



**The Road to the 2010 Olympic and Paralympic Games -  
Transportation Findings of Large Public Events  
in Downtown Vancouver**

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## Abstract

The City of Vancouver is Host City for the 2010 Olympic and Paralympic Games. While the Vancouver Organizing Committee (VANOC) is ultimately responsible for delivering transportation services within the Olympic Domain, the City and other transportation partners need to work closely with VANOC to integrate transportation planning within and outside the Olympic Domain, also known as the Urban Domain.

The City has developed an Olympic Transportation Branch and technical team to support the extensive 2010 transportation planning and operational efforts. The City's Olympic Transportation mission statement is "to create and deliver an accessible, reliable, and sustainable Olympic and Paralympic transportation plan within a functioning urban environment that minimizes impacts and maximizes legacies for Vancouver residents, businesses, and visitors".

To better prepare for planning and delivering the 2010 Winter Games, the City, in partnership with VANOC and other partners, conducted a series of transportation surveys over the last year for the following large public events:

- GM Place = Vancouver Canucks Hockey Game
- BC Place = Rolling Stones Concert
- Downtown (& Kitsilano) = Celebration of Light Fireworks
- Dual Stadium Event = Canucks Hockey & BC Lions Football

The primary objective of the surveys was to determine the travel characteristics associated with large special events in Downtown Vancouver. The survey efforts included pedestrian, vehicle, transit, parking counts and detailed market research. For each event, full crowd size estimates and mode splits were determined.

This paper discusses the City's strategic transportation planning for the 2010 Olympic and Paralympic Winter Games, presents a sampling of the key findings of the stadium special event transportation surveys, and highlights lessons learned on what the City and the public can do regarding their mobility leading up to and during the Games.



## Background

The City of Vancouver is the Host City for the 2010 Olympic and Paralympic Games. While the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) is ultimately responsible for delivering transportation to its clients within the Olympic Domain (i.e. Olympic venue zones), the City and other transportation partners need to work closely with VANOC to integrate transportation planning within and outside the Olympic Domain, also known as the Urban Domain.



For the City, the success of the 2010 Winter Games goes beyond the performance of the athletes and the operation of the sport venues. Success will also be measured by the celebratory experience for our residents and visitors including the quality of transportation services provided and the ability for non-participants to plan ahead and make their trips during the Games with as limited travel disruption as possible. The 2010 Winter Games present an opportunity for the City to showcase its ability to successfully host large special events and leverage the media exposure to further enhance Vancouver as one of the most liveable cities in the world.

With these opportunities also come responsibilities. The City of Vancouver's name is directly tied to the 2010 Winter Games, and how we deliver transportation as a city before, during and after the Games will have a lasting effect on our worldwide reputation, long after VANOC ceases to exist. Therefore, to support the extensive transportation planning and operational efforts needed by the City for the 2010 Winter Games, the City has developed an Olympic Transportation Branch and technical team. The City's Olympic Transportation mission statement is:

*"To create and deliver an accessible, reliable, and sustainable Olympic and Paralympic transportation plan within a functioning urban environment that minimizes impacts and maximizes legacies for Vancouver residents, businesses, and visitors."*

## Integrated Olympic Transportation Planning

An Olympic Transportation technical team with members from each of the City's Transportation branches has been providing a diverse range of expertise in transportation planning for the 2010 Winter Games. The technical team is responsible

for working with VANOC and other relevant transportation agencies to develop and implement strategies for the 2010 Games and related events. The team's scope of responsibilities include all transportation elements, including motor vehicles, bicycle and pedestrian movement, public mass transit, parking, street restrictions or closures and traffic and by-law enforcement.

Throughout 2006 and 2007, the City participated with VANOC and other transportation partners as a part of the Transportation Advisory Committee (TAC), which also consisted of several subcommittees and working groups. Although the TAC was instrumental in beginning to shape how each of the local transportation partners would best integrate with VANOC in delivering a successful Olympic and Paralympic transportation operation, it was too narrow a framework that did not adequately define each agency's specific roles and responsibilities for the Games.

A new structure called the Olympic and Paralympic Transportation Team (OPTT) was created in January 2008 to better align VANOC's and the respective transportation partners' capabilities, jurisdiction, and experience in delivering such a large international special event. The principal function of the OPTT is to plan, co-ordinate and provide integrated transportation services to the 2010 Olympic and Paralympic Games' client groups and spectators while minimizing the impact on the general population and local businesses within the Games theatre.

The OPTT is a partnership between VANOC, the City of Vancouver, TransLink, the Ministry of Transportation, the Resort Municipality of Whistler, and the Vancouver 2010 Integrated Security Unit (ISU) that is striving to deliver a Games-time transportation program resulting in legacies of increased public transit ridership and environmental sustainability awareness.

Specific to Vancouver, the OPTT has defined that the City's responsibilities are to lead and manage routing and traffic management, transportation modeling and pedestrian flows for the remaining two years of transportation planning for the 2010 Winter Games. The scope of functional areas such as public engagement, communications, and the need for a 2010 Games Regional Transportation Management Centre (TMC) are jointly shared by all of the OPTT partners.

