

UBC Okanagan Transportation Status Report Fall 2013

May 2014

campus + community planning
transportation planning



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

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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, a biennial transportation data collection and monitoring program was initiated in 2009. Information regarding travel patterns, traffic volumes and transportation conditions at UBCO will be collected every two years in odd-numbered years. Data collected in 2009 established the “benchmark” conditions against which progress in future years are measured.

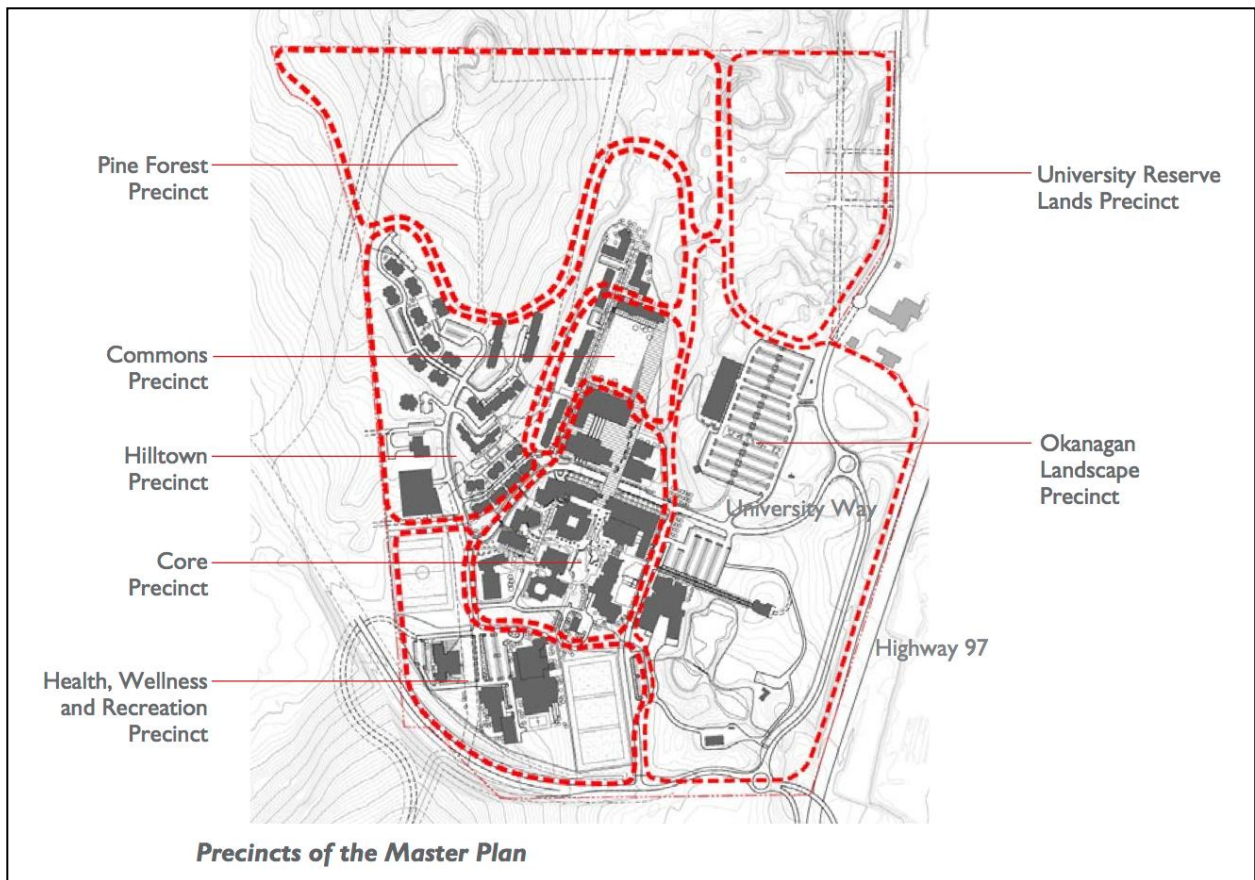
This UBC Okanagan Transportation Status Report Fall 2013 presents a summary of data collected in late September 2013 at UBC Okanagan. This is the second year of “post-benchmark” data collection that is compared with travel patterns from fall 2009 and 2011.

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 updated in 2009 and another Master Plan updating process is underway now in 2014.
- **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 that are particularly relevant to transportation planning include sustainability and creating an outstanding work environment.

Figure 1.1: UBC Okanagan Precincts as Identified in the Master Plan



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. Data is collected during the fall to enable consistent year to 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.

Data collection activities for the fall 2013 are summarized in **Table 1.1**, and data collection locations are illustrated in **Figure 1.2**.

1.3. Understanding the Data

The following terms and measures are used throughout this 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 illustrated by the dotted blue line 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.
- 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 500 vehicles travelling along a section of road 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 this report, unless otherwise stated all reported trips are in **person trips**.*

- 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 average weekday population. The population is calculated as the student enrolment plus the number of staff and faculty (full and part time), as reported by UBC’s Planning and Institutional Research department.
- Substantial effort and cost are required to collect travel data at UBCO. Consequently, it is neither 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** (**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 using automatic counters placed on the roadway. On the other hand, vehicle occupancy and classification counts are done manually. These counts are undertaken for a total of 11 hours from the morning peak through the afternoon peak periods. Daily totals can be estimated by combining occupancy and classification data with the average daily traffic data.

2. Transportation To / From UBC Okanagan

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 is presented in Section 3.

2.1. Person Trips

The average weekday person trips to and from UBCO in fall 2013 was 19,450. A summary and comparison of daily person trips by mode from the fall of 2009 to the fall of 2013 are provided in **Table 2.1** and **Figure 2.1**.

