University of British Columbia – Okanagan Campus

Transportation Status Report Fall 2021

February 2022

THE UNIVERSITY OF BRITISH COLUMBIA

Executive Summary

To understand travel patterns and measure progress in achieving a shift to non-automobile modes of transportation, a biennial transportation data collection and monitoring program has been carried out at the UBC Okanagan (UBCO) campus since 2009. In 2021, UBCO completed a Transportation Plan for the campus. The Plan identified a number of transportation targets to reduce greenhouse gas emissions from commuting. These targets relate to an increased use of sustainable modes of transportation to commute to and from campus, including taking transit, biking, walking and carpooling. Consequently, beginning this year, the Transportation Status Report will include tracking against the transportation targets established in the Transportation Plan. These targets and the corresponding results from the 2021 data collection effort are summarized below.

In 2021, data was collected during the COVID-19 pandemic during which some classes were still being offered online and some staff and faculty were still working remotely. As a result, the data in 2021 will be substantially different from previous years. However, this shift may reflect the beginning of a new trend given the positive benefits of enabling some remote work and some online learning for the campus community.

<u>UBCO Transportation Plan Targets and 2021 Results</u>

TARGET 1: By 2040, at least 55% of all trips to and from campus will be by sustainable modes of transportation (walking, biking or transit).

× In 2021, 40% of all trips were made by transit, walking and biking.

TARGET 2: By 2030 total annual GHG emissions associated with commuting will be reduced by 40% of 2013 levels.

– To be reported through CAP2030 monitoring process.

TARGET 3: By 2040, at least 35% of all trips to and from campus will be by transit.

× In 2021, 21% of all trips to and from campus were made by transit.

TARGET 4: By 2040, at least 20% of all trips to and from campus will be by active modes (biking and walking).

× In 2021, 18.6% of all trips to and from campus were made by active modes.

TARGET 5: Through 2040, total daily automobile traffic to and from campus will not exceed 14,000 vehicle trips per day.

✓ In 2021, there were 8,765 vehicle trips to campus per day.

TARGET 6: By 2040, at least 35% of all automobile trips to and from campus will be by carpooling, ride-sharing and vanpooling.

× In 2021, 22% of all automobile trips to and from campus were made by carpooling, ride-sharing and vanpooling.

The focus of three of the six targets in UBCO's Transportation Plan relate to the mode share of trips to and from campus. The sustainable, transit and active mode shares as well as their targets are presented in ***Figure A.***

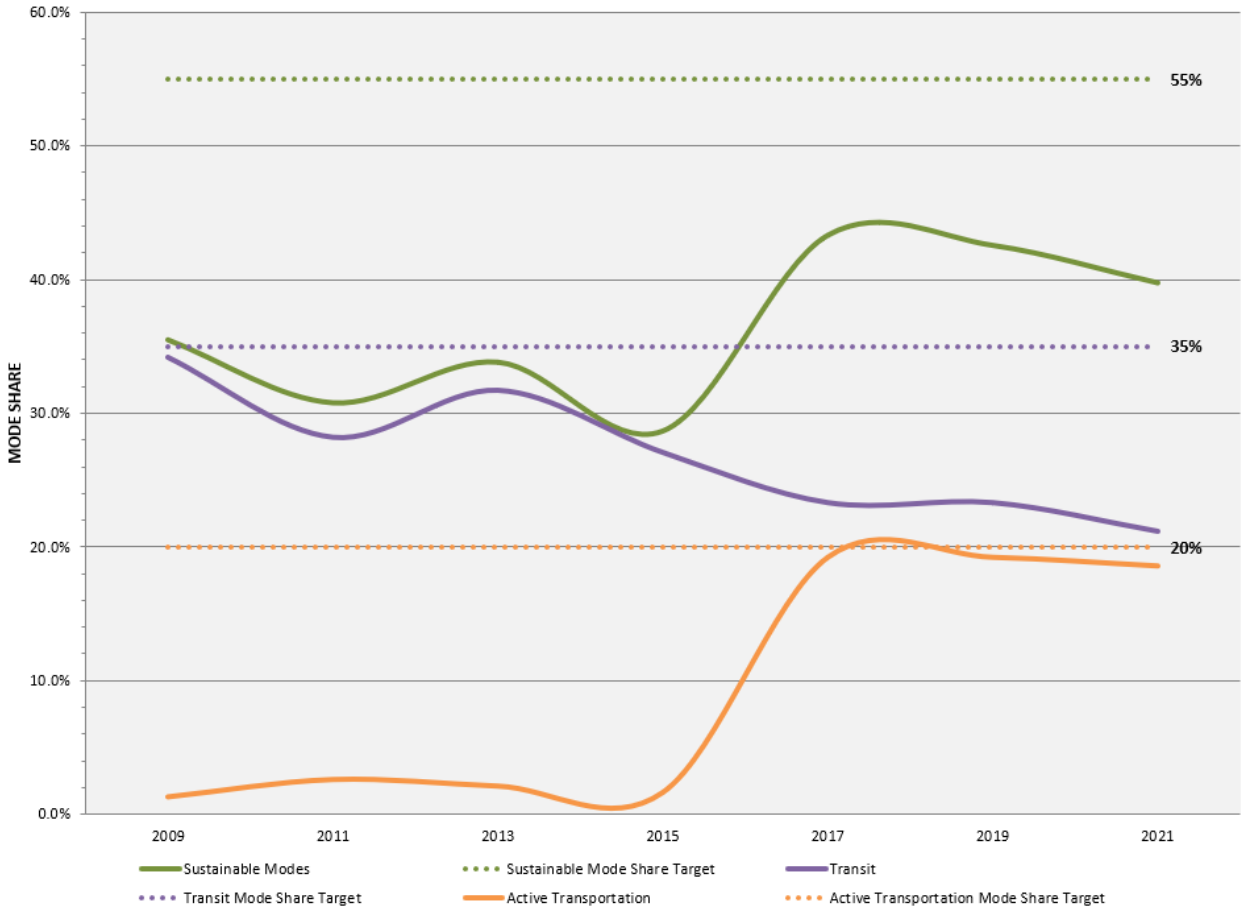

Figure A: 2021 Transportation Plan Mode Share Target Tracking

As shown, there is a lot of work to do to reach the transit and sustainable mode share targets set in the 2021 Transportation Plan. More effort will be made over the coming years to increase trips made by transit through transit pass discounts (for staff and faculty) as well as other incentives. For example, in October 2021, UBCO launched a 15% discount program for staff and faculty in partnership with BC Transit and their ProPASS program. UBCO plans to expand this program for 2022 to draw more staff and faculty onto transit to commute to / from campus.

The number of person trips by mode is shown in ***Figure B***, which captures the changes year to year.

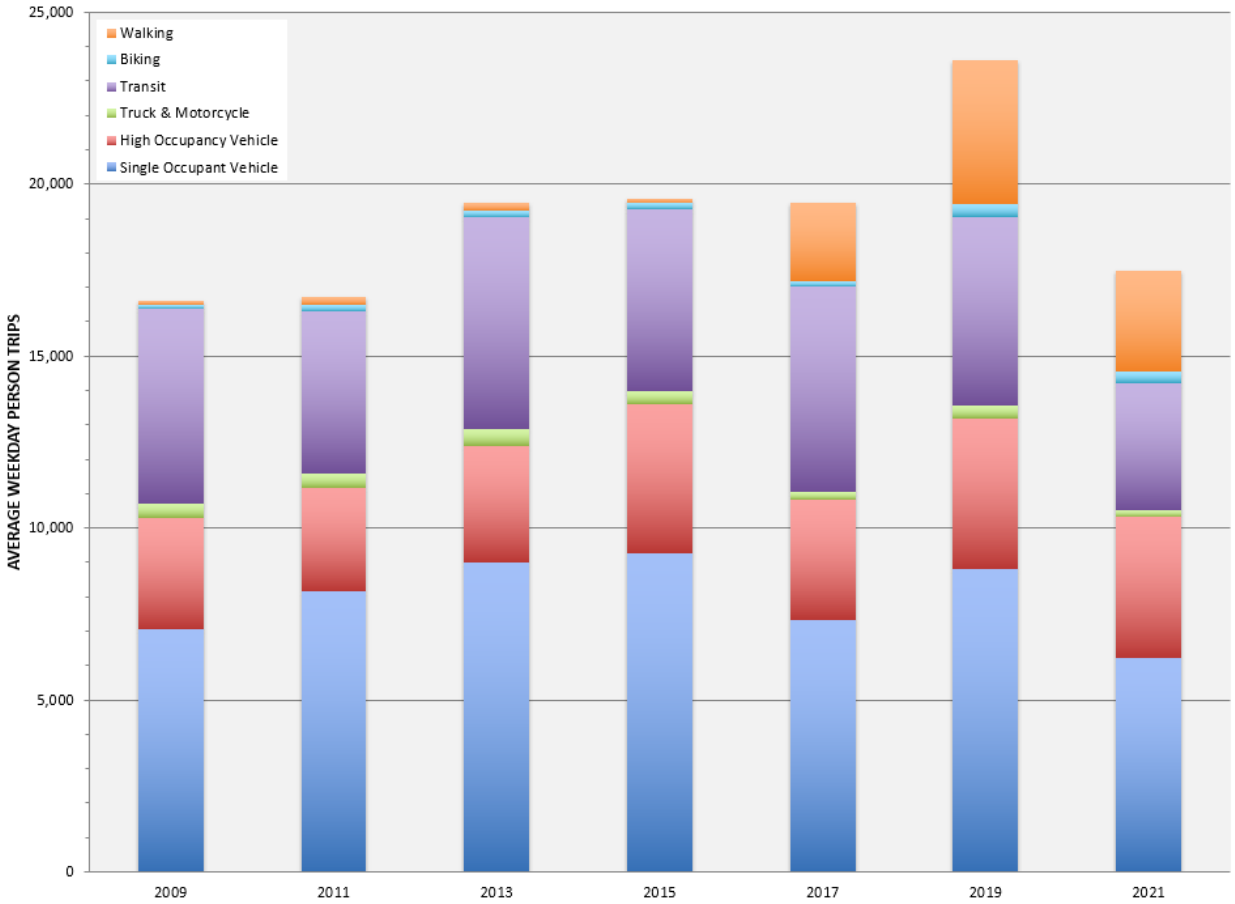

Figure B: Summary of Weekday Person Trips by Mode to / from UBC Okanagan, 2009 - 2021

As can be seen, Single Occupant Vehicle (SOV) trips continue to be the most common way the campus community commutes to and from campus, however walking, transit and High Occupancy Vehicle (HOV) trips are not far behind. The most notable difference between 2009 and 2021 is the increase in the walking mode share starting in 2017, as well as the decrease in the transit mode share. These changes correlate with the development of the nearby University South neighbourhood where now a number of students live and walk to campus, but who would have otherwise lived further from campus and likely used their U-Pass (universal bus pass) and taken transit to campus.

