-Ottawa West							36	5	5	13	**58**
4-Ottawa South							61	27		35	**122**
5-IGB-East	5						121	49	57	68	**299**
6-Ottawa East					24	13	65	13	25	55	**194**
7-Hull	52	56	53	58	91	48					**357**
8-Aylmer	11	16	28	17	17	23					**111**
9-Gatineau West	23	17	49	29	41	29					**188**
10-Gatineau East	5		17	29	41						**93**
TOTAL	**95**	**89**	**147**	**134**	**214**	**112**	**356**	**119**	**113**	**175**	**1553**

TOTAL NUMBER OF 3A+ TRUCKS (24 HOURS)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	TOTAL
1-Ottawa Center							13		28		**41**
2-IGB West							41	13	6	6	**67**
3-Ottawa West							20	28	14	14	**77**
4-Ottawa South							70	6			**77**
5-IGB-East	6					14	33	14	55	42	**165**
6-Ottawa East							6			14	**20**
7-Hull	9	17	4		43	4					**77**
8-Aylmer	56	51	13			43					**163**
9-Gatineau West	43		4	43	43						**132**
10-Gatineau East	9		4	43	4						**60**
TOTAL	**122**	**69**	**26**	**85**	**90**	**61**	**184**	**61**	**103**	**77**	**878**

TOTAL NUMBER OF TRACTOR TRAILERS (24 HOURS)

ZONE GROUP O	**1-Ottawa Center**	**2-IGB West**	**3-Ottawa West**	**4-Ottawa South**	**5-IGB-East**	**6-Ottawa East**	**7-Hull**	**8-Aylmer**	**9-Gatineau West**	**10-Gatineau East**	TOTAL
1-Ottawa Center			5	13	3		5				**26**
2-IGB West							8	10	5	23	**46**
3-Ottawa West	3					5	54	31		41	**133**
4-Ottawa South						3	10	5	5	69	**92**
5-IGB-East						5	59	13	10	10	**97**
6-Ottawa East	3	5	8	25	5	5	62	33	5	26	**176**
7-Hull	5	15	40	15	30	53		5			**164**
8-Aylmer	5	13	10	51	10	20					**109**
9-Gatineau West	5	8	5			5					**23**
10-Gatineau East	3	8	25	63	18	30				5	**152**
TOTAL	**23**	**48**	**94**	**167**	**66**	**127**	**197**	**97**	**26**	**175**	**1019**

DIFFERENCE BETWEEN TOTAL NUMBERS OF ALL TRUCKS [(12 HOURS_DAY+12 HOURS_NIGHT)-24 HOURS]

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL**
1-Ottawa Center			-1	1	1		3	0	4	0	**8**
2-IGB West							11	-1	0	-2	**8**
3-Ottawa West	1					1	-7	-2	2	7	**2**
4-Ottawa South						1	13	-4	-1	-7	**2**
5-IGB-East	0					-5	-5	-2	-1	-5	**-18**
6-Ottawa East	-2	2	3	3	-3	1	-7	4	-2	4	**4**
7-Hull	4	2	8	0	7	-3		-2			**16**
8-Aylmer	8	8	-5	0	5	-29					**-14**
9-Gatineau West	5	-3	-16	9	8	-2					**1**
10-Gatineau East	-1	-1	5	-11	2	-4				1	**-9**
TOTAL	**16**	**7**	**-5**	**1**	**20**	**-40**	**8**	**-8**	**2**	**-2**	**0**

IGB-Inside Green Belt

DIFFERENCE BETWEEN TOTAL NUMBERS OF 2A TRUCKS [(12 HOURS_DAY+12 HOURS_NIGHT)-24 HOURS]

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL**
1-Ottawa Center							1	0	1	0	**2**
2-IGB West							1	1	1		**3**
3-Ottawa West							0	0	0	-1	**1**
4-Ottawa South							2	-3		1	**-1**
5-IGB-East	0						2	-3	2	-2	**0**
6-Ottawa East					-1	0	-3	0	0	-2	**-6**
7-Hull	1	8	-2	0	-3	5					**9**
8-Aylmer	2	-3	-1	4	0	-5					**-2**
9-Gatineau West	1	0	-14	3	3	0					**-7**
10-Gatineau East	1		-3	3	-1						**1**
TOTAL	**6**	**6**	**-19**	**11**	**-3**	**0**	**3**	**-4**	**4**	**-3**	**0**

DIFFERENCE BETWEEN TOTAL NUMBERS OF 3A+ TRUCKS [(12 HOURS_DAY+12 HOURS_NIGHT)-24 HOURS]

ZONE GROUP O	**1-Ottawa Center**	**2-IGB West**	**3-Ottawa West**	**4-Ottawa South**	**5-IGB-East**	**6-Ottawa East**	**7-Hull**	**8-Aylmer**	**9-Gatineau West**	**10-Gatineau East**	**TOTAL**
1-Ottawa Center							-1		3		**3**
2-IGB West							8	-1	0	0	**7**
3-Ottawa West							1	-5	2	2	**0**
4-Ottawa South							8	0			**8**
5-IGB-East	0					-6	-7	2	-4	-3	**-19**
6-Ottawa East							0			2	**1**
7-Hull	1	0	0		6	-1					**5**
8-Aylmer	5	6	0			-17					**-6**
9-Gatineau West	6		0	6	6						**17**
10-Gatineau East	-1		0	-17	0						**-17**
TOTAL	**10**	**6**	**1**	**-11**	**11**	**-24**	**9**	**-4**	**1**	**0**	**0**

DIFFERENCE BETWEEN TOTAL NUMBERS OF TRACTOR TRAILERS [(12 HOURS_DAY+12 HOURS_NIGHT)-24 HOURS]

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL**
1-Ottawa Center			-1	1	1		2				**4**
2-IGB West							2	-2	0	-1	**-1**
3-Ottawa West	1					1	-8	2		5	**1**
4-Ottawa South						1	3	0	-1	-8	**-6**
5-IGB-East						1	1	-1	0	0	**1**
6-Ottawa East	-2	2	3	3	-2	1	-4	4	-1	4	**8**
7-Hull	2	-7	10	0	5	-7		-2			**2**
8-Aylmer	1	4	-4	-4	5	-8					**-7**
9-Gatineau West	-2	-3	-2			-2					**-9**
10-Gatineau East	-2	-1	7	2	3	-4				1	**7**
TOTAL	**0**	**-5**	**13**	**1**	**12**	**-16**	**-4**	**0**	**-3**	**2**	**0**

ABSOLUTE DIFFERENCE BETWEEN TOTAL NUMBERS OF ALL TRUCKS [(12H_DAY+12H_NIGHT)-24H]

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL (ABS)**
1-Ottawa Center			-1	1	1		3	0	4	0	**10**
2-IGB West							11	-1	0	-2	**13**
3-Ottawa West	1					1	-7	-2	2	7	**20**
4-Ottawa South						1	13	-4	-1	-7	**26**
5-IGB-East	0					-5	-5	-2	-1	-5	**19**
6-Ottawa East	-2	2	3	3	-3	1	-7	4	-2	4	**31**
7-Hull	4	2	8	0	7	-3		-2			**27**
8-Aylmer	8	8	-5	0	5	-29					**56**
9-Gatineau West	5	-3	-16	9	8	-2					**43**
10-Gatineau East	-1	-1	5	-11	2	-4				1	**26**
TOTAL (ABS)	**21**	**16**	**38**	**25**	**27**	**48**	**45**	**16**	**11**	**26**	**272**

IGB-Inside Green Belt

ABSOLUTE DIFFERENCE BETWEEN TOTAL NUMBERS OF 2A TRUCKS [(12H_DAY+12H_NIGHT)-24H]

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL (ABS)**
1-Ottawa Center							1	0	1	0	**2**
2-IGB West							1	1	1		**3**
3-Ottawa West							0	0	0	-1	**2**
4-Ottawa South							2	-3		1	**6**
5-IGB-East	0						2	-3	2	-2	**9**
6-Ottawa East					-1	0	-3	0	0	-2	**7**
7-Hull	1	8	-2	0	-3	5					**19**
8-Aylmer	2	-3	-1	4	0	-5					**15**
9-Gatineau West	1	0	-14	3	3	0					**22**
10-Gatineau East	1		-3	3	-1						**8**
TOTAL (ABS)	**6**	**12**	**19**	**11**	**9**	**10**	**8**	**8**	**5**	**5**	**92**

ABSOLUTE DIFFERENCE BETWEEN TOTAL NUMBERS OF 3A+ TRUCKS [(12H_DAY+12H_NIGHT)-24H]

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL (ABS)**
1-Ottawa Center							-1		3		**4**
2-IGB West							8	-1	0	0	**9**
3-Ottawa West							1	-5	2	2	**10**
4-Ottawa South							8	0			**9**
5-IGB-East	0					-6	-7	2	-4	-3	**22**
6-Ottawa East							0			2	**2**
7-Hull	1	0	0		6	-1					**8**
8-Aylmer	5	6	0			-17					**28**
9-Gatineau West	6		0	6	6						**17**
10-Gatineau East	-1		0	-17	0						**18**
TOTAL (ABS)	**12**	**6**	**1**	**22**	**11**	**24**	**26**	**7**	**9**	**7**	**127**

ABSOLUTE DIFFERENCE BETWEEN TOTAL NUMBERS OF TRACTOR TRAILERS [(12H_DAY+12H_NIGHT)-24H]

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL (ABS)**
1-Ottawa Center			-1	1	1		2				**5**
2-IGB West							2	-2	0	-1	**6**
3-Ottawa West	1					1	-8	2		5	**18**
4-Ottawa South						1	3	0	-1	-8	**13**
5-IGB-East						1	1	-1	0	0	**4**
6-Ottawa East	-2	2	3	3	-2	1	-4	4	-1	4	**26**
7-Hull	2	-7	10	0	5	-7		-2			**33**
8-Aylmer	1	4	-4	-4	5	-8					**27**
9-Gatineau West	-2	-3	-2			-2					**9**
10-Gatineau East	-2	-1	7	2	3	-4				1	**20**
TOTAL (ABS)	**10**	**18**	**27**	**11**	**16**	**26**	**20**	**11**	**3**	**20**	**161**

