

NATIONAL ROADSIDE SURVEY – CORRIDOR AND BORDER COMPONENTS (US PARTICIPATION)

BACKGROUND

Three National Roadside Surveys (NRS) have been conducted to date. Each of these surveys had the primary objective of collecting heavy-truck data to determine intra and interprovincial National Highway System (NHS) infrastructure use. In the most recent survey, conducted in 1999, emphasis was also placed on cross-border movements, and the United States, under the umbrella of the Eastern Border Transportation Coalition (EBTC) contributed funds to the survey.

Each of these surveys focused on collecting heavy-truck data via a standard intercept survey, with field staff administering a lengthy questionnaire to truck drivers at predetermined points, usually provincial weigh stations, along the NHS. In 1999, intercept surveys were also administered at permanent provincial weigh stations located within a reasonable proximity to selected Canada / US border crossing points.

Transport Canada Data Requirements

Transport Canada has identified a number of specific planning and policy objectives that dictate the Department's requirement to collect heavy-trucking and other vehicle data. These initiatives, along with a summary of required basic data elements, include the following:

- Border Infrastructure and Security Planning: commodity, tonnage, origin-destination (O-D), routing, vehicle characteristics, axle weights, vehicle counts, driver information, intermodal data, queues and congestion.
- Corridor Multi-Modal Passenger and Freight Modeling: a higher density survey along the Quebec City / Windsor corridor for vehicle counts, axle weights, commodity, tonnage, O-D, routing, vehicle characteristics, intermodal data.
- Data that will aid in the Description of the Trucking Industry in Canada for Policy Analysis: Each of the above would contribute data required for national and regional policy analyses related to the environment, climate change, intermodal and multimodal concerns, urban agenda and various other issues.
- Corridor Data leading to other Major Border Crossing Points: commodity, tonnage, origin-destination (O-D), routing, vehicle characteristics, axle weights, vehicle counts, driver information, intermodal data.
- Transport Canada is proposing to share data collected for the above initiatives with each of the participating jurisdictions. It should be noted that Transport Canada's data needs are not tied to intra and inter-provincial infrastructure maintenance and investment planning, an area of provincial/territorial responsibility that historically has been the primary objective of the NRS.

Overview of the NRS

In keeping with past NRS projects, it is intended to survey truckers at specified locations in order to obtain sufficient data to support a variety of federal and provincial objectives. To the extent possible, surveys will be conducted at provincial vehicle inspection stations, primarily because of the control afforded over trucks but also because of the level of safety for survey personnel that can be provided in such environments.

In certain locations, notably near border points, it is not possible to make use of provincial vehicle inspection facilities since they simply don't exist. Of necessity, sites will have to be chosen that allow survey teams to exercise control over trucks, that have sufficient area to permit weighing of trucks and then conduct interviews. Sites which are vehicle inspection stations typically have static scales available for weighing of vehicles. However, at "ad hoc" sites, this equipment is clearly unavailable and temporary weighing equipment must be provided.

In addition to surveying selected truckers, it is also necessary to count the total number of trucks passing the interview sites and, at a minimum, to classify them. This has to be done primarily to enable survey data to be "expanded" to the universe of trucks passing the site. Counting trucks, however, is a non-trivial exercise and, depending on the highway or road situation in the vicinity of the survey sites, may require different technological approaches to accomplish this.

For survey sites at provincial inspection stations, and for other non-border (interior) sites, it is planned to make use of weigh-in-motion (WIM) systems¹ to count, classify and weigh trucks. At some interior sites and at all border locations, it is not possible to use WIMS because of the speed of vehicles at these locations. If truck speeds are too low, the sensors do not reliably detect, classify and weigh vehicles. As a result, in areas where low speeds or congestion is anticipated, an alternative technology will be employed for vehicle counting and classification: non-intrusive detectors. These devices use radar, for example, to perform the counting/classifying functions. However, they cannot weigh vehicles.

A considerable amount of effort will have to be devoted to both the surveying and the counting activities, though the former will involve the management of and logistical support for up to 100 surveyors, including hiring, training, accommodating and transporting them. Since it is impossible and impractical for statistical reasons to be at all survey sites simultaneously, it will be necessary to carefully schedule survey durations and the moves to different sites while at the same time attempting to adapt to challenges posed by weather and by the inevitable loss of personnel throughout the survey period.

Tentatively, it is planned to commence surveying in June, 2006. A number of activities must take place prior this, however, including hiring a consultant to undertake the survey work, hiring of personnel to do the surveys and training of the personnel. In order to be able to make subsequent use of the survey data for analysis, it is necessary, as mentioned, to have counts of trucks in order to generate expansion factors for each site. This essentially means that the counters should be installed and functioning before surveying actually takes place.

¹ High speed WIMS, which are systems designed to function at normal highway speeds, usually involve a series of sensors embedded in the surface of the highway connected to control electronics that collect, interpret, store and, in some cases, transmit the vehicle data periodically to a centralized location.

Assuming a June start as currently planned, surveying will have to continue well into October, 2006 in order to generate the number of samples (interviews) required for each site. An analysis of the sample size requirements has been undertaken which has allowed the estimation of site days and survey costs for each location.

