2011 Metro Vancouver Regional Trip Diary Survey

Analysis Report

February 2013

TRANSLINK

Methodological difference with 2011 Trip Diary (September 2019)

Past Trip Diary surveys were suspected to have transit bias and underreporting of trips. In recent years, improved survey weighting and smartphone app survey tools were able to address these issues for the 2017 Trip Diary. In order to compare the 2011 and 2017 Trip Diary meaningfully, the 2011 Trip Diary was reweighted to account for these methodological differences.

To reduce transit bias due to the oversampling of transit users, additional control totals such as household's dwelling type and person's usual mode of commute to work were entered into the survey reweighting process. This resulted in a reduction of transit mode share for the 2011 Trip Diary from 13.6% to 12.4%.

With the introduction of smartphone app survey, underreported trips can now be collected. These underreported trips were then used to calibrate web survey weights. In order to correct this bias for 2011, weight adjustments on person with no reported trips and non-home-based trips were done. This resulted in an increase of total trips for the 2011 Trip Diary from 6.8 million to 7.4 million.

See the most recent Trip Diary information at https://www.translink.ca/Plans-and-Projects/Transportation-Surveys.aspx

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INTRODUCTION

The primary objective of TransLink's regularly conducted Regional Trip Diaries is to obtain information on 24-hour weekday travel from a random sample of local residents. The 2011 Regional Trip Diary survey used a combination of online and mail-out questionnaire options and was conducted from September 15th to December 12th, 2011. The study area includes Metro Vancouver, and stretches beyond to encompass the entire Lower Mainland, from Lions Bay to the Fraser Valley Regional District and all the way to Hope.

BACKGROUND AND SURVEY APPROACH

Nearly 125,000 recruitment letters were sent to households which were followed by 83,000 recruitment phone calls. A total of 32,000 households agreed to participate in the survey which resulted in 21,850 ***valid*** household survey returns (2.2% of the households in the study area). Among those who completed the survey, the web option was chosen by 95% of responding households, while only 5% selected the mail-out option. The resulting survey database contains information on 21,850 households, 52,175 individuals and 146,000 trips. The survey sample was expanded to regional totals in order to provide daily trip estimates and regional travel characteristics.

The focus of this report is on the analysis of the survey data for travel behaviour of the residents of Metro Vancouver. The report addresses a range of questions including:

- How many trips are made during a typical weekday in Metro Vancouver and its sub-regions?
- What time of day are people travelling and for what purpose?
- What modes do individuals use to complete their trips?
- What is the geographic distribution of trips between different sub-regions during a typical weekday?
- What are the characteristics of persons using different modes of travel in the region?

ASSUMPTIONS AND METHODOLOGY

The Trip Diary data can be queried and presented in multiple ways. As such, it is important to provide some clarification on the assumptions and methodologies employed in the analysis of the data as well as preparation of the report. Complete details on the design and implementation of the survey are documented in a methodological report under a separate cover. This section describes some key assumptions used to prepare the summaries of the travel information.

At the most basic level, the Trip Diary is a household survey that contains information on the personal travel patterns and characteristics of Metro Vancouver residents. Since data is collected only from local households, the Trip Diary does not include information on commercial vehicle travel, such as trucks and taxis, and non-residents or tourist travel. Hence, many trips that occur in the regional transportation system are not captured by the Trip Diary.

One notable methodological change between this and previous Trip Diary surveys in the region is that in the 2011 version, trip information was collected only for persons five years of age and older. Therefore, whenever comparisons are made between surveys or trends are reported in the report, results of previous surveys have been adjusted to provide consistent comparisons. As a result, values from previous surveys, as they presented in this report, may differ somewhat from

previously published values. Note that throughout this report any references to residents will refer to persons 5 years and older unless otherwise stated.

Travel behaviour can be reported and analyzed either based on the respondent's place of residence or the origin/destination of the trip. Unless otherwise stated, throughout the report, exhibits and tables present information on travel patterns by the respondent's *place of residence.* Whenever information is presented on travel patterns by trip origin or destination this is explicitly noted in the text or exhibit.

Wherever there is a reference to the regional breakdown of the population by categories such as age, gender and income, the breakdowns are based on the Trip Diary which was expanded using Census information. As such, any differences between survey and Census population breakdowns should be minimal.

Some trips are assigned different trip purposes compared to previous Trip Diary surveys. This creates some discrepancies when comparing number and percentage of trips by purpose. For instance, in previous surveys some trips in which parents dropped their kids off at grade school were classified as Grade School trips; conversely, in the 2011 survey, any parent's trip with a reported purpose of "to school" was coded as an Escort trip. Another example is that in previous surveys, trips for short term evening classes and self interest courses were classified as Post-Secondary trips; in the 2011 survey these trips were coded as Social / Recreational trips.

Some of the summations between graphs may not match due to rounding and some of the summations of percentages within graphs may not equal exactly 100% also due to rounding.

The previously published results of the 2008 Regional Trip Diary Survey were based on custom made population estimates / expansion factors developed by a private company for 18 sub-regions in the Lower Mainland. These population estimates are generally about 2% higher than Census based estimates for the 2008 population would have been. In order to allow better comparison between 2008 and 2011 figures for trend analysis, the 2008 Trip Diary expansion factors were adjusted to 2008 population totals that are consistent with the Census estimates using the same sub-areas as applied in the 2011 survey. This approach provides more realistic estimates of changes in trip volumes between 2008 and 2011; however, it also yields estimates for 2008 that are somewhat different from previously published values.

RESULTS

Based on the expanded survey database, it is estimated that approximately 6.06 million daily trips are made by Metro Vancouver residents on a typical fall weekday; this is an increase of 9.2% compared to 2008, the last time a trip diary survey was done in the region. The number of trips by Metro Vancouver residents translates to a daily average of 2.77 trips per person (versus 2.68 in 2008). The 9.2% increase in daily trips between 2008 and 2011 is a result of a combined effect of a 6% increase in population with a 3% increase in the average trip rate.

The survey results show that the hour with the highest travel demand throughout the day is 08:00-09:00 while the highest period demand is during the PM peak period (15:00-18:00). There is a distinct drop in trip volumes during the midday (09:00-15:00), and a large drop off in the evening and night time periods. **Figure ES1** illustrates number of trips by time of day.

Figure ES1 - Weekday Trips by Hour of Day

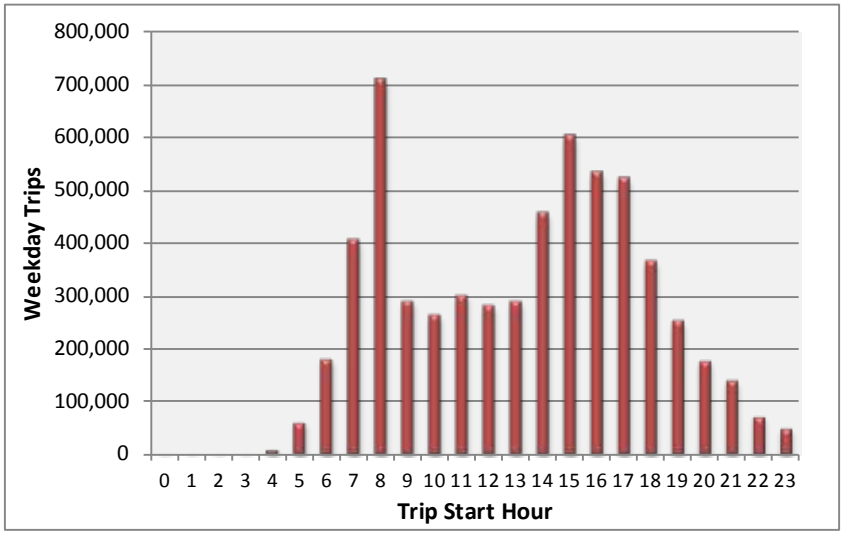
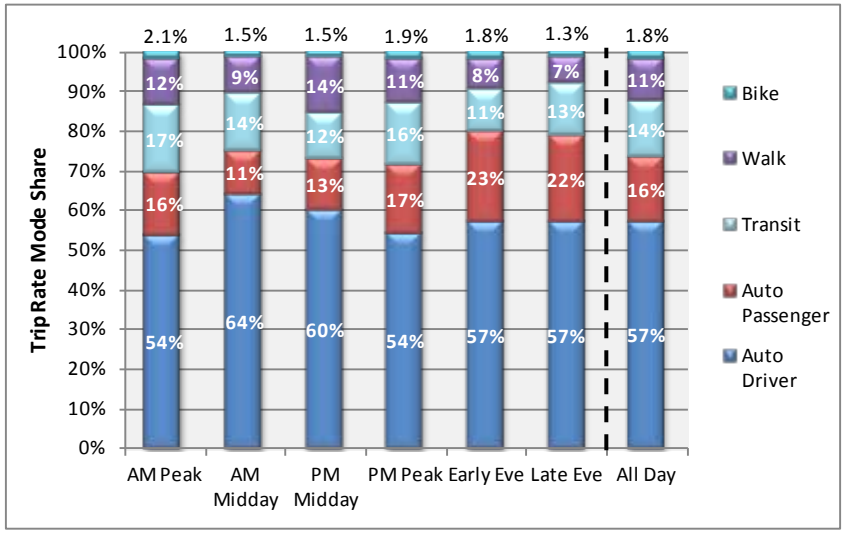


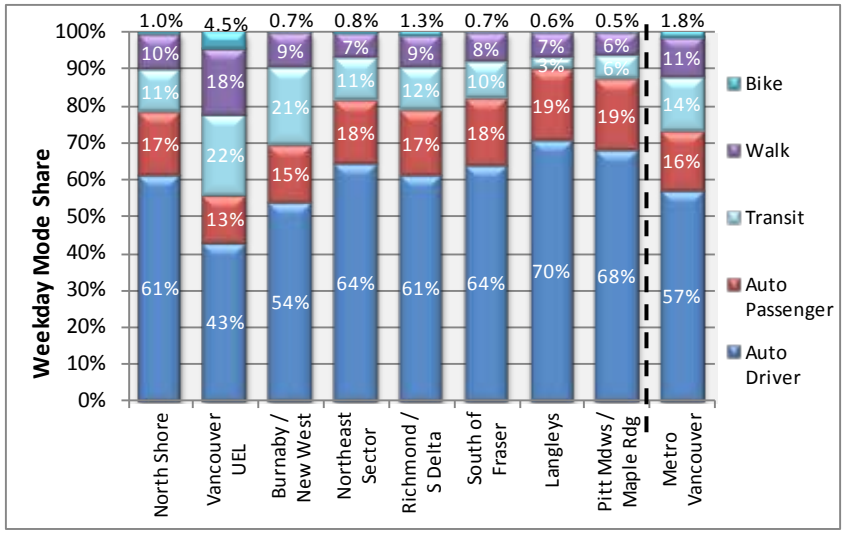
Figure ES2 - Mode Share by Time of Day



Not only does the number of trips fluctuate throughout the day, the modal composition varies as well. The AM and PM peak periods have the highest Transit share and overall sustainable mode share (Transit, Walk and Bike). Auto Driver mode share is relatively high during the Midday periods (09:00-15:00) and Auto Passenger is particularly high during the evening (18:00-24:00). Finally, Walking is consistently high throughout most of the day, tailing off in the evening, and late night. **Figure ES2** illustrates mode share by time of day.

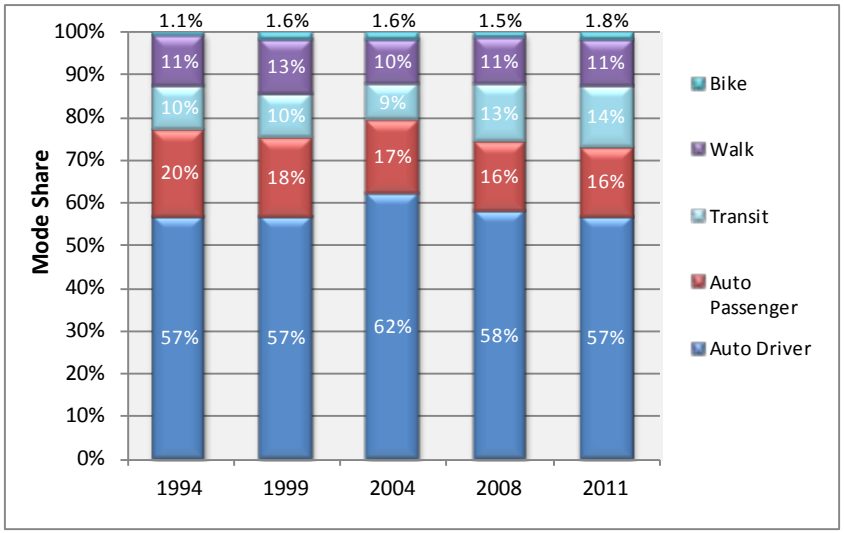
Mode share is also influenced by land use and population density and composition; therefore, mode share varies by geography. **Figure ES3** shows the mode share by sub-region of residence. Auto mode share (driver and passenger) are relatively low for residents of Vancouver / UEL and increase with distance from the Metropolitan core.

Figure ES3 - Mode Share by Sub-Region



Since 1994, mode shares for travel by the residents of Metro Vancouver have been relatively stable for most modes, as can be seen in **Figure ES4**. Auto Driver mode share is consistently around 57 or 58 percent since 1994 (the higher figure for the 2004 survey is an outlier since this was conducted in the spring). Walking as a share of trips has also been stable at about 11 percent throughout the years. On the other hand, opposing trends can be detected in the use of Transit versus the Auto Passenger mode – while Auto Passenger is in decline, Transit usage has increased from 10 to 14 percent over the last 12 years.

Figure ES4 - Trends in Mode Share



In terms of trip lengths, they vary significantly by travel mode and trip purpose. For instance, the average trip made by drivers is 9.9 kilometres, compared with 12.6 kilometres for transit riders and 1.1 kilometres for pedestrians. Similarly, the average trip to work or post-secondary school is 13.1 kilometres, while the average trip to grade school (for which close to half of children are chauffeured by automobile) is only 3.4 kilometres. **Figure ES5** illustrates trip length by mode, while **Figure ES6** illustrates trip length by purpose.

Figure ES5 - Trip Length by Mode

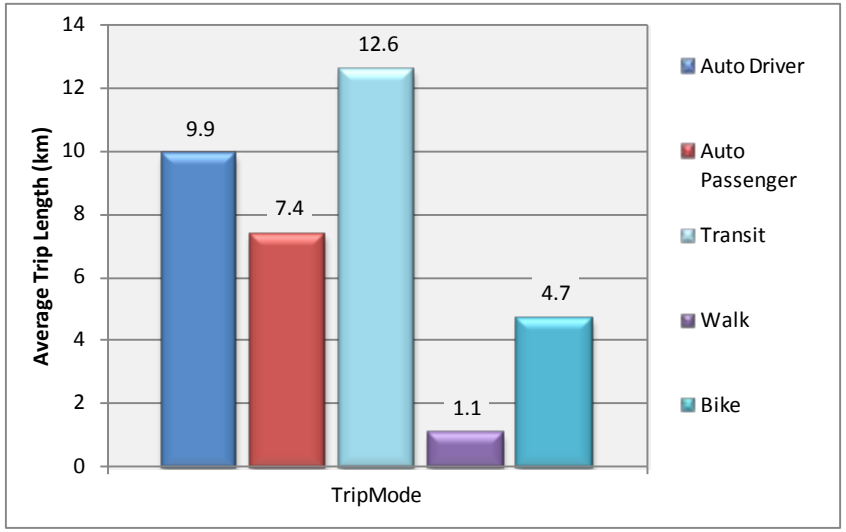
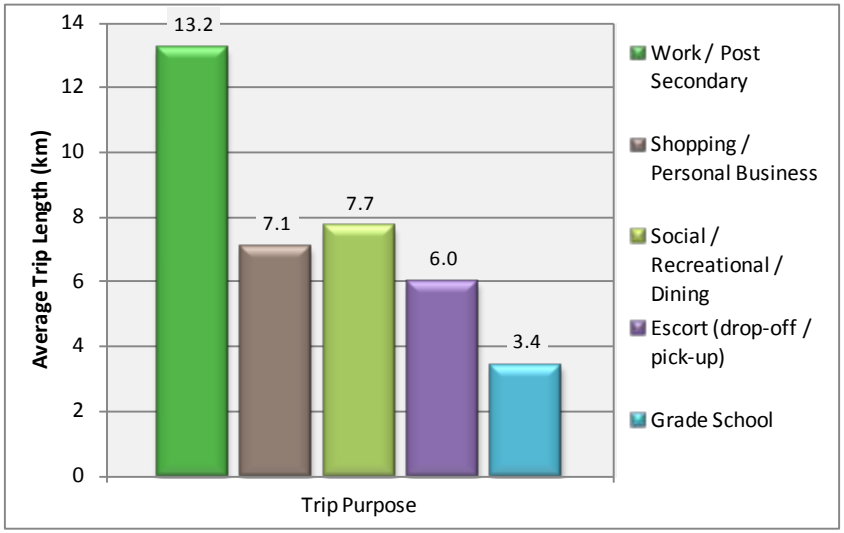
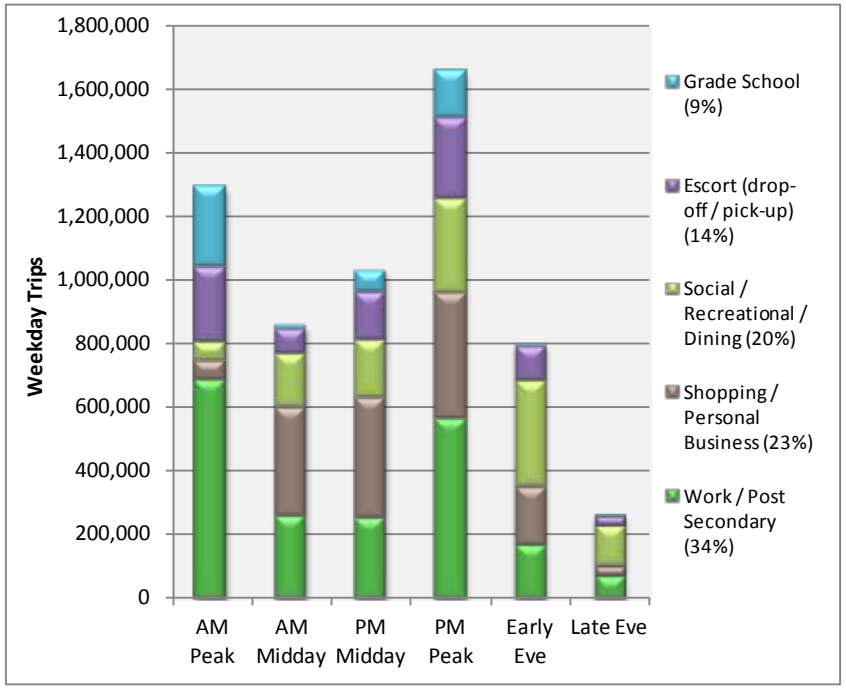


Figure ES6 - Trip Length by Purpose



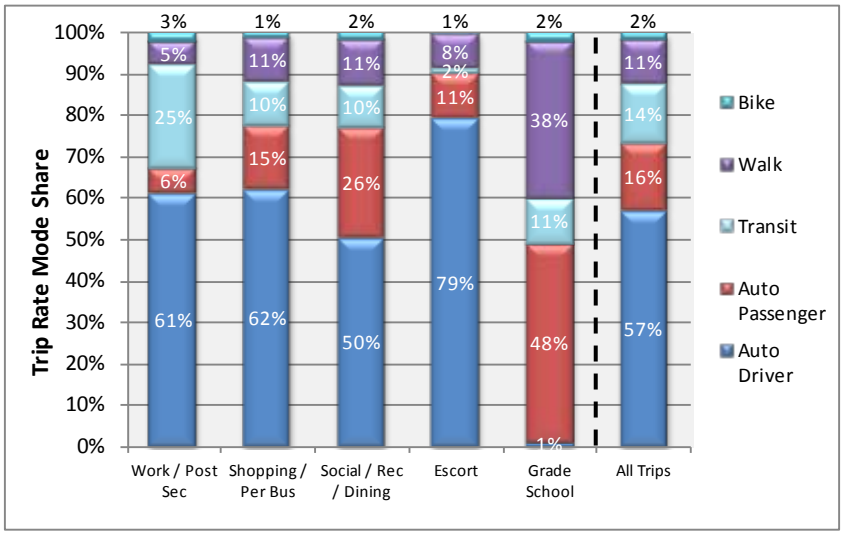
The number of weekday trips made by residents of the Lower Mainland for different purposes by time of day is presented in **Figure ES7**. In terms of trip purpose, trips to and from Work and Post-Secondary school represent the largest trip purpose and account for close to 34 percent of daily travel. On a twenty-four hour basis, travel for Shopping and Personal Business represent close to 23 percent of trips and Social, Recreational and Dining about 20 percent. While trips to Grade School account for 9 percent of all trips, Escort trips have a higher share of all trips at over 14 percent.

Figure ES7 - Trip Purpose by Time Periods



As illustrated in **Figure ES8**, trip purpose also has significant effect on mode share. The most auto dependent type of trips is Escort trips, 79 percent of which are conducted as Auto Driver trips. Work / Post Secondary trips have the highest Transit mode share at 23 percent. Grade School trips are mostly conducted either as Auto Passenger or Walking trips.

Figure ES8 - Mode Share by Trip Purpose



GLOSSARY OF TERMS

The following provides a description of the technical and colloquial terms used throughout this report:

- **Baby Boomer** – someone who was born during the post-World War II baby boom which includes the years 1946 to 1964.
- **Bike & Ride** – a type of trip where someone rides their bike to a transit station and either locks up their bike there or takes their bike with them on the transit service.
- **Casual Mode User** – someone who made trips using more than one primary mode during the survey day.
- **Commute Trip** – a trip for the purpose of travelling to work or post secondary school.
- **Cyclist** – a person making bike trips.
- **Data Expansion** – the process of applying factors to a sample to ensure that it matches the entire population according to specific demographic characteristics.
- **Escort Trip** – occurs when someone assists someone else in their travel needs such as a parent driving their children to school or a friend dropping off someone else at a SkyTrain station.
- **External Trips** – a trip that has either an origin or destination outside the study area.
- **Inter-Modal Trip** – a trip for which more than one mode is used. This typically applies to transit trips whereby an individual uses another mode such as bike or auto passenger to get to transit.
- **Kiss & Ride** – a type of trip where someone is an auto passenger and gets dropped off at a transit station or stop.
- **Life Stage** – these are broad categories that define individuals based on their occupation status. In the report these divide individuals into four groups: full time employed, full time student, non-worker and non-student (e.g. retired, unemployed or homemaker) and part-time worker or student.
- **Modal User** – someone who typically uses a specific mode of travel.
- **Metropolitan Core** – as defined by Metro Vancouver's Regional Growth Strategy (RGS), the Metropolitan Core is the area in the City of Vancouver that includes the Central Business District east of Stanley Park, west of Clark Drive, north of 16th Avenue, and east of Burrard Street on the south side of False Creek.
- **Mode of Travel** – the mode by which someone conducts a trip. The report typically distinguishes between the following modes: Walking, Biking, Transit, Auto Passenger, and Auto Driver. The word "mode" is often used throughout the report as an abbreviation.
- **Mode Share** – the proportion of trips made by different forms of transportation including Walking, Biking, Transit, Auto Passenger or Auto Driver.
- **Multi-Modal User** – someone who used more than one mode of travel during the survey day.
- **Other Trip** – all trips on non-regular and specialized services such as taxi, school bus or tourist and Greyhound buses.
- **Park & Ride** – a type of trip where someone drives part of the way to a destination parks their vehicle and then uses a transit service such as SkyTrain, SeaBus, West Coast Express or bus the rest of the way. The term also applies to the return trip when the auto is used after transit to complete the trip.

- **Passenger Kilometres** – the number of kilometres travelled by individuals by mode of travel.
- **Pedestrian** – a person making walk trips.
- **Primary Mode** - is the main mode of travel on any given trip. In cases where only a single mode is used, the primary mode is the same as that mode. For inter-modal trips, the primary mode is defined as the mode that is most likely to account for the greatest proportion of the entire trip.
- **Sample** – all the households, persons and trips about which data were received through the survey.
- **Single-Modal User** – someone who made trips using only one primary mode during the survey day.
- **Transit Trip** – a trip using one of the regular transit services in the Lower Mainland including bus, SeaBus, SkyTrain and West Coast Express. Transit trips also include "park and ride" and "bike and ride" multi-modal trips.
- **Transportation Model** – a mathematical model developed using specialized computer software used to estimate and forecast traffic and transit volumes on regional roads and transit services to support decision making.
- **Trip** – A trip is defined as an individual leaving one location (origin) and arriving at another (destination) for a reason (purpose). The following *do not* constitute a trip:
    - Walking a dog;
    - Jogging, walking or biking with no specific destination and with no purpose other than the activity itself;
    - Moving around between classes/campus or within the same building complex, such as office; or
    - Commercial vehicle trips – these include trips where the purpose is commercial delivery or driving bus or taxi.
- **Trip Chaining** – occurs when a person makes trips to several activities in sequence without stopping at home between them. For example, an individual may go from work to the gym (trip chaining) and then home rather than going from work to home and then to the gym (not trip chaining).
- **Trip Purpose** – the reason for making a trip. All trips in the report are classified into five types of purposes: Work/Post-Secondary, Shopping/Personal Business, Social/Recreational /Dining, Escort and Grade School.
- **Trip Rate** – the average number of trips per person or household in a single day.
- **Vehicle Kilometres Travelled (VKT)** – the total number of kilometres travelled by private automobiles.
- **Walk Trip** – because walking is a part of virtually any trip (e.g. walking to a bus stop or to get to a parked car), walk trips are defined as trips for which walking was the only mode used; or in other words, walking was done the entire way.

1 BACKGROUND AND OVERVIEW

The region has conducted trip diary surveys since the mid-1980s to gather information on how residents travel. Trip diaries are valuable in understanding the travel characteristics and patterns of residents and in identifying emerging trends. They provide information which can be used to evaluate the effectiveness of the past transportation plans and programs and improvements needed to meet current and future transportation objectives.

The purpose of the 2011 Regional Trip Diary Survey was to:

- Collect statistically reliable 24-hour household travel data for current and future regional transportation and land use planning purposes. This includes updating the Regional Transportation Model;
- Provide a statistically reliable basis for a comparative assessment of the changes in travel behaviour and patterns in the Metro Vancouver and Fraser Valley regions; and,
- Understand the impact of transportation system changes and land-use trends.

Key characteristics of the previous trip diary surveys as well as the current 2011 Trip Diary are presented in **Table 1.0.1**.

Details on the design and implementation of the survey are documented in a separate Methodological Report.

Table 1.0.1 – Comparison of Trip Diary Characteristics

Year	1985	1992	1994	1999	2004	2008	2011
Season	Fall	Fall	Fall / Winter	Fall	Spring	Fall	Fall
Coverage	GVRD	GVRD	Lower Mainland	GVRD	Lower Mainland	Lower Mainland	Lower Mainland
Universe (no. of households)	518,000	642,445	743,000	742,000	913,606	948,026	992,725
Sample (no. of households)	25,000	15,000	1,600	2,990	4,824	17,603	21,851
Sample Rate	4.83%	2.33%	0.22%	0.40%	0.53%	1.86%	2.20%
Time of Day	24h	AM (6-9)	24h	24h	24h	24h	24h
Method	Phone	Phone	Mail	Mail	Mail / Web	Phone / Web	Mail / Web

The focus of this report is on a high level analysis of the survey data for the residents of Metro Vancouver. The report addresses a range of questions including:

- How many trips are made during a typical weekday across Metro Vancouver and its sub-regions?
- What time of day are people travelling and for what purpose?
- What modes do individuals use to complete their trips?

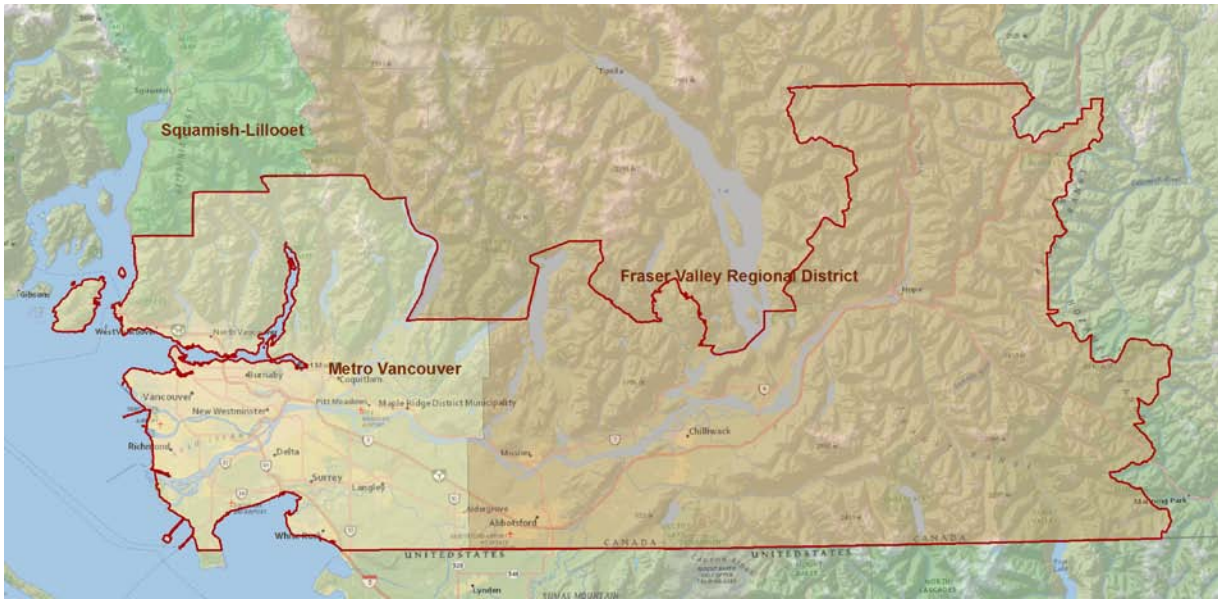
1.1 Survey Methodology

Since the design and implementation of the 2011 Trip Diary has been documented in detail in a separate report, this section provides a brief overview of the survey methodology.

1.1.1 Survey Design

The survey sample area included all of Metro Vancouver (including Bowen Island) and the more populated areas of the Fraser Valley Regional District, including all of the Lower Mainland from Lions Bay to Hope as illustrated in **Figure 1.1.1**.

Figure 1.1.1 – Map of the Trip Diary Survey Area



The Study Design phase focused on the initial planning and design of the survey, as well as training of support and recruitment staff and approval of all survey materials. Survey methods, requirements and timing were determined and sample size (2% initial target) was confirmed.

The design of the survey was generally consistent with previous surveys; however, modifications were made to address issues that had occurred in earlier surveys. For example, to ensure a representative response from all municipalities, the survey sample area was broken into 52 sub-areas. In past Trip Diaries, small municipalities were grouped with larger municipalities (with a single sample size target); in this study closer attention was paid to the geographic breakdown of the region to ensure that survey participation was accurately balanced between and within municipalities. Oversampling was implemented for specific sub-regions where additional funding was provided by the respective municipalities (for details see the Methodology Report).

Trip Diary tools, systems and processes were developed and tested for accuracy and effectiveness. A pilot study was conducted, after which results were reviewed and refinements were made to ensure that the survey was carried out in a timely and accurate manner.

1.1.2 Recruiting and Data Collection

The Recruiting and Data Collection phase focused on recruiting survey participants, which involved a multi-step approach. All selected households (including those with and without listed telephone

landlines) were sent a pre-notification letter which explained the nature of the study and requested their participation. The letter included a link to the online survey and a unique ID number and entry code. All households were invited to go directly online to register themselves for the survey. Those with listed landlines were also recruited by telephone.

Although this was mainly an online survey, households without internet access, or those who indicated that they would prefer not to complete an online survey, were offered the option to complete a paper version of the survey. To ensure a high response rate with good quality responses, a dedicated email address and toll-free helpline were set up to field participants' queries. Follow-up calls were made to offer possible assistance to those households who requested a Chinese or Punjabi version of the paper survey. All households that completed the survey were sent a $10 coffee card as a thank-you for their participation and were entered into a draw prize competition.

Some of the key recruiting statistics were as follows:

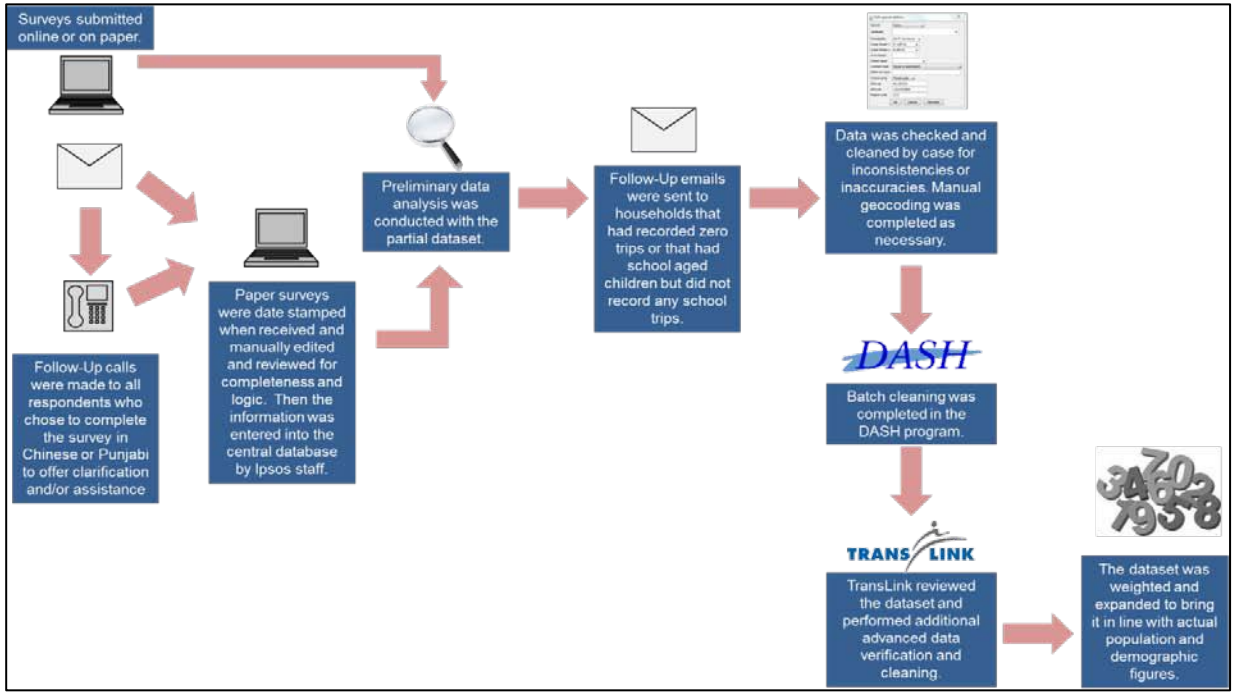
- 124,600 pre-notification letters were mailed to households;
- 82,900 of the households with listed numbers were contacted by telephone;
- 32,000 households were recruited: 21,000 by self-registering online, 10,500 by telephone and 500 via the helpline;
- 22,850 households completed the survey (71% of those recruited).

1.1.3 Data Processing and Verification

During the Data Processing and Verification process, the surveys received were cleaned and verified on an ongoing basis to ensure that the information collected was accurate and reflective of the actual population figures. The chart in **Figure 1.1.2** depicts the general process followed during the Data Processing and Verification phases of the study.

Once all data cleaning and verification procedures were completed, a

Figure 1.1.2 – Data Processing and Verification



total of 21,850 surveys were retained from the original 22,850 received (for details see the Methodology Report).

To ensure the dataset from the 2011 Regional Trip Diary Survey was an accurate reflection of residents' behaviour, it was necessary to ensure that the sample of households and residents that responded to the survey (referred to herein as the sample) were reflective of the actual population on key criteria. The standard practice with research studies is to apply mathematical weights to bring the dataset in line with actual population and demographic figures. Using information from the 2011 Census and an analysis of the Trip Diary, weights were applied based on:

- The number of households in each sample sub-area[1];
- Household size distribution by sub-area;
- Age and gender distribution by sub-area.

The data from this study will be used for transportation planning and forecasting purposes. This means that along with analyzing the percentage of households, persons or trips, there is also a need to analyze the absolute numbers or counts (e.g. how many people are travelling from one zone to another at a certain time of day, by a specific mode and for what purpose?). This required that the dataset be weighted to accurately reflect the region's households/persons/trips, and that it be expanded to be expressed in total population figures. In order to expand the dataset so it was reflective of the entire survey sample area, a total census target of 992,725 households was used. Hence, for the total survey sample size of 21,850, the expansion factor applied to the dataset was 45.43.

[1] The sub-areas are aggregations of the 52 sub-regions. Expansion and weighting was conducted based on 18 sub-areas.

1.2 REGIONAL CONTEXT

This section describes regional trends and changes that have influenced travel behaviour between 2008 and 2011 (the period between the two most recent Trip Diaries). The factors summarized focus on demographic trends, employment trends, consumer trends as well as changes in the transportation network.

1.2.1 Population and Employment Growth

The number of people residing in the Metro Vancouver region continues to grow through natural increases and immigration. **Table 1.2.1** below provides the 2008 and 2011 Metro Vancouver population estimates prepared by BC Stats which shows a 1.9% compound annual growth rate (CAGR) between the last two Trip Diaries.

Table 1.2.1 – Growth in Metro Vancouver Population[2]

	2008	2011	Absolute Change	2008-2011 % Change	CAGR
Total Population	2,273,000	2,405,000	132,000	5.8%	1.9%
Persons over 4 years	2,160,000	2,285,000	125,000	5.8%	1.9%

Table notes: 2008 and 2011 figures are based on BC Stats Population Estimates and are rounded to the nearest 1,000; Source:

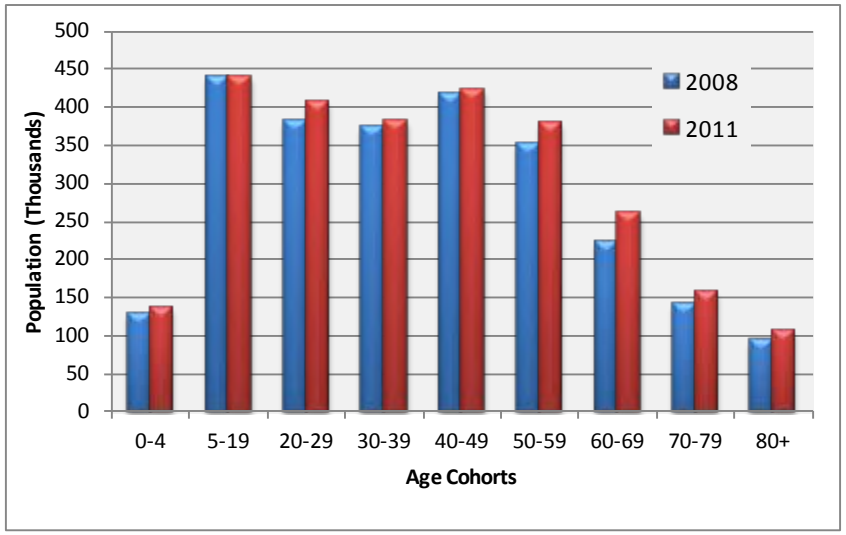
http://www.bcstats.gov.bc.ca/StatisticsBySubject/ Demography/PopulationEstimates.aspx

The rate of population growth during the study period is roughly the same compared to the period between 2004 and 2008 (previous Trip Diaries), where the Metro Vancouver region grew from an estimated 2,147,000 to 2,273,000 people, respectively.

[2] BC Stats Population Estimates.

The population of Metro Vancouver is growing older. The Post World War II baby boomers (Aged 44 to 63) are starting to reach retirement age and leaving the labour force. They are replaced in the labour market by a smaller young age group (see **Figure 1.2.1**).

Figure 1.2.1 – Metro Vancouver Population by Age Groups (2008 vs. 2011)



Source: BC Stats. Accessed from:
http://www.bcstats.gov.bc.ca/statisticsbysubject/Demography/PopulationEstimates.aspx

Currently, immigration is responsible for about 75%-80% of the region's population growth. In the past decade, Metro Vancouver has absorbed approximately 13% of the total immigrants to Canada, accepting between 27,000 and 43,000 immigrants per year. At the same time, the region has generally experienced a loss of population through domestic migration.

1.2.2 Employment

Employment in the region increased approximately 3.6% between 2008 and 2011, from 1.21 million to 1.25 million[3]. This represents a 1.2% CAGR in regional employment. The unemployment rate in Metro Vancouver in 2008 was estimated at 4.3% and rose to 7.1% in 2009. The increase in unemployment can likely be attributed in part to the global economic downtown of 2008. Unemployment in the region in the study period peaked in 2010 at 7.5%. In 2011, it dropped slightly to 7.3%.

Table 1.2.2 – Growth in Metro Vancouver Employment

	Year	Employment
	2008	1,207,000
	2009	1,204,000
	2010	1,220,000
	2011	1,251,000
Change between 2008 and 2011	Absolute	44,000
	Percent	3.6%

Consumer Behaviour

The number of registered vehicles in Metro Vancouver is an indicator of travel behaviour and people's preference to use private automobiles. **Table 1.2.3** summarizes the number of registered vehicles in Metro Vancouver between 2008 and 2011 which has grown by almost 20,000 vehicles per year. This is just slightly slower than population growth, resulting in fewer vehicles per capita. This trend is different than previous years when the number of vehicles per capita had been typically increasing.

Table 1.2.3 - Registered Vehicles in Metro Vancouver (2008 vs. 2011)

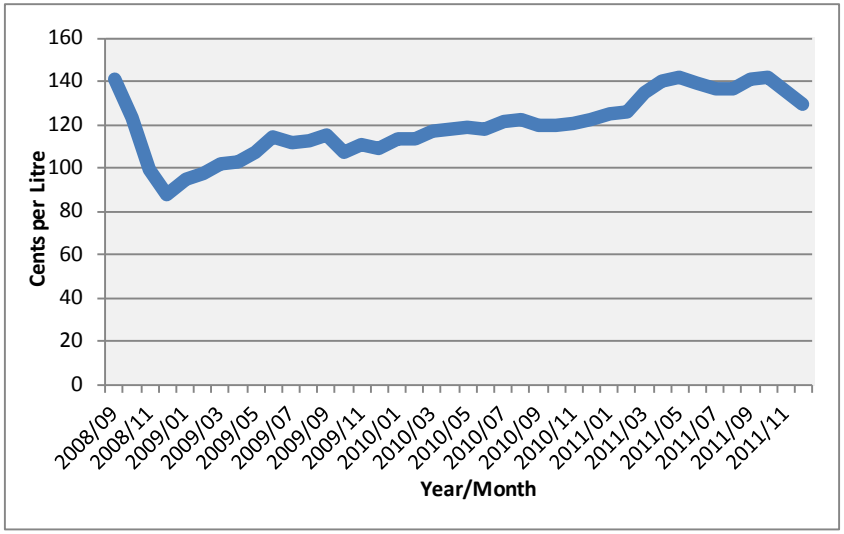
2008		2011		Change	
Total	**Per Capita**	**Total**	**Per Capita**	**Abs.**	**%**
1,420,000	0.63	1,479,000	0.62	59,000	4.2%

- Source: Metro Vancouver Key Facts
- These numbers include all motorized vehicles with active insurance policies on January 31

Another key indicator that influences consumer behaviour is the price of fuel. **Figure 1.2.3** summarizes the trend in the average retail price of fuel in Vancouver over the past three years. Fuel prices dropped during the last survey period and then steadily climbed back up to the $1.40 per litre rate by early 2011. This sustained price of fuel has likely led to changes in travel behaviour as residents seek out cheaper transportation options.

[3] Metro Vancouver Key Facts
http://www.metrovancouver.org/about/publications/Publications/LabourForceandEmploymentActivity-AnnualAverage.pdf

Figure 1.2.3 – Average Retail Price for Fuel in Vancouver (September 2008 to December 2011)



- Source: Statistics Canada. Table 326-0009 - Average retail prices for gasoline and fuel oil, by urban centre, monthly (cents per litre) accessed July 05, 2012.
- Prices are for regular unleaded gasoline at full service filling stations

1.2.3 Transit and Roadway Infrastructure

Since 2008, there are several significant transit and road projects that have changed resident's travel behaviour. The most significant transit project completed between survey periods was the Canada Line, connecting Downtown Vancouver with the Vancouver International Airport and Richmond City Centre. Completed in 2009, this rapid transit service features combined three to four minute headways on the main portion of the line between Bridgeport Station and Waterfront Station. The opening of the Canada Line also included a complete reconfiguration of feeder bus routes including the addition of highway-shoulder bus lanes and queue jumpers along Highway 99 between the Steveston Interchange and Bridgeport Interchange.

Between 2008 and 2011, the Expo and Millennium SkyTrain lines were expanded with 48 new SkyTrain cars. These additional cars provided additional capacity and frequencies to meet ever increasing ridership demand along the line. Overall, service hours on the conventional transit system have increased from 5,644,000 to 6,284,000 between 2008 and 2011; an increase of over 11%.

The most significant road project since the last Trip Diary in 2008 was the completion of the six-lane Golden Ears Bridge (GEB) in 2009 which, at the time of the survey, was the region's only tolled facility. This bridge has increased travel opportunities between Surrey/Langley and Pitt Meadows/Maple Ridge. The previous Albion Ferry was a free alternative but regularly had long line ups during peak periods.

The Pitt River Bridge was replaced in 2009 with three lanes in the westbound direction and four lanes in the eastbound direction. Along with the development of the Mary Hill Interchange, the Pitt River Bridge has expanded vehicle capacity significantly between Port Coquitlam and Pitt Meadows.

The Sea-to-Sky Highway was reconfigured and opened in 2009 in time for the 2010 Winter Olympics. The highway was expanded to four lanes for most of the alignment between Horseshoe Bay and Whistler and features many safety improvements. The highway is now a faster connection between Whistler, Squamish and Metro Vancouver, including Lions Bay.

2 REGIONAL ANALYSIS

The first step in analyzing travel behaviour based on the 2011 Regional Trip Diary Survey is to examine the survey results across the entire Metro Vancouver Region.

The analysis is divided into five sections, each with a different focus:

- Trip Characteristics and Trends
- Travel Behaviour by Age / Gender
- Travel Behaviour by Life Stage
- Travel Behaviour by Household Size and Composition
- Impact of Other Variables

Key findings are illustrated through the extensive use of charts accompanied by explanatory discussion.

2.1 TRIP CHARACTERISTICS AND TRENDS

This section of the report provides an analysis of trip characteristics and trends in Metro Vancouver estimated based on the results of the 2011 Regional Trip Diary Survey. The characteristics include:

- Trips and trip rates
- Trips by purpose
- Trips by time of day
- Mode share
- Trip length (distance)

Comparable results from the 2008 Regional Trip Diary Survey are provided for some of the key characteristics.

The previously published results of the 2008 Trip Diary were based on expansion factors developed using custom population estimates produced by a private company for 18 sub-areas in the Lower Mainland. These population estimates are generally about 2% higher than Census estimates. In order to improve our understanding of trends in travel behaviour between 2008 and 2011, the 2008 Trip Diary expansion factors were adjusted to 2008 population totals that are consistent with the Census estimates using the same sub-areas as applied in the 2011 Trip Diary. This approach provides more realistic estimates of changes in trip volumes between 2008 and 2011.

In addition, the 2011 Trip Diary was limited to persons five years of age and older; the 2008 Trip Diary results, when presented, have been filtered to exclude the persons up to four years of age in order to provide consistent comparisons.

As a result of these changes, the values from 2008 in this report may differ somewhat from previously published values for selected statistics. Note that throughout the remainder of this report any references to residents refer to persons five years and older unless otherwise stated.

2.1.1 Trips and Trip Rates

In 2011, the residents of Metro Vancouver made an estimated 6.06 million trips during a typical fall weekday, compared to estimate of 5.55 million weekday trips in the 2008 Trip Diary. This increase of about 9.2% is higher than the 5.8% increase in the five and older population between 2008 and 2011 based on BC Stats data.

Since the number of daily trips increased at a higher rate than the population, the average trips rate for residents of Metro Vancouver also increased from 2.68 in 2008 to 2.77 in 2011 (an increase of 3.4%).

Although the difference in the trip rates is small, given the large sample sizes of both surveys and the relatively low variability of daily trip rates, the differences are statistically significant with a very high degree of confidence (over 99%).

2.1.2 Trips by Purpose

The trips reported in the 2011 Trip Diary were allocated to one of the following trip purposes:

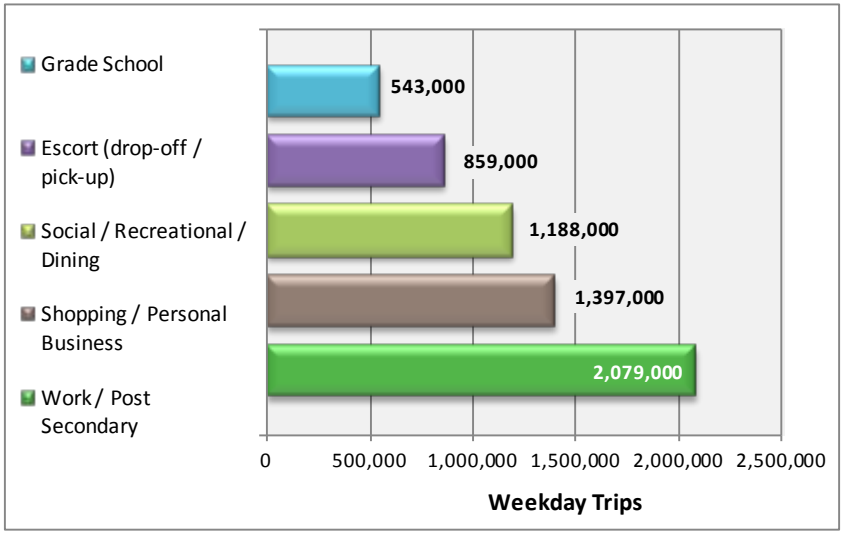
- Work / Post Secondary (including return trips home from those locations);
- Shopping / Personal Business (including shopping, medical and other similar trips as well as the associated return trip home);
- Grade School (including trips to/from elementary or secondary school, to after-school activities, and associated return trips home);

- Social / Recreational / Dining (including dining, visiting and entertainment trips and associated return trips home);
- Escort (trips made to drop someone off or pick them up, e.g. walk a child to school, drive a family member to a transit station and the return trip if the destination is home).

In order to better understand and compare the characteristics of the different trip purposes, trips were further categorized by whether they started from the person's home, went to the person's home, or neither end of the trip was based at home. This further division of trips is useful in understanding the impact of home location on trip patterns and choices.

The estimated number of weekday trips made in the fall of 2011 by the residents of Metro Vancouver for each of the five trip purposes is illustrated in **Figure 2.1.1**. As shown in the figure, the Work / Post Secondary trip purpose accounted for the highest number of trips.

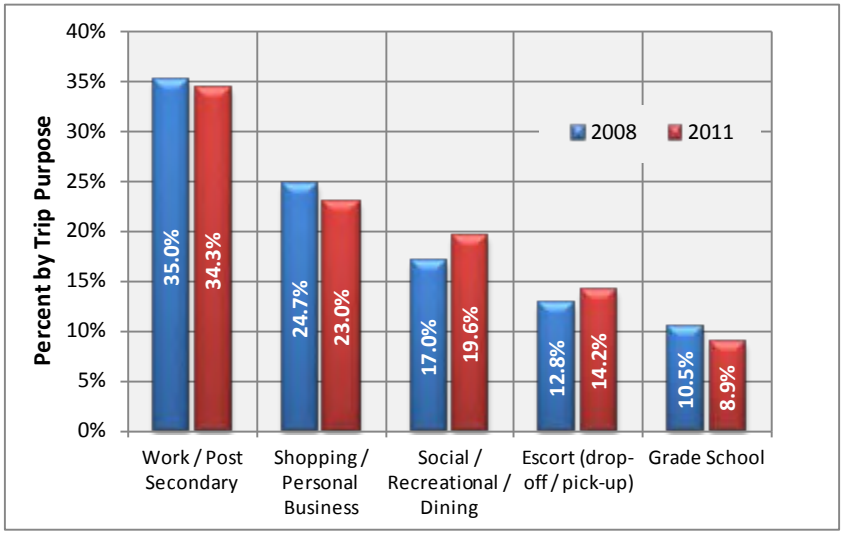
Figure 2.1.1 - Weekday Trips by Purpose



The percentage of trips made for each purpose by Metro Vancouver residents is presented in **Figure 2.1.2** for both the 2008 and 2011 Trip Diaries. The ranking of the purposes is the same for both years; however, there are differences for all trip purposes and these differences are statistically significant. There were drops in the percent of Work / Post Secondary, Shopping / Personal Business and Grade School trips, compared to increases in Social / Recreational and Escort trips.

While, as noted, the differences between survey years are statistically significant some of them could be a result of different categorization during the analysis. In particular, the differences in the allocation of trips to Shopping / Personal Business versus Social / Recreational may be partially related to a change in the order in which trip purpose options were presented in the two surveys. There is potential for some trips to be assigned to either the Personal Business or the Social / Recreational purposes and the specific sequence of these purposes in the survey may have affected the selection of one compared to the other. In addition, there were some differences in the purpose ascribed to trips to attend non post-secondary courses which may have shifted trip proportions from Grade School to the Social / Recreational purpose. For example, a trip by an adult to attend a continuing education or special interest class at a local school or community centre may have been classified as a school trip in 2008 but is classified as a Social / Recreational trip in 2011.

Figure 2.1.2 - Percentage of Trips by Purpose

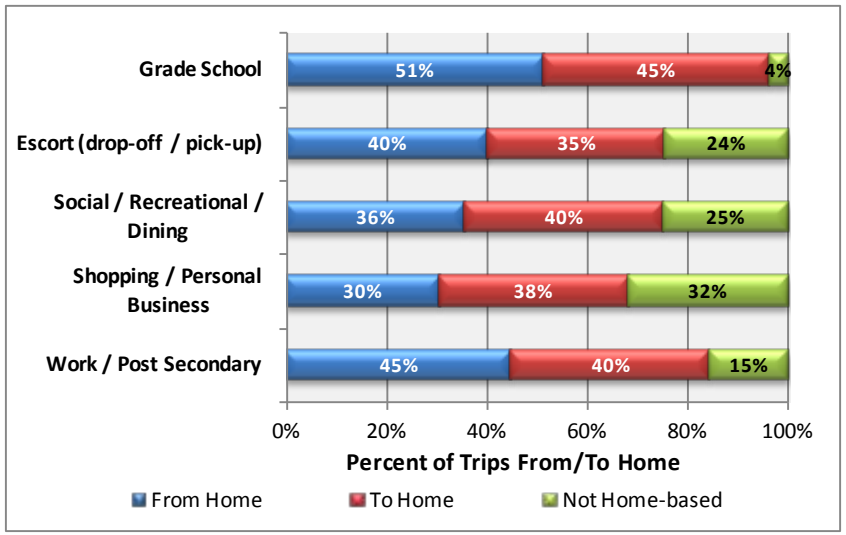


The most notable aspect of the trips by purpose is the high number of Escort trips relative to the number of Grade School trips (there were almost 60% more Escort trips versus Grade School trips in 2011 versus only 23% more in 2008). Dropping off and picking up children from school are the primary reasons for Escort trips; however, Escort trips are occurring throughout the day suggesting that other reasons for Escort trips (e.g. taking older parents to appointments, children to after-school activities) may be becoming more prevalent.

During the conduct of the survey there were concerns that parents were not reporting their children's trips to school due to privacy concerns. Although attempts were made to correct for this underreporting, the number of Grade School trips in Metro Vancouver (about 543,000) remains low relative to the number of grade-schooled aged children (325,000). It may be that parents who took their children to school were more likely to include the school trips of their children in the survey.

The breakdown of each trip purpose by those that start at home (From Home), end at home (To Home) and those with neither ends at home (Not Home-based) is presented in **Figure 2.1.3**.

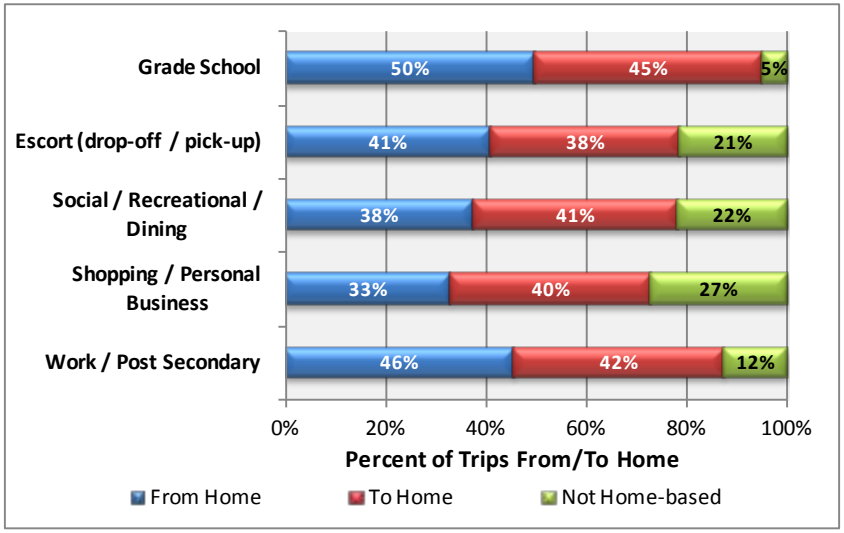
Figure 2.1.3 - Breakdown by Trips From / To Home (2011)



The figure indicates that, Grade School trips are most likely to be going from/to home with only 4% not having the person's home at one end of the trip. This is not surprising since children seldom go to school from a non-home location. Shopping / Personal Business trips, on the other hand, are most likely to start somewhere other than home. This is consistent with the chaining of trips that often occurs for these purposes since chained trips could start from work or other non-home locations.

The corresponding breakdown for trips from the 2008 Trip Diary is presented in **Figure 2.1.4**. It is important to note that, since 2008, there has been a significant increase in the proportion of non home-based trips for all trip purposes (other than Grade School). This change suggests that there has been an increase in the efficiency of travel behaviour (thereby reducing the average number of trips per activity) through greater chaining of trips. For example, an individual may stop on the way home from work to shop or go to a gym rather than making a separate trip from home or not pursuing the activity. This suggests that without the increase in trip chaining, the increase in trip rates would have been even larger.

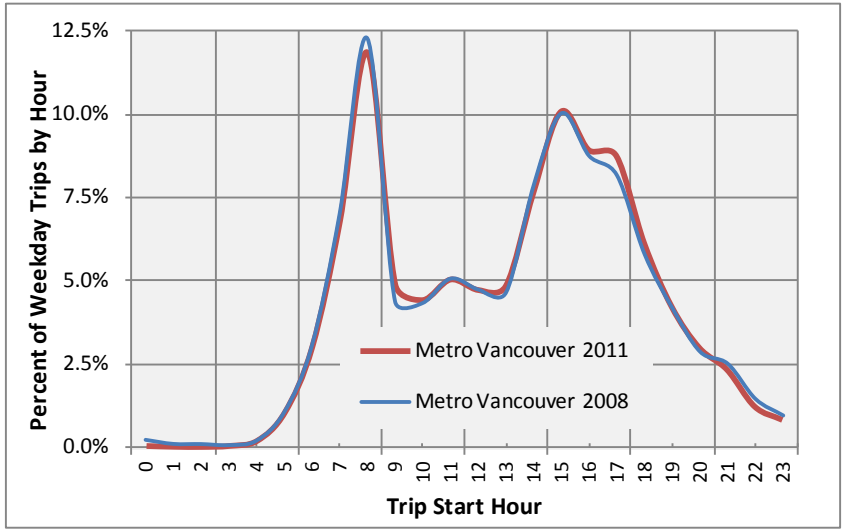
Figure 2.1.4 - Breakdown by Trips From / To Home (2008)



2.1.3 Trips by Time of Day

The distribution of trips by hour-of-day is illustrated in **Figure 2.1.5**. This graph shows the percent of daily trips made by the residents of Metro Vancouver that start during each hour of the day during the fall of 2011. The chart also presents the corresponding pattern for Metro Vancouver residents based on the fall 2008 Trip Diary.

Figure 2.1.5 - Percent of Weekday Trips by Hour of Day



Some of the patterns that are observed include:

- Only 2% of surveyed trips start before 06:00;
- Survey results show a sharp AM peak and a broad PM peak (reflecting an earlier PM peak for Grade School trips);
- A minor midday peak occurs just before noon;
- The patterns in Metro Vancouver for 2011 and 2008 are very similar except for a slight increase in the proportion of trips made later in the PM peak period. This change is consistent with the increase in trip chaining between 2008 and 2011.

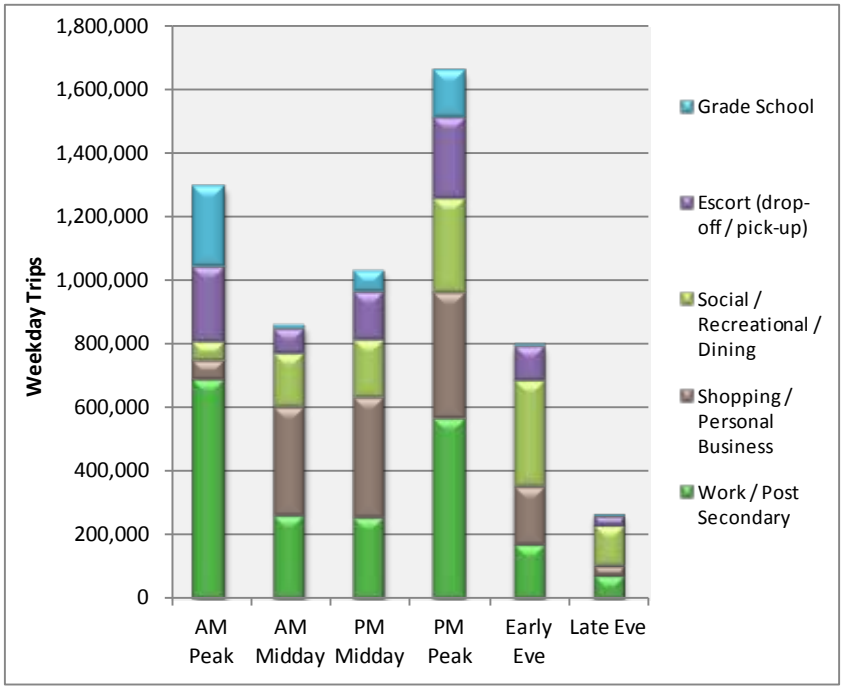
The hours of the day after 6:00 AM were divided into six equal time periods as follows:

Table 2.1.1: Trip Diary Time Periods

AM Peak	AM Midday	PM Midday	PM Peak	Early Eve	Late Eve
06:00-09:00	09:00-12:00	12:00-15:00	15:00-18:00	18:00-21:00	21:00-24:00

The number of trips made by Metro Vancouver residents in each of the time periods is illustrated in **Figure 2.1.6**. This figure also provides a breakdown of the trips by purpose.

Figure 2.1.6 - Weekday Trips by Purpose by Time Period



The variations in trip purpose by time-of-day are consistent with what one would expect given common travel patterns:

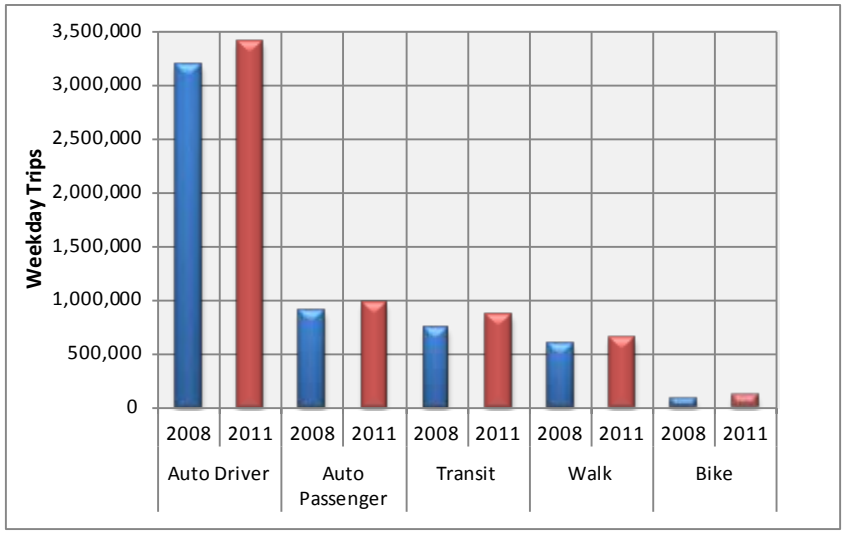
- Highest number of Work / Post Secondary and Grade School trips in the AM peak;
- Highest number of Shopping / Personal Business trips in the PM peak, but PM midday is similar;
- Highest number of Social / Recreational trips occur in the early evening;
- The daily pattern of Escort trips is similar to that of total trips.

2.1.4 Mode Share

Each trip reported in the 2011 Trip Diary was allocated to a primary mode of travel. The Walk and Bike titles were assigned to trips entirely made by these modes. Inter-modal transit trips (e.g. kiss & ride / park & ride / bike & ride) were assigned to the Transit mode.

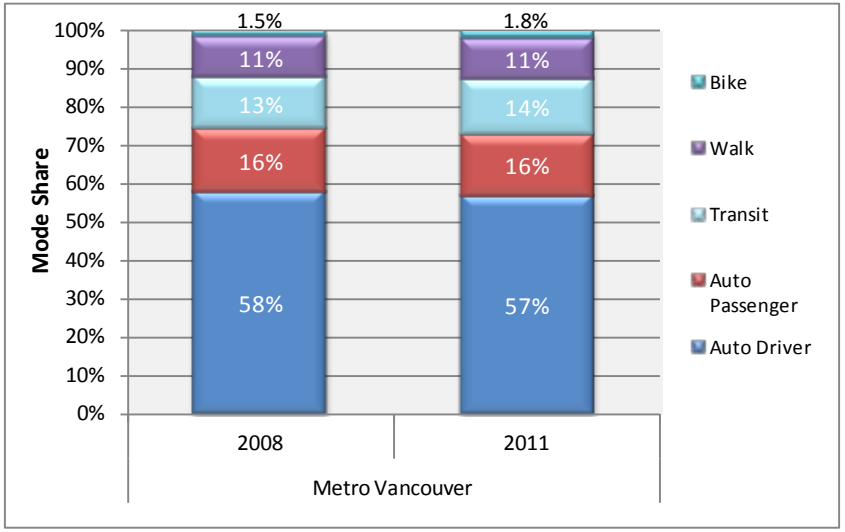
The number of weekday trips made by each mode in 2008 and 2011 by Metro Vancouver residents is illustrated in **Figure 2.1.7**.

Figure 2.1.7 - Weekday Trips by Mode



A comparison of the mode shares based on the 2008 and 2011 Trip Diaries is presented in **Figure 2.1.8**.

Figure 2.1.8 - Weekday 24 Hour Mode Share

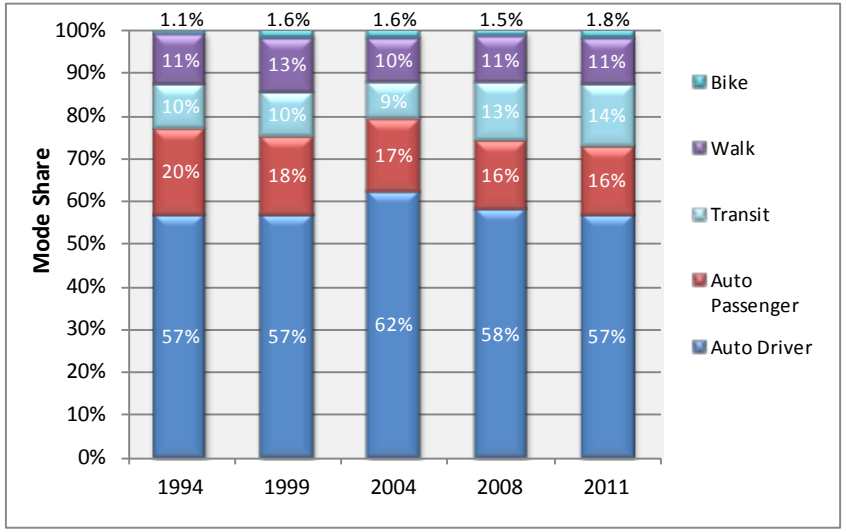


Some of the changes over the past three years include:

- Transit and Bike mode shares have increased for Metro Vancouver residents, while Auto Driver mode share has decreased[4]. The increased Transit mode share may reflect the impact of the Canada Line;
- The Walk mode share was unchanged between 2008 and 2011.

Long-term trends in weekday mode share for Metro Vancouver are presented in **Figure 2.1.9**. The results from previous surveys have been adjusted to exclude persons in the 0 to 4 year age range in order to be consistent with the 2011 Trip Diary.

Figure 2.1.9 Long Term Trends in Mode Share

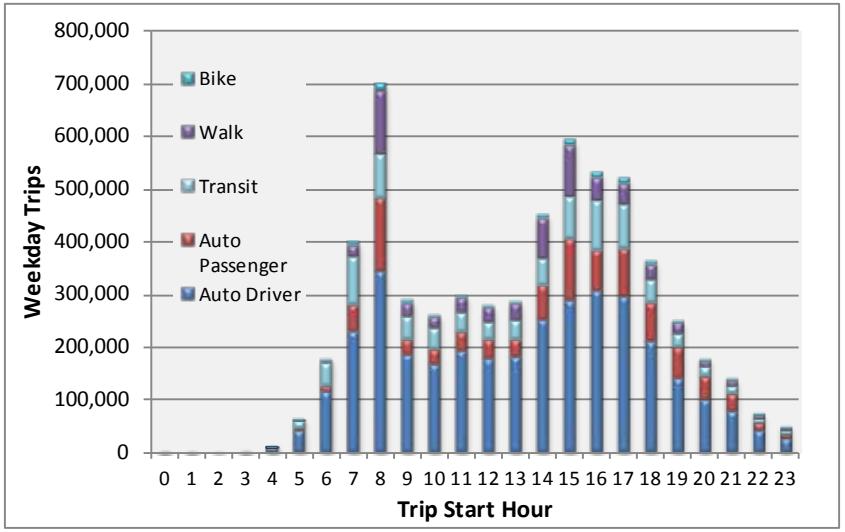


It should be noted that the 2004 Trip Diary was conducted in the spring and is not directly comparable to the results from the other surveys which were conducted in the fall. In addition, the sample sizes of the surveys varied by a factor of ten (as noted in **Table 1.0.1**). Nevertheless, substantial shifts can be observed over the past seventeen years, particularly in Transit and Auto Passenger mode shares. The 40% increase in Transit mode share occurred over a period when total trips also increased by 40% (due to population growth), resulting in almost a doubling of Transit trips. Similarly, daily trips by Bike have more than doubled during the past seventeen years.

[4] These changes are statistically significant at the 99% confidence level

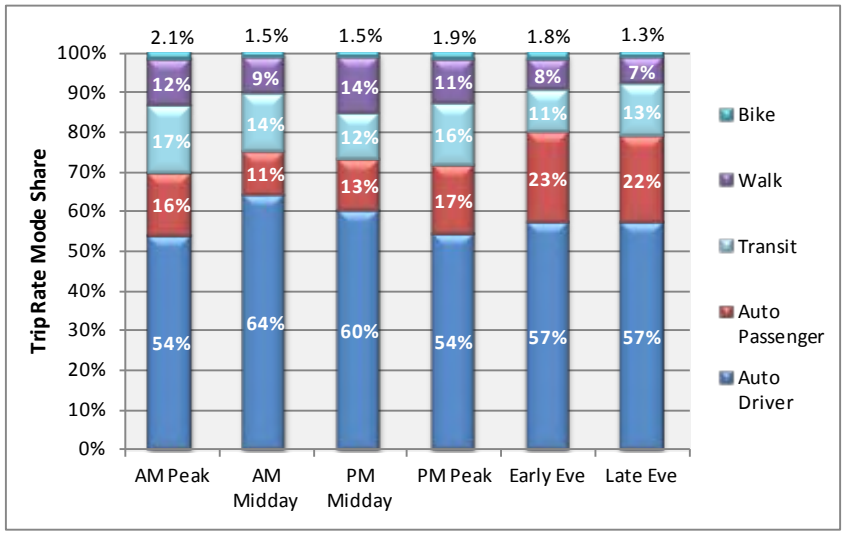
The variation in the number of trips by mode by hour-of-day is presented in **Figure 2.1.10** while the mode shares by time-of-day are presented in **Figure 2.1.11**.

Figure 2.1.10 - Trips by Mode by Hour-of-Day



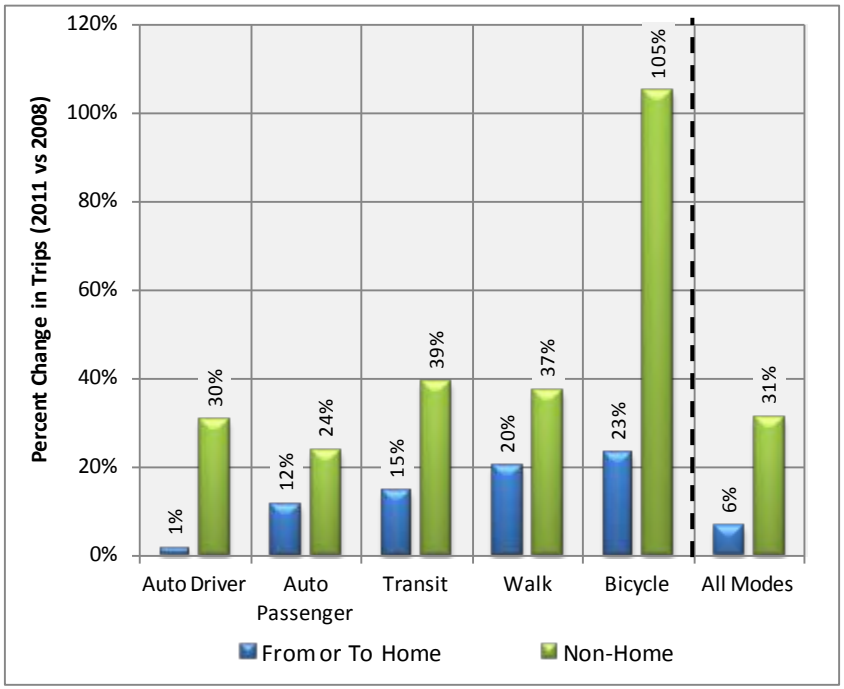
The first of these figures illustrates the concentration of Walk and to a lesser extent Auto Passenger trips during the start and end of grade school (typically between 8:00 and 9:00 in the morning and 14:30 and 15:30 in the afternoon). The second figure illustrates the relative importance of the different modes during different times of the day. Transit and Bike mode shares are highest during the peak periods while Auto Passenger mode shares are highest in the evening. The Auto Driver mode share is higher during the midday versus other times of the day.

Figure 2.1.11 - Weekday Mode Share by Time-of-Day



It is also informative to examine the change in the number of weekday trips between 2008 and 2011 in terms of whether or not the trips were from or to home or were non-home based. **Figure 2.1.12** illustrates the percent growth in trips by mode for these different types of trips (this figure excludes Grade School trips). As can be seen, the relative growth of non-home based trips has been greater than that of home based trips for all modes; this corresponds with the observed increase in trip chaining. From this stand point, it is interesting to note that home based Auto Driver trips only increased by 1% between 2008 and 2011 and so the large majority of increase in Auto Driver trips has been in the chained trips category. At the same time, it is important to remember that the large majority of trips are home based trips and so the proportional difference does not translate to a large absolute change.

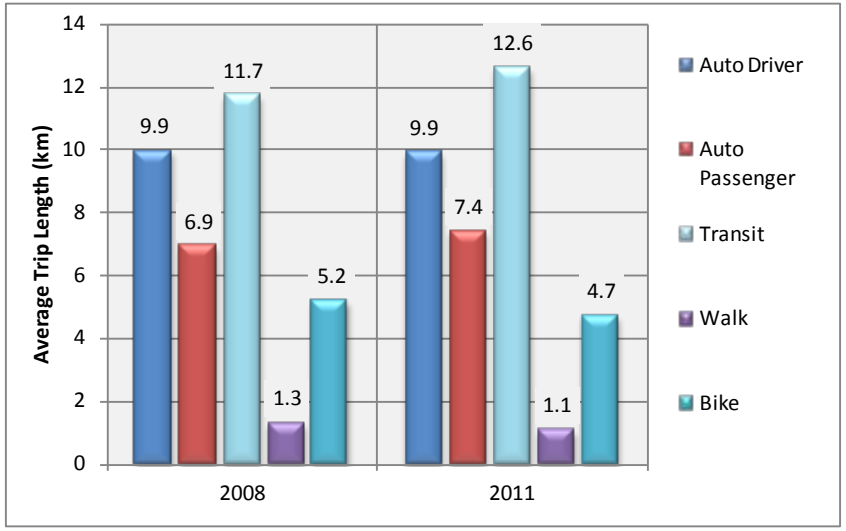
Figure 2.1.12 - Percent Change in Trips by Mode



2.1.5 Trip Length

Trip lengths were estimated for each reported trip based on the geo-coded locations of trip start and end points[5]. Trip lengths for trips leaving or entering the Lower Mainland were set from logical entry points (e.g. the length of a trip to Whistler was set from its origin to just outside of Lions Bay). **Figure 2.1.13** presents the average trip lengths by mode from both the 2008 and 2011 Trip Diaries.

Figure 2.1.13 - Average Trip Length by Mode (2011 vs. 2008)



It is important to note that although the approaches used to estimate trip lengths were similar in both Trip Diaries, there were some differences that may impact the trip length estimates for shorter trips (e.g. Walk trips).

Some of the key observations include:

- Transit trips have the highest average trip length due to the prevalence of Transit trips to the Metropolitan Core and the fact that transit may not be used as often for short distance trips outside of Frequent Transit Network (FTN) corridors;
- There was a significant increase in the average Transit trip length (greater than 0.7 km) that could be partly attributed to the opening of the Canada Line but could also indicate an

[5] The estimated length of each reported trip was calculated by first assigning each geo-coded trip origin and destination to the nearest nodes in TransLink's Regional Transportation Model. The trip length was set equal to the sum of the XY distances to/from the nodes plus the model network distance within the Lower Mainland. For trips within a single traffic zone or a short distance apart, trip lengths were simply calculated as the sum of the XY distances between the origin and destination locations. Unusual trip lengths (high, low, and zero) were excluded from calculations of averages.

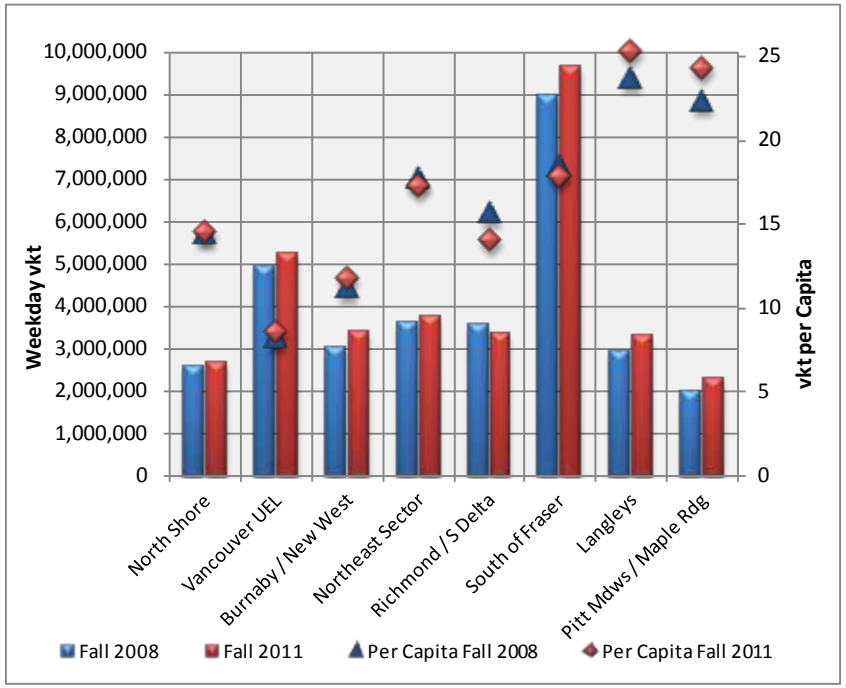
increase in the imbalance between where people live and work in the region;

- The decrease in Bike trip lengths could be related to the greater increase in non-home based trips which tend to be somewhat shorter than home-based trips;
- Auto Driver trip lengths remained virtually unchanged (perhaps the large increase in trip chaining in the mode worked to off-set an otherwise increase in trip length as with the Transit and Auto Passenger modes).

The average trip lengths of Auto Drivers can be used to estimate the daily vehicle-kilometres-travelled (VKT) of Metro Vancouver residents. These values can be normalized using total population counts to further estimate weekday VKT per capita. The estimates of fall weekday VKT in Metro Vancouver increased from 31.57 million in 2008 to 33.65 million kilometres in 2011 (an increase of about 6.6%). Over that same time period the Metro Vancouver population increased at a slightly lower rate. As a result, the weekday VKT per capita in Metro Vancouver stayed about the same at 14.5 km.

The breakdown of these VKT estimates by sub-region is presented in Figure **2.1.14**. There has been an increase in VKT in most sub-regions, primarily driven by population growth. The only sub-region that has experienced a noticeable drop in VKT per capita is Richmond / South Delta. This drop may be related to the introduction of the Canada Line and the associated shifts in mode share.

Figure 2.1.14 - Weekday VKT by Sub-Region



Trip length is also related to purpose which in-turn affects mode choice; average trip length by trip purpose is illustrated in **Figure 2.1.15**. The differences in trip lengths are consistent with expectations; key observations include:

- People travel twice as far to go to work or post secondary institutions relative to other purposes;
- Shopping / Personal Business and Escort trip lengths are similar, Social / Recreational trips are slightly longer, and Grade School trips are much shorter.
- The differences in trip lengths between the 2008 and the 2011 surveys are generally small.

Figure 2.1.15 - Average Trip Length by Purpose

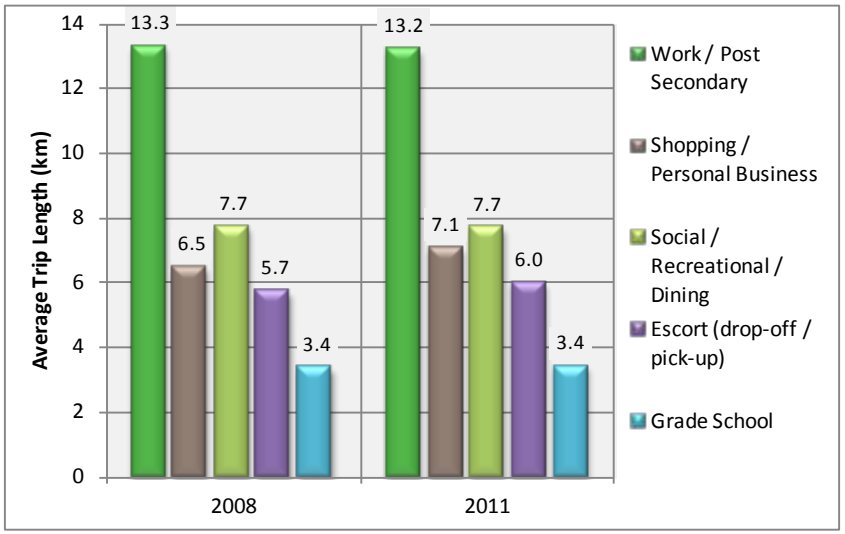
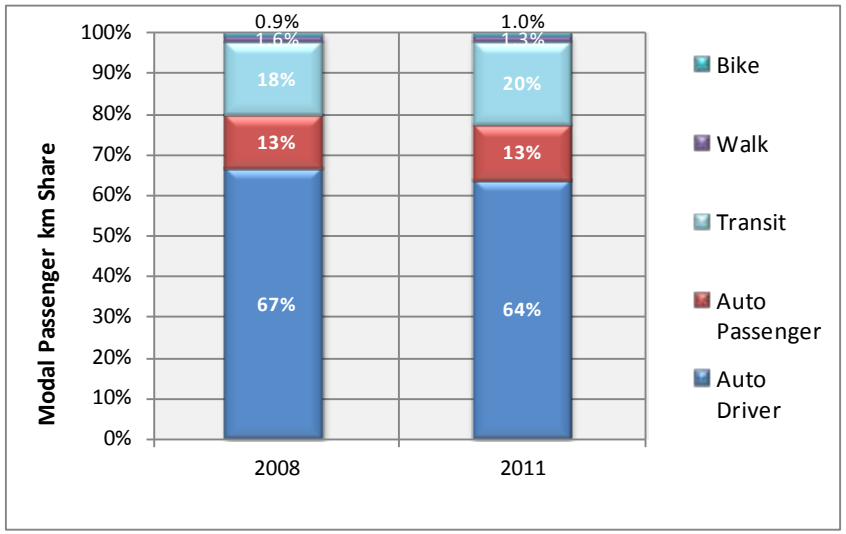


Figure 2.1.16 - Modal Passenger Km Share



Trip lengths can also be used to calculate modal passenger kilometre shares in addition to the trip mode shares that have been traditionally reported in the past. The resulting modal passenger kilometre shares are presented in **Figure 2.1.16** for both the 2008 and the 2011 Trip Diaries.

The figure illustrates:

- There was a drop in the Auto Driver share of passenger km from 67% to 64% and a corresponding increase in the Transit passenger km share from 18% to 20%;
- The share of passenger km by sustainable modes (Transit, Walk and Bike) increased from 20% to 23%.

In addition, when this figure is compared with Figure 2.1.8 (weekday mode share) the following observation can be made:

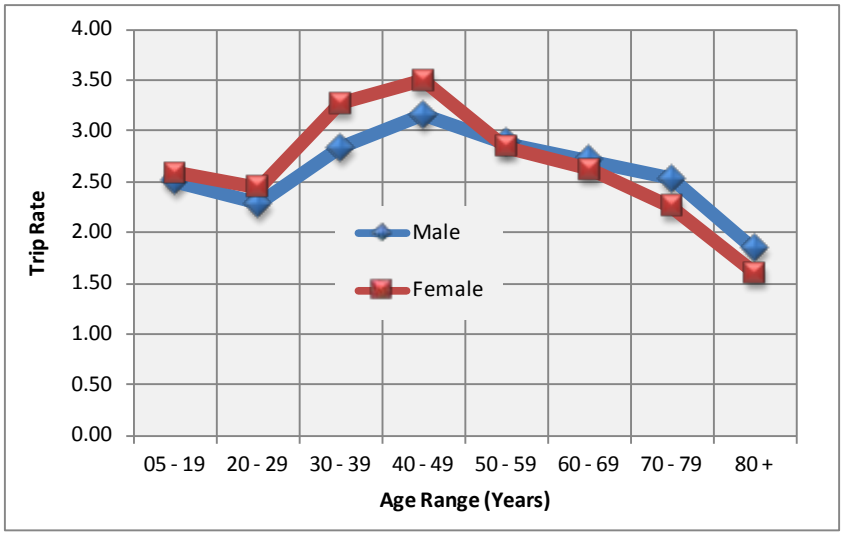
- Modes that have higher than average trip lengths (Auto Driver and Transit) have higher shares of passenger km than their corresponding trip mode shares;
- The share of passenger km by the Walk mode is substantially lower than the Walk mode share since trip lengths for this mode are relatively short;
- The share of passenger km by sustainable modes (Transit, Walk and cycle) is 23% versus a trip mode share of 27% even though the Transit passenger km share is 20% versus a Transit trip mode share of 14%.

2.2 Travel Behaviour by Age / Gender

It is useful to analyze travel behaviour with respect to the age and gender of the trip maker since Metro Vancouver will experience changing demographic patterns over the next thirty years as baby boomers retire and progress from being active adults entering their senior years to older age.

The relationship between age, gender and trip rates for Metro Vancouver residents is illustrated in **Figure 2.2.1**.

Figure 2.2.1 - Trip Rate by Age and Gender



Key observations include:

- The peak trip-making age cohort is the forties, influenced by families with children leading to more Escort and other trips;
- Middle aged (30 to 50) females make more trips than males, likely due to child care and shopping responsibilities;
- Females over the age of 70 have a lower trip rate than males;
- Since the baby boomers are currently in the 45 to 65 age range, average trip rates are likely to fall over the next twenty to thirty years as this generation ages if current trip making behaviours continue.

It should be noted, though, that life stage patterns of the current generations may not follow the patterns of older generations. For instance, baby boomers may be more active as they age than their parents' generation, or today's young adults may be more inclined to raise children in transit oriented areas than the boomers were.

Further analysis by age range uses the following categories:

- 5 - 17: grade school age
- 18 - 24: young adults, often still in school
- 25 - 44: early work and family years
- 45 - 64: established adults
- 65 plus: seniors

The gender analysis focuses on working age adults (i.e. in the 18 to 64 age range) in order to gain insight into the key differences between males and females in their prime commuting years[6]. Trip rates for the different trip purposes by age range and by gender are presented in **Figure 2.2.2** for the residents of Metro Vancouver.

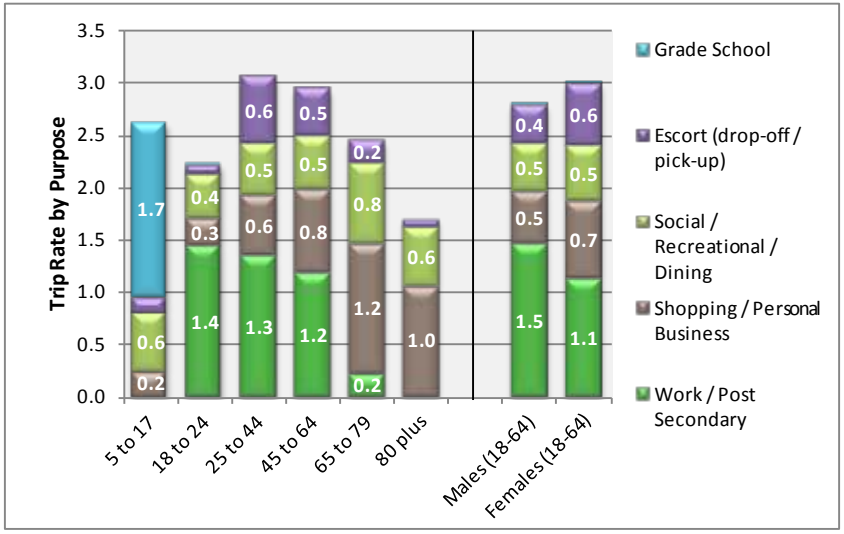
Some of the key observations include:

- Over 60% of the trips made by the youngest age group (5 to 17) are to/from grade school;

[6] The gender analysis excludes the youngest age group (and therefore excludes most grade-school trips) since the travel patterns of school-aged children are dominated by grade-school trips which do not vary significantly by gender.

- About 65% of the trips made by the second youngest age group (18 to 24) are for the Work / Post-Secondary trip purpose;
- Escort trips are most likely to be made by those in the 25 to 44 age group; Work / Post Secondary and Escort trips account for 65% of all trips made by this age group, and there are half as many Escort trips as Work / Post Secondary trips.
- Adult females have a different mix of trip purposes versus adult males making fewer Work / Post Secondary trips and more Escort and Shopping / Personal Business trips.
- Social / Recreational trip rates are similar across all age groups and for both genders.

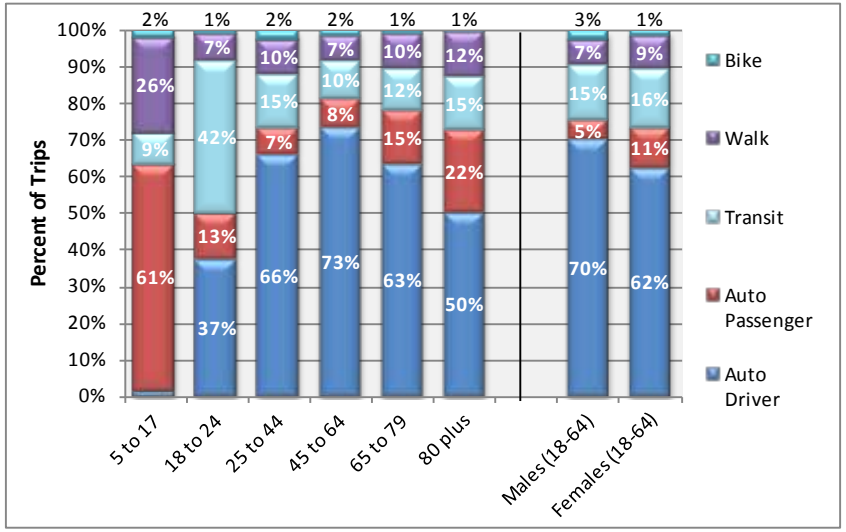
Figure 2.2.2 - Trip Rate by Purpose by Age and Gender



As baby boomers retire, overall trip rates are expected to drop, but more trips will be made for non-work purposes. These trips tend to be shorter, occur during the midday, and have more dispersed patterns.