Another target is related to automobile trips to campus. As shown in ***Figure C***, automobile traffic to and from campus decreased in 2021 to 8,765 trips per day, which is the lowest number recorded since 2009. Although positive, this decrease in automobile trips is attributed to the hybrid remote work / learn environment at UBCO in 2021. With the exception of 2017, automobile trips were trending upwards, however, with the potential for ongoing support of a hybrid work environment at UBCO, this trend has the potential to reverse.

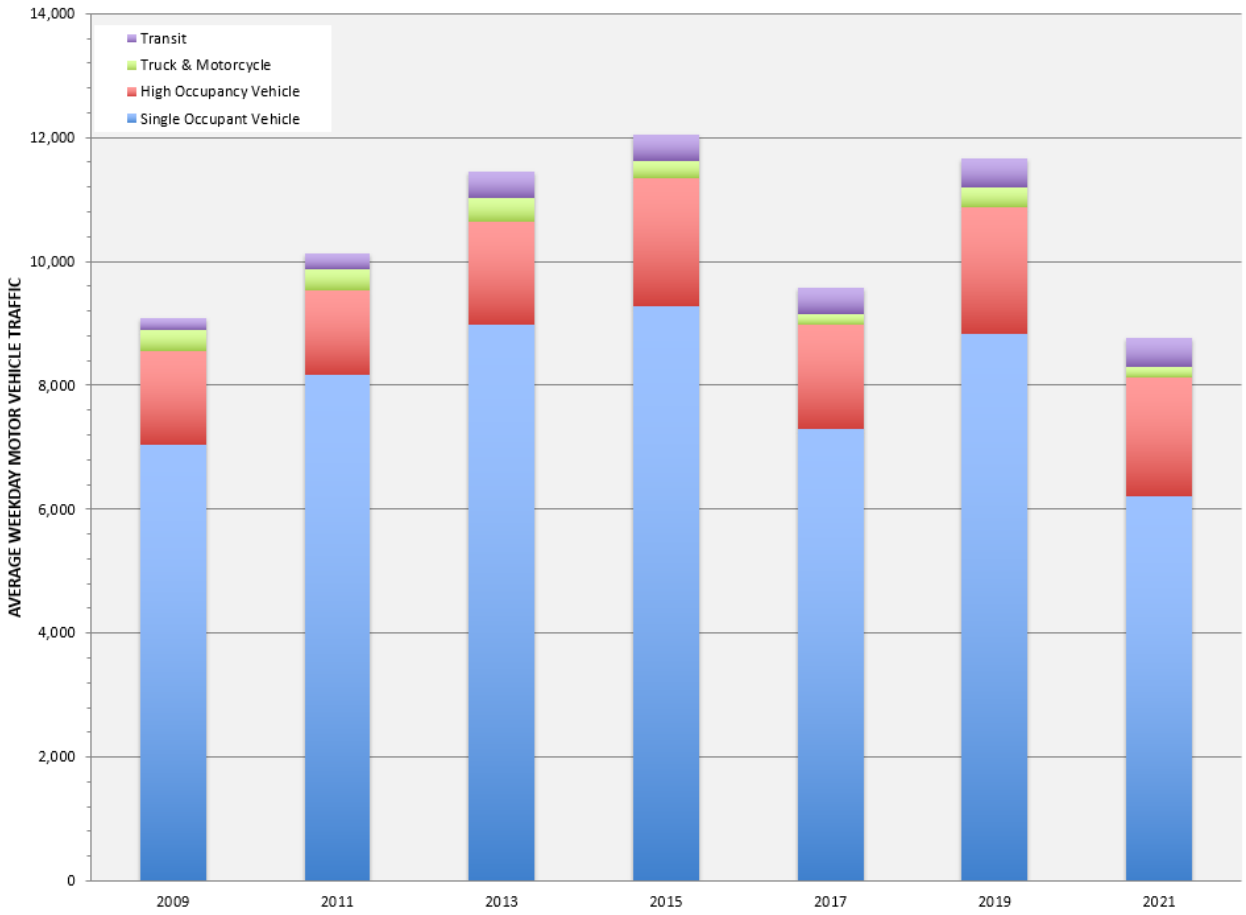

Figure C: Average Weekday Automobile Trips to / from UBC Okanagan, 2009-2021.

Contents

1 INTRODUCTION

Since 2009, UBC has collected data every two years in the fall to monitor travel patterns to and from the Okanagan Campus. This UBC Okanagan Transportation Status Report Fall 2021 provides a snapshot of overall travel trends, and details of travel patterns for each mode of transportation to and from UBCO as well as an overview of transportation trend lines since 2009. The monitoring program of the campus has changed with the growth of the campus and will continue to evolve as the campus continues to grow.

This 2021 data was collected during the COVID-19 pandemic when some classes were being provided online and some staff and faculty were working remotely. As a result, data is expected to be different from previous years.

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***, with the addition of the Innovation Precinct Structure Plan (IPSP), completed in 2018, that covers the northeast quadrant of campus.
- **UBC Strategic Plan: Shaping UBC's Next Century** sets out UBC's collective vision and purpose, as well as goals and strategies for the years ahead. The Plan builds on the university's previous strategic plan, Place and Promise, and focuses on three themes that are believed to be critical to society today: Inclusion, Collaboration and Innovation. Shaping UBC's Next Century will guide decisions, actions and interactions into the future, and will create a framework for resource allocation across the University.
- **Outlook 2040** is formed from the Strategic Plan. It provides a future view of the Okanagan campus and identifies the steps needed to move the university towards even greater impact and service to the people and communities of BC.
- **The UBC Okanagan Transportation Plan** was developed in 2021 to guide the planning, design and delivery of transportation services, programs and infrastructure for the Okanagan campus for decades to come. The Plan includes targets to ensure accountability, shape decision making, and inspire the community to act in ways to achieve UBC Okanagan's campus vision. The targets identified in the Plan include:

- **TARGET 1:** By 2040 at least 55% of all trips to and from campus will be by sustainable modes of transportation (walking, biking or transit).
- **TARGET 2:** By 2030 total annual GHG emissions associated with commuting will be reduced by 40% of 2013 levels.
- **TARGET 3:** By 2040, at least 35% of all trips to and from campus will be by transit.
- **TARGET 4:** By 2040, at least 20% of all trips to and from campus will be by active modes (biking and walking).
- **TARGET 5:** Through 2040, total daily automobile traffic to and from campus will not exceed 14,000 vehicle trips per day.
- **TARGET 6:** By 2040, at least 35% of all automobile trips to and from campus will be by carpooling, ride-sharing and vanpooling.

Figure 1.1: Illustrative Plan of UBC Okanagan Campus with Innovation Precinct Structure 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 in 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, but are not documented in this report.

The bi-annual monitoring results are used to monitor travel patterns on campus. With the completion of the UBCO Transportation Plan in 2021 it will now be used to assess progress towards meeting the targets identified in the Plan and also help guide future implementation priorities.

Data collection activities for 2021 are summarized in ***Table 1.1***, and data collection locations are illustrated in ***Figure 1.2***.

Table 1.1: 2021 Summary of Transportation Data Collection

Data Collection Activity	Locations	Description
Intersection Turning Movement Counts (TMC)	At intersections throughout campus	Manual observation for 8 hours (3hrs in AM, 2hrs in Midday, 3hrs in PM) for one day.
Campus Traffic / Speed Counts	Roads throughout campus.	Automatic tube counters on roads for 7 days (24 hours / day).
Screenline Automatic Traffic Recorder (ATR)	Screenlines	Automatic tube counters on roads for 7 days (24 hours / day).
Transit Ridership	Screenlines	Manual observation from 6:00AM to 4:30AM for one day.
Vehicle Occupancy & Classification	Screenlines	Manual observation for 8 hours (3hrs in AM, 2hrs in Midday, 3hrs in PM) for one day.
Bicycle and Pedestrian Counts	Screenlines	Manual observation for 15 hours (6AM to 9PM) over one day.

