



City of Kingston

KINGSTON REGIONAL SPORTS AND ENTERTAINMENT CENTRE TRANSPORTATION STUDY

FINAL REPORT

JULY 2006



EXECUTIVE SUMMARY

INTRODUCTION

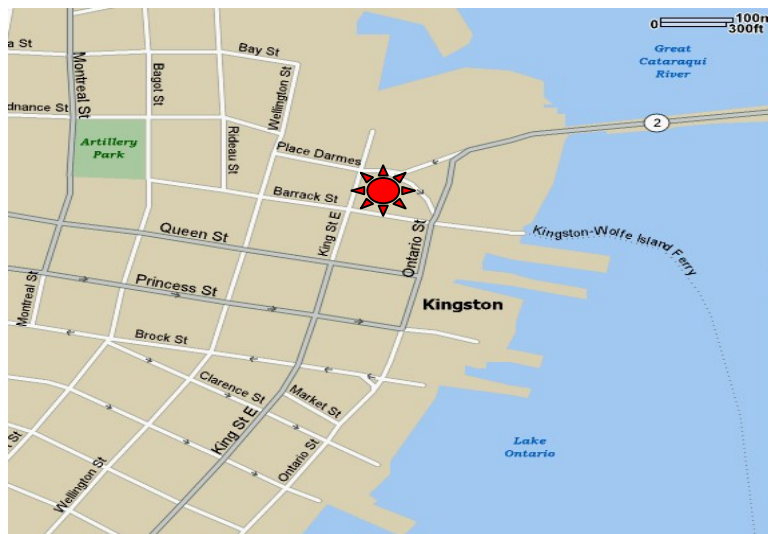
In 2004, the Large Venue Entertainment Centre (LVEC) Task Force report to the City of Kingston indicated that a new entertainment facility was needed to replace the Kingston Memorial Centre. Further, the Task Force concluded that in order for this facility to truly benefit the residents of Kingston into the foreseeable future, it should be located within the downtown area.

The proposed facility is expected to attract a greater calibre of entertainment hosting events such as concerts, trade shows, cultural events, as well as, include an ice pad for the Kingston Frontenacs Ontario Hockey League team. The building is being designed to accommodate an initial seating of 5,000 seats with provisions to expand to a 6,000-seat capacity. In addition, to the ice pad and entertainment facilities, a restaurant, meeting rooms, concession stands and private suites will also be included in the amenities.

In November 2005, the LVEC North Block report was prepared by the City of Kingston and submitted to Council describing the opportunities of locating the site within the North Block Central Business District. The proposed location of the LVEC site described as the North Block is in the lands bounded by Place D’Armes to the north, Wellington Street to the west, Ontario Street to the east and Barrack Street to the south. The site location is illustrated in **Figure 1**.

In January 2006, IBI Group was retained by the City of Kingston to undertake a Transportation Study to review the transportation system operations and parking implications of locating the LVEC (now referred to as the Kingston Regional Sports and Entertainment Centre) project within the North Block.

Figure 1- Kingston Regional Sports and Entertainment Centre Site Location



STUDY APPROACH

The transportation impact study follows an approach that is consistent with standard transportation engineering practice:

- **Existing Conditions** - Assessment of the current transportation system operating conditions within the primary study area, including traffic operations, transit services and operations and pedestrian facilities/utilization. Identification of current deficiencies in the transportation system, if any;
- **Future Transportation Network** – Identification of planned road network improvements within the study area and the potential for any additional major road network modifications that would effect traffic patterns within the subject area such as the extension of Wellington Street to John Counter Boulevard/Elliott Avenue and the roadway improvements associated with the Downtown Action Plan;
- **Future Background Travel Demands** - Develop future background travel forecasts within the study area based on area-wide development potential and specific site development that has the potential to affect travel demands in the study area;
- **Design Event and Attributes** - Determination of an appropriate planning horizon, design event at the facility and design hour of the traffic, transit and pedestrian trips;
- **Parking Demands** - Analyse the parking requirements based on existing large venue entertainment facilities and compare to the available parking supply;
- **Site Development Demands** – Trip generation, distribution and assignment assumptions based on the planned Kingston Regional Sports and Entertainment Centre operations, parking supply availability, anticipated road network operations, and existing patron travel patterns;
- **Future Total Travel Demands** - Future total transportation system operations accounting for background and site-related travel demands on the future transportation network. Identify any capacity or operational concerns related to transportation system, including but not limited to, intersection capacity, corridor capacity, transit service or operational requirements, loading/unloading areas, and pedestrian facility provisions and operations; and
- **Recommended Improvements** - Develop a list of potential operational or physical improvements to address the identified deficiencies.

STUDY FINDINGS

Based on the work undertaken for the Kingston Regional Sports and Entertainment Centre Transportation Impact Study, the following conclusions have been drawn:

Existing Network Operations

- The study area intersections are generally operating at a good level of service during the AM and PM peak weekday travel periods; and

- The primary constraint in the study area is at the Ontario Street/Barrack Street intersection during the PM peak hour, coincident with vehicle demands to the LaSalle Causeway and peaks from the Wolfe Island Ferry exits.

Planned Road Network Improvements

- The road network, including many of the intersections in the general vicinity of the proposed Kingston Regional Sports and Entertainment Centre site, will undergo a number of physical and operational improvements, as part of the City capital works programs in the next few years; and
- The Wellington Street extension, if and when constructed will improve traffic access to the Kingston Regional Sports and Entertainment Centre facility and the associated parking areas.

Site Travel and Parking Demands

- The design event for the Kingston Regional Sports and Entertainment Centre facility is a 5,000 patron evening sporting event or concert. Provided below is a summary of the assumed mode of transportation and the associated vehicle trips and parking requirements.

Figure 2- Trip and Parking Generation Analysis

Mode of Travel	Mode Share	Patrons	Parking Required	Vehicle Trips to/from the Site
Drive and Park Off-Site	75%	3,750	1,500	300 ¹
Pick-Up/Drop-Off Only	5%	250	0	250
Transit Only Passengers	10%	500	0	0
Walk Only	5%	250	0	0
Intercity buses, tour buses, private buses/shuttles, etc.	5%	250	5	10
Total	100%	5,000	1,505	560
Notes:				
1) Assumes that 10% of the “drive and park-off site” patrons will drive directly to the site and then search for readily available parking.				

- The Kingston Regional Sports and Entertainment Centre peak arrival and departure periods for an evening capacity event will occur outside the typical AM and PM road network peak travel periods; and
- The distributed parking system is a positive attribute of the proposal, as it will assist in reducing travel demands in the immediate vicinity of the site and on any one downtown route.



Future Network Operations

- In general, the improved road network can accommodate:
 - The existing traffic volumes during an evening event;
 - Additional traffic associated with general traffic growth in the City and development specific growth; and
 - The traffic demands associated with travel to/from the Kingston Regional Sports and Entertainment Centre site and its associated parking areas.
- Immediately following a capacity event, the transportation system network in the immediate vicinity of the site will be congested for a limited period of time; however, vehicle and pedestrian demands will quickly disperse in time and distance. This is the main advantage of the distributed parking supply and has been experienced at major sporting, entertainment and community facilities in downtown locations.
- Travel demands on the LaSalle Causeway during the pre and post-event peak hours will be less than those currently travelling this facility during a typical weekday PM peak hour;
- Little impact on the Wolfe Islands Ferry operations will occur due to the operation of the Kingston Regional Sports and Entertainment Centre. The event peak periods will not coincide with summer daytime peak ferry demands. In addition, the majority of the main parking opportunities are located away from the Wolfe Island mainland facility;
- Follow-up monitoring can be used to fine tune special event signal timings and review critical areas such as the King Street/Place D'Armes intersection.

Pedestrian Operations

- Sidewalks exist on one or both sides of the roadways within the study area;
- Further improvements to pedestrian facilities in the vicinity of the Kingston Regional Sports and Entertainment Centre including pedestrian access to link sidewalk facilities through any redevelopment initiatives should be considered;
- Primary pedestrian routes between the Kingston Regional Sports and Entertainment Centre site and its associated parking areas are generally facilitated by traffic signal controlled intersections;
- The pedestrian operations at the King Street/Place D'Armes intersection will need to be monitored subsequent to operation of the site to determine if manual traffic control or a high form of pedestrian control is required during capacity events;

- Transit Operations
- Good transit service for the Kingston Regional Sports and Entertainment Centre site is an essential requirement for capacity and other major events;
- Existing transit service in the downtown area would not properly serve an Kingston Regional Sports and Entertainment Centre capacity event in terms of routing and frequency;
- Modified transit service to the Kingston Regional Sports and Entertainment Centre site, special event transit service and/or the location of a transit terminal in close proximity to the Kingston Regional Sports and Entertainment Centre site will improve the transit service to the site and improve usage;
- Any modified transit service should properly account for the pedestrian congestion that will occur immediately subsequent to the event conclusion and the conflict that would occur with transit vehicles.

Parking Supply and Demand

- The Kingston Regional Sports and Entertainment Centre site is being planned with limited on-site parking for buses and will rely on existing off-site public and private parking areas;
- There is sufficient residual capacity in the parking areas in the vicinity of the Kingston Regional Sports and Entertainment Centre site to support a design event (5,000 patrons);
- In general, patrons will be able to find available parking within 400 metres of the Kingston Regional Sports and Entertainment Centre site for the majority of the events at the Kingston Regional Sports and Entertainment Centre site;
- For capacity events, some patrons will be required to park at facilities that are located within a 10 minute walk of the Kingston Regional Sports and Entertainment Centre site;
- A distributed system will reduce traffic congestion and travel demand in the vicinity of the Kingston Regional Sports and Entertainment Centre site and make good use of existing parking facilities.