## **Findings of Large Public Events in Vancouver**

A preliminary estimate of the travel demand generated by Olympic events in the City of Vancouver alone is in the range of 300,000 trips per day, which represents a 15% increase to the City's typical 2 million trips per day. However, Olympic travel demands will be highly concentrated on a few key corridors with a potentially more limited transportation network due to street restrictions or security closures around venues.

To develop a better understanding of how such Olympic travel demands would impact the existing transportation system, the City, in partnership with VANOC and other partners, conducted a series of transportation surveys over the last year for the following large public events:

- GM Place = Vancouver Canucks Hockey Game
- BC Place = Rolling Stones Concert
- Downtown (& Kitsilano) = Celebration of Lights Fireworks
- Dual Stadium Event = Canucks Hockey & BC Lions Football

The primary objective of these transportation surveys was to determine the travel characteristics associated with large special events in Downtown Vancouver and to assist in planning the 2010 Winter Games. The survey efforts included pedestrian, vehicle, transit, and parking counts as well as detailed market research. For each event, full crowd size estimates and mode splits were determined.

### Survey Program

Exhibit 1 shows the types of surveys that were conducted for the GM Place hockey game, which was representative of each survey event effort. It is important to note how labour intensive it is to complete a comprehensive transportation survey for a large public event.

Survey Types		Conducted by	Survey periods	
			Pre-event	Post-event
<b>1. Patron Origins and Size<sup>1</sup></b>	Ticketmaster Postal Code Data	Ticketmaster	Through ticket sale records	
	GM Place Stadium Gate Count	GM Place	Total inbound gate counts	-
<b>2. Patron Characteristics<sup>1</sup></b>	Interview Survey	Mustel Group	5:00 - 9:00PM	-
<b>3. Pedestrians</b>	Pedestrian count	Bunt & Associates	5:00 - 8:00PM	9:00 - 11:30pm
<b>4. Vehicular Traffic</b>	Traffic count	Bunt & Associates	5:00 - 8:00PM	9:00 - 11:30pm
	Loop count <sup>1</sup>	City of Vancouver	Various days on March 2007	
<b>5. Parking</b>	Parking count (downtown)	City of Vancouver	5:00 - 8:00PM	9:00 - 11:30pm
	Parking count (park & ride lot) <sup>1</sup>	TransLink	5:00 - 7:30PM	-
<b>6. Transit</b>	Seabus count <sup>1</sup>	TransLink	March 15, 2007 (all day)	
	Downtown bus load count <sup>1</sup>	TransLink	5:00 - 8:00PM	8:30 - 11:00pm
	Stadium station platform count <sup>1</sup>	TransLink	5:00 - 7:30PM	9:00 - 11:30pm

Note: Additional counts were conducted on a non-event day at GM Place

Exhibit 1: Summary of Surveys Conducted for GM Place Transportation Survey

Exhibit 2 shows how between 60 to 80 staff were deployed in the field to conduct all of the noted surveys. Logistics such as breaks, spares, and equipment availability all need to be well planned in advance. For the BC Place concert, the City received its first snow storm of the year for the entire survey period!

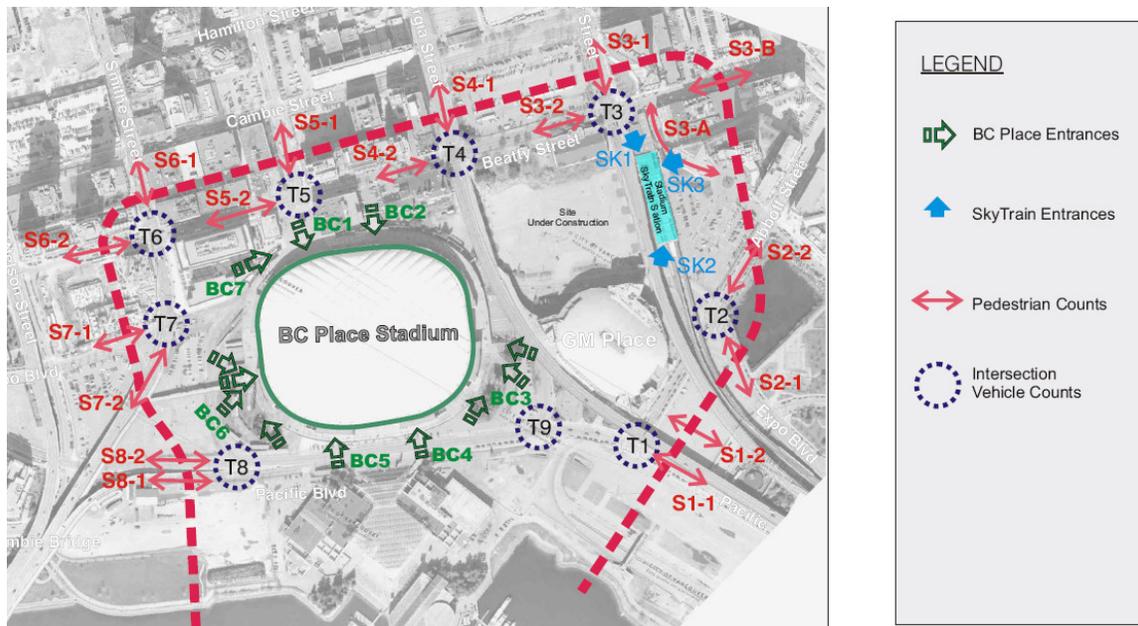


Exhibit 2: Outer and Inner Screenline Survey Program for BC Place Transportation Survey

