

# UBC Okanagan Transportation Status Report Fall 2015

October 2016

**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 2015 presents a summary of data collected in late September 2015 at UBC Okanagan. This is the third year of “post-benchmark” data collection that is compared with travel patterns from fall 2009, 2011 and 2013.

## 1.1. Context

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

- **The UBC Okanagan Campus Plan** was completed in September 2015 and builds on the foundations of the 2005 and 2009 Master Plans. The Plan describes how the campus will develop to accommodate increased student enrolment and expanded university activities. It provides a long-term planning framework for existing and future academic and research activities, student housing, and associated campus services and infrastructure for the next 20 years. The illustrated Campus Plan is provided in **Figure 1.1**.
- **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: Illustrative Plan of UBC Okanagan Campus from the 2015 Campus 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.

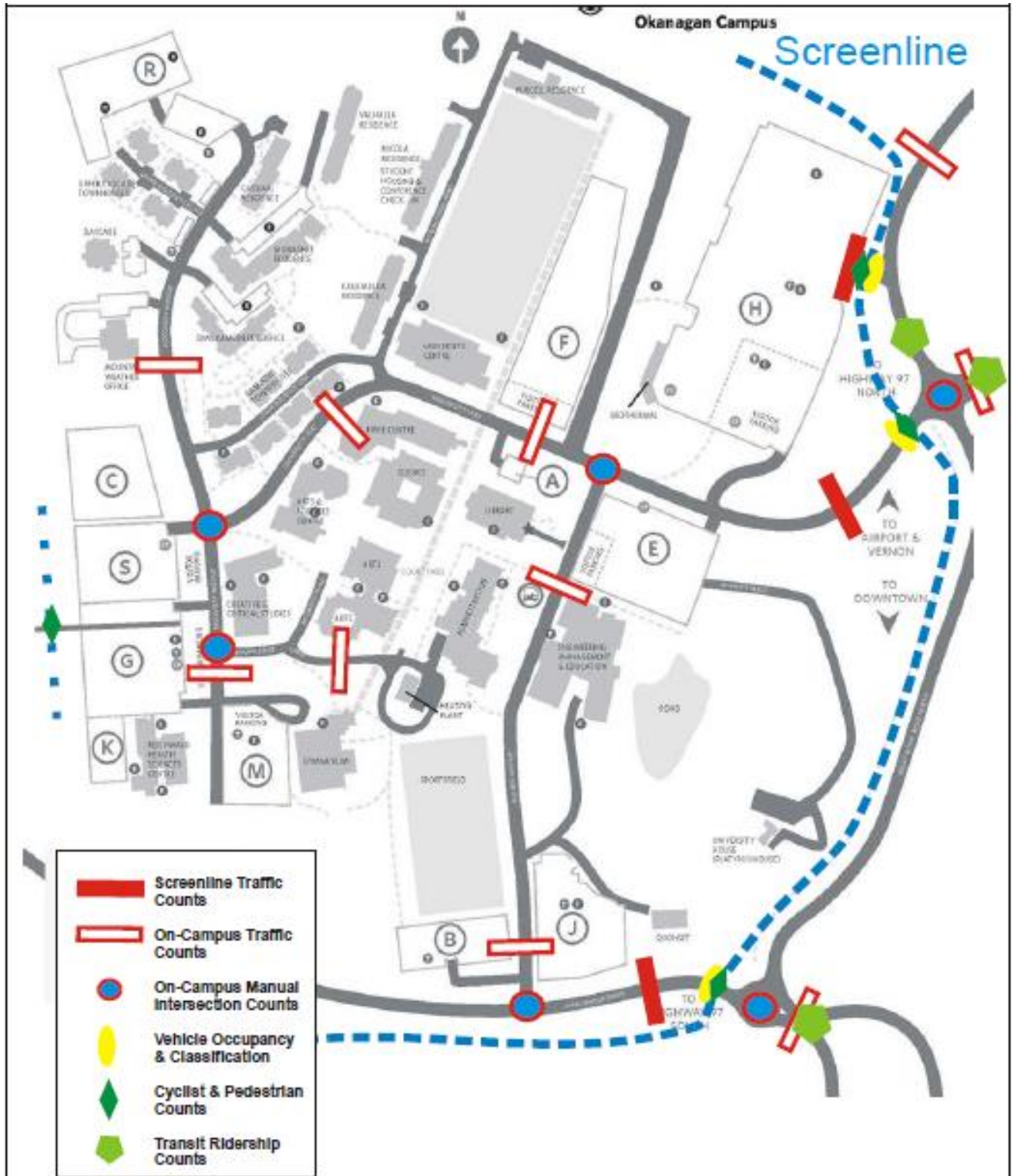
Data collection activities for the fall 2015 are summarized in **Table 1.1**, and data collection locations are illustrated in **Figure 1.2**.

**Table 1.1: Summary of 2015 Transportation Data Collection**

Data Collection Activity	Locations	Description
Intersection Counts	At 6 intersections throughout campus.	Manual observation for 8 hours (3hrs in AM, 2hrs in Midday, 3hrs in PM) for one day.
Automatic Traffic / Speed Counts	At 10 locations on internal and external campus roads.	Automatic tube counters on roads for 7 days (24 hours / day).
Transit Ridership	At 3 screenline locations.	Manual observation from 6:00AM to 4:30AM for one day.
Vehicle Occupancy & Classification	At 3 screenline locations.	Manual observation for 8 hours (3hrs in AM, 2hrs in Midday, 3hrs in PM) for one day.
Bicycle and Pedestrian Counts	At 4 screenline locations.	Manual observation for 15 hours over one day.



Figure 1.2: Data Collection Locations



### 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 2015 was 19,585. A summary and comparison of daily person trips by mode from the fall of 2009 to the fall of 2015 are provided in **Table 2.1** and **Figure 2.1**.

