University of British Columbia

CAMPUS TRANSIT PLAN

June 2003

UBC Campus Transit Plan

SUMMARY

UBC, TransLink, and the GVRD have worked together to produce this Campus Transit Plan, which describes how the main UBC campus will be served by transit in the future. The recommended transit service concept incorporates sufficient capacity to accommodate 20 or more years of growth in transit ridership, and expands transit services throughout the UBC campus.

Objectives

The primary objective of the Campus Transit Plan is to determine how transit can best serve UBC in the future. This means defining routes for regional buses travelling to and through campus, determining what other transit services are needed on campus, and identifying facilities are required to support these transit services.

Other objectives of the Campus Transit Plan include:

- Estimate future transit ridership as a result of U-Pass.
- Determine what services and facilities are required to accommodate increased transit ridership.
- Increase the attraction and use of transit, and thereby reduce single-occupant vehicle travel.

The Campus Transit Plan was developed within the context established by other plans, including the GVRD's Official Community Plan for UBC and UBC's Strategic Transportation Plan. The Campus Transit Plan was also based on plans and proposals related to the eight neighbourhood areas on the UBC campus defined in the Official Community Plan. In turn, the results of the Campus Transit Plan provide input to further development of the neighbourhood plans, as well as to updates of the Official Community Plan and the Strategic Transportation Plan.

Issues

The Campus Transit Plan was initiated in response to several issues, including:

- **Increased transit ridership.** During the 2002/2003 academic year, almost 30,000 trips were made to and from UBC by transit each weekday, amounting to 25% of all trips. Transit use is expected to increase to almost 40,000 trips in September 2003 with introduction of a universal transit pass (called "U-Pass") for students. UBC then plans to introduce a U-Pass for staff and faculty, and eventually hopes to introduce a similar pass for residents at UBC. As a result of this and ongoing growth at UBC, transit ridership by 2011 is forecast to be more than 50,000 trips per day, as illustrated in Figure 1. The Campus Transit Plan identifies how this

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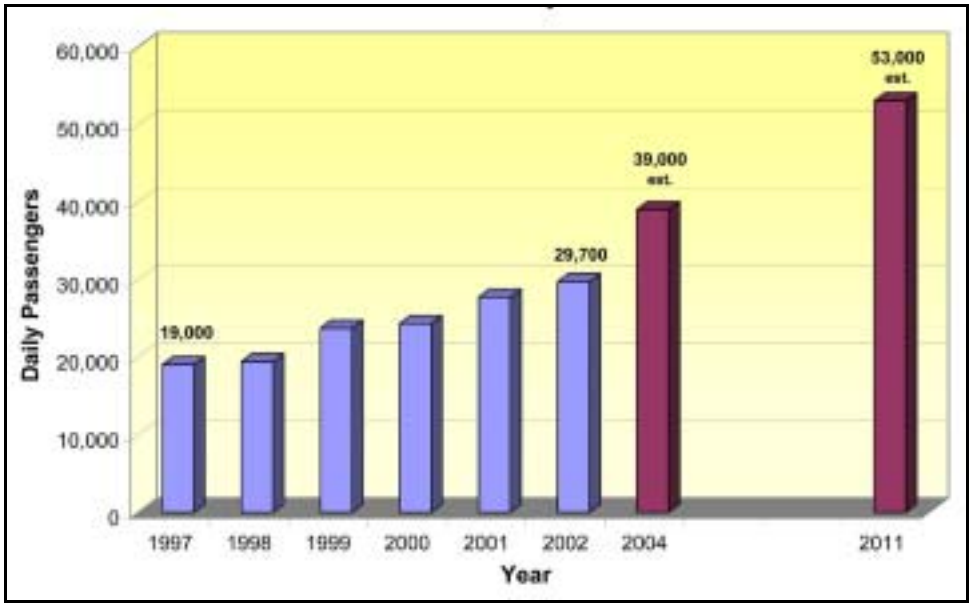
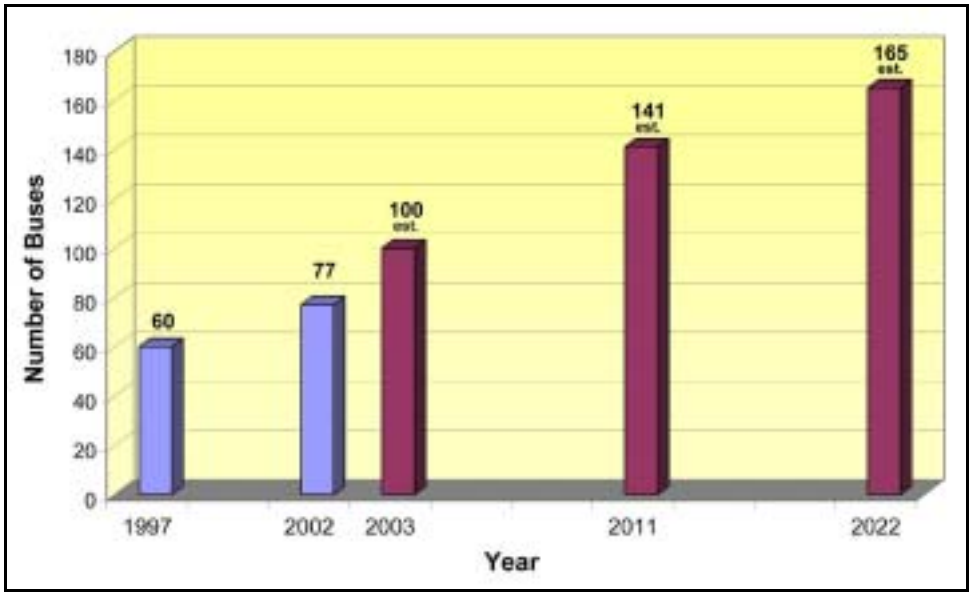
increase in transit ridership can be accommodated while maintaining an efficient and attractive transit service.