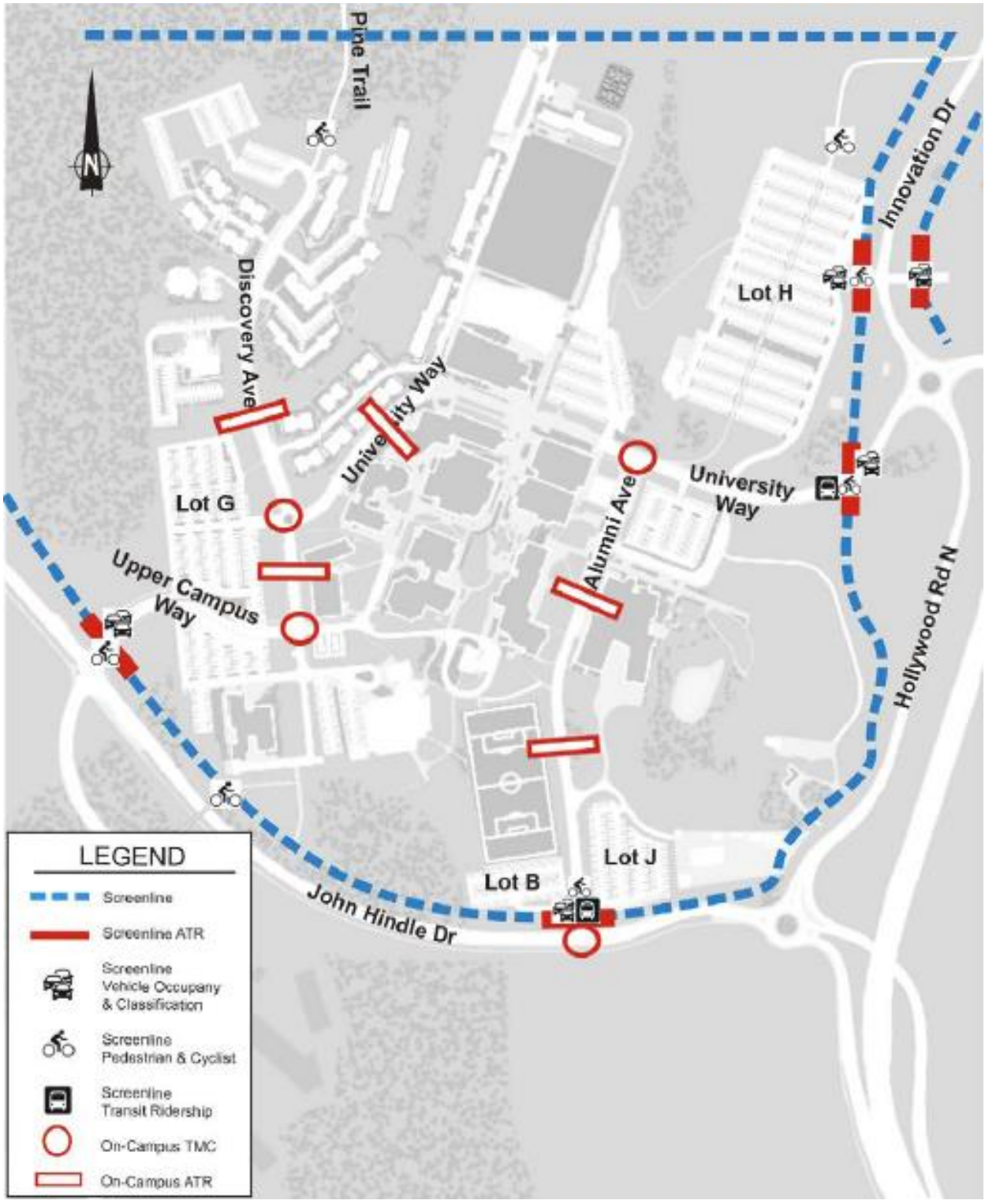

Figure 1.2: 2021 Data Collection Locations

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 UBC:

- 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***. As shown, there are approximately five different entry and exit options.
- **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), high occupancy vehicles (HOVs), transit, bicycles, 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 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 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 daytime population on campus. The average daytime population is calculated as the student enrolment plus the number of staff and faculty (FTE), 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** only (***Table 1.1*** indicates the time periods for each type of data collection activity). Traffic data on all routes leading to and from UBC are collected over a period of one week between the end of October and early November using automatic counters placed on the roadway. Vehicle occupancy and classification counts are done manually, and as a result are relatively expensive. These counts are undertaken for a total of 8 hours from the morning peak through the afternoon peak periods. Daily totals are estimated by combining occupancy and classification data with the average daily traffic data.

1.4 Changes at UBCO Affecting Travel Patterns

UBC is striving to reduce automobile trips to and from the UBC Okanagan Campus by encouraging the use of sustainable modes of transportation, including transit, carpooling, biking and walking. To date, UBCO has implemented several initiatives in support of non-automobile modes of transportation, including a student U-Pass program, a discounted staff and faculty transit pass program, bicycle infrastructure and end-of-trip facilities, and carpool parking. In addition, BC Transit has made ongoing efforts to improve transit service and increase transit capacity to UBCO. A summary of the key changes that have affected travel patterns among students, staff, faculty and community members are as follows:

- **Population.** The average daytime population at the UBC Okanagan campus has increased by approximately 83% since 2009. This includes increased student enrolment and associated increases in faculty and staff. For the purposes of monitoring trends in travel to and from UBCO, the daytime population comprised of students, staff and faculty is used to calculate person trips. ***Table 1.2*** summarizes population figures for fall 2009 and fall 2021, which are based on full time equivalent (FTE) counts.

  It is important to note that the estimate of the average daytime campus population is challenging. It is dependent on the means by which the data is collected and grouped and is impacted by the increasing trend in online courses and remote work and expanding residential campus community. However, efforts are made to allow for consistent cross comparison in the transportation status reports.

Table 1.2: Average Daytime Population at UBC Okanagan

Group	Fall 2009	Fall 2021	Increase (count / percentage)	
Students	5,670	10,230	+4,560	+80%
Staff & Faculty	720	1,470	+750	+104%
Totals	**6,400**	**11,700**	**+5,310**	**+83%**

Source: UBC Planning and Institutional Research Department

- **Student U-Pass for transit.** One of the most significant programs affecting travel patterns at UBCO has been the student U-Pass. The U-Pass is a universal transportation pass that is mandatory for students at a nominal monthly cost. The U-Pass offers students unlimited access to BC Transit.
- **Increased transit service.** BC Transit and the City of Kelowna have been increasing the level of transit service provided to UBCO and continues to make service improvements annually. A new Transit Exchange was built on the UBC Okanagan campus in 2015, which improved the transit experience for the UBCO community. Also, UBCO staff continuously work with City of Kelowna staff to try to align bus schedules with class times.
- **Staff and Faculty transit pass discount.** In 2021, UBCO partnered with BC Transit to offer a discounted transit pass to staff and faculty through their ProPASS program. All staff and faculty have the ability to purchase transit passes at a 15% discount. This is a new program, which will take time to grow, but already UBCO is planning to expand the program in 2022 to offer larger discounts.

- **Parking supply and costs.** UBCO has been increasing the price of parking on campus to keep up with local pricing and to manage demand. Additionally, as a result of the growth in Electric Vehicle (EV) ownership, UBCO has been adding EV charging stations in the parking lots across campus and will continue to add more as demand increases and capacity permits.
- **Bicycle facilities.** Over the last five years, there have been substantial improvements to the City of Kelowna's cycling network, including connections to the UBCO campus. The most notable are the rail to trail conversion and connection via the Bulman Road underpass (under Hwy 97), the Multi Use Pathway (MUP) along John Hindle Drive, and a new pedestrian and cyclist overpass connecting to the University South neighbourhood. All local roads on campus function as either shared roadways that accommodate bicycles or have dedicated bike lanes. Bicycle racks are provided at every building on campus, in addition to secure bike lockers and some end-of-trip facilities.

2 Summary of Transportation at UBCO

This section presents a general summary of transportation to and from UBCO including person trips, trips per person and mode share. Details for each different mode of transportation are presented in ***Section 3***.

For the 2021 monitoring program, the following changes around the university influenced travel patterns:

- This is the second year of data collection since substantial changes in transportation infrastructure to campus, including the new John Hindle Drive extension and Upper Campus Way. As a result, for this collection period these shifted travel patterns are now established.
- A new pedestrian pathway was built connecting H Lot north to the Innovation Precinct. This pathway was included in the screenline count to track walking and biking trips.
- The nearby University South development has continued to grow, bringing a lot more of the campus community within walking and biking distance of the campus.

2.1 Person Trips

The average weekday person trips to and from UBCO in fall 2021 was 17,475, which is 26% less than the number of weekday trips in 2019. This is attributed to the ongoing impacts of COVID-19 and the hybrid of in person and online working and learning environment on campus. A summary and comparison of daily person trips by mode 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	Fall 2019	Fall 2021	Change 2021-2009 (count / %)	
Single Occupant Vehicle (SOV)	7,040	8,820	6,205	-835	-12%
High Occupancy Vehicle (HOV)	3,260	4,365	4,125	865	27%
Truck and Motorcycle	400	370	200	-200	-50%
Transit	5,680	5,495	3,695	-1,985	-35%
Biking	100	380	315	215	215%
Walking	120	4,160	2,935	2,815	2,346%
Totals	**16,600**	**23,590**	**17,475**	**875**	**5%**

In 2021, there was a reduction in total trips for each mode as well as total trips overall when compared to 2019. It is encouraging to see that the number of bicycle trips were only 65 trips less than 2019 counts suggesting that when campus returns to normal operations we may see a bigger increase in bicycle trips.

It is expected to see some variability in trips by mode year over year. Once there are more years of data to analyze, a 3-year rolling average will be more indicative of travel trends. The data collected in 2021 will nonetheless be very unique.