RECOMMENDATIONS

Based on the work undertaken for the Kingston Regional Sports and Entertainment Centre Transportation Impact Study, it is recommended that the City of Kingston:

- Provide a copy of this report to affected stakeholder groups and internal City departments for their information and/or action;
- Continue to pursue the construction of roadway improvements in the study area;
- Initiate planning for improved transit service to the Kingston Regional Sports and Entertainment Centre site for day-to-day operations and special events;

- Take into account the service benefits to the Kingston Regional Sports and Entertainment Centre when considering the location of an improved transit terminal in the downtown;
- Create a mechanism/policy to incorporate events planning for the Kingston Regional Sports and Entertainment Centre with current City special events planning;
- Develop a monitoring program to review traffic, parking and pedestrian operations once the site is operational, specifically the operations of the King Street/Place D'Armes intersection and the traffic infiltration potential in the Anglin Bay area; and
- Initiate a detail parking management plan to review signing plans for parking lot location identification and trailblazing to alternate parking areas.

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1. INTRODUCTION

1.1 Background

Through the establishment of a Large Venue Entertainment Centre (LVEC) task force it was determined that a new entertainment facility is needed to replace the Kingston Memorial Centre. The task force also determined that in order for this facility to truly benefit the residents of Kingston into the foreseeable future it should be located within the downtown area.

The proposed LVEC is expected to attract a greater calibre of entertainment hosting events such as concerts, trade shows, cultural events, as well as, include an ice pad for the Kingston Frontenacs Ontario Hockey League team. The building is being designed to accommodate an initial seating of 5,000 seats with provisions to expand to a 6,000-seat capacity. In addition, to the ice pad and entertainment facilities, a restaurant, meeting rooms, concession stands and private suites will also be included in the amenities.

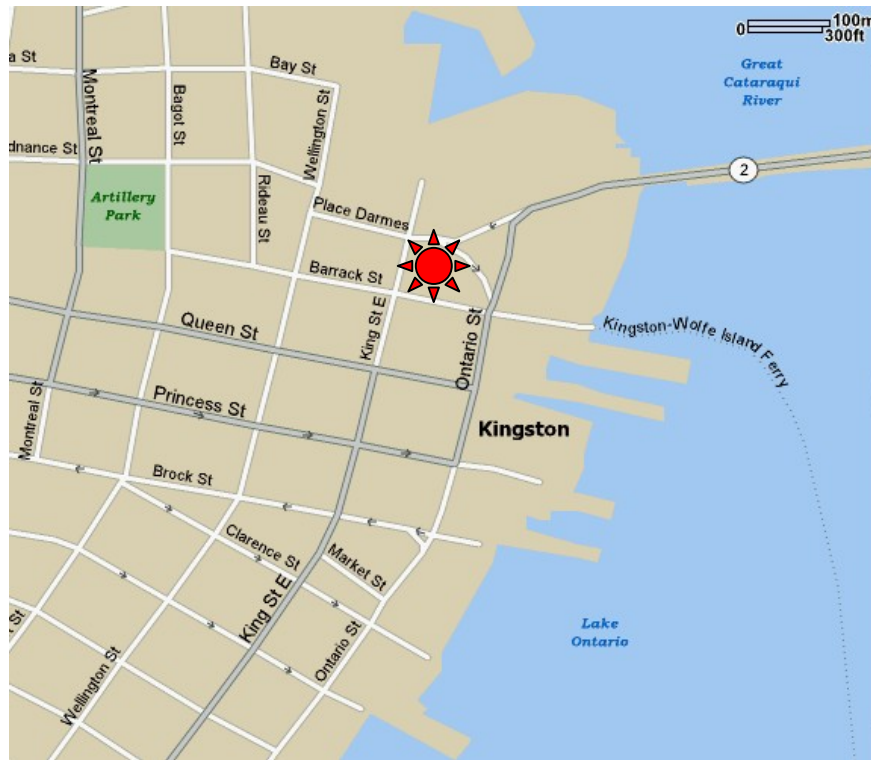
In May 2005, CastleGlenn Engineering completed a report entitled An Evaluation Study for Phase I: Traffic and Parking Viability Assessment for the Proposed Large Venue Entertainment Centre (LVEC) for the Anglin Bay site located in the Inner Harbour (hereafter referred to as the CastleGlenn report).

In September 2005, City Council requested that an alternative location be investigated for the LVEC and in November 2005, the LVEC North Block report was prepared by the City of Kingston and submitted to Council describing the opportunities of locating the site within the North Block Central Business District.

The proposed location of the LVEC site is in the North Block described as the lands bounded by Place D'Armes to the north, Wellington Street to the west, Ontario Street to the east and Barrack Street to the south. The site is illustrated in **Exhibit 1-1**. Brisbin Brook Beynon Architects and SCI Stadium Consultants International Inc. have designed the site plan to include the main entrance on Ontario Street with two lobby entrances fronting Barrack Street and one club entry on Place D'Armes. The transportation study has been based on this site plan dated May 24, 2006.

In January 2006, IBI Group was retained by the City of Kingston to undertake a Transportation Study to review the transportation system operations and parking implications of locating the LVEC (now referred to as the Kingston Regional Sports and Entertainment Centre) project within the North Block. The following represents a summary of the work completed.

Exhibit 1-1 – Kingston Regional Sports and Entertainment Centre Site Location



1.2 Study Area

The primary area of the study was established based on the existing transportation system operations and the trip generation potential of the venue. In determining the study area, it was assumed that the majority of the parking would be accommodated at off-site facilities. The primary study area was identified by the area generally bounded by Anglin Bay to the north, Kingston Harbour to the east, Johnson Street to the south and Bagot Street to the west. The primary study area reflects the transportation system network that will be analyzed in detail; however, major transportation and land use changes outside this area will be taken into consideration, e.g. Wellington Street Extension; as required. **Exhibit 1-2** illustrates the primary study area.

1.3 Planning Horizon

Based on current planning, it is expected that the majority of the construction would commence on the Kingston Regional Sports and Entertainment Centre site in 2006 and be fully operational in a five year horizon. Accordingly, a 2011 planning horizon was assumed for all future analysis scenarios.

Exhibit 1-2 – Primary Study Area



1.4 Study Scope

The overall goal of the Transportation Study is to review the transportation implications of the full build-out potential of the Kingston Regional Sports and Entertainment Centre within the study area. The following represents the scope of the study:

- Assessment of the current transportation system operating conditions within the primary study area, including:
 - Traffic operations;
 - Transit services and operations; and
 - Pedestrian facilities and overall utilization.
- Identification of current deficiencies in the transportation system, if any;
- Identification of planned road network improvements within the study area and the potential for any additional major road network modifications that would effect traffic patterns within the subject area such as the extension of Wellington Street to John Counter Boulevard/Elliott Avenue and the roadway improvements associated with the Downtown Action Plan;
- Develop future background travel forecasts within the study area based on area-wide development potential and specific site development that has the potential to affect travel demands in the study area;
- Determination of an appropriate planning horizon, design event at the facility and design hour of the traffic, transit and pedestrian trips;
- Analyse the parking requirements based on existing large venue facilities and compare to the available parking supply;
- Develop trip generation, distribution and assignment assumptions based on the planned Kingston Regional Sports and Entertainment Centre operations, parking

supply availability, anticipated road network operations, and existing patron travel patterns;

- Assess future total traffic operations accounting for background and site-related travel demands on the future transportation network;
- Identify any capacity or operational concerns related to transportation system, including but not limited to:
 - Intersection capacity;
 - Corridor capacity;
 - Transit service or operational requirements;
 - Loading/unloading areas; and
 - Pedestrian facility provisions and operations.
- Develop a list of potential operational or physical improvements to address the identified deficiencies.

2. DATA COLLECTION

2.1 Traffic and Signal Data

Turning movement count data was obtained from the City of Kingston and from the CastleGlenn Report. Included in **Exhibit 2-1** is a summary of the intersections, their current traffic control, and the dates that the data collection efforts were undertaken.

Exhibit 2-1 – Intersection Control and Count Dates

Intersection		Control Type	Count Date
East-West Road	North-South Road		
Johnson Street	Ontario Street	Signalized	2003
	King Street East	Signalized	2003
	Wellington Street	Unsignalized	July 2002
	Bagot Street	Signalized	July 2002
Clarence Street	Ontario Street	Unsignalized	August 2002
	King Street East	Unsignalized	2003
	Wellington Street	Unsignalized	2003
	Bagot Street	Signalized	July 2002
Market Street	Ontario Street	Unsignalized	2003
	King Street East	Unsignalized	June 2003
Brock Street	Ontario Street	Unsignalized	2003
	King Street East	Signalized	June 2004
	Wellington Street	Signalized	June 2002
	Bagot Street	Signalized	June 2002

Intersection		Control Type	Count Date
East-West Road	North-South Road		
Princess Street	Ontario Street	Signalized	May 2002
	King Street East	Signalized	2004
	Wellington Street	Signalized	July 2002
	Bagot Street	Signalized	May 2005
Queen Street	Ontario Street	Signalized	2004
	King Street East	Signalized	2004
	Wellington Street	Signalized	2004
	Bagot Street	Signalized	June 2002
Barrack Street	Ontario Street	Signalized	2003
	King Street East	Signalized	2004
	Wellington Street	Unsignalized	2004
	Rideau Street	Unsignalized	July 2004
	Bagot Street	Unsignalized	July 2004
Place D'Armes	King Street East	Unsignalized	2004
	Wellington Street	Unsignalized	2003
Ordnance Street	Wellington Street	Unsignalized	July 2003
	Rideau Street	Unsignalized	July 2004
	Bagot Street	Unsignalized	July 2005

Automated Traffic Recorded (ATR) count data was provided for Barrack Street adjacent to the Police Station, the east end of Lasalle Causeway and Rideau Street by Rideaucrest Home. Existing signal timing data was provided by the City of Kingston.

