

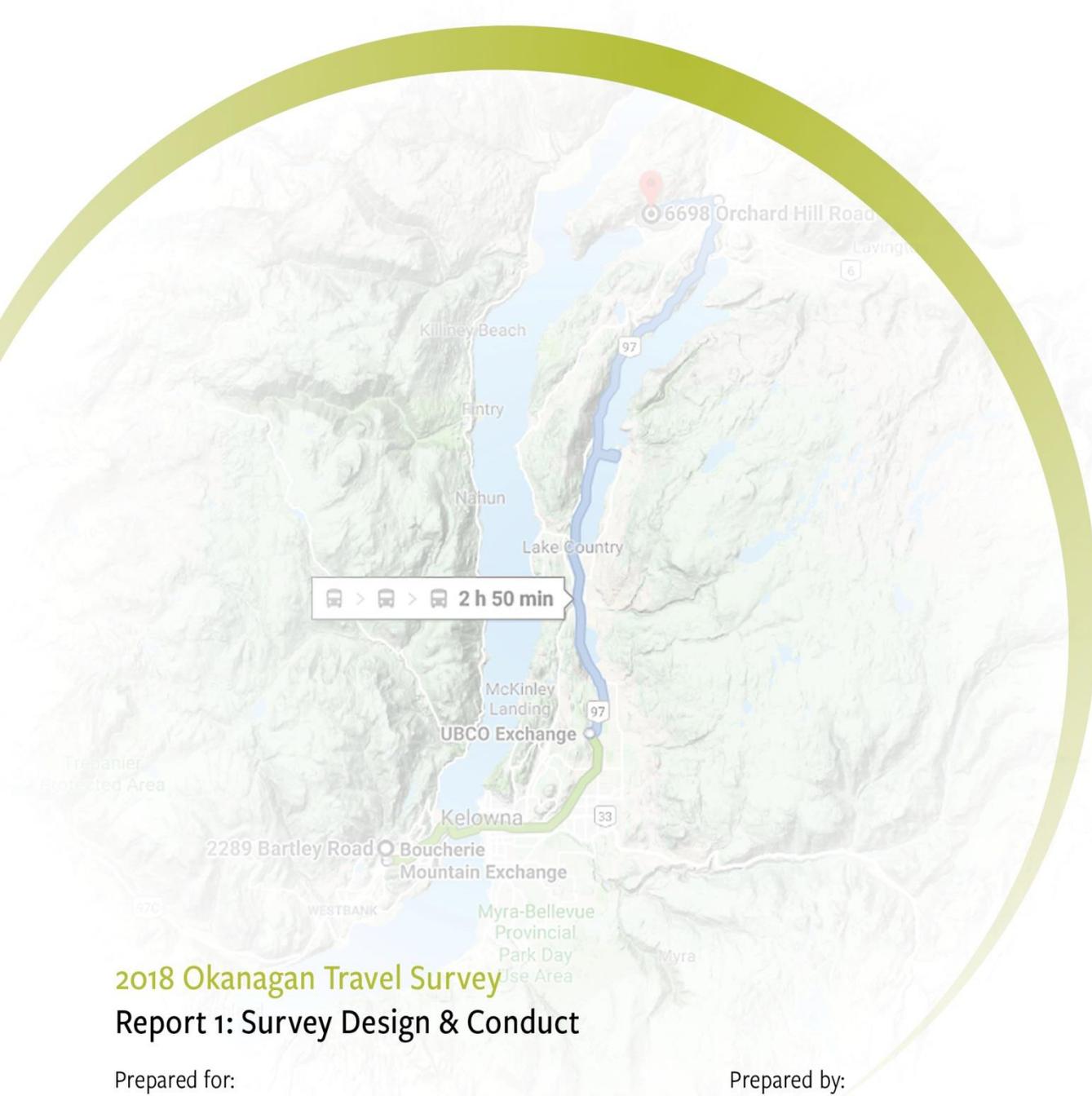


2018 Okanagan Travel Survey

Report 1: Survey Design & Conduct

August 2019





2018 Okanagan Travel Survey Report 1: Survey Design & Conduct

Prepared for:
 City of Kelowna
 City of Vernon
 City of West Kelowna
 Westbank First Nation
 District of Lake Country
 District of Peachland
 Regional District of Central Okanagan
 BC Ministry of Transportation and Infrastructure

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Ministry of
 Transportation
 and Infrastructure



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This project would not be possible without the contributions of over 4,800 participating households that responded to this survey, via phone interview or online, and told us about their daily travel. We thank you for your participation in the region's third household travel survey; you have contributed to transportation planning data that will be useful for years to come.



1 Project Overview

1.1 Project Background

The 2018 Okanagan Travel Survey (OTS) is an initiative of the City of Kelowna, City of Vernon, Regional District of Central Okanagan, West Kelowna, Lake Country, Peachland and Westbank First Nation, as well as the BC Ministry of Transportation and Infrastructure. The survey was undertaken with the support of the smartTRIPS program, an initiative of the Sustainable Transportation Partnership of the Central Okanagan (STPCO).

The OTS uses a household travel survey methodology and is carried out every five years in the Central Okanagan and City of Vernon area. The household travel survey model collects information about daily travel for each member of the household's (5 years of age or older) travel on the previous day. The previous data collection cycles of the Okanagan Travel Survey took place in 2007 and 2013. The survey data collected helps provide local municipalities and regional planners with information critical for making data-based decisions on improvements to transportation infrastructure and services as well as transportation planning and investment decisions.



The Regional District of Central Okanagan, West Kelowna, Lake Country, Peachland and Westbank First Nation, as well as the BC Ministry of Transportation and Infrastructure are responsible for collecting, analysing and distributing data that helps inform decision-makers with regard to transportation systems, planning and infrastructure. Transportation research and origin-destination studies can help to track growth trends in communities. An important input to forecasting models is a profile of residents' travel behaviour, and how this changes over time. Origin-destination (O-D) surveys are commonly used by municipalities and urban areas around the world to develop these types of transportation profiles.

Similar to the goals of the 2007 and 2013 Okanagan Travel Surveys, the 2018 OTS data collected forms a database of resident travel behaviours that can be used as a basis for policy development and transportation planning across the Central Okanagan and The City of Vernon. The 2018 OTS also supports the broader goals of monitoring regional travel patterns in the area, and the development of a regional transportation demand model for the region.

1.2 2018 Okanagan Travel Survey

The 2018 OTS was conducted between late October and mid December of 2018. The survey was a 24-hour recall household travel survey that captured household characteristics, the demographics of all household members, and the details of travel undertaken by household members 5+ years of age on the most recent previous weekday. Respondents could complete the survey online or over the telephone. An address-based sample of households was randomly selected and invited to participate by letter, with some households with matched phone numbers also contacted by phone to target selected areas with low online response rates.

The 2018 survey captured information on 4,886 households, 10,801 people, and 30,299 trips, after data validation and rejection of surveys with data issues. When weighted to compensate for non-response



bias and expanded to the population, the survey data represent approximately 237,300 residents of 102,600 households in the study area, for a sampling rate of 4.8% of households or 4.6% of the population living in private residences.¹ The trip data captured by the survey provide a snapshot of 24-hour travel patterns of residents of the study area over the course of a typical fall weekday.

Overall, the household-level survey results are subject to a margin of sampling error of $\pm 1.7\%$ at a 95% confidence level, taking into account the effects of data weighting.² The margin of sampling error for results for the three sub-area geographies analyses is $\pm 2.3\%$ for the City of Kelowna, $\pm 3.3\%$ for the rest of the Central Okanagan, and $\pm 4.1\%$ for the City of Vernon.

1.3 Report Organization

This report is one of three that document the survey methodology, dataset, and results. The three reports are:

- *Report 1: 2018 Okanagan Travel Survey – Survey Design and Conduct*
- *Report 2: 2018 Okanagan Travel Survey – Survey Database*
- *Report 3: 2018 Okanagan Travel Survey – Analysis of Survey Results and Trends*

This report presents the methodology used to conduct the 2018 Okanagan Travel Survey. The remainder of this report is organized into the following sections:

Section 2: Survey Geography

Section 3: Survey Design

Section 4: Survey Implementation

Section 5: Data Processing

Section 6: Comparisons with 2007 and 2013 Survey Cycles

¹ Excludes approximately 2.4% of the population living in collective residences (senior's care homes, university residences, group homes, prisons, barracks, etc.) or who are homeless.

² 19 times out of 20, for a given survey question, the survey result should be somewhere within the margin of error of the survey results. The margin of error has been corrected to take into account the increase in error associated with data weighting to correct for over-/under-sampling and/or non-response bias.



2 Survey Geography

2.1 Survey Scope

The 2018 study area consists of the six communities in the Central Okanagan (City of Kelowna, Regional District of Central Okanagan, West Kelowna, Lake Country, Peachland and Westbank First Nation), the City of Vernon, and the Okanagan Indian Band lands within these bounds (Duck Lake Indian Reserve No. 7, bordering Lake Country and Kelowna, and Priest's Valley Indian Reserve No. 6 bordering Vernon). The daily travel patterns and socioeconomic characteristics of residents of households in the study area were captured through the survey. The Study Area is shown in [Figure 1](#).

A random sample of households across the Central Okanagan and Vernon was surveyed.

For analysis, most survey results are summarized for three sub-regions: **Vernon**, **Kelowna**, and **Other Central Okanagan** (comprising all other communities in the Central Okanagan, excluding Kelowna).

For the purposes of defining trips external to the study area, a wider geographical 'Travel Area' was developed ([Figure 2](#), following page), so that relatively local trips to, from, and within nearby communities are accounted for, and only trips well beyond the study area bounds are considered true 'external trips'.

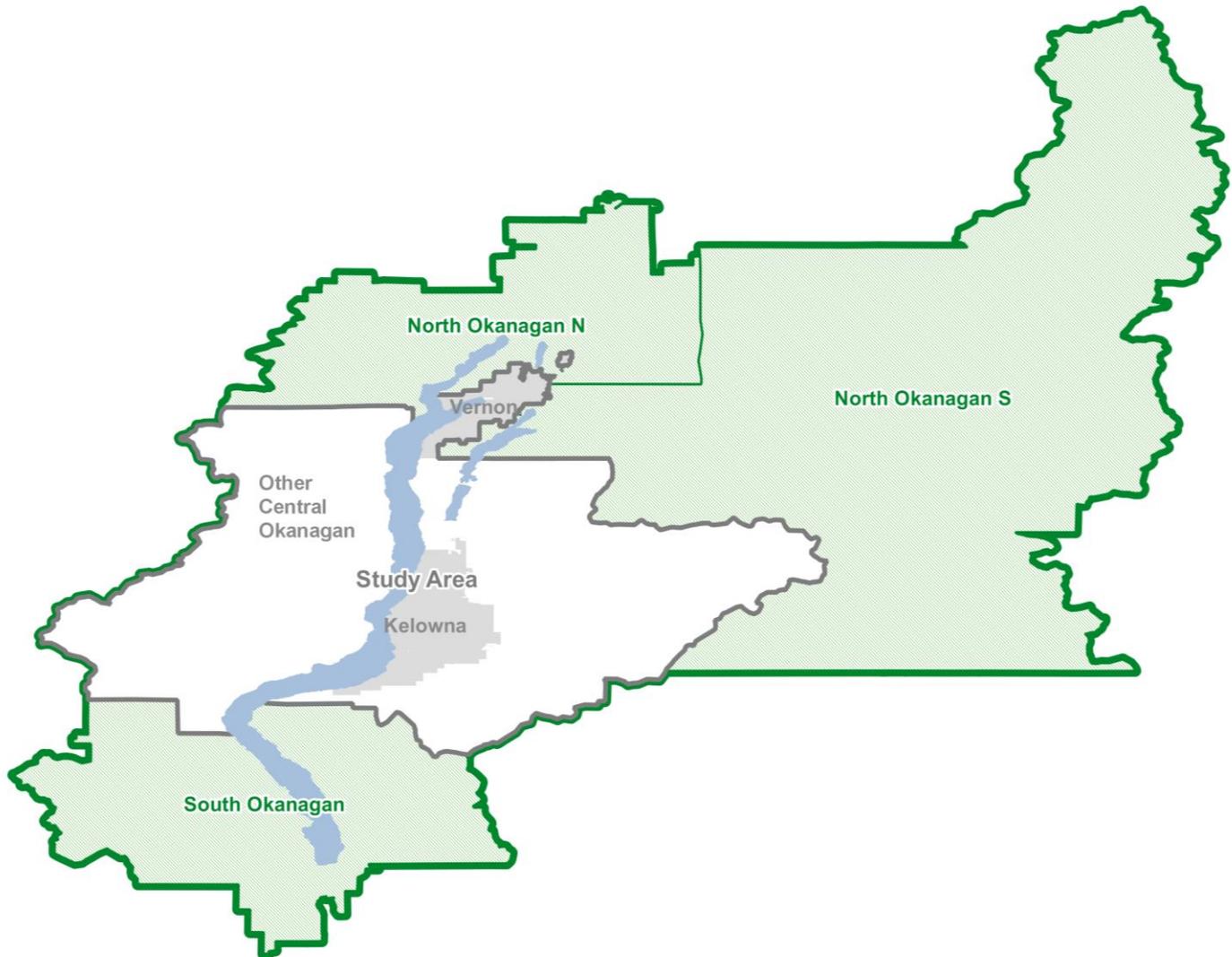
Figure 1. Study Area





The Travel Area includes a wider boundary around the study area to encompass parts of the North and South regions of the Okanagan. The Okanagan South travel area includes Summerland and nearby areas in the Okanagan-Similakeen Regional District. To the North, the Travel Area includes two areas outside the study area: North Okanagan South (including Coldstream, Lumby and other areas more likely to approach Vernon from the South or East) and North Okanagan North (including Armstrong, Enderby, and other nearby areas more likely to approach Vernon from the North).³ The map below shows the external areas and also the three sub-areas in the study area that are the focus of much of the analysis.

Figure 2. Travel Area



³ It may be noted that a similar approach was taken in the 2013 cycle of the Okanagan Travel Survey, where trips within the local study area as well as beyond to North Okanagan, South Okanagan and some surrounding external areas adjacent to the Okanagan Valley were included in the capture and reporting of trips, although the boundaries differed somewhat.



2.1 Sampling Geographies

For the purpose of survey sampling and targeting during survey administration, the study was divided into 33 geographies based on Statistics Canada Aggregated Dissemination Areas (ADAs) and Census Subdivisions. These geographies were adopted for convenience and to ensure that the survey obtained an even distribution of survey completions across the study area, with the understanding that the geographies would be further aggregated or redeveloped for the data weighting and analysis. The sampling geographies are detailed in the section of this report on sampling ([Section 3.3](#), [Table 2](#) and [Table 3](#)).

2.2 Survey Geographies

The travel area is organized into various levels of geography ([Table 1](#) below and continued on the next page). ‘Municipal sectors’ aggregate First Nations communities with municipal boundaries they are located within or adjacent to. In total, 19 sub-municipal ‘districts’ within these sectors were used for data weighting as well as for selected analyses that illustrate the pattern of results within municipalities and sub-areas. The districts within Kelowna, West Kelowna, and Vernon are mapped in [Figure 3](#) (page 12). It may be noted that the 2013 cycle of the Okanagan Travel Survey did not undertake analysis by the same sub-municipal districts.

Most analysis is undertaken for three ‘sub-areas’ which are easily identifiable from the municipal sectors below: **Vernon** (‘Vernon+’ municipal sector), **Kelowna** (‘Kelowna+’ sector), and **Other Central Okanagan** (aggregating all other sectors within the Central Okanagan).

Table 1. Travel Area Geographies

Travel Area	Census Division	Municipal Sector	Census Subdivision	District	
Study Area	Vernon (part of RD of North Okanagan)	Vernon+	City of Vernon	1001	City Core / Alexis Park / Harwood / North Vernon
				1002	East Hill / Middleton / Mission Hill
				1004	Outlying Areas
				1003	Landing / Bella Vista / Turtle Mountain / Priest’s Valley 6
					Priest’s Valley 6
	Central Okanagan	Lake Country	Lake Country	2000	Lake Country
				Kelowna+	City of Kelowna
		3002	Central Kelowna		
		3003	Glenmore		
		3004	Rutland		
		3005	Mission		
		3006	Black Mountain / Southeast		
		3007	Kelowna North		
		3008	Duck Lake 7		
		Westside	City of West Kelowna	4001	Glenrosa / Westbank
				4002	Rose Valley / Lakeview
				5001	Westbank First Nation (WFN)
				Tsinstikeptum 10	
		6000	Peachland		
7000	Central Okanagan J				
RDCO East	Central Okanagan	8000	Central Okanagan		



Travel Area	Census Division	Municipal Sector	Census Subdivision	District	
North Okanagan	(portion of RD of North Okanagan)		Coldstream, Lumby, North Okanagan B (portion), C (portion), D, and E	10001	North Okanagan – South
			Spalumcheen DM, Armstrong, Enderby, Okanagan B (portion) and C (portion), Enderby 3, Harris 3, Okanagan (Part) 1	10002	North Okanagan – North
South Okanagan	(portion of Okanagan Similkameen RD)		Summerland, Okanagan-Similkameen E, Okanagan-Similkameen F.	11000	Okanagan South
External				99999	External

RD = Regional District RDCO = Regional District of Central Okanagan

+ = sector is defined by the municipal boundaries plus First Nations communities within/adjacent to the municipal boundaries.

Within Vernon, the sub-municipal districts used for reporting purposes are aggregations of neighbourhoods within the City of Vernon, plus Priest's Valley, as follows:

1001 City Core / Alexis Park / Harwood / North

Vernon:

Alexis Park
Anderson Business Park
City Core
Community Hill
Harwood
Macdonald Road
North Vernon
West Vernon

1003 Landing / Bella Vista / Turtle Mountain /

Priest's Valley:

Airport/Marshall Fields
Bella Vista/Scott Rd
Davison Rd
Fulton View
Lakeridge
Paddlewheel/Longacre
South Vernon
Turtle Mtn
Waterfront Area
Westmount
Priest's Valley (Okanagan Indian Band lands)

1002 East Hill / Middleton / Mission Hill:

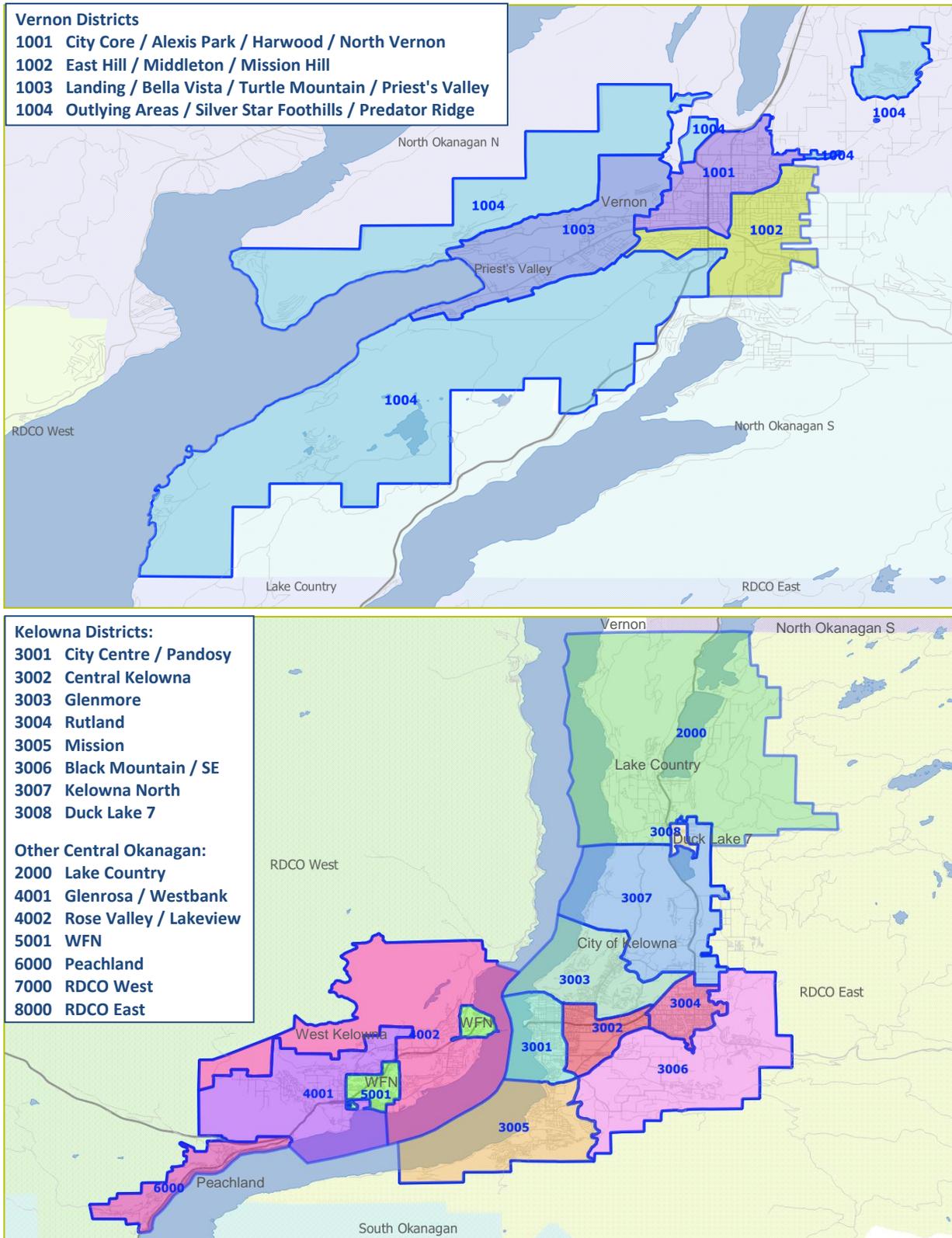
Browne Rd
Country Club Estates
Kal Lake Rd
Middleton Mtn
Mission Hill
North East Hill
South East Hill

1004 Outlying Areas / Silver Star Foothills / Predator Ridge:

Adventure Bay Point
Beverly Estates
Blue Jay
CLD
Commonage Range
DND Lands
Eastside Rd
Ellison Park/Outback
Forest Research Centre
Mission Rd
Okanagan Landing Rd
O'Keefe Range
Predator Ridge
Silver Star Foothills
Spray Irrigation Lands
Sunset Properties
The Rise
Tronson Properties
Tronson Rd



Figure 3. Sub-Municipal Districts





2.3 Data Weighting Geographies

It may be noted that the Statistics Canada Dissemination Area (DA) geographies used to aggregate Census data by district for data weighting purposes occasionally differed from the Vernon neighbourhood boundaries used to form the districts used for reporting purposes. Thus, within Vernon only, the boundaries of the aggregate weighting districts differed slightly from the reporting districts. For weighting purposes, in areas where a DA boundary overlapped two reporting districts, the DA and all households in the DA were assigned to one district only. However, for reporting purposes the surveyed households within the DA were assigned to whichever reporting district they fell within. As the overlaps were few and covered small numbers of households, this should not make much difference in the overall household counts and analysis by district. For all other districts outside of Vernon, the DA aggregations used for weighting fit the boundaries of the districts used for reporting.