Trip rates for the different modes by age range and by gender are presented in **Figure 2.2.3**.

Figure 2.2.3 - Mode Share by Age and Gender



The figure illustrates some key age related patterns:

- Auto Driver mode share is highest for the 45 to 64 age group;
- Transit mode share highest for 18 to 24 age group, this probably reflects the impact of the U-Pass program;
- Males are more likely to drive than females, but Transit use is similar;
- Auto (Driver plus Passenger) is the primary mode for all age groups;
- For adults in the 25 to 79 age range, the Auto Driver mode is dominant ranging from 63% to 73%.

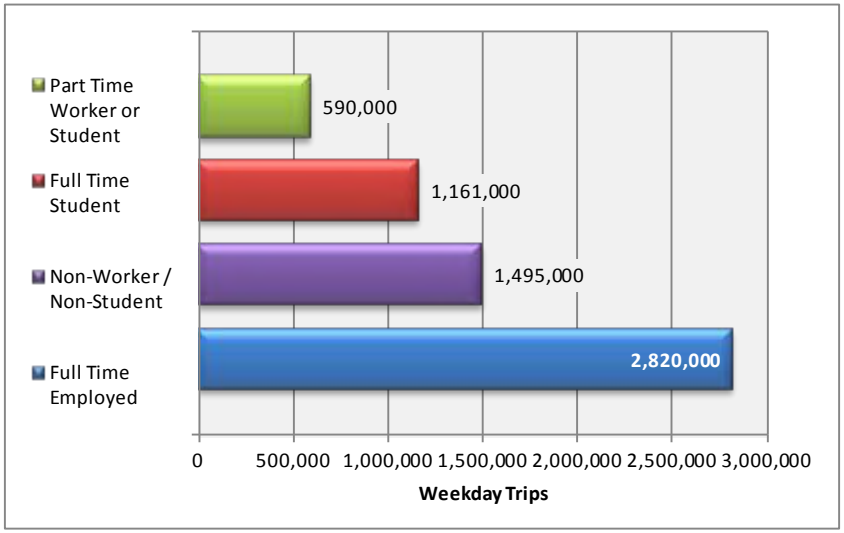
2.3 Travel Behaviour by Life Stage

Four life stage groups were defined for the purposes of this analysis:

- Full-Time Employed (43% of Metro Vancouver residents), this group includes self-employed persons who do not work at home;
- Non-Worker / Non-Student (27%)
- Full Time Students[7] (21%)
- Part Time Worker or Student (9%, only includes persons who are not in the previous categories)

The number of weekday trips made by the residents in each of these four categories is presented in **Figure 2.3.1**.

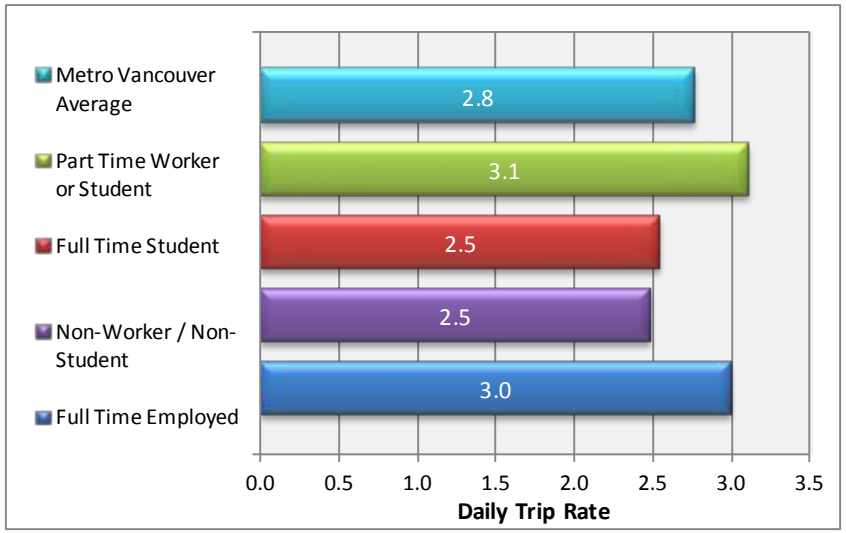
Figure 2.3.1 - Weekday Trips by Life Stage Group



The distribution of trips by life stage category is similar to the population distribution for the categories, although workers (both part-time and full-time) make proportionally more trips than non-workers. For example, Full-Time Employed persons make 46% of all weekday trips by Metro Vancouver residents. This group, along with the Part Time group, have trip rates that are higher than average (3.0-3.1 versus an average of 2.8), as illustrated in **Figure 2.3.2**. Non-workers and Full-Time Students have similar below average trip rates (2.5).

The extent to which retiring Baby Boomers take on part-time employment in the initial years of retirement may affect near to mid-term trends in trip rates.

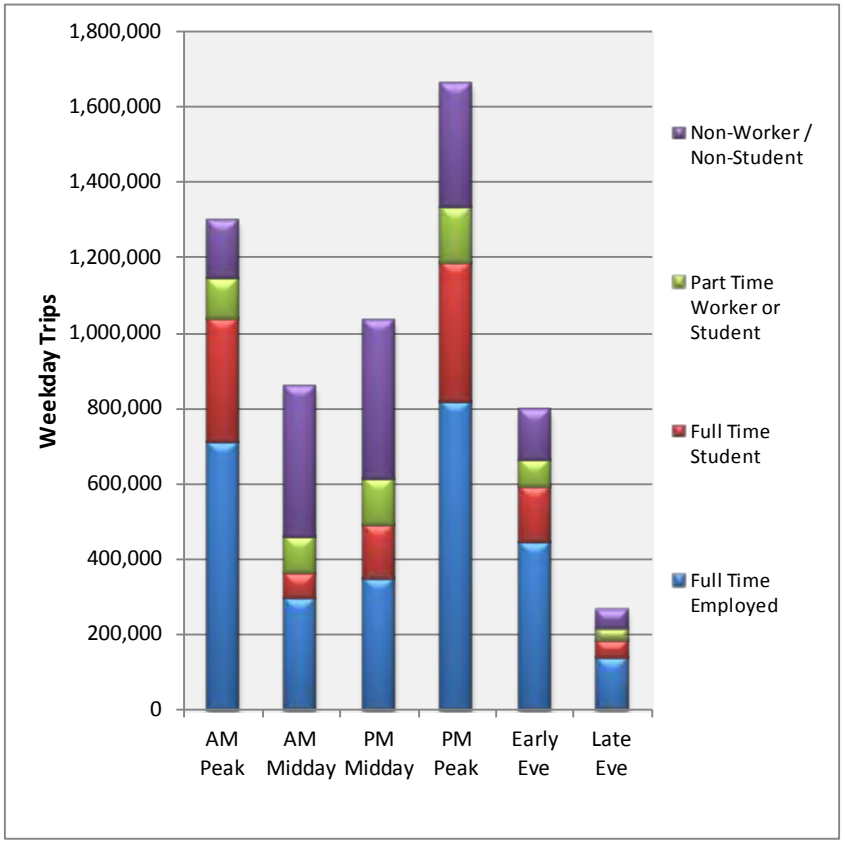
Figure 2.3.2 - Trip Rates by Life stage Group



[7] Full time students may have a part-time job. If a person indicated that they were both a full time student and full time employed they were categorized based on age, student if under 18, full time employed if 18 or over.

The distribution of trips made by each group by time of day is illustrated in **Figure 2.3.3**. The patterns are consistent with expectations in that full-time workers and students make most of their trips during the peak periods (56% and 64% respectively), while people in the Non-Worker / Non-Student group make most of the their trips (55%) during the midday periods. Trips made by Part-Time Workers or Students are distributed throughout the day.

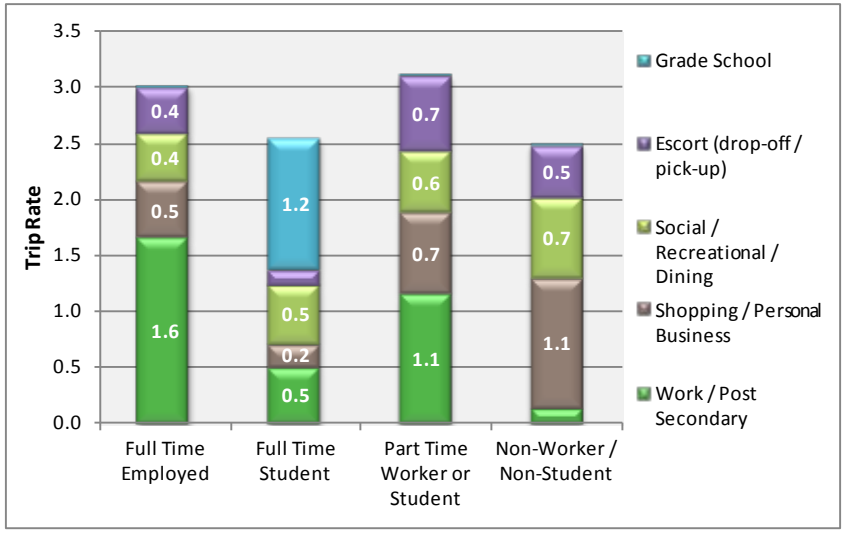
Figure 2.3.3 - Trips by Life stage Group by Time of Day



Trip rates by trip purpose for the different groups are presented in **Figure 2.3.4**. Some of the patterns evident in the figure include:

- The majority of the trips made by Full-Time Employed and Full-Time Students are for Work / Post Secondary or Grade School purposes;
- The Part-Time Worker or Student group also makes on average, over one trip per day for Work / Post Secondary purposes and has the highest trip rate for Escort trips;
- The Non-Worker / Non-Student group have the highest trip rates for both of the Shopping / Personal Business and the Social / Recreational purposes. This group made some trips for Work / Post Secondary purposes since this purpose may include some trips to continuing education and self-interest courses that were reported as trips to school.

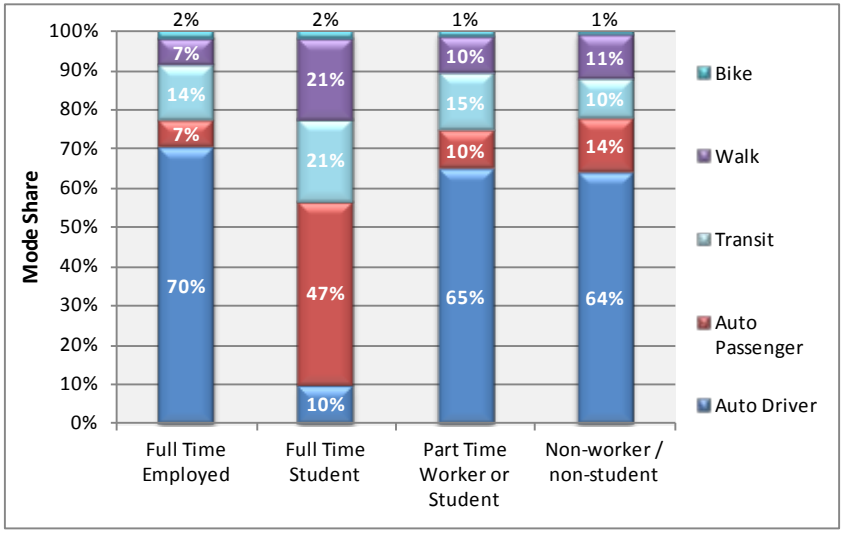
Figure 2.3.4 - Trip Rate by Purpose by Life stage Group



The trip-rate mode share for each group is presented in **Figure 2.3.5**. The pattern for Full-Time Students is significantly different since most of the persons in this group are grade school students with no driver's license. Interestingly, almost half the trips made by this group are as Auto Passengers. This group also has the highest Walk and Transit mode shares (each at about 20%). Other characteristics include:

- Full-Time Employed are most likely to make their trips as Auto Drivers and least likely to Walk or be an Auto Passenger. The low use of the Walk mode is consistent with the longer length of work trips;
- Non-Workers / Non-Student are the least likely to use Transit, probably because of the high proportion of Shopping/Personal Business trips they make;
- Auto Driver is the dominant mode for all groups other than students.

Figure 2.3.5 - Trip Rate Mode Share by Life stage Group

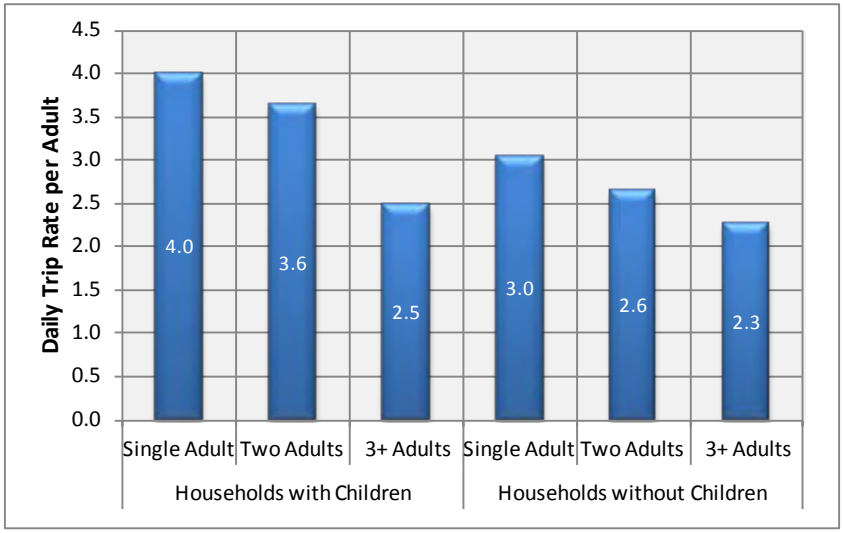


2.4 Travel Behaviour by Household Size and Composition

This section of the analysis examines travel patterns of adults, considering not only household size but also whether or not grade-school or pre-school aged children are in the household. Trip rates and mode share are presented by individual adults and not by household to allow comparison with previous values. Since grade-school aged children have significantly different trip patterns, this analysis excludes persons under 18 years of age in order to more clearly illustrate impact of household size on trip making by adults.

Figure 2.4.1 presents the variation in trip rates by household size and composition.

Figure 2.4.1 – Adult Trip Rate by Household Size

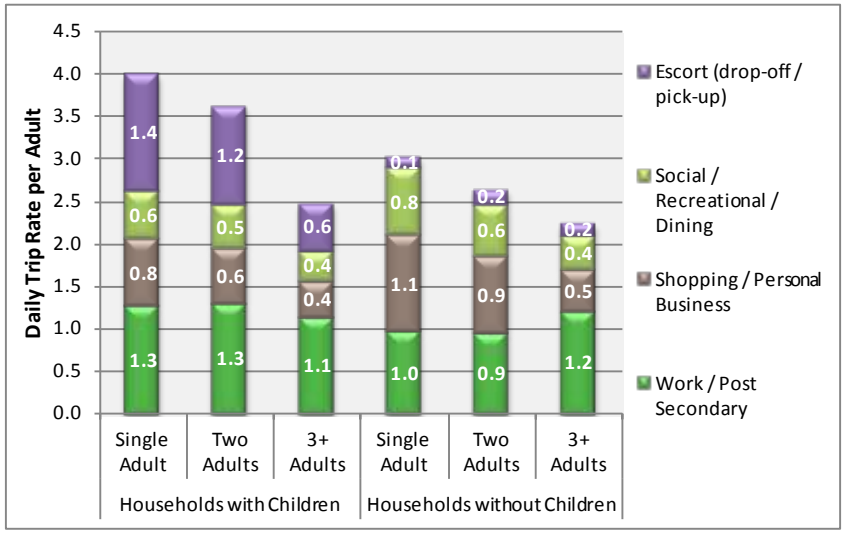


Based on the figure, it is evident that:

- Personal trip rates decrease with increasing household size, although larger households still make more trips in total;
- Adults in households with children have higher trip rates than those without children; though this difference is not as pronounced when there are three or more adults in the household. This may be because the third adult in households with children is a young adult who is in school or a retired senior.

The impact of household size and composition on trip purpose is illustrated in **Figure 2.4.2**.

Figure 2.4.2 – Adult Trip Rate by Trip Purpose by Household Size

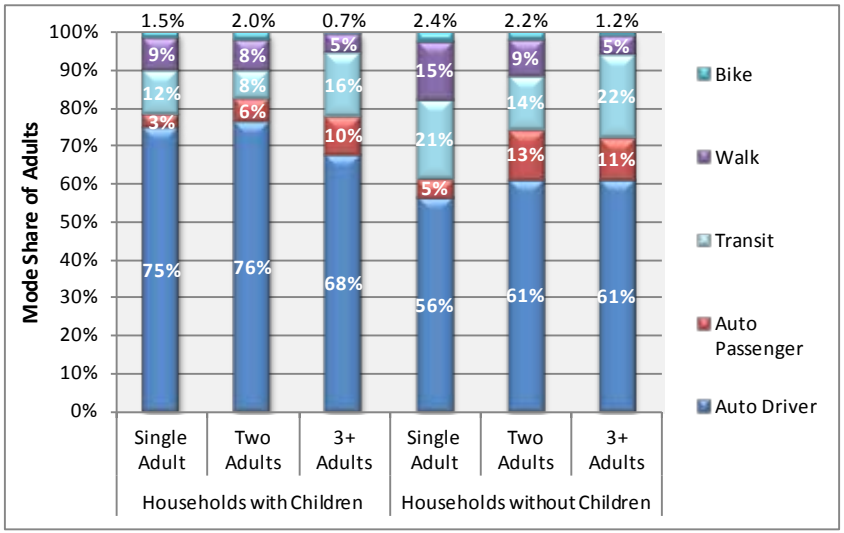


Some of the interesting patterns shown in the figure include:

- The primary difference between households with and without children is in the greater number of Escort trips made by adults in households with children;
- Adults in households where there is only a single adult cannot share their errands, therefore they make more Shopping / Personal Business trips per adult than multi-adult households;
- Larger households make fewer trips per person for all purposes except Work / Post Secondary.

The 24 hour trip mode shares for adults in each type of household are presented in **Figure 2.4.3**.

Figure 2.4.3 – Mode Share of Adults by Household Size



Differences are more pronounced between households with children versus those without than between household of different size within each group. In addition:

- Adults in households with children are more likely to drive;
- Transit and Auto Passenger mode shares are higher in households without children;
- Larger households are more likely to have adults making trips as Auto Passengers.

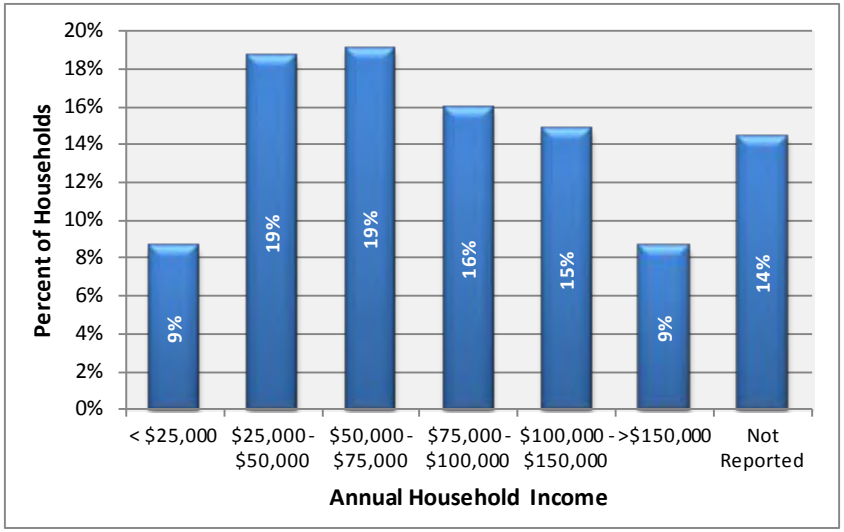
2.5 Analysis of Other Variables

The relationships between trip rates and mode shares and other household characteristics including household income and housing type were also analysed. The results of this analysis are presented in this section of the report.

2.5.1 Household Income

As part of the 2011 Trip Diary, each household was asked to indicate what range the annual income of the household fell into. The distributions of the responses are presented in **Figure 2.5.1**.

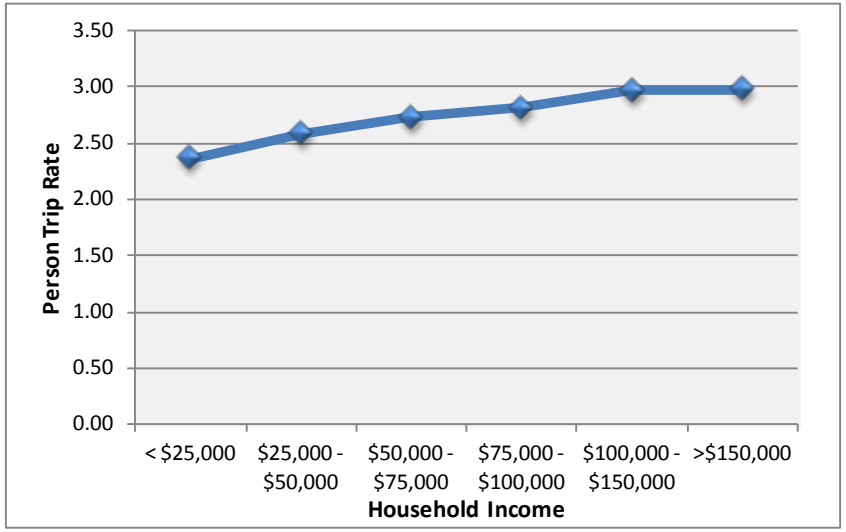
Figure 2.5.1 - Percent of Households by Household Income



Although households are often reluctant to divulge financial information; about 85% of the households in the survey provided household income information.

The average trip rates per person in each of the household income ranges are presented in **Figure 2.5.2**.

Figure 2.5.2 - Trip Rate versus Household Income



The figure illustrates that per person trip rates increase with higher household income up to $100,000 for residents of Metro Vancouver.

The relationships between a person's household income and their mode share are presented in **Figures 2.5.3**.

This figure shows that:

- Auto driver mode share increases with increasing household income;
- Transit mode share decreases with increasing household income;
- Auto passenger mode share is not strongly correlated to household income except in the lowest income range.

Figure 2.5.3 – Mode Share versus Household Income

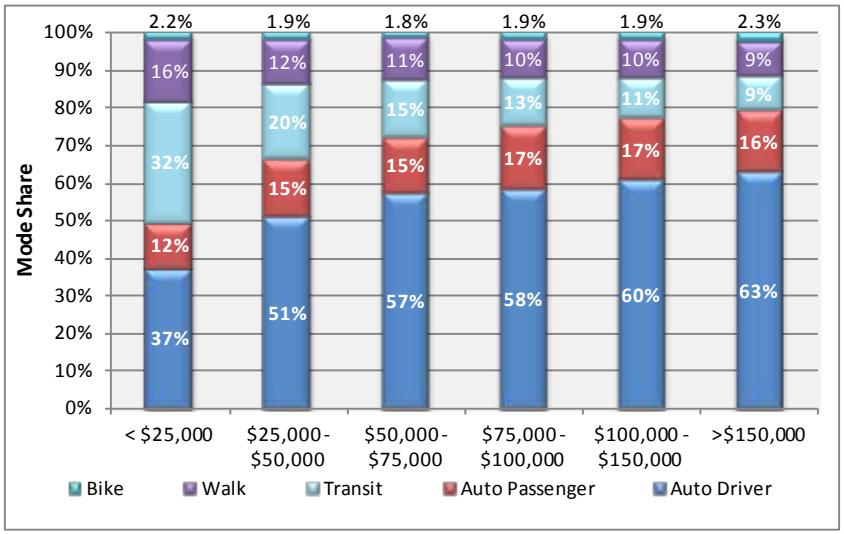
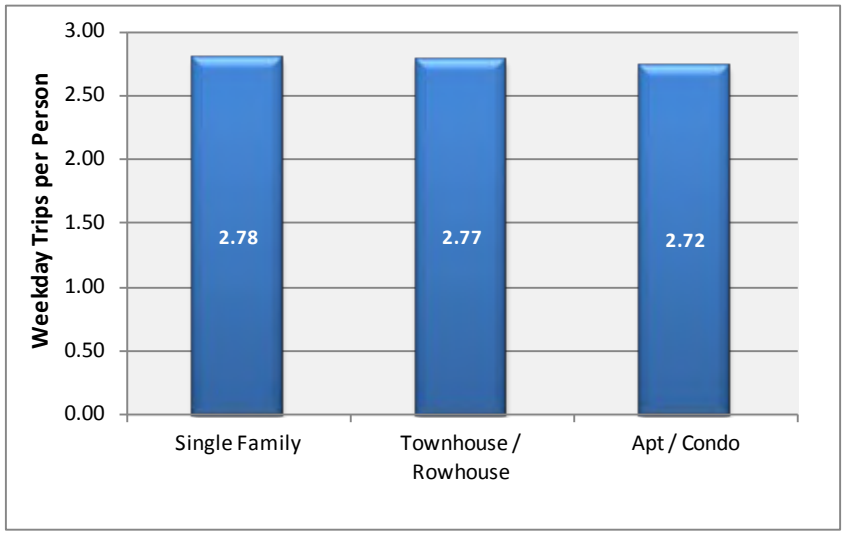


Figure 2.5.5 - Trip Rate versus Housing Type



2.5.2 Dwelling Structure Type

Survey respondents were also asked to indicate what type of dwelling unit they lived in. The various types were grouped into three categories:

- Single Family (51% in Metro Vancouver)
- Townhouse / Rowhouse (15%)
- Apartment / Condo (34%)

The trip rates of persons living in the different housing types are presented in **Figure 2.5.5**. This figure shows that there are no substantial differences in trip rates. Other factors have more impact than housing type.

Differences in mode share by housing type are presented in **Figure 2.5.6**. Not surprisingly, persons living in higher density housing types make a higher proportion of their trips using non-auto modes. In addition, there are noticeable differences in all mode shares based on housing type; these differences may be correlated to location, income and family structure.

Figure 2.5.6 - Weekday Mode Share versus Housing Type

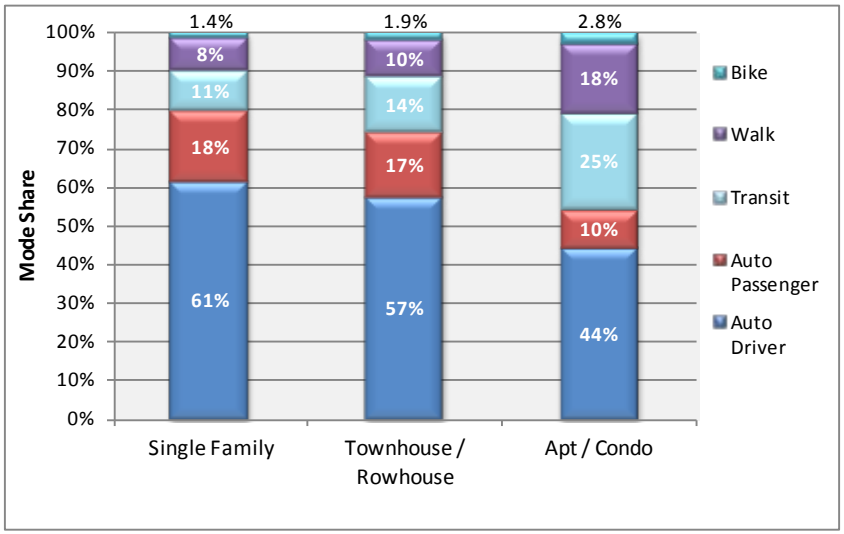
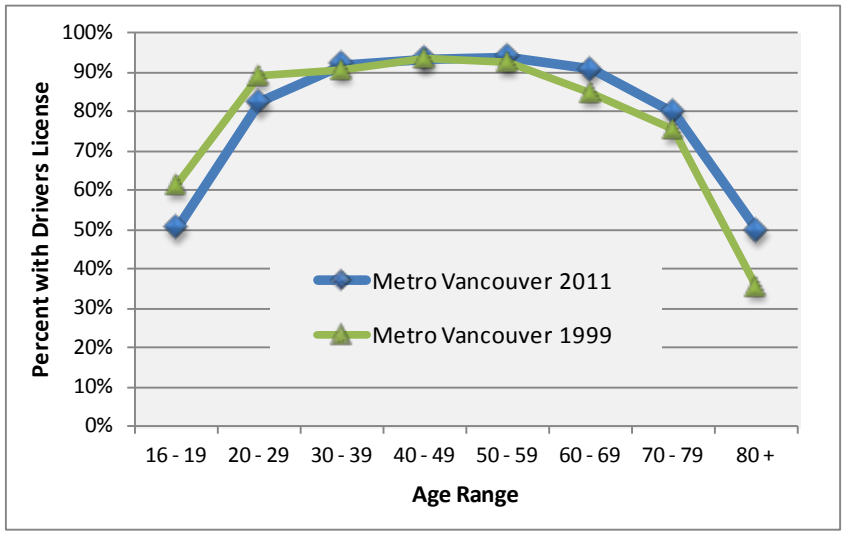


Figure 2.5.7 - Percent with Driver's License versus Age



2.5.3 Driver's License

The percentage of persons with a driver's license by age range is presented in **Figure 2.5.7**. The Figure also includes data from the 1999 Trip Diary. It is interesting to note that there has been a noticeable drop in the proportion of young adults with driver's licenses and an increase in the proportions of older adults with licenses. The former may be partly attributable to a combination of the graduated licensing program and the implementation of the U-Pass program, while some of it may be attributable to a generational behaviour change because of shifts in values and attitudes.

3 SUB-REGIONAL ANALYSIS

While it is important to gain insight into the transportation behaviour of the region as a whole, it is also helpful to examine various aspects at a sub-regional level by delving further into the similarity and differences between sub-regions. For the purposes of this analysis, Metro Vancouver was divided into eight sub-regions. In addition, the transportation patterns of the Fraser Valley Regional District (FVRD) were reviewed as a neighbouring region using similar analysis to that conducted for sub-regions. The analysis sub-regions (illustrated in **Figure 3.0.1**) were as follows[8]:

- **North Shore** (Lions Bay, Bowen Island, West Vancouver, North Vancouver City, and North Vancouver District);
- **Vancouver / UEL** (Vancouver and the University Endowment Lands);
- **Burnaby / New Westminster** (Burnaby and New Westminster);
- **Northeast Sector** (Anmore, Belcarra, Port Moody, Coquitlam, and Port Coquitlam);
- **Richmond / South Delta** (Richmond, Ladner, Tsawwassen, and the rural areas of Delta)
- **South of Fraser** (North Delta, Surrey, and White Rock);
- **Langleys** (Langley City and Langley Township)
- **Pitt Meadows / Maple Ridge** (Pitt Meadows and Maple Ridge)
- **FVRD -** Fraser Valley Regional District.

The number of residents (5 years and older) in each of these areas is illustrated in **Figure 3.0.1a** while the average trip rates for those residents are presented in **Figure 3.0.1b**. Analysis of the trip rates suggests that:

- Many of the differences in the trip rates are statistically significant;
- The differences may reflect demographics and socio-economic conditions as much as location. As noted in the previous section, trip rates vary significantly by age and by household income. The sub-regions have different age and income distributions which in-turn affect trip rates;
- Because population size fluctuates between sub-regions much more than trip rates, the number of trips associated with the residents of a sub-region will primarily reflect the number of people in the sub-region.

[8] Some of the sub-region names are abbreviated at times so that they can fit into charts.

Figure 3.0.1 - Report Sub-Regions

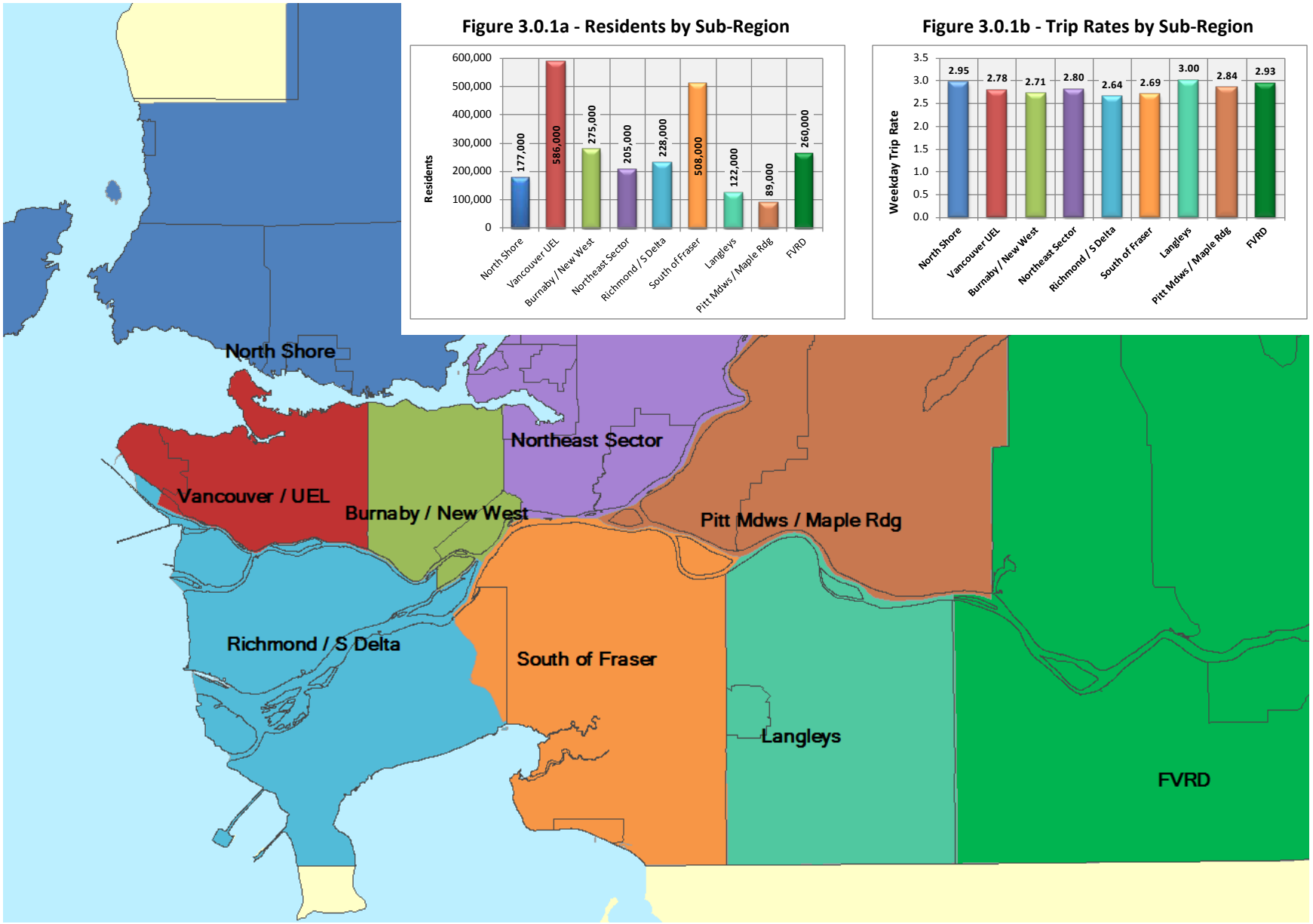


Figure 3.0.1a - Residents by Sub-Region

Figure 3.0.1b - Trip Rates by Sub-Region

The time-of-day profiles for trips generated by the residents of the different sub-regions are presented in **Figures 3.0.2a and 3.0.2b**.

Figure 3.0.2a - Percent of Trips by Hour of Day by Sub-Region

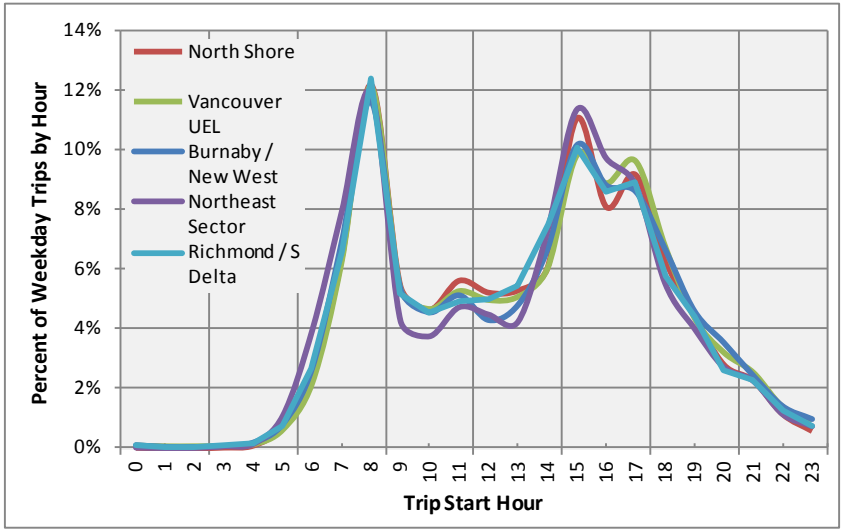
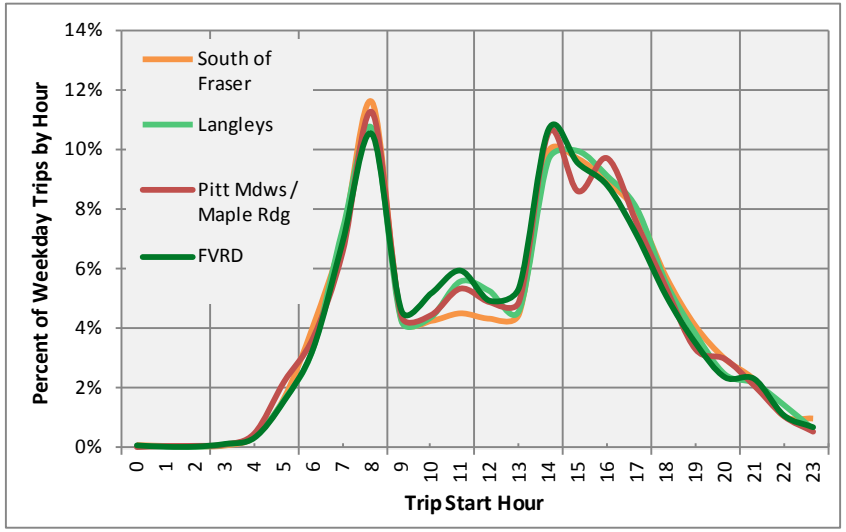


Figure 3.0.2b - Percent of Trips by Hour of Day by Sub-Region



Overall, the figures illustrate that the time-of-day profiles are similar across all sub-regions. There is a sharp morning peak period due to the overlap of trips to work and trips to school. This is followed by a significant drop in the number of trips at 09:00. There is a minor mid-day peak just before noon throughout all of the sub-regions. All sub-regions have PM peak periods that are broader than the AM peak period with PM peak hourly volumes that are lower than during the AM peak period except in the case of FVRD. This reflects the typical spread between the end of the school day and the end of the work day. It is interesting to note that the percent of trips made at the end of the school day (around 15:00) is higher than the end-of-work peak (16:00-17:00); however, since many school trips are short and in many cases are Walk trips, the impact on the transportation network is not as significant or is more localized.

Some of the specific differences in the time-of-day profiles include:

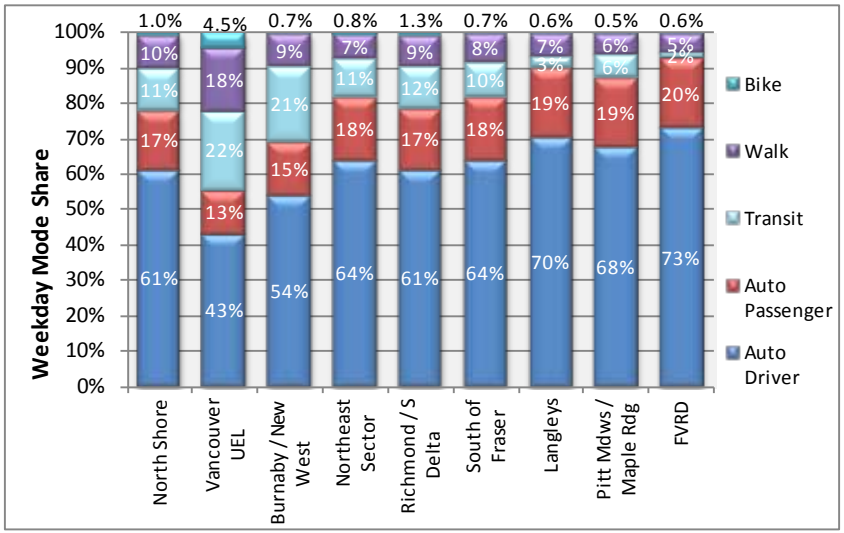
- South of Fraser, Langleys, Pitt Meadows / Maple Ridge, and FVRD sub-regions all have PM peak periods that start earlier than the other sub-regions. This reflects differences in the timing of the school day in these sub-regions;
- There appears to be some correlation between the location and size of sub-regions and the height of the PM peak hour relative to the AM peak hour. More central and larger sub-regions tend to have fewer PM peak hour trips as percentage of daily trips. On the other hand, the FVRD has a PM peak hour that is slightly busier than its AM peak hour;
- Inner sub-regions (Vancouver / UEL, Burnaby / New Westminster, North Shore, Richmond / South Delta) have a

dip in the PM peak period between the school peak (around 15:00) and the work peak (around 17:00), as does the Pitt Meadows / Maple Ridge sub-region;

- The North Shore, the Northeast Sector, Pitt Meadows / Maple Ridge, and FVRD have more pronounced PM school peaks. This may reflect the relative proportions of school-aged children versus employed adults in these sub-regions.

The mode share of trips made by the residents of the different sub-regions is presented in **Figure 3.0.3**. Transit, Walk, and Bike mode shares are highest in Vancouver/UEL and generally decline with distance from the Metropolitan Core; they are lowest in the FVRD.

Figure 3.0.3 - Weekday Mode Share by Sub-Region



The following sub-sections of the report present selected data for the sub-regions. The analysis examines the demographics and travel patterns of the residents of the sub-region (5 years and older) as well as patterns for trips originating in the sub-region to destinations within the Lower Mainland.

The following figures are presented for each sub-region:

- Figure 3.X.1 - Residents by Age and Gender: this figure presents the age and gender profile of the sub-region based on the expanded survey results. Since the 2011 Census was used for the expansion of the survey, these estimates are reflective of Census values;
- Figure 3.X.2 - Residents by Employment Status: this figure presents the distribution of the life stage of the survey respondents from the sub-region based on expanded person counts;
- Figure 3.X.3 - Residents by Household Income: this figure presents the distribution of the self-reported household income of the survey respondents from the sub-region based on expanded person counts;
- Figure 3.X.4 - Residents by Housing Type: this figure presents the distribution of the housing type of the survey respondents from the sub-region based on expanded person counts;
- Figure 3.X.5 - Trip Distribution by Sub-Region: this figure presents the distribution of trips originating from the sub-region to the other sub-regions in the Lower Mainland. The values presented are estimates of weekday trips made by all Lower Mainland residents, not just the residents of the specific sub-region;

- Figure 3.X.5a - Daily Trips to Sub-Regions: this figure is a pie chart of the values presented in Figure 1.X.5;
- Figure 3.X.5b - Trip Purpose to Sub-Regions: this figure illustrates the trip purpose distribution of the trips originating in the specific sub-region for each of the destination sub-regions. *Note that in cases where trips volumes to a sub-region are low, trip purpose distributions may not accurately represent actual patterns*;
- Figure 3.X.5c - Weekday Mode Share to Sub-Regions: this figure illustrates the mode share of the trips originating in the specific sub-region for each of the destination sub-regions. *As above, in cases where trips volumes to a sub-region are low, mode shares may not accurately represent actual patterns*;
- Figure 3.X.6 - Trips by Mode: this figure presents the estimated weekday trips by mode made by the residents of the sub-region from both the 2008 and 2011 Trip Diaries as well as the mode share from the two diaries;
- Figure 3.X.7 - Average Trip Length by Trip Purpose: this figure presents the estimated average trip length by trip purpose for trips made by the residents of the sub-region;
- Figure 3.X.8 - Average Trip Length by Mode: this figure presents the estimated average trip length by mode for trips made by the residents of the sub-region;
- Figure 3.X.9 - Weekday Mode Share by Purpose: this figure presents the estimated mode share by trip purpose for trips made by the residents of the sub-region;
- Table 3.X.1 - Weekday VKT: this table presents the estimated VKT and VKT per capita for the residents of the sub-region. The VKT estimates do not include travel by residents outside of the Lower Mainland or travel by visitors to the Lower Mainland.

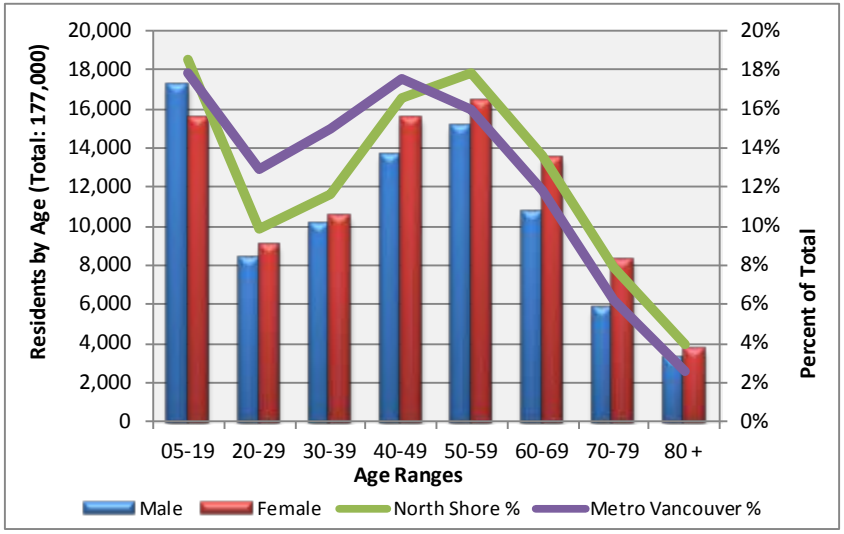
Similar charts are presented for Metro Vancouver municipalities with 2011 populations over 10,000 in Appendix A. In addition, similar charts are also presented for selected special places in Metro Vancouver in Appendix B. These special places include: the Metropolitan Core, Surrey Metro Centre, Regional Town Centres, Municipal Town Centres, and major Universities.

3.1 NORTH SHORE

The North Shore sub-region includes the municipalities of Lions Bay, Bowen Island, West Vancouver, the City and District of North Vancouver, and First Nations communities in the area. The age and gender profile of the sub-region is presented in **Figure 3.1.1**. This figure illustrates that:

- The North Shore has proportionally fewer persons in the 20 to 39 age range than Metro Vancouver and more who are 50 year or older;
- More adult females reside on the North Shore than adult males, particularly in the 60 to 79 age range.

Figure 3.1.1 - Residents by Age and Gender (North Shore)



The distribution of residents by their employment status is presented in **Figure 3.1.2**. The figure shows that the North Shore has proportionally more Non-Workers / Non-Students than Metro Vancouver and fewer Full-Time Workers as would be expected given the age distribution in the sub-region. In general this would tend to reduce trips rates; however, **Figure 3.1.3** shows that the North Shore has proportionally more persons in households with higher income than Metro Vancouver. Since average trip rates increase with increasing household income, this pattern, combined with the lower proportion of young adults (who tend to have lower than average trip rates) off-sets the impact of fewer Full-Time Workers.

Figure 3.1.2 - Residents by Employment Status (North Shore)

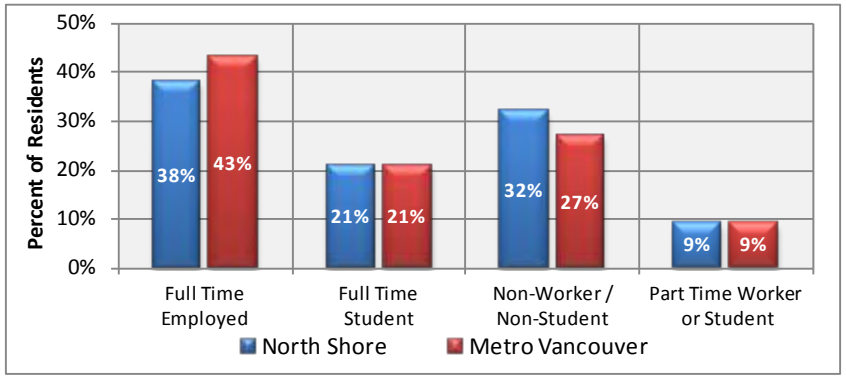
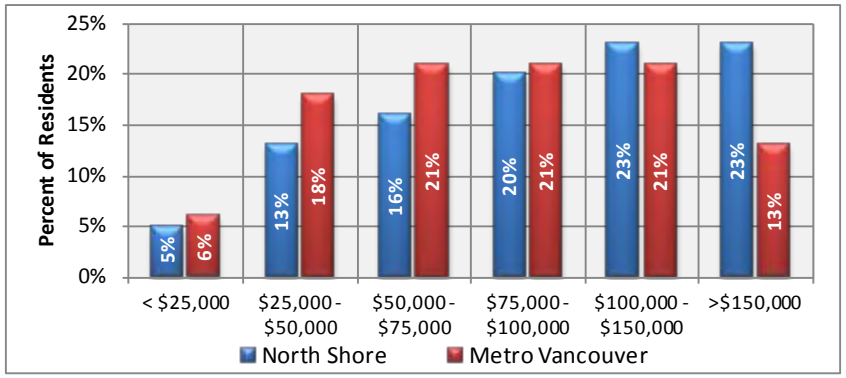
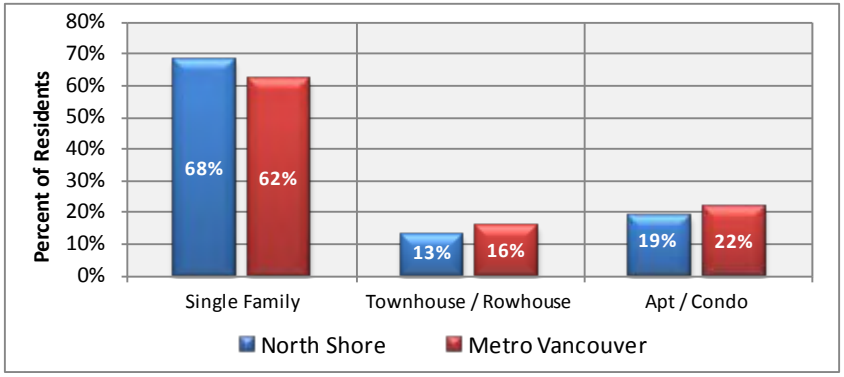


Figure 3.1.3 - Residents by Household Income (North Shore)



The North Shore also has a higher proportion of persons in single family housing as compared with Metro Vancouver overall as illustrated in **Figure 3.1.4**.

Figure 3.1.4 - Residents by Housing Type (North Shore)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the North Shore Sub-Region (not including commercial or truck trips). **Figure 3.1.5a** shows that the large majority of trips (76%) originating on the North Shore stay in the sub-region. The next largest proportions of trip destinations are the Vancouver / UEL and Burnaby / New Westminster sub-regions with 14% and 5% respectively of the weekday trips. The remaining sub-regions each account for less than 2% of the trip destinations.

The percent of trips destined for each sub-region that were made for the five different trip purposes is presented in **Figure 3.1.5b**. Trips that remained in the North Shore sub-region were widely distributed across all trip purposes with a fairly low proportion of internal Work / Post Secondary trips (less than 20%). On the other hand, trips to the other sub-regions in Metro Vancouver were primarily for the Work / Post Secondary purpose.

The weekday mode shares for trips from the North Shore to each sub-region are presented in **Figure 3.1.5c**. As expected the Walk mode has a significant share only for trips that are internal to the sub-region. Transit mode share is highest for trips to the Vancouver / UEL sub-region but also high for the Richmond / South Delta sub-region. The Auto Passenger mode is most used for either local trips or long distance trips (The Langleys and FVRD). The overall weekday mode share is primarily a function of internal trips within the North Shore and trips to Vancouver / UEL destinations since these sub-regions account for 90% of the daily trips originating from the North Shore.

The remaining analysis of the North Shore sub-region examines the characteristics of trips made by residents of the sub-region. As previously presented in **Figure 3.0.1b** North Shore residents have a weekday trip rate of 2.95, one of the highest trip rates of all sub-regions and they made an estimated 521,000 trips during a typical fall weekday in 2011.

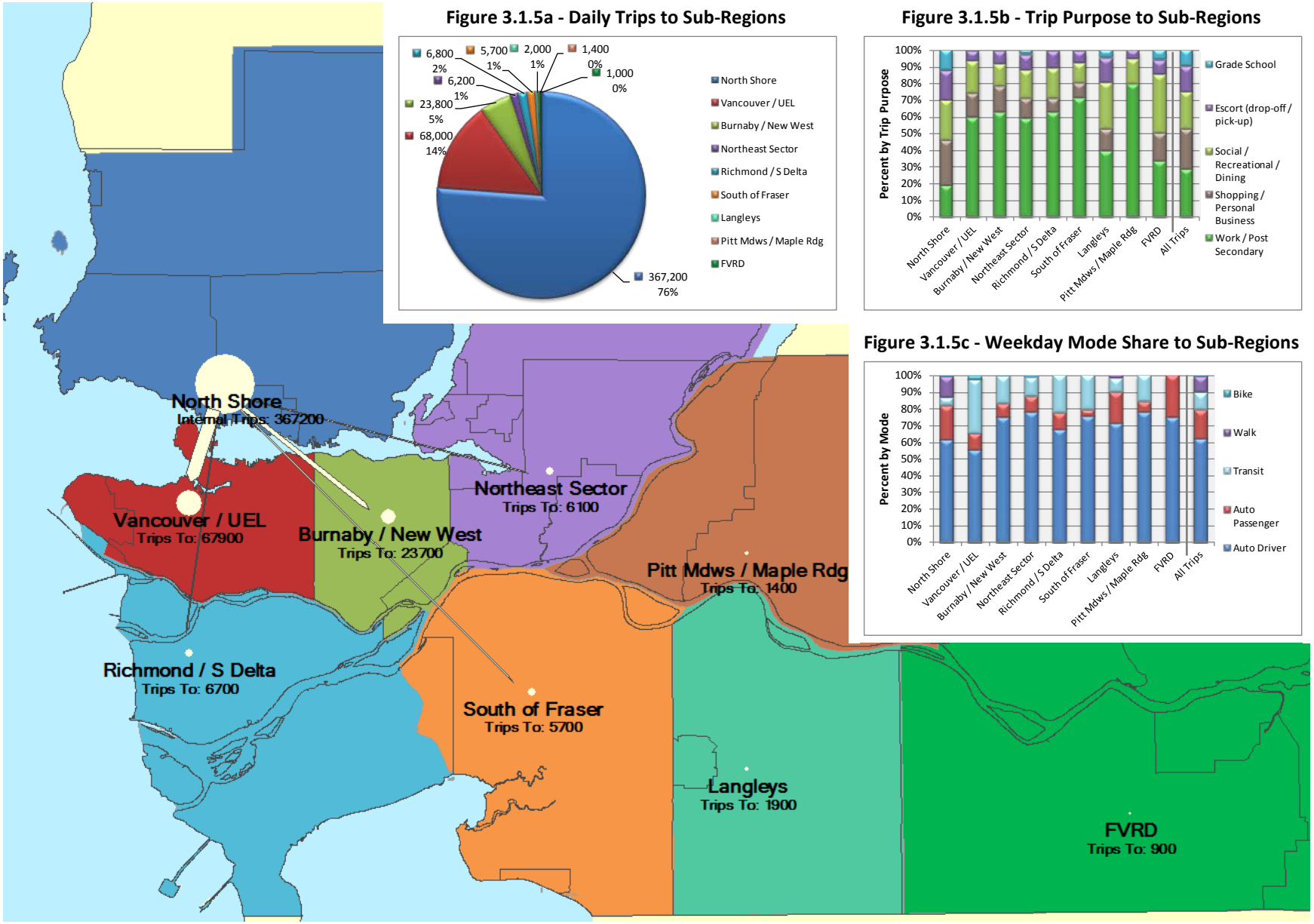


Figure 3.1.5a - Daily Trips to Sub-Regions

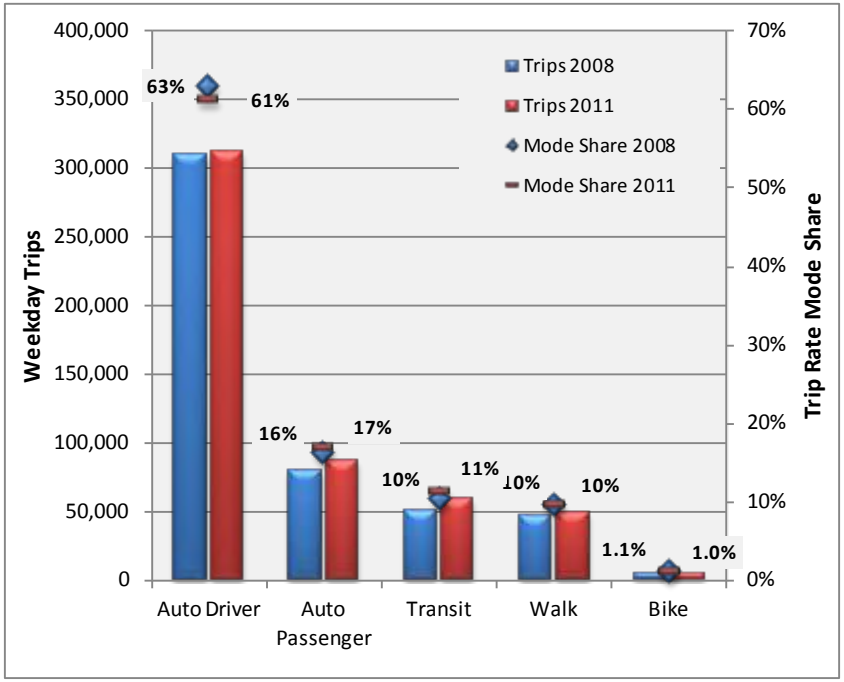
Figure 3.1.5b - Trip Purpose to Sub-Regions

Figure 3.1.5c - Weekday Mode Share to Sub-Regions

Figure 3.1.5 - Trip Distribution by Sub-Region of Trip Origin (North Shore)

The number of daily trips by North Shore residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure3.1.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.1.6 - Trips by Mode (North Shore)



Note: Mode shares may not add to 100% due to rounding.

Generally, the number of trips made by North Shore residents has been relatively stable. Total trip volumes and mode shares have increased for Auto Passenger and Transit modes, along with a similar decrease in Auto Driver mode share.

The average trip lengths for residents of the North Shore are presented in **Figures 3.1.7 and 3.1.8** by trip purpose and mode respectively. As expected, trip lengths are longest for the Work / Post Secondary purpose and shortest for Grade School trips. Trip lengths for most purposes are similar in length to the Metro Vancouver averages, except Work / Post Secondary trips (which are shorter).

Not surprisingly, Walk trips are the shortest and similar in length to Walk trips across Metro Vancouver. Transit trips are the longest and have changed the most since 2008. Auto driver and Auto Passenger trips are somewhat shorter for North Shore residents as compared to Metro Vancouver overall and have remained stable since 2008. Bicycle trips are longer than the Metro Vancouver average, perhaps because the Metro Vancouver average is skewed by heavier Bike use in the Vancouver / UEL sub-region with generally shorter trip lengths.

The weekday mode shares for the North Shore sub-region are presented in **Figure 3.1.9**. Key characteristics illustrated in this chart include:

- North Shore residents are more likely to drive and less likely to take transit relative to Metro Vancouver residents overall;
- Escort trips in particular are predominately auto-oriented;
- Transit mode share is highest for Work / Post Secondary trips accounting for 22% of trips with this purpose.
- Nearly half of Grade School trips are by Walking, cycling, or Transit.

Figure 3.1.7 - Average Trip Length by Trip Purpose (North Shore)

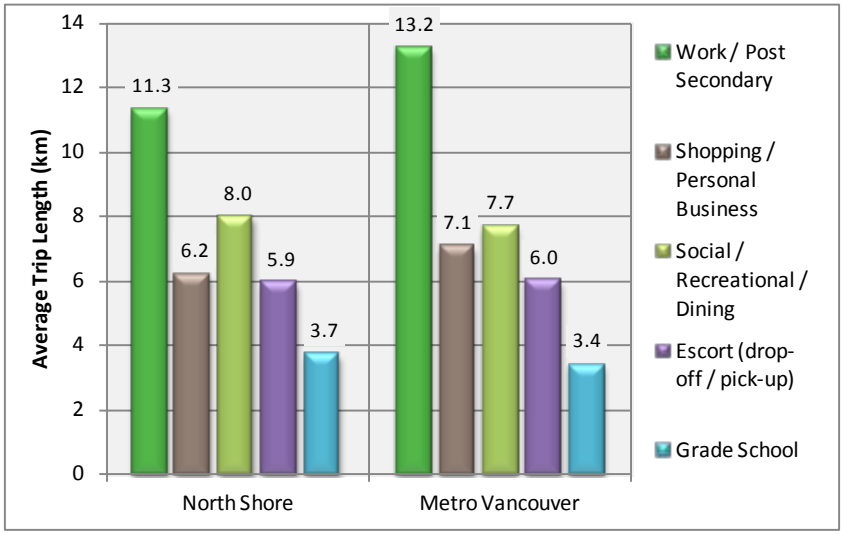


Figure 3.1.8 - Average Trip Length by Mode (North Shore)

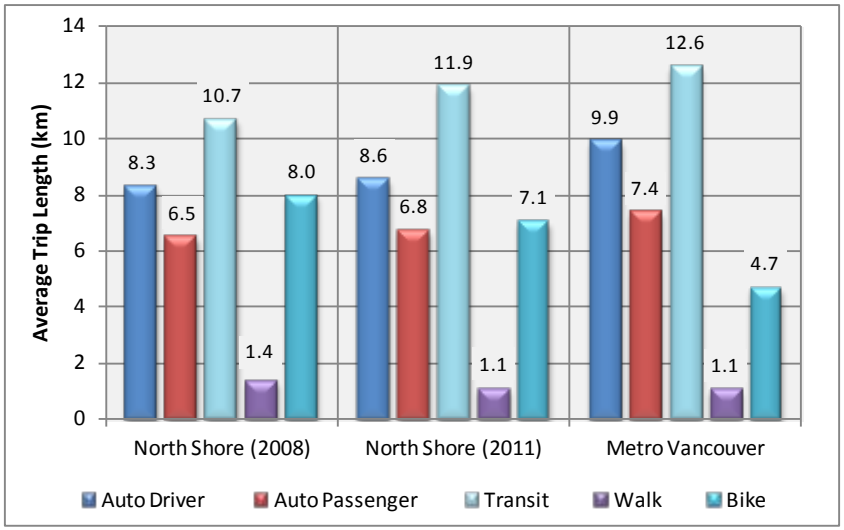
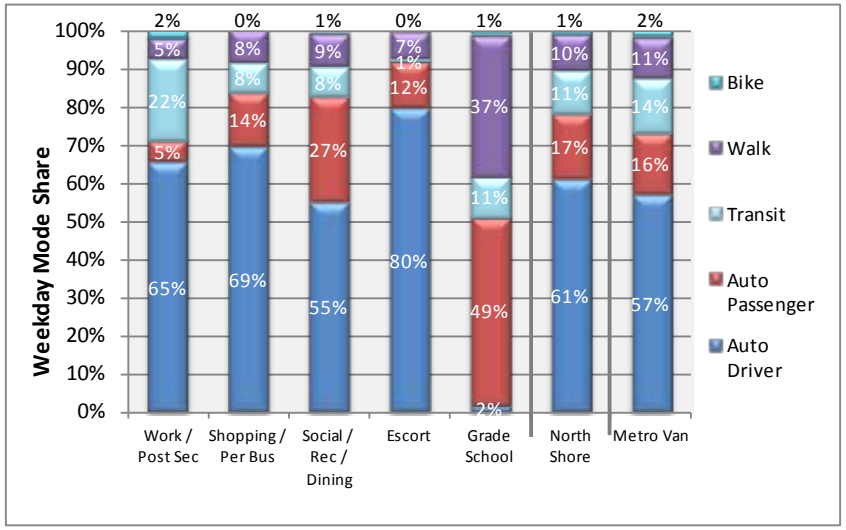


Figure 3.1.9 - Weekday Mode Share by Purpose (North Shore)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by North Shore residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.1.1**.

Table 3.1.1 - Weekday VKT (North Shore)

	2008	2011
VKT (millions)	2.57	2.67
VKT per capita	14.4	14.4

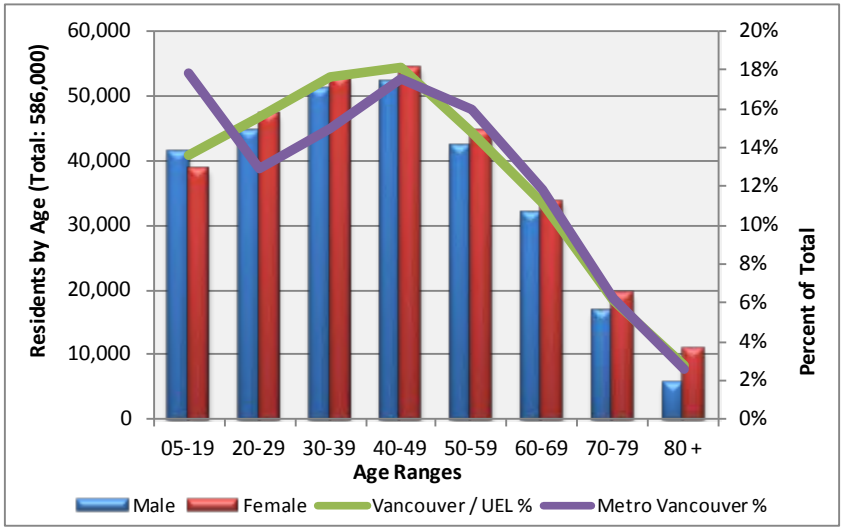
The absolute increase in VKT is consistent with the increase in population of the North Shore sub-region. The decrease in Auto driver mode share was offset by an increase in average trip lengths, which kept per capita VKT unchanged.

3.2 VANCOUVER / UEL

The Vancouver / UEL sub-region includes the City of Vancouver and the University Endowment Lands (UEL). The age and gender profile of the sub-region is presented in **Figure 3.2.1**. The figure illustrates that:

- The Vancouver / UEL sub-region has proportionally more persons in the 20 to 39 age range than Metro Vancouver and fewer who are 19 years or younger;
- More adult females reside in the Vancouver / UEL sub-region than adult males, particularly in the age ranges over 50.

Figure 3.2.1 - Residents by Age and Gender (Vancouver / UEL)



The distribution of residents by their employment status is presented in **Figure 3.2.2**. The figure shows that the Vancouver / UEL sub-region has proportionally more Full-Time Employed persons than Metro Vancouver and fewer Full-Time Students as would be expected given the age distribution in the sub-region. In general, this would tend to increase trips rates; however, **Figure 3.2.3** shows that the Vancouver / UEL sub-region has proportionally more persons in households with lower income than Metro Vancouver. This may off-set the impact of more full-time workers.

Figure 3.2.2 - Residents by Employment Status (Vancouver / UEL)

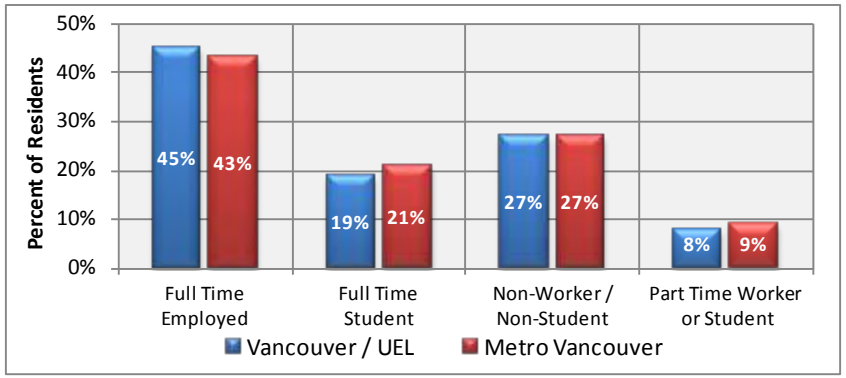
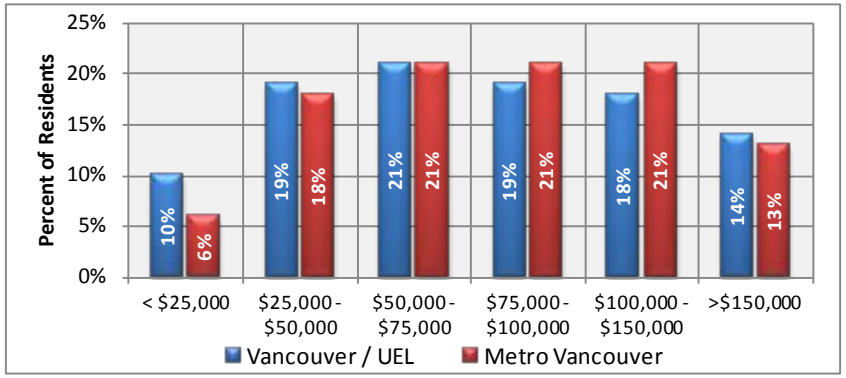
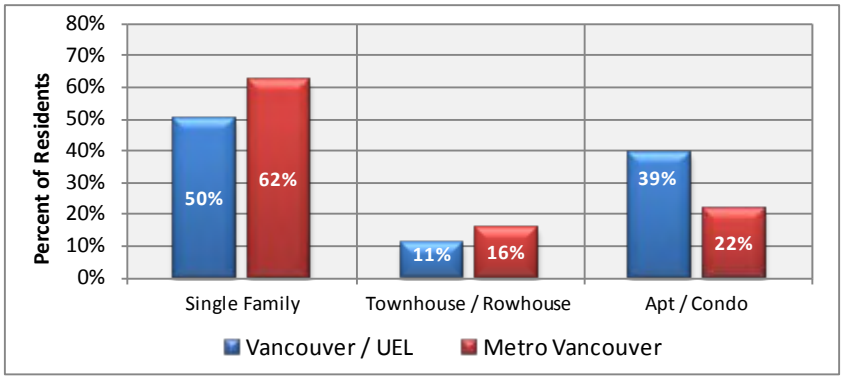


Figure 3.2.3 - Residents by Household Income (Vancouver / UEL)



The Vancouver / UEL sub-region also has a lower proportion of residents living in single family housing and a higher proportion in apartment / condo housing as compared with Metro Vancouver overall, as illustrated in **Figure 3.2.4**. This mix would tend to decrease trip rates for the sub-region.

Figure 3.2.4 - Residents by Housing Type (Vancouver / UEL)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the Vancouver / UEL sub-region (not including commercial or truck trips). Figure **3.2.5a** shows that the large majority of trips (75%) originating in the Vancouver / UEL sub-region stay in the sub-region. The remaining trip destinations are primarily divided among the adjacent sub-regions, each accounting for 4% to 9% of the trips.

The percent of trips destined to each sub-region that were made for the five different trip purposes is presented in **Figure 3.2.5b**. Trips that remain in the Vancouver / UEL sub-region are widely distributed across all trip purposes. Trips to the other sub-regions in Metro Vancouver were primarily for the Work / Post Secondary purpose.

The weekday mode shares for trips from the Vancouver / UEL sub-region to each sub-region are presented in **Figure 3.2.5c**. As expected the Walk mode has a significant share only for trips that are internal to the sub-region. Transit mode share is highest (45%) for trips to the South of Fraser sub-region but also high (29% to 40%) for almost all of the other sub-regions in Metro Vancouver (only the Transit mode share to the Langleys at 18% was lower). Transit mode share is relatively low (21%) for trips that remain in the Vancouver / UEL sub-region, reflecting the lower proportion of internal Work / Post Secondary trips relative to all internal trips and the higher proportions of Walk and Bike trips. The Auto Passenger mode is used more heavily for internal and long distance trips (e.g. to the Langleys). The overall weekday mode shares are primarily a function of internal trips since these trips account for 75% of the daily trips originating from the Vancouver / UEL sub-region.

The remaining analysis of the Vancouver / UEL sub-region examines the characteristics of trips made by the residents of the sub-region. As previously presented in **Figure 3.0.1b,** Vancouver / UEL sub-region residents have a weekday trip rate of 2.78, and they made an estimated 1.63 million trips during a typical fall weekday in 2011.

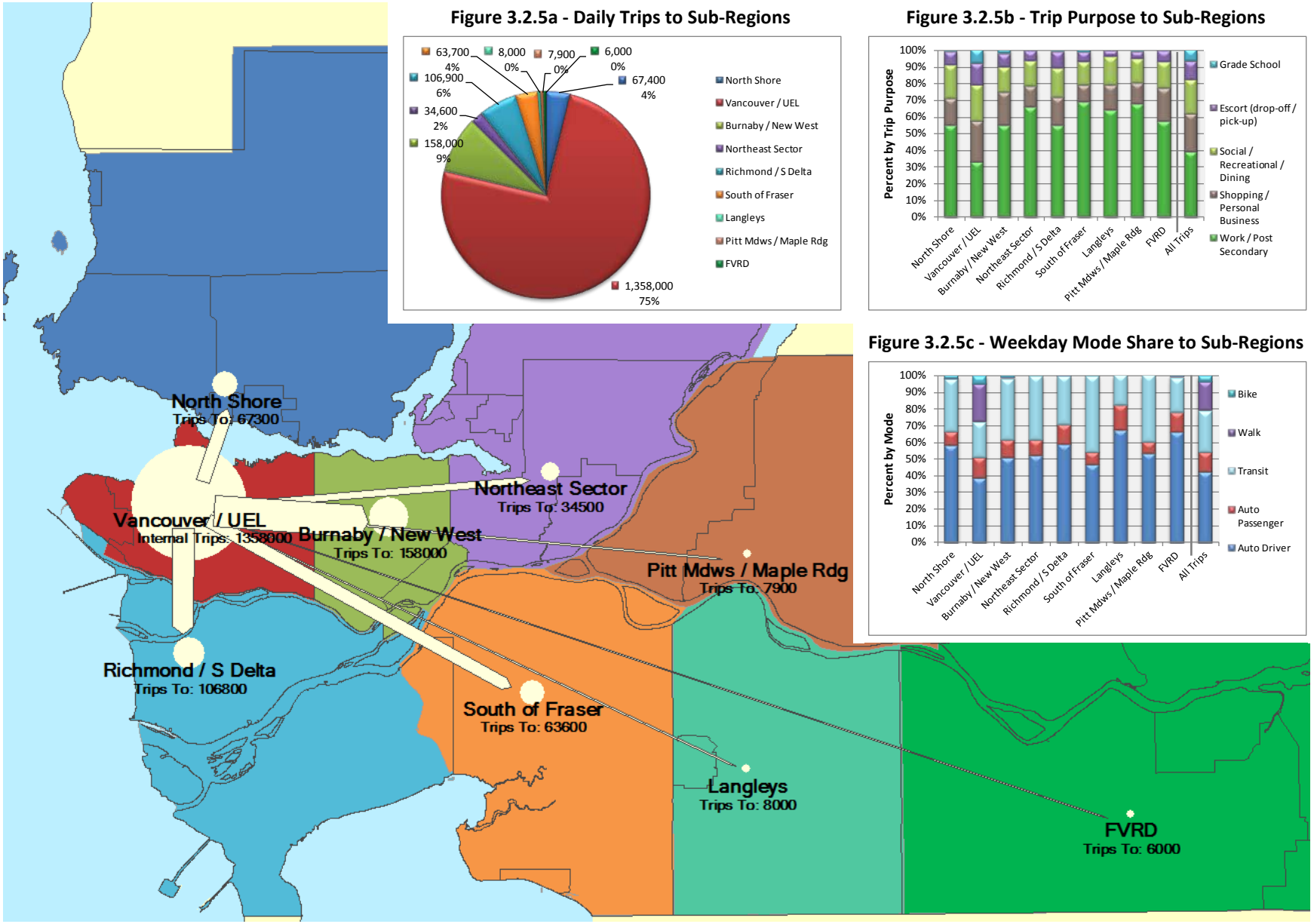


Figure 3.2.5a - Daily Trips to Sub-Regions

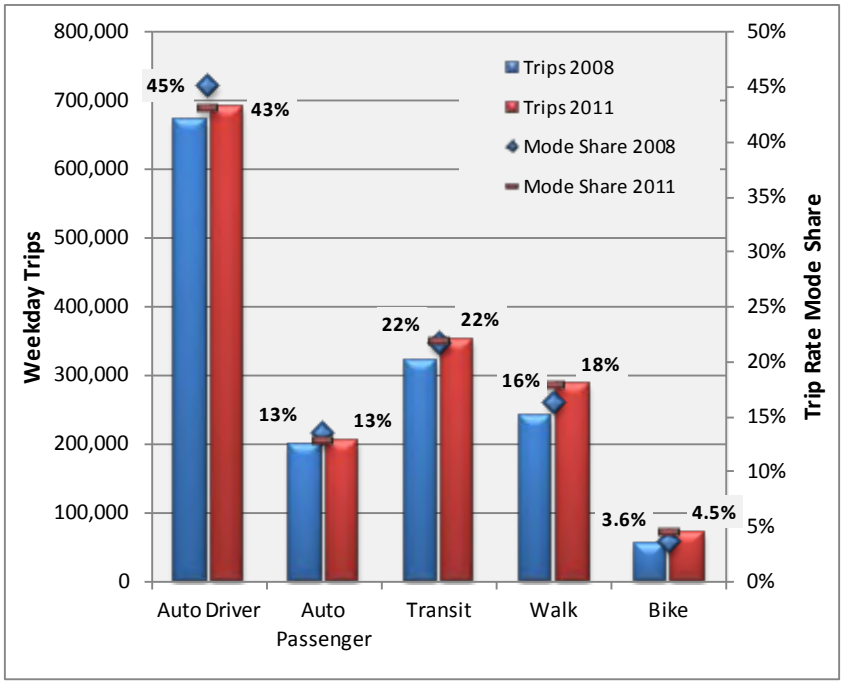
Figure 3.2.5b - Trip Purpose to Sub-Regions

Figure 3.2.5c - Weekday Mode Share to Sub-Regions

Figure 3.2.5 - Trip Distribution by Sub-Region of Trip Origin (Vancouver / UEL)

The number of daily trips by Vancouver / UEL sub-region residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.2.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.2.6 - Trips by Mode (Vancouver / UEL)

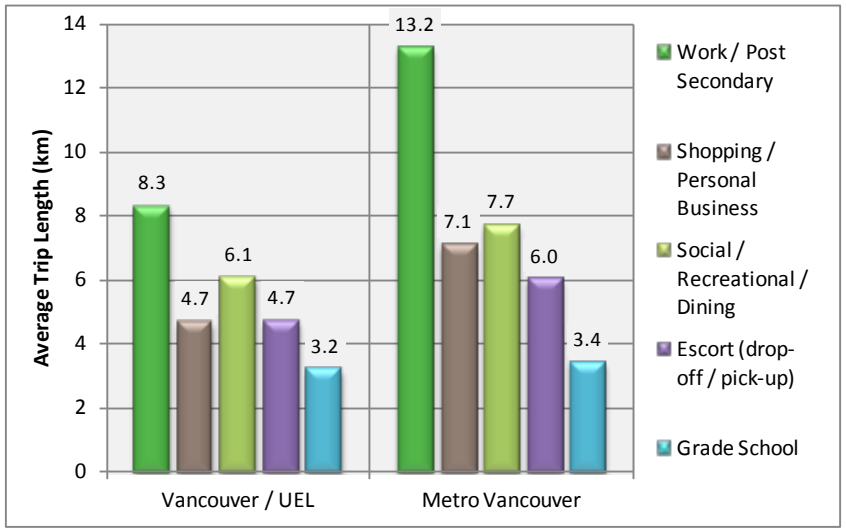


Note: Mode shares may not add to 100% due to rounding.

Generally, the number of trips made by Vancouver / UEL sub-region residents has increased at a faster pace than population growth. This difference in trip rates may be related to changing demographics in the sub-region, or changes in travel. Auto driver trips have increased at a slower rate than other modes resulting in a drop in Auto Driver mode share. The shares of active modes (Walk and Bike) have increased. Bike trips had the largest percent increase (just under 35%); this may be related to the significant investments in cycling infrastructure and programming within this sub-region.

The average trip lengths for residents of the Vancouver / UEL sub-region are presented in **Figures 3.2.7 and 3.2.8** by trip purpose and mode respectively. Similar to other sub-regions, trip lengths are longest for the Work / Post Secondary trip purpose and shortest for Grade School trips. Trip lengths for all purposes are noticeably shorter in length when compared to the Metro Vancouver averages.

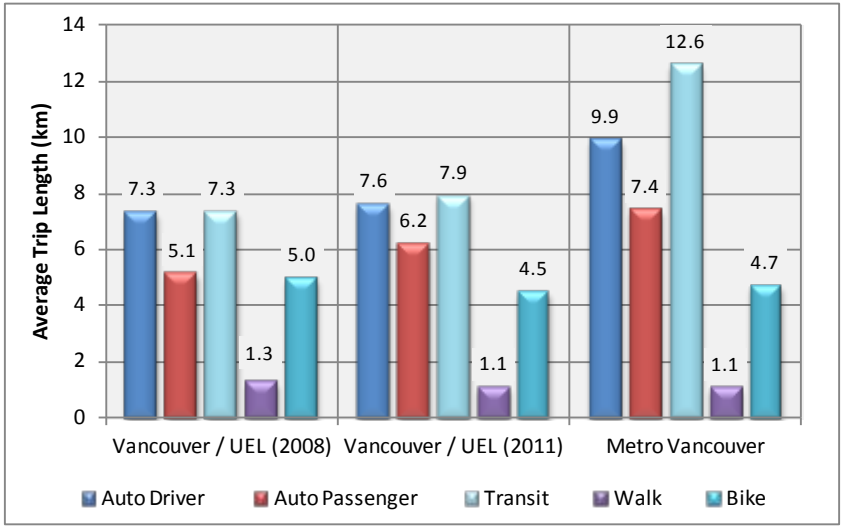
Figure 3.2.7 - Average Trip Length by Trip Purpose (Vancouver / UEL)



Not surprisingly, Walk trips are the shortest and similar in length to Walk trips across Metro Vancouver. Transit trips are the longest but they are 30% shorter than the Metro Vancouver average. Auto driver and Auto Passenger trips are also shorter for Vancouver / UEL sub-region residents as compared to the Metro Vancouver averages. Bicycle trips are similar to the Metro Vancouver average since the

Vancouver / UEL sub-region accounts for most Bike trips in Metro Vancouver.

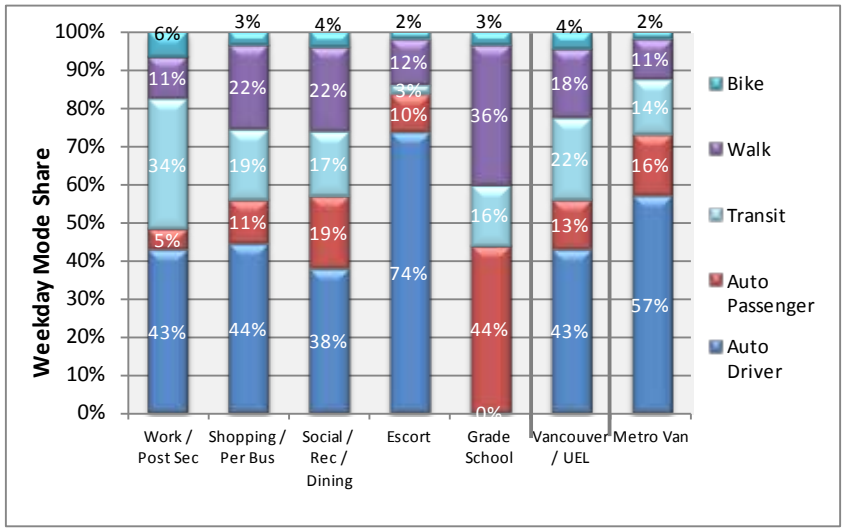
Figure 3.2.8 - Average Trip Length by Mode (Vancouver / UEL)



The weekday mode shares for the Vancouver / UEL sub-region are presented in **Figure 3.2.9**. Key characteristics include:

- Vancouver / UEL sub-region residents are more likely to take Transit, Walk or Bike and less likely to drive relative to Metro Vancouver residents overall.
- Work / Post Secondary trips in particular have a high Transit mode share accounting for 34% of the trips.
- Auto driver mode share is highest for Escort trips.

Figure 3.2.9 - Mode Share by Purpose (Vancouver / UEL)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by Vancouver / UEL sub-region residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.2.1**.

Table 3.2.1 - Weekday VKT (Vancouver / UEL)

	2008	2011
VKT (millions)	4.92	5.25
VKT per capita	8.2	8.5

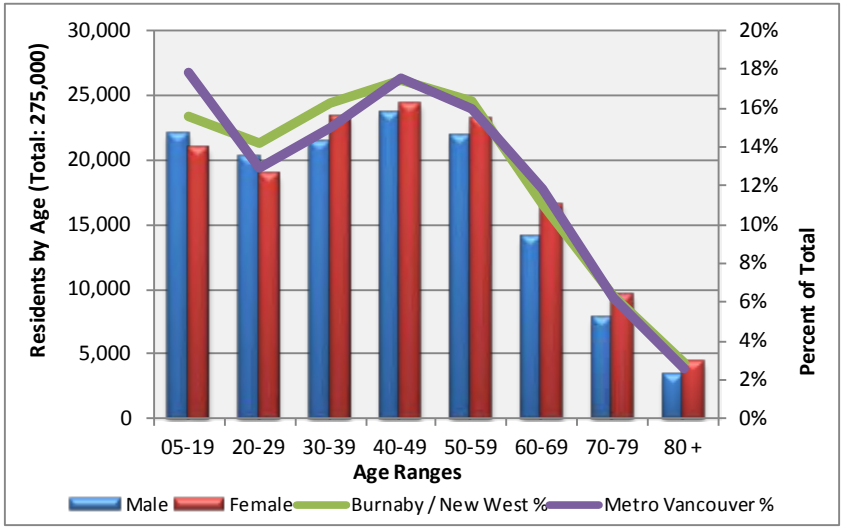
The increase in VKT and VKT per capita reflect the higher population, overall trip rates, and the increase in average Auto driver trip lengths in 2011 versus 2008.

3.3 BURNABY / NEW WESTMINSTER

The Burnaby / New Westminster sub-region includes the municipalities of Burnaby and New Westminster. The age and gender profile of the sub-region is presented in **Figure 3.3.1**. The figure illustrates that:

- The Burnaby / New Westminster sub-region has proportionally more persons in the 20 to 39 age range than Metro Vancouver and fewer who are 19 years or younger;
- More adult females reside in the Burnaby / New Westminster sub-region than adult males, particularly in the age ranges over 50.

Figure 3.3.1 - Residents by Age and Gender (Burnaby / New West)



The distribution of residents by their employment status is presented in **Figure 3.2.2**. The figure shows that the Burnaby / New Westminster sub-region has a slightly higher proportion of Full-time Employed persons than Metro Vancouver and fewer Full-Time Students as would be expected given the age distribution in the sub-region. In general, this would tend to increase trips rates; however, **Figure 3.2.3** shows that the Burnaby / New Westminster sub-region has proportionally more persons in households with lower income than Metro Vancouver. This pattern off-sets the impact of more Full-Time Workers.

Figure 3.3.2 - Residents by Employment Status (Burnaby / New West)

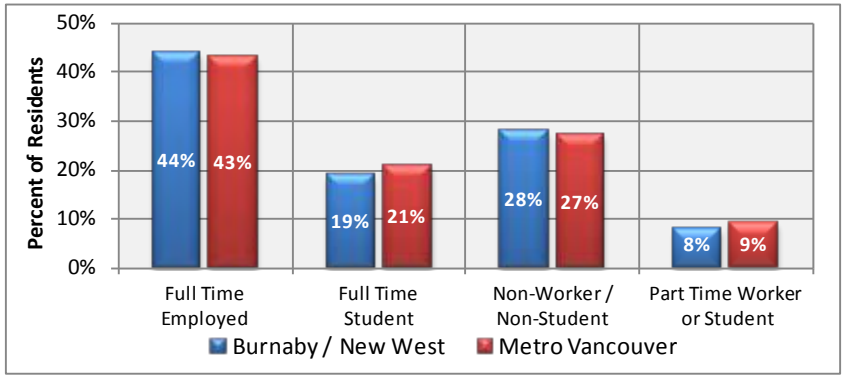
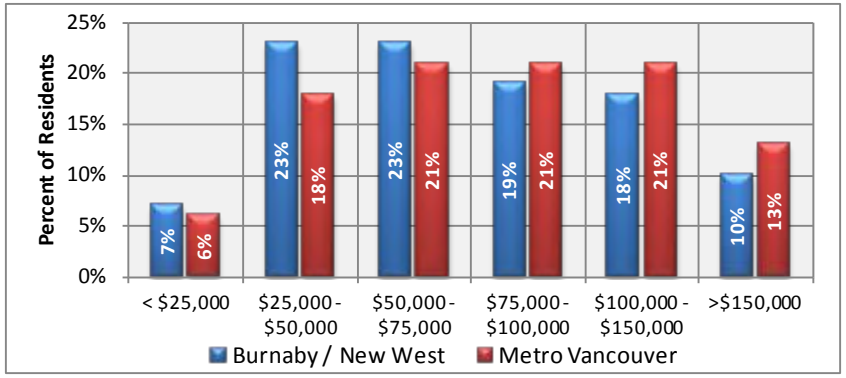
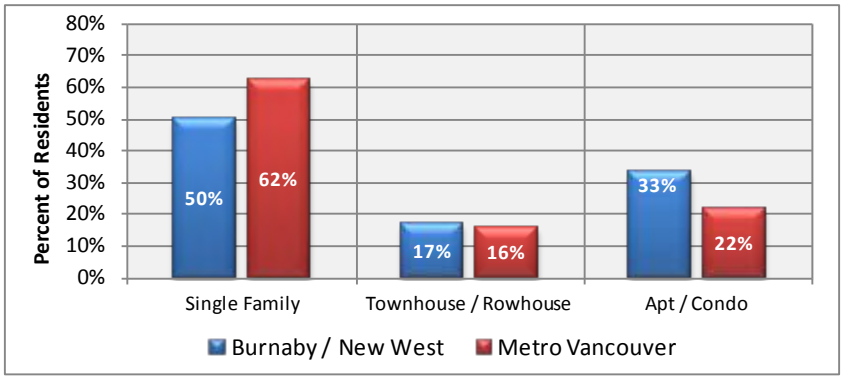


Figure 3.3.3 - Residents by Household Income (Burnaby / New West)



The Burnaby / New Westminster sub-region also has a lower proportion of residents living in single family housing and a higher proportion in apartment / condo housing as compared with Metro Vancouver overall as illustrated in **Figure 3.3.4**. This mix would tend to decrease trip rates for the sub-region.

Figure 3.3.4 - Residents by Housing Type (Burnaby / New West)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the Burnaby / New Westminster sub-region (not including commercial or truck trips). Figure **3.3.5a** shows that the majority of trips (56%) originating on the Burnaby / New Westminster sub-region stay in the sub-region, while a further 20% are destined to the Vancouver / UEL sub-region. The Northeast Sector and the South of Fraser sub-regions account for a further 8% and 7% of the destinations respectively. The remaining trip destinations are divided among the other Metro Vancouver sub-regions, each accounting for up to 4% of the trips. At 44% of trips leaving the sub-region, the Burnaby / New Westminster sub-region has the highest proportion of interactions with other sub-regions (no other sub-region has more than 35% of trips destined for other sub-regions).

The percent of trips destined for each sub-region that were made for the five different trip purposes is presented in **Figure 3.3.5b**. Similar to other sub-regions, trips that remain in the Burnaby / New Westminster sub-region are widely distributed across all trip purposes. Trips to the other sub-regions in Metro Vancouver were primarily for the Work / Post Secondary purpose.

The weekday mode shares for trips from the Burnaby / New Westminster sub-region to each sub-region are presented in **Figure 3.3.5c**. As expected the most Walk trips are internal to the sub-region. Transit mode share is highest (37%) for trips to the Vancouver / UEL sub-region but also high (29%) for trips to South of Fraser destinations. Excluding the FVRD, Transit mode share is lowest (9%) for trips to the Langleys sub-region. The Auto Passenger mode is most used for trips that are internal to the sub-region. The overall weekday mode shares are primarily a function of internal trips and those to adjacent sub-regions since these trips account for over 95% of the daily trips originating from the Burnaby / New Westminster sub-region.

The remaining analysis of the Burnaby / New Westminster sub-region examines the characteristics of trips made by the residents of the sub-region. As previously presented in **Figure 3.0.1b** Burnaby / New Westminster sub-region residents have a weekday trip rate of 2.71, and they made an estimated 749,000 trips during a typical fall weekday in 2011. This trip rate is slightly lower than the Metro Vancouver average (2.77) and is consistent with the household income and housing type distribution in the sub-region.