COMPARISON OF TOTAL NUMBER OF ALL TRUCKS FOR DIFFERENT PERIOD OF TIME

ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D*	N*	D+N	24H*	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H
1-Ottawa Center									3	1	5	5	13	1	14	13	3		3	3				
2-IGB West																								
3-Ottawa West	4		4	3																	6		6	5
4-Ottawa South																					4		4	3
5-IGB East	11		11	11																	6	8	14	19
6-Ottawa East		1	1	3	7		7	5	11		11	8	22	6	28	25	22	3	25	29	19		19	18
7-Hull	69		69	65	63	27	90	88	100	6	106	98	50	23	73	73	159	13	172	164	48	54	102	105
8-Aylmer	77	3	80	71	81	7	88	80	33	13	46	51	35	33	68	68	32		32	27	11	45	56	85
9-Gatineau West	72	3	75	70	18	4	22	25	16	27	42	59	66	15	81	72	77	15	92	84	29	3	32	34
10-Gatineau East	11	4	15	17	3	3	6	8	45	6	52	47	65	59	124	135	63	3	66	63	15	12	27	30
TOTAL	**244**	**11**	**255**	**240**	**172**	**41**	**213**	**206**	**208**	**53**	**261**	**267**	**251**	**136**	**387**	**386**	**356**	**34**	**390**	**370**	**138**	**121**	**259**	**299**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	50	3	53	50	13		13	13	49		49	45	5		5	5	**137**	**6**	**142**	**134**
2-IGB West	86	14	100	89	31	5	36	37	20	1	21	21	16	12	28	29	**153**	**31**	**185**	**176**
3-Ottawa West	72	32	104	110	45	16	61	63	21		21	19	54	20	74	68	**201**	**68**	**270**	**268**
4-Ottawa South	143	12	155	142	28	7	34	38		4	4	5	49	48	97	104	**223**	**71**	**293**	**291**
5-IGB East	178	31	209	213	50	23	73	75	109	11	120	122	89	26	115	120	**444**	**99**	**543**	**561**
6-Ottawa East	92	34	126	133	42	8	50	46	13	16	29	30	80	19	99	95	**308**	**86**	**395**	**391**
7-Hull						3	3	5									**490**	**125**	**615**	**599**
8-Aylmer																	**269**	**100**	**369**	**383**
9-Gatineau West																	**277**	**67**	**344**	**343**
10-Gatineau East													6		6	5	**208**	**87**	**295**	**304**
TOTAL	**620**	**126**	**745**	**737**	**208**	**61**	**270**	**277**	**212**	**32**	**244**	**242**	**300**	**125**	**425**	**426**	**2709**	**741**	**3450**	**3450**

IGB-Inside Green Belt

D* - DAY (7:00 - 17:00)

N* - NIGHT (19:00 - 7:00)

24H* - 24 HOUR PERIOD

COMPARISON OF TOTAL NUMBER OF 2A TRUCKS FOR DIFFERENT PERIOD OF TIME

ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H
1-Ottawa Center																								
2-IGB West																								
3-Ottawa West																								
4-Ottawa South																								
5-IGB East	5		5	5																				
6-Ottawa East																	22		22	24	13		13	13
7-Hull	53		53	52	49	15	64	56	51		51	53	40	18	58	58	81	7	88	91	22	30	52	48
8-Aylmer	13		13	11	6	7	13	16	24	3	27	28	6	15	21	17	18		18	17	11	7	18	23
9-Gatineau West	24		24	23	18		18	17	11	24	35	49	18	15	33	29	29	15	44	41	29		29	29
10-Gatineau East	6		6	5					11	3	15	17	18	15	33	29	40		40	41				
TOTAL	**100**		**100**	**95**	**73**	**22**	**95**	**89**	**97**	**30**	**128**	**147**	**81**	**63**	**145**	**134**	**190**	**22**	**212**	**214**	**75**	**37**	**112**	**112**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	31	3	33	33	13		13	13	18		18	17	5		5	5	**66**	**3**	**69**	**67**
2-IGB West	38	3	41	41	15		15	14	10		10	9					**64**	**3**	**67**	**64**
3-Ottawa West	33	3	36	36	5		5	5	5		5	5		12	12	13	**43**	**15**	**58**	**58**
4-Ottawa South	51	12	63	61	18	6	24	27					23	12	35	35	**92**	**30**	**122**	**122**
5-IGB East	120	3	123	121	28	18	46	49	59		59	57	51	15	66	68	**263**	**36**	**298**	**299**
6-Ottawa East	56	6	62	65	13		13	13	13	12	25	25	38	15	53	55	**155**	**33**	**188**	**194**
7-Hull																	**296**	**70**	**366**	**357**
8-Aylmer																	**78**	**32**	**110**	**111**
9-Gatineau West																	**127**	**54**	**181**	**188**
10-Gatineau East																	**75**	**18**	**93**	**93**
TOTAL	**329**	**29**	**358**	**356**	**92**	**23**	**115**	**119**	**105**	**12**	**117**	**113**	**117**	**54**	**172**	**175**	**1260**	**293**	**1553**	**1553**

COMPARISON OF TOTAL NUMBER OF 3A+ TRUCKS FOR DIFFERENT PERIOD OF TIME

ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H
1-Ottawa Center																								
2-IGB West																								
3-Ottawa West																								
4-Ottawa South																								
5-IGB East	6		6	6																	8	8	14	
6-Ottawa East																								
7-Hull	9		9	9	14	3	17	17	5		5	4					48		48	43		3	3	4
8-Aylmer	58	3	61	56	58		58	51	9	3	13	13										26	26	43
9-Gatineau West	48		48	43					5		5	4	48		48	43	48		48	43				
10-Gatineau East	5	3	8	9					5		5	4		26	26	43	5		5	4				
TOTAL	**126**	**6**	**132**	**122**	**72**	**3**	**75**	**69**	**23**	**3**	**27**	**26**	**48**	**26**	**74**	**85**	**101**		**101**	**90**		**37**	**37**	**61**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	12		12	13					31		31	28					**44**		**44**	**41**
2-IGB West	38	11	49	41	12		12	13	6		6	6	6		6	6	**62**	**11**	**73**	**67**
3-Ottawa West	22		22	20	16	8	23	28	16		16	14	16		16	14	**69**	**8**	**77**	**77**
4-Ottawa South	79		79	70	6		6	6									**85**		**85**	**77**
5-IGB East	18	8	26	33	16		16	14	44	8	51	55	31	8	39	42	**115**	**30**	**146**	**165**
6-Ottawa East	6		6	6									16		16	14	**22**		**22**	**20**
7-Hull																	**76**	**6**	**83**	**77**
8-Aylmer																	**124**	**32**	**157**	**163**
9-Gatineau West																	**149**		**149**	**132**
10-Gatineau East																	**14**	**29**	**43**	**60**
TOTAL	**175**	**19**	**193**	**184**	**50**	**8**	**57**	**61**	**97**	**8**	**105**	**103**	**69**	**8**	**77**	**77**	**761**	**117**	**878**	**878**

COMPARISON OF TOTAL NUMBER OF TRACTOR TRAILERS FOR DIFFERENT PERIOD OF TIME

ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H
1-Ottawa Center									3	1	5	5	13	1	14	13	3		3	3				
2-IGB West																								
3-Ottawa West	4		4	3																	6		6	5
4-Ottawa South																					4		4	3
5-IGB East																					6		6	5
6-Ottawa East		1	1	3	7		7	5	11		11	8	22	6	28	25		3	3	5	6		6	5
7-Hull	7		7	5		9	9	15	44	6	50	40	11	4	15	15	30	6	35	30	25	21	46	53
8-Aylmer	6		6	5	17		17	13		6	6	10	29	18	46	51	15		15	10		12	12	20
9-Gatineau West		3	3	5		4	4	8		3	3	5										3	3	5
10-Gatineau East		1	1	3	3	3	6	8	30	3	32	25	47	18	65	63	18	3	21	18	15	12	27	30
TOTAL	**17**	**5**	**22**	**23**	**28**	**16**	**44**	**48**	**88**	**19**	**107**	**94**	**122**	**47**	**169**	**167**	**65**	**12**	**77**	**66**	**63**	**48**	**111**	**127**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	7		7	5													**26**	**3**	**29**	**26**
2-IGB West	10		10	8	4	5	8	10	4	1	5	5	10	12	22	23	**27**	**18**	**45**	**46**
3-Ottawa West	16	29	46	54	24	9	32	31					39	8	46	41	**89**	**46**	**135**	**133**
4-Ottawa South	13		13	10	4	1	5	5		4	4	5	26	36	62	69	**46**	**41**	**87**	**92**
5-IGB East	39	20	60	59	6	5	11	13	6	4	10	10	6	4	10	10	**65**	**33**	**98**	**97**
6-Ottawa East	29	28	58	62	29	8	37	33		4	4	5	26	4	30	26	**131**	**54**	**185**	**176**
7-Hull						3	3	5									**117**	**49**	**166**	**164**
8-Aylmer																	**67**	**36**	**102**	**109**
9-Gatineau West																		**13**	**13**	**23**
10-Gatineau East													6		6	5	**119**	**40**	**159**	**152**
TOTAL	**115**	**78**	**193**	**197**	**67**	**30**	**97**	**97**	**10**	**13**	**23**	**26**	**113**	**63**	**176**	**175**	**688**	**331**	**1019**	**1019**

Appendix G: District Comparisons of Trucks by Percent

COMPARISON OF PERCENTS OF ALL TRUCKS FOR DIFFERENT PERIOD OF TIME (%)

ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D*	N*	D+N	24H*	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H
1-Ottawa Center									0	0	0	0	0	0	0	0	0		0	0				
2-IGB West																								
3-Ottawa West	0		0	0																	0		0	0
4-Ottawa South																					0		0	0
5-IGB East	0		0	0																	0	1	0	1
6-Ottawa East		0	0	0	0		0	0	0		0	0	1	1	1	1	1	0	1	1	1		1	1
7-Hull	3		2	2	2	4	3	3	4	1	3	3	2	3	2	2	6	2	5	5	2	7	3	3
8-Aylmer	3	0	2	2	3	1	3	2	1	2	1	1	1	4	2	2	1		1	1	0	6	2	2
9-Gatineau West	3	0	2	2	1	1	1	1	1	4	1	2	2	2	2	2	3	2	3	2	1	0	1	1
10-Gatineau East	0	1	0	0	0	0	0	0	2	1	1	1	2	8	4	4	2	0	2	2	1	2	1	1
TOTAL	**9**	**2**	**7**	**7**	**6**	**6**	**6**	**6**	**8**	**7**	**8**	**8**	**9**	**18**	**11**	**11**	**13**	**5**	**11**	**11**	**5**	**16**	**8**	**9**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	2	0	2	1	0		0	0	2		1	1	0		0	0	**5**	**1**	**4**	**4**
2-IGB West	3	2	3	3	1	1	1	1	1	0	1	1	1	2	1	1	**6**	**4**	**5**	**5**
3-Ottawa West	3	4	3	3	2	2	2	2	1		1	1	2	3	2	2	**7**	**9**	**8**	**8**
4-Ottawa South	5	2	4	4	1	1	1	1		1	0	0	2	6	3	3	**8**	**10**	**9**	**8**
5-IGB East	7	4	6	6	2	3	2	2	4	2	3	4	3	4	3	3	**16**	**13**	**16**	**16**
6-Ottawa East	3	5	4	4	2	1	1	1	0	2	1	1	3	3	3	3	**11**	**12**	**11**	**11**
7-Hull						0	0	0									**18**	**17**	**18**	**17**
8-Aylmer																	**10**	**13**	**11**	**11**
9-Gatineau West																	**10**	**9**	**10**	**10**
10-Gatineau East													0		0	0	**8**	**12**	**9**	**9**
TOTAL	**23**	**17**	**22**	**21**	**8**	**8**	**8**	**8**	**8**	**4**	**7**	**7**	**11**	**17**	**12**	**12**	**100**	**100**	**100**	**100**

IGB-Inside Green Belt
D* - DAY (7:00 - 17:00)
N* - NIGHT (19:00 - 7:00)
24H - 24 HOURS

COMPARISON OF PERCENTS OF 2A TRUCKS FOR DIFFERENT PERIOD OF TIME (%)

ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H
1-Ottawa Center																								
2-IGB West																								
3-Ottawa West																								
4-Ottawa South																								
5-IGB East	0		0	0																				
6-Ottawa East																	2		1	2	1		1	1
7-Hull	4		3	3	4	5	4	4	4		3	3	3	6	4	4	6	2	6	6	2	10	3	3
8-Aylmer	1		1	1	1	2	1	1	2	1	2	2	1	5	1	1	1		1	1	1	2	1	1
9-Gatineau West	2		2	1	1		1	1	1	8	2	3	1	5	2	2	2	5	3	3	2		2	2
10-Gatineau East	1		0	0					1	1	1	1	1	5	2	2	3		3	3				
TOTAL	**8**		**6**	**6**	**6**	**7**	**6**	**6**	**8**	**10**	**8**	**9**	**6**	**22**	**9**	**9**	**15**	**7**	**14**	**14**	**6**	**13**	**7**	**7**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	2	1	2	2	1		1	1	1		1	1	0		0	0	**5**	**1**	**4**	**4**
2-IGB West	3	1	3	3	1		1	1	1		1	1					**5**	**1**	**4**	**4**
3-Ottawa West	3	1	2	2	0		0	0	0		0	0		4	1	1	**3**	**5**	**4**	**4**
4-Ottawa South	4	4	4	4	1	2	2	2					2	4	2	2	**7**	**10**	**8**	**8**
5-IGB East	10	1	8	8	2	6	3	3	5		4	4	4	5	4	4	**21**	**12**	**19**	**19**
6-Ottawa East	4	2	4	4	1		1	1	1	4	2	2	3	5	3	4	**12**	**11**	**12**	**13**
7-Hull																	**24**	**24**	**24**	**23**
8-Aylmer																	**6**	**11**	**7**	**7**
9-Gatineau West																	**10**	**18**	**12**	**12**
10-Gatineau East																	**6**	**6**	**6**	**6**
TOTAL	**26**	**10**	**23**	**23**	**7**	**8**	**7**	**8**	**8**	**4**	**8**	**7**	**9**	**19**	**11**	**11**	**100**	**100**	**100**	**100**

COMPARISON OF PERCENTS OF 3A+ TRUCKS FOR DIFFERENT PERIOD OF TIME (%)

ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D	**N**	**D+N**	**24H**	**D**	**N**	**D+N**	**24H**	**D**	**N**	**D+N**	**24H**	**D**	**N**	**D+N**	**24H**	**D**	**N**	**D+N**	**24H**	**D**	**N**	**D+N**	**24H**
1-Ottawa Center																								
2-IGB West																								
3-Ottawa West																								
4-Ottawa South																								
5-IGB East	1		1	1																		6	1	2
6-Ottawa East																								
7-Hull	1		1	1	2	3	2	2	1		1	0					6		5	5		3	0	0
8-Aylmer	8	3	7	6	8		7	6	1	3	1	1										22	3	5
9-Gatineau West	6		5	5					1		1	0	6		5	5	6		5	5				
10-Gatineau East	1	3	1	1					1		1	0		22	3	5	1		1	0				
TOTAL	**17**	**5**	**15**	**14**	**9**	**3**	**9**	**8**	**3**	**3**	**3**	**3**	**6**	**22**	**8**	**10**	**13**		**12**	**10**		**31**	**4**	**7**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	2		1	1					4		4	3					**6**		**5**	**5**
2-IGB West	5	9	6	5	2		1	1	1		1	1	1		1	1	**8**	**9**	**8**	**8**
3-Ottawa West	3		2	2	2	6	3	3	2		2	2	2		2	2	**9**	**6**	**9**	**9**
4-Ottawa South	10		9	8	1		1	1									**11**		**10**	**9**
5-IGB East	2	6	3	4	2		2	2	6	6	6	6	4	6	4	5	**15**	**26**	**17**	**19**
6-Ottawa East	1		1	1									2		2	2	**3**		**2**	**2**
7-Hull																	**10**	**5**	**9**	**9**
8-Aylmer																	**16**	**28**	**18**	**19**
9-Gatineau West																	**20**		**17**	**15**
10-Gatineau East																	**2**	**25**	**5**	**7**
TOTAL	**23**	**16**	**22**	**21**	**7**	**6**	**7**	**7**	**13**	**6**	**12**	**12**	**9**	**6**	**9**	**9**	**100**	**100**	**100**	**100**

COMPARISON OF PERCENTS OF TRACTOR TRAILERS FOR DIFFERENT PERIOD OF TIME (%)

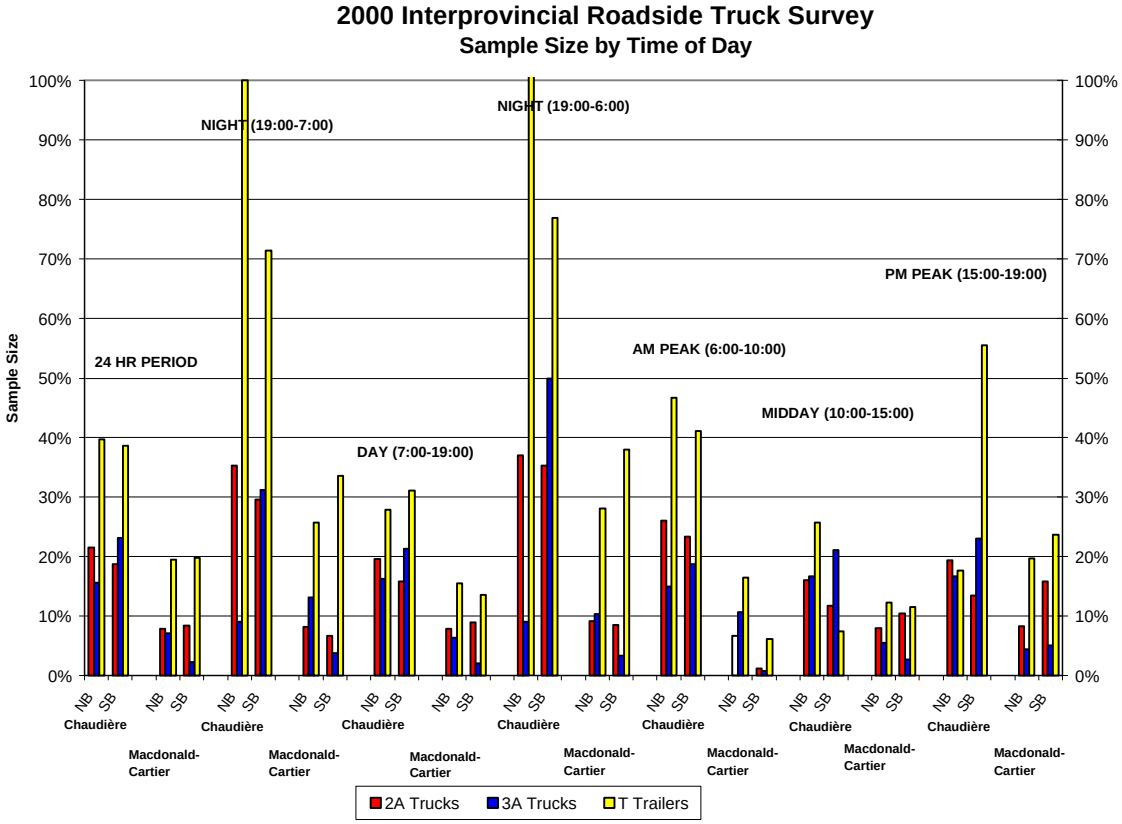
ZONE GROUP O	1-Ottawa Center				2-IGB West				3-Ottawa West				4-Ottawa South				5-IGB East				6-Ottawa East			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H
1-Ottawa Center									0	0	0	1	2	0	1	1	0		0	0				
2-IGB West																								
3-Ottawa West	1		0	0																	1		1	1
4-Ottawa South																					1		0	0
5-IGB East																					1		1	1
6-Ottawa East		0	0	0	1		1	0	2		1	1	3	2	3	2		1	0	0	1		1	1
7-Hull	1		1	0		3	1	1	6	2	5	4	2	1	1	1	4	2	3	3	4	6	5	5
8-Aylmer	1		1	1	2		2	1		2	1	1	4	5	5	5	2		1	1		4	1	2
9-Gatineau West		1	0	0		1	0	1		1	0	0										1	0	0
10-Gatineau East		0	0	0	0	1	1	1	4	1	3	2	7	5	6	6	3	1	2	2	2	4	3	3
TOTAL	**3**	**2**	**2**	**2**	**4**	**5**	**4**	**5**	**13**	**6**	**10**	**9**	**18**	**14**	**17**	**16**	**10**	**4**	**8**	**6**	**9**	**14**	**11**	**12**