3 Survey Design

3.1 Overview

A travel survey captures the trips made by residents of an area over the course of a 24-hour working weekday. This activity is expressed as a person-trip for a particular purpose between an origin and a destination. The trip is made using one or more transportation modes at a specific time. *The 2018 Okanagan Travel Survey* allowed for up to five modes to be captured per trip; if transit was selected as one of the modes in a trip record, up to five transit routes could be selected.

The 2018 survey was a household-based survey that collected demographic information on all household members and trip information for household members 5 years of age and older. The survey employed a 24-hour recall method that asked survey respondents to report on their trips on the previous weekday, from 4:00 a.m. on the previous day to 3:59 a.m. the next day.

Household travel surveys capture factual information on household characteristics, demographics, and the details of trips across a single day.

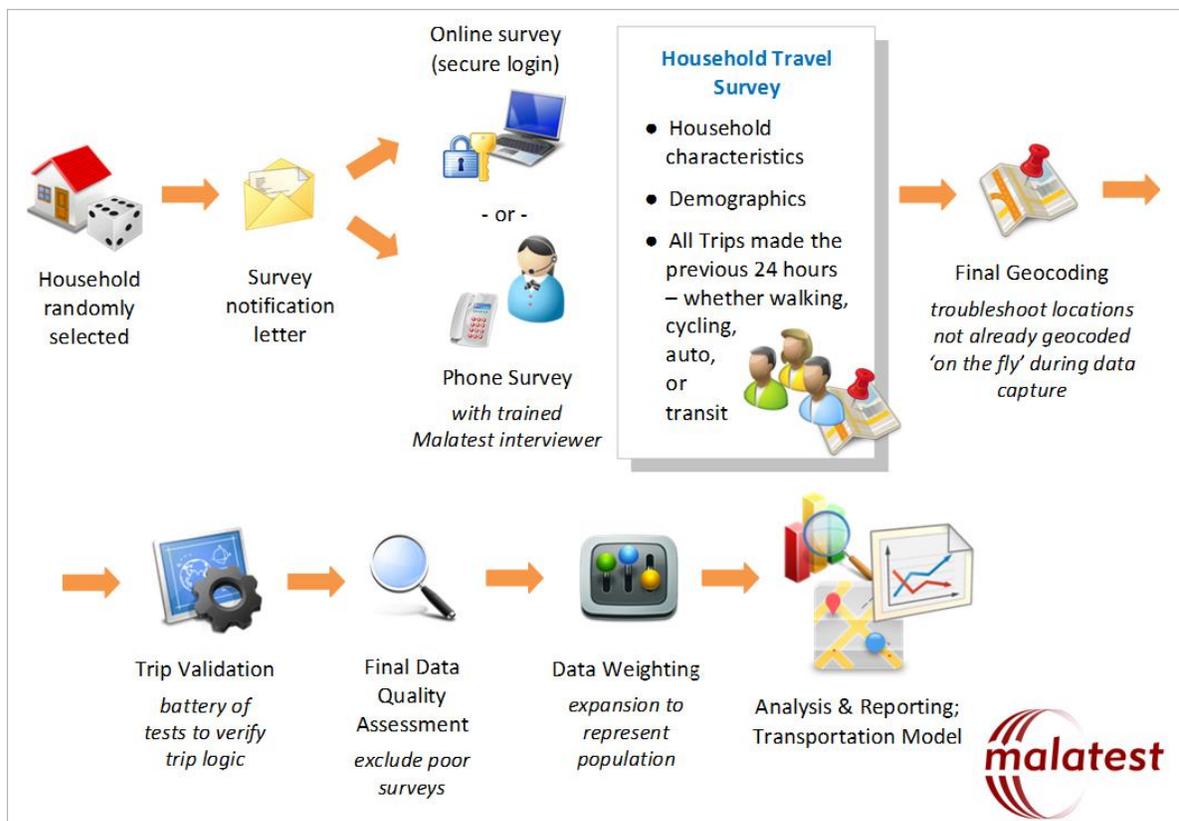
In addition to capturing travel characteristics, the survey also gathers demographic information about the respondents and the households in which they live. These data points are used to expand and validate the survey responses as well as to develop a profile of travel behaviour. Demographic data compliments the travel data collected, as travel and demographic characteristics are related to each other.

The survey could be completed online or over the phone. The survey was conducted using Malatest's Triptelligence™ system, an integrated CATI/CAWI (computer assisted telephone/web interview) system incorporating Google Maps and data handling features developed specifically for origin-destination surveys. A project toll-free help-line was established for respondents to call in and complete the survey by phone if they preferred, and for project staff to answer questions about the survey. A telephone scripted version of the survey was programmed to allow interviewers to administer the survey quickly and responsively.

The diagram below in **Figure 4** illustrates the general process for the household travel survey after completion of the initial planning stages. The survey process is discussed in further detail in later sections of this report.



Figure 4. Survey Process



3.2 Population Sample Frame

The population frame for the 2018 OTS included all private households within the study area with a mailable residential address. As outlined in Section 2 of this report, the study area encompasses the Central Okanagan area, including City of Kelowna, West Kelowna, Lake Country, Peachland and Westbank First Nation, and the City of Vernon.

All persons normally residing within each sampled household in the study area were included in the sample frame. In the case of people with more than one normal residence (e.g., children in shared custody), these individuals were included if they were present in the household on the day for which travel data was collected. Detailed trip data were only collected for individuals five years of age or older, as it is assumed that younger children would generally be accompanied by an older individual for their travel. For children under the age of five the survey collected some limited demographic data (such as age and gender), and asked the respondent whether or not the household member(s) under age five travelled at all on the travel day. Additional reasoning for limiting data collection to older individuals is the reluctance of some respondents to provide potentially sensitive information about the activities of younger children. It may be noted that the sampling frame does not include the small proportions of the population that are housed in collective dwellings or institutional settings or who are homeless.



3.3 Sample Design and Sample Selection

To obtain coverage of all households in the study area, including cell-phone-only households, an address-based sampling approach was taken. Households were randomly selected from databases of mailable residential addresses, with a portion of these households having only address listings (address-only), while a portion had addresses that could be matched to listed phone numbers (address-and-phone). While addresses outside of the City of Kelowna were drawn from Canada Post address databases, addresses within the City of Kelowna came from a city-provided address database, as the City had good enumeration of addresses with unit numbers.

Households were sent survey invitation letters with secure access codes and instructions for completing the survey online or over the telephone, although the emphasis was on online completion. Those with listed landlines in areas with low response may have received follow-up telephone calls to complete the survey over the telephone or encourage online completion.

The study area was divided into sampling districts as shown in **Table 2** which generally consisted of individual aggregated dissemination areas (ADAs). The next stage in the sampling plan was to allocate the budgeted target surveys to the various sampling districts so as to ensure a sample that would be both

The survey targeted a 4.3% sampling rate in most areas, with some over-sampling in areas with small populations.

(a) broadly representative of the population of the entire study area, and (b) for each Census Subdivision (CSD), large enough to result in a reasonable margin of error. In order to accomplish this goal, CSDs with smaller populations were oversampled to ensure that the theoretical margin of sampling error is less than $\pm 5.0\%$ within each sub-area and less than $\pm 6.5\%$ within most sampling districts. Notable exceptions include the small area of Silver Star in Vernon, which has only a population of 10, or the low population areas of Duck Lake, Central Okanagan East, and Central Okanagan West, each of which had a sampling rate greater than 8%.

A total of 53,678 survey invitation letters were sent throughout the survey administration period, with 41,100 sent to address-only listings and 12,578 sent to address-and-phone listings (addresses that could be matched to a listed landline).

Phone follow-up was undertaken with a portion of the address-and-phone sample in order to target specific sampling districts that had lower-than-expected response rates. Overall, across both sample types, the survey had a 9.3% response rate before the rejection of invalid surveys.

Survey targets were exceeded for the majority of sampling districts, with the overall survey target exceeded by 9% overall, for an overall 4.8% sampling rate. Of the 33 sampling districts, only three districts achieved less than 95% of target (Springfield/Spall, Duck Lake, and Central Okanagan East). In the data expansion, data weighting was applied to balance the expanded sample by geography.



Table 2. Sampling Plan by Sampling District

Sampling District	ADA	Population 2011 Census	Population 2016 Census	CAGR (2011- 2016)	House- holds 2016	Est. House- holds 2018*	Target Sampling Rate	Target Surveys	Est. Sample Error (±%)**	
101	Kelowna Fringe (Ellison - SE)	59350003 ⁽⁵⁾	6,324	6,512	0.6%	2,255	2,282	4.3%	98	9.7%
102	Glenmore - Wilden - McKinley	59350004	14,074	15,429	1.9%	6,237	6,471	4.3%	277	5.8%
103	Dilworth - University	59350006	6,395	7,289	2.7%	3,034	3,197	4.3%	137	8.2%
104	Downtown - North Central	59350010	6,346	7,195	2.5%	3,820	4,017	4.3%	172	7.3%
105	Old Glenmore	59350011	7,884	8,939	2.5%	3,828	4,025	4.3%	172	7.3%
106	Rutland North	59350014	9,333	9,584	0.5%	3,542	3,580	4.3%	153	7.8%
107	South Central	59350015	9,327	9,798	1.0%	5,042	5,142	4.3%	220	6.5%
108	Capri - Guisachan	59350016	7,198	7,738	1.5%	3,948	4,064	4.3%	174	7.3%
109	Springfield/Spall	59350018	6,533	6,777	0.7%	3,469	3,520	4.3%	151	7.8%
110	Rutland Centre	59350019	7,636	8,150	1.3%	3,738	3,837	4.3%	164	7.5%
111	Rutland South	59350020	9,380	9,636	0.5%	3,633	3,672	4.3%	157	7.7%
112	Lower Mission	59350021	9,325	10,414	2.2%	4,362	4,559	4.3%	195	6.9%
113	Black Mountain - South East	59350022	8,539	9,583	2.3%	3,570	3,739	4.3%	160	7.6%
114	Upper Mission	59350023	8,628	9,961	2.9%	3,292	3,487	4.3%	149	7.9%
115	Duck Lake ⁽¹⁾	59350005	1,917	1,664	-2.8%	852	805	10.6%	85	10.1%
200	Lake Country	59350002	11,708	12,922	2.0%	5,094	5,299	4.3%	227	6.4%
300	Peachland	59350017	5,200	5,428	0.9%	2,458	2,501	5.2%	130	8.4%
400	Central Okanagan East	59350003⁽⁵⁾	3,795	3,824	0.2%	1,518	1,523	8.3%	126	8.4%
500	Central Okanagan West (J)	59350001⁽⁶⁾	1,947	1,981	0.3%	901	907	13.1%	119	8.4%
601	West Kelowna Fringe	59350001 ⁽⁶⁾	5,551	6,068	1.8%	2,171	2,250	4.3%	96	9.8%
602	West Kelowna N	59350007	6,780	7,460	1.9%	2,790	2,899	4.3%	124	8.6%
603	West Kelowna W	59350008 ⁽⁷⁾	10,969	11,243	0.5%	4,378	4,421	4.3%	189	7.0%
604	West Kelowna S	59350012	7,702	7,980	0.7%	3,134	3,179	4.3%	136	8.2%
605	West Kelowna Memorial Park	59350601	-	-	-	-	-	-	-	-
701	Westbank FN 1 ⁽²⁾	59350013	5,872	7,612	5.3%	3,649	4,048	4.3%	173	7.3%
702	Westbank FN 2 ⁽²⁾	59350009	1,186	1,416	3.6%	571	613	4.3%	26	18.8%
801	Vernon Silver Star 1	59370009	1,361	1,710	4.7%	634	695	4.3%	30	17.5%
802	Vernon Silver Star 2	59370011	-	10	n/a	5	5	4.3%	1	98.0%
803	Vernon Inner W	59370010	7,545	7,585	0.1%	3,722	3,730	4.3%	160	7.6%
804	Vernon Inner E	59370012	8,985	9,429	1.0%	3,875	3,950	4.3%	169	7.4%
805	Vernon West	59370008	8,281	8,667	0.9%	4,118	4,194	4.3%	179	7.2%
806	Vernon South West	59370014	11,978	12,715	1.2%	5,444	5,576	4.3%	239	6.2%
807	Priest's Valley ⁽³⁾	59370013	598	628	1.0%	303	309	4.3%	13	26.6%
Total			218,617	235,347	1.5%	99,387	102,496	4.5%	4,601	1.4%
Subtotals:										
100	Kelowna + Duck Lake⁽⁴⁾		119,229	129,044	1.6%	54,755	56,397	4.4%	2,464	1.9%
600	West Kelowna⁽⁴⁾		30,902	32,655	1.1%	12,437	12,749	4.3%	545	4.1%
700	Westbank FN⁽⁴⁾		7,058	9,028	5.0%	4,220	4,661	4.3%	199	6.8%
800	Vernon + Priest's Valley⁽⁴⁾		38,778	40,744	1.0%	18,101	18,459	4.3%	791	3.4%

ADA = Aggregated Dissemination Area; CAGR = compound annual growth rate; Households = private dwellings occupied by usual residents

(1) Duck Lake 7 - Okanagan Indian Band. Census Subdivision (CSD) sits between Lake Country and Kelowna. Grouped with Kelowna sub-area for analysis.

(2) Tsinstikeptum 9, 10 - Westbank First Nation. Both CSDs sit within the West Kelowna boundaries.

(3) Priest's Valley 6 - Okanagan Indian Band. Grouped with Vernon sub-area for analysis.

(4) Sub-area population and household totals based on CSD-level data. Slight differences between the sum of the individual ADAs and the sub-area totals may be the result of slightly different geographical definitions

(5), (6) ADAs split across the boundaries of the sampling districts. Population and household counts estimated by aggregating Dissemination Areas (DAs)

(7) A small part of ADA 59350008 in West Kelowna extends into Central Okanagan West, however, it only accounts for 100 population, or potentially 4 survey completions, so not enough to overly influence the survey targets.

* The population growth rate has been applied to scale up dwellings counts from 2016 to 2018. It is likely that the growth rate for dwellings is greater than that for population. More precise estimates were not within project scope.

** The actual measurement for the total population would be expected to be within ± the sampling error of the survey result at a 95% confidence level (19 times out of 20). Due to the design effects associated with unbalanced response rates by household size, dwelling type and age group, the actual sampling error after application of data weights will be higher.



Table 3. Survey Completions by Sampling District

Sampling District	Est. Households 2018	Addresses Sampled	Target Surveys	Surveys Completed	Response Rate	% of Target	Rejected Surveys	Valid Surveys	Final Sampling Rate
101 Kelowna Fringe (Ellison - SE)	2,282	1,238	98	148	12.0%	151%	4	144	5.6%
102 Glenmore - Wilden - McKinley	6,471	2,401	277	299	12.5%	108%	1	298	4.6%
103 Dilworth - University	3,197	1,320	137	134	10.2%	98%	6	128	4.2%
104 Downtown - North Central	4,017	2,598	172	187	7.2%	109%	4	183	4.6%
105 Old Glenmore	4,025	1,546	172	185	12.0%	108%	2	183	4.5%
106 Rutland North	3,580	2,339	153	166	7.1%	108%	4	162	4.6%
107 South Central	5,142	2,334	220	229	9.8%	104%	3	226	4.4%
108 Capri - Guisachan	4,064	1,889	174	206	10.9%	118%	5	201	4.5%
109 Springfield/Spall	3,520	1,107	151	127	11.5%	84%	2	125	4.1%
110 Rutland Centre	3,837	2,165	164	160	7.4%	98%	6	154	4.2%
111 Rutland South	3,672	2,391	157	182	7.6%	116%	1	181	4.9%
112 Lower Mission	4,559	2,330	195	245	10.5%	126%	8	237	5.3%
113 Black Mountain - South East	3,739	1,617	160	165	10.2%	103%	8	157	4.3%
114 Upper Mission	3,487	1,349	149	163	12.1%	109%	3	160	4.6%
115 Duck Lake	805	1,159	85	80	6.9%	94%	2	78	12.0%
200 Lake Country	5,299	2,825	227	257	9.1%	113%	6	251	4.8%
300 Peachland	2,501	1,467	130	143	9.7%	110%	2	141	5.7%
400 Central Okanagan East	1,523	1,467	126	108	7.4%	86%	3	105	7.9%
500 Central Okanagan West (J)	907	1,212	119	122	10.1%	103%	1	121	11.9%
601 West Kelowna Fringe	2,250	976	96	92	9.4%	96%	2	90	4.1%
602 West Kelowna N	2,899	1,289	124	127	9.9%	102%	4	123	4.4%
603 West Kelowna W	4,421	2,622	189	202	7.7%	107%	6	196	4.6%
604 West Kelowna S	3,179	1,842	136	159	8.6%	117%	2	157	5.0%
605 West Kelowna Memorial Park	-	-	-	-	-	-	-	-	-
701 Westbank FN 1	4,048	2,393	173	174	7.3%	101%	7	167	4.2%
702 Westbank FN 2	613	493	26	34	6.9%	131%	-	34	5.2%
801 Vernon Silver Star 1	695	209	30	40	19.1%	133%	-	40	5.3%
802 Vernon Silver Star 2	5	3	1	1	33.3%	100%	-	1	19.9%
803 Vernon Inner W	3,730	2,500	160	174	7.0%	109%	3	171	4.6%
804 Vernon Inner E	3,950	1,824	169	196	10.7%	116%	5	191	5.0%
805 Vernon West	4,194	1,949	179	198	10.2%	111%	2	196	4.5%
806 Vernon South West	5,576	2,605	239	274	10.5%	115%	4	270	4.9%
807 Priest's Valley	309	219	13	16	7.3%	123%	1	15	5.2%
Total	102,496	53,678	4,601	4,993	9.3%	109%	107	4,886	4.8%
Subtotals:									
100 Kelowna + Duck Lake	56,397	27,783	2,464	2,676	9.6%	109%	59	2,617	4.7%
600 West Kelowna	12,749	6,729	545	580	8.6%	106%	14	566	4.6%
700 Westbank FN	4,661	2,886	199	208	7.2%	105%	7	201	4.4%
800 Vernon + Priest's Valley	18,459	9,309	791	899	9.7%	114%	15	884	4.8%

Note: For certain districts the number of addresses sampled exceeds the estimated number of households in the given sampling district due to imprecision in the pre-geocoding of addresses to sampling district and/or imprecision in estimating the dwelling counts for ADAs that were split by sampling district boundaries.



3.4 Survey Instrument

The survey instrument for the 2018 OTS is a 24-hour recall survey. The key part of the survey was for respondents to provide detailed information about all trips taken by members of their household on the weekday prior to the day of the survey interview or online survey completion. Specifically, respondents were asked about trips beginning in the 24-hour period between 4:00 a.m. on the day prior to the survey and 3:59 a.m. on the day of the survey. This recall methodology minimizes the biases associated with remembering one's activities in the past. This approach also ensures no pre-selection of travel dates is possible. This limits the potential for a respondent to report on a particular travel date, which ultimately can bias the data if respondents selectively report their travel activities.