Figure 3.3.5a - Daily Trips to Sub-Regions

Figure 3.3.5b - Trip Purpose to Sub-Regions

Figure 3.3.5c - Weekday Mode Share to Sub-Regions

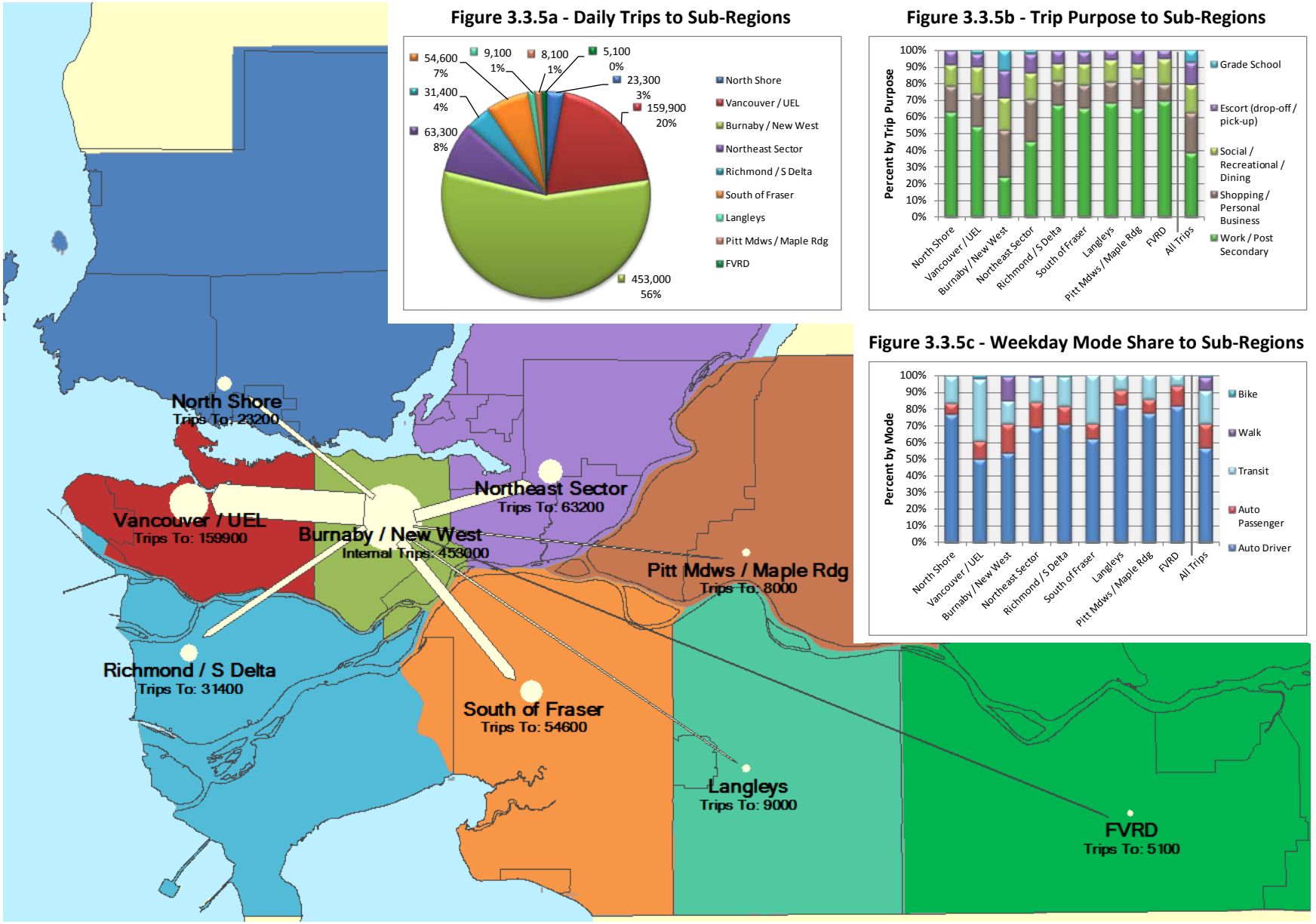
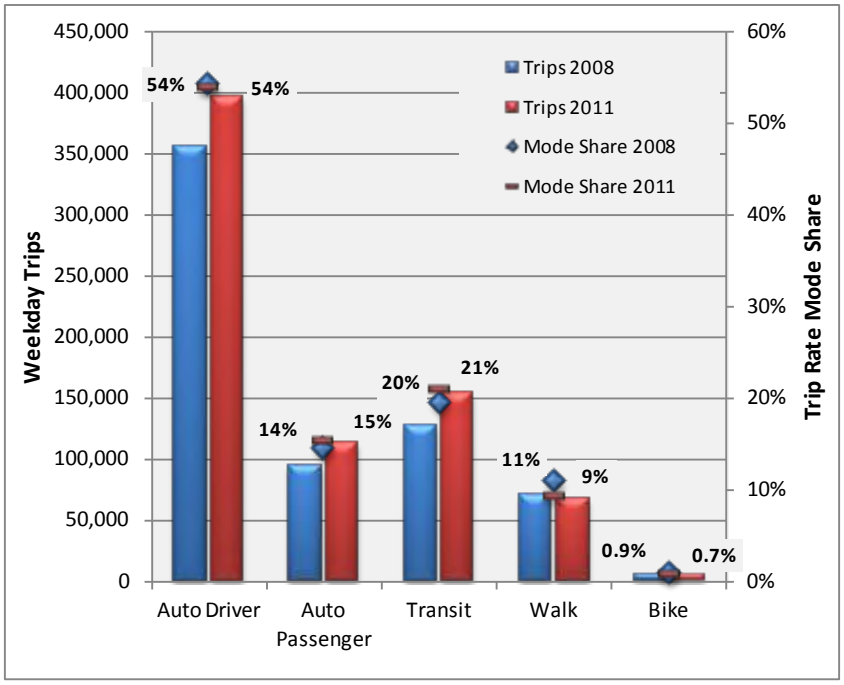


Figure 3.3.5 - Trip Distribution by Sub-Region of Trip Origin (Burnaby / New West)

The number of daily trips by Burnaby / New Westminster sub-region residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.3.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.3.6 - Trips by Mode (Burnaby / New West)

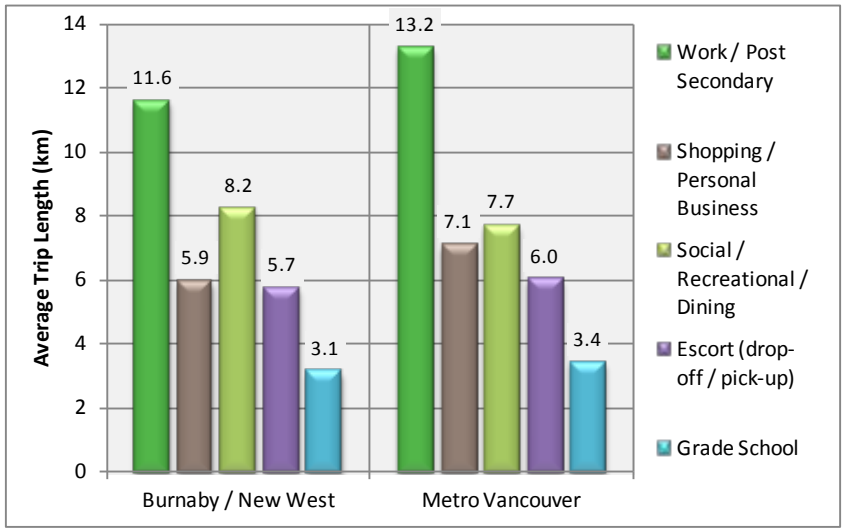


Note: Mode shares may not add to 100% due to rounding.

Generally, the number of trips made by Burnaby / New Westminster sub-region residents has increased at a higher pace than population growth. This difference in trip rates may be related to changing demographics in the sub-region, or changes in travel behaviour. Auto driver trips have increased at a rate similar to total trips resulting in an unchanged Auto Driver mode share. The shares of the Auto Passenger and Transit modes have increased with a corresponding decrease in the Walk mode. The increase in Transit mode share may be related to the expansion of the U-Pass program to include BCIT.

The average trip lengths for residents of the Burnaby / New Westminster sub-region are presented in **Figures 3.3.7 and 3.3.8** by trip purpose and mode respectively. Trip lengths are longest for the Work / Post Secondary purpose and shortest for Grade School trips. Trip lengths for all purposes other than Social / Recreational are shorter in length when compared to the Metro Vancouver averages.

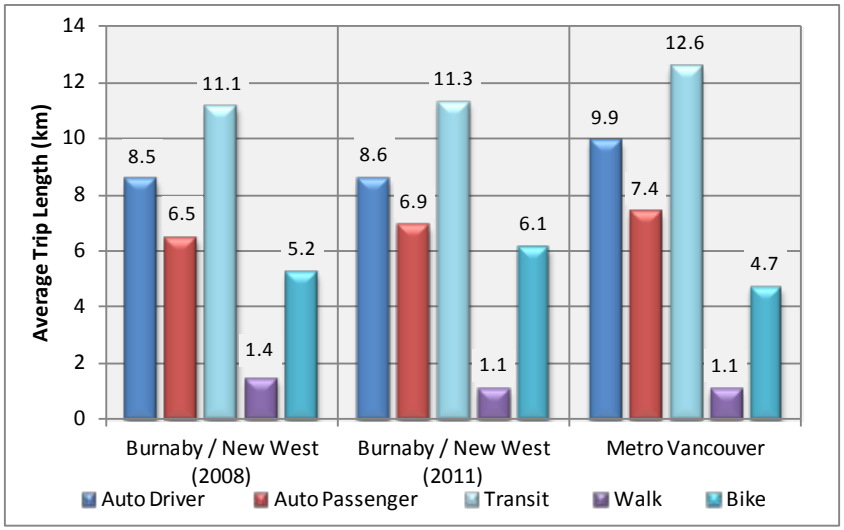
Figure 3.3.7 - Average Trip Length by Trip Purpose (Burnaby / New West)



Not surprisingly, Walk trips are the shortest and similar in length to Walk trips across Metro Vancouver. Transit trips are the longest but they are shorter than the Metro Vancouver average. Auto driver and Auto Passenger trips are also somewhat shorter for Burnaby / New Westminster sub-region residents as compared the Metro Vancouver overall. Bike trips are longer than the Metro Vancouver average,

perhaps because the Metro Vancouver average is skewed by the heavier Bike use in the Vancouver / UEL sub-region with generally shorter trip lengths. Comparison between the 2011 and 2008 Trip Diaries indicates that average trip lengths increased for most modes.

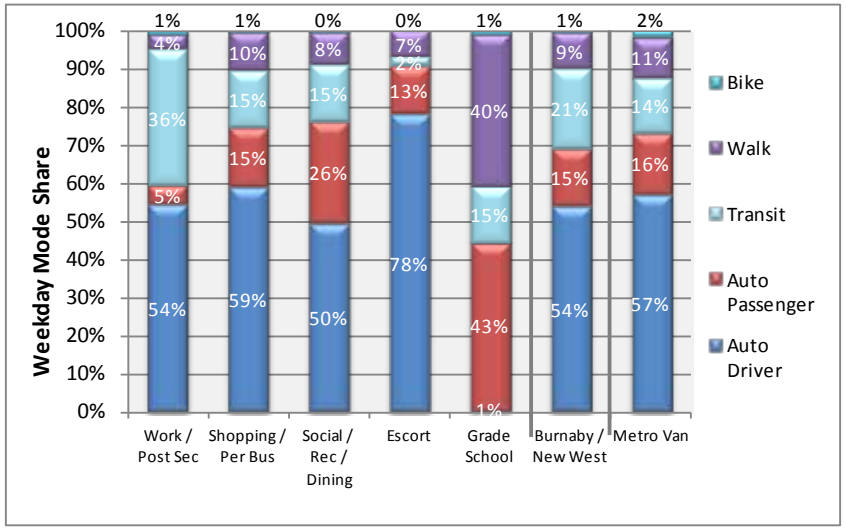
Figure 3.2.8 - Average Trip Length by Mode (Burnaby / New West)



The weekday mode shares for the Burnaby / New Westminster sub-region are presented in **Figure 3.3.9**. Key characteristics include:

- Burnaby / New Westminster sub-region residents are more likely to take transit and somewhat less likely to drive relative to Metro Vancouver residents overall.
- Work / Post Secondary trips in particular have a high Transit mode share accounting for 36% of the trips.
- Auto driver mode share is highest for Escort trips.

Figure 3.3.9 - Mode Share by Purpose (Burnaby / New West)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by Burnaby / New Westminster sub-region residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.3.1**.

Table 3.3.1 - Weekday VKT (Burnaby / New West)

	2008	2011
VKT (millions)	3.03	3.40
VKT per capita	11.1	11.8

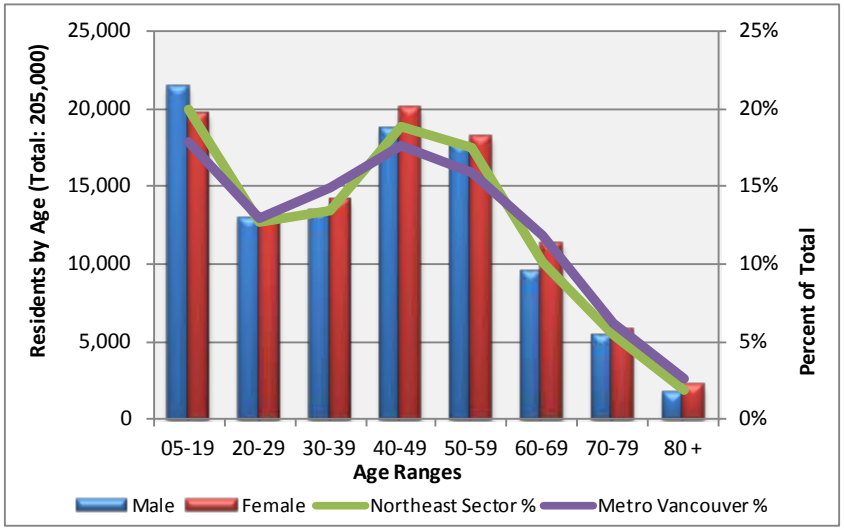
The increase in VKT and VKT per capita reflect the higher population and trip rates as well as the increase in Auto driver average trip length in 2011 versus 2008.

3.4 NORTHEAST SECTOR

The Northeast Sector sub-region includes the municipalities of Coquitlam, Port Moody, Port Coquitlam, Anmore, and Belcarra and First Nations communities in the area. The age and gender profile of the sub-region is presented in **Figure 3.4.1**. The figure illustrates that:

- The Northeast Sector has an age profile that is similar to that of Metro Vancouver;
- More adult females reside in the Northeast Sector than adult males.

Figure 3.4.1 - Residents by Age and Gender (Northeast Sector)



The distribution of residents by their employment status is presented in **Figure 3.4.2**. The figure shows that the Northeast Sector has proportionally fewer Non-Workers / Non-Students than Metro Vancouver and slightly more Full-Time Workers and Full-Time Students. Given that the age profile and employment status in the Northeast Sector is similar to that of Metro Vancouver overall, similar trips rates would be expected; however, **Figure 3.4.3** shows that the Northeast Sector has proportionally more persons in households with higher income than Metro Vancouver. This would tend to increase the average trip rate.

Figure 3.4.2 - Residents by Employment Status (Northeast Sector)

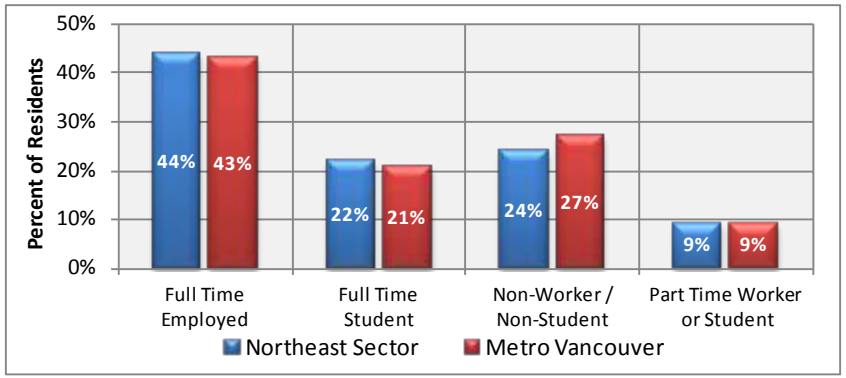
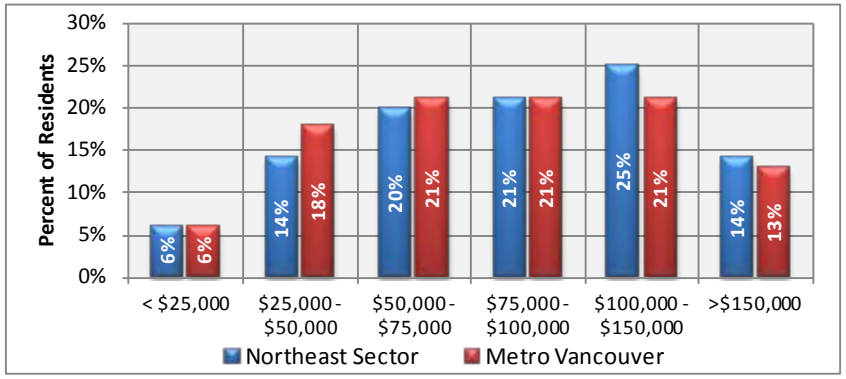
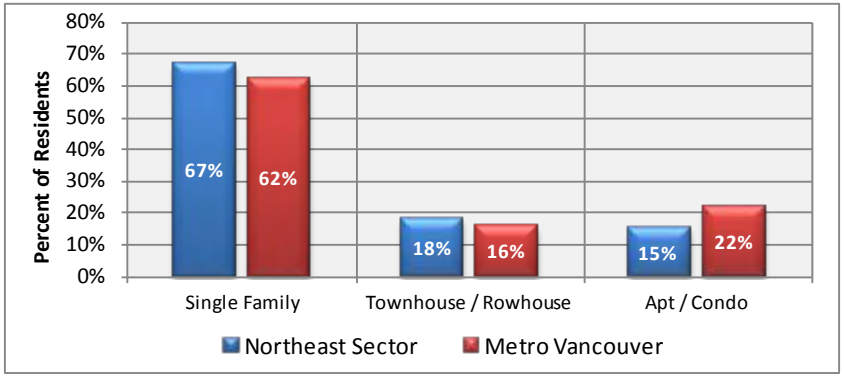


Figure 3.4.3 - Residents by Household Income (Northeast Sector)



The Northeast Sector also has a higher proportion of persons in single family housing and fewer in apartments / condos as compared with Metro Vancouver overall as illustrated in **Figure 3.4.4**.

Figure 3.4.4 - Residents by Housing Type (Northeast Sector)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the Northeast Sector Sub-Region (not including commercial or truck trips). **Figure 3.4.5a** shows that the large majority of trips (68%) originating in the Northeast Sector stay in the sub-region. The next largest proportion of trip destinations is the Burnaby / New Westminster sub-region with 13% of the weekday trips while the Vancouver / UEL sub-region accounts for 7%. The South of Fraser sub-region accounts for a further 3%. The remaining sub-regions each account for only 1% to 2% of the trip destinations.

The percent of trips destined to each sub-region that were made for the five different trip purposes is presented in **Figure 3.4.5b**. Trips that remain in the Northeast Sector sub-region were widely distributed across all trip purposes, with particularly low percentage of Work / Post Secondary trips (around 15%). Trips to the other sub-regions in Metro Vancouver are primarily for the Work / Post Secondary purpose. Shopping / Personal Business trips account for a substantial proportion of trip purposes both within the sub-region itself and to nearby sub-regions. Grade School trips primarily stay in the Northeast Sector.

The weekday mode shares for trips from the Northeast Sector to each sub-region are presented in **Figure 3.4.5c**. As expected the Walk mode has a significant share only for trips that are internal to the sub-region. Transit mode share is highest for trips to the Vancouver / UEL sub-region. The Auto Passenger mode is most used for local trips. The overall weekday mode share is primarily a function of trips to Northeast Sector, Burnaby / New Westminster, and Vancouver / UEL destinations since these sub-regions account for 90% of the daily trips originating from the Northeast Sector.

The remaining analysis of the Northeast Sector sub-region examines the characteristics of trips made by the residents of the sub-region. As previously presented in **Figure 3.0.1b** Northeast Sector residents have a weekday trip rate of 2.80, similar to the average trip rate for all of Metro Vancouver (2.77) and they made an estimated 570,000 trips during a typical fall weekday in 2011.

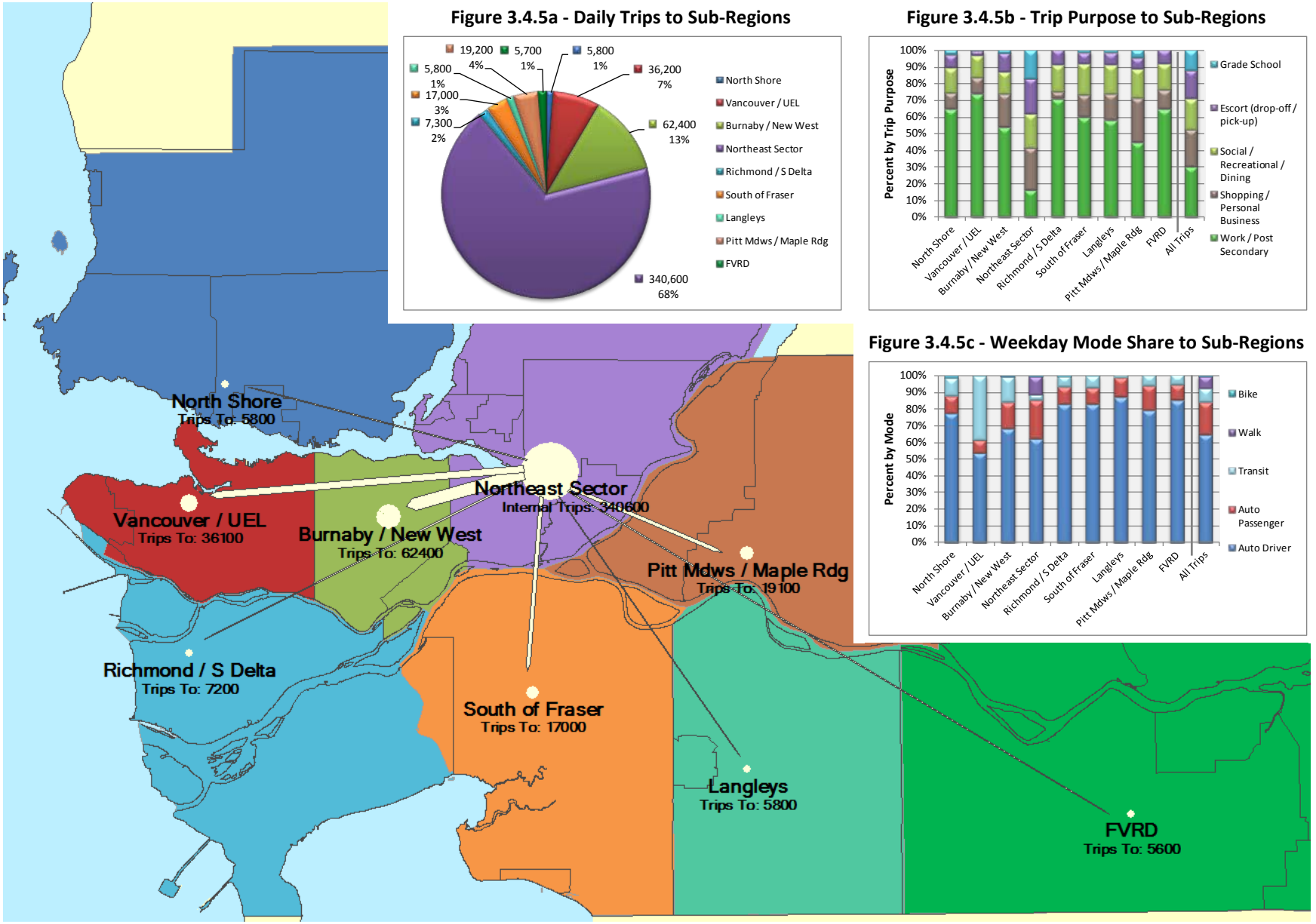


Figure 3.4.5a - Daily Trips to Sub-Regions

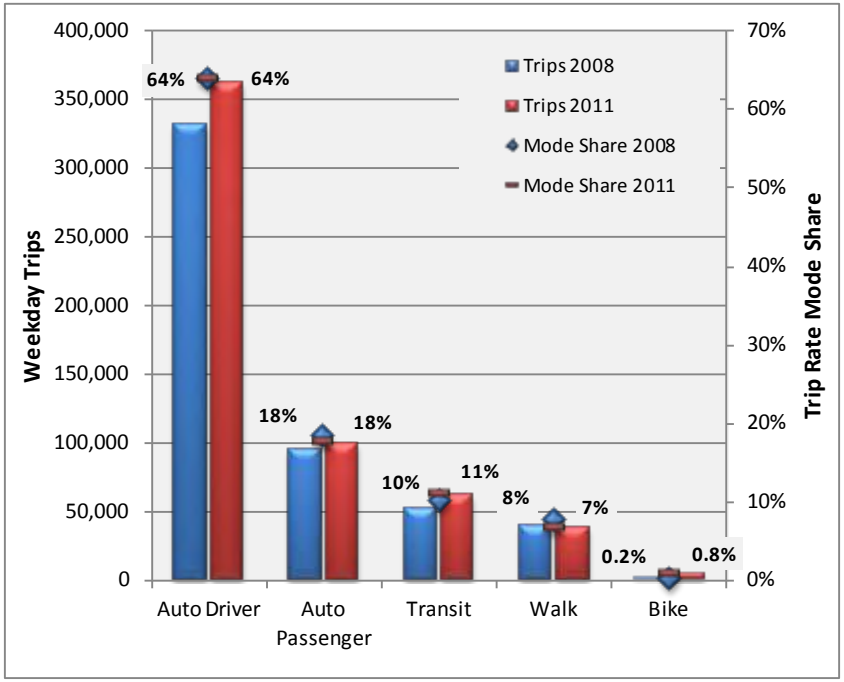
Figure 3.4.5b - Trip Purpose to Sub-Regions

Figure 3.4.5c - Weekday Mode Share to Sub-Regions

Figure 3.4.5 - Trip Distribution by Sub-Region of Trip Origin (Northeast Sector)

The number of daily trips by Northeast Sector residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.4.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.4.6 - Trips by Mode (Northeast Sector)

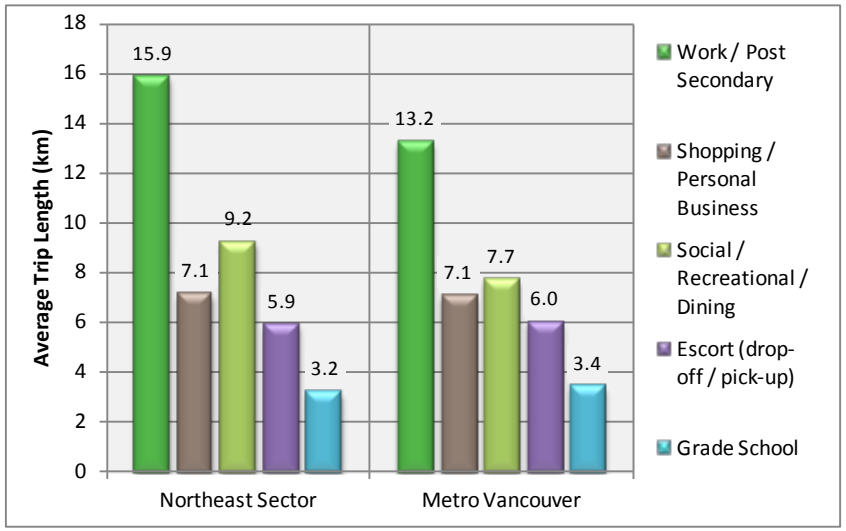


Note: Mode shares may not add to 100% due to rounding.

Overall the number of trips made by Northeast Sector residents has increased at a rate higher than population growth. Transit trips have increased at a faster rate than the auto and Walk modes resulting in an increase in Transit mode share. Bike mode share has also increased. The high proportion of Auto Drivers may reflect the demographics of the Northeast Sector: more individuals in the prime commuting age ranges, more high income households than the Metro Vancouver proportions, and more persons in single family housing.

The average trip lengths for residents of the Northeast Sector are presented in **Figures 3.4.7 and 3.4.8** by trip purpose and mode respectively. Trip lengths are longest for the Work / Post Secondary purpose and shortest for Grade School trips. Trip lengths for Work / Post Secondary and Social / Recreational purposes are significantly longer than the Metro Vancouver averages.

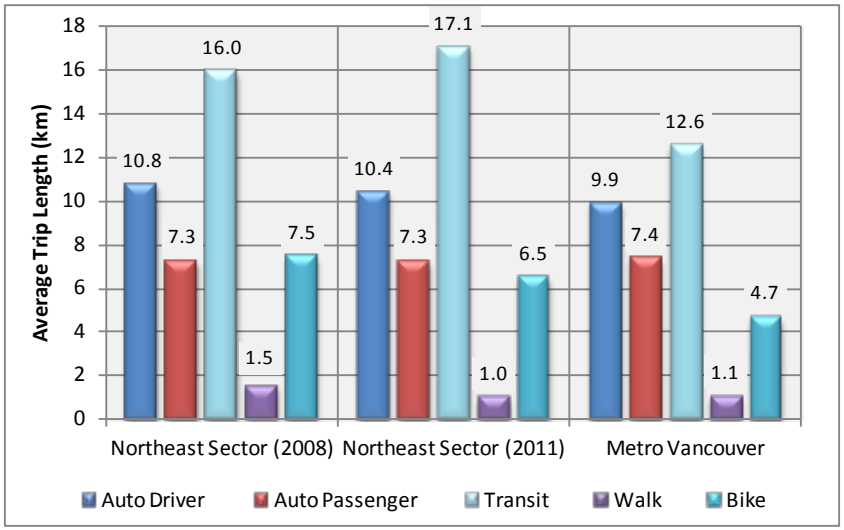
Figure 3.4.7 - Average Trip Length by Trip Purpose (Northeast Sector)



As with other sub-regions, Walk trips are the shortest and similar in length to Walk trips across Metro Vancouver. Transit trips are the longest and are about 35% longer than the Metro Vancouver average, reflecting in part the impact of the West Coast Express service in the sub-region. Auto driver and Auto Passenger trips by Northeast Sector residents are similar in length to the Metro Vancouver average. Bicycle trips are longer than the Metro Vancouver average, perhaps

because the Metro Vancouver average is skewed by the heavier Bike use in the Vancouver / UEL sub-region with generally shorter trip lengths. Average Transit trip lengths increased between 2008 and 2011 while average Auto Driver trip length decreased over the same time period.

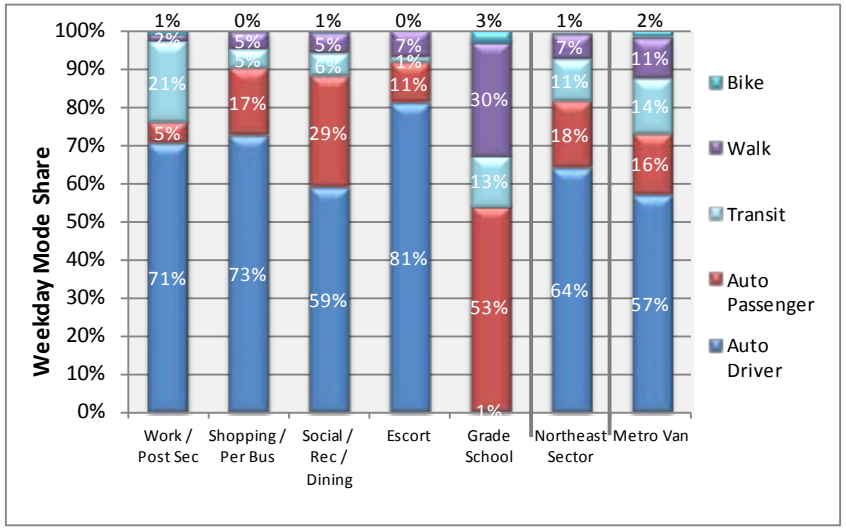
Figure 3.4.7 - Average Trip Length by Mode (Northeast Sector)



The weekday mode shares for the Northeast Sector sub-region are presented in **Figure 3.4.9**. Key characteristics illustrated in this chart include:

- Northeast Sector residents are more likely to drive and less likely to take transit relative to Metro Vancouver residents overall;
- Similar to other sub-regions, Escort trips are predominately auto-oriented;
- Transit mode share is highest for Work / Post Secondary trips accounting for 21% of the trips.

Figure 3.4.9 - Mode Share by Purpose (Northeast Sector)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by Northeast Sector residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.4.1**.

Table 3.4.1 - Weekday VKT (Northeast Sector)

	2008	2011
VKT (millions)	3.57	3.77
VKT per capita	17.5	17.2

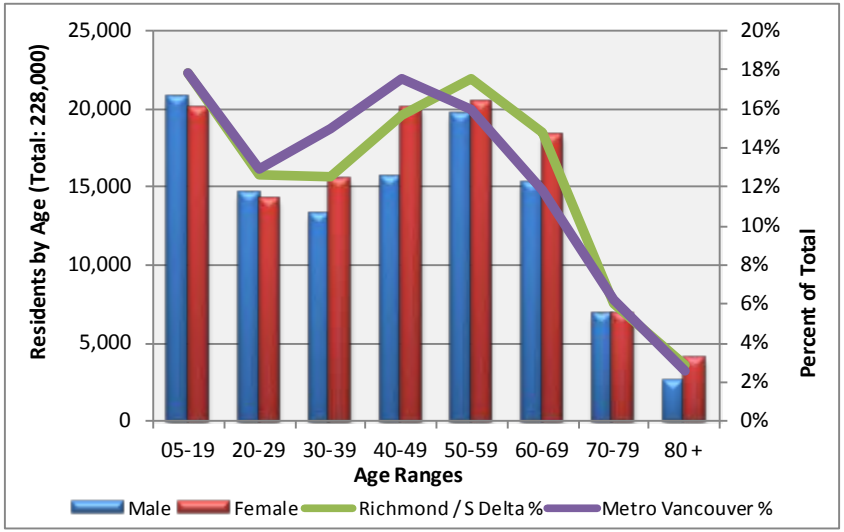
The increase in VKT is consistent with the absolute growth in the number of Auto Driver trips while the decrease in VKT per capita can be attributed to the decrease in the average Auto Driver trip length.

3.5 RICHMOND / SOUTH DELTA

The Richmond / South Delta sub-region includes the municipality of Richmond, all of Delta except for North Delta, and First Nations communities in the area. The age and gender profile of the sub-region is presented in **Figure 3.5.1**. The figure illustrates that:

- The Richmond / South Delta sub-region has proportionally fewer persons in the 30 to 49 age range than Metro Vancouver and more who are in the 50 to 69 age range;
- More adult females reside in Richmond / South Delta than adult males, particularly in the 40 to 49 age range and the 60 to 69 age range.

Figure 3.5.1 - Residents by Age and Gender (Richmond / South Delta)



The distribution of residents by their employment status is presented in **Figure 3.5.2**. The figure shows that the Richmond / South Delta sub-region has proportionally more non-workers than Metro Vancouver and fewer full-time workers. In general this would tend to reduce trips rates; in addition, **Figure 3.5.3** shows that the Richmond / South Delta sub-region has proportionally more persons in households with lower income than Metro Vancouver. This, combined with the lower proportion adults in the 30 to 49 age range (who tend to have higher than average trip rates) increases the likelihood of lower trip rates.

Figure 3.5.2 - Residents by Employment Status (Richmond / South Delta)

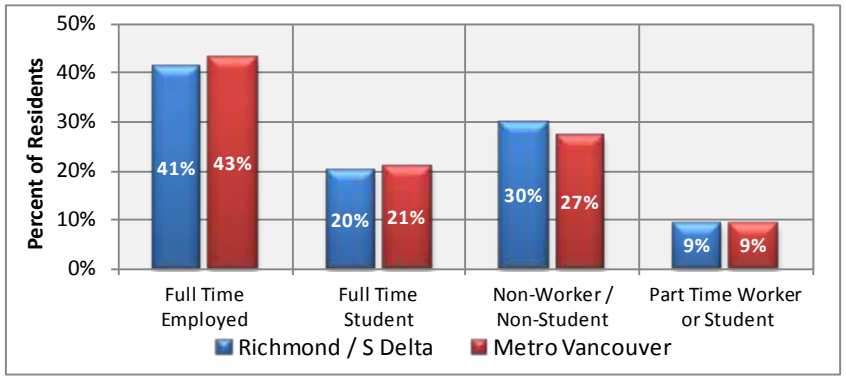
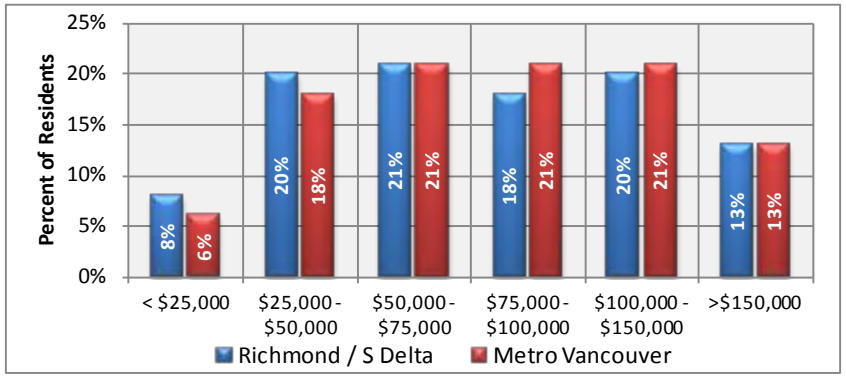
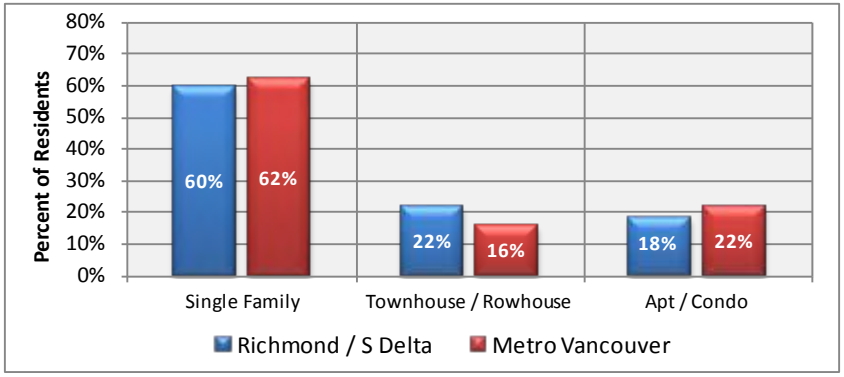


Figure 3.5.3 - Residents by Household Income (Richmond / South Delta)



The Richmond / South Delta sub-region has a higher proportion of persons in Townhouse / Rowhouse housing as compared with Metro Vancouver overall as illustrated in **Figure 3.5.4**.

Figure 3.5.4 - Residents by Housing Type (Richmond / South Delta)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the Richmond / South Delta sub-region (not including commercial or truck trips). **Figure 3.5.5a** shows that the majority of trips (67%) originating in Richmond / South Delta stay in the sub-region. The next largest proportion of trip destinations is the Vancouver / UEL sub-region (16%). The South of Fraser sub-region accounts for a further 8%, while a further 5% are destined to Burnaby / New Westminster. The remaining sub-regions each account for up to 1% of the trip destinations.

The percent of trips destined to each sub-region that were made for the five different trip purposes is presented in **Figure 3.5.5b**. Trips that remain in the Richmond / South Delta sub-region are widely distributed across all trip purposes. Trips to the other sub-regions in Metro Vancouver were primarily for the Work / Post Secondary purpose.

The weekday mode shares for trips from the Richmond / South Delta sub-region to each sub-region are presented in **Figure 3.5.5c**. As expected the Walk mode has a significant share only for trips that are internal to the sub-region. Transit mode share is highest for trips to the Vancouver / UEL sub-region (28%) but only 5% for trips that remain in the sub-region. The Auto Passenger mode is most used for local trips. The overall weekday mode share is primarily a function of trips to Richmond / South Delta and Vancouver / UEL destinations since these sub-regions account for 83% of the daily trips originating from the Richmond / South Delta sub-region.

The remaining analysis of the Richmond / South Delta sub-region examines the characteristics of trips made by the residents of the sub-region. As previously presented in **Figure 3.0.1b** Richmond / South Delta residents have a weekday trip rate of 2.64, the lowest trip rate of all sub-regions and they made an estimated 604,000 trips during a typical fall weekday in 2011. The lower average trip rate is consistent with the age and household income distributions in the sub-region.

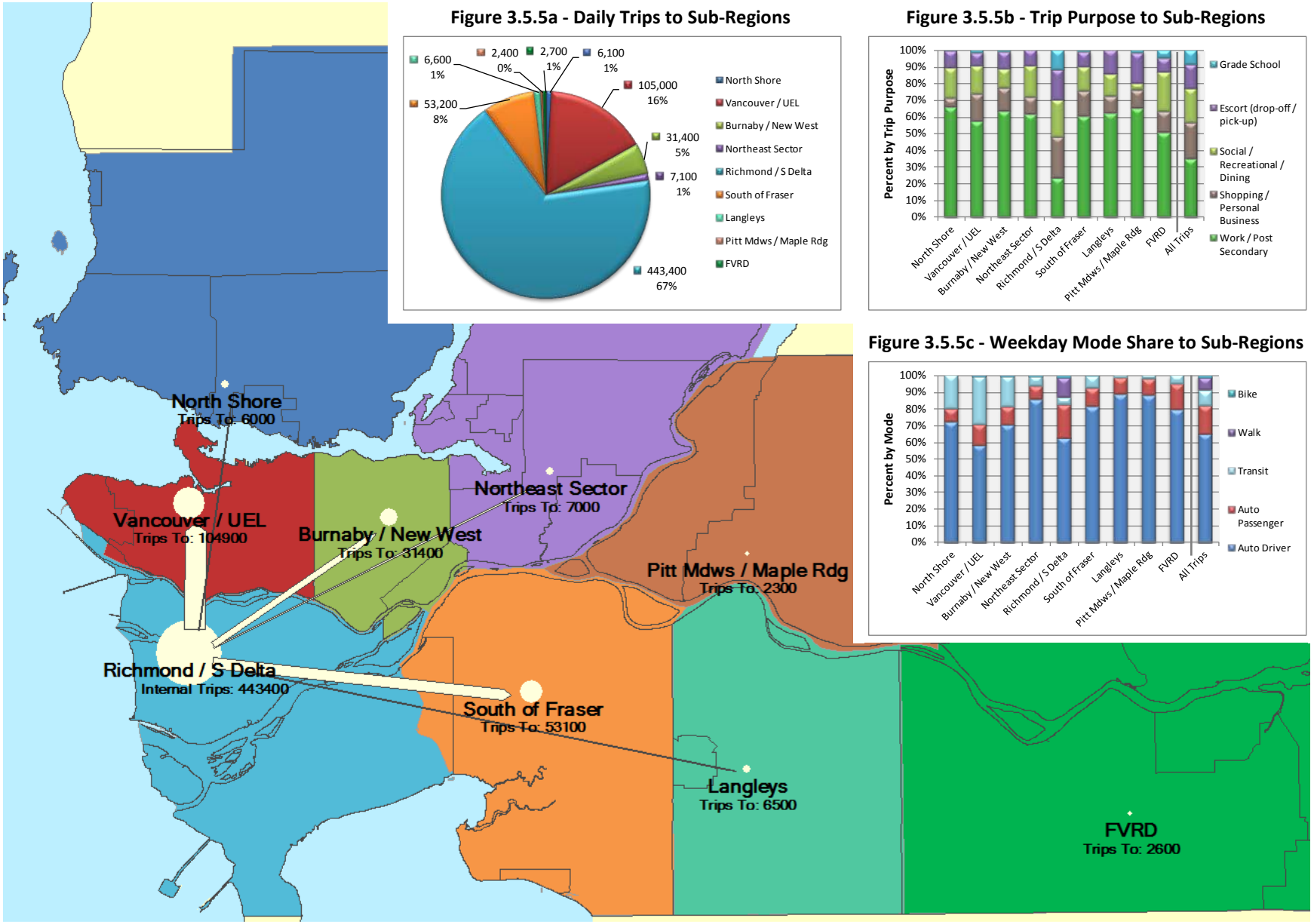


Figure 3.5.5a - Daily Trips to Sub-Regions

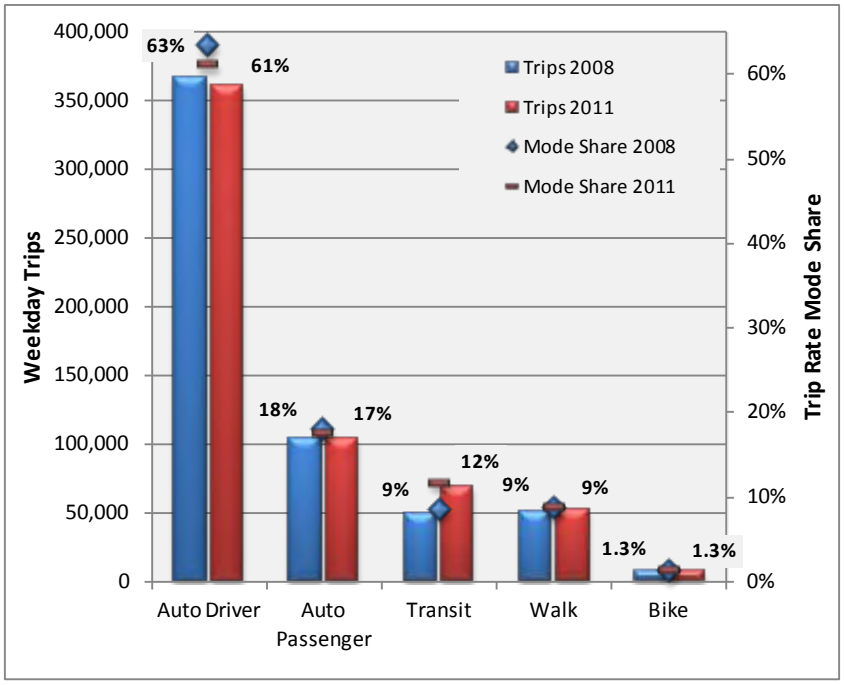
Figure 3.5.5b - Trip Purpose to Sub-Regions

Figure 3.5.5c - Weekday Mode Share to Sub-Regions

Figure 3.5.5 - Trip Distribution by Sub-Region of Trip Origin (Richmond / South Delta)

The number of daily trips by Richmond / South Delta residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.5.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.5.6 - Trips by Mode (Richmond / S Delta)



Note: Mode shares may not add to 100% due to rounding.

This sub-region had the most substantial changes between 2008 and 2011. These changes, e.g. more Transit trips and a higher Transit mode share, are consistent with the expected impact of the opening of the Canada Line. There has been a drop in reported Auto Driver and Auto Passenger trips equal to about 35% of the number of additional Transit trips, suggesting that the 3.1% growth in trips from the sub-region, compared to 2008, has been accommodated by transit.

The average trip lengths for residents of the Richmond / South Delta sub-region are presented in **Figures 3.5.7 and 3.5.8** by trip purpose and mode respectively. Trip lengths are longest for the Work / Post Secondary purpose and shortest for Grade School trips. Trip lengths for all purposes are similar in length to the Metro Vancouver averages.

As in all sub-regions, Walk trips are the shortest and similar in length to Walk trips across Metro Vancouver. Transit trips are the longest and about 20% longer than the Metro Vancouver average; this may reflect the impact of transit travel to the Metropolitan Core. The average trip lengths for the remaining modes are similar to the Metro Vancouver averages. The average length of Auto Driver trips decreased while the average length of Transit trips increased. These changes are consistent with the likely impact of the Canada Line on travel patterns.

The weekday mode shares for the Richmond / South Delta sub-region are presented in **Figure 3.5.9**. Key characteristics illustrated in these charts include:

- Richmond / South Delta residents are somewhat more likely to drive and less likely to walk or take transit relative to Metro Vancouver residents overall;
- Escort trips in particular are predominately auto-oriented;
- Transit mode share is highest for Work / Post Secondary trips accounting for 23% of the trips.

Figure 3.5.7 - Average Trip Length by Trip Purpose (Richmond / S Delta)

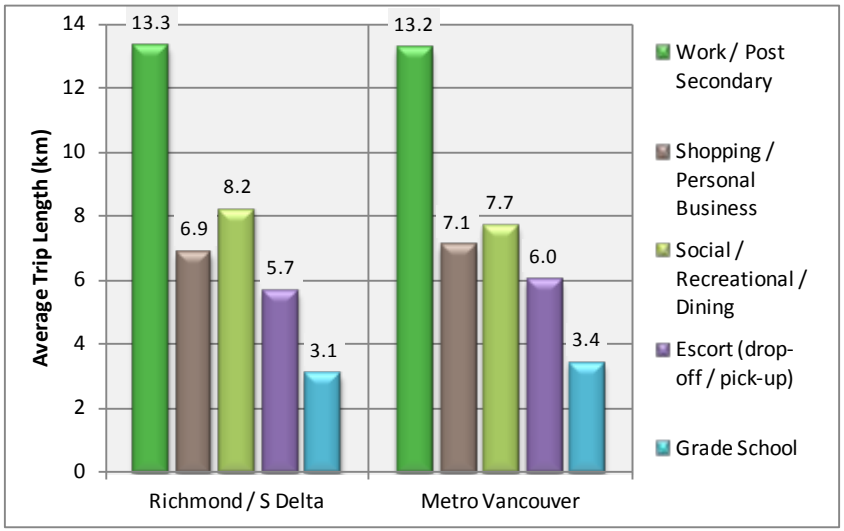


Figure 3.5.8 - Average Trip Length by Mode (Richmond / S Delta)

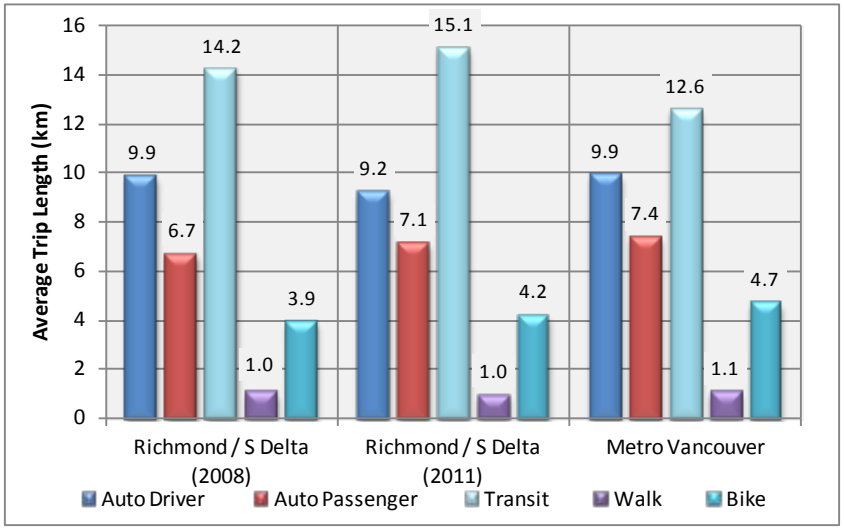
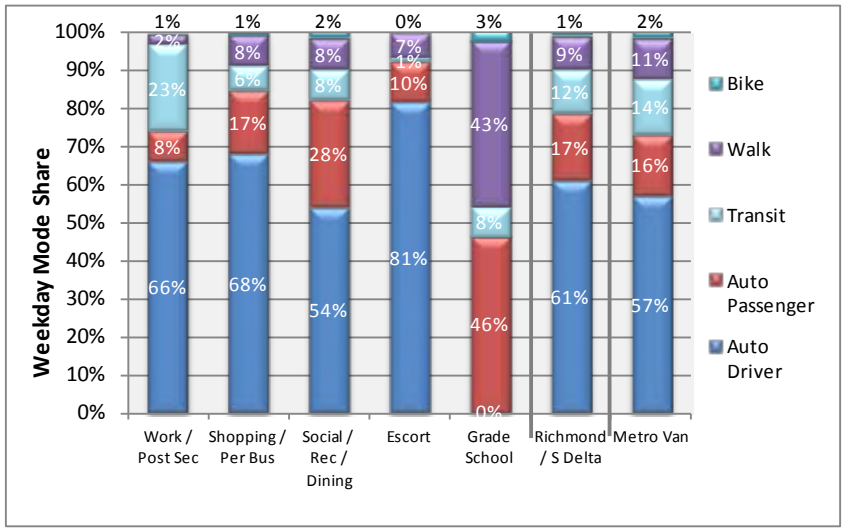


Figure 3.5.9 - Mode Share by Purpose (Richmond / S Delta)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by Richmond / South Delta residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.5.1**.

Table 3.5.1 - Weekday VKT (Richmond / S Delta)

	2008	2011
VKT (millions)	3.61	3.32
VKT per capita	15.8	14.0

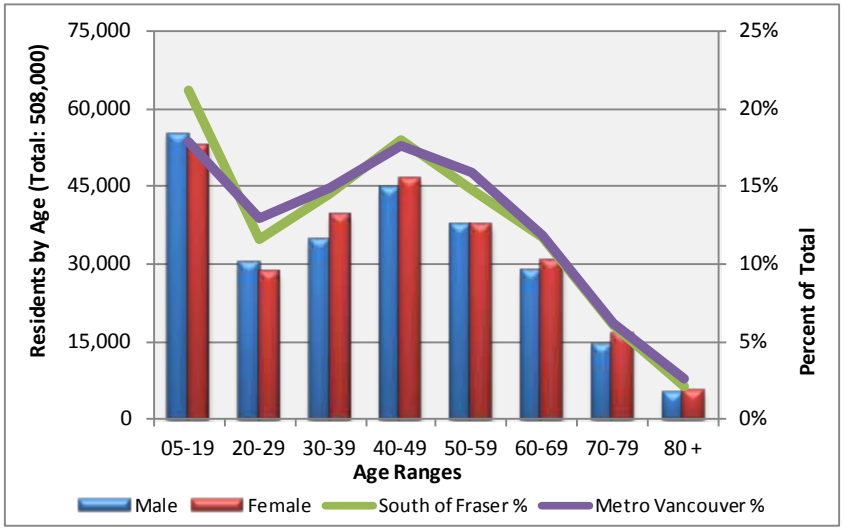
The decrease in VKT and VKT per capita is significant and is likely an outcome of the opening of the Canada Line.

3.6 SOUTH OF FRASER

The South of Fraser sub-region includes the municipalities of Surrey and White Rock, as well as north Delta. The age and gender profile of the sub-region is presented in **Figure 3.5.1**. The figure illustrates that:

- The South of Fraser sub-region has proportionally more persons in the 5 to 19 age range than Metro Vancouver and fewer who are in the 20 to 29 age range;
- More adult females reside on the South of Fraser than adult males, particularly in the 30 to 39 age range.

Figure 3.6.1 - Residents by Age and Gender (South of Fraser)



The distribution of residents by their employment status is presented in **Figure 3.6.2**. The figure shows that the South of Fraser has proportionally slightly more Full-Time Students than Metro Vancouver and slightly fewer Full-Time Workers and Non-Workers / Non-Students. **Figure 3.6.3** shows that the South of Fraser sub-region has proportionally more persons in households in the middle income ranges than Metro Vancouver with fewer in the lowest and highest ranges.

Figure 3.6.2 - Residents by Employment Status (South of Fraser)

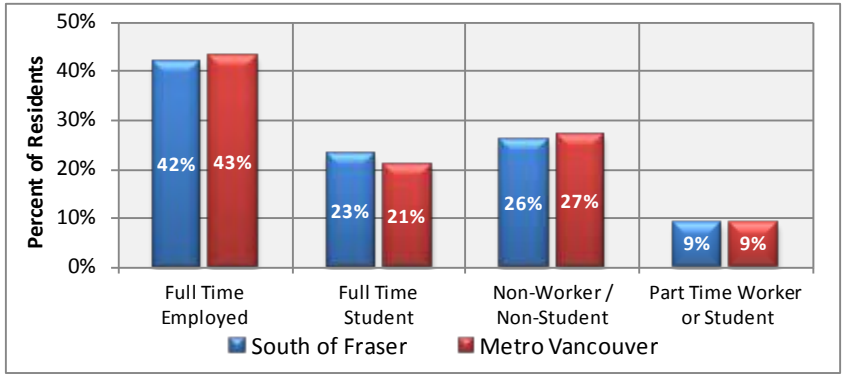
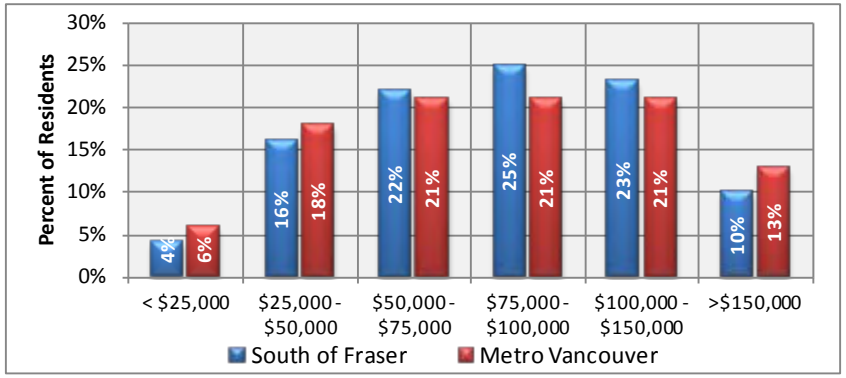
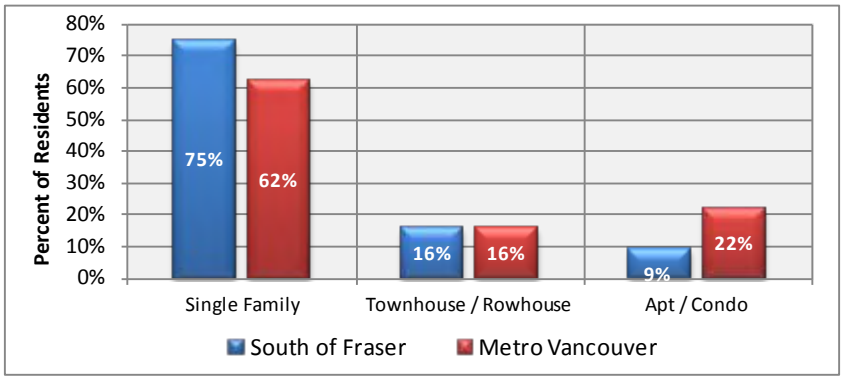


Figure 3.6.3 - Residents by Household Income (South of Fraser)



The South of Fraser sub-region has a higher proportion of persons in Single Family housing and fewer residents living in Apartments / Condos as compared with Metro Vancouver overall as illustrated in **Figure 3.6.4**.

Figure 3.6.4 - Residents by Housing Type (South of Fraser)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the South of Fraser sub-region (not including commercial or truck trips). **Figure 3.6.5a** shows that the large majority of trips (76%) originating in the South of Fraser sub-region stay there. The next largest proportion of trip destinations is the Langleys sub-region, with 6% of the weekday trips. The Vancouver / UEL, Burnaby / New Westminster, Richmond / South Delta sub-regions each account for a further 5% each. The remaining sub-regions account for up to 1% of the trip destinations each.

The percent of trips destined to each sub-region that were made for the five different trip purposes is presented in **Figure 3.6.5b**. Trips that remain in the South of Fraser sub-region are distributed across all trip purposes. Trips to the other sub-regions in Metro Vancouver were primarily for the Work / Post Secondary purpose.

The weekday mode shares for trips from the South of Fraser sub-region to each sub-region are presented in **Figure 3.6.5c**. As expected the Walk mode has a significant share only for trips that are internal to the sub-region. Transit mode share is highest for trips to the Vancouver / UEL sub-region (45%) but only 4% for trips that remain in the sub-region. The Auto Passenger mode is most used for local trips. From a transit planning perspective, even though Transit mode share is highest for trips going to Vancouver / UEL, it is important to note that they have an impact on the local transit trips as they feed the long haul services (e.g. SkyTrain). More importantly, because of the high number of trips that remain in the sub-region, the absolute number of Transit trips that stay in the sub-region is higher than the number of Transit trips destined to the Vancouver / UEL sub-region.

The overall weekday mode share is primarily a function of internal trips within the sub-region since they account for 76% of the daily trips originating from the South of Fraser sub-region.

The remaining analysis of the South of Fraser sub-region examines the characteristics of trips made by the residents of the sub-region. As previously presented in **Figure 3.0.1b** South of Fraser residents have a weekday trip rate of 2.69, a trip rate somewhat lower than the overall trip rate of Metro Vancouver residents (2.77) and they made an estimated 1.37 million trips during a typical fall weekday in 2011. The lower trip rate is consistent with the higher proportion of children in the sub-region.

Figure 3.6.5a - Daily Trips to Sub-Regions

Figure 3.6.5b - Trip Purpose to Sub-Regions

Figure 3.6.5c - Weekday Mode Share to Sub-Regions

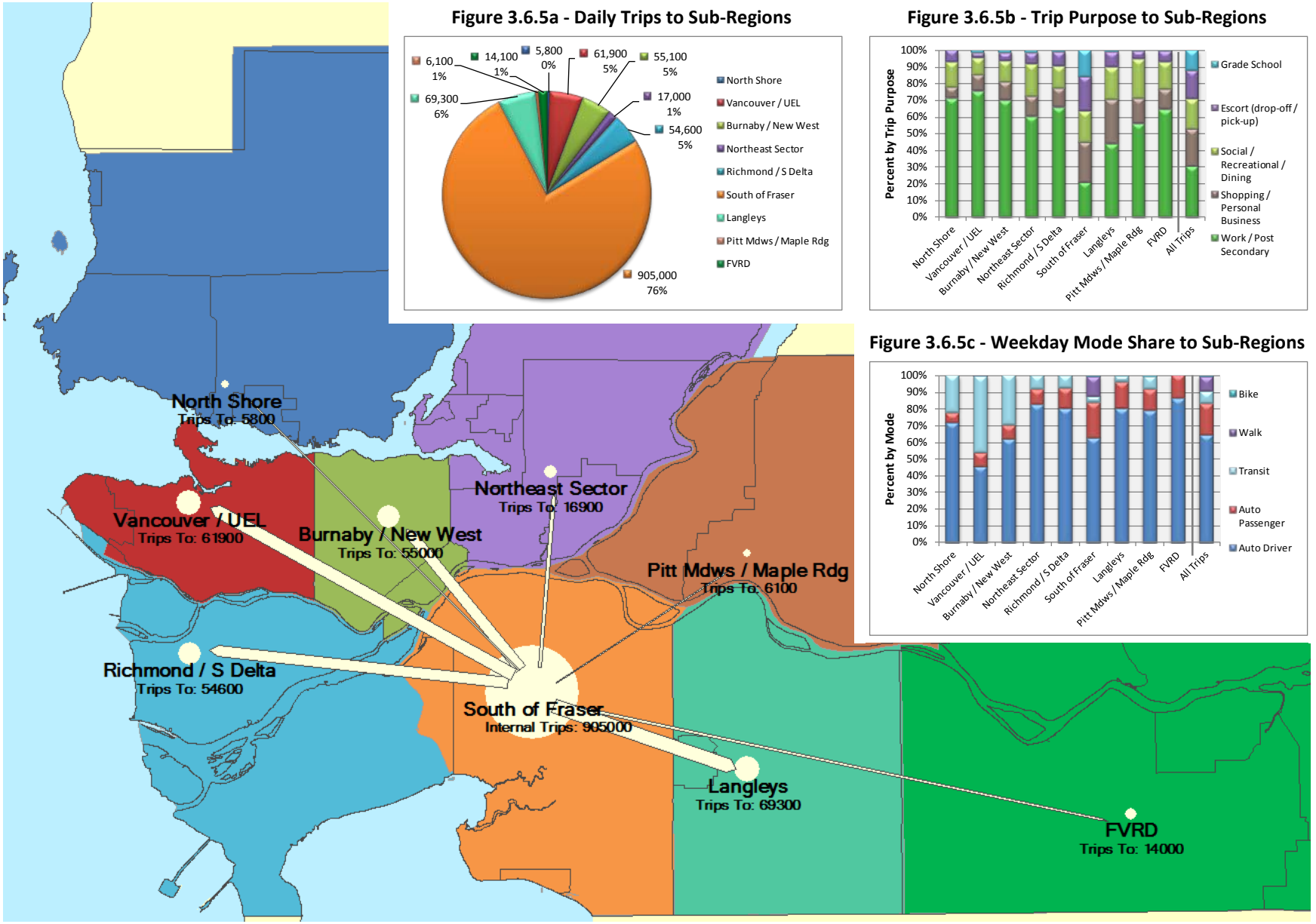
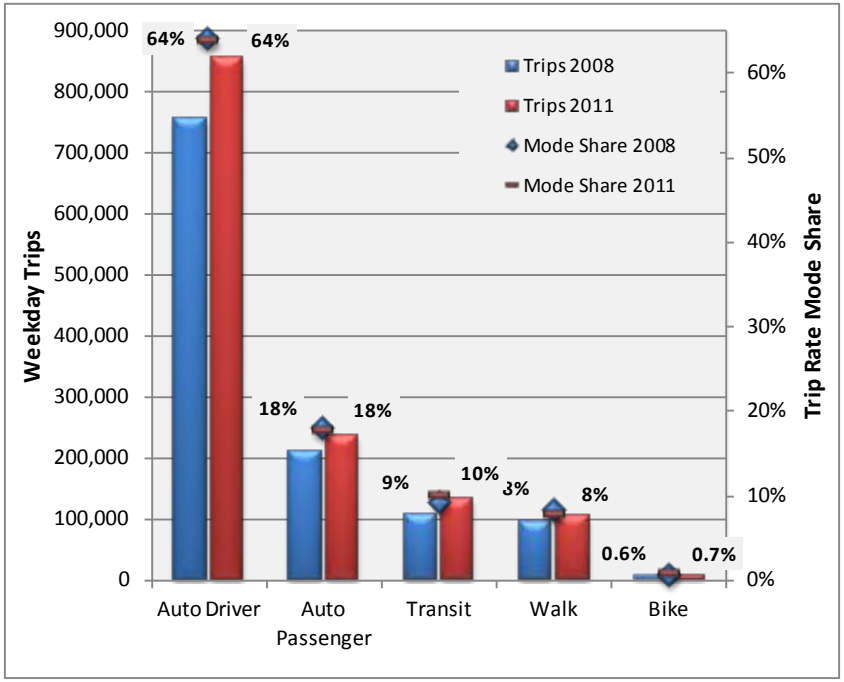


Figure 3.6.5 - Trip Distribution by Sub-Region of Trip Origin (South of Fraser)

The number of daily trips by South of Fraser residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.6.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.6.6 - Trips by Mode (South of Fraser)

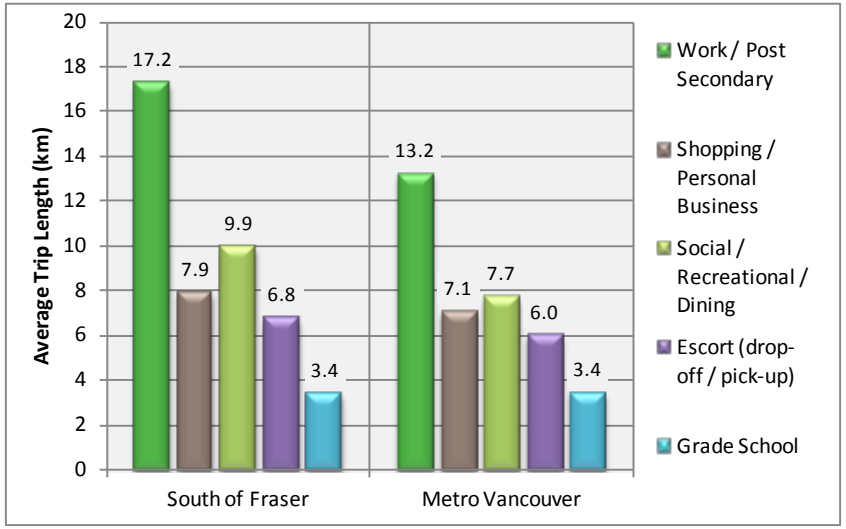


Note: Mode shares may not add to 100% due to rounding.

Overall the number of trips made by South of Fraser residents has increased at a faster pace than population growth. Auto driver trips have increased at a rate similar to the growth in total trips resulting in a stable Auto Driver mode share; however, since the sub-region's population was almost 11% higher in 2011 than 2008, Auto Driver trips increased by 90,000. Transit trips have increase at a faster rate, resulting in an increase in Transit mode share. The numbers of Auto Passenger and Walk trips have increased at a rate slightly below the rate of increase in all trips over the time period between the two surveys.

The average trip lengths for residents of the South of Fraser sub-region are presented in **Figures 3.6.7 and 3.6.8** by trip purpose and mode respectively. Trip lengths for all purposes are longer than the Metro Vancouver averages. In particular, Work / Post Secondary trips are 30% longer. Similarly to other sub-regions, trip lengths are longest for the Work / Post Secondary purpose and shortest for Grade School trips.

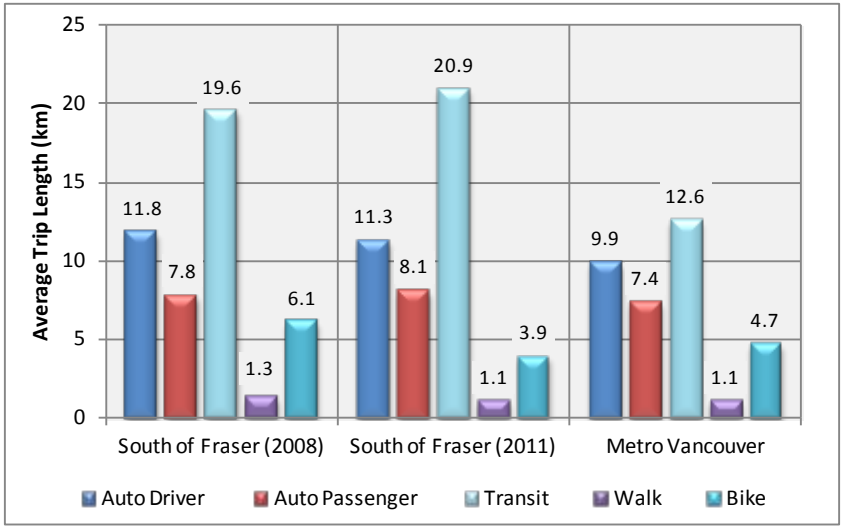
Figure 3.6.7 - Average Trip Length by Trip Purpose (South of Fraser)



Walk trips are the shortest and similar in length to Walk trips across Metro Vancouver. Transit trips are the longest and about 65% longer than the Metro Vancouver average; this may reflect the geography of the region, especially the impact of transit travel to the Metropolitan Core. The average trip lengths for the auto modes are also higher than

the Metro Vancouver averages. Compared to 2008, there has been a slight decrease in average Auto Driver trip length and a slight increase in average Transit trip length.

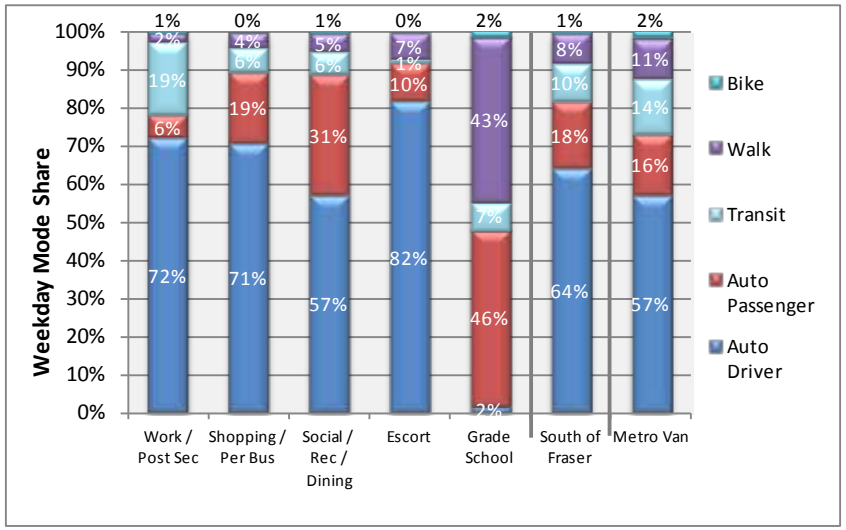
Figure 3.6.8 - Average Trip Length by Mode (South of Fraser)



The weekday mode shares for the South of Fraser sub-region are presented in **Figure 3.6.9**. Key characteristics illustrated in these charts include:

- South of Fraser residents are more likely to drive and less likely to walk or take transit relative to Metro Vancouver residents overall;
- Escort trips in particular are predominately auto-oriented;
- Transit mode share is highest for Work / Post Secondary trips accounting for 19% of the trips.

Figure 3.6.9 - Mode Share by Purpose (South of Fraser)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by South of Fraser residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.6.1**.

Table 3.6.1 - Weekday VKT (South of Fraser)

	2008	2011
VKT (millions)	8.96	9.67
VKT per capita	18.4	17.8

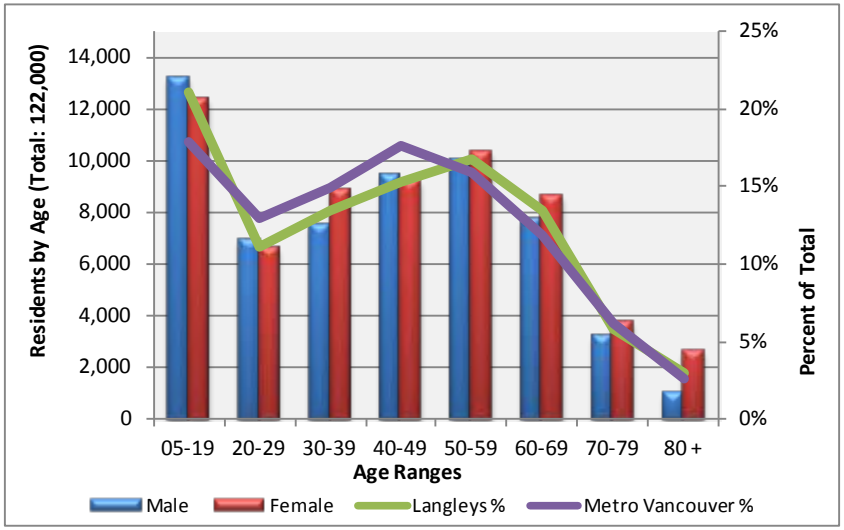
Although overall VKT has increased due to population growth, the VKT per capita has decreased because of the reduction in the average Auto Driver trip distances in the sub-region.

3.7 LANGLEYS

The Langleys sub-region includes the municipalities Langley City and Langley Township. The age and gender profile of the sub-region is presented in **Figure 3.7.1**. The figure illustrates that:

- The Langleys sub-region has proportionally more persons in the 5 to 19 age range than Metro Vancouver and fewer who are in the 20 to 49 age ranges;
- More adult females reside in the Langleys sub-region than adult males, particularly in the 30 to 39 age range.

Figure 3.7.1 - Residents by Age and Gender (Langleys)



The distribution of residents by their employment status is presented in **Figure 3.7.2**. The figure shows that the Langleys sub-region has proportionally slightly more Full-Time Students and Non-Workers / Non-Students than Metro Vancouver and slightly fewer Full-Time Workers. **Figure 3.7.3** shows that the Langleys sub-region has proportionally more persons in households in the middle income ranges than Metro Vancouver with fewer in the lowest and highest ranges.

Figure 3.7.2 - Residents by Employment Status (Langleys)

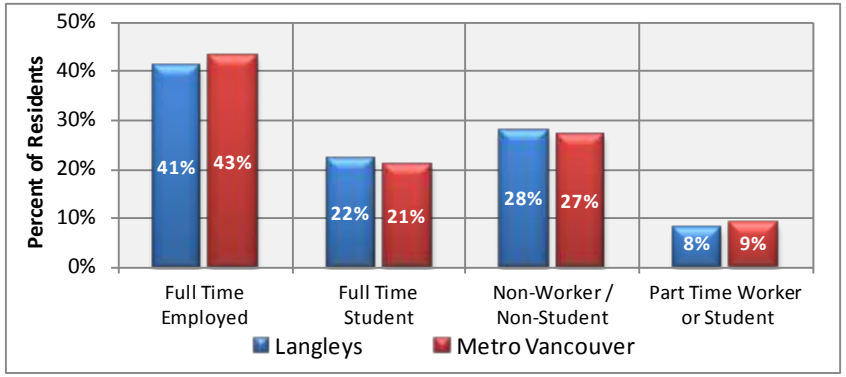
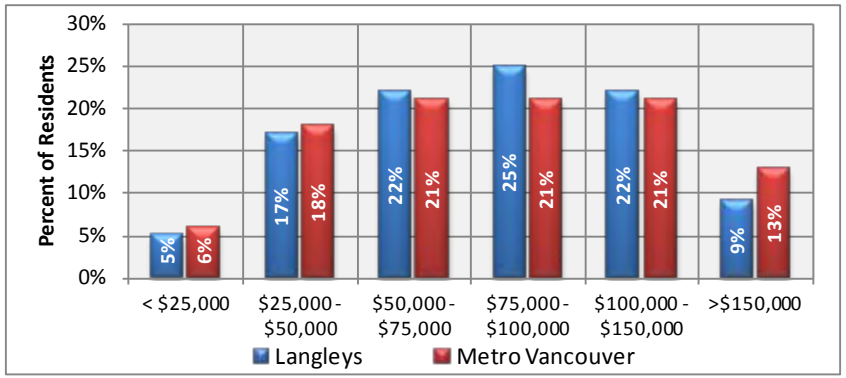
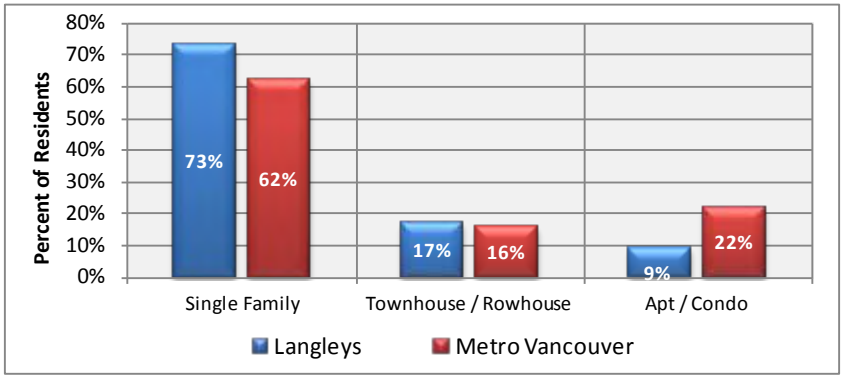


Figure 3.7.3 - Residents by Household Income (Langleys)



The Langleys sub-region also has a higher proportion of persons in single family housing and fewer residents living in apartments / condos as compared with Metro Vancouver overall as illustrated in **Figure 3.7.4**.

Figure 3.7.4 - Residents by Housing Type (Langleys)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the Langleys sub-region (not including commercial or truck trips). **Figure 3.7.5a** shows that the majority of trips (65%) originating in the Langleys stay in the sub-region. The next largest proportion of trip destinations is the South of Fraser sub-region with 18% of weekday trips. The FVRD sub-region accounts for a further 7%. The remaining sub-regions each account for only 1% to 2% of trip destinations. It is interesting to note that more trips are destined for the FVRD than the whole of the Burrard Peninsula and Northeast Sector combined.

The percent of trips destined for each sub-region that were made for the five different trip purposes is presented in **Figure 3.7.5b**. Trips that remain in the Langleys sub-region were widely distributed across all trip purposes, but the share of the Work / Post Secondary trips is particularly low (less than 20%). Trips to the other sub-regions in Metro Vancouver were primarily for the Work / Post Secondary purpose. As indicated earlier, in cases where trips volumes to a sub-region are low, trip purpose distributions may not accurately represent actual patterns.

The weekday mode shares for trips from the Langleys sub-region to each sub-region are presented in **Figure 3.7.5c**. As expected the Walk mode has a significant share only for trips that are internal to the sub-region. Transit mode share is highest for trips to Vancouver / UEL (19%) but only 2% for trips that remain in the sub-region. The low Transit mode share for trips that remain in the sub-region may be related to a dispersed trip pattern and the lack of strong transit corridors in the Langleys. The Auto Passenger mode is most used for local trips.

The overall weekday mode share is primarily a function of trips within the sub-region and to South of Fraser destinations since these sub-regions combined account for 83% of the daily trips originating from the Langleys sub-region.

The remaining analysis of the Langleys sub-region examines the characteristics of trips made by residents of the sub-region. As previously presented in **Figure 3.0.1b** the Langleys sub-region residents have a weekday trip rate of 3.00, the highest trip rate of all sub-regions and they made an estimated 365,000 trips during a typical fall weekday in 2011.

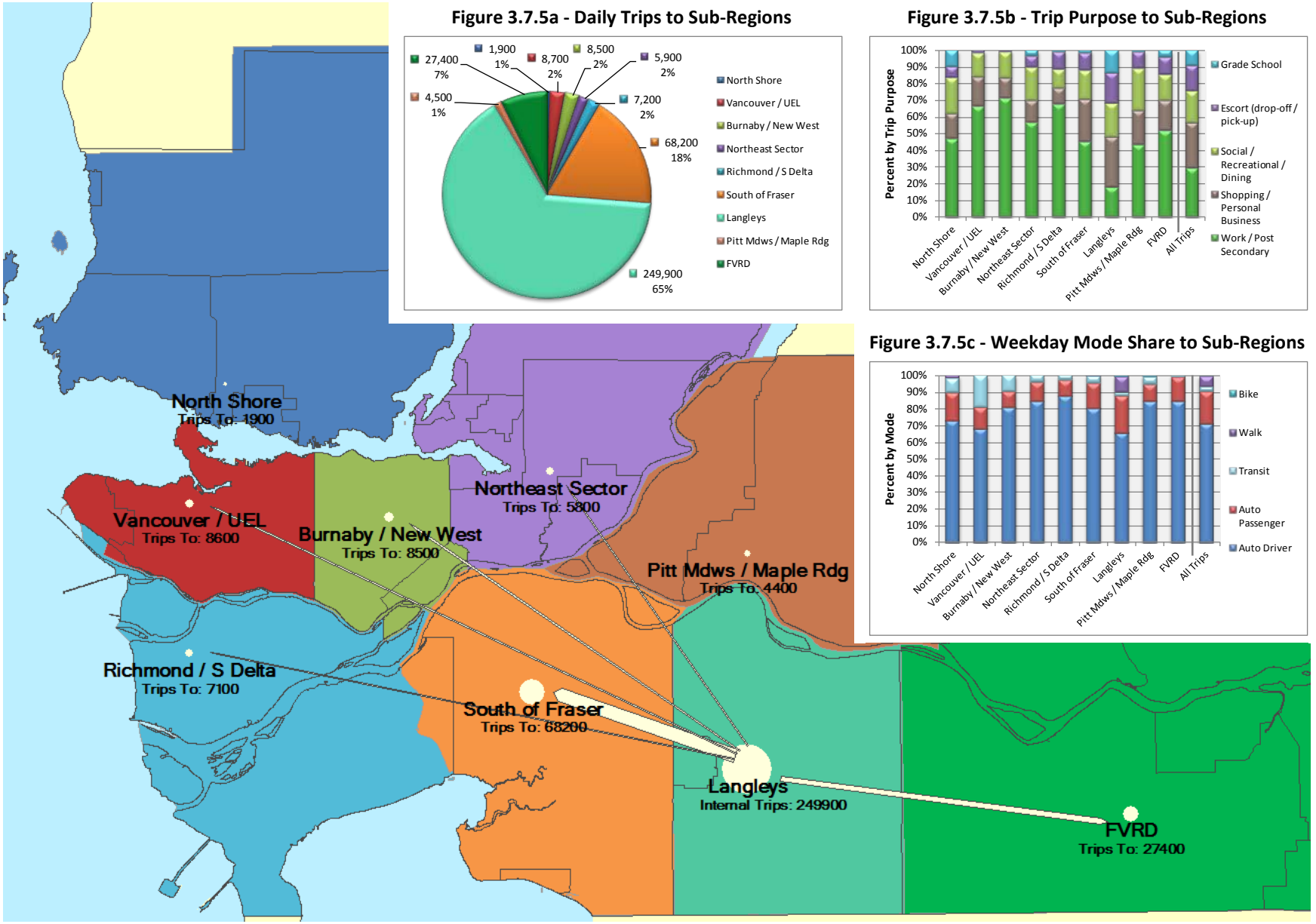


Figure 3.7.5a - Daily Trips to Sub-Regions

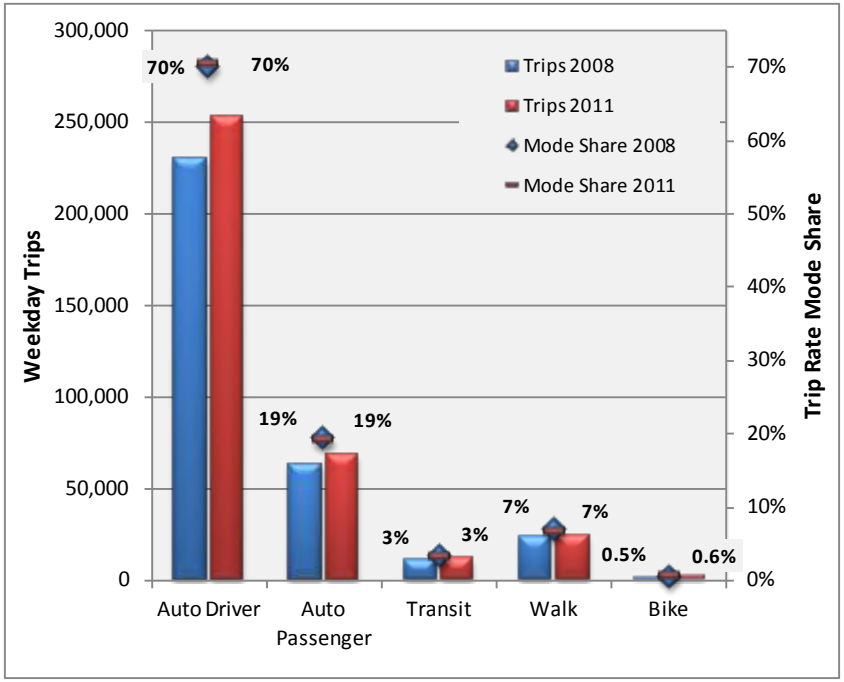
Figure 3.7.5b - Trip Purpose to Sub-Regions

Figure 3.7.5c - Weekday Mode Share to Sub-Regions

Figure 3.7.5 - Trip Distribution by Sub-Region of Trip Origin (Langleys)

The number of daily trips by sub-regional residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.7.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.7.6 - Trips by Mode (Langleys)



Note: Mode shares may not add to 100% due to rounding.

Overall the number of trips made by Langleys sub-region residents has increased at a rate somewhat higher than population growth due to a higher overall trip rate in 2011 versus 2008. However, mode shares have remained relatively constant.

The average trip lengths for residents of the Langleys sub-region are presented in **Figures 3.7.7 and 3.7.8** by trip purpose and mode respectively. Trip lengths are longest for the Work / Post Secondary purpose and shortest for Grade School trips. Trip lengths for all purposes are longer than the Metro Vancouver averages. In particular, Work / Post Secondary trips are about 40% longer.

As in other sub-regions, Walk trips are the shortest. Transit trips are the longest and about 90% longer than the Metro Vancouver average; this may reflect the geography of the region and the impact of transit travel to the Metropolitan Core. The average trip lengths for the auto modes are also higher than the Metro Vancouver averages. Between the 2008 and 2011 Trip Diaries, there has been a significant increase in average Transit trip length.

The weekday mode shares for the Langleys sub-region are presented in **Figure 3.7.9**. Key characteristics illustrated in these charts include:

- Langleys sub-region residents are more likely to drive and less likely to walk or take transit relative to Metro Vancouver residents overall;
- Auto passenger mode share is higher than the Metro Vancouver average;
- Transit mode share is highest for Work / Post Secondary trips but only accounts for 6% of these trips.

Figure 3.7.7 - Average Trip Length by Trip Purpose (Langleys)

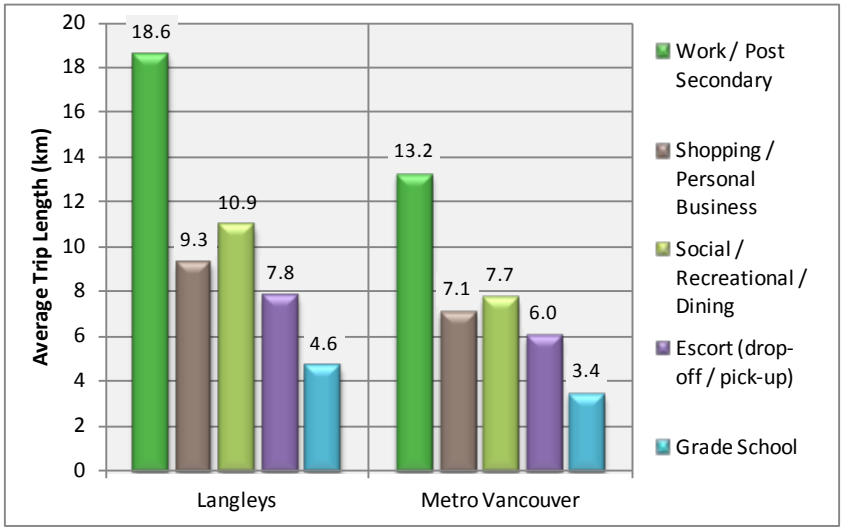


Figure 3.7.8 - Average Trip Length by Mode (Langleys)

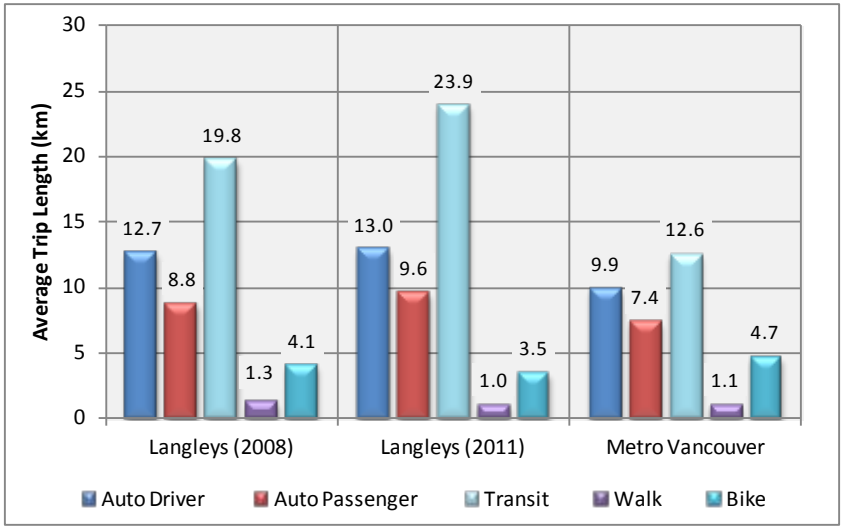
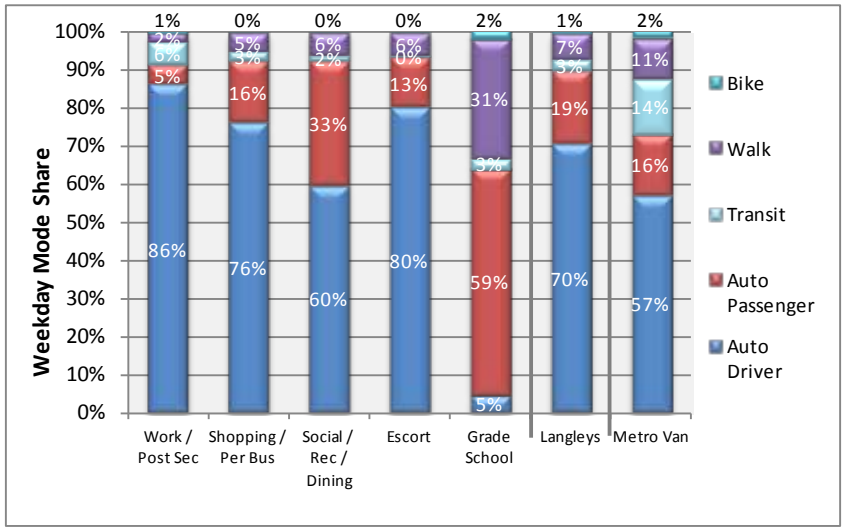


Figure 3.7.9 - Mode Share by Purpose (Langleys)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by Langleys sub-region residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.7.1**.