ZONE GROUP O	7-Hull				8-Aylmer				9-Gatineau West				10-Gatineau East				**TOTAL**			
	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	D	N	D+N	24H	**D**	**N**	**D+N**	**24H**
1-Ottawa Center	1		1	0													**4**	**1**	**3**	**3**
2-IGB West	1		1	1	1	1	1	1	1	0	0	0	1	4	2	2	**4**	**5**	**4**	**5**
3-Ottawa West	2	9	4	5	3	3	3	3					6	2	5	4	**13**	**14**	**13**	**13**
4-Ottawa South	2		1	1	1	0	0	0		1	0	1	4	11	6	7	**7**	**12**	**9**	**9**
5-IGB East	6	6	6	6	1	1	1	1	1	1	1	1	1	1	1	1	**9**	**10**	**10**	**10**
6-Ottawa East	4	9	6	6	4	2	4	3		1	0	1	4	1	3	3	**19**	**16**	**18**	**17**
7-Hull						1	0	0									**17**	**15**	**16**	**16**
8-Aylmer																	**10**	**11**	**10**	**11**
9-Gatineau West																		**4**	**1**	**2**
10-Gatineau East													1		1	1	**17**	**12**	**16**	**15**
TOTAL	**17**	**24**	**19**	**19**	**10**	**9**	**10**	**10**	**1**	**4**	**2**	**3**	**16**	**19**	**17**	**17**	**100**	**100**	**100**	**100**

Appendix H: Survey Expansion Factors

EXPANSION FACTORS FOR TRUCKS BY BRIDGE, DIRECTION, TIME PERIOD AND TYPE OF TRUCKS

BRIDGE	DIRECTION	PERIOD	2A Trucks	3A+ Trucks	Tractor Trailers
Chaudière	Northbound	24 HOUR TOTAL	4.64	6.41	2.52
		NIGHT (19:00-7:00)	2.83	11.00	1.00
		DAY (7:00-19:00)	5.11	6.13	3.59
		ALL OTHER	2.70	11.00	0.91
		AM PEAK(6:00-10:00)	3.84	6.67	2.14
		MIDDAY(10:00-15:00)	6.22	6.00	3.88
		PM PEAK(15:00-19:00)	5.17	6.00	5.67
Chaudière	Southbound	24 HOUR TOTAL	5.32	4.33	2.59
		NIGHT (19:00-7:00)	3.38	3.20	1.40
		DAY (7:00-19:00)	6.32	4.69	3.21
		ALL OTHER	2.83	2.00	1.30
		AM PEAK(6:00-10:00)	4.28	5.33	2.43
		MIDDAY(10:00-15:00)	8.50	4.75	13.50
		PM PEAK(15:00-19:00)	7.40	4.33	1.80
Macdonald-Cartier	Northbound	24 HOUR TOTAL	12.65	14.04	5.14
		NIGHT (19:00-7:00)	12.14	7.60	3.89
		DAY (7:00-19:00)	12.76	15.74	6.45
		ALL OTHER	10.83	9.67	3.56
		AM PEAK(6:00-10:00)	14.89	9.40	6.06
		MIDDAY(10:00-15:00)	12.44	18.25	8.13
		PM PEAK(15:00-19:00)	12.00	22.67	5.07
Macdonald-Cartier	Southbound	24 HOUR TOTAL	11.89	42.63	5.05
		NIGHT (19:00-7:00)	15.00	26.00	2.98
		DAY (7:00-19:00)	11.19	48.17	7.38
		ALL OTHER	11.71	30.00	2.63
		AM PEAK(6:00-10:00)	79.00	122.00	16.20
		MIDDAY(10:00-15:00)	9.58	37.50	8.65
		PM PEAK(15:00-19:00)	6.31	19.50	4.23



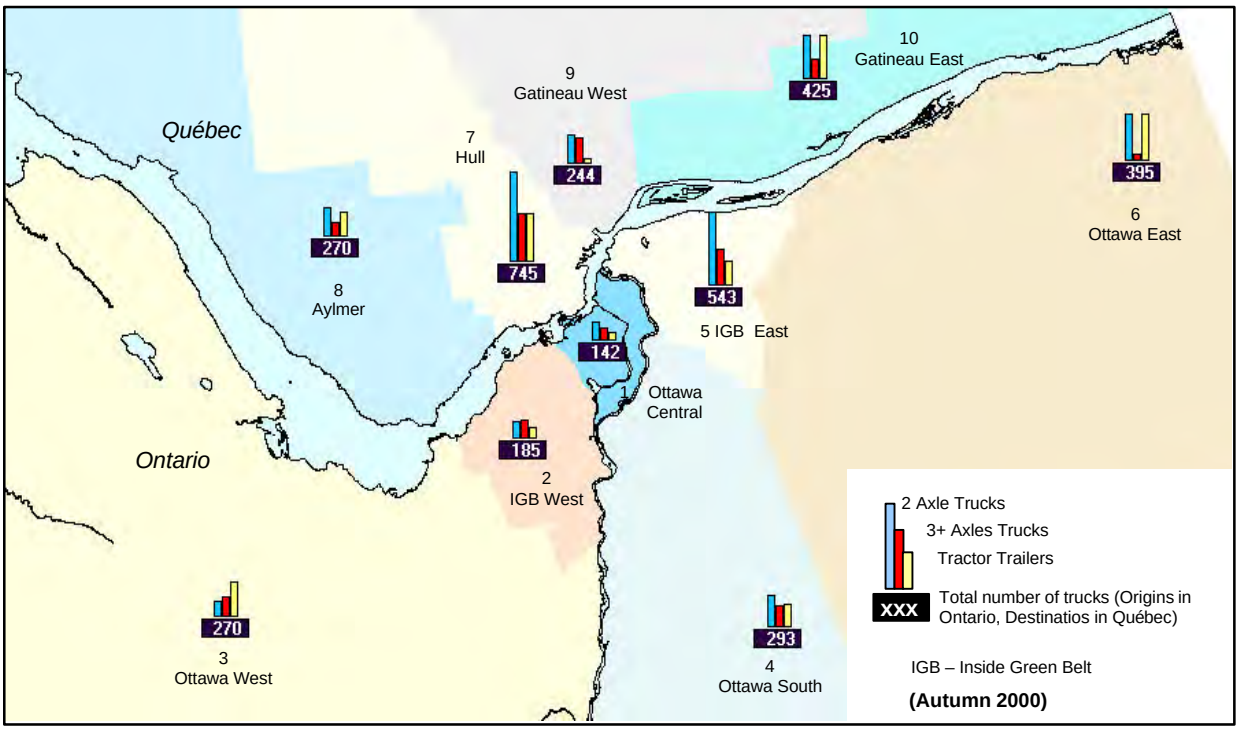
Appendix I: Trip Characteristics

Truck trip characteristics

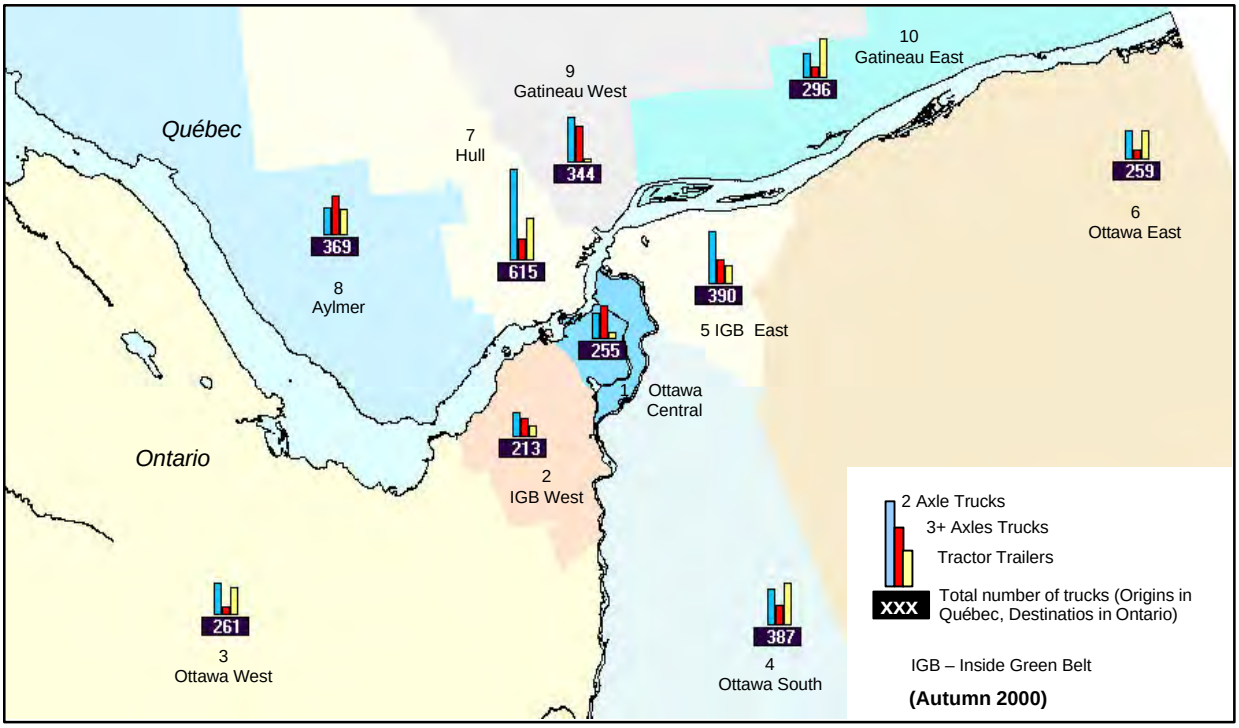
BRIDGE	*DIRECTION*	*Location O*	*Location D*	*SUM 2A*	*SUM 3A+*	*SUM Trailer*	*SUM TRUCKS*
Chaudière	Northbound	EXTERNAL	EXTERNAL			7.55	7.55
		EXTERNAL	INTERNAL	9.29	6.41	27.69	43.39
		INTERNAL	EXTERNAL	4.64			4.64
		INTERNAL	INTERNAL	260.07	102.59	37.76	400.41
	Summary for 'DIRECTION' = Northbound						
	Sum			***274.00***	***109.00***	***73.00***	***456.00***
Chaudière	Southbound	EXTERNAL	EXTERNAL			5.17	5.17
		EXTERNAL	INTERNAL	10.64		12.93	23.57
		INTERNAL	EXTERNAL	5.32	4.33	28.45	38.10
		INTERNAL	INTERNAL	234.04	86.67	28.45	349.16
	Summary for 'DIRECTION' = Southbound						
	Sum			***250.00***	***91.00***	***75.00***	***416.00***
Summary for 'BRIDGE' = Chaudière							
Sum				***524.00***	***200.00***	***148.00***	***872.00***
Macdonald-Cartier	Northbound	EXTERNAL	EXTERNAL	25.30		61.67	86.97
		EXTERNAL	INTERNAL	88.55	28.08	231.28	347.91
		INTERNAL	EXTERNAL	37.95	14.04	20.56	72.55
		INTERNAL	INTERNAL	354.20	294.88	128.49	777.56
	Summary for 'DIRECTION' = Northbound						
	Sum			***506.00***	***337.00***	***442.00***	***1285.00***
Macdonald-Cartier	Southbound	EXTERNAL	EXTERNAL	11.89		65.61	77.50
		EXTERNAL	INTERNAL	47.55	42.63	75.71	165.88
		INTERNAL	EXTERNAL	47.55	42.63	186.74	276.91
		INTERNAL	INTERNAL	416.02	255.75	100.94	772.71
	Summary for 'DIRECTION' = Southbound						
	Sum			***523.00***	***341.00***	***429.00***	***1293.00***
Summary for 'BRIDGE' = Macdonald-Cartier							
Sum				***1029.00***	***678.00***	***871.00***	***2578.00***
Grand Total				***1553.00***	***878.00***	***1019.00***	***3450.00***