**Table 2.1: Weekday Person Trips to / from UBC Okanagan**

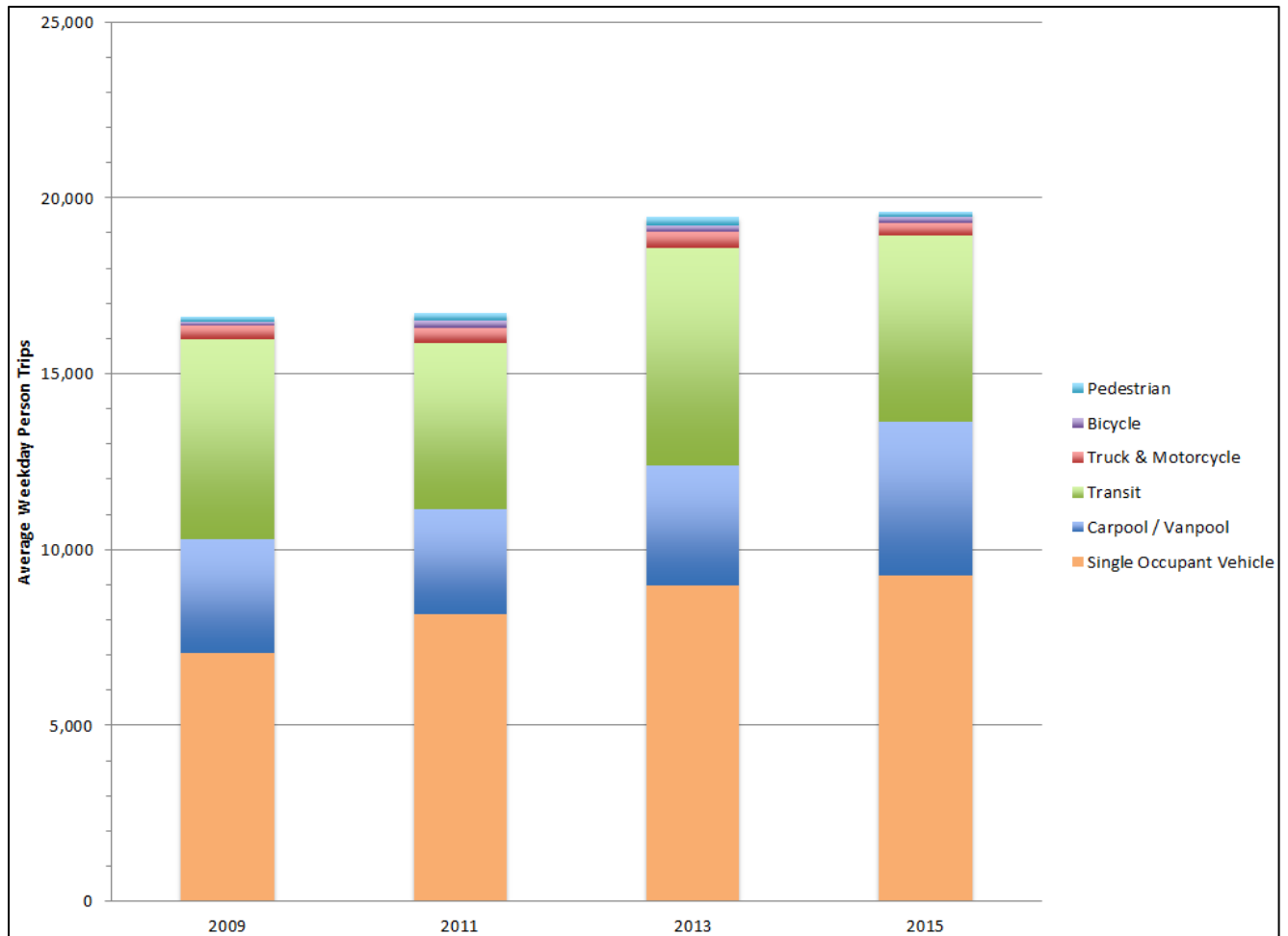
Travel Mode Classification	Person Trips							
	Fall 2009 Count	Fall 2009 Split	Fall 2011 Count	Fall 2011 Split	Fall 2013 Count	Fall 2013 Split	Fall 2015 Count	Fall 2015 Split
Single Occupant Vehicle (SOV)	7,040	42.4%	8,170	48.8%	8,980	46.2%	9,275	47.4%
Carpool / Vanpool	3,260	19.7%	2,990	17.9%	3,410	17.5%	4,340	22.2%
Truck & Motorcycle	400	2.4%	420	2.5%	480	2.5%	350	1.8%
Transit	5,680	34.2%	4,720	28.2%	6,170	31.7%	5,300	27.1%
Bicycle	100	0.60%	200	1.2%	185	1.0%	200	1.0%
Pedestrian	120	0.70%	230	1.4%	225	1.2%	120	0.6%
<b>Totals</b>	<b>16,600</b>	<b>100%</b>	<b>16,730</b>	<b>100%</b>	<b>19,450</b>	<b>100%</b>	<b>19,585</b>	<b>100%</b>
<b>Campus POP</b>	<b>6,400</b>		<b>8,270</b>		<b>8,820</b>		<b>8,820</b>	

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 47% of all trips and is up from 46% mode share in 2013.
- The number of person trips to and from campus generally remained constant from 2013.
- Trips by transit account for 27% of all trips to / from Campus, down 4.6% from fall 2013 to fall 2015.
- Bicycle and pedestrian trips went down slightly from 2013 to 2015.