Table 3.7.1 - Weekday VKT (Langleys)

	2008	2011
VKT (millions)	2.91	3.28
VKT per capita	23.6	25.2

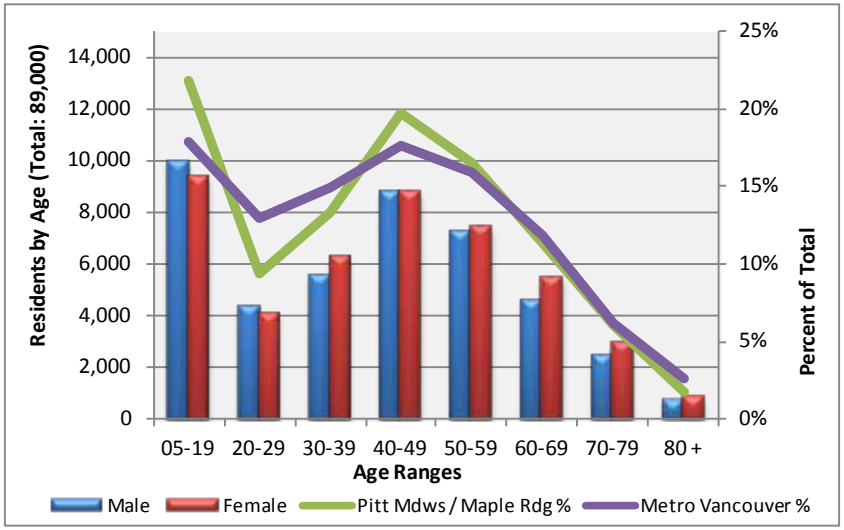
Overall VKT has increased due to population growth and a higher trip rate; in addition, the VKT per capita has increased also due to the higher trip rates and the longer Auto Driver trips.

3.8 PITT MEADOWS / MAPLE RIDGE

The Pitt Meadows / Maple Ridge sub-region includes the municipalities Pitt Meadows and Maple Ridge and First Nations communities in the area. The age and gender profile of the sub-region is presented in **Figure 3.8.1**. The figure illustrates that:

- The Pitt Meadows / Maple Ridge sub-region has an age profile that is different from that of Metro Vancouver;
- There are proportionally more children in the sub-region than in Metro Vancouver overall;
- There are proportionally fewer young adults (age 20 to 39) and more adults in the 40 to 49 age bracket.

Figure 3.8.1 - Residents by Age and Gender (Pitt Mdws / Maple Rdg)



The distribution of residents by their employment status is presented in **Figure 3.8.2**. The figure shows that the Pitt Meadows / Maple Ridge sub-region has a distribution that is very similar to Metro Vancouver.

Given that the employment status in the Pitt Meadows / Maple Ridge is similar to that of Metro Vancouver overall, similar trip rates would be expected; however, **Figure 3.8.3** shows that the Pitt Meadows / Maple Ridge sub-region has proportionally more persons in households with higher income than Metro Vancouver. This would tend to increase the average trip rate.

Figure 3.8.2 - Residents by Employment Status (Pitt Mdws / Maple Rdg)

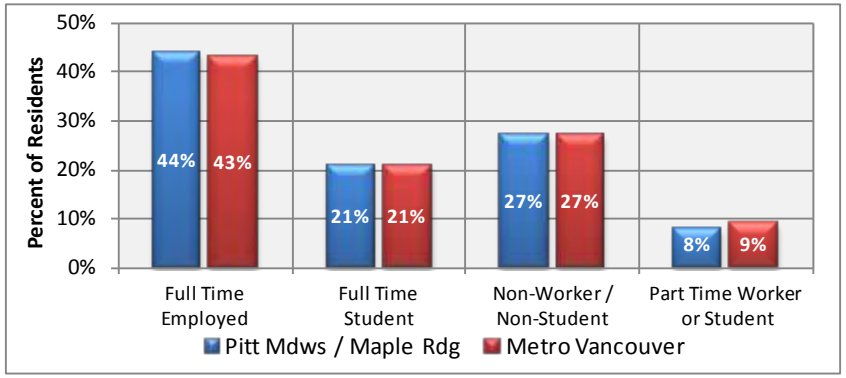
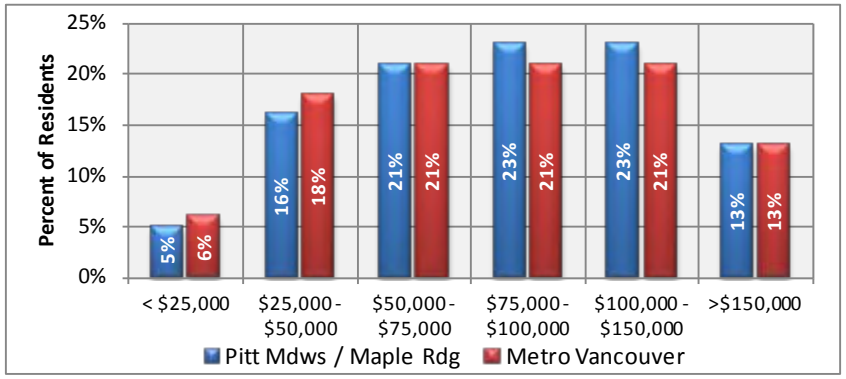
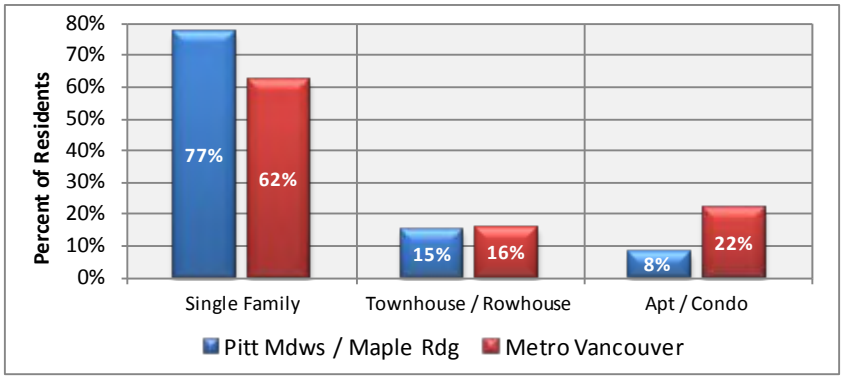


Figure 3.8.3 - Residents by Household Income (Pitt Mdws / Maple Rdg)



The Pitt Meadows / Maple Ridge sub-region also has a higher proportion of persons in single family housing and fewer in apartments / condos as compared with Metro Vancouver overall as illustrated in **Figure 3.8.4**.

Figure 3.8.4 - Residents by Housing Type (Pitt Mdws / Maple Rdg)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the Pitt Meadows / Maple Ridge sub-region (not including commercial or truck trips). **Figure 3.8.5a** shows that the majority of trips (72%) originating in the Pitt Meadows / Maple Ridge sub-region stay in the sub-region. The next largest proportion of trip destinations is the Northeast Sector, with 9% of weekday trips. The remaining sub-regions each account for 1% to 4% of the trip destinations.

The percent of trips destined for each sub-region that were made for the five different trip purposes is presented in **Figure 3.8.5b**. Trips that remain in the Pitt Meadows / Maple Ridge sub-region are widely distributed across all trip purposes, except Work / Post Secondary trips have a particularly low share (less than 15%). Trips to the other sub-regions in Metro Vancouver were primarily for the Work / Post Secondary purpose. Most Grade School trips stay in the sub-region.

The weekday mode shares for trips from the Pitt Meadows / Maple Ridge sub-region to each sub-region are presented in **Figure 3.8.5c**. As expected the Walk mode has a significant share only for trips that are internal to the sub-region. Transit mode share is highest for trips to the Vancouver / UEL sub-region. The Auto Passenger mode is most used for local trips. The overall weekday mode share is primarily a function of trips to the Pitt Meadows / Maple Ridge sub-region and Northeast Sector destinations since these sub-regions account for 81% of the daily trips originating from the Pitt Meadows / Maple Ridge sub-region.

The remaining analysis of the Pitt Meadows / Maple Ridge sub-region examines the characteristics of trips made by the residents of the sub-region. As previously presented in **Figure 3.0.1b** Pitt Meadows / Maple Ridge sub-region residents have a weekday trip rate of 2.84, the third highest trip rate of sub-regions in Metro Vancouver and they made an estimated 252,000 trips during a typical fall weekday in 2011.

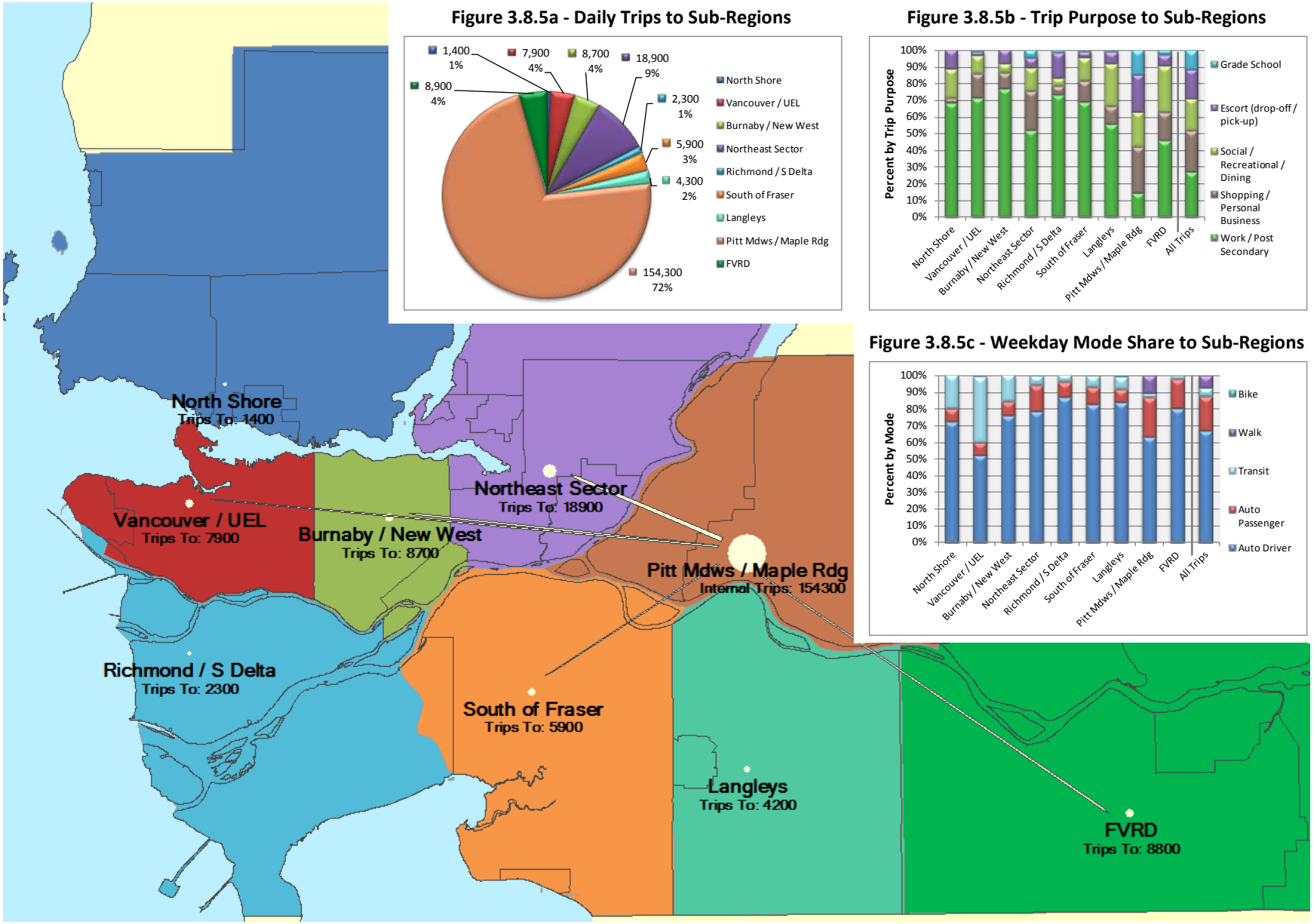


Figure 3.8.5a - Daily Trips to Sub-Regions

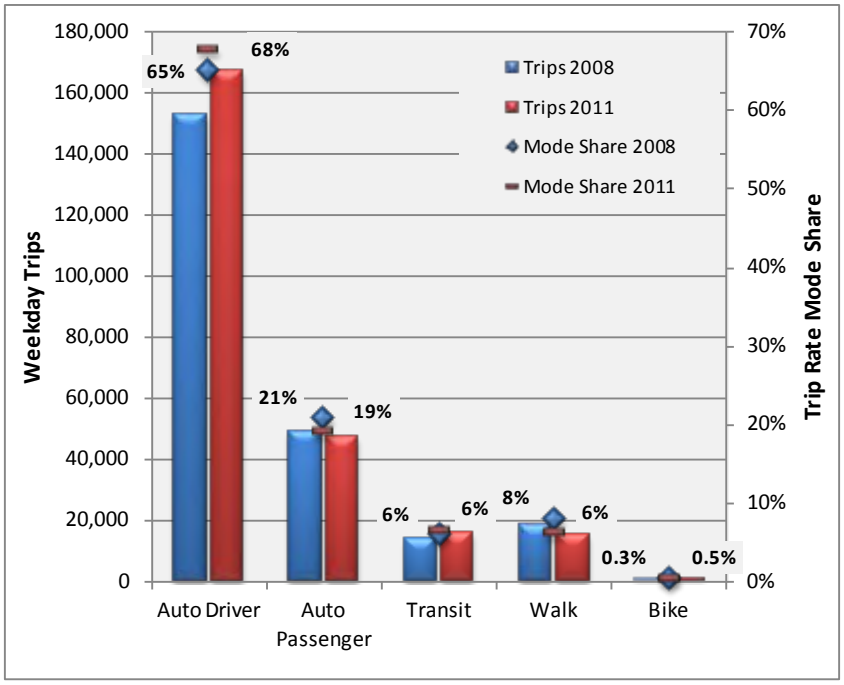
Figure 3.8.5b - Trip Purpose to Sub-Regions

Figure 3.8.5c - Weekday Mode Share to Sub-Regions

Figure 3.8.5 - Trip Distribution by Sub-Region of Trip Origin (Pitt Mdws / Maple Rdg)

The number of daily trips by Pitt Meadows / Maple Ridge residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.8.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.8.6 - Trips by Mode (Pitt Mdws / Maple Rdg)

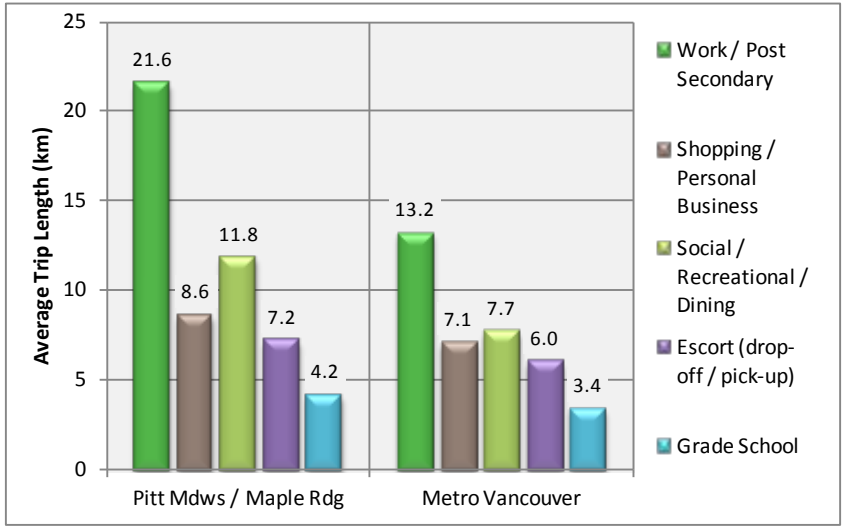


Note: Mode shares may not add to 100% due to rounding.

Overall the number of trips made by Pitt Meadows / Maple Ridge residents has increased at a pace similar to population growth. Auto driver trips have increased at a faster rate than the Auto Passenger and Walk modes resulting in an increase in Auto Driver mode share. Bike mode share has increased, but remains under 1%. The high proportion of Auto Drivers may reflect the demographics and geography of the sub-region: more individuals in the prime commuting age ranges, more high income households than the Metro Vancouver proportions, and more persons in single family housing.

The average trip lengths for residents of the Pitt Meadows / Maple Ridge are presented in **Figures 3.8.7 and 3.8.8** by trip purpose and mode respectively. Trip lengths for all purposes are longer than the Metro Vancouver averages; most notably both Work / Post Secondary, and Social / Recreational / Dinning trips are more than 50% longer than the regional average.

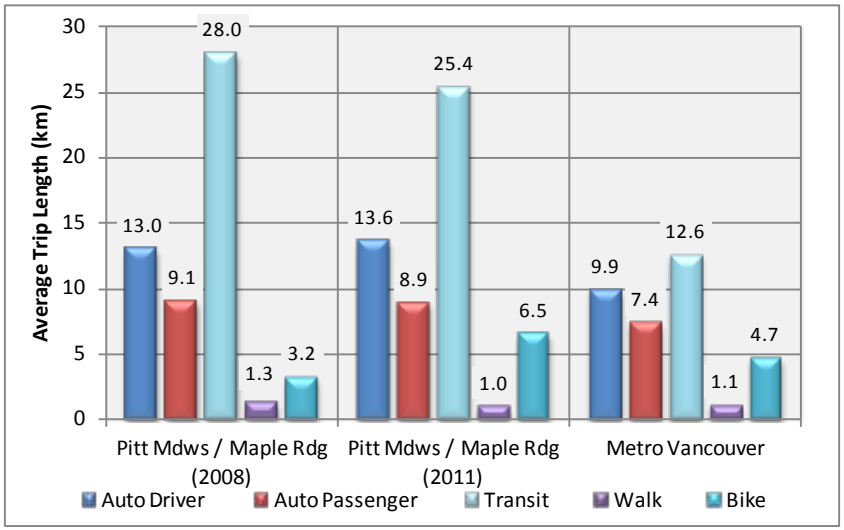
Figure 3.8.7 - Average Trip Length by Trip Purpose (Pitt Mdws / Maple Rdg)



As with all sub-regions, Walk trips are the shortest. Transit trips are the longest and are 100% longer than the Metro Vancouver average, reflecting in part the impact of the West Coast Express service in the sub-region. Auto driver and Auto Passenger trips are also longer for Pitt Meadows / Maple Ridge residents as compared to Metro Vancouver overall. Bicycle trips are longer than the Metro Vancouver

average, perhaps because the Metro Vancouver average is skewed by the heavier Bike use in the Vancouver / UEL sub-region with generally shorter trip lengths. Generally, average trip lengths by mode were relatively stable between 2008 and 2011 except for a decrease in Transit lengths. Given the very low volume of Bike trips the change in Bike trip length may not be meaningful.

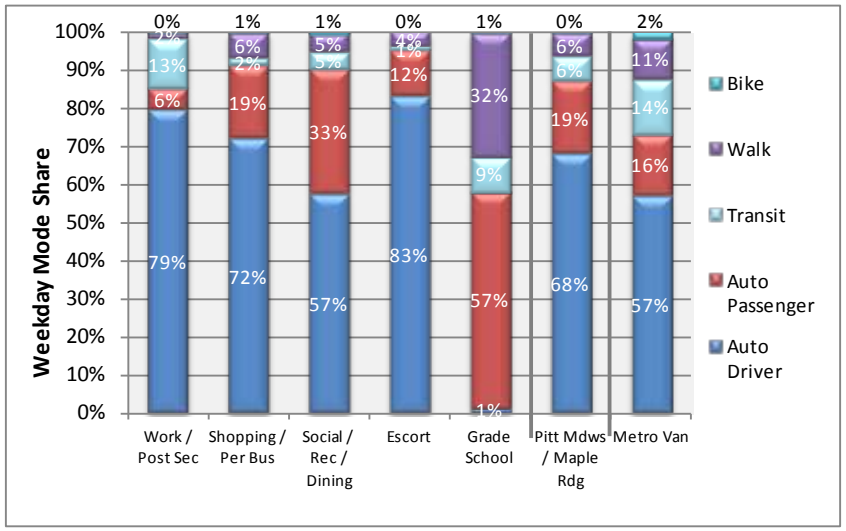
Figure 3.8.7 - Average Trip Length by Mode (Pitt Mdws / Maple Rdg)



The weekday mode shares for the Pitt Meadows / Maple Ridge sub-region are presented in **Figure 3.8.9**. Key characteristics illustrated in this chart include:

- Pitt Meadows / Maple Ridge residents are more likely to drive and less likely to take transit or walk relative to Metro Vancouver residents overall;
- Escort trips in particular are predominately auto-oriented;
- Transit mode share is highest for Work / Post Secondary trips accounting for 13% of the trips.

Figure 3.8.9 - Mode Share by Purpose (Pitt Mdws / Maple Rdg)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by Pitt Meadows / Maple Ridge residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.8.1**.

Table 3.8.1 - Weekday VKT (Pitt Mdws / Maple Rdg)

	2008	2011
VKT (millions)	2.00	2.28
VKT per capita	22.3	24.3

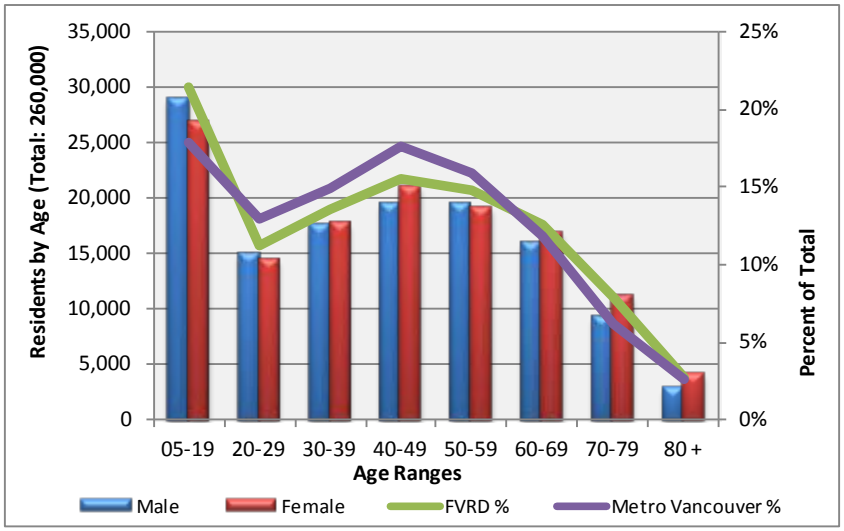
The increase in VKT and VKT per capita is consistent with population growth and the higher mode share for Auto Driver trips as well as the increase in the Auto Driver mode share.

3.9 Fraser Valley Regional District

The Fraser Valley sub-region includes all of the larger municipalities in the Fraser Valley Regional District including Abbotsford, Chilliwack, Mission, and Hope as well as almost all of the smaller communities (the survey area included over 99% of FVRD residents). The age and gender profile of the sub-region is presented in **Figure 3.9.1**. The figure illustrates that:

- The FVRD has proportionally more persons in the 5 to 19 age range than Metro Vancouver and fewer who are in the 20 to 59 age range.

Figure 3.9.1 - Residents by Age and Gender (Fraser Valley)



The distribution of residents by their employment status is presented in **Figure 3.9.2**. The figure shows that the Fraser Valley has proportionally more Non-Workers / Non-Students than Metro Vancouver and fewer Full-Time Workers. **Figure 3.9.3** shows that the Fraser Valley sub-region has proportionally more persons in households in the lower middle income ranges than Metro Vancouver with fewer in the highest ranges.

Figure 3.9.2 - Residents by Employment Status (Fraser Valley)

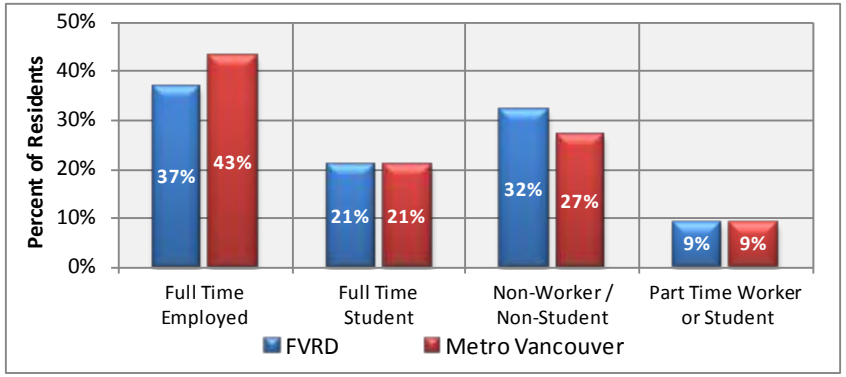
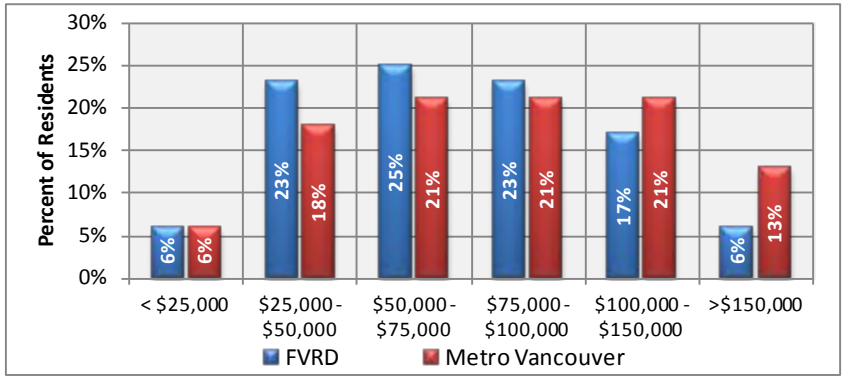
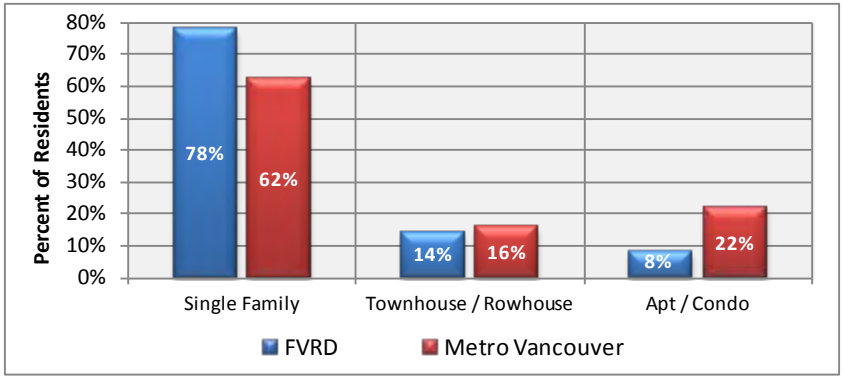


Figure 3.9.3 - Residents by Household Income (Fraser Valley)



The Fraser Valley has a higher proportion of persons in single family housing and fewer residents living in apartments / condos as compared with Metro Vancouver overall as illustrated in **Figure 3.9.4**.

Figure 3.9.4 - Residents by Housing Type (Fraser Valley)



The map and charts on the following page illustrate the patterns for all weekday trips made by Lower Mainland residents originating from the Fraser Valley Sub-Region (these trips do not include commercial or truck trips). **Figure 3.9.5a** shows that the large majority of trips (90%) originating in the Fraser Valley stay in the sub-region. The next largest proportion of trip destinations is the Langleys sub-region with 4% of the weekday trips. The remaining sub-regions each account for up to 2% of the trip destinations. Only 1% of the trips from the Fraser Valley are destined to the Vancouver / UEL sub-region, probably due to the large distance between these two areas.

The percent of trips destined for the Metro Vancouver sub-regions by trip purpose is presented in **Figure 3.9.5b**. Trips that remain in the Fraser Valley are widely distributed across all trip purposes; however, trips to Metro Vancouver were primarily for the Work / Post Secondary purpose.

The weekday mode shares for trips from the Fraser Valley to the Metro Vancouver sub-regions are presented in **Figure 3.9.5c**. As expected the Walk mode has a significant share only for trips that are internal to the Fraser Valley. Transit mode share is highest for trips to the Vancouver / UEL sub-region (22%) but only 1.4% for trips that remain in the Fraser Valley. The Auto Passenger mode is used across all trip destinations. The overall weekday mode share is primarily a function of trips internal to the Fraser Valley since these trips account for 90% of all trips originating there.

The remaining analysis of the Fraser Valley examines the characteristics of trips made by the residents of that region. As previously presented in **Figure 3.0.1b** Fraser Valley residents have a weekday trip rate of 2.93, third highest in the study area after the Langleys and North Shore sub-regions and they made an estimated 762,000 trips during a typical fall weekday in 2011.

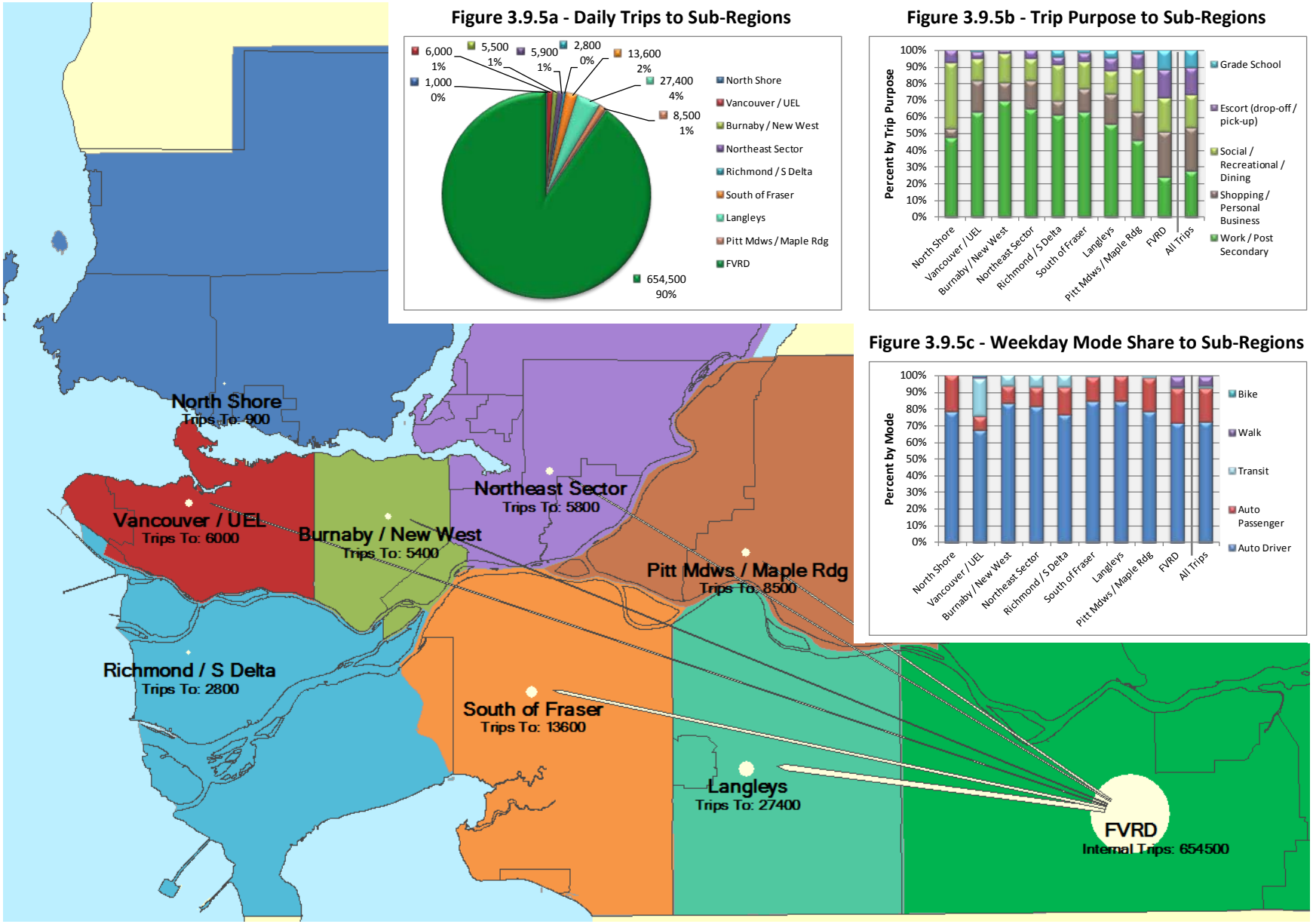


Figure 3.9.5a - Daily Trips to Sub-Regions

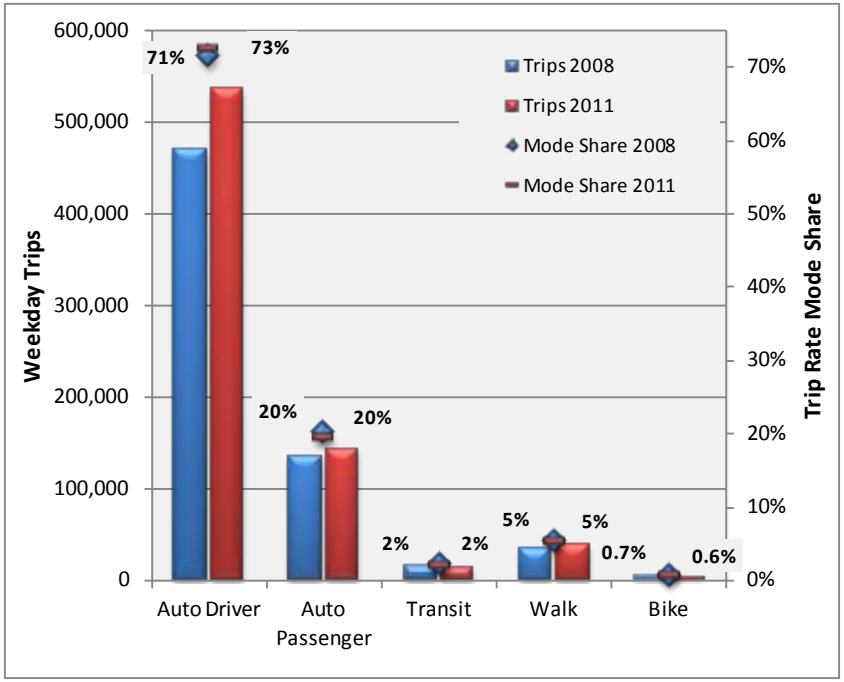
Figure 3.9.5b - Trip Purpose to Sub-Regions

Figure 3.9.5c - Weekday Mode Share to Sub-Regions

Figure 3.9.5 - Trip Distribution by Sub-Region of Trip Origin (Fraser Valley)

The number of daily trips by Fraser Valley residents by mode based on the 2008 and 2011 Trip Diaries is presented in **Figure 3.9.6**. The figure also provides the mode shares based on the two surveys.

Figure 3.9.6 - Trips by Mode (Fraser Valley)



Note: Mode shares may not add to 100% due to rounding.

Overall the number of trips made by Fraser Valley residents has increased at a rate higher than population growth. Trips for all modes have increased at a rate similar to the growth in total trips resulting in relatively stable mode shares. The 2008 results were factored up to reflect similar coverage to that of the 2011 Trip Diary (the 2011 survey covered a larger area than the 2008 survey). Nevertheless, the trip rate in 2011 was higher than the rate in 2008.

The average trip lengths for residents of the Fraser Valley are presented in **Figures 3.9.7 and 3.9.8** by trip purpose and mode respectively. Trip lengths for all purposes are longer than the Metro Vancouver averages, reflecting in part the more dispersed pattern of development in the area. In particular, Work / Post Secondary trips are 50% longer and Grade School trips are 65% longer.

Walk trips are the shortest and are only slightly longer than Walk trips across Metro Vancouver. Transit trips are the longest and about 80% longer than the Metro Vancouver average; this may reflect the impact of transit travel to Metro Vancouver via the West Coast Express. Average Transit trip length increased substantially between 2008 and 2011. Since the FVRD sub-region includes Mission and since Transit trips on the West Coast Express from Mission to downtown are over 70 km in length, this increase in Transit trip length may be related to how many of these trips were captured in the respective Trip Diary Surveys. The average trip length for the Auto Driver mode is about 35% higher than the Metro Vancouver average.

The weekday mode shares for the Fraser Valley sub-region are presented in **Figure 3.9.9**. Key characteristics illustrated in these charts include:

- Fraser Valley residents are more likely to drive and much less likely to walk or take transit relative to Metro Vancouver residents;
- Work / Post Secondary trips in particular are predominately auto-driver oriented;
- Transit mode share is highest for Work / Post Secondary trips accounting for 4% of the trips.

Figure 3.9.7 - Average Trip Length by Trip Purpose (Fraser Valley)

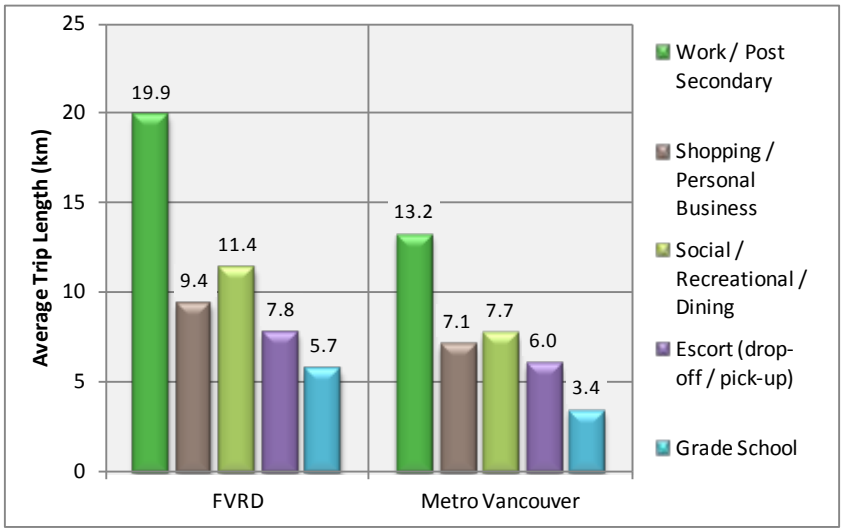


Figure 3.9.8 - Average Trip Length by Mode (Fraser Valley)

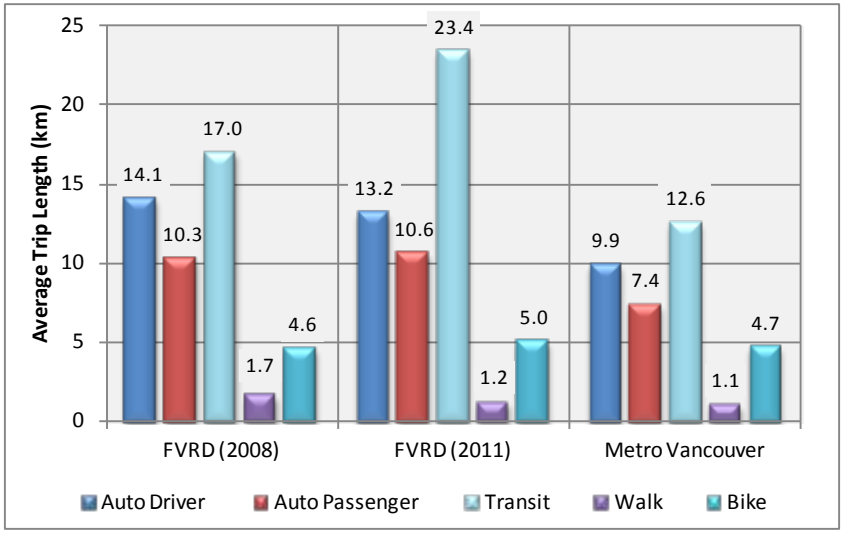
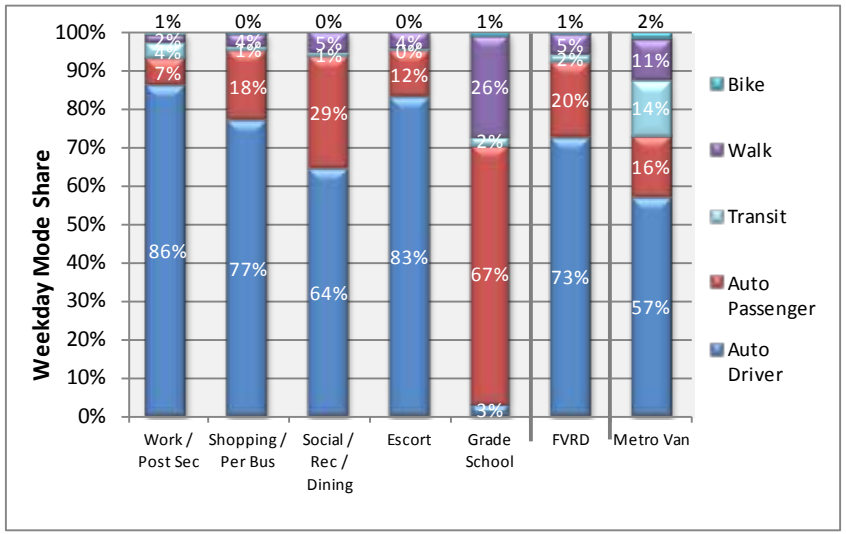


Figure 3.9.9 - Mode Share by Purpose (Fraser Valley)



Note: Mode shares may not add to 100% due to rounding.

The average trip length for Auto Driver trips was used to develop an estimate of the vehicle kilometres travelled (VKT) by Fraser Valley residents on a typical fall weekday in 2011. This estimate was compared to corresponding values from the 2008 Trip Diary. This comparison is presented in **Table 3.9.1**.

Table 3.9.1 - Weekday VKT (Fraser Valley)

	2008	2011
VKT (millions)	6.64	7.08
VKT per capita	25.0	25.6

Overall VKT has increased due to population growth and higher trip rates; the VKT per capita has also increased since the growth in trips was larger than the decrease in average trip lengths.

3.10 Summary of Sub-Regional Analysis

The preceding analysis presented the demographic and travel patterns of the residents of various sub-regions of Metro Vancouver and the FVRD, as well as patterns for trips originating in the sub-region to destinations within the Lower Mainland. The analysis indicates that in 2011, more trips were made by Transit and cycling than in 2008, but the car is still the dominant travel mode. Vehicle use becomes more prevalent with increased distance from the Metropolitan Core. These mode share patterns and trends are summarized in **Figure 3.10.1**.

Auto mode share has decreased in the North Shore, Vancouver / UEL, and Richmond / South Delta sub-regions. The most significant reduction in auto use was seen in the Richmond / South Delta sub-region, likely due to the opening of the Canada Line in 2009. Auto driver mode share has remained stable in Burnaby / New Westminster, the Northeast Sector, the Langleys, and the South of Fraser sub-regions. Interestingly there has been an increase in Auto Driver mode share in Pitt Meadows / Maple Ridge, even though Transit mode share also increased.

The residents of the two Burrard Peninsula sub-regions (Vancouver / UEL with 22% and Burnaby / New Westminster with 21%) have substantially higher Transit mode share than the Metro Vancouver average of 14%. The surrounding sub-regions have average Transit mode shares of 10% to 12%, while the sub-regions furthest from the Metropolitan Core (Pitt Meadows / Maple Ridge and the Langleys) have the lowest average Transit mode shares (between 3% and 6%).

On the other hand, the two Burrard Peninsula sub-regions have lower than average Auto Passenger mode shares (13% and 15% versus 16% for Metro Vancouver). All of the other sub-regions in Metro Vancouver had Auto Passenger mode shares of 17% to 19%.

Only the Vancouver / UEL sub-region had Walk and Bike mode shares that were higher than the Metro Vancouver averages. The difference between the Vancouver / UEL sub-region and the rest of Metro Vancouver is particularly significant with respect to Bike mode share where it is 4.5% in Vancouver / UEL and under 1.5% in all other sub-regions.

Overall, Metro Vancouver residents travel outside of their home sub-region about 33% of the time, with most of these trips to adjacent sub-regions. The residents of the Vancouver / UEL sub-region are least likely (22%) to travel outside of their sub-region given the concentration of employment, shopping, educational, and other activities in the sub-region. Conversely, the residents of the Burnaby / New Westminster sub-region are most likely to make trips outside of their home regions. This is likely due to the smaller size of that sub-region, its central location in the region, and the ease with which the sub-region's residents can get to the Metropolitan Core.

The review of trip purposes by sub-region in the preceding sections of the report show that trips between sub-regions tend to be dominated by Work / Post Secondary trips while trip purpose is most varied for trips that stay within any given sub-region. Grade School trips tend to stay internal to the sub-region and therefore they are generally the shortest of all trip purposes, whereas the distribution patterns of Work / Post Secondary trips make these trips generally the longest.

Correspondingly, Walk trips tend to be internal to the sub-region while Transit trips have a high proportion of Work / Post Secondary trips and their average trip length is the highest of all modes.

Figure 3.10.1 - Snapshot of Metro Vancouver Travel Patterns

A Snapshot of Metro Vancouver Travel Patterns

Metro Vancouver Total

Population/Employment (2011)	2,313,000/1,228,000
Number of daily trips by residents (2011)	6,065,000
Growth in trips (2008 to 2011)	+9.2%
Auto driver mode share (2008/2011)	58% / 57%
Auto passenger mode share (2008/2011)	16% / 16%
Transit mode share (2008/2011)	13% / 14%
Walk mode share (2008/2011)	11% / 11%
Bike mode share (2008/2011)	1.5% / 1.8%
Proportion of resident trips outside home sub-region	33%

North Shore

Population/Employment (2011)	185,000/82,000
Number of daily trips by residents (2011)	521,000
Growth in trips (2008 to 2011)	+4.7%
Auto driver mode share (2008/2011)	63% / 61%
Auto passenger mode share (2008/2011)	16% / 17%
Transit mode share (2008/2011)	10% / 11%
Walk mode share (2008/2011)	10% / 10%
Bike mode share (2008/2011)	1.1% / 1.0%
Proportion of resident trips outside home sub-region	32%

Vancouver / UEL

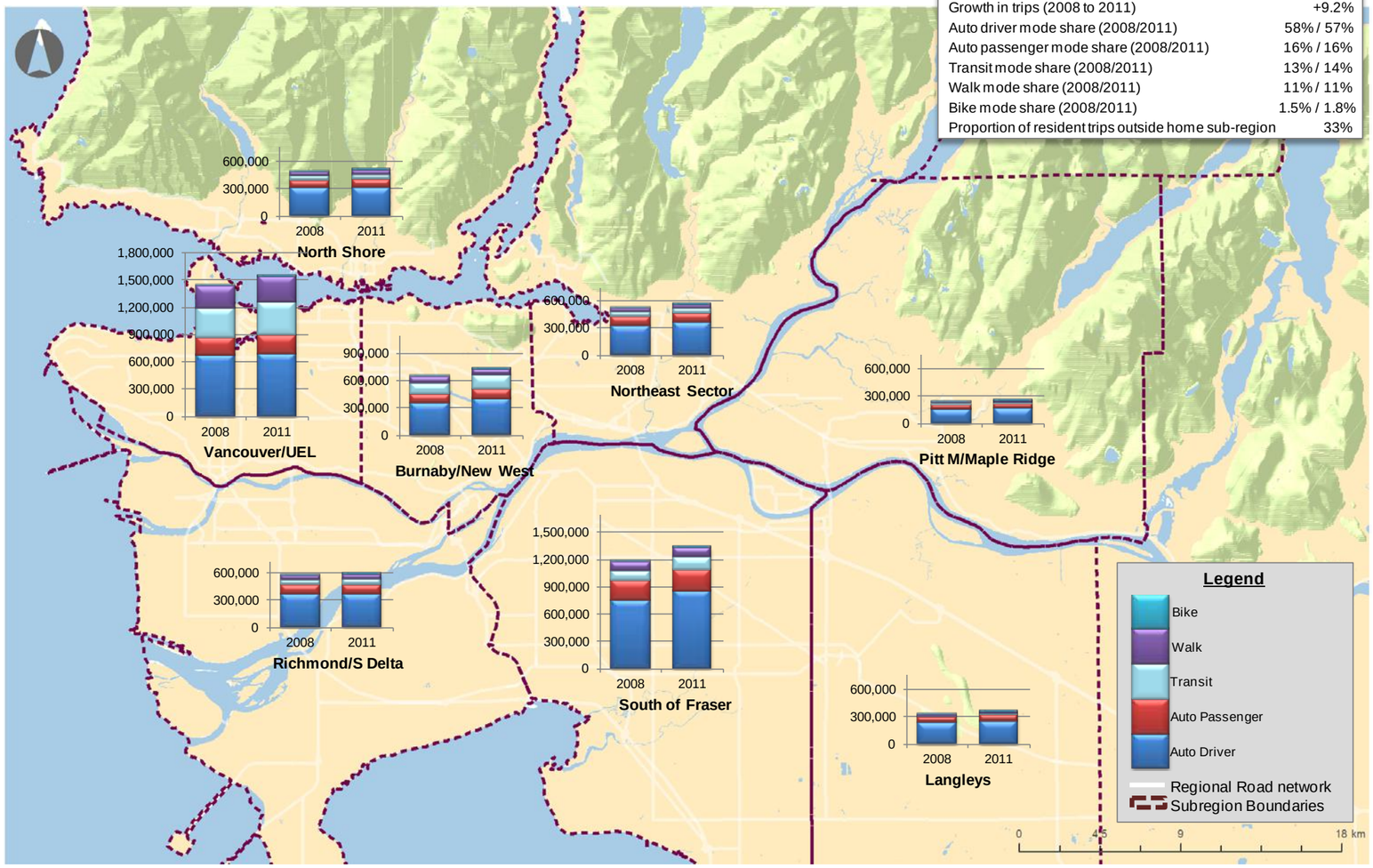
Population/Employment (2011)	618,000/426,000
Number of daily trip by residents (2011)	1,633,000
Growth in trips (2008 to 2011)	+7.9%
Auto driver mode share (2008/2011)	45% / 43%
Auto passenger mode share (2008/2011)	13% / 13%
Transit mode share (2008/2011)	22% / 22%
Walk mode share (2008/2011)	16% / 18%
Bike mode share (2008/2011)	3.6% / 4.5%
Proportion of resident trips outside home sub-region	22%

Burnaby / New Westminster

Population/Employment (2011)	289,000/174,000
Number of daily trips by residents (2011)	747,000
Growth in trips (2008 to 2011)	+12.9%
Auto driver mode share (2008/2011)	54% / 54%
Auto passenger mode share (2008/2011)	14% / 15%
Transit mode share (2008/2011)	20% / 21%
Walk mode share (2008/2011)	11% / 9%
Bike mode share (2008/2011)	0.9% / 0.7%
Proportion of resident trips outside home sub-region	44%

Northeast Sector

Population/Employment (2011)	219,000/82,000
Number of daily trip by residents (2011)	575,000
Growth in trips (2008 to 2011)	+9.1%
Auto driver mode share (2008/2011)	64% / 64%
Auto passenger mode share (2008/2011)	18% / 18%
Transit mode share (2008/2011)	10% / 11%
Walk mode share (2008/2011)	8% / 7%
Bike mode share (2008/2011)	0.2% / 0.8%
Proportion of resident trips outside home sub-region	43%



Richmond/South Delta

Population/Employment (2011)	237,000/179,000
Number of daily trip by residents (2011)	602,000
Growth in trips (2008 to 2011)	+3.1%
Auto driver mode share (2008/2011)	63% / 61%
Auto passenger mode share (2008/2011)	18% / 17%
Transit mode share (2008/2011)	9% / 12%
Walk mode share (2008/2011)	9% / 9%
Bike mode share (2008/2011)	1.3% / 1.3%
Proportion of resident trips outside home sub-region	31%

South of Fraser

Population/Employment (2011)	542,000/185,000
Number of daily trips by residents (2011)	1,369,000
Growth in trips (2008 to 2011)	+14.2%
Auto driver mode share (2008/2011)	64% / 64%
Auto passenger mode share (2008/2011)	18% / 18%
Transit mode share (2008/2011)	9% / 10%
Walk mode share (2008/2011)	8% / 8%
Bike mode share (2008/2011)	0.6% / 0.7%
Proportion of resident trips outside home sub-region	35%

Langleys

Population/Employment (2011)	130,000/69,000
Number of daily trips by residents (2011)	365,000
Growth in trips (2008 to 2011)	+9.6%
Auto driver mode share (2008/2011)	70% / 70%
Auto passenger mode share (2008/2011)	19% / 19%
Transit mode share (2008/2011)	3% / 3%
Walk mode share (2008/2011)	7% / 7%
Bike mode share (2008/2011)	0.5% / 0.6%
Proportion of resident trips outside home sub-region	37%

PittMeadows/MapleRidge

Population/Employment (2011)	94,000/31,000
Number of daily trips by residents (2011)	252,000
Growth in trips (2008 to 2011)	+5.9%
Auto driver mode share (2008/2011)	65% / 68%
Auto passenger mode share (2008/2011)	21% / 19%
Transit mode share (2008/2011)	6% / 6%
Walk mode share (2008/2011)	8% / 6%
Bike mode share (2008/2011)	0.3% / 0.5%
Proportion of resident trips outside home sub-region	40%

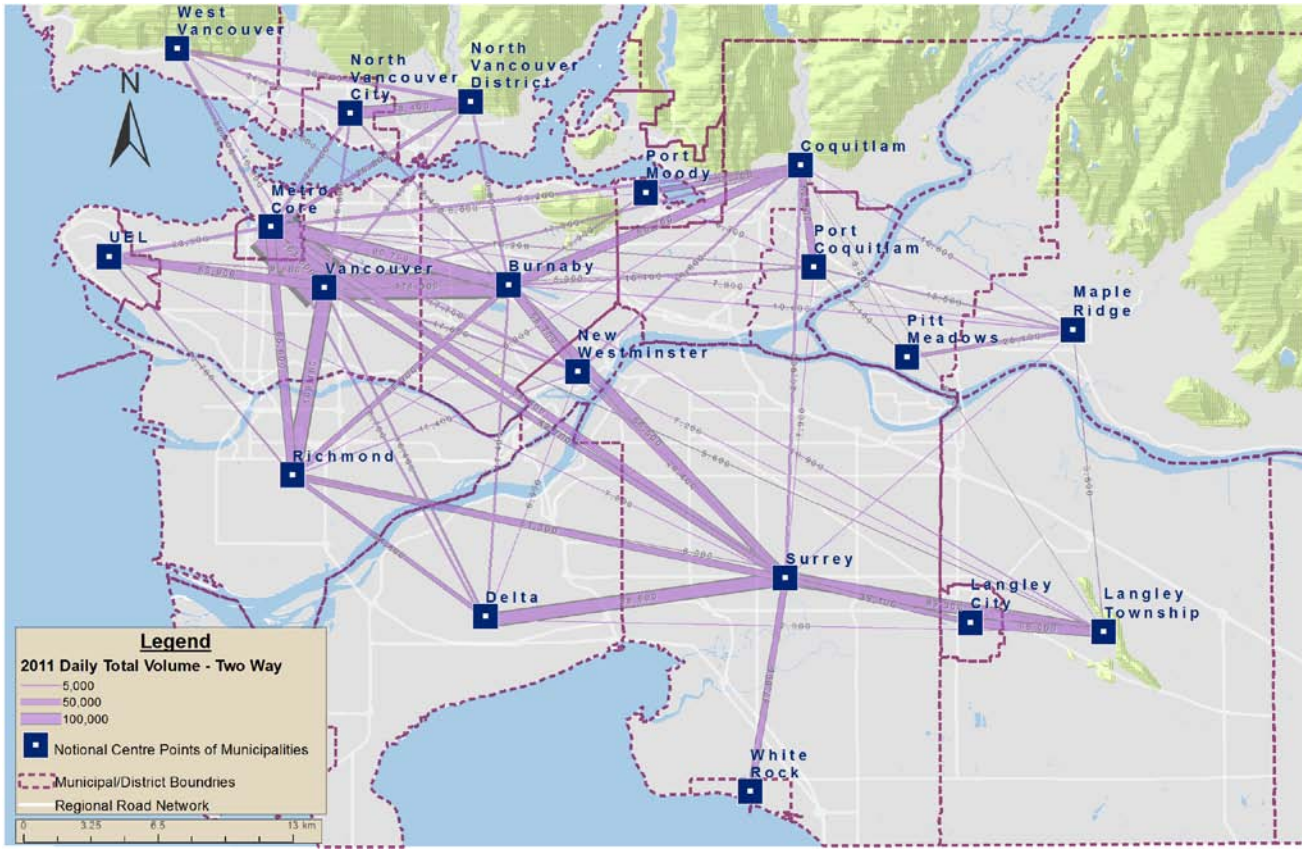
The pattern of daily trips between Metro Vancouver municipalities is illustrated in **Figure 3.10.2**.The Metropolitan Core is shown separately from the rest of the City of Vancouver in this and the following figures. The figures do not include trips that are internal to each municipality or area. In order to improve the clarity of the figures, minimum thresholds were set for the trip volumes to display on each map.

The figure shows that Metro Vancouver is an integrated region. There are trip pairs between every municipality in the region. The levels of interaction, however, do differ in scale. The greatest number of trips occurs between Vancouver, the Metropolitan Core, Burnaby, and Richmond.

In addition, the Fraser River is a real barrier to interactions between sub-regions on opposite sides of it and there are comparatively few trips made between them. As an example, though there is a direct major river crossing between Surrey and Coquitlam, trips between these two municipalities represent only about 2.7% of all the trips to and from Surrey, and about 5.3% of all the trips to and from Coquitlam.

One notable exception to the barrier of the Fraser River is the strong transit commuting patterns between Surrey and the Burrard Peninsula (Vancouver and Burnaby) due to the SkyTrain connections between these cities (see **Figure 3.10.4**).

Figure 3.10.2 - Daily Trips between Municipalities



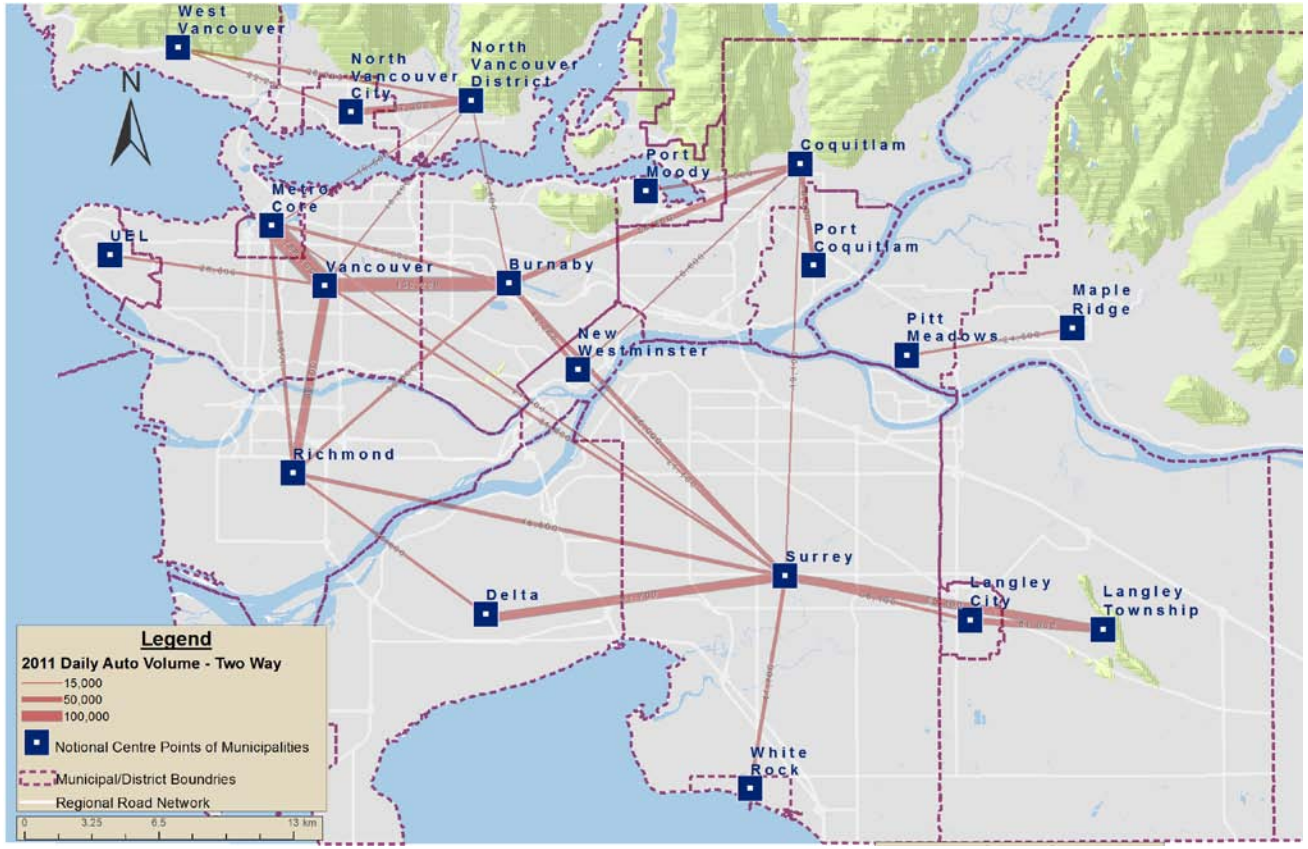
The number of daily auto trips between municipalities is illustrated in **Figure 3.10.3**. The figure only shows interactions where the number of daily trips exceeds 15,000.

The barrier effect of the Fraser River is more apparent in this figure. The Burrard Inlet also has a similar impact on auto trips between the North Shore and the rest of Metro Vancouver. The relatively low volume of Auto Driver trips between Pitt Meadows / Maple Ridge and other municipalities reflects both the effect of water crossings and lower population and employment totals in those areas.

South of the Fraser, most travel between municipalities is to and from Surrey, and is almost entirely by car. Nevertheless, the highest volume of Auto Driver trips between the mapped areas is between the Metropolitan Core and the rest of the City of Vancouver followed by Auto Driver trips between Vancouver and Burnaby. This reflects the concentration of major trip destinations in these areas.

The sub-region charts and tables earlier in the report presented estimates of vehicle kilometres travelled (VKT) and VKT per capita. Between 2008 and 2011 most sub-regions experienced absolute increases in VKT because of population growth that lead to an increase in the number of Auto Driver trips; on the other hand, there are mixed trends with regard to VKT per capita, as some sub-regions experienced a decrease in that as a result of a decrease in the average distance of Auto Driver trips. This is usually correlated with an increase in Transit mode share (as in Richmond / South Delta and the Northeast sector).

Figure 3.10.3 - Auto Driver Trips between Municipalities



The number of daily Transit trips between municipalities is illustrated in **Figure 3.10.4**. The figure only shows interactions where the number of daily trips exceeds 8,000.

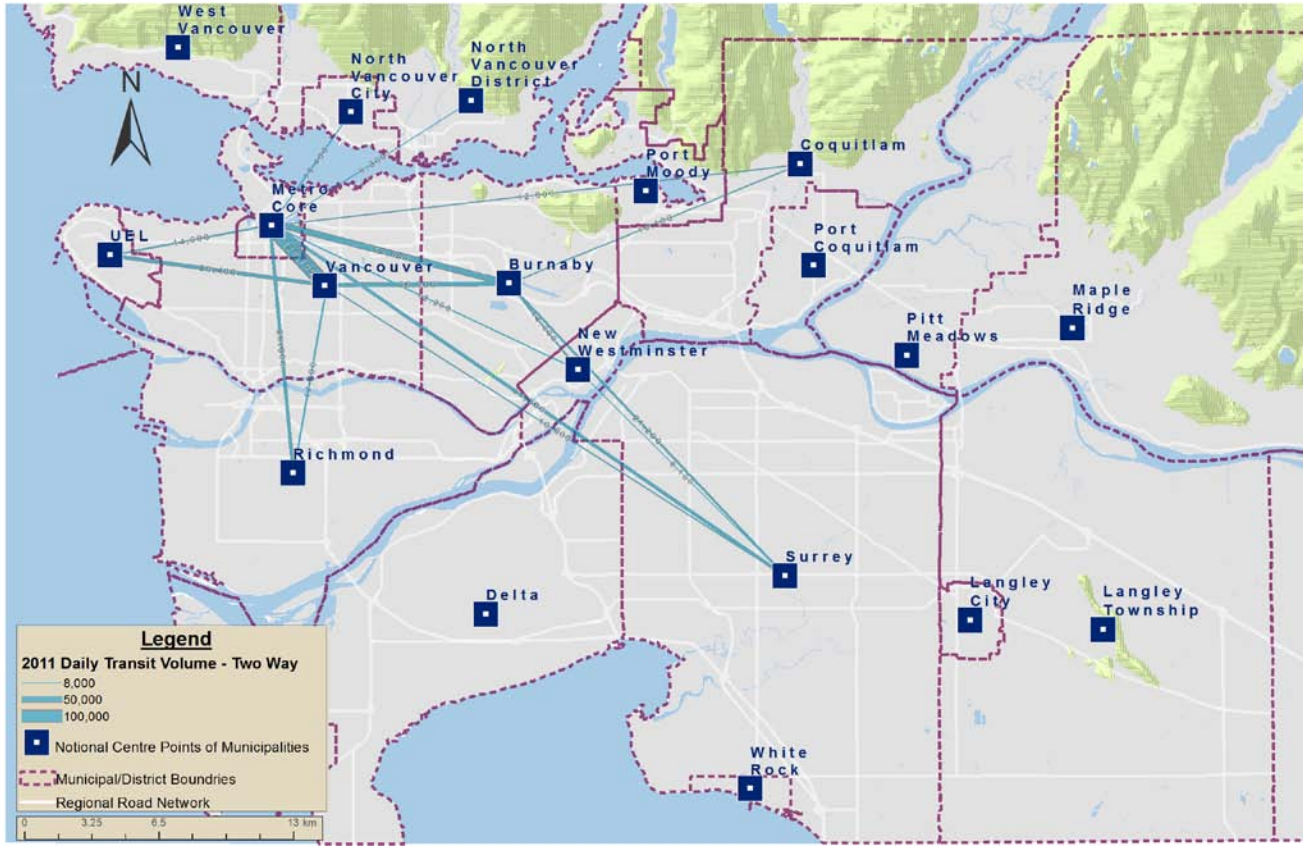
The radial pattern of Transit trips between municipalities is evident in the figure with most Transit trips focused on areas in the Burrard Peninsula.

The highest volume of Transit trips between the mapped areas is between the Metropolitan Core and the rest of the City of Vancouver followed by trips between the Metropolitan Core and Burnaby.

There is also a substantial number of Transit trips between Vancouver (excluding the Metropolitan Core) and both the UEL and Burnaby, as well as between the Metropolitan Core and Richmond and Surrey. All of these substantial transit interactions are served by rapid transit services (SkyTrain or Canada Line) except for the Transit trips to UEL.

South of the Fraser and east of the Pitt River, the number of Transit trips between municipalities were below the threshold for this figure (8,000 Transit trips per day). As illustrated in the previous figure, most trips between municipalities south of the Fraser are to and from Surrey and these are predominately made by car.

Figure 3.10.4 - Transit Trips between Municipalities



The number of trips from municipalities in the direction of the Metropolitan Core during the AM peak period (6 to 9 AM) is illustrated in **Figure 3.10.5**. The figure only shows interactions where the number of inbound trips during the period exceeds 5,500. Similarly, the number of trips from municipalities in the direction away from the Metropolitan Core during the AM peak period is illustrated in **Figure 3.10.6**. This latter figure only shows interactions where the number of outbound trips during the period exceeds 2,500; however, the line thicknesses in both figures are set using similar scales.

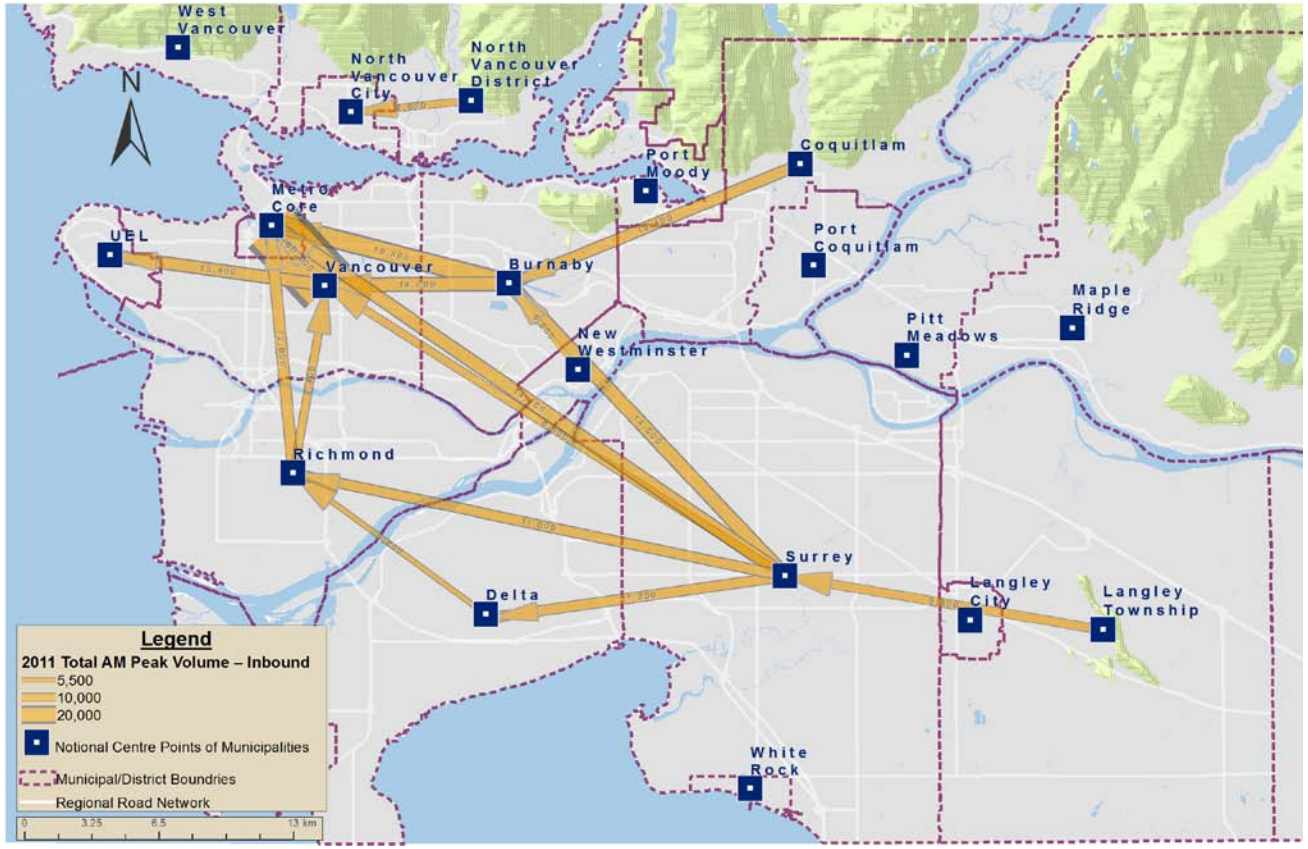
On the North Shore the number of trips between the City and District of North Vancouver is relatively balanced and exceeds the number of trips from both municipalities to the Metropolitan Core.

The Metropolitan Core draws most of the inter-municipal trips from the rest of Vancouver followed by Burnaby, Richmond, and Surrey. These areas are also the most common destinations for trips from the Metropolitan Core during the AM peak period, though volumes are much lower.

Trips to the rest of Vancouver follow a similar pattern; however, in this case the number of outbound trips to Richmond and Burnaby slightly exceeds the number of inbound trips during the AM peak period. This balance in the peak period flows facilitates more effective utilization of transit services and to a lesser extent, road capacity.

Not surprisingly, travel to the UEL is primarily in the inbound direction during the AM peak period.

Figure 3.10.5 - AM Inbound Trips between Municipalities



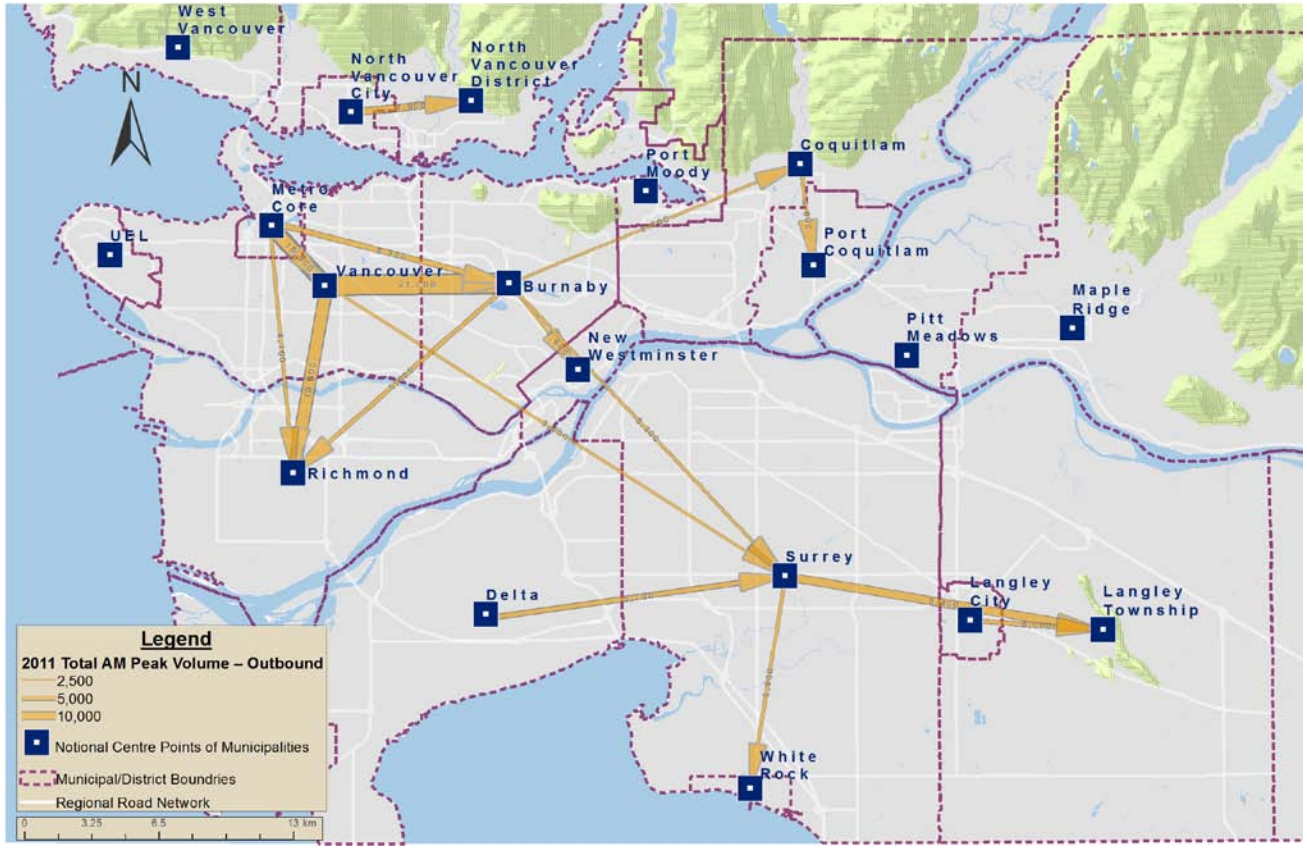
There is a strong directional bias in AM peak period trips between the municipalities south of the main arm of the Fraser River and those to the north. For example, commuting travel between Surrey and communities north of the Fraser is not balanced, with substantially more commuters leaving Surrey than travelling to it. Nearly 80% of all AM peak trips between Surrey and communities north of the Fraser River are leaving Surrey.

Interestingly, commute travel between Surrey and other South of the Fraser communities is largely balanced, with similar numbers of people travelling to Surrey for work as away from it.

Appendix A of the report presents additional information on Metro Vancouver municipalities. The information includes mode shares and trip lengths of trips made by municipal residents, as well as changes in mode shares and the number of trips since the 2008 Trip Diary.

Appendix B provides a series of charts similar to those presented earlier for each sub-region for selected special places in Metro Vancouver, including the Metropolitan Core, Regional and Municipal Town Centres and the major universities.

Figure 3.10.3 - AM Outbound Trips between Municipalities



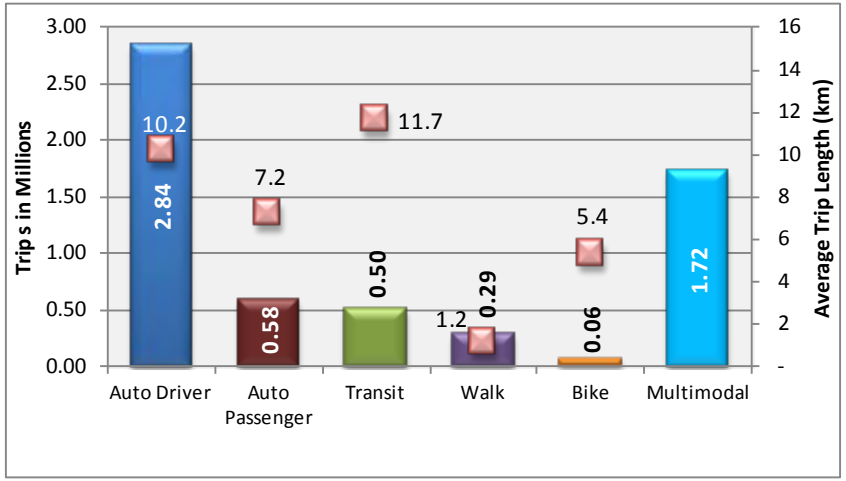
4 SYSTEM USERS - MODAL ANALYSIS

Residents of Metro Vancouver choose a variety of modes for their travel needs. This section examines each of the five major modes of travel (Auto Driver, Auto Passenger, Transit, Walk, and Bike) and the characteristics of the Metro Vancouver residents that used those modes on the day they completed their survey. Trips by other modes (e.g. taxi, school bus) and trips where the mode was not reported were not considered in this analysis nor were users who made trips solely by those modes.

Each trip recorded in the Trip Diary was allocated to a primary mode. Anyone that made all of their trips during their survey travel day using a given primary mode of travel (excluding trips by "Other" modes) is defined as a single-mode user of the mode. Anyone that made trips with different primary modes during the day is defined as a "casual" user of each of these modes, or as a "multi-modal" user. Through these definitions, the analysis focuses on the people that use multiple primary modes compared to single-mode users. This is a different way of analyzing the transportation system and provides insight into the demographic characteristics of the people who use different modes.

Figure 4.0.1 illustrates the total number of trips made by the persons assigned to each of the modal user categories along with their average trip length. Since some people used other non-major modes (e.g. school bus or taxi) for their trips, the total number of trips in this figure (5.95 million) is less than the total number of weekday trips made by Metro Vancouver residents (6.06 million). Average trip lengths have been calculated based on trips made by single-mode users in order to highlight differences between modal user categories. Average trip length is not included for trips by the multi-modal users since these trips are made by various modes as illustrated in the figure.

Figure 4.0.1 – Trips and Trip Lengths by Single and Multi-Modal Users



Note that in this figure, as well as many others in this section of the report, trips are presented as vertical bars using the axis on the left, while trip distances are presented as specific points using a small square symbol and these points relate to the axis on the right of the figure.

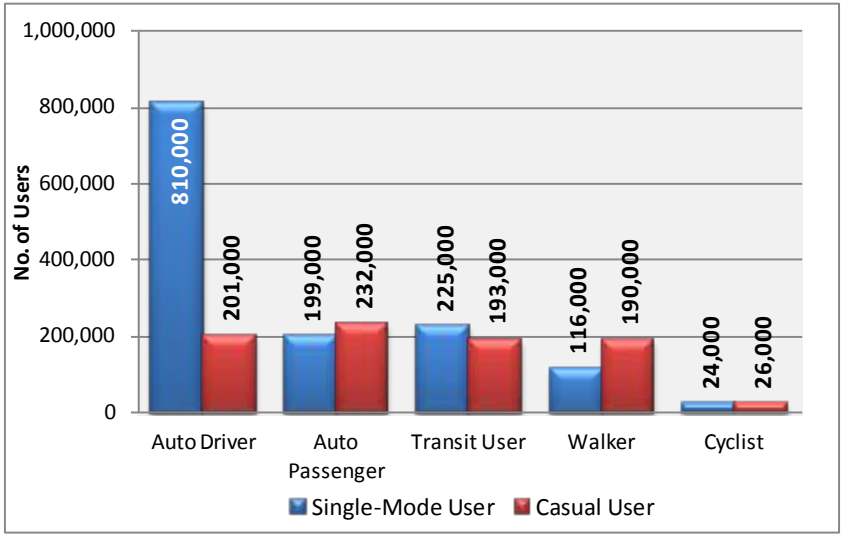
Trips by auto users and in particular those who made trips only as Auto Drivers make up the majority of the travel market. On the other hand, single-mode Transit users have the highest average trip length.

Figure 4.0.2 illustrates the number of people using each of the major modes with a distinction of whether they are single-modal or multi-modal users of the mode.

Multi-modal users belong to more than one modal category and so the total number of persons represented in the figure exceeds the

number of Metro Vancouver residents who made trips on the day they completed their survey.

Figure 4.0.2 – Number of People by Mode Use



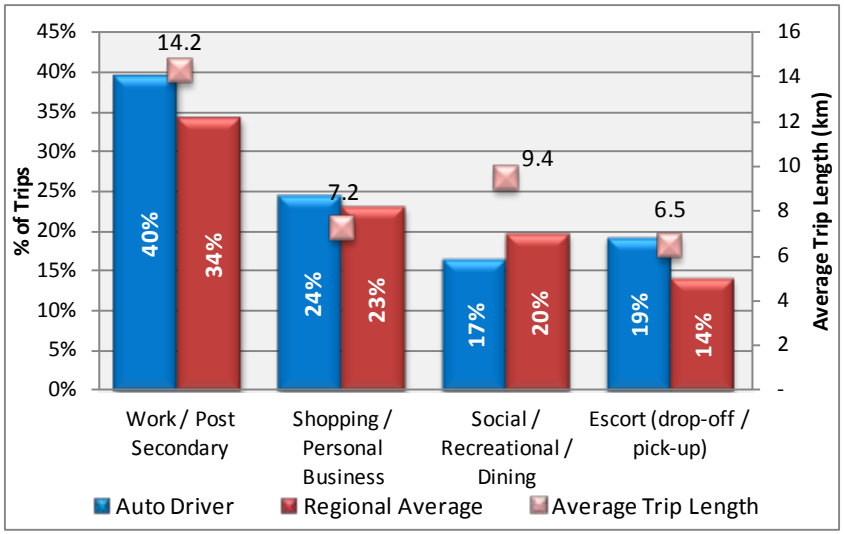
As expected auto users, and especially Auto Drivers, are more than half of the system users. In addition, Auto Drivers are the only mode users that exhibit a strong tendency to be single-mode users. Usage of other modes tends to be fairly balanced between single-mode and multi-modal users.

4.1 AUTO DRIVERS

This section provides a profile of single-mode Auto Drivers. For context, the demographic profile of all trips/users in the region is presented so that a comparative analysis can be conducted for the users of each mode of travel; this is the "Regional Average" shown in each figure.

Figure 4.1.1 summarizes the percentage of trips by single-mode Auto Drivers by trip purpose as well as average trip length for those trips.

Figure 4.1.1 – Auto Driver Trips by Purpose and Trip Length[9]



As shown, single-mode Auto Drivers are more likely to make trips for Work / Post Secondary and Escort purposes relative to the overall proportions for these trip purposes. Conversely, the proportion of trips for Social / Recreation / Dining purposes by single-mode Auto Drivers is lower than the general proportion for these trips. Trip for Work / Post Secondary purposes are longest while Escort trips have the shortest trip length.

Figure 4.1.2 provides the proportion of single-mode Auto Drivers by gender. The figure shows that Auto Drivers are more likely to be males relative to their proportion in the regional population. Moreover, trips made by male single-mode Auto Drivers tend to be significantly longer than trips made by females.

Figure 4.1.2 – Proportion of Auto Drivers by Gender

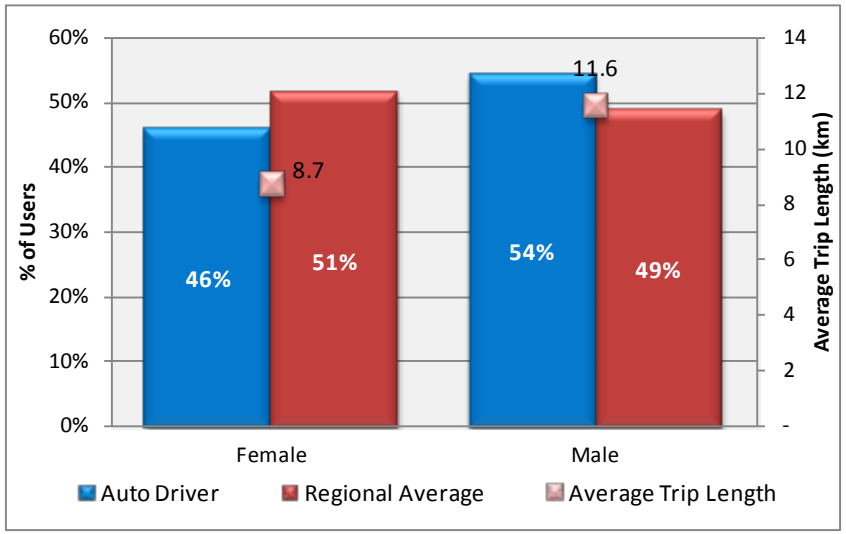


Figure 4.1.3 shows the proportion of single-mode Auto Drivers and Auto Driver trip length by age groups. As depicted in the figure, most Auto Drivers are in the age groups of 25 to 64; these groups are also the only ones with more Auto Drivers than their proportion in the population. The proportion of Auto Drivers drops off slightly below 25 and above 79. For obvious reasons a very low proportion of Auto Drivers are in the 5 to 17 age group; therefore this group is not

[9] The regional average in this figure does not include Grade School trips.

included in the figure. Auto driver trip lengths are negatively correlated with age – generally, as people become older they tend to make shorter driving trips.

Figure 4.1.3 – Age Profile of Auto Drivers

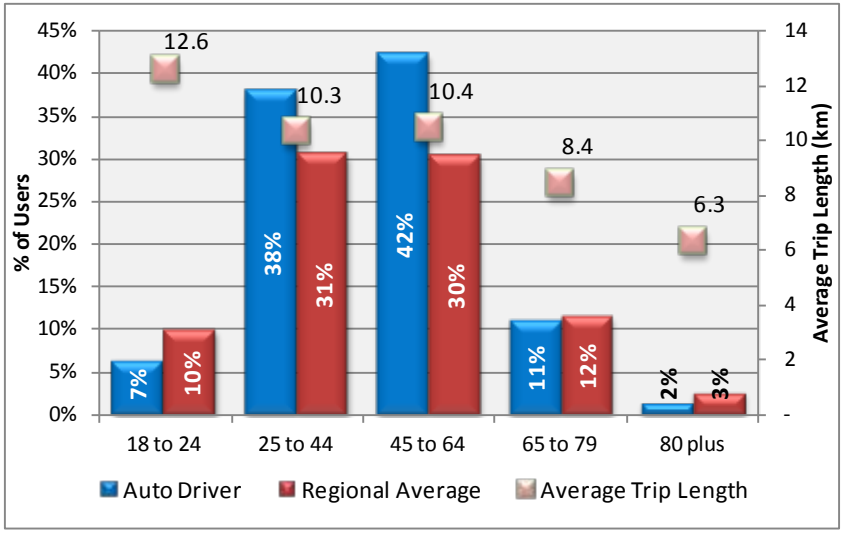


Figure 4.1.4 provides a breakdown of single-mode Auto Drivers by life stage. As can be expected based on the age group distribution, most of the Auto Drivers (62%) are Full Time Employees, while only 3% are Full Time Students (once again due to the low number of drivers in grade school). The proportions in the other groups are similar to regional proportions.

Figure 4.1.5 illustrates the proportion of Auto Drivers by income group and clearly shows a correlation between household income and being an Auto Driver and average trip lengths. Single-mode Auto Drivers are significantly less likely to be in households with annual incomes of under $50,000 and more likely to be in households with incomes over $100,000 relative to the overall population.

Figure 4.1.4 – Proportion of Auto Drivers by Life stage

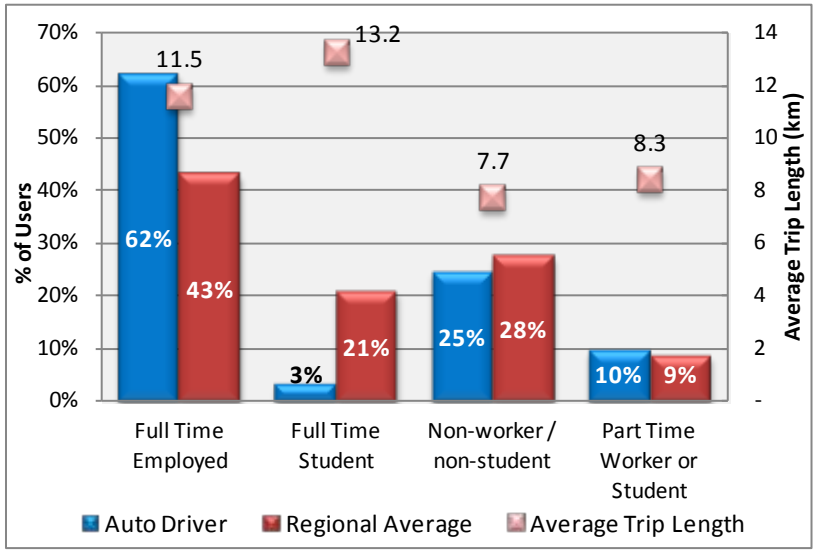
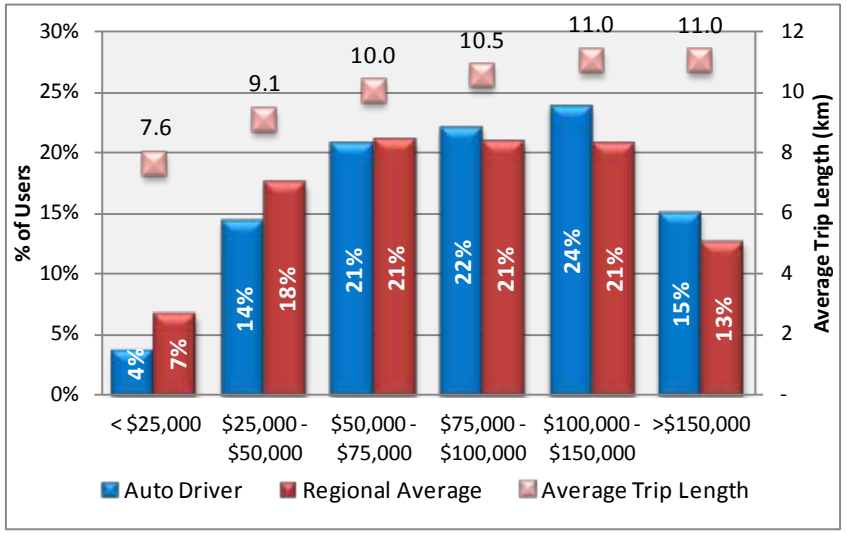


Figure 4.1.5 – Proportion of Auto Drivers by Income Group



It is interesting to note that while the proportion of single-mode Auto Drivers differs from the regional distribution, the distribution of multi-modal users who use the auto-driver mode in terms of household income is similar to the regional distribution for income groups over $25,000.

Figure 4.1.6 provides breakdown of single-mode Auto Drivers by dwelling types. The figure indicates that a higher share of Auto Drivers live in single family dwellings relative to the regional distribution. Conversely, a lower share than the regional proportion lives in apartments and condos. Average trip length is not affected much by housing type.