The 2018 OTS survey instrument consisted of three main sections (refer to **Appendix B** for the full survey instrument):

Household level

- ✓ Confirm have reached appropriate person to complete the survey. (Online: also confirm at least 16 years of age).
- ✓ Confirm phone number
- ✓ Travel day surveyed (date and day of week)
- ✓ Confirm address (Geocode home XY coordinates)
- ✓ Dwelling type
- ✓ Number of householders
- ✓ Number of vehicles available to householders (includes company vehicles, lease or own, motorcycles, light trucks, but not recreational vehicles like RVs, UTVs, or snowmobiles)
- ✓ Number of motor vehicles of each type (passenger car, SUV, pickup truck or van, motorcycle, other)
- ✓ Number of motor vehicles of each fuel type (if has vehicles)
- ✓ Number of working bicycles available to householders
- ✓ Household Income (asked at end of survey, after trip capture)

Person level – for each person in the household

- ✓ Identifier (respondent's preference – first name, initial, relationship, or other identifier) for reference in survey questions
- ✓ Gender
- ✓ Age
- ✓ If age refused, Age Range within a 5-year range
- ✓ Driver's license (yes/no)
- ✓ Student status (f/t, p/t)
- ✓ School level (Elementary, High School, College, etc.)
- ✓ School name / location (Geocode school XY coordinates)
- ✓ Employed (yes, no, don't know)
- ✓ Employment status (f/t, p/t, unemployed, retired)
- ✓ Workplace location (employed) (note if home) (Geocode workplace XY coordinates)
- ✓ Type of occupation (if employed)



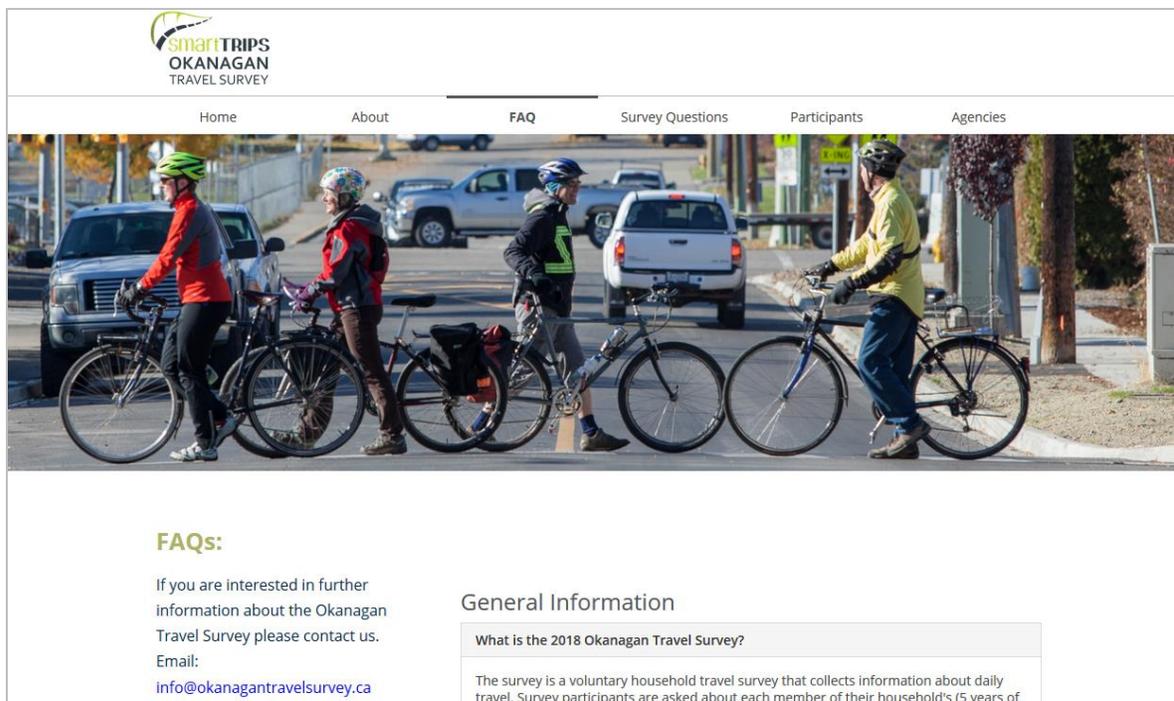
- ✓ Made any trips between 4:00 a.m. yesterday and 3:59 a.m. today

Trip level – for each trip made by each household member 5+ years of age

- ✓ Origin (Geocode origin XY coordinates)
- ✓ Destination (Geocode destination XY coordinates)
- ✓ Trip departure time
- ✓ Trip arrival time
- ✓ Trip purpose (or activity at destination location)
- ✓ Mode of travel (up to five modes)
- ✓ Clarify access and egress modes if transit was chosen without a preceding or next mode entry
- ✓ Transit route(s) (if transit taken) (route name or number)
- ✓ Number of vehicle occupants (if auto driver or auto passenger)
- ✓ Vehicle availability for trip (if not by automobile and household has vehicles)
- ✓ Additional information about trip (open-ended response)

3.5 Survey Websites / Login Portal

A customised website was designed for the 2018 cycle of the survey that featured a study specific URL (<http://okanagantravelsurvey.ca>) for participants to log into their survey. The website featured pages on frequently asked questions, participant information, study incentives, etc. The website featured information regarding the nature of the survey questions, and highlighted the intrinsic value of the research activities being undertaken. A customised email address and toll-free project helpline number were also established to link participants directly to project support staff for assistance.

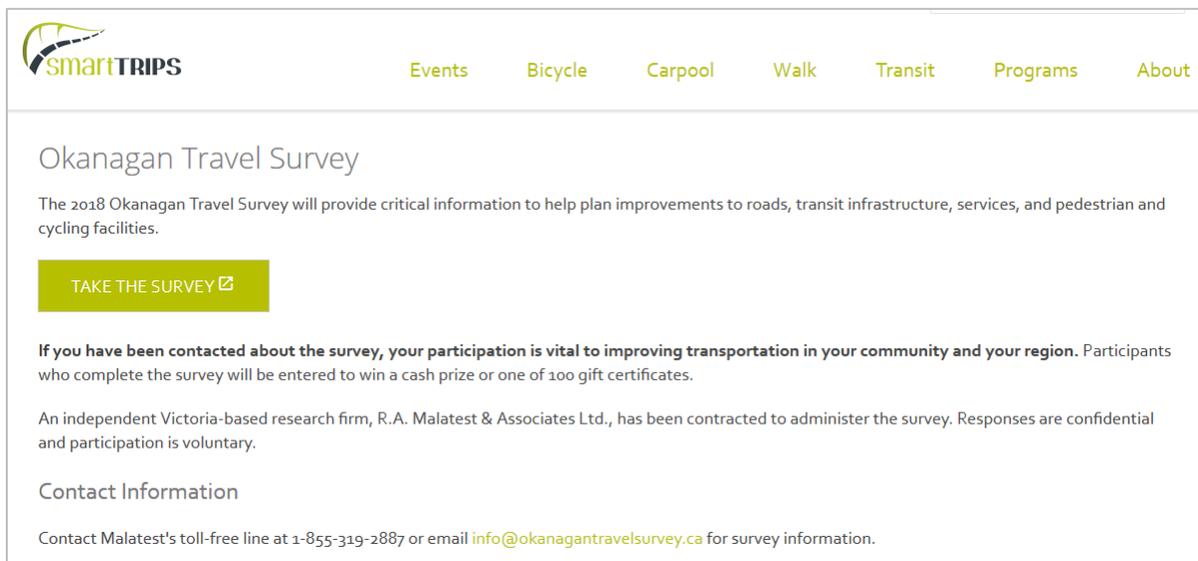




The project website was designed with the objective of aiding online respondents with logging into their survey, encouraging online participation (i.e., boosting online response rates) and to act as an information resource for residents of the Central Okanagan and City of Vernon seeking further information about the study.

Central Okanagan residents received invitation letters directing them to log in via an additional project web page hosted on www.smartTRIPS.ca/travelsurvey. The smartTRIPS website login button redirected participants to the Malatest-hosted project website at okanagantravelsurvey.ca in order to facilitate access to their survey and also to direct web traffic to the smartTRIPS.ca website. This additional website promotion was intended to further brand the survey to residents of the Central Okanagan as part of larger ongoing transportation initiatives in the region. The smartTRIPS project website is pictured below and also featured an FAQ section with common questions asked about the 2018 OTS data collection activities.

City of Vernon residents received instructions in their invitation letter to login directly via the web portal at the okanagantravelsurvey.ca project website pictured earlier.



The invitation letters are included in **Appendix A** of this report with the differences for City of Vernon residents highlighted for reference. Further details about the invitation letters are found in **Section 3.6** of this report.

The development of the branded invitation letters and survey websites complemented the promotional efforts by the partner municipalities' project team via news media press releases and social media updates.



3.6 Invitation Letter

An invitation letter was mailed out to residents within the study area that were randomly selected to participate in the study. The invitation letter also highlighted the survey website and login ID to encourage online participation rates. The invitation letter included information about the project, and a letter customized to the specific area being sampled. Two variations of the invitation letter and three envelope designs were deployed to highlight the municipalities specific to the respondent's local area. City of Kelowna and City of Vernon residents received their letters in envelopes featuring the municipal logo; residents outside of the cities of Vernon and Kelowna received the City of Kelowna version of the invitation letter in a smartTrips branded envelope that featured a listing of all the project partners and messaging on the front that read: ***Help Shape Your Region's Transportation Future.***

The branding of survey invitations was tailored to the municipality of the household invited to participate.

The two variations of the invitation letters are included in **Appendix A**.

The invitation letters were sent out in three flights spaced out a number of days apart over the first two weeks of the survey administration period. This was done to spread the survey completions across days of the week and across the survey administration period. After initial response to Flights 1-3 was assessed, a fourth and a fifth flight were sent out to target areas with lower response.



4 Survey Implementation

4.1 Survey Programming and Testing

Malatest's CallWeb-based Triptelligence™ system was used to conduct both the telephone and online versions of the survey. Once the initial design phase of survey development was finalized, the survey instrument was programmed into the system. Advanced functionality such as pop-up screens and information bubbles were added. Search-as-you-type lists were programmed into the survey instrument for bus routes/bus stops and local school names to be quickly and easily looked up by respondents.

Internal testing of the survey flow was performed to ensure the questionnaire skip patterns were functioning appropriately, all applicable questions for each household member were being answered, and data clarification/validation questions were being triggered when unusual data were entered. The survey instrument's sophisticated logic checks cross-referenced data points captured for each household member from the household, demographic, and trip sections of the survey in order to paint a comprehensive picture of each household member's travel day.

Final checks in the survey testing process involved review of data saved by extracting survey test case data (from completed test cases), then checking that information was being stored properly and crucial data points such as latitude/longitudinal coordinates were properly captured and saved. This process was repeated on survey data captured from respondents during the survey field test.

4.2 Field Test

The field test for the survey was scheduled for October 25th and October 26th, 2018, with survey recruitment conducted entirely by telephone "cold calls" without advance letters being sent. An additional day of field testing was scheduled (October 27) in order to thoroughly test the survey instrument and survey programming. Complimentary goals of the field test included:

- Assessment of the flow and design of the survey from both the interviewer and respondent perspective;
- Determine survey flow rates (completions per hour by interviewer);
- Complete the survey with 20-30 respondents (target completion rate for field test); and
- Compile feedback on suggested improvements to the survey design prior to the full administration launch date.

A total of 396 calls were made during the survey field test resulting in 22 survey completions. On October 27th additional calls were made to bolster the number of completions obtained for the field test. This brought the total number of survey completions to 36 (n calls=613 total with the extended field test dates of October 25th to 27th). It may be noted that the field test was meant to test survey processes and was not intended to provide a definitive idea of the response rate achievable when more than one call attempt is made per household.



Field test participants were asked to provide feedback on the survey, and the overall response was positive. Survey interviewers were also asked to provide feedback on the flow of the survey and note any challenges encountered or questions that required additional clarification or explanation. Interviewers reported that respondents were receptive to the survey and willing to participate. A debriefing session was conducted with the interviewers following the field test to discuss issues that arose. No major modifications were made to the survey programming prior to full survey administration.

4.3 Full Survey Administration

Full survey administration of the 2018 OTS began on October 28, 2018 with the majority of surveying completed by December 7, by which time survey completion targets had been met or exceeded for almost all regions. Limited telephone surveying extended until December 18 in order to attempt to finish partially completed online surveys and to ensure a buffer of extra survey completions within each region to replace any surveys which might later be found to contain unusable data. The online survey was left active for a few additional days to December 22 to allow online respondents with partially completed surveys the opportunity to fill in missing data.

Participants completed the survey online or by phone interview. The great majority of travel dates surveyed were between October 24 and December 6, 2018.

As the 2018 OTS considers only weekday travel, telephone surveying was limited to Tuesday through Saturday, to collect data on Monday through Friday travel. Online respondents were permitted to complete the survey between Sunday and Monday. However, they were required to answer the survey with respect to either the previous Thursday or Friday (this was alternated to avoid having an overcoverage of survey completions on Fridays). No calls were made on Remembrance Day (November 11), as travel on this weekday would be atypical of normal travel patterns. Online surveys were restricted from providing travel for this day also.

Ongoing monitoring was done to identify any shortfall in survey completions for any districts, and survey efforts were adjusted accordingly. In order to account for potentially unusable survey completions, targets were slightly exceeded for most districts. Readers are referred to [Table 3](#) for review of survey completions by sampling district.

The travel dates surveyed span October 24 to December 21, 2018. However, it may be noted that the majority of the surveys (90%) were obtained for travel dates between November 12 and December 6, 2018. It may be noted that the time frame of the 2018 OTS was about one month later than the 2013 survey (23 September to 30 November 2013, with 90% of surveys completed by November 4), and in a different season than the 2007 survey (13 April to 18 May 2007).

By day of week, Thursdays and Fridays are somewhat over-represented compared to Mondays, Tuesdays and Wednesdays. However, trip rates were similar by day of week, and no adjustments were made to the data weighting to rebalance days of the week. Taken as a whole, the data may be considered to be representative of the travel in the region on an average fall weekday in 2018.



Survey invitation letters sent to households in the address-based samples invited them to complete the survey online through a secure web server connected to the survey website's login portal. The questions in the online version of the survey were largely identical to those in the telephone version, with only minor differences to scripting and phrasing of questions. Respondents contacted by telephone who expressed a preference to do the survey online were provided the option to do so, and were e-mailed instructions with a link to the online survey. The mixed-mode telephone/online method maximized opportunities for households to complete the survey.

A prize draw was offered as a way to incentivize participation. The prizes included a grand prize of \$500 cash, and one hundred \$25 gift cards (a choice of three local merchants was offered to winners). The prize draw took place in early 2019. Prize winners who declined their prize were given the option to have the value of their prize donated to a local charity instead. Donations were made to the United Way North Okanagan and the United Way Central Okanagan as a result of some winners declining their gift card prizes.⁴

4.4 Survey Response

In total, 4,993 survey interviews were completed. Across both sample types, the overall gross response rate was 9.3%, prior to survey data review and validation. This level of response is reasonable given that the survey had only a limited budget for targeted telephone interviewing, and the response is higher than the response in the 2013 survey (3.3%).

For the address-only portion of the sample, telephone contact only occurred if the respondent called in to complete the survey over the phone, or if a survey interviewer followed up with an incomplete survey in which the respondent had provided telephone contact information.

A small proportion of the 4,993 surveys were found during data cleaning and validation processes to have irresolvable data issues (too many responses of 'decline' or 'don't know' or too many vague or ambiguous trip origins or destinations). In total, 107 of the survey completions obtained were not useable for data analysis, representing a 2.1% survey rejection rate. After rejection of these surveys, the final survey sample numbered 4,886 surveys, for a valid response rate of 9.1%.

The survey data collection phase exceeded targets, achieving 4,886 validated survey completions (285 surveys above target).

By sample type, the invitations sent to the address-only portion of the sample yielded an 8.1% response rate after rejection of invalid surveys, while the invitations sent to the address-and-phone portion of the sample yielded a 12.2% response rate after rejections. The response to the address-and-phone portion of the sample was higher in part due to the higher online response from this type of sample, as well as due to the targeted phone follow-up in selected districts.

The final results of the survey by sampling district are detailed in **Table 3** (page 10) in the section on sampling earlier in this report. The final results of the survey by reporting district are detailed in **Table 7** (page 41) in **Section 5.10** on sampling errors later in this report.

⁴ Full details regarding the study's prize draw are found at: <http://okanagantravelsurvey.ca/prize-draw.php>



5 Data Processing

5.1 Data Validation

Logic and error checking was undertaken at the moment of data capture and continued in post-processing. A number of data checks were pre-programmed into the survey instrument, and result in error messages, warning messages, or clarification questions to ensure that respondents were reporting the best possible data. Initial data checking of the survey instrument itself was carried out during survey administration. Checks were performed to ensure that the CATI/CAWI survey instrument was functioning properly, including following the appropriate skip patterns during the survey and saving the appropriate data for locations captured. On the close of survey administration, all survey data were extracted from Malatest's Triptelligence™ system and brought into an SQL database for post-processing of the survey data.

Initial data processing was conducted to construct daily "trip chains" for each person. During the survey process, respondents sometimes reported their travel out of sequence (for example, if after entering some trips they remembered a trip from earlier in the day). In these situations, trip departure times were cross-checked with the trip record sequence to ensure the trips were placed in the proper chronological order and that the respondent had not made mistakes.

Post-processing the survey data involves running multiple validation tests and maintaining an audit trail that provides additional quality controls.

A set of automated checks were performed on the data to identify records with incomplete or inconsistent data, and to check trip logic both within individual trips and across trip chains. Checks for inconsistent data included, for example, verifying that the number of person records matched the reported number of people living in the household, or verifying that trips with a travel mode of auto driver were made by people who reported having a driver's licence. Trip logic checks included, but were not limited to, tests such as the following: origin and destination at the same location; trips with a distance inappropriate for the mode of travel; persons with an unusually long distance reported from home to school / work; verification of sequence of trips reported (no trips out of order or errors in times recorded); review of travel days where the destination of the last trip was not 'home' without a reason why. Many of these data checks were built upon earlier data validation questions asked of respondents during surveying.

Cases were flagged for unusual travel activity (i.e., they can occur, but are not considered to be a normal or typical travel activity) and critical trip logic issues. Cases that were flagged by validation tests were individually reviewed to assess the feasibility and plausibility of the information as reported by respondents. Not all data that failed these tests required correction upon review; however, where appropriate, follow-up and correction was undertaken. The general procedure followed to resolve issues was to examine other data to determine if the missing data could be imputed. Some cases were flagged for follow-up phone calls with respondents to clarify or correct survey responses. Audit trails were maintained to ensure that corrections to the data were



preserved, with the original data as collected available for reference by data validation and coding teams in case corrections needed to be reversed during quality control review.

The cleaning and confirming of data was done by a team of trained data validation staff, all of whom had worked on prior Malatest travel studies, with a team of supervisors ensuring that all work followed protocol. Final data review, outlined in [Section 5.4](#), was done by the research team, including final decisions about which cases to exclude from the analysis and reporting.

5.2 Geocoding

The household travel survey model requires that various locations (home addresses, workplaces, schools, and trip destinations) be geocoded to a precise latitude/longitude. Locations were geocoded during data collection in the Triptelligence™ system by Google Maps tools. Occasionally, respondents or phone interviewers may have misidentified a location on the map. During post-processing, validation tests were used to identify incorrect locations, such as testing distance travelled against travel mode. When such errors were identified, data validation staff either followed up with the respondent to clarify the information or made logical imputations through close examination of survey responses. When new locations were identified, they were manually geocoded. Once all locations were geocoded, GIS tools were used to assign each location to its appropriate district for use in modelling and analysis.

Trips that were entirely external (i.e., both the trip origin and the trip destination outside the travel area) were excluded from the final dataset. Trips with at least one trip end within the travel area (i.e., either origin or destination) were retained and used in the analysis. Trips that were to or from an external area that used an airport were split into two trips, the local trip to or from the terminal, and the trip between the terminal and the external location.

The wider geographical boundary of the travel area was defined in order to standardize the criteria for inclusion of trips in the final dataset (due to the integrated nature of travel through the Okanagan Valley, particularly around the City of Vernon in the Regional District of North Okanagan). One limitation of the study area was that it excluded major destinations for study participants, such as Okanagan College's Vernon Campus (which is located just outside the City of Vernon's borders), and major towns such as Penticton (located in the Regional District of Okanagan-Similkameen); Creation of the wider travel area around the study area allowed for these trips to be included in analysis rather than being treated as purely external trips and thus excluded from the final dataset.



5.3 Vehicle Kilometres Travelled (VKT) Estimates from Google Map Directions API

For the 2018 OTS, two versions of trip distance were generated: the straight-line distance from the trip origin to the trip destination, and the estimated actual distance travelled as estimated by querying the Google Map Directions API with inputs of the mode of travel, origin, destination, and time of day.

Using Google Map Directions API is a simple and cost efficient way to estimate actual distance travelled for a household travel survey based on trip origins and destinations reported on the survey. The computation is done following data verification and quality assurance is completed without being an extra burden on household travel survey participants (i.e., we do not need to ask respondents for odometer readings).

Estimates of actual distances travelled provide an idea of daily usage of the road system and can inform modeling of greenhouse gas emissions.

The Google algorithms are excellent at determining the best route and estimating its distance. The algorithms also provide an estimated duration of the trip in traffic at the given time of day. Total duration of the trip will account for traffic congestion during peak periods. Google Map Directions is capable of calculating distance for four possible modes of travel (driving, walking, bicycling and transit). It also has the capacity of taking into account waypoints for all travel modes excluding transit.

It should be noted that the estimated distance and travel time may be shorter or longer than the true values for the actual route taken by the survey respondent on their travel day. The respondent may not necessarily have taken the same route as Google's predicted best route (although in many scenarios, the possible alternatives are not much different). Also, the Google prediction model integrates estimates of the impact of traffic conditions for the given time of day of the trip, but with typical conditions as understood when queried.⁵ The querying of Google Maps occurs after data verification (weeks after the trip was taken), thus the route choice, distance, and duration might vary from that in actual traffic conditions on the actual survey date. Finally, trips that combine automobile and transit (ex. 'park and ride' trips) may not yield accurate estimates from the Google Map Directions, although such trips only comprise a very small percentage of all trips. For walking and biking trips, data limitations mean the Google directions may not accurately capture distance. Notwithstanding these limitations, the Google Map directions distances should provide an estimate of kilometers travelled for most trips.