2.2 Pedestrian Volumes

Pedestrian counts were available through the turning movement counts and the following reports:

- Pedestrian Traffic: Downtown Kingston!, August 2005; and
- Pedestrian Traffic: Downtown Kingston!, 2002 – 2005.

2.3 Field Studies

Visual observations of the study area intersection and road sections were undertaken in January 2006 on a weekday and Saturday to:

- Determine intersection lane configurations and control;
- Confirm lane utilization;
- Observe intersection operations; and
- Assess pedestrian facilities and their general utilization.

2.4 Parking Facilities

The City of Kingston provided a parking supply summary of municipal and private lots and their corresponding number of spaces. The parking lots were categorized according to whether they were 0 to 300 metres, 300 to 600 metres or 600 to 900 metres to the Kingston Regional Sports and Entertainment Centre North Block.

Other relevant sources obtained from the City regarding parking facilities included:

- The Parking Utilization Study 2005 – City of Kingston dated May 2006 completed by IBI Group;
- The Parking Utilization Study Final Report – City of Kingston dated June 2003 completed by BA Group; and
- Parking occupancy studies completed as part of the Phase 1: Traffic and Parking Viability Assessment for the LVEC, CastleGlenn Consultants, May 2005.

3. EXISTING CONDITIONS

3.1 Road Network

The existing road network generally consists of a grid network with the north-south roadways parallel to the shoreline of the Kingston Harbour. The LaSalle Causeway provides a connecting link across the Kingston Harbour and Inner Harbour for residents of Kingston East (formerly Pittsburgh Township) including major traffic generators such as Barriefield, the Royal Military College (RMC) and the Canadian Arm Forces Base (CFB Kingston).

Included in **Exhibit 3-1** is a summary of the study area roadways and their current function and major attributes.

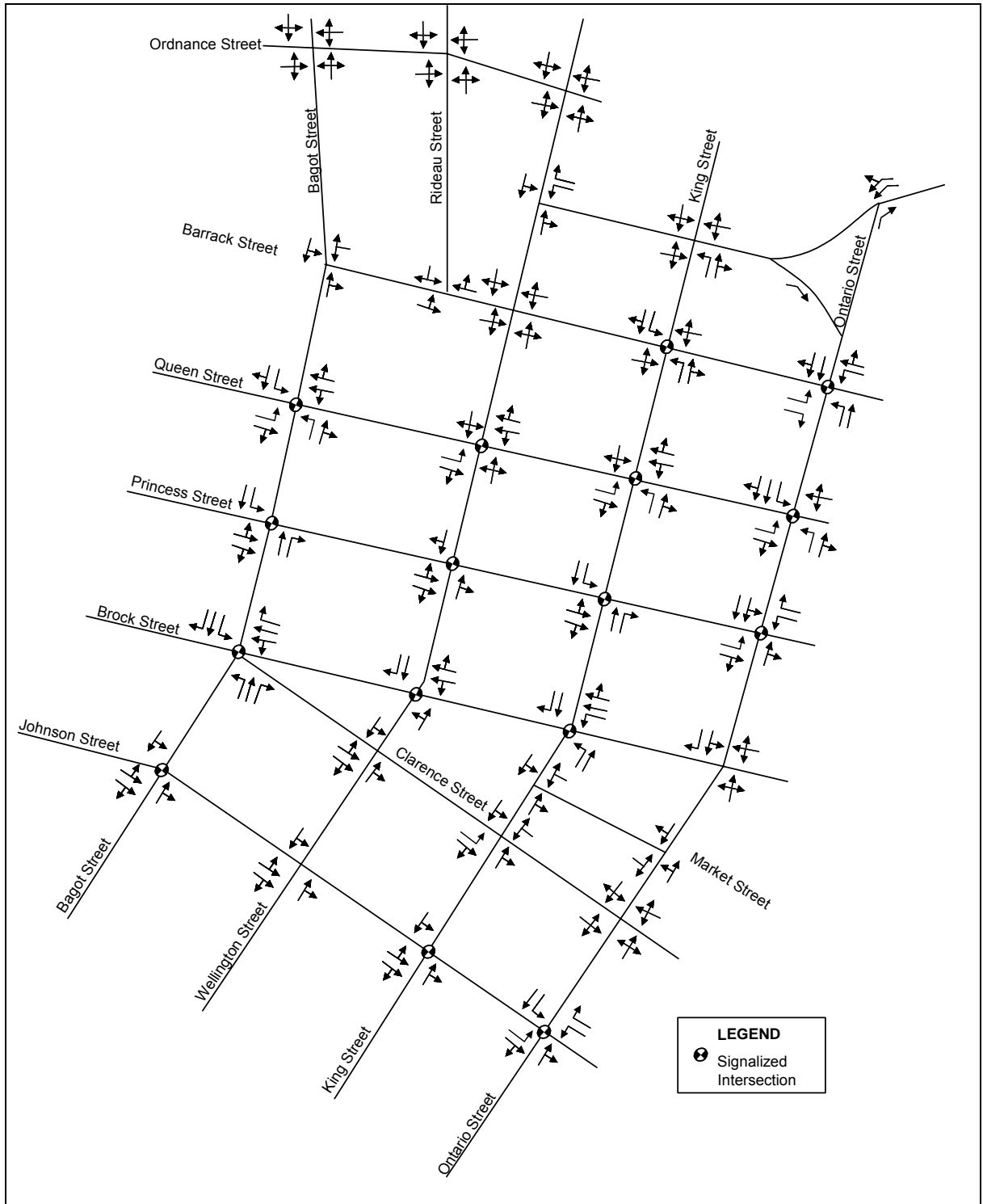
Exhibit 3-1 – Road Network Function and Characteristics

Roadway	Function ¹	Cross-Section	Other Characteristics
La Salle Causeway	Arterial	Two Lane	Pedestrian path on south side of causeway
Place D'Armes	Arterial	Two Lane	No eastbound access to La Salle Causeway
Barrack Street	Local	Two Lane	On-street parking on north side adjacent to Food Basics (between King and Wellington)
Queen Street	Arterial	Three Lane (two westbound lanes)	On-street parking on south side, from King Street west to Division Street
Princess Street	Collector	Two Lane (one-way eastbound)	On-street parking lay-bys on both sides of the street
Brock Street	Arterial	Two Lane (one-way westbound)	On-street parking on both sides of the street

Roadway	Function ¹	Cross-Section	Other Characteristics
Clarence Street	Local	Two Lane (one-way eastbound between King and Bagot)	On-street angled parking on both sides
Johnson Street	Arterial	Two Lane (one-way eastbound)	On-street parking on north side, from King Street to Division Street and on south side east of King Street.
Ontario Street	Arterial	Two Lane	On-street parking lay-bys on east side, south of Queen Street
King Street	Local	Two Lane	On-street parking lay-bys on both sides
Wellington Street	Arterial	Two Lane	EA currently underway to extend Wellington Road to Montreal Street in the vicinity of Rideau Street/Railway Street. On-street parking on both sides.
Bagot Street	Local	Two Lane	On-street parking on both sides
Montreal Street	Collector	Two Lane	On-street parking on both sides
Notes: (1) Based on Schedule "E" of the City of Kingston, Official Plan, June 1989			

The existing lane configurations and intersection control within the study area are illustrated in **Exhibit 3-2**.

Exhibit 3-2 - Existing Lane Configuration and Intersection Control



3.2 Peak Travel Periods

To determine the critical analysis periods for the existing road network, automatic traffic recorder (ATR) counts were reviewed to determine the peak hours of travel. **Exhibit 3-3** and **Exhibit 3-4** illustrate the traffic profiles for Barrack Street between Ontario Street and King Street and for the LaSalle Causeway in the vicinity of RMC.