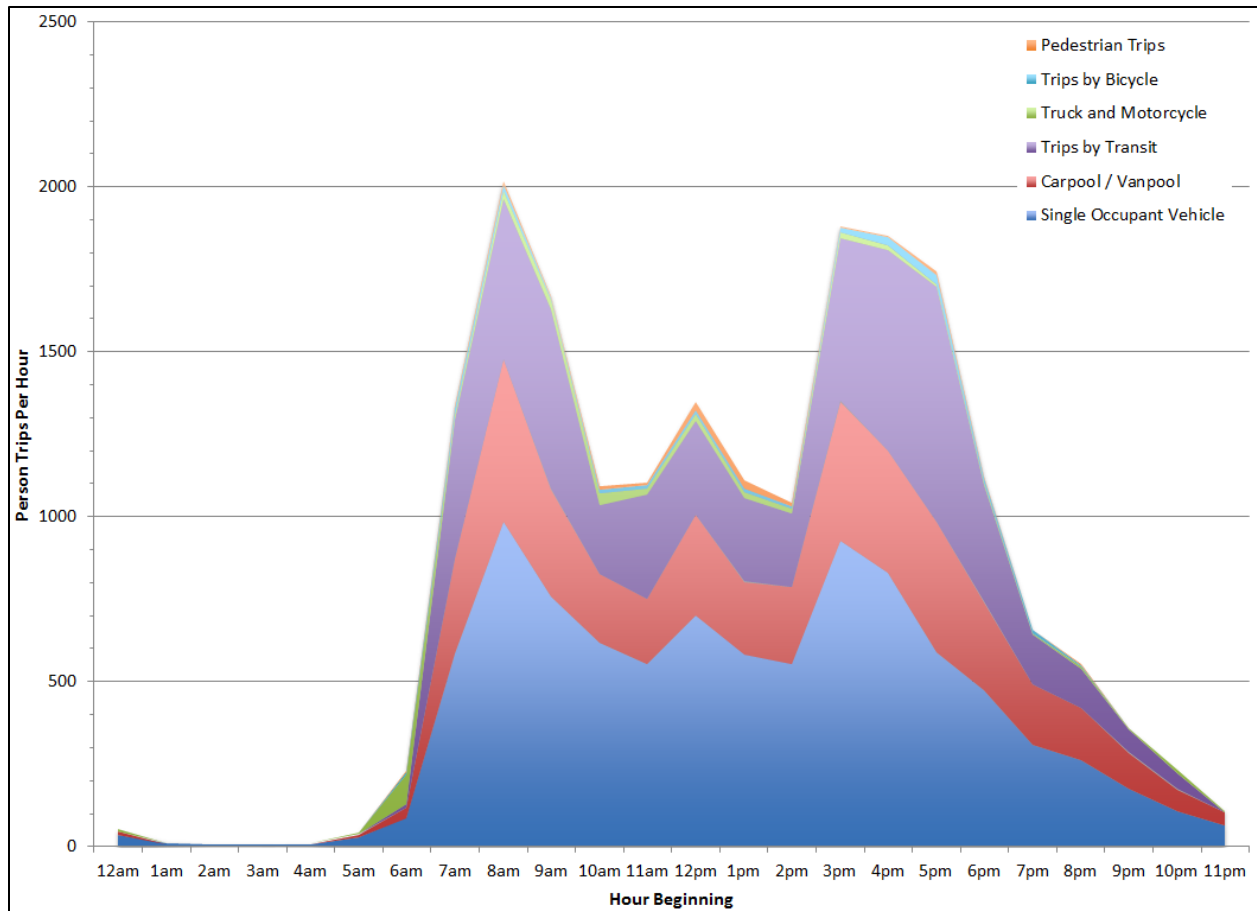


**Figure 2.1: Weekday Person Trips to / from UBC Okanagan from 2009 to 2015**



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 three clearly defined peaks for travel to and from UBCO representing the peak arrival (8am-9am) and departure (3pm-4pm) periods as well as the lunch hour peak (12noon to 1pm).

**Figure 2.2: Hourly Distribution of Person Trips To & From UBCO in Fall 2015**



The hourly distribution of trips in the chart above shows a shift back to a heavy one hour morning peak period, while the afternoon peak is distributed over two hours. UBCO Campus Planning will look into opportunities to shift work start times and distribute class start times to minimize this peak.

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**.

