

# Moving More with Less: An Integrated Transportation Demand Management Approach at the University of British Columbia

Carole Jolly<sup>1</sup>

<sup>1</sup> University of British Columbia, BC, Canada

## 1 Introduction

The University of British Columbia (UBC) is one of Canada's largest academic institutions and is home to over 44,000 full and part time students, 10,000 staff and faculty, and 3,500 market residents (residents that have purchased or rent a home at market value, and may not be affiliated with the University as a staff, faculty or student member). Currently there are over 12,000 residents living on campus (including students, staff, faculty, and market residents) and by 2021, it is estimated that the residential population will grow to over 18,000 people. The main UBC Vancouver campus is part of the Greater Vancouver Regional



District (GVRD) and is situated within Electoral Area A. Located approximately 12 km from downtown Vancouver and situated on the Point Grey peninsula, UBC spans over 402-hectares and includes an academic core; eight residential neighbourhoods; reserve land space for future institutional development, and commercial development throughout. The campus is surrounded by 763 hectares of protected parkland, limiting the ability of campus development to sprawl beyond its current borders.

Figure 1: UBC Boundary (UBC Aerial Photo, 1992)

Its geographic isolation away from the downtown core of Vancouver coupled with an average growth rate of 2% per year alongside an aggressive neighbourhood development plan has encouraged opportunities for UBC to take a proactive approach in developing strategies to pursue sustainable transportation targets aimed at reducing single occupancy vehicle traffic, while increasing transit ridership and other alternative mode choices.



Figure 2: Vancouver and UBC area map (UBC, 2007)

To this end, in partnership with the Greater Vancouver Regional District, an Official Community Plan was developed in 1997, with the intent to help guide all future campus growth and development in accordance with the GVRD's Livable Region Strategic Plan (LRSP). The LRSP is the GVRD's regional growth strategy aimed at maintaining regional livability and protection of environment in the face of anticipated growth (GVRD, 1999). All levels of government use the LRSP, including Electoral Area A, as the framework for making regional land use and transportation decisions.

## **1.1 UBC's Official Community Plan & Memorandum of Understanding**

The Official Community Plan (OCP) recognizes the regional objectives of the Livable Region Strategic Plan and provides a policy framework for housing and other non-institutional development on the campus by setting objectives for land use and transportation. In 1997, the University experienced over 106,000 person trips in and out of the campus each day (Urban Systems, 2006) and today remains the second largest destination in the Lower Mainland next to the downtown core (UBC Campus and Community Planning, 1994). The OCP recognized the potential impact of traffic growth and congestion as it relates to both adjacent communities and land use, and in response included specific targets to promote sustainable transportation options within the OCP.

### **1.1.1 OCP transportation objectives and demand management targets**

The Official Community Plan (Campus and Community Planning, 1992) includes an access plan, complementary to land use, to meet regional and community goals, as outlined in the following objectives:

- Ecology: Decision making will be transit supportive, pedestrian friendly, and bicycle receptive to minimize pollution. Linkages to regional corridors will be coordinated. A strong program of transportation demand management will be followed.
- Economy: UBC will be the destination of better, more effective transit service. Policies will be more auto-restrained. Transit will be supported by locating higher density development in proximity to transit service. Opportunity will be provided for people to study and work at home.
- Community: Transit systems will be planned in conjunction with land use to provide access throughout both the campus and the residential areas. The on-campus circulation system will be hierarchical and recognize the multiple uses but will favour pedestrian, bicycles, and transit. Principles of traffic calming will be applied.
- Accessing UBC: Management of access to the campus through inter-jurisdictional dialogue and cooperation, increased transit service to UBC from elsewhere in the Region, and UBC's support to reduce peak demands on transit through class schedule changes that promote a spread of peak arrival times.

Specific to Transportation Demand Management (TDM), the following targets have been set:

- UBC will continue to develop, communicate, and pursue a TDM plan that will include increasing parking costs and measures to reduce single occupant vehicle travel from 1996 levels by 20%, continuing to reduce the amount of commuter parking, and adopting policies that favour higher occupancy vehicles.
- UBC will promote, through education, pricing and other systems, the use of alternatives other than the single occupant vehicle.
- UBC will need to advance opportunities for 'telecommuting' where possible.
- UBC will need to develop truck travel, dispersal routes and hours of operation in cooperation with the City of Vancouver.
- UBC will need to investigate and pursue a 'U Pass' program as part of Transportation Demand Management.

The Official Community Plan establishes UBC's commitment to pursue sustainable transportation options while reducing single occupancy vehicle dependency and overall traffic growth to and from UBC, ultimately setting the framework for UBC's comprehensive transportation demand management strategy, which is delivered through the TREK Program Centre. This paper will provide an overview of the TREK Program, including its Strategic Transportation Plan and specific sustainable transportation targets. This paper will discuss TREK's success to date in reducing travel to and from its Vancouver Campus, including a review of the programs it has employed to achieve such success and the effectiveness of the comprehensive transportation demand management strategy. Strengths, weaknesses, opportunities, and constraints that have been realized in UBC's pursuit of its sustainable transportation targets will also be discussed, followed by a summary of next steps in continuing to move more with less.