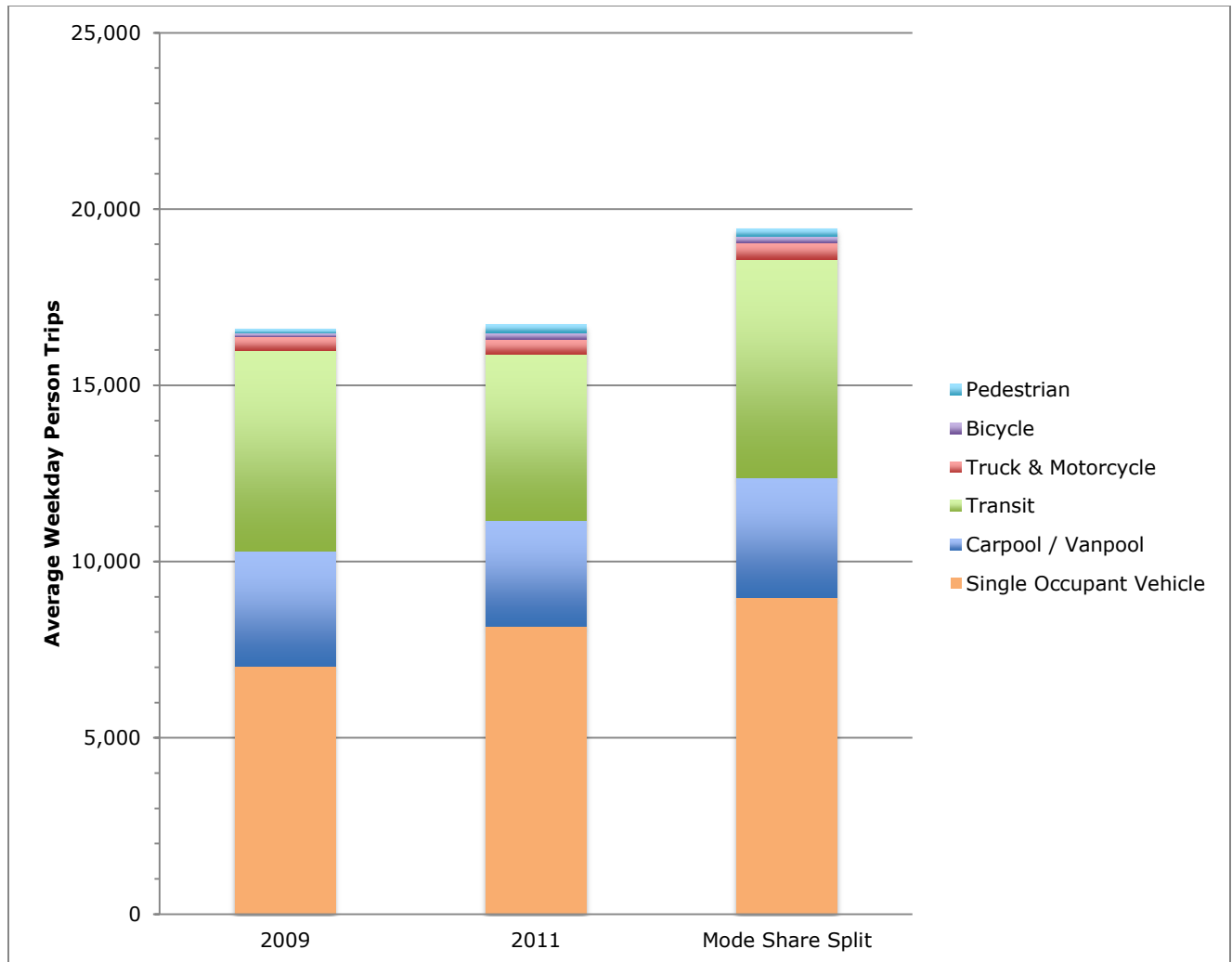
Table 2.1: Weekday Person Trips to / from UBC Okanagan

Travel Mode Classification	Person Trips					
	Fall 2009 Count	Fall 2009 Split	Fall 2011 Count	Fall 2011 Split	Fall 2013 Count	Fall 2013 Split
Single Occupant Vehicle (SOV)	7,040	42.4%	8,170	48.8%	8,980	46.2%
Carpool / Vanpool	3,260	19.7%	2,990	17.9%	3,410	17.5%
Truck & Motorcycle	400	2.4%	420	2.5%	480	2.5%
Transit	5,680	34.2%	4,720	28.2%	6,170	31.7%
Bicycle	100	0.60%	200	1.2%	185	1.0%
Pedestrian	120	0.70%	230	1.4%	225	1.2%
Totals	16,600	100%	16,730	100%	19,450	100%