Exhibit 3-3 - Traffic Volume Profile by Direction for Barrack Street

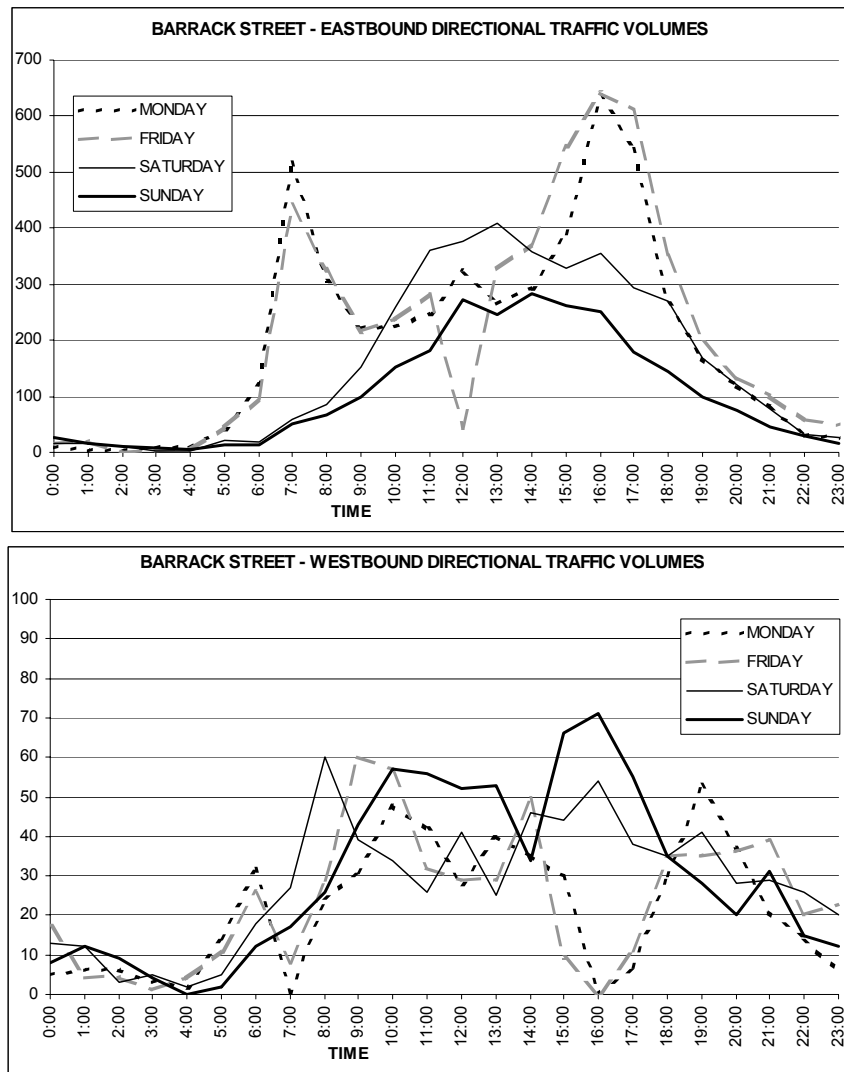
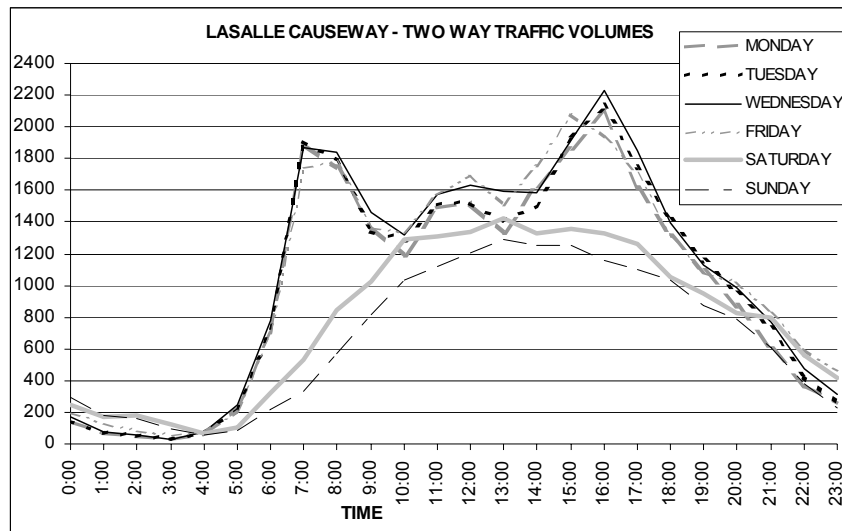


Exhibit 3-4 - Traffic Volume Profile for the LaSalle Causeway



Based on a review of the above, the following are concluded:

- Weekday AM and PM peak hour volumes exceed the peak hours experienced on Saturday and Sunday mid-day;
- Eastbound Barrack Street volumes demonstrate typical weekday AM and PM peak hour volumes in the range of 500 to 625 vehicles per hour during the 7:00 – 8:00 a.m. and 4:00 to 5:00 p.m. periods, respectively;
- The westbound volumes on Barrack Street coincide with the arrival of the Wolfe Island Ferry and are therefore; less indicative of general traffic patterns on the road network;
- Eastbound Barrack Street volumes are about 400 vehicles per hour during the 6:00 to 7:00 p.m. period, or approximately 60% of the PM peak hour;
- Similar peak hours start times of 7:00 a.m. and 4:00 p.m. are evident from examining the two-way traffic volumes on the LaSalle Causeway;
- The weekday AM and PM peak hour traffic volumes on the LaSalle Causeway are approximately 1,800 and 2,100 vehicles, respectively;
- The Saturday and Sunday counts are significantly lower at a peak hour volume of approximately 1,400 vehicles in both directions between the hours of 1:00 to 2:00 p.m.; and
- Traffic volumes on the LaSalle Causeway are about 1,400 vehicles per hour during the 6:00 to 7:00 p.m. period, or approximately 65% of the PM peak hour.

These traffic trends are integral in the determination of the study design hours and the future background traffic volumes during Kingston Regional Sports and Entertainment Centre events, outlined in **Sections 5.3 and 5.7**, respectively.

3.3 Intersection Operations

Based on visual observations of the existing road network, it was determined that the intersections represent the key constraints within the study area. Included in **Exhibit 3-5** and **Exhibit 3-6** are the existing AM and PM peak hour traffic volumes.

The existing AM and PM peak hour intersection operations were analyzed using the Highway Capacity Manual Methodology (HCM) and specifically the Synchro 6.0 analysis package. The model was calibrated based on field observations of current intersection operations. Provided in **Exhibit 3-7** is a summary of the intersection analysis during the peak hours. **Appendix A** includes detailed full analysis summaries.

Based on the analysis of the signalized intersections, the conclusions are as follows:

- In general, the traffic signal timing plans for the signalized intersections in the study area are fixed during all times of the day and week, i.e., peak hour and weekend plans are not present;
- The signalized intersections within the study area are operating below capacity during the AM peak hour;
- During the PM peak hour, the eastbound left at the Barrack Street/Ontario Street intersection is approaching capacity. The east-west directions operate with split phasing to accommodate the traffic exiting the Wolfe Island Ferry;
- The northbound through movement at the Barrack Street/Ontario Street intersection is approaching capacity. The maximum green time assigned to this phase is not sufficient to clear every cycle of the northbound traffic during the PM peak hour.

It should be noted that the City has recently installed video vehicle detection at the Barrack Street/Ontario Street intersection to detect when vehicles are exiting the ferry in order to operate two condition-specific traffic signal timing plans at the intersection: one co-ordinated plan for non-ferry times and one un-coordinated plan to accommodate ferry traffic.

The unsignalized intersections within the study area were modelled using the HCM methodology. All of the unsignalized intersections are operating below capacity during both peak periods.