CURRENT PLANS

The roadside survey has several components, two of which, the border and corridor components, involve Transport Canada as the lead agency. Other components will be undertaken by a number of provincial departments of transportation. The latter components will be focused on surveying at predominantly interior provincial locations to complement the work being undertaken by Transport Canada.

To date a number of provinces have indicated that they will not participate in the forthcoming NRS and conduct surveys at interior points within their jurisdictions. However, those that have chosen not to participate have indicated that they will provide support to Transport Canada for the conduct of surveys at defined border points by TC. Quebec and Ontario are participating with Transport Canada in the conduct of surveys in the Corridor and intend to conduct surveys at other locations within their jurisdictions to supplement and complement the Corridor work.

A number of provinces in Western Canada have indicated that they do not intend to conduct NRS surveys within their jurisdictions. However, all have indicated that they will support Transport Canada in conducting surveys at specified border locations. In the east, New Brunswick has indicated that it will support Transport Canada’s survey efforts at border locations. Agreements have yet to be signed between Transport Canada and the provinces concerning the level of co-operation and assistance that may be expected. All provinces with border crossing points are participating in or supporting the border component of the NRS.

CORRIDOR AND BORDER POINT STATISTICS

Transport Canada is planning to survey at 28 Ontario and Quebec sites in the Quebec City - Windsor corridor in support of Corridor modeling work during the summer and fall of 2006. Survey sites within the Corridor include a number of sites that are border points and other sites on provincial highways that are considered to be interior locations.

The following table identifies the 10 border crossing points within the Corridor at which Transport Canada intends to conduct surveys in addition to the Canadian and US cities located adjacent to or near these crossings.

Border Points Within the Corridor		
Crossing	Canadian City	US City
Ambassador Bridge	Windsor, ON	Detroit, MI
Windsor Tunnel	Windsor, ON	Detroit, MI
Bluewater Bridge	Sarnia, ON	Port Huron, MI
Peace Bridge	Fort Erie, ON	Buffalo, NY

Queenston-Lewiston Bridge	Niagara Falls, ON	Lewiston, NY
Lansdowne	Lansdowne, ON	Alexandria Bay, NY
Cornwall	Cornwall, ON	Massena, NY
Lacolle	Lacolle, QC	Champlain, NY
Philipsburg	Philipsburg, QC	Highgate Springs, VT
Rock Island	Rock Island, QC	Derby Line, VT

In addition to the border points within the Corridor, Transport Canada is also planning to conduct surveys at 13 other border points across the country which, in total, comprise the top 23 Canada/US border points ranked by a combination of both truck volume and trade activity. Originally it was intended to be at only 20 border points as ranked by trucking activity. However, a review of trade data suggested that the number of border points of interest to Transport Canada be expanded.

These 23 sites account for about 90% of the US/Canada transborder trucking activity and 88% of the total value of trade by truck between the US and Canada. It should be noted, however, that the value of trade through these border points is understated, perhaps significantly, due to reporting issues with import data. For Canadian Border Services Agency (CBSA) purposes, carriers are in some cases permitted to “clear” their cargo at inland points some distance from the border. Thus, the value of trade through specific crossings, principally the major crossings in Ontario, will always be understated. Appendix A identifies the top 23 border crossing points for trucks along with the 2004 daily two-way truck volume and the value of goods transported by truck through these crossings.

The following table lists the additional 13 non-corridor border points along with the associated Canadian and US cities near these crossings.

Border Points Outside the Corridor		
Crossing	Canadian City	US City
Pacific Highway	Pac Highway, BC	Blaine, WA
Aldergrove	Aldergrove, BC	Lynden, WA
Huntingdon	Huntingdon, BC	Sumas, WA
Osoyoos	Osoyoos, BC	Oroville, WA
Coutts	Coutts, AB	Sweetgrass, MT
North Portal	North Portal, SK	Portal, ND
Emerson	Emerson, MB	Pembina, ND
Sault Ste. Marie	Sault Ste. Marie, ON	Sault Ste Marie, MI
Prescott	Prescott, ON	Ogdensburg, NY
Armstrong	Saint-Theophile, QC	Dennistown, ME
Woodstock	Woodstock, NB	Houlton, ME
St. Stephen	St. Stephen, NB	Calais, ME
Milltown	Milltown, NB	Milltown, ME

In addition to surveying at the top 23 border crossing sites, interest has been expressed by US officials in obtaining interviews at the top 33 border crossing points. In aggregate, the value of US-Canada trade which would be represented by the top 33 sites would account for approximately 89% of total US-Canada trade by truck and 94% of all trucks crossing the border, both ways.

As shown in Appendix B, however, these additional 10 crossings account for only \$3.5 B or 1% of the total value of trade by truck between the US and Canada annually and 1,500 trucks per day or 4% of the total number of trucks crossing the border both ways each day.

SAMPLE SIZES FOR CORRIDOR AND BORDER SURVEYING

Transport Canada engaged the services of statisticians from Statistics Canada in order to develop estimates of required sample sizes for surveying at Corridor sites and at additional border sites across the country. These estimates have been used to drive cost estimates of surveying at corridor and border locations.

Sample Sizes – Corridor

Sample sizes have been designed to support Corridor modeling needs and for that purpose must be sufficiently large to support the definition of a range of commodities and origins, destinations. That is, OD regions were defined within the Corridor and a commodity classification defined so as to allow the generation of a required number of samples (interviews) at each site.