Although the City aspires to complete a similar data collection effort for an Olympic event, it is unlikely that enough survey staff and project managers will be available to repeat such an effort given all of the operational needs during the Games period.

### Patrons' Origin and Gate Counts

For both the GM Place and BC Place events, Ticketmaster data was retrieved which included the postal codes of the addresses of the original ticket purchasers. When compared to the stated origins of event attendees from the on-site market research, the number of Vancouver residents who actually attend the events is less than what the Ticketmaster data findings suggest. This distortion is shown in Exhibit 3 (next page) and is likely a combination of ticket buyers using their Downtown work addresses to purchase tickets and some local ticket holders who purchase tickets for friends or relatives outside of the City.

This is an important finding for Olympic transportation planning as tickets for the 2010 Winter Games will go on sale in late 2008. While similar postal code data of Games ticket purchasers will be available for the City to analyze, it is likely to be even more distorted than for the Stadium study events given the number of international visitors expected to attend the Games.

	Ticketmaster %	Actual %
Vancouver	35.4%	22.8%
Vancouver Island	2.4%	4.8%
Other BC	2.0%	8.0%
Outside BC	3.4%	4.7%

Exhibit 3: Percentage of Patrons' Origins for Ticketmaster and Actual Market Research Data

Actual gate counts were also available for both the BC Place and GM Place events to compare to the number of tickets sold by Ticketmaster and the Vancouver Canucks. This was useful information in estimating a 5% absentee rate for the concert and validating that the hockey game was in fact a sellout crowd. Exhibit 4 provides a schematic of the various entry levels to GM Place which aids in receiving a high demand of event attendees close to the event start time.

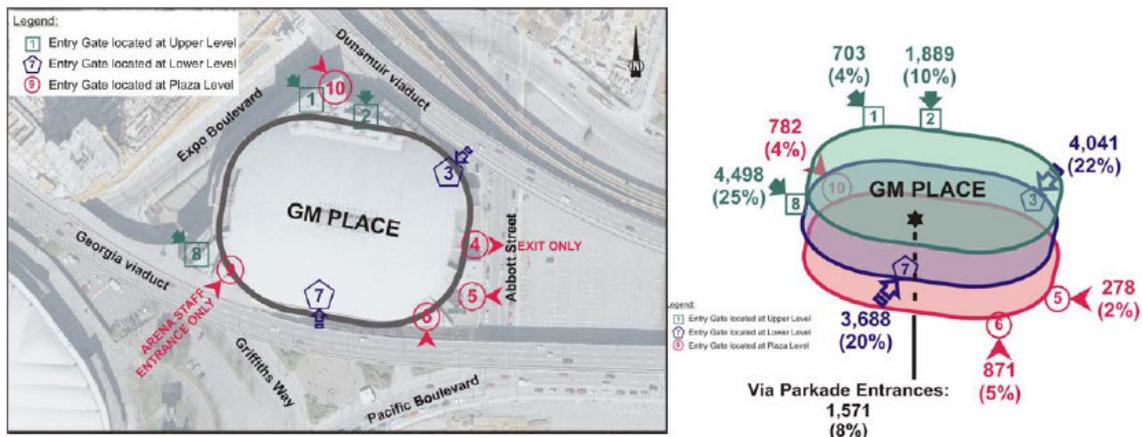


Exhibit 4: GM Place Gate Counts for Upper, Lower, and Plaza Levels

For the 2010 Winter Games, it is unlikely that the stadiums will be able to operate with all gates open given the additional security checks that will be required at Olympic Domain venues. This will create the need for adequate queueing space for a limited number of gate entries and could cause atypical event queueing and congestion on the City's street network.

### Parking Location and Accumulation

The City conducted parking accumulation counts at 9 to 10 major parking facilities for the hockey game and concert night respectively. Exhibits 5 and 6 show the observed parking lot locations and accumulation for the GM Place event.