Exhibit 3-5 – Existing AM Peak Hour Volumes

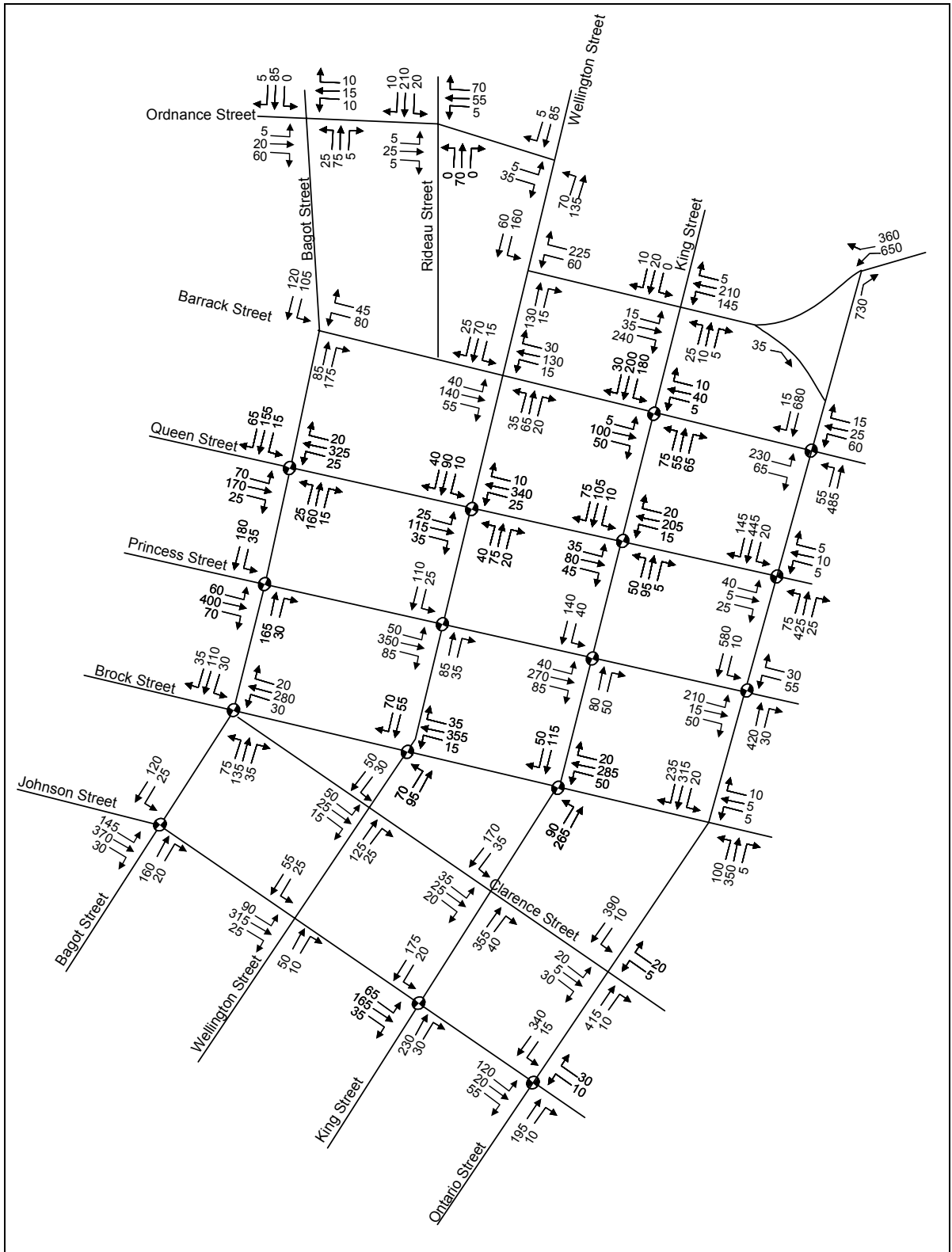


Exhibit 3-6 – Existing PM Peak Hour Volumes

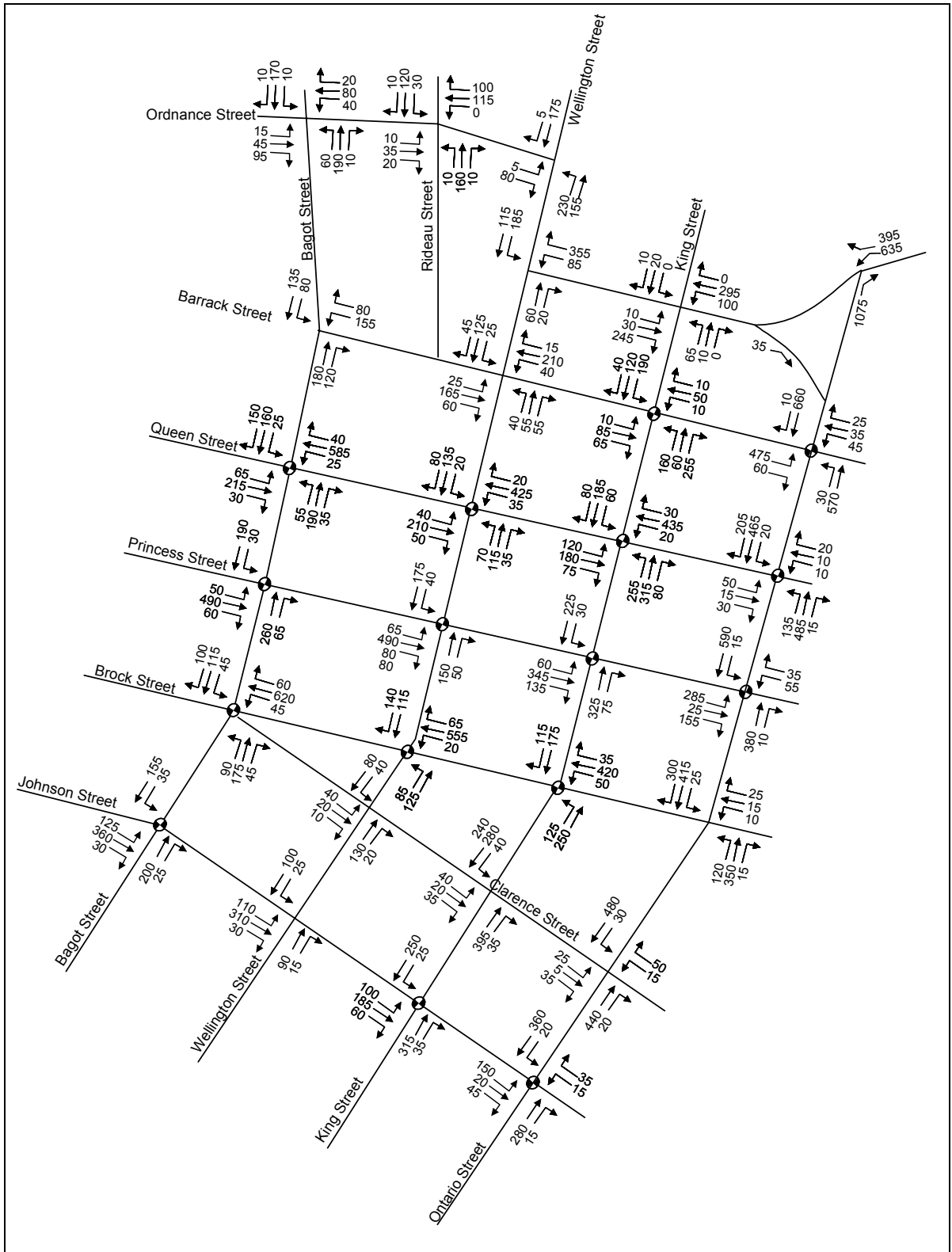


Exhibit 3-7 – Signalized Intersection Operations

Intersection	Peak Hour	Overall LOS		Critical		Comments
		LOS	V/C	LOS	V/C	
Johnson Street/Ontario Street	AM	B	0.42	-	-	
	PM	B	0.45	-	-	
Johnson Street/King Street	AM	B	0.45	-	-	
	PM	B	0.62	-	-	
Johnson Street/ Bagot Street	AM	B	0.36	-	-	
	PM	B	0.44	-	-	
Brock Street/King Street East	AM	B	0.32	-	-	
	PM	B	0.41	-	-	
Brock Street/Wellington Street	AM	A	0.34	-	-	
	PM	B	0.45	-	-	
Brock Street/Bagot Street	AM	A	0.23	-	-	
	PM	A	0.42	-	-	
Princess Street/Ontario Street	AM	F	0.57	-	-	SB approach operates with occasional delays
	PM	F	0.74	-	-	
Princess Street/King Street	AM	A	0.30	-	-	
	PM	B	0.43	-	-	
Princess Street/Wellington St.	AM	A	0.32	-	-	
	PM	B	0.45	-	-	
Princess Street/Bagot Street	AM	B	0.37	-	-	
	PM	B	0.41	-	-	
Queen Street/Ontario Street	AM	C	0.46	-	-	
	PM	C	0.51	-	-	
Queen Street/King Street East	AM	B	0.33	-	-	
	PM	E	0.75	-	-	
Queen Street/Wellington Street	AM	B	0.28	-	-	
	PM	B	0.58	-	-	
Queen Street/Bagot Street	AM	B	0.46	-	-	
	PM	B	0.64	-	-	
Barrack Street/Ontario Street	AM	B	0.63	-	-	
	PM	D	0.82	F	0.82	EB left and NB through are approaching capacity.
Barrack Street/King Street East	AM	B	0.39	-	-	
	PM	B	0.63	-	-	

3.4 Pedestrian and Bicycle Facilities

Sidewalk facilities are provided on one or both sides of the study area roadways. One exception to this is the lack of a sidewalk on the south side of Barrack Street between Ontario Street and King Street.

Specific bicycle counts/studies within the primary study area were not undertaken. It should be noted that bicycle routes/lanes are planned for many of the roadways directly adjacent to the Kingston Regional Sports and Entertainment Centre site through the Kingston Transportation Master Plan (KTMP). Bicycle travel to/from a major sporting/entertainment facility such as the Kingston Regional Sports and Entertainment Centre site is generally limited and therefore was not

considered a critical factor in the impact assessment. Although not a critical factor, provisions for some type of bicycle facility will be provided at a location in proximity to the Kingston Regional Sports and Entertainment Centre site.

3.5 Ferry Operations

The ferry service to and from Wolfe Island is operated from the dock at the base of Barrack Street. Vehicles enter the ferry terminal at a wide unsignalized entrance approximately 30 metres south of the signalized Ontario Street/Barrack Street intersection. The entrance to the ferry terminal operates well, although the southbound left turn entry from Ontario Street does become blocked periodically by northbound queued vehicles on Ontario Street during peak travel periods. The westbound approach to the Ontario Street/Barrack Street intersection provides a one-way two-lane exit from the ferry dock, allowing traffic to turn onto Ontario Street or proceed straight through on Barrack Street. The westbound approach and pedestrian movements are actuated and will only be called when there is demand. Video detection has recently been implemented at this intersection to facilitate the egress movement from the ferry by pre-empting traffic control signal to permit additional green time to the westbound approach. When vehicles are not detected at this approach the traffic control signal does not designate any green time to this movement but rather runs in coordination with the adjacent traffic signals.

The ferry leaves Kingston every hour starting at 6:15 a.m. to 12:40 a.m. The last ferry leaves at 2:00 a.m. These arrival and departure times change seasonally. The capacity of the ferry is 55 vehicles and 330 passengers with peak travel times during the summer months.

3.6 Transit

The majority of the Kingston Transit routes service the downtown area; however, only Route 12: Kingscourt/Highway 15 and Route 18: Student Circuit directly service the roadways adjacent to the proposed Kingston Regional Sports and Entertainment Centre site. Provide below is a general summary of each routes coverage.

Route 1: Princess/Bath – Operates from the Collins Bay Road area, along Princess Street and Bath Road, through the Brock Street downtown terminal and along Montreal Street north of Highway 401.