## **2 UBC Strategic Transportation Plan (STP)**

The Strategic Transportation Plan (TREK Program Centre, 1999) recommends a comprehensive and integrated TDM strategy in support of UBC's sustainability commitments and in order to fulfil UBC transportation-related commitments under the UBC Official Community Plan. The STP was created as a 5-year planning document with specific TDM targets as follows:

- To reduce 24-hour single occupant vehicle (SOV) traffic volumes to and from UBC by 20% below 1997 levels by 2002;
- To increase 24-hour ridership on public transit to UBC by 20% above 1997 levels by 2002;
- To be the lead agency in creating a U-Pass system in collaboration with the Regional Transportation Authority and the City of Vancouver;
- To develop and implement, as a top priority, a comprehensive and integrated transportation demand management strategy (known as the STP);
- To reduce the impact of heavy truck traffic to and from campus, by improving coordination of goods and services vehicle movements; and
- To implement an accessible, safe, environmentally friendly, and cost-effective campus shuttle system.

The STP was developed over a two-year consultation period from 1997-1999, at which time UBC's Board of Governors adopted it. In its development, over 35 different on and off campus stakeholder groups were invited to provide input to identify issues, assess options, make recommendations and partner in its implementation. The end result is an STP that includes 55 policy recommendations to address issues related to single occupancy trip reduction, parking, transit, U-Pass, bikes, pedestrians, wheelers, carpooling, shuttles, education and promotion, traffic calming, housing, land use, and truck traffic management.

Many of the TDM targets of the 1999 STP have since been met and in 2005, an updated STP was developed and adopted by UBC. The 2005 STP has been established as a 5-year planning document, at which time, it will be updated again to account for what has been accomplished and what changes have occurred on campus during this period. Building on the 1999 STP, the 2005 STP (Campus and Community Planning, 2005) includes the following revised TDM targets:

- To reduce 24-hour single occupant vehicle (SOV) traffic volumes to and from UBC by 30% per person below 1997 levels; and
- To maintain overall vehicle volumes at or below 1997 levels.

## **3 UBC TREK Program Centre**

The TREK Program Centre, an acronym for **T**rip Reduction, **R**esearch, **E**ducation, and **K**nowledge was established in 1999. As the University's Transportation Demand

Management Program, TREK's primary role is to improve transportation options for members of the UBC community via the development of a wide range of sustainable transportation options in support of the University's sustainability commitments and the Official Community Plan. Included in TREK's portfolio are the following TDM initiatives:

- Outreach and education;
- Cycling;
- Carpooling and car sharing;
- Campus Shuttles;
- Emergency Ride Home;
- Transit discount; and
- U-Pass

The TREK Program Centre is located within the portfolio of Land and Building Services, which is the primary steward for all UBC facilities and infrastructure.

### **3.1 Outreach and education**

TREK participates in a wide range of education and outreach initiatives within the campus environment to help raise the profile of the TDM portfolio. The most successful and wide-used tool that TREK relies on for dissemination of its information is its website ([www.trek.ubc.ca](http://www.trek.ubc.ca)), where all program information and research projects are posted. In addition, TREK attends whenever possible all new staff, faculty, and student orientation sessions to provide information on transportation choices and encourage members of the UBC community to commute using a sustainable mode. As opportunities arise, TREK also organizes and/or participates in transportation festivals that help further raise the profile of the TREK office.

### **3.2 Cycling**

While the climate of Vancouver lends itself to a very rainy and wet winter season, cycling remains a mode choice for some all year-round. TREK has developed a wide range of cycling initiatives in an effort to encourage more people to cycle to, from, and around the UBC campus. End of trip facilities are a large part of TREK's cycling portfolio with an annual capital budget of approximately \$100,000 CDN devoted to cycling-related infrastructure including bike racks, secure bike cages, bike lockers, and roadway improvements (lane striping, stencilling, road widening). TREK's capital budget is typically supplemented with provincial funding through grant opportunities and capital cost sharing programs. This has enabled TREK to more aggressively pursue and enhance its end of trip facility program. In addition, TREK also financially contributes to the bike co-op and bike kitchen, a student run cooperative organization that fixes and sells bikes, runs bike repair workshops, and helps advance cycling as a viable commute option. The financial contribution from TREK varies from year to year from \$5,000 to \$10,000 CDN.

### **3.3 Carpooling and car sharing**

While carpooling has declined over the past several years (likely due to improved transit service), TREK continues to provide free online ride matching services through two different service providers. No studies have been done to measure the success of these services in developing carpool matches, however section 5 of this paper will highlight trends in carpooling mode share. TREK has also recently developed a car share program to capitalize on fleet vehicles that are not frequently used, while providing an incentive for staff and faculty to leave their personal vehicles at home. This program works by allowing departments that own departmental vehicles to register their vehicles into an online fleet booking system. Staff and faculty across campus that may need use of a vehicle throughout the day for UBC-related business can then book departmental vehicles, in exchange for a booking fee based on km driven and gas usage. Not only does this eliminate the need for

staff and faculty to bring their vehicle to campus (in the event they need use of a vehicle throughout the day), but also provides a cost-recovery mechanism for vehicle-owning departments to help offset the cost of owning and maintaining a departmental vehicle. This program is expected to launch fall 2007.

### **3.4 Campus shuttles**

The campus receives approximately 10,000 annual shuttle service hours from the Regional Transportation Authority, TransLink. There are 2 mini buses, each with a passenger capacity of 24 persons and 2 wheelchairs. The service operates on a fixed-route around the periphery of the campus core every 30 minutes. Prior to this, shuttle service was operated through the TREK Program Centre and UBC Parking and Access Control using two 13-passenger natural gas vans and operating on demand. The current shuttle service operates solely around campus, and is intended to provide mobility to people with mobility impairments, access to campus destinations for visitors, and access to student and market housing for campus residents. Although the university spans over 402 hectares, the majority of trips made within the campus core are by walking and cycling, with minimal shuttle and vehicular use. The interior campus road network has not been designed with vehicle use in mind, where the main road network is closed to vehicular traffic.