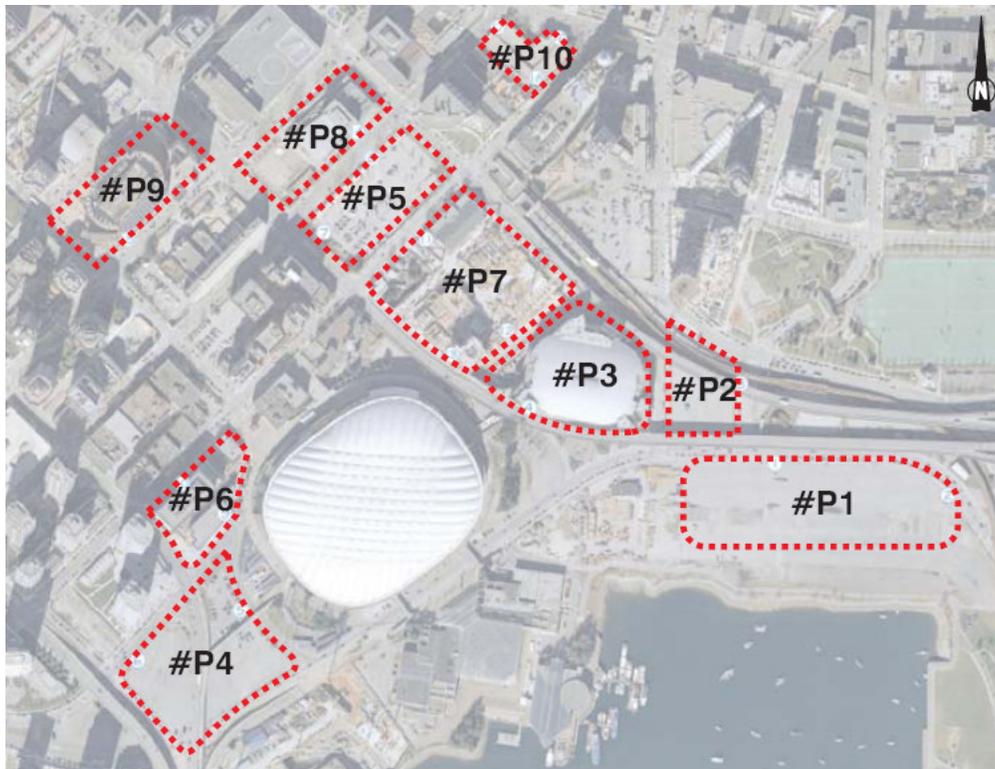


Exhibit 5: Observed Parking Lot Locations for GM Place Transportation Survey

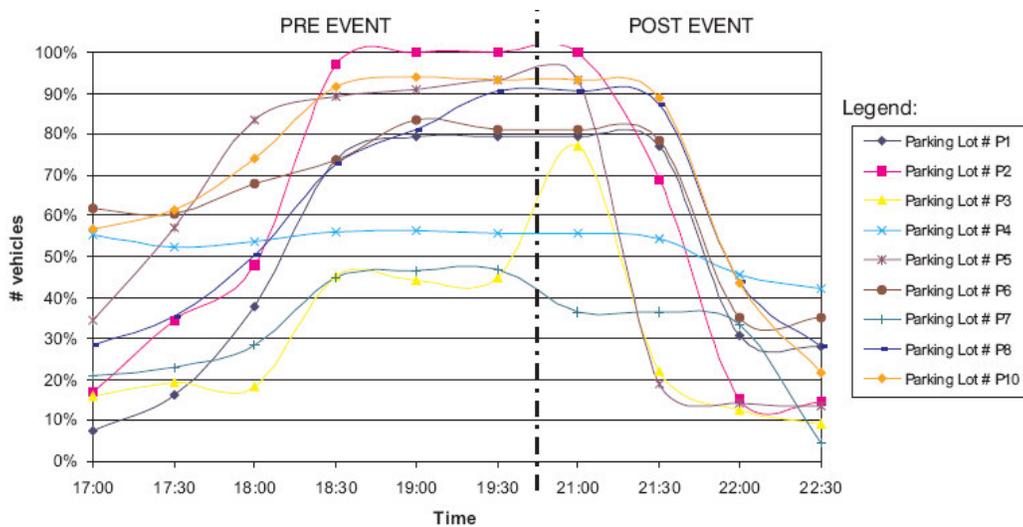


Exhibit 6: Observed Parking Lot Accumulation for GM Place Transportation Survey

For the hockey game, a key finding was that about 60% of patron parking demand was within a two-block radius of GM Place. During the 2010 Winter Games, most of this parking demand will be displaced as these parking facilities will be within the venue security perimeter or used for Olympic operations.

## Trip Origins and Post-Game Destinations

More than 25% of the GM Place event attendees came directly from work and more than 20% came directly from Downtown. After the Game, more than 75% went directly home while over 15% went directly to a restaurant or bar, mostly in the Downtown. For the BC Place concert, only 2% of event attendees came directly from work and over 20% went directly to a restaurant or bar afterwards.

These findings highlight the different trip origins and destinations as they relate to a sporting event on a weekday (Thursday) as compared to a concert on a weekend (Saturday). Based on this, it is likely that GM Place, as the Olympic hockey venue, and BC Place, as the Olympic medal ceremonies venue, will have a variety of transportation profiles and patterns on any given day during the Games.