On the basis of the analysis undertaken by Statistics Canada, about 59,400 interviews must be undertaken at interior sites within the Corridor in addition to about 15,800 samples from the 10 border sites falling within the Corridor. In total, approximately 75,000 samples must be obtained from both interior and border sites in the Corridor.

Sample Sizes – Border (Balance of Top 23)

In addition to surveying within the Corridor, however, Transport Canada intends to survey truckers at an additional 13 border sites across Canada. The same group at Statistics Canada generated estimates of sample sizes that would be required for these locations.

It should be noted that the method of estimating samples sizes at border points differs from that used for determining sample sizes for points within the Corridor. It may be recalled that the statistical design approach used for the Corridor was intended specifically to generate data for aggregated commodities along with a pre-specified series of origin-destination regions.

As a result of a combination of tight time constraints and insufficient data, initial estimates of sample sizes for border points were done on the basis of tonne-kilometres through each border point without consideration of commodity or origin-destination. The analysis suggested that slightly more than 19,000 interviews were required at the remaining border sites not considered as part of the Corridor.

Although further development of these estimates is being pursued, it is unclear at the moment when to expect these estimates and what the magnitude of any changes might be. If OD and commodity are to be adequately represented by the samples, however, then it may be assumed that the sample sizes will have to increase.

This is not to suggest that the current sample size estimates for the border points will not capture some degree of origin, destination and commodity since they will. However, it is likely that for some commodity/OD combinations there will be an insufficient number of samples to have prior confidence in the results. It is impossible to know this in advance with any degree of certainty.

Sample Sizes – Border (Balance of Top 33)

In addition to estimating the sampling requirements for the Corridor and the top 23 border sites, work was also undertaken on estimating the sample size requirements for the remaining 10 border points making up the top 33 truck border crossing locations. Approximately 15,000 samples would have to be captured at the 10 remaining border sites on the basis of the same methodology as was used to estimate sample sizes for those other border points outside the Corridor.

Summary of Sample Size Requirements		
	Number of Sites*	Sample Size
Corridor – Interior	18	59,492
Corridor - Border	10	15,804
Balance of Top 23	13	19,043
Sub-total	41	94,339
Balance of Top 33	10	14,797
Total	51	109,136

* Most sites have both directions represented; however, some sites are uni-directional

SURVEY DATA AND SURVEY TIME ESTIMATES

A common questionnaire will be used within the Corridor and by the provinces of Ontario and Quebec when conducting their own surveys outside the Corridor. It is also expected that the provinces of New Brunswick and Nova Scotia will use the same questionnaire. The finalized list of questions or data items to be addressed in the survey is provided in Appendix C.

Based on pilot projects undertaken in the fall of 2005, it is anticipated that while the average time for surveyors to conduct surveys of truckers will be about 12 minutes, additional surveyor time

will be required to enter weight and axle spacing data. In addition, some degree of down time will occur for breaks as well as a variable amount of truck inter-arrival time. On average, then, it has been estimated that it will take about 20 minutes between surveys including interview time, data entry and various forms of delay. This estimate of time, in conjunction with estimates of the required number of surveys by site has been used to produce estimates of the number of site days at each location and, from that, estimates of cost to conduct the surveys.

It has been assumed that it will be necessary to work three shifts of eight hours each day with an average of 2-3 surveyors per shift in order to generate the required number of samples. Additional staff will be required for site supervision, traffic control and portable weigh scale operation (for sites without static scales). The combination of the staffing levels at each site (which can vary slightly depending on site specific requirements) along with the estimated number of days of surveying at each site that are required (to generate the required number of samples) yields the number of crew days needed for each site. It is estimated that some 4,100 crew days will be required at interior sites in the Corridor while an additional 4,000 crew days will be required at the top 23 border sites. The estimated number of crew days for the 10 additional border crossings is expected to be about 1,700.

While surveys undertaken at sites within the Corridor will use the questionnaire shown in Appendix C, Prairie provinces have insisted that, as a condition of their support, the length of the survey could not exceed five or six minutes. As a result, a shorter version of the questionnaire will be used at border points in western Canada. The same core questions on commodities, origin, destination, vehicle configuration and routing will be maintained. However, some questions will be dropped and some levels of detail in the routing (notably address level data) will not be maintained.

ESTIMATED COSTS

Estimated Costs of Surveying

Using the unit costs developed from Transport Canada's experience with conducting pilot surveys in the fall of 2005 as guidance, estimated costs for conducting interviews at corridor interior sites and the various border sites were developed. To generate the required number of surveys at the 18 interior corridor sites, the estimated costs would be approximately \$1.8 million.

The costs of conducting the interviews at the top 23 border points has been estimated to be about \$1.58 million. For the 10 additional border sites comprising the balance of the top 33 border points, the estimated costs of conducting the surveys would be about \$0.7 million.

Vehicle Counting

In addition to conducting surveys it is also necessary to count and classify the trucks that pass by each interview site in order to be able to have a basis for expansion of the sample. Various technologies will be used to count and classify and, in some cases, weigh, vehicles at locations close to the interview sites. Weigh-in-motion (WIM) systems will be deployed at 10 sites in the Corridor while non-intrusive devices will be used at another 10 locations. The decision was

made to use non-intrusive devices at various locations, principally near borders ,where vehicle queuing may occur. As mentioned, WIMS are not effective at low vehicle speeds and it has been necessary to consider other counting devices to work around this shortcoming.

