

THE UNIVERSITY OF BRITISH COLUMBIA



Fall 2009 UBC Okanagan Transportation Status Report

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1.INTRODUCTION

Consistent with its sustainability goals, UBC wishes to reduce automobile trips to and from the UBC Okanagan campus (UBCO), and encourage the use of other modes of transportation, including transit, carpooling, cycling and walking. To date, UBC has implemented several initiatives in support of non-automobile modes of transportation, including a student U-Pass program and bicycle parking facilities.

In order to measure progress in achieving a shift to non-automobile modes of transportation, an annual transportation data collection and monitoring program was initiated at UBCO this year. Information will be collected regarding travel patterns, traffic volumes and transportation conditions at UBCO. It is intended that data for 2009 will establish “benchmark” conditions against which progress in future years can be measured.

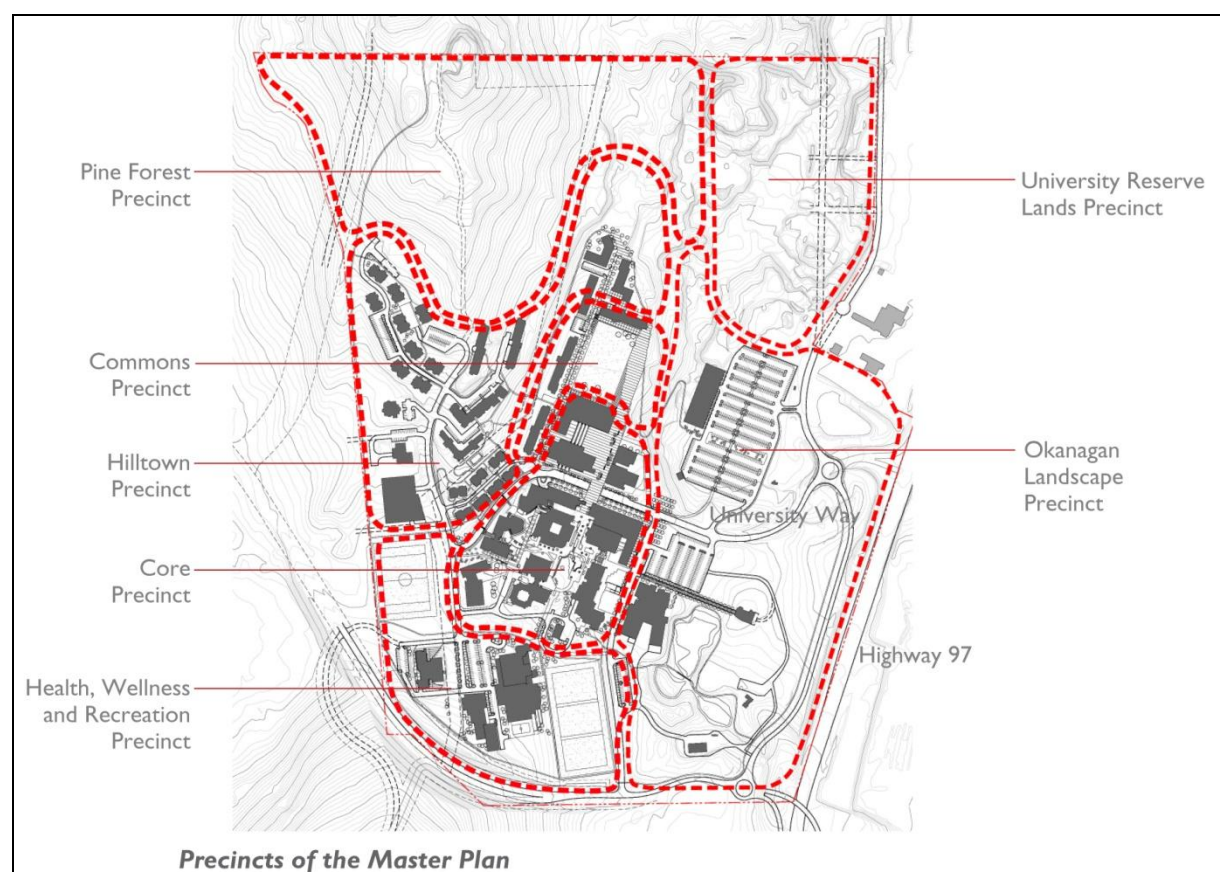
This *Fall 2009 UBCO Transportation Status Report* presents a summary of the data collected in Fall 2009 (late September and early October) at UBC Okanagan. Data were also collected in Spring 2009, and are included in this report in key locations where a comparison with Fall data is useful. On an overall basis, data collected in the Spring appear to under-represent average annual daily trips to and from UBCO, particularly for transit trips. For this reason, the Fall 2009 data are emphasized in this report, and it is recommended that in subsequent years, reports be prepared based on data collected each Fall. In future reports, Fall 2009 data should be used to compare current transportation conditions with those of the “benchmark” 2009 year.

1.1. Context

Transportation planning at UBCO is undertaken within the direction and context provided by several plans and policies, including:

- **The Master Plan** for UBCO describes how the campus will develop to accommodate increased student enrolment and expanded university activities. The Master Plan separates the campus into eight distinct precincts, as illustrated in Figure 1.1. The plan describes buildings and infrastructure to be developed in each precinct, as well as overall guidelines for development, and a phasing plan. The Master Plan was approved by the Board of Governors in September 2005.
- **Place and Promise: The UBC Plan** establishes the University’s vision and values, and makes specific commitments in nine areas of strategic priority. For each commitment, the UBC Plan establishes goals and actions designed to see them through. The University’s core commitments are to student learning, research excellence and community engagement. Other commitments which are particularly relevant to transportation planning include sustainability and creating an outstanding work environment.

Figure 1.1 – UBC Okanagan Precincts



1.2. Transportation Monitoring Program

Travel patterns to and from UBCO are monitored on an on-going basis through a variety of different data collection methods. It is anticipated that in future years, the majority of the data will be collected during the Fall, which will provide a consistent basis for year-by-year comparisons of travel patterns, mode shares and traffic volumes. Additional data collection activities may be undertaken at other times of the year to obtain information regarding specific modes of travel, seasonal variations and localized traffic volumes. During 2009, data were collected in the Spring and Fall, in order to establish a more complete data set for this “benchmark” year, and to determine the optimum time to collect data in future years.

Current data collection activities are summarized in Table 1.1. Count locations are illustrated in Figure 1.2. In Fall 2009, one speed/volume count on the north part of Discovery Avenue was relocated to the south due to construction. It is intended that in future years, this count be located adjacent the Mountain Weather Office as in Spring 2009. One additional speed/volume count location and one additional intersection count location were added in Fall 2009.