## Mode Splits for Stadium Events

Exhibit 7 shows a summary of the observed mode splits for the events at both stadiums including a 1996 transportation survey benchmark for GM Place, collected as part of the Entertainment District Transportation Study. Most notable is the doubling of the walking mode split to both stadiums from 5% to at least 10%. This is most likely attributable to the City's increased residential population in the Downtown over the last 10 years.

Modes	GM PLACE	GM PLACE	BC PLACE
	Saturday, December 7, 1996	Thursday, March 15, 2007	Saturday, November 25, 2006
Event	Hockey Game	Hockey Game	Concert
Crowd size	16,605	18,325	47,182
<b>Car</b>	63.1%	55.9%	40.1%
<b>Transit</b>			
Skytrain	22.3%	21.1%	23.8%
City Bus	2.4%	4.2%	8.7%
SeaBus	0.2%	0.9%	1.0%
Combination: SeaBus and/or City Bus and/or Skytrain	0.0%	1.2%	1.8%
<i>Transit total</i>	<i>24.9%</i>	<i>27.4%</i>	<i>35.3%</i>
<b>Charter bus/taxi/limousine</b>	7.4%	5.2%	14.0%
<b>Bike/Walk</b>	4.7%	11.6%	10.7%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Exhibit 7: Summary of Stadium Event Transportation Survey Mode Splits

Another key finding was the regional variance as it relates to transit mode splits. Patrons from Burnaby, New Westminster, and Surrey were more likely to use transit than patrons from Richmond, Delta, and the Tri-Cities. This is likely related to the convenience and high-quality transit service provided by SkyTrain. It is hoped that the Canada Line will encourage more Richmond and Delta event attendees to use transit rather than private vehicles for the 2010 Winter Games.

### Pedestrian Volumes

A significant amount of the transportation survey data collection effort went into determining the total inbound and outbound pedestrian volumes for an inner screenline around the stadiums and an outer screenline generally bounded by Smithe, Beatty, Dunsmuir, and Abbott. An additional inner screenline was also undertaken to determine the total number of transit patrons entering/leaving the Stadium SkyTrain Station for both stadium events.

Exhibits 8 to 11 show the peak 15-minute pedestrian counts before and after the GM Place and BC Place events. Key findings relate to both the overall percentage and volume of event attendees who arrive and depart in the peak 15 minutes and how different the pedestrian volumes can be for two adjacent Downtown stadiums given their respective capacities and connectivity to the City's street network.

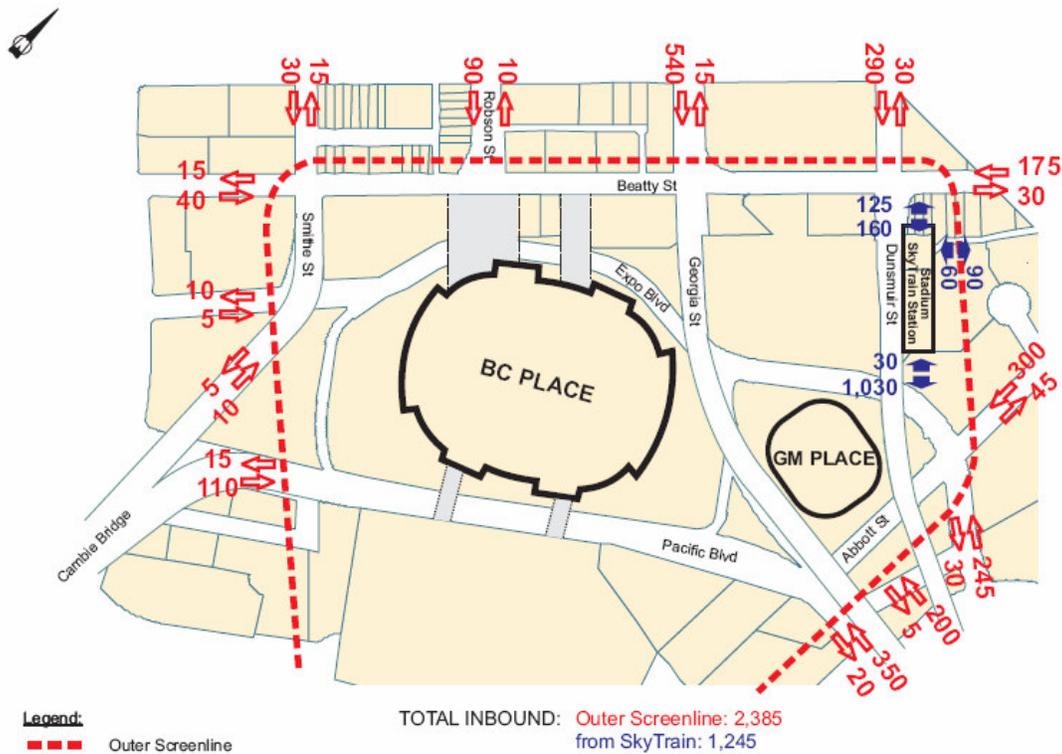


Exhibit 8: GM Place Peak 15-Minute Pedestrian Count – Pre-Event (18:45 to 19:00)