Route 2: Division/Union - Operates through a number of residential/retails areas between Sir John A. MacDonald Boulevard and Portsmouth Avenue, along Union Street, through the downtown via Princess/Brock and then along Divisions Street.

Route 3: King Street – With major stops at the Kingston Centre, St. Lawrence College and St. Mary's on the Lake Hospital, the route operates along King Street, Ontario Street, Brock Street and Bagot Street.

Route 4: Princess/Midland – Connects the Cataraqui Town Centre and Kingston Centre to the downtown area. Within the study area, the route operates on Princess Street, King Street and Brock Street.

Route 6: Gardiners Road/St. Lawrence College – Operates through a number of residential/retail areas north of Taylor-Kidd Boulevard between Princess and Bayridge Drive and connects to the Brock Street downtown terminal.

Route 12: Kingscourt/Highway 15 – Connects many of the residential areas east of Highway 15 to the industrial area south of Highway 401 between Sir John A MacDonald Boulevard and Division

Street. The route traverses the LaSalle Causeway and travels along Ontario Street, Place D’Armes, King Street, Johnson Street, Brock Street in the downtown.

Exhibit 3-8 - Route 12 Routing Through Downtown Network



Transit Route 18: Student Circuit – Connects Queen’s University to a downtown loop consisting of Barrack Street, Ontario Street, Wellington Street and Brock Street. Operates on Wellington Street to Barrack Street to Ontario Street to Brock Street through the study area heading to the John Deutsch University Centre on University Avenue between the hours of 6:00 PM and 9:00 PM every 30 minutes. On Saturday and Sunday and during the academic year this route operates from 1:00 PM to 5:00 PM every 30 minutes.

Exhibit 3-9 - Route 18 Routing Through Downtown Network



4. FUTURE BACKGROUND TRANSPORTATION OPERATIONS

A future background (2011) development horizon was assessed to review the future transportation operations regardless of the Kingston Regional Sports and Entertainment Centre development. Based on the analysis of the existing conditions and the anticipated peak travel of the Kingston Regional Sports and Entertainment Centre site, the PM peak hour was analyzed as the critical period.

4.1 Road Network Assumptions

The planned road network improvements that have been identified within the study area or that would effect traffic patterns within the subject area are as follows:

Two-Way Clarence Street between Ontario Street and King Street

Clarence Street has recently been converted to operate as a two-way roadway within this section; however, current traffic counts that were obtained from the City were not recent enough to reflect these changes and therefore adjustments were made in the future background analysis to account for this operational modification.

Traffic Signal Control at Queen Street/Ontario Street Intersection

Traffic signal control has recently been installed at the Queen Street/Ontario Street intersection and revisions to the signal timings along Ontario Street have been undertaken. All intersection analysis included in this study reflects this traffic control change.

Traffic Control at Wellington Street/Place D'Armes and All-Way Stop Controls at Wellington Street/Barrack Street Intersection

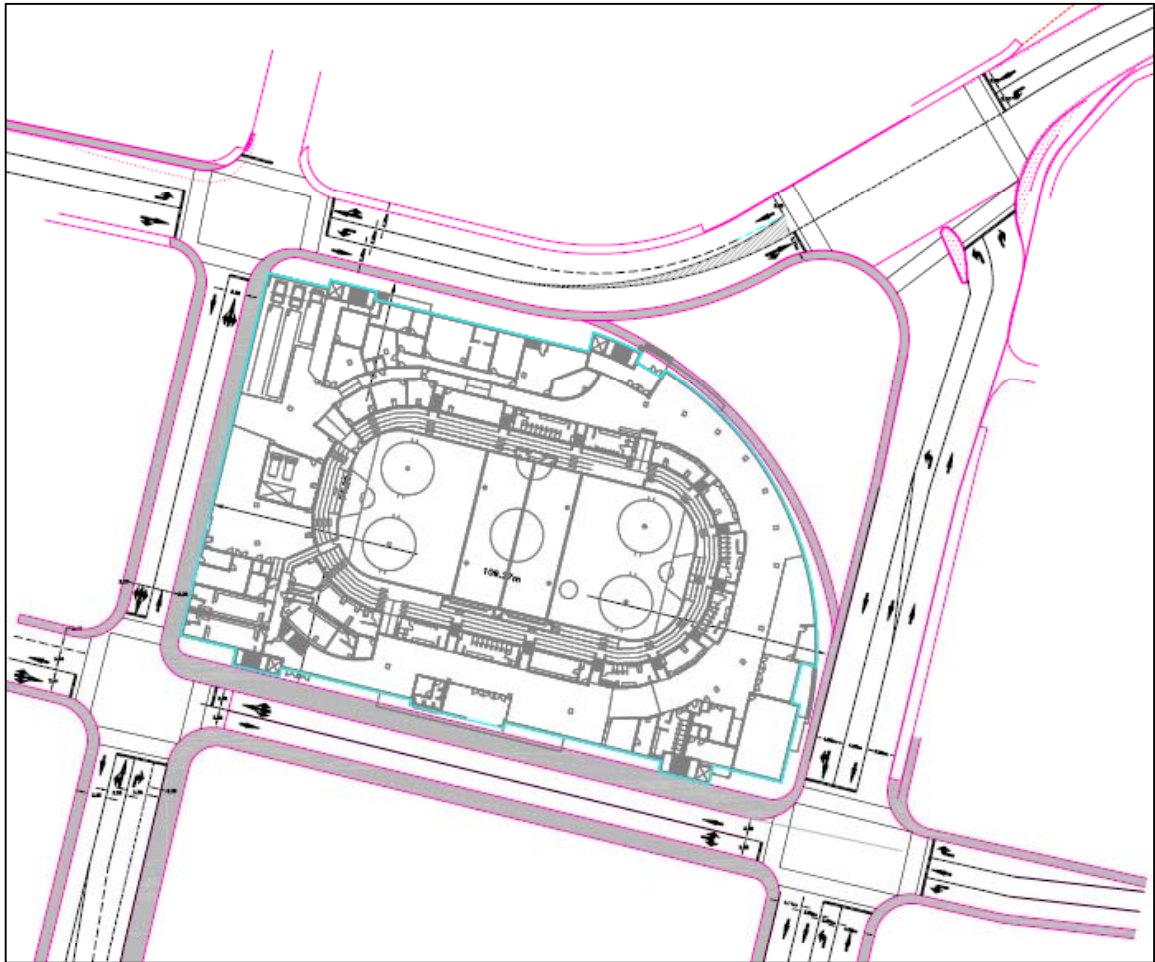
As part of the 2005-2007 capital projects in the downtown, traffic signal control is being proposed at the Wellington Street/Place D'Armes and an all-way stop control has recently been implemented at Wellington Street/Barrack Street intersection. These traffic control changes have been incorporated into the future analysis. Although traffic signal control is not currently warranted at Wellington Street/Barrack Street, the intersection will be evaluated for full signalization post-construction.

Reconstruction of the Place D'Armes/Ontario Street Intersection

The Place D'Armes/Ontario Street intersection is being reconfigured to accommodate the proposed Kingston Regional Sports and Entertainment Centre site. Modifications to the existing intersection include:

- Removal of the eastbound south channelized right turn lane;
- Permitting full turning movements at the intersection; and
- Implementing traffic signal controls and pedestrian crossings.

The proposed reconstruction of the intersection is illustrated in **Exhibit 4-1**.

Exhibit 4-1 – Proposed Reconstruction of the Place D’Armes/Ontario Street Intersection**Wellington Street Extension to John Counter Boulevard/Elliott Avenue**

The July 2004 Kingston Transportation Master Plan (KTMP) confirmed the need for a new northern roadway connection. Accordingly, Wellington Street is planned to extend as a two-lane roadway from Railway Street to Elliott Avenue/John Counter Boulevard (Refer to **Exhibit 4-2**). The Municipal Class Environmental Assessment process for this project is currently underway. The extension to Montreal Street is currently planned for the 2008 or 2009 horizon; whereas, the section from Montreal Street to John Counter Boulevard is currently listed as a 2010 or 2011 project. It is anticipated that the Kingston Regional Sports and Entertainment Centre will be in operation before the extension is completed.

Future analysis has not included the extension of Wellington Street to Montreal Street in order to reflect a worse case scenario as the extension is expected to improve traffic operations within the study area.

Exhibit 4-2 - Proposed Wellington Street Extension (KTMP)



Third Crossing of the Cataraqui River – Gore-Elliot

The July 2004 KTMP identified the need for a third crossing of the Cataraqui River to accommodate future east-west demands. This improvement is currently planned beyond the ten year horizon however could be scheduled sooner given recent discussions within the City. However, confirmation of the timeline of this project is not known at this time and therefore has not been accounted for in the subject study.

4.2 Development/Redevelopment Potential

Block “D” Redevelopment

The Block “D” redevelopment area is located east of Ontario Street opposite Earl Street. The development is generally planned in two phases and consists of residential, office and hotel uses. Provided in **Exhibit 4-3** is below is a summary of the proposed developments

Exhibit 4-3 - Potential Block "D" Development

Phase	Use	Density
1	Apartment	142 units
	Condominium	93 units
2	Hotel	144 rooms
	Meeting Rooms	5,850 ft ²
	Restaurant	1,600 ft ²
3	Apartment	120 units
	Office	11,894 ft ²

The analysis of the future background conditions assumes that Phases 1, 2 and 3 of the Block D development will be fully built out. This assumption is by no means an assertion of the timing or approvals of the Block D development but a means of providing a conservative approach to accounting for background growth in the study area.