Appendix J: Origins and Destinations of Truck Trips by Direction

Origins and Destinations of Truck Trips (Northbound direction)



Origins and Destinations of Truck Trips (Southbound Direction)



Appendix K: Concentration of Truck Trip Ends

Number of trucks by traffic zone (Origin+Destination)

No.	Zone	Trucks	Trucks_cumul	Trucks_cumul (%)
1	162	578	578	8
2	88	463	1041	15
3	189	358	1399	20
4	120	246	1645	24
5	158	194	1839	27
6	167	182	2021	29
7	89	176	2197	32
8	200	163	2360	34
9	174	157	2517	36
10	146	148	2665	39
11	83	147	2812	41
12	190	139	2951	43
13	111	132	3083	45
14	187	132	3215	47
15	168	118	3333	48
16	186	103	3436	50
17	184	101	3537	51
18	164	101	3638	53
19	161	98	3736	54
20	198	98	3834	56
21	188	95	3929	57
22	8	91	4020	58
23	171	91	4111	60
24	177	86	4197	61
25	179	84	4281	62
26	169	82	4363	63
27	55	76	4439	64
28	173	75	4514	65
29	155	71	4585	66
30	159	70	4655	67
31	257	69	4724	68
32	116	65	4789	69
33	10	56	4845	70
34	16	55	4900	71
35	147	55	4955	72
36	183	51	5006	73
37	172	51	5057	73
38	180	51	5108	74
39	251	50	5158	75
40	205	50	5208	75
41	139	48	5256	76
42	191	46	5302	77
43	93	42	5344	77
44	1	40	5384	78
45	154	39	5423	79
46	196	39	5462	79
47	199	37	5499	80
48	121	37	5536	80
49	193	36	5572	81
50	192	35	5607	81
51	150	35	5642	82
52	252	32	5674	82
53	153	30	5704	83
54	237	30	5734	83
55	141	30	5764	84
56	166	29	5793	84
57	254	27	5820	84

13 traffic zones accounted for 40% of all trucks (O+D)

No.	Zone	Trucks	Trucks_cumul	Trucks_cumul (%)
1	162	578	578	8
2	88	463	1041	15
3	120	246	1287	19
4	158	194	1481	21
5	167	182	1663	24
6	89	176	1839	27
7	174	157	1996	29
8	146	148	2144	31
9	83	147	2291	33
10	111	132	2423	35
11	168	118	2541	37
12	184	101	2642	38
13	164	101	2743	40

20 traffic zones accounted for 20% of all trucks (O+D)

No.	Zone	Trucks	Trucks_cumul	Trucks_cumul (%)
1	161	98	98	1
2	8	91	189	3
3	171	91	280	4
4	177	86	366	5
5	179	84	450	7
6	169	82	532	8
7	55	76	608	9
8	173	75	683	10
9	155	71	754	11
10	159	70	824	12
11	257	69	893	13
12	116	65	958	14
13	10	56	1014	15
14	16	55	1069	15
15	147	55	1124	16
16	183	51	1175	17
17	172	51	1226	18
18	180	51	1277	19
19	251	50	1327	19
20	205	50	1377	20

15 external traffic zones accounted for 19% of all trucks (O+D)

No.	Zone	Trucks	Trucks_cumul	Trucks_cumul (%)
1	189	358	358	5
2	200	163	521	8
3	190	139	660	10
4	187	132	792	11
5	186	103	895	13
6	198	98	993	14
7	188	95	1088	16
8	191	46	1134	16
9	196	39	1173	17
10	199	37	1210	18
11	193	36	1246	18
12	192	35	1281	19
13	194	9	1290	19
14	195	7	1297	19
15	197	3	1300	19

Number of trucks by traffic zone (Origin+Destination)

No.	Zone	Trucks	Trucks_cumul	Trucks_cumul (%)
58	204	27	5847	85
59	90	26	5873	85
60	143	26	5899	85
61	80	26	5925	86
62	119	24	5949	86
63	238	24	5973	87
64	253	24	5997	87
65	175	23	6020	87
66	136	23	6043	88
67	151	23	6066	88
68	233	23	6089	88
69	54	22	6111	89
70	249	22	6133	89
71	258	22	6155	89
72	39	21	6176	90
73	115	21	6197	90
74	66	21	6218	90
75	130	20	6238	90
76	4	19	6257	91
77	165	18	6275	91
78	117	17	6292	91
79	17	17	6309	91
80	170	17	6326	92
81	20	17	6343	92
82	12	16	6359	92
83	7	16	6375	92
84	75	16	6391	93
85	97	15	6406	93
86	107	14	6420	93
87	76	14	6434	93
88	110	14	6448	93
89	22	13	6461	94
90	145	13	6474	94
91	26	13	6487	94
92	125	13	6500	94
93	35	13	6513	94
94	19	13	6526	95
95	37	13	6539	95
96	28	13	6552	95
97	255	12	6564	95
98	70	12	6576	95
99	134	11	6587	95
100	176	11	6598	96
101	91	11	6609	96
102	135	11	6620	96
103	140	11	6631	96
104	2	10	6641	96
105	51	10	6651	96
106	148	10	6661	97
107	40	9	6670	97

Number of trucks by traffic zone (Origin+Destination)

No.	Zone	Trucks	Trucks_cumul	Trucks_cumul (%)
108	194	9	6679	97
109	157	9	6688	97
110	63	8	6696	97
111	250	8	6704	97
112	41	8	6712	97
113	24	8	6720	97
114	210	8	6728	98
115	105	7	6735	98
116	149	7	6742	98
117	195	7	6749	98
118	239	7	6756	98
119	256	6	6762	98
120	103	6	6768	98
121	11	6	6774	98
122	29	6	6780	98
123	43	6	6786	98
124	50	6	6792	98
125	57	6	6798	99
126	220	6	6804	99
127	126	6	6810	99
128	6	5	6815	99
129	156	5	6820	99
130	207	5	6825	99
131	34	5	6830	99
132	42	5	6835	99
133	67	5	6840	99
134	3	5	6845	99
135	112	5	6850	99
136	123	5	6855	99
137	77	5	6860	99
138	18	5	6865	99
139	98	5	6870	100
140	230	3	6873	100
141	9	3	6876	100
142	197	3	6879	100
143	95	3	6882	100
144	106	3	6885	100
145	73	3	6888	100
146	152	3	6891	100
147	240	3	6894	100
148	23	3	6897	100
149	178	3	6900	100

Appendix L: Tabulations of Trip Origins and Destinations by Truck Classification

TOTAL NUMBER OF ALL TRUCKS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL**
1-Ottawa Center			5	14	3		53	13	49	5	**142**
2-IGB West							100	36	21	28	**185**
3-Ottawa West	4					6	104	61	21	74	**270**
4-Ottawa South						4	155	34	4	97	**293**
5-IGB-East	11					14	209	73	120	115	**543**
6-Ottawa East	1	7	11	28	25	19	126	50	29	99	**395**
7-Hull	69	90	106	73	172	102		3			**615**
8-Aylmer	80	88	46	68	32	56					**369**
9-Gatineau West	75	22	42	81	92	32					**344**
10-Gatineau East	15	6	52	124	66	27				6	**295**
TOTAL	**255**	**213**	**261**	**387**	**390**	**259**	**745**	**270**	**244**	**425**	**3450**