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

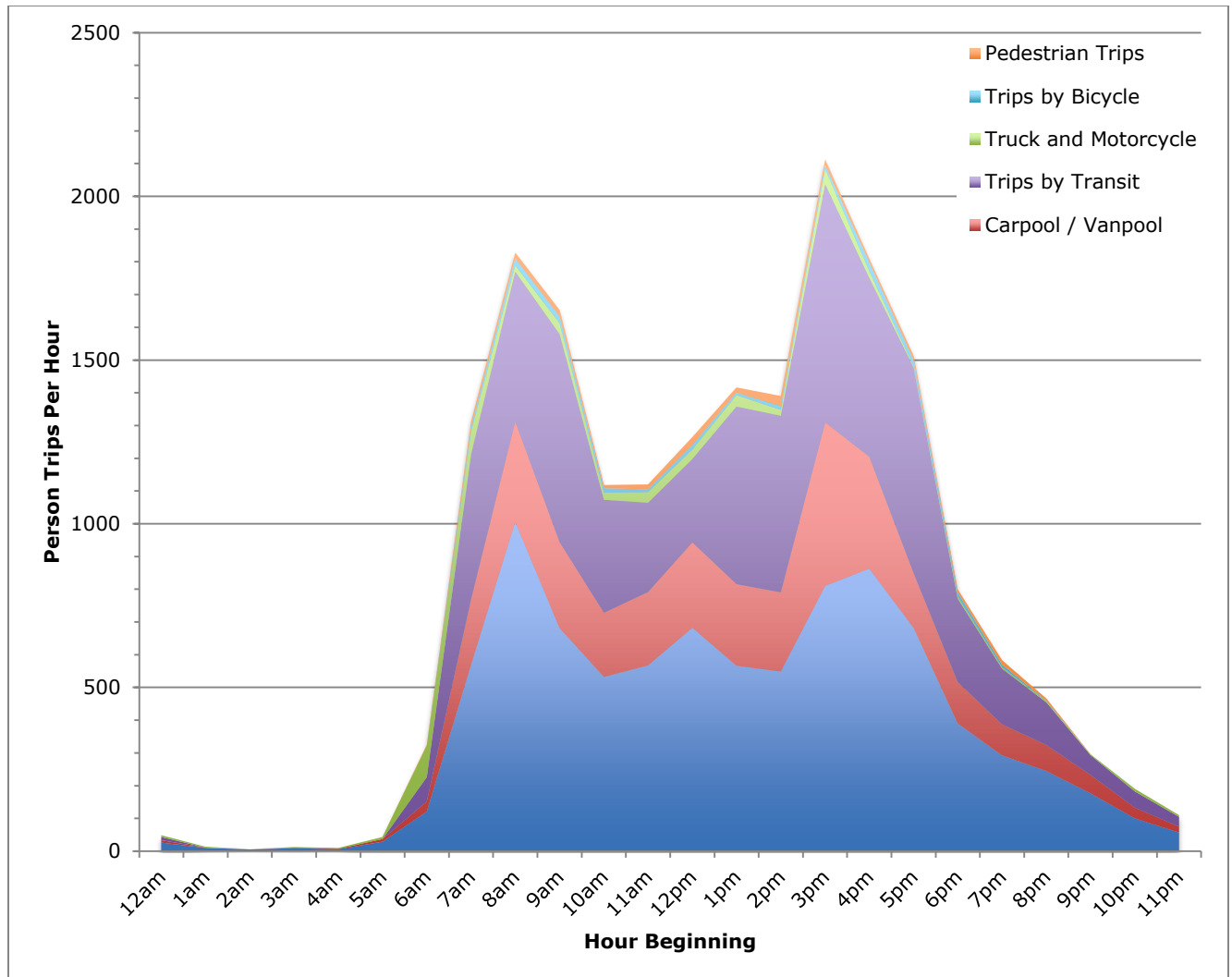
- Automobiles are the dominant form of travel to and from UBCO. SOV travel is the most popular mode of transportation accounting for 46% of all trips.
- The proportion of SOV trips decreased by almost 2.6% from fall 2011 to fall 2013.
- Trips by transit account for nearly 32% of all trips to / from Campus, up 3.5% of all trips from fall 2011 to fall 2013.
- Bicycle and pedestrian trips went down slightly from 2011 to 2013. Trips by bike account for 1.2% of all trips and trips by foot account for 1.0% of all trips.

Figure 2.1: Weekday Person Trips to / from UBC Okanagan from 2009 to 2013



The daily arrival and departure patterns for all person trips to and from UBCO are illustrated in **Figure 2.2**. As shown in the graph there are two clearly defined peaks for travel to and from UBCO representing the peak arrival (8am-9am) and departure (3pm-4pm) periods. The other observable pattern is with single occupant vehicle and vanpool trips from 12noon to 1pm.

Figure 2.2: Hourly Distribution of Person Trips To & From UBCO in Fall 2013



In order to compare travel patterns from year to year on a consistent basis, it is important to negate the effects of population / enrolment growth. To compare the Trips Per Person by mode the average weekday person trips by each mode is divided by the average weekday campus population. The average weekday campus population values include all full and part time students, staff and faculty and are presented in **Table 2.2**.