Figure 1: Transit Ridership at UBC



- **Transit service levels.** Currently, 77 buses travel to UBC between 8 and 9 a.m. Transit service levels will continue to increase as transit ridership increases, with the result that, by 2022, 165 buses per hour — equivalent to almost three buses per minute — will travel to UBC in the morning peak hour, as illustrated in Figure 2. The Campus Transit Plan identifies transit facilities to accommodate this number of buses on campus.

Figure 2: Number of Buses at UBC (morning peak hour, westbound)

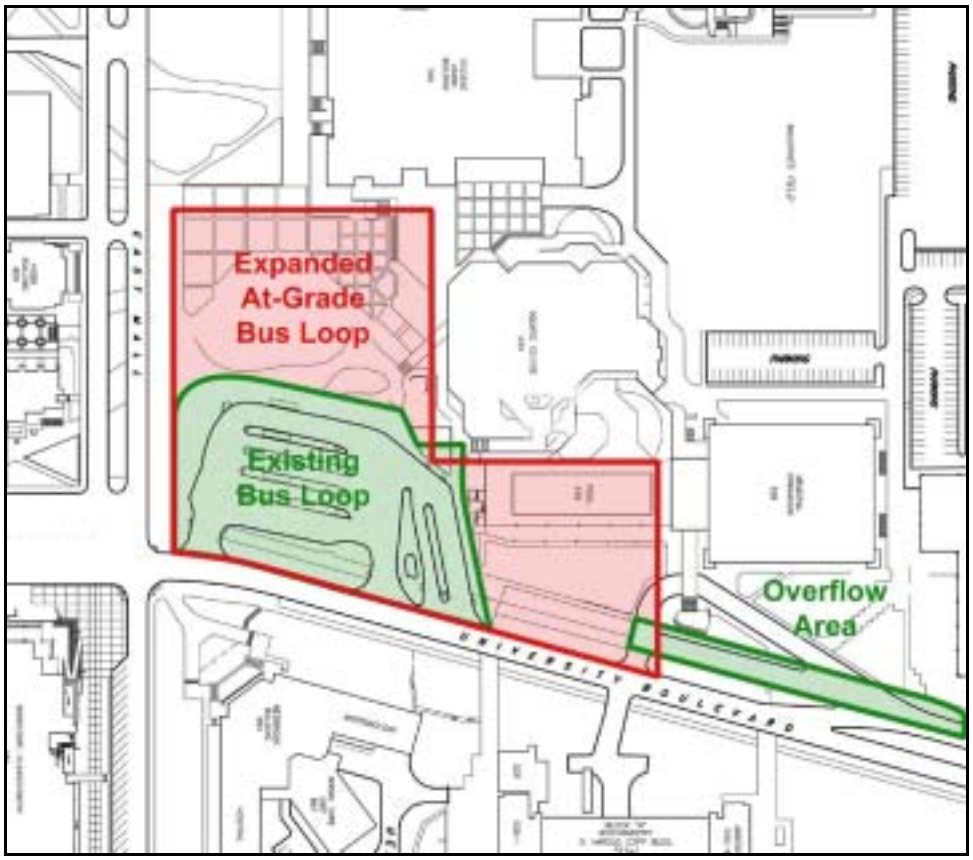


- **Bus loop capacity.** Despite being expanded twice in the past 20 years, the existing bus loop is over capacity. During peak periods, there is not sufficient room in the bus loop for all buses, and consequently an overflow area in front of the War Memorial Gym is used for some buses. Within the bus loop, many of the platforms are too small to accommodate waiting passengers during peak periods, as illustrated in Figure 3.

  Increases in transit ridership and service levels could be accommodated by further expanding the bus loop. However, continued expansion of the bus loop would mean that, 20 years from now, the bus loop would have almost tripled in size, as illustrated in Figure 4. The Campus Transit Plan considered a range of alternatives to expanding the bus loop to this size, and identifies an optimum configuration for a central transit station.

