

Calgary



The Calgary Goods Movement Strategy

External truck origin/destination
survey summary report

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Executive summary

Purpose and methodology

To improve the understanding of the movement of goods in Calgary, in particular as an input to the development of The City of Calgary's Calgary Goods Movement Strategy (the Strategy), an external roadside truck origin/destination survey was commissioned by The City. The survey was conducted by ME2 Transportation Data, and coding and analysis was conducted by Watt Consulting Group (Watt), David Kriger Consultants Inc. (DKCI), and CPCS Transcom Ltd. (CPCS). A total of 3644 of surveys were attempted, with 3513 completed surveys, for a completion rate of 96%.¹

Because the survey was carried out around the perimeter of Calgary, it is only representative of truck trips coming in, going out, and going through Calgary (i.e. *external trips*). Separately, as part of the development of the Strategy, analysis of other sources was used to understand truck movements within Calgary to a greater extent.

Summary of key findings

Overall truck counts

Based on 24-hour truck counts conducted at each survey location, there are an estimated 20,800² truck trips passing through the survey locations surveyed every day. Compared to a previous 2001 external truck origin-destination survey, in which 13,360 truck movements were counted, there has been considerable growth in truck movement into/out of Calgary. Since 2001, the average annual truck growth rate was 2.8%, which is slightly faster than Calgary's population growth between 2001 and 2016³ of 2.6% per year, on average.

Truck types

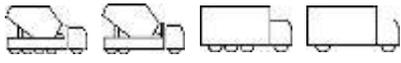
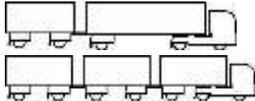
As part of the survey, drivers of single unit trucks, single trailer trucks, multiple trailer trucks and pickup trucks with trailers were interviewed. Figure ES-1 shows typical examples of the types of trucks that were surveyed.⁴ The definition of multiple trailer trucks includes both long combination vehicles and vehicles with multiple cargo-carrying areas, such as a dump truck with an attached trailer. A small number of pickup trucks with trailers was also surveyed, although these are not shown in the figure.

¹ The completion rate excludes refusals to complete. However, the rate includes a small number of surveys for which some responses are missing: they are included in the tally and in the analysis because they are otherwise complete and usable.

² All values have been rounded to the nearest 10.

³ This growth is based on the observed populations of the Calgary Census Metropolitan Area observed in 2001 and 2016 Statistics Canada Census. 2016 is the most recently reported Census.

⁴ Pickup trucks with trailers are not shown.

Vehicle type	Example
Single unit trucks – such as cement mixers, a five-ton truck or a dump truck.	
Single trailer trucks – such as a tractor unit with one semi-trailer.	
Multiple trailer trucks – such as a long combination vehicles or truck with multiple cargo areas, like a dump truck with an attached trailer.	

Source: Watt Team

Figure ES-1: Truck types surveyed

The most commonly observed vehicles at the survey locations were single trailer trucks (61%), with average gross vehicle weights (GVW) of approximately 43,000 kg. The second and third most commonly observed trucks at the perimeter of Calgary were single unit trucks (18%) and multiple trailer trucks (16%).

A small but notable fraction of trucks carried dangerous goods into/out of Calgary (3.8%). These trucks carried a variety of dangerous goods, with flammable liquids such as petroleum products and crude oil being cited most frequently.

Trip patterns

An estimated 20,800 truck trips⁵ passed through the survey locations every day. The survey focused on the types of trips trucks were making. In the survey, trip start, trip end and intermediate stop locations were aggregated as follows:

- City quadrants (northeast, northwest, southeast, southwest) within Calgary;
- Compass heading (north, south, east, west) within the Calgary region but outside of Calgary (i.e. *North region, South region, East region, West region*);
- *Outside region*: outside of the Calgary region, but within Alberta;
- *Outside Alberta*: Outside of Alberta, but within Canada; and
- *Outside Canada*: Outside of Canada (i.e. the United States).

In addition to the aggregations recorded during the survey, for further analysis, the following trip patterns are frequently used to differentiate trips travelling a short distance from those travelling a longer distance:

- *local/regional trips*: trips that began *and* ended *within* the Calgary region
- *long-distance trips*: trips that began *or* ended *outside* of the Calgary region

Other trip patterns are also common and identified as needed.

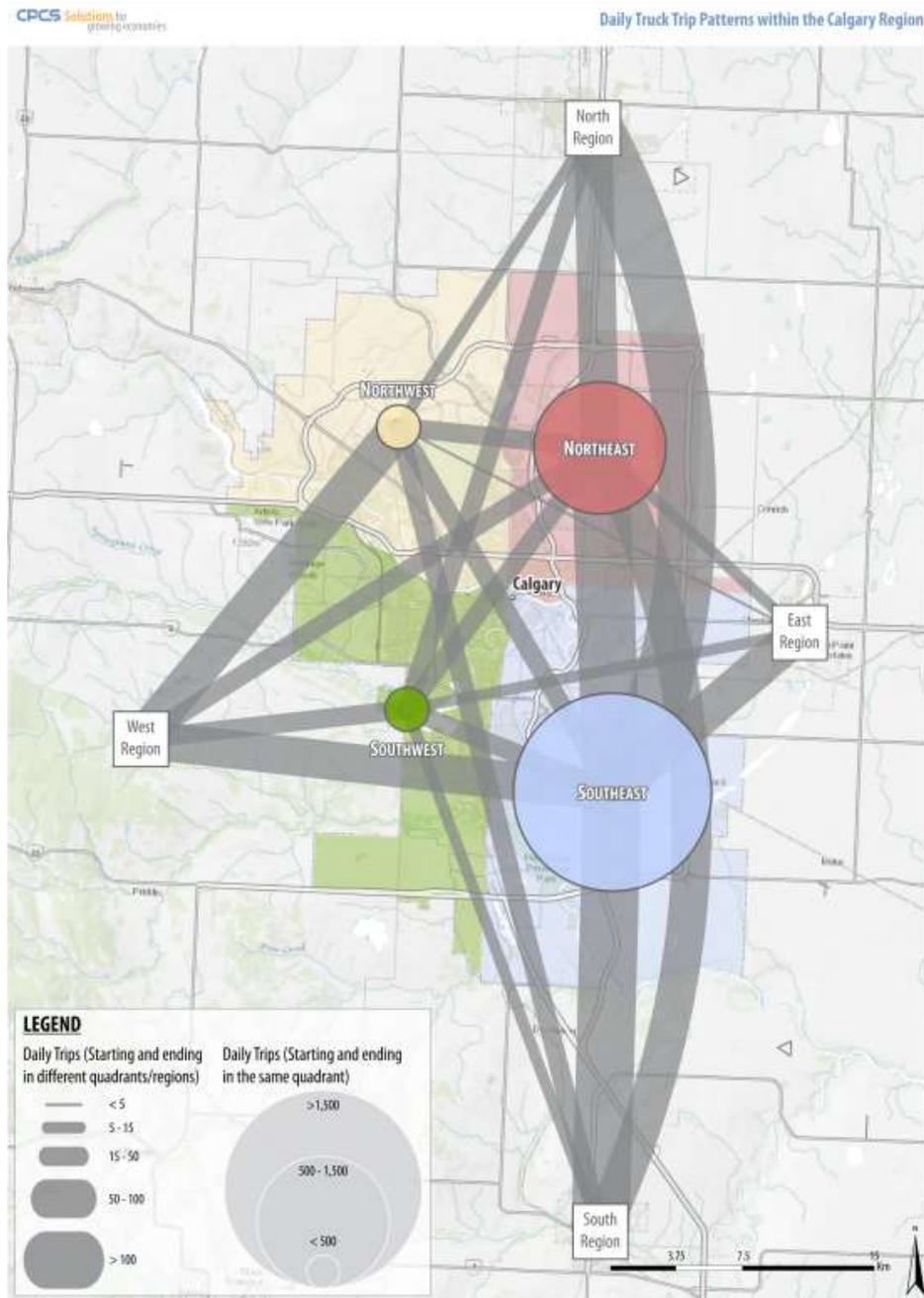
⁵ The analysis assumes that there were no or minimal instances in which the same vehicle was surveyed twice.

Drivers were asked where they began and ended their trip on the day of the survey.⁶ The majority of trips surveyed (59%) are local and regional trips, with the remainder either starting or ending outside the Calgary region. Smaller trucks (single unit and pickups with trailers) are more likely to be local/regional trips. Larger trucks (single and multiple trailers) are more likely to be making long distance trips.

In line with other analyses conducted as part of the development of the Strategy, most trips start, end or stop in southeast Calgary. More specifically, 40% of all external trips either started or ended in southeast Calgary. This finding is consistent with the southeast quadrant's dominant role as Calgary's industrial hub. Figure ES-2 shows trip start and end patterns within the Calgary region.

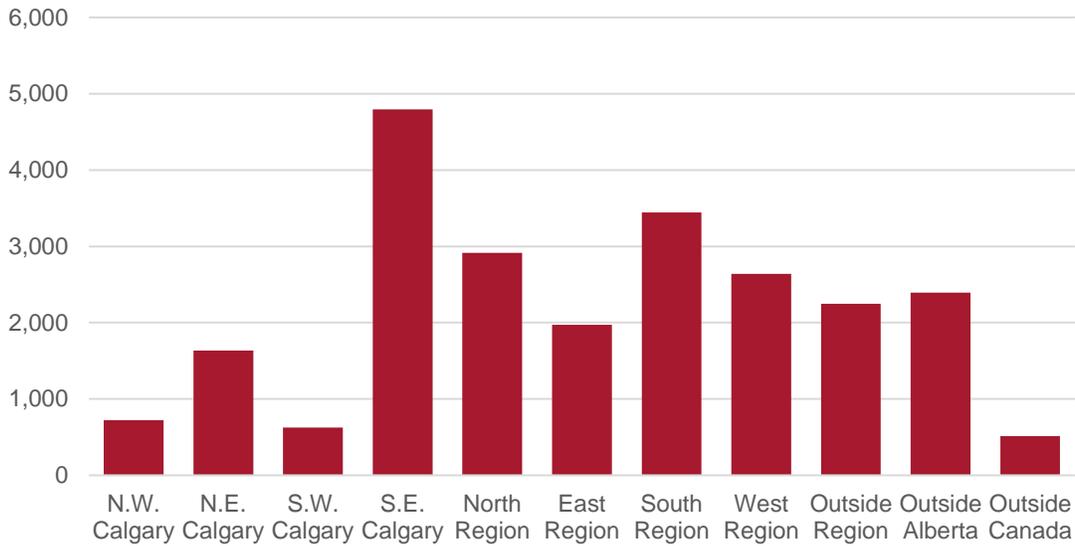
⁶ The entire survey was concerned with activity that occurred on the same day as the actual survey, even if the trip was made over several days.

Figure ES-2: Trip start and end patterns – Calgary Region



Source: CPCS analysis based on external truck origin/destination survey results.

In addition to capturing the daily start and end of all trips, the surveyors asked drivers for their stopping patterns. Specifically they were asked 'Where did you stop LAST before arriving at this location?' and 'Where will you be stopping NEXT after this survey?' Figure ES-3 shows the total number of stops trucks made in each region. Aligning with the other data sources considered in the Strategy, southeast Calgary sees the largest number of stops, followed by the south region.



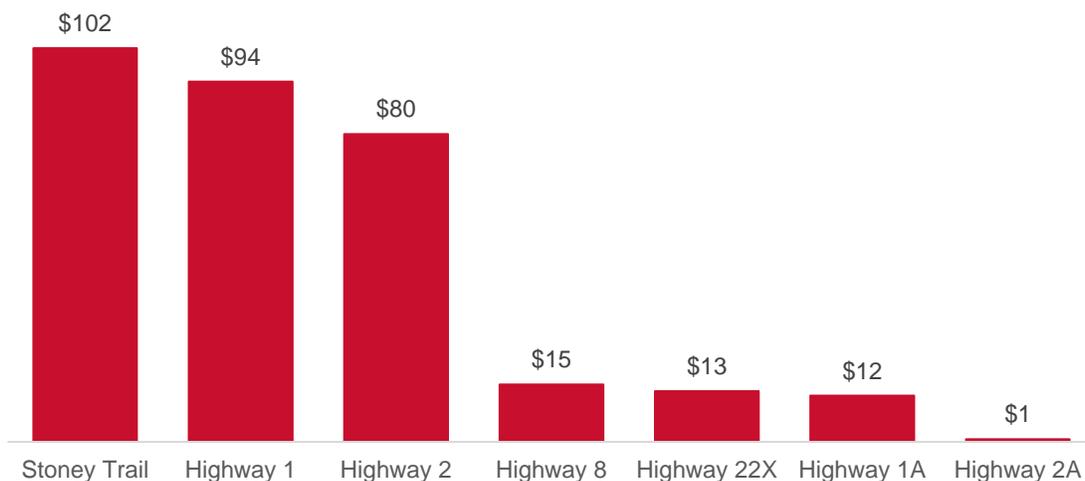
Source: CPCS analysis based on external truck origin/destination survey results.

Figure ES-3: Total stops by surveyed trucks

Load characteristics and goods profile

Drivers were asked about the type of goods that they carried. The general profile of each good can be seen in Figure ES-4. Food and farm goods account for 26% of all trucks surveyed, followed by general freight at 18%.

from beyond the Calgary region, and \$3.4 million per day leave. Based on trips observed as part of the survey, at least \$100 million per day (CAD 2017) moves on the busiest truck routes in Calgary, notably Stoney Trail (Figure ES-6). These findings illustrate the importance of maintaining fluid goods movement corridors within Calgary. **However, note that the values in Figure ES-6 cannot be summed, as a trip can use multiple highways.**



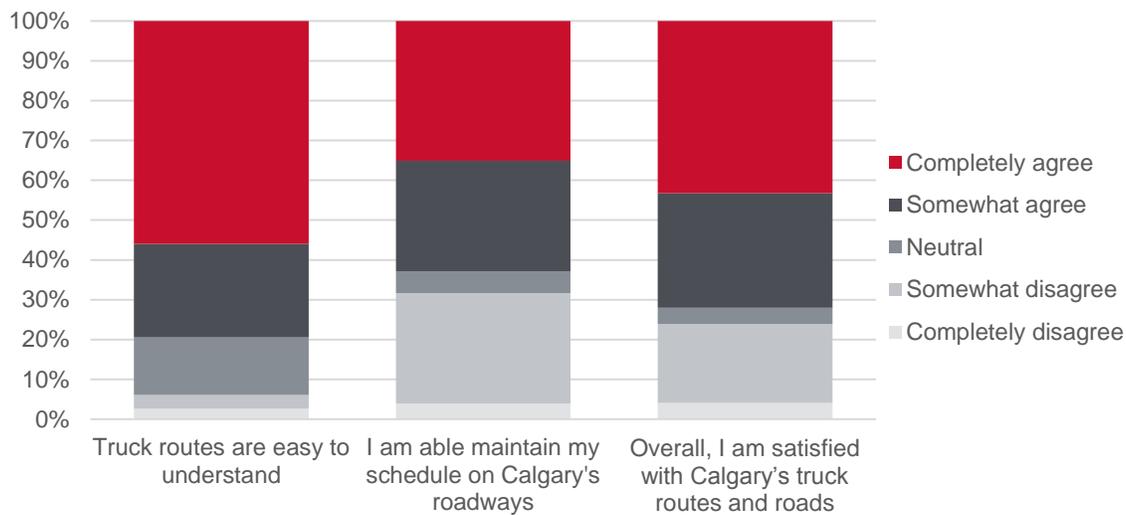
Source: CPCS analysis based on external truck origin/destination survey results.

Figure ES-6: Estimated value of goods on each highway per day (millions CAD 2017)

There are several limitations to the methodology with counteracting implications. Most importantly, these estimates are based only on the sample of goods passing through the survey cordon, so they can illustrate only the external flows, as opposed to all goods moving within Calgary. Because of this limitation, the estimated weight and value of goods shown here do not represent the full value of all goods that are transported each day in Calgary. Moreover, several assumptions must be made in the parameters used to calculate the costs of these external flows. As a result, **the values shown here for external flows should be considered approximate, order-of-magnitude estimates only.**

Driver satisfaction

Overall, drivers were satisfied with Calgary's roads, with over 70% indicating that they "completely agree" or "agree" with the statement "Overall, I am satisfied with Calgary's truck routes and roadways" (Figure ES-6).



Source: CPCS analysis based on external truck origin/destination survey results.

Figure ES-6: Summarized driver satisfaction metrics

Drivers were also asked for specific comments about Calgary’s roads, using an open-response format. Although drivers were satisfied with Calgary’s roads, as noted above, some concerns were expressed. The two most commonly cited concerns were that roads are too bumpy (notably Stoney Trail) and that signage could be improved.

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Glossary of definitions and acronyms

Term	Definition
CAD	Canadian dollar
CFS	US Commodity Flow Survey
depot-based trip	A trip that started and ended in the same zone (quadrant or compass-heading region) in the Calgary region
EB	Eastbound
Expansion factor	The ratio of 24-hour directional truck counts to completed surveys
External trips	Truck trips into, out of or through Calgary
gross vehicle weight	The maximum capacity weight of a truck
GVW	Gross vehicle weight
kg	Kilogram
local/regional trips	Trips that began and ended within the Calgary region
long-distance trips	Trips that began or ended outside of the Calgary region
NB	Northbound
N.O.S	Not otherwise specified
O/D	Origin/destination
outside Alberta	The geographic area outside Alberta, but within Canada
outside Canada	The geographic area outside Canada (i.e. the United States)
outside region	The geographic area outside the Calgary region, but within Alberta

region (north, south, east, west)	The area in the Calgary region identified by compass heading
SB	Southbound
tare	The empty, unloaded, weight of a truck
through trip	A trip that started and ended outside the Calgary region, and made no stops to pick up or drop off a load
UN number	United Nations system of classifying dangerous goods for transport
USD	US dollar
WB	Westbound

1 Introduction

1.1 Methodology and study area

1.1.1 Purpose and methodology

To improve the understanding of the movement of goods in Calgary, in particular as an input to the development of The City of Calgary's Calgary Goods Movement Strategy (the Strategy), The City commissioned an external roadside truck origin/destination (O/D) survey. The survey was conducted by ME2 Transportation Data, and coding and analysis was conducted by Watt Consulting Group (Watt), David Kriger Consultants Inc. (DKCI), and CPCS Transcom Limited (CPCS). This report presents the key findings of the survey.

A total of 3644 of surveys were attempted, with 3513 completed surveys, for a completion rate of 96%.⁸

The following questions were asked of all surveyed drivers:

- The type of vehicle they were driving;
- Whether they were carrying dangerous goods and the associated transportation of dangerous goods identification number;
- The Tare and Gross Vehicle Weight⁹ of the vehicle;
- Where they started their trip at the beginning of the day;
- Where they ended their trip at the end of the day;
- Where they last stopped and what they did there;
- Where they will stop next and what they will do there;
- Any additional stops made;
- The provincial highways they used on the trip;
- The use of Stoney Trail (Highway 201) on the trip;
- Whether they connected to airports or rail terminals;
- The reason they chose their route;
- What type of goods they were carrying and whether they had a full load;
- Their overall satisfaction with their trip through Calgary, broken down into the following:
 - "Calgary's Truck routes and restrictions are easy to understand"
 - "I am able to maintain schedule of Calgary's roads"
 - "Overall, I am satisfied with Calgary's truck routes and roads"

Appendix A provides the survey form used.

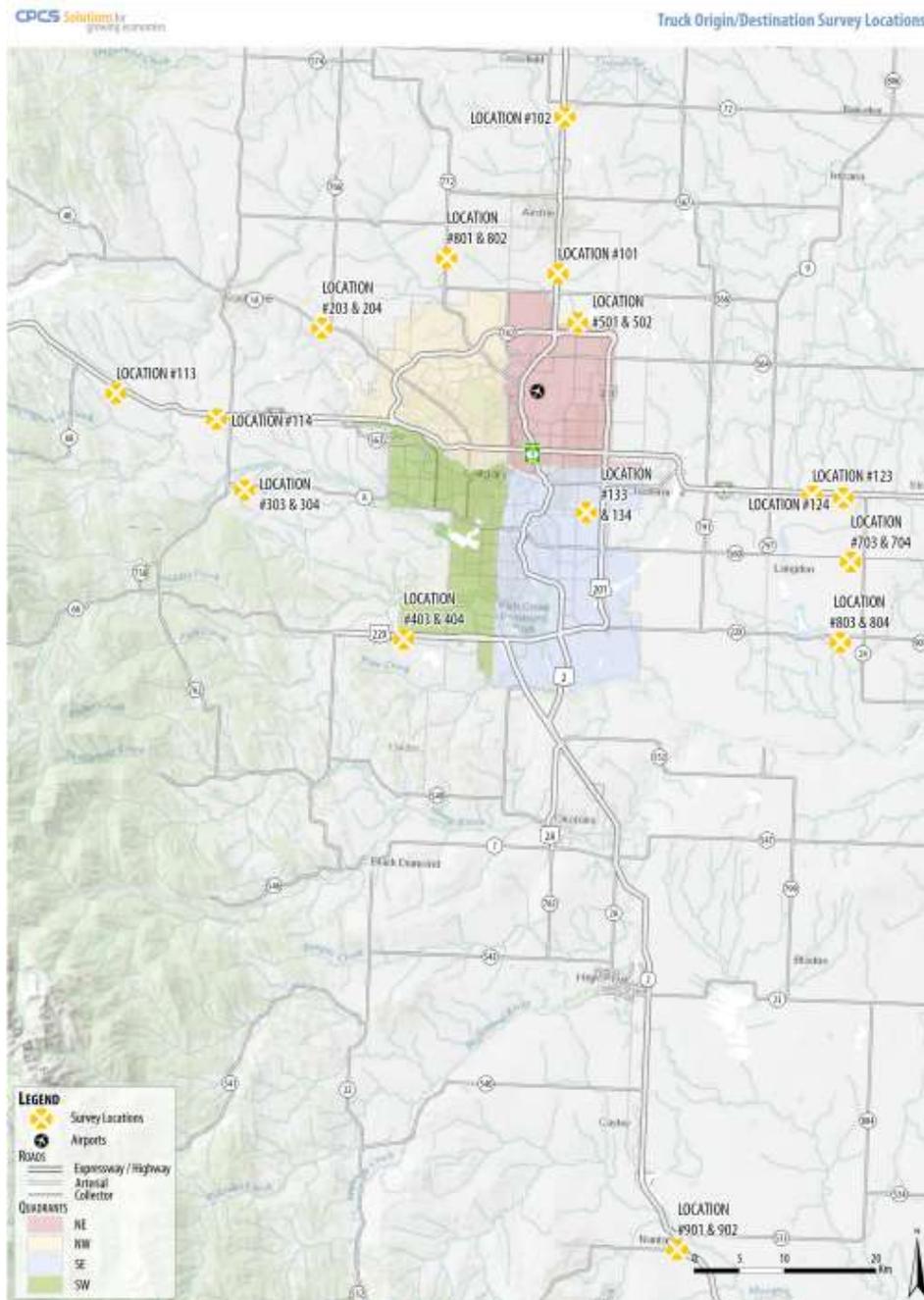
1.1.2 Study area and timelines

The study was conducted on 12 roads and highways surrounding Calgary over 16 days spanning from June 19th, 2017 to August 10th, 2017. All 12 locations were surveyed in both directions, for a total of 24

⁸ The completion rate excludes refusals to complete. However, the rate includes a small number of surveys for which some responses are missing: they are included in the tally and in the analysis because they are otherwise complete and usable.