Figure 4.1.6 – Proportion of Auto Drivers by Housing Type

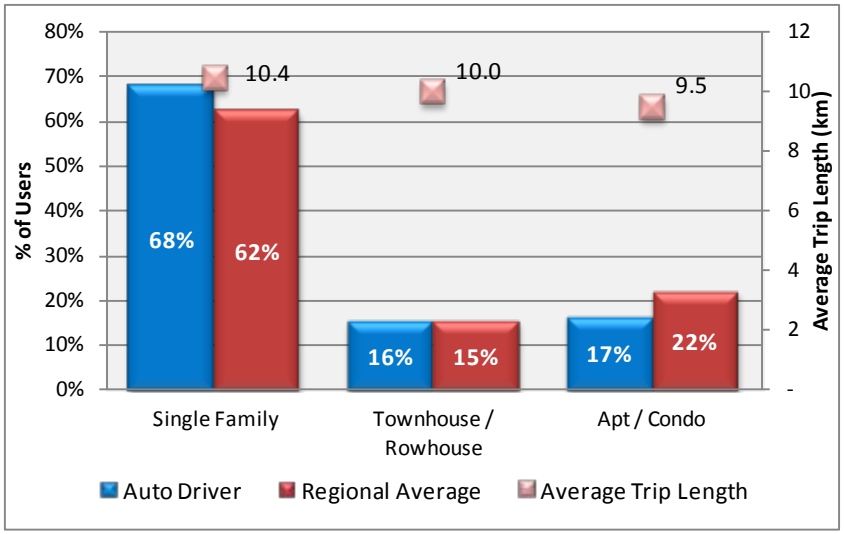
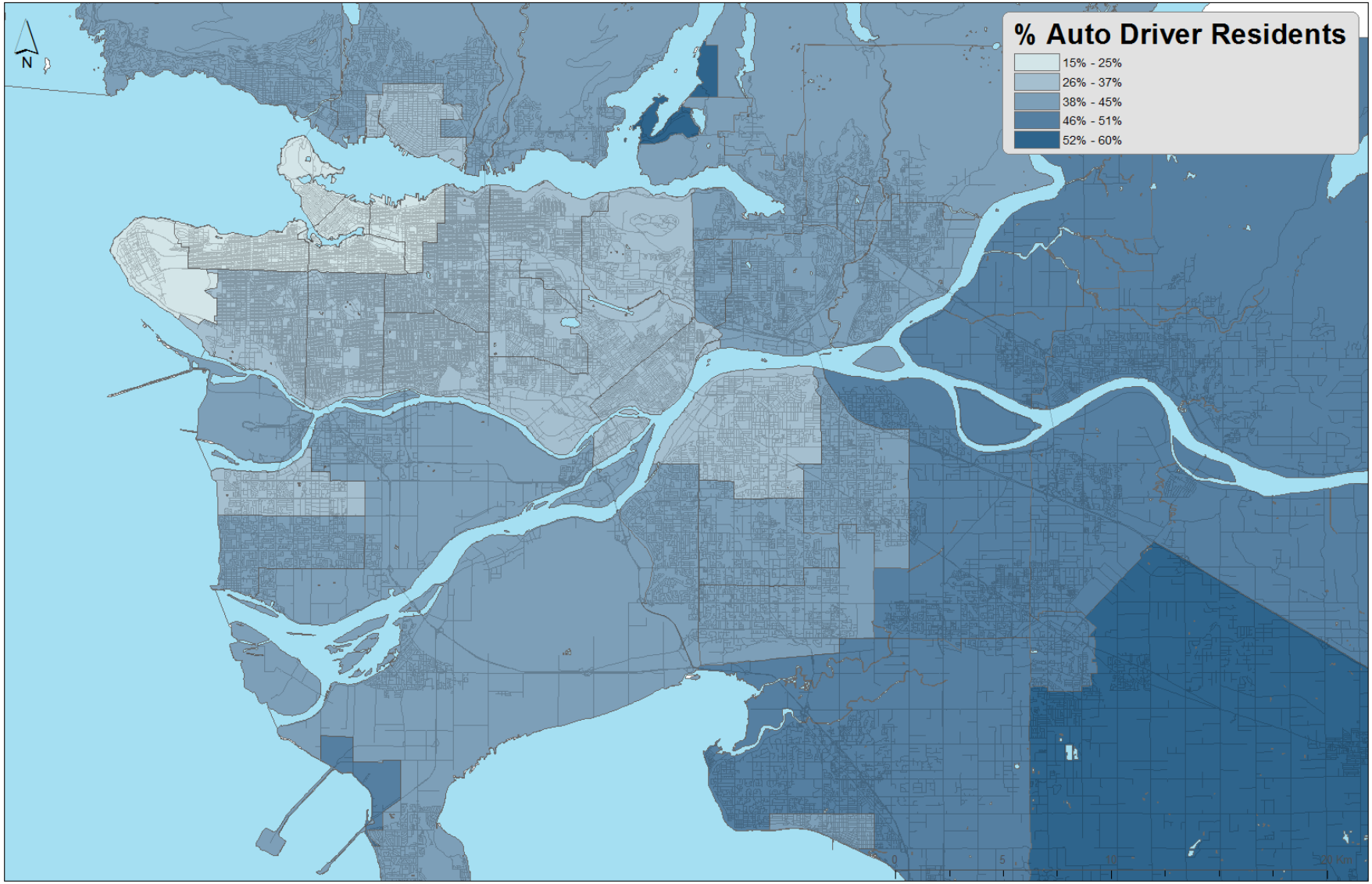


Figure 4.1.7 presents the proportion of single-mode Auto Drivers versus total residents in each of the 52 sampling sub-areas used in the 2011 Trip Diary. The figure shows that the highest proportions of Auto Drivers are in outlying communities. The lowest proportions of Auto Drivers are in the Metropolitan Core and the UEL. Areas with rapid transit service also have lower proportions of single-mode Auto Drivers.

Figure 4.1.7 – Population Share of Single-mode Auto Drivers



4.2 AUTO PASSENGERS

This section provides an analysis of single-mode Auto Passenger users and the length of trips made by this mode user group.

Figure 4.2.1 shows that trips by Auto Passenger users are less likely to be Work / Post Secondary trips and more likely to be Social / Recreational/ Dining and Grade School trips relative to regional averages over all modes and users. While the distribution of trips by purpose is markedly different than that of single-mode Auto Drivers, trip length by purpose mirrors closely that of Auto Driver trips.

Figure 4.2.1 – Auto Passenger Trips by Purpose and Trip Length

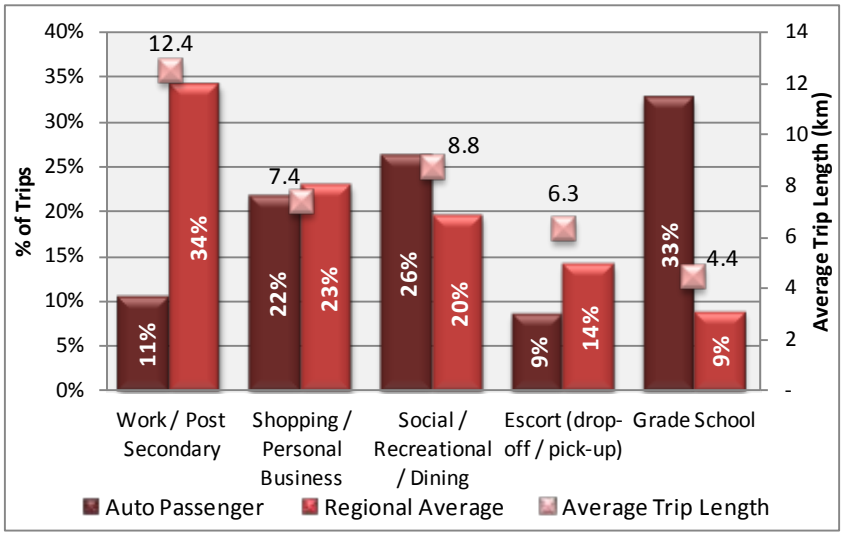


Figure 4.2.2 indicates that single-mode Auto Passengers are more likely to be females than males. However, there is no significant difference in trip length between the genders.

Figure 4.2.2 – Proportion of Auto Passengers by Gender

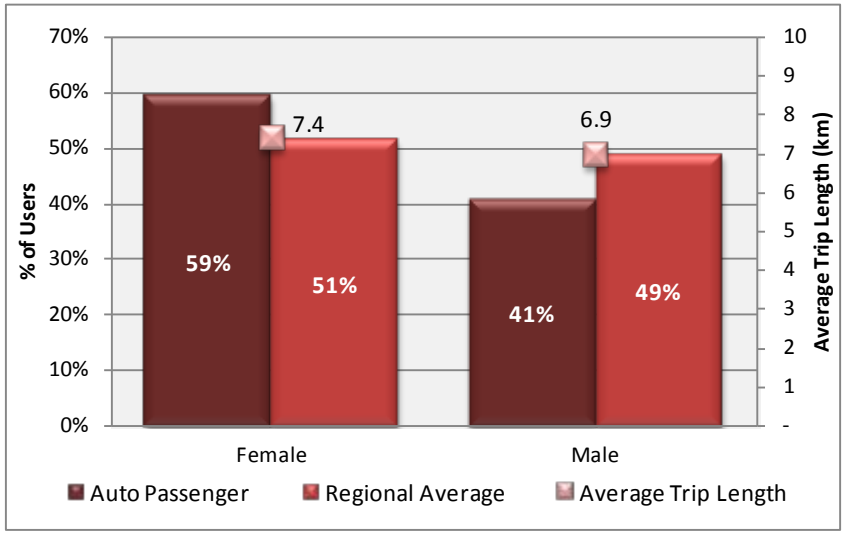


Figure 4.2.3 – Age Profile of Auto Passengers

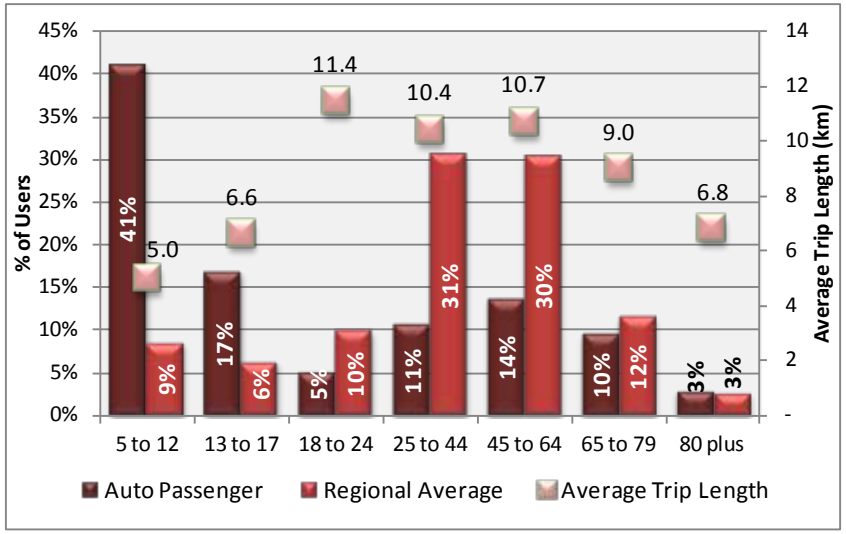


Figure 4.2.3 shows that single-mode Auto Passengers are considerably more likely to be children and adolescents (ages 5-17). Conversely, Auto Passengers are markedly less likely to be people in age groups 25-64, when compared to their proportion in the population.

Trip length by age group closely mirrors that of the Auto Drivers with negative correlation between age and trip length (for 18 and older).

Figure 4.2.4 indicates that as expected, Auto Passengers are most likely to be Full Time Students and are least likely to be Full Time Employed when compared to their proportion in the population. Interestingly, single-mode Auto Passengers have a disproportionately low proportion of Non-Worker / Non-Students.

Figure 4.2.4 – Proportion of Auto Passengers by Life stage

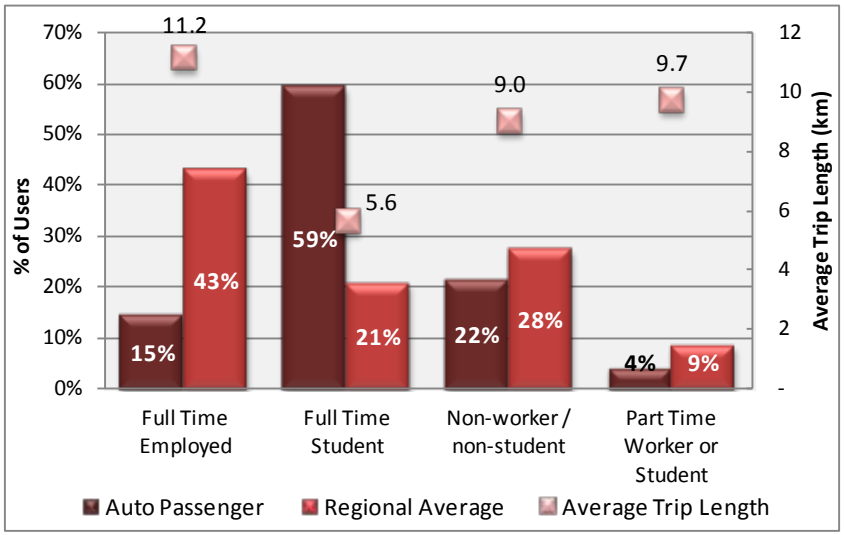


Figure 4.2.5 indicates that there is some correlation between household income and mode usage as there are more Auto Passenger users from households in income groups of over $75,000 than their proportion in the population. This may be related to a greater propensity to drive children to school among households with higher household incomes. Trip distance, however, is not correlated to household income.

Figure 4.2.5 – Proportion of Auto Passengers by Income Group

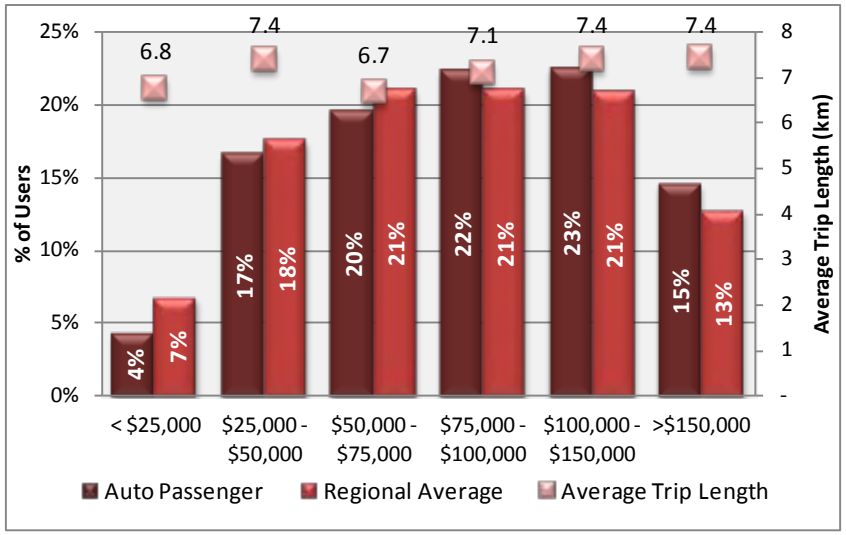


Figure 4.2.6 indicates that single-mode Auto Passenger users are more likely to live in single family houses and less likely to dwell in apartments and condos than Metro Vancouver residents overall. This is not surprising given the high proportion of children in this user group. The likely impact of children on trip distances is also apparent (school trips tend to be relatively short) since Auto Passengers in apartments and condos have the highest average trip lengths.

Figure 4.2.6 – Proportion of Auto Passengers by Housing Type

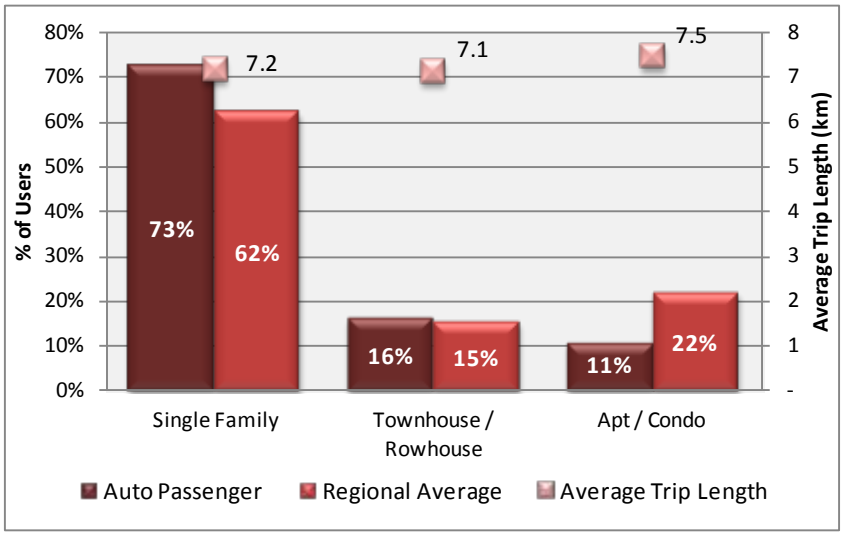
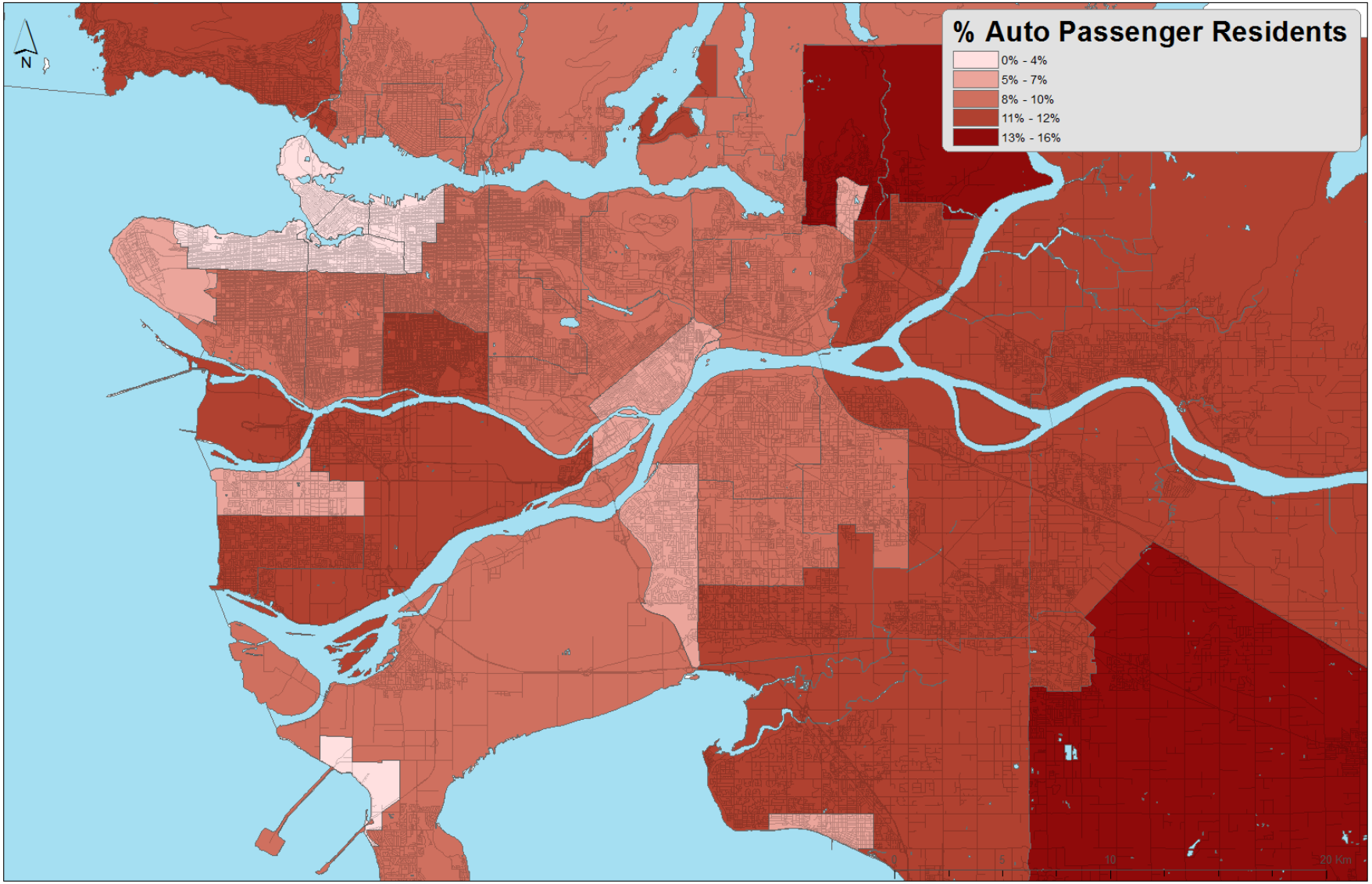


Figure 4.2.7 presents the proportion of single-mode Auto Passengers versus total residents in each of the 52 sampling sub-areas. The figure illustrates that the distribution of Auto Passenger users is similar to that of Auto Drivers; i.e. the proportion of Auto Passengers generally increases with distance from Metropolitan Core.

The similarities between the geographic residential, household income and dwelling type distributions of Auto Passengers and Auto Drivers is consistent with the high proportion of children among single-mode Auto Passengers and potentially parents with children among Auto Drivers. This suggests that most ride shares occur within the household.

Figure 4.2.7 – Population Share of Single-mode Auto Passengers

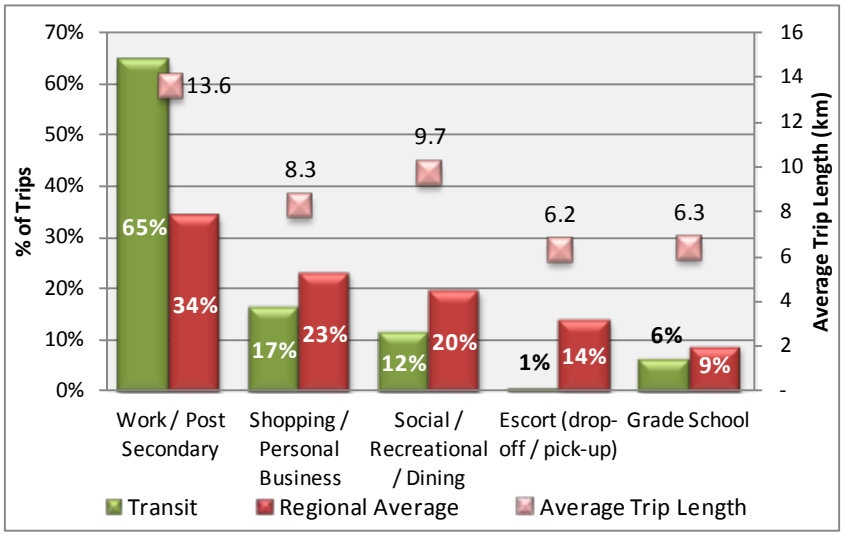


4.3 TRANSIT USERS

This section provides analysis of single-mode Transit users and the length of their trips.

Figure 4.3.1 depicts that 68% of the trips by single-mode Transit users are for Work / Post Secondary purposes; this is a much higher proportion than the proportion of commuting trips from all trips. On the other hand, single-mode Transit users are much less likely to make any other type of trips, in particularly Escort trips.

Figure 4.3.1 – Transit Trips by Purpose and Trip Length



The distance profile of Transit trips by purpose is generally similar to that of the Auto Driver and Auto Passenger users. One notable exception is the higher average length of Grade School trips by Transit users compared to Auto Passenger users.

Figure 4.3.2 shows that single-mode Transit users are slightly more likely to be females than males; at the same time, the average trip length of male Transit users was slightly longer.

Figure 4.3.2 – Proportion of Transit Users by Gender

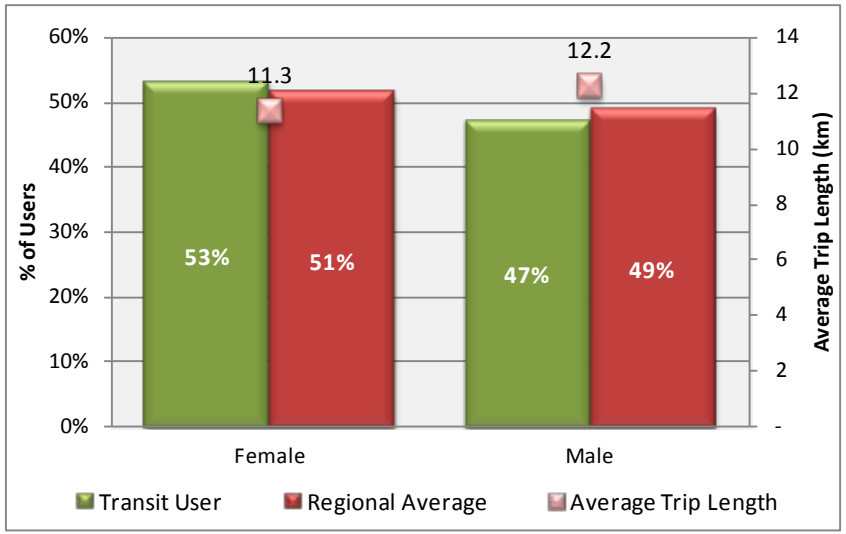


Figure 4.3.3 presents a potential generation shift. Single-mode Transit users are significantly more likely to be young adults (ages 18-24) than their proportion in the population while older age groups are considerably less likely to be Transit users. This could be due to the U-Pass program for the former and high auto ownership for the latter. The proportion of single-mode Transit users in the youngest age category is small; this is consistent with the lower proportion of Grade School trips among single-mode users.

Similar to the Auto modes, average Transit trip length for single-mode Transit users peaks when people are 18-24 and decreases with age.

Figure 4.3.3 – Transit Users by Age Group

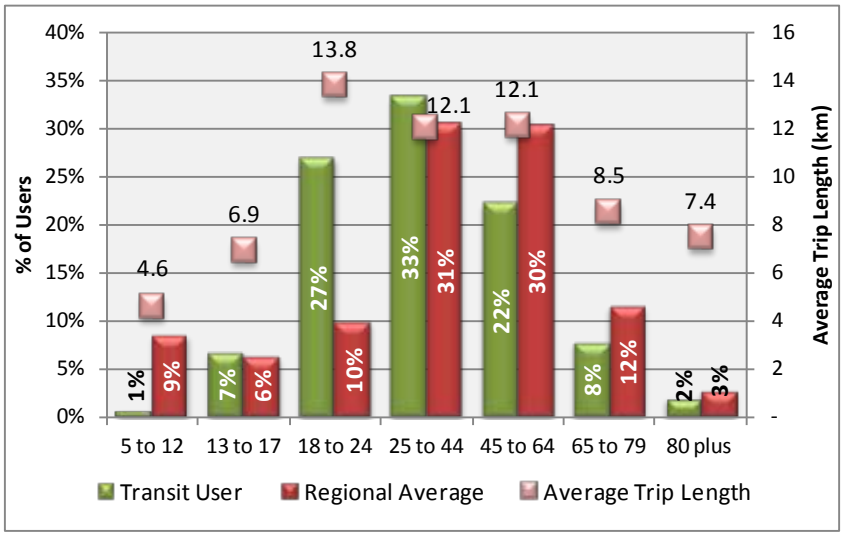


Figure 4.3.4 indicates that most single-mode Transit users (about 75%) are either Full Time Employees or Full Time Students. Both of these life stage groups are more likely to be Transit users than their share in the population. Conversely, Transit users are less likely to be Non-Workers / Non-Students relative to their share in the population. This group also has the shortest average Transit trip length.

Figure 4.3.5 indicates that, as expected, Transit usage is negatively correlated with household income – single-mode Transit users are more likely to be people from lower income households than their share in the population, and are less likely to be from households with high incomes. The figure also highlights that except for the lowest income groups, Transit trip length is not affected substantially by household income.

Figure 4.3.4 – Proportion of Transit Users by Life stage

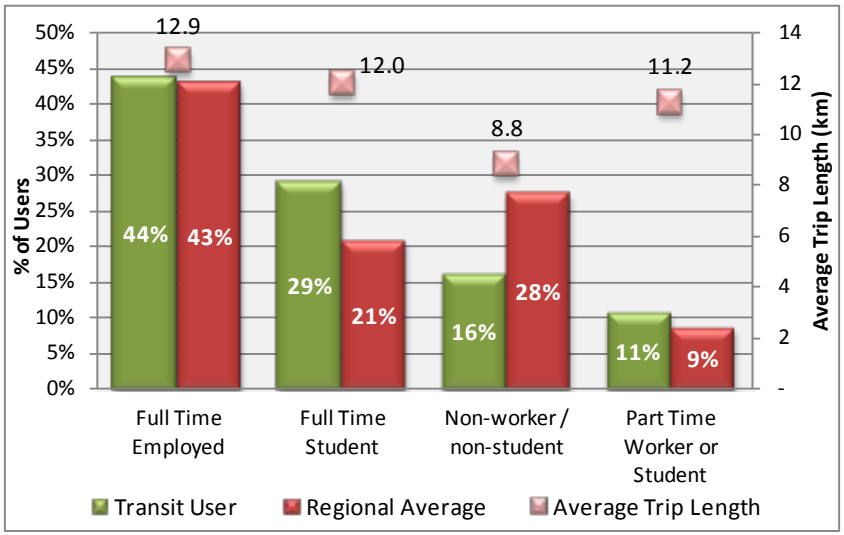


Figure 4.3.5 – Proportion of Transit Users by Income Group

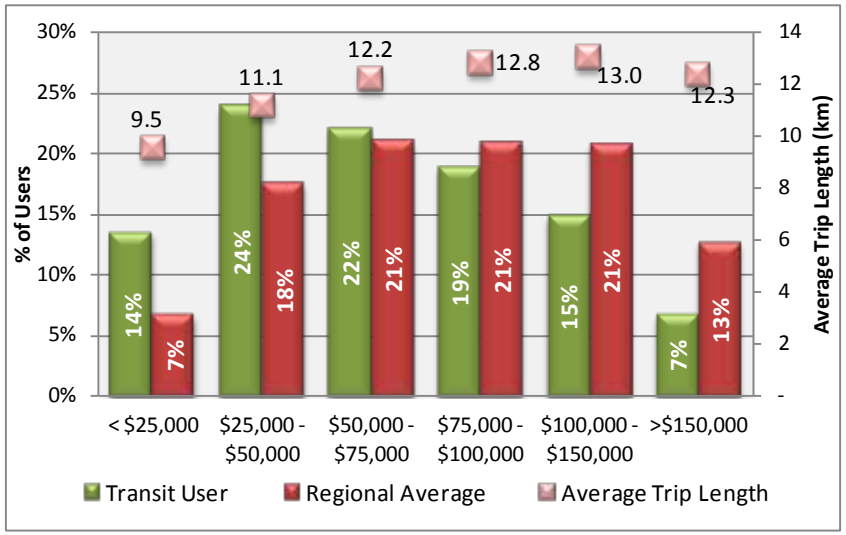


Figure 4.3.6 shows that, as expected, single-mode Transit users are significantly more likely to live in apartments or condos, and less likely to live in single family dwellings relative to the overall population. Transit users who dwell in single family housing, however, make longer Transit trips on average than dwellers of more dense types of housing.

Figure 4.3.6 – Proportion of Transit Users by Housing Type

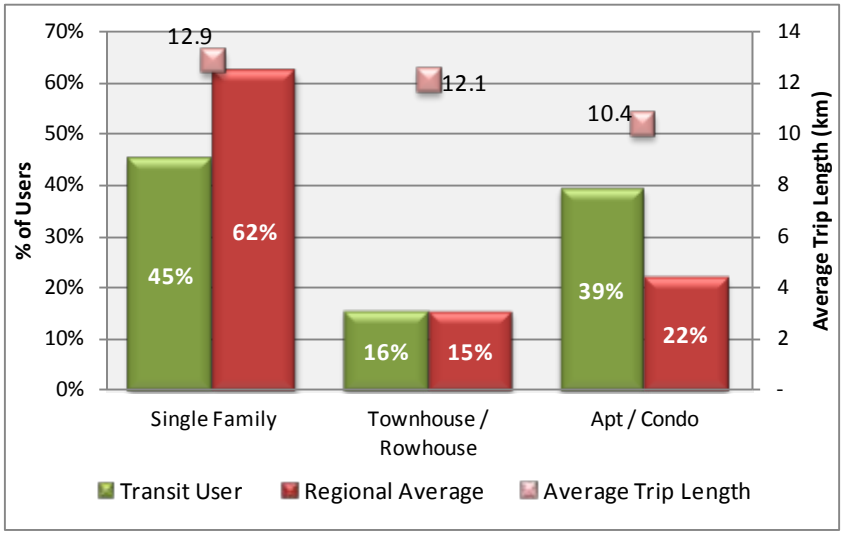


Figure 4.3.7 presents distributions of usage of different payment methods for transit. The green bars represent the proportion of Transit users on the day of the survey; the red bars, in comparison, provide the distribution of payment methods used by those that indicated transit usage in the last 30 days, but did not use transit on the day of the survey.

For reference, according to survey results, about 19% of the population used transit on the day of the survey while about 52% of the population use transit at least once a month.

The major findings from these figures are that regular Transit users (the ones that used transit on the day of the survey) mostly pay by prepaid fares such as Monthly FareCards, U-Pass or annual pass. Occasional users, on the other hand, use mostly cash and FareSavers to pay for transit usage.

Figure 4.3.7 – Transit Users by Fare Payment Type

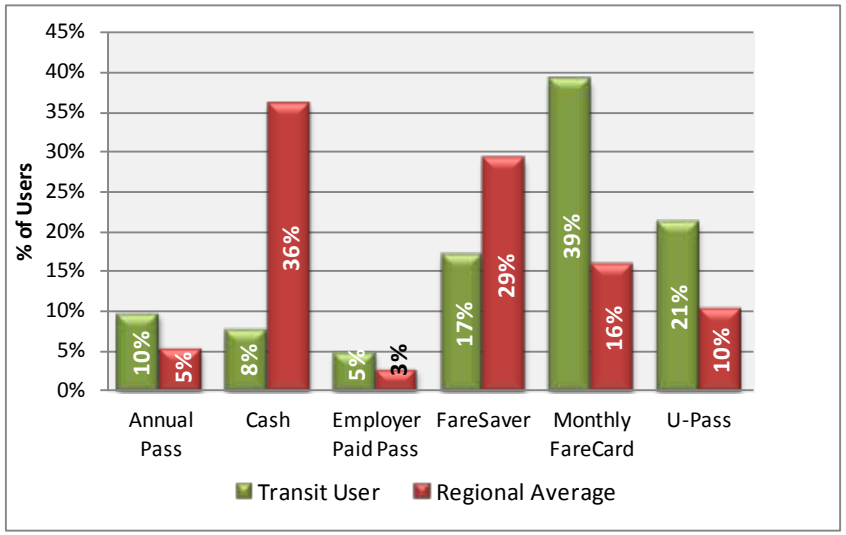
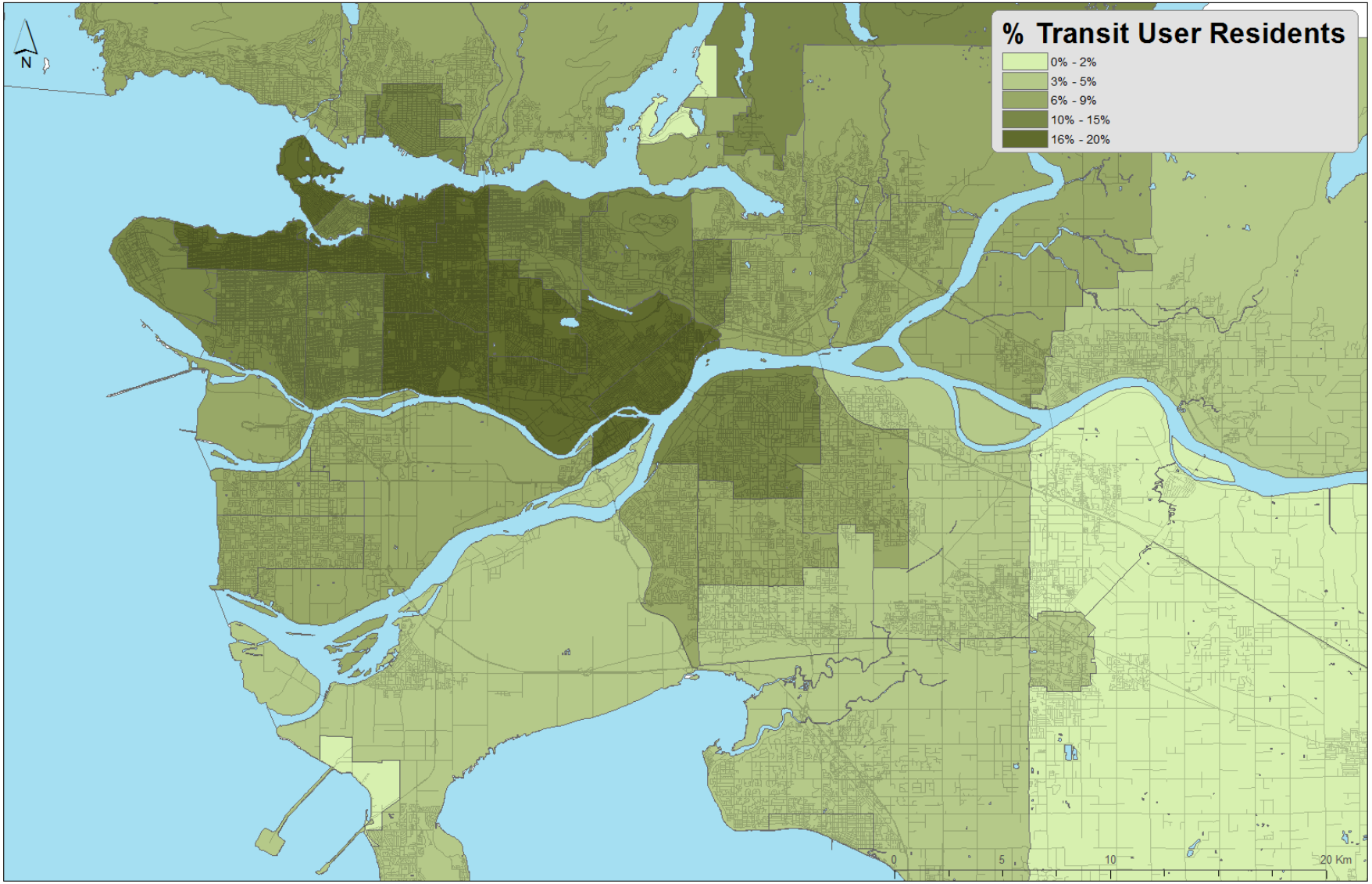


Figure 4.3.8 indicates that single-mode Transit users as a proportion of total residents in each of the sample sub-areas are highest at the Metropolitan Core and along the original SkyTrain corridor and decrease with distance from it. Note that this pattern of Transit users is opposite to that of auto users who are more concentrated in outlying areas of the region.

Figure 4.3.8 – Population Share of Single-mode Transit Users



Note: High proportion of Transit users in Anmore due to high number of West Coast Express users and low sample in this sub area.

4.4 PEDESTRIANS

This section provides an analysis of people that conducted only Walk trips on the day of the survey and the length of those Walk trips. These trips are made entirely by walking and do not include walking to transit. Furthermore, the Trip Diary does not include walk trips that are made without a clear trip destination, such as walking the dog.

Figure 4.4.1 shows that single-mode pedestrians are much more likely to make Grade School trips than Metro Vancouver residents in general; as a result, these pedestrians are less likely to make trips for all other trip purposes.

As with other modes, the longest Walk trips are for Work / Post Secondary; yet, single-mode pedestrians are much less likely to make these types of trips relative to the overall population.

Figure 4.4.1 – Walk Trips by Purpose and Trip Length

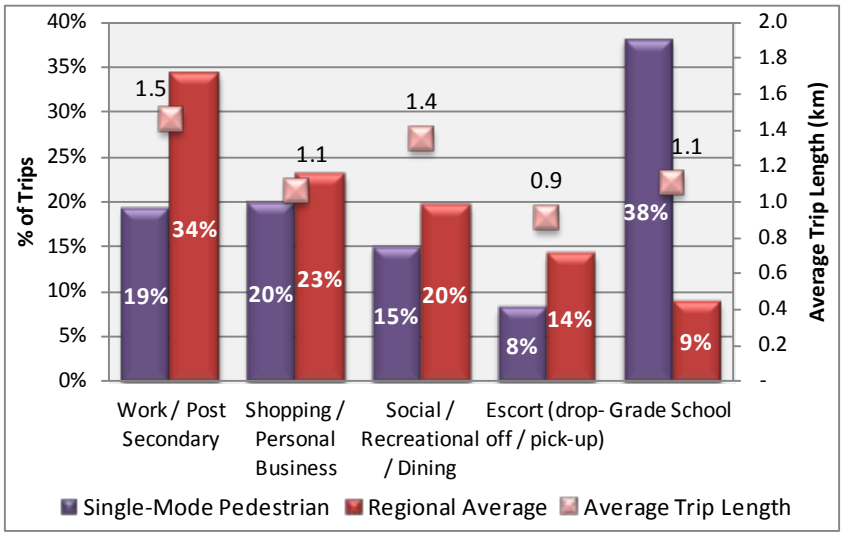


Figure 4.4.2 indicates that single-mode pedestrians are slightly more likely to be females than males; but, average trip distance is not influenced by gender.

Figure 4.4.2 – Proportion of Pedestrians by Gender

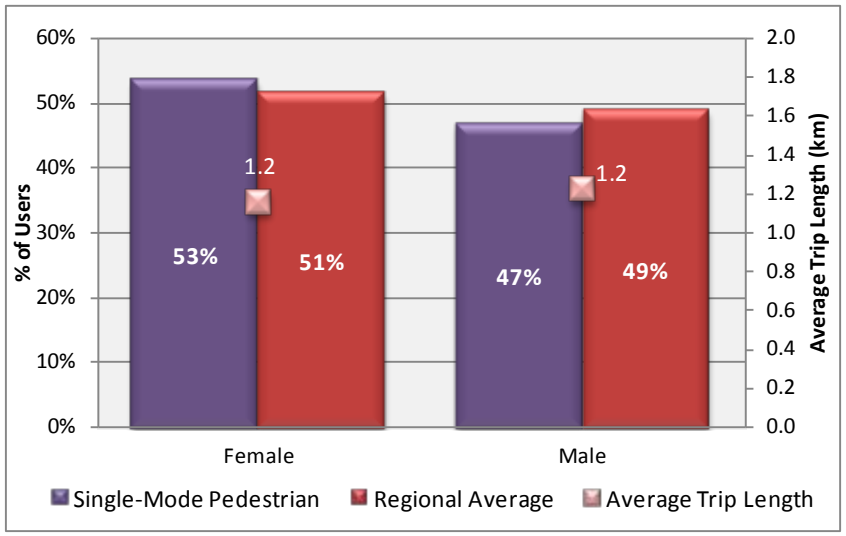


Figure 4.4.3 shows that pedestrians tend to be young people (ages 5-17) much more than their proportion in the population.

Unlike other modes, walking trip distance has no correlation with age for people 25 and older.

Figure 4.4.3 – Age Profile of Pedestrians

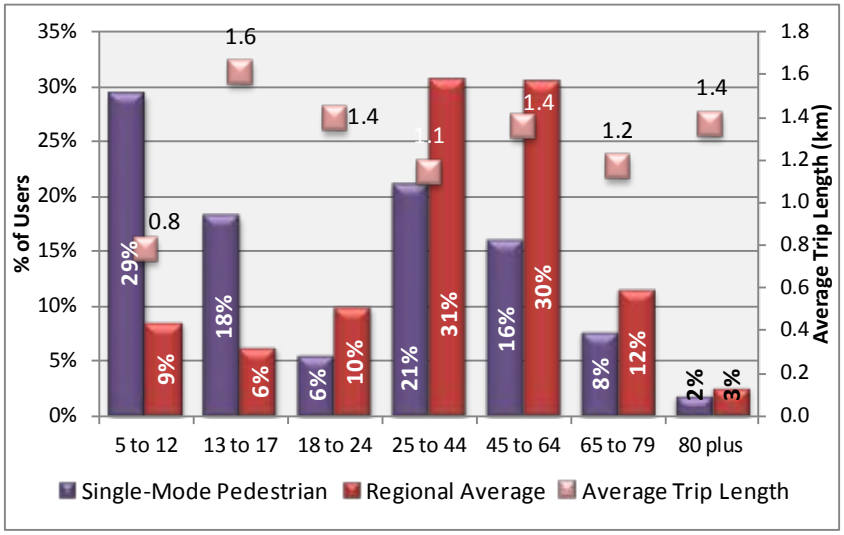


Figure 4.4.4 – Proportion of Pedestrians by Life stage

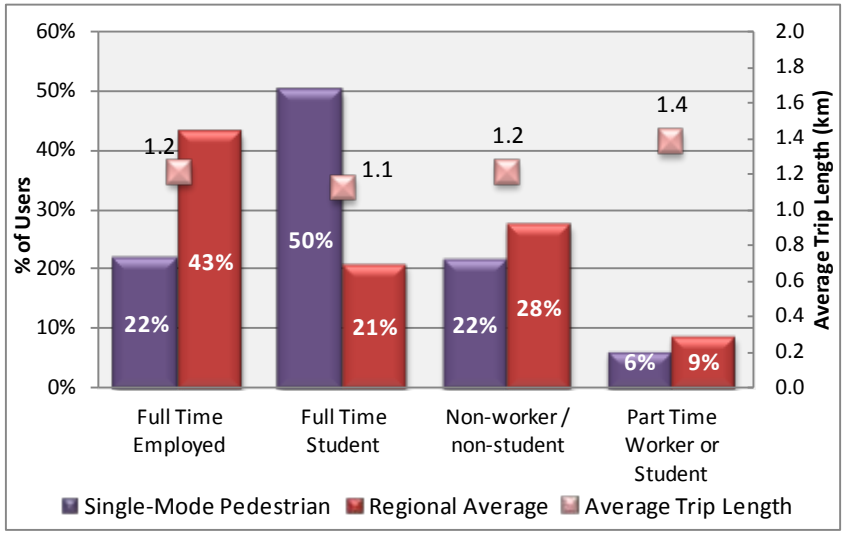


Figure 4.4.4 shows that, as can be expected, single-mode pedestrians are significantly more likely to be Full Time Students than their proportion in the population; in fact, half of all the people that make only Walk trips during the day are Full Time Students. Conversely, pedestrians are far less likely to be Full Time Employees relative to their proportion in the population.

Figure 4.4.5 indicates that there is a small negative correlation between being a single-mode pedestrian and household income, and no correlation between household income and walking trip length.

Figure 4.4.5 – Proportion of Pedestrians by Income Group

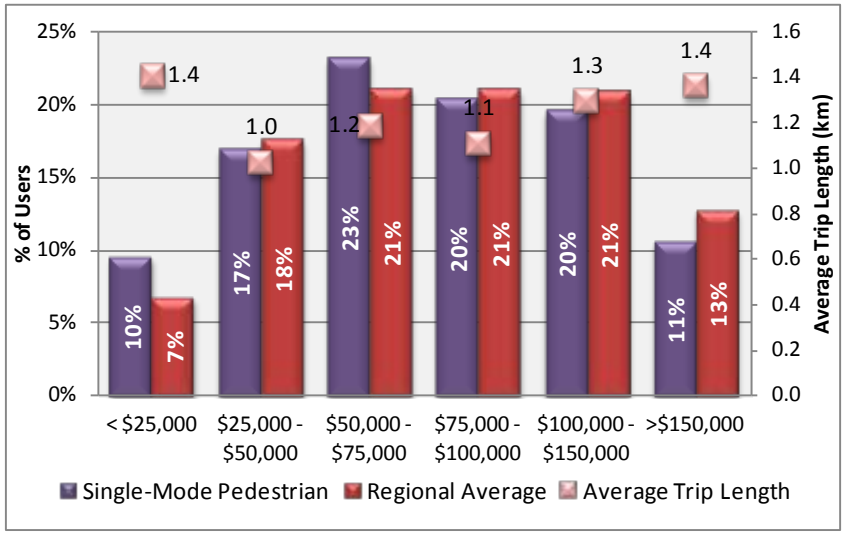


Figure 4.4.6 indicates that similar to Transit usage, the proportion of pedestrians who are apartment / condo dwellers is much higher than their proportion in the population; the opposite is true for pedestrians who are dwellers of single family houses. This may be because the distance to destinations is often shorter for apartment / condo dwellers.

Figure 4.4.6 – Proportion of Pedestrians by Housing Type

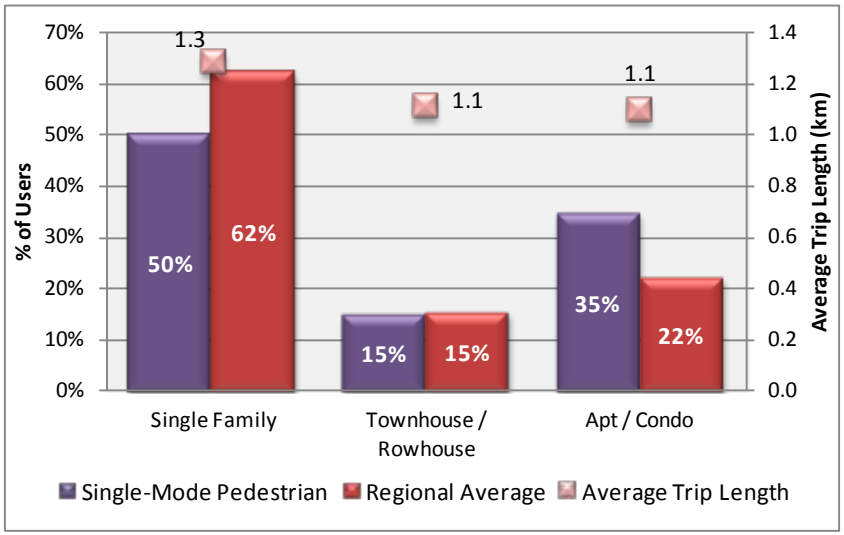
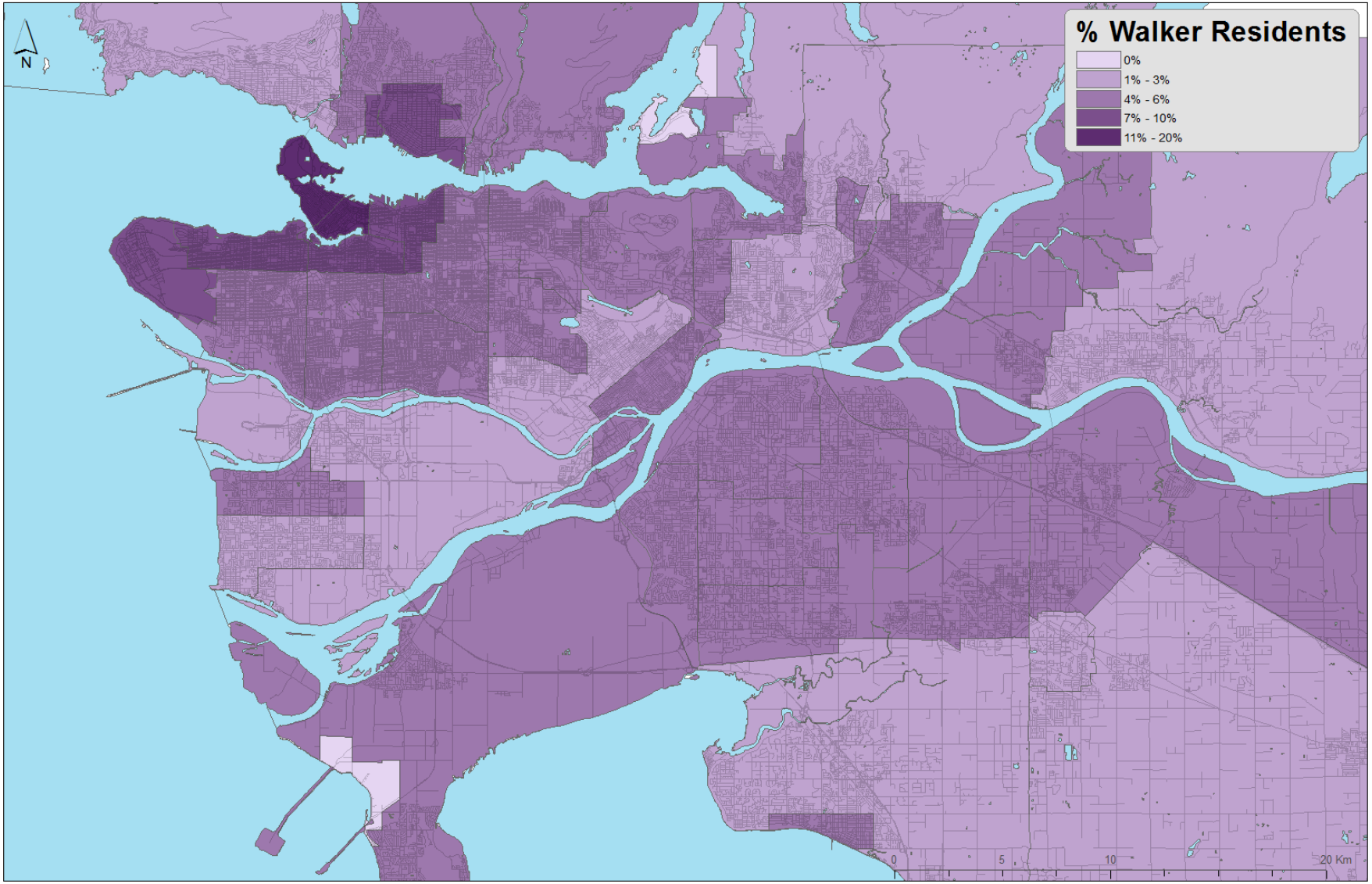


Figure 4.4.7 indicates that proportions of single-mode pedestrians relative to the number of residents in each sample sub-area are highest at the Metropolitan Core. At the same time, there are a few more densely urbanized locations such as the City of North Vancouver and the Broadway corridor in Vancouver, with relatively large percentages of single-mode pedestrians.

Figure 4.4.7 – Population Share of Single-mode Pedestrians



4.5 CYCLISTS

This section provides analysis of single-mode Bike users and the length of their cycling trips. Similar to trips made by pedestrians, this analysis does not include Bike trips without a clearly defined trip destination, such as a recreational ride around the Stanley Park Seawall.

Figure 4.5.1 indicates that 56% of all trips by single-mode Bike users are commuting trips. These are also the longest Bike trips at close to 7km on average.

Figure 4.5.1 – Bike Trips by Purpose and Trip Length

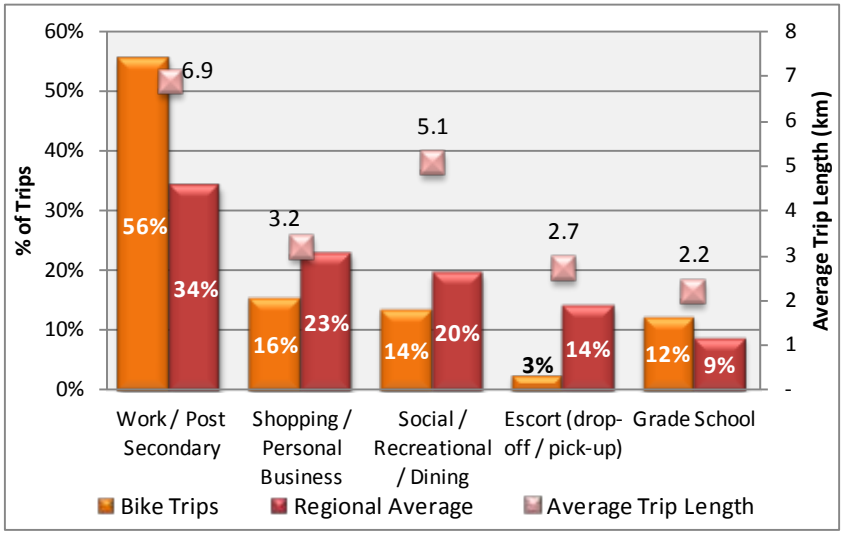


Figure 4.5.2 indicates that single-mode Bike users are much more likely to be males – more than two thirds of Bike users are males. Males' Bike trips also tend to be longer than those of females.

Figure 4.5.2 – Proportion of Cyclists by Gender

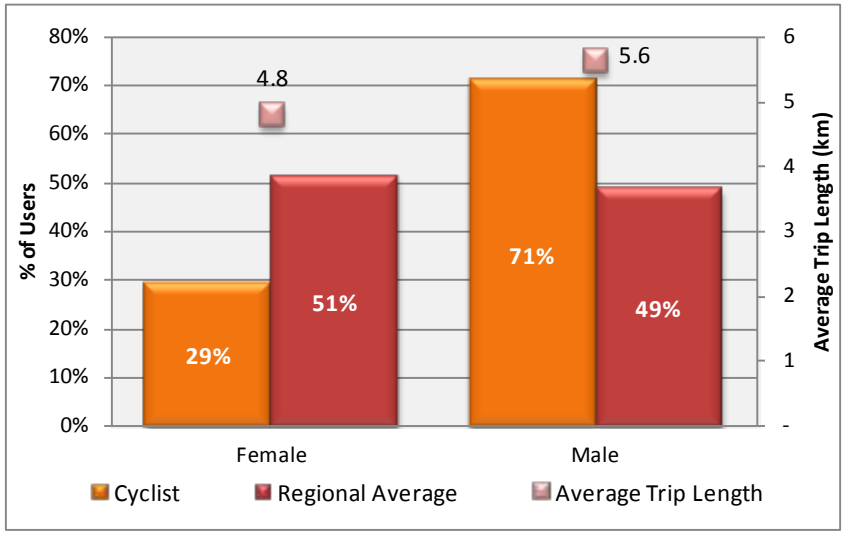


Figure 4.5.3 shows that the age group of 25-44 is the only one for which the proportion of single-mode Bike users significantly exceeds the overall proportion in the population.

With regard to distance though, similar to most other modes, the longest Bike trips are performed by people from the 18-24 age group; cycling trip distance generally declines with age.

Figure 4.5.4 indicates that single-mode Cyclists are most likely to be Full Time Employees, as Full Time Employees account for 59% of the users (only Auto Drivers have a higher likelihood of being Full Time Employees). Full Time Employees also conduct the longest Bike trips. Conversely, relative to the overall population, Cyclists are least likely to be Non-Workers / Non-Students.

Figure 4.5.3 – Age Profile of Cyclists

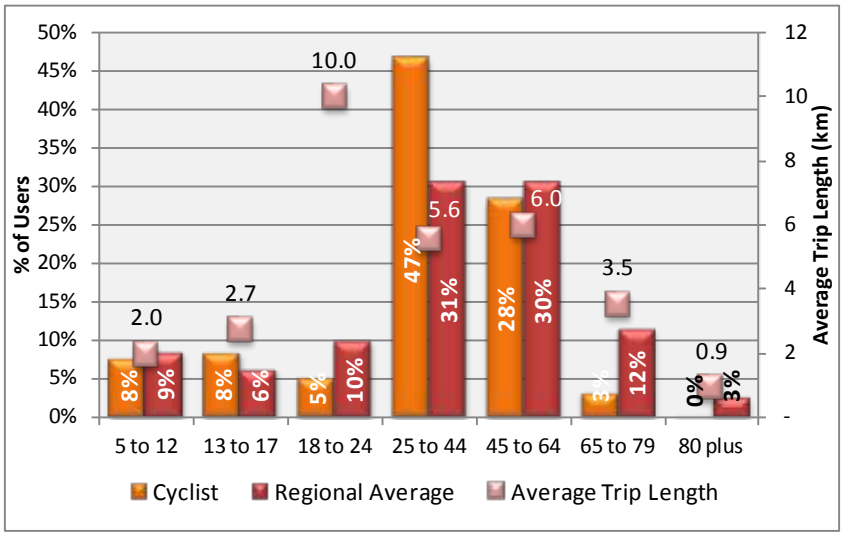


Figure 4.5.4 – Proportion of Cyclists by Life stage

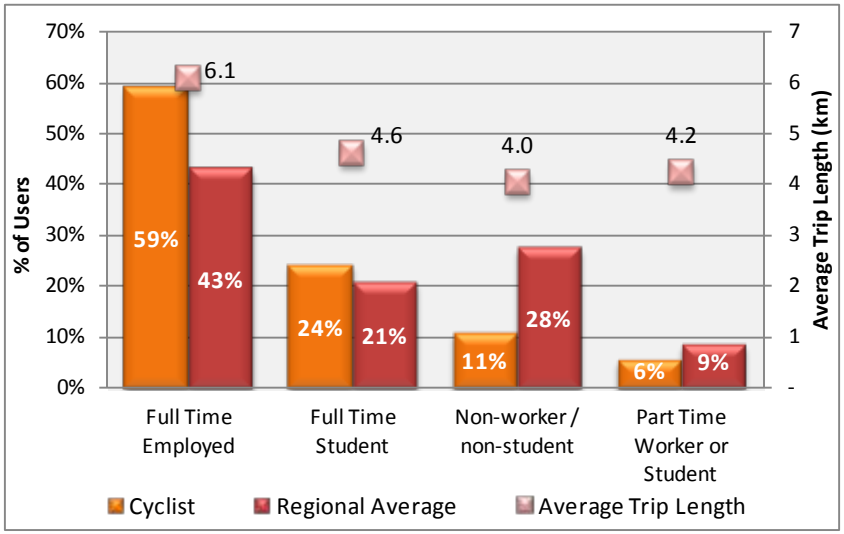


Figure 4.5.5 shows that single-mode Bike users and cycling trips' distance are correlated with household income (except in the very low income group). Cyclists (along with Auto Drivers) are also the mode users with the highest percentage of people from the highest income group.

Figure 4.5.5 – Proportion of Cyclists by Income Group

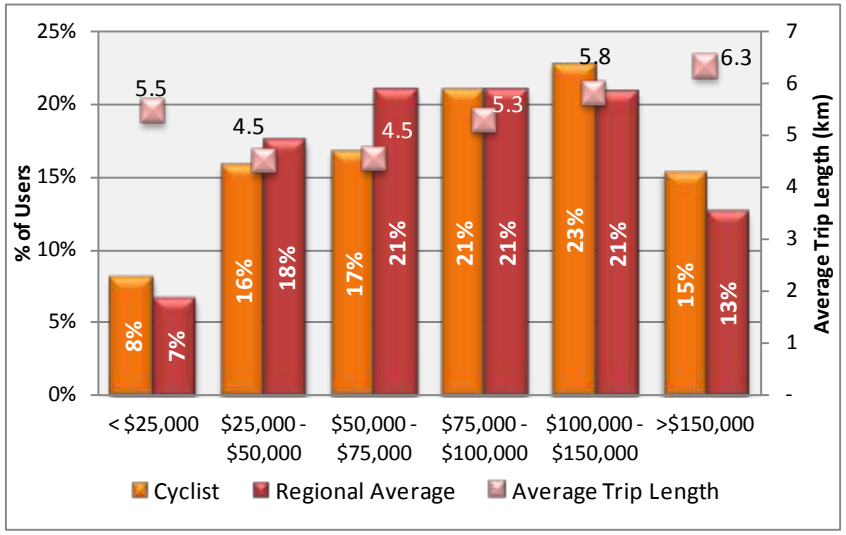


Figure 4.5.6 indicates that, as expected and similar to Transit and Walking, Cyclists are more likely to be living in apartments/condos and townhouses than the overall population and than those that use automobiles. The impact of dwelling type on average trip distance is also consistent with other modal user groups with Cyclists who live in single family dwellings having the longest average trip lengths.

Figure 4.5.6 – Proportion of Cyclists by Housing Type

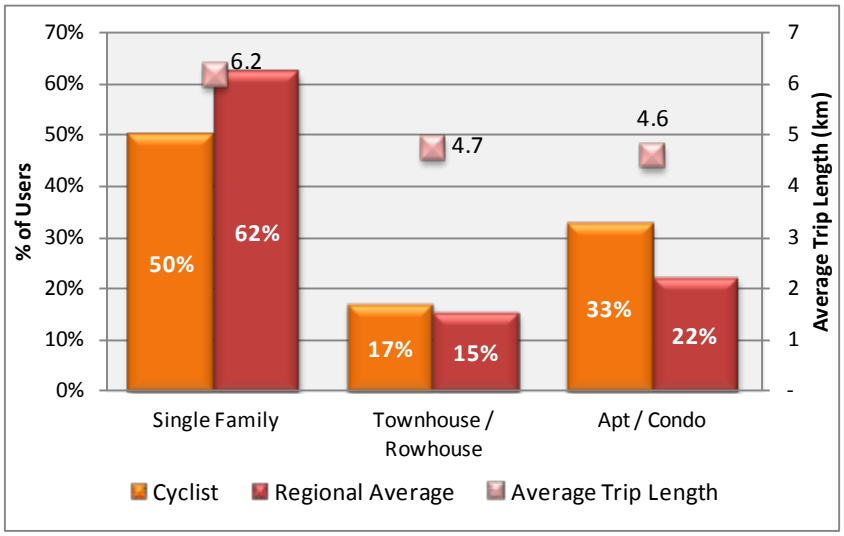
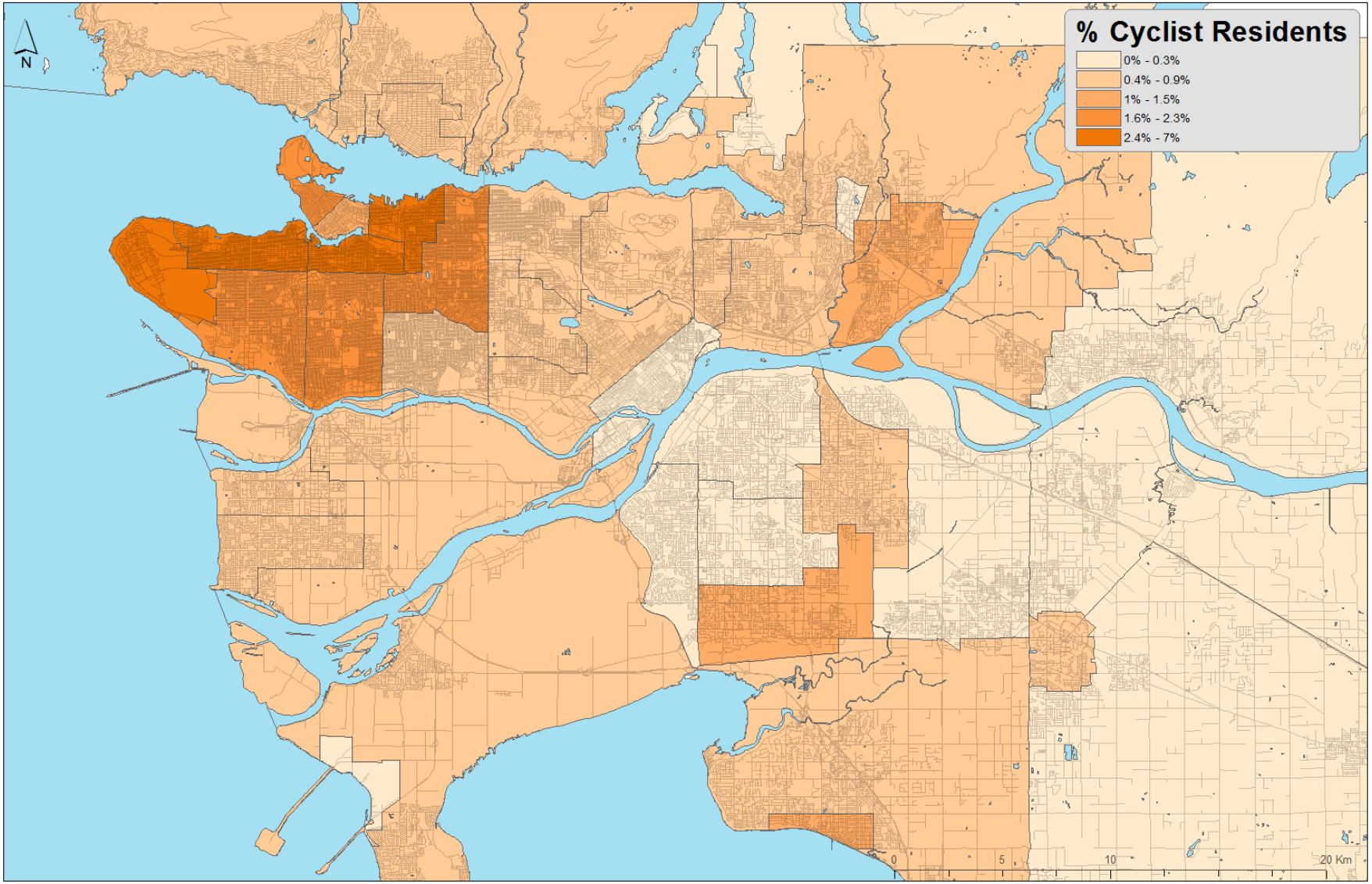


Figure 4.5.7 indicates that unlike pedestrians, single-mode Bike users as proportions of all sub-area residents are highest along the Broadway corridor rather than in the Metropolitan Core. Single-mode Bike users account for more than 1.5% of residents only in the City of Vancouver.

Figure 4.5.7 – Population Share of Single-mode Bike Users



4.6 Multi-Modal Users

Many people choose to use different modes of travel throughout a day. Residents will typically choose the mode of travel that minimizes travel time and out-of-pocket costs and maximizes convenience and comfort. Which mode is the most desirable for a particular trip could vary depending on the origin and destination, the purpose and the time of day the trip is taken. Sometimes, people use several modes in a single trip, these are called inter-modal trips. This section provides analysis of the people that conducted trips using several different primary modes during their survey travel day.

Figure 4.6.1 – Persons by Number of Different Primary Modes Used

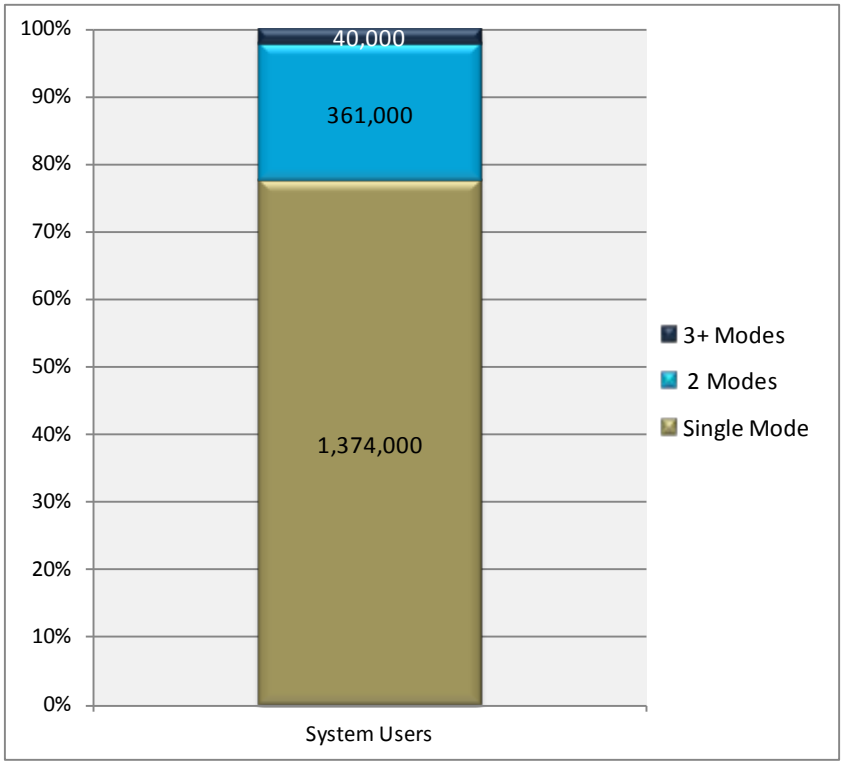
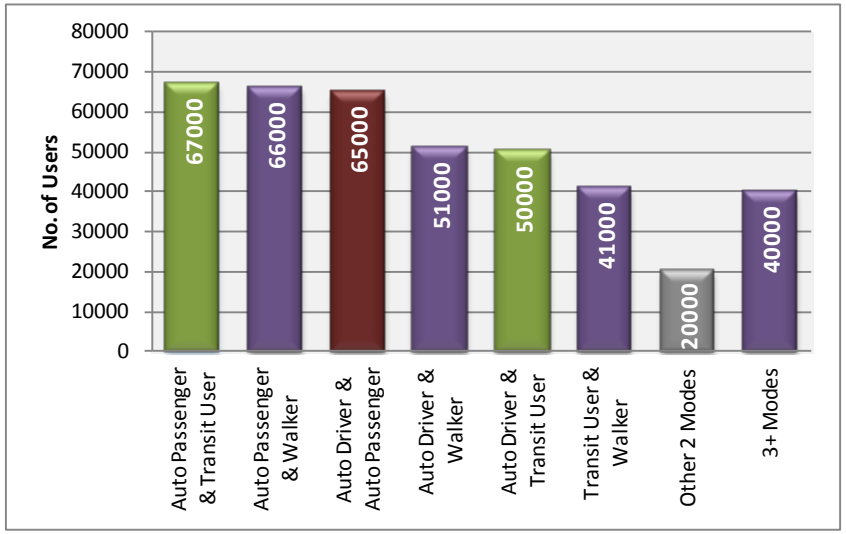


Figure 4.6.1 compares the number of single mode users to that of multi-modal users in Metro Vancouver. As can be seen, the large majority of people (almost 80%) utilize only a single mode of travel and only 2% of all users use three or more modes per day.

Note that these are proportions of multi-modal users within a single day; naturally, the longer the period of analysis is the more chance people have to use a variety of modes.

Figure 4.6.2 – Multi-Modal Persons by Modes Used[10]



† Bar colours are based on second mode.

Figure 4.6.2 depicts the frequency of mode combinations of multi-modal users with at least one Auto Driver or Auto Passenger trip. The largest groups of multi-modal users are those combining Auto

[10] This figure includes some overlap – for instance, an Auto Passenger-transit user could have used driving to a park & ride facility as a secondary mode to transit. The Auto Driver part of the trip is not accounted for in this case. This analysis only focuses on the primary mode of travel.

Passenger trips with other modes (Driving, Walking and Transit respectively); this is another indication that Auto Passengers are more flexible in their mode choice than Auto Drivers.

Figure 4.6.3 indicates that multi-modal users are more likely to be females than males.

Figure 4.6.3 – Multi-Modal Trip Makers by Gender

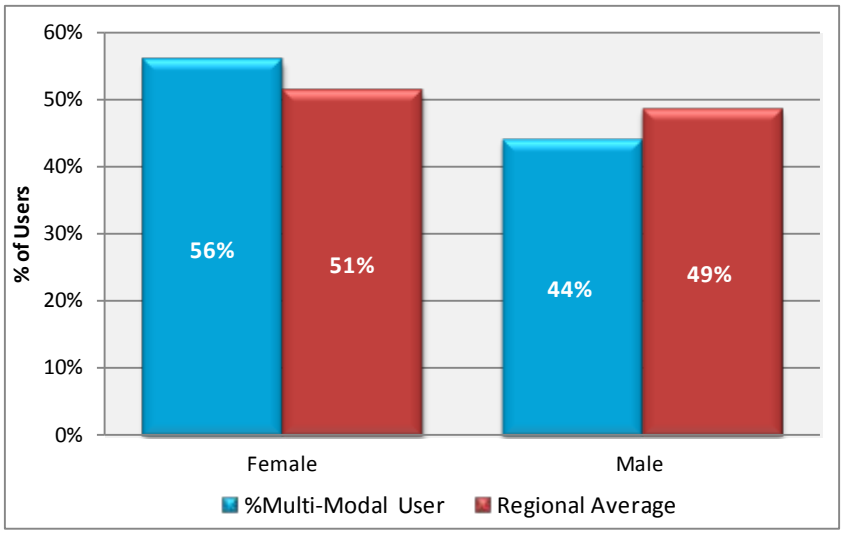


Figure 4.6.4 shows that multi-modal users are more likely to be in younger age groups of people up to 44 years relative to the overall population, while the opposite is true for the older age groups. This could be because of auto ownership and availability - as people become older they may have greater access to an automobile. On the other hand, it can also be a generational gap where older people are used to relying on the automobile while younger people are accustomed to using different modes.

Figure 4.6.4 – Multi Modal Trip Makers by Age Group

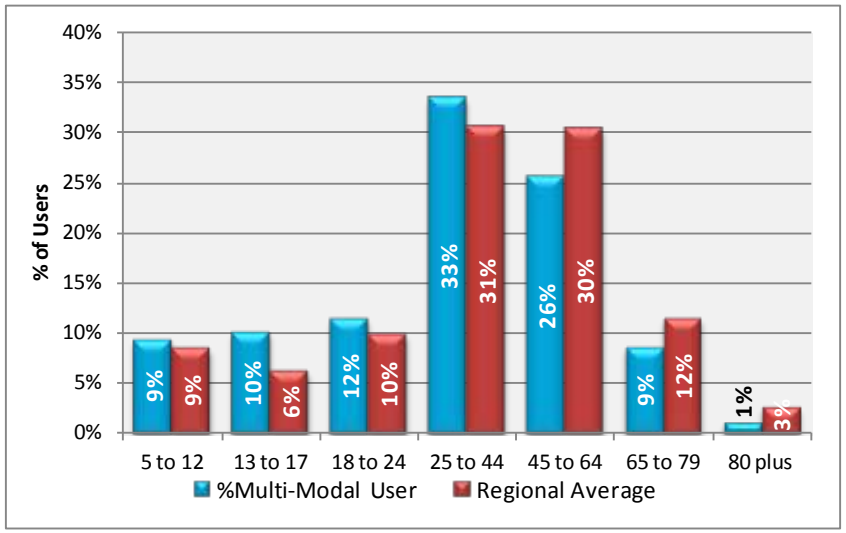


Figure 4.6.5 depicts the proportion of multi-modal users by life stage. As can be seen in the figure, Full Time Employees are the biggest group of multi-mode users and their proportion of users is similar to their proportion in the overall population. On the other hand, multi-modal users have a greater tendency to be Full Time Students compared to the overall population. Conversely, Non-Workers / Non-Students are the least likely to be Multi-modal users relative to the overall population.

Figure 4.6.5 – Proportion of Multi Modal Users by Life stage

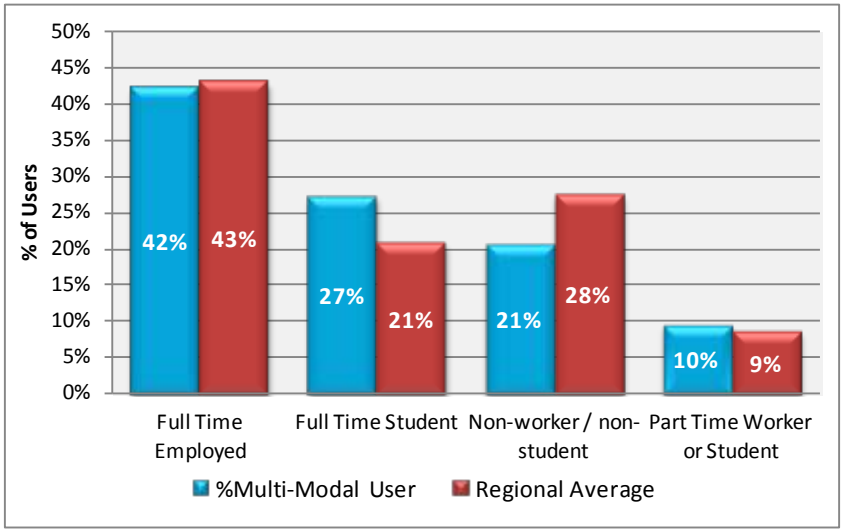


Figure 4.6.6 – Proportion of Multi Modal Users by Income

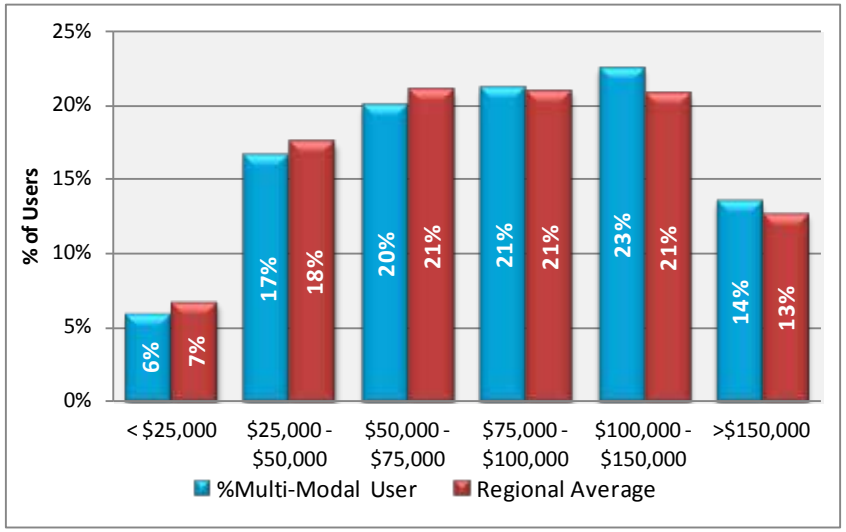


Figure 4.6.6 shows that there is some correlation between income and the propensity to use multiple models; multi-mode users are slightly more likely to be from higher income groups relative to the overall population.

Figure 4.6.7 indicates that multi-modal users are somewhat more likely to be people living in apartments or condos and less likely to live in single family dwellings relative to the overall population.

Figure 4.6.8 indicates that multi-modal users as a proportion of total residents in each of the sample sub-areas are highest in the Metropolitan Core and along the Broadway corridor. The proportion of multi-modal users is also relatively high throughout the Burrard Peninsula, the City and District of North Vancouver, and central Richmond.

Figure 4.6.7 – Proportion of Multi Modal Users by Housing Type

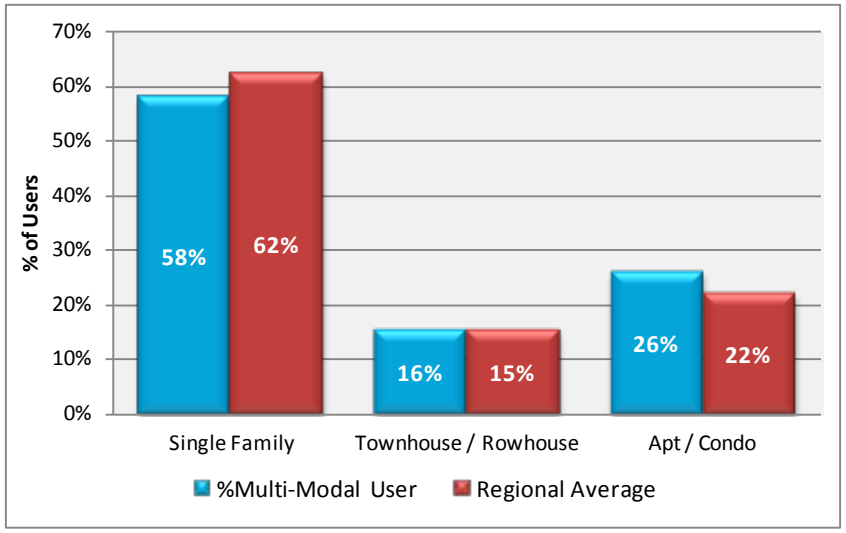
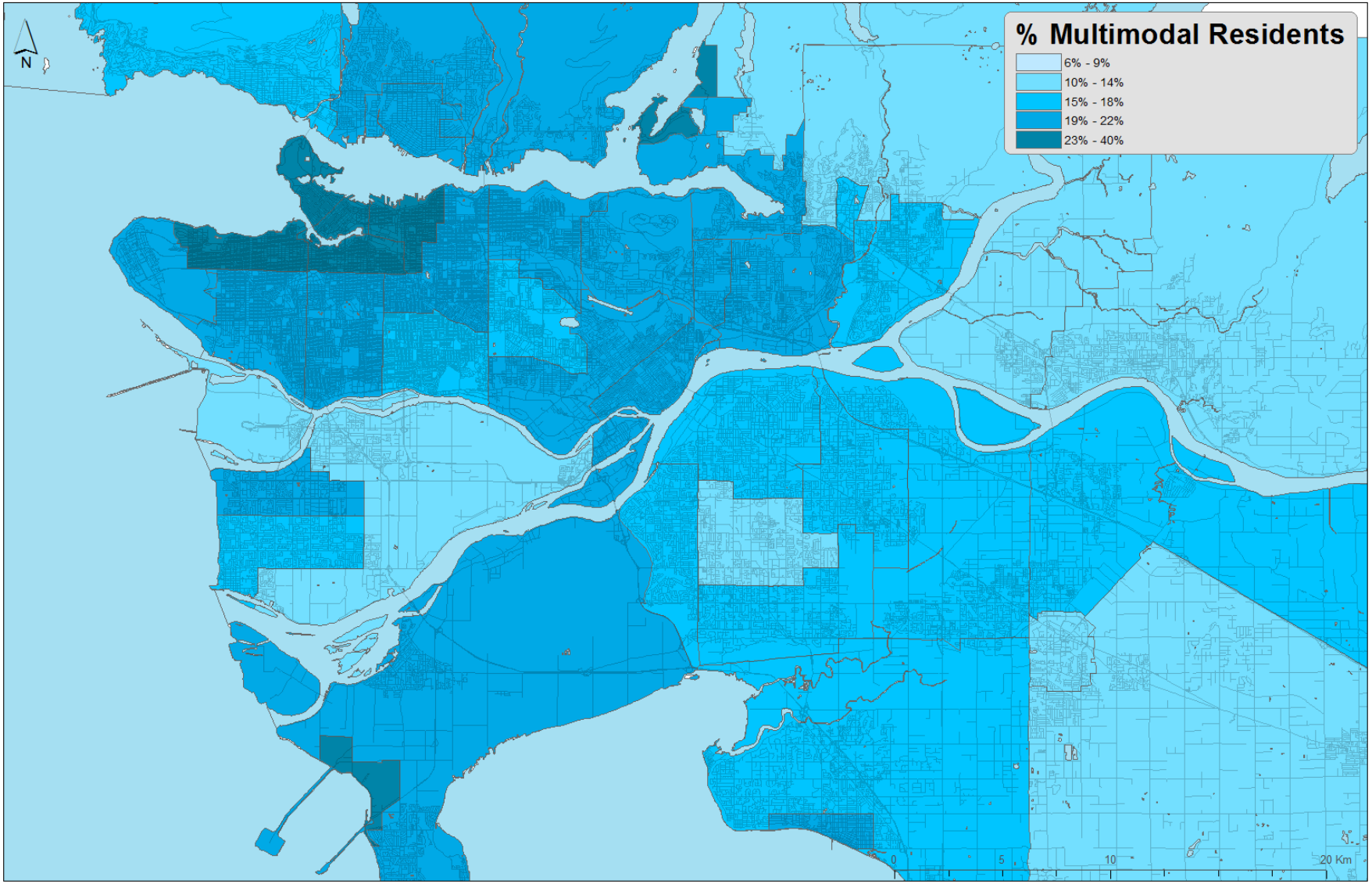


Figure 4.6.8 – Population Share of Multi-modal Users



4.7 SUMMARY OF SYSTEM USERS ANALYSIS

This section has provided an in-depth analysis of the demographic profile of the various system users with comparisons to regional averages. The characteristics of each system user including trip purpose, trip length, gender, age profile, life stage, income, housing type and geographic distribution of residents has been summarized. In addition, the section includes an analysis of multi-modal users. This provides a unique approach for better understanding the overall travel market and the users of the transportation system. There are many unique and defining characteristics of the various system users that have been revealed through this approach by drawing comparisons to the regional average. Some of the key findings from this analysis include the following:

- Auto drivers exhibit the highest rate of single-mode usage while the other modes show a balance between single and multi-mode usage.
- Transit users exhibit the longest trip lengths out of all other modal users.
- The geographic distribution of Auto Drivers (and passengers) place of residence is almost a mirror image of that of Transit users. Transit users are concentrated in the core inner municipalities while Auto Drivers and passengers are focused in the outer municipalities.
- Trip length is usually not influenced by income; however it is strongly influenced by age since young adults (18-24) conduct the longest trips and as people get older their average trip length decreases.
- Transit, Walking and cycling users are more likely to live in non-single family dwellings relative to the overall population.
- The similarities between the geographic residential, economic and dwelling type distributions of Auto Passengers and Auto Drivers suggest that most ride sharing occurs within the household or neighbours.
- Cyclists, Transit and multi-modal users are more likely to be in the younger age groups of people up to 44 years relative to the overall population. This could be because of auto availability; but it can also indicate a generational gap where older people are used to relying on the automobile while younger people are accustomed to using different modes.

Figure 4.7.1 provides the dominant attributes of the different mode users. For example, Cyclists are typically dominated by males who are young professionals, their income is positively correlated to usage of this mode and they live in an apartment within the inner municipalities.

Figure 4.7.1 – Typical Attributes of Different Mode Users

	Gender	Life Cycle	Income	Dwelling	Location
Driver	Male	Employee	+	Single Family	Suburbs
Passenger	Female	Grade School	+	Single Family	Suburbs
Transit	Female	Young Adults	-	Apartment	Inner Municipalities
Pedestrians	Female	Grade School	-	Apartment	Inner Municipalities
Cyclists	Male	Young Professionals	+	Apartment	Inner Municipalities
Multi-Modal	Female	Young	+	Apartment	Inner Municipalities

Note: the sign for "Income" relates to the correlation between household income and tendency to use the specific mode.

By looking at the Trip Diary in this manner, a good understanding of each modal user has been provided along with the characteristics that make each mode user group unique.

Appendices

APPENDICES

A. MUNICIPAL ANALYSIS

This section of the report presents selected data for Metro Vancouver municipalities with a population of over 10,000 residents in 2011. The analysis includes all daily trips made by the residents of the municipality (5 years of age and older) within the Lower Mainland.

The analysis does not consider trips made to/from the municipality by non-residents or trips made through the municipality.

The following figures are presented for each municipality:

- Figure A.X.1: A map of the Lower Mainland that illustrates the percent distribution of trip destinations by municipality for daily trips by the residents of the selected municipality. Data are only shown for municipal destinations that account for more than 0.4% of the total daily trips made by the residents;
- Figure A.X.2: A chart that illustrates the weekday mode share for trips made by the residents of the selected municipality to a destination in that municipality. This includes the return portion of trips made to other municipalities as well as trips that were internal to the municipality. As a result, the values in these charts are not directly comparable to the analysis of sub-regional internal versus external trips presented in the main report ;
- Figure A.X.3: A chart that illustrates the weekday trips by mode made by the residents of the selected municipality to a destination outside of that municipality. Trips totals have been calculated by destination sub-region in order to facilitate comparisons across municipalities;
- Figure A.X.4: A chart that illustrates average trip length by mode for trips made by the residents of the selected municipality. It should be noted that average bike trip lengths in smaller municipalities may not accurately reflect actual averages given the small sample size for these types of trips. Regional averages are also shown for comparative purposes;
- Figure A.X.5: A chart that illustrates average trip length by trip purpose for trips made by the residents of the selected municipality. Regional averages are also shown;
- Figure A.X.6: A chart that illustrates weekday mode share by trip purpose for trips made by the residents of the selected municipality;
- Figure A.X.7: A chart that illustrates trips by mode and weekday mode share for trips made by the residents of the selected municipality on a typical weekday in the fall of 2008 versus the fall of 2011. As indicated in the main body of the report, in order to improve our understanding of trends in travel behaviour between 2008 and 2011, the 2008 Trip Diary expansion factors were adjusted to 2008 population totals that are consistent with the Census estimates using the same sub-areas as applied in the 2011 survey. Nevertheless, it should be noted that the range of uncertainty in the estimates of trips and mode share increases as the size of the municipality decreases. As a result, any changes illustrated in the charts between 2008 and 2011, particularly in the smaller municipalities, may not be statistically significant.