5.4 Final Data Assessment

After post-processing and final geocoding work was completed, a final assessment of the dataset was undertaken. The household, person, and trip records were screened against data acceptance criteria, and households with insufficient or poor information were rejected. Trips missing essential information such as departure time, purpose, mode, origin, or destination were flagged as 'poor trip

⁵ <https://developers.google.com/maps/documentation/directions/>



records.’ Household surveys were rejected if household or demographic data critical to the analysis or data expansion were missing or could not be determined (e.g., household location, age and gender of persons within the household), or if critical trip information was missing or illogical. People with poor trip records or an overall poor trip chain were examined to see if data could be reconstructed, usually by referring to other household members travel. Similar analysis and reconstruction was done with other major missing data points and where possible, data was imputed or drawn from built-in survey validation questions as asking respondents why they didn’t travel to work.

In the end, a small number of the survey completions (2.1%) were discarded for having critical unresolved data issues. Respondents who did not provide their specific age but provided an age range had ages imputed (385 cases). A small number of person records (25 cases) with unknown or illogical ages had values imputed. A small number of person records with unknown gender (23 cases) or with responses of “other” (9 cases) were either assigned on the basis of the name given or randomly assigned to create a new variable for use in data weighting and analysis by gender. The original responses are retained in the final database.

It may be noted that, even after data cleaning and validation, some questions in the dataset may have responses with codes of ‘unknown/refused’. Overall, most respondents were willing to provide most of the information requested of them throughout the survey. Missing responses are largely due to the respondent being unable to provide the requested information (e.g., not knowing the exact location visited by another household member) rather than their being unwilling to provide the information. It may also be possible for some reporting errors to have gone unnoticed in the data checks. It is not unusual for such large and complex datasets to have some ‘noise’ in the data, which, while not generally noticeable in the analysis of the overall aggregated results, may show up in analysis when small subsamples of the data are analysed. Considerable effort has gone into minimizing and mitigating the likelihood of such errors, but they are still possible. Readers are referred to [Section 5.9](#) on Data Reliability for more information.

5.5 Data Weighting and Expansion

Data weighting and expansion is the process of expanding the sample of trips collected during the Household Travel Survey to represent all trips taken by residents of the study area on a typical weekday. The general approach is to compare various characteristics (e.g., household size, dwelling type, age, gender) of the survey sample with the same characteristics for the population as a whole. Data weighting based on these characteristics is used to expand the data in a way that compensates for both planned and unexpected disproportionate results.

Data weighting corrects for biases in the survey sample. Data expansion scales the weighted data so that the survey results represent actual numbers of households, people, and daily trips in the region.

The sampling plan oversampled certain districts with smaller populations in order to obtain better data within these districts. In addition to this planned-for disproportion by district, the unweighted



survey data were less than representative due to non-response bias, which occurs when certain types of household are less likely to respond to the survey.

The study area geography was organized into expansion zones (also referred to as weighting districts). The expansion zones were developed based on Statistics Canada Census Subdivisions (CSDs) and, within Kelowna, Vernon, and West Kelowna, were further based on aggregated neighbourhoods mapped against Statistics Canada Dissemination Areas (DAs). It may be noted that the boundaries of the expansion zone share the same definitions as the 19 districts in the study area used for reporting (see [Table 1](#)), with the exception of a few instances where the boundaries of a component DA straddled the boundaries of the neighbourhoods that define the districts. Rather than attempting to split the DA-level Census data to two different expansion zones, the DAs were assigned to either one expansion zones or another, thus a few expansion zones have slightly different boundaries from the reporting zones. As these overlaps were few, and affected only a small portion of all households in each expansion zone / reporting district, these slight discrepancies should not overly skew the weighted data or the demographic profiles when analysed by reporting district. Users of the data should be careful to select the field appropriate district geography for their purposes, which in most instances will be the reporting district.

It may be noted that the sampling districts are a more disaggregated level of geography than the expansion zones used for data weighting and analysis, in part to ensure a reasonably representative geographic distribution within each expansion zone.

An iterative proportional fitting (IPF) method was employed to balance household weights and person weights for the multiple weighting controls. In this method, incremental adjustments to the household weights are made in succession for each of the household controls, as well as a composite adjustment to each household weight to account for the disproportionate distribution by age/gender amongst the members of each household. Each successive adjustment to balance a given control may slightly or significantly unbalance the correction previously introduced for a different control. However, iteratively cycling through each control results in convergence to a solution where all household and population controls have expected distributions (to within reasonable tolerance; some deviations may be expected, particularly for weighting districts with smaller sample sizes). In this manner, all persons within each household carry the same weight as the household. Limits were set on extreme weights, although they were allowed to range from 0.25 to 4.0 times the base expansion weight for the household's district. The weights received final calibrations to ensure that the total number of households in each district matched the control totals.

The weighting controls were developed from 2016 Census data. The controls were selected for having significant influence on trip-making behaviour and for completeness of the information in the survey data. The weighting controls included, for each weighting district:

- **total households** (private dwellings occupied by usual residents),
- household counts by **dwelling type** (house, apartment, other ground oriented),
- household counts by **household size** (1-person, 2-person, 3-person, 4-person, 5+ person),



and

- population counts by **age and gender** (12 age ranges, 2 genders).

Estimates for 2018 were projected forward from 2016 Census counts using 2011 Census to 2016 Census growth rates by CSD or Aggregated Dissemination Area (ADA) where appropriate. The population counts by age and gender were rescaled to represent population living in private residential dwellings (reducing the population count by the 2.4% of the population living in collective dwellings or without fixed address, who are not represented by the survey; and accounting for unequal distribution of this segment of the population by age group, i.e., people in older age groups are more likely to be living in collective dwellings). In some small weighting districts, age and/or gender categories may have been collapsed further due to small sample sizes or cells with no sample.

Three lower-priority secondary weighting adjustments were introduced at the beginning of the weighting process (one pass only):

- **incidence of travel in rejected surveys vs. in accepted surveys.** As only a small proportion of all survey completions was rejected, this factor was small;⁶
- **distribution of households by Statistics Canada Dissemination Area (DA)** so that the initial weighted distributions would be better geographically balanced within each expansion zone; and
- **total public post-secondary enrolment** across the study area for UBC Okanagan, Okanagan College, Okanagan College Vernon Campus, excluding students living in residence (who were not surveyed).

It should be noted that these adjustments were used to ‘seed’ the weights, in the hopes of steering the distributions to be more representative for these attributes, but afterwards, the adjustments for the primary weighting controls were allowed to determine the final weights. The secondary controls were not used in subsequent iterations of the IPF weighting. The weighted survey data may not necessarily align as closely with the census counts by DA or the overall enrolment counts by post-secondary campus.

No attempt was made to adjust the weighting to balance the survey sample by day of week. It may be noted that travel on Thursdays and Fridays is somewhat over-represented, while travel on Mondays, Tuesdays, and Wednesdays is somewhat under-represented.

5.6 Validation of the Expanded Data

The expanded survey responses for household, person, and trip characteristics were compared to Census and other benchmark data (such as transit boardings) in order to validate the data expansion, with positive overall results. The following observations about the representativeness of

⁶ As people who did not travel on their travel day had little chance of rejection of their surveys, while those who did travel have more data points thus more chances to be rejected during data validation, a slight adjustment factor was applied to accepted household surveys with travel to compensate for the higher rejection rate amongst travelling households.



the weighted data can be made:

- The final weighted survey data match the reference data exactly in terms of number of households, and match closely in terms of population.
- The weighted data were found to align very closely with the dwelling type aggregations⁷, household size, age and gender distributions from the Census (projected to 2018), as might be expected as these were the weighting controls.
- Variations in the age distribution by five-year age group may be attributed in part to the fact that in the data weighting, the age groups were collapsed further (usually into 10-year age groups for those 25+ years). Variance in a given five-year age group is usually balanced out by variance with the opposite valence an adjacent age group.
- The survey data under-represent the portion of the population who are 75+ years of age. This is by design: The Census age distribution data is for the entire population, including those who live in collective dwellings (such as senior's homes), whereas the household travel survey is based on population living in private dwellings. In the data weighting, the Census-based control counts for population 75+ years were discounted more than other age groups when taking into account that a larger percentage of the older population living in collective dwellings as compared with younger population under 75 years of age. The discounting of population in collective dwellings was done using Census statistics on the proportion of the population living in collective dwellings by age group available at the provincial level.
- Weighted counts of total workers living in the study area and counts of workers who have a fixed place of work outside the home also matched Census counts projected to 2018.
- Amongst employed survey respondents, the distribution of the weighted data by occupational group (10 National Occupational Classification major groups) varied somewhat from the Census, with workers in Health Services occupations somewhat over-represented (122% of expected counts) and workers in the following occupations somewhat under-represented (79%-82% of expected counts): sales and service occupations; natural resource, agriculture and related occupations; and occupations in manufacturing and utilities. For other occupational groups, the weighted counts were between 88% and 99% of expected.

⁷ While the dwelling type aggregations (single-detached, apartment or condominium, and other ground oriented) aligned well, it may be noted that within the other ground oriented aggregation, row/townhouses were somewhat over-represented and semi-detached houses were under-represented.



- Looking at weighted survey counts for post-secondary student enrolments revealed some under-representation of students, with weighted counts for UBC Okanagan representing 77% of the 9,973 enrollment in the 2018/19 academic year (which is not unsurprising as this survey of private residential addresses does not represent the over 1,600 students living in residence on campus); 91% of enrolments at Okanagan College’s main campus in Kelowna; and 77% of enrolments at Okanagan College Vernon campus, which is to be expected as the Vernon campus likely attracts students from nearby communities in the North Okanagan that were not part of the sampled study area.
- Comparing Census data on reported 2015 pre-tax household income against the 2018 OTS valid survey responses suggests that the survey results may somewhat under-represent households at the lowest (below \$30,000 per year) and highest income ranges (\$125,000 or more), and slightly over-represent those in income brackets in-between. This comparison should be interpreted with caution, however, as incomes for working people will have increased from 2015 to 2018, and only 17% of survey respondents refused to provide a response to this question.
- Census data on workers’ journeys to work were also compared to the survey results. It may be noted that these data are not strictly comparable: The Census journey-to-work data ask persons who workers what their usual mode of travel was in the last week before the May 10 Census, or if not employed that week, their longest-held job in the last 16 months⁸; In contrast, the Okanagan Travel Survey asked persons who were currently employed what their mode of travel was if they worked on a single day (the previous weekday in late October through mid-December), with some workers not commuting on the sampled day (e.g., due to not being scheduled to work, working from home, away on travel, or sick). Thus one might expect the survey counts to be lower than the Census counts, which they were, by about 24%. Comparing the mode shares (% distributions), the Census data and weighted survey results are relatively similar, with some differences (survey results for auto driver and bicycle commute mode shares are slightly higher than Census journey-to-work shares, and slightly lower for transit shares). Given the differences between the data definitions and time of year, it is difficult to say whether the differences suggest bias in the survey results.

⁸ Main mode of commuting “reported for population aged 15 years and over, in private households, who worked at some time since January 1, 2015. Persons who indicated that they either had no fixed workplace address, or specified a usual workplace address, were asked to identify the mode of transportation they usually used to commute from home to work. The variable usually relates to the individual's job held during the week of Sunday, May 1 to Saturday, May 7, 2016. However, if the person did not work during that week but had worked at some time since January 1, 2015, the information relates to the job held the longest during that period. ...Persons who used more than one mode of commuting were asked to identify the single mode they used for most of the travel distance. As a result, the question provides data on the main mode of commuting.” (Statistics Canada. Dictionary, Census of Population 2016, Main mode of commuting, release data May 3, 2017; <https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/pop177-eng.cfm>)



- Transit ridership figures for the Kelowna Regional Transit System were compared against the weighted survey data. This comparison shows weighted survey counts virtually equal to ridership figures, both when compared to total trips and when compared to total estimated boardings (trips that involve transfers between bus routes have more than one boarding). It may be noted that official ridership figures may under-count total ridership.⁹ In this context, it may be possible that despite the match between the weighted survey counts and official ridership, the survey may slightly under-represent actual transit trips. At the very least, survey data do not represent the local transit trips of students living in on-campus accommodation, as collective residences were not included in the survey sample.
- Ridership data for the Vernon Regional Transit System were not examined. As this transit system services Vernon, Coldstream, and the North Okanagan, any comparisons to the survey data for just Vernon residents would likely be difficult to interpret.

The results of these comparisons are highlighted in [Table 4](#) on the following pages. The table presents the unweighted survey counts, the weighted data after the application of base geographic data weights, and the weighted data after the adjustment for household and demographic characteristics. As illustrated, the data weighting corrects for a number of biases in the unweighted survey data.

Overall, the weighted survey data appear to align very well with the reference data examined, which should provide confidence in the survey results. Notwithstanding the efforts to ensure that the survey data are representative of the population as a whole, it should be noted that it may not be possible to correct for all sources of non-response bias. The survey data may not provide a perfect match for all population characteristics (as evidenced by the modest differences in the comparisons against college and university enrolments, occupation type, and household income).

The survey data have not been validated against other external data sources such as screenline counts. If the data are tested against other external data sources and discrepancies between the weighted survey data and other sources are found, it may be possible to address this in the transportation modelling through recalibration using other sources of information.

⁹ While monthly passes are scanned and cash fares are counted, post-secondary students with a U-Pass simply have to present their pass, and some drivers may not consistently manually register each student boarding.



Table 4. Validation of Weighted Survey Data

Category	Census or Other Reference Data		Sample Size		Base Geographic Expansion Weights Applied		After IPF weighting for household/ demographic characteristics		Diff.	% -pt Diff
		%		%		%		%		
Households	102,594		4,886		102,594		102,594		0	
Population in Private Dwellings	237,135		10,801		226,575		237,254		+120	
Population Aged 5+ Years in Private Dwellings	227,150		10,418		218,336		226,816		-334	
Household Vehicles	n/a		9,046		188,006		186,786			
Dwelling Type										
Single-detached house	53,035	51.7%	3,016	61.7%	62,022	60.5%	53,239	51.9%	+204	0.2%
Apartment or condominium	24,028	23.4%	862	17.6%	19,307	18.8%	23,728	23.1%	-300	-0.3%
Other Ground-Oriented Subtotal	25,605	25.0%	1,008	20.6%	21,265	20.7%	25,627	25.0%	+22	0.0%
Row house or townhouse	6,498	6.3%	443	9.1%	9,782	9.5%	11,324	11.0%	+4,825	4.7%
Semi-detached house	14,782	14.4%	279	5.7%	5,889	5.7%	7,183	7.0%	-4,905	-4.8%
Separate unit in house			85	1.7%	1,819	1.8%	2,694	2.6%		
Mobile home	4,037	3.9%	197	4.0%	3,736	3.6%	4,410	4.3%	+373	0.4%
Other	288	0.3%	4	0.1%	40	0.0%	16	0.0%	-271	-0.3%
<i>The data were weighted for three categories: house, apartment, and other ground-oriented. Within other-ground oriented, it appears the survey data somewhat over-represent row/town house dwellings and under-represent semi-detached houses.</i>										
Household Size										
1 person	28,570	27.8%	1,122	23.0%	24,122	23.5%	28,486	27.8%	-84	-0.1%
2 persons	41,774	40.7%	2,533	51.8%	52,394	51.1%	41,694	40.6%	-80	-0.1%
3 persons	13,825	13.5%	563	11.5%	11,912	11.6%	13,868	13.5%	+43	0.0%
4 persons	11,885	11.6%	497	10.2%	10,591	10.3%	11,926	11.6%	+41	0.0%
5+ persons	6,457	6.3%	171	3.5%	3,575	3.5%	6,621	6.5%	+165	0.2%
Household Income										
\$0 to less than \$30,000	17,874	17.5%	488	12.1%	10,465	12.3%	12,816	14.8%	-5,058	-2.7%
\$30,000 to less than \$50,000	18,212	17.8%	775	19.2%	16,306	19.2%	17,016	19.6%	-1,196	1.8%
\$50,000 to less than \$80,000	22,533	22.1%	986	24.4%	20,835	24.5%	20,136	23.2%	-2,396	1.1%
\$80,000 to less than \$125,000	22,800	22.3%	1,002	24.8%	21,004	24.7%	20,723	23.9%	-2,077	1.5%
\$125,000 or more	20,674	20.3%	791	19.6%	16,459	19.3%	16,112	18.6%	-4,562	-1.7%
Decline / don't know	n/a		844	excl.	17,524	excl.	15,790	excl.		
<i>Interpret comparison of 2018 OTS figures vs. 2016 Census with caution: 17% of survey respondents refused; different reference years.</i>										
Persons with drivers license	n/a		8,948	82.8%	186,877	82.5%	186,849	78.8%		
Total workers living in area	117,780	49.7%	4,897	45.3%	103,440	45.7%	116,233	49.0%	-1,546	-0.7%
Full time workers	n/a		3,745	34.7%	79,129	34.9%	89,133	37.6%		
Part time workers	n/a		1,168	10.8%	24,644	10.9%	27,546	11.6%		
Place of work										
Work from home	10,620	9.0%	652	13.3%	13,563	13.1%	14,283	12.3%	+3,663	3.3%
Usual place of work	88,866	75.4%	3,564	72.8%	75,762	73.2%	86,143	74.1%	-2,723	-1.3%
No fixed workplace address	17,921	15.2%	652	13.3%	13,483	13.0%	15,191	13.1%	-2,730	-2.1%
Work outside Canada	418	0.4%		0.0%		0.0%		0.0%	-418	-0.4%
Unknown	n/a		29	0.6%	633	0.6%	617	0.5%	+617	0.5%



Category	Census or Other Reference Data		Sample Size		Base Geographic Expansion Weights Applied		After IPF weighting for household/ demographic characteristics		Diff.	% -pt Diff
		%		%		%		%		
Students										
FT student K-12	n/a		1,115		22,135		30,225			
PT student K-12	n/a		9		154		309			
FT student PSE / other	n/a		326		8,382		12,415			
PT student PSE / other	n/a		109		2,383		3,755			
Public PSE Enrolments										
UBC Okanagan (UBCO)	9,973		213		4,560		7,668		-2,305	
Okanagan College Vernon	1,088		12		264		767		-321	
Okanagan College	6,126		132		2,819		5,542		-584	
<i>Note: The 2018 OTS did not survey UBCO students living in on-campus residences, which house up to 1,676 students. Also, enrolments at all institutions may include students living outside the study area.</i>										
Gender										
Male	117,736	49.6%	5,208	48.2%	108,987	48.1%	114,985	48.5%	-2,751	-1.2%
Female	125,424	52.9%	5,593	51.8%	117,588	51.9%	122,269	51.5%	-3,155	-1.4%
Age Range										
0 - 4 years	10,656	4.4%	383	3.5%	8,239	3.6%	10,438	4.4%	-217	0.0%
5 - 14 years	23,739	9.8%	883	8.2%	18,680	8.2%	23,673	10.0%	-65	0.2%
15 - 19 years	12,803	5.3%	414	3.8%	8,700	3.8%	12,665	5.3%	-139	0.1%
20 - 24 years	14,662	6.0%	352	3.3%	7,571	3.3%	14,050	5.9%	-612	-0.1%
25 - 34 years	29,133	12.0%	1,109	10.3%	24,079	10.6%	28,710	12.1%	-423	0.1%
35 - 44 years	27,540	11.3%	1,143	10.6%	24,448	10.8%	27,373	11.5%	-167	0.2%
45 - 54 years	33,348	13.7%	1,223	11.3%	25,436	11.2%	33,160	14.0%	-188	0.3%
55 - 64 years	37,319	15.3%	2,158	20.0%	44,200	19.5%	36,968	15.6%	-351	0.2%
65 - 74 years	28,982	11.9%	2,072	19.2%	42,524	18.8%	28,543	12.0%	-439	0.1%
75+ years	24,979	10.3%	1,064	9.9%	22,696	10.0%	21,674	9.1%	-3,305	-1.1%
<i>Census distributions are based on total population (243,160), whereas the survey captured information on only the portion of the population living in private households (227,150) excluding those living in collective dwellings such as campus residences, prisons, barracks, group homes, and seniors care homes. The greater under-representation of those 75+ is due to more seniors living in collective dwellings than other age groups.</i>										
Mode of Transportation to Work										
Auto Driver	86,212	80.7%	2,835	83.8%	59,705	83.3%	67,279	82.5%		1.8%
Auto Passenger	5,798	5.4%	178	5.3%	3,810	5.3%	4,414	5.4%		0.0%
Transit	3,758	3.5%	86	2.5%	1,894	2.6%	2,750	3.4%		-0.1%
Bicycle	2,691	2.5%	110	3.3%	2,467	3.4%	2,595	3.2%		0.7%
Walked	5,351	5.0%	159	4.7%	3,496	4.9%	4,119	5.1%		0.0%
Other	2,963	2.8%	14	0.4%	306	0.4%	374	0.5%		-2.3%
Total Persons (Census) / Total First Work Trips (Survey)	106,773		3,382		71,678		81,531			

Interpret comparison with Census with caution. Definitions differ significantly:

2018 Okanagan Travel Survey: mode of transportation of first trip to work or first work-related trip on travel day (if worked on travel day) for those who were employed on the day that they were surveyed (whether or not the mode was their 'usual' mode) for travel day in fall 2018.