⁹ The tare weight is the weight of the truck when not laden. The Gross Vehicle Weight is the maximum operating weight of the vehicle when loaded.

sets of surveys. A map of the survey locations is provided in Figure 1-1. Appendix B provides a detailed listing of the survey dates by location.



Source: Watt Team

Figure 1-1: Survey locations

To allow for consistency, the same locations as those surveyed in 2001 were used. However, some changes were required due to road construction, such as at Peigan Trail, and to other factors. As a result, there were slight shifts in some of the actual survey locations. These changes are not likely to

impact the usability of the survey results for the Strategy. Both directions at a given location were generally surveyed on the same day, except at high-volume locations where survey crews could not be allocated between the two directional sites.

Because the survey was carried out around the perimeter of Calgary, it is representative of truck trips coming in to, going out of and going through Calgary (i.e. *external trips*). As part of the development of the Strategy, other information has been analyzed to further understand truck movements within Calgary.

All surveys were completed during daylight hours between approximately 8:00 AM and 5:00 PM.

1.1.3 Survey expansion

At each survey location, a directional 24-hour truck count was taken. At each location and each direction, the ratio of 24-hour truck counts to completed surveys was estimated. As shown in **Table 1-1**, this ratio, referred to as an *expansion factor*, varies by location from 1.92 to 22.22. A higher expansion factor means the survey responses at that location need to be weighted more heavily relative to other locations, as there is a greater truck volume relative to completed surveys. Except where otherwise noted, all aggregate results presented in this report are based on the expanded data.

Table 1-1: Truck counts and expansion factors

Location No.	Location		24-Hour Truck Count	Interviews Attempted	Refusals	Completed Surveys	Percentage Completed	Expansion Factor (24-Hour Counts to Completed Surveys)
101	Highway 2 North	NB	3032	323	22	301	93%	10.07
102	Highway 2 North	SB	2222	103	3	100	97%	22.22
113	Highway 1 West	EB	1308	251	6	245	98%	5.34
114	Highway 1 West	WB	999	324	3	321	99%	3.11
123	Highway 1 East	EB	614	274	8	266	97%	2.31
124	Highway 1 East	WB	1587	261	2	259	99%	6.13
133	Peigan Trail	EB	2162	185	12	173	94%	12.50
134	Peigan Trail	WB	1759	162	5	157	97%	11.20
203	Highway 1A West	EB	375	102	4	98	96%	3.83
204	Highway 1A West	WB	298	110	8	102	93%	2.92
303	Highway 8	EB	587	87	0	87	100%	6.75
304	Highway 8	WB	529	95	3	92	97%	5.75
403	Highway 22X West	EB	193	78	1	77	99%	2.51

Table 1-1: Truck counts and expansion factors

Location No.	Location		24-Hour Truck Count	Interviews Attempted	Refusals	Completed Surveys	Percentage Completed	Expansion Factor (24-Hour Counts to Completed Surveys)
404	Highway 22X West	WB	157	56	1	55	98%	2.85
501	Metis Trail	NB	538	136	10	126	93%	4.27
502	Metis Trail	SB	529	140	6	134	96%	3.95
603	Highway 22X East	EB	505	108	2	106	98%	4.76
604	Highway 22X East	WB	545	107	9	98	92%	5.56
703	Highway 560 East	EB	142	77	3	74	96%	1.92
704	Highway 560 East	WB	160	38	1	37	97%	4.32
801	Highway 772	NB	210	47	1	46	98%	4.57
802	Highway 772	SB	224	29	1	28	97%	8.00
901	Highway 2 South	NB	1041	266	9	257	97%	4.05
902	Highway 2 South	SB	1090	285	11	274	96%	3.98
	Total		20,806	3644	131	3513	96%	

NB = Northbound. SB = Southbound. EB = Eastbound. WB = Westbound. Source: Watt Team

The 2001 external truck origin-destination survey counted 13,360 truck movements in a 24-hour period. Since then, the average annual truck growth rate has been 2.8%, which is slightly faster than Calgary's population growth between 2001 and 2016¹⁰ of 2.6% per year, on average.

Survey counts by location from 2001 are shown in Table 1-2. Because of significant changes to the road network since 2001, notably the construction of Stoney Trail, direct comparisons on individual roads are difficult to make.

¹⁰ This growth is based on the observed populations of the Calgary Census Metropolitan Area observed in 2001 and 2016 Statistics Canada Census. 2016 is the most recently reported census.

Table 1-2: 2001 survey 24-hour truck counts

Highway Location	Vehicles
1A	234
21	489
22 North	337
22 South	457
23	517
2 North	4531
2 South	1416
534	77
541	566
542	66
561	191
806	304
9	326
901	380
TCH East (Highway 1)	1870
TCH West (Highway 1)	1599

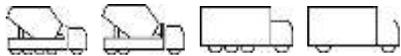
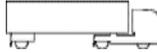
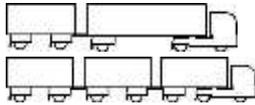
Source: CPCS summary of the [2001 Calgary Region External Truck Origin Destination Survey Study](#).

2 Truck origin/destination survey results

2.1 Vehicle characteristics

Many types of trucks use Calgary’s roads and highways. As part of the external cordon survey, drivers of single unit trucks, single trailer trucks, multiple trailer trucks and pickup trucks with trailers were interviewed. Figure 2-1 provides examples of the types of trucks that were surveyed.¹¹ The definition of multiple trailer trucks includes both long combination vehicles and trucks with multiple cargo-carrying areas, such as a dump truck with an attached trailer. A small number of pickup trucks with trailers was also surveyed – these are not shown in the figure.

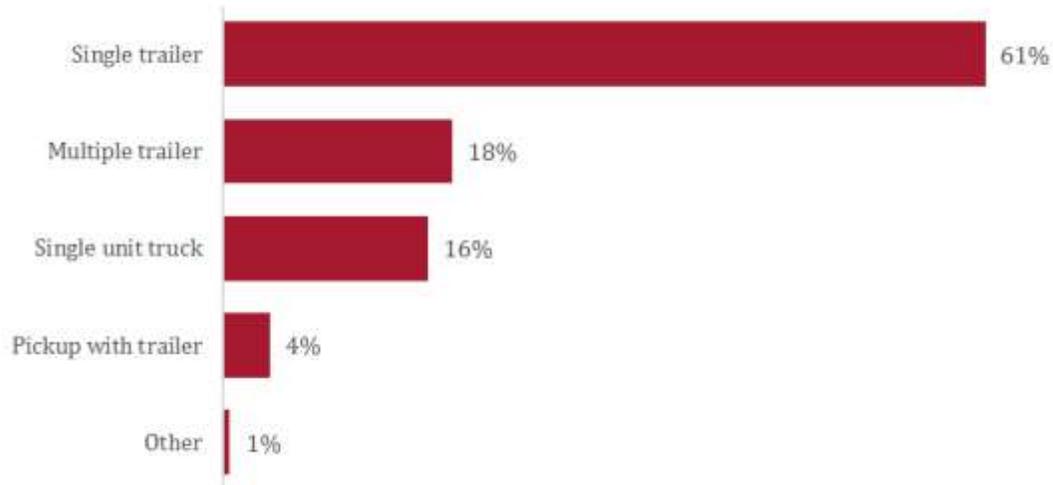
Figure 2-1: Truck types surveyed

Vehicle type	Example
Single unit trucks – such as cement mixers, a five-ton truck or a dump truck.	
Single trailer trucks – such as a tractor unit with one semi-trailer.	
Multiple trailer trucks – such as a long combination vehicle or truck with multiple cargo areas, like a dump truck with an attached trailer.	

Source: Watt Team

As shown in Figure 2-2, 61% of trucks travelling through and around Calgary were single trailer trucks. Approximately equal numbers of single unit trucks and multiple trailer trucks were observed, at 18% and 16% of all trucks observed, respectively. Most of the remaining trucks on the road were pickup trucks with trailers, at 4%. The other category includes miscellaneous other commercial vehicles not carrying goods such as tow trucks, semi-trucks without trailers, etc.

¹¹ Pickup trucks with trailers are not shown.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-2: Vehicle type distribution

2.1.1 Vehicle weight

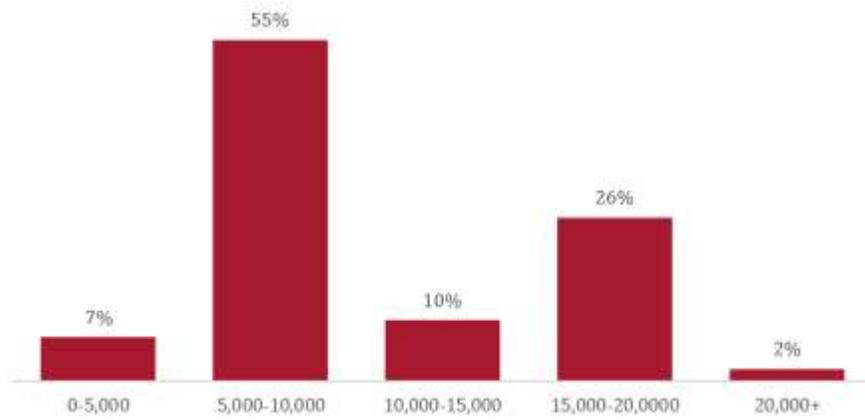
As surveyors approached the vehicles, they gathered information regarding truck *tare* (empty) and *gross vehicle weight* (GVW) posted on the vehicles (Figure 2-3).



Source: ME2 Transportation Data

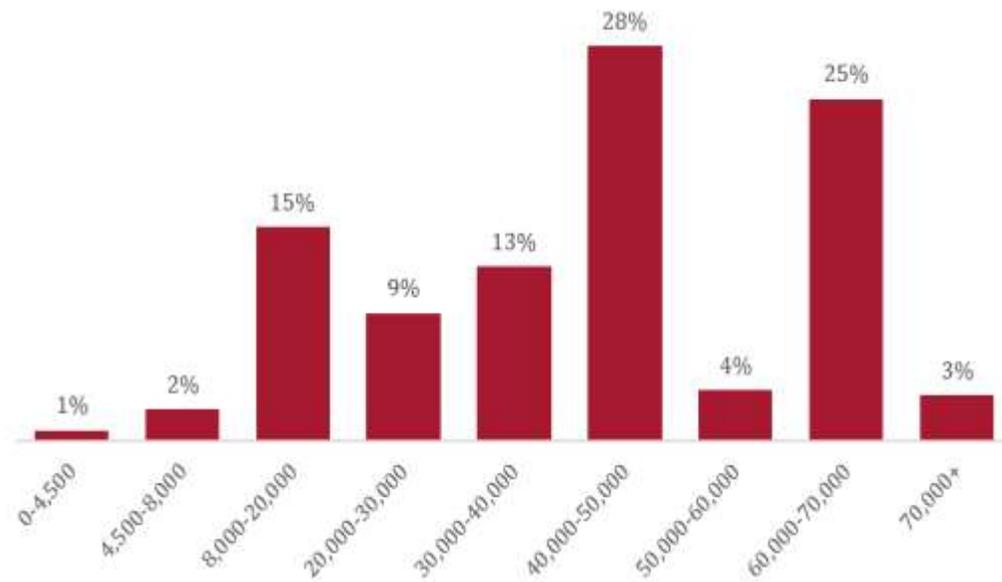
Figure 2-3: Example of tare and GVW markings

The tare weight of vehicles surveyed was predominantly in the 5,000-10,000 kg weight class (55%). Figure 2-4 displays the full distribution of tare weights observed. Similarly, Figure 2-5 shows the distributions of GVW, with most trucks falling in the 20,000 to 70,000 kg gross weight range.



Source: CPCS analysis based on external truck origin/destination survey results.

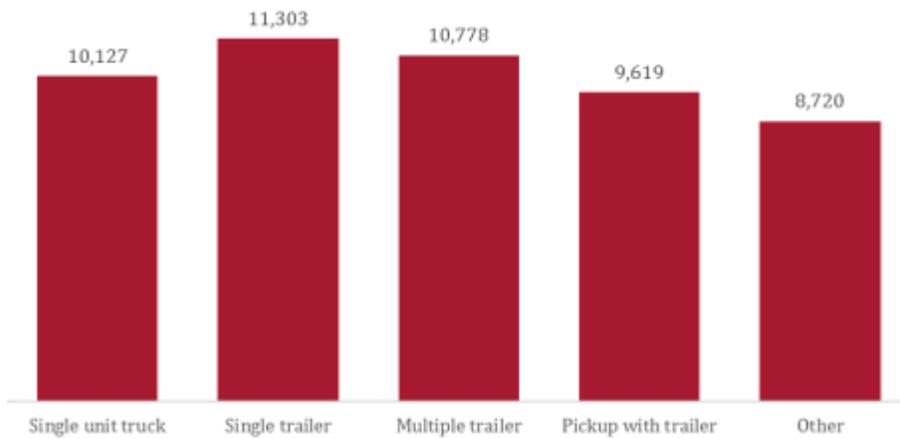
Figure 2-4: Vehicle tare weight distribution (kilograms)



Source: CPCS analysis based on external truck origin/destination survey results.

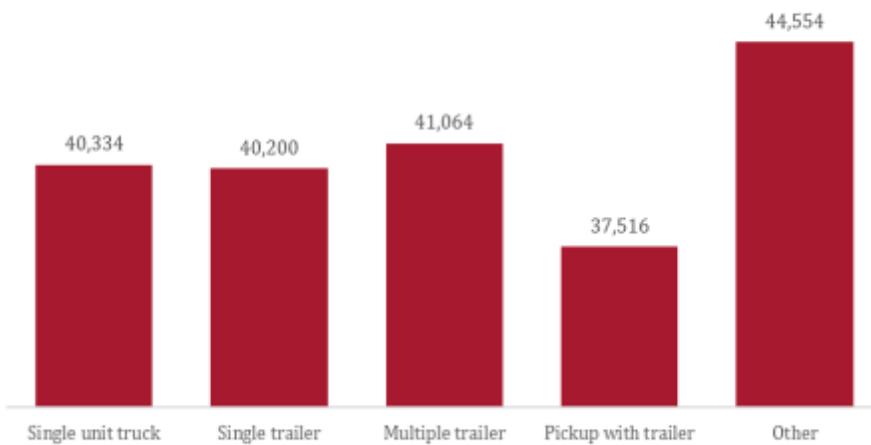
Figure 2-5: Gross vehicle weight (kilograms)

Figure 2-6: Average tare weights by vehicle class shows the distribution of these weights by class of vehicle.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-6: Average tare weights by vehicle class



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-7: Average GVW weights by vehicle class

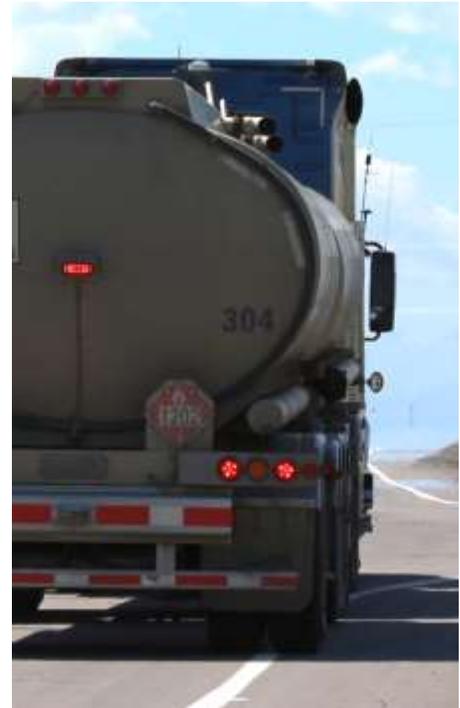
Appendix C provides further details on vehicle characteristics by survey location.

2.1.2 Vehicles transporting dangerous goods

Dangerous goods are regularly transported by trucks in and around Calgary. Trucks carrying dangerous goods were identified based on the placard they display (e.g. Figure 2-8). The four-digit code on the placard typically refers to the United Nations (UN) classification system that is used to identify dangerous goods that are being moved. In the example shown in Figure 2-8, 1202 refers to UN 1202 – Diesel Fuel, Gas Oil, or Heating Oil, Light.¹²

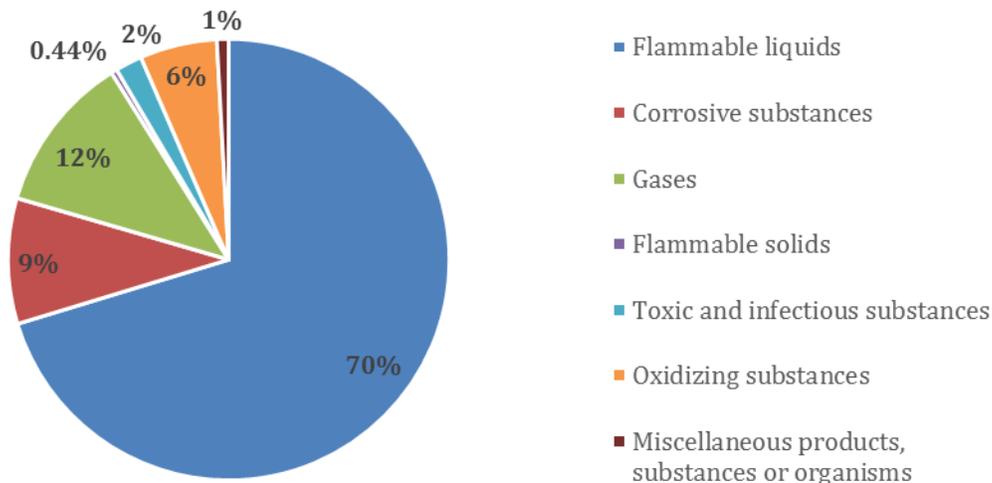
An estimated 3.8% of all trucks surveyed carried dangerous goods. Dangerous goods were transported on single unit trucks (3.3% of all single unit trucks), single trailers (2.5%) and multiple trailers (8.9%).

Dangerous goods were aggregated using the classification scheme used within the Transportation of Dangerous Goods Regulations, made under the federal *Transportation of Dangerous Goods Act, 1992*. The majority of trucks carrying dangerous goods carried class 3 flammable liquids (70%). Corrosive substances, gases, and oxidizing substances also made up a considerable portion of the transported dangerous goods (Figure 2-9).



Source: ME2 Transportation Data

Figure 2-8: Example of a truck displaying a dangerous goods placard



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-9: Distribution of dangerous good classification (by trips)

¹² Transportation of Dangerous Goods Regulations, Schedule 1.

Table 2-1 lists the range of dangerous goods UN numbers observed during the surveys.

Table 2-1: List of UN numbers recorded

UN Number	Description
1993	Flammable liquid, N.O.S.
1202	Diesel Fuel; Gas Oil; or Heating Oil, light
1267	Petroleum Crude Oil
1823	Sodium Hydroxide, Solid
1073	Oxygen, Refrigerated Liquid
1203	Gasoline; Motor Spirit; Petrol
2448	Molten Sulfur
1072	Oxygen, Compressed
1044	Fire Extinguishers with compressed or liquefied Gas
2902	Pesticide, Liquid, Toxic, N.O.S
1075	Liquefied Petroleum Gases
1101	Diethylaluminum chloride
2924	Flammable Liquid, Corrosive, N.O.S.
1942	Ammonium Nitrate
1993	Flammable Liquid, N.O.S;
2929	Toxic Liquid, Flammable, Organic, N.O.S.
3082	Environmentally Hazardous Substance, Liquid, N.O.S
1268	Petroleum Distillates, N.O.S
2818	Ammonium Polysulfide Solution
1863	Fuel, Aviation, Turbine Engine
2491	Ethanolamine
1814	Potassium Hydroxide Solution
3830	Desensitized Explosive, Solid, N.O.S
1866	Resin Solution, flammable
3265	Corrosive Liquid, acidic, organic, n.o.s
1977	Nitrogen, Refrigerated, Liquid
3286	Flammable Liquid, Toxic, Corrosive, N.O.S.
2187	Carbon Dioxide, Refrigerated, Liquid
3264	Corrosive Liquid, acidic, organic, n.o.s
3373	Biological Substance, Category B
1830	Sulfuric Acid with more than 51% acid
2735	Amines, Liquid, Corrosive, N.O.S or Polyamines, Liquid, Corrosive, N.O.S
2426	Ammonium Nitrate, Liquid
1207	Hexaldehyde

N.O.S. = Not otherwise specified. Source: CPCS analysis based on external truck origin/destination survey result and information from Transport Canada.

2.2 Trip characteristics

Approximately 20,800 truck trips¹³ were estimated to pass through the survey locations every day. The survey focused on the types of trips made by these trucks. These ‘trips’ represent the ‘tour’ made between the point at which the truck started its day and the point at which it ended its day, regardless of the number of interim stops it made along the way. Specific patterns can be determined from trip start and end patterns, trip stopping pattern and purpose, routing choice and connections to intermodal facilities. Each of these aspects is further discussed in the subsections below.

In the survey, trip start, trip end and interim stop locations were aggregated as follows:

- City quadrants (northeast, northwest, southeast, southwest) within Calgary;
- Compass heading (north, south, east, west) within the Calgary region but outside of Calgary (i.e. *North region, South region, East region, West region*);
- *Outside region*: outside of the Calgary region, but within Alberta;
- *Outside Alberta*: Outside of Alberta, but within Canada; and
- *Outside Canada*: Outside of Canada (i.e. the United States).

In addition to the aggregations recorded during the survey, for further analysis, the following trip patterns are frequently used to differentiate trips travelling a short distance from those travelling a longer distance:

- *local/regional trips*: trips that began *and ended within* the Calgary region
- *long-distance trips*: trips that began *or ended outside* of the Calgary region

Other trip patterns are also common and identified as needed.

2.2.1 Trip start and end locations

Drivers were asked for the address where they began their trip and the address where they were going to their trip on the day of the survey. All survey questions concerned activities that occurred only the actual day of the survey, even if the trip covered several days.

Table 2-2 through Table 2-7 summarize the start and end patterns for all trucks, and by type of truck.¹⁴ The majority of trips surveyed (59%) were local and regional trips, with the remainder either having started or ended outside the region. Smaller trucks (single unit and pickup trucks with trailers) were more likely to be local/regional trips. In total, 86% and 90% of trips by single unit and pickup trucks with trailers, respectively, were local or regional trips. Larger trucks (single and multiple trailers) were more likely to begin or end their trips outside the Calgary region. In total, 50% and 54% of trips made by single and multiple trailer trucks, respectively, were local or regional trips.

¹³ The analysis assumed that there were no or minimal instances in which the same vehicle was surveyed twice.

¹⁴ The percentages in these tables were based on the total number of trips in which both start and end locations were provided. On an expanded basis, there were 19,400 trips in which both a start and an end location were provided, i.e. 100% is equivalent to 19,400 trips. Note that for each row, the totals refer to the percent of all trips that start in a certain location – e.g., 48.23% of all trips in Table start in Calgary. The column totals refer to the percent of all trips that end in each location.