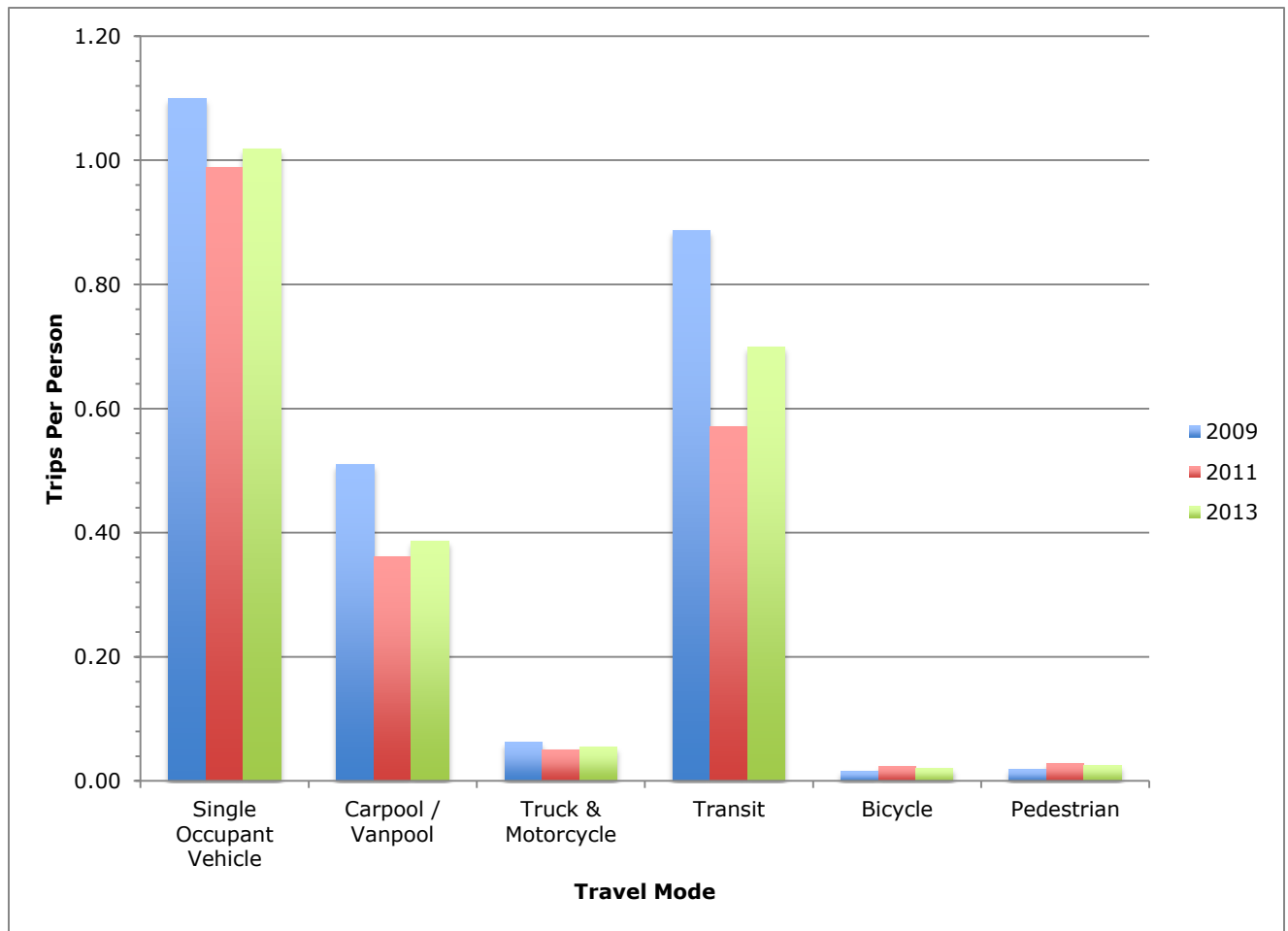
It is expected that the average total trips per person per day would be around two; a trip to campus and a trip from campus. The campus population and trips per person to and from UBCO from fall 2009 to fall 2013 are presented in **Table 2.2** and **Figure 2.2**, respectively.

Table 2.2: Weekday Trips Per Person to / from UBC Okanagan from 2009 to 2013

Travel Mode Classification	Trips Per Person			2013 Mode Share Split
	Fall 2009	Fall 2011	Fall 2013	
Single Occupant Vehicle (SOV)	1.100	0.988	1.018	46.2%
Carpool / Vanpool	0.509	0.362	0.387	17.5%
Truck & Motorcycle	0.063	0.051	0.054	2.5%
Transit	0.888	0.571	0.700	31.7%
Bicycle	0.016	0.024	0.021	1.0%
Pedestrian	0.019	0.028	0.026	1.2%
Totals	2.59	2.02	2.21	+9.0%
CAMPUS POPULATION*	6,400	8,270	8,820	+6.7%

*Population reported from fall attendance values.

Figure 2.2: Weekday Trips Per Person to / From UBC Okanagan from 2009 to 2013



The campus population increased approximately 6.7% from 2011 to 2013 and there was also an increase in the number of trips per person, up 9% from 2011 to 2013. Compared to 2011 the distribution is similar with only a slight shift from single occupant trips to transit trips.