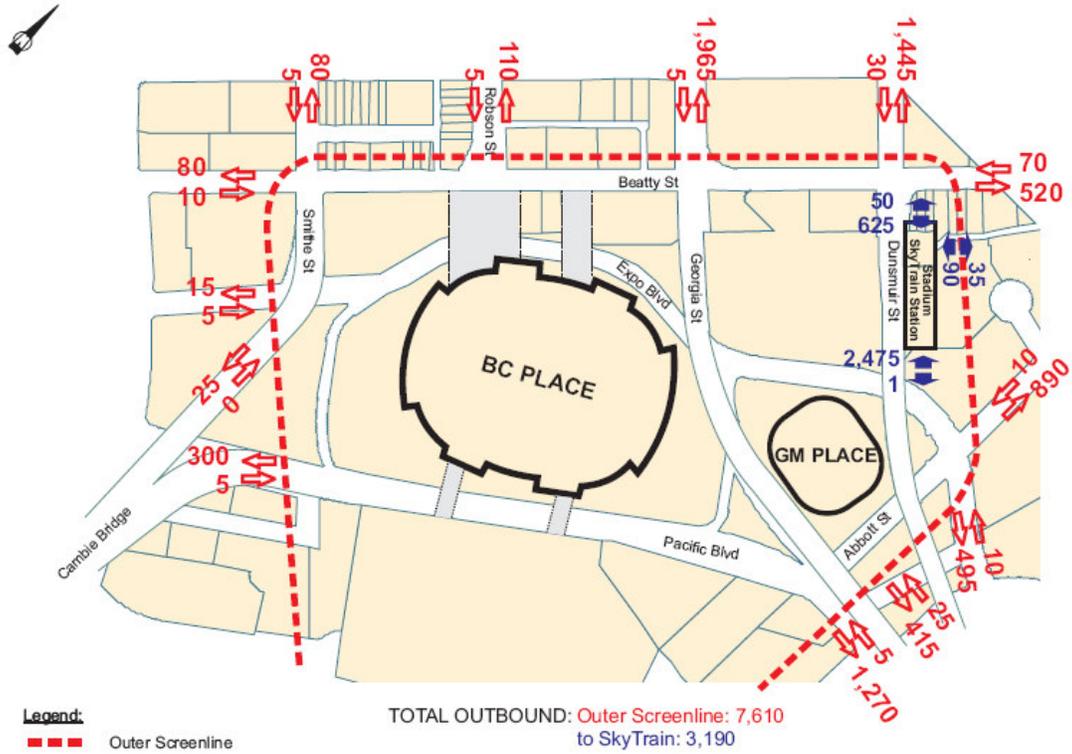


Exhibit 9: GM Place Peak 15-Minute Pedestrian Count – Post-Event (21:30 to 21:45)