The largest portions of the long-distance trips started or ended elsewhere in Canada, but outside Alberta. More specifically:

- The proportion of trips starting or ending elsewhere in Alberta was greatest for multiple trailer trucks, with 10% of trips made by these trucks ending elsewhere in Alberta and 9% of trips made by these trucks starting elsewhere in Alberta. For all other types of trucks, the proportions never exceeded 7%.
- The proportions of trips starting or ending elsewhere in Canada were greatest for single trailers (24% of trips ending and 14% of trips starting) and multiple trailers (19% ending and 15% starting).
- The proportions of trips starting or ending outside Canada were greatest for single trailers (2% of trips starting and 5% of trips ending), followed by multiple trailers (1% and 4%, respectively). The slightly lower rates for multiple trailers are consistent with the different regulations regarding long combination vehicles in varying jurisdictions.

Table 2-2: Trip start and ends table (all trucks)

Start \ End	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did Not Respond	Total
Calgary	32.10%	3.71%	1.75%	8.09%	1.80%	0.78%	48.23%
Calgary Region	3.15%	19.85%	0.80%	4.90%	1.21%	1.13%	31.03%
Outside Region	0.82%	0.45%	4.05%	0.74%	0.02%	0.20%	6.27%
Outside Alberta	3.98%	2.23%	0.67%	4.30%	0.15%	0.25%	11.58%
Outside Canada	0.39%	0.65%	0.17%	0.10%	0.32%	0.01%	1.64%
Did Not Respond	0.08%	0.26%	0.06%	0.27%	0.08%	0.49%	1.24%
Total	40.52%	27.15%	7.50%	18.39%	3.58%	2.85%	100.00%

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-3: Trip start and ends table (single unit truck)

Start \ End	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did Not Respond	Total
Calgary	55.24%	5.34%	0.73%	0.72%	0.00%	0.53%	62.57%
Calgary Region	3.07%	22.87%	0.13%	0.88%	0.00%	0.89%	27.83%
Outside Region	0.23%	0.43%	5.68%	0.00%	0.00%	0.00%	6.34%
Outside Alberta	0.19%	0.60%	0.25%	0.60%	0.00%	0.08%	1.72%
Outside Canada	0.00%	0.27%	0.00%	0.00%	0.00%	0.00%	0.27%
Did Not Respond	0.38%	0.14%	0.00%	0.00%	0.00%	0.74%	1.26%
Total	59.12%	29.64%	6.79%	2.20%	0.00%	2.24%	100.00%

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-4: Trip start and ends table (single trailer)

Start \ End	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did Not Respond	Total
Calgary	28.18%	3.26%	2.03%	11.22%	2.24%	0.83%	47.75%
Calgary Region	3.14%	15.95%	0.75%	5.93%	1.53%	1.22%	28.52%
Outside Region	1.01%	0.51%	2.97%	0.76%	0.03%	0.31%	5.58%
Outside Alberta	5.74%	2.31%	0.55%	5.17%	0.21%	0.35%	14.33%
Outside Canada	0.63%	0.72%	0.24%	0.17%	0.44%	0.02%	2.22%
Did Not Respond	0.04%	0.37%	0.10%	0.38%	0.14%	0.57%	1.60%
Total	38.74%	23.12%	6.63%	23.63%	4.59%	3.30%	100.00%

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-5: Trip start and ends table (multiple trailer)

Start \ End	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did Not Respond	Total
Calgary	22.60%	3.31%	1.68%	5.73%	2.15%	1.01%	36.48%
Calgary Region	2.91%	25.83%	0.85%	5.96%	1.21%	1.14%	37.91%
Outside Region	0.91%	0.47%	5.79%	1.43%	0.00%	0.11%	8.72%
Outside Alberta	3.03%	4.28%	1.58%	5.96%	0.16%	0.15%	15.16%
Outside Canada	0.16%	0.91%	0.00%	0.00%	0.31%	0.00%	1.39%
Did Not Respond	0.00%	0.11%	0.00%	0.24%	0.00%	0.00%	0.35%
Total	29.62%	34.93%	9.90%	19.31%	3.83%	2.41%	100.00%

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-6: Trip start and ends table (pickup trucks with trailer)

Start \ End	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did Not Respond	Total
Calgary	33.57%	4.60%	1.34%	0.95%	0.00%	0.56%	41.01%
Calgary Region	6.09%	45.43%	1.84%	0.00%	0.00%	1.57%	54.93%
Outside Region	0.00%	0.00%	1.77%	0.00%	0.00%	0.00%	1.77%
Outside Alberta	0.86%	0.00%	0.57%	0.00%	0.00%	0.00%	1.43%
Outside Canada	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did Not Respond	0.00%	0.00%	0.00%	0.00%	0.00%	0.86%	0.86%
Total	40.51%	50.03%	5.52%	0.95%	0.00%	2.99%	100.00%

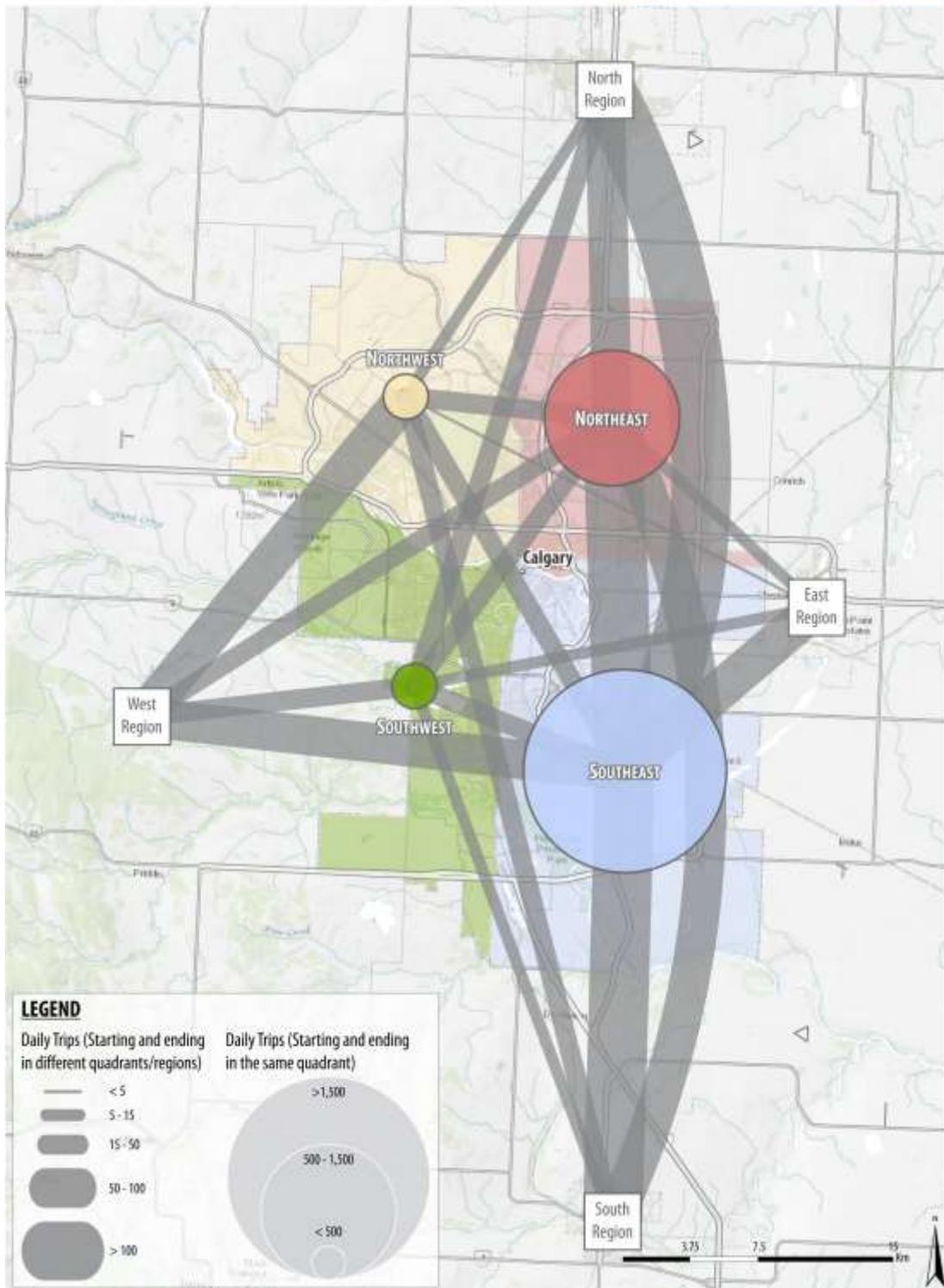
Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-7: Trip start and ends table (other trucks)

Start \ End	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did Not Respond	Total
Calgary	42.10%	3.31%	0.00%	0.00%	4.31%	0.00%	49.72%
Calgary Region	0.00%	38.35%	0.00%	11.93%	0.00%	0.00%	50.28%
Outside Region	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outside Alberta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outside Canada	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did Not Respond	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	42.10%	41.66%	0.00%	11.93%	4.31%	0.00%	100.00%

Source: CPCS analysis based on external truck origin/destination survey results.

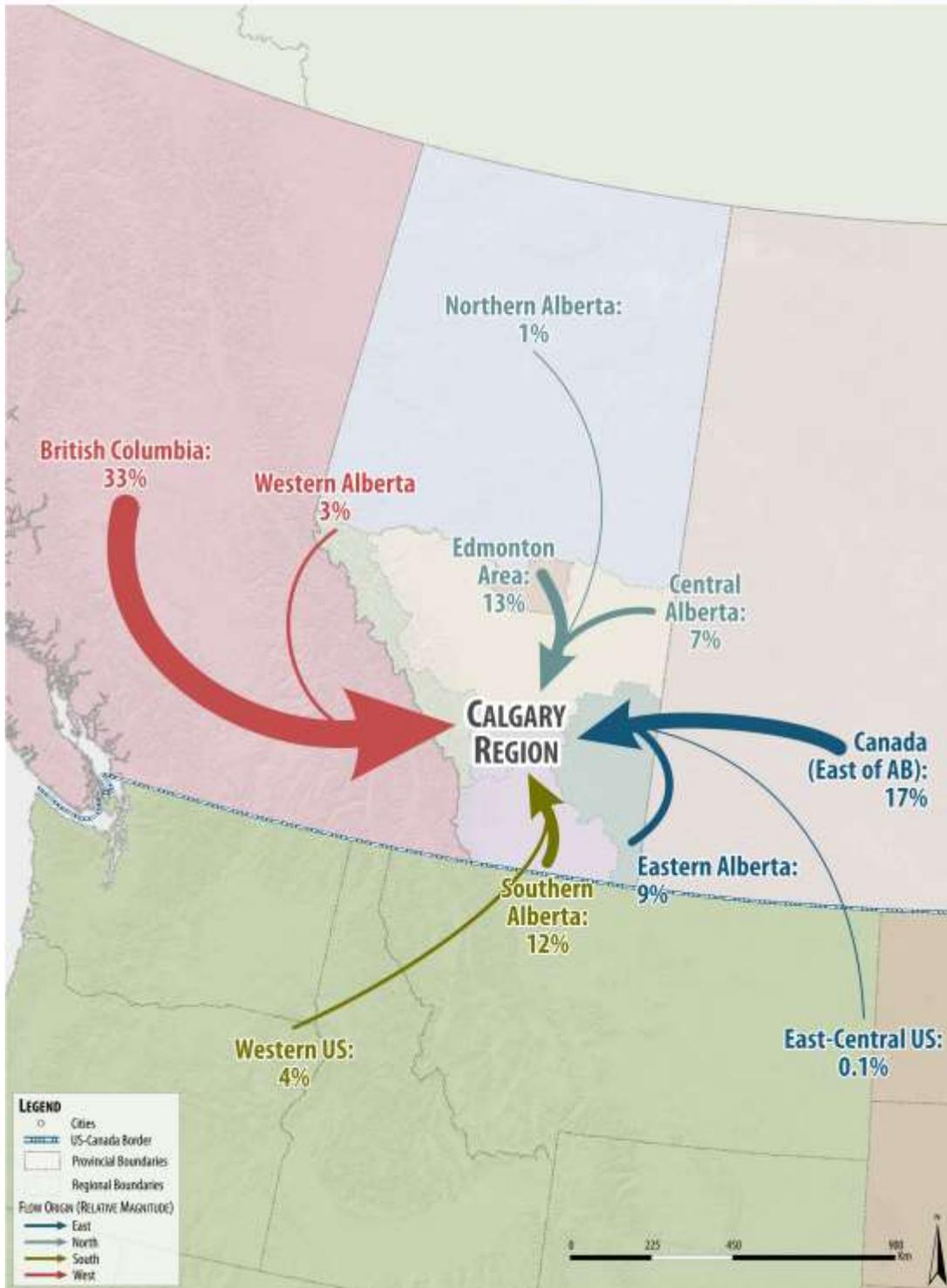
Further disaggregating, Figure 2-10 shows trips start and end patterns in the Calgary region. Predominantly, external trips started and/or ended within southeast Calgary. More specifically, 40% of all external trips either started or ended in southeast Calgary. These findings highlight the importance of southeast Calgary as an important goods movement generator. A significant number of trips also started and ended in northeast Calgary.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-10: Trip start and end patterns – Calgary Region

Figure 2-11 and Figure 2-12 show long-distance trip patterns to and from the Calgary region. Predominantly, most trips were to and from British Columbia (34% and 33% of external trips, respectively). From Calgary, a greater proportion of trips headed north towards Edmonton (27%) than towards regions east of Alberta (21%). However, to Calgary, a greater proportion of trips came from east of Alberta (26%) than from areas north of Calgary (21%). The proportions of trips between Calgary and other areas in Alberta and beyond highlight Calgary's role as a distribution centre in Western Canada.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-11: Long distance trip patterns to Calgary

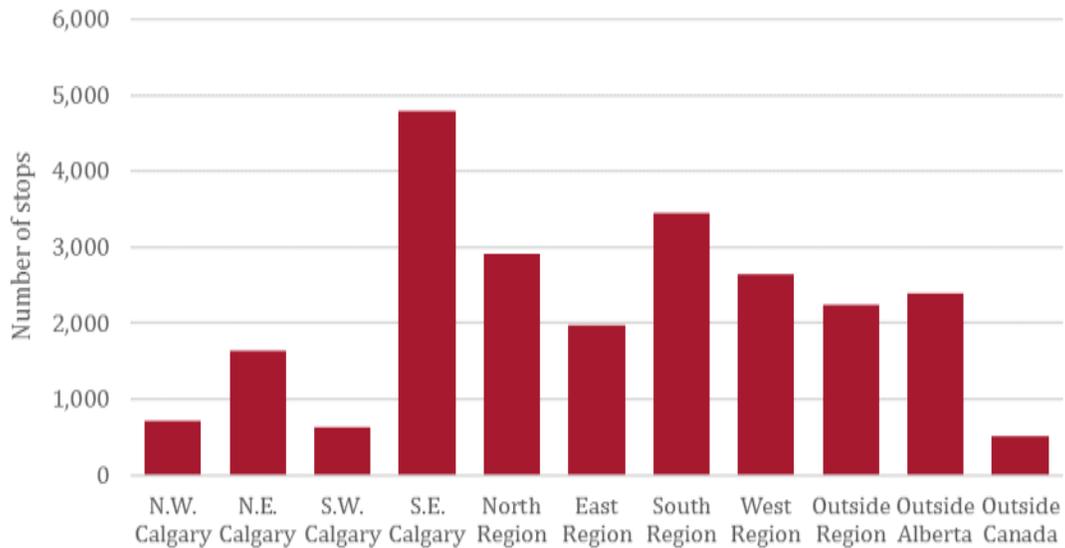


Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-12: Long-distance trip patterns from Calgary

2.2.2 Trip stopping pattern

In addition to capturing the daily starts and ends of all trips, surveyors also asked drivers for their stopping patterns. Drivers were asked ‘Where did you stop LAST before arriving at this location?’ and ‘Where will you be stopping NEXT after this survey?’ Figure 2-13 shows the number of stops trucks made in each region, combining all survey locations together. Note that these stops represent only one leg of a truck’s trip – the surveyed leg – and do not include any additional stops made on the day of the survey. Nonetheless, within Calgary, these results align with the other data sources considered in the Strategy, such as GPS truck trip traces, with southeast Calgary seeing the largest number of stops.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-13: Stop locations

Table 2-8 to Table 2-13 show the stop patterns for pick ups and drop offs by truck type. Single unit trucks (20%), multiple trailer trucks (39%) and pickup trucks with trailers (27%) were more likely to have a pick up or drop off within the Calgary region before and after the survey as compared to single trailer trucks (8%). This finding is consistent with smaller single unit trucks and pickups with trailers being more likely to operate within Calgary, and larger trailers being more likely to operate outside the city limits. The higher proportion of multiple trailer trucks picking up and dropping off in the region may be driven by traffic such as aggregates. It is also of interest that nearly 44% of all trucks did not stop for a pick up or drop off before the survey was conducted, and 23% did not plan to stop for a pick up or drop off after the survey was conducted.

Table 2-8: Truck pick ups and drop offs (all trucks)

After Before	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did not disclose	Did not stop	Total
Calgary	1.54%	4.05%	2.30%	1.30%	0.47%	0.91%	7.90%	18.48%
Calgary Region	6.36%	7.21%	0.62%	0.94%	0.69%	0.67%	10.99%	27.47%
Outside Region	1.20%	0.34%	1.06%	0.05%	0.00%	0.07%	1.97%	4.69%
Outside Alberta	1.24%	0.63%	0.17%	0.00%	0.00%	0.08%	1.33%	3.46%
Outside Canada	0.26%	0.06%	0.08%	0.15%	0.00%	0.00%	0.00%	0.55%
Did not disclose	0.15%	0.32%	0.17%	0.24%	0.00%	0.21%	0.44%	1.54%
Did not stop	15.49%	20.51%	3.53%	2.80%	0.84%	0.12%	0.52%	43.81%
Total	26.24%	33.11%	7.93%	5.49%	1.99%	2.07%	23.16%	100.00%

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-9: Truck pick ups and drop offs (single unit trucks)

After Before	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did not disclose	Did not stop	Total
Calgary	5.08%	5.30%	1.86%	0.00%	0.00%	0.61%	17.68%	30.54%
Calgary Region	5.09%	4.25%	1.31%	1.17%	0.00%	0.35%	5.02%	17.19%
Outside Region	0.99%	0.17%	0.00%	0.00%	0.00%	0.00%	1.36%	2.52%
Outside Alberta	0.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.93%
Outside Canada	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did not disclose	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.54%	1.18%
Did not stop	14.55%	28.84%	3.48%	0.54%	0.00%	0.24%	0.00%	47.64%
Total	26.83%	38.57%	6.65%	1.71%	0.00%	1.20%	25.06%	100.00 %

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-10: Truck pick ups and drop offs (single trailer trucks)

After Before	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did not disclose	Did not stop	Total
Calgary	1.53%	6.35%	4.01%	3.43%	0.62%	2.32%	12.34%	30.60%
Calgary Region	11.86%	12.00%	0.21%	0.82%	1.33%	1.66%	20.10%	47.97%
Outside Region	1.76%	0.33%	1.85%	0.00%	0.00%	0.20%	3.68%	7.82%
Outside Alberta	3.13%	1.20%	0.38%	0.00%	0.00%	0.24%	2.64%	7.59%
Outside Canada	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did not disclose	0.00%	0.70%	0.50%	0.70%	0.00%	0.48%	0.63%	3.01%
Did not stop	0.00%	0.70%	0.50%	0.70%	0.00%	0.48%	0.63%	3.01%
Total	18.28%	21.29%	7.44%	5.65%	1.94%	5.38%	40.02%	100.00 %

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-11: Truck pick ups and drop offs (multiple trailer trucks)

After Before	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did not disclose	Did not stop	Total
Calgary	0.62%	11.45%	4.27%	0.45%	2.81%	0.00%	5.55%	25.17%
Calgary Region	9.78%	17.43%	2.70%	3.44%	0.71%	0.33%	17.57%	51.95%
Outside Region	3.81%	1.40%	3.38%	0.45%	0.00%	0.00%	4.01%	13.06%
Outside Alberta	0.66%	1.85%	0.35%	0.00%	0.00%	0.00%	2.70%	5.56%
Outside Canada	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did not disclose	0.35%	0.22%	0.00%	0.00%	0.00%	0.43%	1.13%	2.13%
Did not stop	0.35%	0.22%	0.00%	0.00%	0.00%	0.43%	1.13%	2.13%
Total	15.57%	32.57%	10.70%	4.34%	3.51%	1.19%	32.11%	100.00 %

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-12: Truck pick ups and drop offs (pickup trucks with trailer)

After Before	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did not disclose	Did not stop	Total
Calgary	0.00%	6.85%	1.68%	0.00%	0.00%	6.75%	11.97%	27.25%
Calgary Region	10.43%	9.64%	0.00%	2.19%	0.00%	0.00%	44.95%	67.20%
Outside Region	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%
Outside Alberta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outside Canada	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did not disclose	0.00%	2.15%	0.00%	0.00%	0.00%	0.00%	0.00%	2.15%
Did not stop	0.00%	2.15%	0.00%	0.00%	0.00%	0.00%	0.00%	2.15%
Total	10.43%	22.03%	1.68%	2.19%	0.00%	6.75%	56.92%	100.00 %

Source: CPCS analysis based on external truck origin/destination survey results.

Table 2-13: Truck pick ups and drop offs (other trucks)

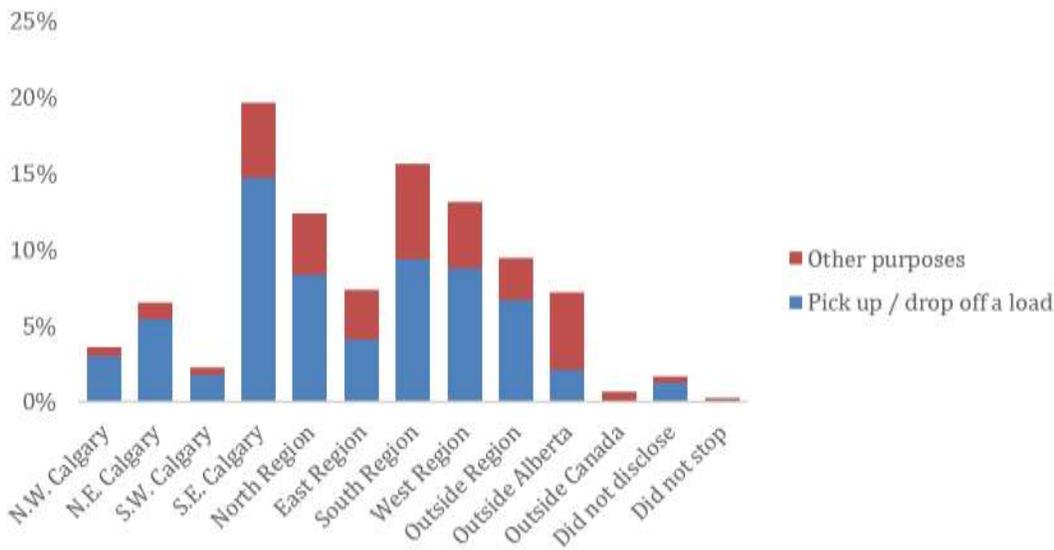
After Before	Calgary	Calgary Region	Outside Region	Outside Alberta	Outside Canada	Did not disclose	Did not stop	Total
Calgary	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	37.30%	37.30%
Calgary Region	23.57%	0.00%	0.00%	0.00%	39.14%	0.00%	0.00%	62.70%
Outside Region	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outside Alberta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outside Canada	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did not disclose	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Did not stop	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	23.57%	0.00%	0.00%	0.00%	39.14%	0.00%	37.30%	100.00 %

Source: CPCS analysis based on external truck origin/destination survey results.