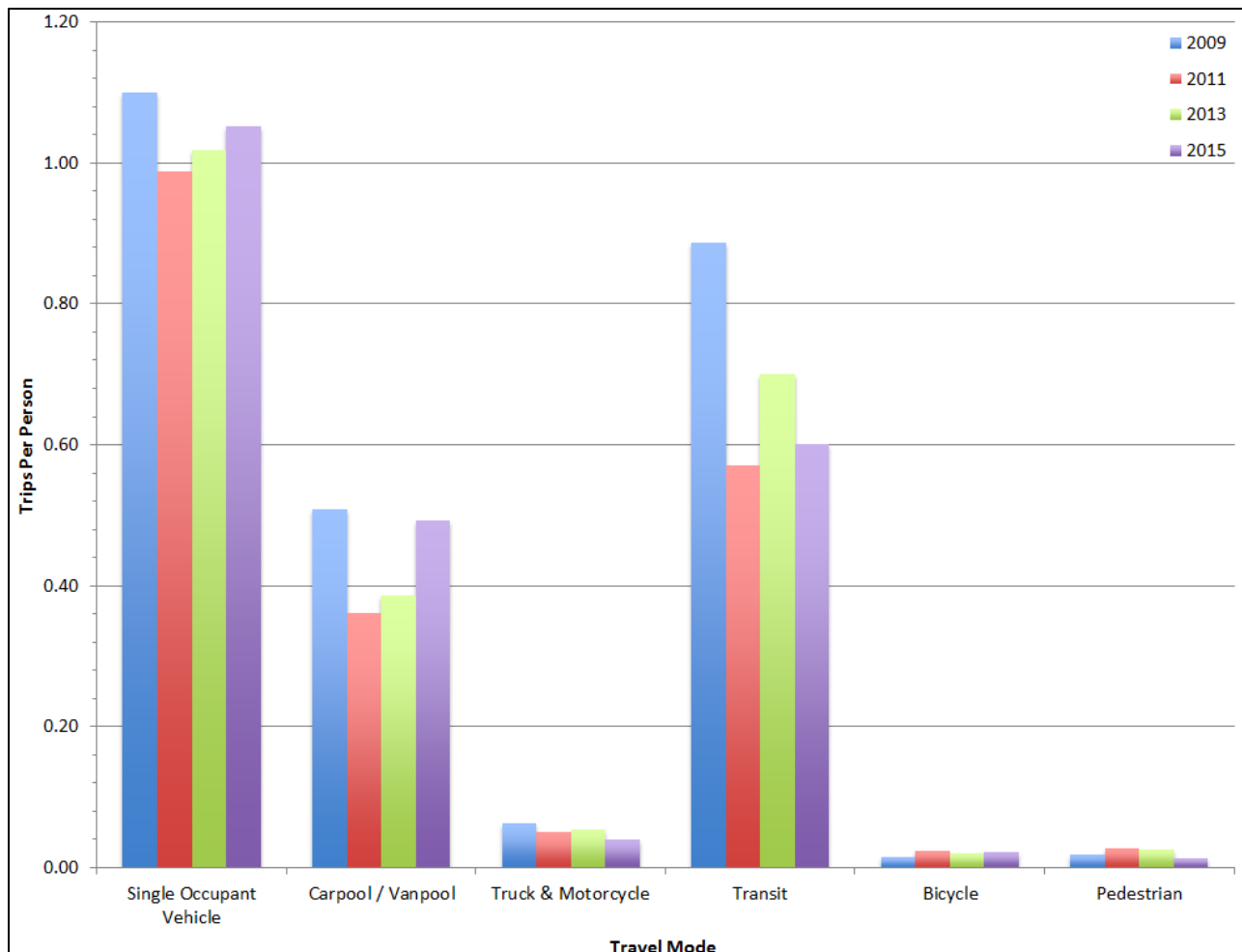
It is expected that the average total trips per person per day would be around two; a trip to campus and a trip from campus. The campus population and trips per person to and from UBCO from fall 2009 to fall 2015 are presented in **Table 2.2** and **Figure 2.2**.

**Table 2.2: Weekday Trips Per Person to / from UBC Okanagan from 2009 to 2015**

Travel Mode Classification	Trips Per Person				2015 Mode Share Split
	Fall 2009	Fall 2011	Fall 2013	Fall 2015	
Single Occupant Vehicle (SOV)	1.100	0.988	1.018	1.052	47.4%
Carpool / Vanpool	0.509	0.362	0.387	0.492	22.2%
Truck & Motorcycle	0.063	0.051	0.054	0.040	1.8%
Transit	0.888	0.571	0.700	0.601	27.1%
Bicycle	0.016	0.024	0.021	0.023	1.0%
Pedestrian	0.019	0.028	0.026	0.014	0.6%
<b>Totals</b>	<b>2.59</b>	<b>2.02</b>	<b>2.21</b>	<b>2.22</b>	<b>100.0%</b>
<b>CAMPUS POPULATION*</b>	<b>6,400</b>	<b>8,270</b>	<b>8,820</b>	<b>8,820</b>	

\*Population reported from fall attendance values, 2013 values match 2015 values coincidentally.

**Figure 2.2: Weekday Trips Per Person to / From UBC Okanagan from 2009 to 2015**



The campus population held steady from 2013 to 2015 as did the total number of trips per person. However, compared to 2013 there was an increase in single occupancy vehicle trips and carpool trips and a decrease in transit and pedestrian trips.

## 2.2. Transit

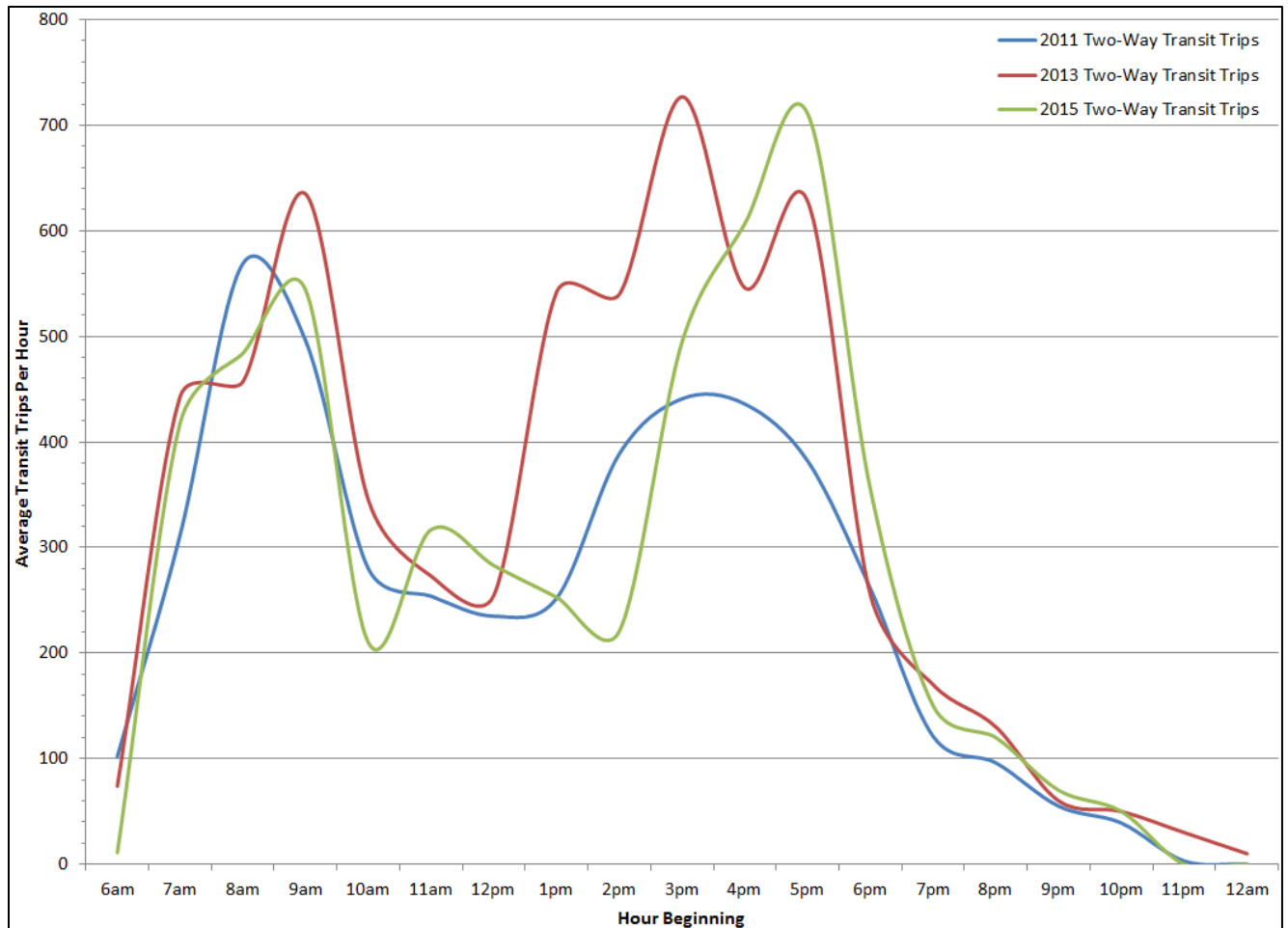
There was an average of 5,300 weekday transit trips to and from UBCO in fall 2015 on seven different transit routes. One change for the 2015 year was a transit fare increase to \$2.50, which may explain some of the decrease in transit trips in 2015.