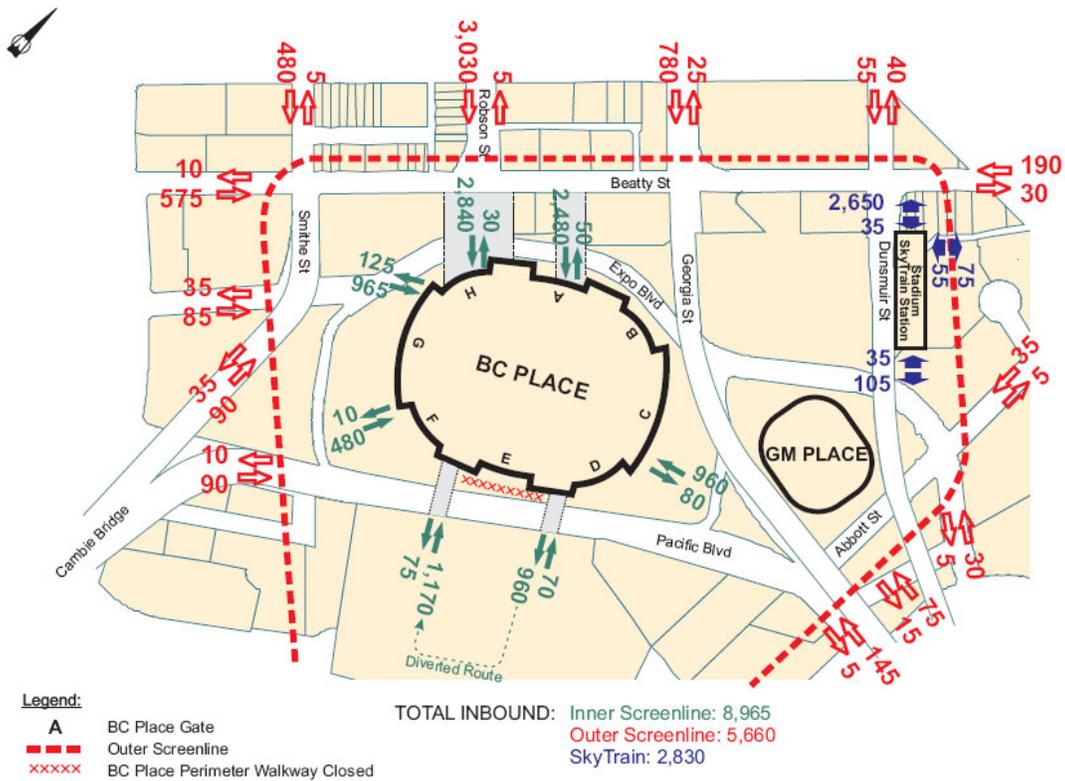


Exhibit 10: BC Place Peak 15-Minute Pedestrian Count – Pre-Event (18:30 to 18:45)

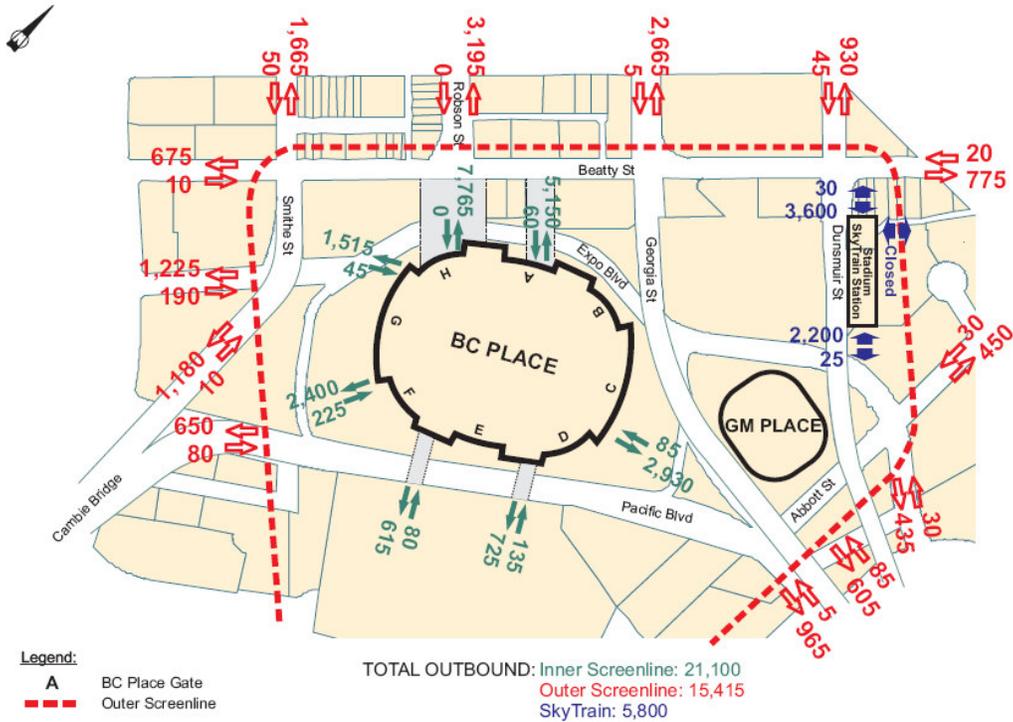


Exhibit 11: BC Place Peak 15-Minute Pedestrian Count – Post-Event (23:15 to 23:30)

Exhibit 12 highlights the spatial distribution of pedestrian movements for both stadium events. The importance of Robson Street as a pedestrian connector to the Downtown is critical for BC Place but almost insignificant for GM Place. GM Place relies much more on Dunsmuir Street and the lower level street network (i.e. Abbott), as well as parking within the outer screenline. Equally important to both stadiums is the Stadium SkyTrain Station and Georgia Street.

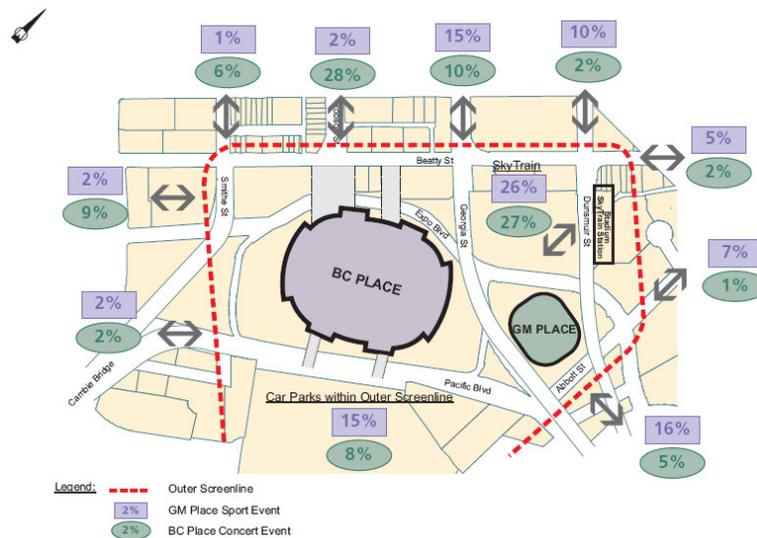


Exhibit 12: Spatial Distribution of Pedestrian Movements for Stadium Events

## Dual Event at BC Place and GM Place

For the 2010 Winter Games, VANOC's latest competition schedule is considering staging up to three hockey games per day at GM Place and an Olympic medal ceremonies at BC Place every evening. A final more focused transportation survey was conducted on a dual-event condition for the stadium district to measure the overlapping pedestrian flows and characteristics. The specific stadium events were as follows:

- BC Lions Western Conference Final football game
  - Start time of 1:30PM, Attendance of 55,000
  - Partial road closure of Robson Street
- Vancouver Canuck's hockey game
  - Start time of 5:00PM, Attendance of 18,000
  - Partial road closure of Beatty Street

Although the time separation between the end of the football game at 4:35PM and the start of the hockey game was only 25 minutes, the overlap of outbound football and inbound hockey crowds was considered manageable in light of the police control during the peak overlap period. However, the primary operational challenge was the ability for the SkyTrain Stadium Station to receive the football crowd surge during this peak period. Exhibit 13 shows the observed pedestrian volumes for the peak 15-minutes (4:50PM to 5:05PM) and the total peak period (3:30PM to 7:00PM).

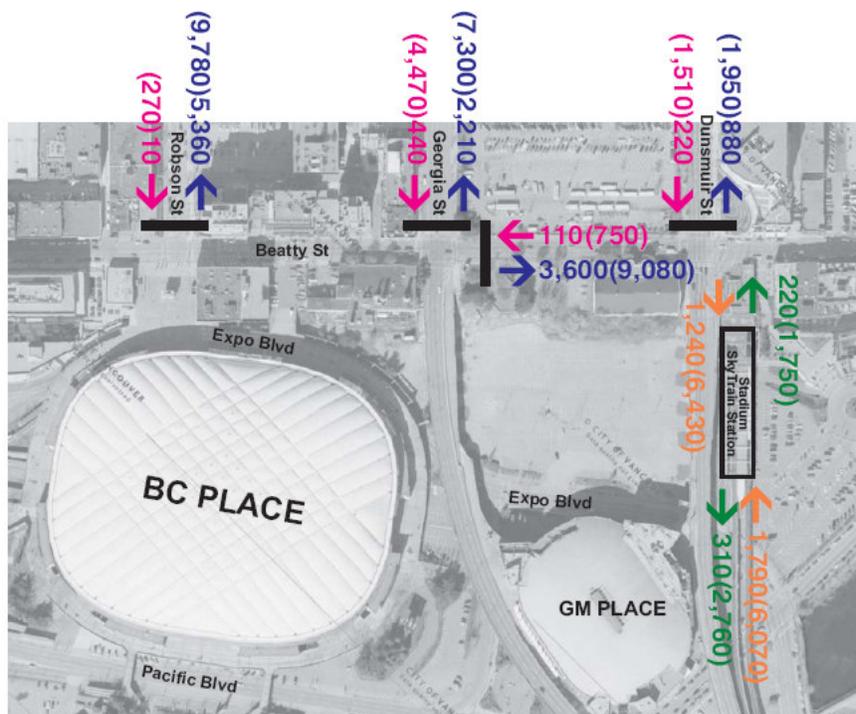


Exhibit 13: Dual-Event Stadium Pedestrian Volumes for Peak 15-Minutes (and Total Peak Period)

The football game attendance of 55,000 was determined to have the highest transit and walking stadium event mode splits of 37% and 17% respectively. This is an encouraging finding as it suggests for the 2010 Winter Games that as the number and size of events planned for the Downtown increases, so does the mode split for more sustainable transportation modes.



Exhibit 14: BC Lion's Western Conference Final – Robson Street Street Closure (Pre-Game)

## Conclusions

As the City assists in creating and delivering an accessible, reliable, and sustainable transportation system for the 2010 Olympic and Paralympic Games, its Olympic Transportation technical team will need to depend greatly on the integration of its transportation planning with VANOC and other transportation partners.

With respect to the City's more defined role of leading and managing routing, traffic management, transportation modelling, and pedestrian flows, the transportation surveys that the City conducted on large public events has been a useful exercise to better understand how to operationally prepare for the demands of the Games. Even as standalone studies, the surveys have been an important monitoring effort that further validate the progress the City has made in supporting more sustainable transportation modes.

## Acknowledgements

The City would like to acknowledge the significant consulting efforts completed by Bunt & Associates, including their sub-consultants CTS and the Mustel Group, to finalize these transportation surveys. In particular, the author would like to thank David Tam, who project managed the studies for Bunt & Associates, Paul Storer and Gord Foy from the City who assisted in managing the City's data collection surveys, and Clark Lim and Kenneth Kuo for leading TransLink's data collection efforts.

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