2.2.3 Trip stop purposes

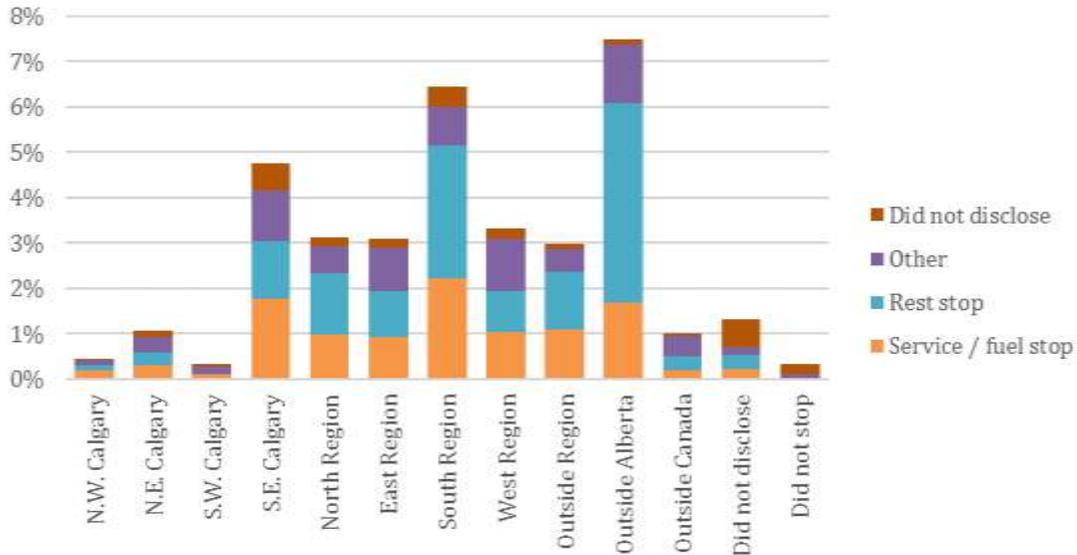
Trucks stop for purposes other than pick ups and drop offs, notably for rest stops and service/fuel stops. Figure 2-14 and Figure 2-14: All stops by location and purpose

show the proportion of stops for pick-ups and drop offs as compared to other types of stops. Trucks were much more likely to stop outside Calgary for purposes other than pick-ups and drop offs. In part, this tendency reflects the long distances that are involved and the corresponding need to stop for rest and service/fuel. The greater proportion of non-pick up / drop off stops in the region surrounding Calgary and in southeast Calgary compared with the rest of Calgary may also reflect the availability of truck service centres and depots in these locations. Trucks were especially unlikely to stop for rest within Calgary, with their prevalence being greater outside the city, although a number of service and fuel stops were made in southeast Calgary. There were also more stops in the North and South Regions as compared to the East and West Regions – again perhaps reflecting the locations of truck service centres and depots.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-14: All stops by location and purpose

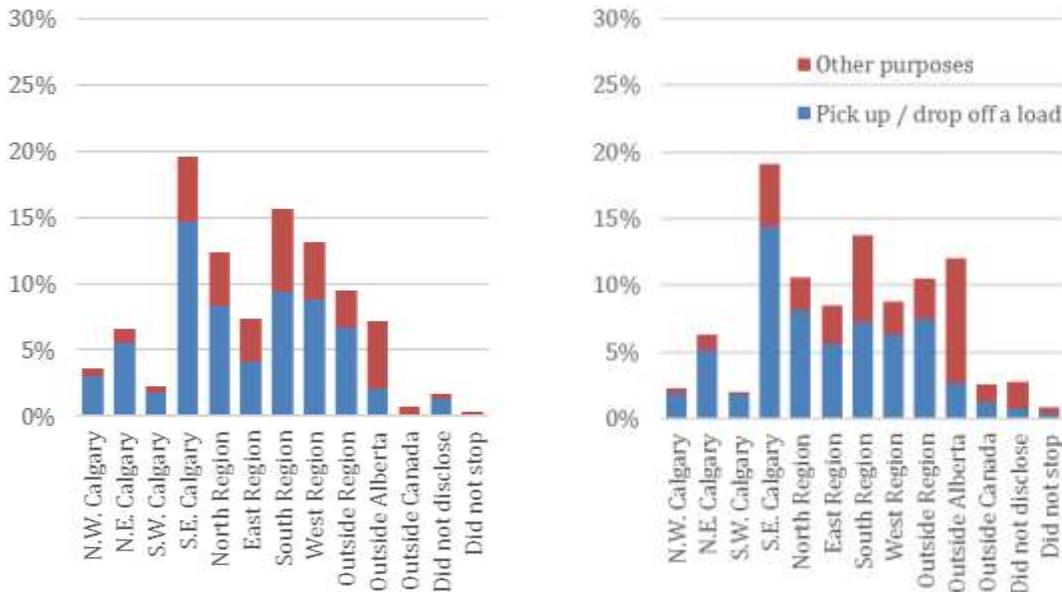


Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-15: All Stops by location and purpose (expanded other purposes)

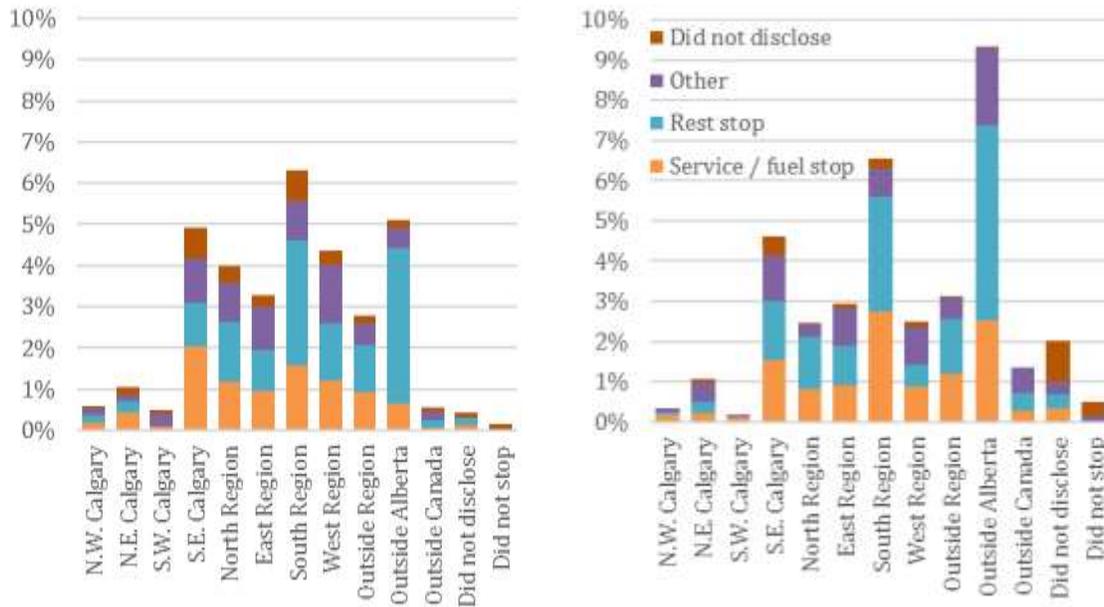
Figure 2-16 and

Figure 2-17 provide separate breakdowns for stops before the survey and after the survey. Overall, the stopping patterns were similar for stops before and after the survey, although there was a higher percentage of planned service and rest stops outside Alberta *after* the survey as compared to before.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-16: Stop purpose before (left) and after (right) survey by location and purpose



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-17: Stop purpose before (left) and after (right) survey by location and purpose (expanded other purposes) Trip patterns

2.2.3.1 Depot-based trips

Trips that start *and* end within the same quadrant or region were likely to be depot-based trips (i.e. return to the same facility each day).¹⁵ Approximately half of all trips started and ended in the same quadrant or region. The southeastern quadrant of Calgary was particularly prominent for depot-based trips (Table 2-14), at two-thirds of all trips (68%), followed by the East Region at 63%.

¹⁵ Without further analysis, it can only be inferred that trips that start in the same zone were depot-based trips as the truck may return to a different address in the same zone.

Table 2-14: Depot-based trips

Zone	Percentage of trips starting in the zone	Percentage of trips starting and ending in the zone	Percentage of depot-based trips
Northwest Calgary	2.7%	1.4%	50.7%
Northeast Calgary	9.7%	5.5%	56.8%
Southwest Calgary	1.7%	0.7%	42.2%
Southeast Calgary	34.1%	23.1%	67.6%
North Region	11.2%	5.3%	46.8%
East Region	5.9%	3.7%	62.5%
South Region	10.7%	5.5%	50.8%
West Region	3.1%	1.8%	57.4%

Source: CPCS analysis based on external truck origin/destination survey results.

2.2.3.2 Through trips

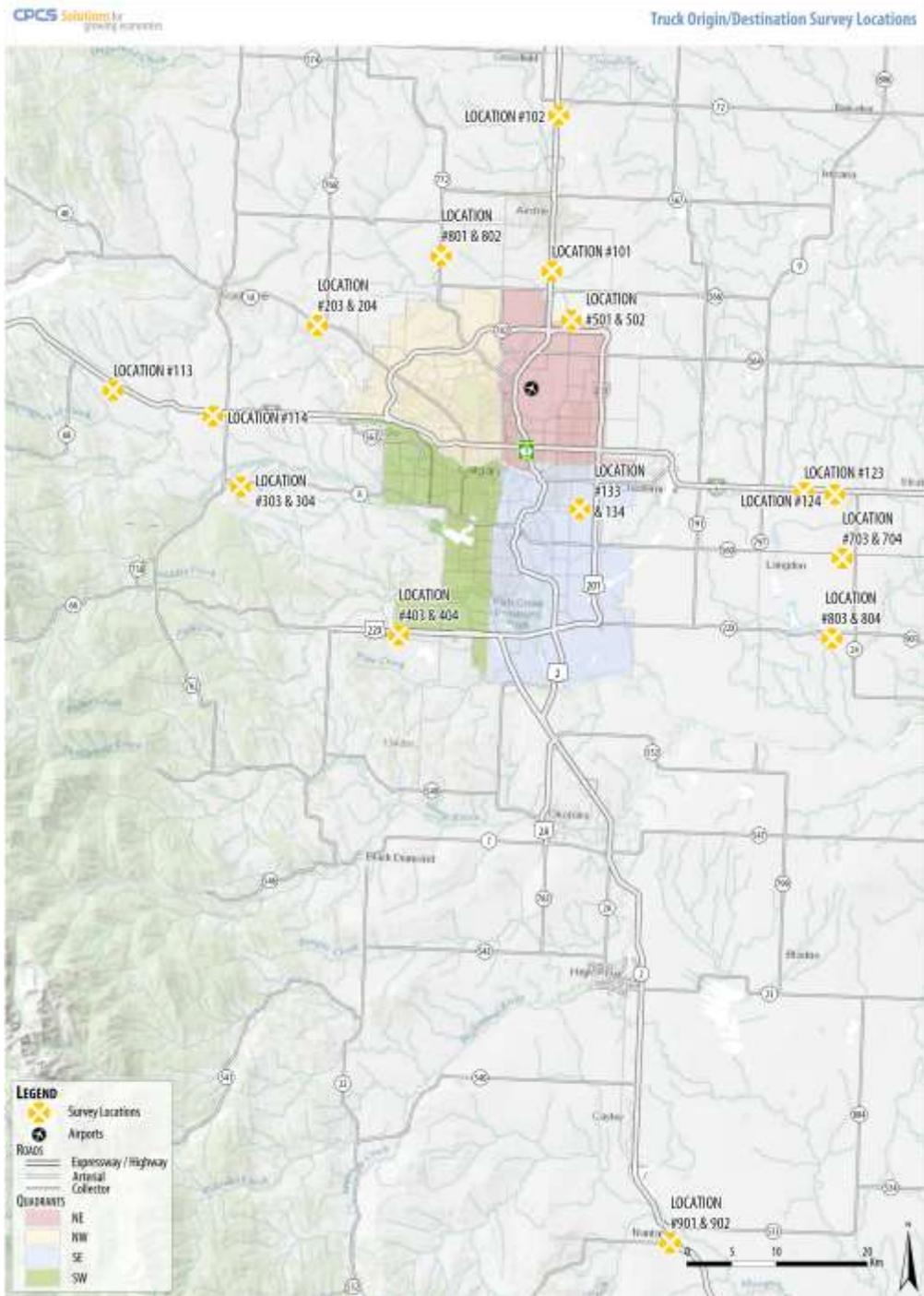
In this report, through trips are those that both started and ended outside of the Calgary region, and made no stops to pick up or drop off a load. Approximately 38% of trips were long-distance, and started or ended outside of the Calgary region.¹⁶ Of those trips, 28% (or 11% of all trips) started and ended outside of the Calgary region, suggesting that they could be through trips if they did not make a stop in Calgary. However, most trips starting and ending outside of the Calgary did make a pick up or drop off. As a result, only 4% of all trips were likely to be purely through traffic.

2.2.4 Trip routing

2.2.4.1 Use of provincial highways

For ease of reference, Figure 2-18 shows the provincial highways around Calgary.

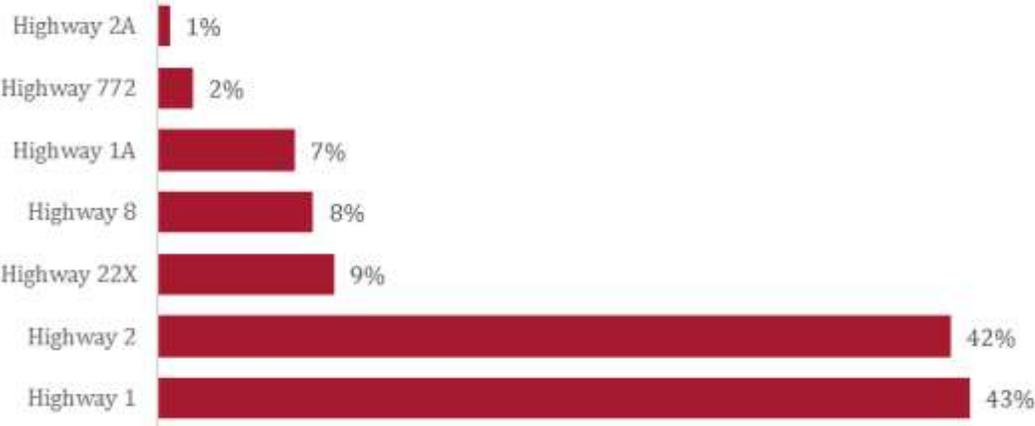
¹⁶ This percentage is based on the total number of trips in which both a start and end location were recorded.



Source: Watt Team

Figure 2-18: Provincial highways around Calgary

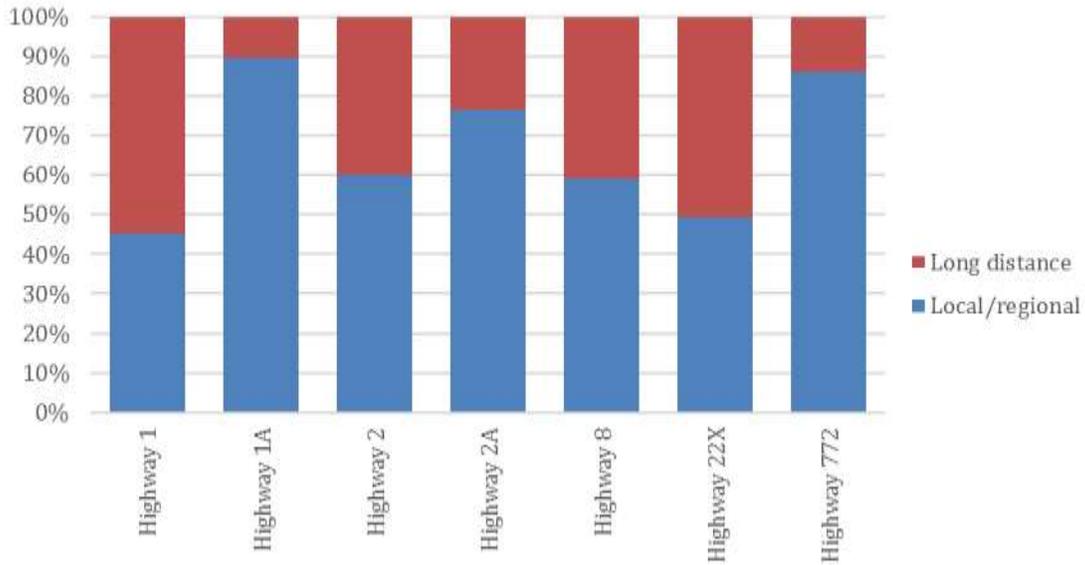
Drivers were asked to indicate the provincial highways they had used or planned to use on their trip. Figure 2-19 depicts the highways used by the surveyed drivers, including the highway on which the survey was conducted. The main highways used were Highways 1 and 2, with 43% and 42%, respectively, of all surveyed drivers having used them.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-19: Percentage of drivers using each highway

Figure 2-20 breaks down long-distance and local/regional trips as proportions of all trips on each highway. Highways 1, 2, 8, and 22X were used by a greater percentage of long-distance trucks, whereas Highways 1A, 2A, and 772 were primarily used by local/regional traffic.



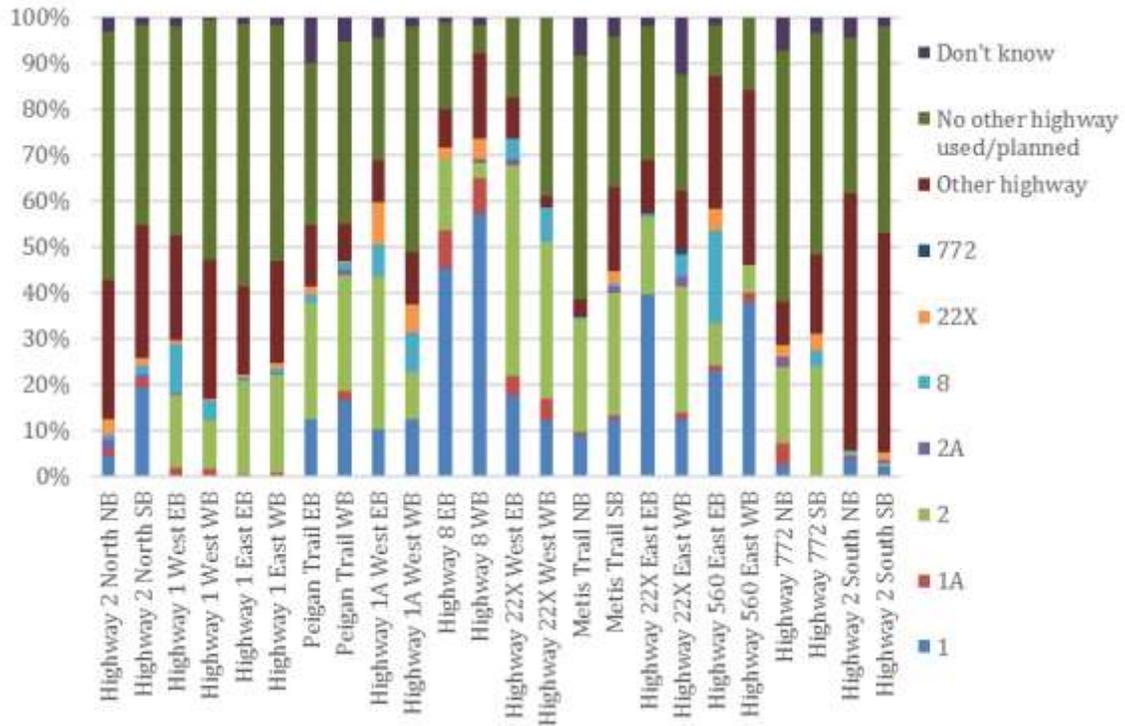
Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-20: Local/regional versus long-distance trips by highway

Figure 2-21 shows the other provincial highways that drivers used or planned to use – excluding the highway on which the survey took place and Stoney Trail¹⁷ -- by survey location. Depending on the location, between 34% and 57% of trucks did not use or plan to use another provincial highway. A driver interviewed on Highways 1 and 2 was more likely, as compared to most other survey locations, to have *not* used¹⁸ another provincial highway. Metis Trail also had a similar profile, with most northbound trucks (53%) and a significant proportion of southbound trucks (33%) not using another provincial highway. By contrast, drivers interviewed on Highway 8 were the most likely to have used another provincial highway, notably Highway 1.

¹⁷ Truck use of Stoney Trail is discussed in the next section.

¹⁸ The wording of the question was such that the driver also did not *plan* to use another provincial highway.



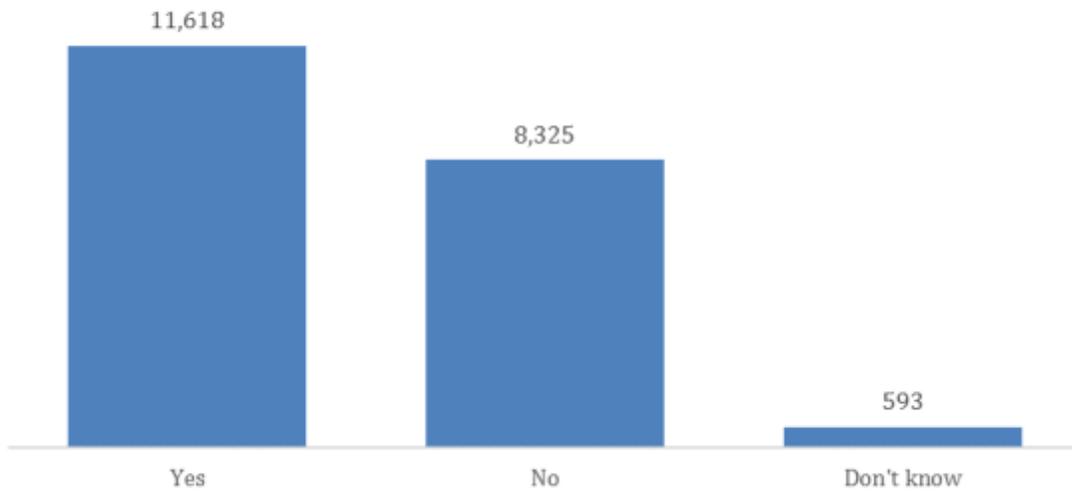
Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-21: Other highways used by survey location

2.2.4.2 Use of Stoney Trail

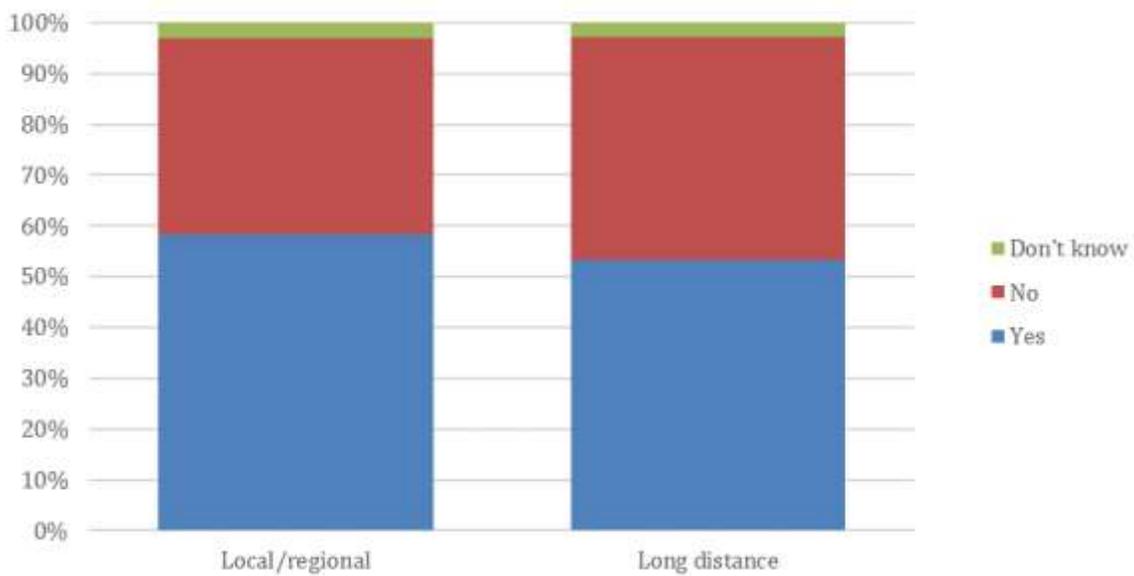
Stoney Trail was a popular choice for trucks travelling in, around or through Calgary. Approximately 12,000 trips per day, or 58% of the 20,800 daily trips captured in the survey, used Stoney Trail (Figure 2-22). Local/regional trips were slightly more likely to use it than long distance trucks (Figure 2-22: Number of trips per day using Stoney Trail

).