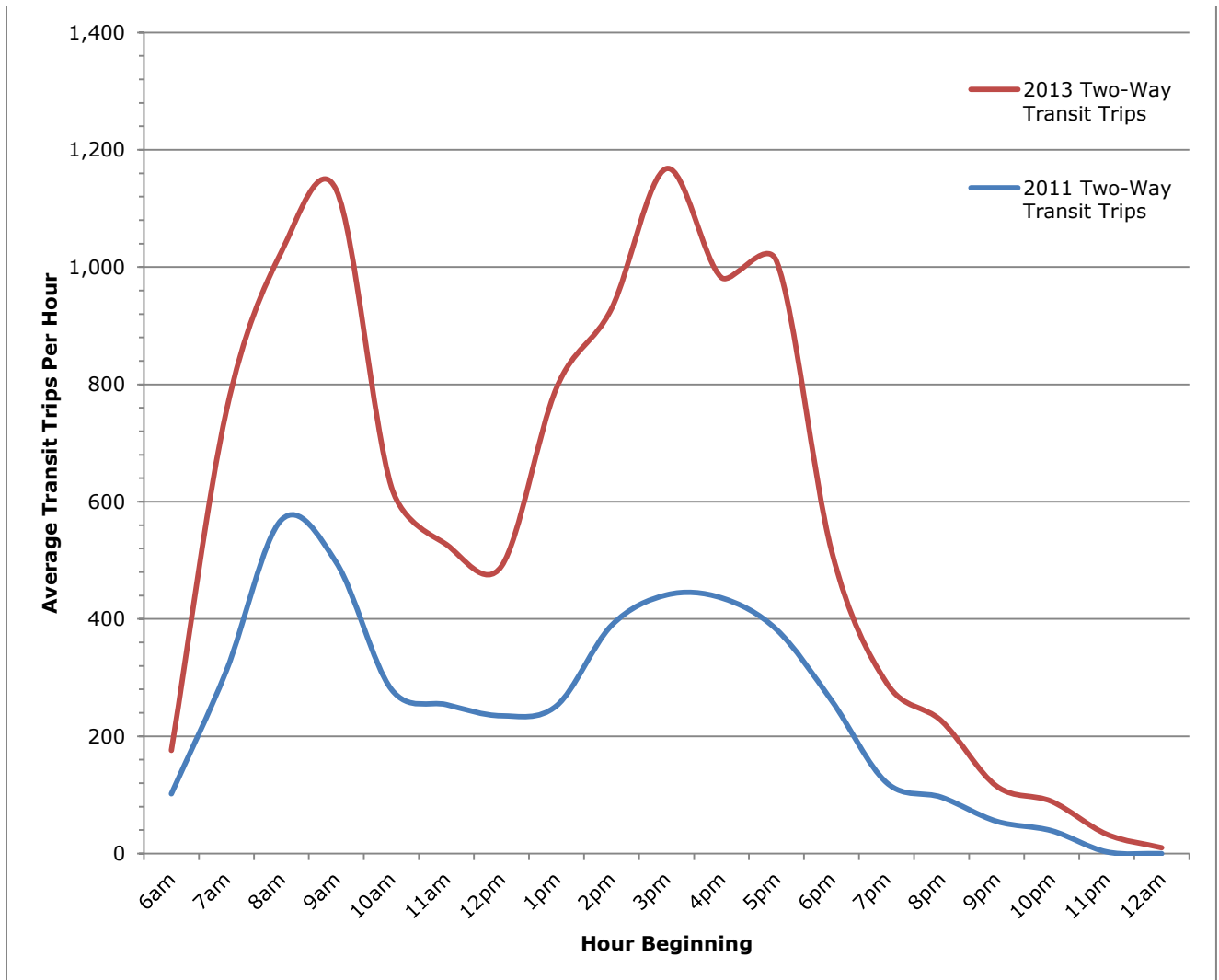
2.2. Transit

There was an average of 6,170 weekday transit trips to and from UBCO in fall 2013 on seven different transit routes. In 2013 an additional route was added that services the Quail Ridge residential area to the north of the campus. The transit trips are summarized in **Table 2.3** while **Figure 2.5** illustrates the transit ridership by hour for fall 2011 and fall 2013.

Table 2.3: Weekday Transit Trips to / from UBCO in Fall 2013

Route	AM Peak (6AM-9AM)	Midday (9AM-3PM)	PM Peak (3PM-6PM)	Evening (6PM-1AM)	Totals	
4 Pandosy Via Highway 97	171	20	194	0	385	6%
6 Glenmore	67	44	60	10	181	3%
8 Pandosy Via Rutland	187	948	481	255	1,871	30%
13 Quail Ridge	24	36	72	0	132	2%
23 Lake Country	244	736	444	70	1,494	24%
90 Vernon	98	80	79	20	277	4%
97 Express	183	726	571	350	1,830	30%
Totals (Rounded)	975	2,590	1,901	705	6,170	100%

Figure 2.5: Average Hourly Weekday Transit Trips to & from UBCO



There were approximately 1,450 (31%) more trips by transit per day and almost 23% more transit trips per person per day from 2011 to 2013. Other key observations regarding transit use at UBCO are as follows:

- There is an increase in transit service to/from UBCO, which is resulting in increased ridership numbers. There were 82 more buses counted over the same period in 2013 compared to 2011.
- Ridership is highest on routes 8 Pandosy via Rutland and the 97 Express.
- Approximately 31% of transit trips were from areas north of UBCO, on routes 13, 23 and 90. This includes trips to and from the Quail Ridge residential development serviced by Route 13 (2% of trips).
- The morning peak hour for transit trips occurs from 9:00 to 10:00 am with 10% of the days total transit trips. The afternoon peak hour occurs between 3:00 and 4:00 pm with 12% of the days total transit trips.