### **3.5 Emergency Ride Home (ERH)**

The Emergency Ride Home (ERH) program is available to all staff, students, and faculty who may need to get home or to a hospital quickly in the event of a personal or family illness, but do not have access to a personal vehicle. The ERH program is available to any UBC member who uses an alternative mode of transportation to commute on average 3 times a week (based on honour system) and works by providing a 90% reimbursement off the cost of a taxi ride upon submittal of a receipt. While it is a useful TDM tool, it is not widely used and operates on a budget of less than \$3000 CDN per year.

### **3.6 Transit discount program for staff**

The Employer Pass Program (EPP) is a transit discount program available to any UBC staff or faculty member. It provides a discount of approximately 15% off the cost of a monthly transit pass where participating members pay through automatic UBC payroll deduction. Participants must sign onto the program for at least 12 months. The EPP is a partnership program with the Regional Transportation Authority, TransLink, whom fund the 15% discount. UBC's role is to administer and promote the program to staff and faculty members. To date, there are approximately 600 EPP participants out of a total of 10,000 staff and faculty.

### **3.7 TREK Program Centre funding**

The TREK Program Centre receives the majority of its operational funds from UBC Parking and Access Control, which is a separate department from the TREK Program Centre. The remaining operational funds come from a General Municipal Services Levy (GMSL), which is paid by all ancillary departments and is equivalent to the municipal portion of the total property taxes paid for the property owned on campus. Efforts are continually made to use program funding for leveraging other funding through provincial and federal grant and funding partnership programs. Operational funds are used to pay for all office expenses, staff wages and benefits, program development and the continued maintenance of TREK's TDM portfolio, including the U-Pass program (which will be discussed in the section below). Capital funding is used to pay for all capital projects, including, but not limited to end of trip

facilities for cyclists, funding for the bike co-op program, and minor road infrastructure improvements for cyclists.

In advance of the beginning of each fiscal year in April, an annual budget is prepared outlining all operational and capital expenses for the upcoming year. This budget is submitted to UBC's Board of Governors, the highest-level decision making body at UBC for approval and once approved, guides the program's expenditures for the fiscal year. The process for developing the budget is referred to as zero-based budgeting, which requires the budget to start at a zero base, and all expenses thereafter must be justified and required to ensure the ongoing success of the TREK Program Centre. Given the zero-based budgeting model, there is little flexibility to pursue other initiatives outside of what has been pre-approved as the annual budget by the Board of Governors. This ensures that all prescribed program initiatives and objectives can be met on an annual basis, without the threat of a deficit at the year-end and/or lack of funding for an initiative mid-year.

### **3.8 Universal transit pass (U-Pass)**

The U-Pass Program is one of TREK's most successful TDM initiatives to date. This section provides an overview of U-Pass, its funding structure, and some highlights of the program.

#### **3.8.1 U-Pass overview**

The U-Pass was implemented in September 2003 under a partnership agreement with the University of British Columbia, the UBC Alma Mater student union Society (AMS), and the Regional Transportation Authority (TransLink). Designed as an integrated comprehensive transportation package, the U-Pass provides students with universal, accessible, and affordable access to all of TransLink's regional public transit services, including the SeaBus, SkyTrain, and buses. The U-Pass aims to promote student access to all non-SOV (single occupancy vehicle) travel modes to, from, and on-campus by increasing transportation options and providing pass holders with the following benefits:

- Unlimited access to TransLink Bus, SkyTrain, and SeaBus services (all zones)
- Discounted West Coast Express fares (commuter train)
- Increased service and capacity on UBC bus routes (including restoration of late night service)
- Discounts at participating merchants
- Continued access to all of TREK's other TDM initiatives.

The U-Pass is mandatory for all members of the Alma Mater Society (the majority of all full and part time graduate and undergraduate students) and the U-Pass fee is assessed at the beginning of each 4-month semester that the student is enrolled in, as part of tuition fees. There are limited opportunities for students to opt out. Of the 44,000 full and part time students on campus in 2006, close to 40,000 were assessed a U-Pass fee. Students who opted out include those students on exchange, students with a disability, students taking distance education courses only, students coming to campus on average one day a week or less throughout the semester, and students who hold another valid transit pass.

#### **3.8.2 U-Pass implementation**

The U-Pass was first implemented in September 2003 at a cost to students of \$20 per month for every month they are enrolled in full or part time courses. The U-Pass fee is assessed as part of student tuition fees, and as a result is deemed a student fee increase. All fee increases that are not required as part of university administration must be approved via a student referendum that can only pass with a minimum of 10% quorum in addition to a simple majority approval. To this end, in February 2003, a student referendum was held to ask students whether or not they were in support of a \$20 per month fee increase for the implementation of U-Pass. The referendum was met with unprecedented success with a



69% approval rating based on 39% of students who voted. Following the referendum, TransLink, the University of British Columbia, and the Alma Mater Society negotiated a legal agreement to outline the terms, conditions, and expectations of the U-Pass program and its partners. The legal agreement was signed in September 2003 and expired in April 2005 at which time, the U-Pass price increased, at the discretion of TransLink, by \$2 CDN.

Given that such a fee increase would result in an increase to student fees, another referendum was required to continue the U-Pass program at a higher price of \$22 per month. This referendum was held in February 2005, where two questions were asked of students. Firstly, do they support the continuation of U-Pass at the higher price, and secondly do they support the expansion of U-Pass to the summer semester that runs from May-August (should students be enrolled in this semester, which typically receives approximately half of the winter semester enrolment rates that run from September-April). This referendum received a 92% approval rating with over 50% of student votes, validating the support among students for U-Pass. A renewed agreement was also negotiated among the U-Pass partners, which is set to expire August 2008, and at which time another price increase will likely occur.