Source: CPCS analysis based on external truck origin/destination survey results.

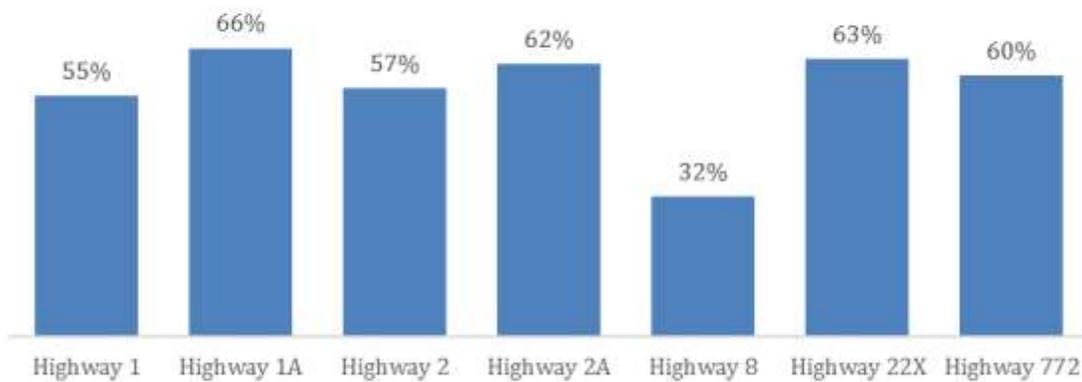
Figure 2-22: Number of trips per day using Stoney Trail



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-23: Use of Stoney Trail by local/regional versus long distance trips

The relationship between the use of Stoney Trail and other provincial highways is of particular interest. Figure 2-24 shows the percentage of trips on each provincial highway that also used or planned to use Stoney Trail. Most of the drivers also used Stoney Trail on their trip (55% to 66%). The only exception was Highway 8, on which only 32% of trucks also used Stoney Trail. This relatively low proportion is consistent with Highway 8 being the only route that does not connect directly to Stoney Trail.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-24: Percentage of trips on each provincial highway that also used Stoney Trail

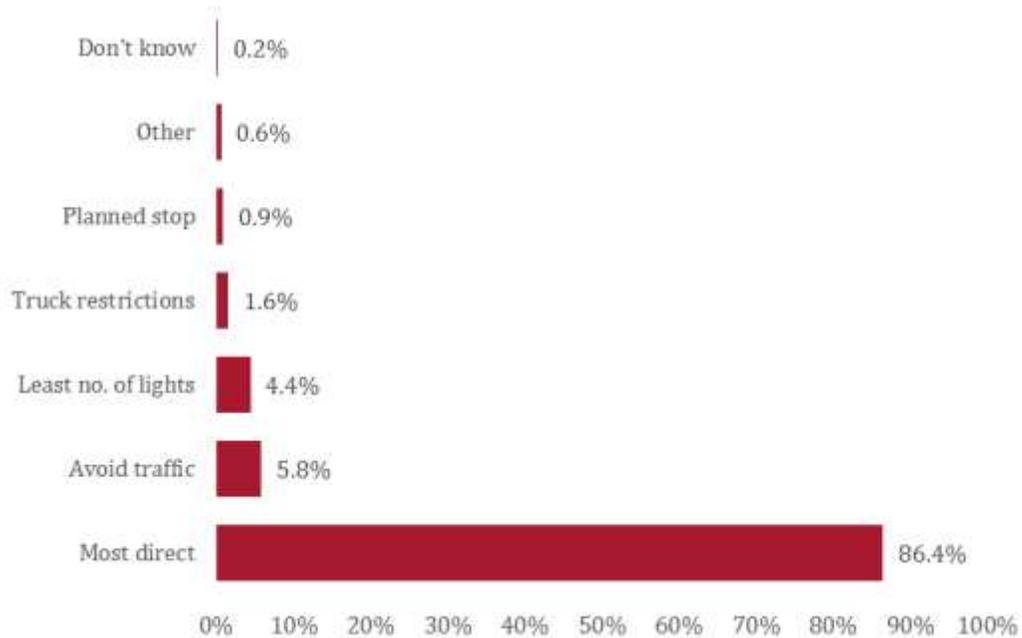
2.2.4.3 Route selection

Truck drivers were asked why they selected their route. The majority of drivers selected their route because it was the most direct route (Figure 2-25). Arguably, the wording “most direct route” is a bit of a catchall, though it is nonetheless interesting to note that other reasons had very limited responses. Long distance trips were more likely to be influenced by truck restrictions than were local/regional trips (Figure 2-25: Route selection rationale

), and these trips are exclusively single and multiple trailer trucks (

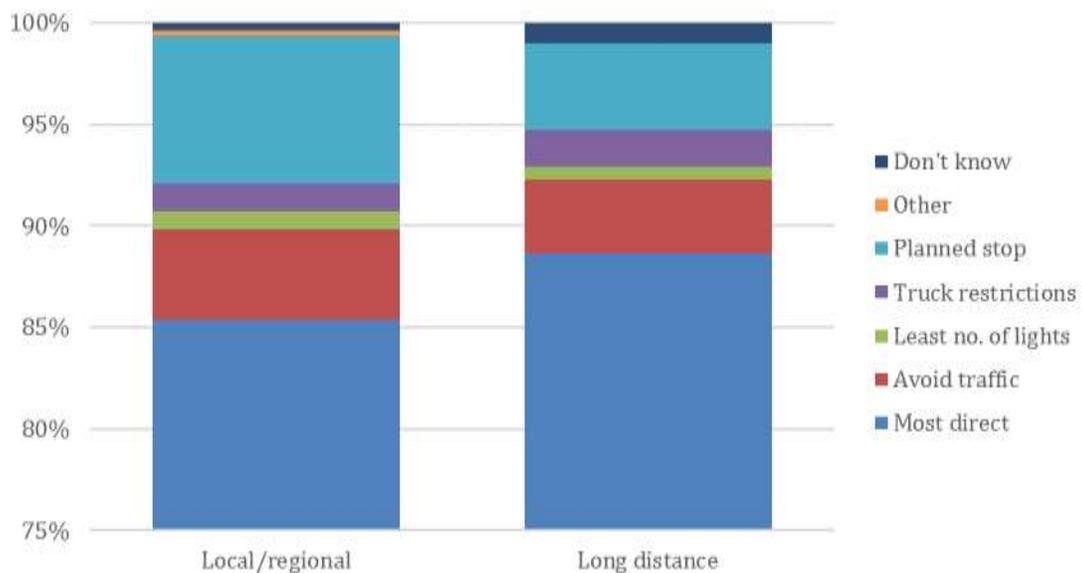
Figure 2-26: Route selection rationale by local/regional versus long distance trips

). Hence, the route choice might also be influenced by heavy truck route restrictions or by over-dimensional restrictions. The choice also suggests that drivers were mindful of restrictions in planning their routes. In contrast, planned stops represented a higher proportion of local/regional trips than was the case for long distance trips.



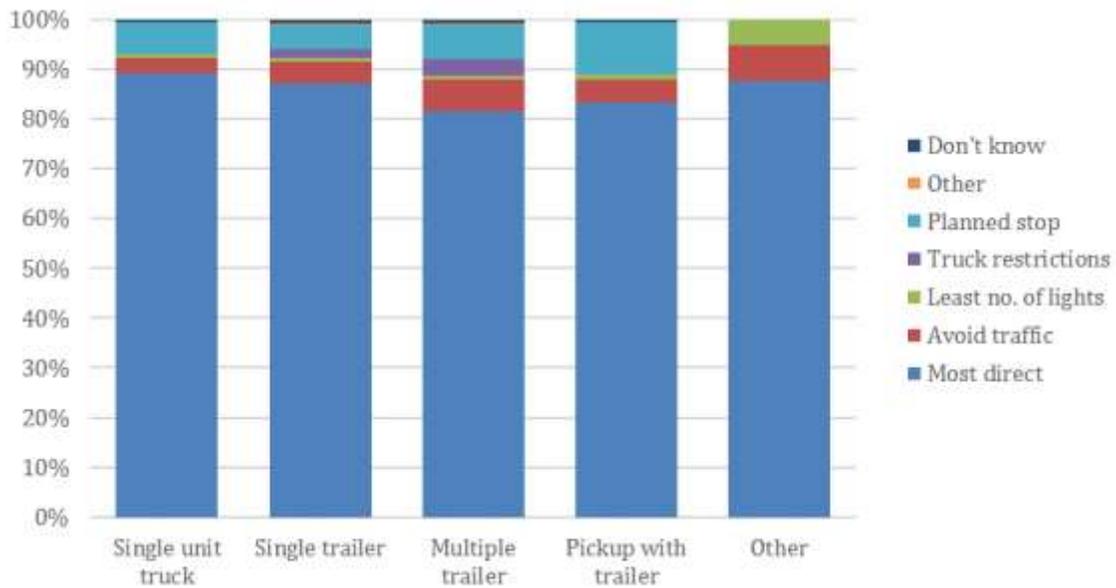
Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-25: Route selection rationale



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-26: Route selection rationale by local/regional versus long distance trips



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-27: Route selection rationale by truck type

2.2.5 Intermodal connections

2.2.5.1 Airport connections

Although less than 1% of all trucks surveyed accessed the airport, intermodal connections are nonetheless crucial parts of a multi-modal freight network (Table 2-15). Ninety-six percent of the trips connecting to the airports were local (

Table 2-16). It should be noted that these figures do not include trucks that operate entirely inside the external cordon.

Table 2-15: Airport connections

Airport	Calgary (YYC)	Edmonton (YEG)	Other	No	Don't know
Trips	133	6	11	20667	34
Percentage	0.64%	0.03%	0.05%	99.12%	0.16%

Source: CPCS analysis based on external truck origin/destination survey results.

Note: The values in the table above are not indicative of the total number of trips to and from these facilities, as the survey method did not capture trips that stayed entirely inside or entirely outside the survey cordon.

Table 2-16: Airport connections – local/regional versus long distance trips

Trip type	Trips	Percentage
Local/regional	130	95.89%
Long distance	6	4.11%
Did not disclose	-	0.00%

Source: CPCS analysis based on external truck origin/destination survey results.

Note: The trips in the above table are less than the total number of trips going to and from the airport due to missing data on the starts and ends of certain trips.

2.2.5.2 Rail intermodal terminal connection

Similar to airports, relatively few of the trucks surveyed accessed rail terminals (2.6%). On a daily basis, approximately 289 external trips access the CN Calgary Terminal and 221 accessed the CP Calgary Terminal (Table 2-17). The lower number of trips to the CP terminal, as compared to the CN terminal, is likely due to the fact that many of the trips to the CP terminal, which is within Calgary, were not intercepted by the external survey, while the CN terminal is located outside the cordon, in Conrich, hence were more likely to be captured in the survey.

Table 2-17: Rail intermodal terminal connections

Terminal used	No rail terminals	CN Calgary terminal	CP Calgary terminal	Don't know	Other rail terminals
Number of trips	20,359	289	221	35	23
Percentage of all trucks surveyed	97.85%	1.39%	1.06%	0.17%	0.11%

Source: CPCS analysis based on external truck origin/destination survey results.

Note: The values in the table above are not indicative of the total number of trips to and from these facilities, as the survey method did not capture trips that stay on either side of the survey cordon.

Most trips to rail terminals were local/regional (

Table 2-18). Of the trucks accessing the terminals, more were long distance (14% for rail terminals) than those accessing the airports (3.5% for airports).

Table 2-18: Rail intermodal terminal connections – local/regional versus long-distance trips

Trip type	Trip	Percentage
Local/regional	328	81.94%
Long distance	69	17.28%
Did not disclose	3	0.78%

Source: CPCS analysis based on external truck origin/destination survey results.
 Note: Absolute numbers may not match exactly due to missing information on start and end points of trucks accessing rail terminals.

2.2.5.3 Airport and intermodal rail stops

Of the trucks accessing either rail or airport terminals, 7% accessed more than one of these terminals on their daily trip (Table 2-19).

Table 2-19: Airport and intermodal rail connections

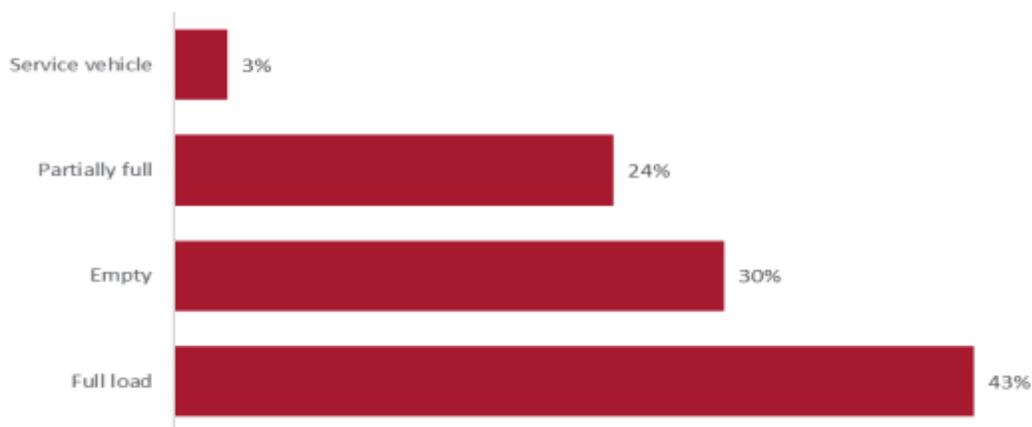
Trip type	Value
Total trips accessing rail intermodal or airport terminals	594
Trips accessing rail intermodal and airport terminals	41
Percentage of total	6.92%

Source: CPCS team analysis based on truck origin-destination survey results.

2.3 Load characteristics and goods profile

2.3.1 Load efficiency

Drivers were asked about the characteristics of the load they were carrying. Forty-three percent of all trucks surveyed had a full load, 24% had a partial load and 30% were completely empty (Figure 2-28). Note that this figure and some of the ensuing figures include service vehicles as a distinct category: these were maintenance vehicles carrying items such as a new utility pole and the like.

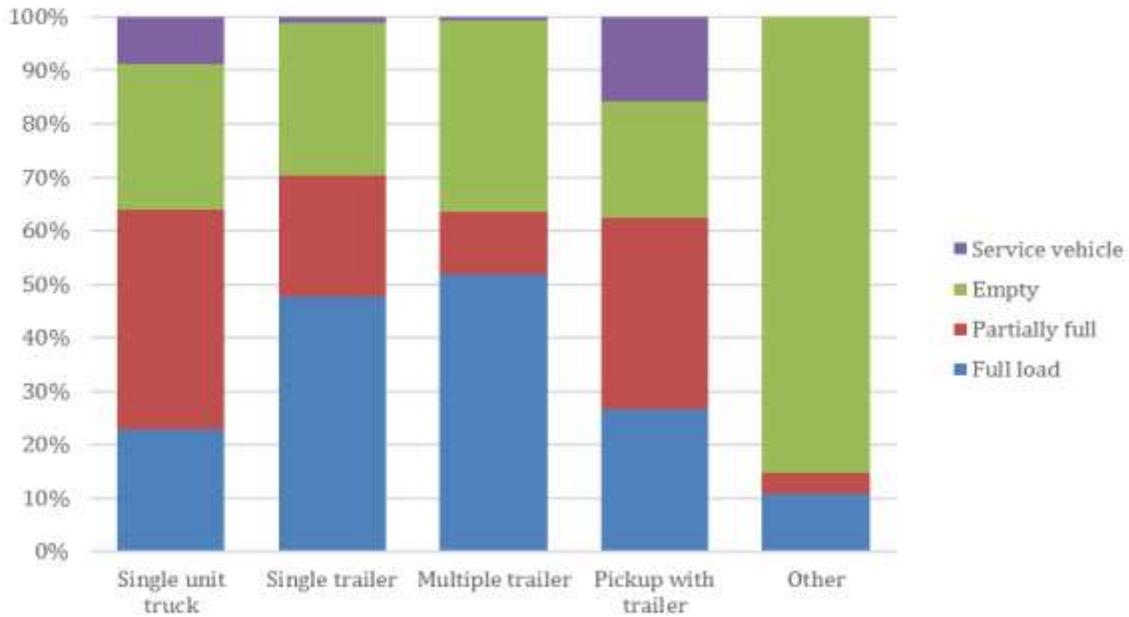


Source: CPCS team analysis based on truck origin-destination survey results.

Figure 2-28: Load efficiency of vehicles surveyed

Ignoring pickup trucks with trailers, single unit trucks were more likely to have a partial load than a full load (Figure 2-29). Single unit and single trailer trucks were approximately equally as likely to be completely empty. As compared to these truck types, multiple trailer trucks were slightly more likely to be completely empty. However, multiple trailers were more likely to contain full loads as opposed to partial loads, which is consistent with the rationale for deploying a larger capacity vehicle with a single

power unit. This profile was also consistent with multiple trucks carrying aggregates (non-metallic minerals) leaving a pit completely full and returning completely empty.



Source: CPCS team analysis based on truck origin-destination survey results.

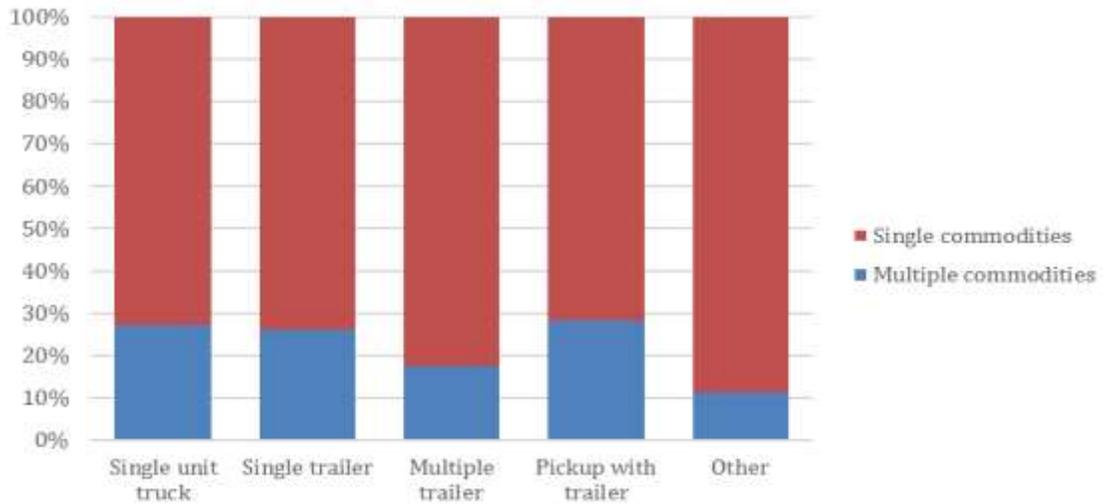
Figure 2-29: Load efficiency by truck type

Most trucks were roughly uniform in their propensity to carry multiple commodities, with multiple trailer trucks being slightly more likely to carry single commodities than other types of trucks (

Figure 2-30). In contrast, trucks travelling long distance were slightly more likely to be carrying multiple commodities than those conducting local/regional trips (

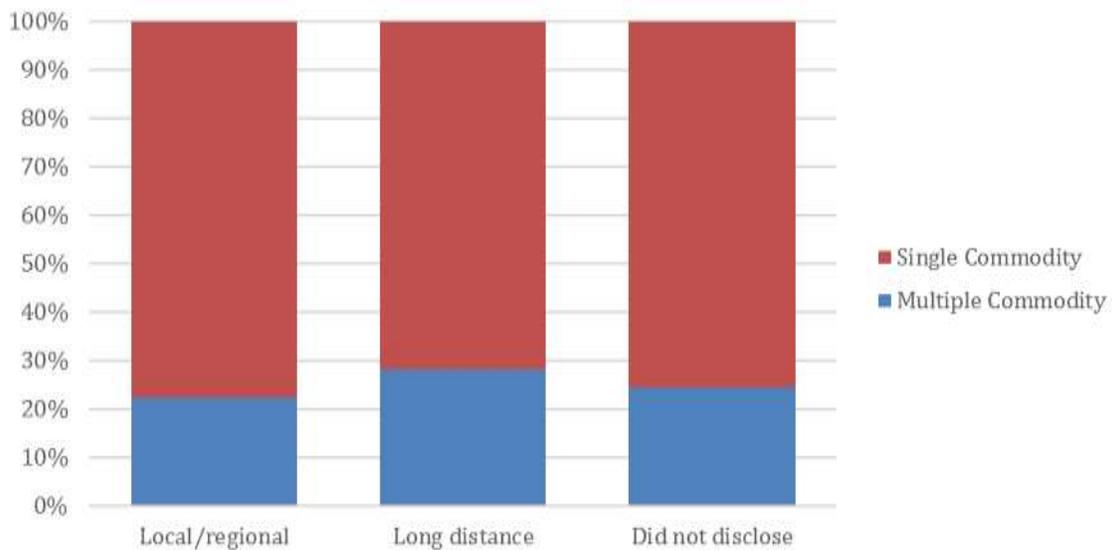
Figure 2-30: Load profile by truck type

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Source: CPCS analysis based on external truck origin/destination survey results.