Transport Canada has decided to contract out the installation of vehicle counting devices, the maintenance of these devices and the collection of data from these devices. Estimated costs for the 2006 survey season for this data contract for the Corridor is expected to be about \$2.0 M

The specific counting technologies proposed for each survey site along with the estimated costs of generating vehicle count data at these sites for the 2006 and 2007 periods have been determined. In several cases, counters already exist. A number of sites (Aldergrove, BC; Huntingdon, BC; Osoyoos, BC; North Portal, SK; Emerson, MB; and Woodstock, NB) either currently have or will have WIMS or AVCS available in the near future. As a result, no cost estimates were included for these sites. It will be necessary to obtain the count data from these sites, however, and process the data in the same manner as the other sites.

Estimates of the cost of obtaining vehicle count data from interior corridor sites are slightly less than \$1.0 M for 2006 and about \$0.4 M for 2007. For the top 23 border sites, the expected costs for counting are about \$0.7 M in 2006 and \$0.3 M in 2007.

For the balance of the top 33 border points, it has been estimated that the costs of installing temporary counters and collecting vehicle data at these sites would be approximately \$0.25 million for 2006. Costs for vehicle counting were only been estimated for 2006 on the assumption that there was little merit in leaving the devices on site for an extended period of time.

Total Estimated Costs, Border-Related Surveying and Vehicle Counting

The following table presents a summary of sample sizes and estimated survey and counting costs for the top 23 border points and the interior corridor survey points. As shown in the following table, total costs for surveying at the top 23 Canada-US crossings as well as the corridor interior points are estimated to be approximately \$5.5 million.

	Total Estimated Costs			
	Total Samples (000)	Survey Component (\$000,000)	Counting Component (\$000,000)	Estimated Total Costs (\$000,000)
Top 23 Border Sites	34.9	1.58	1.13*	2.71
Interior Sites	59.5	1.76	0.99	2.76
Total		3.34	2.12	5.47

* Note that the costs for counting at the top 23 border sites includes an additional cost element of \$400K for the acquisition of 10 portable slow speed WIMS which are necessary at border locations to weigh vehicles since scales are unavailable.

As has been mentioned previously, there has been interest expressed in obtaining survey data for the balance of the top 33 crossings. If the proposed sample size of approximately 15,000 surveys was to be generated at the remaining 10 crossings, this would require an estimated \$0.7 million for surveying and \$0.2 million for counting for a total estimated cost of almost \$1.0 million.

As previously suggested, the aggregate incremental trade activity at these 10 crossings was \$3.45 billion in 2004 involving some 1,513 trucks daily through these crossings. Transport Canada considers that the estimated incremental cost of almost \$1.0 million to obtain about 14,800 samples at these additional crossings does not merit surveying at these locations.

Accordingly, Transport Canada does not intend to fund any surveying at these locations. Any interest on the part of the US or provinces in surveying at these locations must be at their own expense. As well, due to the amount of surveying activity that must be undertaken at other sites both for the border, the corridor and for other goals, additional survey resources such as Transport Canada's tablet computers are unlikely to be available.

Estimated Costs to the US of Participation in Capturing Border-Related NRS Data

Although certain border points would be, by definition, included in a survey of transborder trucking activities, it is clear that trucks which may be moving between the US and Canada may also be interviewed at non-border, interior sites. This suggests that samples from interior sites for which a transborder trip can be identified should be of interest to the US. The reason for including these interior points is that this implicitly results in an increase in the border-related sample size. Estimates for the number of transborder truck trips sampled at interior Corridor sites were developed from an analysis of 1999 NRS data. The proportion of samples that were attributable to a transborder truck trip were highly variable by site and ranged from a low of about 5% at some Quebec sites to a high of almost 80% at a number of Ontario sites relatively near the border.

Estimated costs for US participation in the border-related component of the NRS is shown in the following table as are the expected number of samples for each aspect of the survey.

Estimated costs for the US to participate in the border component of the NRS are expected to be about \$1.71 million (in 2006 only as costs in subsequent years will be borne by Transport Canada) for the top 23 sites plus a portion of the cost of surveying at corridor interior sites and a further \$0.95 million for the additional 10 border sites for an estimated total of \$2.65 million.

Total Estimated US Costs				
	US Samples (000)	Survey Component (\$000,000)	Counting Component (\$000,000)	Estimated US Total (\$000,000)
Top 23 Border Sites	34.9	0.79	0.56	1.35
Interior Sites	16.6	0.22	0.13	0.35

Sub-total Border-related	51.5	1.01	0.69	1.71
Top 24-33 Border Sites	14.8	0.72	0.22	0.95
Total	66.3	1.74	0.92	2.65

Additional Cost Elements

A number of survey elements which will involve additional costs to Transport Canada and in some cases, to various provinces were not included in the preceding analysis. The elements include:

- The costs of acquiring and installing WIMS by various provinces under contribution agreements will be shared between Transport Canada and several provincial departments of transportation. It would be inappropriate to allocate the Transport Canada portion of these costs to the US-sharable costs while ignoring the fact that provincial governments have also contributed funding.
- The incremental costs of provincial enforcement staff will be absorbed by the provincial departments of transportation. Transport Canada has no mechanism to recoup these costs and return the funds to the provinces.
- Training costs for survey personnel (for the corridor and border work) will be absorbed by Transport Canada.
- The costs of additional surveyors to act as “floaters” or backup staff are uncertain at this time, but will be included in the contract for surveying.
- The costs of certain data validation will be absorbed by Transport Canada. The costs of validating the routing data, coding the commodity descriptions and checking data integrity on a continuing basis will be borne by Transport Canada.
- The costs of project management for the border and corridor will be absorbed by Transport Canada.
- Costs of accommodation for surveyors on days off between sites has not been estimated yet but will be a cost to be borne as part of the surveying contract.