Figure 3: Passengers Overflowing Platforms in Bus Loop

Figure 4: Footprints of Existing and Expanded Bus Loops



- **Congestion and delays.** Congestion is a chronic problem on University Boulevard between Wesbrook Mall and East Mall. During much of the daytime on weekdays, traffic on westbound University Boulevard is backed up from the East Mall intersection at the bookstore — sometimes as far as Wesbrook Mall. As shown in Figure 5, buses are caught in this congestion, and can be delayed up to six minutes travelling along University Boulevard. The Campus Transit Plan identifies how congestion and delays to transit services can be minimized, so as to ensure that transit service remains fast, reliable and attractive.

Figure 5: Congestion on University Boulevard

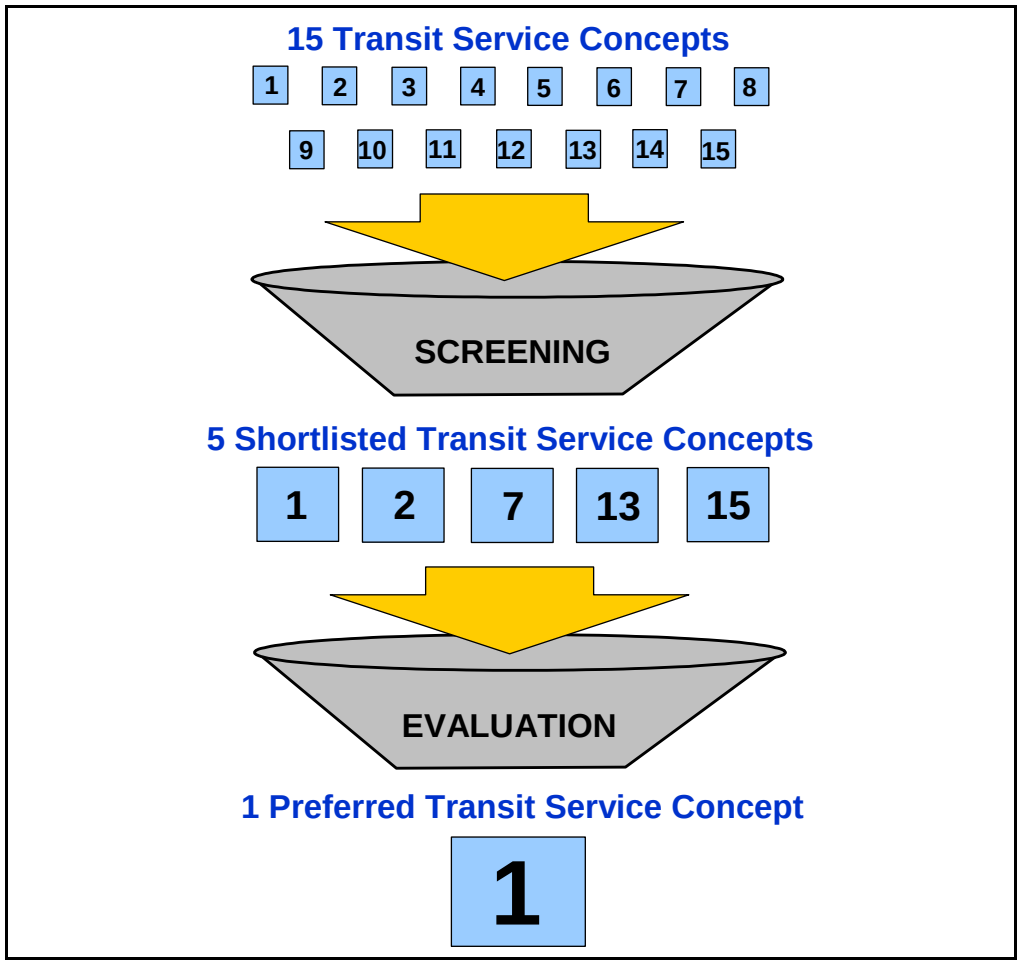
- **Coverage.** As outlying areas of the campus are developed, there will be a greater need for transit services to accommodate trips within the campus. The Campus Transit Plan identifies how coverage of the campus can be improved with Community Shuttle services.