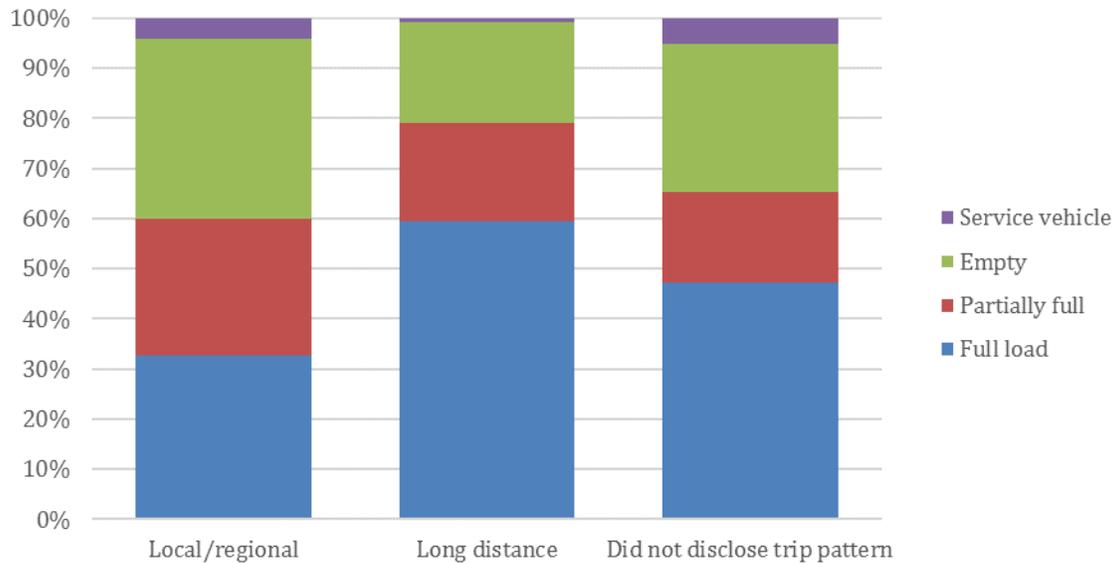
Figure 2-30: Load profile by truck type



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-31: Single versus multiple commodities by local/regional versus long distance

Furthermore, trucks travelling long distances were more likely to be full (60%) than trucks making local or regional trips (32%) (Figure 2-32).



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-32: Load efficiency by local/regional versus long distance

2.3.2 Goods profile

Drivers were asked about the type of goods they carried from a list of categories, as listed in Table 2-20 with examples.

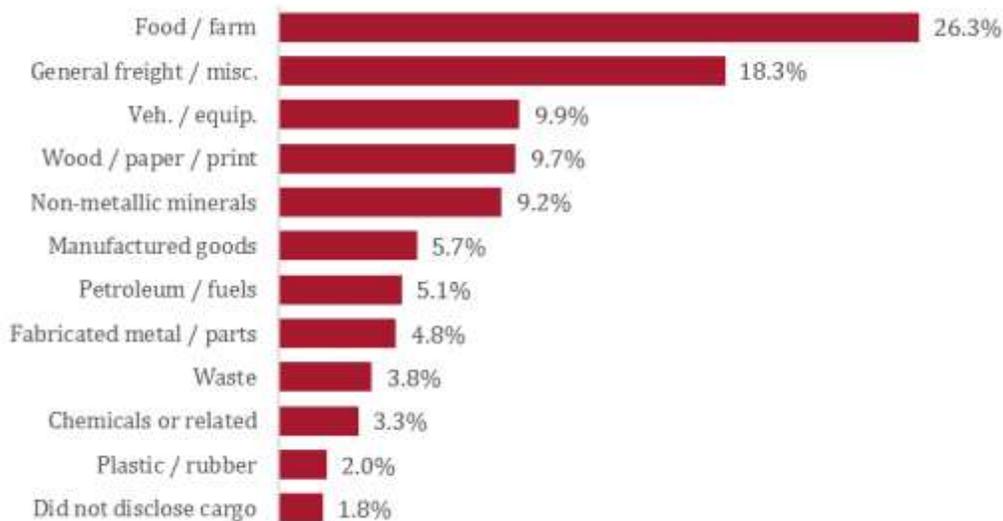
Table 2-20: Category of goods included on survey form

Category	Example products
Food / farm	Products bound to grocery stores (meat, produce, etc.) and agricultural products (such as grains and oilseeds)
General freight / miscellaneous	Mixed freight, such as freight destined to department stores
Vehicles / equipment	Finished cars and trucks
Wood / paper / print	Dimensional lumber, wood chips, plywood, pallets, paper
Non-metallic minerals	Aggregates such as sand and gravel
Manufactured goods	Other manufactured goods such as home appliances
Petroleum / fuels	Petroleum products such as diesel, gasoline, etc.
Fabricated metal / parts	Manufactured metal such as rebar, rolled steel, pipe, etc.
Waste	Garbage and recycling

Chemicals or related	Chemicals including fertilizers, compressed gases, etc.
Plastic / rubber	Tires, plastic bins, etc.

Source: Watt Team.

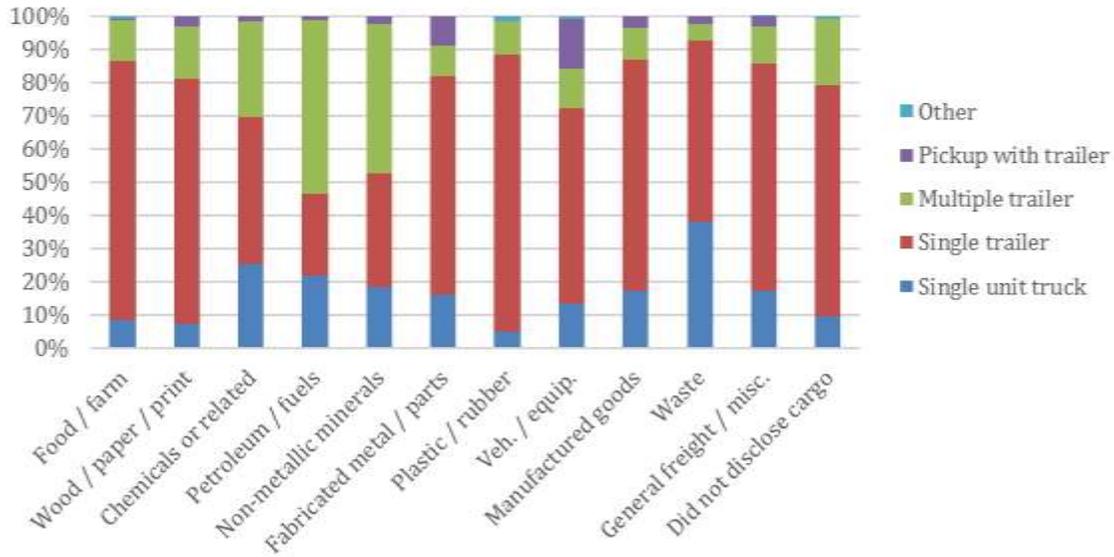
The general profile goods carried is shown in Figure 2-33. Food and farm goods account for 26% of all trucks surveyed, followed by general freight at 18%.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-33: Goods profile by truck (by trips)

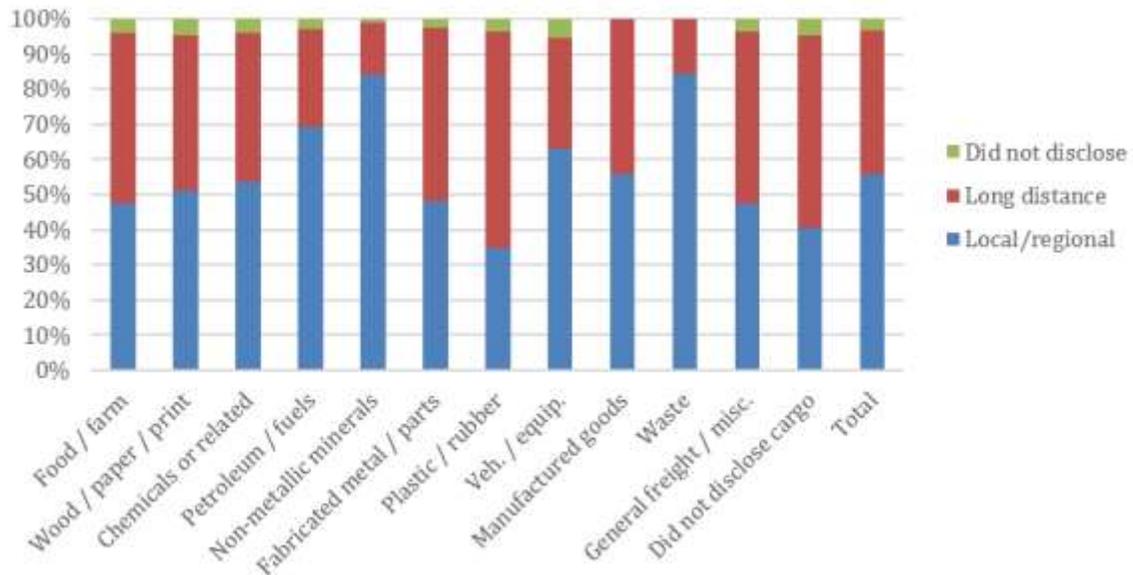
According to Figure 2-34, multiple trailer trucks were most likely to be used to carry raw materials (chemicals or related, petroleum / fuels, non-metallic minerals). Most other categories were moved primarily by single trailer trucks. Single unit trucks were used to transport a considerable portion of the waste and general freight markets.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-34: Goods profile by truck type (by trips)

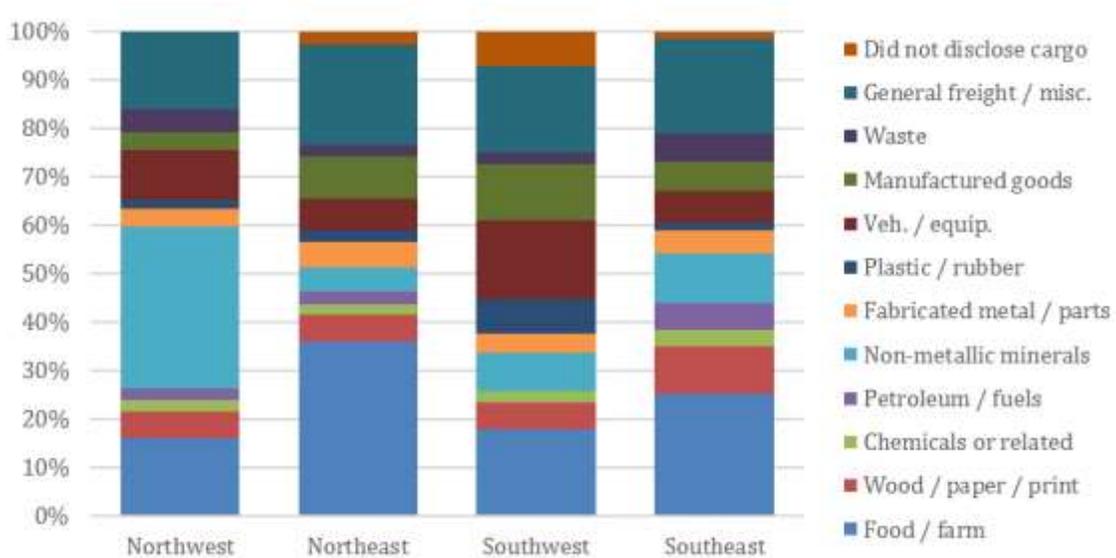
Figure 2-35 shows the likelihood a good travels within the local/regional market or is a long distance trip. Waste and non-metallic minerals (e.g. aggregates) are particularly likely to be local/regional trips. Commodities like food /farm, wood/paper/print, and plastic/rubber are particularly likely to be part of a long-distance trip.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-35: Goods profile by local/regional versus long distance trips

Figure 2-36 breaks down the percentage of trips by category of goods carried for trips that started or ended in each Calgary quadrant. Of note, the largest proportion of trips that started or ended in northwest Calgary carried non-metallic minerals, which is to be expected given the numerous aggregate pits located in this quadrant. As well, compared to southeast Calgary a higher proportion of trips starting or ending in northeast Calgary carried food/farm products. Companies distributing fresh food products may prefer to be more closely located to the airport to receive goods, which could explain this difference between the quadrants.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-36: Percentage of trips that started or ended in each quadrant that carried each category of goods

The word map in Figure 2-37 depicts the frequency of goods mentioned according to the size of the words. These are more specific than the categories, and drivers had the opportunity to provide an open response. As a result, the word map also shows the diversity of the products carried by trucks into and out of Calgary.

It can be seen that the most frequently mentioned commodities were cement and gravel. Although non-metallic minerals are only the fourth largest commodity category carried into and out of Calgary (by number of trips), cement and gravel appear to make up most of this category. Also commonly cited were food products such as meat, groceries, and produce; building materials such as lumber and wood; and water. Among the smaller, less frequently cited words there is a diversity of products such as beer, oilfield supplies, cars and mail, for example.

converted from US Dollars (USD) to Canadian Dollars (CAD) using a rate of 1.00 USD = 1.21 CAD.¹⁹ Table 2-21 shows the correspondence between the categories used in the survey and the US CFS.

Table 2-21: Survey code / CFS code relationships

Survey code	CFS code
Food / farm	Average of all agriculture classifications
Wood / paper / print	Wood Products & Pulp, newsprint, paper and paperboard
Chemicals or related	Basic Chemicals
Petroleum / fuels	Gasoline, aviation turbine fuel, and ethanol
Non-metallic minerals	Other non-metallic minerals
Fabricated metal / parts	Base metal in primary or semi-finished forms and in finished basic shapes
Plastic / rubber	Plastics and Rubber
Vehicles / equipment	Motorized and other vehicles (includes parts)
Manufactured goods	Miscellaneous manufactured products
Waste	Waste and Scrape
General freight / miscellaneous	Mixed Freight
Did not disclose	Mixed Freight

Source: CPCS analysis based on external truck origin/destination survey results.

There are several limitations to the methodology with counteracting implications:

- The calculations assume a typical tonnage per trip based on the vehicle capacity²⁰ and a coarse loading estimate - e.g., a partially loaded vehicle is half full. Some vehicles may reach their capacity in terms of volume before their capacity in terms of weight, lowering the weight of goods being transported.
- The calculations use average value-to-tonne ratios by commodity type rather than the actual value of goods. These assumed average values may be higher or lower than the actual values of goods being transported in Calgary.
- These estimates are based only on the sample of goods passing through the survey cordon, so they can only illustrate the external flows, as opposed to all goods moving within Calgary. On the one hand, the calculated estimates of weight and tonnage are likely lower than the actual

¹⁹ The methodology is similar to one used by Statistics Canada in “Trucking Across the Border: The Relative Cost of Cross-border and Domestic Trucking, 2004 to 2009” by Anderson and Brown.

²⁰ The calculations also assume that trucks reach their weight limit rather than their volume limit first.

weight and value of goods being transported in Calgary. On the other hand, the distribution of the type of goods being transported to/from Calgary, on each highway or to/from each facility is likely not representative of the urban activity that takes places within Calgary and which was not captured in the survey.

Overall, and especially given that the survey captured only a small proportion of the activity that takes places within Calgary, the estimated weight and value of goods discussed here are likely to be conservative. Moreover, insofar as they largely represent trips made to, from and through Calgary, the values should be considered approximate, order-of-magnitude estimates only.

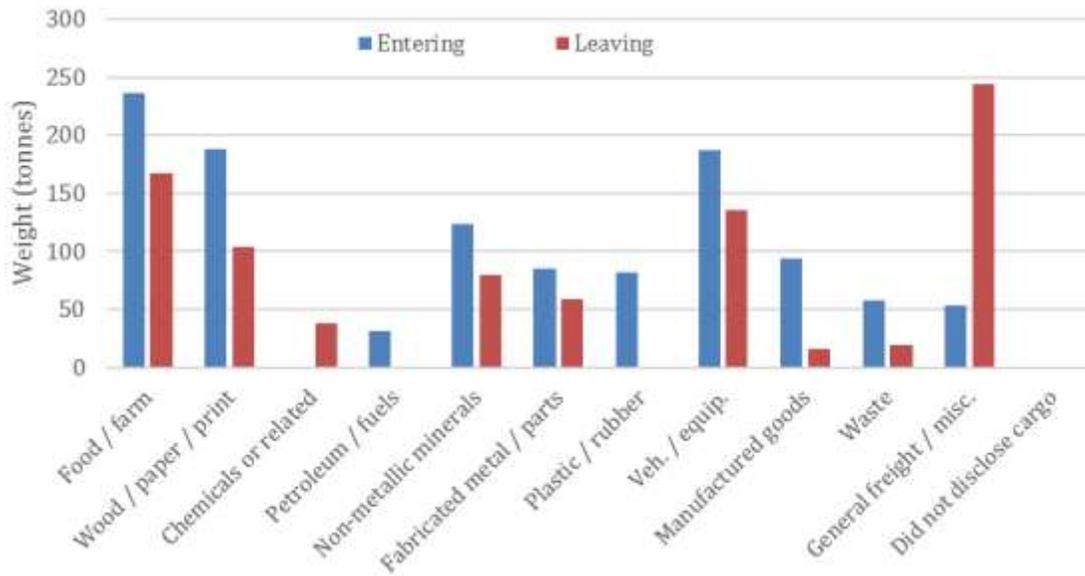
2.4.1 Entry and exit flows

In total, an estimated 1,140 tonnes per day of all types of goods entered Calgary from beyond the Calgary region,²¹ and 860 tonnes per day left.²²

Figure 2-38 shows the estimated weight of goods entering and leaving Calgary from or to beyond the region. Food and farm products made up a large proportion of the total volume of goods entering and leaving Calgary by truck. Non-metallic metals and fabricated metals and parts also comprised a large portion of the volume. Waste and general freight both left Calgary in large volumes, with relatively little of it entering Calgary.

²¹ For example, goods transported from Edmonton (outside the Calgary region) to Calgary were included in the estimate, but goods transported from Rocky View County (inside the Calgary region) to Calgary were not.

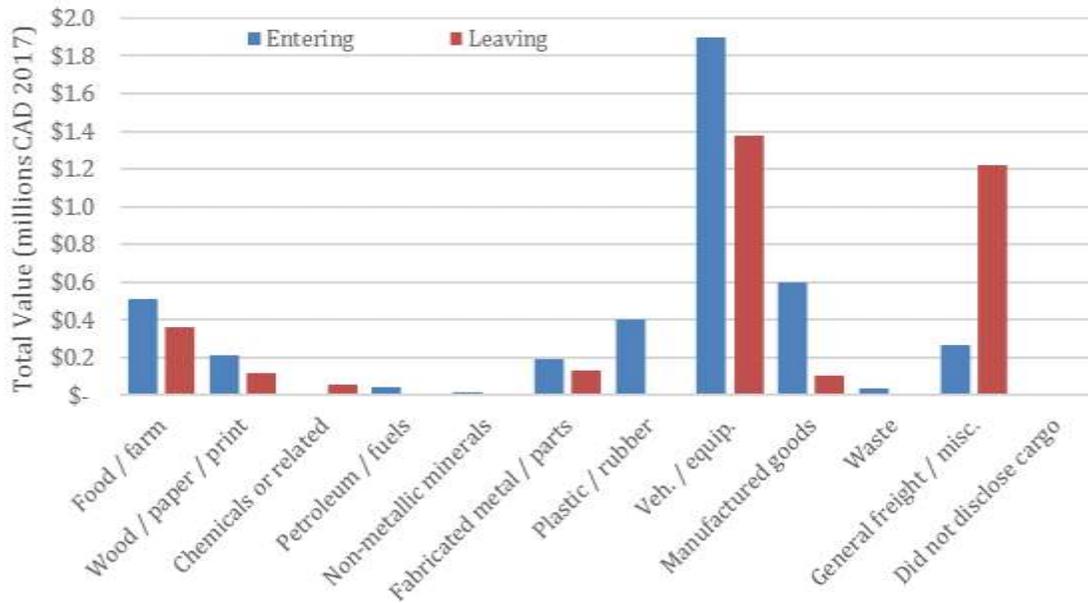
²² Goods entering Calgary were defined as any truck surveyed, with at least a partial load, that had a future stop in Calgary making a pick up or drop off, and that had started its trip outside the Calgary region. In contrast, goods leaving Calgary were defined as any truck with at least a partial load, which had started its trip in Calgary, had made a pick up or drop off in Calgary and was ending its trip outside the region.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-38: Estimated weight of goods entering and leaving Calgary on a daily basis on trucks

By value, in total an estimated \$4.2 million (CAD 2017) per day of goods entered Calgary from beyond the region, and \$3.4 million per day left. As shown in Figure 2-39, the distribution of value transported by type of goods was considerably different than the distribution of weight transported – i.e., some heavier goods, such as sand, have low unit values while some lighter goods, such as computer components, have high unit values. Food and farm goods still occupy a considerable portion of the total value of goods; however, high-value goods like fabricated metals / parts, vehicles / equipment, and manufactured goods were much more prominent.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-39: Estimated value of goods entering and leaving Calgary on a daily basis on trucks

2.4.2 Distribution by highway

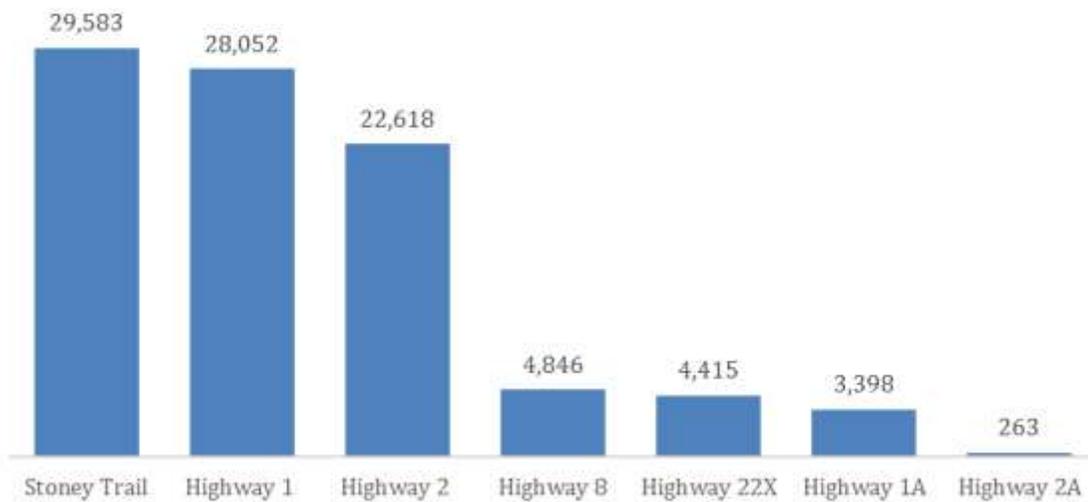
Figure 2-40 and Figure 2-40: Estimated weight of goods on each highway per day (tonnes)

depict the estimated weight and value of goods carried daily on each highway in the Calgary region, respectively. The methodology used to estimate the tonnages and values is described above. Once the tonnage and value of goods being carried were estimated, they were assigned to highways based on the survey responses described in Sections 2.2.4.1 and 2.2.4.2.

While these values are substantial, they still represent only a fraction of the total value of goods and travelling by truck on the main roads and highways around Calgary. Large volumes of goods travel by road entirely within Calgary and are not measured here.