Census: usual mode of transportation to work for anyone who was employed in the last X months (even if not employed at time of Census), as answered in May 2016. As a result, the Census figures will not necessarily reflect actual mode shares for work commutes on a given day (as on any given day many who provided a response to the Census question on usual mode of transportation for work will not actually take a work trip).



Category	Census or Other Reference Data		Sample Size		Base Geographic Expansion Weights Applied		After IPF weighting for household/ demographic characteristics		Diff.	%pt Diff
		%		%		%		%		
Transit Boardings										
Total Transit Trips	n/a		554		12,231		19,114			
Total Transit Boardings	n/a		691		15,225		23,814			
Kelowna Regional Transit System / First boarding location in Central Okanagan	19,400		610		13,420		20,440		+1,040	
Vernon Regional Transit System / First boarding location in North Okanagan	n/a		81		1,805		2,374			

All reference data are based on the 2016 Census data scaled up to reflect growth to 2018 by aggregated dissemination area, with the exception of the Fall 2018 transit boardings for the Kelowna Regional Transit System, which were provided to the City of Kelowna by BC Transit.

5.7 Final Survey Dataset

The final database is in Microsoft Access format and includes the expanded data for the 2018 OTS Survey. The dataset consists of three main data tables along with associated lookup tables. The final dataset contains the following records:

Table 5. Final Dataset Summary

Table	# of Valid Records	Weighted #
Household	4,886	102,594
Persons	10,801	237,254
Trips (for persons 5+ years)	30,299	684,754

Separate tables were provided with the following additional information:

- **Verbatim open-ended comments in response to the final question on the survey**, “In your opinion, what is the most important transportation issue or challenge in your community?” A total of 3,345 respondents provided some kind of comment on this question.
- **Contact information for respondents who agreed to participate in future research**. As this table contains personal information, steps should be taken to control access to it to only those municipal staff who require access in order to invite respondents to participate in future surveys. A total of 3,261 survey respondents agreed to participate in future research.

5.8 Weighted Distribution of Surveys by Travel Day

Table 6 presents the breakdown of weighted surveys completed by the day of week of the travel dates surveyed. Mondays and Tuesdays are somewhat under-represented compared to other days of the week, and Thursdays and Fridays are somewhat over-represented.

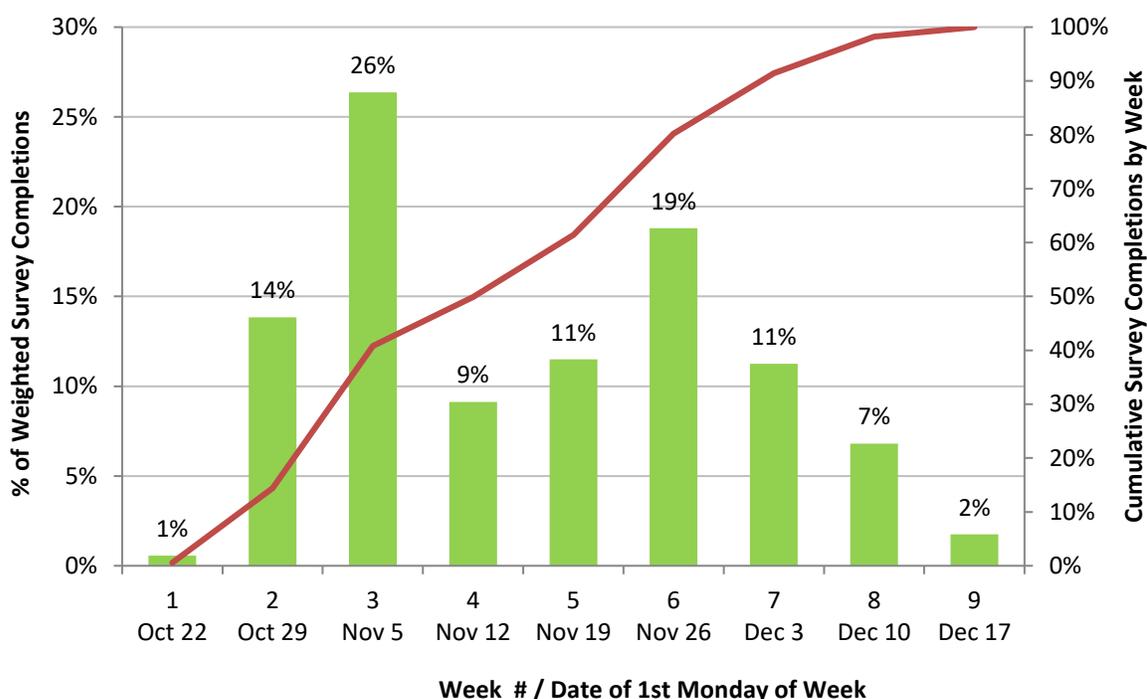


Table 6. Survey Completions by Day of Week

Day	% of Surveys	Weighted %
Monday	14.6%	14.4%
Tuesday	16.5%	16.6%
Wednesday	16.4%	16.2%
Thursday	22.7%	22.6%
Friday	29.9%	30.2%

The data collection period covered travel dates October 24 to December 21, 2018. **Figure 5** presents the distribution of weighted surveys across the survey administration period. Approximately 90% of all weighted surveys were completed for travel dates between November 5 and December 6, 2018

Figure 5. Survey Completions by Week of Survey Administration (Travel Days: Oct 24 – Dec 21)



5.9 Data Reliability

The 2018 OTS was conducted with a sample of about 4.8% of households in the study area. As with any survey, the data collected can be subject to sources of error or bias that can affect the reliability of the survey results. Potential sources of error can include the following:

- *Undercoverage.* Coverage error is associated with the failure to include some populations in the same frame used for sample selection, which may occur with samples of convenience such as telephone directories. The 2018 sample frame was enriched by City of Kelowna address data amalgamated with the Canada Post database of mailable residential addresses;



this hybrid sampling approach should provide excellent coverage of private dwellings in the study area, reducing the concern of undercoverage. However, both data sources may miss some housing types, such as basement/secondary suites, mobile home parks and other non-conventional dwelling types.

- *Non-response bias.* Non-response bias occurs when individuals who do not participate in a survey differ in relevant ways from individuals who do participate. For example, younger people are often less inclined to participate in surveys. This bias has also been addressed, in part, through the data expansion process, including the weighting by dwelling type, age, and gender. However, it should be noted that there can be other, hidden biases in the data that could not be corrected by the data weighting.
- *Measurement error.* This type of error is associated with the failure of survey instruments to capture correct information (e.g., through misunderstanding survey questions). To control for this, the questionnaire and associated materials were based on previously well-tested survey questions, thoroughly reviewed for content and meaning, and field-tested with a sample of respondents prior to the full survey administration. Telephone interviewers were trained on the objectives of the survey, definitions of key terms, the intent of survey questions, and how to address different trip circumstances described by respondents. During survey administration, interviews were regularly monitored by a supervisor to ensure consistent application of questions. The online survey also included a number of built-in tests to prompt respondents to confirm key data and clarify illogical responses.
- *Processing error.* Processing errors include data entry, coding, editing, and imputation errors. These potential sources of error were addressed through comprehensive training of survey staff and survey validation staff, continuous quality management practices, and data validation.
- *Sampling error.* Sampling error refers to the variability that occurs by chance because a sample was surveyed, rather than the complete population. As best as possible, sampling error was controlled in the sample design by over-sampling from districts with smaller populations, as a strictly proportional sample design would have resulted in very few completions for smaller districts.
- *Error due to extreme weights when analysing small samples.* Notwithstanding the limiting of very extreme weights in the data weighting, small sample sizes for some strata and non-response bias may contribute to the assignment of high weights for some cases relative to others within the same geographic district or population stratum. Users of the data should take note that the sample sizes for some districts are relatively modest, and the survey results for such districts should be interpreted with caution. Caution should also be exercised when analysing any small subgroups of the total population.



5.10 Estimates of Sampling Error

Sampling error can be estimated based on the size of the sample universe (number of households in the region) and the number of household survey completions. The estimated margin of error for the survey results at the household level is presented in [Table 7](#) for each district, as well as for the aggregations used in reporting. The estimated margin of error for the survey results at the person level is presented in **Error! Reference source not found**. The sampling errors have been corrected to account for the effects of the data weighting.

Overall, the margin of error for the household-level survey results is estimated at $\pm 1.7\%$ at a 95% confidence level (theoretically, for a given survey question, the true response proportion for the population would be somewhere within the margin of error of the survey results 19 times out of 20). For person- and trip-level survey results for the entire study area is estimated to be $\pm 1.1\%$.

Sampling errors provide an idea of how much survey results may vary due to random selection of a sample of households. Other sources of bias or error may also affect the accuracy of the survey results.

Sampling errors increase when the study area is disaggregated into sub-areas and districts. The sampling design included higher sampling rates for smaller populations, in order to reduce the sampling errors when reporting on these districts individually. Nevertheless, survey results for geographies with smaller samples and higher sampling errors should be interpreted with caution.

Reporting of survey results related to trips originating in or destined to given sub-areas or sub-municipal districts will include trips made by residents of the given geography as well as other residents of the study area from outside the given geography. For example, while the survey sample for residents of Kelowna North is modest (104 households with 250 persons), the reporting on trips within the district is based on a considerably larger sample of surveyed residents (943 persons) who reported travelling to, from, or within this district (UBC Okanagan in this district is a significant attractor of trips). Therefore the sampling error associated with information on trips to, from or within the area would be much better than that for just the trips made by residents of the area. Sampling errors for trips destined to each geography are also listed in [Table 8](#). It may be noted that the sampling errors for person-level information can be considered to carry over to the trips those people make (i.e., the sampling error is associated with the entire trip chain). Therefore the calculation of sampling error was undertaken using the number of persons as the sample size rather than number of trips.¹⁰

It should be understood that sampling error is not the only possible source of error. While efforts have been made to weight the data to be more representative of the population, there may be non-response bias or other sources of error not accounted for in the data weighting and data processing.

¹⁰ It may also be noted that the person-level sampling errors are a crude estimate, in that the actual sample units were households, and individual persons were not independently sampled. The sampling errors have not been adjusted to take into account the clustered nature of the sampling of persons.



Table 7. Survey Completions and Sampling Errors – for Household Level Statistics

Geography of Residence	District	2018 Occupied Dwelling Units (N) ⁽¹⁾	Household Surveys Completed (n)	Sampling Rate ⁽²⁾	Theoretical Margin of Error ⁽³⁾
Study Area		102,600	4,886	4.8%	±1.7%
Central Okanagan		84,100	4,002	4.8%	±1.9%
Vernon		18,500	884	4.8%	±4.1%
Kelowna		56,500	2,617	4.6%	±2.3%
Other Central Okanagan		27,600	1,385	5.0%	±3.3%
City Core / Alexis Park / Harwood / North Vernon	1001	5,800	234	4.0%	±7.6%
East Hill / Middleton / Mission Hill	1002	6,400	292	4.6%	±7.4%
Landing / Bella Vista / Turtle Mountain / Priest's Valley	1003	4,200	209	5.0%	±8.5%
Outlying Areas *	1004	2,000	149	7.4%	±9.1%
Lake Country	2000	5,300	251	4.7%	±7.5%
City Centre / Pandosy	3001	13,400	613	4.6%	±4.6%
Central Kelowna	3002	8,900	365	4.1%	±6.1%
Glenmore	3003	8,200	381	4.6%	±5.8%
Rutland	3004	11,100	497	4.5%	±5.1%
Mission	3005	6,600	332	5.0%	±6.3%
Black Mountain / Southeast	3006	5,400	247	4.6%	±8.0%
Kelowna North *	3007	2,100	104	4.9%	±11.5%
Duck Lake 7 *	3008	800	78	9.7%	±13.5%
Glenrosa / Westbank	4001	7,300	318	4.4%	±6.5%
Rose Valley / Lakeview	4002	5,400	247	4.5%	±7.5%
<i>West Kelowna Subtotal</i>		<i>12,700</i>	<i>565</i>	<i>4.4%</i>	<i>±4.9%</i>
WFN	5001	4,700	201	4.3%	±8.0%
Peachland *	6000	2,500	141	5.6%	±11.2%
RDCO West *	7000	900	106	11.7%	±12.1%
RDCO East *	8000	1,500	121	7.9%	±11.7%

⁽¹⁾ Estimated dwelling units in 2018, projected forward from 2016 by using population growth trends from the 2011 Census to the 2016 Census by aggregated dissemination area.

⁽²⁾ Sampling rate: the percentage of households surveyed.

⁽³⁾ Sampling error: in random sampling, the actual results for the population may be expected to lie within the range of the survey result plus or minus the sampling error, at a 95% confidence level (i.e., 19 times out of 20). The sampling errors estimated above have been adjusted for possible design effects due to over-/under-sampling.

* Districts with smaller sample sizes / higher sampling errors. Results for these districts should be interpreted with caution.



Table 8. Survey Samples, Sampling Errors – for Person-Level Statistics & Trips Made by those Persons

Geography of Residence	District	Sampling Error For Trips Made by Residents of District				For Trips Destined to District			
		2018 Estimated Population (N) ⁽¹⁾	Persons Surveyed (n)	Sampling Rate ⁽²⁾	Theoretical Margin of Error ⁽³⁾	Trip Records for Persons Living in District	Trips Records for Trips Destined to District	Sample Size (n) (Persons with Trips Destined to District)	Theoretical Margin of Error ⁽³⁾
Study Area		237,300	10,801	4.6%	±1.1%	30,299	29,554	8,608	±1.3%
Central Okanagan		197,000	8,963	4.5%	±1.2%	25,135	24,810	7,362	±1.4%
Vernon		40,200	1,838	4.6%	±2.9%	5,164	4,744	1,594	±3.1%
Kelowna		129,900	5,831	4.5%	±1.5%	17,015	18,900	6,223	±1.5%
Other Central Okanagan		67,200	3,132	4.7%	±2.2%	8,120	5,910	2,830	±2.3%
City Core/ Alexis Park / Harwood/ North Vernon	1001	10,300	419	4.1%	±5.6%	1,097	2,460	1,163	±3.6%
East Hill / Middleton / Mission Hill	1002	15,200	646	4.3%	±4.9%	1,986	1,263	726	±4.6%
Landing/ Bella Vista/ Turtle Mountain/ Priest's Valley	1003	10,000	444	4.5%	±5.9%	1,103	629	420	±6.0%
Outlying Areas *	1004	4,800	329	6.9%	±6.3%	978	392	303	±6.9%
Lake Country	2000	13,200	603	4.6%	±4.7%	1,680	1,257	655	±4.5%
City Centre / Pandosy	3001	25,200	1,178	4.7%	±3.4%	3,626	4,842	2,824	±2.2%
Central Kelowna	3002	17,100	717	4.2%	±4.3%	2,143	5,716	3,259	±2.1%
Glenmore	3003	20,400	948	4.6%	±3.7%	2,980	1,920	1,164	±3.4%
Rutland	3004	27,100	1,153	4.3%	±3.4%	3,204	2,564	1,504	±3.0%
Mission	3005	18,900	827	4.4%	±3.9%	2,487	1,651	993	±3.6%
Black Mountain / Southeast	3006	14,500	615	4.2%	±5.0%	1,545	876	631	±4.9%
Kelowna North *	3007	5,000	250	5.0%	±7.3%	642	1,176	943	±3.8%
Duck Lake 7 *	3008	1,600	143	9.2%	±9.9%	388	155	122	±11.1%
Glenrosa / Westbank	4001	18,500	723	3.9%	±4.4%	1,768	1,386	873	±4.0%
Rose Valley / Lakeview	4002	14,300	617	4.3%	±4.8%	1,623	1,167	786	±4.2%
West Kelowna Subtotal		32,800	1,340	4.1%	±3.2%	3,391	2,553	1,429	±3.1%
WFN	5001	9,700	395	4.1%	±5.9%	984	1,134	749	±4.3%
Peachland *	6000	5,500	294	5.3%	±7.8%	749	434	268	±7.9%
RDCO West *	7000	2,000	213	10.9%	±8.6%	494	187	153	±10.0%
RDCO East *	8000	3,900	287	7.3%	±7.6%	822	345	260	±7.8%
External to Study Area		n/a	n/a	n/a	n/a	n/a	159	157	±9.6%

⁽¹⁾ Estimated population living in private dwellings 2018, projected forward from 2016 by using population growth trends from the 2011 Census to the 2016 Census by aggregated dissemination area.

⁽²⁾ Sampling rate: the percentage of households surveyed.

⁽³⁾ Sampling error: in random sampling, the actual results for the population may be expected to lie within the range of the survey result plus or minus the sampling error, at a 95% confidence level (i.e., 19 times out of 20). The sampling errors estimated above have been adjusted for possible design effects due to over-/under-sampling.

* Districts with smaller sample sizes / higher sampling errors. Results for these districts should be interpreted with caution.



6 Comparisons with 2007 and 2013 Survey Cycles

An aspect of transportation research of great interest is to track trends over time, to understand changing transportation demand and to measure the impact of transportation initiatives and policies. Therefore the 2007 and 2013 travel survey data are invaluable for tracking how the key indicators such as mode share and trip rates change over time. This section outlines work undertaken to facilitate comparisons and highlights differences between the survey cycles.

6.1 Treatment of the 2007 and 2013 Survey Data for Longitudinal Comparisons

In order to facilitate longitudinal analysis, aspects of the 2013 dataset were reworked to provide a better basis for comparison and the data were reweighted. The 2007 baseline survey included a number of municipalities in the North Okanagan other than Vernon. In 2013 and 2018 Vernon was the only North Okanagan municipality surveyed, so these records were dropped from the 2007 data set. The 2013 survey included surveys with 24 UBCO students living in residence on campus. The 2018 survey did not survey collective dwellings, so the on-campus records were dropped from the 2013 dataset to provide the same basis for comparison. Location data in both the 2007 and 2013 datasets were recoded to the geographic systems used in 2018 in order to facilitate longitudinal comparisons at the sub-regional level. As a result of these adjustments, statistics for the earlier survey cycles reported in the analytical report may in some cases differ slightly from those reported at the time of those survey cycles. Outlined below is the number of survey records associated with each of the surveys datasets analysed in *Report 3: 2018 Okanagan Travel Survey – Analysis of Survey Results and Trends*.

Table 9. Survey Records: 2007, 2013, and 2018 surveys

Table	2007 Original	2007 Filtered to Current Study Area	2013 Original	2013 Revised	2018
Households	3,583	2,956	3,057	3,005	4,886
Persons	9,070	7,877	6,972	6,881	10,801
Trips	30,082	24,875	22,441	22,227	30,299

6.2 Differences Between 2018 and 2013 Survey Cycles

There may be methodological differences between the different survey cycles related to question wording, sampling, data processing, or other aspects of the research design that may affect the comparability of the datasets. Some methodological differences between survey cycles that may affect comparisons include:

- Implementation of address-based sampling in 2018.** An address-based sampling approach was employed, with sources that provided good coverage of apartments (both in the City of Kelowna's own database and in the Canada Post database for other communities). This approach provides very coverage of all residences in the study area, including cell-phone-only households (which are missed in traditional approaches drawing on telephone directory listings). The 2013 report did not identify where the sample list was drawn from, so the extent of the coverage of all household types is unknown.



- **Travel survey method and random assignment of travel days.** The 2018 survey employed a 24 hour recall method, in which the respondent can complete the survey on the first contact, regarding the previous weekday. The travel date thus depended on when letter invitations were delivered, when respondents acted to log on online, and when follow-up phone calls were placed. The 2013 survey employed a trip-diary recruitment-style approach where participants are recruited to the survey, assigned a particular travel date in the future to report on, and given a trip diary for all household members to fill out on their travel day. It may be possible that the trip-diary method, while generally more expensive, capture more discretionary trips (e.g., leaving work for lunch or a coffee) for some participating households due to provision of trip diary in advance, although this was mitigated in 2018 by the inclusion of probes in the survey program intended to elicit the reporting of discretionary trips.
- **Additional post-processing.** The 2018 survey data post-processing routines employed more extensive trip validations on the dataset. Over 200 data validation tests were designed to check for missing values, logic flaws, and inconsistent responses in the survey data. The data validation tests placed flags on each case that failed one of the tests, and these flags were then reviewed by data validation/geocoding staff to resolve any inconsistencies by addressing obvious errors, follow up with respondents, and/or flag surveys for removal. The post-processing of survey data is further discussed in [Section 5](#) of this report.
- **Implementation of estimates of Vehicle Kilometres Travelled (VKT).** The 2018 survey introduced a new way of estimating actual distance travelled. The datasets for previous cycles included straight-line calculations of the distances between trip origin and destination coordinates, as a convenient measure without processing the data through specialized software to assess actual distance on road networks. For the 2018 dataset, Google Maps APIs were also employed to estimate the actual distance travelled for key vehicular modes (automobile, transit).
- **Questionnaire changes.** While the 2018 questionnaire was largely similar to the 2013 survey, there are some notable differences:
 - **Location capture via Google maps.** The 2018 survey used Google API technologies to embed Google mapping tools within the survey platform, allowing respondents to use Google Maps to pin point locations, with the latitude and longitude and location description stored in the survey database. In order to prevent inadvertent capture of similarly named locations outside the study area as well as poorly described locations, the Google search function was programmed to warn respondents if the location was outside the study area or returned a very poor precision from Google.
 - **No use of a paper Travel Diary.** The 2013 Okanagan Travel Survey's data collection tools included a paper copy of the travel diary that was sent out and returned via mail carrier. The 2018 OTS did not include a paper travel-diary approach and instead focused on



maximizing online response rates via development of a project-based website/survey login portal and fine-tuning the online survey tool for ease of use via mobile device.