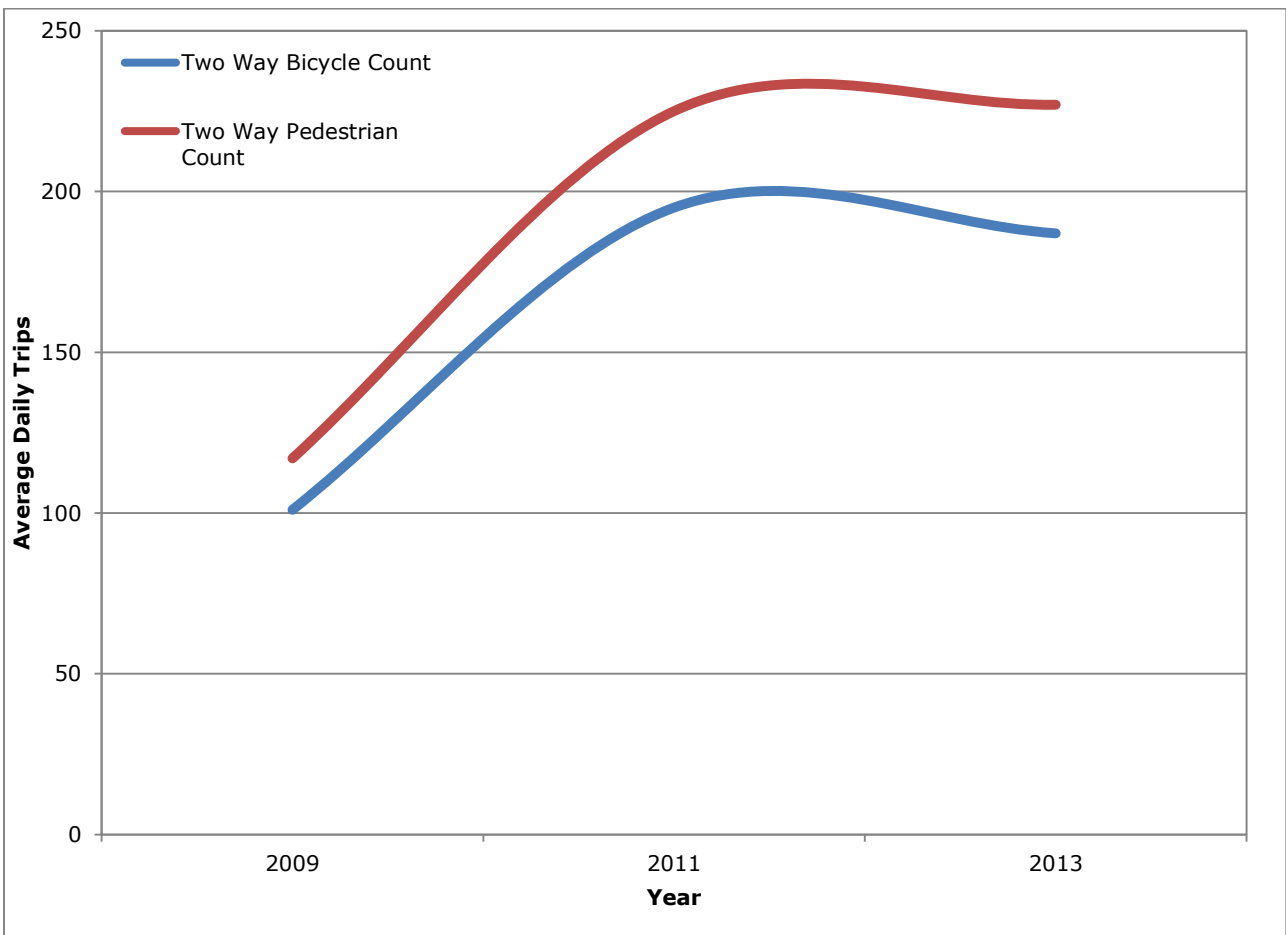
2.3. Bicycles and Pedestrians

Table 2.4 and **Figure 2.6** summarize bicycle and pedestrian trips to and from UBCO from 2009 to 2013. Pedestrian and bicycle trips were counted at four access points: the north roundabout, the south roundabout, west campus on Roberts Lake Road and at the access to Lot H (location added in 2013 as a result of road network changes).

Table 2.4: Average Weekday Bicycle and Pedestrian Trips to & from UBC Okanagan

Count Location	Bicycles			Pedestrians		
	2009	2011	2013	2009	2011	2013
North Access	2	2	2	3	5	97
South Access	12	42	23	3	6	45
West Access (Roberts Lake Road)	87	151	156	111	214	65
Lot H Access (new for 2013)	N/A	N/A	6	N/A	N/A	20
Totals (Rounded)	100	195	185	115	225	225

Figure 2.6: Trend of Average Weekday Bicycle and Pedestrian Trips to / from UBCO



Key observations regarding bicycle and pedestrian trips include:

- Number of cycling and walking trips has leveled off with no noticeable change in average weekday volumes from 2011 to 2013.
- Pedestrian activity changed in 2013 with a more even distribution of trips between the north, south and west access points to the Campus. This may be a result of access restrictions imposed on the west side of the campus.
- Cyclist behaviour is consistent by most frequently travelling to / from the campus via the West Access.
- All buses operating on transit routes serving UBCO are equipped with two bicycle racks. A total of 34 bicycles were counted throughout one full day of operations in Fall 2013, representing an average rack utilization of 0.05 bicycles per available space. This is less than the 0.10 average bike rack utilization in 2011.

2.4. Motor Vehicles

Table 2.5 provides a summary of weekday motor vehicle traffic to and from the UBCO campus. Key observations regarding automobile traffic include:

- There was a 13% increase in the number of vehicle trips to / from UBCO from 2011 to 2013.
- A small modal shift from single occupant vehicles to carpool and transit was observed in 2013 compared to 2011.

The results from 2013 show a positive shift in vehicle trips to / from the campus. More people are shifting to carpool options or transit as opposed to using their personal vehicles. This is in line with the goal of reducing vehicular trips to/from the campus.

Table 2.5: Average Weekday Motor Vehicle Trips to / from UBC Okanagan Fall 2013

Vehicle Classification	Fall 2009		Fall 2011		Fall 2013	
	Count	Split	Count	Split	Count	Split
Single Occupant Vehicle (SOV)	7,040	77.4%	8,170	80.6%	8,980	78.5%
Carpool / Vanpool	1,520	16.7%	1,365	13.5%	1,660	14.5%
Motorcycles & Trucks	325	3.6%	345	3.4%	390	3.4%
Transit Buses	210*	2.3%	255*	2.5%	410	3.6%
Total Vehicles	9,095	100%	10,135	100%	11,440	100%

*Previously reported counts of buses adjusted for consistent annual comparison.

Table 2.6 summarizes weekly traffic volumes to and from UBCO. The AM and PM average weekday peak hour traffic volumes increased slightly in 2013 with 300 more vehicle trips in the AM peak hour and 110 more vehicle trips in the PM peak hour. The weekday traffic volumes to and from campus are more consistent in 2013 compared to previous years with only a max difference of 150 vehicle trips per day. Weekend traffic volumes are significantly less than weekday traffic volumes, but volumes were observed to be approximately 30% higher on Saturday in 2013 compared to Saturday in 2011.

Table 2.6: Summary of Average Weekly Traffic Volumes to / from UBCO in Fall 2013

Time Period	Fall 2009	Fall 2011	Fall 2013
Weekday Average*			
• AM peak hour	830	910	1,210
• PM peak hour	870	1,010	1,120
• 24 hours	9,100	10,135	11,440
Daily			
• Monday	8,910	10,100	11,480
• Tuesday	8,800	10,550	11,370
• Wednesday	9,280	10,290	11,420
• Thursday	9,280	10,360	11,410
• Friday	9,130	9,920	11,520
• Saturday	4,200	3,810	4,990
• Sunday	2,800	3,310	3,730

*Am Peak Hour is 8am-9am, PM peak hour is 3pm-4pm

2.5. Vehicle Occupancy

Vehicle occupancy is a measure of the average number of people travelling per vehicle collected during the peak periods in a weekday. It is calculated by dividing the total number of person trips by the total number of vehicles during a specified time period. **Table 2.7** provides a summary of vehicle occupancies for personal vehicles including carpools and vanpools from 2009 to 2013. Key observations regarding vehicle occupancies include:

- The average automobile occupancy in Fall 2013 was 1.17 persons per vehicle, which matches the occupancy levels observed in 2011.
- The average occupancy for carpools and vanpools reduced in 2013 to 2.09 persons per vehicle down from 2.18 persons per vehicle in 2011.