SCHEDULING

As mentioned previously, the nominal start date for field surveys is June 1, 2006. However, a number of factors will influence the actual start date. The primary considerations are contractual in nature. It is expected that it will not be until mid-May that contracts for both installation of vehicle counting equipment and for surveying can be awarded. Several weeks will be required to obtain permits and install equipment.

For the surveying activities, it will be necessary for the contractor to hire and train up to 100 surveyors. This could also require several weeks’ time. At the present time, it is the intention to

seek three proposals to undertake the surveying. The rationale for this is that one group would be based in western Canada to conduct surveys at border points in BC, Alberta, Saskatchewan and Manitoba while the two other groups would be based in Ontario and Quebec, respectively. The Ontario group would conduct surveys at border points and at interior corridor points in the province while the Quebec group would conduct surveys in that province and at several border points in New Brunswick. There are linguistic and logistical reasons for maintaining three groups, but it would be conceivable for a single firm to be awarded all of the contracts, thus potentially achieving economies.

Draft schedules have been developed for purposes of planning tentative surveying at all sites, for estimating the crew requirements, to attempt some preliminary resource leveling and to gauge the potential impact on tablet computer requirements. Surveying in western Canada is expected to require the least amount of time, slightly less than three months overall to be at all sites, although construction at the Pacific Highway crossing this summer will likely necessitate surveying southbound traffic in late fall. Surveying in Ontario is expected to require 3 ½ months while surveying in Quebec and New Brunswick will likely require 2 ½ months, similar to western Canada. It is intended to have completed all surveying by the end of October, 2006, pending a timely awarding of these contracts.

Data from the counting devices will be transmitted to Transport Canada frequently throughout the course of the field survey portion of the project. Data from surveyors will also be transmitted to Transport Canada frequently. In order to be in a position to detect anomalous data and to take corrective action rapidly, it will be necessary to have daily transmissions of data from each site. The other impact of this will be to ensure that Transport Canada can provide data to participating stakeholders in as short a time as possible.

While it is intended that surveying will be completed by the end of October, 2006, further data validation and development of a data set which incorporates expansion factors will take several months. Tentatively, Transport Canada would be targeting a March 31, 2007 release date to participating stakeholders. A public data release is planned but would be at a much later date and contain much more aggregated data.

DATA RELEASE

Subject to certain constraints contained in legislation, Transport Canada will endeavour to provide US participants who have co-funded this activity with the data for each interview that involves a transborder movement, or at least 51,000 records.

It should be noted, however, that Transport Canada is prevented by Section 51 of the Canada Transportation Act from releasing information which would allow the identification of any firm or individual. As a result, Transport Canada will be unable to release address level detail, company names and certain other details captured during the course of the surveys which have a degree of sensitivity associated with them. For example, since it is highly probable that address information would permit the identification of specific companies and individuals, this data will not be released.

In order to minimize the likelihood of identification of individuals and firms, Transport Canada would propose to:

- Remove company names from the data set to be distributed to US stakeholders
- Aggregate address data up to Census Metropolitan Areas, for example, and their US equivalents
- Aggregate commodities up to a suitable level (eg: 14 major commodity groups)
- Remove address data from the routes for each trip

At this point in time, it is difficult to provide a precise estimate of the amount of effort and therefore the time that would be required to create this subset, and to structure the data to enable it to be used easily. While data collection activities will be complete by the end of October, 2006, considerable work remains to be done before a release of the data to US stakeholders. At the same time, Transport Canada is sensitive to the needs of stakeholders and does not wish to inordinately delay release of the data. Accordingly, a release date of June 1, 2007 is being targeted for the US data set.

The data set will be provided in the form of a flat file, in any agreed upon file format and include expansion factors. Full documentation of the file, including metadata will be provided.

Appendix A: Top 23 Border Crossings: Truck Volume and Value of Trade

Crossing	Daily Two-way Truck Volume, 2004	Two-way Trade, 2004 (\$ millions)
Ambassador Bridge	9,865	122,387
Peace Bridge	3,478	53,295
Bluewater Bridge	4,693	52,886
Lacolle	1,996	20,410
Pacific Highway	2,065	16,181
Lansdowne	1,330	15,005
Emerson	1,084	13,946
Queenston-Lewiston Bridge	2,760	12,181
Coutts	658	10,166
Philipsburg	921	8,909
North Portal	327	5,930
Woodstock	416	3,429
Rock Island	764	3,083
St. Stephen	185	2,856
Huntingdon	405	1,033
Sault Ste. Marie	345	2,329
Prescott	162	1,792
Cornwall	303	1,205
Osoyoos	251	780
Armstrong	330	624
Aldergrove	571	400
Milltown	231	47*
Windsor Tunnel	160	**
Total	33,300	348,827