- **Commercial vehicle trips.** In the 2013 Okanagan Travel Survey, commercial trips were entirely excluded from the dataset, and respondents were encouraged (via survey promotional materials) not to include commercial trips in their reporting. For the 2018 survey, participants were asked to include their first trip to work and last trip home when reporting on a travel date that involved commercial vehicle trips. By reporting on these first and last trips, travel to and from the workplace is captured for commercial drivers, better representing the travel of those employed in occupations that rely on commercial vehicles/trips.
- **New information on vehicles and bicycles.** The 2018 survey captured new information on the number of household vehicles by vehicle type and fuel types, and on bicycle type (adult bicycle, adult e-bike, or child bicycle). Future surveys will be able to track evolving changes in these transportation options.
- **Capture of bus routes.** The 2018 cycle captured information on bus routes used to aid in the validation of transit trips and to allow for the calculation of the number of boardings. The 2013 survey data file did not identify bus routes taken.
- **Survey date range.** The 2018 survey had a later fall start than 2013, while the 2007 survey was conducted in the spring. **Table 10** details the data collection time frame for each of the three survey cycles, along with weather norms for those periods. While commutes, school enrolments, and other activity patterns may be equivalent for the most part, of all the transportation indicators analysed, the cycling and walking mode shares may be most influenced by weather, so caution should be exercised when making longitudinal comparisons.

Table 10. Survey Time Periods and Temperature Norms, 2007-2018

Survey	Range of travel dates surveyed	Average daily min - max, average daily temperature*	Monthly precipitation*
2007	13 April to 18 May 2007	April: 1.3°C to 15.5°C, avg. 8.4°C May: 5.4°C to 20.0°C, avg. 12.8°C (most surveys)	April: 29 mm May: 40 mm
2013	23 Sept. to 30 Nov. 2013 90% of surveys by 4 Nov	Sept: 5.9°C to 21.7°C, avg. 13.9°C Oct: 1.3°C to 13.4°C, avg. 7.4°C (most surveys) Nov: -2.4°C to 5.6°C, avg. 1.6°C	Sept: 32 mm Oct: 29 mm
2018	24 Oct. to 21 Dec. 2018, 90% of surveys by 6 Dec	Oct: 1.3°C to 13.4°C, avg. 7.4°C Nov: -2.4°C to 5.6°C, avg. 1.6°C (most surveys) Dec: -5.9°C to 0.7°C, avg. -2.6°C	Oct: 29 mm Nov: 40 mm

* Environment Canada Canadian Climate Normals 1981-2010 Station Data, Kelowna Station A, (https://climate.weather.gc.ca/climate_normals/index_e.html)



6.3 Interpreting Longitudinal Comparisons

The usefulness of the comparisons between the cycles is strengthened by the fact that the 2013 and 2018 surveys were conducted in the same season of the year (with both K-12 and post-secondary in school) and the fact that the questionnaire had the same core data elements in all cycles, and by the adjustments to the previous data sets to provide a similar basis for comparison (as noted in [Section 6.1](#)). Nevertheless, as discussed above, both methodological differences and the weather during the time period of the survey may also affect the travel patterns captured in each survey, particularly for travel indicators such as active mode choices. Readers are referred to [Sections 4.5.3, 4.5.4 and 4.5.5 of Report 2: Analysis of Survey Results and Trends](#) for discussion of transit trip results across the survey cycles, the effects of weather on bicycle trips, and analysis of the survey data on overall active transportation mode shares.

The survey samples for any of the three survey cycles may have biases even after data weighting, whether due to non-response bias, sampling error, or survey methodology. Those biases and the reasons for them may be different in different survey cycles. Therefore, some careful consideration should be exercised when interpreting longitudinal comparisons. For longitudinal analysis of mode shares and some other survey measures, when patterns across individual cycles do not necessarily follow a consistent trend, sometimes it may be advisable to make longer-term comparisons (across the 11 years since the baseline) rather than focus too much on shorter-term (five- or six-year) changes between cycles. Longer-term comparisons should reveal overall trends in demographic patterns and travel behaviour that might be masked or confounded by fluctuations in survey cycles due to different biases in those data cycles or even just due to the margin of error associated with random sampling.

Appendix A: Survey Invitation Letters



Log in at
smartTRIPS.ca/travelsurvey
Your secure access code is
123456789

Resident
Address Line 1
Address Line 2

Dear Resident:

Your household has been randomly selected to participate in the 2018 Okanagan Travel Survey. The survey, conducted every five years, provides critical information for making decisions on improvements to transportation infrastructure and services. **Your participation will be a vital contribution to improving transportation for your community and your region.**

- Take the survey online at **smartTRIPS.ca/travelsurvey** using the secure access code at the top of this letter.
- Complete the survey over the phone by calling the survey hotline toll-free at **1.855.319.2887**.

B.C.-based research firm R.A. Malatest & Associates Ltd. will be conducting the survey on behalf of the municipalities of Kelowna, Vernon, West Kelowna, Peachland, Lake Country, the Regional District of Central Okanagan, Westbank First Nation, and the Ministry of Transportation and Infrastructure.

All information your household provides for the survey will be strictly confidential. Your personal information will not be shared with any other individual or organization, in accordance with the Freedom of Information and Protection of Privacy Act.

By participating, you could win a \$500 cash prize or a \$25 gift card to a local business (odds 1 in 48). If you win, you can request that the value of your prize be donated to the United Way Central Okanagan.

Have a question or need more information? Contact Malatest's toll-free line at **1.855.319.2887** or email **info@okanagantravelsurvey.ca**. For questions about transportation research in the Okanagan, contact Cameron Taylor-Noonan at **CTaylor-Noonan@kelowna.ca** or 250-470-0656.

Sincerely,

Rafael Villarreal, P. Eng
Administrator, Sustainable Transportation Partnership of the Central Okanagan (STPCO)



Variations for Vernon residents are highlighted in blue



Log in at
okanagantravelsurvey.ca
Your secure access code is
123456789

Resident
Address Line 1
Address Line 2

Dear Resident:

Your household has been randomly selected to participate in the 2018 Okanagan Travel Survey. The survey, conducted every five years, provides critical information for making decisions on improvements to transportation infrastructure and services. **Your participation will be a vital contribution to improving transportation for your region.**

- Take the survey online at **okanagantravelsurvey.ca** using the secure access code at the top of this letter.
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B.C.-based research firm R.A. Malatest & Associates Ltd. will be conducting the survey on behalf of the municipalities of **Vernon, Kelowna**, West Kelowna, Peachland, Lake Country, the Regional District of Central Okanagan, Westbank First Nation, and the Ministry of Transportation and Infrastructure.

All information your household provides for the survey will be strictly confidential. Your personal information will not be shared with any other individual or organization, in accordance with the Freedom of Information and Protection of Privacy Act.

By participating, you could win a \$500 cash prize or a \$25 gift card to a local business (odds 1 in 48). If you win, you can request that the value of your prize be donated to a local charity.

Have a question or need more information? Contact Malatest's toll-free line at **1.855.319.2887** or email **info@okanagantravelsurvey.ca**. For questions about transportation research in the Okanagan, contact **Angela Broadbent at ABroadbent@vernon.ca or 250-550-7831**.

Sincerely,

Kim Flick
Director, Community Infrastructure and Development, City of Vernon



Appendix B: Survey Questionnaire

**Okanagan Travel Survey
2018 Survey Questionnaire
Online / Phone Interview Scripts**

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Questionnaire numbering is non-sequential and refers to numbering within the original template.

Grey shading indicates scripts for the telephone interview version that differ from the phone version.

Orange text indicates a key variable name in the final data file that is associated with a given question.

1. SUMMARY OF SURVEY DATA ELEMENTS

Trip definition: A trip is a journey from one place (origin) to another (destination) with a single purpose that may involve more than one mode of travel. Travel to work with a stop at a coffee shop is two separate trips: one with a purpose of restaurant/dining, another with a purpose of work. Travel to work which involved driving to a park & ride location then taking transit the rest of the way is considered a single trip with a primary mode of transit and a transit access mode of driving.

Household level

Note: survey weekday travel only

- ✓ Confirm have reached appropriate person to complete the survey. (Online: also confirm at least 16 years of age).
- ✓ Confirm phone number
- ✓ Travel day surveyed (date and day of week)
- ✓ Confirm address (Geocode home XY coordinates)
- ✓ Dwelling type
- ✓ Number of householders
- ✓ Number of vehicles available to householders (includes company vehicles, lease or own, motorcycles, light trucks, but not recreational vehicles like RVs, UTVs, or snowmobiles)
- ✓ Number of motor vehicles of each type (passenger car, SUV, pickup truck or van, motorcycle, other)
- ✓ Number of motor vehicles of each fuel type (if has vehicles)
- ✓ Number of working bicycles available to householders
- ✓ Household Income (asked at end of survey, after trip capture)

Person level

- ✓ Identifier (respondent's preference – first name, initial, relationship, or other identifier) for reference in survey questions
- ✓ Gender
- ✓ Age
- ✓ If age refused, Age Range within a 5-year range
- ✓ Driver's license (yes/no)
- ✓ Mobility challenged status
- ✓ Student status (f/t, p/t)
- ✓ School level (Elementary, High School, College, etc.)
- ✓ School name / location (Geocode school XY coordinates)
- ✓ Employed (yes, no, don't know)
- ✓ Employment status (f/t, p/t, unemployed, retired)
- ✓ Workplace location (employed) (note if home) (Geocode workplace XY coordinates)
- ✓ Type of occupation (if employed)
- ✓ Made any trips between 4:00 a.m. yesterday and 3:59 a.m. today

**Trip level
of age only****Note: survey trips for respondents 5+ years**

- ✓ Origin (Geocode origin XY coordinates)
- ✓ Destination (Geocode destination XY coordinates)
- ✓ Trip departure time
- ✓ Trip arrival time
- ✓ Trip purpose (or activity at destination location)
- ✓ Mode of travel (up to five modes)
- ✓ Clarify access and egress modes if transit was chosen without a preceding or next mode entry
- ✓ Transit route(s) (if transit taken) (route name or number)
- ✓ Number of vehicle occupants (if auto driver or auto passenger)
- ✓ Vehicle availability for trip (if not by automobile and household has vehicles)
- ✓ Additional information about trip (open-ended response)

Questions associated with data validation**For quality control purposes – not used for analysis**

- ✓ If did not take any trips, confirm reason
- ✓ If first origin of the day was not home, confirm & confirm reason why not start from home
- ✓ If last destination of the day was not home, confirm that were at last location until end of travel day (3:59 a.m.)
- ✓ Ask whether stopped along the way in case respondent missed reporting a trip in order to collect information to use to split the trip (assuming classic definition of a trip being a journey for a single purpose is used, which means a trip to work with a stop for coffee becomes two trips)
- ✓ If auto driver or motorcycle, and not have drivers license, confirm mode / clarify
- ✓ If auto driver or motorcycle, and not have vehicle in household, confirm mode / clarify
- ✓ If a worker, and primary work location outside the home, and did not take any trips with work as a purpose or a destination, confirm whether worked from home
- ✓ If a student, and school location outside the home, and did not take any trips with school as a purpose or a destination, confirm whether attended school

Additional participant questions**Not part of the main dataset – not used for analysis**

- ✓ Most important transportation issue or challenge in your community (open-ended, online-respondents only, provided to client without coding or analysis)
- ✓ Willingness to participate in future research
- ✓ Prize draw entry

**Okanagan Travel Survey
Online Survey / Telephone Interview Script**

2. INTRODUCTION – ONLINE HOUSEHOLD TRAVEL SURVEY



To begin the survey, please enter the secure access code found on the top of your notification letter.
Secure Access Code: _____ **Begin Survey**

Welcome to the Okanagan Travel Survey. This survey is about the transportation choices people make.

This survey is about the transportation choices people make. The survey results will be used to help plan improvements to roads, transit infrastructure, and pedestrian and cycling facilities across the region.

How long does it take to complete the survey? Approximately 10-25 minutes depending on the size of your household and number of trips. It is extremely important all your data is entered completely and accurately. You can also complete the survey by telephone with one of our professional interviewers by calling us toll-free at **1.855.319.2887**.

What kinds of questions are asked? The first two sections of the survey contain questions about your household and the people in your household. The final section asks questions about the trips taken by every member of your household 5 years of age or older on a particular weekday (your Travel Day).

Will my privacy be protected? Yes. Your survey responses will be combined with others' responses before they are analysed. Your contact information will be permanently deleted once the survey is concluded. Click here to view our [Privacy Statement](#).

How was I selected for the survey? Your household was selected at random from households across the Okanagan. A limited number of households are invited to join the study, so the few minutes you take to participate will have a big impact. The survey is voluntary, but to truly represent the travel behaviour of all types of residents in your neighbourhood, we hope that you will choose to participate.

Which communities are being surveyed? Kelowna, Vernon, West Kelowna, Westbank First Nation, Lake Country, Peachland, and electoral areas in the Regional District of Central Okanagan.

Who is conducting the survey? The partner agencies (City of Kelowna, City Vernon, and the other local governments within the Regional District Central Okanagan) have contracted independent BC-based research firm R.A. Malatest & Associates Ltd. to conduct the survey.

Are there incentives for participation? Participants who complete the survey are eligible to enter a prize draw. You could win a cash prize of \$500 or one of 100 \$25 e-gift certificates to a local merchant (with the option of donating your prize to charity if you win). Your chances of winning a prize are approximately 1 in 48. A total of \$3,000 in prizes will be awarded. The prize draw is administered by R.A. Malatest & Associates Ltd. and will be drawn once the survey administration period is completed.

What day of the week should I report on? We are interested in your travel on the most recent previous weekday. It is important that you provide a snapshot of what you actually did on that day, even if it was not a typical day, or even if you did not travel.

Who do I contact for more information or for help?

- If you would prefer to complete the survey by telephone, please call **1.855.319.2887** (toll free).
- You may also call the number above for assistance with the on-line survey, or e-mail us at info@okanagantravelsurvey.ca.
- If you wish to validate the authenticity of this survey you may contact Cameron Taylor-Noonan at the City of Kelowna at CTaylor-Noonan@kelowna.ca or 250-470-0656 or Angela Broadbent at the City of Vernon at ABroadbent@vernon.ca or 250-550-7831.
- For more information about this study, please visit <https://smartrips.ca/travelsurveyor> or <http://okanagantravelsurvey.ca>.

Please note that your answers to the survey are saved each time you click on the Previous or Next Buttons.

A1. The survey should be completed by a person in your household 16 years of age or older who is familiar with your household's weekday travel. Are you that person?

1. Yes
2. No

[IF NO]

A1X. This survey must be completed by someone 16 years of age or older who is familiar with your household's weekday travel.

If you are 16 years of age or older, click the Previous button to change your answer.

If you are under the age of 16, please have an older person in your household fill out the survey.

3. INTRODUCTION – TELEPHONE INTERVIEW

Hello, my name is _____, and I am calling on behalf of the City of Kelowna, City of Vernon, and the other governments in the Central Okanagan area to follow up on an invitation we recently sent you to participate in a major study of household travel patterns in the Okanagan.

As reported in the media, we are conducting a study of household travel patterns in the Okanagan. This will help inform decisions to improve transportation infrastructure and services across the region. I would like to ask you some questions about the trips made by members of your household yesterday.

(INTERVIEWER: If sounds young, verify over the age of 16. If no, ask to talk to appropriate person and restart intro)

USE FOLLOWING SCRIPTS AS NECESSARY:

The survey will be about the transportation choices people make.

- This survey is about the transportation choices people make. The survey results will be used to help plan improvements to roads, transit infrastructure, and pedestrian and cycling facilities across the region.
-
- Your household has been randomly selected to participate in this study. This major transportation research study is conducted only once every 5 to 6 years. The survey is voluntary, but to truly represent the travel behaviour of residents in your area, it is important that you participate in the study.
- The survey takes about 10-25 minutes depending on the size of your household and your answers.
- The survey contains questions about your household and the people in your household. It also asks about the trips people in your household make.
- Even if you did not make any trips yesterday, it is important that we record that information as well. The survey will be shorter for you.
- I work for R.A. Malatest & Associates Ltd, a Victoria-based professional research firm. The City of Kelowna, City of Vernon, and the other local governments in the Central Okanagan area have contracted our firm to conduct this survey on their behalf. IF NECESSARY. The full list of partners in this research includes: the cities of Kelowna, Vernon, and West Kelowna; Westbank First Nation; the districts of Lake Country, Peachland, and the Regional District of Central Okanagan; and the B.C. Ministry of Transportation and Infrastructure.
- If you wish to validate the authenticity of this survey you may call Cameron Taylor-Noonan at the City of Kelowna at 250-470-0656 or Angela Broadbent at the City of Vernon at 250-550-7831.

- I can send you an e-mail with information about the study, and a link to the smartTRIPS web page about this study. (If you prefer I can mail you information about the purpose of the survey, and call you back after you have reviewed the information.)
- Participants that complete the survey are eligible to enter a prize draw. You could win a cash prize of \$500 or one of 100 e-gift certificates to a local merchant (with the option of donating your prize to charity if you win – either the United Way Central Okanagan or the United Way North Okanagan). Your chances of winning a prize are approximately 1 in 48. A total of \$3,000 in prizes will be awarded. The prize draw is administered by R.A. Malatest & Associates Ltd. and will be drawn once the survey administration period is completed.

A1. **I need to talk to the person, 16 or older, who is most familiar with your household’s trips made yesterday. Are you that person? May I complete the survey with you now?**

1. Yes (confirmed correct person)
2. No (ask to talk to that person and restart introduction)

INTERVIEWER: IF RESPONDENT DID NOT RECEIVE LETTER AND WISHES MORE INFORMATION BEFORE PROCEEDING:

I can send you an e-mail with information about the study, and a link to the smartTRIPS web page about this study. (If you prefer I can mail you information about the purpose of the survey, and call you back after you have reviewed the information.)

[IF NO]

A1X. **This survey must be completed by someone 16 years of age or older who is familiar with your household’s weekday travel. May I speak to someone in your household is over the age or sixteen and who is familiar with your household’s travel?**

INTERVIEWER: Click Previous to change the answer on previous page and proceed.

A2. [ONLY ASKED OF TELEPHONE INTERVIEW RESPONDENTS. ASSUME ONLINE RESPONDENTS HAVE RECEIVED THE LETTER IN THE MAIL IN ORDER TO GET ACCESS CODE TO LOG ON]
Have you received the letter in the mail describing this study?

1. Yes
2. No
3. Don’t know

INTERVIEWER: IF RESPONDENT DID NOT RECEIVE LETTER AND WISHES MORE INFORMATION BEFORE PROCEEDING:

I can send you an e-mail with information about the study, and a link to the smartTRIPS web page about this study. (If you prefer I can mail you information about the purpose of the survey, and call you back after you have reviewed the information.)

4. SURVEY PRIVACY STATEMENT

[available anywhere there is a link to the [Privacy Statement](#)]

The survey team is dedicated to protecting the privacy of its participants.

Collection of information for the survey is being undertaken in accordance with Sections 26 through 36 of BC's Freedom of Information and Protection of Privacy Act (FOIPPA). The confidentiality of any information collected is protected under the provisions of the Act.

Any information obtained from each household is processed, stored, and used in a form that does not permit any particular household to be identified. Names, addresses, and phone numbers are deleted from the data file at the conclusion of the survey's data collection phase.

Canadian-based research firm R.A. Malatest & Associates Ltd. is conducting the survey data collection under the direction of the City of Kelowna and City of Vernon on behalf of other partner agencies (including the City of West Kelowna; Westbank First Nation; the districts of Lake Country and Peachland; the Regional District of Central Okanagan, and the B.C. Ministry of Transportation and Infrastructure) and with the highest standards of the protection of privacy and confidentiality. Click here for a link to the firm's Privacy Policy [URL: <http://www.malatest.com/Privacy.htm> - launch in separate window].

For more information, please contact 1.855.319.2887 (toll free) or e-mail info@okanagantravelsurvey.ca.

Municipal contacts for privacy concerns related to the survey include: Cameron Taylor-Noonan at the City of Kelowna at (CTaylor-Noonan@kelowna.ca or 250-470-0656) or Angela Broadbent at the City of Vernon (ABroadbent@vernon.ca or 250-550-7831).

For more information about this research study please visit

<http://smartTRIPS.ca/travelsurvey> or <http://okanagantravelsurvey.ca> .

5. HOUSEHOLD INFORMATION

PHONE: Before we begin, I'd like to let you know that this survey is entirely confidential.

WEB: This survey is entirely confidential and uses secure internet protocols.

Your survey responses will only be analyzed after all personal identifying information has been removed. Survey responses will be aggregated for analysis and will be used only for transportation and regional planning purposes.

PHONE: I am now going to ask you some general questions concerning your household

WEB: This section contains questions about your household.

B1A. We would like to be able to contact you in the event we need to verify any of your responses.

Please provide a phone number and email address you may be reached at by our staff.

Name: [NAME]

Phone Number: [PHONE NUMBER] [mandatory field] Extension: _____

[optional]

E-mail: _____ [optional field]

This information will be kept confidential and will not be shared with anyone. We will contact you only in the event we need to verify your responses. Your contact information will be deleted once the survey is concluded.

Click here to view our [Privacy Statement](#).

B2. [if address exists in sample file AND street address flag=1 (i.e., address is not a mailing address like a rural route or PO Box)]]

The home address we have on file for you is listed below. Please verify the address and correct it if necessary. This information is required to identify the location of your trips.