### 3.8.3 U-Pass funding

While the U-Pass program is part of TREK's TDM portfolio, it has a unique funding model. In establishing the price for U-Pass, TransLink maintained a position of revenue neutrality whereby they ensured the U-Pass price would not result in a gain (or loss) of revenue from 'pre U-Pass' revenue levels based on student ridership. Any increases in revenue through U-Pass as a result of student enrolment are equivalent to increases in revenue, which would have occurred without a U-Pass program. In establishing a revenue neutral price point, TransLink undertook market research to measure pre U-Pass ridership from students at UBC. From this data, TransLink established an annual revenue figure, which was then divided by the total student population to determine a revenue neutral U-Pass price. TransLink proposed this to be \$28 CDN per month per student and after several years of negotiations, UBC, the AMS, and TransLink agreed to a revenue neutral price point of \$23 CDN per student per month. However, the AMS would not support this price, claiming it to be too high to garner student support. The University then committed to subsidize the cost of the U-Pass by \$3 CDN per student per month, bringing the cost to students down to \$20 CDN per month. With the \$2 CDN price increase in 2005, the new U-Pass cost is \$25 per student per month, however the University continues to provide the \$3 CDN per student per month subsidy, bringing the cost to students down to \$22 CDN per month.

Although the U-Pass program is based on principles of revenue neutrality, it is not cost-neutral, as all program partners have invested funds in program delivery and implementation. Based on an 18-month U-Pass report (Urban Systems, 2005), TransLink has incurred an additional service cost of \$4.6 million CDN per year as a result of increased transit service to both UBC and another university campus within the region that implemented U-Pass at the same time as UBC. Prior to its implementation, TransLink and UBC anticipated a transit ridership increase of approximately 30%. Transit ridership actually rose by 53% in its first year at UBC, far surpassing estimates, thereby requiring TransLink to increase its service hours more than initially anticipated. To help offset the increased cost of providing additional service and also help fund advertising campaigns, Translink received a \$1million CDN exclusive sponsorship from a local bank cooperative (VanCity) over a three year period. In exchange for this exclusive sponsorship, the U-Pass is advertised on all TransLink U-Pass media as the 'VanCity' U-Pass. The VanCity sponsorship has since been extended.

The U-Pass report (Urban Systems, 2005) suggests that UBC has incurred significant costs as a result of U-Pass. In addition to the \$3 subsidy per student, which equates to \$1.2 million CDN per year (based on approximately 40,000 winter session students and 20,000 summer session students), UBC also provides an annual sum of \$50,000 CDN to fund an additional U-Pass subsidy program, administered by the AMS. This subsidy program enables the AMS to give full and partial subsidies off the cost of the U-Pass to students who

can demonstrate financial hardship or who meet other criteria as established by the AMS that limits or inhibits their ability to benefit from the U-Pass program. In addition, in its first 2 years of implementation, the University provided a subsidy of \$5 off the cost of U-Pass for all students living in student housing, which equated to over \$300,000 CDN per year. Beyond these costs, all U-Pass parties also incur expenses via staff time to administer the program and ensure its ongoing success.

#### 3.8.4 Benefits

The U-Pass program has been TREK's most successful TDM tool to date, resulting in significant transit ridership growth and automobile traffic reductions. The U-Pass report (Urban Systems, 2005) suggests that all program partners have reaped tremendous benefits from this program. From TransLink's perspective, the U-Pass has resulted in a more predictable revenue stream, reduced costs for cash-handling fares, and reduced growth in regional traffic and a corresponding reduction in greenhouse gas and air pollutant emissions. From UBC and AMS perspectives, the U-Pass has increased affordable and accessible access to transportation for students, resulting in a significant cost savings to students of approximately \$800 per year (a collective cost savings of \$3 million per month). The U-Pass has also reduced demand for parking on campus allowing the deferral of parking structure development in addition to reducing traffic on campus thereby helping UBC meet its Official Community Plan and sustainability commitments.

#### 3.8.5 U-Pass program successes and challenges

The U-Pass Report (Urban Systems, 2005) highlights some of the successes and challenges that have been faced in the implementation and ongoing delivery of the U-Pass program. Showcasing its success, the U-Pass report indicates that 86% of students use their U-Pass and a further 4% indicate an intention to use their U-Pass. In terms of challenges, one of the biggest challenges faced is the high demand for transit service, which has resulted in crowded buses that cannot meet demand during peak travel periods. TransLink is working to address this by procuring more buses to add to their fleet, although this is a lengthy process that will not happen in the immediate term.

Another big challenge is the lack of a sustainable funding model for U-Pass. As student enrolment continues to grow, funding provided from Parking and GMSL does not fully cover the U-Pass subsidy of \$3 per student per month, resulting in an unstable funding model that creates financial hardship on the operations of the TREK Program Centre. To this end, TREK is currently exploring creative opportunities to phase out this subsidy over a three year period beginning September 2008. This would require students to pay the full cost of U-Pass and would no longer require an ongoing subsidy funded by the University.

#### 3.8.6 U-Pass program expansion

Given the success of the student U-Pass program, UBC is eager to expand to staff and faculty and campus residents who are not students, staff or faculty. Initial discussions have begun with TransLink to explore opportunities for program expansion.