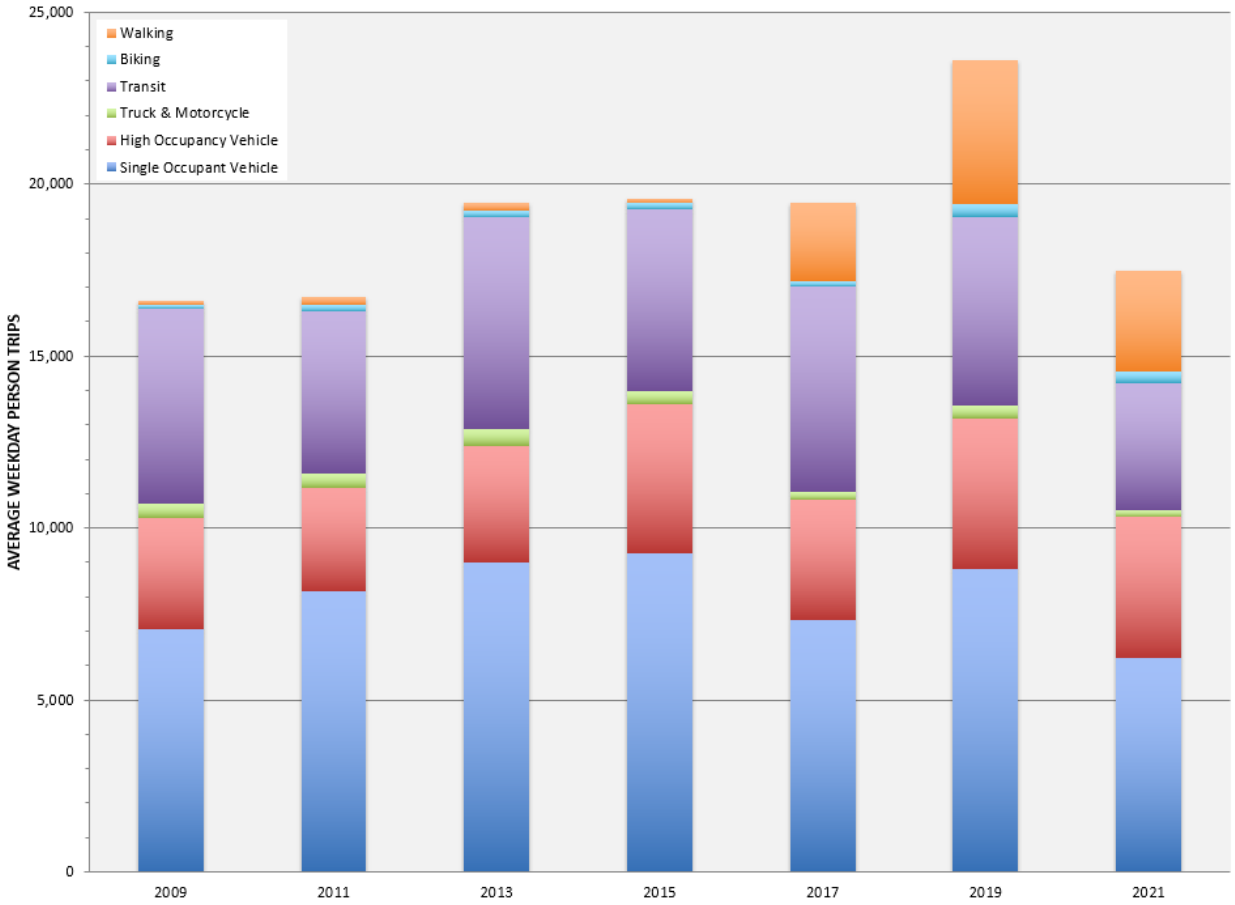

Figure 2.1: Weekday Person Trips to / from UBCO, 2009 – 2021

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 for each mode is divided by the average weekday campus population. The average weekday campus population values include FTE's of all full and part time students, staff and faculty. In 2021 a new methodology was used by UBC's Planning and Institutional Research Office (PAIR) to better estimate of the average weekday population on campus. As a result, there may be some larger differences to past years, but with COVID-19 impacting the 2021 data collection this change is unlikely to be noticed.

The campus population and trips per person to and from UBCO are presented in ***Table 2.2***.

Table 2.2: Weekday Trips Per Person to / from UBC Okangan

Travel Mode Classification	Trips Per Person			
	Fall 2009	Fall 2019	Fall 2021	% Change 2021-2009
Single Occupant Vehicle	1.10	0.78	0.53	-52%
High Occupant Vehicle	0.51	0.39	0.35	-31%
Truck & Motorcycle	0.06	0.03	0.02	-73%
Transit	0.89	0.49	0.32	-64%
Biking	0.02	0.03	0.03	+72%
Walking	0.02	0.37	0.25	+1,238%
Totals	**2.59**	**2.09**	**1.49**	**-42%**
CAMPUS POPULATION	***6,400***	***11,290***	***11,700***	***+83%***

The trips per person in 2021 are substantially different from recent years as a result of a limited number of people travelling to / from campus for work or school. A majority of trips in 2021 were made by personal vehicles (SOV and HOV), followed by transit.

2.2 Mode Share Summary

The mode share comparison for 2009 and 2021 are shown in ***Figure 2.2*** and the tracking of the Transportation Plan mode share targets is presented in ***Figure 2.3.*** The most notable difference between 2009 and 2021 is the large walking mode share in 2021 along with the decreased transit mode share. With more people walking, there are less trips by transit. This is as a result of the high number of students moving into the nearby University South neighbourhood, who would otherwise have lived further from campus and likely have used their U-Pass and taken transit to campus.

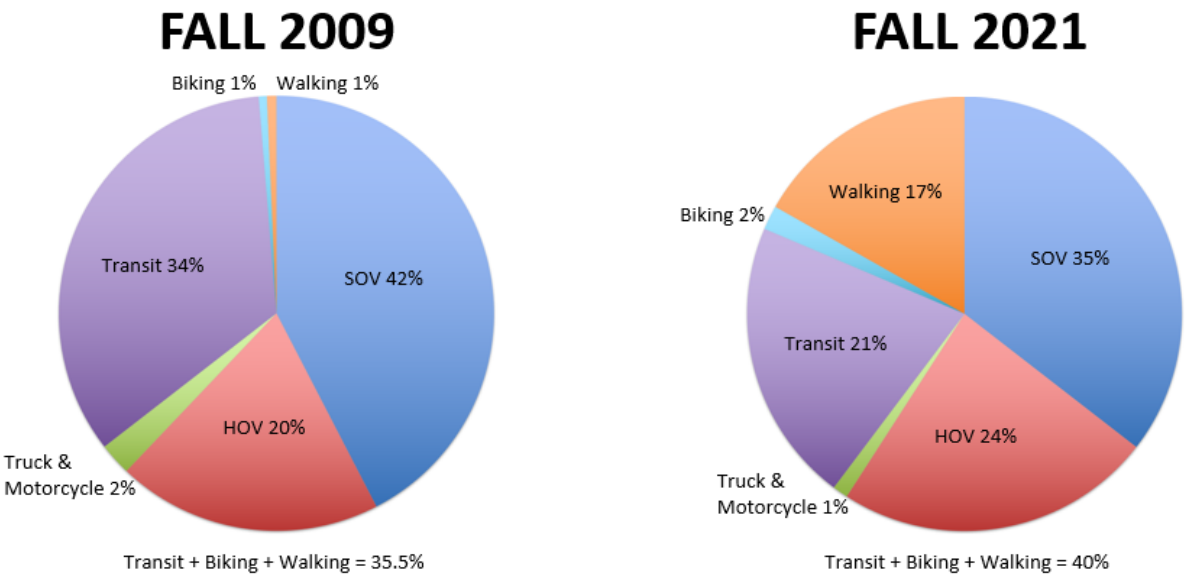

Figure 2.2: Average Weekday Mode Share To / From UBC, 2009 vs. 2021

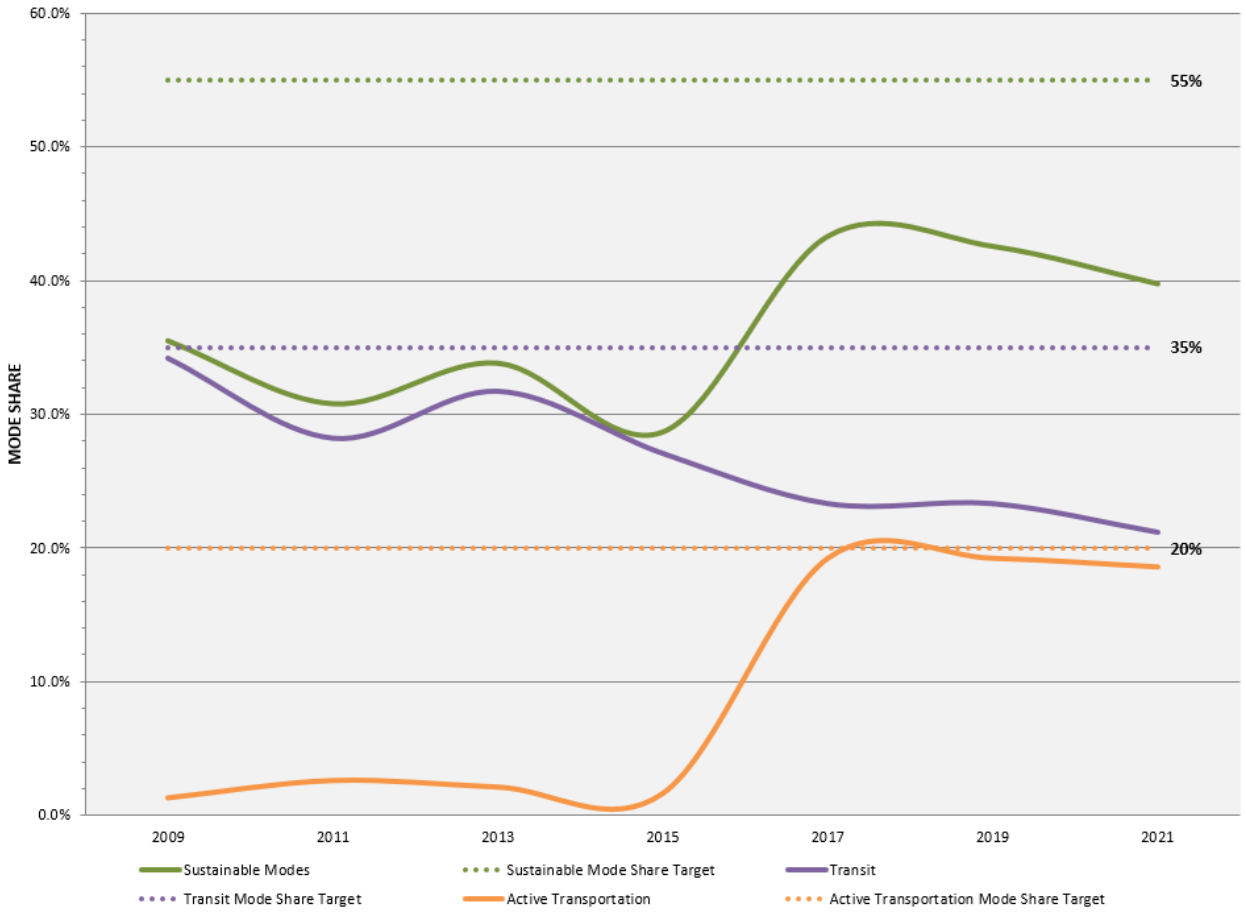

Figure A: 2021 Transportation Plan Mode Share Target Tracking

UBCO Transportation Plan Targets

TARGET 1: By 2040 at least 55% of all trips to and from campus will be by sustainable modes of transportation (walking, biking or transit).