Table 1.1 – 2009 Data Collection Activities

Data Collection Activity	Locations	Description
Traffic volumes to/from campus	<ul style="list-style-type: none">• North access• South access	7 consecutive days 24 hours/day
Vehicle occupancies and classifications	<ul style="list-style-type: none">• North access• South access	1 weekday 11 hours (7 am – 6 pm)
Transit ridership	<ul style="list-style-type: none">• North access• South access	1 weekday 19 hours (6 am – 1 am)
Cyclists and pedestrians	<ul style="list-style-type: none">• North access• South access• Roberts Lake Rd.	1 weekday 15 hours (7 am – 10 pm)
Traffic speeds and volumes on campus	7 on-campus locations	7 consecutive days 24 hours/day
Intersection traffic volumes	5 intersections	1 weekday 8 hours (7–10 am + 11–1 pm + 3–6 pm)

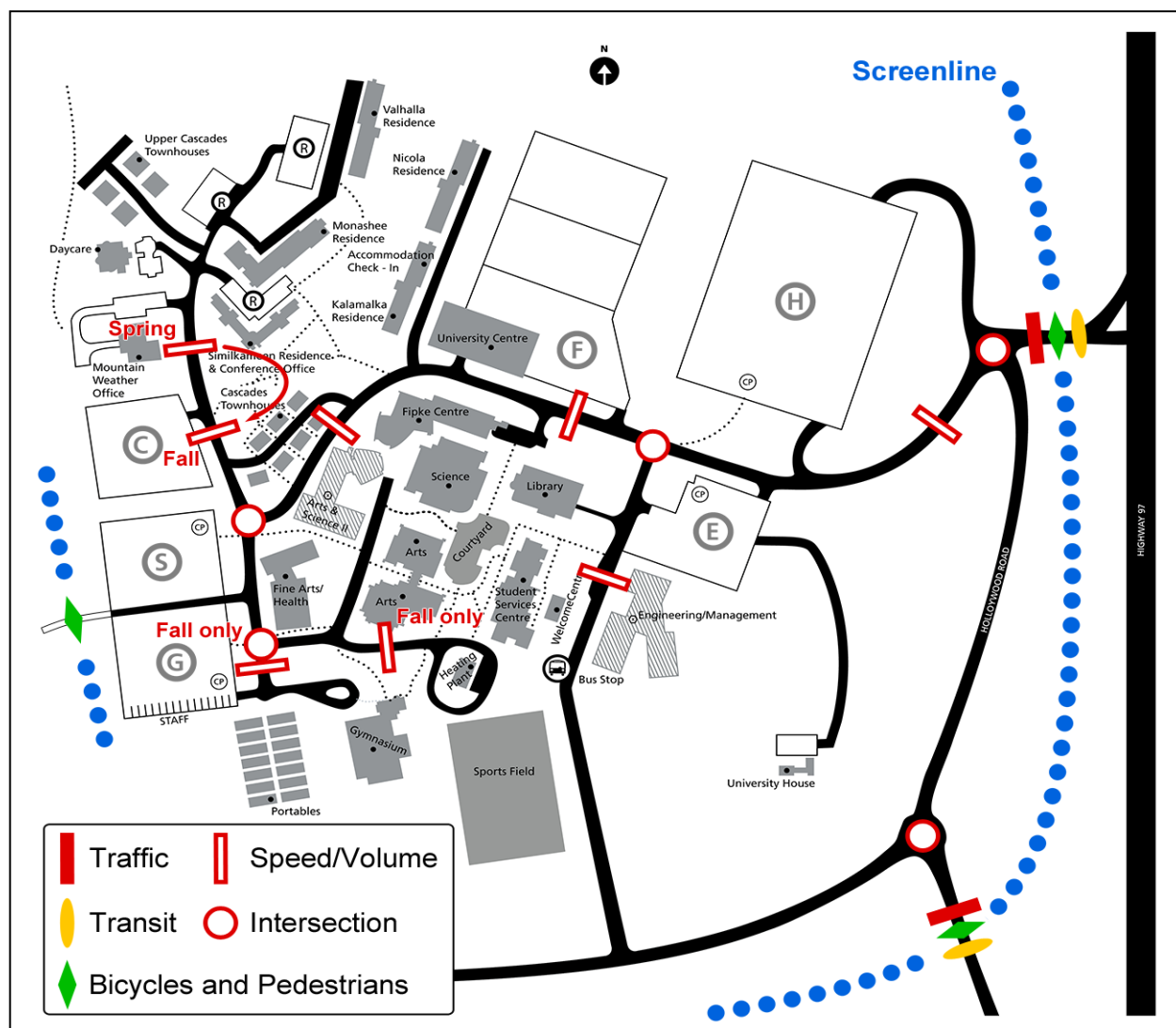
In addition to these annual data collection activities, UBC undertook a campus-wide transportation survey in Fall 2009. The results of this survey provide information regarding the travel patterns, attitudes and needs of students, staff, faculty and others at UBCO. It is anticipated that UBC will continue to conduct similar surveys in future years, to supplement the data collected through the annual data collection program.

1.3. Understanding the Data

The following terms and measures are used throughout the Transportation Status Report to describe various characteristics of travel patterns and trends at UBCO:

- A **screenline** is an imaginary line across which trips are recorded. At UBCO, the screenline around the campus is located on the west side of Highway 97 (between the roundabouts and the highway) and across Roberts Lake Road west of the G parking lot, as illustrated in Figure 1.2.
- **Mode share** (also called “mode split”) refers to the relative proportions of trips by various travel modes during a particular time period. Mode shares are generally reported for single occupant vehicles (SOVs), carpool and vanpools (also called high occupancy vehicles or HOV’s), transit, bicycle, pedestrians and other modes such as motorcycles and trucks.

Figure 1.2 – 2009 Data Collection Locations



- Person trips.** The data presented in the *Transportation Status Report* include traffic volumes and person trips. Traffic volumes are simply the number of vehicles passing a point, whereas person trips are the number of people passing a point by all modes of transportation. A person trip is a one-way trip made by one person. For example, in one hour there might be 500 vehicles travelling along a section of road (traffic volumes generally reflect vehicles travelling in both directions). These 500 vehicles might include 450 automobiles with a total of 600 persons in them, 30 buses with a total of 1,000 persons in them, and 20 light and heavy trucks with 25 persons in them. The total number of person trips associated with these 500 vehicles is 1,625 person trips.

Throughout the *Transportation Status Report*, unless otherwise stated, all reported trips are person trips.

- **Trips per person.** The population at UBCO — students, staff, faculty and others — increases each year. This means that when comparing absolute numbers of person trips and traffic volumes, and changes from one year to another reflect the effects of two different factors — changes in travel patterns and increases in population growth. To distinguish changes in travel patterns from changes due to population increase, a different measure is used — trips per person. This provides a consistent basis for monitoring travel trends regardless of how much or how little population growth occurs. Trips per person are calculated as the number of person trips divided by the number of persons at UBCO during the weekday daytime. The number of persons is calculated as the student enrolment plus the number of staff and faculty, as reported by UBC's Planning and Institutional Research department.
- **Time periods.** Substantial effort and cost are required to collect travel data at UBCO. Consequently, it is not reasonable nor necessary to collect all data in all locations at all hours of the day and night. Instead, some data are collected during selected time periods only (Table 1.1 indicates the time periods for each type of data collection activity). Traffic data on all routes leading to and from UBCO are collected over a period of one week. These data are collected using automatic counters placed on the roadway, and consequently it is cost-effective to collect a full week of data. On the other hand, vehicle occupancy and classification counts are done manually, and as a result are relatively expensive. These counts are undertaken for a total of 11 hours from the morning peak through the afternoon peak periods. When combined with other 24-hour data, daily totals can be reliably estimated from occupancy and classification data collected for 11 hours in a day.