The transit trips are summarized in **Table 2.3** while **Figure 2.5** illustrates the transit ridership by hour for fall 2011 to fall 2015.

**Table 2.3: Weekday Transit Trips to / from UBCO in Fall 2015**

Route	AM Peak (6AM-9AM)	Midday (9AM-3PM)	PM Peak (3PM-6PM)	Evening (6PM-1AM)	Totals	
4 Pandosy Via Highway 97	30	30	50	0	<b>110</b>	<b>2%</b>
6 Glenmore	50	20	163	85	<b>318</b>	<b>6%</b>
8 Pandosy Via Rutland	345	781	731	164	<b>2,021</b>	<b>38%</b>
13 Quail Ridge	1	6	42	18	<b>67</b>	<b>1%</b>
23 Lake Country	136	156	112	134	<b>538</b>	<b>10%</b>
90 Vernon	120	70	90	10	<b>290</b>	<b>5%</b>
97 Express	231	765	625	334	<b>1,955</b>	<b>37%</b>
<b>Totals (Rounded)</b>	<b>915</b>	<b>1,830</b>	<b>1,815</b>	<b>745</b>	<b>5,300</b>	<b>100%</b>

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



There were approximately 870 (14%) fewer trips by transit per day and 4.5% fewer transit trips per person per day from 2013 to 2015. Other key observations regarding transit use at UBCO are as follows:

- There are significant peaks in transit usage as opposed to a continuous distribution.
- Ridership is highest on routes 8 Pandosy via Rutland and the 97 Express.
- Approximately 16% 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 (1% of trips).
- The morning peak hour for transit trips occurs from 9:00 to 10:00 am. The afternoon peak hour occurs between 5:00 and 6:00 pm. Both peak periods are later than the distribution of all trips to and from campus.