× In 2021 40% of all trips were made by transit, walking and biking.

TARGET 3: By 2040, at least 35% of all trips to and from campus will be by transit.

× In 2021, 21% of all trips to and from campus were made by transit.

TARGET 4: By 2040, at least 20% of all trips to and from campus will be by active modes (biking and walking).

The hourly distribution of weekday person trips throughout the day in 2021 is shown in ***Figure 2.4***, which follows the expected pattern with a peak of trips to campus in the morning and a peak of trips from campus in the afternoon. It is interesting to note the sharper peak in the morning and the rounder peak in the afternoon. This is likely attributed to a common start time in the morning and a more spread out end of day time for all staff, faculty and students. UBCO will continue to monitor the distribution of trips throughout the day. It is most desirable to have more rounded peaks to reduce the strain on the transportation network.

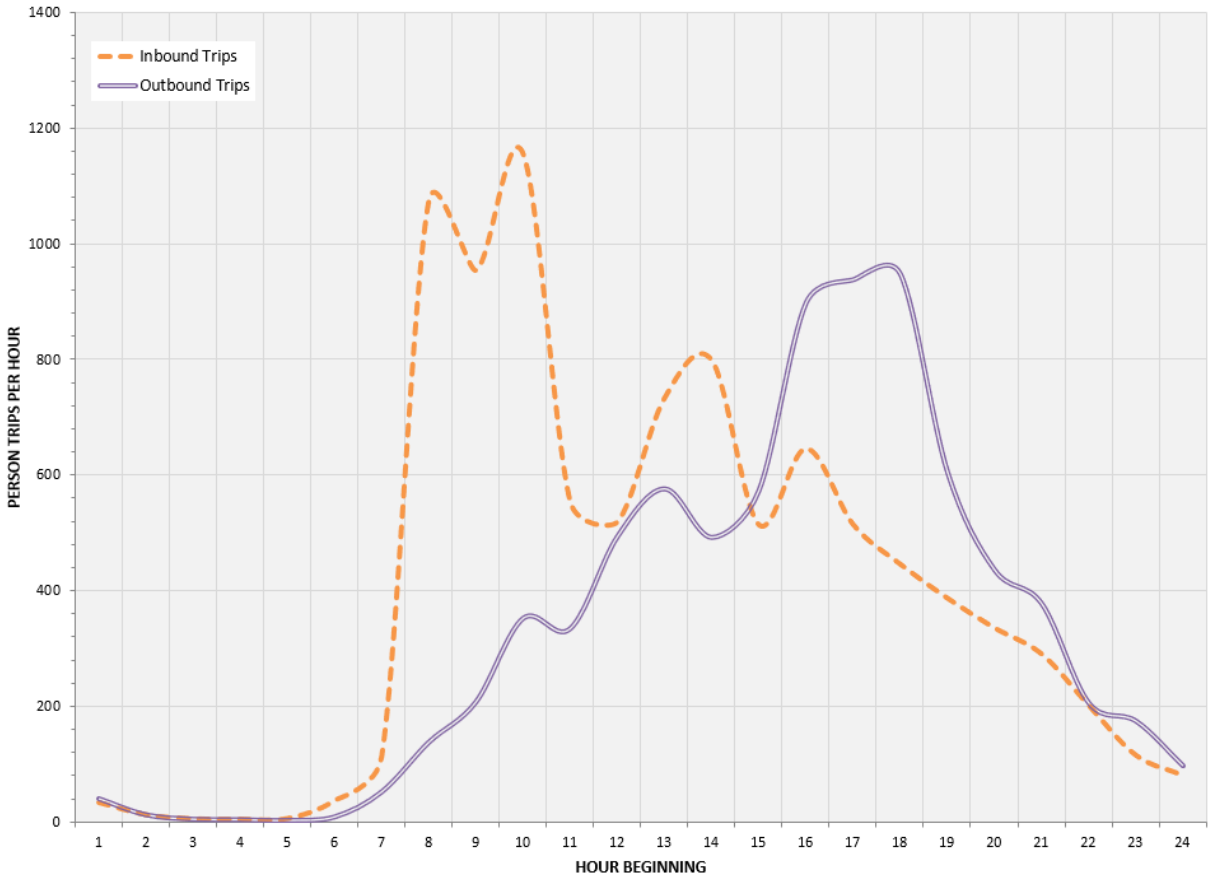

Figure 2.4: 2021 Hourly Distribution of Average Weekday Person Trips to / from UBCO

3 Transportation 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 for each mode of travel. Information regarding transportation conditions on campus is presented in ***Section 4***.

3.1 Transit

Transit usage has been declining on campus, particularly since the development of the University South neighbourhood. As a result, it appears that UBCO community members, mostly students, now living in the University South neighbourhood walk to campus instead of taking transit. This is captured in the trips by transit summary provided in ***Table 3.1***.

Table 3.1: Summary of Average Weekday Transit Trips to / from UBCO

Route	Fall 2009	Fall 2017	Fall 2019	Fall 2021	2021 Split
4 Pandosy (Hwy 97)	-	100	362	258	7%
6 Glenmore	30	238	528	354	10%
8 Pandosy (Rutland)	1,290	2,291	1,394	1,064	29%
13 Quail Ridge	-	228	275	56	2%
23 Lake Country	660	565	748	492	13%
90 Vernon	140	262	208	138	4%
97 Express	3,60	2,292	1,744	1,334	36%
Totals (Rounded)	**5,680**	**5,975**	**5,260**	**3,695**	100%

In 2021, transit trips were much lower than in 2019, which can be attributed to less activity on campus. With the completion of the Transportation Plan in 2021, more effort will be made over the coming years to increase trips made by transit through transit pass discounts (for staff and faculty) as well as other incentives. In October 2021, UBCO launched a 15% discount program for staff and faculty in partnership with the City of Kelowna and their ProPASS program.

Comparing the routes to campus, the route 97 Express carries the most passengers to / from campus with 36% of all transit trips followed closely by route 8 Pandosy at 29%. During the development of the Transportation Plan, the community raised the need for increased transit service north of the campus such as to Quail Ridge and Lake Country. This need is supported by the growth in ridership on route 23 Lake Country, which now carries 13% of all transit trips.

The daily distribution of transit trips to and from UBCO in 2021 is shown in ***Figure 3.1***. The morning peak in inbound transit trips occurs between 8am and 10am followed by another surge in inbound trips around noon. The afternoon peak in outbound transit trips occurs between 3pm and 6pm resulting in a more distributed demand for transit. A distributed peak in demand is important because sharp peaks in transit demand translate to overcrowding and poor service / experience for transit riders, which tends to push

passengers to less sustainable alternatives. UBCO staff will be monitoring this closely and work on strategies to spread the arrival times to campus more evenly.