2. TRAVEL TO AND FROM UBCO

This section of the *Transportation Status Report* describes travel patterns and trends for trips to and from the UBC Okanagan campus. Information regarding transportation conditions on campus are presented in Section 3.

2.1. Person Trips

On average, there were 16,600 person trips to and from UBCO on a typical weekday in Fall 2009. Table 2.1 provides a summary of daily person trips by mode in Spring and Fall 2009. Figure 2.1 illustrates the relative shares for each mode of travel.

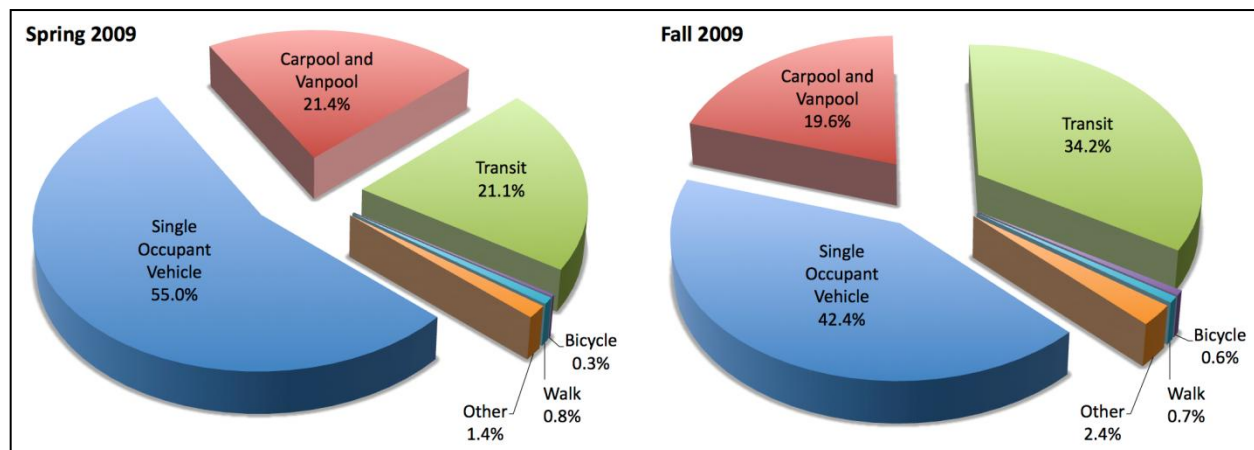
Table 2.1 – Weekday Person Trips To/From UBCO

	Person Trips			
	Spring 2009		Fall 2009	
Single occupant vehicle (SOV)	6,470	55.0%	7,040	42.4%
Carpool and vanpool	2,520	21.4%	3,260	19.7%
Transit	2,480	21.0%	5,680	34.2%
Bicycle	30	0.3%	100	0.6%
Pedestrian	90	0.8%	120	0.7%
Truck and motorcycle	170	1.5%	400	2.4%
Totals	11,760	100%	16,600	100%

Key observations regarding modes of travel to and from UBCO include:

- Automobiles are the dominant form of travel to and from UBCO, and driving alone is the most popular mode of transportation.
- Transit accounts for 34% of trips.
- Bicycle and pedestrians trips account for slightly more than 1% of all trips to and from UBCO. This is not a surprising result given that the location of the campus is a significant distance from most residential areas in the region.

Figure 2.1 – Weekday Mode Shares of Trips To/From UBC Okanagan, Fall 2009



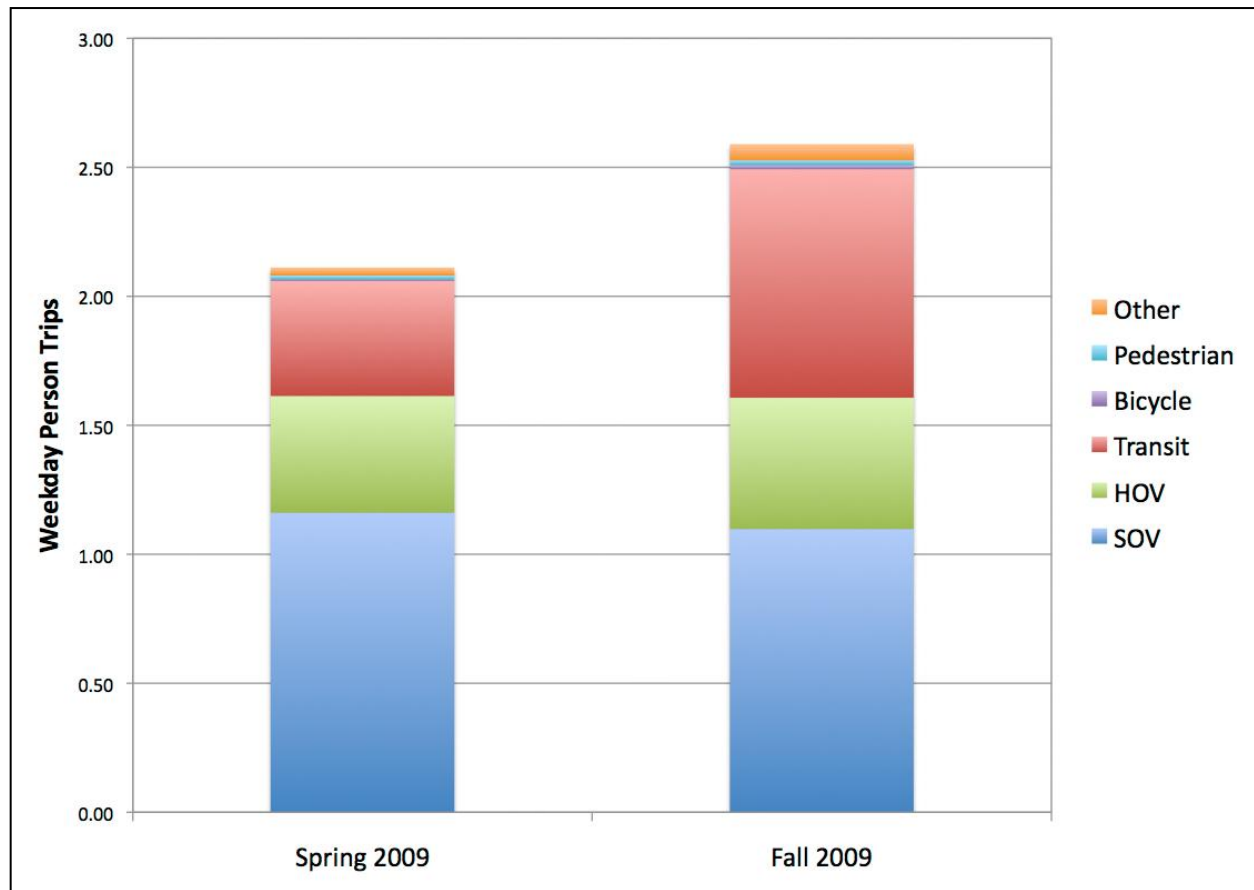
In order to compare travel patterns from year to year on a consistent basis, it is important to negate the effects of population and enrolment growth. This means comparing trips per person, where the number of daily person trips is divided by the daytime campus population of students, staff and faculty. Trips per person to and from UBCO for 2009 are summarized in Table 2.2 and illustrated in Figure 2.2, and reflect daytime campus populations of 5,570 persons in Spring 2009, and 6,410 persons in Fall 2009.