Table 2.7: Vehicle Occupancy to / from UBC Vancouver in 2013

Vehicle Classification	Fall 2009	Fall 2011	Fall 2013
Single Occupant Vehicle	1.00	1.00	1.00
Carpool / Vanpool	2.15	2.18	2.08
All Motor Vehicles	1.20	1.17	1.17

3. Transportation Within UBC Okanagan 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 and 3.2**. For each movement the Fall 2013 hourly volume is indicated followed by the Fall 2011 volume in brackets. Key observations regarding traffic volumes include:

- During the Morning Peak Hour no significant increase in traffic movements on campus.
- Most noticeable change during the Morning Peak Hour is the increased traffic on the west side of campus along Discovery Avenue.
- During the Afternoon Peak Hour traffic patterns changed minimally from 2011 to 2013 with less traffic at the north roundabout and more traffic at the south roundabout.

Figure 3.1: Morning Peak Hour Traffic Volumes at UBC Okanagan

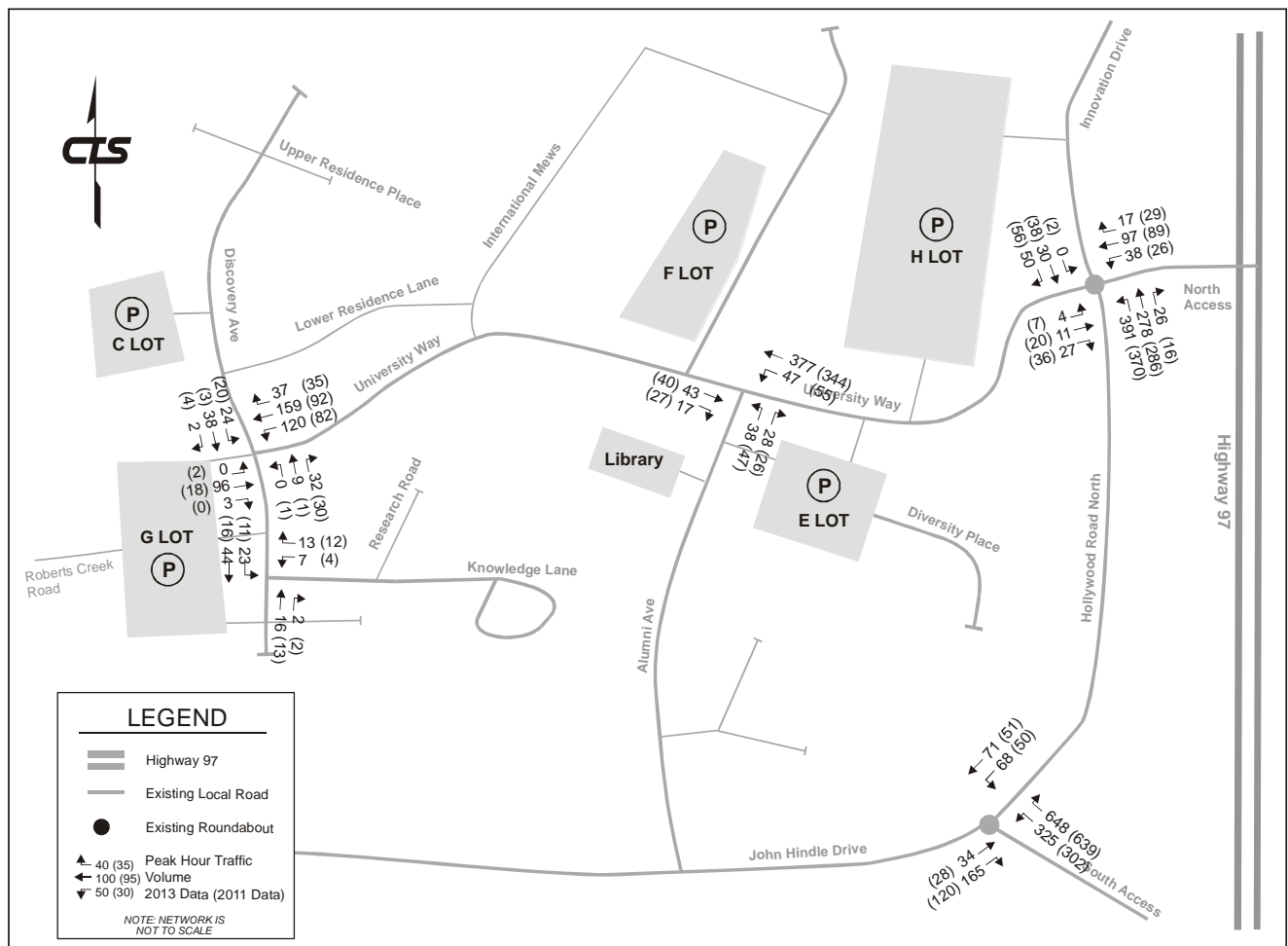
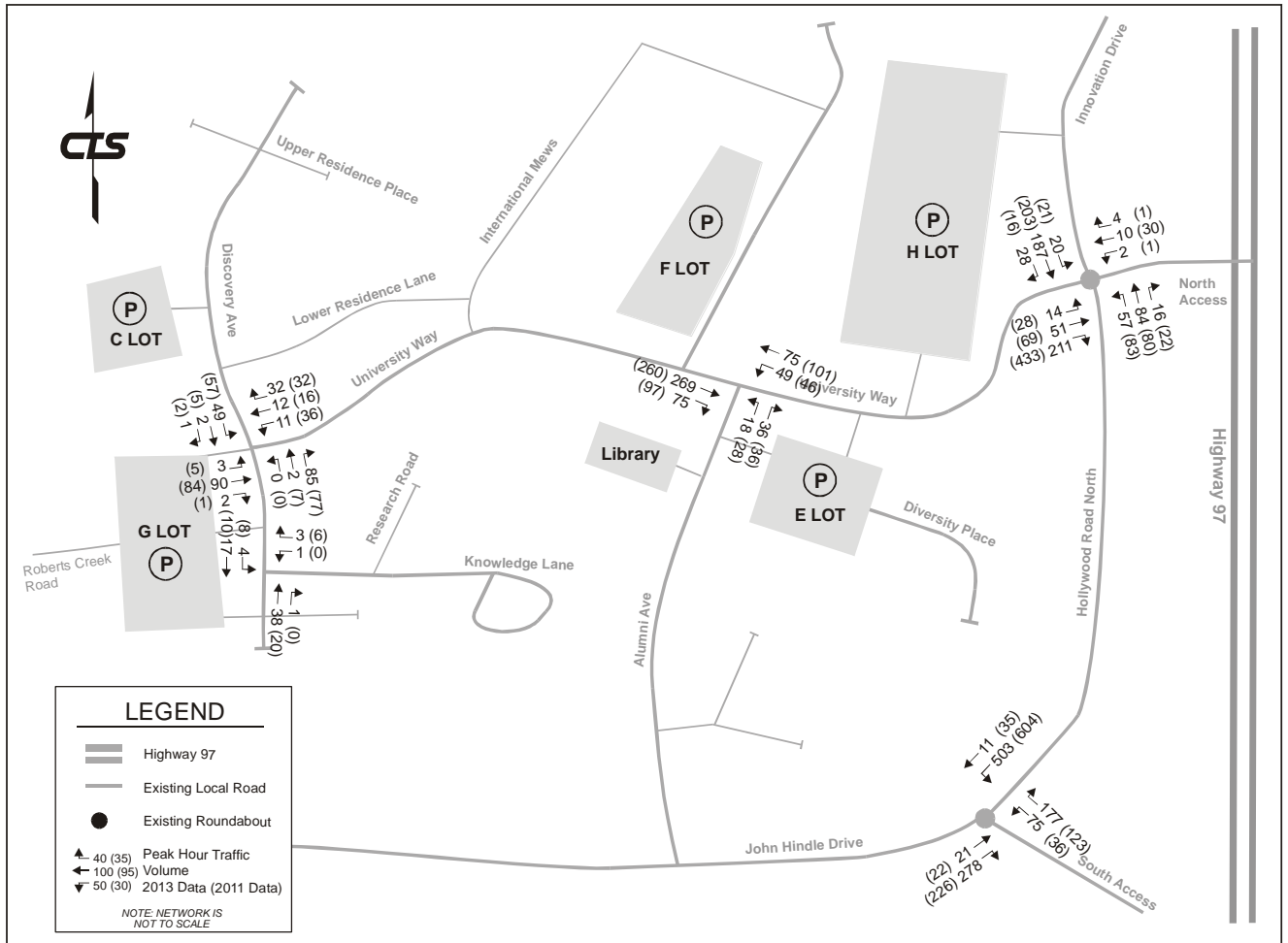