## **4 Other sustainable transportation initiatives**

Beyond TREK's TDM portfolio, UBC has undertaken other initiatives to help advance its sustainable transportation commitments. The Sustainability Office, also contained within the portfolio of Land and Building Services, developed the UBC Residential Environmental Assessment Program (REAP). REAP is intended to provide a framework to encourage and measure sustainable building practices for market-based and staff/faculty/student residential developments at UBC. The objective of establishing such a framework is to bring about the construction of multi-family residential projects at UBC, which are of a higher quality than



those built using the “standard practices” within the BC Lower Mainland. REAP is based on the LEED™ green building rating system, and is in keeping with the University’s sustainability policies. All developers are required to participate in REAP and incorporate the mandatory design requirements within their building program. The degree to which developers participate in the optional sustainability or green initiatives is voluntary and rewarded with Bronze, Silver, Gold or Platinum ratings (Sustainability Office, 2007). As part of the mandatory credits, there are sustainable transportation credits for the inclusion of covered and secure bicycle storage facilities and the contribution of the equivalent of one community car share vehicle per 100 residential units or the provision of a dedicated parking stall and vehicle to be shared by residents of the development. The developer can further opt to designate two parking stalls for use by alternatively fuelled vehicles for every 8 parking stalls or fraction thereof **and** provide electrical service suitable for a charging station for every two parking stalls designated for alternatively-fuelled vehicles.

Further to REAP, all new residential, commercial, and institutional development on campus are subject to a TDM audit applied by the TREK Program Centre, whereby a review is undertaken of all development applications in order to ensure projects address issues regarding sustainable transportation, such as provision of adequate bike parking.

Another sustainable transportation initiative that TREK employed in 2001 was the change of class start times to help spread the morning peak arrival time. Previously, the first classes in the morning all began at 8.30am. This was changed so that some students now begin classes at 8am, some remain at 8.30am, and some begin at 9am. Based on subsequent analysis, this resulted in 12% more transit trips per day being accommodated on the same number of buses.

UBC has also eliminated close to 3,000 commuter parking stalls on campus since 1997, which equates to a reduction in the commuter parking supply of approximately 25%. The price of parking has also increased and has more than doubled in some areas from 1997 to 2007, which has resulted in a reduced demand in parking. In terms of carpool parking, the University used to provide permits for carpools at approximately half the price of a regular permit. The carpool permit option was phased out 3 years ago and instead was replaced with the option for people to share their parking permit between vehicles and determine among themselves how to cost share the permit price. Motorcycle parking continues to be priced significantly cheaper than regular permits although rates have been subject to increases of approximately \$1.00 CDN per year over the last three years. Student parking permits currently sell for approximately \$120 CDN per month and staff and faculty permits sell for approximately \$70 CDN per month (motorcycle parking is available for approximately \$20 CDN per month). According to Parking and Access Control (2007), there are now just over 9,000 surface and parkade parking spaces available across campus. Serving over 45,500 commuters, this equates to a parking ratio of 0.2 stalls per person, which is consistent with the 2005 Strategic Transportation Plan parking ratio target.

## **5 Measures of success**

The UBC TREK Program Centre has been very successful in meeting the transportation objectives as outlined in the Official Community Plan and Strategic Transportation Plan. Since 1997, UBC has collected data each year on travel patterns to and from the campus. A year-to-year comparison of this data provides a measure of UBC’s progress in achieving its transportation goals. The Fall 2006 Transportation Status Report (Urban Systems, 2006) provides the most recent data collected. This section will provide a review of overall travel trends.

## 5.1 Annual monitoring program

Travel patterns to and from UBC are monitored on an on-going basis through a variety of data collection methods. The majority of data is collected during the fall, which provides a consistent basis for year-to-year comparisons. Additional data collection is undertaken at other times of the year to obtain information regarding specific modes of travel, seasonal variations and localized volumes. The following data activities are included in the annual monitoring program:

- Screenline traffic counts: automatic counters (tubes) on roads leading into campus (the screenline) for 7 days, 24 hours/day;
- Campus traffic/speed counts: automatic counters (tubes) on roads throughout campus for 7 days, 24 hours/day;
- Intersection counts: manual observation for 8 hours (3 in AM, 2 in midday, 3 in PM) at intersections throughout campus for one day.;
- Vehicle occupancy and classification: manual observation for 8 hours (3 in AM, 2 in midday, 3 in PM) across the screenline for one day;
- Transit ridership: manual observation from 6am to 4:30am across the screenline for one day;
- Bicycles and pedestrians: manual observation for 8 hours (3 in AM, 2 in midday, 3 in PM) across the screenline for one day; and
- Heavy trucks: manual observation for 15 hours for one day each quarter.

## 5.2 Population changes

Since 1997, the daytime population at UBC has increased 28%. This includes increased student enrollment, associated increases in faculty and staff and increased numbers of residents on campus. For the purposes of monitoring trends in travel to and from UBC, the daytime population comprised of students, staff, and faculty is used to calculate person trips. Table 1 highlights population figures for fall 1997 through fall 2006:

Table 1: Daytime population at UBC (UBC Planning and Institutional research, 2006)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Students	33,200	34,200	35,500	35,250	37,850	39,250	40,950	42,350	43,500	44,150
Staff	7,250	7,450	7,450	7,700	6,500	7,900	7,900	7,200	7,400	7,800
Faculty	1,850	1,750	1,750	1,750	1,750	1,850	1,950	2,050	2,100	2,150
<b>Total</b>	<b>42,300</b>	<b>43,400</b>	<b>44,700</b>	<b>44,700</b>	<b>46,100</b>	<b>49,00</b>	<b>50,800</b>	<b>51,600</b>	<b>53,000</b>	<b>54,100</b>

## 5.3 Travel to and from UBC

On average, there were 102,900 person trips (one-way per person trips) to and from UBC on a typical weekday in fall 2006. Table 2 provides a comparison of person trips from 1997 to 2006.