Table 2.2 – Weekday Trips Per Person To/From UBCO

	Trips per Person	
	Spring 2009	Fall 2009
Single occupant vehicle (SOV)	1.16	1.10
Carpool and vanpool	0.45	0.51
Transit	0.44	0.89
Bicycle	0.01	0.02
Pedestrian	0.02	0.02
Truck and motorcycle	0.03	0.06
Totals	2.11	2.59

Transit trips are the significant difference between travel patterns in Spring and Fall 2009 — transit trips per person doubled in Fall 2009, whereas the numbers of trips per person by other modes remained relatively constant. Likely reasons for the increase in transit trips in Fall 2009 include substantial improvements in transit service levels, increased parking prices on campus and a reduction in the supply of parking permits. These changes will have a permanent and lasting effect on transit ridership in future years, and for this reason Fall 2009 transit trips should be considered a representative benchmark of typical travel patterns to and from UBCO.

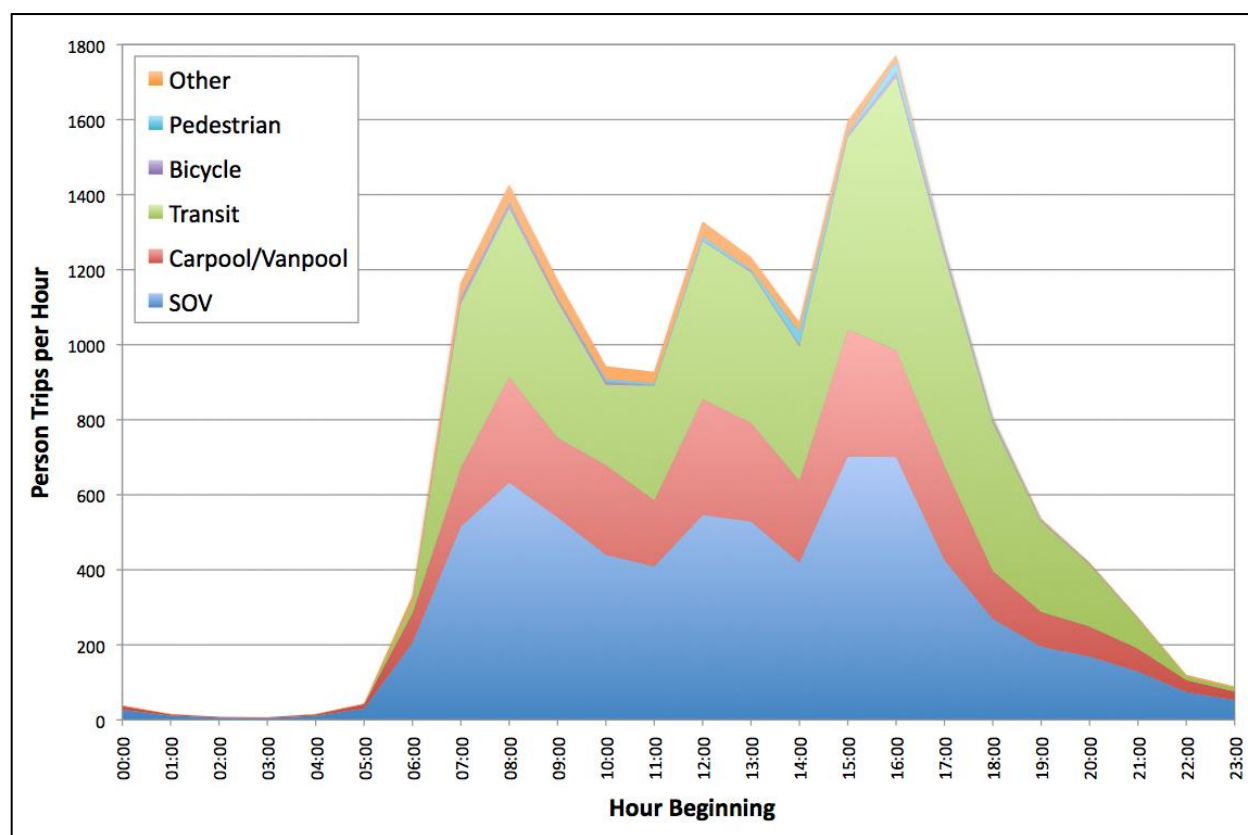
Figure 2.2 – Weekday Trips Per Person To/From UBCO



It is important to note that the experience collecting similar data at UBC Vancouver has been that the average number of trips per person fluctuates from year to year. With only one year of data available for UBCO, it is not appropriate to draw any conclusions regarding an apparent increase from Spring to Fall.

Figure 2.3 illustrates the daily arrival and departure patterns for all person trips to and from UBCO in Fall 2009, by all modes. The greatest number of trips per hour occurs during the afternoon peak hour from 4:00 to 5:00 p.m., which accounts for 15% of daily trips. The morning peak hour (8:00 to 9:00 a.m.) and the midday peak hour (noon to 1:00 p.m.) account for 12% and 11% of daily trips, respectively.