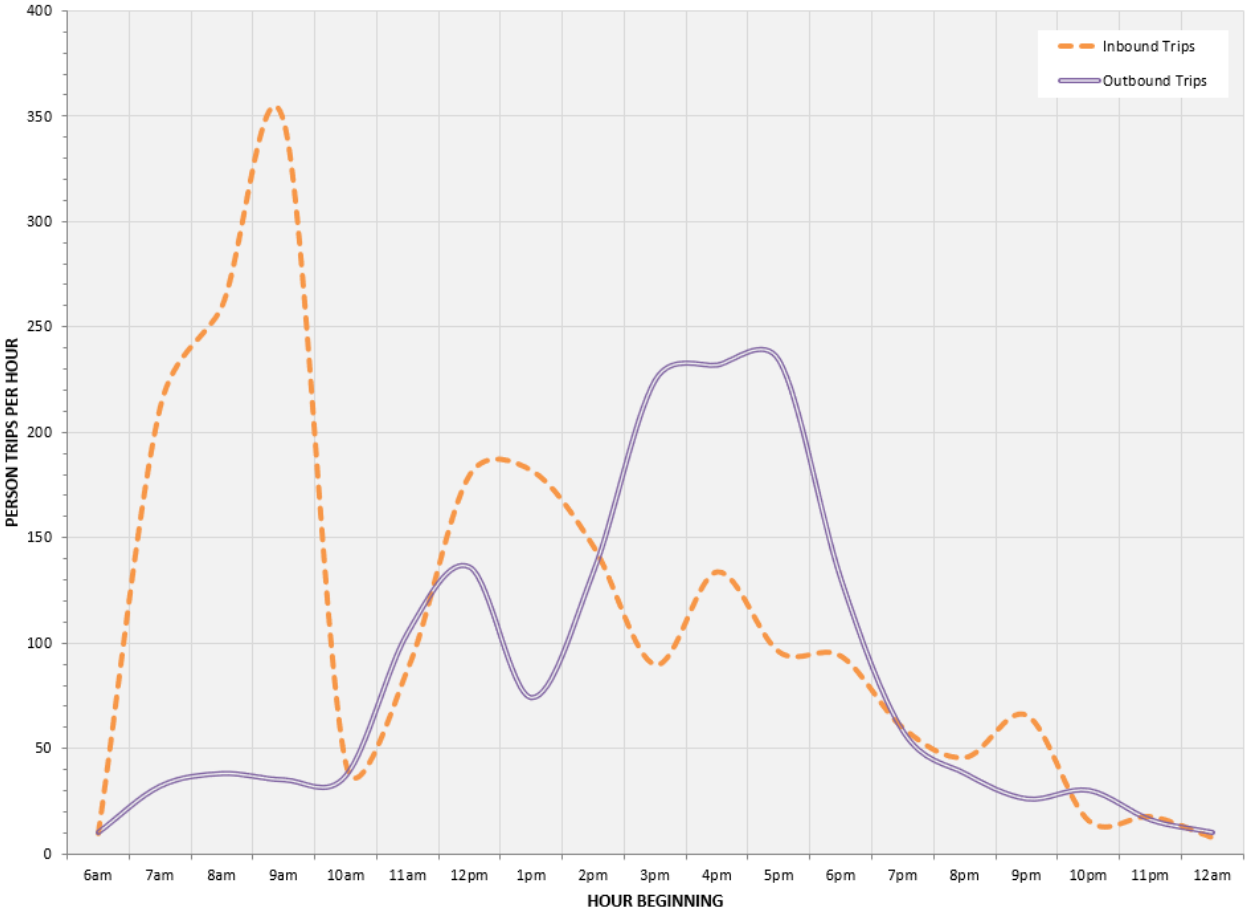

Figure 3.1: 2021 Distribution of Average Weekday Transit Trips to / from UBCO

3.2 Biking and Walking

Table 3.5 and ***Figure 3.4*** provide summaries of the trend in biking and walking trips from the last few years. Bicycles and pedestrians were counted at seven access points in 2021. A new screenline was added in 2021 as a result of a new pathway connecting H Lot north to the Innovation Precinct.

Table 3.5: Summary of Average Weekday Bicycle and Pedestrian Trips to / from UBCO at Screenlines

Screenline	Bicycles			Pedestrians		
	2017	2019	2021	2017	2019	2021
University Way	10	26	15	23	444	31
Alumni Avenue	133	190	138	2,028	144	75
West Campus / Upper Campus	-	102	69	0	163	57
H Lot	13	-	16	244	-	19
JHD Overpass	-	29	31	-	3,213	2,496
Pine Trail	-	33	28	-	195	187
Path North of Lot H*	-	-	19	-	-	71
Totals	**155**	**380**	**315**	**2,295**	**4,160**	**2,935**

**New for 2021*

Key observations regarding bicycle and pedestrian trips include:

- The number of trips by bicycle were slightly less in 2021 compared to 2019. However, an increase in the number of bicycle trips is anticipated in future years as a result of the ongoing expansion and improvement in City of Kelowna's bicycle network, particularly connecting to the UBCO campus.
- Pedestrian activity decreased from 2019, but there were still nearly 3,000 pedestrian trips per day.
- Bike trips to and from campus are distributed mostly between Alumni Avenue for trips arriving from the south / east and Upper Campus Way for trips arriving from the west.
- UBC launched a pilot project at the beginning of 2022 to bring bike share to the Okanagan campus. This will likely remain in place for the 2023 monitoring period, which hopefully will have a positive impact on more trips to and from campus by bike.

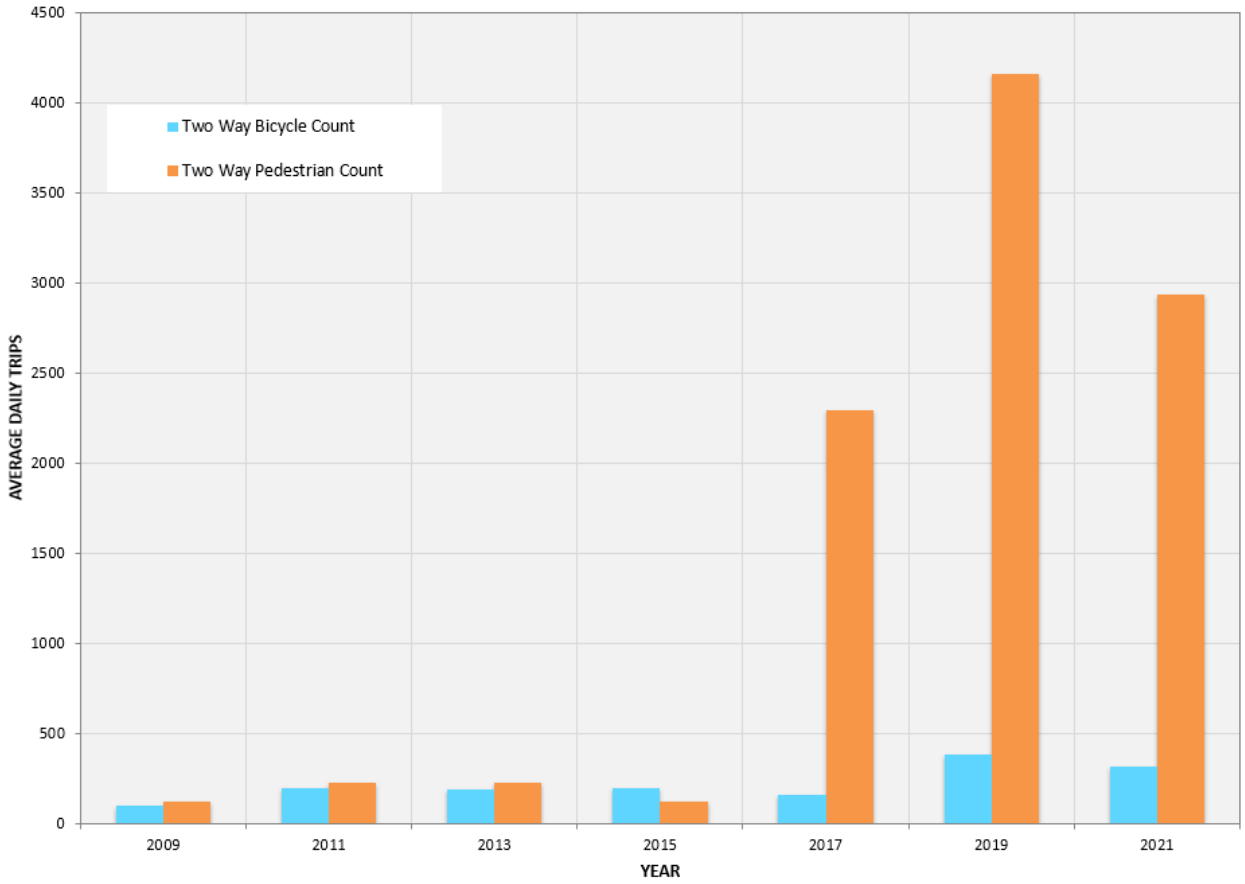

Figure 3.4: Summary of Average Weekday Bicycle Trips to / from UBCO

Most buses operating on transit routes serving the UBC Okanagan campus are equipped with bicycle racks, each of which has space for two bicycles. UBC tracks the demand for bike racks on buses to identify trends and to identify capacity issues to share with BC Transit and the City of Kelowna. Below is a summary of the usage of racks over the past three monitoring periods:

- In 2021, total of 30 bicycles were on buses at a 3% usage rate.
- In 2019, total of 55 bicycles were on buses at a 7% usage rate.
- In 2017, total of 48 bicycles were on buses at a 6% usage rate.

Overall, there tends to be very low demand to take bikes on buses to or from the UBCO campus.

3.3 Automobile Traffic

UBC is committed to reducing the amount of automobile traffic travelling to and from UBCO each day. Automobile traffic includes single occupancy vehicles (SOV's), high occupancy vehicles (HOV's), motorcycles, trucks, and transit buses. A summary of average weekday automobile traffic to and from the UBCO campus is provided in ***Table 3.2*** and ***Figure 3.2***.