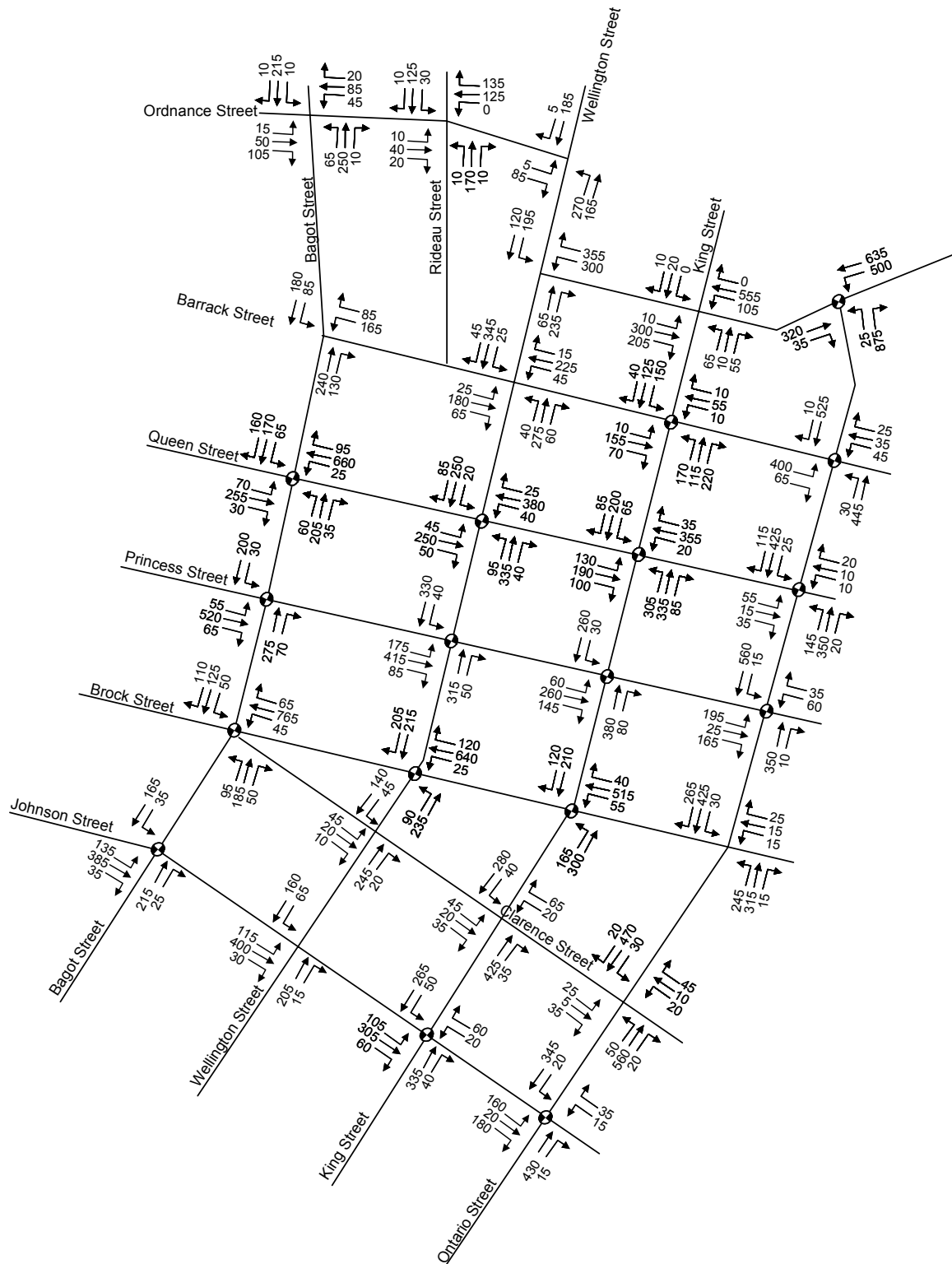
4.3 Future Background Traffic

The future background traffic forecasts include the following:

- Traffic reassigned from the resulting road network improvements included in **Section 4.1**;
- Traffic generated from the development and redevelopment of the sites listed in **Section 4.2**; and
- Traffic projected to a five year planning horizon by a 1.3% per annum growth rate applied to all traffic movements within the Study Area. The per annum growth was established through discussion with City Planning Department.

By applying a general background growth factor to all turning movements within the study area and accounting for specific growth from the Block D development, double counting of development potential will occur, but will net a conservative future background condition, from which the Kingston Regional Sports and Entertainment Centre transportation impacts will be measured.

Exhibit 4-4 – Future Background Traffic Volumes (PM Peak Hour of Roadway)



4.4 Future Background Operations

Future background PM peak hour intersection operations were analyzed using the HCM methodology. Provided in **Exhibit 4-5** is a summary of the signalized intersection analysis during the peak hours. **Appendix A** includes detailed full analysis summaries. It should be noted that the future background analysis summarized below includes the proposed road improvements discussed in Section 4.1.

Exhibit 4-5 – Future Background PM Signalized Intersection Operations

Intersection	Overall LOS		Critical		Comments
	LOS	V/C	LOS	V/C	
Johnson Street/Ontario Street	A	0.57	-	-	
Johnson Street/King Street East	C	0.52	-	-	
Johnson Street/ Bagot Street	B	0.47	-	-	
Brock Street/King Street East	B	0.50	-	-	
Brock Street/Wellington Street	B	0.67	-	-	
Brock Street/Bagot Street	A	0.51	-	-	
Princess Street/Ontario Street	B	0.49	-	-	
Princess Street/King Street East	B	0.51	-	-	
Princess Street/Wellington Street	B	0.70	-	-	
Princess Street/Bagot Street	B	0.46	-	-	
Queen Street/Ontario Street	D	0.43	-	-	
Queen Street/King Street East	C	0.83	-	-	
Queen Street/Wellington Street	B	0.52	-	-	
Queen Street/Bagot Street	C	0.68	-	-	
Barrack Street/Ontario Street	D	0.83	-	-	
Barrack Street/King Street East	B	0.77	-	-	
Place D'Armes/Ontario Street	D	0.95	-	-	NB right will approach capacity
Place D'Armes/Wellington Street	A	0.46	-	-	

Based on the analysis of the signalized intersections, the conclusions are as follows:

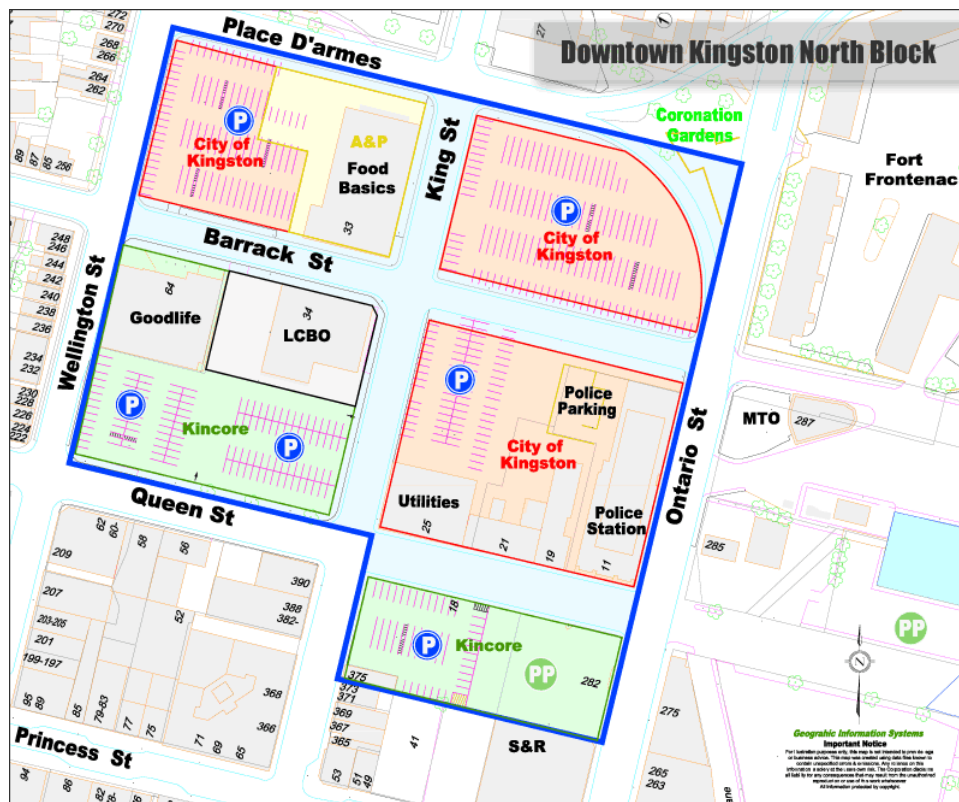
- A majority of the signalized intersections are expected to operate below capacity during the future background PM peak hour conditions;
- The northbound right volumes on Ontario Street at Place D'Armes are expected to operate with delays; however, below their theoretical capacity;
- The north and south approaches on Barrack Street at Wellington Street are expected to approach capacity under all-way stop control; and
- The northbound through and eastbound left at Barrack Street/Ontario Street will approach capacity based on the existing signal timings, which minimize the green time in the east-west direction. Video detection recently implemented will improve operations by only minimizing the eastbound and north-south approaches when a vehicle is detected exiting the ferry in the east approach.