Figure 2.3 – Weekday Person Trips To/From UBCO Okanagan, Fall 2009



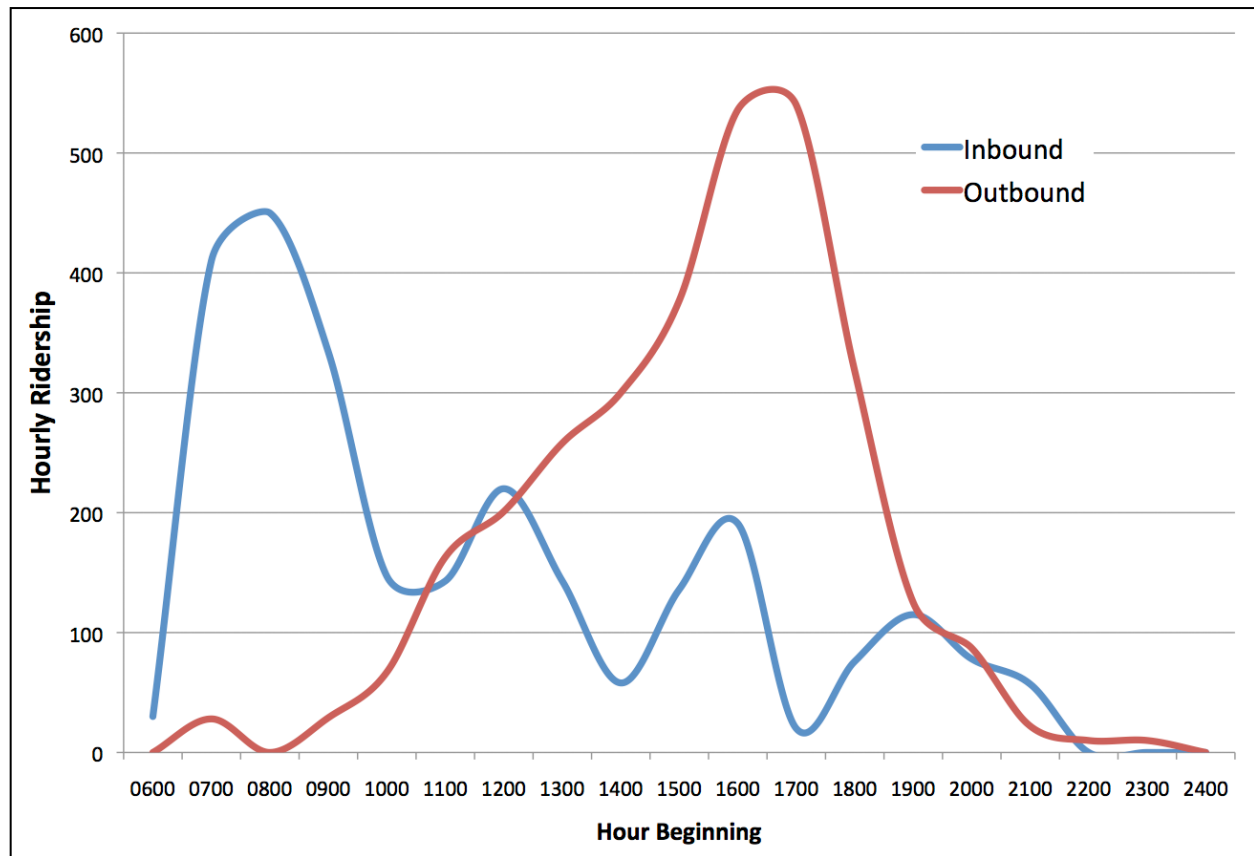
2.2. Transit

There were a total of 5,680 transit trips to and from UBCO on a weekday in Fall 2009, as summarized in Table 2.3. The route 97 Express carried two-thirds of the total transit ridership, and route 8 carried almost one-quarter of the ridership. Figure 2.4 illustrates transit ridership by hour.

Table 2.3 – Weekday Transit Trips To/From UBCO, Fall 2009

Route	AM Peak 0600 to 0900	Midday 0900 to 1500	PM Peak 1500 to 1800	Eve 1800 to 0100	Totals	
7 Glenmore	0	0	30	0	30	0.5%
8 University	300	400	360	230	1,290	22.8%
23 Lake Country	0	10	60	30	100	1.7%
8/23 UBCO/LC	80	140	180	160	560	9.9%
90 Connector	40	70	30	0	140	2.5%
97 Express	500	1,440	1,140	480	3,560	62.6%
Totals	920 16.2%	2,060 36.3%	1,800 31.7%	900 15.8%	5,680 100%	

Figure 2.4 – Weekday Transit Trips To/From UBCO, Fall 2009



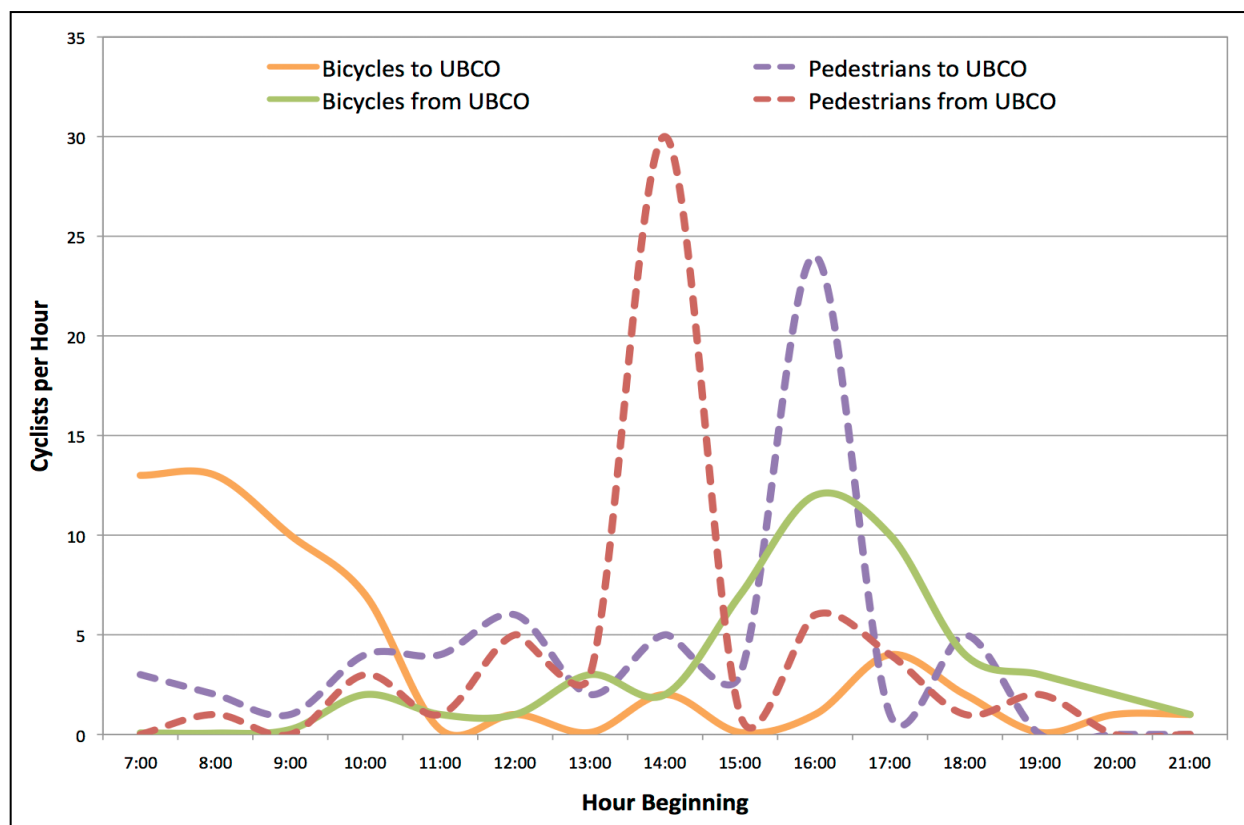
2.3. Bicycles and Pedestrians

Table 2.4 and Figure 2.5 summarize bicycle and pedestrian trips to and from UBCO in Fall 2009. Roberts Lake Road is the main route to campus for cyclists and pedestrians, accounting for 90% of all bicycle and pedestrian trips.