A.1 CITY OF BURNABY

Figure A.1.2 - Mode Share - to Burnaby

Figure A.1.3 - Weekday Trips by Mode - to Other Areas

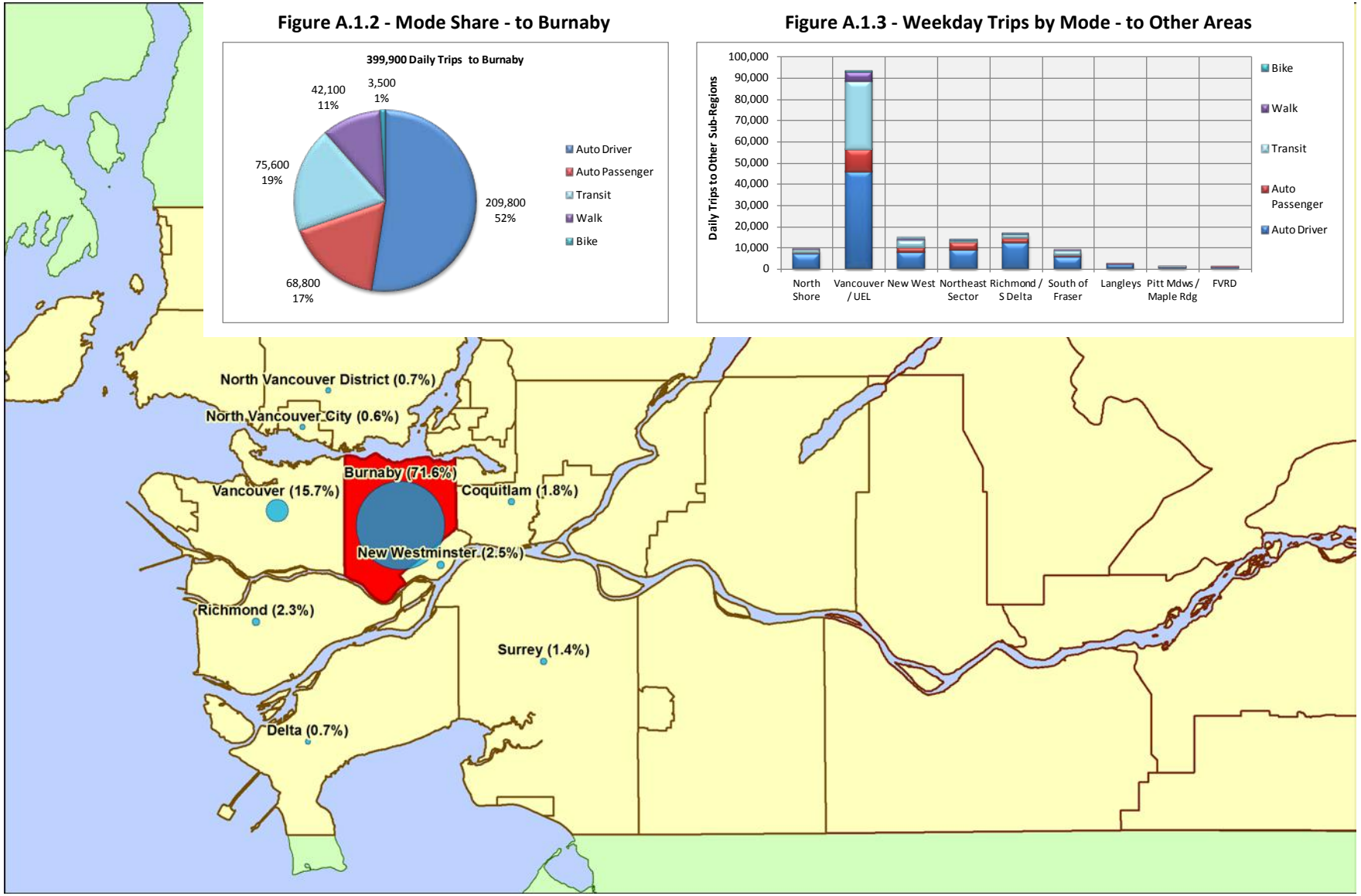


Figure A.1.1 - Trip Destinations - Burnaby Residents

Figure A.1.4 - Average Trip Length by Mode (Burnaby)

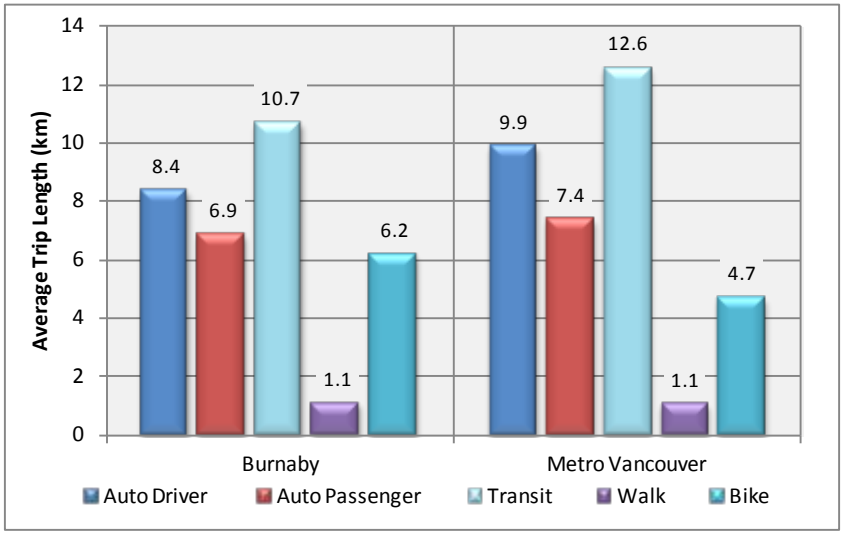


Figure A.1.5 - Average Trip Length by Trip Purpose (Burnaby)

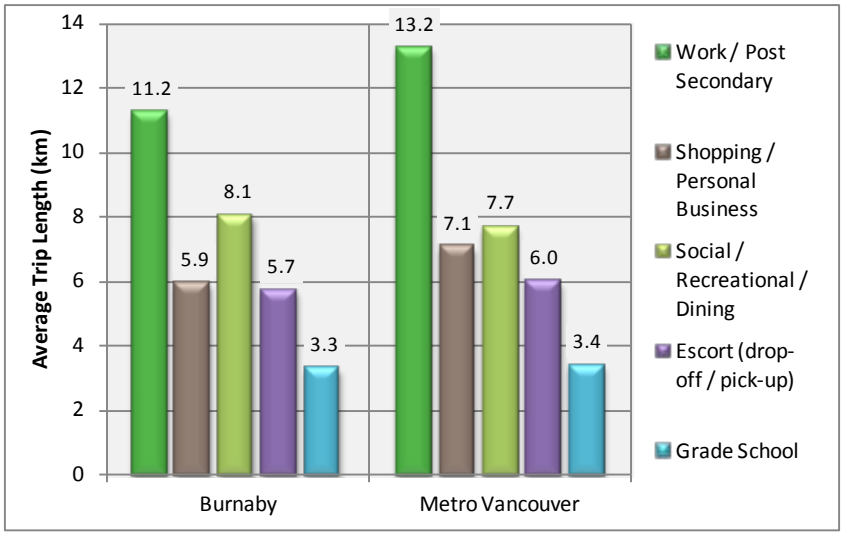


Figure A.1.6 - Weekday Mode Share (Burnaby)

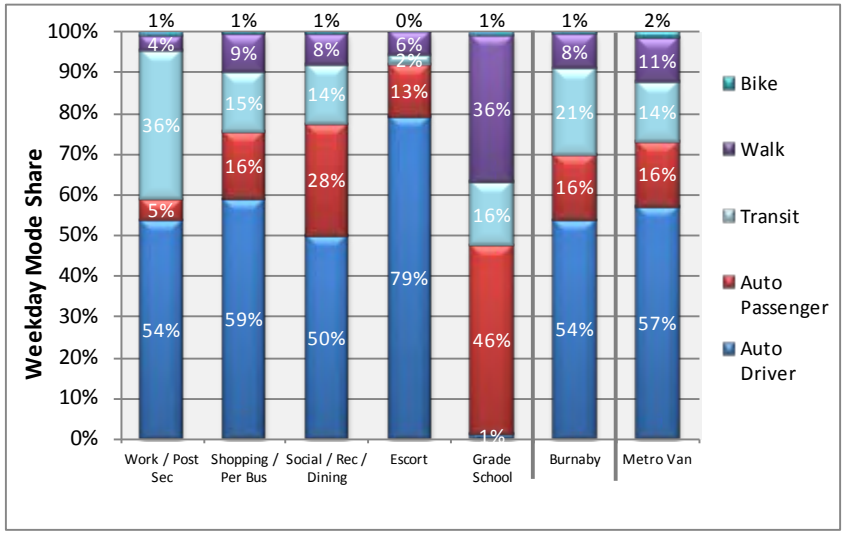
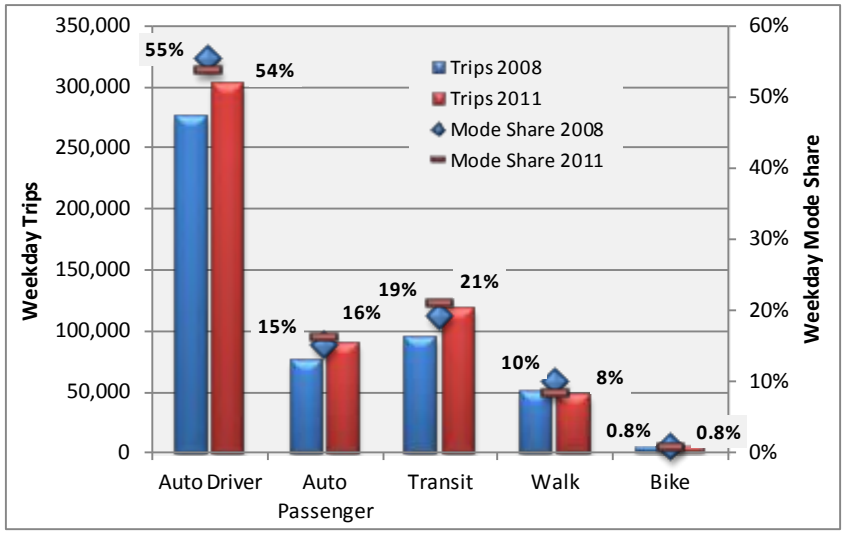


Figure A.1.7 - Trips by Mode and Mode Share (Burnaby)



A.2 CITY OF COQUITLAM

Figure A.2.2 - Mode Share - to Coquitlam

Figure A.2.3 - Weekday Trips by Mode - to Other Areas

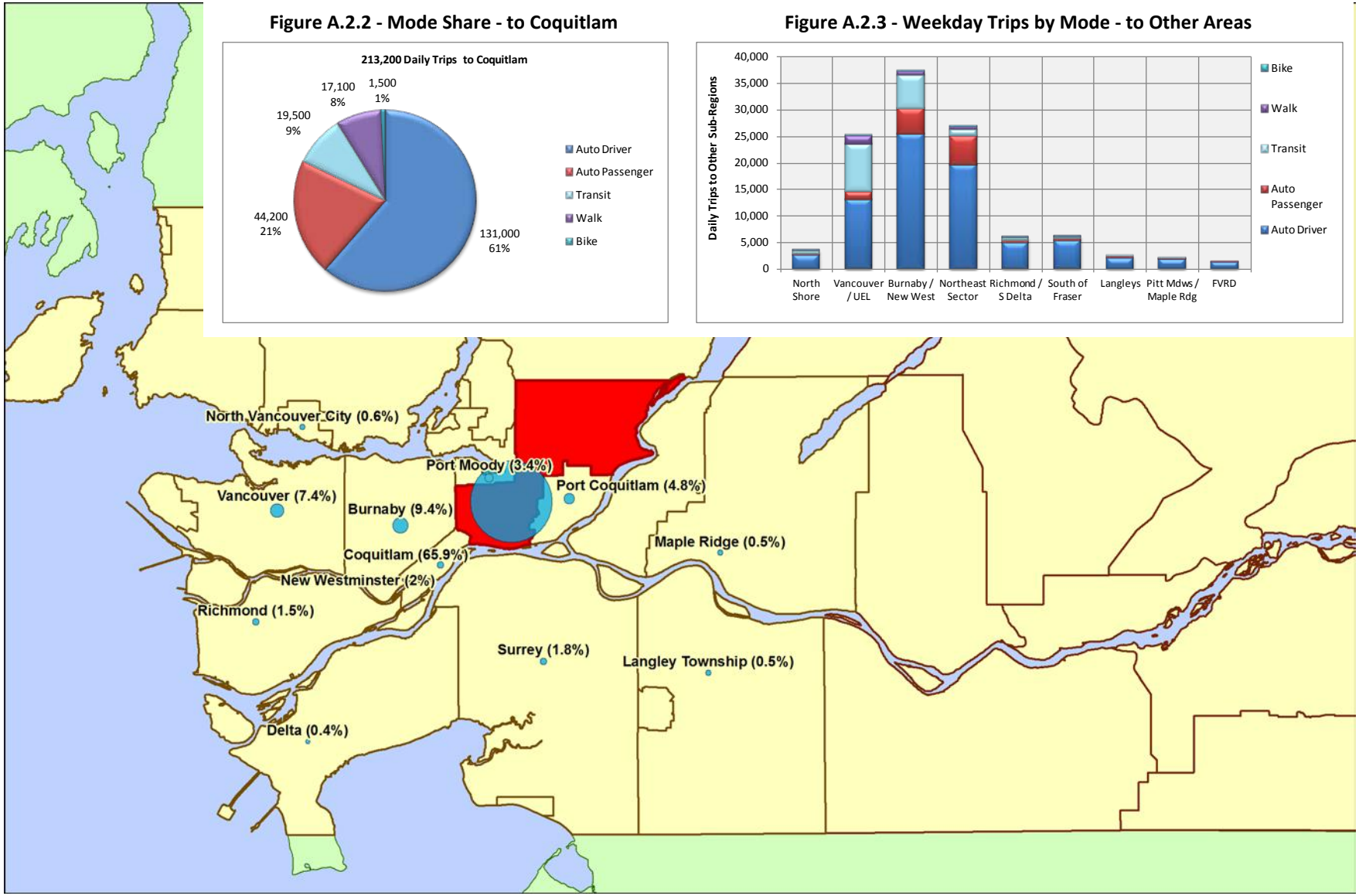


Figure A.2.1 - Trip Destinations - Coquitlam Residents

Figure A.2.4 - Average Trip Length by Mode (Coquitlam)

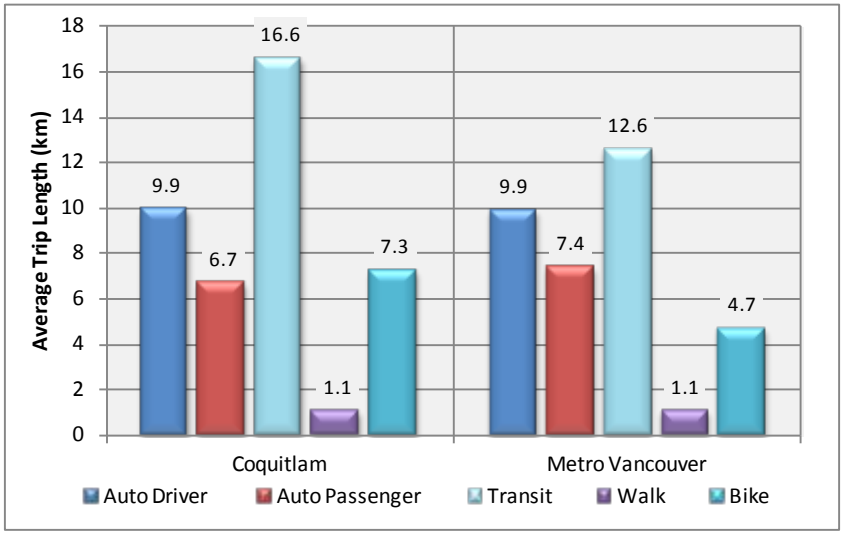


Figure A.2.5 - Average Trip Length by Trip Purpose (Coquitlam)

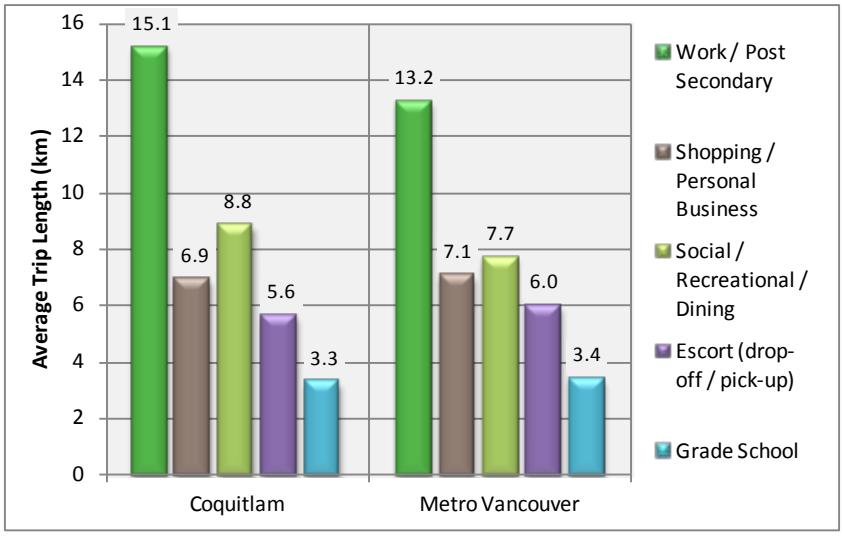


Figure A.2.6 - Weekday Mode Share (Coquitlam)

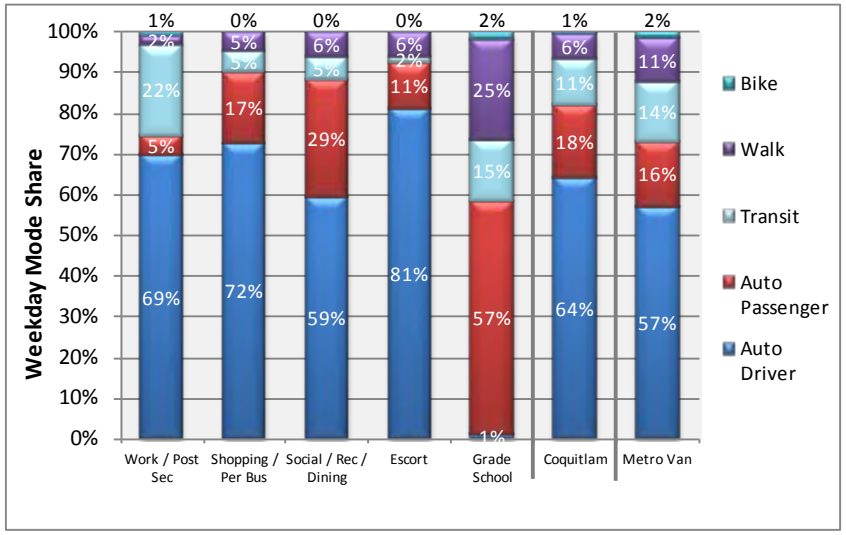
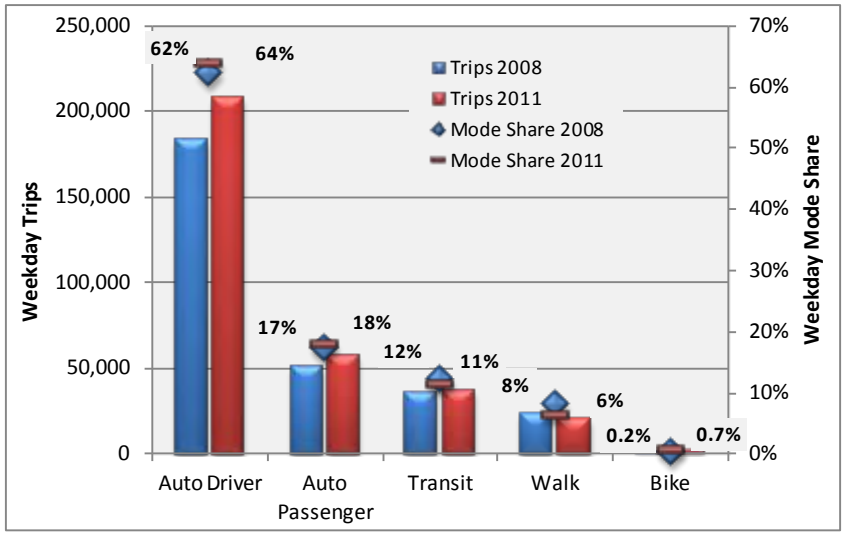


Figure A.2.7 - Trips by Mode and Mode Share (Coquitlam)



A.3 CORPORATION OF DELTA

Figure A.3.2 - Mode Share - to Delta

Figure A.3.3 - Weekday Trips by Mode - to Other Areas

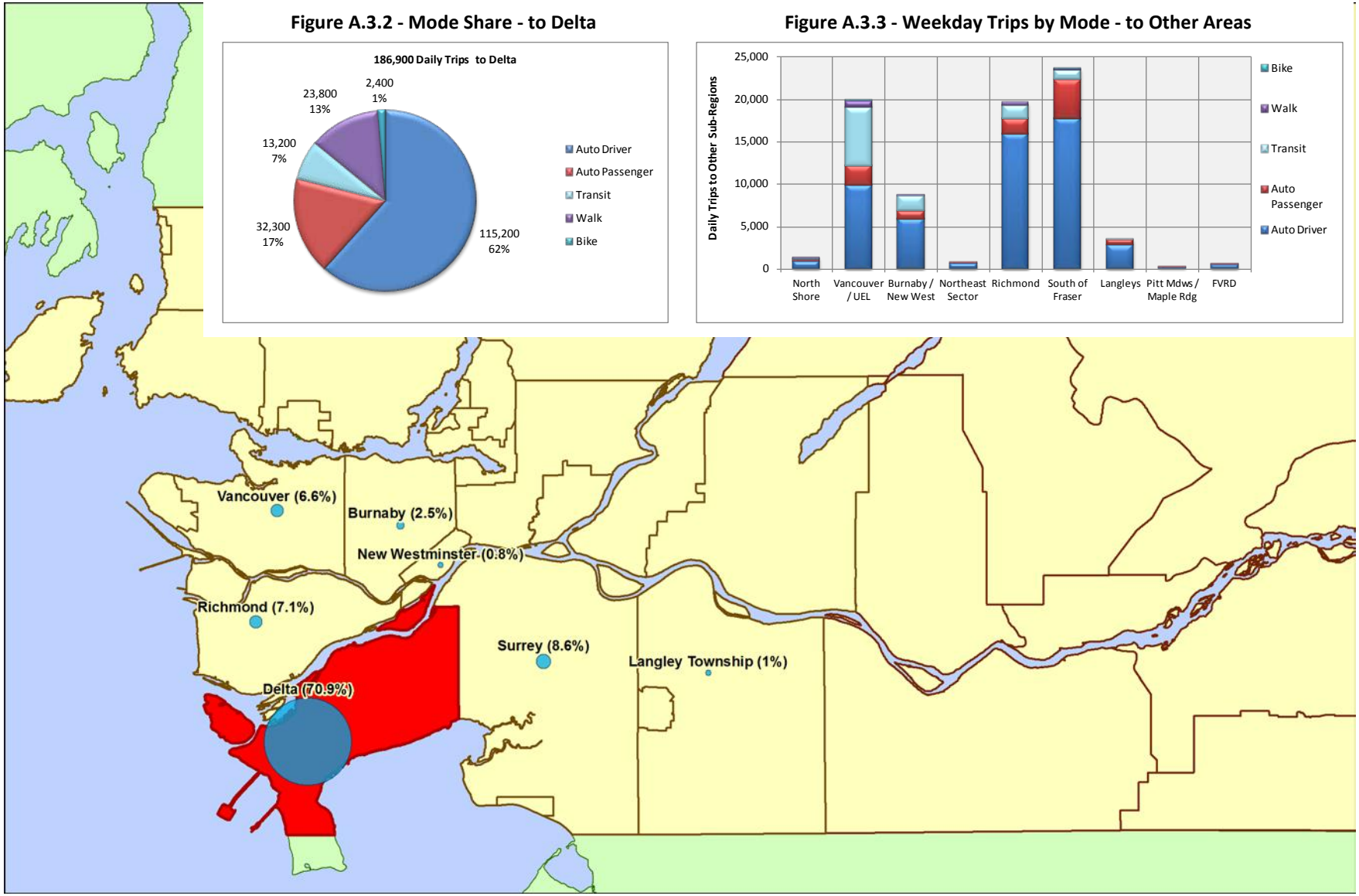


Figure A.3.1 - Trip Destinations - Delta Residents

Figure A.3.4 - Average Trip Length by Mode (Delta)

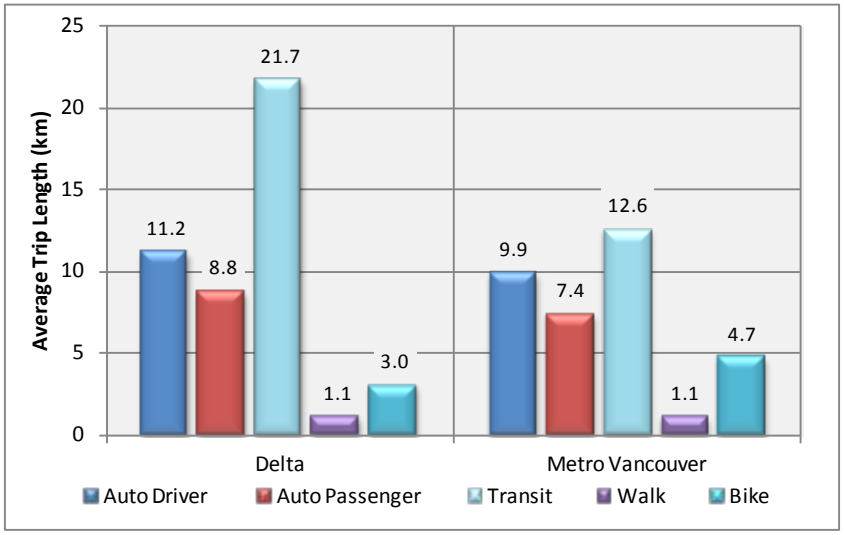


Figure A.3.5 - Average Trip Length by Trip Purpose (Delta)

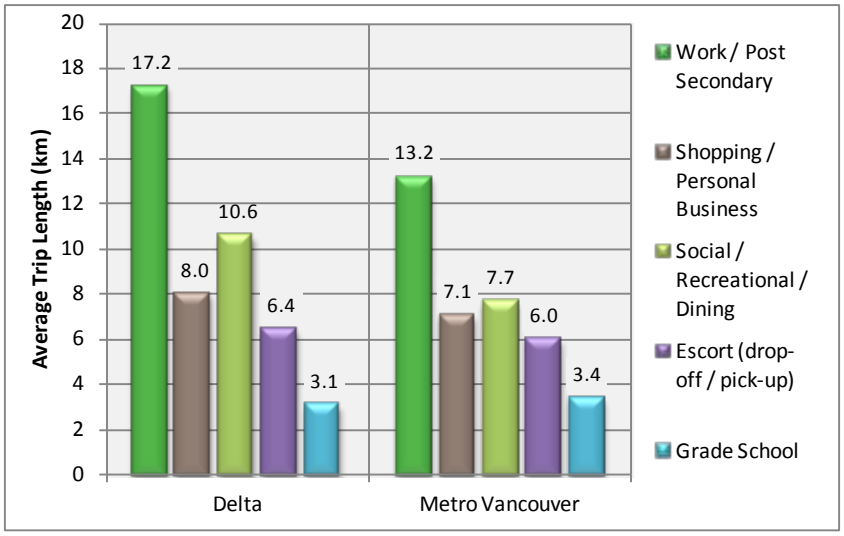


Figure A.3.6 - Weekday Mode Share (Delta)

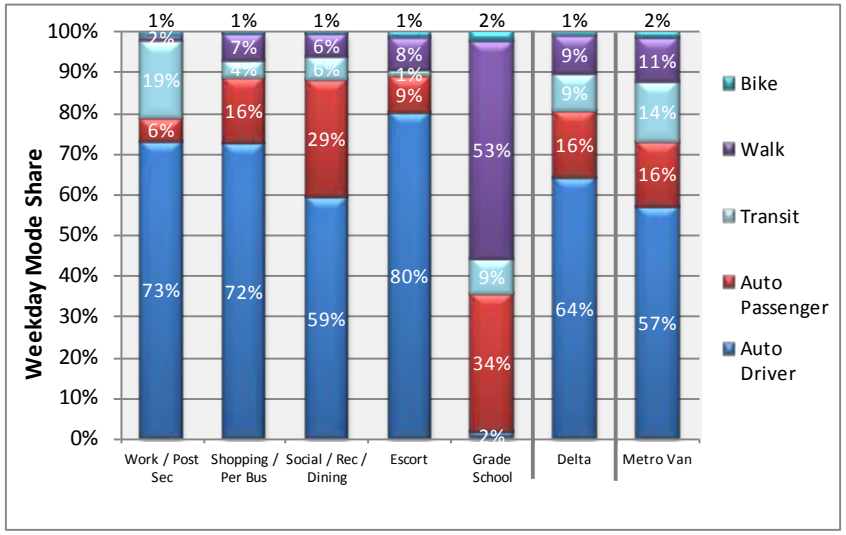
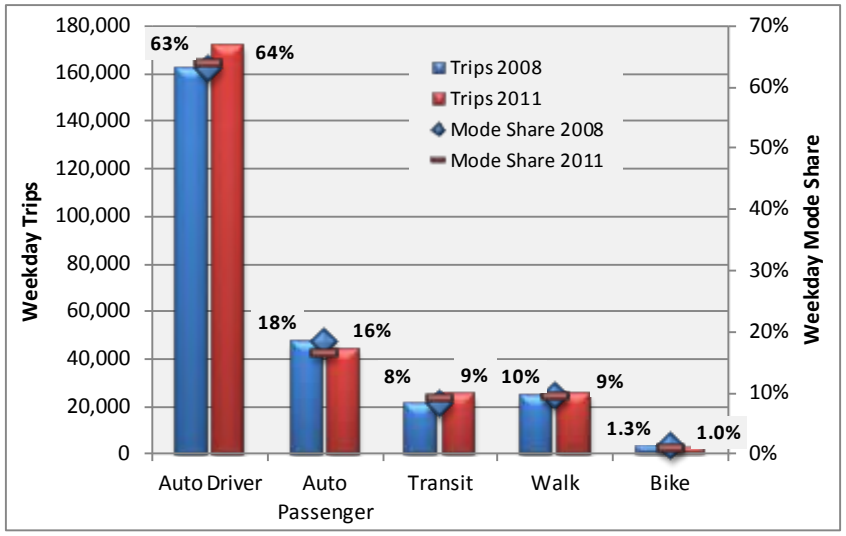


Figure A.3.7 - Trips by Mode and Mode Share (Delta)



A.4 CITY OF LANGLEY

Figure A.4.2 - Mode Share - to Langley City

Figure A.4.3 - Weekday Trips by Mode - to Other Areas

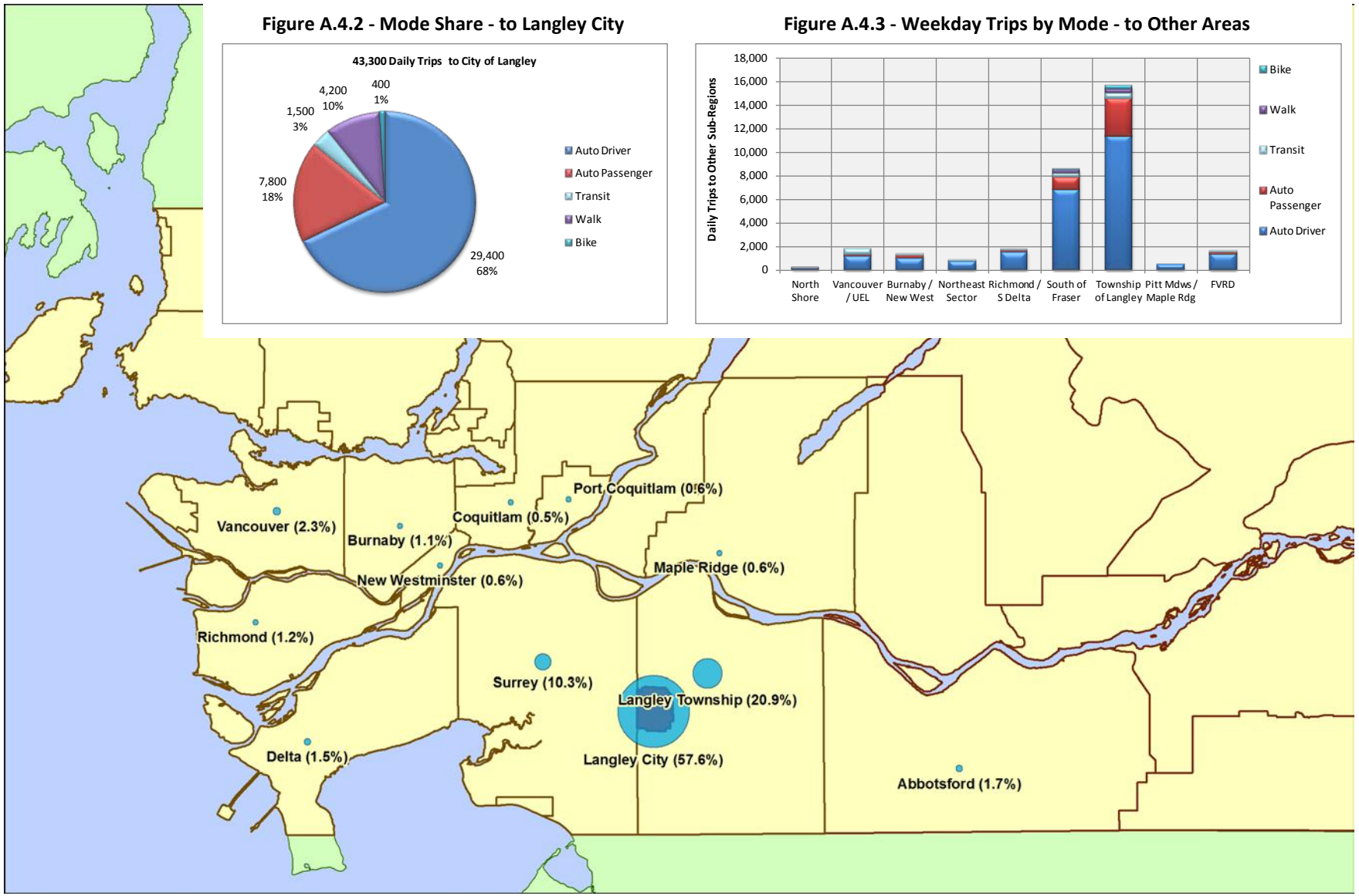


Figure A.4.1 - Trip Destinations - Langley City Residents

Figure A.4.4 - Average Trip Length by Mode (Langley City)

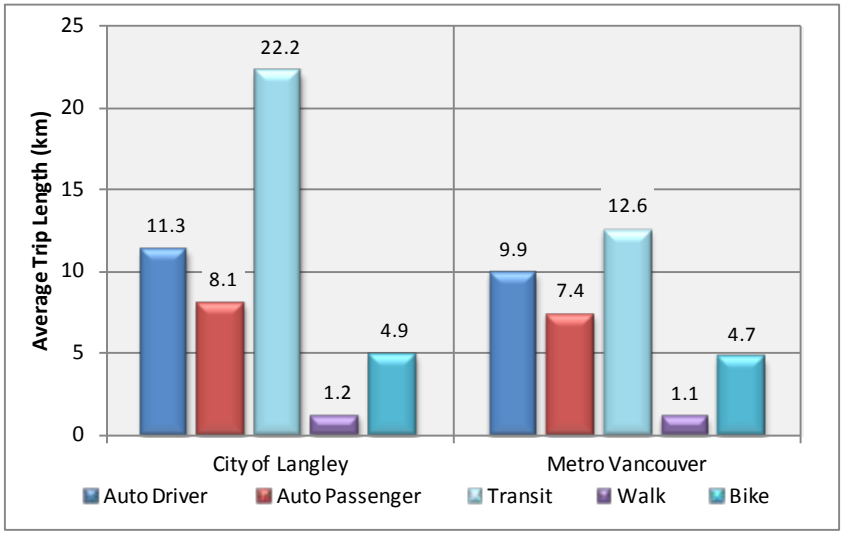


Figure A.4.5 - Average Trip Length by Trip Purpose (Langley City)

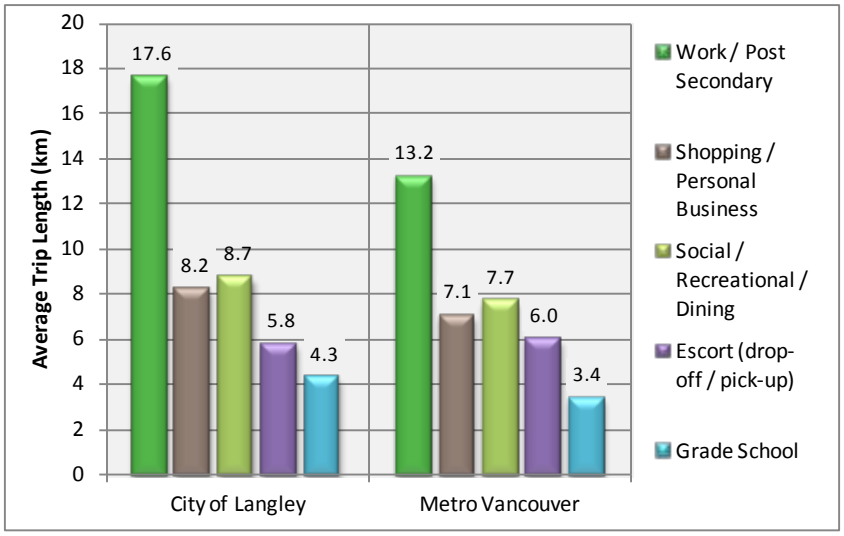


Figure A.4.6 - Weekday Mode Share (Langley City)

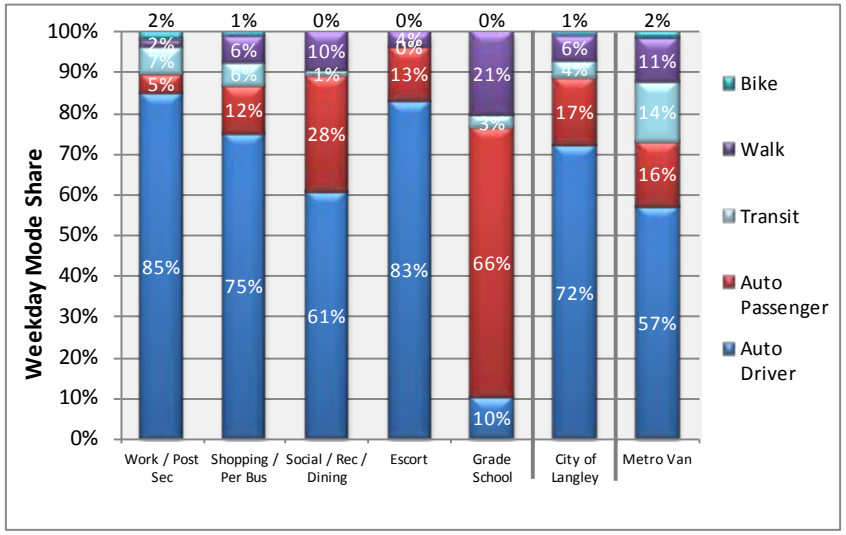
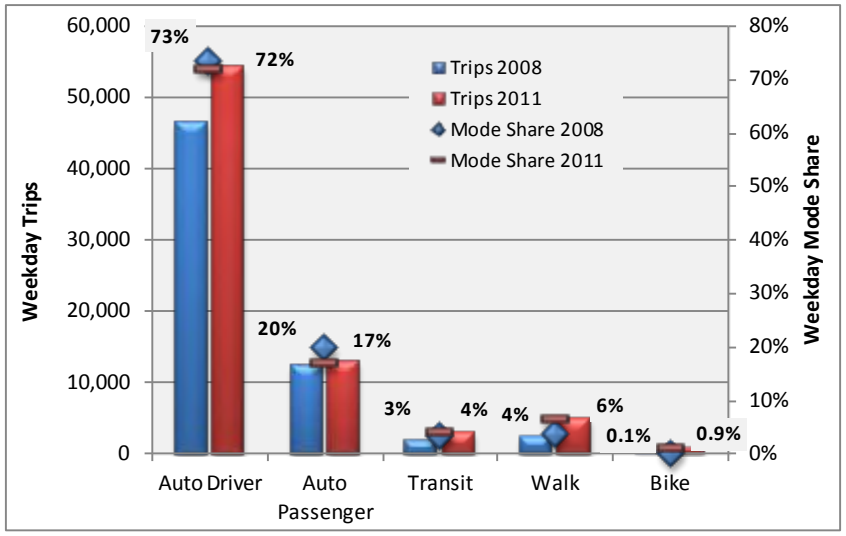


Figure A.4.7 - Trips by Mode and Mode Share (Langley City)



A.5 TOWNSHIP OF LANGLEY

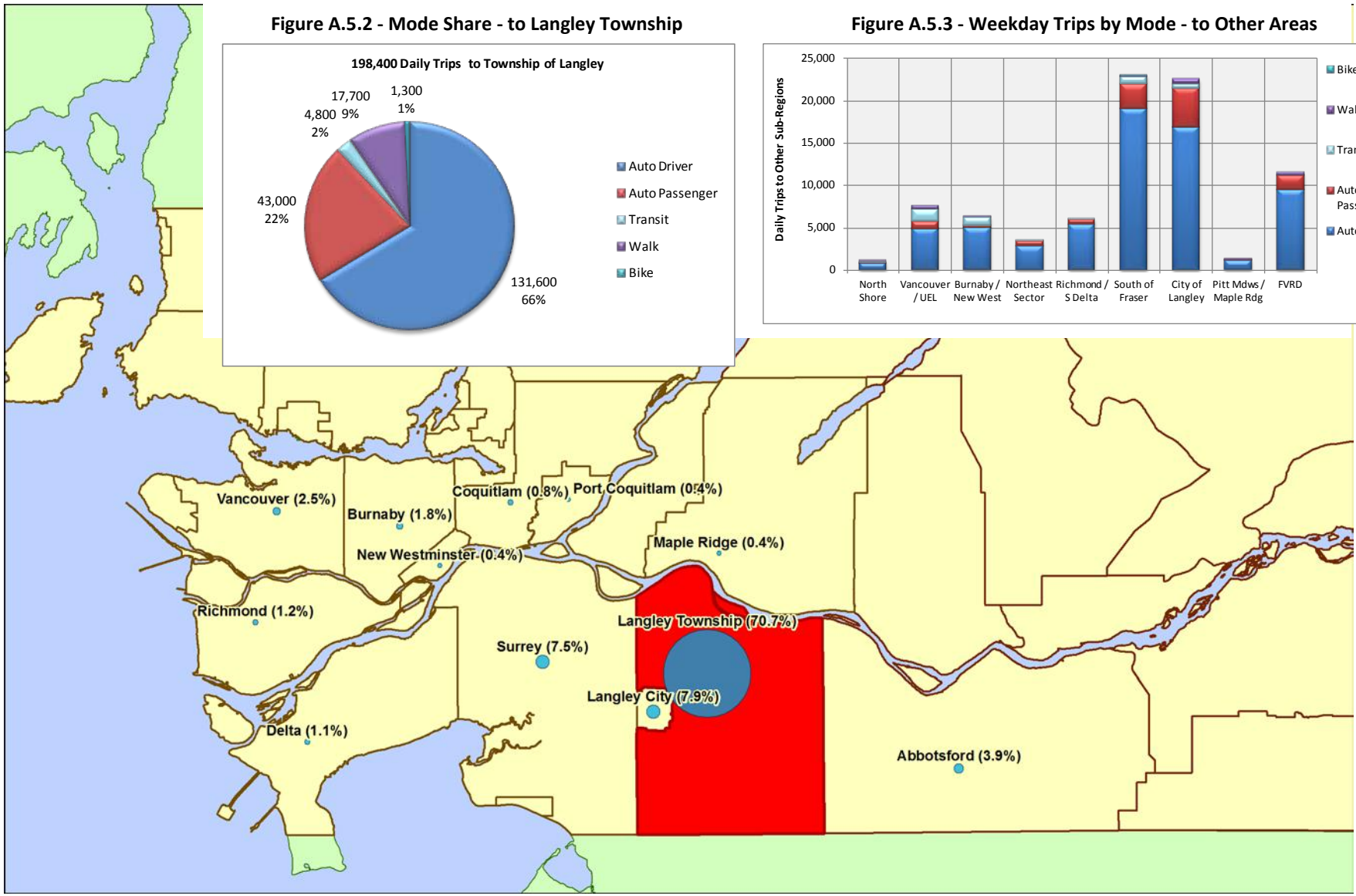


Figure A.5.1 - Trip Destinations - Langley Township Residents

Figure A.5.2 - Mode Share - to Langley Township

Figure A.5.3 - Weekday Trips by Mode - to Other Areas

Figure A.5.4 - Average Trip Length by Mode (Langley Township)

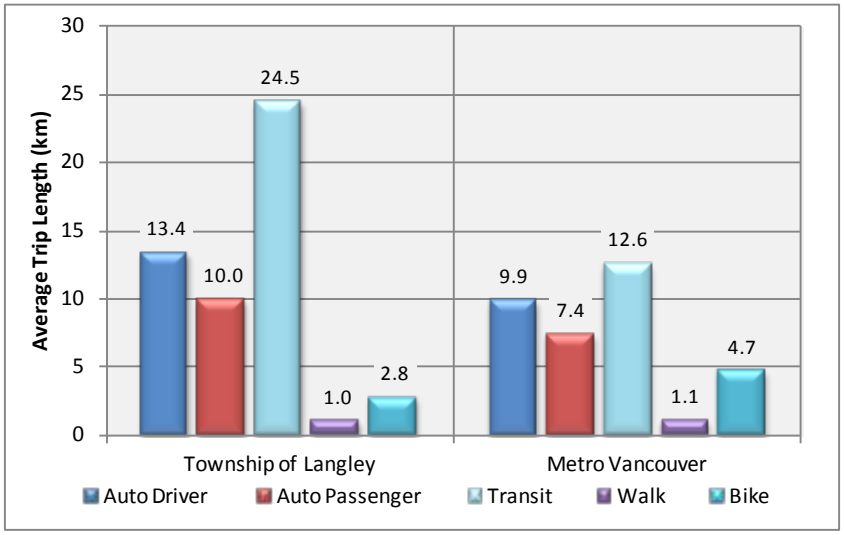


Figure A.5.5 - Average Trip Length by Trip Purpose (Langley Township)

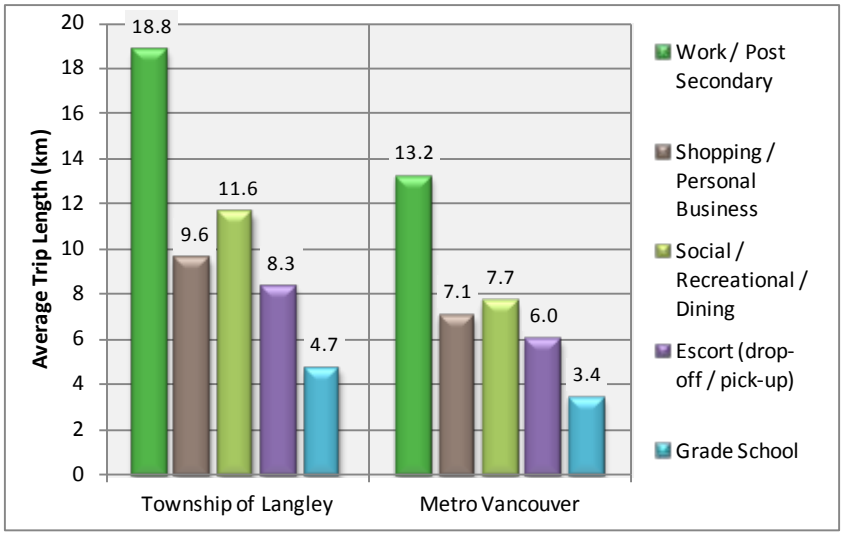


Figure A.5.6 - Weekday Mode Share (Langley Township)

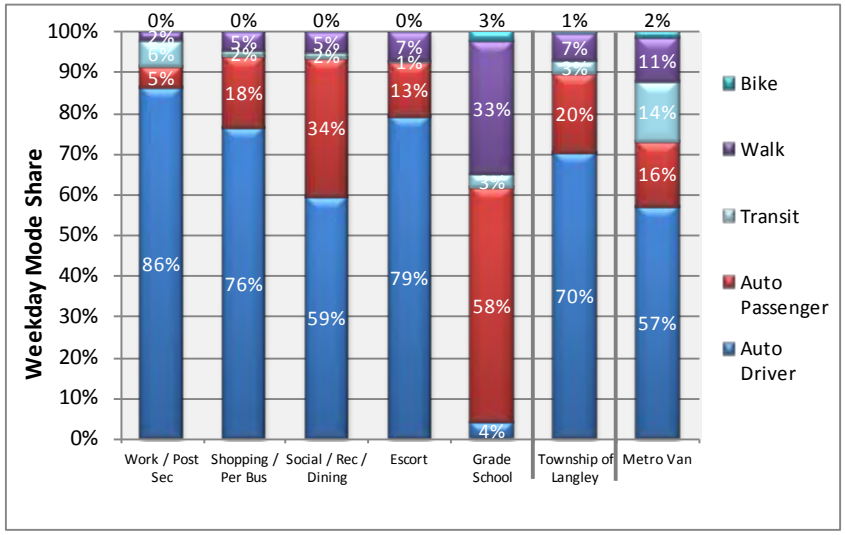
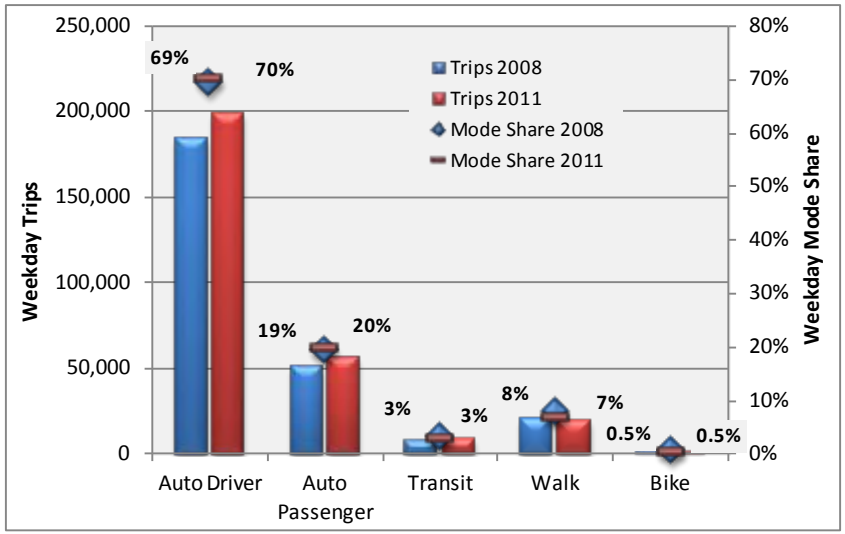


Figure A.5.7 - Trips by Mode and Mode Share (Langley Township)



A.6 DISTRICT OF MAPLE RIDGE

Figure A.6.2 - Mode Share - to Maple Ridge

Figure A.6.3 - Weekday Trips by Mode - to Other Areas

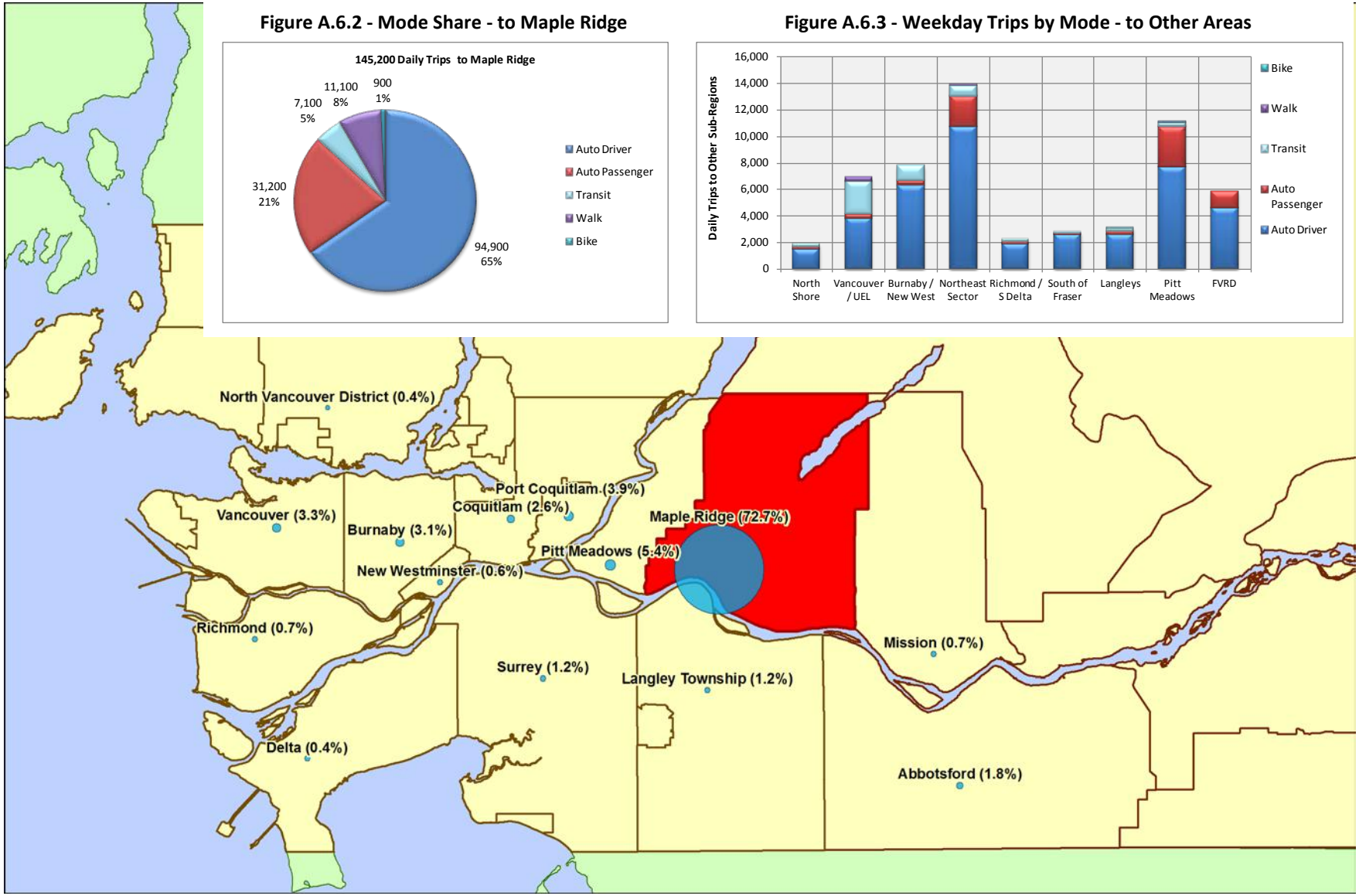


Figure A.6.1 - Trip Destinations - Maple Ridge Residents

Figure A.6.4 - Average Trip Length by Mode (Maple Ridge)

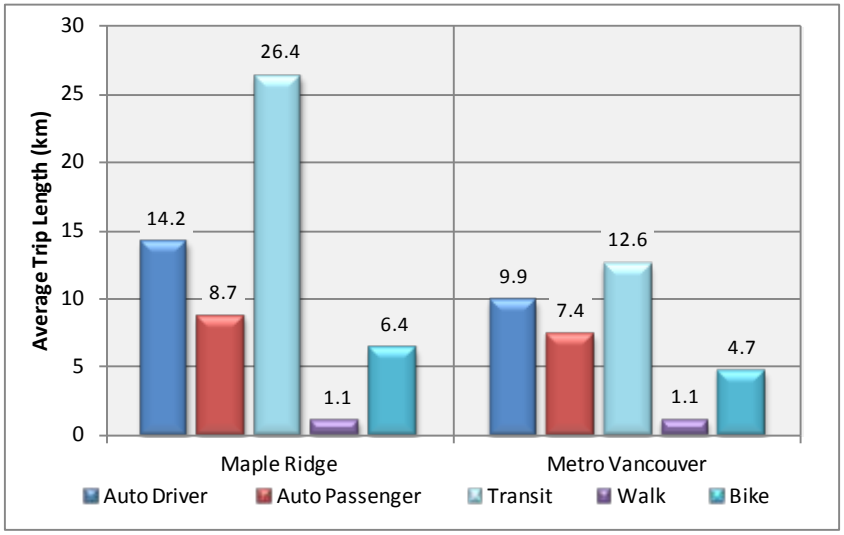


Figure A.6.5 - Average Trip Length by Trip Purpose (Maple Ridge)

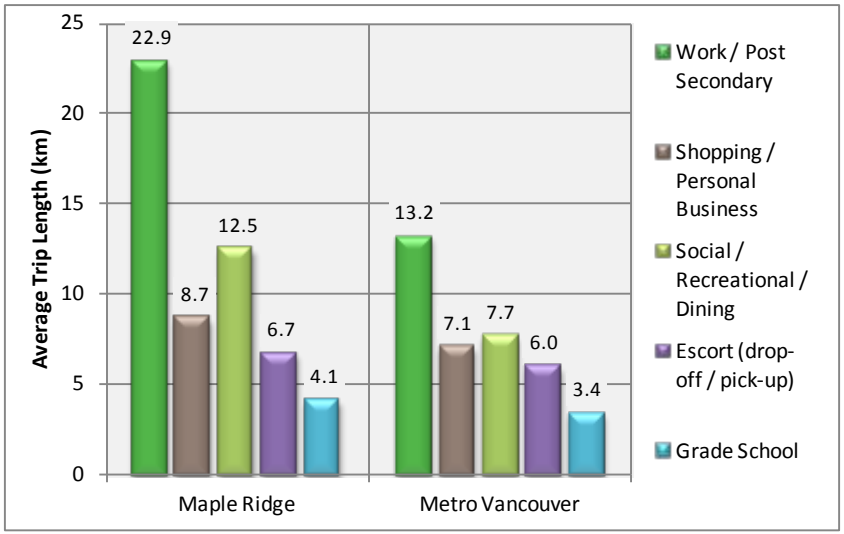


Figure A.6.6 - Weekday Mode Share (Maple Ridge)

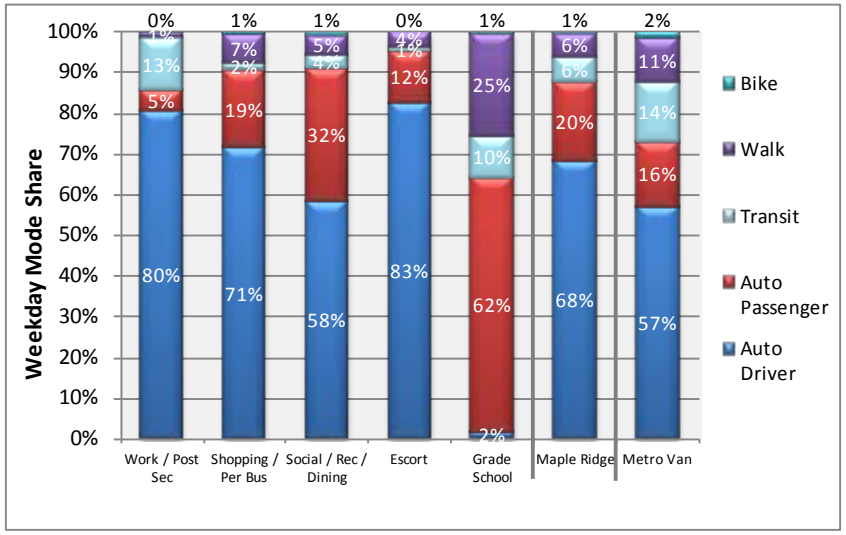
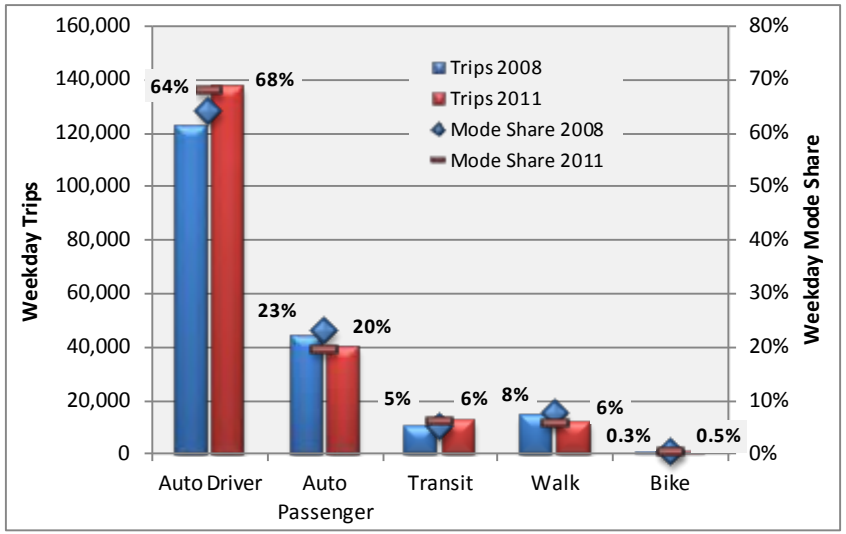


Figure A.6.7 - Trips by Mode and Mode Share (Maple Ridge)



A.7 CITY OF NEW WESTMINSTER

Figure A.7.2 - Mode Share -to New Westminster

Figure A.7.3 - Weekday Trips by Mode - to Other Areas

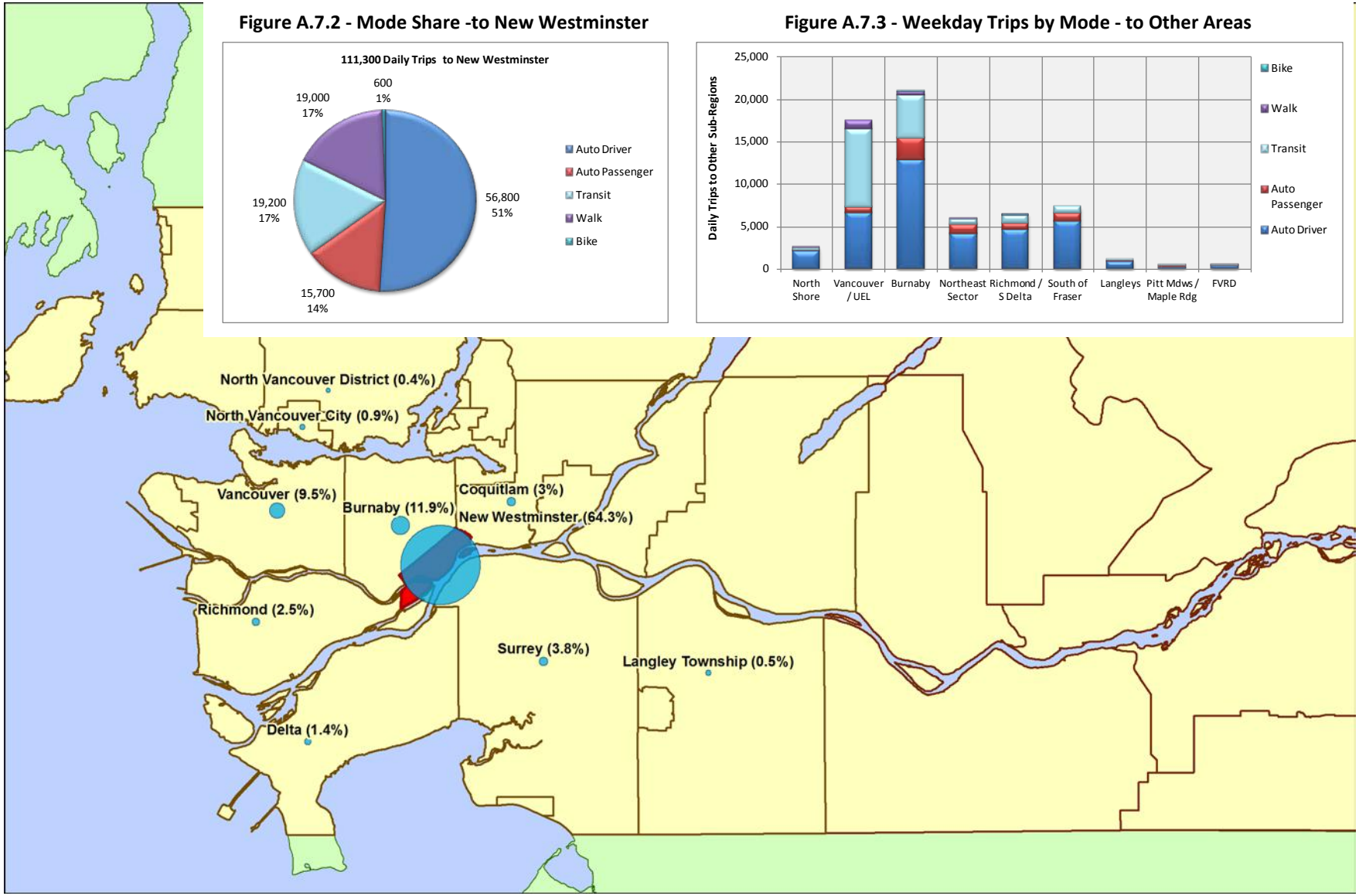


Figure A.7.1 - Trip Destinations - New Westminster Residents

Figure A.7.4 - Average Trip Length by Mode (New Westminster)

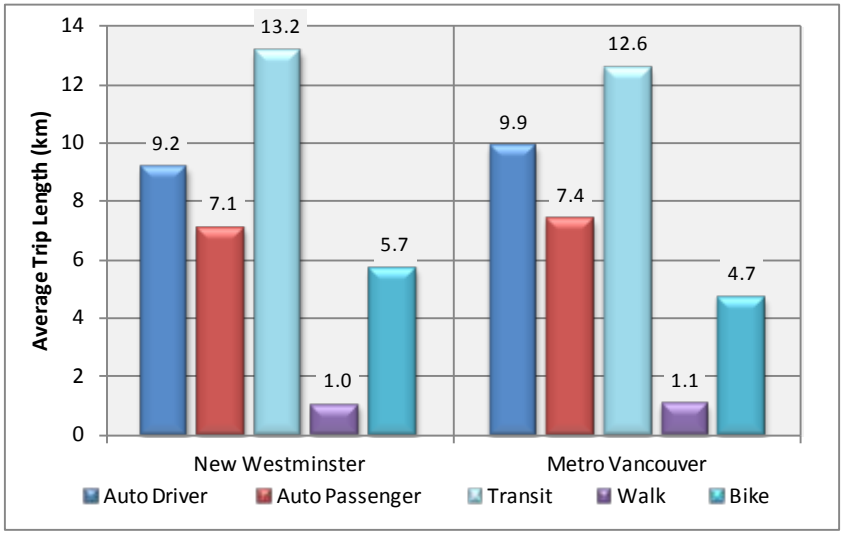


Figure A.7.5 - Average Trip Length by Trip Purpose (New Westminster)

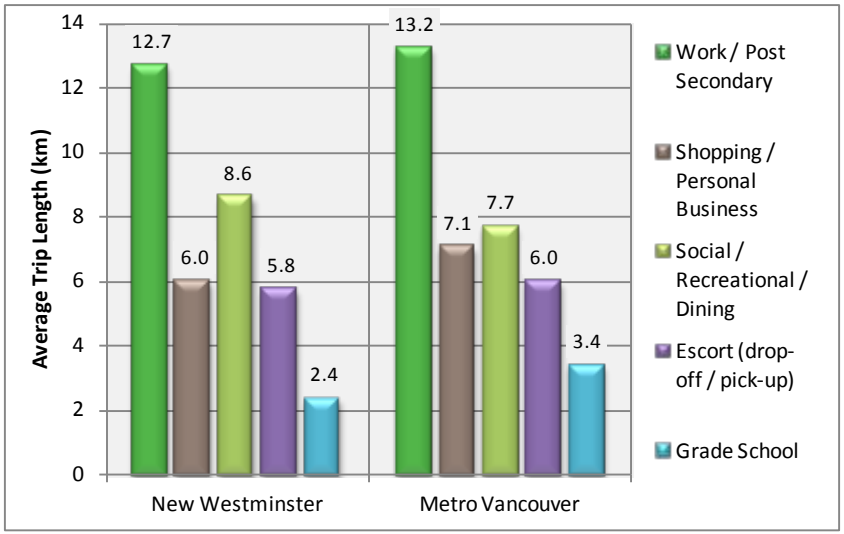


Figure A.7.6 - Weekday Mode Share (New Westminster)

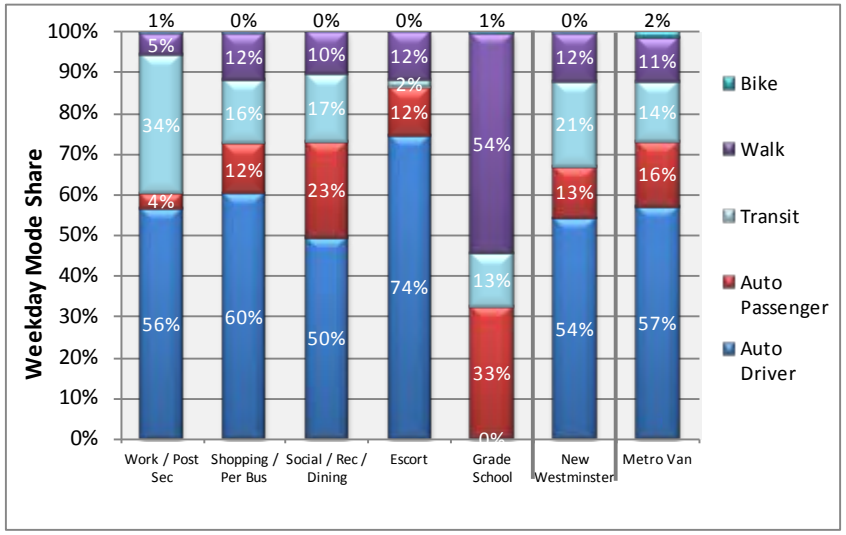
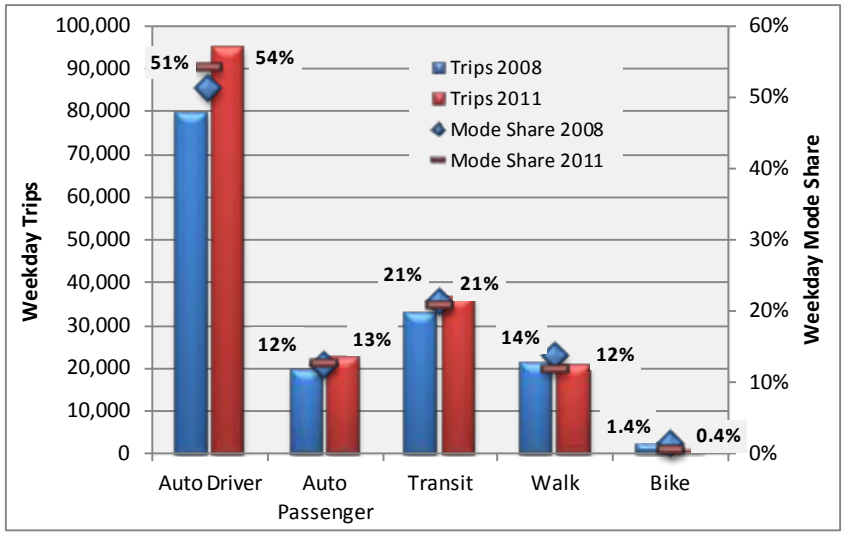


Figure A.7.7 - Trips by Mode and Mode Share (New Westminster)



A.8 CITY OF NORTH VANCOUVER

Figure A.8.2 - Mode Share - to N Vancouver City

Figure A.8.3 - Weekday Trips by Mode - to Other Areas

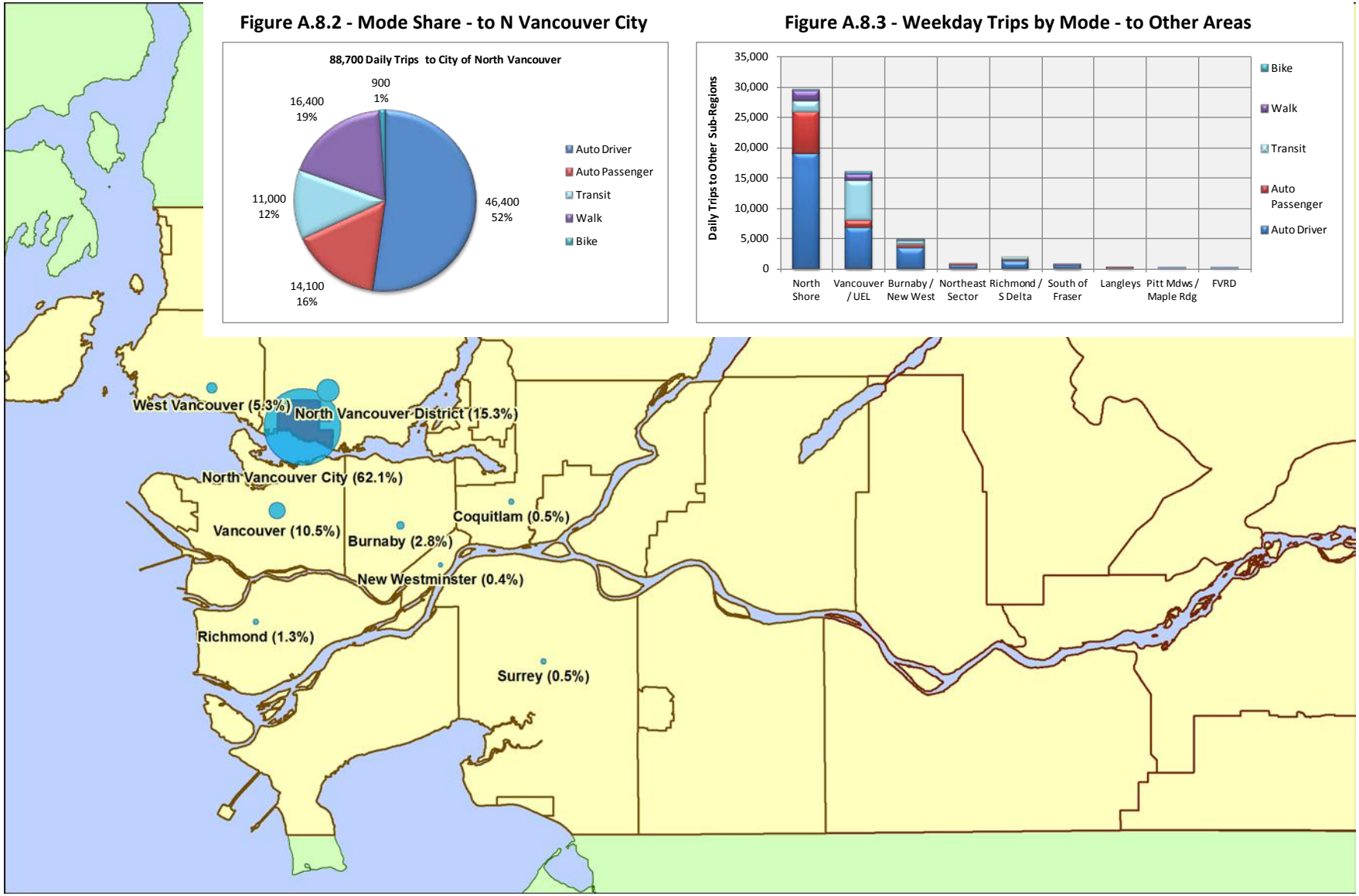


Figure A.8.1 - Trip Destinations - North Vancouver City Residents

Figure A.8.4 - Average Trip Length by Mode (North Vancouver City)

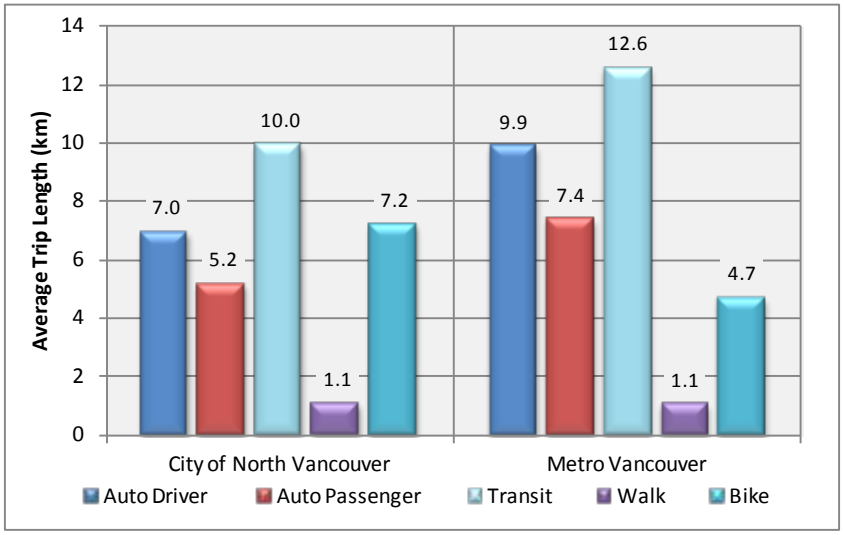


Figure A.8.5 - Average Trip Length by Trip Purpose (North Vancouver City)

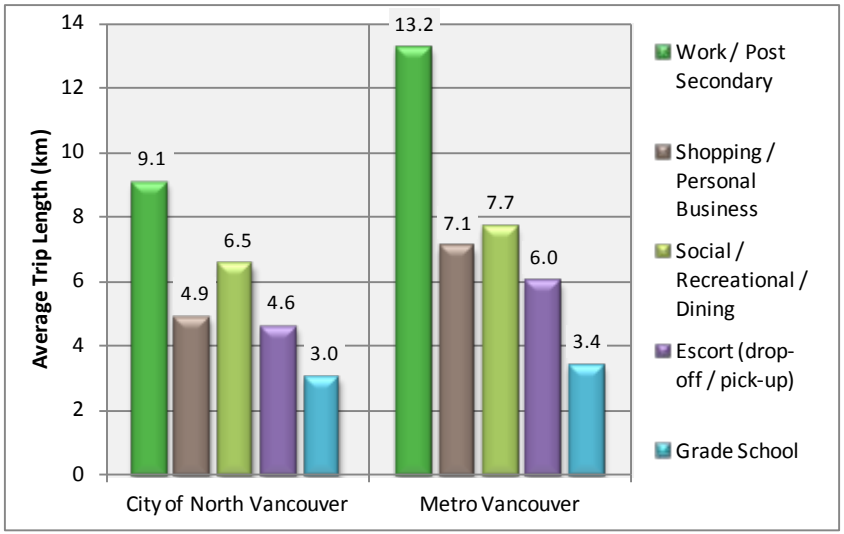


Figure A.8.6 - Weekday Mode Share (North Vancouver City)

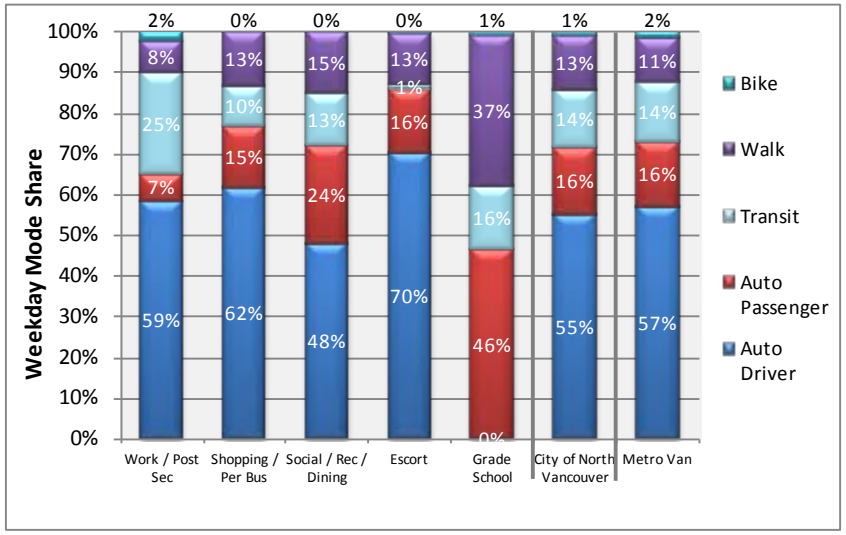
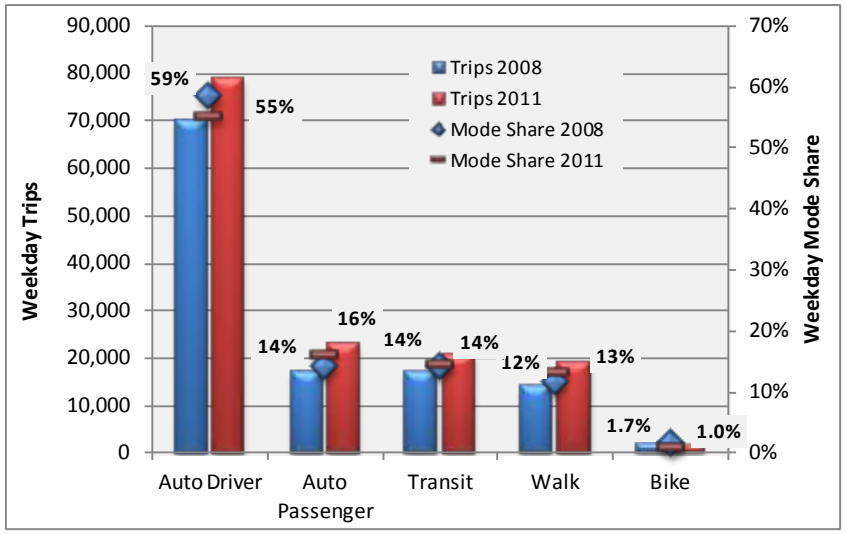


Figure A.8.7 - Trips by Mode and Mode Share (North Vancouver City)



A.9 DISTRICT OF NORTH VANCOUVER

Figure A.9.2 - Mode Share -to North Van District

Figure A.9.3 - Weekday Trips by Mode - to Other Areas

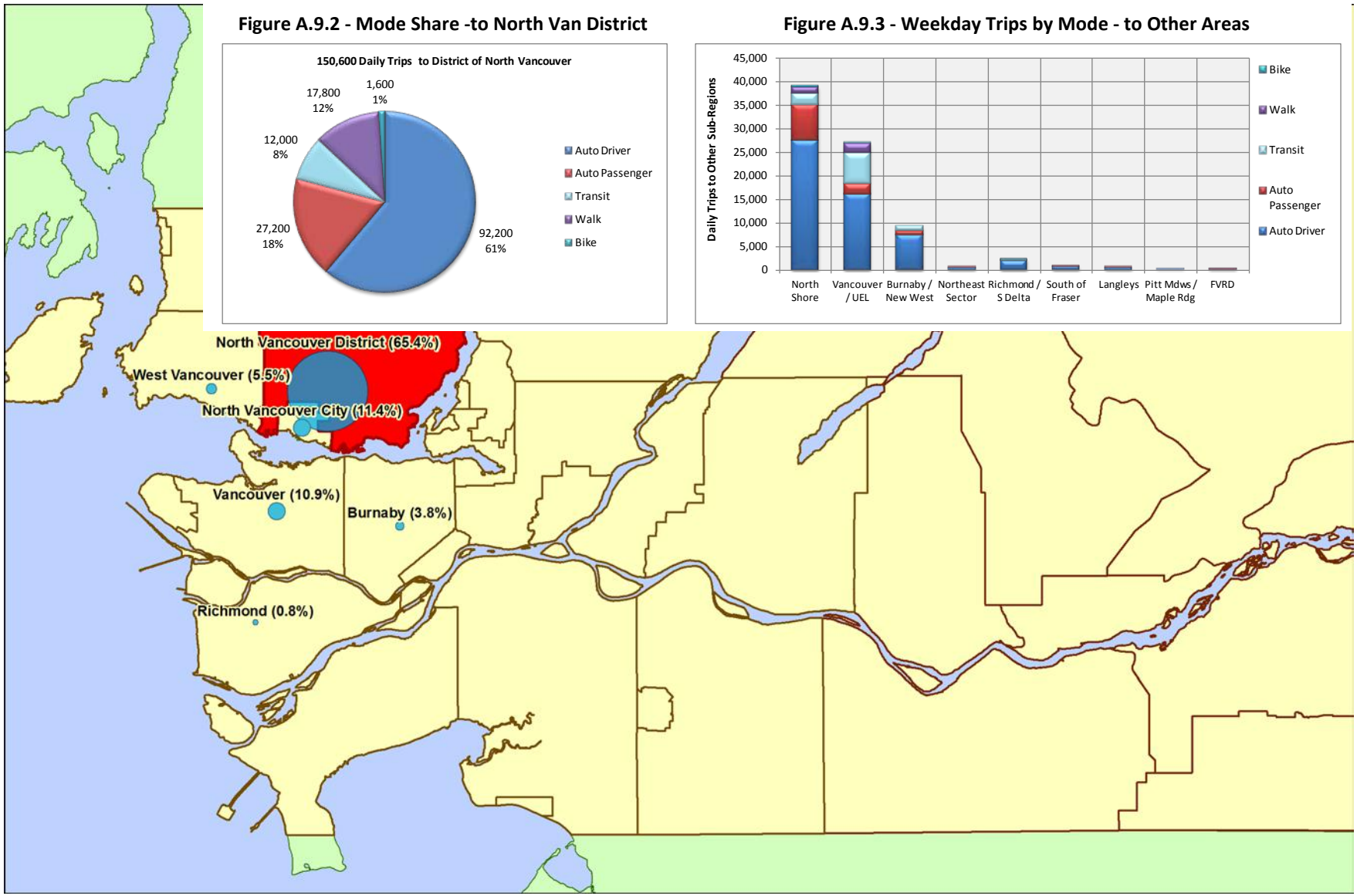


Figure A.9.1 - Trip Destinations - North Vancouver District Residents

Figure A.9.4 - Average Trip Length by Mode (North Vancouver District)

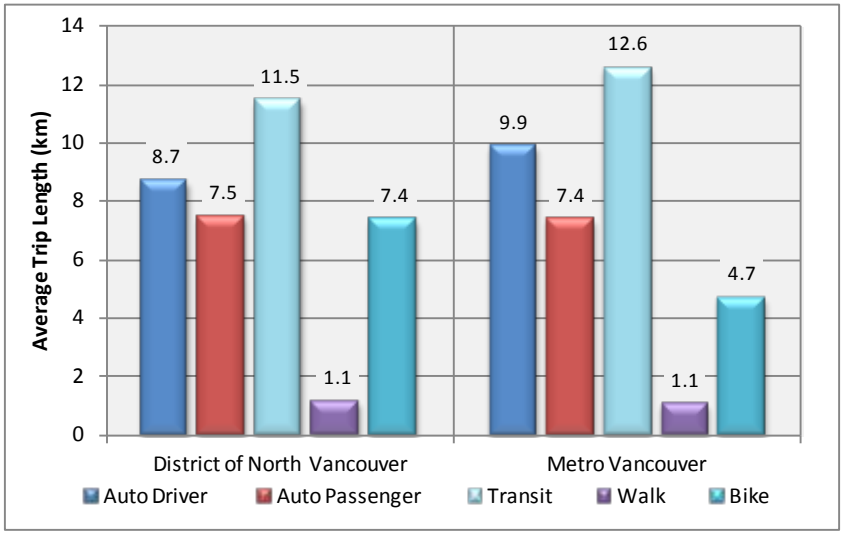


Figure A.9.5 - Average Trip Length by Purpose (North Vancouver District)

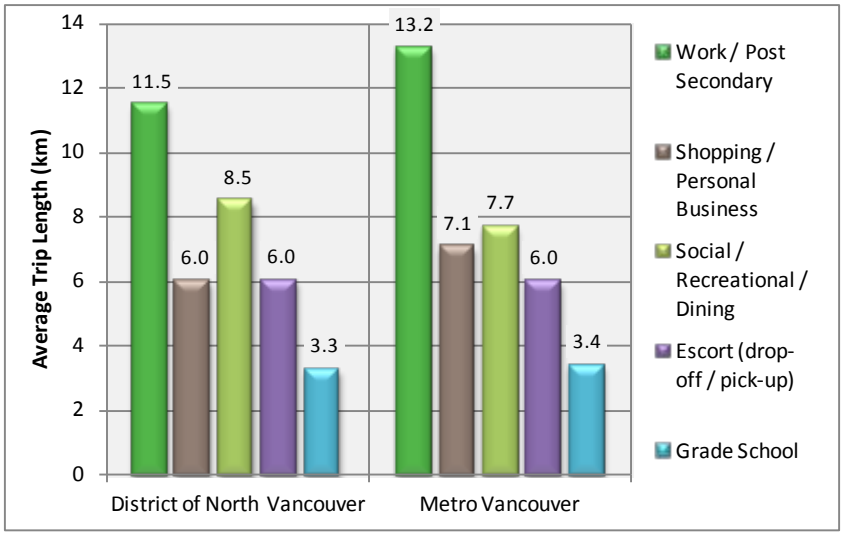


Figure A.9.6 - Weekday Mode Share (North Vancouver District)

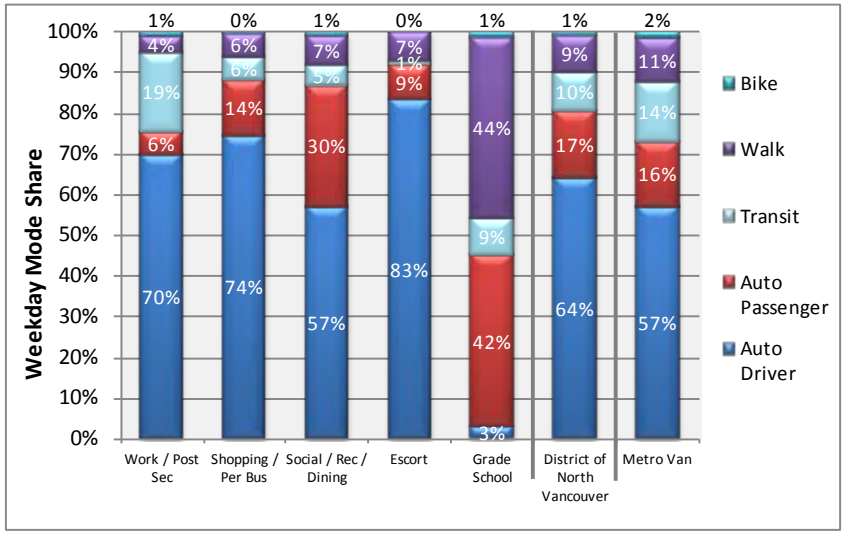
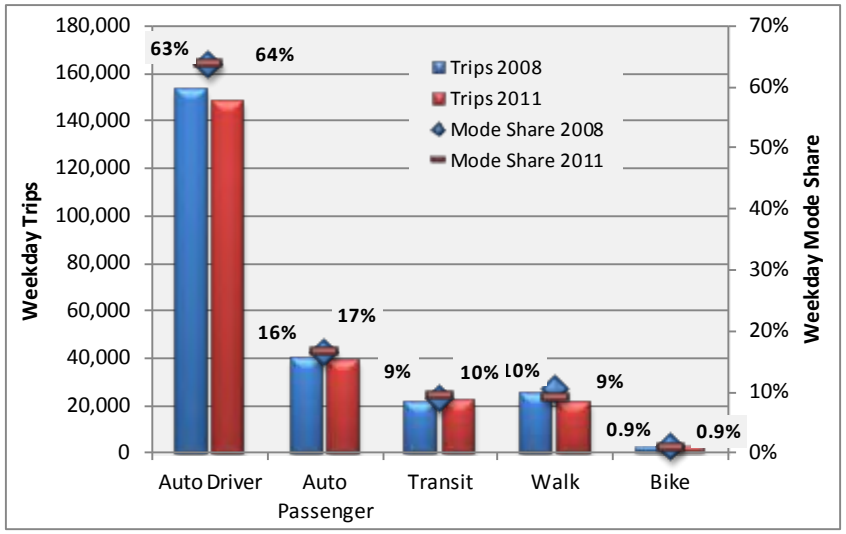


Figure A.9.7 - Trips by Mode and Mode Share (North Vancouver District)



A.10 CITY OF PITT MEADOWS

Figure A.10.2 - Mode Share - to Pitt Meadows

Figure A.10.3 - Weekday Trips by Mode - to Other Areas

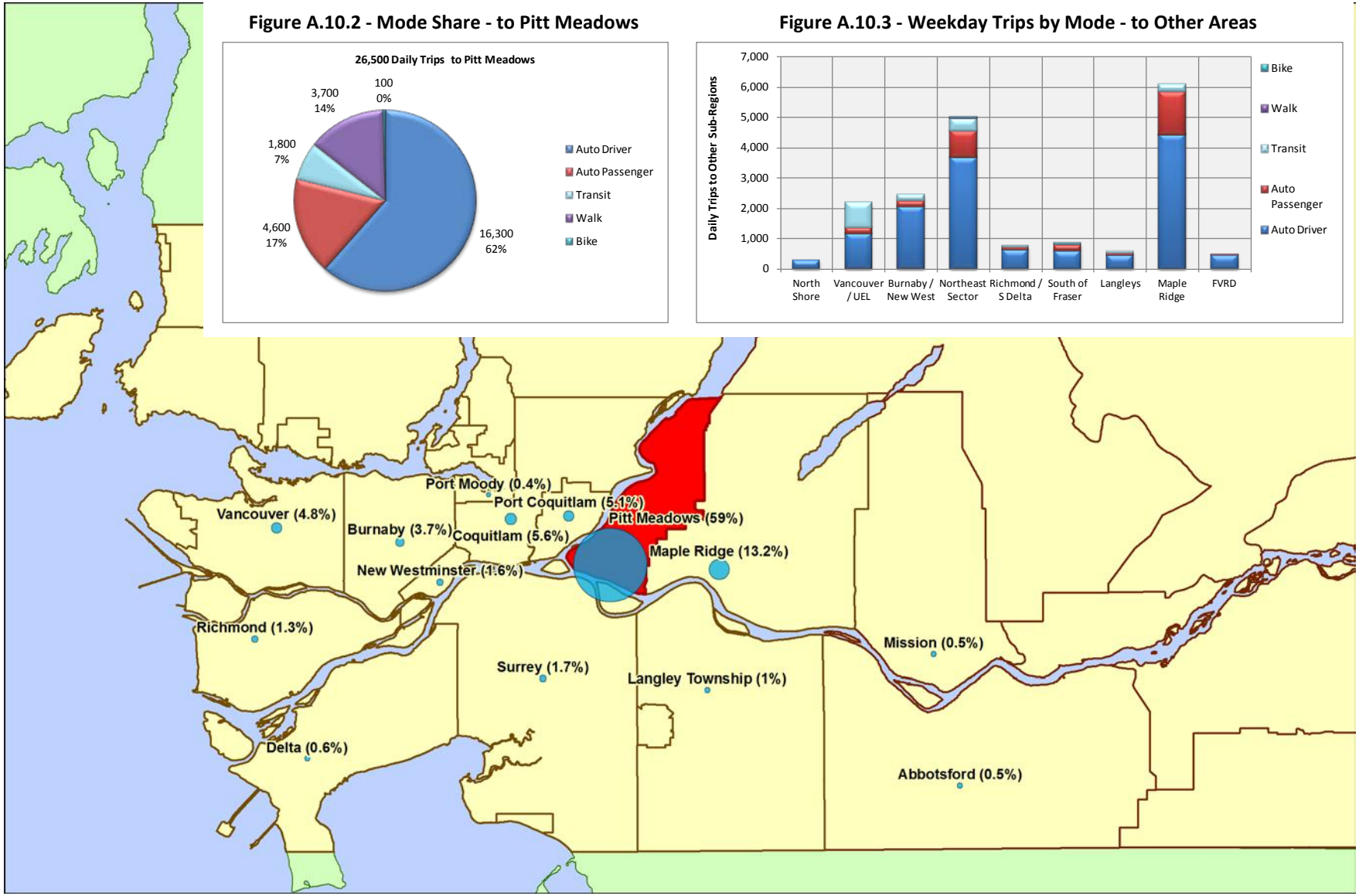


Figure A.10.1 - Trip Destinations - Pitt Meadows Residents

Figure A.10.4 - Average Trip Length by Mode (Pitt Meadows)

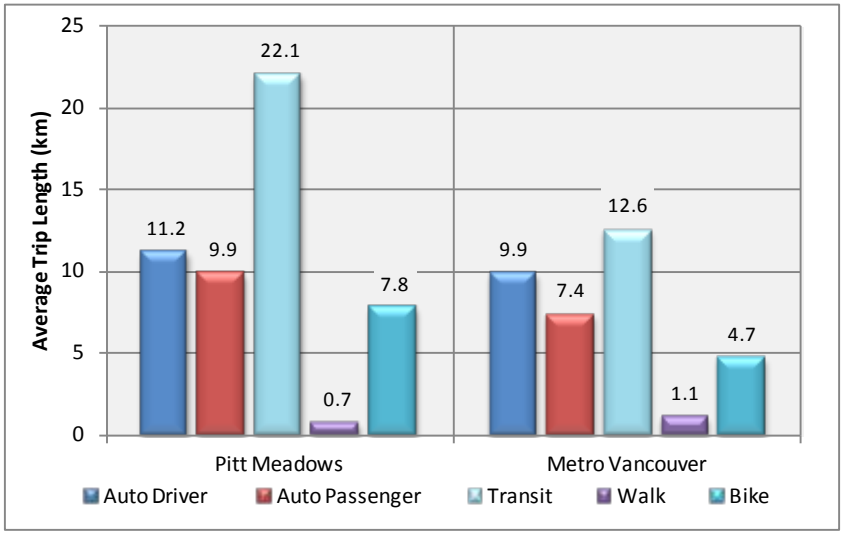


Figure A.10.5 - Average Trip Length by Trip Purpose (Pitt Meadows)

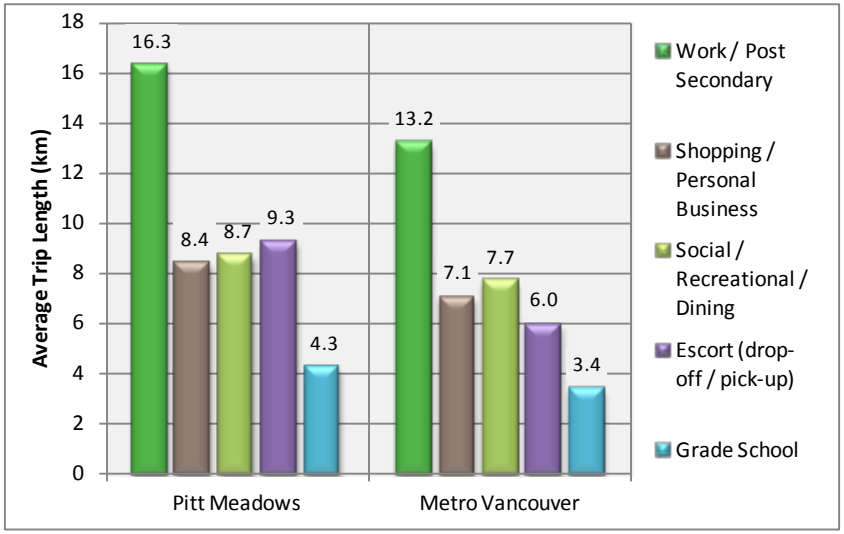


Figure A.10.6 - Weekday Mode Share (Pitt Meadows)

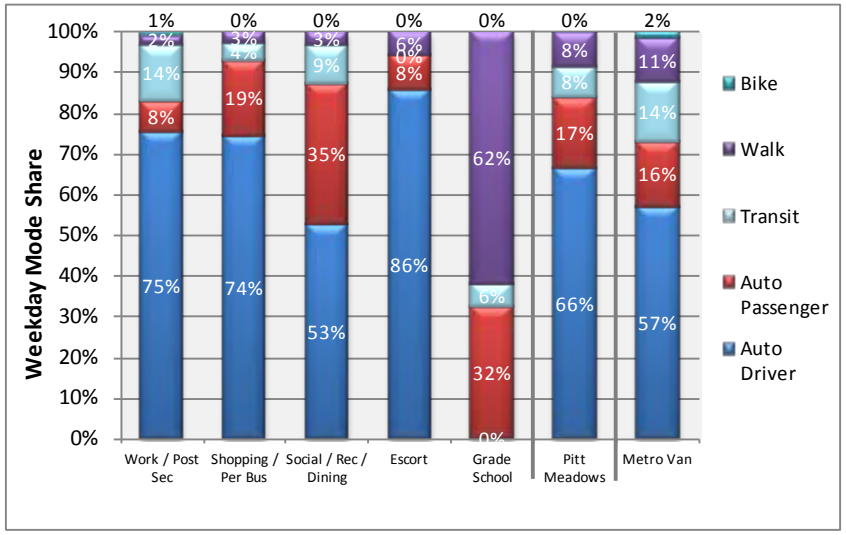
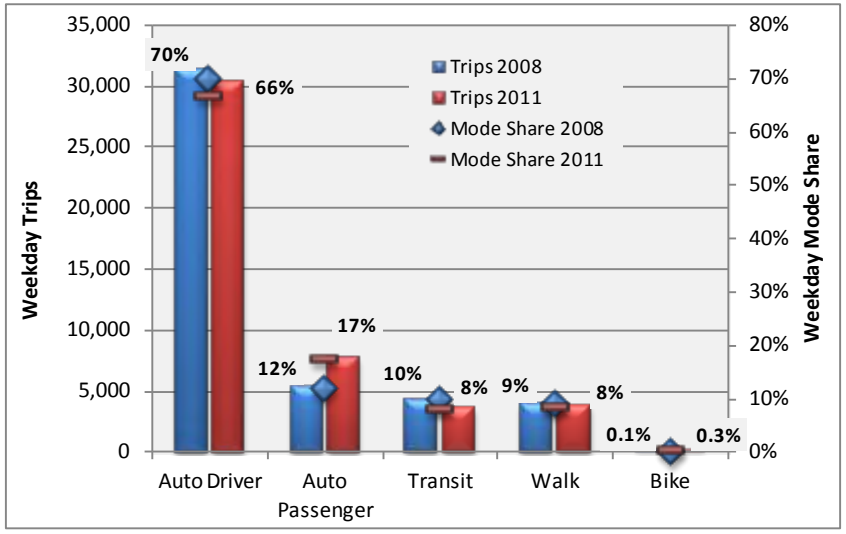


Figure A.10.7 - Trips by Mode and Mode Share (Pitt Meadows)[1]



[1] The observed changes in the auto driver and auto passenger mode shares might be due to sample size and sampling differences between the surveys.