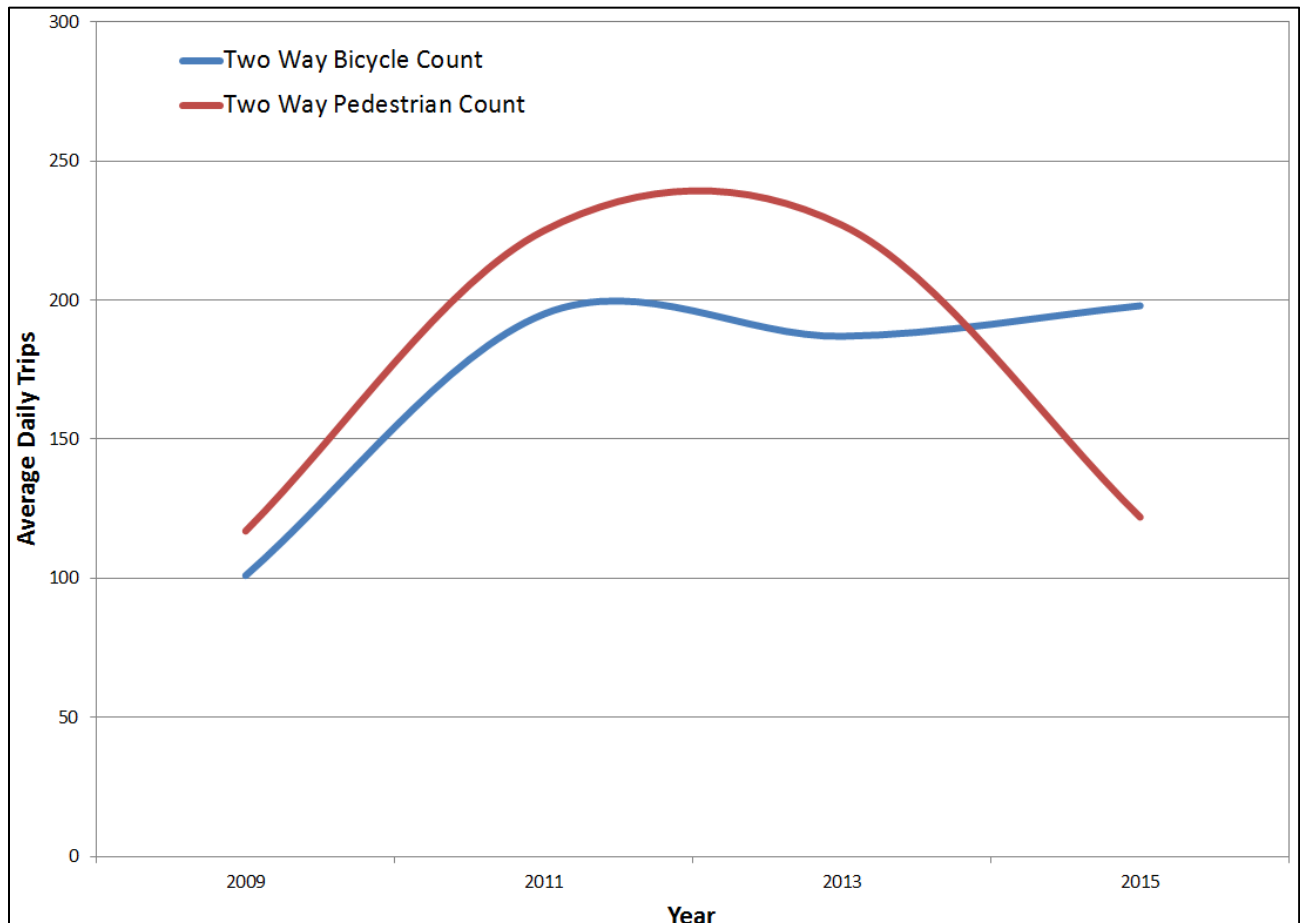
### 2.3. Bicycles and Pedestrians

**Table 2.4** and **Figure 2.6** summarize bicycle and pedestrian trips to and from UBCO from 2009 to 2015. 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	2015	2009	2011	2013	2015
North Access	2	2	2	12	3	5	97	46
South Access	12	42	23	50	3	6	45	40
West Access (Curtis Road)	87	151	156	119	111	214	65	14
Lot H Access (new for 2013)	N/A	N/A	6	17	N/A	N/A	20	22
<b>Totals (Rounded)</b>	100	195	185	200	115	225	225	120

**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 trips has leveled off with no noticeable change in average weekday volumes from 2011 to 2015.
- Pedestrian activity significantly decreased in 2015 with the most noticeable decreases at the north and west accesses. Pedestrian traffic at the west access has been decreasing since 2011 as a result of access permission changes. Starting in 2017 this access to residents west of the campus will no longer be permitted with the construction of the John Hindle Drive extension.
- Cyclist behaviour is consistent to previous years with the most popular access point on the west side of campus. However, compared to 2013 the number of trips via the west access decreased 24% (37 trips).
- All buses operating on transit routes serving UBCO are equipped with two bicycle racks. A total of 68 bicycles were counted throughout one full day of operations in Fall 2015, representing an average rack utilization of 0.06 bicycles per available space. This matches the bike rack utilization in 2013, however the total number of bikes arriving to campus by bus increased from 34 to 68.

## 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 were 610 (5%) more vehicle trips to / from UBCO from 2013 to 2015.
- A small modal shift from single occupant vehicles to carpool and transit was observed in 2015 compared to 2013.

The results from 2015 show a slight positive shift in vehicle trips to / from the campus. More people are shifting to carpool options as opposed to driving alone. Unfortunately there were still more vehicle trips to the campus overall compared to 2013 despite a reported consistent population. This could be attributed to transit fare increases or other. This will be monitored closely in the 2017 analysis.

**Table 2.5: Average Weekday Motor Vehicle Trips to / from UBC Okanagan Fall 2015**

Vehicle Classification	Fall 2009		Fall 2011		Fall 2013		Fall 2015	
	Count	Split	Count	Split	Count	Split	Count	Split
Single Occupant Vehicle (SOV)	7,040	77.4%	8,170	80.6%	8,980	78.5%	9,280	77.0%
Carpool / Vanpool	1,520	16.7%	1,365	13.5%	1,660	14.5%	2,060	17.1%
Motorcycles & Trucks	325	3.6%	345	3.4%	390	3.4%	290	2.4%
Transit Buses	210*	2.3%	255*	2.5%	410	3.6%	420	3.5%
<b>Total Vehicles</b>	<b>9,095</b>	<b>100%</b>	<b>10,135</b>	<b>100%</b>	<b>11,440</b>	<b>100%</b>	<b>12,050</b>	<b>100%</b>

\*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 2015. The weekday traffic volumes to and from campus are comparable throughout the week, with a slight decrease on Fridays compared to Monday through Thursday. Weekend traffic volumes are significantly less than weekday traffic volumes.

**Table 2.6: Summary of Average Weekly Traffic Volumes to / from UBCO in Fall 2015**

Time Period	Fall 2009	Fall 2011	Fall 2013	Fall 2015
Weekday Average*				
• AM peak hour	830	910	1,210	1,280
• PM peak hour	870	1,010	1,120	1,170
• 24 hours	9,100	10,135	11,440	12,040
Daily				
• Monday	8,910	10,100	11,480	12,310
• Tuesday	8,800	10,550	11,370	12,000
• Wednesday	9,280	10,290	11,420	12,030
• Thursday	9,280	10,360	11,410	12,290
• Friday	9,130	9,920	11,520	11,600
• Saturday	4,200	3,810	4,990	2,760
• Sunday	2,800	3,310	3,730	3,550

\*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 2015. Key observations regarding vehicle occupancies include:

- The average automobile occupancy in fall 2015 was 1.20 persons per vehicle, which is up from 1.17 persons per vehicle in 2013 and 2011.
- The average occupancy for carpools and vanpools increased slightly to 2.10 persons per vehicle up from 2.08 persons per vehicle in 2013.