Table 2: Weekday person trips across UBC Screenline (Urban Systems, 2006)

	Fall 1997	Fall 2006	Change from 1997 to 2006	
Single Occupant Vehicle (SOV)	46,000	40,600	-5,400	-12%
Carpool	36,100	17,600	-18,500	-51%

Transit	19,000	41,500	+22,500	+118%
Bike	2,700	1,200	-1,500	-56%
Walk	1,400	700	-700	-50%
Truck and Motorcycle*	900	1,300	+400	+44%
<b>Total</b>	<b>106,000</b>	<b>102,900</b>	<b>-3,200</b>	<b>-3%</b>

\* Motorcycle and Truck traffic have been categorized together in order to streamline the data and provide a consistent comparison of numbers from previous years (which used to list this category of traffic as 'other' as these modes are not the primary focus of the data collection program).

Of most significance is that in fall 2006, trips to and from UBC were lower than in any other year and despite the 28% growth in population, weekday person trips to and from UBC has decreased by 3% since 1997. Factors contributing to this include the ongoing success of U-Pass, more people living on or close to campus, and a reduced and constrained parking supply. The 2006 Transportation Status Report also highlights the following changes in travel patterns from 1997 to 2006:

- Transit trips have more than doubled. From fall 1997 to 2006, the number of daily transit trips to and from UBC has increased by 118%. In the first year of the U-Pass program, transit ridership increased 53% from the previous year.
- Single Occupant Vehicle (SOV) trips have decreased. Since 1997, the number of daily SOV trips decreased 12%, alongside a 28% growth in population. The number of SOV trips in fall 2006 is 5,400 less than in 1997.
- Carpool and vanpool trips have steadily declined since 1997. In fall 2006, carpool and vanpool trips were less than half of the fall 1997 level. The 18,500 fewer carpool trips in fall 2006 are equivalent to a reduction in the daily traffic volumes to and from UBC of 8,100 automobiles.
- Bike and pedestrian trips dropped significantly in fall 2004 and have remained at low levels since then. In fall 2006, bike and pedestrian trips were 56% and 50% less than in fall 1997, respectively. It is important to note that the university continues to invest in bicycle infrastructure despite this drop in mode share. The ongoing investment in cycling infrastructure helps ensure that the campus remains a bike-friendly environment for the many residents that live on campus and for those people who choose to commute to campus by transit (all regional buses are equipped with bike racks) or vehicle and then use a bicycle to travel across campus.
- Other trips have fluctuated from year to year. These fluctuations and the overall increase in other trips as compared to 1997 levels are primarily due to fluctuations in numbers of motorcycle and light truck (trucks with 2 axels) trips.

The above data is based on total person trips, which does not take into account the effects that population and enrolment growth may have on transportation trends. For this reason, it is also important to consider changes in per person trip rates. Based on the 2006 Status Report, the average number of per person trips in fall 2006 was 1.90 trips per day, which is a 24% decrease from fall 1997. Of particular interest is the fact that fall 2006 marks the first year where this number has dropped below 2 trips per person per day. The 2006 Transportation Report suggests this may be due to a substantial number of people on campus who do not leave the campus during a typical weekday, that is, they live, work, study and shop on campus. Table 3 outlines the weekday trips per person from fall 1997-2006.

Table 3: Weekday trips per person across UBC screenline (Urban Systems, 2006)

	Fall 1997	Fall 2006	Change from 1997 to 2006	
Single Occupant Vehicle (SOV)	1.09	0.75	-0.34	-31%

Carpool	0.85	0.33	-0.52	-61%
Transit	0.45	0.77	+0.32	+71%
Bike	0.07	0.02	-0.05	-71%
Walk	0.03	0.01	-0.02	-67%
Truck and Motorcycle	0.02	0.02	-	-
<b>Total</b>	<b>2.51</b>	<b>1.90</b>	<b>-0.61</b>	<b>-24%</b>

The above table indicates that when population growth is accounted for, UBC has experienced a 31% decrease in Single Occupant Vehicle traffic since 1997, thus meeting the 2005 Strategic Transportation Plan objective of a 30% per person reduction in single occupancy vehicle levels from 1997.

Overall automobile traffic to and from UBC has decreased substantially, from 62,000 automobiles per weekday in fall 1997 to 48,800 automobiles per weekday in fall 2006. This amounts to a 22% reduction in automobile traffic, despite a 28% growth in daytime campus population. This reduction meets the Strategic Transportation Plan of maintaining overall automobile levels at or below 1997 levels.

The annual mode share (percentages of people using a single mode) is illustrated in Figure 3 below. This figure highlights the change in mode share from 1997 through 2006 and shows that the most significant change since 1997 has been the increase in transit mode share, which now accounts for more trips to and from UBC than any other mode.