A.11 CITY OF PORT COQUITLAM

Figure A.11.2 - Mode Share - to Port Coquitlam

Figure A.11.3 - Weekday Trips by Mode - to Other Areas

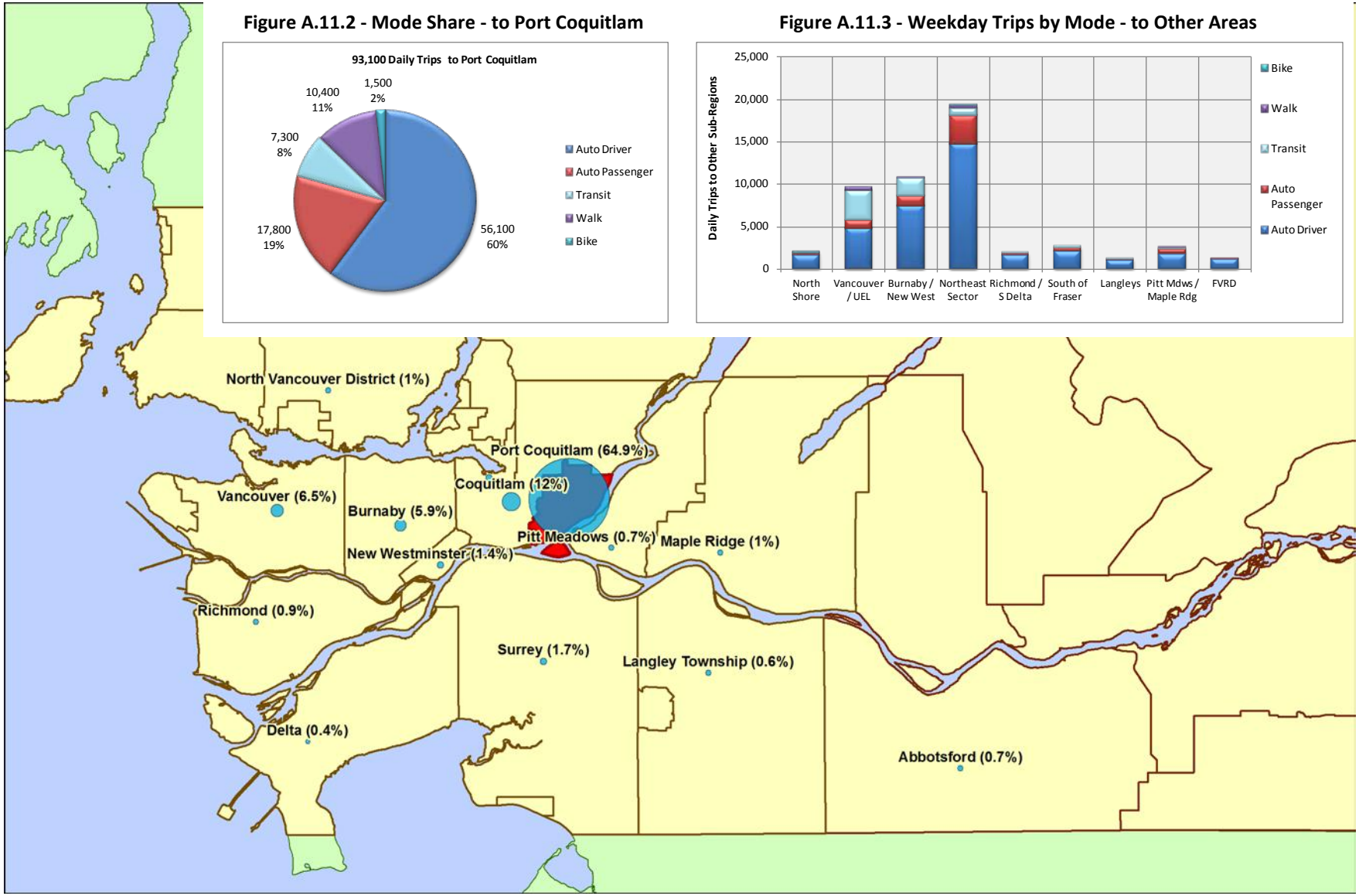


Figure A.11.1 - Trip Destinations - Port Coquitlam Residents

Figure A.11.4 - Average Trip Length by Mode (Port Coquitlam)

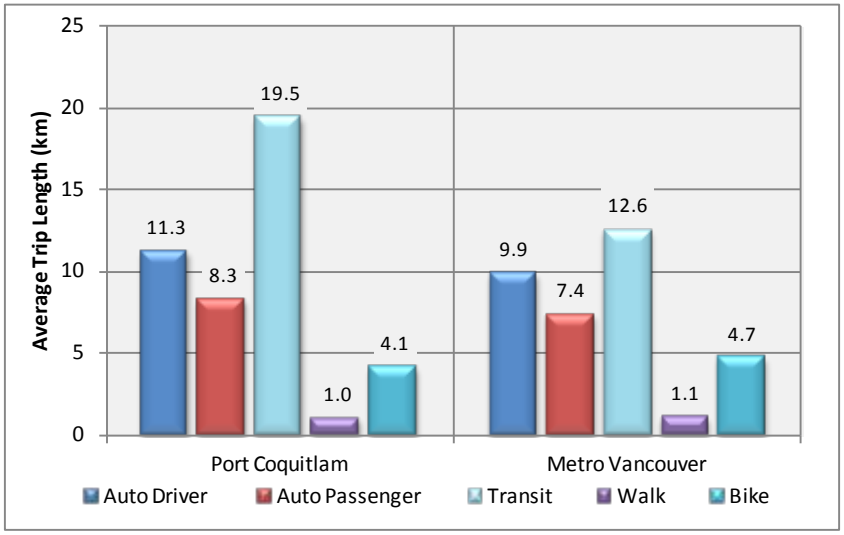


Figure A.11.5 - Average Trip Length by Trip Purpose (Port Coquitlam)

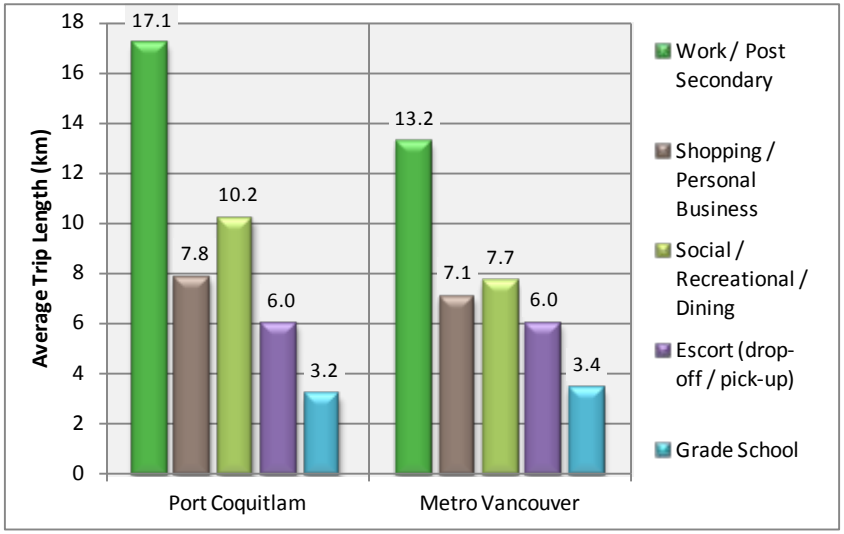


Figure A.11.6 - Weekday Mode Share (Port Coquitlam)

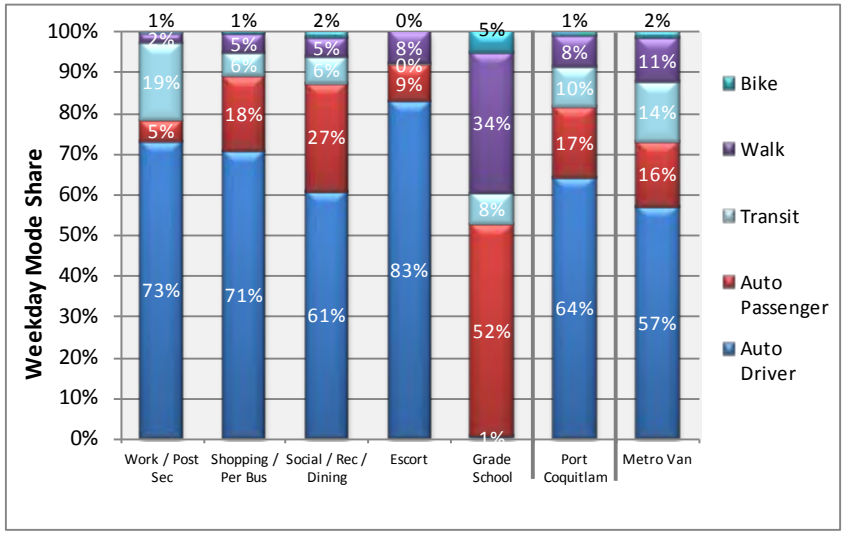
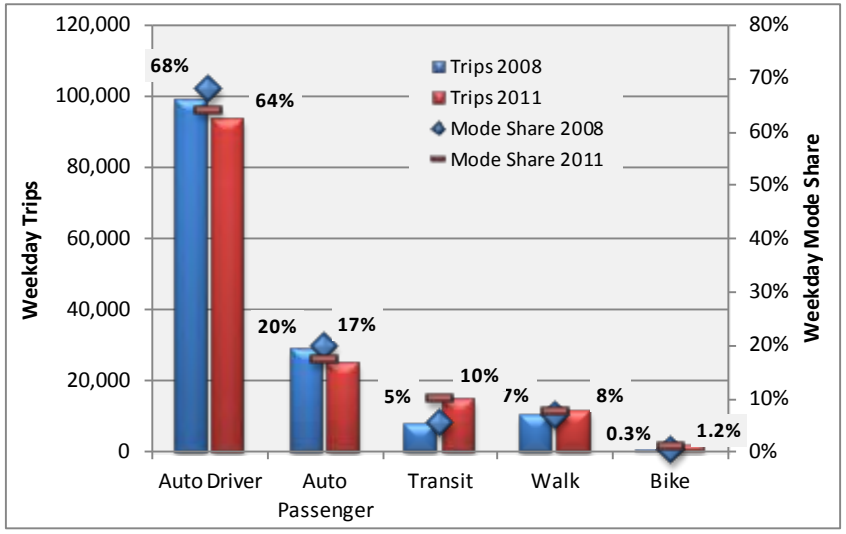


Figure A.11.7 - Trips by Mode and Mode Share (Port Coquitlam)[2]



[2] The observed changes in mode shares might be due to small sample size and sampling differences between the surveys.

A.12 CITY OF PORT MOODY

Figure A.12.2 - Mode Share - to Port Moody

Figure A.12.3 - Weekday Trips by Mode - to Other Areas

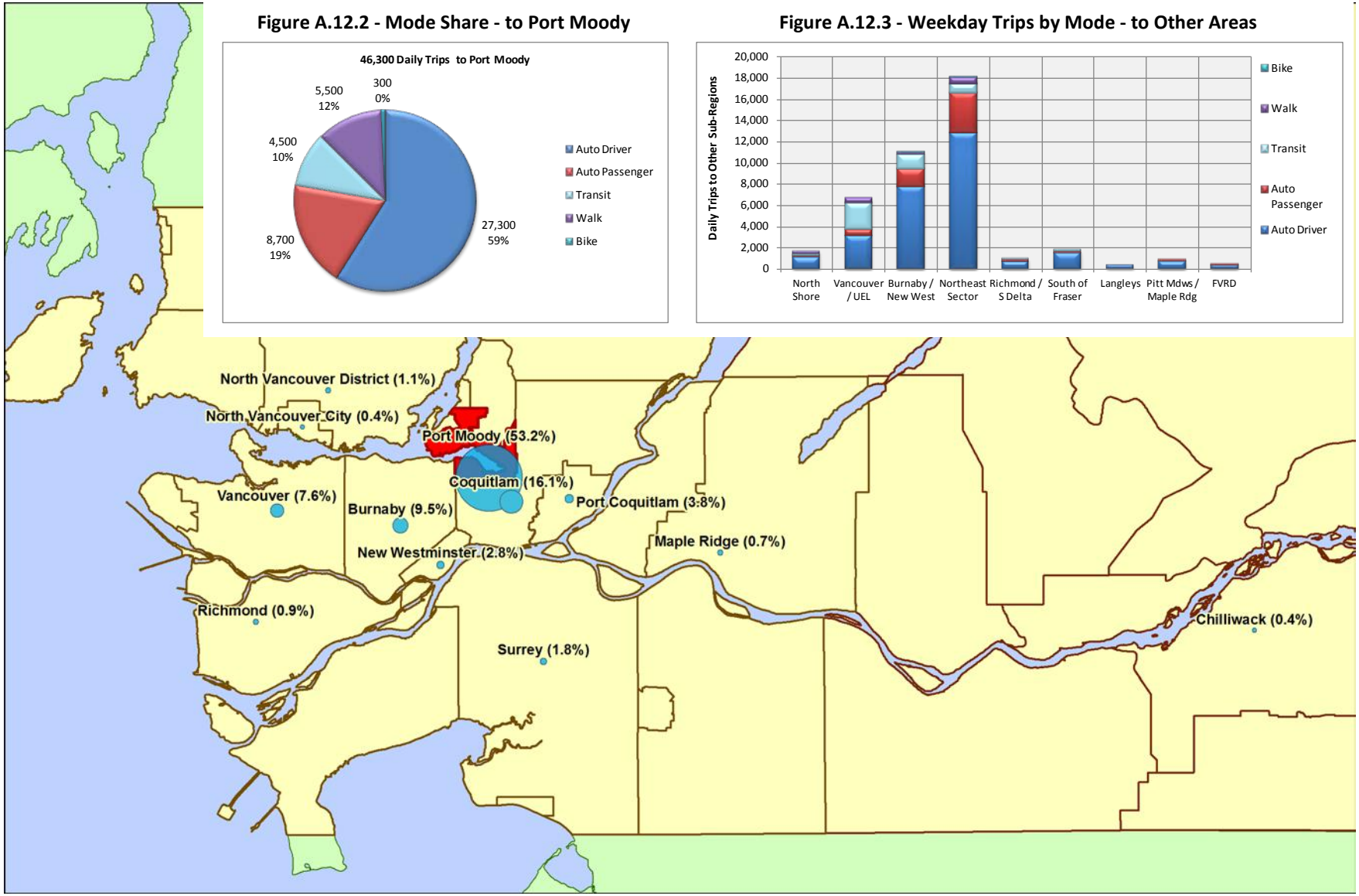


Figure A.12.1 - Trip Destinations - Port Moody Residents

Figure A.12.4 - Average Trip Length by Mode (Port Moody)[3]

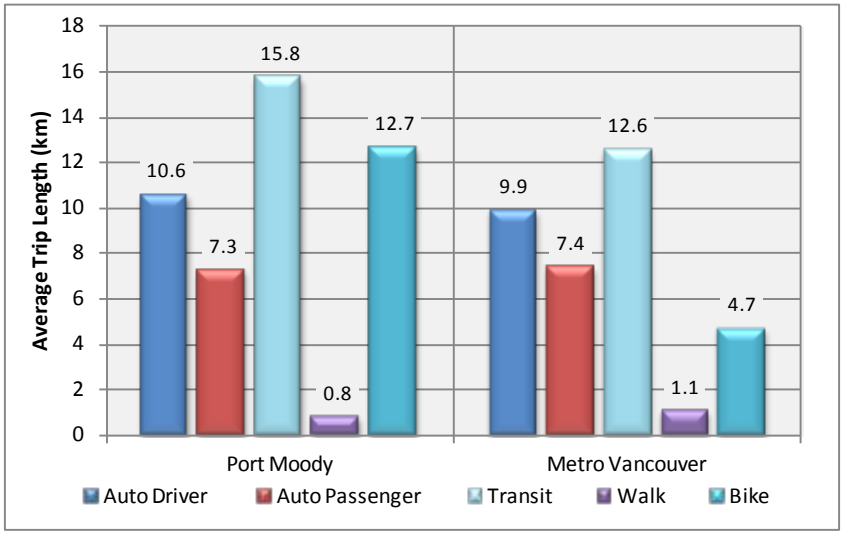


Figure A.12.5 - Average Trip Length by Trip Purpose (Port Moody)

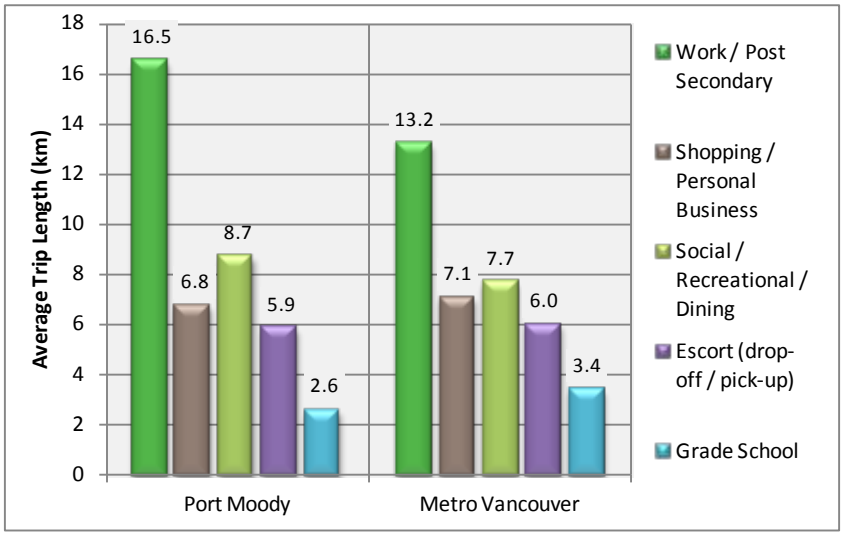


Figure A.12.6 - Weekday Mode Share (Port Moody)

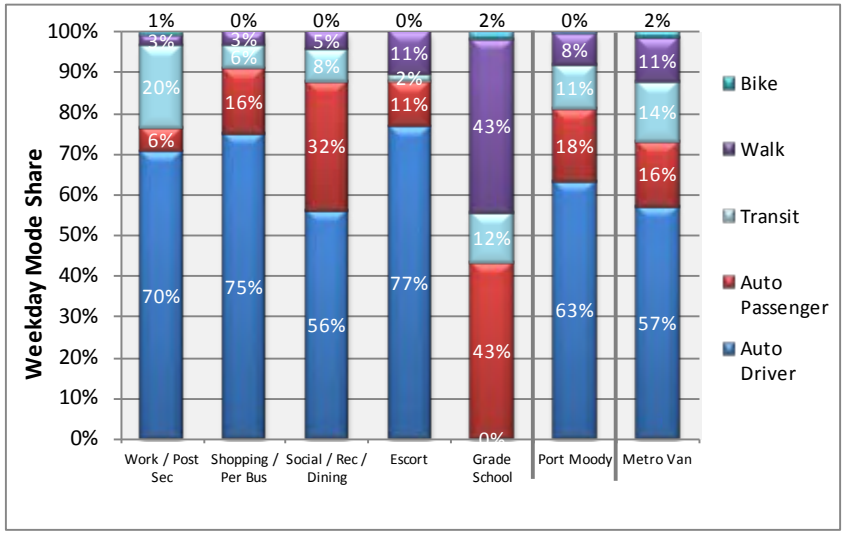
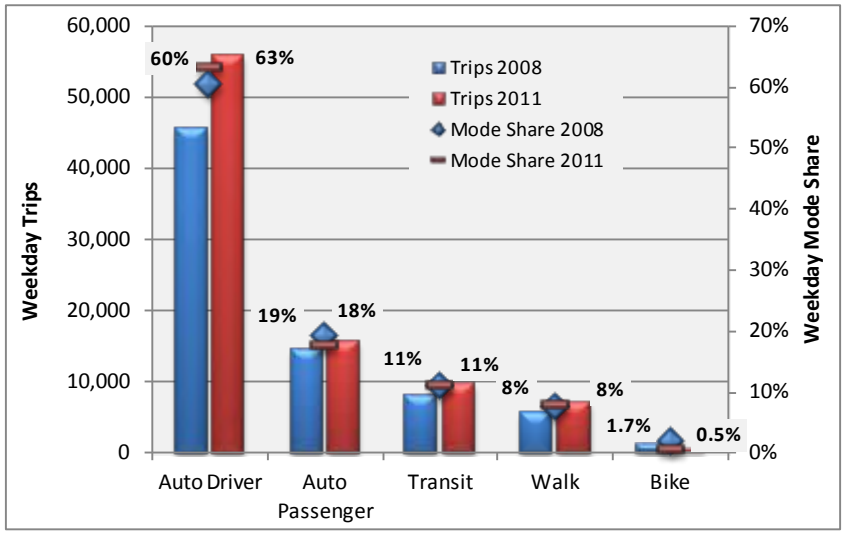


Figure A.12.7 - Trips by Mode and Mode Share (Port Moody)



[3] The remarkably high average bike trip length is based on an extremely small sample size (only 10 trips).

A.13 CITY OF RICHMOND

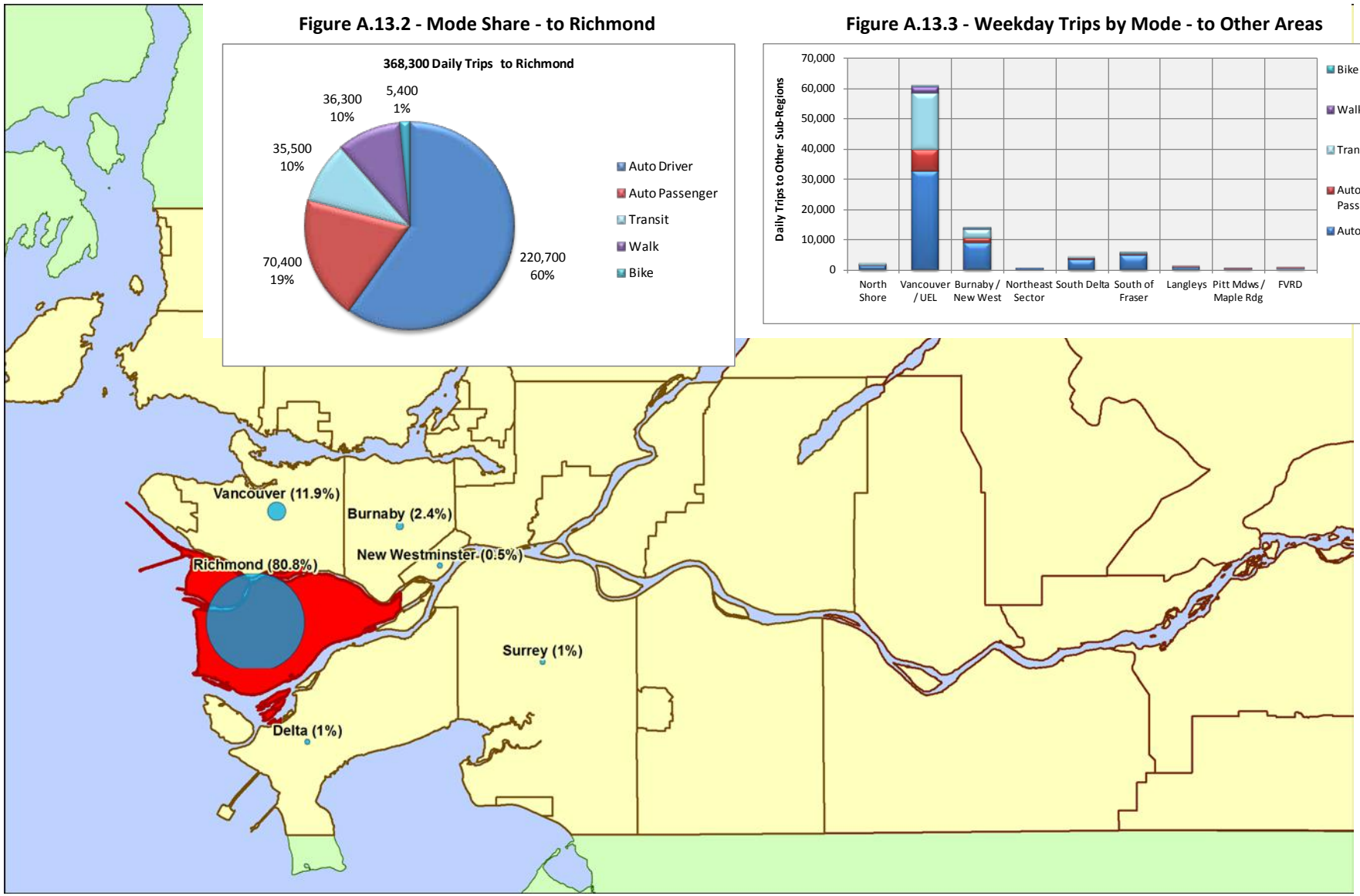


Figure A.13.2 - Mode Share - to Richmond

Figure A.13.3 - Weekday Trips by Mode - to Other Areas

Figure A.13.1 - Trip Destinations - Richmond Residents

Figure A.13.4 - Average Trip Length by Mode (Richmond)

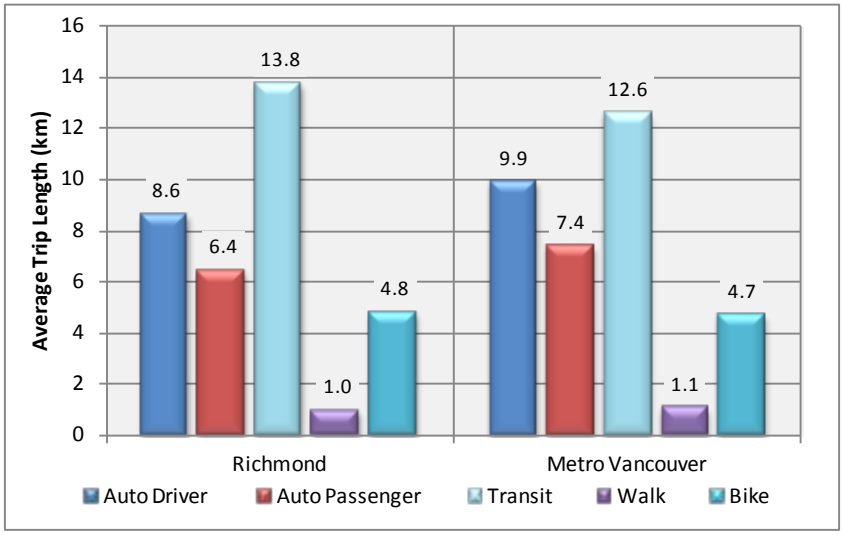


Figure A.13.5 - Average Trip Length by Trip Purpose (Richmond)

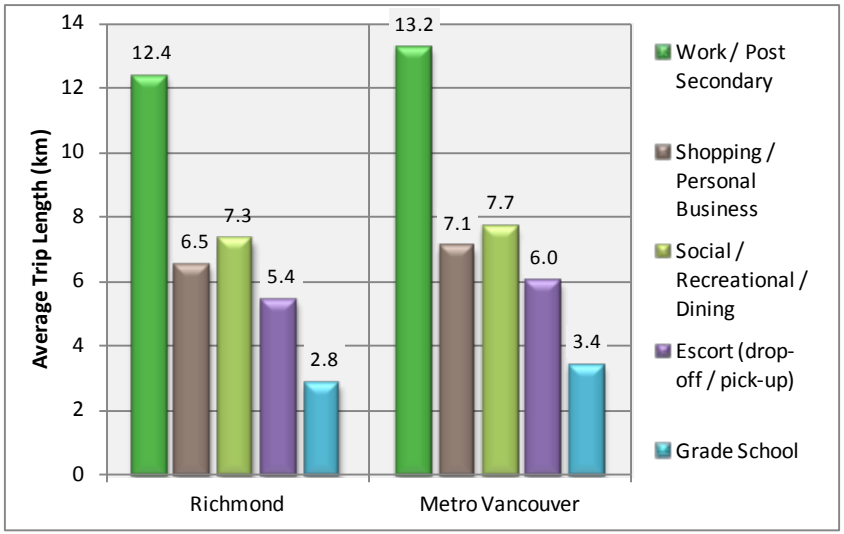


Figure A.13.6 - Weekday Mode Share (Richmond)

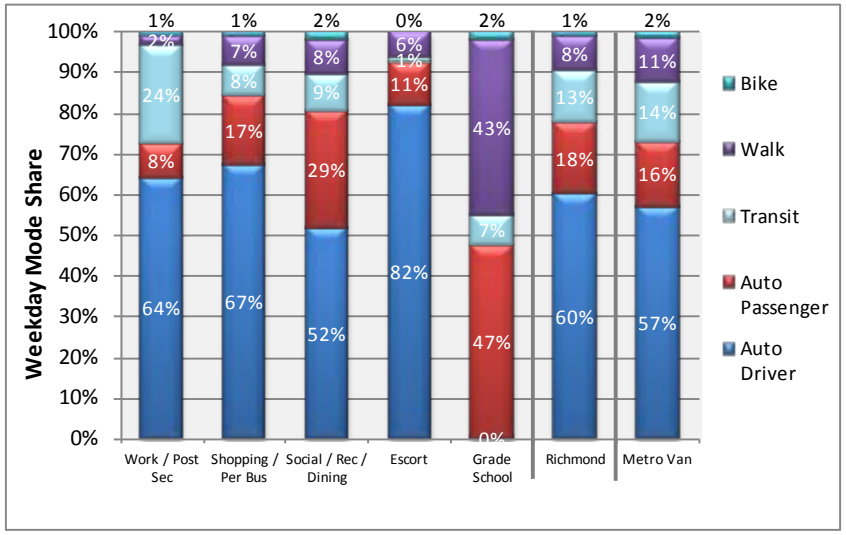
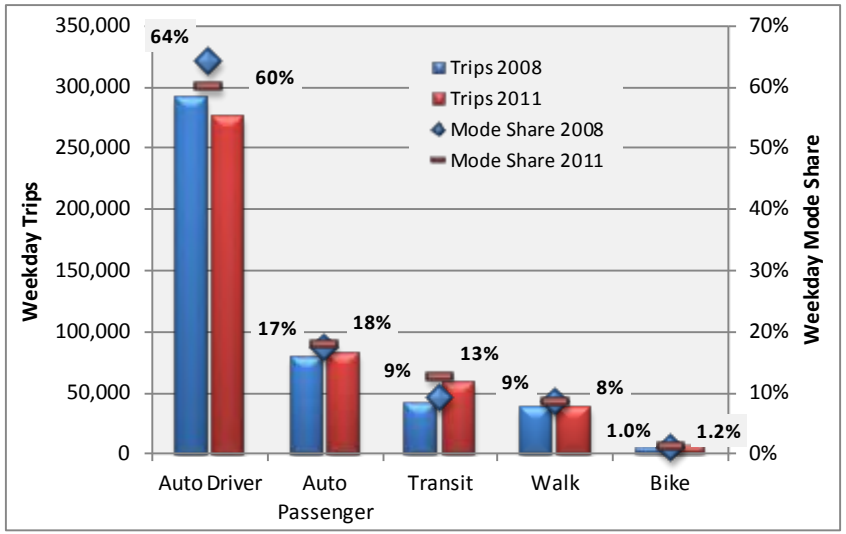


Figure A.13.7 - Trips by Mode and Mode Share (Richmond)



A.14 CITY OF SURREY

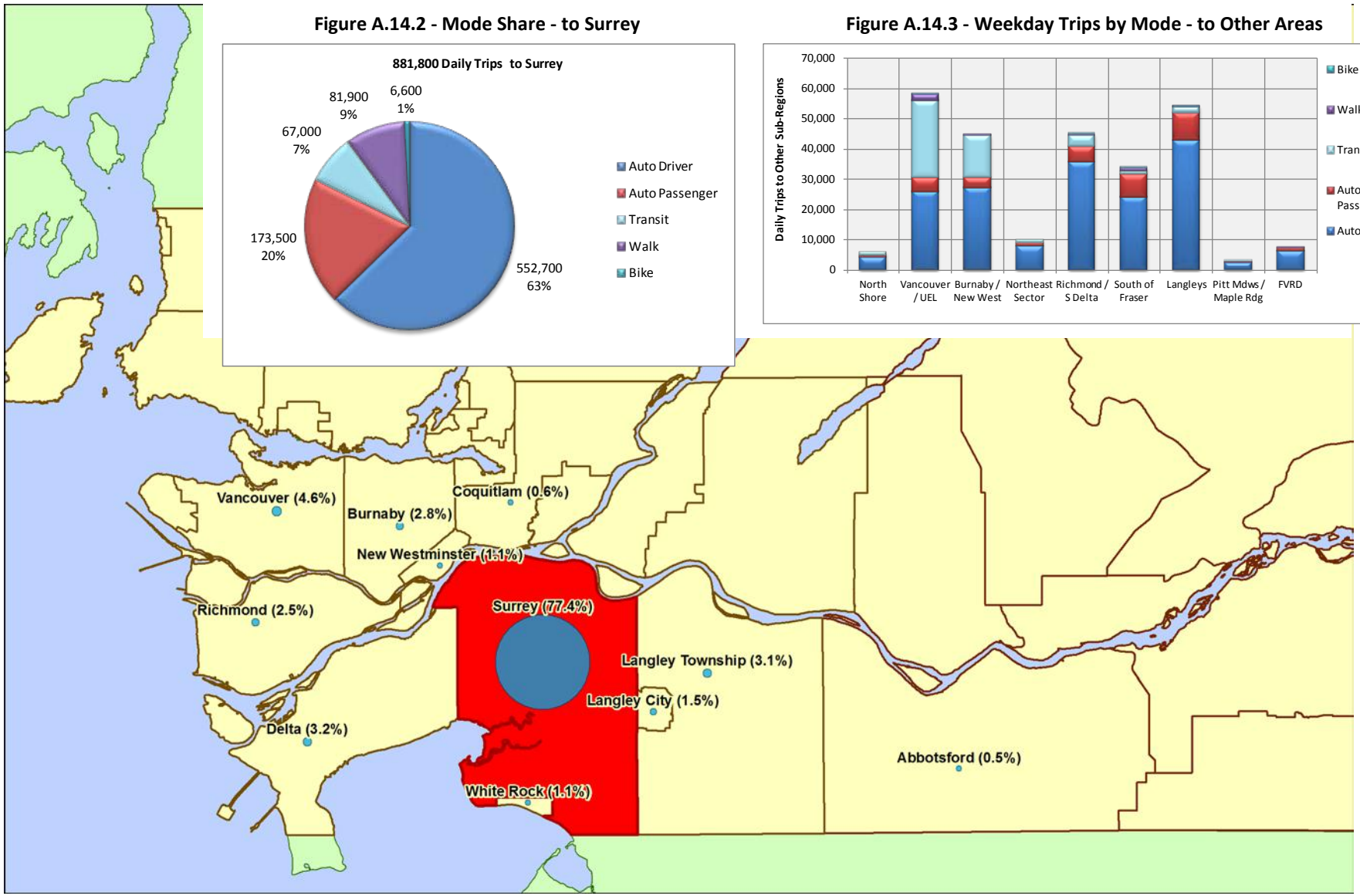


Figure A.14.2 - Mode Share - to Surrey

Figure A.14.3 - Weekday Trips by Mode - to Other Areas

Figure A.14.1 - Trip Destinations - Surrey Residents

Figure A.14.4 - Average Trip Length by Mode (Surrey)

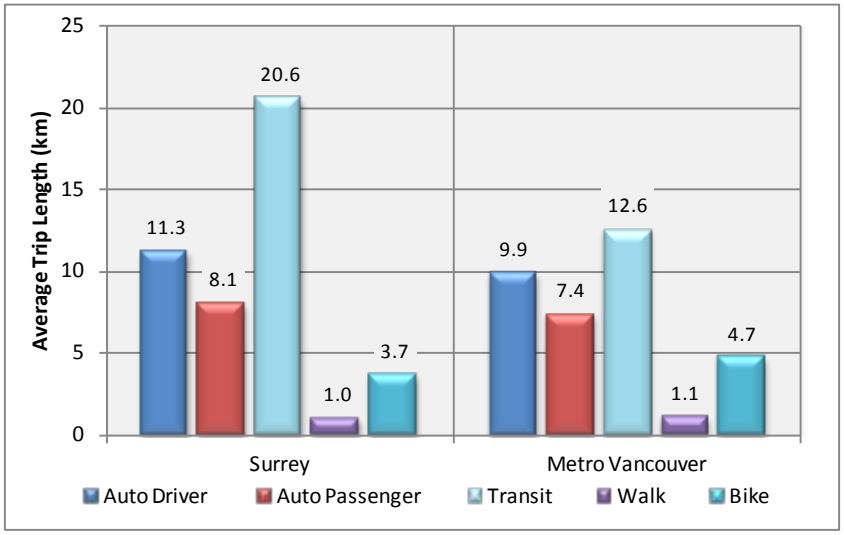


Figure A.14.5 - Average Trip Length by Trip Purpose (Surrey)

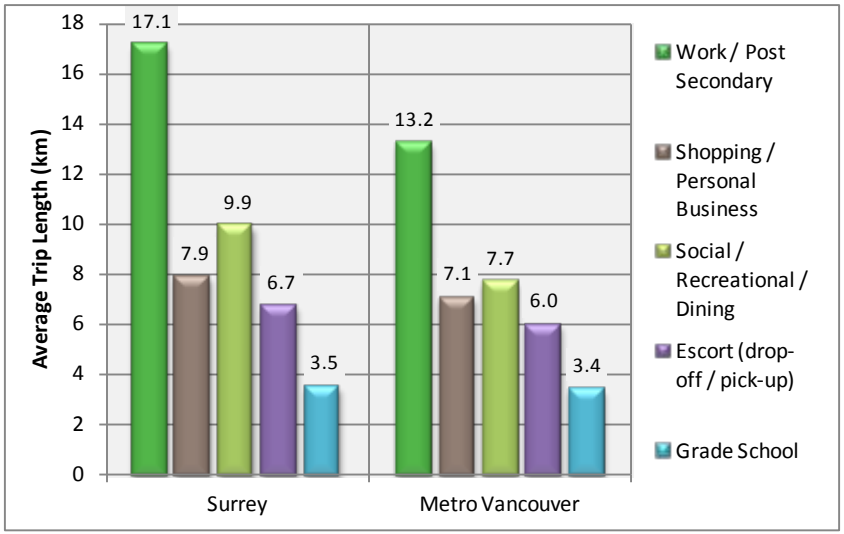


Figure A.14.6 - Weekday Mode Share (Surrey)

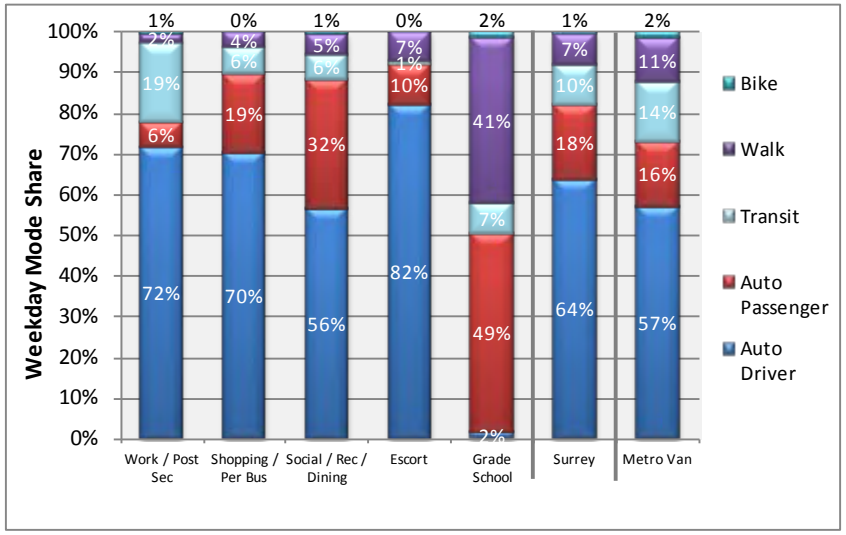
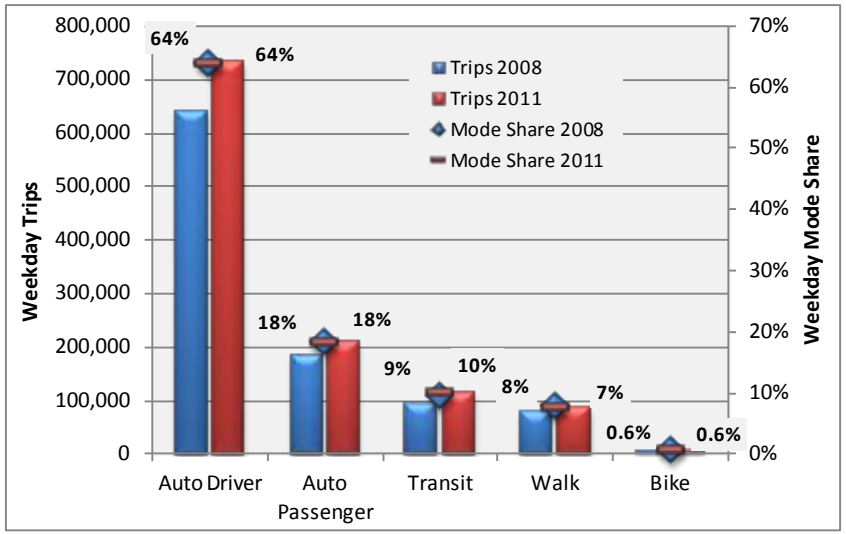


Figure A.14.7 - Trips by Mode and Mode Share (Surrey)



A.15 CITY OF VANCOUVER

Figure A.15.2 - Mode Share - to Vancouver

Figure A.15.3 - Weekday Trips by Mode - to Other Areas

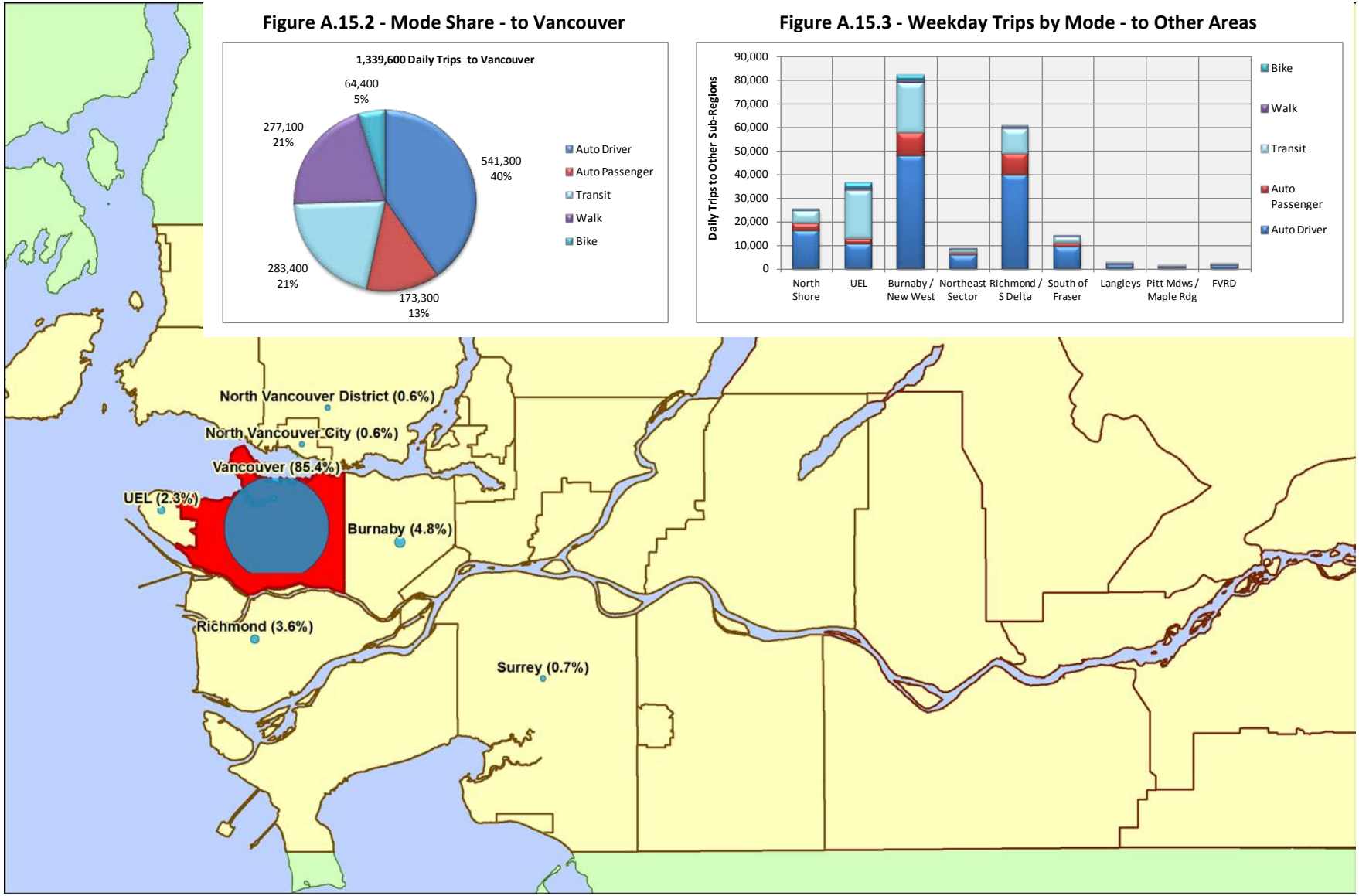


Figure A.15.1 - Trip Destinations - Vancouver Residents

Figure A.15.4 - Average Trip Length by Mode (Vancouver)

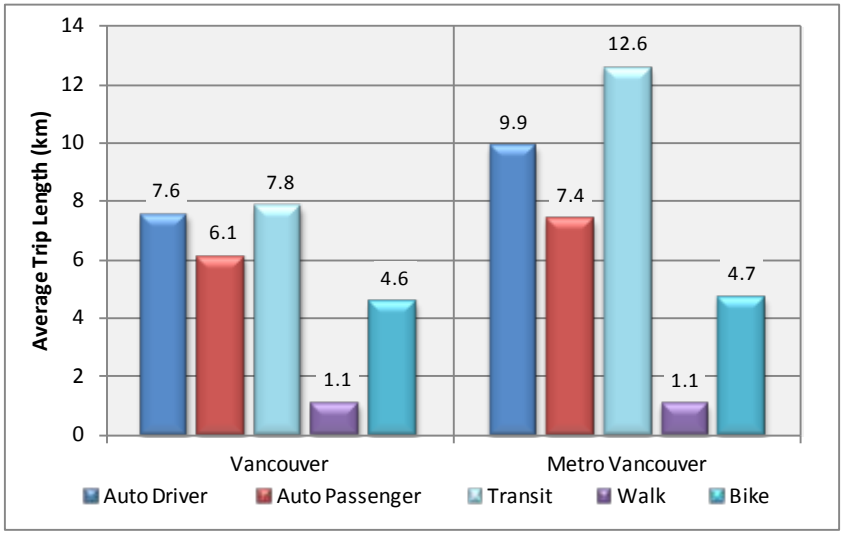


Figure A.15.5 - Average Trip Length by Trip Purpose (Vancouver)

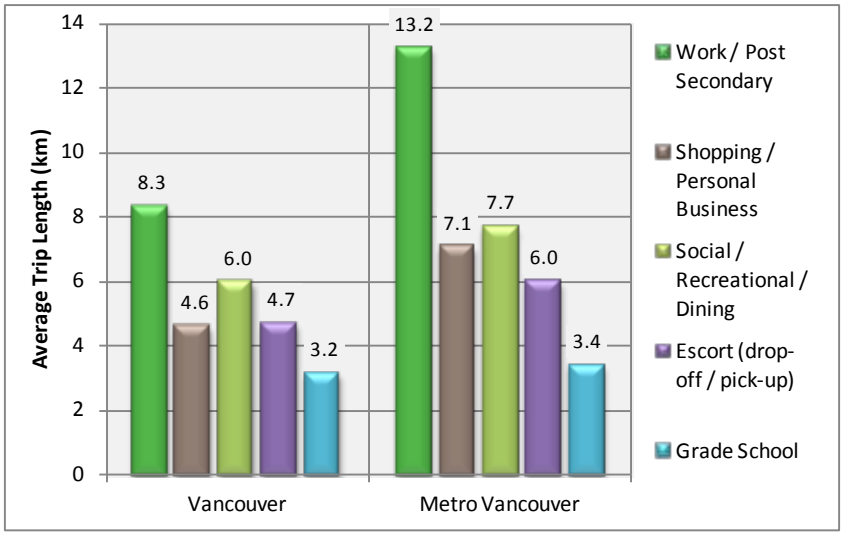


Figure A.15.6 - Weekday Mode Share (Vancouver)

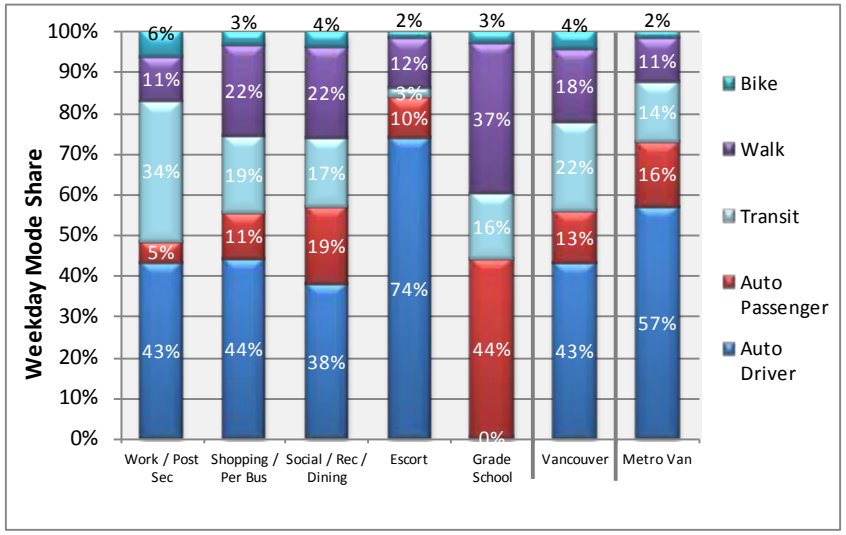
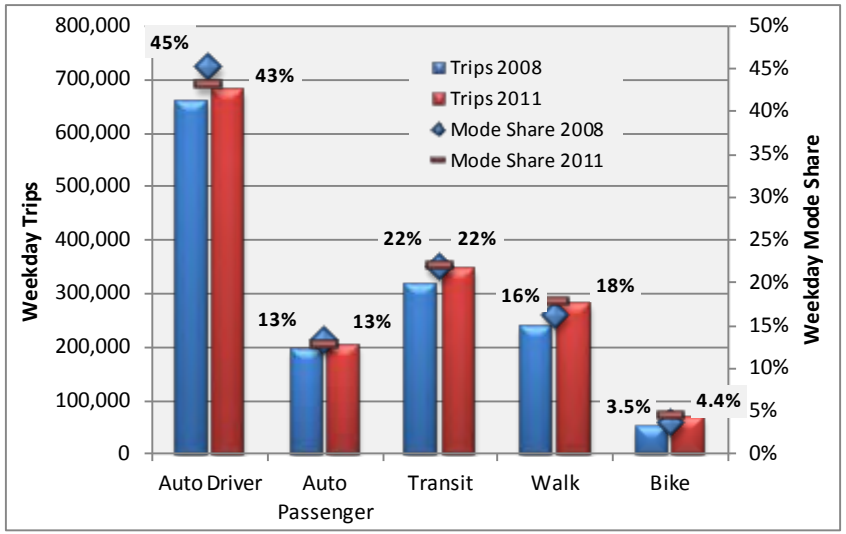


Figure A.15.7 - Trips by Mode and Mode Share (Vancouver)



A.16 DISTRICT OF WEST VANCOUVER

Figure A.16.2 - Mode Share - to West Vancouver

Figure A.16.3 - Weekday Trips by Mode - to Other Areas

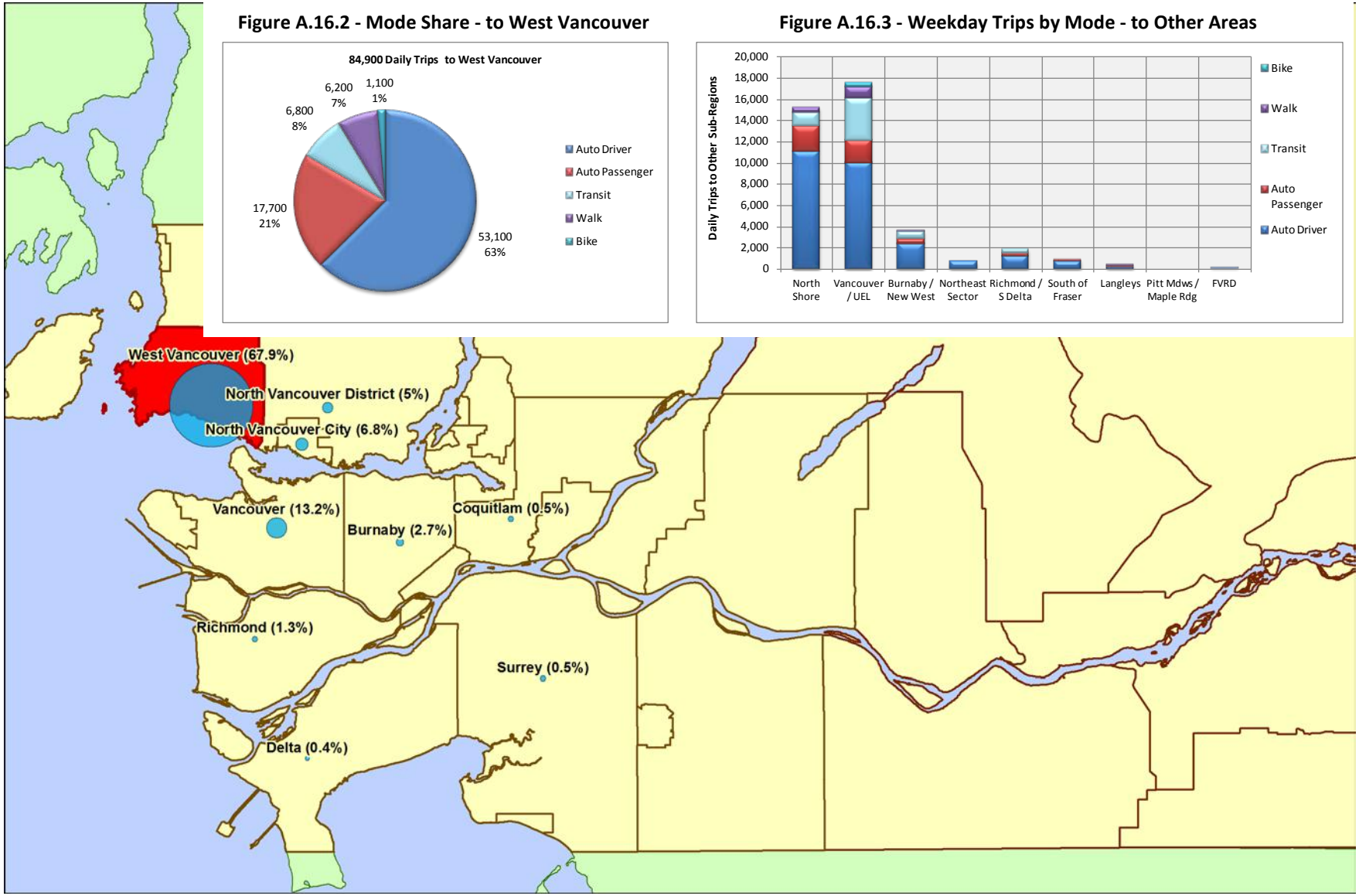


Figure A.16.1 - Trip Destinations - West Vancouver Residents

Figure A.16.4 - Average Trip Length by Mode (West Vancouver)

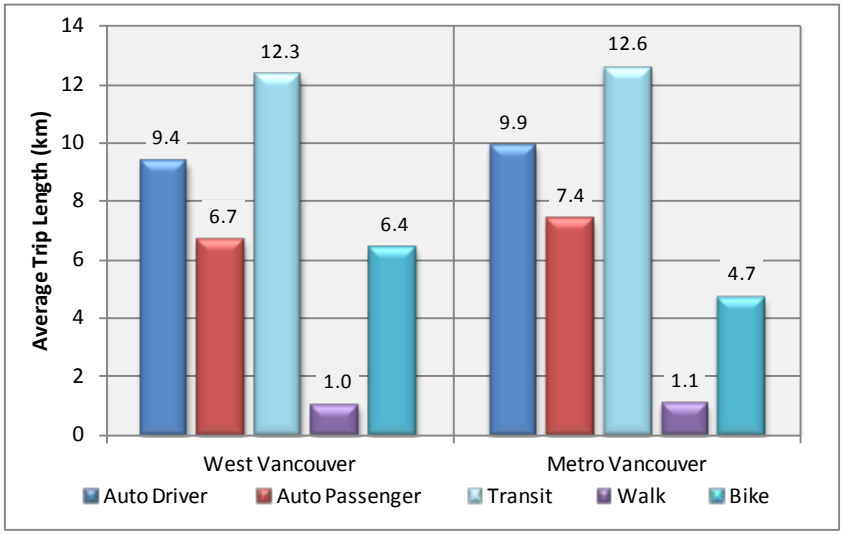


Figure A.16.5 - Average Trip Length by Trip Purpose (West Vancouver)

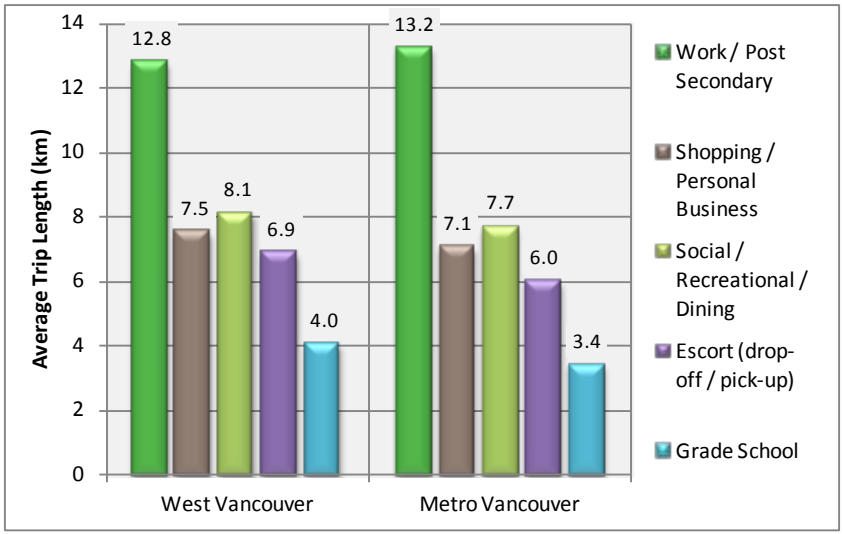


Figure A.16.6 - Weekday Mode Share (West Vancouver)

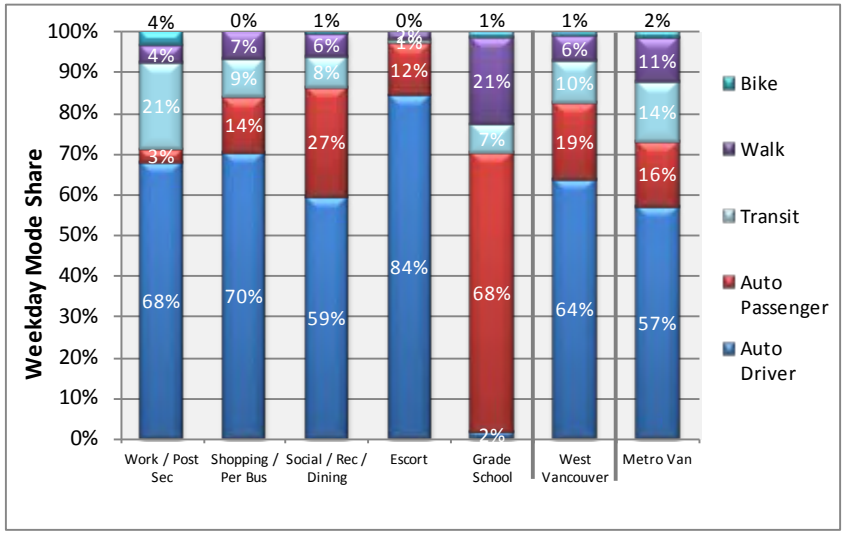
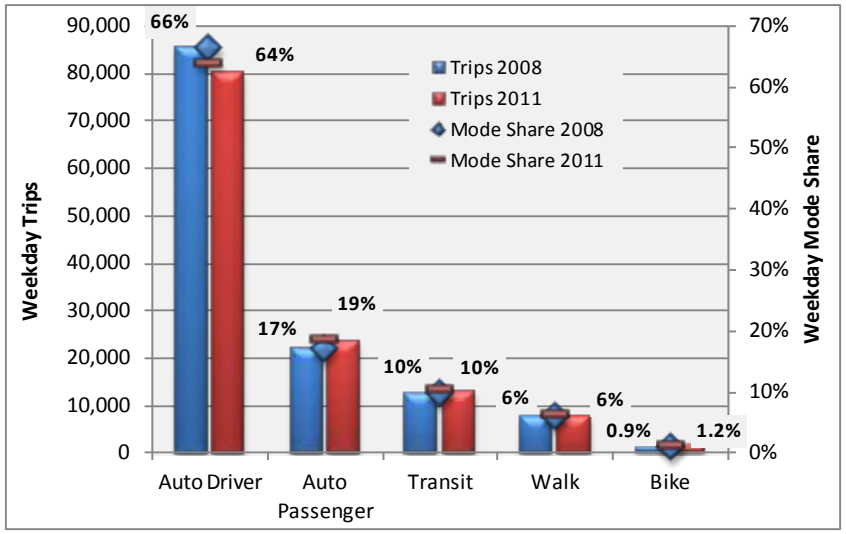


Figure A.16.7 - Trips by Mode and Mode Share (West Vancouver)



A.17 CITY OF WHITE ROCK

Figure A.17.2 - Mode Share - to White Rock

Figure A.17.3 - Weekday Trips by Mode - to Other Areas

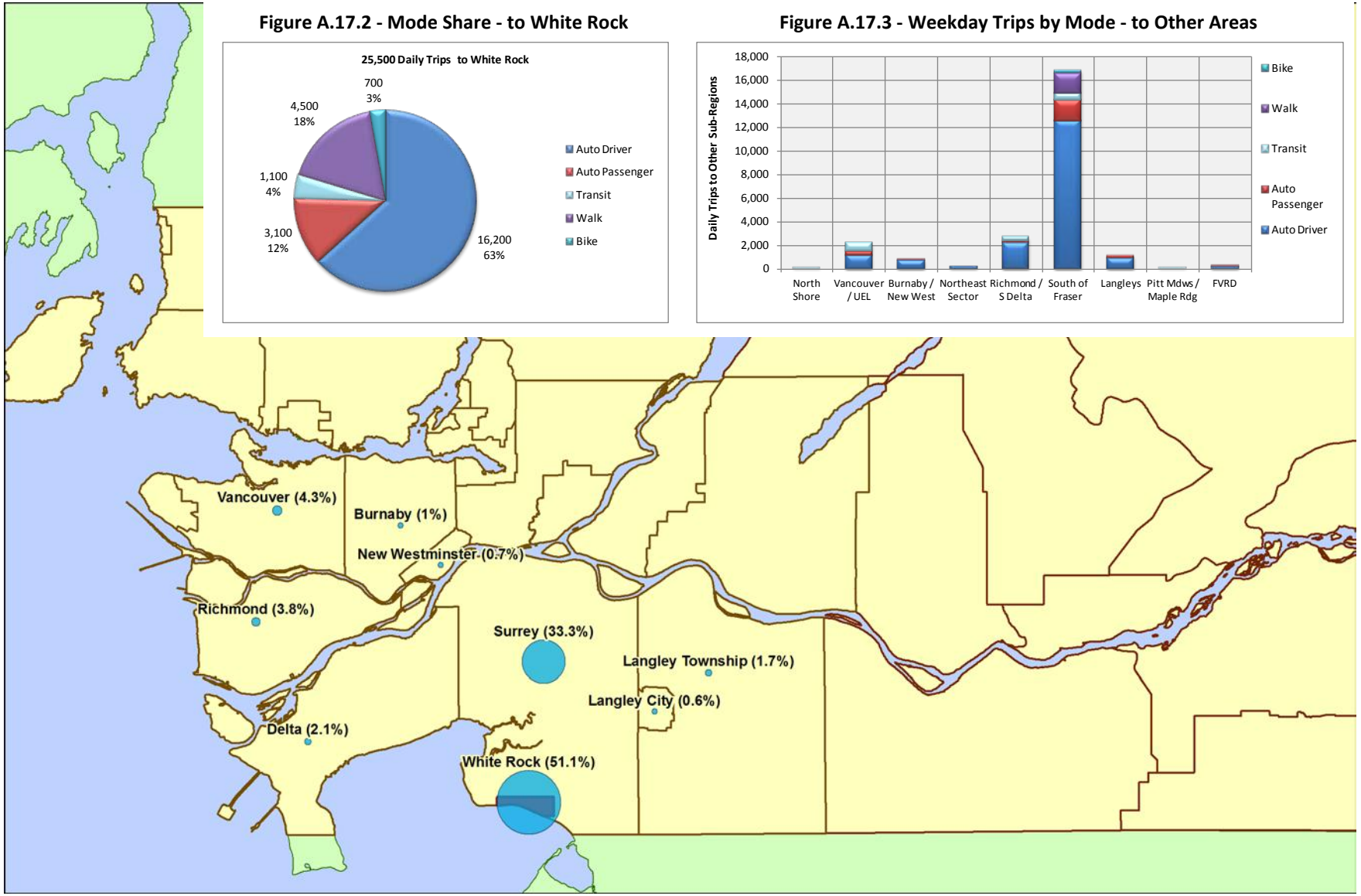


Figure A.17.1 - Trip Destinations - White Rock Residents

Figure A.17.4 - Average Trip Length by Mode (White Rock)

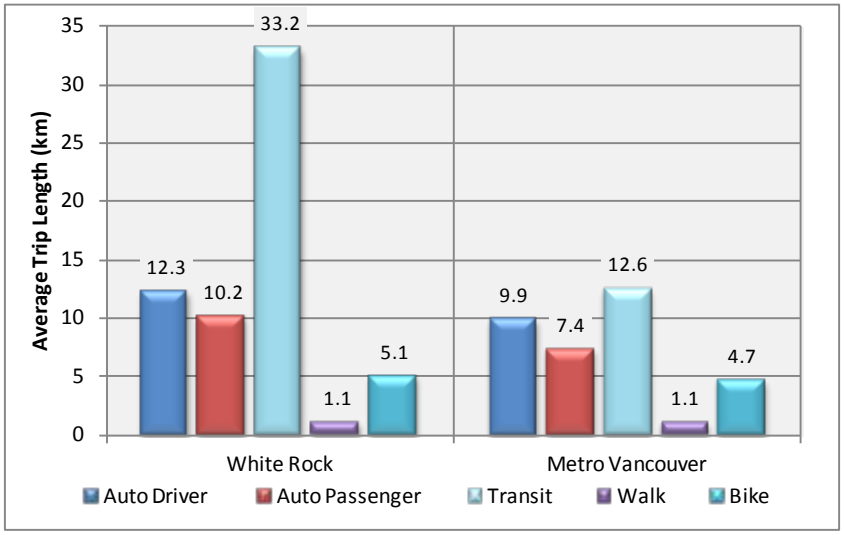


Figure A.17.5 - Average Trip Length by Trip Purpose (White Rock)

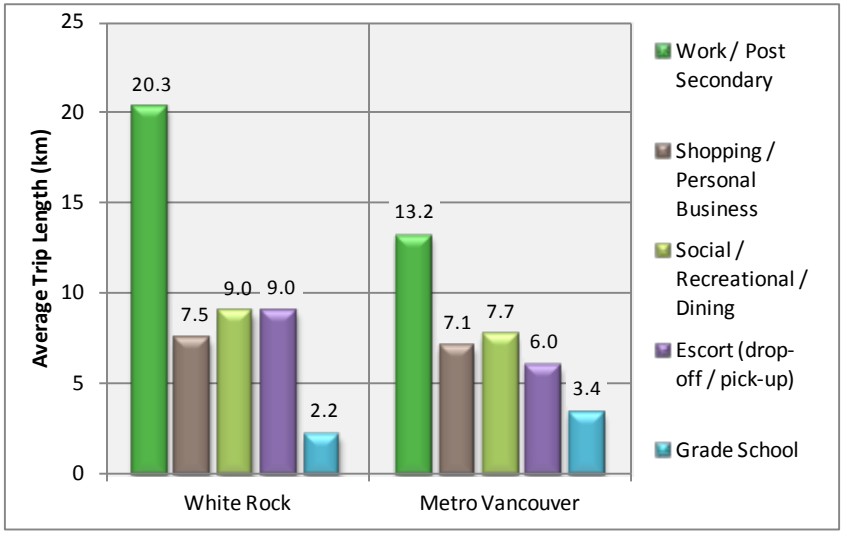


Figure A.17.6 - Weekday Mode Share (White Rock)

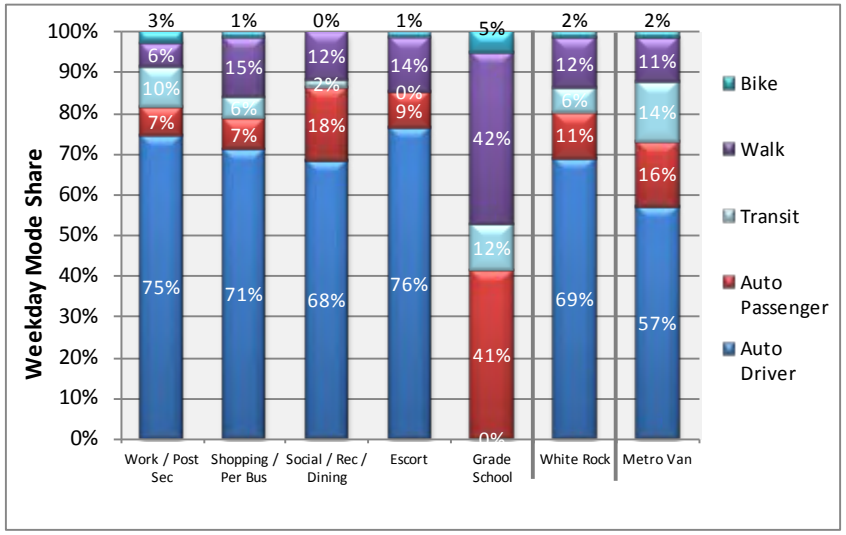
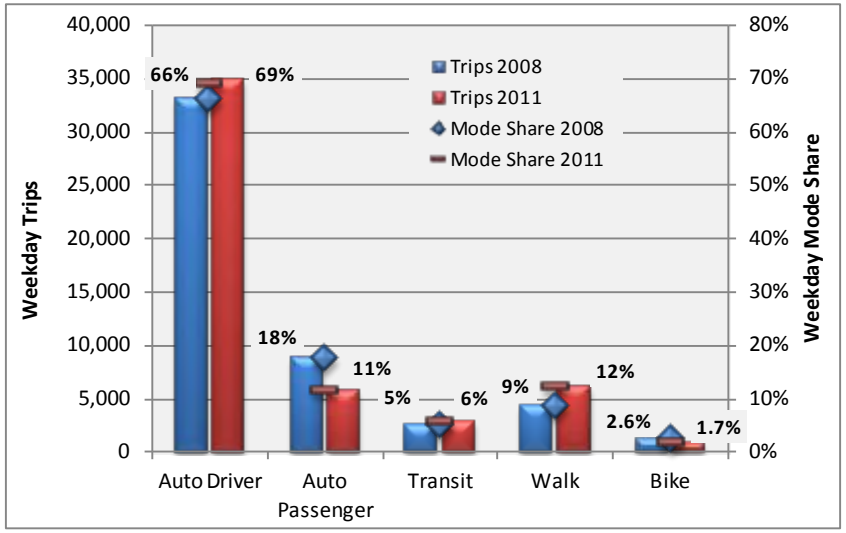


Figure A.17.7 - Trips by Mode and Mode Share (White Rock)[4]



[4] The observed changes in mode shares (especially auto passenger) might be due to small sample size and sampling differences between the surveys.

B. SPECIAL PLACES

The Metro Vancouver Region is spread out across approximately 283,000 hectares and contains many places of regional and/or municipal significance such as the Metropolitan Core and Surrey Metro Centre, the Regional Town Centres and Municipal Town Centres. These places, as illustrated in **Map B.0.1**, are characterized by higher population and employment densities and typically contain a major shopping centre or business district. A brief description of each special place is provided as follows:

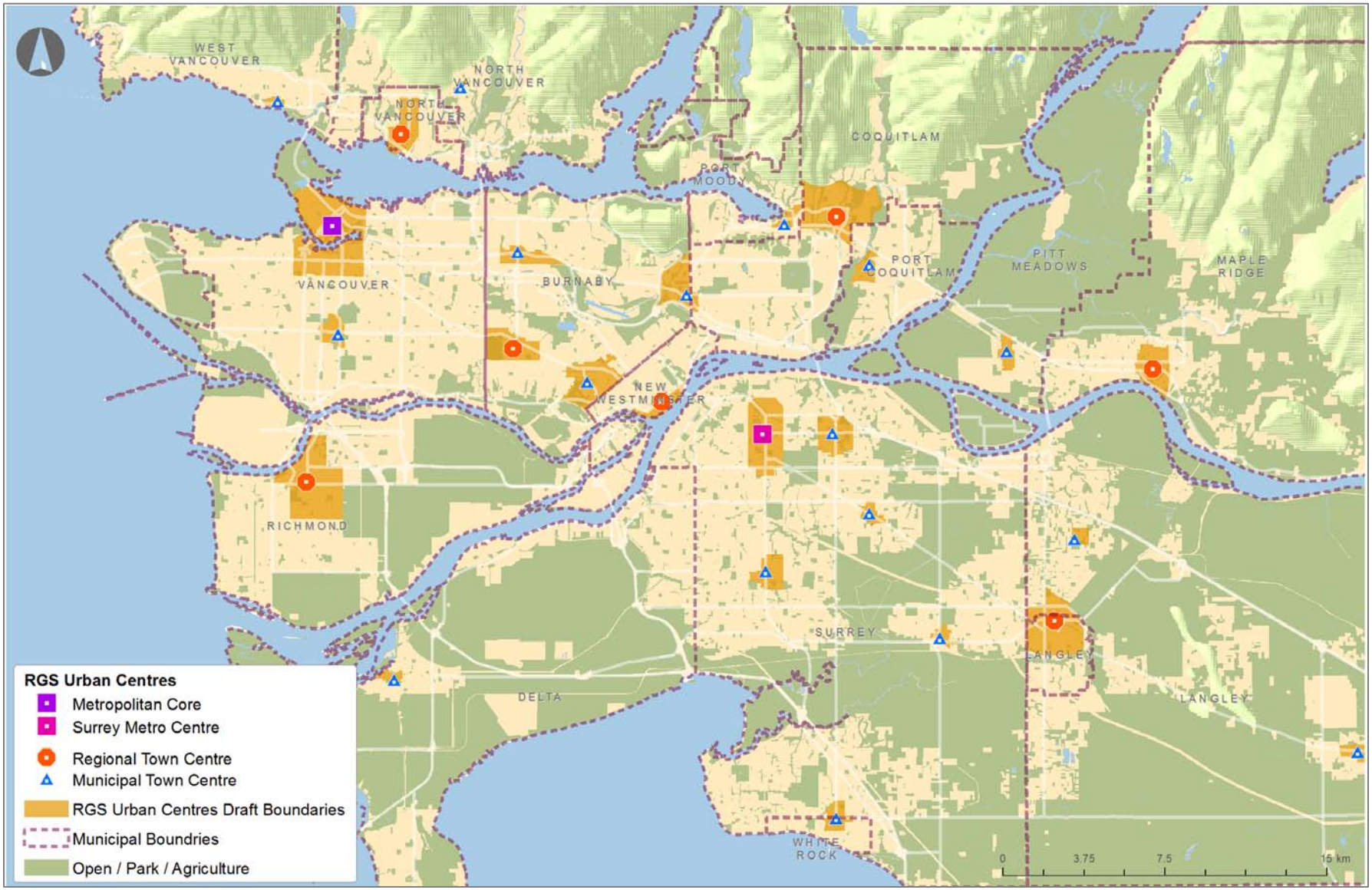
- **Metropolitan Core** – This area includes downtown Vancouver and Central Broadway and contains the highest concentration of people and jobs in the region. It is connected to the rest of the region by a tight network of roadways as well as transit services including SkyTrain, bus, West Coast Express and SeaBus.
- **Surrey Metro Centre** – This area is the central core of Surrey and includes the highest concentration of people and jobs in the South of Fraser area. It is connected to the rest of the South of Fraser sub-region by key roadways such as King George Blvd, Fraser Hwy, 104th Ave and 96th Ave. Key transit services include bus and SkyTrain.
- **Regional Town Centres** – These are key regional destinations that usually include an employment district, shopping centre and high concentration of residential units. They are all connected by major arterial roadways and most include frequent transit connections. There are seven Regional Town Centres in Metro Vancouver based on the Regional Growth Strategy.
- **Municipal Town Centres** – These areas are smaller town centres that typically include a commercial hub and are connected by bus services. There are 15 Municipal Town Centres in Metro Vancouver.
- **Universities** – These include the three major academic institutions in Metro Vancouver: the University of British Columbia (UBC), Simon Fraser University (SFU) and the British Columbia Institute of Technology (BCIT).

Because of their particular characteristics, travel patterns to these areas are different compared to the rest of the region and warrant special attention. The following sub sections describe these special places and the unique travel patterns to them.

Similar to the Modal Users section (Section 4), this appendix provides information on the demographic profile of people that reside within each of the special places. The profile of users includes information on the gender, age group, life stage, income and housing type composition in each type of locations. In addition, information on origin-destination patterns of trips to and from each special place, as well as trip patterns of residents of special places, is also provided.

Note that any trip distances in the charts in this appendix refer to all trips to Special Places, not just to trips between regional centres.

Map B.0.1 – Special Places in Metro Vancouver



Source: Metro Vancouver.

Figure B.0.1 – Distribution Patterns of Trips between Centres

		Trip Destinations			
	Special Place	Metro Core	Surrey Metro Centre	Regional City Centres	Municipal Town Centres
Trip Origins	Metro Core	275,000	3,000	31,000	21,000
	Surrey Metro Centre	3,000	11,000	4,000	6,000
	Regional City Centres	30,000	4,000	120,000(1)/47,000(2)	25,000
	Municipal Town Centres	23,000	6,000	24,000	50,000(3)/16,000(4)

Notes:

(1) Trips within Regional City Centres
(2) Trips between Regional City Centres
(3) Trips within Municipal Town Centres
(4) Trips between Municipal Town Centres.

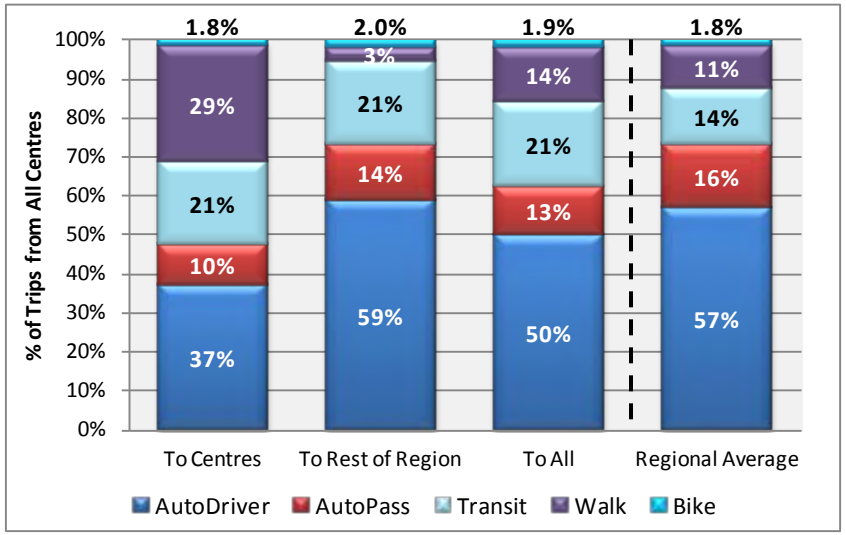
Figure B.0.2 – Proportion of Distribution Patterns of Trips between Centres

		Trip Destination			
	Special Place	Metro Core	Surrey Metro Centre	Regional City Centres	Municipal Town Centres
Trip Origin	Metro Core	39%	0.4%	4%	3%
	Surrey Metro Centre	0.4%	2%	1%	1%
	Regional City Centres	4%	1%	17%(1)/7%(2)	4%
	Municipal Town Centres	3%	1%	3%	7%(3)/2%(4)

Notes:

(1) Trips within Regional City Centres
(2) Trips between Regional City Centres
(3) Trips within Municipal Town Centres
(4) Trips between Municipal Town Centres.

Figure B.0.3 – Mode Usage and Trip Patterns between Centres[5,6]



[5] All Centres Average includes the average mode share of trips from all centres to all centres.
[6] Regional Average represents all trips, including trips from all areas of the region to all other areas of the region, not just from centres to centres.