We are interested in the physical address of your home, not your mailing address.

STREET ADDRESS

CITY / TOWN

POSTAL CODE

Confirm address is correct, or edit the fields displayed

1. Yes

2. No

9. Decline to answer / don't know

B2X. [IF DECLINE TO ANSWER IN B2]

Unfortunately, the survey cannot proceed without an answer to this question. Your participation is very important, and all personal information you provide will be kept strictly confidential. Click here to view our [Privacy Statement](#).

If you are uncomfortable providing us your exact street address and you live in an urban area, you may provide your postal code. If you live in a rural area, please provide your street address, or at least the closest cross-streets.

Rather than terminating the survey, would you reconsider answering this question?

[if agree, go back to previous question]

[If still refuse:] Thank you for your time. Have a pleasant day / evening.

HomeLat, HomeLong, etc.

HOME_LOCATION

[Map the address provided using Google Maps]

[If no address in sample or if address flag indicates a mailing address such as PO Box and address page was skipped]: **What is your home's physical address? Please provide where you live. Do not provide a rural route or a PO Box. This information is required to identify the location of your trips.**

[If confirmed address on previous page:] [display confirmed address above Google Map]

WEB: **Does the map correctly show where your home address is located? If not, please move the marker to where it is located, or use the Search box to search for your correct address.**

PHONE: CONFIRM WITH RESPONDENT WHAT THE MAP SHOWS: E.g., I am looking at the location on Google Maps. It looks like your home is near the intersection of [STREET] and [STREET]. Is that correct?

LOCATION CAPTURE [HOME COORDINATES]

DwellType

B3. **What type of dwelling is that?**

1. single-detached house
6. secondary suite in a single-detached house (such as a basement apartment)
2. apartment or condominium
3. row house or townhouse
4. semi-detached house (side-by-side, duplex)
5. mobile home
8. other, please specify: _____

PplNum

B4. **What is the total number of people living in your household, including yourself?**

(Include children in joint custody if living in your household on your Travel Day.

Include roommates, housemates, live-in housekeepers, and lodgers if they share communal facilities. Exclude anyone living in a separate apartment within the building.

Do not include visitors, even if they are staying for an extended period of time.)

___ **Total # persons in household**

(confirm with respondent)

99. decline / don't know [go to B5]

B5. [IF DECLINE TO ANSWER IN B4]

Unfortunately, the survey cannot proceed without an answer to this question. Your participation is very important, and all personal information you provide will be kept strictly confidential. Click here to view our [Privacy Statement](#).

Rather than terminating the survey, would you reconsider providing this information?

WEB: Click the Previous button to go back and provide a response, or click End Survey to quit]

[if agree, go back to previous question]

[If still refuse, record as refusal:] Thank you for your time. Have a pleasant day / evening

VehNum

- B6. **How many licensed (insured) motor vehicles (including cars, light trucks, vans and motorcycles) are available to the members of your household, including yourself?**
Please include personal and business vehicles.
(Do not count any motor vehicles which are not registered. Do not count any that are registered to an owner in the household but not insured to be on the road.)
(Do include all vehicles provided by employers and which household members use to go to work or for personal use.)
- _____
77. none
99. Don't know

NumVehPass...NumVehOther

- B7. [# vehicles >= 1] **How many of the [B6 #] insured vehicles are in each of the following categories:**
1. Passenger cars _____
 2. SUVs (sport utility vehicles) _____
 3. Pickup trucks or vans _____
 4. Motorcycles _____
 5. Other (freight truck, etc) _____
 9. decline / don't know _____

AlfFuelVeh, NumVehHybrid, NumVehElectric, NumVehDiesel, NumVehBiodiesel, NumVehUnk, NumVehPetrol

- B7A. [if # vehicles=1] **Is the vehicle a hybrid, electric, diesel, or biodiesel powered?**
[if # vehicles>1] **Are any of these vehicles hybrid, electric, diesel, or biodiesel powered?**
(i.e., an alternative fuel source than gasoline)
1. Yes
 2. No [skip to B8]
 9. decline / don't know
- B7B. [if yes; # vehicles=1] **Is the vehicle...?**
1. A hybrid
 2. Electric-only
 3. Diesel
 4. Biodiesel
 9. decline / don't know
- B7C. [if yes; # vehicles > 1] **How many of the [B6 #] vehicles are...**
(Note: remainder of vehicles are assumed to be gasoline powered)
1. Hybrid? _____
 2. Electric-only? _____
 3. Diesel? _____
 4. Biodiesel? _____
 9. decline / don't know

BikeNum, NumBikesAdult, NumBikesEBike, NumBikesChild

B8. WEB: **How many regular adult bicycles, electric bicycles, and working children’s bicycles (used in the past year) are available to members of your household?**

PHONE: **How many working regular adult bicycles are available to members of your household? And how many e-bicycles? And how many working children’s bicycles that have been used in the last year?**

Adult regular bicycles: ____

Adult e-bicycles (electric assist): ____

Children’s bicycles: ____

99. decline / don’t know

6. LOCATION CAPTURE MODULE

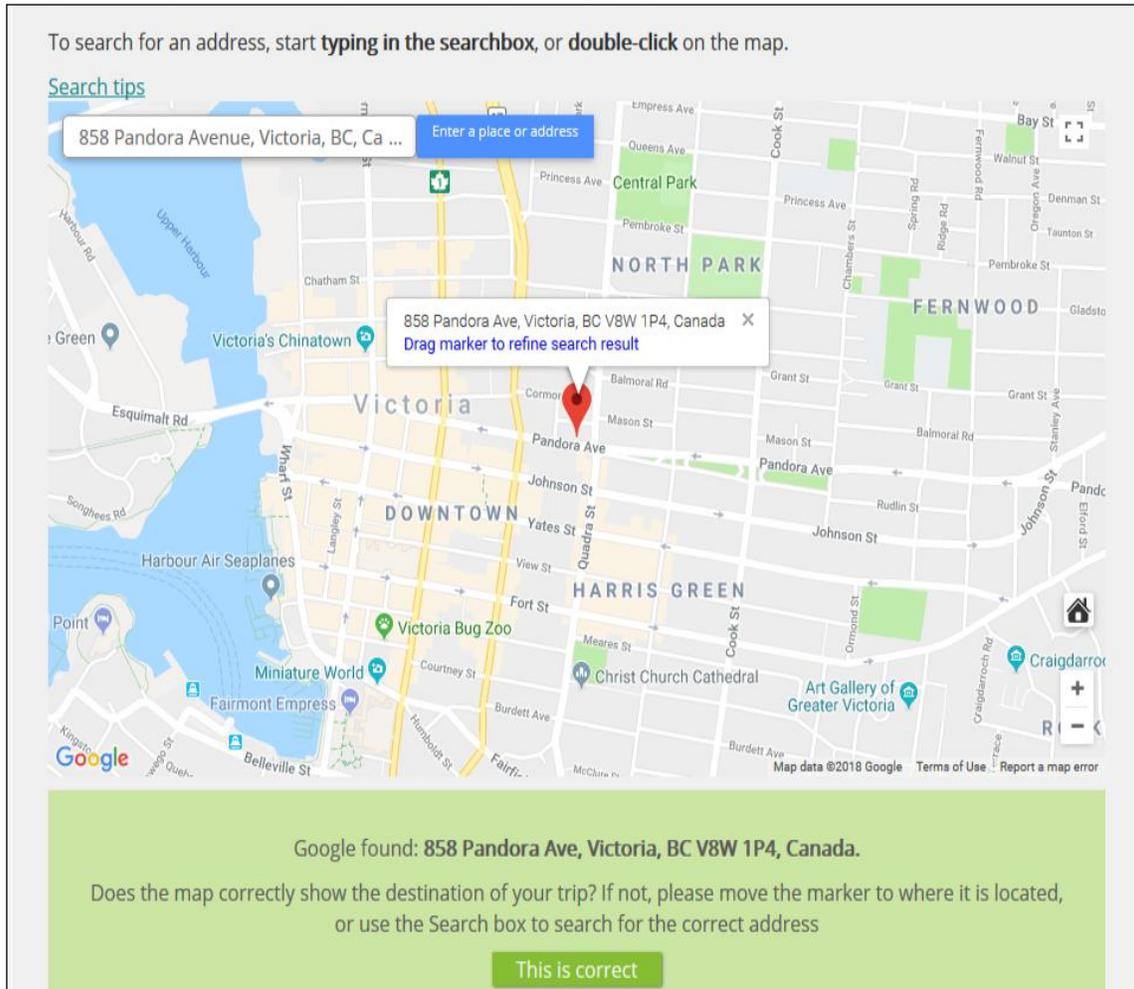
The general format of the location capture screen is as follows, modified for each survey question as required. Anywhere the survey indicates **LOCATION CAPTURE** in the survey instrument this format will be used.

- LOC1
 - o **Home** (display confirmed address, from sample or as captured in the survey)
 - o [Your/PERSON’s] main **work** location (display address captured in survey)
 - o [Your/PERSON’s] **school** (display address captured in survey)
 - o [PERSON 2]’s main work location (display address captured in survey)
 - o [PERSON 3]’s main work location (display address captured in survey)
 - ...etc...
 - o [PERSON 2]’s main school location (display address captured in survey)
 - o [PERSON 3]’s main school location (display address captured in survey)
 - ...etc...
 - o [previously captured destination #1]
 - o [previously captured destination #2]
 - ...etc...
 - o On the road / no fixed location (no fixed place of work) [Work and school location capture only]
 - o Other location [Google Geocode searches and Google Maps confirmation]

Example screen shot: First page allows respondent to pick from locations already given by the household, or indicate that it is another location:



Example screen shot: If respondent selects 'Other location' they can provide their location by via Google search, double-clicking on the map, or dragging the marker.



7. DEMOGRAPHICS INTRO

The next section is about your demographics. You will be asked to provide some information about yourself before moving on to recording your trips in the next section of the survey.

Your responses are entirely confidential. Your personal information will be protected, and any identifying information will be deleted from the data prior to analysis. Click here to view our [Privacy Statement](#).

[IF ONE PERSON HOUSEHOLD]

Please fill in your name or initials in the table below, then click on the 'enter demographic information' link to answer your demographic questions.

Person #1 ID

Before proceeding, please ensure that all information provided is accurate.

If the number of people in the household is not correct, use the Previous button to go back to the question about the number of people in the household.

Upon selecting 'Continue,' the information provided thus far will be saved and processed.

To edit your demographic information, please click on the Edit Demographics link in the above table. Once your demographic questions are complete, you can enter your trips.

[IF MORE THAN ONE PERSON]

The next section is about the demographics of your household. You will be asked to provide some information about yourself and the other members of your household.

Please fill in the following table with a way of identifying each person. This will make it easier to refer to them in questions later in the survey. You could use a name, nickname, initials, or familial relationship (husband, son 12 years old, etc.).

Person #1 ID

Person #2 ID

Person #3 ID

Etc.

[TABLE LISTING ALL HOUSEHOLDERS]

Before proceeding, please ensure that all information provided is accurate.

If the number of people in the household is not correct, use the Previous button to go back to the question about the number of people in the household.

Upon selecting 'Continue,' the information provided thus far will be saved and processed.

To edit the information for any household member, please click on the Edit Demographics links in the above table. Once demographic information is entered for all members of your household, you can start entering your trips.

8. DEMOGRAPHICS – GENDER, AGE, LICENCE, ETC.

GenderOrig, Gender

C1. **What is [your/PERSON's] gender?**

[INTERVIEWER: do not ask unless necessary – record only]

1. male
2. female
3. non-binary
9. decline

AgeOrig, Age

C2. **What is [your/PERSON's] age?**

9. decline / don't know

C2A. [if not provide specific age] **What age range do [you/PERSON] belong to?**

[INTERVIEWER: Read the age ranges, starting at a relevant one]

1. 0 – 4 years
2. 5 – 9 years
3. 10 – 15 years
4. 16 – 17 years
5. 18 – 24 years
6. 25 – 34 years
7. 35 – 44 years
8. 45 – 54 years
9. 55 – 64 years
10. 65 – 74 years
11. 75+ years
99. decline / don't know

C2B. [if 99 to C2A]

Unfortunately, the survey cannot proceed without an answer to this question. Demographic information such as age is crucial to transportation research. Your participation is very important, and all personal information you provide will be kept strictly confidential. Click [here](#) to view our Privacy Statement.

Rather than terminating the survey, would you reconsider answering this question?

If you are uncomfortable providing us [your / PERSON's] exact age, please select from the ranges below to continue the survey.

1. 0 – 4 years (infant or toddler, trips will not be captured)
2. 5 – 15 years (child or youth not eligible for driver's license)
3. 16+ years (eligible for driver's license)

[INTERVIEWER: Go back to previous question if precise range given or select from broad ranges above]

[If still refuse:] Thank you for your time. Have a pleasant day / evening.

- C2C. [if (PERSON #1<16 IN C2 or PERSON#1=C2A age range<3 or PERSON#1=C2B age range <3)
AND # of people in household =1]
[Cul-de-sac page with only Previous and End Survey buttons]
You indicated that only 1 person lives in your household, and that you are [AGE years or AGE RANGE] old.
This survey must be completed by someone 16 years of age or older who is familiar with your household's weekday travel.
If you are 16 years of age or older, click the Previous button to change your answer.
If you are under the age of 16, please have an older person in your household fill out the survey.

sVDvrLic

- C3. [if age >= 16, or C2A <4 C2B <3]
[Do you/does PERSON] have a valid driver's licence?
[mouseover for valid driver's licence: This includes any category of motor vehicle license, including a temporary learner's permit. Answer 'No' if the licence has expired and has not been renewed or if it has been suspended.]
1. Yes
 2. No
 99. decline / don't know

MobilityChallenges, sVMobAid_WC, sVMobAid_Scoot, sVMobAid_Walk, sVMobAid_Cane, sVMobAid_Crutch, sVMobAid_NoAid, sVMobAid_DK

- C8. **[Do you/does PERSON] have a physical disability or condition that limits [your/their] mobility?**
1. No (no mobility challenges)
 - If yes, please select the main type of mobility assistance used below ---
 2. Wheelchair
 3. Scooter
 4. Walker
 5. Cane
 6. Crutches
 7. Mobility challenge, but none of the above devices used
 9. Don't know whether or not there is any mobility challenge

OccStatus, svWkFT, svWkPT, svSchFT, svSchPT, svRetire, svWkNO, svStOth, svStOthTxt

- C4. [If age 5+]
Which of the following apply to [you/PERSON]? Select all that apply.
- PHONE:
[If 15+years:] INTERVIEWER: ASK ABOUT BOTH EMPLOYMENT STATUS AND STUDENT STATUS

[Are you/Is PERSON] currently working (i.e., an employee or self-employed)? Is that full-time or part-time?

[Do you/does PERSON] currently attend school or another learning institution? (K-12 or post-secondary) Is that full-time or part-time?

1. Work full-time (30 or more hours per week) [only display if age 12+]
2. Work part-time (less than 30 hours per week) [only display if age 12+]
3. Student full-time
4. Student part-time
5. Unemployed
6. Retired [only display if age 40 +]
77. Other, specify: _____

PROGRAMMING NOTE: [cannot select 'unemployed' if work full-time or part-time]

9. DEMOGRAPHICS – SCHOOL DETAILS

C4X. [if respondent indicated both f/t student and f/t worker, provide confirmation message:]
From your answers, it appears that [you attend/PERSON attends] school full-time and also [work/works] full-time (more than 30 hours per week at [your/PERSON's] main job).

Is this correct?

1. Yes, attend **school full-time** and **work full-time** (more than 30 hours/week)
2. No, attend **school part-time** and **work full-time** (more than 30 hours/week)
3. No, attend **school full-time** and **work part-time** (less than 30 hours/week)
4. Unsure

SchoolType

C4A. [if student]

What kind of school [do you/does PERSON] attend?

1. Elementary school (Kindergarten through grade 6 or 7 depending on the school district)
2. [Display if sample not Vernon] Middle school (Grade 7 to 9)
3. [Display if sample not Vernon] High school (grades 10 to 12)
4. [Display if sample = Vernon] Secondary school (usually grades 8 to 12)
5. College or university
6. Alternate, adult basic education, or other
7. Online / distance learning only, please specify level (high school, college, university, adult basic education: _____)

[PROGRAMMER: VERNON SAMPLES WILL HAVE PRESTRATES = 801 TO 807]

SchoolName

C4B. [if student]

What is the name of [your/PERSON'S] school?

(you can choose from suggestions that appear as you type, or, if none of the suggestions applies, you can type the name exactly as you know it)

School Name: _____ [Auto-suggest as you type]

8. Home schooled (does not attend a school outside the home)

[List of K-12 schools in study area provided by client, supplemented with public post-secondary, and larger private post-secondary]

[Include street address and municipality in description of school location]

SchoolLocation, SchoolLat, SchoolLong, etc.

C4D. [If not on list] **What is the location of the school?**

[If on list, map location:] **Does this location appear to be correct?** (If it is not correct, please drag the marker on the map, double-click, or use the search bar to find the correct location)

LOCATION CAPTURE [SCHOOL CO-ORDINATES / TAZ]

10. DEMOGRAPHICS – WORK DETAILS
--

WorkPlace, WorkLat, WorkLong, etc.

C6A. [if employed] **What is the address of [your/PERSON's] normal place of work (main job)?**

(This is the address of the worksite that [you/PERSON] normally commute[s] to every day)

LOCATION CAPTURE [WORK CO-ORDINATES / TAZ]

[PROGRAMMER NOTE: INCLUDE HOME AS A POSSIBLE WORK LOCATION]

Occupation

C7. **Which of the following best fits the nature of [your/PERSON's] occupation?**

1 **Management Occupations**

(mouseover: senior government managers, financial and administrative services managers, health, education and social services managers, construction and transportation managers, etc.)

2 **Business, Finance & Administration Occupations**

(mouseover: HR and business services professionals, financial auditors and accountants, office and administrative support, legal and medical administrative assistants, payroll and banking clerks, postal workers, shipping and receiving, inventory, dispatchers, survey interviewers and statistical clerks, etc.)

3 **Natural & Applied Sciences Occupations**

(mouseover: physicists, chemists, civil, mechanical, electrical, chemical, industrial and other professional engineers, geoscientists, architects, land surveyors, computer and information systems professionals, technical professions etc.)

4 **Health Services Occupations**

(mouseover: registered nurses, physicians, dentists, veterinarians, optometrists, chiropractors, pharmacists, nutritionists, therapy and assessment professionals, paramedics, medical technologists and technicians etc.)

5 **Post Secondary Education, Law & Social, Community & Government Services, and Law**

(mouseover: university and college instructors, judges, lawyers, policy and program researchers, social and community service workers, police officers, firefighters, correctional officers, by-law enforcement etc.)

11 **Secondary and Elementary School Teachers**

(mouseover: secondary and elementary school teachers)

6 **Performing & Facilitating Art, Culture, Recreation & Sports**

(mouseover: librarians, authors, journalists, creative arts, photographers, graphic arts technicians, occupations in motion pictures, broadcasting and the performing arts, athletes, recreation and sport instructors, graphic designers, interior designers etc.)

7 **Sales & Service Provision**

(mouseover: retail sales, food and beverage services, travel agents, tour guides, cashiers, cooks, janitors, building superintendents, retail and wholesale buyers etc.)

8 **Trades, Transport & Equipment Operators**

(mouseover: contractors, industrial, electrical and construction trades workers, machinists, iron workers, welders, machine operators, electricians, cable technicians, plumbers, carpenters, roofers, painters, cabinet makers, millwrights, automotive technicians, crane operators, drillers in surface mining, quarrying and construction, truck drivers, bus drivers, taxi drivers, trades helpers and labourers etc.)

77 **Commercial driver (such as a courier, taxi, or bus driver)**

9 **Occupations in Natural Resources, Agriculture & Related Production**

(mouseover: oil and gas well drillers servicers, testers and related workers, logging and forestry workers and supervisors, fishing, farming, landscaping, trappers and hunters, harvesting, mine workers and supervisors etc.)

10 **Occupations in Manufacturing & Utilities**

(mouseover: processing and manufacturing supervisors and workers, motor vehicle assembly, electronics and electrical products manufacturing, petroleum, gas and chemical process operators, utilities equipment operators and controllers, chemical plant machine operators, plastics and rubber processing machine operators and workers, pulp and paper production,

wood processing, mechanical, electrical and electronics assemblers, furniture assembly and finishing, mineral and metal processing etc.)

- 80 Other, please specify: _____
- 99 Don't know

[Cycle through above questions for as many people in household as were indicated. Some questions may not be applicable for children under the age of 5 for whom we will not ask about trips]

11. TRIPS INTRODUCTION

D1.

[Begin with primary respondent, section is tailored as appropriately for subsequent respondents]

This section consists of questions about the trips taken by the members of your household **during a single weekday** (your Travel Day).

In order to ensure the most accurate recollection of your travel, please use [yesterday/TRAVELDAY] as your Travel Day.

[CYCLE THROUGH TRIPS SECTION FOR ALL HOUSEHOLDERS >= age 5]

This section is about the trips [you/PERSON] made on [TRAVEL DAY], that is any trip during the 24-hour period between 4:00 a.m. yesterday ([TRAVEL DAY]) and 4:00 a.m. this morning, whether for work, school, shopping or any other purpose.

This section will have a series of questions for each separate trip. [if any member of the household is under the age of 5, i.e., C2<5 or C2A=1 or C2B=1:] We will only ask for trip details for children 5 years of age or older.