**Table 2.7: Vehicle Occupancy to / from UBC Okanagan in 2015**

Vehicle Classification	Fall 2009	Fall 2011	Fall 2013	Fall 2015
Single Occupant Vehicle	1.00	1.00	1.00	1.00
Carpool / Vanpool	2.15	2.18	2.08	2.10
All Motor Vehicles	1.20	1.17	1.17	1.20

UBC will continue to work on increasing the average vehicle occupancies by providing incentives to carpooling such as preferred parking locations, campus discounts, or other.

## 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 2015 hourly volume is indicated followed by the Fall 2013 volume in brackets. Key observations regarding traffic volumes include:

- During the morning peak hour no significant changes to travel patterns or traffic volumes on campus.
- During the afternoon peak hour more traffic was observed to travel northbound and southbound through the north roundabout on Hollywood Drive / Innovation Precinct when compared to 2013 volumes. Increased traffic was also observed at the south roundabout to and from areas west of the roundabout. This is likely as a result of the opening of the University South residential neighbourhood.

Figure 3.1: Morning Peak Hour Traffic Volumes at UBC Okanagan

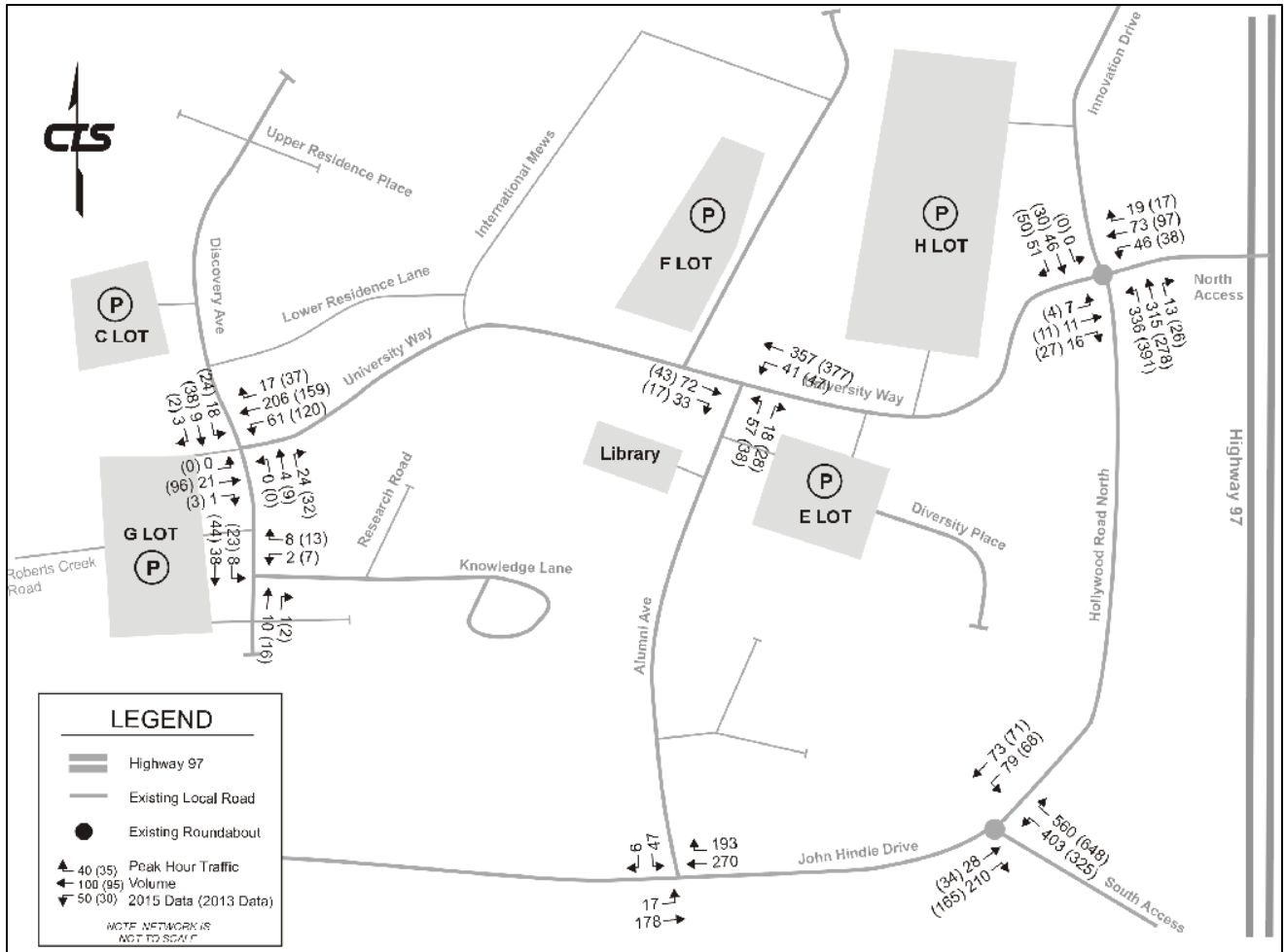
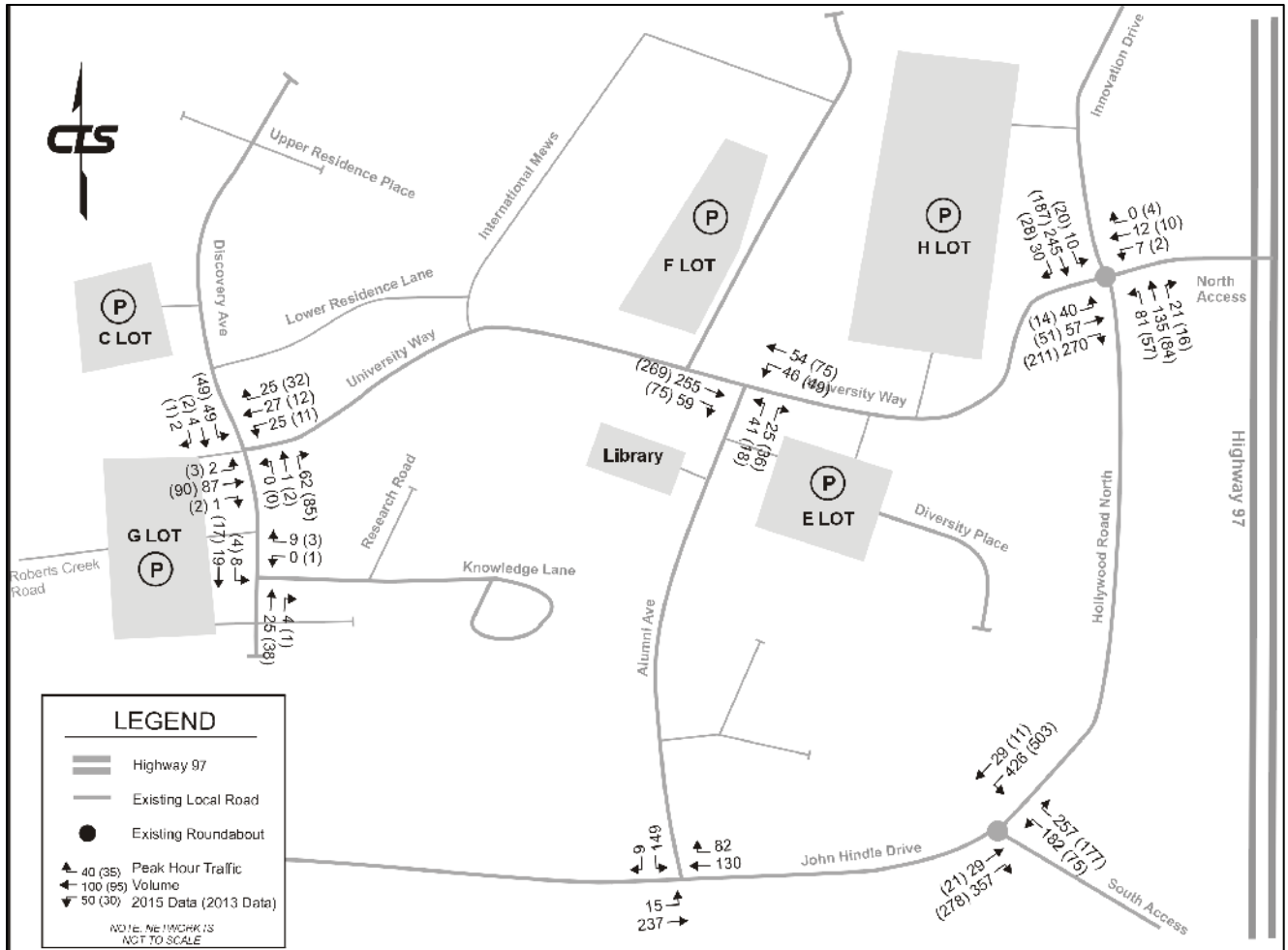