IGB-Inside Green Belt

TOTAL NUMBER OF 2A TRUCKS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL**
1-Ottawa Center							33	13	18	5	**69**
2-IGB West							41	15	10		**67**
3-Ottawa West							36	5	5	12	**58**
4-Ottawa South							63	24		35	**122**
5-IGB-East	5						123	46	59	66	**298**
6-Ottawa East					22	13	62	13	25	53	**188**
7-Hull	53	64	51	58	88	52					**366**
8-Aylmer	13	13	27	21	18	18					**110**
9-Gatineau West	24	18	35	33	44	29					**181**
10-Gatineau East	6		15	33	40						**93**
TOTAL	**100**	**95**	**128**	**145**	**212**	**112**	**358**	**115**	**117**	**172**	**1553**

TOTAL NUMBER OF 3A+ TRUCKS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL**
1-Ottawa Center							12		31		**44**
2-IGB West							49	12	6	6	**73**
3-Ottawa West							22	23	16	16	**77**
4-Ottawa South							79	6			**85**
5-IGB-East	6					8	26	16	51	39	**146**
6-Ottawa East							6			16	**22**
7-Hull	9	17	5		48	3					**83**
8-Aylmer	61	58	13			26					**157**
9-Gatineau West	48		5	48	48						**149**
10-Gatineau East	8		5	26	5						**43**
TOTAL	**132**	**75**	**27**	**74**	**101**	**37**	**193**	**57**	**105**	**77**	**878**

TOTAL NUMBER OF TRACTOR TRAILERS (12 HOURS_DAY+12 HOURS_NIGHT)

ZONE GROUP O	1-Ottawa Center	2-IGB West	3-Ottawa West	4-Ottawa South	5-IGB-East	6-Ottawa East	7-Hull	8-Aylmer	9-Gatineau West	10-Gatineau East	**TOTAL**
1-Ottawa Center			5	14	3		7				**29**
2-IGB West							10	8	5	22	**45**
3-Ottawa West	4					6	46	32		46	**135**
4-Ottawa South						4	13	5	4	62	**87**
5-IGB-East						6	60	11	10	10	**98**
6-Ottawa East	1	7	11	28	3	6	58	37	4	30	**185**
7-Hull	7	9	50	15	35	46		3			**166**
8-Aylmer	6	17	6	46	15	12					**102**
9-Gatineau West	3	4	3			3					**13**
10-Gatineau East	1	6	32	65	21	27				6	**159**
TOTAL	**22**	**44**	**107**	**169**	**77**	**111**	**193**	**97**	**23**	**176**	**1019**

Appendix M: Detailed Comments on Trip Origins and Destinations

DETAILED COMMENTS ON TRIPS ORIGINS AND DESTINATIONS

Detailed daily origin-destination desire lines are presented in the Report in Exhibit 18 for all truck trips, in Exhibit 19 for 2 axle truck trips, in Exhibit 20 for 3+ axle truck trips and in Exhibit 21 for tractor trailer trips. Here are summarized some key characteristics.

The number of truck trips higher than 50, for all truck classifications collectively or individually, is considered to represent strong orientation, while 25-50 truck trips are considered to represent a modestly strong orientation. Number of truck trips is presented in parenthesis.

EXHIBIT 18 (all truck trips) as illustrated in exhibit panel:

A – Trips from the Aylmer district demonstrate a strong orientation to Ottawa East (56), Ottawa Central (80), Ottawa South (68) and IGB West (88). Trips to Aylmer district demonstrate a strong orientation from IGB East (73) and from Ottawa West (61).
The trips to Aylmer demonstrate a modestly strong orientation from Ottawa South (34) and from IGB West (36). The Modestly strong orientation of truck trips from Aylmer is demonstrated to IGB East (32) and to Ottawa West (46);

B – Trips from the Hull district demonstrate a strong orientation to Ottawa Central (69), Ottawa South (73), IGB West (90), Ottawa East (102), Ottawa West (106), IGB East (172). Trips to Hull district demonstrate a strong orientation from Ottawa Central (53), IGB West (100), Ottawa West (104), Ottawa East (126), Ottawa South (155) and IGB East (209);

C – Trips from the Gatineau West district demonstrate a strong orientation to Ottawa Central (75), Ottawa South (81) and IGB East (92). The trips to Gatineau West demonstrate strong orientation from IGB East (120).
Modestly strong orientation is demonstrated from Gatineau West to Ottawa East (32) and Ottawa West (43). In other direction, a modestly strong orientation is demonstrated to Gatineau West from Ottawa East (29) and Ottawa Central (49);

D – Trips from the Gatineau East district demonstrate a strong orientation to Ottawa West (52), IGB East (66) and Ottawa South (124). The trips to Gatineau East demonstrate a strong orientation from Ottawa West (74), Ottawa South (97), Ottawa East (99) and IGB East (115).
Modestly strong orientation is demonstrated from Gatineau East to Ottawa East (27) and from IGB West to Gatineau East (28).;

EXHIBIT 19 (2 axle truck trips) as illustrated in exhibit panel:

A – Modestly strong orientation of trips from the Aylmer district is demonstrated to Ottawa West (27) as well as from IGB East to Aylmer (46);

B – Trips from Hull district demonstrate a strong orientation to Ottawa West (51), Ottawa East (52), Ottawa Central (53), Ottawa South (58), IGB West (64) and IGB East (88). The trips to Hull demonstrate a strong orientation from Ottawa East (62), Ottawa South (63) and IGB East (123)
Modestly strong orientation is demonstrated to Hull from Ottawa Central (33), Ottawa West (36) and IGB West (41);

C – Trips to the Gatineau West district demonstrate a strong orientation from IGB East (59).

Modestly strong orientation is demonstrated from Gatineau West to Ottawa East (29), Ottawa South (33), Ottawa West (35) and IGB East (44). In opposite direction, a modestly strong orientation is demonstrated from Ottawa East to Gatineau West (25);
D – Trips to the Gatineau East district demonstrate a strong orientation from Ottawa East (53) and from IGB East (66).
Modestly strong orientation of trips is demonstrated from Gatineau East to Ottawa South (33) and IGB East (40) as well as from Ottawa South to Gatineau East (35);

EXHIBIT 20 (3+ axle truck trips) as illustrated in exhibit panel:

A – Trips from the Aylmer district demonstrate a strong orientation to IGB West (58) and Ottawa Central (61), while a modestly strong orientation is demonstrated from Aylmer to Ottawa East (26);
B – Trips to Hull district demonstrate a strong orientation from Ottawa South (79).
Modestly strong orientation is demonstrated to Hull from IGB East (26) and from IGB West (49) as well as from Hull to IGB East (48);
C – Trips to the Gatineau West district demonstrate a strong orientation from IGB East (51).
Modestly strong orientation is demonstrated from Gatineau West to IGB East (48), Ottawa South (48) and Ottawa Central (48) as well as from Ottawa Central to Gatineau West (31);
D – Modestly strong orientation of trips is demonstrated from Gatineau East to Ottawa South (26) and from IGB East to Gatineau East (39);

EXHIBIT 21 (tractor trailer trips) as illustrated in exhibit panel:

A – Trips to the Aylmer district demonstrate a modestly strong orientation from Ottawa West (32) and from Ottawa East (37). In opposite direction, a modestly strong orientation is demonstrated from Aylmer to Ottawa South (46);
B – Trips to Hull district demonstrate a strong orientation from Ottawa East (58) and from IGB East (60).
Modestly strong orientation is demonstrated to Hull from Ottawa West (46) as well as from Hull to Ottawa West (50);
C – There is no a strong or modestly strong orientation of trips to/from the Gatineau West district to/from the districts on the Ottawa side of the National Capital Region;
D – Trips to Gatineau East district demonstrate a strong orientation from Ottawa South (62). In the opposite direction, a strong orientation of trips is demonstrated from Gatineau East to Ottawa South (65).
Modestly strong orientation of trips is demonstrated from Gatineau East to Ottawa East (27) and Ottawa West (33). In the opposite direction, a modestly strong orientation of trips is demonstrated to Gatineau East from Ottawa East (30) and from Ottawa West (46).

Appendix N: Categories of Commodities

Commodity carried and number of All trucks during the day (7:00-19:00)

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
	Empty Trucks	1092		1092
1	ALUMINUMS	8	1	
2	ASPHALT	4	1	
3	BRICKS	4	1	
4	CARDBOARD TUBES	7	1	
5	CEMENT	86	1	
6	CEMENT POWDERED	7	1	
7	CLAY	33	1	
8	CONCRETE	42	1	
9	CONSTRUCTION EQUIPMENT	20	1	
10	CONSTRUCTION MATERIALS	7	1	
11	DEBRIS	12	1	
12	DOOR	8	1	
13	DRYWALL	11	1	
14	ELECTRICAL MANHOLES	7	1	
15	FOAM	7	1	
16	KITCHEN CABINETS	13	1	
17	LIGHT FIXTURES	5	1	
18	MANHOLE COVER FORMS	7	1	
19	METAL BEAMS	11	1	
20	METAL SHEETS	16	1	
21	NEW JERSEY CEMENT BARRIERS	8	1	
22	PAINTING CANVASS	13	1	
23	PHONE FOR HYDRO	13	1	
24	PLUMBING SUPPLIES	38	1	
25	POOL EQUIPMENT	13	1	
26	ROOFING MATERIALS	5	1	
27	SAND	4	1	
28	SHEET METAL	6	1	
29	TELEPHONE POLES	7	1	
30	TRANSFORMER	8	1	
31	TREE	7	1	
32	TRUSS	7	1	
33	WINDOWS	21	1	
34	WOOD ROOF TRUSS	12	1	472
35	BAKED GOODS	6	2	
36	BOTTLED WATER	11	2	
37	BREAD	12	2	
38	CAKES	5	2	
39	CANNED FOOD	13	2	
40	CHICKEN	20	2	
41	CHIPS	11	2	
42	COOKIES / BISCUITS	12	2	
43	COOKIES AND CRACKERS	7	2	
44	EGGS	13	2	
45	FOOD	21	2	
46	FOOD FROZEN	35	2	
47	FRIES	7	2	
48	MEAT BEEF AND FROZEN GOODS	7	2	
49	NESTLE ICE TEA	7	2	
50	PEPSI PRODUCT	16	2	