* Note: Significant portion of value of goods crossing at Milltown included under St. Stephen

** Note: Windsor Tunnel trade data included under Ambassador Bridge

Appendix B: Truck Volume and Value of Trade at Balance of Top 33 Border Crossings

Crossing	Daily Two-way Truck Volume, 2004	Two-way Trade, 2004 (\$ millions)
Kingsgate	202	969
Stanhope	154	622
Fort Frances	121	508
Pigeon River	221	496
Boissevain	121	330
Roosville	124	184
Edmundston	137	167
St. Leonard	204	122
Woburn	143	54
East Hereford	116	16
Total	1,543	3,468

Appendix C: Questions Contained in the Survey to be used at Sites Within the Corridor

CATEGORY	QUESTION
Observations	Record the truck's basic configuration.
Observations	Record the truck style for the truck/trailer(s). Select all that apply.
Observations	Record the class for each of the Dangerous Good(s) Placard(s) visible on the truck.
Observations	Record the UN Dangerous Goods code for each of the Dangerous Good(s) Placard(s) visible on the truck.
Observations	Record the province/state shown on the license plate of the power unit.
Observations	Record the License Plate number ignoring spaces or special symbols (that are not letter/numbers).
Interview - Start	I am with Transport Canada. This interview is being conducted in collaboration with the Ministère des Transports du Québec and the Ministry of Transportation Ontario. This interview is also supported by the Canadian Trucking Alliance. The interview will finish within 12 minutes. We appreciate your input.
Interview - Start	What language will the interview be conducted in?
Interview - Carrier	What is the name of your company?
Interview - Carrier	Does your company typically haul another company's goods for money?
Interview - Carrier	On this particular trip are you hauling another company's goods for money?
Interview - Carrier	Are you the registered owner of the tractor?
Interview - Carrier	Do you have a long-term contract with a trucking company to haul cargo for them?
Interview - Cargo	How many shipments are on-board?
Interview - Cargo	How many shipments do you still intend to pick up on this trip?
Interview - Cargo	Was all the cargo loaded onto your truck at one address?
Interview - Cargo	Will all the cargo be unloaded off of your truck at one address?
Interview - Cargo	What is the total weight or volume of all cargo carried?
Interview - Cargo	Unit of measure for WEIGHT ALL CARGO
Interview - Cargo	Record how accurate the weight of the cargo on-board provided is below.
Interview - Cargo	Are you full to the back? If not about how full (by used space in the cargo area) are you?
Interview - Cargo	What is the heaviest commodity on board? (DESCRIPTION)
Interview - Cargo	What is the heaviest commodity on board? (CLASSIFY)
Interview - Cargo	Does the cargo only consist of this commodity?
Interview - Cargo	Does your cargo include any commodities that are classified as dangerous goods or hazardous goods?

Interview - Trip	ACTION: Go to the ROUTE form and obtain the route for the major commodity on the truck using the wizard. You will also get the departure and arrival times and previous/next stop information.
	Did you successfully obtain the route?
Interview - Trip	What is the facility type at (Heaviest Commodity Pickup or Origin)
Interview - Trip	What is the facility type at (Heaviest Commodity Dropoff or Destination)
Interview - Just in Time	On this trip do you have a penalty if your delivery is late? If yes, how much delay are you allowed?
Interview - Just in Time	Have you made an effort to time and route your trip in order to avoid congested traffic in urban areas or avoid congestion at the border?
Interview - Driver	In which province or state do you live? (province/state)
Interview - Driver	In which city do you live?
Interview - Truck Profile	Where is your truck based (Garaged)? (province/state)
Interview - Truck Profile	From which city is the truck based (Garaged)?
Interview - Truck Profile	How many axles can be lifted on your truck? (Include each liftable axle regardless of its up or down position)
Interview - Truck Profile	Is your trailer carrying a container that separates from the base of the trailer?
Interview - Truck Profile	What is the length of your trailer?****
Post Interview Work	ACTION: Go to the WIM form and specify the bumper and axle measurements for the truck.
	Did you successfully obtain these measurements?
Post Interview Work	Is the truck a tractor with two trailers? If yes, describe the connection (hitch type) between the two trailers.
Post Interview Work	Record how many axles are on the first unit of a tractor-trailer (the tractor) or a count of all of the axles on a straight truck (excluding a trailer if a trailer is attached).
Post Interview Work	Is the truck a tractor with one or more trailers or a straight truck with a trailer? If yes, record how many axles are on the second unit (the first trailer of a tractor-trailer or the trailer of a straight truck/trailer).
Post Interview Work	Is the truck a tractor with two trailers? If yes, record how many axles are on the third unit (the second trailer of a tractor-trailer).
Post Interview Work	ACTION: After the interview get the weight by axle(s) print out from the individual responsible for the weights and enter the weight for each axle(s) measured on the WIM form. Do this by putting the axles measured and weights for each axle(s) measured in for each line of the printout.
	Did you successfully obtain the weights?