Figure 3.2: Afternoon Peak Hour Traffic Volumes at UBC Okanagan



The count location at Alumni Avenue and John Hindle Drive was added in 2015 to track changes as a result of the upcoming John Hindle Drive Extension project.



### 3.2. Traffic Speeds

Traffic speeds were recorded at a number of locations on campus using pneumatic tubes, which were identified in **Figure 1.2**. The 85<sup>th</sup> 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 85<sup>th</sup> percentile speed data is summarized below in **Table 3.1** for key locations across campus. Occasionally new locations are added year over year, which are represented by dashes.

Key observations regarding traffic speeds on campus include:

- Speeds on University Way just west of the north roundabout reduced from 2013 recorded speeds.
- Speeds on John Hindle Drive east of Alumni Avenue exceed 50km/h.
- Speeds on Alumni Avenue north of John Hindle Drive exceed 50km/h.
- Speeds on University Way east of Discovery Avenue decreased, likely in part due to congestion.
- The average travel speeds on Discovery Avenue improved, decreasing to speeds similar to those measured in 2009.

**Table 3.1: Average Weekday 85<sup>th</sup> Percentile Traffic Speed (km/h)**

Location	Eastbound / Northbound				Westbound / Southbound			
	Fall 2009	Fall 2011	Fall 2013	Fall 2015	Fall 2009	Fall 2011	Fall 2013	Fall 2015
1. University Way – Between roundabout and Alumni Ave	52.9	49.1	55.1	49.7	49.8	49.6	50.9	47.9
2. University Way – West of Alumni Avenue	39.1	39.3	38.5	38.0	37.0	36.2	36.0	33.3
3. University Way – East of Discovery Avenue	39.3	37.0	36.9	23.2	40.0	35.2	42.8	28.7
4. Discovery Avenue – North of Lot C Access	54.5	31.6	44.1	36.4	48.3	31.3	49.0	39.2
5. Discovery Avenue – North of Lot G Access	28.3	57.4	33.5	34.7	29.1	60.7	34.7	37.6
6. Knowledge Lane	29.9	29.4	29.1	28.2	30.3	29.5	28.8	28.3
7. Alumni Avenue – South of Library Access	43.4	37.1	29.0	44.3	43.6	36.7	28.5	44.8
8. Alumni Avenue – North of John Hindle Drive	-	-	49.5	52.4	-	-	54.9	53.8
9. John Hindle Drive – East of Alumni Avenue	-	-	58.9	55.2	-	-	54.8	54.5

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