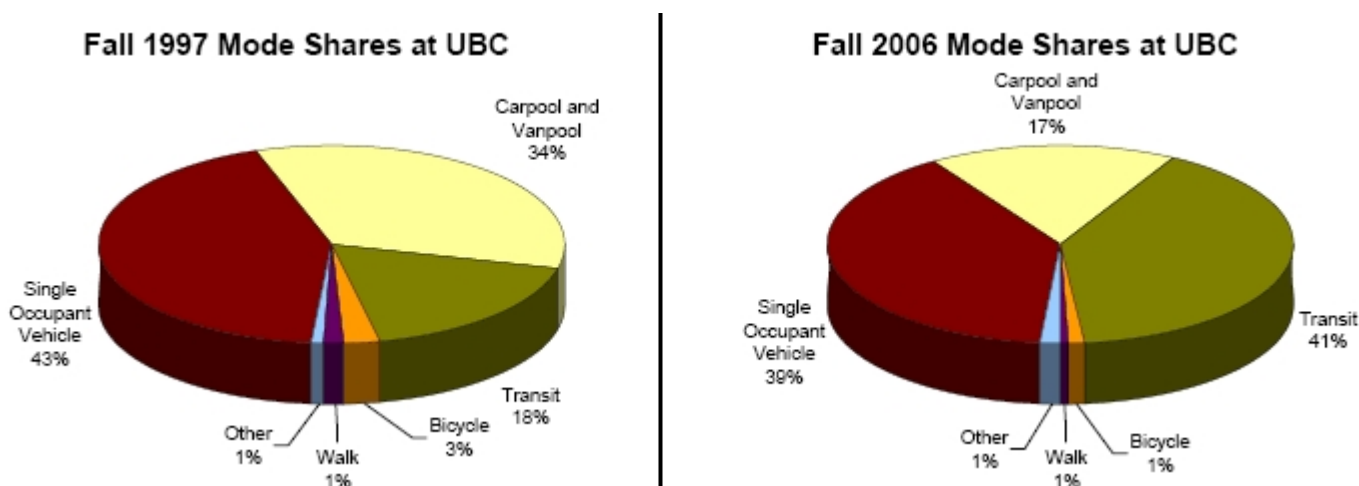


Figure 3: Fall 1997 mode share compared to fall 2006 mode share at UBC (Urban Systems, 2006)

## 5.4 Measuring Progress

As outlined in Section 1 and 2 of this paper, UBC has established several Transportation Demand Management Targets within its Official Community Plan and Strategic Transportation Plan. In providing a summary of the TREK Program Centre's success, these targets are duplicated below along with progress to date as shown in **bold text**.

### 5.4.1 Official Community Plan TDM targets and progress to date

- UBC will continue to develop, communicate, and pursue a TDM plan that will include increasing parking costs and measures to reduce single occupant vehicle travel from 1996 levels by 20%, continuing to reduce the amount of commuter parking, and adopting policies that favour higher occupancy vehicles. **Policy to index minimum daily parking**

**prices to transit fares in addition to reduction in commuter parking supply of 25% since 1997.**

- UBC will promote, through education, pricing and other systems, the use of alternatives other than the single occupant vehicle. **This target has been met through the continued work of the TREK Program Centre.**
- UBC will need to advance opportunities for 'telecommuting' where possible. **TREK encourages employees, if feasible to do so, to discuss telecommuting opportunities with their employer.**
- UBC will need to develop truck travel, dispersal routes and hours of operation in cooperation with the City of Vancouver. **UBC has adopted a truck traffic management program and established a target of a maximum annual average of 300 heavy truck trips per day to/from UBC.**
- UBC will need to investigate and pursue a 'U Pass' program as part of Transportation Demand Management. **This target has been met through the implementation of the U-Pass program in 2003.**

#### 5.4.2 Strategic Transportation Plan targets and progress to date

- To reduce 24-hour single occupant vehicle (SOV) traffic volumes to and from UBC by 30% per person below 1997 levels. **Achieved. SOV rates per person reduced by 31% since 1997.**
- To maintain overall vehicle volumes at or below 1997 levels. **Achieved. Overall vehicle rates reduced by 22% since 1997.**
- To increase 24-ridership on public transit to UBC by 20% above 1997 levels by 2002. **Achieved. Overall transit ridership increase of 118% since 1997.**
- To be the lead agency in creating a U-Pass system in collaboration with the Regional Transportation Authority and the City of Vancouver. **Achieved.**
- To develop and implement, as a top priority, a comprehensive and integrated transportation demand management strategy (known as the STP). **Achieved.**
- To reduce the impact of heavy truck traffic to and from campus, by improving coordination of goods and services vehicle movements. **Achieved.**
- To implement an accessible, safe, environmentally friendly, and cost-effective campus shuttle system. **Achieved.**

## 6 Strengths, Weaknesses, Opportunities, Constraints

The TREK Program Centre has been successful in meeting all of its Strategic Transportation Plan targets and Official Community Plan commitments. Since 1997, TREK has realized many strengths, weaknesses, opportunities, and constraints in its quest to improve UBC's sustainable transportation options.

### 6.1 Strengths

- **Captive audience:** The majority of the population at any post-secondary environment is made up of students. Students can often be a captive audience for advancing TDM, as they are living or spending much of their day in a new compact environment where potential past habits of vehicle dependency may no longer be practical and/or necessary. In addition, mandated programs such as U-Pass are easily implemented within a small controlled environment, which provides a foundation to ensure its long-term success.
- **Campus partnerships:** Many of the TDM programs TREK has developed rely on partnership support with other UBC departments. This is of particular relevance to the U-Pass program, which has enabled TREK to work closely with the Alma Mater student union Society in creating an extremely successful TDM initiative. As a result of such partnerships, collaboration on a variety of other initiatives, such as outreach and

marketing has occurred, thereby strengthening social networks within the university environment.