- **Transportation targets.** UBC has committed to pursue targets of increased transit ridership and reduced single-occupant vehicle traffic. The Campus Transit Plan identifies improvements and changes in transit services and facilities that will increase transit ridership and reduce single-occupant vehicle traffic.

Study Process

A two-stage process was used to evaluate the transit service concepts. As illustrated in Figure 6, the first stage involved screening out 10 of the 15 concepts to reduce the number of concepts to five "shortlisted" concepts. These five concepts were then evaluated in detail in the second stage. Based on the results of the evaluation, a single recommended concept was identified.

Figure 6: Evaluation Process



The screening and evaluation considered a number of factors, including those summarized in Table 1. The evaluation of the shortlisted transit service concepts was based on analysis of existing and future conditions at UBC, using computer simulation tools and transit ridership forecasting models.

Table 1: Evaluation Criteria

Category	Criteria	Measure
Customer service	Passenger travel time	Average walk + in-bus travel time
	Coverage	Regional bus coverage of campus
	Clarity of service	Ease of understanding routes
Safety	Conflicts with vulnerable road users	Potential conflicts with pedestrians and cyclists
	Traffic conflicts	Potential bus–motor vehicle conflicts
	Personal security	Personal safety and access to assistance
Community	Land use	Sites affected by bus routes and facilities
	Traffic and parking	Effects on circulation and parking
Environmental	Noise	Change in noise levels on campus
	Air quality	Change in bus emissions on campus
	Appearance	Visual benefits and impacts
Transit operations	Delays	Average delay per bus
	Operations	Scheduling and operational flexibility
Ridership	"External" trips	AM peak hour ridership to/from UBC
	"Internal" trips	Ability to accommodate internal trips
Cost	Total annualized costs	Relative operating and capital costs
Implementation	Transit facilities	Timing and ease of implementation
	Roadway changes and transit priority	Timing and ease of implementation

Recommended Transit Service Concept

The recommended transit service concept is illustrated in Figure 7. This concept was identified as the best overall concept by a wide margin as compared with the other 14 transit service concepts that were considered. Table 2 provides a summary of the evaluation of the five short-listed concepts.

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Figure 7: Recommended Transit Service Concept