Routing Details	
Routing Details	<p>Major Commodity Pick-up location [Only asked if carrying cargo] Where did you pick-up the heaviest commodity currently on board? City/Subdivision Level (I.e. Scarborough, Newmarket, etc. in Toronto area) Address Level</p>
Routing Details	<p>Trip origin CARRYING CARGO: Where did you pick up the first cargo currently on board? EMPTY: Where did you start this trip with this empty vehicle? City/Subdivision Level (I.e. Scarborough, Newmarket, etc. in Toronto area) Address Level Date/Time left Origin</p>
Routing Details	<p>Major commodity drop-off location [Only asked if carrying cargo] Where will you drop-off the heaviest commodity currently on board? City/Subdivision Level (I.e. Scarborough, Newmarket, etc. in Toronto area) Address Level</p>
Routing Details	<p>Trip destination CARRYING CARGO: Where will you drop-off the last cargo currently on board? EMPTY: Where will you finish this trip with this empty vehicle? City/Subdivision Level (I.e. Scarborough, Newmarket, etc. in Toronto area) Address Level Date/Time arrived at Destination</p>
Routing Details	<p>Previous Stop City/Subdivision Level (I.e. Scarborough, Newmarket, etc. in Toronto area) -- May add routing error Address Level Purpose of Stop</p>
Routing Details	<p>Next Stop City/Subdivision Level (I.e. Scarborough, Newmarket, etc. in Toronto area) -- May add routing error Address Level</p>

	Purpose of Stop
Routing Details	Data Collection Site (pre-filled) Date/Time arrived at Data Collection Site (available from Tablet's system clock)
Routing Details	International Border(s)
Routing Details	Confirm major route and waypoint order using the Generated Map

Appendix D: Questions Contained in the Survey to be used at Border Sites in Western Canada

CATEGORY	QUESTION or DATA ITEM
Observations	Record the truck's basic configuration.
Observations	Record the truck style for the truck/trailer(s). Select all that apply.
Observations	Record the class for each of the Dangerous Good(s) Placard(s) visible on the truck.
Observations	Record the UN Dangerous Goods code for each of the Dangerous Good(s) Placard(s) visible on the truck.
Observations	Record the province/state shown on the license plate of the power unit.
Observations	Record the License Plate number ignoring spaces or special symbols (that are not letters/numbers).
Interview - Start	I am with Transport Canada. This interview is being conducted in collaboration with the (BC Ministry of Transportation / Alberta Transportation / Saskatchewan Highways and Transportation / Manitoba Transportation) This interview is also supported by the Canadian Trucking Alliance. The interview will finish within 6 minutes. We appreciate your cooperation
Interview - Start	What language will the interview be conducted in?
Interview - Carrier	Does your company typically haul another company's goods for money?
Interview - Carrier	Are you the registered owner of the tractor?
Interview - Cargo	How many shipments are on-board?
Interview - Cargo	What is the total weight or volume of all cargo carried?
Interview - Cargo	Unit of measure for WEIGHT ALL CARGO
Interview - Cargo	Are you full to the back? If not about how full (by used space in the cargo area) are you?
Interview - Cargo	What is the heaviest commodity on board? (DESCRIPTION)
Interview - Cargo	Does the cargo only consist of this commodity?
Interview - Trip	ACTION: Go to the ROUTE form and obtain the route for the major commodity on the truck using the wizard. You will also get the departure and arrival times and previous/next stop information.
	Did you successfully obtain the route?
Interview - Trip	What is the facility type at (Heaviest Commodity Pickup or Origin)
Interview - Trip	What is the facility type at (Heaviest Commodity Dropoff or Destination)
Interview - Driver	In which province or state do you live? (province/state)
Interview - Truck Profile	Where is your truck based (Garaged)? (province/state)

Post Interview Work	<p><i>ACTION: After the interview get the total weight and the total number of axles for the truck and enter the total weight and total number of axles on the WIM form.</i></p> <p><i>Did you successfully obtain the weights?</i></p>
Routing Details	
Routing Details	<p>Major Commodity Pick-up location [Only asked if carrying cargo]</p> <p>Where did you pick-up the heaviest commodity currently on board?</p> <p>City/Subdivision Level (capture postal code for 5 largest western Canadian cities)</p>
Routing Details	<p>Trip origin</p> <p>CARRYING CARGO:</p> <p>Where did you pick up the first cargo currently on board?</p> <p>EMPTY:</p> <p>Where did you start this trip with this empty vehicle?</p> <p>City/Subdivision Level (capture postal code for 5 largest western Canadian cities)</p> <p>Date/Time left Origin</p>
Routing Details	<p>Major commodity drop-off location [Only asked if carrying cargo]</p> <p>Where will you drop-off the heaviest commodity currently on board?</p> <p>City/Subdivision Level (capture postal code for 5 largest western Canadian cities)</p>
Routing Details	<p>Trip destination</p> <p>CARRYING CARGO:</p> <p>Where will you drop-off the last cargo currently on board?</p> <p>EMPTY:</p> <p>Where will you finish this trip with this empty vehicle?</p> <p>City/Subdivision Level (capture postal code for 5 largest western Canadian cities)</p> <p>Date/Time arrived at Destination</p>
Routing Details	<p>Data Collection Site (pre-filled)</p> <p>Date/Time arrived at Data Collection Site (available from Tablet's system clock)</p>
Routing Details	International Border(s)
Routing Details	Confirm major route and waypoint order using the Generated Map

List of Deliverables for 2006 National Roadside Survey

I. Micro-data file

A micro-data file will be provided containing one record for each transborder trip sampled during the survey. The following four main components would be included in this file:

1. Truck information

	Element	Description
1	Survey ID	Unique identification number for each sampled truck in the survey
2	Configuration	The truck's basic configuration (e.g. straight truck, tractor and one trailer, train with more than one trailer)
3	Body style	The style/shape of the cargo area (e.g. dry van, flatbed, tanker, hopper)
4	Lift axles*	How many axles can be lifted on the truck
5	Container*	Whether the trailer carries a container that separates from the base of the trailer
6	Connection type*	Hitch type between two trailers (A, B, or C train)
7	Axles on 1st unit*	Number of axles on the first unit of a truck
8	Axles on 2nd unit*	Number of axles on the second unit
9	Axles on 3rd unit*	Number of axles on the third unit (i.e. the second trailer of a tractor-trailer).
10	Axle weights**	Weights of each axle group derived from a static scale measurement
11	Axle spacings**	Distance between axles

* Not obtained during interviews in Western Canada

** In Western Canada, only total weight and total number of axles obtained

2. Carrier information

	Element	Description
1	Plate jurisdiction	Province/state shown on license plate of the power unit
2	For-hire/private	Whether the truck moves its own goods or other companies' goods
3	Owner-operator	Denotes whether the trucker owns his truck
4	Driver province/state	Province/state where the driver resides
5	Truck base	Province/state where the truck is normally based

3. Cargo information

	Element	Description
1	Shipments	Number of shipments on board
2	Cargo weight	Weight of the cargo

3	Cargo volume	Estimate of the percentage of the available cargo volume that is occupied
4	Heaviest commodity classification	Classification of heaviest commodity according to an aggregated SCTG commodity grouping (14 groups) – See Annex I
5	Other commodities onboard	Percentage of total cargo weight accounted for by other commodities onboard
6	Dangerous Goods Class	DG class (1-9 and sub-classes)
7	Dangerous Goods Code	UN Dangerous Goods code

4. Trip information

	Element	Description
1	Origin of the heaviest commodity	U.S. county/Canadian Census Division in which the heaviest commodity was picked-up
2	Type of facility at origin of the heaviest commodity	Description of the facility at which the heaviest commodity was picked-up (e.g. terminal, warehouse, plant)
3	Destination of the heaviest commodity	U.S. county/Canadian Census Division in which the heaviest commodity was dropped-off
4	Type of facility at destination of the heaviest commodity	Description of the facility at which the heaviest commodity was dropped-off (e.g. terminal, warehouse, plant)
5	Last stop*	Last place that the truck stopped before being interviewed
6	Next stop*	Expected place that the truck will stop next after being interviewed
7	Border crossing	Place where the truck crossed the Canada-U.S. border
8	Data Collection Site	Description of the place where the survey was conducted
9	Trip distance	Distance of the trip for the heaviest commodity
10	Sample weight	Number of trips in the population represented by the sampled truck. (Used to expand the sample to the population totals)
11	Start time of trip	Estimated time the heaviest commodity was picked up
12	Stop time of trip	Estimated time the heaviest commodity was dropped off

* Not obtained during interviews in Western Canada

Note that Latitude/Longitude coordinates will be provided for each point listed in Part 4 and that a tool for calculating the variability in the estimates will also be provided.

II. Trip routing

All trip route itineraries will be validated during the data cleaning process. All routes created in the survey application using MapPoint will be converted into a corresponding route object in TransCAD. Transport Canada proposes to use the following cartographic files for trip routing: Canada – National Road Network (V. 1.0); U.S.- National Highway Planning Network (V. 2005-08). All routes will then be stored in a TransCAD route system (.rts file) of the following form:

	Element	Description
1	Survey ID	ID of the sampled trip

2	Route description	Short description indicating where trip started and ended
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i. Origin-Destination matrix

An origin-destination matrix will be provided showing all movements between origin and destination for each commodity group. The matrix will be provided in two formats: 1) spreadsheet/database; 2) TransCAD matrix (*.mtx). The contents will be the following:

	Element	Description
1	Survey ID	ID of the sampled trip
2	Origin	Origin of heaviest commodity
3	Destination	Destination of heaviest commodity
4	Commodity class	SCTG commodity class aggregation
5	Number of trips	Population estimate of number of trips in O-D-C triplicate
6	Tonnage	Population estimate of the tonnage carried in the O-D-C triplicate
7	Distance	Distance for each O-D-C trip
8	Tonne-km	Population estimate of the tonne-km in the O-D-C triplicate

III. Survey summary

Transport Canada will prepare summary tabulations of the main results from the Roadside Survey. Also to be included will be an explanation of the methodology, and a description of how the survey was conducted in the field.

Annex 1: List of Commodity Groups based on the Standard Classification of Transported Goods (SCTG)

1	Agricultural and food products
2	Minerals, ores, and stone
3	Coal, petroleum and related products
4	Chemicals, pharmaceuticals, fertilizers, plastics, rubber, and related products
5	Logs, wood and related raw products
6	Pulp, Paper and Paperboard
7	Non-metallic mineral products
8	Metallic products
9	Machinery, electronic/electrical equipment and precision instruments
10	Vehicles and other transportation equipment
11	Other manufactured products (e.g. textiles, furniture, leather)
12	Waste and scrap
13	Less-than-Truckload, courier, parcels, and mail

14	Unclassified
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