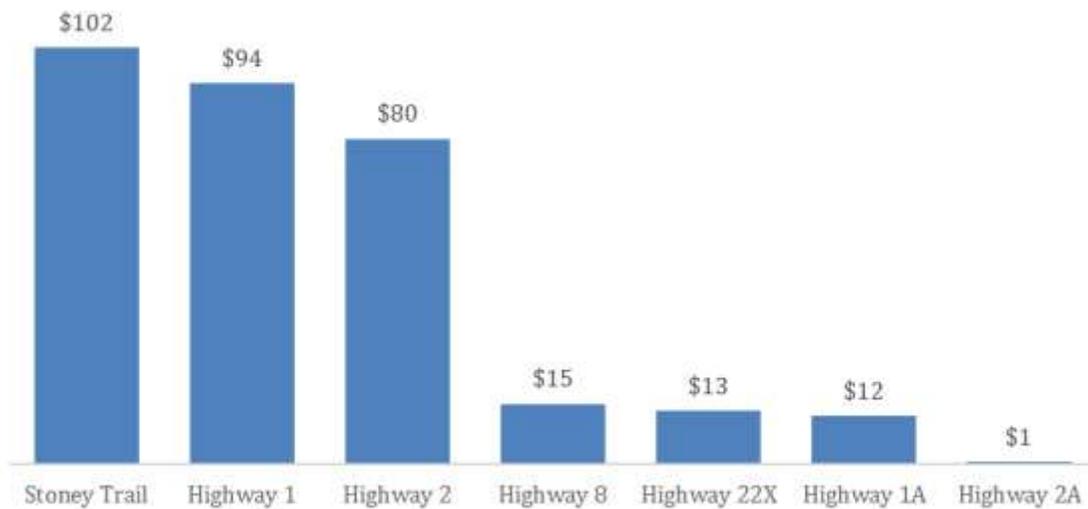
The volume of goods transported on each highway on a given day varies considerably. An estimated 30,000 tonnes of goods at a value of approximately \$100 million (CAD 2017) was carried every day on Stoney Trail. High values of goods were also carried on Highways 1 and 2 each day, at \$90 million (CAD 2017) and \$80 million (CAD 2017) respectively. In particular, Highway 2 carried the largest fraction of high value-to-weight vehicles and equipment in the region, at over \$30 million (CAD 2017) on a typical day. By comparison, other highways in the region dealt with much smaller volumes of goods.

Note that the weight and values on each highway cannot be summed to provide a cumulative total as a given trip may use multiple highways.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-40: Estimated weight of goods on each highway per day (tonnes)



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-41: Estimated value of goods on each highway per day (millions CAD 2017)

2.4.3 Distribution by terminal

In addition to the highways, it is possible to look at the weight and value of goods at each of the main rail and air terminals:

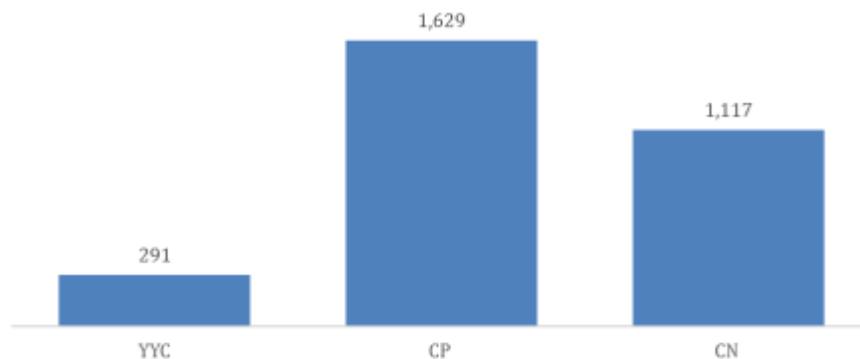
- CN Intermodal

- CP Intermodal
- Calgary International Airport (YYC)

The estimated values presented include only external trips. As well, because of the differing proximities of the terminals relative to the location of the survey (i.e., the CP Intermodal terminal and YYC are located in Calgary well within the survey cordon while the CN Intermodal terminal is located beyond the survey cordon in Conrich), detailed comparisons between terminals should be made with caution.

The value per weight of each commodity differs according to the mode on which it travels. Generally higher value goods travel by air, while trucks and rail carry lower value commodities. Figure 2-42 and Figure 2-43 show the total weight and value distribution for each terminal. Using the values from these figures, the values per tonne of goods connecting to the CN intermodal terminal, CP intermodal terminal and YYC were approximately \$3,000, \$1,000 and \$9,000 respectively. In essence, the value per tonne of goods connecting to YYC was nearly an order of magnitude greater than the value per tonne of goods travelling by rail intermodal.

CP’s rail terminal carried the most in total weight out of the three of the intermodal terminals; however, in terms of value it carried the least. Both CN and YYC carried much more high value freight in terms of equipment and general freight. CP still carried considerable volumes of food/farm, wood/paper/print and chemicals or related, which are relatively low value goods according to the US CFS. To reiterate, it is important to note that these findings reflect only trips that crossed the external cordon and are not necessarily representative of all trips that may go to/from these terminals.



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-42: Estimated weight of goods connecting to each intermodal terminal per day (tonnes)



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-43: Estimated value of goods connecting to each intermodal terminal per day (millions CAD 2017)

2.5 Driver satisfaction

2.5.1 Satisfaction metrics

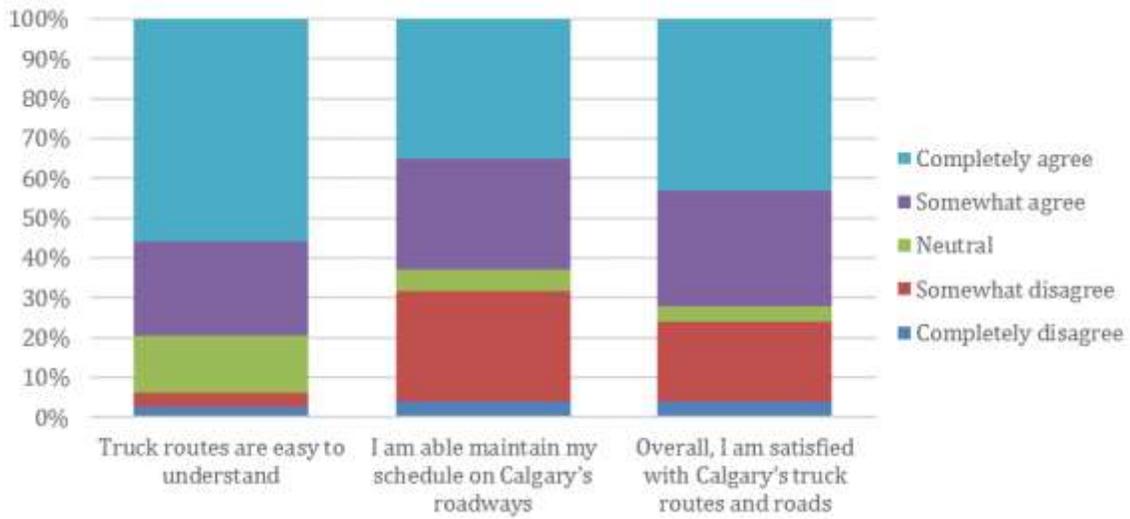
Truck drivers were asked three questions regarding their satisfaction with Calgary roads, which they were asked to rank on a scale from 1 (do not agree at all) to 5 (completely agree). The questions were:

- Calgary's truck routes and restrictions are easy to understand
- I am able to maintain schedule on Calgary's roads
- Overall, I am satisfied with Calgary's truck routes and roads

Figure 2-44 summarizes the drivers' responses, and Figure 2-44: Summarized driver satisfaction metrics

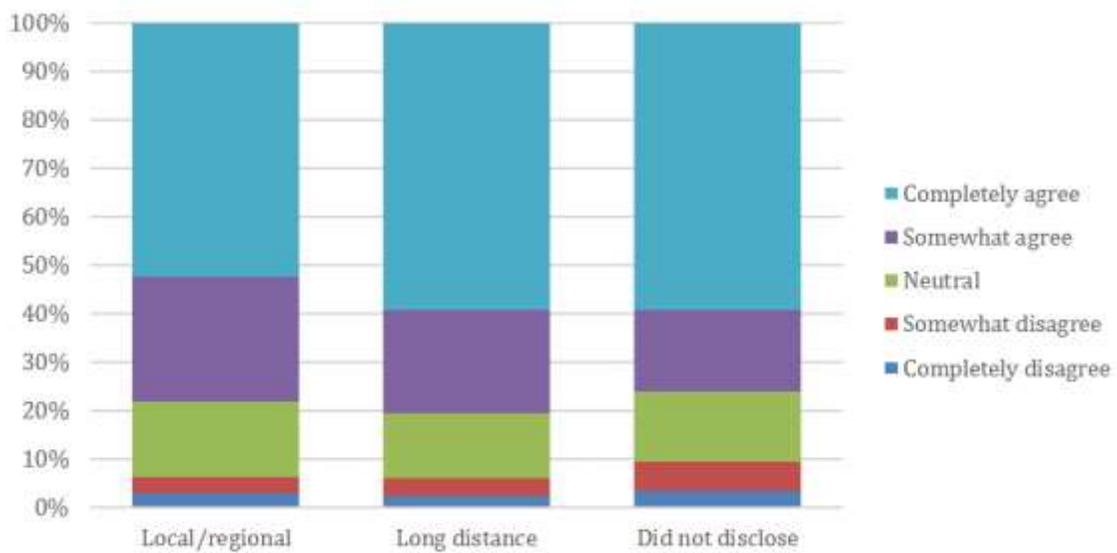
to Figure 2-46: 'I am able to maintain my schedule on Calgary's roadways' by local/regional versus long distance

break down the responses by local/regional trips versus long distance trips. In general, drivers were satisfied with driving on Calgary roads, with 70% of drivers having a ranking of 'somewhat agree' and 'completely agree.' Drivers, on average, felt that truck routes were easy to understand, with 80% ranking those either 'somewhat agree' or 'completely agree.' Drivers were also more likely to rank that question neutral than the other questions, with approximately 15% feeling neutral about understanding truck routes. The question about maintaining their schedule on Calgary roads had the largest negative sentiment, with 36% of drivers either responding 'completely disagree' or 'somewhat disagree' to that question. Drivers making local/regional trips were more likely to express dissatisfaction across all three questions than drivers who made long-distance trips. This suggests that Calgary's roads were better, on average, than other jurisdictions and that long-distance drivers were spending relatively lower proportions of their trip in urban areas.



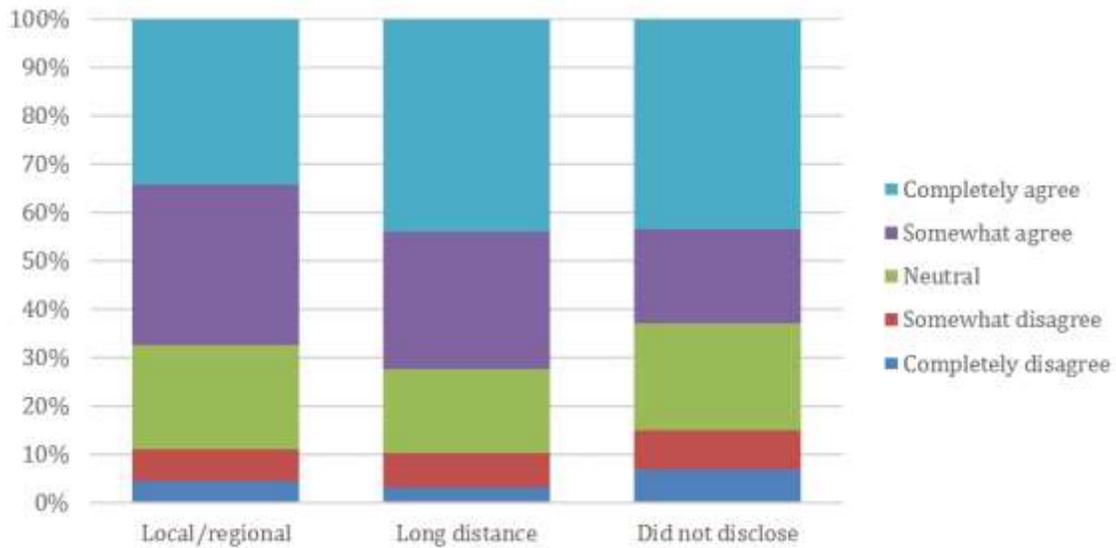
Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-44: Summarized driver satisfaction metrics



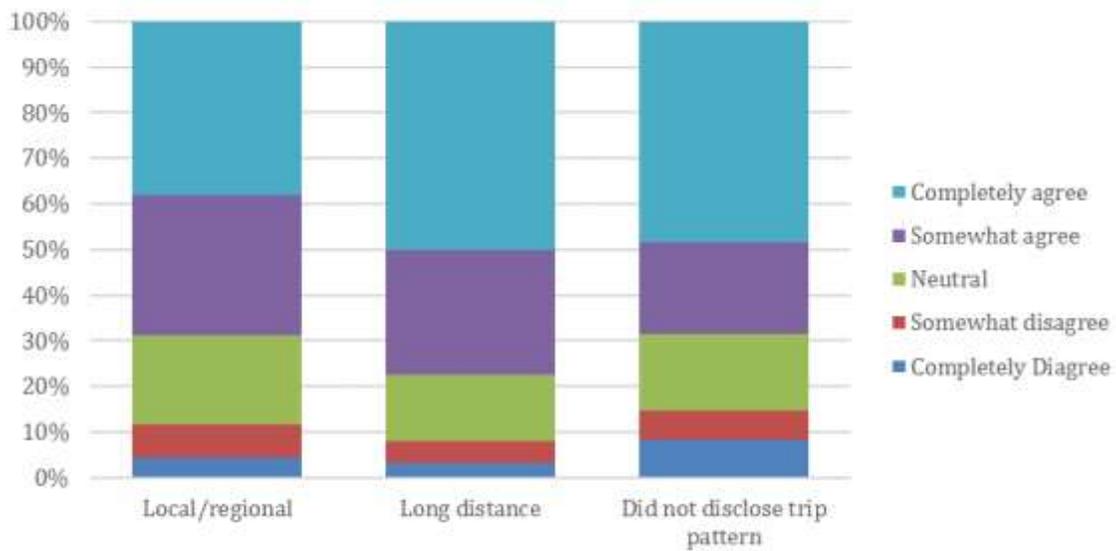
Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-45: 'Truck routes are easy to understand' by local/regional versus long distance



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-46: 'I am able to maintain my schedule on Calgary's roadways' by local/regional versus long distance



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-47: 'I am satisfied with Calgary's truck routes and roadways' by local/regional versus long distance

2.5.2 Satisfaction metrics by highway

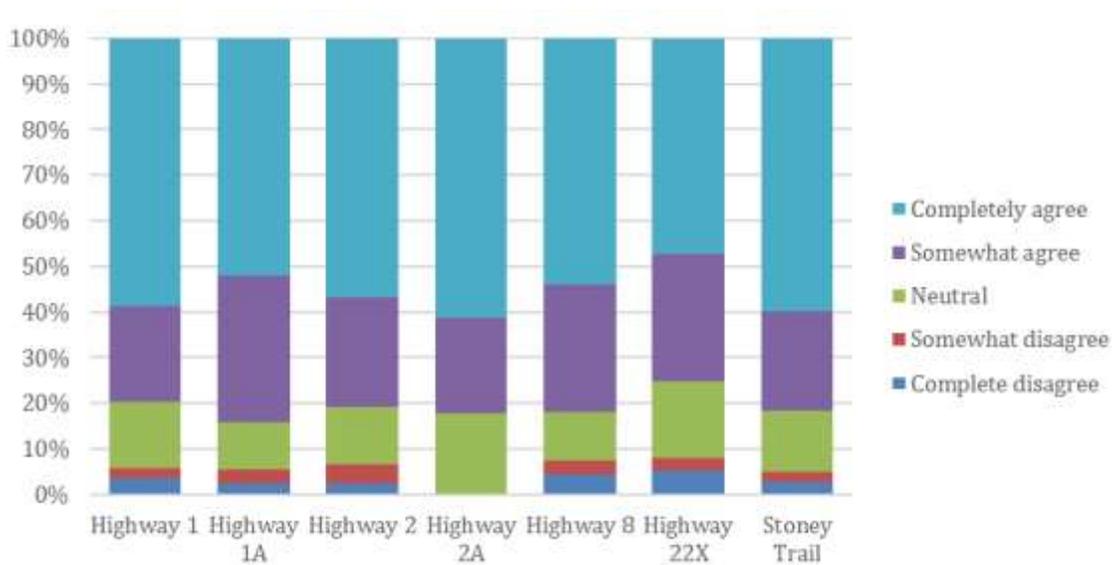
When looking at responses by highway used, a few trends start to appear (Figure 2-48, Figure 2-48: 'Truck routes are easy to understand' by highway used

and

Figure 2-49: 'I am able to maintain my schedule on Calgary's roadways' by highway used

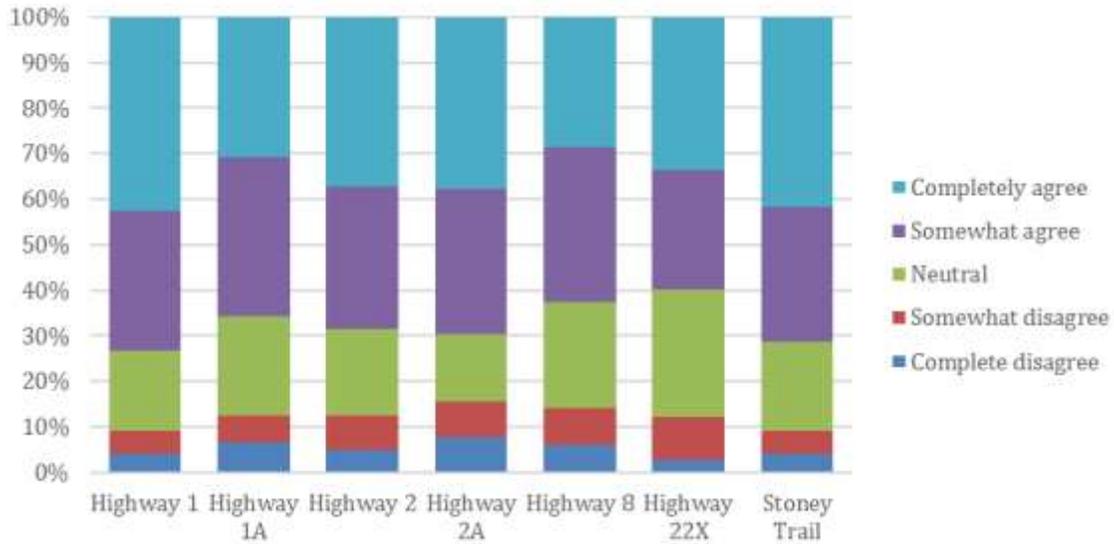
). In general, the highest levels of dissatisfaction were cited for Highway 22X. Approximately 46% of drivers who used Highway 22X disagreed or had a neutral response to the statement 'I am satisfied with Calgary's truck routes and roadways.' However, despite Highway 22X performing relatively poorly compared to the other highways, in absolute terms the responses were largely positive.

Drivers who used Highways 1, 2 and Stoney Trail generally expressed the highest levels of satisfaction across all three questions. For all three highways, over 70% of truck drivers responded either 'somewhat agree' or 'completely agree' to the statement 'I am able to maintain my schedule on Calgary's roadways.' Similarly, for the statement 'I am satisfied with Calgary's truck routes and roadways,' that proportion was likewise over 70%.



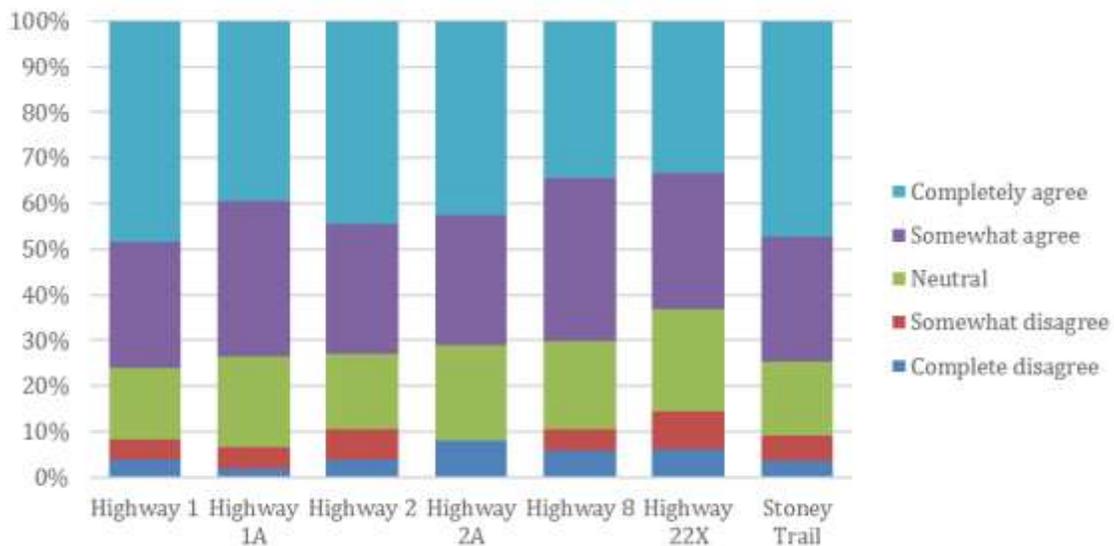
Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-48: 'Truck routes are easy to understand' by highway used



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-49: 'I am able to maintain my schedule on Calgary's roadways' by highway used



Source: CPCS analysis based on external truck origin/destination survey results.

Figure 2-50: 'I am satisfied with Calgary's truck routes and roadways' by highway used

2.5.3 Other comments

Drivers were provided the opportunity to provide a free response as part of the survey. Table 2-22 lists the comments by the number of times they were cited.

Table 2-22: Summary of comments by type

Comment	Count
Roads are too bumpy	102

Difficulty with signage	53
Frustration with traffic	43
Problems with Stoney Trail	38
Cannot maintain schedule during rush hour	28
Frustration with construction	22
General desire for infrastructure improvements	20
Problems with Deerfoot Trail	18
Need more facilities for trucks (rest stops, parking, etc)	15
Problems with Glenmore Trail	12
Problems with intersections	9
Problems with other drivers	9
Concerns over restricted routes	9

Source: CPCS analysis based on external truck origin/destination survey results.

The most frequently cited comment was that roads were too bumpy. Predominantly, this comment referred to Stoney Trail, although other highways were mentioned as well. Some examples of the verbatim comments provide further insight:

- Stoney so bumpy truckers lose money in lost goods
- Stoney too bumpy
- Stoney Trail is awful because it is so rough & bumpy. Has a horse killed while transporting due to being on the rough surface, bumped around.
- Stoney Trail too uneven. Roads sunken by bridges
- Highway 8 within city is very rough, Crowchild Brisebois frost heaves

The next most frequently cited comment related to difficulty with signage. Many comments suggested that the signage was not provided early enough before the driver must make a decision. In some cases, the signage was unclear or confusing. At least one comment suggested that some truck drivers were unaware of the truck route map that The City of Calgary has published. Some examples of the verbatim comments received include:

- 22x, 901 - What weight?
- Road bans not consistent, need better signage.
- Signage off of Highway 22X on to Stoney Trail sucks
- Signage not early enough
- Truck route: easy once you are familiar.
- Better signage.
- Better signage (bigger, more advanced warning)
- Restrictions on Ogden Road not clear
- Bigger signs

With respect to frustration with traffic, many of the responses noted that the concern was dependent on the time of day or occurred during the peak periods - i.e. it was not necessarily congested all day.