B.1 METROPOLITAN CORE

Figure B.1.1 – Trip Distribution by Mode

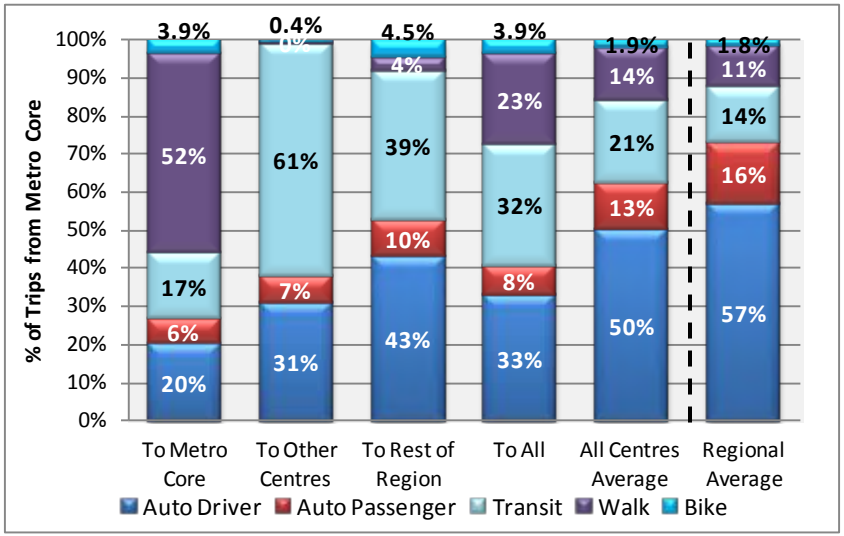


Figure B.1.2 – Trips to Metro Core by Mode

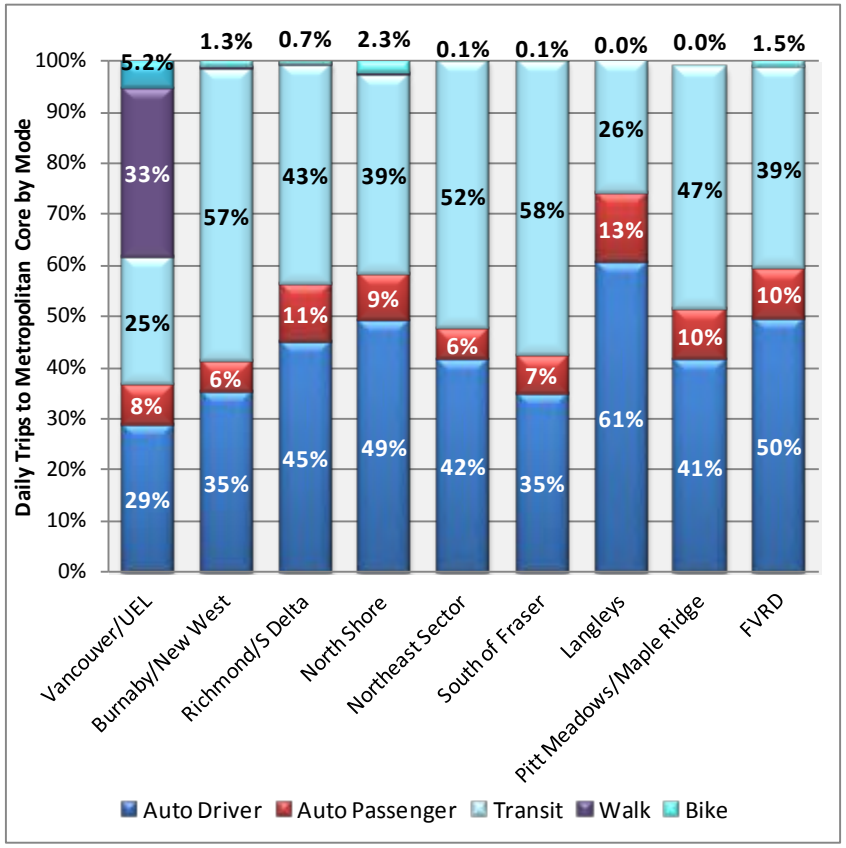


Figure B.1.2 – Trip Distribution Patterns

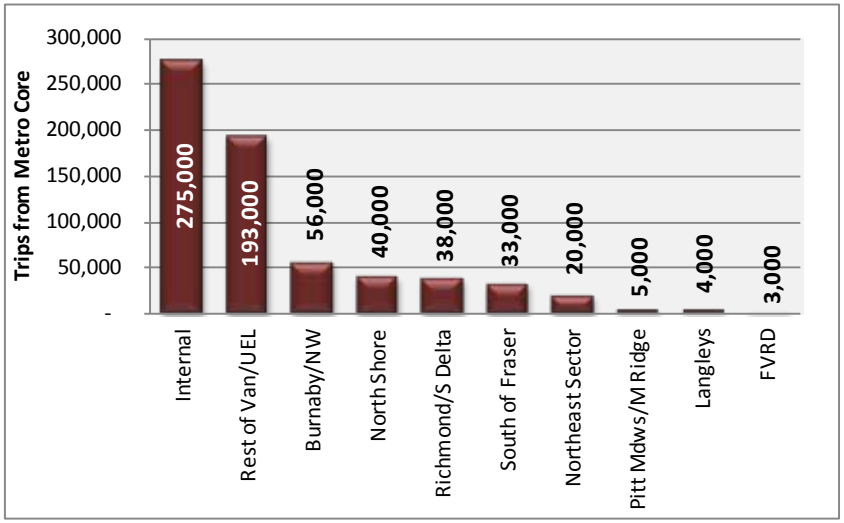


Figure B.1.3 – Trips by Time of Day

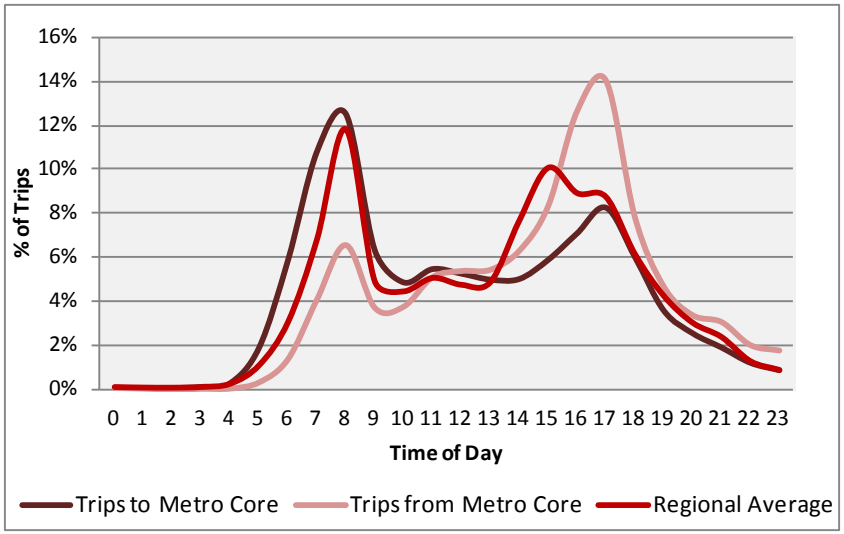


Figure B.1.4 – Proportion of Trips by Purpose

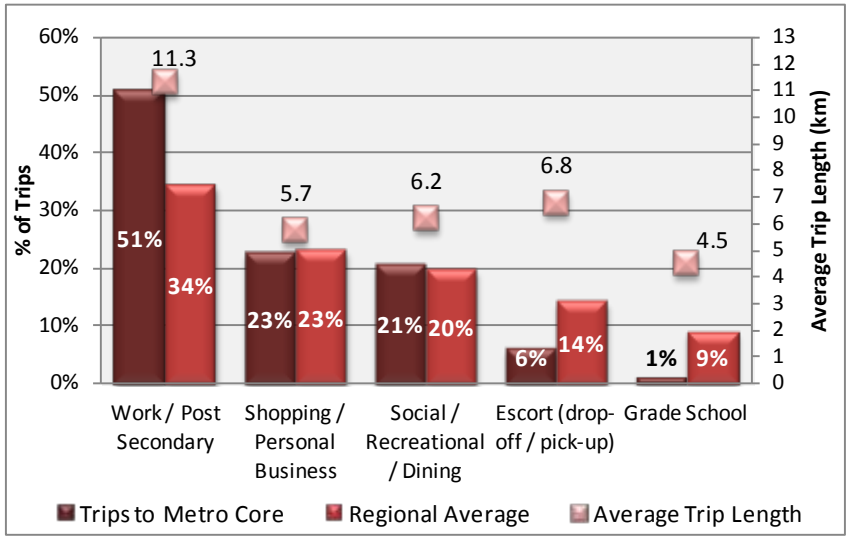


Figure B.1.5 – Proportion of Single-Mode and Multimodal Users

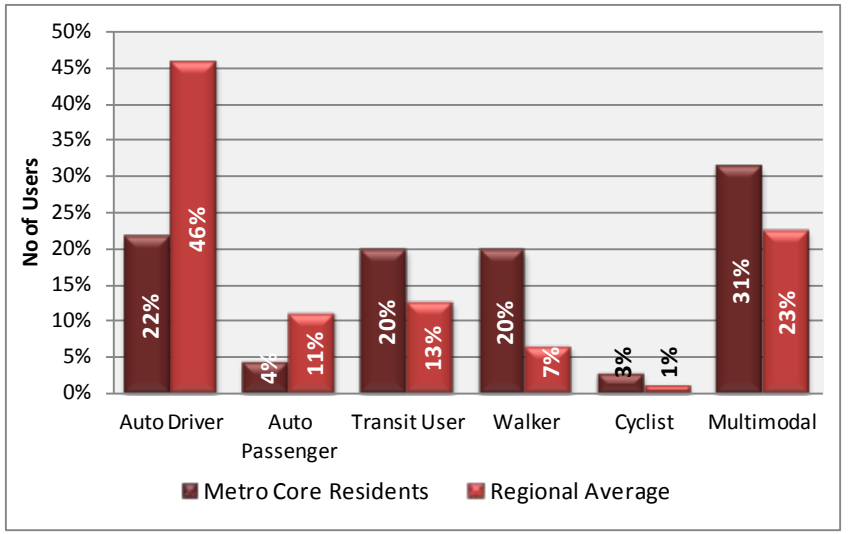


Figure B.1.6 – Resident Trips by Time of Day

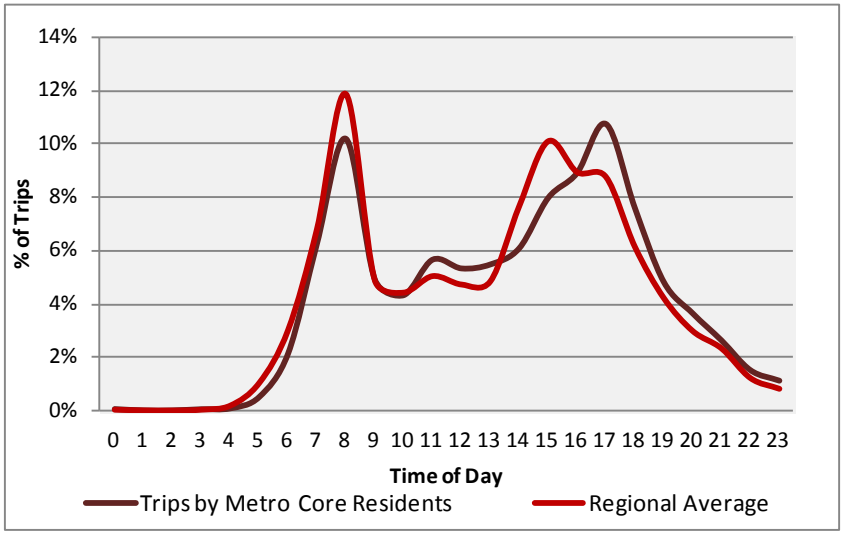


Figure B.1.8 – Proportion of Resident Trips by Purpose

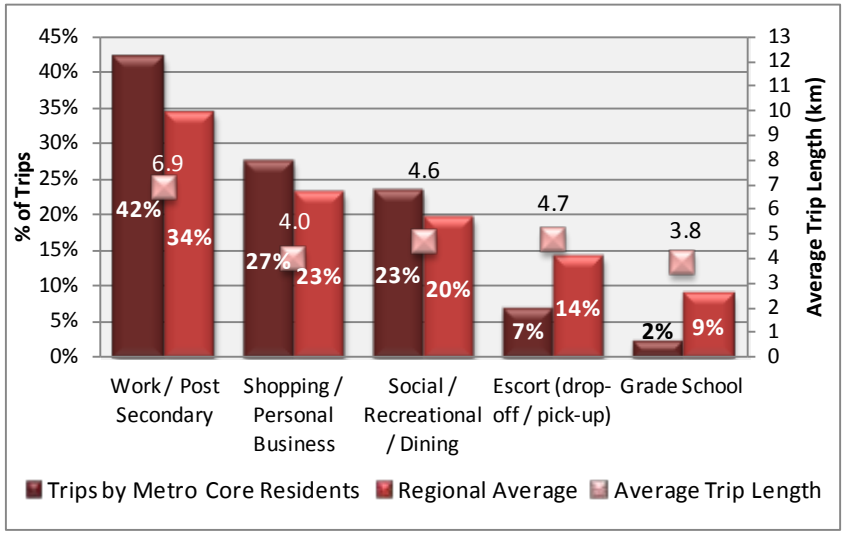


Figure B.1.7 – Proportion of Resident Trips by Mode

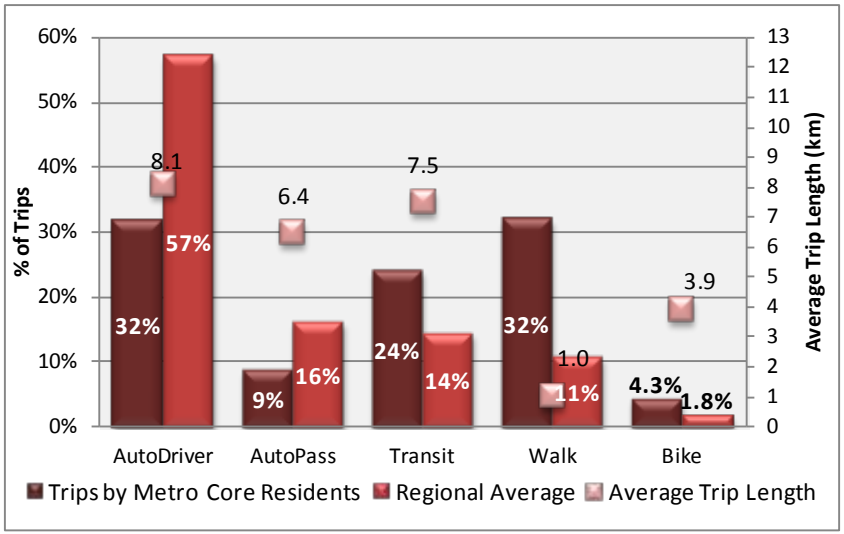


Figure B.1.9 – Gender Profile of Residents

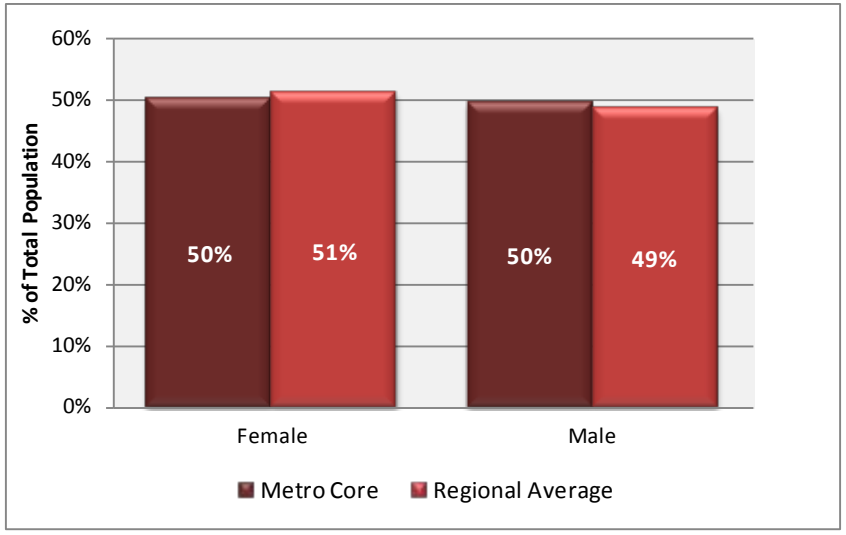


Figure B.1.10 – Life Stage Profile of Residents

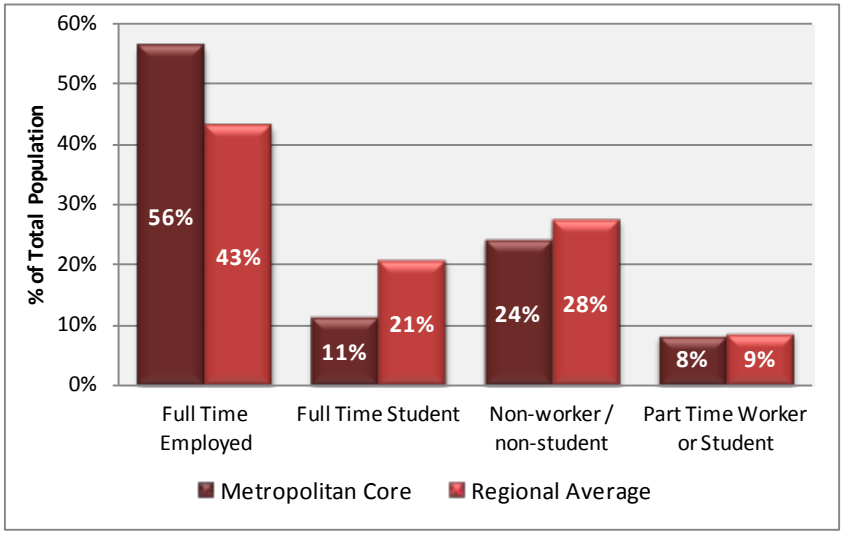


Figure B.1.12 – Housing Type Profile of Residents

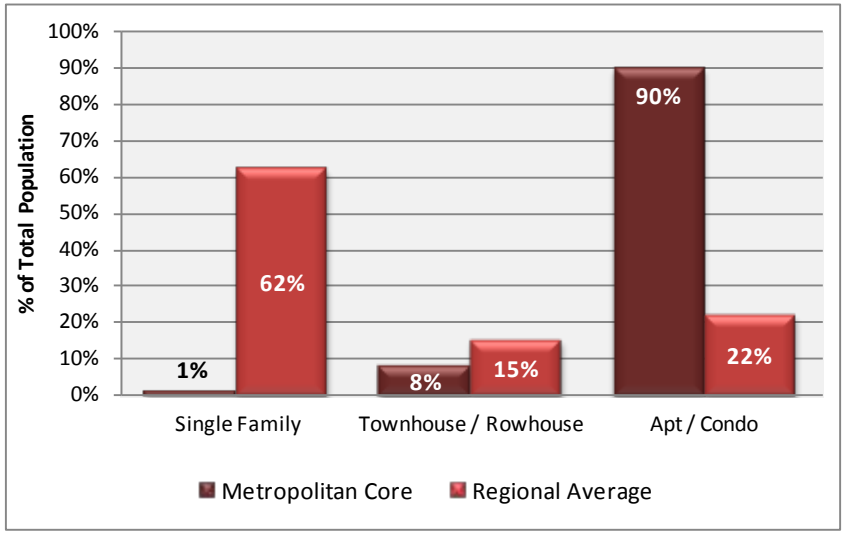
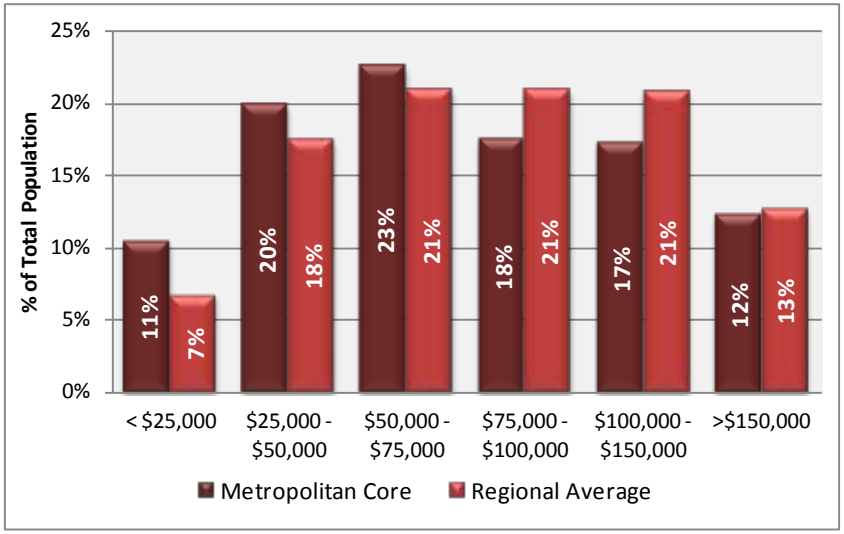


Figure B.1.11 – Income Profile of Residents



B.2 SURREY METRO CENTRE

Figure B.2.1 – Trip Distribution by Mode

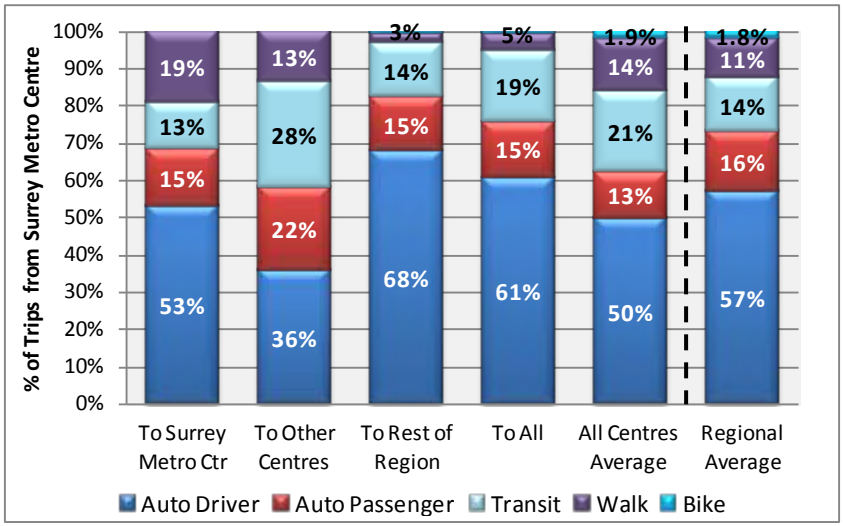


Figure B.2.2 – Trip Distribution Patterns

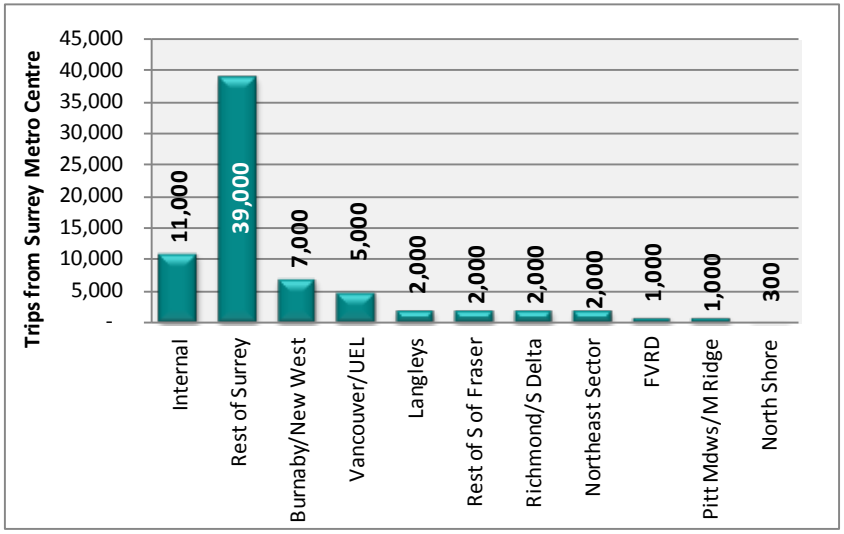


Figure B.2.3 – Trips by Time of Day

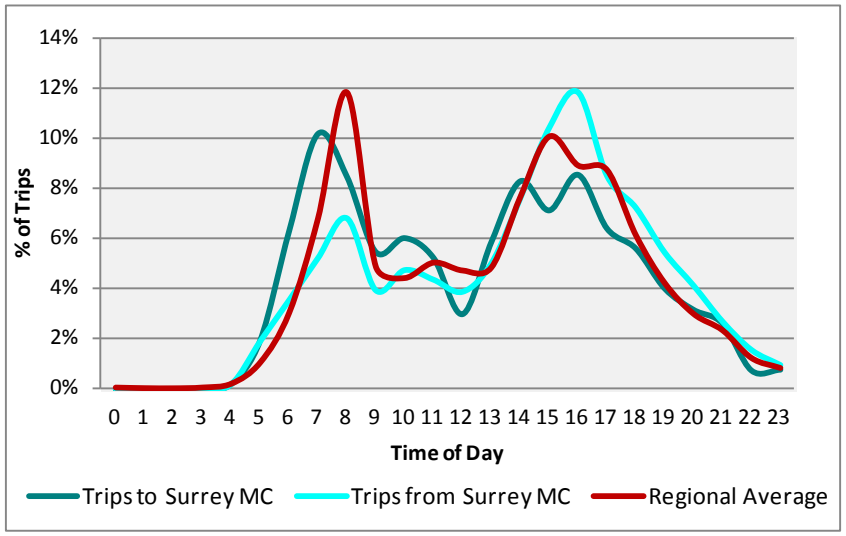


Figure B.2.4 – Proportion of Trips by Purpose

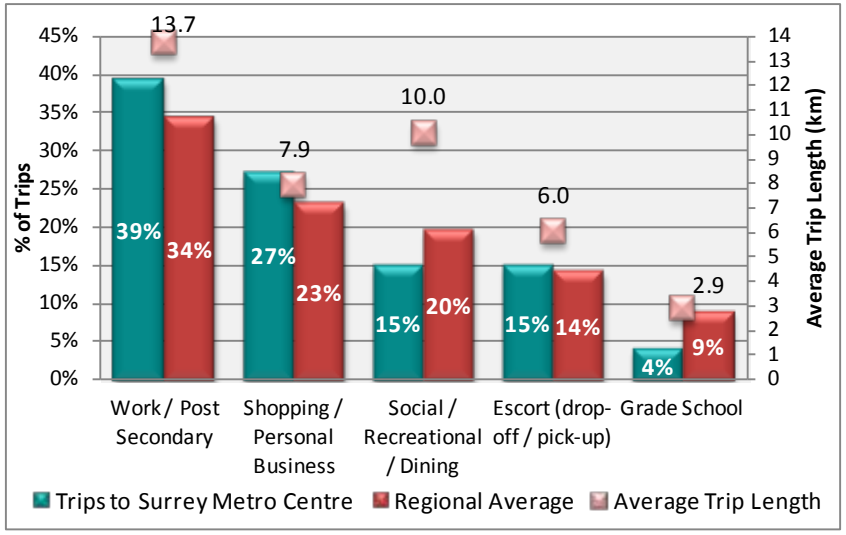


Figure B.2.5 – Proportion of Single-Mode and Multimodal Users

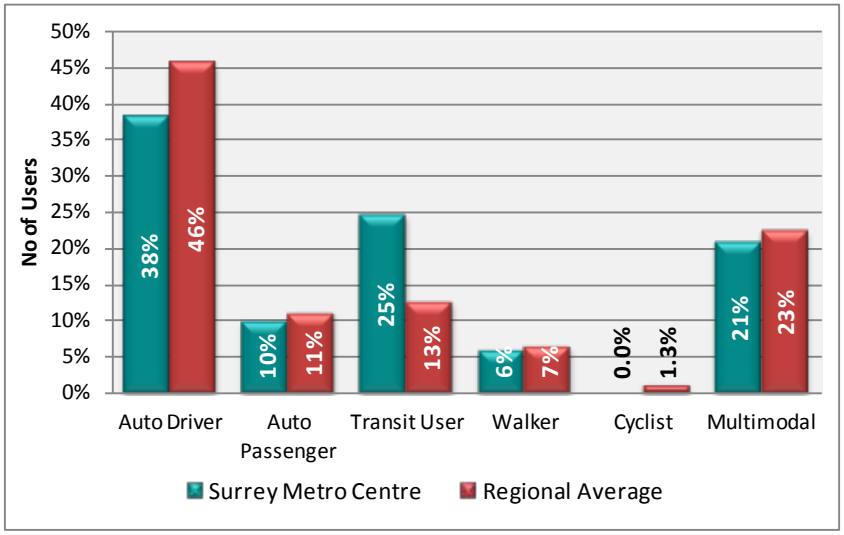


Figure B.2.6 – Resident Trips by Time of Day

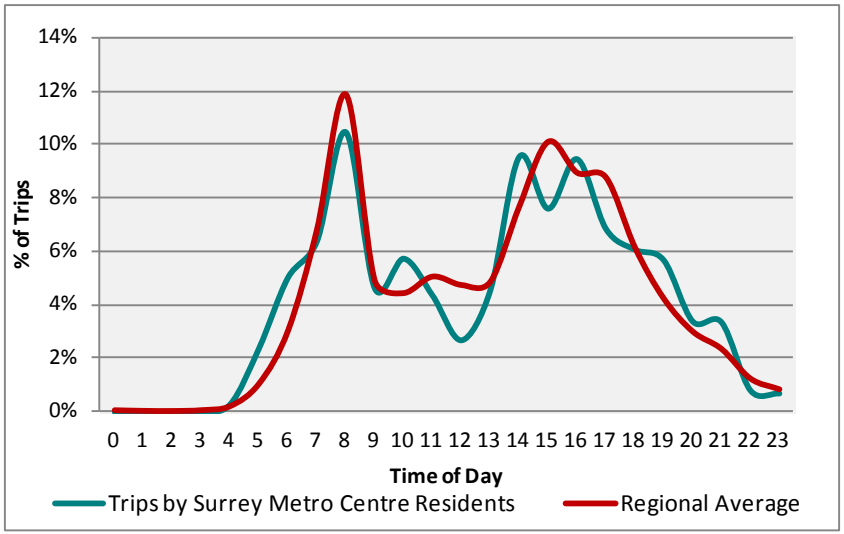


Figure B.2.7 – Proportion of Resident Trips by Mode

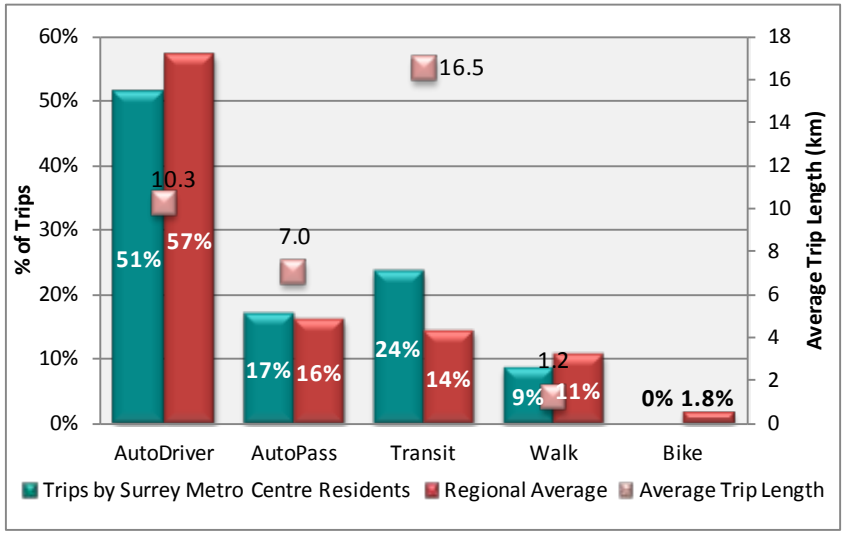


Figure B.2.8 – Proportion of Resident Trips by Purpose

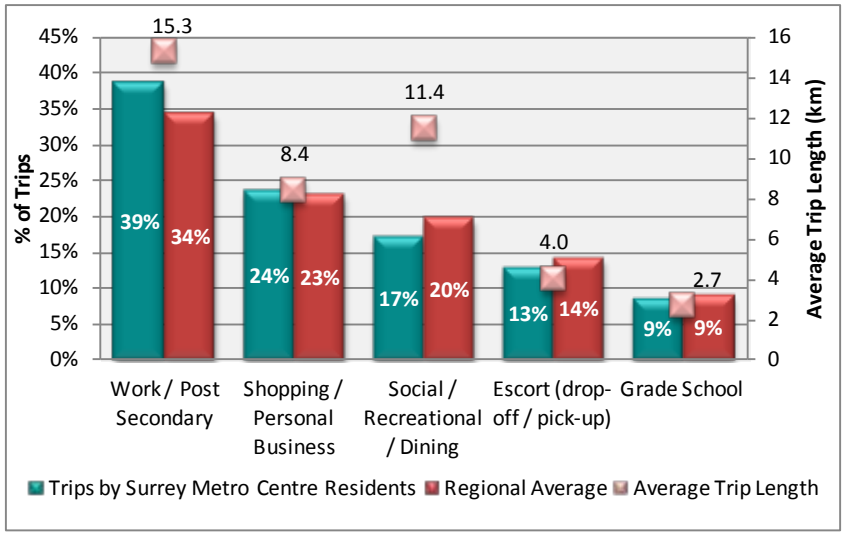


Figure B.2.9 – Gender Profile of Residents

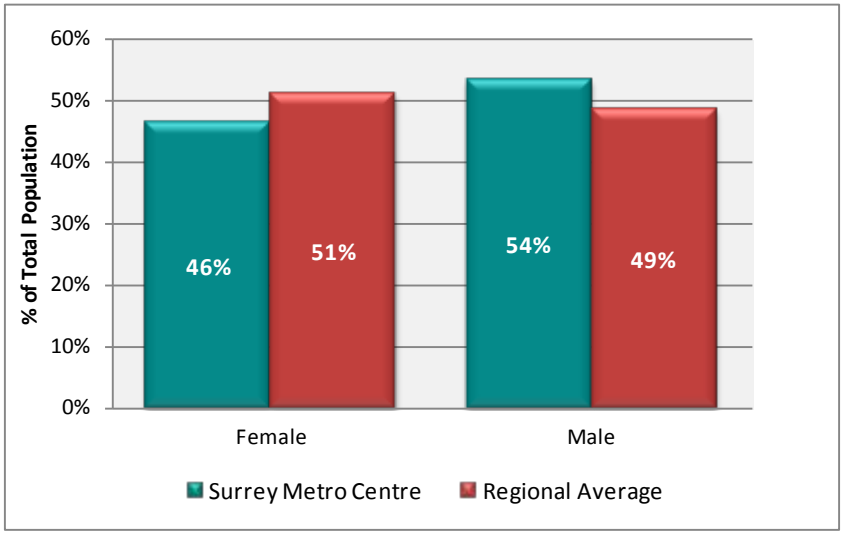


Figure B.2.10 – Life stage Profile of Residents

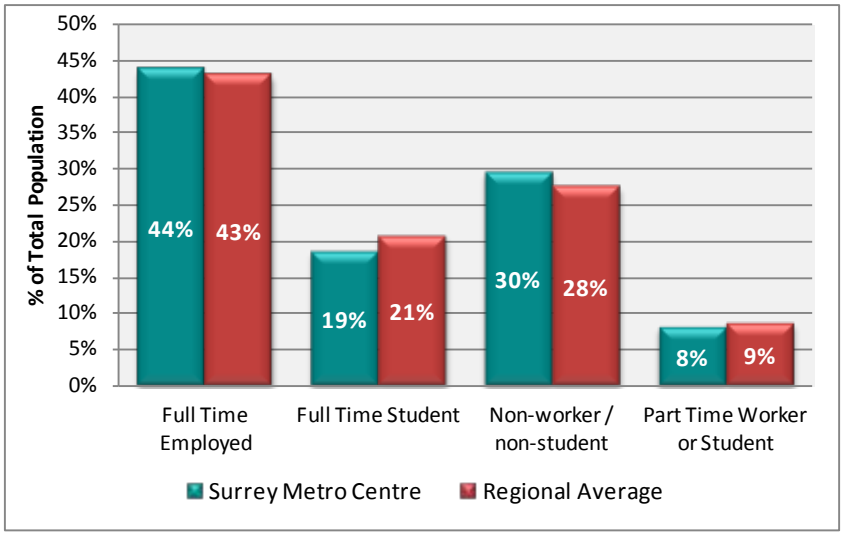


Figure B.2.11 – Income Profile of Residents

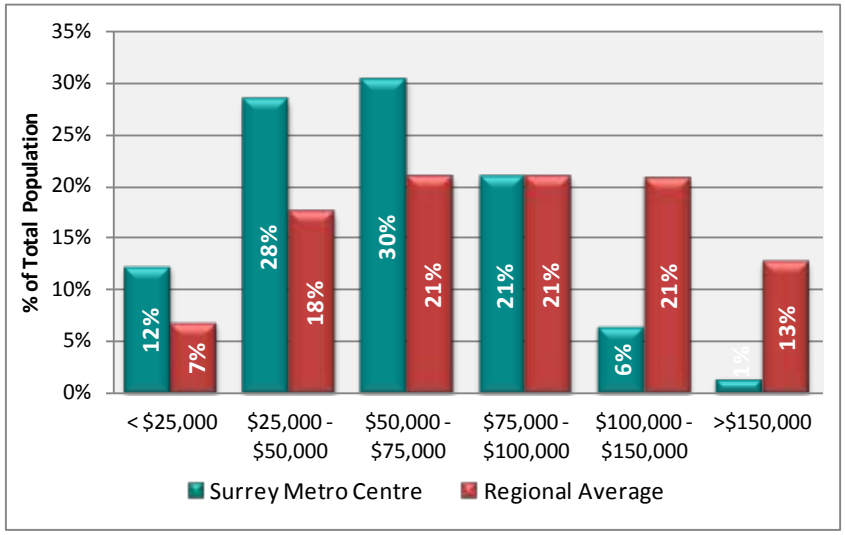
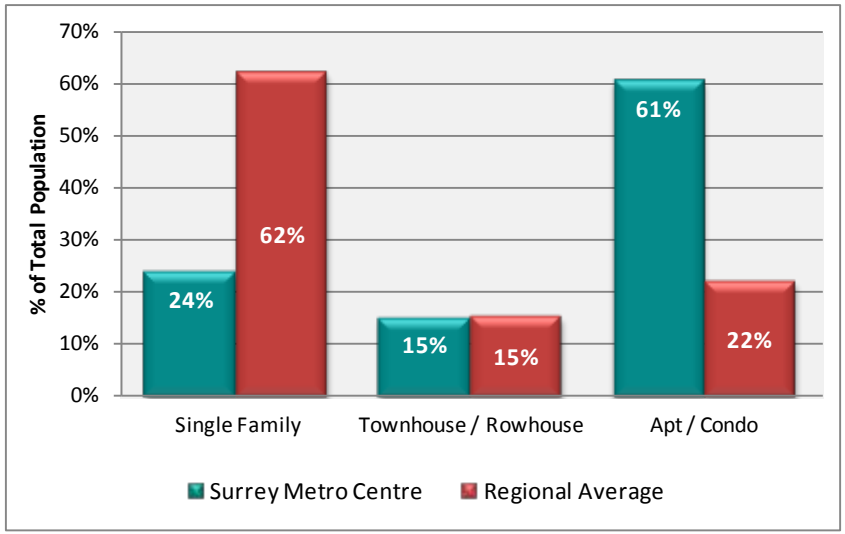


Figure B.2.12 – Housing Type Profile of Residents



B.3 Regional City Centres

Figure B.3.1 – Trip Distribution by Mode

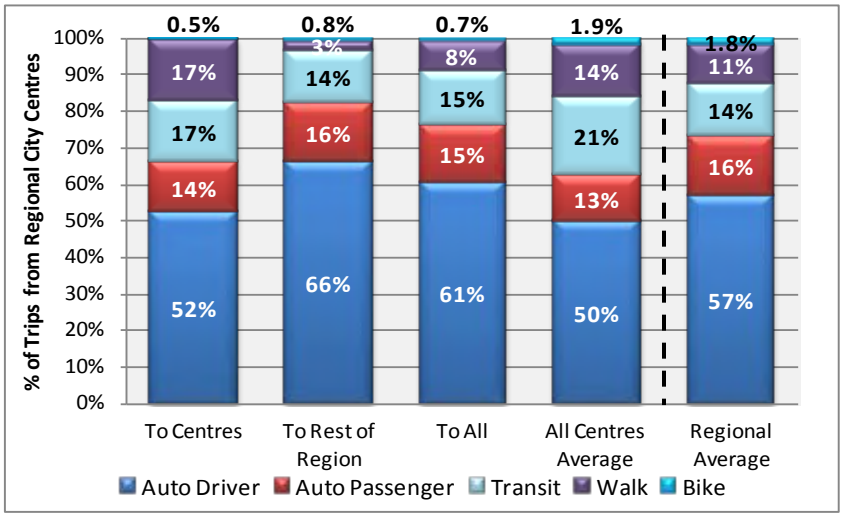


Figure B.3.2 – Trips by Time of Day

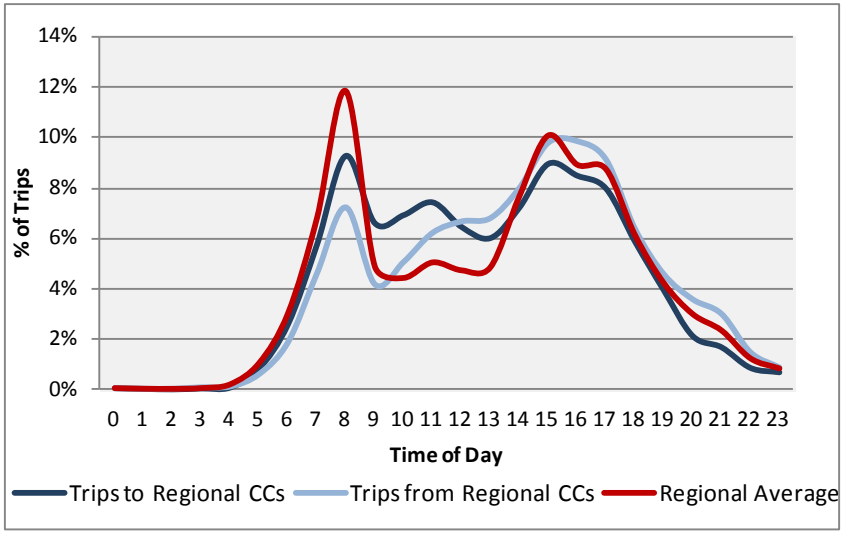


Figure B.3.3 – Proportion of Trips by Mode

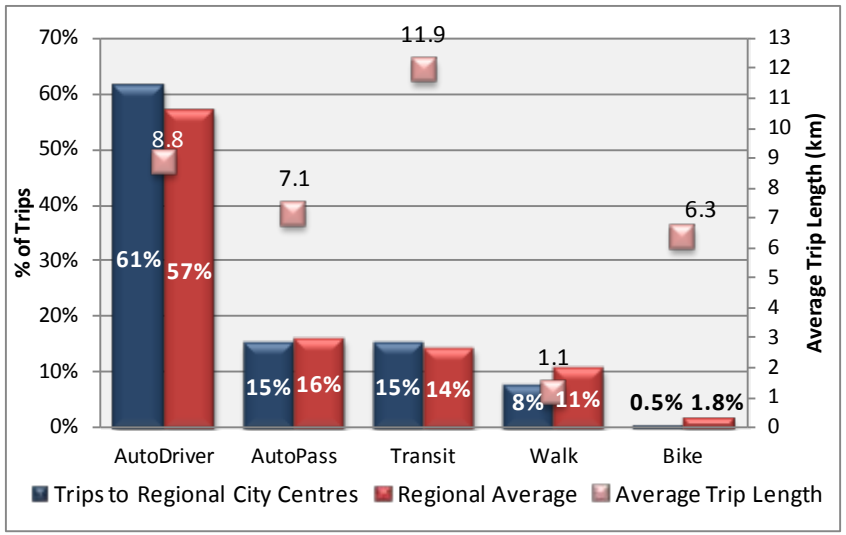


Figure B.3.4 – Proportion of Trips by Purpose

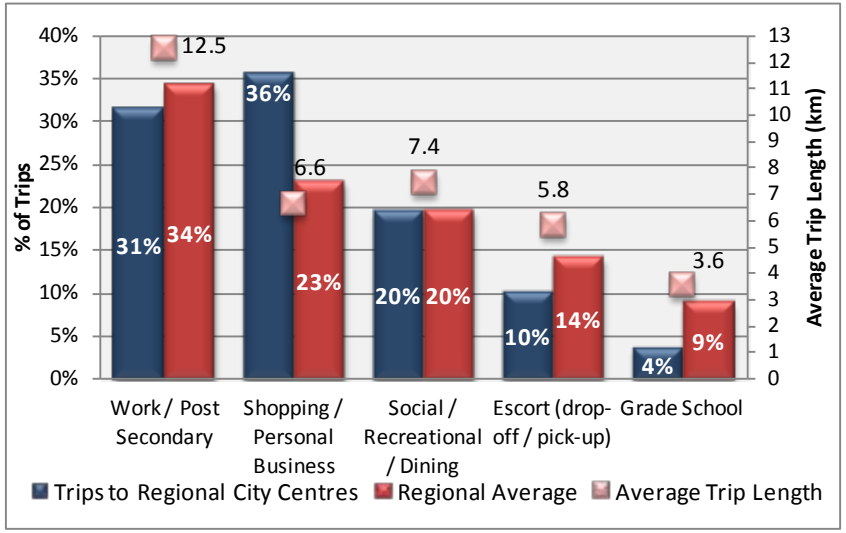


Figure B.3.5 – Proportion of Single-Mode and Multimodal Users

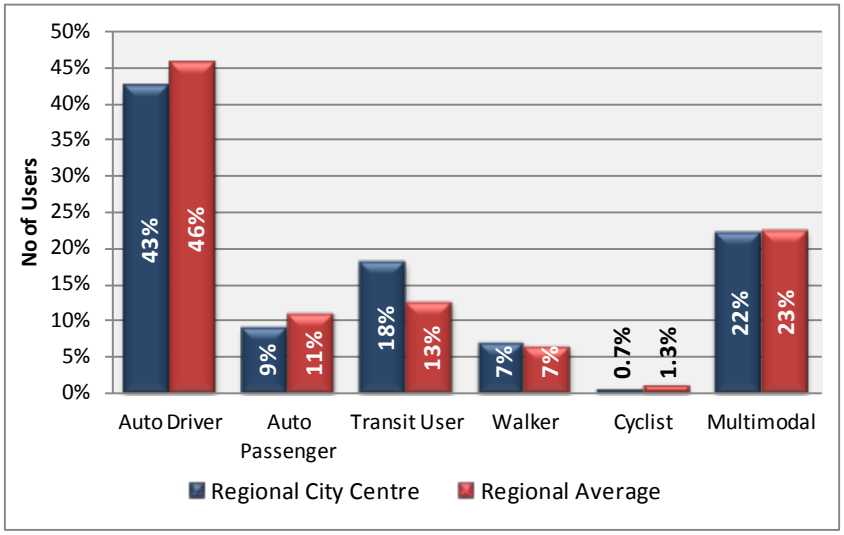


Figure B.3.6 – Resident Trips by Time of Day

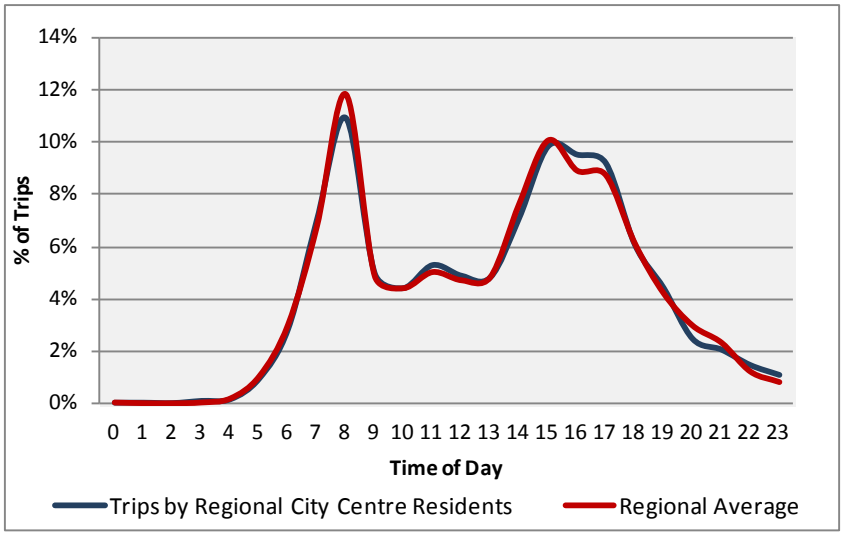


Figure B.3.7 – Proportion of Resident Trips by Mode

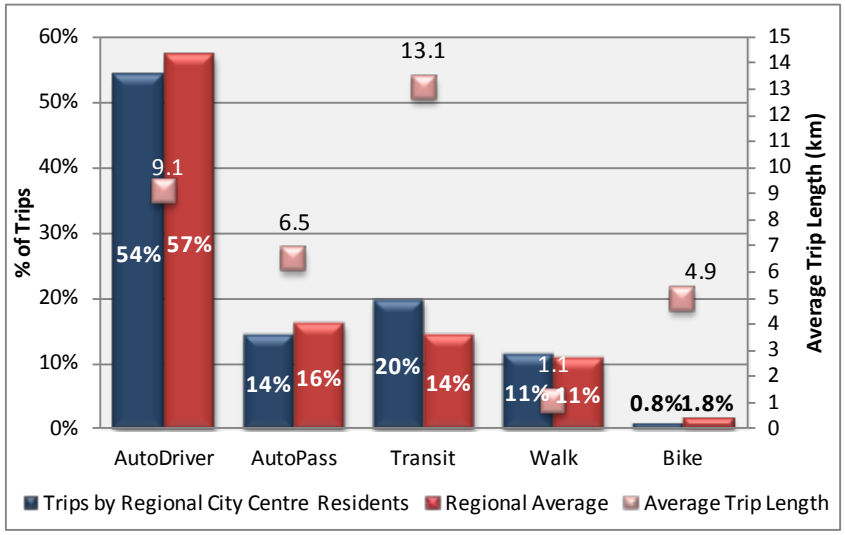


Figure B.3.8 – Proportion of Resident Trips by Purpose

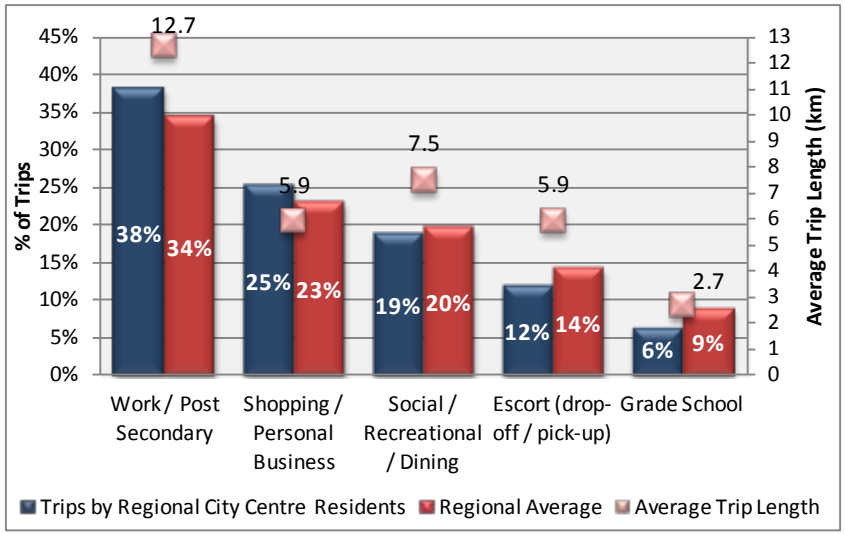


Figure B.3.9 – Gender Profile of Residents

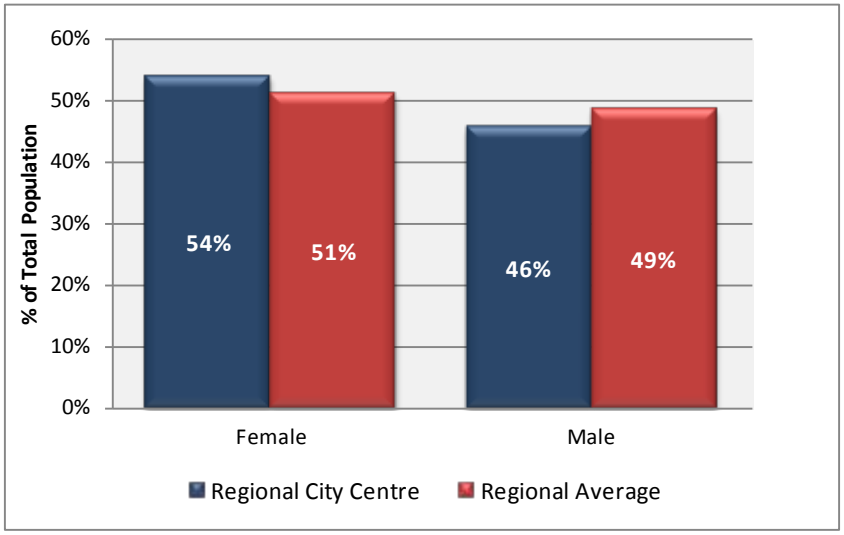


Figure B.3.10 – Life stage Profile of Residents

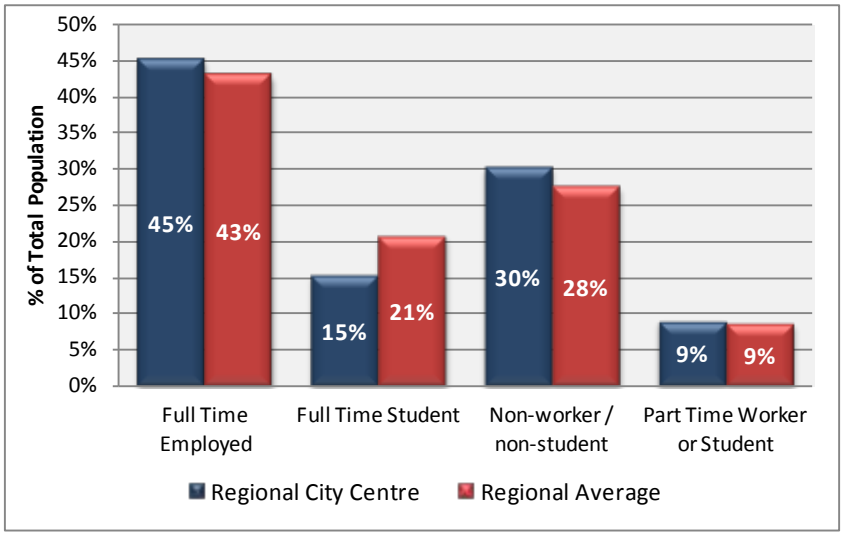


Figure B.3.11 – Income Profile of Residents

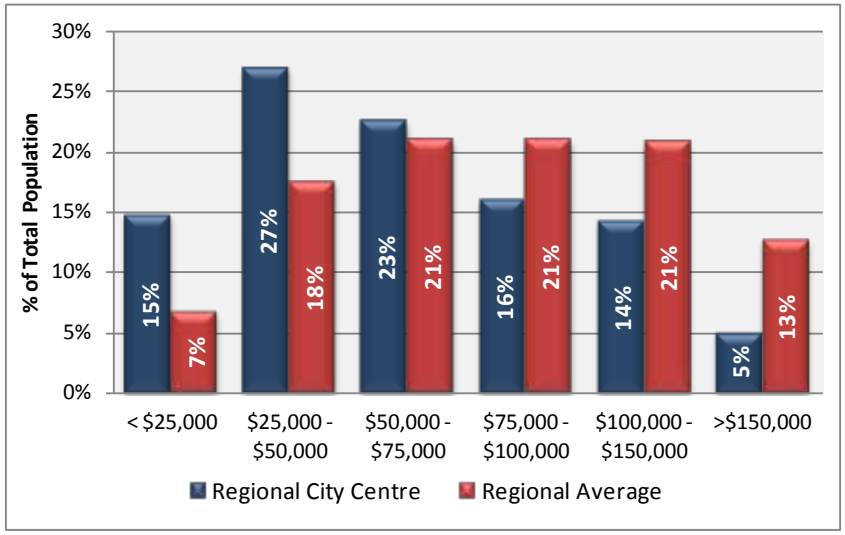
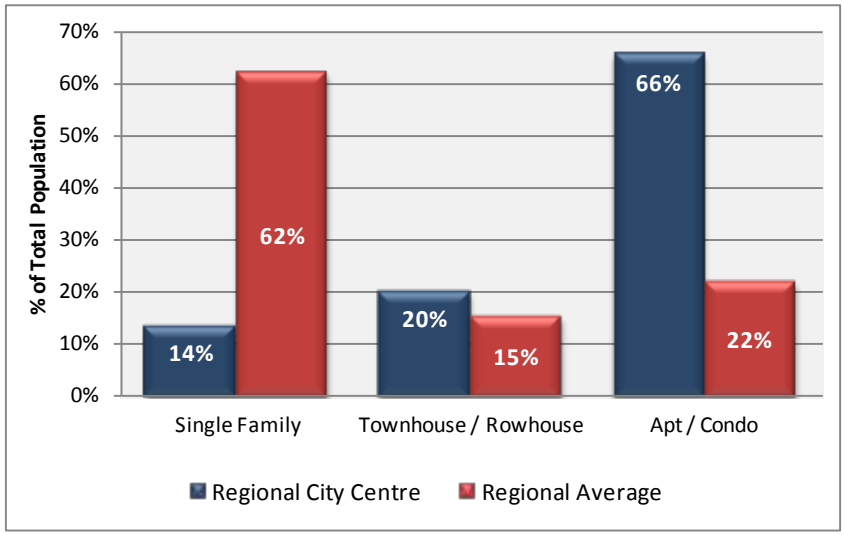


Figure B.3.12 – Housing Type Profile of Residents



B.4 MUNICIPAL TOWN CENTRES

Figure B.4.1 – Trip Distribution by Mode

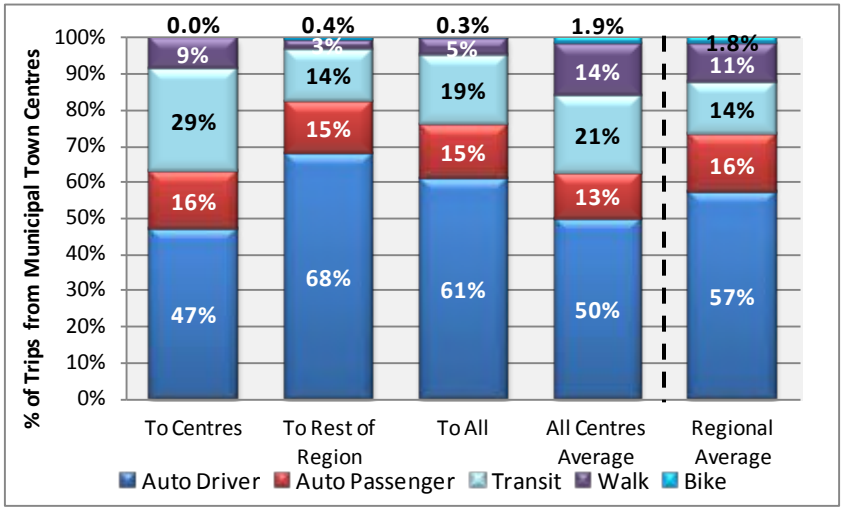


Figure B.4.2 – Trips by Time of Day

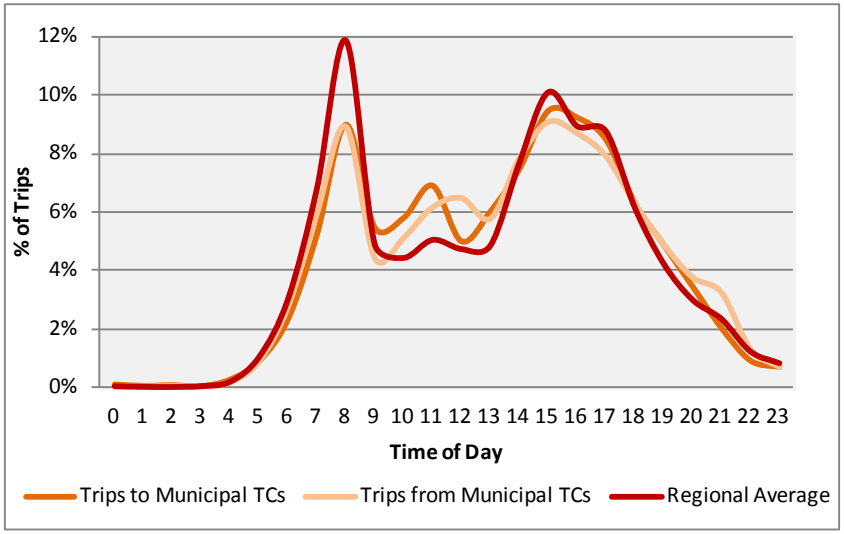


Figure B.4.3 – Proportion of Trips by Mode

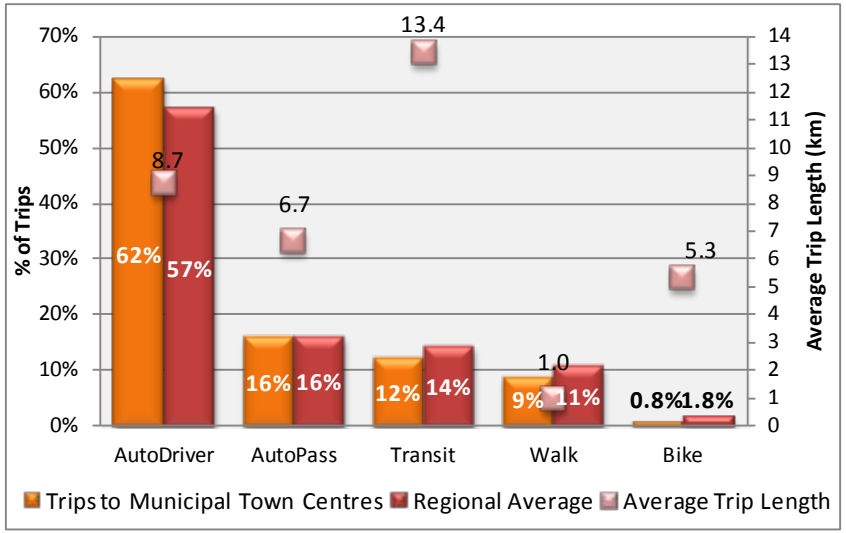


Figure B.4.4 – Proportion of Trips by Purpose

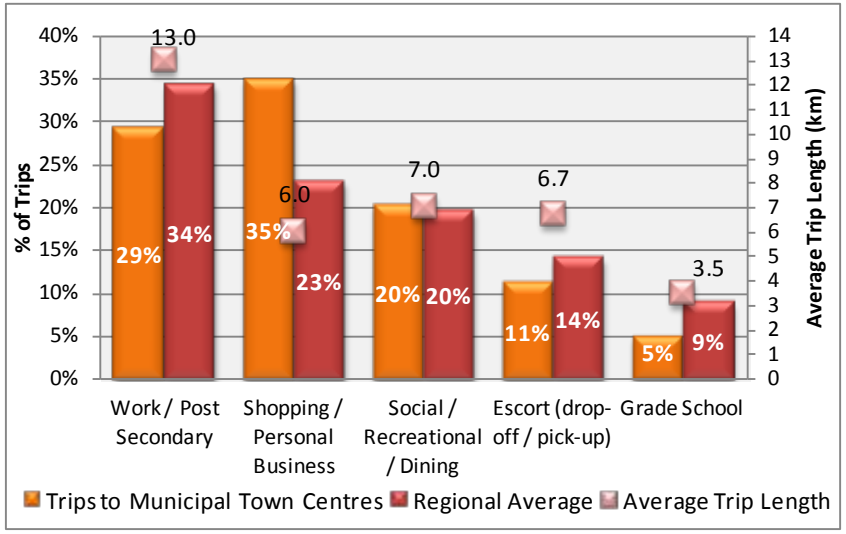


Figure B.4.5 – Proportion of Single-Mode and Multimodal Users

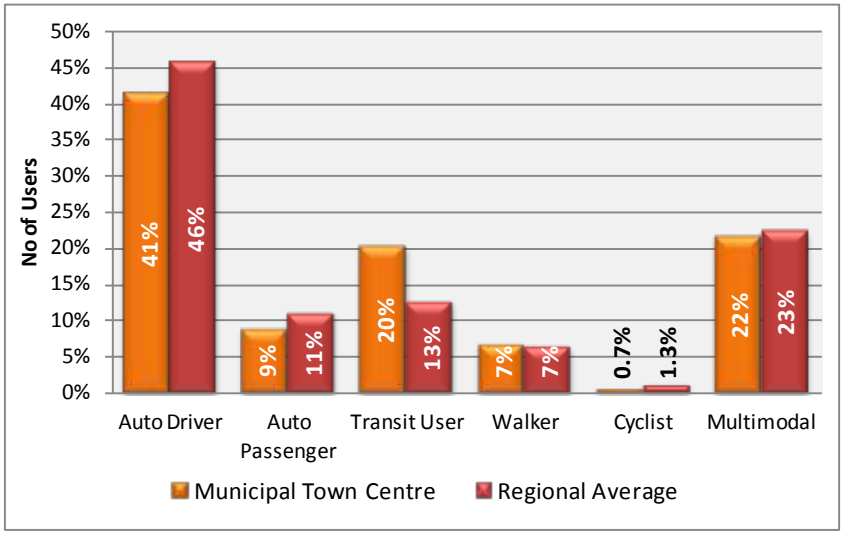


Figure B.4.6 – Resident Trips by Time of Day

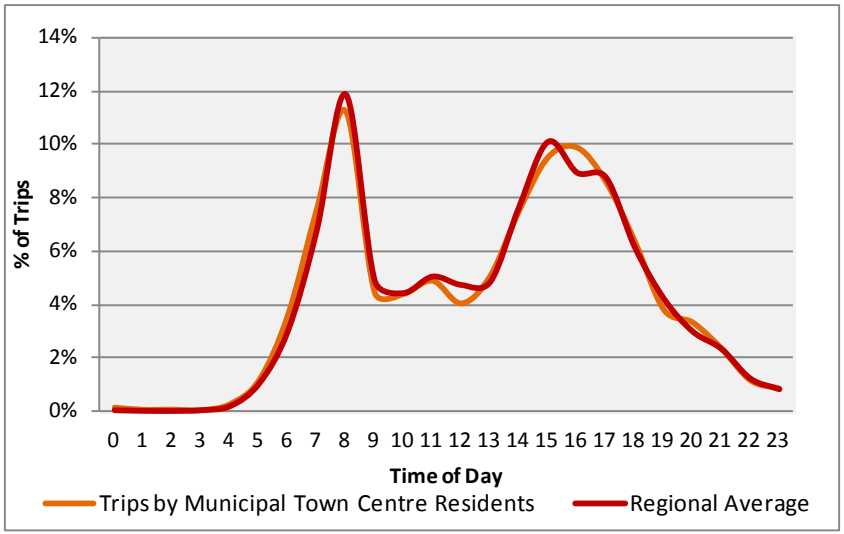


Figure B.4.7 – Proportion of Resident Trips by Mode

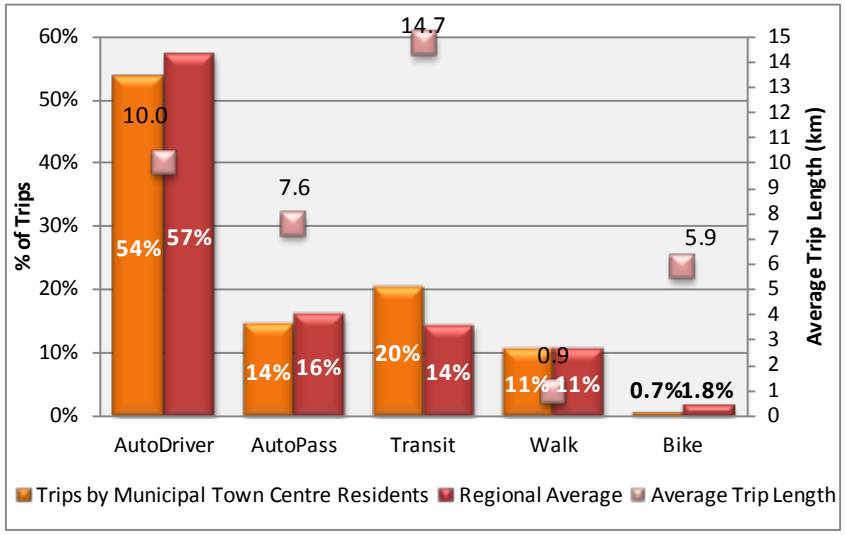


Figure B.4.8 – Proportion of Resident Trips by Purpose

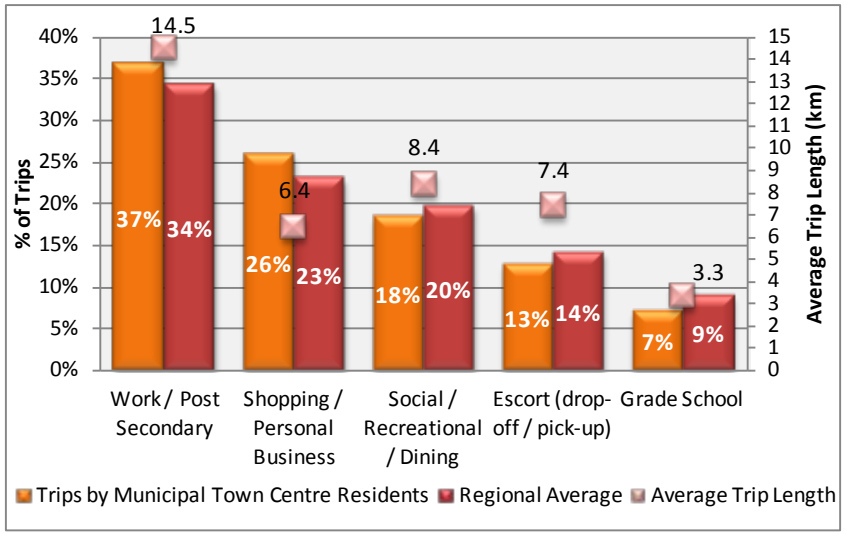


Figure B.4.9 – Gender Profile of Residents

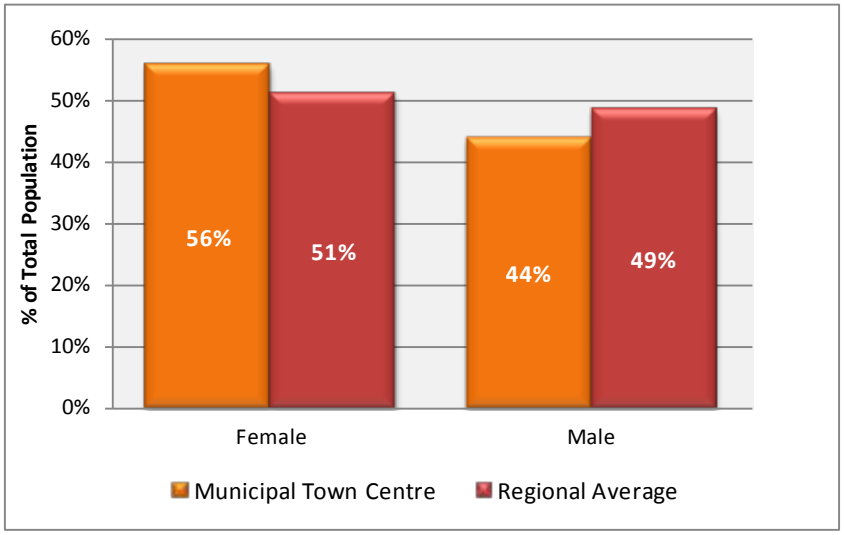


Figure B.4.10 – Life stage Profile of Residents

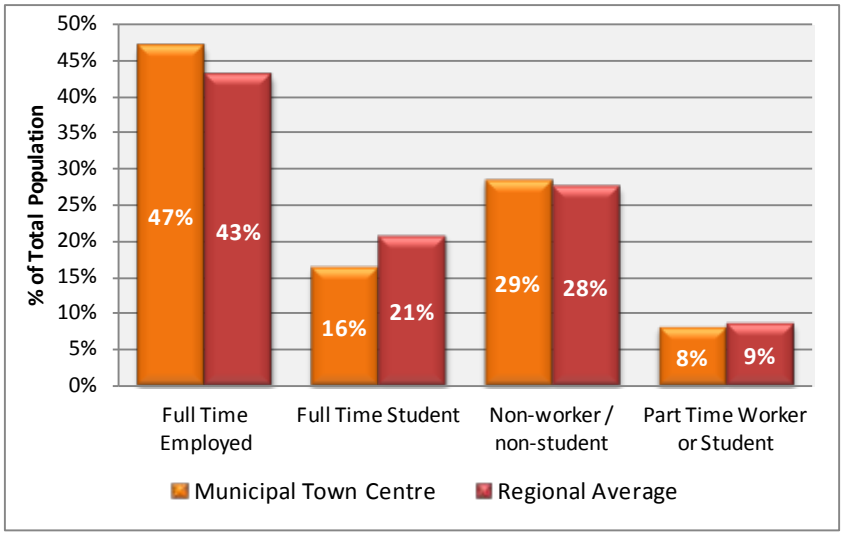


Figure B.4.11 – Income Profile of Residents

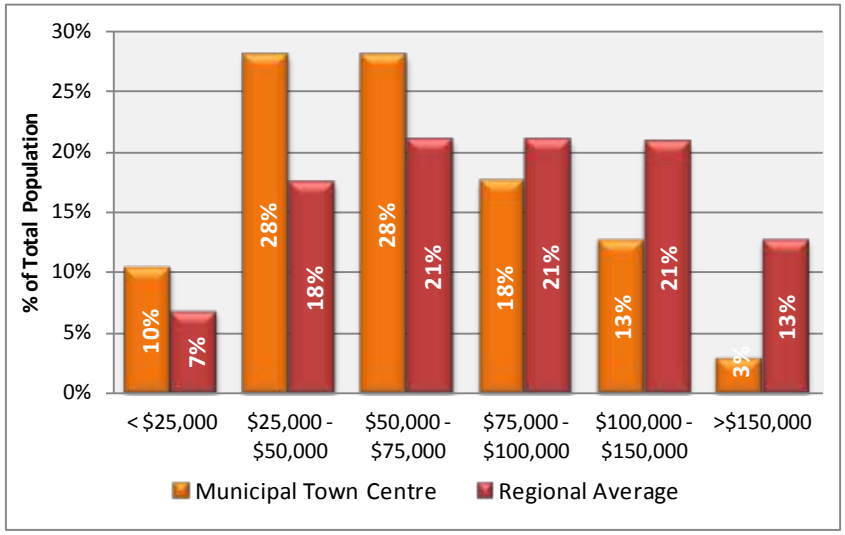
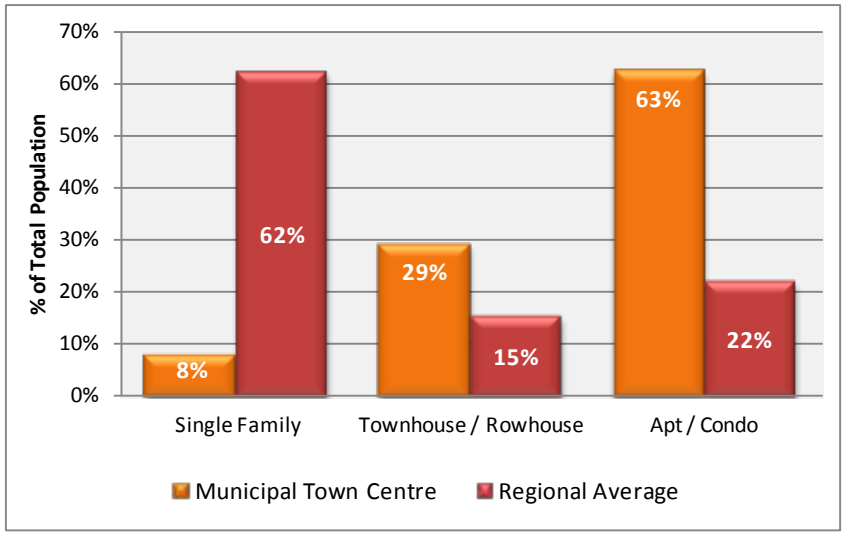


Figure B.4.12 – Housing Type Profile of Residents



B.5 Major Post Secondary Institutions

The focus of this section is on trips to and from the main campuses of the largest post secondary institutions in Metro Vancouver. These include: the main campus of UBC including the new residential developments that are on-campus, the main campus of SFU including the residential and office/commercial developments on Burnaby Mountain, and the main campus of BCIT. Note that trips between classes are not captured in the Trip Diary survey but trips to non-university destinations in the defined areas are included. Therefore, the results may be somewhat skewed. **Figure B.5.1** highlights the three main post secondary institutions that were included in this analysis. Given the residential development patterns at these campuses, the figures by residents are dominated by UBC residents and don't include any residents from the BCIT campus.

Figure B.5.3 – Proportion of Trips by Mode

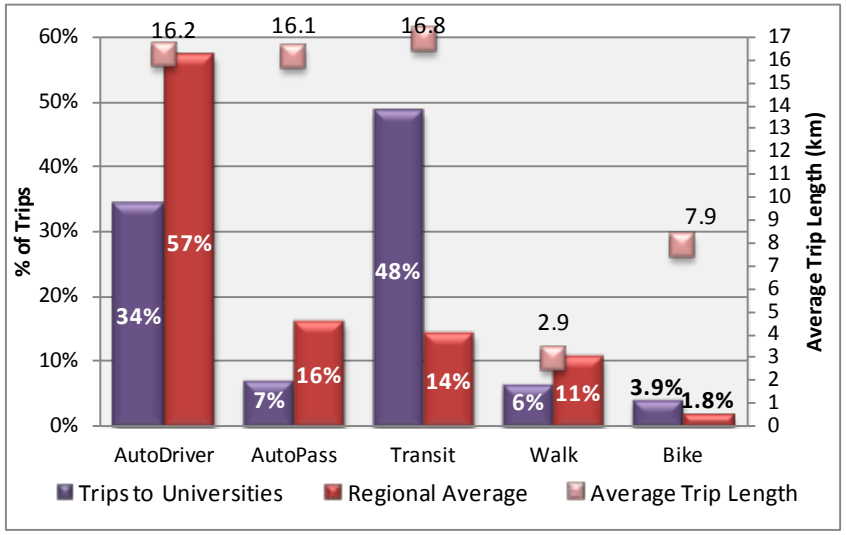


Figure B.5.2 – Trips by Time of Day

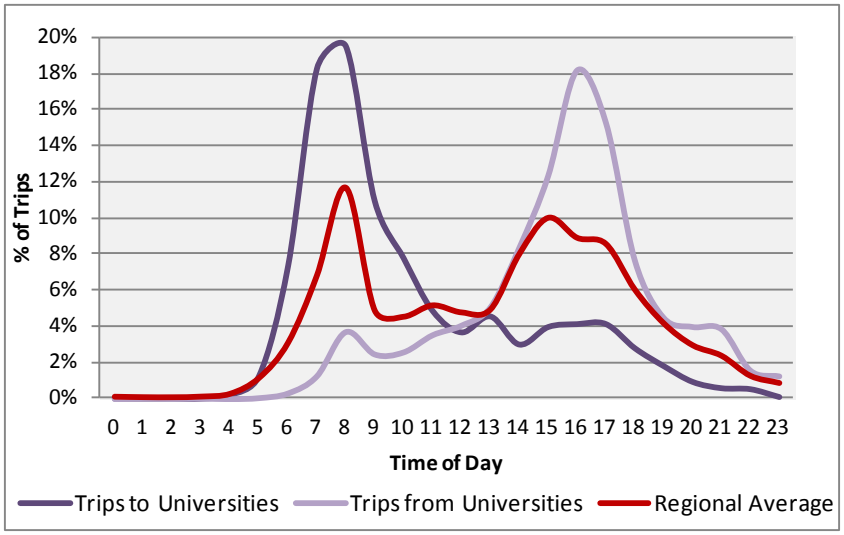


Figure B.5.4 – Proportion of Trips by Purpose

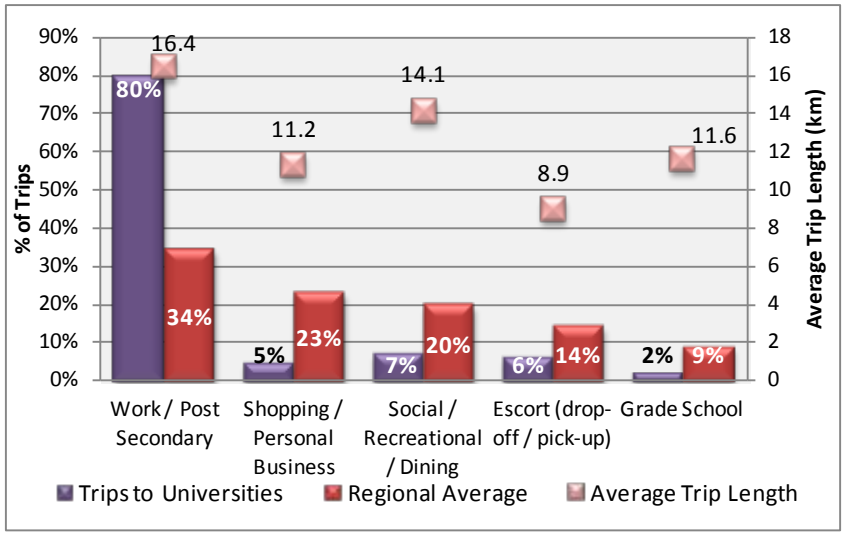
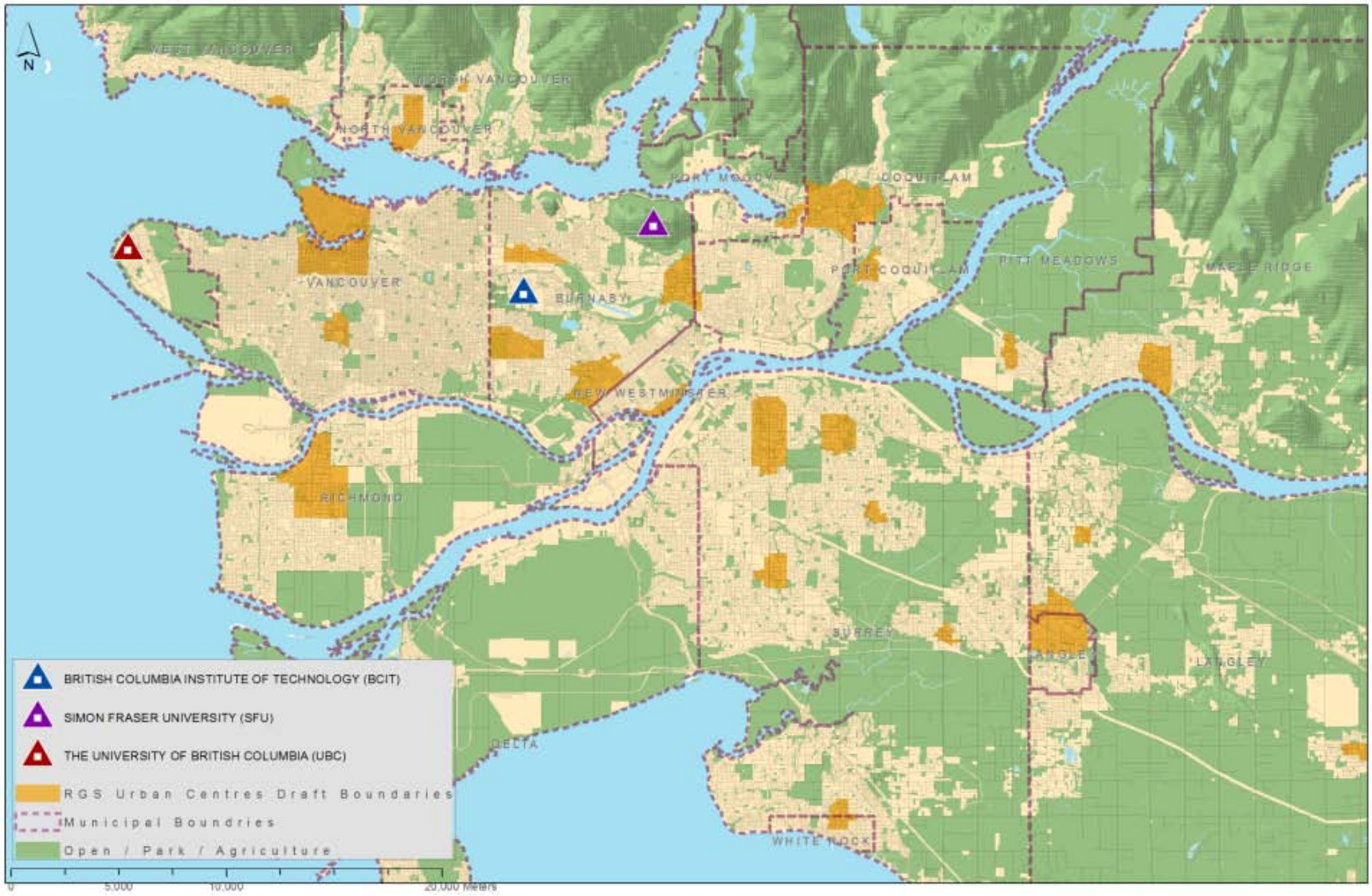


Figure B.5.1 – Universities in Metro Vancouver



Note: Other campuses exist in the region for SFU (Surrey/Harbour Centre), UBC (Robson Square) and BCIT (Aerospace on Sea Island); however they were not included as part of this analysis.

Figure B.5.5 – Proportion of Single-Mode and Multimodal Users

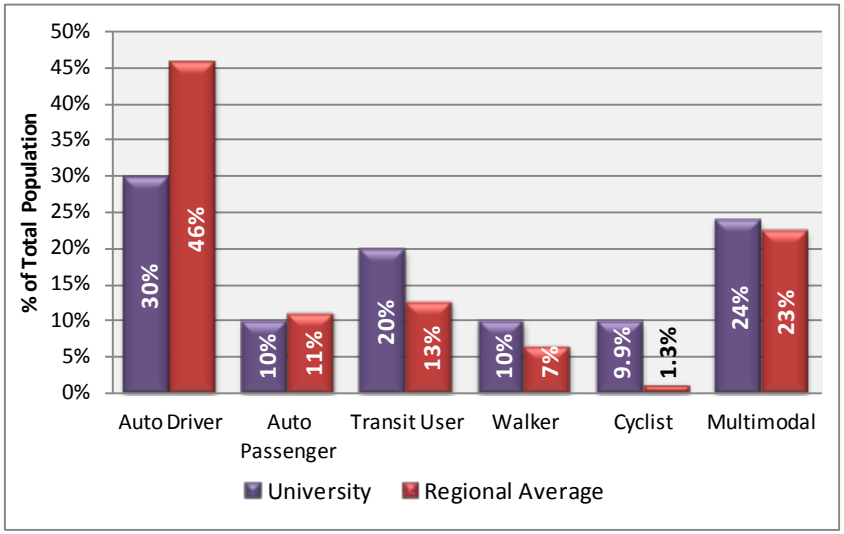


Figure B.5.6 – Resident Trips by Time of Day

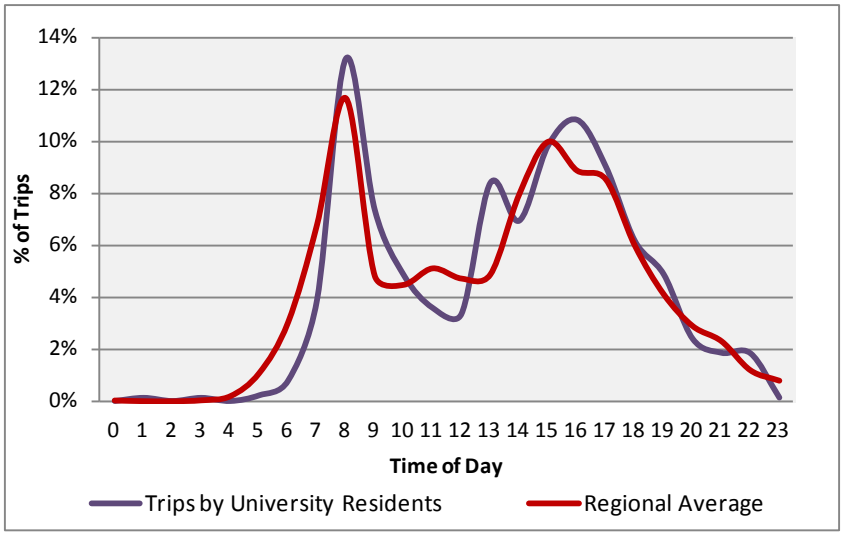


Figure B.5.7 – Proportion of Resident Trips by Mode

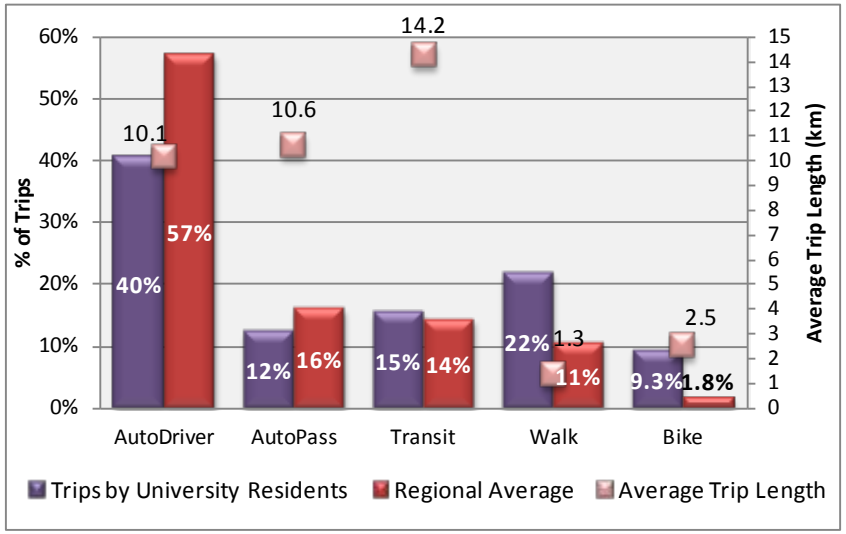


Figure B.5.8 – Proportion of Resident Trips by Purpose

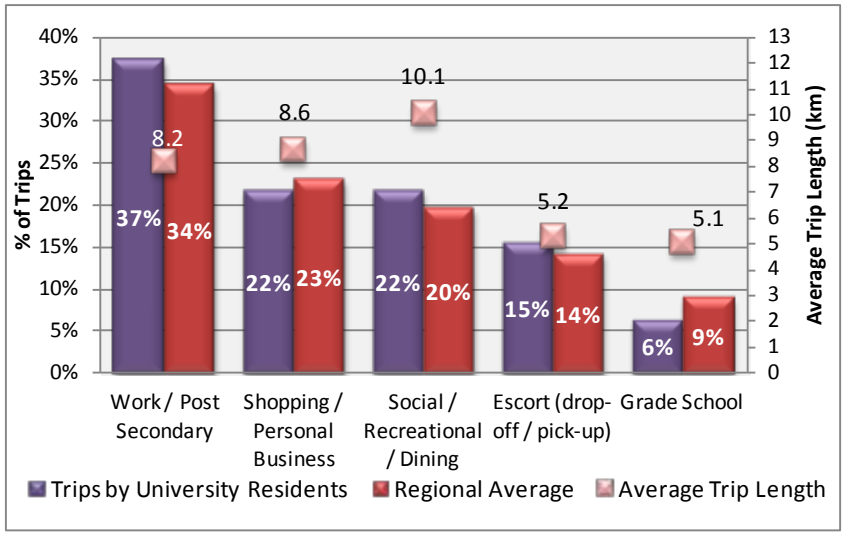


Figure B.5.9 – Gender Profile of Residents

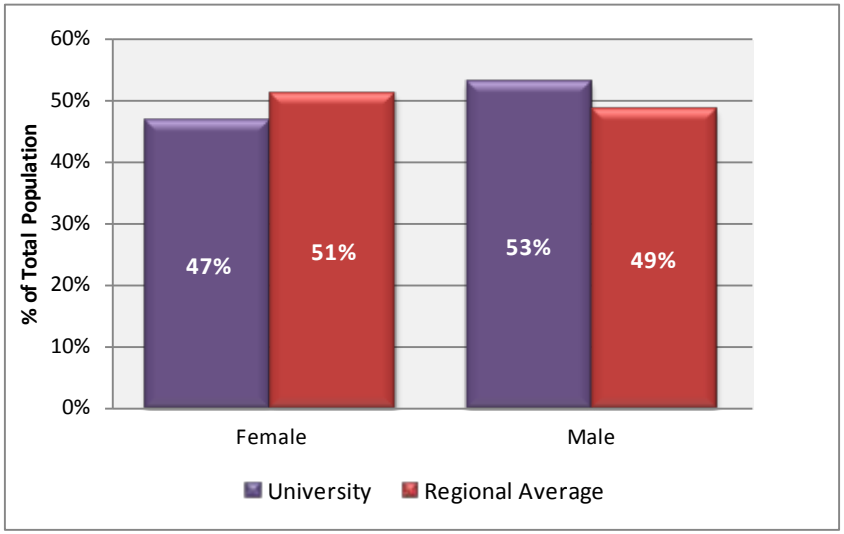


Figure B.5.10 – Life stage Profile of Residents

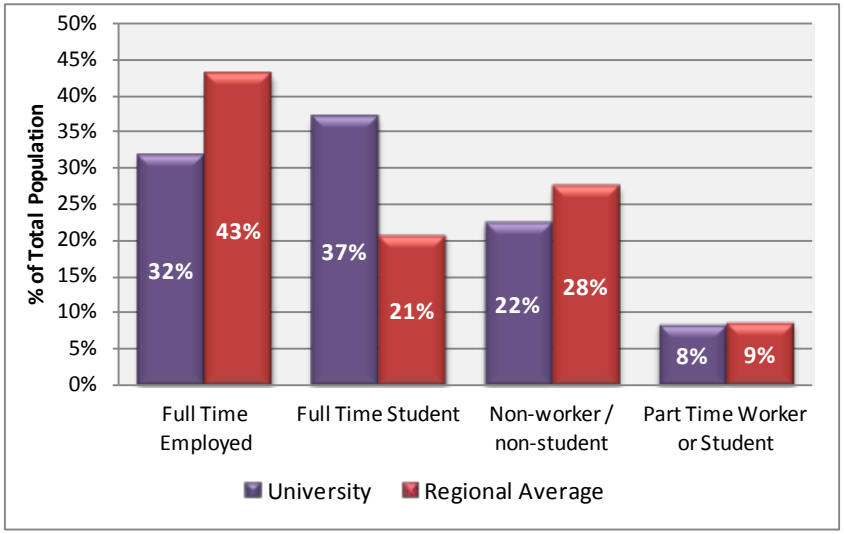


Figure B.5.11 – Income Profile of Residents

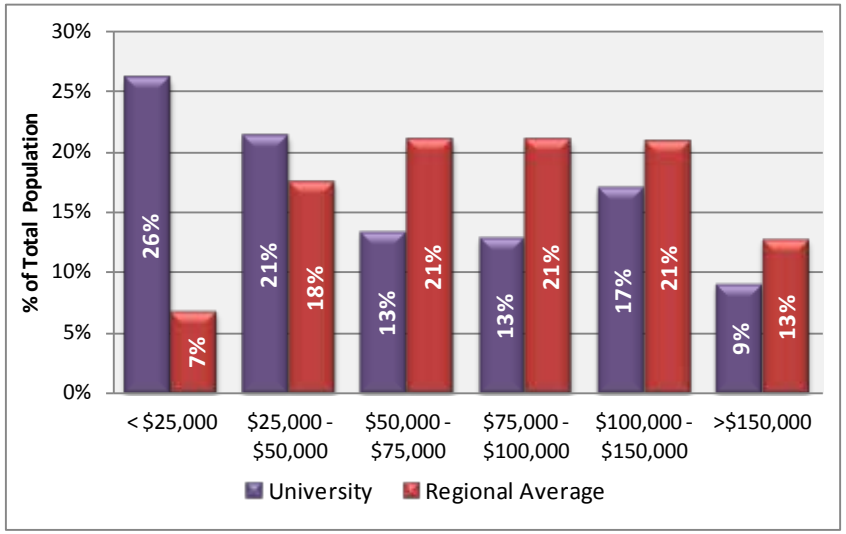


Figure B.5.12 – Housing Type Profile of Residents