Table 3.2: Average Weekday Automobile Trips to / from UBCO

Travel Mode Classification	Fall 2009	Fall 2019	Fall 2021	Split 2021
Single Occupant Vehicle (SOV)	7,040	8,820	6,203	71%
High Occupancy Vehicle (HOV)	1,520	2,065	1,932	22%
Motorcycles & Trucks	325	309	165	2%
Transit Buses	210	470	465	5%
Totals	**9,095**	**11,664**	**8,765**	100%

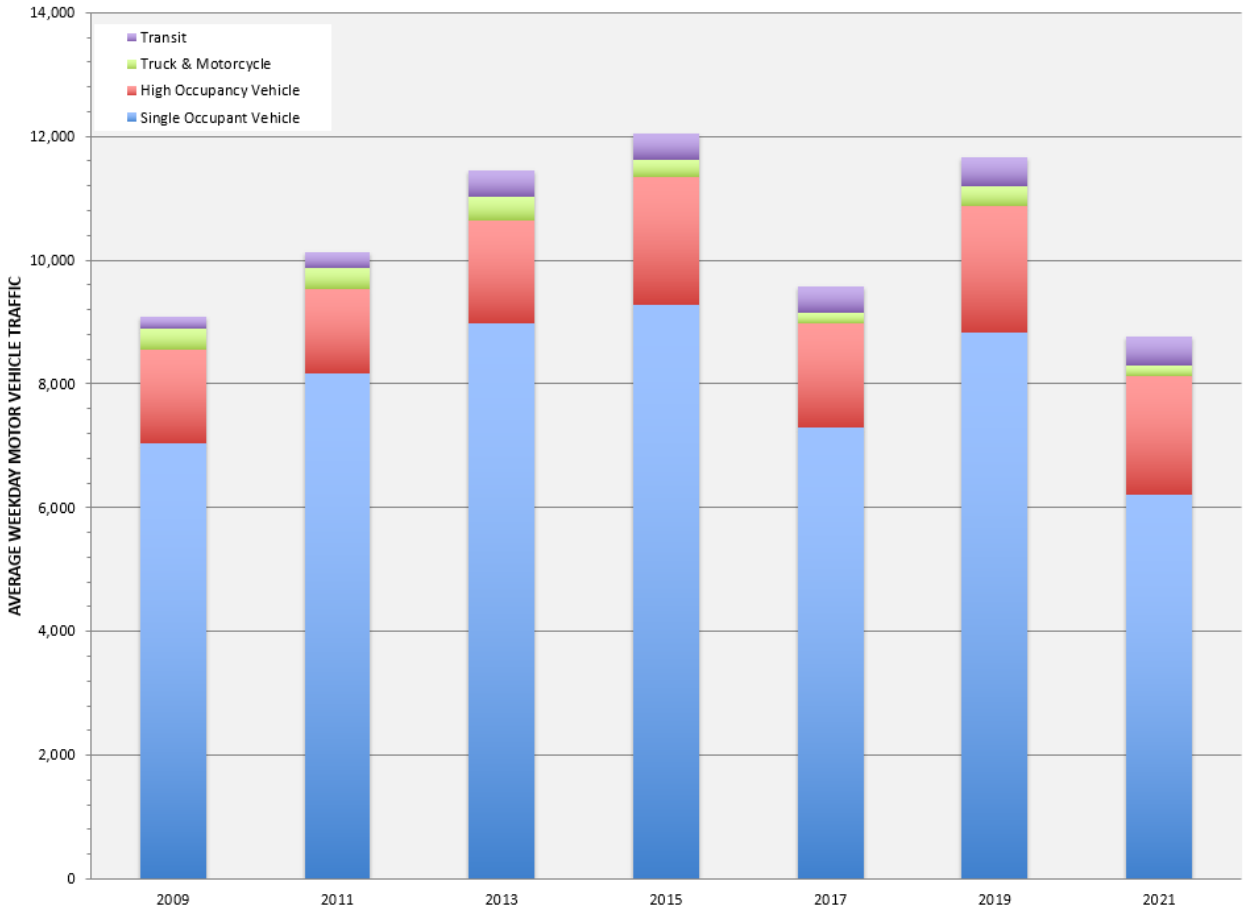

Figure 3.2: Daily automobile trips to / from UBCO

As shown, automobile traffic to and from campus decreased in 2021 to 8,765 trips per day, which is the lowest recorded since 2009. With the exception of 2017, automobile trips were trending upwards, however, with the potential for ongoing support of a hybrid work environment with some remote work at UBCO, there is potential for this trend to reverse.

To get an understanding of when automobile trips are occurring throughout the day, the number of automobile vehicle trips per hour for SOV's and HOV's inbound and outbound from campus are presented in ***Figure. 3.3.***

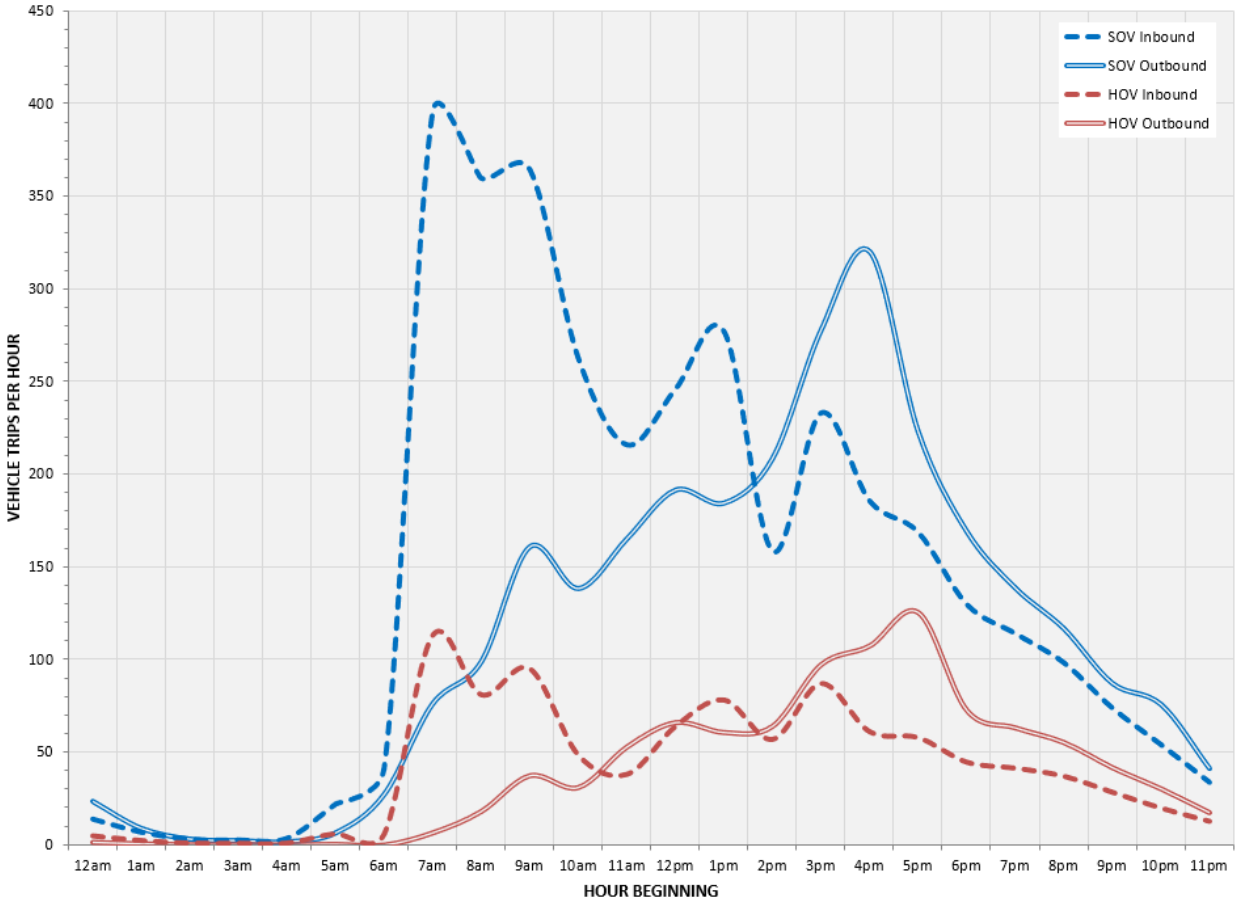

Figure 3.3: 2021 Distribution of SOV and HOV Vehicle Traffic to / from UBC

The distribution of SOV trips is a little different than what was observed for transit trips in ***Figure 3.1.*** Unlike the distribution of transit trips, there is a sharper peak of SOV and HOV trips outbound from campus in the afternoon. This sharp afternoon peak in SOV trips between 4pm and 5pm is likely tied to the popular end of workday at 4pm for staff. Sharp peaks like this put a lot of strain on the transportation network on campus and in the region, and causes delays to all automobile modes.

Table 3.3 summarizes the daily traffic volumes at each screenline location. As shown, Upper Campus Way carries the greatest number of vehicle trips per day followed by University Way. This is a bit surprising since Upper Campus Way does not provide access to quite as many parking spaces, but it does allow for good access to the core of the campus on the uphill side, so it may be more heavily used by people getting dropped-off and picked-up.

Table 3.3: 2021 Summary of Average Weekday Traffic Volumes at Screenlines

Screenline	Average Weekday Traffic Volume 2021	
	Count	Split
Lot H Access	1,250	14.3%
Alumni Avenue	1,675	19.1%
University Way	2,194	25.0%
Upper Campus Way	3,646	41.6%
Totals	**8,765**	**100.0%**

Vehicle occupancy allows UBC to understand travel patterns of the community. Vehicle occupancy is a measure of the number of people travelling per vehicle. The average daily vehicle occupancies are presented in ***Table 3.4***, which interestingly increased slightly in 2021.

Table 3.4: Average Daily Vehicle Occupancy to / from UBC Okanagan

Travel Mode Classification	Fall 2009	Fall 2017	Fall 2019	Fall 2021
Vehicles (SOV's + HOV's)	1.20	1.20	1.15	1.22
HOV's (Carpools / Vanpools)	2.15	2.11	2.12	2.13

UBCO is planning to create programs and incentives to increase the number of HOV trips made to and from campus since carpooling has the potential to reduce the number of vehicles arriving to campus to park and to reduce greenhouse gas emissions associated with commuting.

Transportation Plan Targets

TARGET 5: Through 2040, total daily automobile traffic to and from campus will not exceed 14,000 vehicle trips per day.

✓ In 2021 there were 8,765 vehicle trips per day to and from campus.

TARGET 6: By 2040, at least 35% of all automobile trips to and from campus will be by carpooling, ride-sharing and vanpooling (HOV's).

4 Traffic Conditions At UBC

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

4.1 Traffic Speeds

Traffic speeds were recorded at a number of locations on campus over one week using pneumatic tubes. The locations of the counts are identified in ***Figure 1.1***.

The 85th percentile speed is typically used for the purposes of representing travel speeds and is the speed below which 85% of the traffic travels. The average 85th percentile speed data over the last few monitoring periods is summarized in ***Table 4.1***. Data highlighted in red represents locations where current year collected speed data is more than 5km/h above the posted speed limit of 30km/h.