Table 2.4 – Weekday Bicycle and Pedestrian Trips To/From UBCO, Fall 2009

Route	Bicycle		Pedestrian	
	To Campus	From Campus	To Campus	From Campus
North access	1	1	2	1
South access	10	3	2	1
Roberts Lake Road	44	44	56	55
Totals	55	48	60	57

Figure 2.5 – Weekday Bicycle and Pedestrian Trips To/From UBCO, Fall 2009



All buses operating on transit routes serving UBCO are equipped with bicycle racks, each of which has space for two bicycles. A total of 54 bicycles were observed in one day in Fall 2009, representing an average rack utilization of 0.11 bicycles per available space.

2.4. Traffic

Table 2.5 provides a summary of weekday motor vehicle traffic to and from the UBCO campus. Automobiles account for 94% of motor vehicle traffic, amounting to 8,560 trips per weekday in Fall 2009. Single occupant vehicles represent 77% of all motor vehicle trips.

Table 2.5 – Weekday Traffic Volumes To/From UBCO

	Spring 2009		Fall 2009	
Single occupant vehicles	6,460	80.4%	7,040	77.4%
Carpool and vanpool vehicles	1,180	14.6%	1,520	16.7%
Total automobiles (SOV + carpool/vanpool)	7,640	95.0%	8,560	94.1%
Trucks, buses and motorcycles	410	5.0%	540	5.9%
Total motor vehicles	8,050	100%	9,100	100%

Table 2.6 summarizes weekly traffic volumes to and from UBCO. Traffic volumes are highest on Wednesdays, Thursday and Fridays and lowest on Sundays. The morning peak hour for traffic occurs from 8:00 to 9:00 a.m., while the afternoon peak hour varies between 2:00 and 6:00 p.m. The south access to campus accommodates over 80% of all motor vehicle traffic to and from UBCO.

Table 2.6 – Weekly Traffic Volumes To/From UBCO

Time Period	Spring 2009		Fall 2009	
Weekday (average)				
• AM peak hour (8–9 a.m.)	630	7.9%	830	9.1%
• PM peak hour (3–4 p.m.)	820	10.1%	900	9.9%
• 24 hours	8,050	100%	9,100	100%
Weekend (average)				
• Peak hour (2–3 p.m.)	270	8.8%		
• Peak hour (5–6 p.m.)			280	8.1%
• 24 hours	3,030	100%	3,500	100%
Week (daily)				
• Monday	7,350	85%	8,910	96%
• Tuesday	7,960	92%	8,800	95%
• Wednesday	7,720	89%	9,280	100%
• Thursday	8,510	98%	9,280	100%
• Friday	8,680	100%	9,130	98%
• Saturday	3,400	39%	4,200	45%
• Sunday	2,670	31%	2,800	30%

2.5. Vehicle Occupancy

Vehicle occupancy is a measure of the average number of people travelling per vehicle during a certain period of time. It is calculated by dividing the total number of person trips by the total number of vehicles during a specified time period.

The average automobile occupancy in Fall 2009 was 1.18 persons per vehicle, as indicated in Table 2.7. The average occupancy for carpools and vanpools was 2.14 persons per vehicle, which reflects 90% two-person carpools, 7% three-person carpools, and 3% vehicles with four or more persons.

Table 2.7 – 24-Hour Automobile Occupancies To/From UBCO

	Spring 2009	Fall 2009
Single occupant vehicles	1.00	1.00
Carpools and vanpools	2.14	2.15

All automobiles	1.18	1.20
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3.CONDITIONS ON CAMPUS

This section of the *Transportation Status Report* summarizes transportation conditions on campus, particularly traffic volumes and speeds at key locations.

3.1. Traffic Volumes

Peak hour traffic volumes at key intersections on campus are illustrated in Figures 3.1, 3.2 and 3.3. For each movement, two figures are given — the fall 2009 hourly volume, followed by the Spring 2009 volume in parentheses. Key observations regarding traffic volumes include:

- Approximately 82% of traffic travelling to and from UBCO uses the south access.
- During the morning peak hour, almost 40% of the traffic to UBCO continues through the campus to Discovery Avenue. During the afternoon peak hour, almost 40% of the traffic leaving the campus originates on Discovery Avenue.