Figure 3.2: Afternoon Peak Hour Traffic Volumes at UBC Okanagan



3.2. Traffic Speeds

Traffic speeds were recorded at nine locations on campus using pneumatic tubes, which were identified in **Figure 1.2**. The 85th percentile speed is typically used for the purposes of representing travel speeds and represents the speed below which 85% of the traffic travels. The average weekday 85th percentile speed data is summarized below in **Table 3.1**. Two additional locations were added to the 2013 data collection task and do not have past year comparable values. These locations were added in anticipation of traffic pattern changes on campus.

Key observations regarding traffic speeds on campus include:

- Speeds on University way just west of the north roundabout exceeded speeds of 50km/h.
- Speeds on John Hindle Drive east of Alumni Avenue exceeded speeds of 50km/h.
- Speeds on Alumni Avenue north of John Hindle Drive exceeded speeds of 50km/h.
- The average travel speeds on Discovery Avenue improved, decreasing to speeds similar to those measured in 2009.

Table 3.1: Average Weekday 85th Percentile Traffic Speed (km/h)

Location	Eastbound / Northbound			Westbound / Southbound		
	Fall 2009	Fall 2011	Fall 2013	Fall 2009	Fall 2011	Fall 2013
1. University Way – Between roundabout and Alumni Ave	52.9	49.1	55.1	49.8	49.6	50.9
2. University Way – West of Alumni Avenue	39.1	39.3	38.5	37.0	36.2	36.0
3. University Way – East of Discovery Avenue	39.3	37.0	36.9	40.0	35.2	42.8
4. Discovery Avenue – North of Lot C Access	54.5	31.6	44.1	48.3	31.3	49.0
5. Discovery Avenue – North of Lot G Access	28.3	57.4	33.5	29.1	60.7	34.7
6. Knowledge Lane	29.9	29.4	29.1	30.3	29.5	28.8
7. Alumni Avenue – South of Library Access	43.4	37.1	29.0	43.6	36.7	28.5
8. Alumni Avenue – North of John Hindle Drive	-	-	49.5	-	-	54.9
9. John Hindle Drive – East of Alumni Avenue	-	-	58.9	-	-	54.8

*Speeds in red are at or above the campus speed limit of 50km/h.

Given the results of the 2013 speed analysis, it is recommended additional speed data be collected along University Way, Alumni Avenue and John Hindle Drive.