- Strategic Transportation Plan (STP) and Official Community Plan (OCP) targets: One of the biggest strengths of TREK's success has been its ability to meet the transportation targets of both the STP and the OCP. Through its TDM portfolio, TREK has been able to advance UBC's sustainable transportation commitments and will look forward to setting higher targets in subsequent years as these plans are reviewed and updated.
- Transportation Demand Management policies: By having established TDM targets and policies, TREK has been able to create a comprehensive TDM portfolio supported by the University. Its pursuit of TDM initiatives have not been done in isolation and have instead been part of the University's larger sustainability commitments, thereby creating a momentum for the advancement of sustainability that may not otherwise occur.
- Leading by example: The Associate Vice President of Land and Building Services holds a senior administrative position at UBC yet continues to showcase his support for sustainable transportation by 'walking the talk'. He cycles, walks, carpools, or takes transit from his home to work each day, thus setting an example to his staff, students, and other colleagues. This helps validate the work that TREK is doing and also encourages others to try more sustainable commuting options.

## **6.2 Weaknesses**

- Budget: Given that the majority of TREK's operational budget is funded through revenues generated from parking sales, and given the success of TREK's TDM initiatives, TREK is essentially slowly 'cutting off the hand that feeds it'. With less and less revenue being generated from parking sales, less and less money is available to fund TREK. Coupled with this is the ongoing growth of student enrolment, which results in more U-Pass holders, ultimately resulting in more money needed to fund the \$3 per student per month subsidy. Every year presents a new challenge in securing funding and ensuring an adequate budget is available to sustain the delivery of TREK's TDM portfolio. This weakness is however being addressed through the exploration of creative opportunities to phase out the \$3 per student per month U-Pass subsidy.

## **6.3 Opportunities**

- Partnerships: Through the development of its TDM portfolio, TREK has developed partnerships with other transportation agencies and advocacy groups outside of the University environment. This has not only allowed for the creation of strong social networks, but also provides a foundation for future collaboration on creative programs to help advance sustainable transportation across the region thereby fostering an environment for knowledge sharing and continual networking.
- Research and innovation: Given the university environment, research and innovation is inherent. The TREK Program Centre can continue to collaborate with academic departments that are studying transportation related topics. Such collaboration may include research and intern opportunities for students to work with TREK, and TREK partnering with academic departments on creative research projects within the field of sustainable transportation.

## **6.4 Constraints**

- Regional transit services: As previously mentioned, one of the biggest challenges faced as a result of the success of U-Pass, is the ability for TransLink to continue to meet growing demand. As a result, many UBC commuters who rely on transit as a primary mode choice have experienced longer commute times due to full buses passing them by as a result of lack of transit vehicles. Consequently, the U-Pass



program was anecdotally called the “Pass-U” program in reference to crowded buses. While TransLink has been working to increase their fleet, it is a long process and will not likely solve issues of supply and demand in the immediate term. Further, anecdotal evidence suggests that because of crowded buses, some students, staff and faculty have moved away from transit and back into their private vehicles. While the data does not validate this, it may become an issue in the future should transit service levels fail to meet a continued growth in demand.

- UBC environment: UBC is located on the western tip of the Burrard Peninsula approximately 12km away from the downtown core. In addition, it is located on top of a ridge and is surrounded by hills, which make cycling somewhat of a challenge, particularly to those folks new to cycling. Further, its Canadian west coast environment means wet and cold winter months, which can act a barrier for the advancement of active transportation (cycling and walking). Despite this, TREK has managed to overcome these constraints by implementing transportation options to serve a wide range of commuting needs.

## **7 Conclusions**

The University of British Columbia has successfully created a comprehensive transportation demand management strategy through the development of the TREK Program Centre. Much of the success of TREK is based on the establishment of policies and targets to help guide and support the advancement of transportation demand management. Without the implementation of such policies and targets, there is no built-in support for TDM, nor is there any framework for guidance, which may result in an inability to move initiatives forward. Adding to its success is TREK's ability to establish partnerships with departments within and external to the University community. Through the development of such partnerships, opportunities to work on creative initiatives have been borne along with the creation of a foundation on which future partnership opportunities may be established. Perhaps the most important conclusion to draw from this paper is the importance of data collection, in order to measure success. Without adequate data collection, the University and TREK would have no benchmark on which to measure how far it has advanced in meeting its transportation targets, nor would it have any indication on when to increase targets, and continually strive for better results.

In closing, while TREK faces weaknesses and constraints, it has successfully managed to advance a comprehensive sustainable transportation strategy that has had significant impacts on favoring more sustainable transportation trends. Although every post-secondary institution will undoubtedly differ from one campus to the next, there are many similarities that such institutions share and many opportunities for these institutions to capitalize on in advancing sustainable transportation agendas. For more information on TREK, please visit [www.trek.ubc.ca](http://www.trek.ubc.ca).

## **8 References**

Sustainability Office (2007) *Residential Environmental Assessment Program* The University of British Columbia

The Greater Vancouver Regional District (1999) *Livable Region Strategic Plan* GVRD

TREK Program Centre (1999) *UBC Strategic Transportation Plan* The University of British Columbia

UBC Campus and Community Planning (1992) *The UBC Official Community Plan* The University of British Columbia

UBC Campus and Community Planning (2005) *UBC 2005 Strategic Transportation Plan* The University of British Columbia

UBC Parking and Access Control (2007) [www.parking.ubc.ca](http://www.parking.ubc.ca) The University of British Columbia

University of British Columbia (2006) *Planning and Institutional Research* The University of British Columbia

University of British Columbia (2007) [www.ubc.ca](http://www.ubc.ca) The University of British Columbia

Urban Systems (2006) *UBC Fall 2006 Transportation Status Report* The University of British Columbia

Urban System (2005) *U-Pass Review Final Report* Urban Systems Richmond BC