Figure 3.1 – Morning Peak Hour Traffic Volumes, Fall (and Spring) 2009

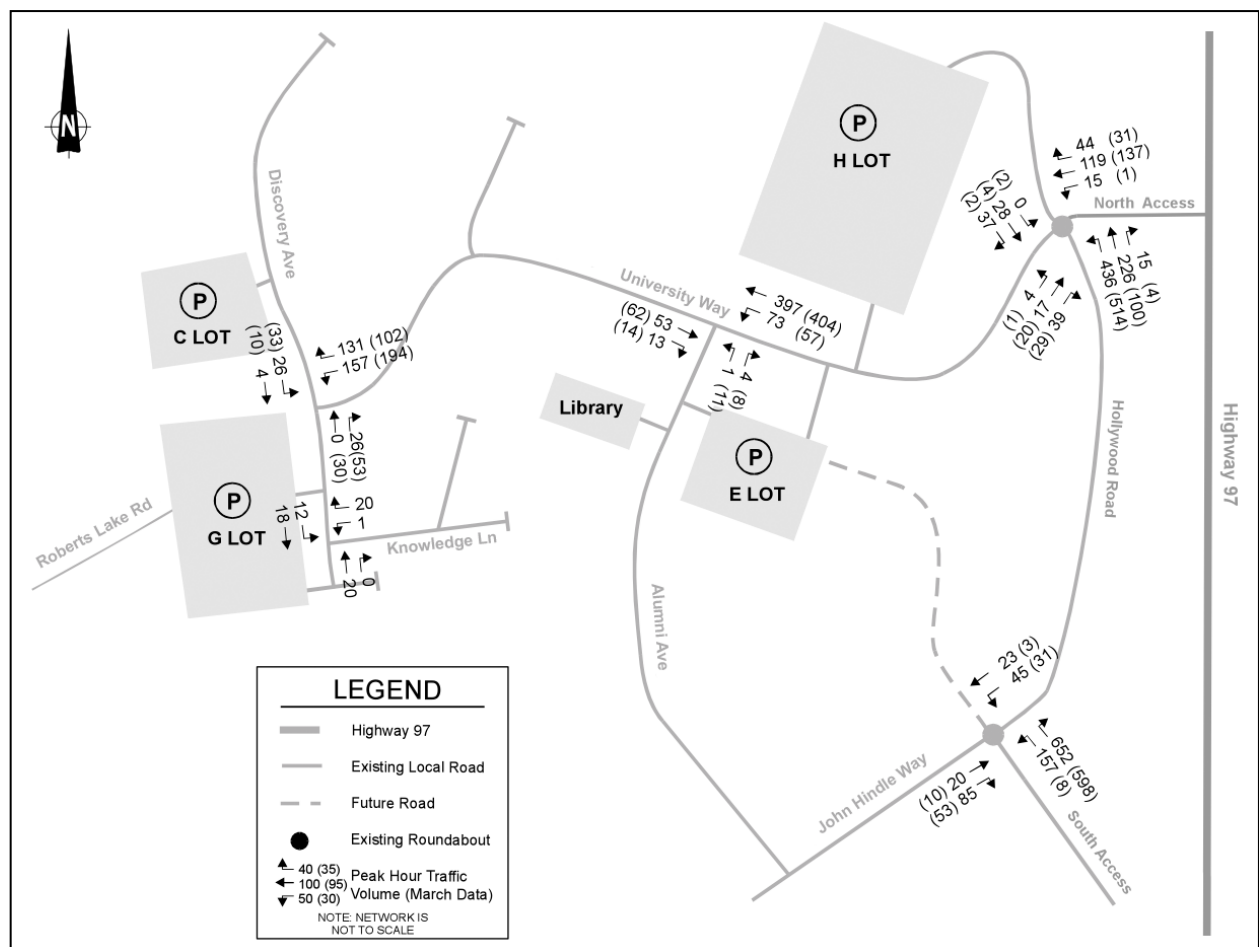
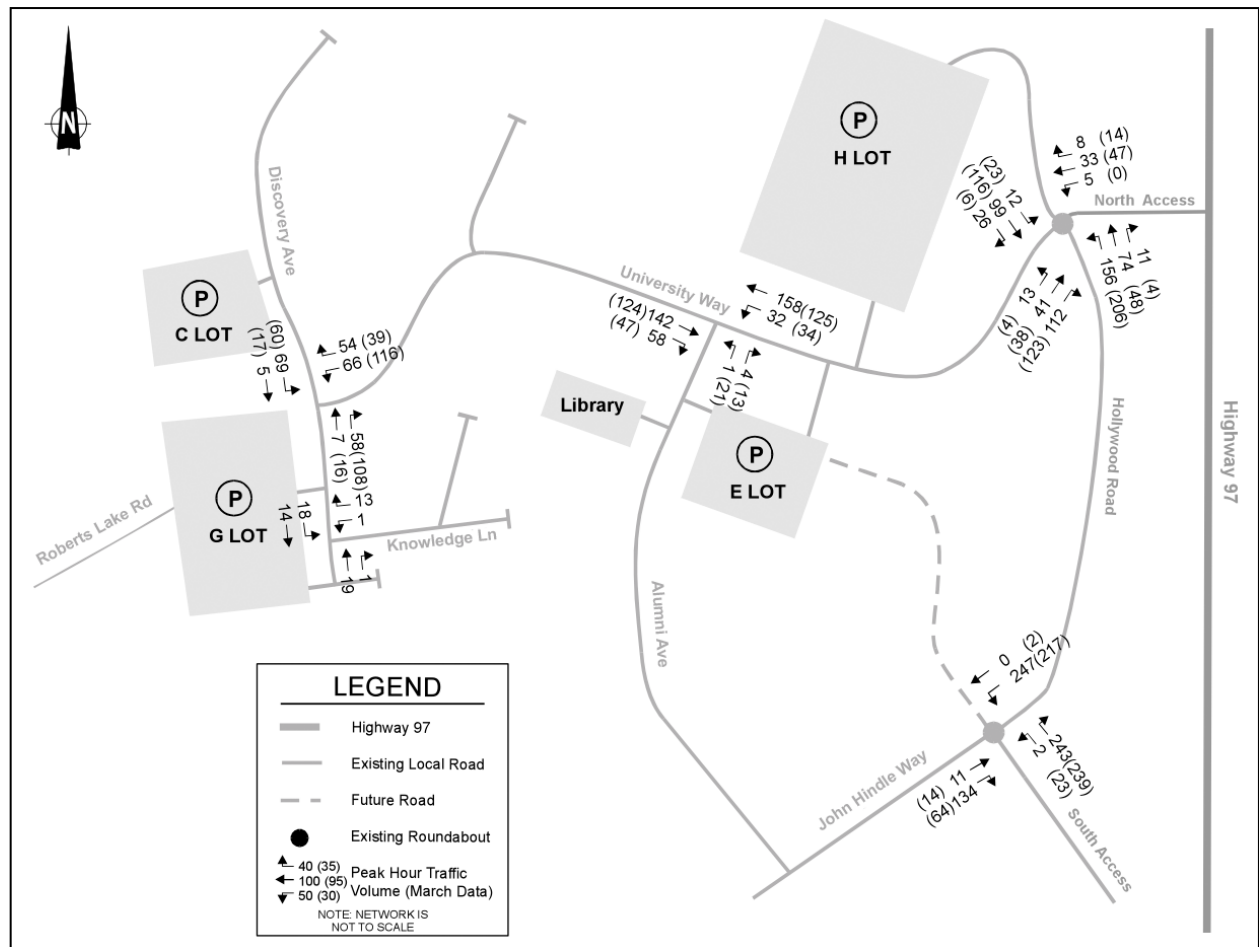
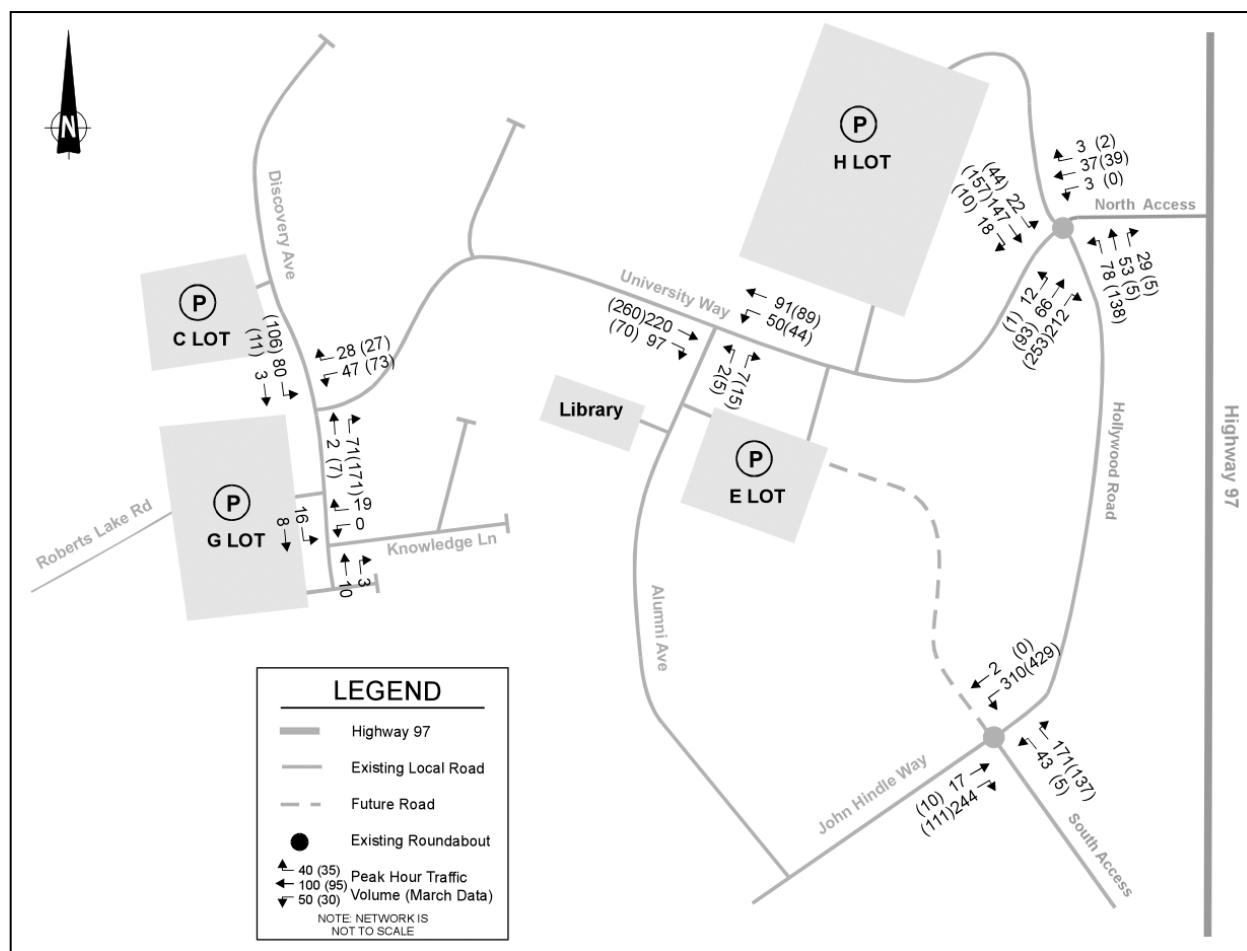