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
51	POTATO CHIPS	5	2	
52	POTATOES	12	2	
53	PRODUCE, APPLES	5	2	
54	PRODUCE, MOSTLY BANANAS	3	2	
55	SOFT DRINKS	16	2	
56	SOYA MILK	12	2	
57	VEGETABLES	5	2	
58	WATER	25	2	285
59	ANIMAL FEED	4	3	
60	BEDROOM FURNITURE	7	3	
61	BRAS	5	3	
62	CHAIRS	13	3	
63	CLEANING SUPPLIES	25	3	
64	CLOTHING RACKS	13	3	
65	EMPTY PEPSI CANS	12	3	
66	FURNITURE	37	3	
67	GARBAGE CONTAINERS	12	3	
68	HOUSE CONTENTS	13	3	
69	HOUSEHOLD GOODS	13	3	
70	MAIL	25	3	
71	MIRRORS	7	3	
72	PARCELS AND PACKAGES	5	3	
73	PLANTS	4	3	
74	POLY BAGS	7	3	
75	SHELVING	5	3	
76	SOAP	8	3	
77	TABLES	11	3	
78	TENT	5	3	
79	TOBACCO	7	3	
80	TOOLS	13	3	
81	TV AND VCRS	7	3	
82	USED HOUSEHOLD GOODS	4	3	259
83	BOXES	26	4	
84	CARDBOARD BOXES	13	4	
85	NEWSPAPERS	12	4	
86	NEWSPAPERS SHEETS	8	4	
87	NEWSPRINT	8	4	
88	PAPER	84	4	
89	PAPER PREMIUM	8	4	
90	PAPER RECYCLED	12	4	
91	PAPER ROLLS	18	4	
92	TOILET PAPER	8	4	
93	WASTE NEWSPRINT	7	4	202
94	LUMBER	14	5	
95	PRESSURE TREATED LUMBER	50	5	
96	SAWDUST, WOODCHIPS	6	5	
97	WOOD	43	5	
98	WOOD BOARDS	8	5	
99	WOOD CHIPS AND BLOCKS	8	5	
100	WOOD PELLETS	8	5	
101	WOOD PLANKS	15	5	152

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
102	3 QUARTERS WATER 1 QUARTER ACID	3	6	
103	ASPHALT WASTE	5	6	
104	COMPRESSED GASES, OXYGEN	7	6	
105	FURNACE OIL	5	6	
106	GAS AND LIQUID CO2	13	6	
107	GASNO LEAD REG	7	6	
108	LIME	3	6	
109	LIQUID FERTILER	5	6	
110	PESTICIDES	7	6	
111	PETROLEUM	7	6	
112	PROPANE	16	6	
113	PROPANE TANKS	5	6	
114	WASTE OIL	6	6	90
115	ARCHIVES	5	7	
116	BINDERS	5	7	
117	COMPUTER EQUIPMENT	5	7	
118	COMPUTERS	28	7	
119	ELECTRONIC CASH PRODUCT	5	7	
120	GOVERNMENT RECORDS	7	7	
121	OFFICE EQUIPMENT	12	7	
122	OFFICE FURNITURE	12	7	
123	OFFICE SUPPLIES	5	7	
124	PRINTING SUPPLIES	13	7	
125	STATIONARY	5	7	103
126	AUTO PARTS	7	8	
127	BOB CAT	8	8	
128	CARS	7	8	
129	EQUIPMENT TO FIX TRAILERS	7	8	
130	TIRES	20	8	
131	TRUCK CABS	7	8	54
	TOTAL	**2709**		**2709**
	Where: Drivers reported some commodity	1617		
	Empty trucks	1092		

*) Commodity names are modified in some cases because of typing errors in the questionnaire

Commodity carried and number of All trucks during the night (19:00-7:00)

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
	Empty trucks	286		286
1	INSULATION	8	1	8
2	BAKERY PRODUCTS	12	2	
3	BREAD	13	2	
4	CHEESE	8	2	
5	DAIRY PRODUCTS	8	2	
6	FOOD	3	2	
7	FOOD FROZEN	4	2	
8	FOOD-DESSERTS	3	2	
9	GROCERIES	19	2	
10	JOS LOUIS CAKES	15	2	
11	MILK	6	2	
12	PICK LES	3	2	
13	POULTRY	3	2	
14	PRODUCE	5	2	
15	SANDWICH MEATS	12	2	
16	SNACK FOODS	15	2	131
17	ART	3	3	
18	CLEANING SUPPLIES	1	3	
19	DRUG STORE PRODUCTS	4	3	
20	FLOWERS	8	3	
21	FRIDGE	15	3	
22	FURNITURE	6	3	
23	HARDWARE	4	3	
24	HOUSEHOLD FURNITURE	3	3	
25	LTL MIXED FREIGHT	3	3	
26	MAIL	12	3	
27	MIXED FREIGHT	4	3	
28	PHARMACEUTICALS	4	3	
29	SHOES	4	3	
30	SNOW BLOWER	4	3	
31	SPRING MACHINE	12	3	
32	STEDMAN'S MERCHANDISE	3	3	
33	STORE SUPPLIES	4	3	
34	TOWELS	3	3	99
35	FLYERS	4	4	
36	KLEENEX BOXES	4	4	
37	LABELS	4	4	
38	NEWSPAPERS	15	4	
39	NEWSPRINT	6	4	
40	OLD NEWSPAPER	4	4	
41	PAPER	31	4	
42	PAPER NEWSPRINT	3	4	
43	PAPER PRODUCTS	3	4	
44	PAPER RECYCLED	8	4	
45	PAPER ROLLS	6	4	
46	SCRAP PAPER	12	4	
47	TOILET PAPER	3	4	104
48	ASPEN IT E	3	5	
49	CHIP BOARD	3	5	
50	LOGS	4	5	

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
51	LUMBER	11	5	
52	MDF BOARD	3	5	
53	WHIFFLE BOARD	3	5	
54	WOOD	10	5	
55	WOOD PANELS	3	5	
56	WOOD PRODUCTS	3	5	44
57	CALCIUM CARBONATE	1	6	
58	CHLORATE SODIUM	3	6	
59	COLOURED DIESEL	3	6	
60	FURNACE FUEL	11	6	
61	GAS	4	6	
62	GASOLINE	9	6	
63	HYDRATED LIME	4	6	
64	OMYAFILL SLURRY.	1	6	
65	OXYGEN	12	6	
66	PASTE	3	6	
67	SALT	4	6	56
68	AUTO PARTS	1	8	
69	CARS	4	8	
70	TIRES	3	8	
71	VEHICLES	4	8	13
	TOTAL	**741**		**741**
	Where: Drivers reported some commodity	455		
	Empty trucks	286		

*) Commodity names are modified in some cases because of typing errors in the questionnaire

Commodity carried and number of All trucks during the 24 hour period

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
	Empty Trucks	1378		1378
1	ALUMINUMS	8	1	
2	ASPHALT	4	1	
3	BRICKS	4	1	
4	CARDBOARD TUBES	7	1	
5	CEMENT	86	1	
6	CEMENT POWDERED	7	1	
7	CLAY	33	1	
8	CONCRETE	42	1	
9	CONSTRUCTION EQUIPMENT	20	1	
10	CONSTRUCTION MATERIALS	7	1	
11	DEBRIS	12	1	
12	DOOR	8	1	
13	DRYWALL	11	1	
14	ELECTRICAL MANHOLES	7	1	
15	FOAM	7	1	
16	INSULATION	8	1	
17	KITCHEN CABINETS	13	1	
18	LIGHT FIXTURES	5	1	
19	MANHOLE COVER FORMS	7	1	
20	METAL BEAMS	11	1	
21	METAL SHEETS	16	1	
22	NEW JERSEY CEMENT BARRIERS	8	1	
23	PAINTING CANVASS	13	1	
24	PHONE FOR HYDRO	13	1	
25	PLUMBING SUPPLIES	38	1	
26	POOL EQUIPMENT	13	1	
27	ROOFING MATERIALS	5	1	
28	SAND	4	1	
29	SHEET METAL	6	1	
30	TELEPHONE POLES	7	1	
31	TRANSFORMER	8	1	
32	TREE	7	1	
33	TRUSS	7	1	
34	WINDOWS	21	1	
35	WOOD ROOF TRUSS	12	1	480
36	BAKED GOODS	6	2	
37	BAKERY PRODUCTS	12	2	
38	BOTTLED WATER	11	2	
39	BREAD	25	2	
40	CAKES	5	2	
41	CANNED FOOD	13	2	
42	CHEESE	8	2	
43	CHICKEN	20	2	
44	CHIPS	11	2	
45	COOKIES / BISCUITS	12	2	
46	COOKIES AND CRACKERS	7	2	
47	DAIRY PRODUCTS	8	2	
48	EGGS	13	2	
49	FOOD	24	2	
50	FOOD FROZEN	39	2	

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
51	FOOD-DESSERTS	3	2	
52	FRIES	7	2	
53	GROCERIES	19	2	
54	JOS LOUIS CAKES	15	2	
55	MEAT BEEF AND FROZEN GOODS	7	2	
56	MILK	6	2	
57	NESTLE ICE TEA	7	2	
58	PEPSI PRODUCT	16	2	
59	PICK LES	3	2	
60	POTATO CHIPS	5	2	
61	POTATOES	12	2	
62	POULTRY	3	2	
63	PRODUCE	5	2	
64	PRODUCE, APPLES	5	2	
65	PRODUCE, MOSTLY BANANAS	3	2	
66	SANDWICH MEATS	12	2	
67	SNACK FOODS	15	2	
68	SOFT DRINKS	16	2	
69	SOYA MILK	12	2	
70	VEGETABLES	5	2	
71	WATER	25	2	416
72	ANIMAL FEED	4	3	
73	ART	3	3	
74	BEDROOM FURNITURE	7	3	
75	BRAS	5	3	
76	CHAIRS	13	3	
77	CLEANING SUPPLIES	26	3	
78	CLOTHING RACKS	13	3	
79	DRUG STORE PRODUCTS	4	3	
80	EMPTY PEPSI CANS	12	3	
81	FLOWERS	8	3	
82	FRIDGE	15	3	
83	FURNITURE	43	3	
84	GARBAGE CONTAINERS	12	3	
85	HARDWARE	4	3	
86	HOUSE CONTENTS	13	3	
87	HOUSEHOLD FURNITURE	3	3	
88	HOUSEHOLD GOODS	13	3	
89	LTL MIXED FREIGHT	3	3	
90	MAIL	37	3	
91	MIRRORS	7	3	
92	MIXED FREIGHT	4	3	
93	PARCELS AND PACKAGES	5	3	
94	PHARMACEUTICALS	4	3	
95	PLANTS	4	3	
96	POLY BAGS	7	3	
97	SHELVING	5	3	
98	SHOES	4	3	
99	SNOW BLOWER	4	3	
100	SOAP	8	3	