Table 4.1: Average 85th Percentile Traffic Speeds (km/h) on Campus

Location (Speed Limit km/h)	Eastbound / Northbound				Westbound / Southbound			
	Fall 2015	Fall 2017	Fall 2019	Fall 2021	Fall 2015	Fall 2017	Fall 2019	Fall 2021
University Way – west of Innovation (30km/h)	50	34	48	49	50	31	48	50
University Way – East of Discovery Avenue (30km/h)	23	34	39	35	29	37	34	40
Discovery Avenue – North of University Way (30km/h)	36	40	36	36	39	45	32	32
Discovery Avenue – North of Upper Campus Way (30km/h)	35	32		37	38	31	37	37
Knowledge Lane (30km/h)	28	26	-	-	28	24	-	-
Alumni Avenue – South of University Way (30km/h)	44	41	36	32	45	43.5	39	35
Alumni Avenue – North of J Lot Access (30km/h)	52	42	49	43	54	43	52	42
Upper Campus Way (30km/h)	-	-	43	39	-	-	41	42

Most speeds decreased or remained the same on campus in 2021 compared to 2019. Other key observations regarding traffic speeds on campus include:

- Speeds on Alumni Avenue north of J lot have been problematic in the past with people speeding. A new crosswalk with traffic calming measures were installed in 2021, which seems to have helped reduce speeds along this segment of Alumni Avenue.
- Speeds on Alumni Avenue south of University Way also have decreased compared to 2019.

4.2 Traffic Volumes

Peak hour traffic volumes collected over one day at key intersections on campus are illustrated in ***Figures 4.1*** and ***4.2***. The turning volumes are not intended to represent average daily traffic volumes or conditions, but are intended to provide a general overview of traffic demands on campus during the AM and PM peak hours.

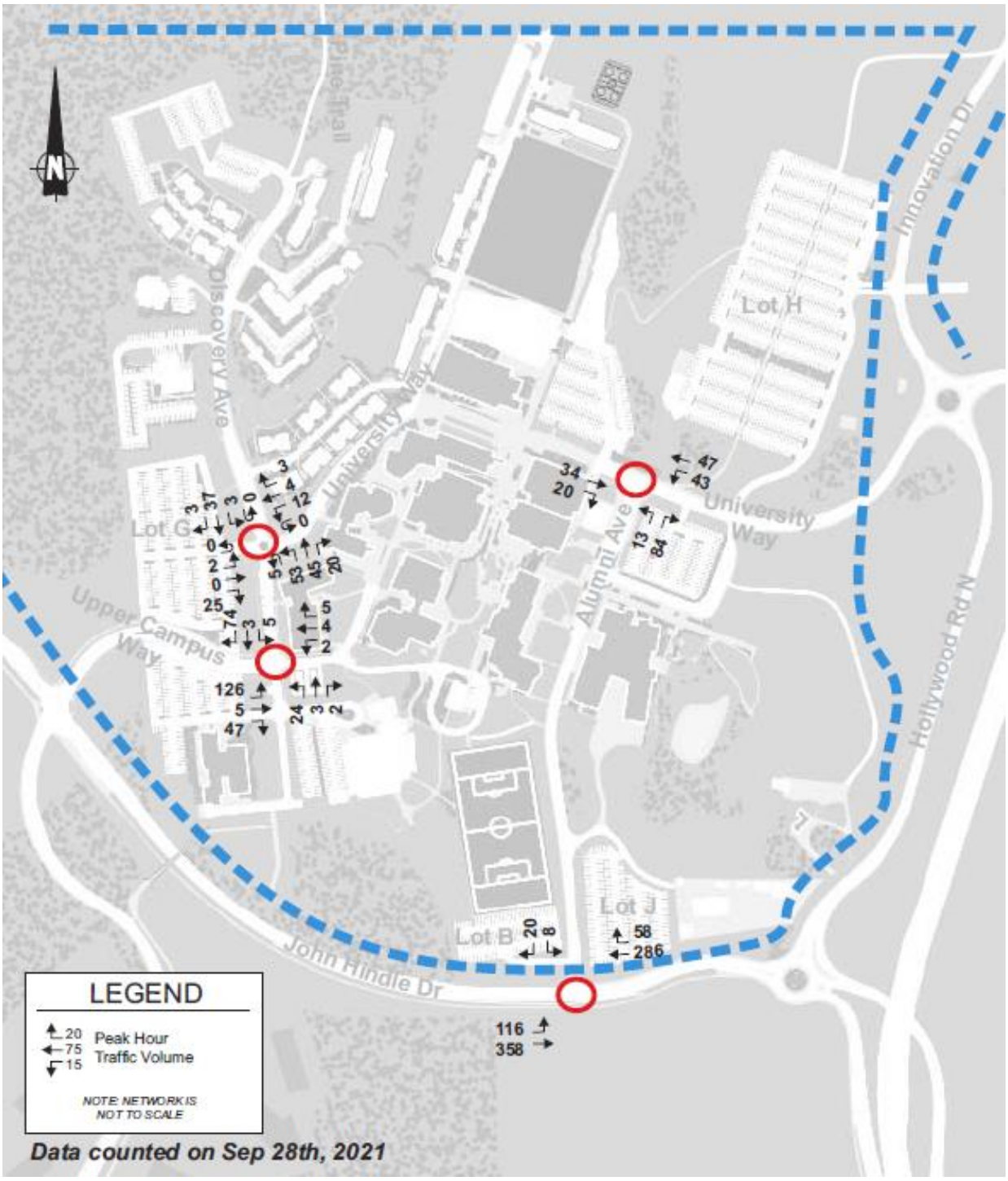

Figure 4.1: 2021 Morning Peak Hour Traffic Volumes at UBCO

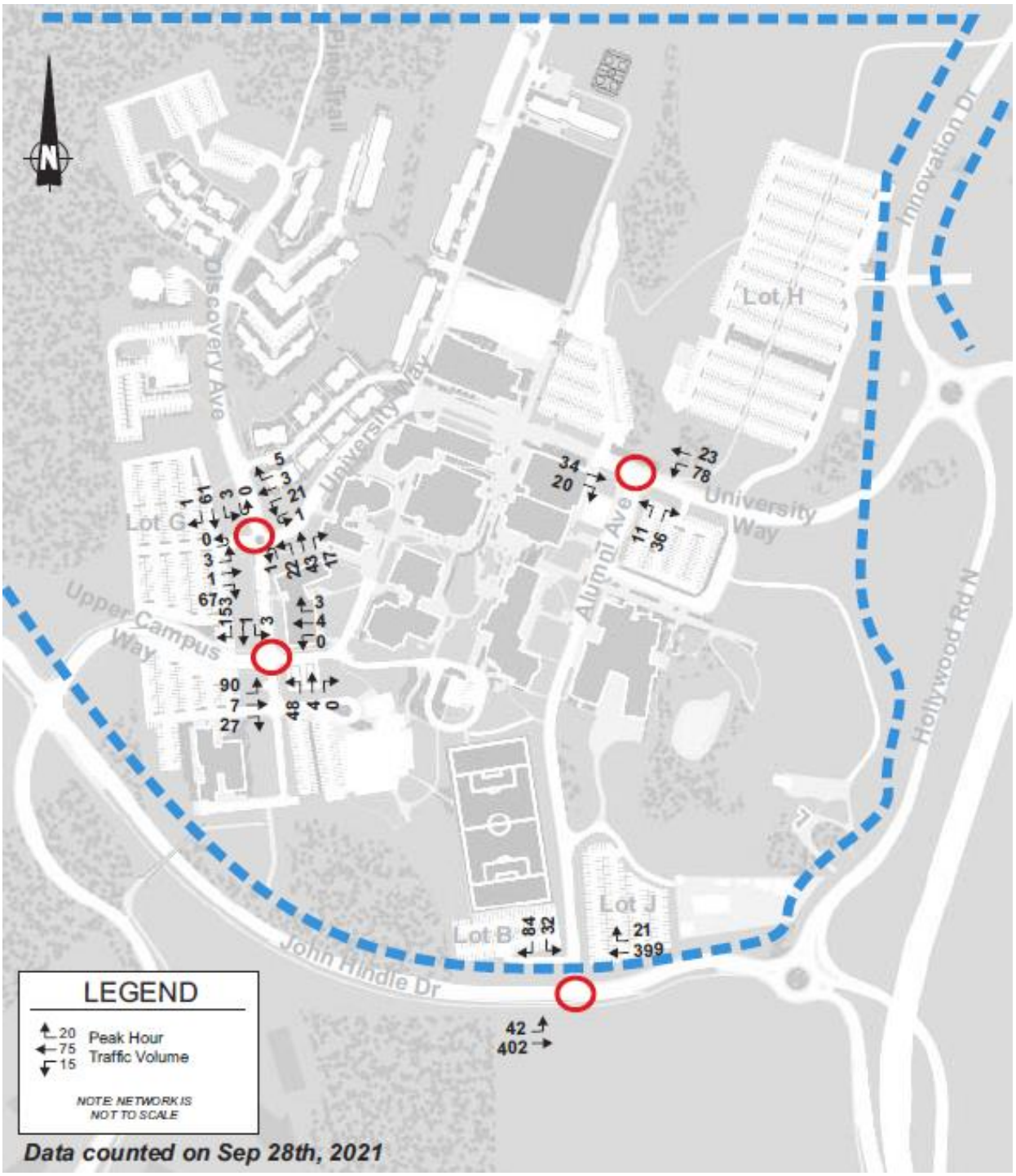

Figure 4.2: 2021 Afternoon / Evening Peak Hour Traffic Volumes at UBCO

This concludes the results of the 2021 Transportation Status Report.