Figure 3.2 – Midday Peak Hour Traffic Volumes, Fall 2009



- Two-thirds to four-fifths of the traffic leaving the campus in the afternoon peak hour via the south access travels via University Way and Hollywood Road. Only 20% to 33% travels via Alumni Avenue.

Figure 3.3 – Afternoon Peak Hour Traffic Volumes, Fall 2009



3.2. Traffic Speeds

Traffic speeds were recorded at seven locations on campus, as illustrated in Figure 3.4 and as summarized in Table 3.1. Eighty-fifth percentile speeds are typically used for the purposes of assessing traffic speeds, as these represent the speeds below which 85% of the traffic is travelling.

The key observations regarding traffic speeds on campus are that speeds along the north part of Discovery Avenue are close to or exceed 50 km/h, and speeds along University Way and Alumni Avenue in the centre of the campus exceed 40 km/h. These speeds are generally considered incompatible with pedestrian activity. Speeds much closer to 30 km/h are desirable in areas where there are significant numbers of pedestrians. Consequently, UBC may wish to consider traffic calming measures in locations 2, 3, 4 and 7 to reduce traffic speeds along these sections of road.

Figure 3.4 – Traffic Speed Locations

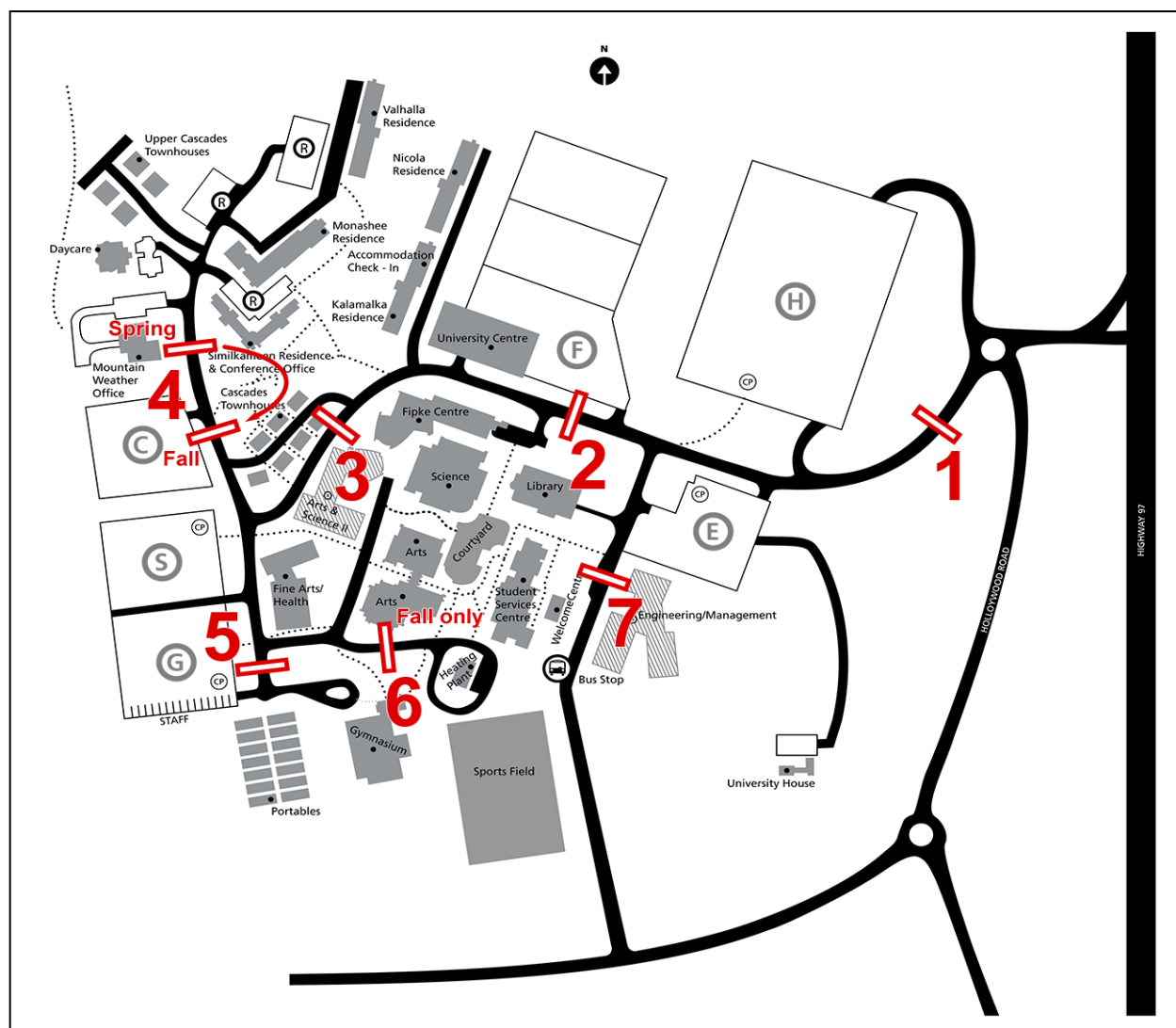


Table 3.1 – Weekday 85th Percentile Traffic Speeds (km/h)

Location	Eastbound/ Northbound		Westbound/ Southbound	
	Spring 2009	Fall 2009	Spring 2009	Fall 2009
1 University Way west of roundabout	56.9	52.9	55.1	49.8
2 University Way west of Alumni	48.2	39.1	48.0	37.0
3 University Way at Arts & Sciences	46.7	39.3	48.3	40.0
4 Discovery Avenue near C lot	53.8	54.5	54.0	48.3
5 Discovery Avenue near G lot	31.8	28.3	32.0	29.1
6 Knowledge Lane	no count	29.9	no count	30.3
7 Alumni Avenue south of library	32.4	43.4	34.5	43.6