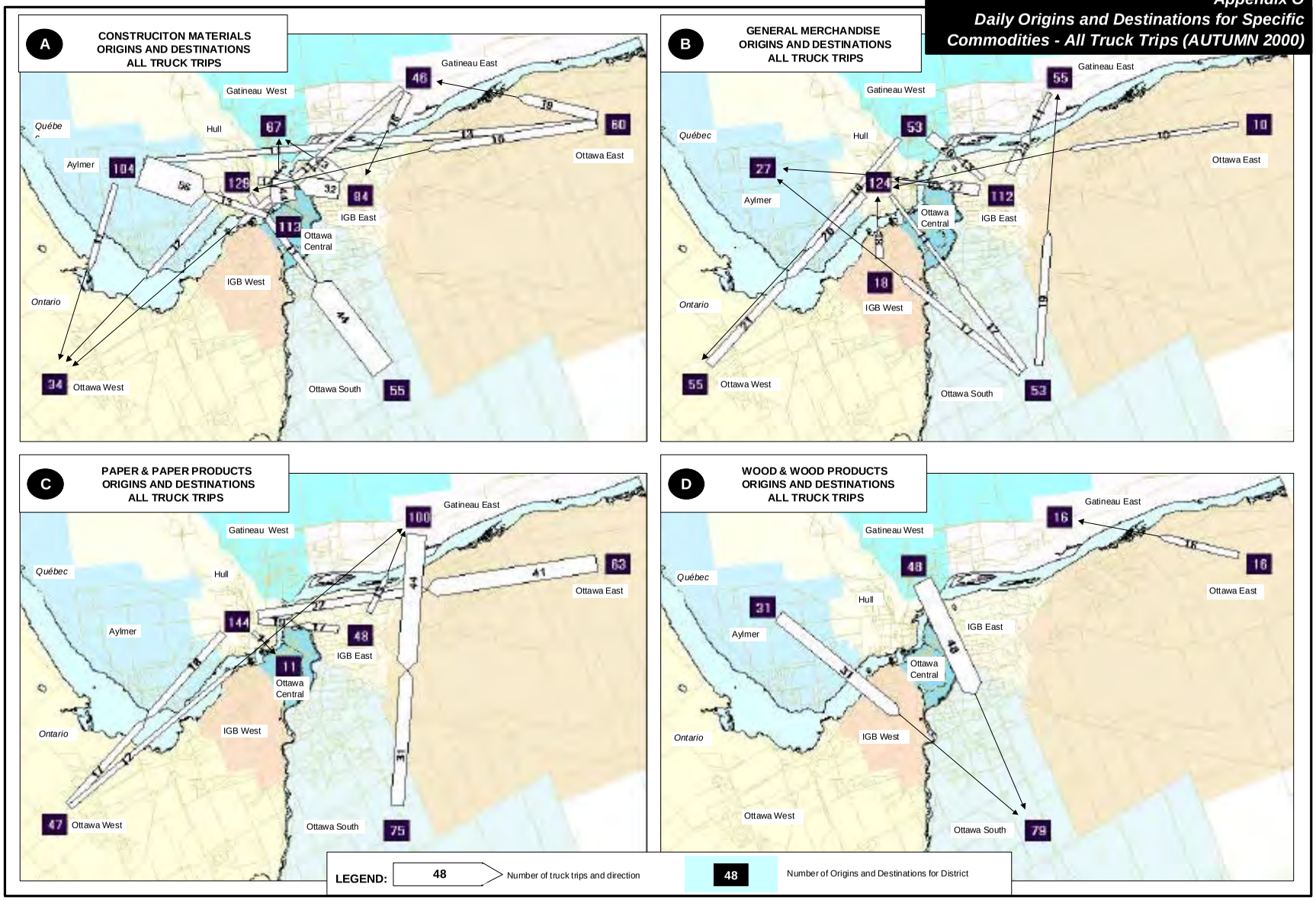
No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
101	SPRING MACHINE	12	3	
102	STEDMAN'S MERCHANDISE	3	3	
103	STORE SUPPLIES	4	3	
104	TABLES	11	3	
105	TENT	5	3	
106	TOBACCO	7	3	
107	TOOLS	13	3	
108	TOWELS	3	3	
109	TV AND VCRS	7	3	
110	USED HOUSEHOLD GOODS	4	3	358
111	BOXES	26	4	
112	CARDBOARD BOXES	13	4	
113	FLYERS	4	4	
114	KLEENEX BOXES	4	4	
115	LABELS	4	4	
116	NEWSPAPERS	27	4	
117	NEWSPAPERS SHEETS	8	4	
118	NEWSPRINT	14	4	
119	OLD NEWSPAPER	4	4	
120	PAPER	115	4	
121	PAPER NEWSPRINT	3	4	
122	PAPER PREMIUM	8	4	
123	PAPER PRODUCTS	3	4	
124	PAPER RECYCLED	20	4	
125	PAPER ROLLS	24	4	
126	SCRAP PAPER	12	4	
127	TOILET PAPER	11	4	
128	WASTE NEWSPRINT	7	4	306
129	ASPEN IT E	3	5	
130	CHIP BOARD	3	5	
131	LOGS	4	5	
132	LUMBER	25	5	
133	MDF BOARD	3	5	
134	PRESSURE TREATED LUMBER	50	5	
135	SAWDUST, WOODCHIPS	6	5	
136	WHIFFLE BOARD	3	5	
137	WOOD	53	5	
138	WOOD BOARDS	8	5	
139	WOOD CHIPS AND BLOCKS	8	5	
140	WOOD PANELS	3	5	
141	WOOD PELLETS	8	5	
142	WOOD PLANKS	15	5	
143	WOOD PRODUCTS	3	5	195
144	3 QUARTERS WATER 1 QUARTER ACID	3	6	
145	ASPHALT WASTE	5	6	
146	CALCIUM CARBONATE	1	6	
147	CHLORATE SODIUM	3	6	
148	COLOURED DIESEL	3	6	
149	COMPRESSED GASES, OXYGEN	7	6	
150	FURNACE FUEL	11	6	

No.	COMMODITY NAME*	NUMBER OF TRUCKS	COMMODITY CATEGORY	NUMBER OF TRUCKS PER COMMODITY CATEGORY
151	FURNACE OIL	5	6	
152	GAS	4	6	
153	GAS AND LIQUID CO2	13	6	
154	GASNO LEAD REG	7	6	
155	GASOLINE	9	6	
156	HYDRATED LIME	4	6	
157	LIME	3	6	
158	LIQUID FERTILER	5	6	
159	OMYAFILL SLURRY.	1	6	
160	OXYGEN	12	6	
161	PASTE	3	6	
162	PESTICIDES	7	6	
163	PETROLEUM	7	6	
164	PROPANE	16	6	
165	PROPANE TANKS	5	6	
166	SALT	4	6	
167	WASTE OIL	6	6	147
168	ARCHIVES	5	7	
169	BINDERS	5	7	
170	COMPUTER EQUIPMENT	5	7	
171	COMPUTERS	28	7	
172	ELECTRONIC CASH PRODUCT	5	7	
173	GOVERNMENT RECORDS	7	7	
174	OFFICE EQUIPMENT	12	7	
175	OFFICE FURNITURE	12	7	
176	OFFICE SUPPLIES	5	7	
177	PRINTING SUPPLIES	13	7	
178	STATIONARY	5	7	103
179	AUTO PARTS	8	8	
180	BOB CAT	8	8	
181	CARS	11	8	
182	EQUIPMENT TO FIX TRAILERS	7	8	
183	TIRES	23	8	
184	TRUCK CABS	7	8	
185	VEHICLES	4	8	67
	TOTAL	**3450**		**3450**
	Where: Drivers reported some commodity	2072		
	Empty trucks	1378		

*) Commodity names are modified in some cases because of typing errors in the questionnaire

Appendix O: Trip Origins and Destinations for Specific Commodities and Detailed Comments

Appendix O
Daily Origins and Destinations for Specific Commodities - All Truck Trips (AUTUMN 2000)



The characteristics as portrayed on the exhibit (Appendix O) are summarized in the following:

Construction materials trips are portrayed on Panel A. These trips are widely dispersed with the stronger links being from Aylmer to Ottawa Central (56 trips), from Ottawa South to Hull (44), from Ottawa Central to Gatineau West (44), from IGB East to Hull (32) and from IGB East to Gatineau West (23).

General merchandise trips are portrayed on Panel B. As would be expected, there are no particularly strong orientations. The stronger bi-directional desire lines being from Hull to Ottawa West (20+21),from Gatineau West to IGB East (26+13), from Gatineau East to IGB East (11+25) and from Hull to Ottawa South (11+17). Some of the stronger uni-directional desire lines being from IGB East to Hull (27), from Ottawa South to Gatineau East (19), from IGB West to Hull (18), from Ottawa South to Aylmer (17) and from Gatineau West to Ottawa West (14).

Paper and paper products trips are portrayed on Panel C. As illustrated, there are some strong orientations with the stronger bi-directional desire lines being from Gatineau East to Ottawa South (44+31), from Ottawa East to Hull (41+22). Bi-directional desire lines are also presented from Hull to IGB East (19+17) and from Hull to Ottawa West (18+17). Uni-directional desire lines are presented from IGB East to Gatineau East (13), from Ottawa West to Gatineau East (12) and from Hull to IGB East (11).

Wood and wood products trips are portrayed on Panel D. As illustrated, strong uni-directional desire lines are from Gatineau West to Ottawa South (48) and from Aylmer to Ottawa South (31), while there is a modestly strong orientation from Ottawa East to Gatineau East (16).