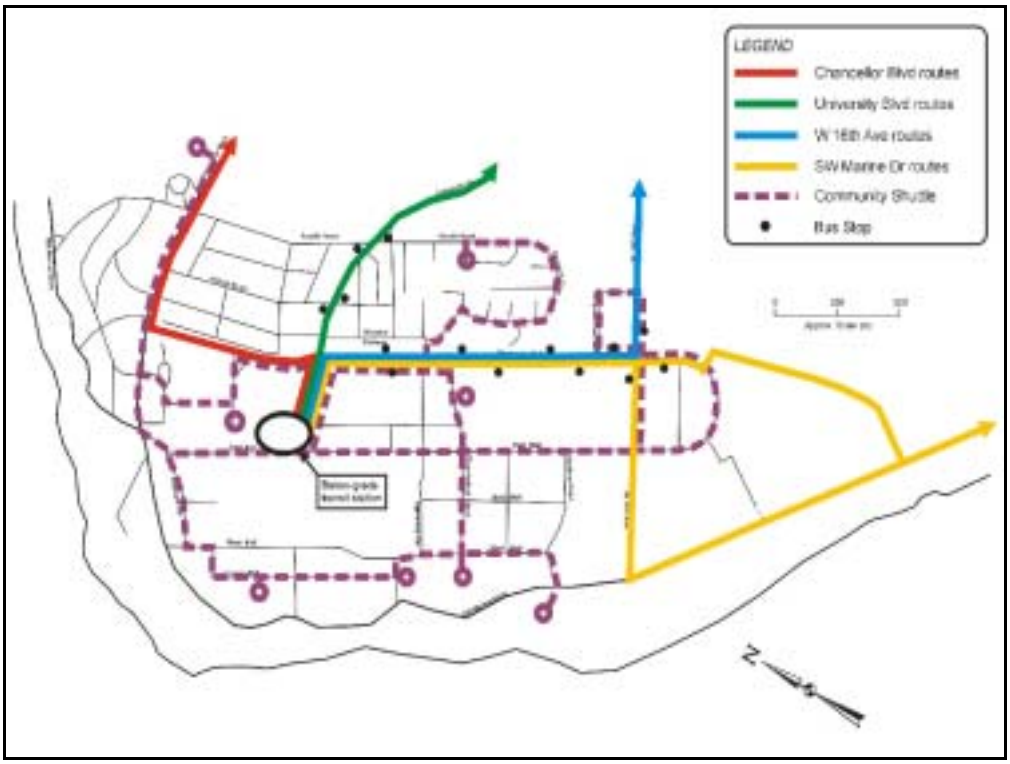

Table 2: Evaluation Summary

Category	Concept				
	1	2	7	13	15
Customer service	○	◓	●	●	◓
Safety	●	◒	◒	●	●
Community	●	◒	●	●	●
Environmental	●	◒	●	●	●
Transit Operations	●	◒	●	●	◒
Ridership	○	◓	◓	◓	◓
Cost	◓	○	●	●	○
Implementation	◒	◒	◒	●	●
Overall	●	○	●	●	○
Comparison with Existing					
● Better	◓	○ Neutral	◒		● Worse

URBANSYSTEMS

The key features of the recommended transit service concept include:

- **Existing regional bus routes are maintained.** All regional buses would follow existing routes, with the exception of Routes 41 and 49, which would eventually travel through South Campus via a new road (with transit-only access or traffic calming measures to discourage motorists from short-cutting through South Campus).

  A key benefit of maintaining existing regional bus routes is that buses are not routed through campus, avoiding potential noise, air quality and visual impacts. Instead, coverage of campus is provided by smaller Community Shuttle buses, as described below.

- **A new Community Shuttle service expands coverage of campus.** A key feature of the recommended transit service plan is a Community Shuttle service operating throughout campus during the daytime and evening. Community Shuttle services would extend coverage of campus within 300-m walking distance.

  Several buses would operate along a number of routes, providing service as frequently as every 15 minutes. Smaller buses would be used, as illustrated in Figure 8. Eventually, buses could be fuelled by natural gas, hydrogen or other alternative fuels in order to minimize noise and air quality impacts.

Figure 8: Community Shuttle Bus

Community Shuttle service would be intended primarily to provide mobility on campus for persons with disabilities, persons travelling alone at night, persons making long trips across campus, and persons travelling with large or heavy objects.

- **A single centrally-located transit station.** All regional bus routes and Community Shuttle routes would converge at a single transit station, located where the existing bus loop is located. This provides several benefits:

  - *Direct and convenient access to buses.* The transit station would be located close to the centre of the academic core, which is the destination for most transit passengers. Any location within the academic core area would be within a 10-minute walk of the transit station.

  - *A choice of routes at one location reduces waiting times.* Many transit passengers can use two or more bus routes to travel from UBC to their destination. For example, a student who lives in Kitsilano on 6th Avenue near Macdonald Street would have a choice of up to five different routes to travel home. With a single transit station served by all routes, this student could board the first bus leaving the station on any of these routes, which reduces the waiting time for a bus.

  - *Easy to understand.* A common departure point for all buses leaving campus is easy for passengers to understand. Passengers know they are able to catch a bus on any route at a single location. With a more dispersed system, transit users would need to be familiar with the on-campus routings to be sure that they walk to the correct stop when they want to leave campus.