What is a trip? A trip is a one-way journey from one location to a destination for a single purpose. A trip may include more than one mode of travel, such as car and transit.

- It is important to report all trips, even for a short distance, on foot for instance.
- If you stopped off on your way to somewhere else, such as to drop off a child at school or pick up a coffee, then that journey would be two trips. The return portion of a journey is also considered a separate trip.
- Report all trips, whether made by walking, car, truck, bicycle, transit or any other mode of travel.
- [if person is employed:] Report your trips for business meetings and work-related purposes.
- Do not report walking the dog around the block and returning to the same place.
- Do not report going for a jog around the neighbourhood and returning to the same place. (However, if you jog to work, please report jogging to work as a trip to work).

How precise do locations need to be? We will ask you where you travelled to. Please try to describe locations as precisely as possible, to the accuracy of street address. Use the Google Map provided to search for a specific business or place, or double click on the map to set a 'pushpin' marker. You can drag the marker to the exact location. If possible, try to avoid placing markers at intersections – drag them to the actual destination you travelled to.

[if person is employed:]

If [you are/PERSON IS] a commercial driver (bus driver, taxi driver, courier, traveling salesman):

You do not have to tell us about the all the work trips [you/PERSON] made for commercial deliveries, or while driving a taxi or bus. But please report the following:

- Your first trip to where you started your work day (terminal, office) or your first delivery or stopping point if you started your delivery/work schedule directly from home.
- Your final work-related stopping point if it is different from the one above.
- A return trip to your home or other non-work related location at the end of your work day.
- All personal trips by any mode of travel.

(INTERVIEWER: If the person was out of town yesterday, we can capture their travel if it passed through or ended up in the Okanagan).

[CYCLE THROUGH TRIP SECTION FOR PRIMARY RESPONDENT]

[NEXT, CYCLE THROUGH INTRODUCTION AND TRIP FOR EACH HOUSEHOLD MEMBER]

12. TRIP CAPTURE – START OF TRAVEL DAY

[if PERSON's age<=5 display following introduction]

PHONE: As [PERSON] is under the age of 5, I do not have to ask you questions about the trips they took yesterday. However, I will ask whether he or she travelled at all yesterday.

(If asked why: It is assumed that most of the time we would capture their travel accompanied by an adult, in an adults' trips)

WEB: As [PERSON] is under the age of 5, you do not need to provide details about the trips they took yesterday. However, we would like to know whether he or she travelled at all yesterday.

TookTrips

E1. **Did [you/PERSON] make at least one trip - by any mode of travel whether car, bus, cycling, or walking - at any time [yesterday/TRAVELDAY])?**

(Note: Trips include those made via any mode of travel, including all motorized modes of transportation and any non-motorized modes of transportation such as walking, cycling, rollerblading, skateboarding, and so on)

1. Yes
2. No [CYCLE TO NEXT PERSON]

WhyNoTrips

E1X. [If E1=2 (no trips):]

Why did [you/PERSON] not leave home or make any trips [yesterday/TRAVEL DAY]?

1. Out of town for entire day
2. Sick/ill or care for other sick/ill household member
3. Not scheduled for school classes or activities
4. Not scheduled for work or on extended leave from work (paternity/maternity, short-term disability)
5. Worked from home, and did not leave home for any reason
6. No need to leave home
7. Could not leave home, no transportation available
77. Other (specify): _____
100. Actually, [I/PERSON] did leave home to go to work or school or to make at least one other kind of trip [GO BACK TO E1]

[IF E1C OTHER THAN 100 (did make trips) CYCLE TO NEXT PERSON]

WhyNoWork1

E1X1. [if employed=yes AND (E1X=3 or 6 or 7 or 77), regardless of whether work from home or not]
You did not report [going to work / that [PERSON] went to work] [yesterday/on TRAVEL DAY].

Were [you/PERSON] working at home?

1. Yes, worked from home (telecommuted)
2. No, away on business / working on the road
3. No, did not work
4. No, actually [I/PERSON] worked and did take work-related trips
5. Other, specify: _____

E1X2. [if E1X1=1 actually did make work trips]
 Please report [your/PERSON's] trips to and from work, or for work-related purposes, whether [you/PERSON] walked or used another mode of travel.
 [PROCEED TO E4]

WhyNoSchool1

E1X3. [if a student AND (E1X=4 or 5 or 6 or 7 or 77), regardless of whether home-schooled or not]
You did not report [going to school / that PERSON went to school]. Did [you/PERSON] attend school [yesterday/on TRAVELDAY]?

1. Yes, did go to school
2. Attended school from home (home schooled, distance learning)
3. No, did not have any scheduled classes, stayed home sick, or did not attend school for another reason
4. No, away on a field trip or other travel
5. Other, specify: _____

E1X4. [if E1X3=1 actually did make school trips]
 Please report [your/PERSON's] trips to and from school, or for school related purposes, whether [you/PERSON] walked or used another mode of travel.
 [PROCEED TO E4]

Origin, OriginLat, OriginLon, etc.

E4. Did your first trip start from home?
 1. Home
 2. Another location

WhyFirstTripStart

E4A. [If E4 <> home]
You mentioned that [your/person's] first trip of the day started at a location other than your home. Is it that [you were/PERSON was]...?

1. Working a night shift (past 4 am, the start of the travel day)
2. Staying overnight at another household? (friend's, relative's, parent's, etc.)
3. Away from home on business travel?
4. Away from home on vacation (or other personal travel)?
5. Another reason, please specify: _____

E4B. [if E4A=3, 4 (away on business or vacation travel)]

You mentioned that [you/PERSON] started the travel day away from home because [you were/PERSON was] away on business or vacation travel. Did you travel back to the survey area (the Central Okanagan or Vernon) between 4:00 a.m. [yesterday/TRAVEL DAY] and 3:59 a.m. [today/TRAVELDAY +1]?

1. Yes
2. No

E4X. [If E4B=no]

You said that [you were/PERSON was] away the entire day due to business or vacation. Since [you/PERSON] did not return to the survey area, you do not have to enter trips for this day.

If [you/PERSON] did return, please click the Previous button below to change your answer to Yes, and then please report on your travel for the day.

[PROGRAMMING NOTE: if E4B=no, conclude trip capture and log person as “No trips” in (should be reflected in person table in household overview)]

E4C. [If E4=another location and (E4B=yes or E4A=1,2,or 5)]

What was the starting point of your first trip [yesterday/TRAVEL DAY]?
LOCATION CAPTURE [ORIGIN CO-ORDINATES]

13. TRIP CAPTURE – LOCATION, TIME, PURPOSE, MODES

Destination, DestLat, DestLong, etc.

E5. [if trip=1:] **Where did you go first?**

[if trip>1:] **Where did you go next?**

(Note: For trips requiring air travel: please treat the trip to the airport as a separate trip from the trip on the airplane.)

LOCATION CAPTURE [DESTINATION CO-ORDINATES / TAZ]

[WORK LOCATIONS AND SCHOOL LOCATIONS FOR ALL HOUSEHOLD MEMBERS ARE INCLUDED IN LIST OF KNOWN LOCATIONS]

TripStart

E2. **At what time did [you/PERSON] leave on this trip?**

Please enter a time between 4:00 a.m. the previous day [TRAVELDAY] and 3:59 a.m. [TRAVELDAY+1]

Time: [Dropdown with hours and AM/PM] Minutes: _____ [0-59]

Please provide your best guess if you cannot give the exact time.

TripEnd

E2. **At what time did [you/PERSON] arrive at your destination ([DESTINATION])?**

(0400 to 2759)

Please enter a time between 4:00 a.m. the previous day [TRAVELDAY] and 3:59 a.m. [TRAVELDAY+1]

Time: [Dropdown with hours and AM/PM] Minutes: _____ [0-59]

Please provide your best guess if you cannot give the exact time.

TripPurpose**E3. What was the main purpose of this trip?**

- 10. Travel to Work (usual place of work)
- 11. Work-related
[mouseover: Trips to attend meetings, and for other work-related purposes. If job hunting or volunteering, please select 'Other'.]
- 12. Working on the road / itinerant workplace / no fixed work address
- 20. Post-Secondary School (university, college, private post-secondary)
- 30. Attend School (K-12)
[mouseover: Trips made for the purpose of attending school. If driving someone to/from school, select 'Pick up a passenger' or 'drop off a passenger'. If parent attending parent-teacher meeting, select 'Other'. If work at the school, select Work.]
- 41. Restaurant (whether eat-in or take-out)
- 42. Recreation (gym, swimming, etc.)
- 43. Social outing / meet friends
- 44. Shopping
- 45. Personal business (e.g., bank, dentist, health appointments, personal care, errands)
- 91. Pick up a passenger (e.g., pick up child at school, pick up someone at work, etc)
- 92. Drop off a passenger (e.g., drop off child at school, drop off someone at work, etc)
- 80. RETURN HOME ([recall address])
- 888. Other, please specify: _____

E5B. [Include probes to clarify if trip purpose = RETURN HOME but did not select home as destination]

E5C. [Include probes to clarify if trip purpose <> RETURN HOME but select destination=home]

Mode1, Mode2, Mode3, Mode4, Mode5**E7. How did you get there? Please select up to 5 modes, in order of use.**

INTERVIEWER: If Transit bus in first mode, probe: how did you get to the bus stop?

If only one mode, prompt: did you use another mode of transportation?

If answer of "carpooling": was that as a passenger or as a driver?

What was your first mode of transportation?

Mode 1: [select from drop down]

Mode 2: [select from drop down]

Mode 3: [select from drop down]

Mode 4: [select from drop down]

Mode 5: [select from drop down]

- 1. Auto driver
- 2. Auto passenger
- 3. Public transit
- 4. HandyDart or Health Connections
- 5. School bus (e.g., yellow bus)
- 6. Bicycle
- 7. Walked (incl. jogging, roller-blading, skateboarding, wheelchair, electric scooter)
- 8. Taxi
- 12. Motorcycle or moped/scooter
- 13. Intercity coach bus (e.g., Greyhound, Silver City Stagelines)
- 88. Other (please specify): _____

14. TRIP CAPTURE – TRANSIT

- E7A. [if first mode recorded was 5. transit bus]
How did [you/PERSON] get to the bus stop?
 19. Bus stop was right in front of my origin (the starting point of the trip: [previous destination])
 [+ Same list of modes as above excluding public transit]
- E7B. [If last of the modes recorded was 5. transit bus (last mode could be in any of Mode2-5)]
How did [you/PERSON] get from the bus stop to your final destination ([destination of this trip])? Or did the bus drop you off right in front of your destination?
 19. Bus stop was right at my destination ([recall current destination])
 [+ Same list of modes as above excluding public transit]

Route1, Route2, Route3, Route4, Route5

- E9. [if bus]
 PHONE: What bus routes did [you/PERSON] take? (in the order that they were taken)
 (After capturing one bus route, prompt: Did you take another bus route?)
 WEB: **Please list the bus routes that [you/PERSON] took? (in the order that they were taken)**
 First route: ____
 Second route: ____
 Third route: ____
 Fourth route: ____
 Fifth route: ____
 [list of bus routes can be obtained from General Transit Feed Specifications (GTFS), combine Vernon and Central Okanagan GTFS lists]

15. TRIP CAPTURE – AUTO DRIVER OR PASSENGER

- E19A. [if E7 mode = auto driver OR motorcycle AND not licensed to drive]
 [if auto driver:] **You reported that [you were/PERSON was] an automobile driver for this trip; however, you previously indicated that [you do/PERSON does] not have a driver's license. Which of the following best applies...?**
 [if motorcycle:] **You reported that [you were/PERSON was] traveled by motorcycle on this trip; however, you previously indicated that [you do/PERSON does] not have a driver's license. Which of the following best applies...?**
 1. [YOU actually have/Person actually has] a driver's license
 2. [YOU were/Person was] a [if motorcycle: motorcycle] passenger, not the driver
 7. Other, please specify: _____
- E19B. [E7= auto driver AND no vehicles available to the household (B6=0)]
You reported that [YOU were/PERSON was] an automobile driver for this trip; however, you previously indicated that your household has no vehicles available for your use. Which of the following applies...?
 1. I drove a work vehicle, rental, or borrowed vehicle
 2. I drove a car share vehicle

3. My household actually has vehicles. Please specify how many: _____
6. No, [I/PERSON] was a actually a passenger, not the driver

TotalVehOccs

E10. [if by automobile (driver OR passenger - look at answers of all of main mode question and of access and egress mode questions)]

How many people were in the car, including [yourself/PERSON]?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7 or more
9. Don't know

16. TRIP CAPTURE – OTHER STOPS

[Note: answers in this section will be used to split original trip record reported into multiple trip records, but will not be included in the final dataset.]

E50. [ask this question if Age>14 and {(Origin=Home and Destination=any householder's work or school) OR (Origin= any householder's work or school and Destination=Home)}. Intent is to capture missed incidental trips without forcing respondent to go back and correct previous info.]
In [you/PERSON's] trip from [ORIGIN] to [DESTINATION], did [you/PERSON] make any other stops along the way? (stopped for gas, went through drive-through, picked someone up, or dropped someone off)

1. Yes
2. No

E50B. [If E50=Yes]
Where did [you/PERSON] stop?
 LOCATION CAPTURE

E50C. [If E50=Yes]
Why did [you/PERSON] stop there?
 [Repeat list of trip purposes]

E50D. [If E50=Yes and E50C = picked someone up and Mode=Driver]
How many people did [you/PERSON] pick up there?

—

E50E. [If E50=Yes and E50C = dropped someone off and Mode=Driver]
How many people did [you/PERSON] drop off there?

—

E50F. **What time did [you/PERSON] arrive at [location in E50B]?**
 Please enter a time between 4:00 a.m. the previous day [TRAVELDAY] and 3:59 a.m. [TRAVELDAY+1]
 Time: [Dropdown with hours and AM/PM] Minutes: _____ [0-59]

E50F. **What time did [you/PERSON] leave [location in E50B] to go to [E5 DESTINATION]?**
 Please enter a time between 4:00 a.m. the previous day [TRAVELDAY] and 3:59 a.m. [TRAVELDAY+1]
 Time: [Dropdown with hours and AM/PM] Minutes: _____ [0-59]

17. TRIP CAPTURE – OTHER INFORMATION

svSustVehQ

E11. [if trip made not driver or passenger and Origin=Home and HH had vehicles]

Was a vehicle available for this trip (but you chose not to drive it)?

1. Yes
2. No
9. Don't know

E11N.

PHONE: INTERVIEWER: If there is anything unusual about a trip (e.g., round trip from home to home) or the individual trip chains, or if useful information, please make notes here, otherwise proceed to next question without delay. Use only when necessary.

WEB: Please note any exceptions on this trips or issues/errors you may have had (e.g., clarification of location, purpose, etc.)?

For assistance, please contact 1.855.319.2887 or email us at info@okanagantravelsurvey.ca.

E12. **Prompt: Did [you/PERSON] make another trip after that?**

1. Yes
2. No

18. TRIP CAPTURE – END OF TRAVEL DAY

DidNotReturnHome

E13. [if E12 = No AND (destination <> home OR trip purpose <> home)]

From your answers, it appears [you/PERSON] did not return home.

Just to confirm, [were you/was PERSON] at this final destination, [RECALL DESTINATION], until at least past 4 a.m. [today/TRAVEL DAY+1] (the end of the travel day)?

1. Did not return home, was at this final destination until past 4 a.m.
2. Returned home (more trips to record) [RETURN TO E12 AND CORRECT ANSWER]

WhyNoReturnHome

E14. [if E14 = 1. yes]

Why did [you/PERSON] not return home before the end of the day?

(Note: for this survey, the end of the Travel Day extends past midnight to 4 am the next day)
(We are only asking as a check to ensure that we captured [your/PERSON's] entire travel)

1. Worked a night shift past 4 am
2. Stayed overnight at another household (whether friend, relative, parent)?
3. Away from home on business travel
4. Away from home for vacation travel
5. Other, please specify: _____

WhyNoWork

E16. [if employed=yes AND did not make a work-related trip AND no trip destination of 'usual workplace' (E5<>main work location) AND E12=777 (No more trips)]
You did not report [going to work / that [PERSON] went to work] [yesterday/on TRAVEL DAY].

Were [you/PERSON] working at home?

1. Yes, worked from home (telecommuted)
2. No, away on business / working on the road
3. No, did not work
4. No, actually [I/PERSON] worked and did take work-related trips
5. Other, specify: _____

E17A. [if E16=Yes actually did work)]

Please add your trips to and from work, on the Trips Overview page whether you walked or used another mode of travel.

Please also record any other trips by modes other than walking that you may have missed.

Link to Trips Overview page.

WhyNoSchool

E16A. [if a full time student AND did not make a school-related trip AND no trip destination of 'school' (E5<>person's own school) AND E12=777 (No more trips)]

You did not report [going to school / that PERSON went to school]. Did [you/PERSON] attend school [yesterday/on TRAVELDAY]?

1. Yes, did go to school
2. Attended school from home (home schooled, distance learning)
3. No, did not have any scheduled classes, stayed home sick, or did not attend school for another reason
4. No, away on a field trip or other travel
5. Other, specify: _____

E17B. [if went to school E16A=Yes and usual school location other than 'home']

Please add your trips to and from school, on the Trips Overview page whether you walked or used another mode of travel. *Link to Trips Overview Page*

Please also record any other trips by modes other than walking that you may have missed.

[CYCLE THROUGH TRIPS FOR EACH PERSON]

E20. Your household trips can be reviewed and edited on this page before exiting the trip section of the survey. You can also add additional trips here that you may have missed. Can you think of any other trips you or other members of your household made [yesterday/TRAVEL DAY] either during the day or in the evening that we may have missed?

If so, click on Add Trips or use the Edit trip links to edit a trip you've already entered.

If you are done entering trips, click on Go to Household Summary where you can continue through the final questions of the survey once you've finished your trip entries for your household.

19. FINAL QUESTIONS

HhIncome

B9. WEB: **Which of the following ranges corresponds to your household's total income last year? (Please consider all sources of income, before taxes)**

PHONE: May I ask which of the following ranges corresponds to your household's total income last year? (Consider all sources of income, before income taxes)? (INTERVIEWER: read answers until confirmation)

This information is useful for transportation planning purposes, to get a better understanding of the travel patterns of different types of households. Your answers will remain entirely confidential. Click here to see our [Privacy Statement](#).

1. \$0 to less than \$30,000
2. \$30,000 to less than \$50,000
3. \$50,000 to less than \$80,000
4. \$80,000 to less than \$125,000
5. \$125,000 or more
9. Decline / don't know

[The ranges above would have, in 2016, divided the Okanagan population into approximately five groups (19%, 19%, 22%, 22%, and 19% of the population, respectively).]

B10A. **Did you have any difficulty reporting your trip information? Or do you have any comments about the information you provided on your survey?**

99. No

INTERVIEWER: Do not ask the respondent if they have any final comments to make. Do not record any information here unless it pertains to potential issues in the trip data collected (e.g., you think you made an error in capturing trips, or the system did not perform as expected).

FinalComments

B10B. [Online respondents only]

Thank you for reporting your travel information. We just have a couple of final questions for you.

In your opinion, what is the most important transportation issue or challenge in your community?

99. No comment

Future Research**B11. Would you be willing to be contacted to participate in future transportation-related research?**

Your contact information will only be used to contact you for future transportation-related research conducted by partner agencies in this research (City of Kelowna, City of Vernon, City of West Kelowna, Westbank First Nation, District of Peachland, District of Lake Country, and the Regional District of Central Okanagan). Your answers to the Okanagan Travel Survey may be used to select groups of participants for future research (for example, some research might target only bicycle users, transit users, or people living in a neighbourhood).

Your contact information will never be sold or shared with any other agency, or used for any other purpose other than to invite you to participate in Okanagan-based transportation research in the future. Click here to see our [Privacy Statement](#).

1. Yes
2. No

20. PRIZE DRAW**F1. Participants in the survey are eligible to enter a prize draw. A total of \$3,000 in prizes will be awarded. Would you like to enter into the draw?**

INTERVIEWER: If more information requested

Prizes include:

- 1 cash prize of \$500
- 100 \$25 gift certificates to local merchants. If you decline to accept your prize, it can be donated to a local charity.

Chances of winning a prize are about 1 in 48. The prize draw is administered by R.A. Malatest & Associates Ltd. and will be drawn once the survey administration period is completed.

1. Yes
2. No

F2. [If yes]

PHONE: May I confirm your name and phone number, so that we can contact you to let you know if you have won?

Your name and phone number will be kept confidential and will be used only to contact you in the event your name is selected in the prize draw.

WEB: Please confirm your name and phone number, so that the survey administrator can contact you at this phone number in the event your name is selected in the prize draw.

This personal information will not be used for any other purpose nor will it be shared with anyone else.

Name: _____ [prepopulate with first name, if respondent provided their name earlier]

Phone: _____ [prepopulated with household phone number. Allow edits in case respondent wants to be contacted at another number]

Email: _____ [prepopulate with household email, allow edits]

21. CONCLUSION

Please click on the Submit button to submit your survey answers and conclude the survey.
After you click Submit, you will no longer be able to edit your answers.

That concludes the Okanagan Travel Survey.
Thank you very much for your participation!

Your survey answers have been saved. Click here to see our [Privacy Statement](#).

If you wish to change any of your answers, or if you have any concerns about the survey, please contact info@okanagantravelsurvey.ca or **1.855.319.2887**

**That concludes the survey. Thank you very much for your cooperation.
Have a pleasant evening.**

For more information about the survey, please visit: <http://smartTRIPS.ca/travelsurvey>