Other comments related to general traffic congestion and general issues with Stoney Trail, among others. A full listing of the comments received is provided in Appendix D.

3 Closing

To improve the understanding of the movement of goods in Calgary, in particular as an input to the development of The City of Calgary's Calgary Goods Movement Strategy (the Strategy), an external roadside truck origin/destination survey was commissioned by The City. The data collected and summarized above provided a number of insights regarding how, where and what types of goods were moved in and out of Calgary, and will be further used to support the development of the Strategy. To that end, The City of Calgary and the project team wish to thank all the drivers who took the time to participate in the survey and provided the data and feedback that allowed for this analysis.

Appendix A: Survey forms

Attached as legal-sized files in the PDF version.

Appendix B: Survey dates

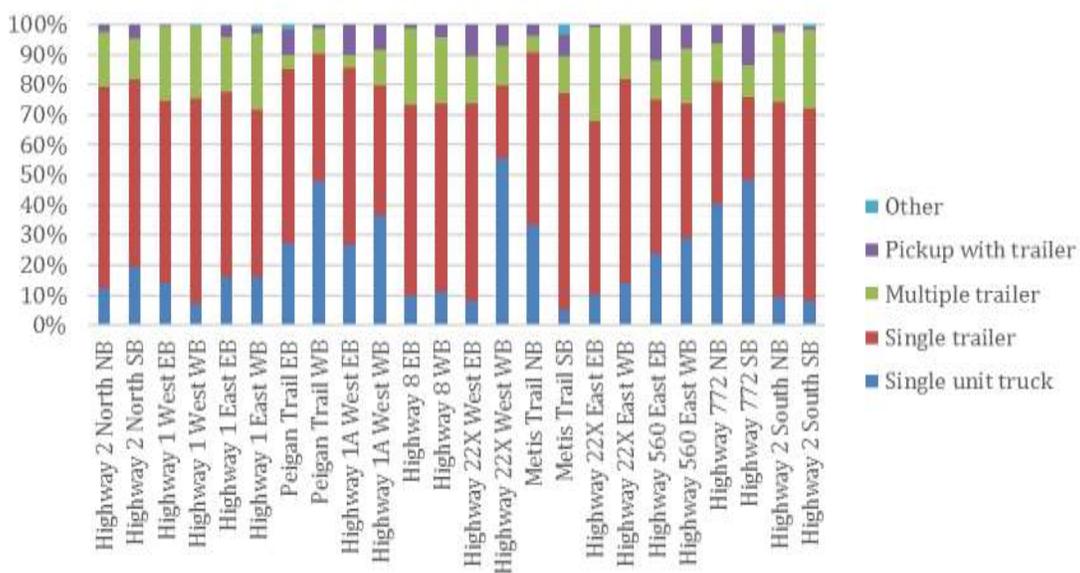
The table below summarizes the actual survey dates.

Location	Location Number	Direction	Date
Highway 1 East	123	Eastbound	Tuesday July 25, 2017
Highway 1 East	124	Westbound	Monday July 24, 2017
Highway 1 West	113	Eastbound	Thursday July 20, 2017
Highway 1 West	114	Westbound	Wednesday July 19, 2017
Highway 1A West	203 (EB) / 204 (WB)	Eastbound / Westbound	Tuesday June 20, 2017
Highway 2 North	101	Northbound	Monday June 19, 2017
Highway 2 North	102	Southbound	Thursday August 10, 2017
Highway 2 South	901	Northbound	Thursday July 6, 2017
Highway 2 South	902	Southbound	Wednesday July 5, 2017
Highway 22X East	603 (EB) / 604 (WB)	Eastbound / Westbound	Tuesday June 27, 2017
Highway 22X West	403 (EB) / 404 (WB)	Eastbound / Westbound	Thursday June 22, 2017
Highway 560	703 (EB) / 704 (WB)	Eastbound / Westbound	Wednesday June 28, 2017
Highway 772	801 (NB) / 802 (SB)	Northbound / Southbound	Thursday June 29, 2017
Highway 8 West	303 (EB) / 304 (WB)	Eastbound / Westbound	Wednesday June 21, 2017
Metis Trail	501 (NB) / 502 (SB)	Northbound / Southbound	Monday June 26, 2017
Peigan Trail	133 (EB) / 134 (WB)	Eastbound / Westbound	Wednesday July 26, 2017
Total Days = 16			

Appendix C: Summary of vehicle types by survey location

Figure C-1, Figure C-2, and Figure C-3 show vehicle information by survey location. A greater proportion of single and multiple trailer trucks were observed entering/exiting Calgary along Highways 1, 2, 8 and 22X²³, as well as via Metis Trail. By contrast, a greater proportion of single unit trucks was observed along Peigan Trail, Highway 22X West and Highway 772. These findings suggest that multiple trailer trucks tended to be used more for long-distance transport on the primary inter-city routes, while single unit trucks tended to be used for more localized/regional trips.

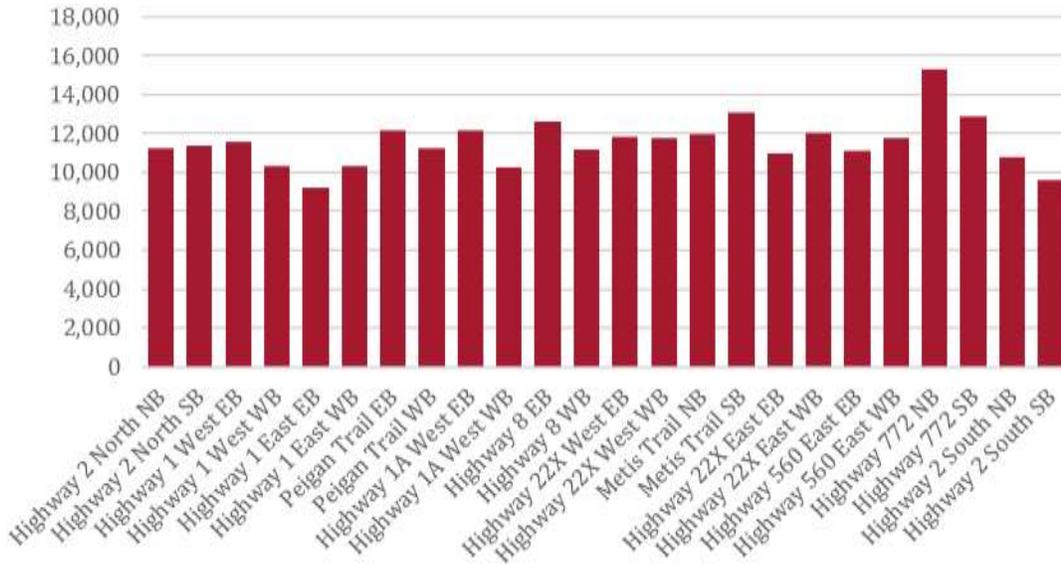
Figure C-0-1: Distribution of truck types by survey location



NB = Northbound. SB = Southbound. EB = Eastbound. WB = Westbound.
 Source: CPCS analysis based on external truck origin/destination survey results.

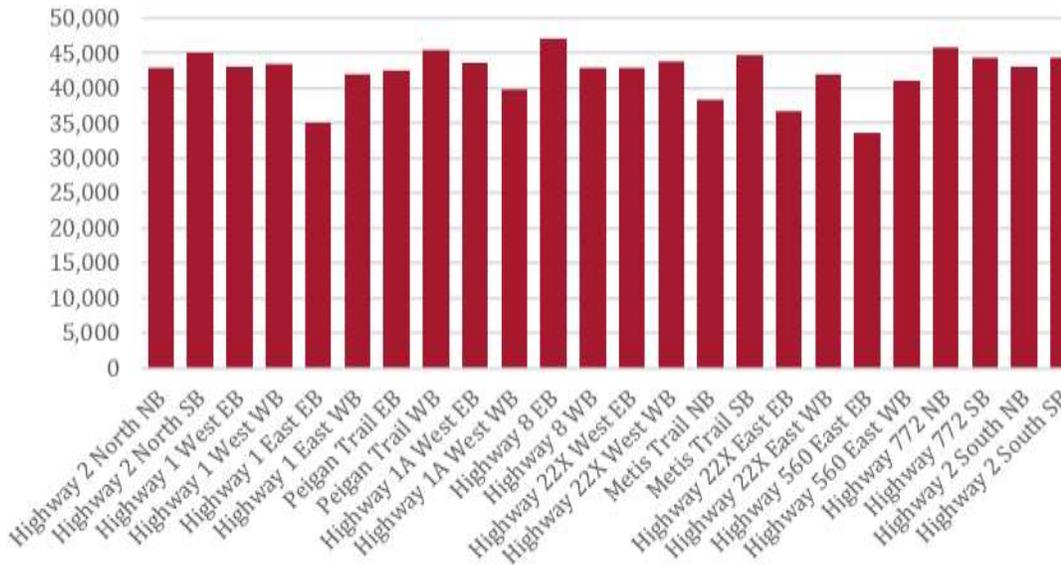
²³ Except for on Highway 22X West in the westbound direction.

Figure C-0-2: Average tare weight by survey location



NB = Northbound. SB = Southbound. EB = Eastbound. WB = Westbound.
 Source: CPCS analysis based on external truck origin/destination survey results.

Figure C-0-3: Average GVW by survey location



NB = Northbound. SB = Southbound. EB = Eastbound. WB = Westbound.
 Source: CPCS analysis based on external truck origin/destination survey results.

Appendix D: Truck driver comments

The list below provides all comments received by drivers, as recorded by the interviewers.

- N/A
- traffic
- traffic on Stoney
- traffic
- Traffic
- Truck route: lack of signage. Maintain schedule: depends on the day
- Not Deerfoot
- Bumpy & Uneven. Language Barrier - unable to get correct info
- Road bans not consistent, need better signage. Stoney Tr too uneven. Roads sunken by bridges
- Too bumpy
- More freeways
- Too much traffic
- Maintain Schedule: Don't know
- Maintain Schedule: Don't know
- Signage off of highway 22X on to Stoney Trail sucks
- Stoney too bumpy
- not enough safety check o equipment
- does not drive thru Calgary
- does not drive thru Calgary
- Traffic
- bumpy
- Stoney
- signage not early enough
- Very happy with Stoney Tr
- Stoney so bumpy truckers lose money in lost goods
- construction confusing
- Drivers not courteous, longer merge lanes, driver ed.
- Stoney is great for flow but a bit rough
- too rough
- Don't Understand
- need to educate public
- Potholes, bad drivers
- Traffic
- Truck route: easy once you are familiar. Maintain Schedule: dependant on time of day
- More ring roads in cities
- 42 & 106 ave dangerous crossing
- traffic, more rest areas
- need more rest stops
- Bumpy
- Better signage. Put another lane N McKnight
- need bigger roads
- fix potholes
- bumpy
- Deerfoot
- fix Glenmore speed
- need more truck stops
- congestion
- Stoney 2 lane
- Downtown can get confusing
- Roads need to be wider
- Maintain Schedule: it depends, Glenmore can be busy/accidents
- Depending on time of day
- #2 is bad
- Better signage (bigger, more advanced warning)
- Schedule: Don't know. Stoney Tr is awful because it is so rough & bumpy. Has a horse killed while transporting due to being on the rough surface, bumped around.
- does not drive thru Calgary
- everything but bridges
- Unless he uses Deerfoot. Stoney Tr 2 lanes to merge causes chaos. Too rough, it's an embarrassment. Bottlenecks everywhere. Stoney Tr & 17 Ave, Deerfoot & Anderson/Blackfoot, Glenmore & Hwy 8
- Maintain Schedule: depends on the time of day
- Except Deerfoot Tr
- Maintain a schedule: Don't Know
- Depends on time of day
- Restrictions on Ogden rd not clear
- bumpy
- No workers at construction sites

- signage not early enough, trucks too big for roundabouts
- bumps, congestion
- Construction
- more rest and parking spaces
- construction delays
- fix Glenmore trail, roads are terrible
- rough roads
- more rest stops on hwy
- bigger signs
- 64 Ave bottleneck
- bumpy
- ring road needed soon
- bumps, signs
- longer left turn lights
- left turn light too short
- Stoney bad
- bumpy
- Stoney bumpy
- Advance warning for height restrictions
- Awful to get around with construction
- Map would be good. Truck routes & restrictions would be better if there was a map available to plan out route.
- Traffic
- Highway 8 within city is very rough, Crowchild Brisebois frost eaves
- Routes & Restrictions - Not small Trucks
- Surveyed going East
- Problems with Hwy 8: no engine breaks makes using the truck more unsafe & means they need to go 70km, can't go 80km and this means he's slowing the traffic behind him and they get angry.
- Very happy with Calgary's roads
- Stoney Tr is good but bottlenecks, Northbound near 16th when goes from 4 lanes down to 2
- Would like to see the ring road completed. Stoney Tr, 25 min around the city. Condition of roads need improvement. Coming around the South way of ring road is an issue.
- Rush hour & Construction
- Traffic
- Bumpy roads
- Bumpy roads
- Glenmore?
- 22x, 901 - What weight?
- Better signage & documentation
- Maintain schedule: traffic, rush hour
- More overpasses, less traffic lights
- Stoney Trail too bumpy - Don't raise speed limit to 110km/hr. Hwy 22X is not adequately marked coming from the north or the west - needs signage.
- Maintain Schedule: unless there's an accident
- Rough Roads, construction
- Country Hills confusion
- Bumpy Roads
- Glenmore Tr, Stoney Tr very bad.
- Still many holes in road, many bumpy roads
- Deerfoot Trail needs better planning
- Downtown core restrictions very unclear
- Rut too fast - especially hard in a standard, need to pave better - last longer
- Schedule: time dependant
- Paving slows too much, more stops, pullovers
- More rest stops
- Stoney Trail super bumpy
- More signage for weight restrictions
- Construction, Stoney Tr needs works
- Ogden bumpy
- Language barrier
- Calgary not trucker friendly
- construction
- more semi parking
- congestion
- Stoney too rough
- traffic congestions
- going thru Calgary too slow
- widen Deerfoot
- non commercial vehicle
- as long as its not rush hour
- Stoney Tr too bumpy
- depends on time of day
- N/A
- better than use
- Turning lights turn too quickly
- Satisfied - holes, cracks in road
- except rush hours
- Depends on the day
- Too rough & chewed up

- start timing lights
- Bicycles off #8
- less construction
- traffic
- don't know
- Calgary APP restrictions
- More truck routes. Less congested routes
- infrastructure no good
- a road for just trucks
- bumpy
- doesn't drive Calgary
- doesn't use Calgary roads
- restrictions, accidents
- Merge Deerfoot to Southland - put cement barricade, traffic jumps in between lanes. Biggest issues merge lanes.
- Construction during day
- more rest areas
- Too many cloverleaves, new construction = delays, GPS not updated, advised to take back roads, main roads too busy (by fellow truckers)
- Bumpy along Glenmore
- Stoney Tr needs upgrade
- hates Stoney trail
- Roads are too rough. Bridges & Roads. Safety getting in the way of safety. Also outlying areas - roads are awful.
- 16 is main reason for schedule delays
- hwy 43 needs work
- better signage
- unsafe
- bottlenecks, traffic enforcement needed
- even roads
- change Stoney Tr
- no notice for height restrictions
- Dependant on time of day
- #8 is too rough. Widen lanes on Glenmore
- Schedule & satisfied: Don't know
- Traffic lights too fast for turning trucks
- Limited road choices, so if one gets tied up you're stuck
- Not satisfied with inner city
- Hwy 8: too bumpy/ cracked pavement
- road
- Did not want to answer questions. Wider highways, lane increase
- in rush
- Traffic
- better signage
- depend on time of day
- Truck route restrictions are marked after the intersections rather than before. Mark restrictions with more advance notice.
- no wide load roads
- Not during rush. Stoney Tr is too bumpy
- driver education
- Bumpy
- Resurface Roads
- need more direct routes
- Potholes
- traffic congestion, poor signage
- Likes SE roads. Better than Edmonton
- Memorial does not allow trucks, however he has to deliver to a lot of the new building sites along memorial The routes he has to take are very convoluted.
- truck route signs
- bumpy, no shoulders
- doesn't drive in Calgary
- Stoney bumpy
- Avoids Calgary - traffics and bumpy
- Question 14, all three "Don't know"
- Did Survey Eastbound
- Stoney bumpy
- small lanes
- traffic congestion
- Cannot maintain schedule during rush hour
- DT traffic sucks
- Bumpy Stoney Tr
- Construction
- Fix tracks @ Glenmore. Bumpy
- traffic congestion
- Not truck friendly intersections
- try to avoid city driving
- Wider road on #772
- Already surveyed
- Construction
- Maintain Schedule: Unknown.
- route restrictions need signage

- rough
- Stoney bumpy
- Schedule - bottle neck on Stoney.
Satisfied - newer areas are better
- Stoney is good but Deerfoot is not
- Too rough, Roads sagging
- Signage could improve
- Deerfoot Sucks
- Rush hour
- Truck route, schedule & Satisfied: Don't know
- Better Signage
- Truck Routes: Don't know
- Medians prevent you from being able to exit communities easily by preventing left hand turns
- Stoney Trail causing damages to suspension
- Truck route: Don't Know
- Stoney trail bumpy by Peigan Tr SB
- route not easy to understand
- Stoney bumpy
- Shorter distance - Stoney trail to avoid congestion in morning, Glenmore later as it's shorter
- Better than Vancouver
- Signs before turns for truck route
- Route: sometimes ambiguous, can't maintain schedule during rush hour,
Satisfied: traffic, especially Deerfoot.
Deerfoot & 64/McKnight - widened to lanes, at least at exits/between exits.
Deerfoot Southbound/Blackfoot backs up to/past Memorial
- Where Stoney Tr & 16th join need more lanes - backs up. Deerfoot - too much congestion
- Depends on time and accidents
- Stoney Trail should have been there 20 years ago
- Bridges are choppy
- Too many bad drivers
- Truck Route: More signage, clearly marked
- Poor signage
- more lanes on Stoney and Deerfoot
- traffic
- drivers discourteous to truckers
- Stoney rough
- Unhappy re: potholes in Woodbine area
- Speed limit too low. People don't maintain speed. Need sign on Stoney Trail stating no slow moving vehicles.
- Truck route: Don't know
- speed limit, drivers
- clear cars faster
- No passing lanes
- Signage - restricted routes aren't marked until after you've already turned onto them
- Dangerous good routes not as clear
- better signage
- bumpy
- Be more satisfied when Stoney Tr is complete
- Congestion
- Truck Routes & Satisfied: Unknown
- bumps
- Potholes
- Satisfied: Don't Know
- Depends on the say & time
- Higher road rating
- Stoney is bad (bumpy)
- wider roads
- Stoney Tr not up to standards.
- Traffic
- not rush hour
- Truck route: don't know, Maintain schedule: don't know
- traffic congestion
- traffic
- Hwy 1 WB needs repair
- too many restricted truck routes
- Deerfoot bad
- lights longer
- Able to maintain schedule taking outer roads and knowing the routes. Would be more satisfied if inner route across the city (Glenmore, 16th) were better
- Not Winter
- Maintain Schedule: Don't know
- Truck route, schedule & Satisfied: Don't know
- Stoney - Glenmore should be cloverleaf NOT lights, Every overpass is different, you never know which lane you're going to need. Stoney Tr should be more

lanes, when it goes from 4 to 2 it gets bottlenecked.

- lanes 17th Ave. Would be 5 but where Stoney goes down to 2 lanes @ 17th
- Maintain Schedule: Don't know
- need more rest stops
- Doesn't agree with restrictions
- could improve
- need more truck stops/parking
- Stoney Tr bumpy, schedule depends on time of day
- Completed Eastbound
- better road planning
- traffic
- construction, traffic
- new driver
- fix Glenmore
- rush hour
- late signage, potholes,
- Traffic too much all day
- 1A to Sunset Ridge to bypass Cochrane
- Stoney trail is rough
- Maintain Schedule: Depends on time of day
- bumpy
- Glenmore tracks
- Crowchild bridge not enforced
- Downtown unaware bridge. Railway crossing bumpy
- poor traffic management
- Avoids Deerfoot if possible
- Truck route: police won't let use of. Schedule: slow
- Better signage for dangerous goods
- Better signage on truck route
- Stoney Trail bumpy
- Rush hour slows you down
- Unless there's an accident
- more truck routes, maps
- 16 Ave & Stoney no access, having to stop at lights
- signage
- potholes
- Truck Route: Don't Know
- Maintain Schedule & Satisfied: Don't know
- Except for construction on Glenmore
- Not in winter
- Complaints: 61st Exit is difficult & exit for Glenmore
- Weather permitting
- Road repairs needed
- road closures route maps
- Glenmore bad
- lack of signage
- doesn't drive Calgary
- truck restrictions, Stoney too narrow
- Truck route & Satisfied: Don't know. Roads can be confusing
- Truck Routes, Schedule, & Satisfied: Don't Know
- Mark restrictions more in advance
- Barlow trains too long
- bad signage
- 52 St rail tracks
- more truck stops
- Stoney too rough
- fix Stoney trail
- traffic congestion
- construction
- bumpy
- Signs Clearly marked
- bumpy
- finish Stoney Tr
- bumpy
- bumpy
- doesn't drive in Calgary
- bumpy, potholes
- 90 Ave needs paving
- Detours not mindful of dangerous goods trucks. Post restrictions before intersections.
- potholes, bumps
- Truck Routes: Don't know
- terrible
- Blackfoot narrow
- too busy #2
- Deerfoot is awful
- Maintain Schedule: depending on time of day
- Truck route, schedule, satisfied: Don't know
- Stoney Tr bumpy, Deerfoot no fuel trucks
- Stoney Tr too bumpy

- Maintaining Schedule - Construction traffic
- bumpy
- doesn't like Stoney
- bumpy
- Question 14, all three "Don't know"
- Road Quality
- doesn't go thru Calgary
- language barrier
- Meters are hard for people from the US - Metric system.
- construction
- Truck route not marked far enough in advance
- needs upgrading
- construction
- bumpy, bigger signs
- bigger signs
- Open up Stoney Tr 17 Ave SE
- Accidents on Deerfoot
- Except Deerfoot Tr Rush hour
- Truck Routes: Don't know
- Wants better paving
- better road planning
- Depends on time of day. After 2pm no
- bad traffic congestion
- CAA
- traffic, Deerfoot, ignorance
- construction
- traffic
- bumpy
- Tries to avoid truck routes
- Traffic
- signage
- doesn't drive in Calgary
- Likes Stoney Tr
- Main concern is with safety. People don't slow down when yellow lights on tow truck are flashing. Traffic Congestion. Reckless drivers
- fix potholes
- const signs left up
- Too bumpy
- route map, bridge heights
- residential areas hard to get in
- traffic congestion, poor signage
- Ramps need more work.
- Oversize trucks on narrow roads
- fix roads
- bumpy
- Except Deerfoot Tr
- Rush Hour
- signage blocked by trees
- traffic and signage
- Cannot maintain a schedule in the city
- Schedule - Traffic is too busy
- Signs on Stoney confusing
- Odgen Rd is confusing
- More facilities for truckers
- need railway overpasses
- too many restrictions
- except rush hours
- more rest areas with washrooms
- Traffic bad
- Depends on time of day