- **A below-grade transit station.** The transit station would be located below grade, below where the existing bus loop is located. Buses would enter and exit the below-grade station on University Boulevard at Wesbrook Mall. The transit station would have a capacity of 40 or more buses, which is sufficient to accommodate increased transit service at UBC over the next 25 years and beyond.

  The primary benefit of a below-grade transit station is faster transit service and fewer delays to buses. A key feature of the transit station would be a "fare-paid zone," which could only be entered by paying a transit fare. Because everyone inside the fare-paid zone would have already paid the fare, passengers would be able to board buses through all doors. This means that an articulated bus could be loaded in 60 to 90 seconds, as compared with as much as five minutes without a fare-paid zone. Faster bus loading means faster transit service.

A below-grade transit station also means that buses would avoid traffic congestion and delays at pedestrian crosswalks on University Boulevard. As a result, transit service would be faster and there would be fewer delays to buses.

Key features of the below-grade transit station at UBC would include:

- *Safe.* The station would be well-illuminated, would incorporate a secure fare-paid zone, and would be patrolled by security personnel.
- *Accessible.* The station would be accessible by ramps, escalators and/or elevators to accommodate persons with disabilities.
- *Attractive.* The station would be integrated with a new plaza at surface level and with adjacent buildings. It would be illuminated by natural light, supplemented with a high level of lighting. The station could also include retail uses, as well as secure bicycle storage. The bus entrance on University Boulevard would be landscaped and designed as a feature of the roadway.
- *Comfortable.* The below-grade transit station would be weather-protected, heated and climate controlled. Seating, telephones and other amenities would be provided.
- *Ventilated.* Passengers would be separated from buses by glass doors. When buses are ready to depart, the doors would open and passengers would walk directly onto the bus. Exhaust from buses would be vented from the transit station, and could be filtered and cleaned so as to maximize air quality in the station and outdoors.
- *Efficient.* Real-time information displays would provide timely and accurate information regarding bus departures for transit passengers. Bus circulation, loading and unloading would minimize bus travel times and emissions.

- **Lowest overall cost.** The annualized costs for the recommended transit service concept total an estimated $10.6 million per year, as summarized in Table 2. The costs for the recommended concept are lower than for any of the other service concepts, due to lower transit operating costs, which are the result of shorter regional bus routes on campus. The costs in Table 2 represent the costs for all participating agencies (UBC, TransLink and others). The regional transit service costs represent only the portion of the costs of regional routes on the UBC campus. The estimated cost of constructing the below-grade transit station — which as of May 30, 2003 is estimated to be $17 million — represents an annualized cost of $1.2 million.

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Table 2: Estimated Annualized Costs
(total costs for all participating agencies)

Transit operating costs*	Regional buses	$5.2 million
	Community Shuttle	$2.3 million
Vehicle capital costs*	Regional buses	$1.3 million
	Community Shuttle	$0.3 million
Transit facility capital costs		$1.2 million
Transit facility operating costs		$0.3 million
Total annual cost		**$10.6 million**
* Transit operating and vehicle costs are for portions of regional routes on UBC campus		

Consultation

The preliminary results of the Campus Transit Plan were presented to the community at an open house held in April 2003. Prior to the open house, presentations were made to UBC's Transportation Advisory Committee during the development of the Campus Transit Plan. In all cases, feedback from the community was incorporated into the Campus Transit Plan.

Overall, the response to the recommended transit service concept was positive. Some members of the community remain concerned about the below-grade transit station. Many persons who attended the open house and expressed concerns regarding the below-grade transit station revised their opinion of a below-grade transit station after they had an opportunity to view photographs of other similar facilities, and discussed the issue with staff. Others remained concerned, specifically regarding the appearance and aesthetics of the station and the bus entrance, safety and security, and ventilation.

The Campus Transit Plan responds to much of the community input. Specific issues regarding the design of the transit station, the location of the bus entrance and implementation of the transit station will be addressed in subsequent detailed planning and design work undertaken by UBC and TransLink. Preliminary evaluation of the below-grade transit station and examination of similar facilities in Vancouver and other communities indicates that a below-grade transit station can be implemented in a manner which addresses these issues. The Burrard SkyTrain station provides a local example of a below-grade transit station, as illustrated in Figure 9. Examples of below-grade transit stations in other communities are included in Figure 10.

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Figure 9: Burrard SkyTrain Station

Figure 10: Below-Grade Transit Stations in Other Communities