5. KINGSTON REGIONAL SPORTS AND ENTERTAINMENT CENTRE SITE DEVELOPMENT

5.1 Location and Use

The Kingston Regional Sports and Entertainment Centre is proposed in the North Block. The building envelope will encompass the lands bounded by Place D’Armes in the north, Ontario Street to the east, Barrack Street to the south and King Street to the west. The facility is expected to have a seating capacity of 6,000.

Exhibit 5-1 - Kingston Regional Sports and Entertainment Centre Site and Surrounding Area



As planned, the proposed development has the potential to host the following events:

- Ontario Hockey League Games;
- Other ice sports;
- Ice shows;
- Children’s/musical concerts;
- Performing arts;
- Agricultural, sporting, trade and other shows;
- Meetings and conventions/conferences;
- Convocation/graduation ceremonies;
- Sporting events; and
- Hockey and Sports Hall of Fame.

When events are not being held, the facilities offices and meeting rooms would be used to support the administrative functions of the facility. The facility may also have amenities such as restaurants and drinking establishments.

5.2 Design Event

The Business Plan for the Kingston Regional Sports and Entertainment Centre venue prepared by the City of Kingston outlines a potential number of major events that may occur given the size and operations of the building. Included in **Exhibit 5-2** is a summary based on the business plan.

Exhibit 5-2 - Type and Number of Major Events

Average Event Size (Patrons)	Estimated Yearly Frequency	Percentage of Total ¹
≥ 5,000	5	5.2%
≥ 4,500 and < 5,000	5	5.2%
≥ 4,000 and < 4,500	42	43.3%
≥ 3,000 and < 4,000	17	17.5%
≥ 2,000 and < 3,000	12	12.4%
≥ 1,000 and < 2,000	5	5.2%
≥ 500 and < 1,000	11	11.3%
Total	97	100%

Notes: (1) Rounded to the nearest 0.1 percent

With the floor area seating capacity there is potential for some events to exceed the average “major” event size of 5,000 patrons. Nevertheless, an appropriate design event was established as a 5,000 patron event, for the following reasons:

- Based on transportation industry standards, it is not typical to design a roadway or parking facility for the “worst hour of the worst day of the year”. Otherwise, our transportation facilities would have an over supply of capacity for all times of the year, except a select number of peak hours;
- For major roadway projects the design hourly volume (DHV) is usually taken as the 30th highest hourly volume (30 DHV) in a one year period;
- Assuming one peak hour before and one peak hour after each major event at the Kingston Regional Sports and Entertainment Centre and an event greater than 4,500 patrons (10 events per year), would account for the 20th highest hour of the year (20 DHV); and
- Taking the above into account, it would be reasonable to design the transportation system network and parking facilities for a 4,000 patron event.

The design event will be a 5,000 patron sporting event or concert occurring on a weekday evening, including a Friday evening. Sensitivity testing of a 6,000 person event is presented in **Section 5.13** and considers the effects on traffic operations at the site and parking requirements.

5.3 Design Periods

Typically a transportation impact study focuses on the effects a new development will have on the weekday AM, weekday PM or weekend mid-day peak traffic periods, as a function of the specific use.

During these typical times, the Kingston Regional Sports and Entertainment Centre uses may generate travel demands associated with periodic events such as conferences, children's concerts, trade shows, etc. In addition, there will be smaller ongoing sporting events and day-to-day general site operations generating morning and afternoon peak traffic. These daily and periodic events will generally not produce capacity events at the facility and are not appropriate design events.

In general, sporting events and concerts begin at 7:00 or 7:30 p.m. and would be concluded between 9:30 and 11:00 p.m. For major sporting venues, pre-event arrivals may occur over the course of a number of hours. From previous visual observations by others, arrivals at the existing Memorial Centre occurred over approximately 90 minutes before the event. To be conservative, it has been assumed that 100% of the patrons will arrive and depart within in one hour of the event beginning and conclusion, respectively. Therefore, the worst-combination of background traffic (those motorist already on the roadway during the design hour) and the Kingston Regional Sports and Entertainment Centre related trips has been assumed to be 6:00 to 7:00 p.m. and 9:00 to 10:00 p.m.

5.4 Trip and Parking Generation

5.4.1 BASE ASSUMPTIONS

The following base assumptions were made for a design event:

Modal Split

The study has assumed a modal split for vehicles of 75% to drive and park off-site plus 5% for pick-up/drop-off activities only. The remaining 20% has been designated to transit (10%), walking (5%) and intercity/tour buses or private shuttles (5%).

The Kingston Regional Sports and Entertainment Centre site is located in the downtown area within walking distance of the existing Brock Street transit terminal with two key existing Kingston Transit routes travelling past the site. This results in a greater potential for transit use in comparison to the Memorial Centre. There is potential for existing transit route extensions (during event evenings) and the addition of special event routes to service the site. Taking this into account a 10% transit modal split was assumed.

For a capacity event such as a major hockey game or concert, it is expected that private groups and shuttles will be provided to the venue. This has been conservatively estimated at 5% of the total patrons.

Pedestrian traffic (5% of total patrons) would reflect patrons that:

- Live nearby the proposed facility and could walk to the site, including the Canadian Forces base and college residents;
- Have the potential to park in private driveways or at their place of employment in the immediate vicinity of the site and would not require parking; and

- Patrons staying in nearby hotels.

Auto Occupancy

A low auto occupancy of 1.8 persons per vehicle is currently exhibited at regular season games at the Memorial Centre. An auto occupancy of 2.5 persons per vehicle has been assumed for the subject site, for the following reasons:

- To maintain a vehicle occupancy of 1.8 persons, single occupant vehicle (SOV) arrivals would have to represent over 30% of the vehicles arriving to event and a very low percentage vehicles arriving with three or four persons. For a capacity event at a major venue, these assumptions cannot be supported through any other formal study;
- Studies have illustrated major event auto occupancies generally in the range of 3.2 to 3.5 persons per vehicle, albeit for larger venues; and
- There will be a charge for public and private lots in the downtown; whereas, the nominal charge currently charged at the Memorial Centre supports single occupancy use.

Bus Capacity

A bus capacity for a City of Kingston, school or tour bus was assumed to be 50 persons.

Travel Directly to the Site

In determining the travel patterns and demands associated with a large venue such as the Kingston Regional Sports and Entertainment Centre it is typically assumed that attendees are generally familiar with the road network and are "repeat attendees". This is particularly important in determining actual vehicles trips to the site and parking provisions, i.e., all patrons will not drive directly to the Kingston Regional Sports and Entertainment Centre site and then begin to pursue parking availability.

It has been assumed that approximately 10% of those driving to the event will travel directly to the site and then begin looking for readily available parking. All others would have the knowledge of the site location and parking opportunities and would travel directly to the parking facilities.

It has been assumed that pick-up/drop-off patrons will arrive two "event attendees" per vehicle and will represent two vehicle trips to the site, i.e., one inbound and one outbound trip. The traffic analysis provide in this report assumes that pick-up/drop-off activities will occur on Barrack Street or King Street; however, in reality remote pick-up and drop-off activities are arranged between the chauffeur and event attendees, i.e., the motorist does not want to be caught in pedestrian congestion around the site after the event.

5.4.2 SUMMARY OF DEMANDS

Applying the above assumptions to the design event of 5,000 persons, it was determined that approximately 1,505 parking spaces and 560 two-way peak hour vehicle trips at the site would need to be accommodated. **Exhibit 5-3** provides a summary of the analysis.

Exhibit 5-3 - Trip and Parking Generation Analysis

Mode of Travel	Mode Share	Patrons	Parking Required	Vehicle Trips to/from the Site
Drive and Park Off-Site	75%	3,750	1,500	300 ¹
Pick-Up/Drop-Off Only	5%	250	0	250
Transit Only Passengers	10%	500	0	0
Walk Only	5%	250	0	0
Intercity buses, tour buses, private buses/shuttles, etc.	5%	250	5	10
Total	100%	5,000	1,505	560
Notes:				
1) Assumes that 10% of the “drive and park-off site” patrons will drive directly to the site and then search for readily available parking.				

5.5 Available Parking Supply and Operations

As planned, the Kingston Regional Sports and Entertainment Centre site will rely on readily available public and private sector parking areas to furnish the facilities parking supply with a limited number of special use parking spaces provided in municipal lots within close proximity to the Kingston Regional Sports and Entertainment Centre site. Therefore, the parking supply location and availability will govern traffic and pedestrian travel around the proposed site and within the primary study area.

A distributed parking supply system provides a number of benefits compared to a large parking facility at the site:

- The traffic associated with arrival and departure periods of a major event are less severe as:
 - Trips are attracted to and generated from numerous locations throughout the study area, as opposed to one or two “point sources”;
 - Only a limited number of parking lots will be in the immediate vicinity of the Kingston Regional Sports and Entertainment Centre site; therefore, will not conflict and be delayed by the heavy egress pedestrian flows after a large event;
 - Patrons arriving to or leaving from an Kingston Regional Sports and Entertainment Centre event will choose to frequent local shopping, restaurant and entertainment uses along their way to/from parking areas, a concept casually referred to as “walking wallets”; and
 - Patrons will leave the facility and walk to their parking areas at different speeds thus dispersing the peak traffic flows at any one parking area.
- Patrons have the choice of parking at a more remote location to obtain more economical parking fees and facilitate timely departure along a known less congested route; and

- Existing parking supplies are utilized, which is consistent with good transportation planning and system utilization.

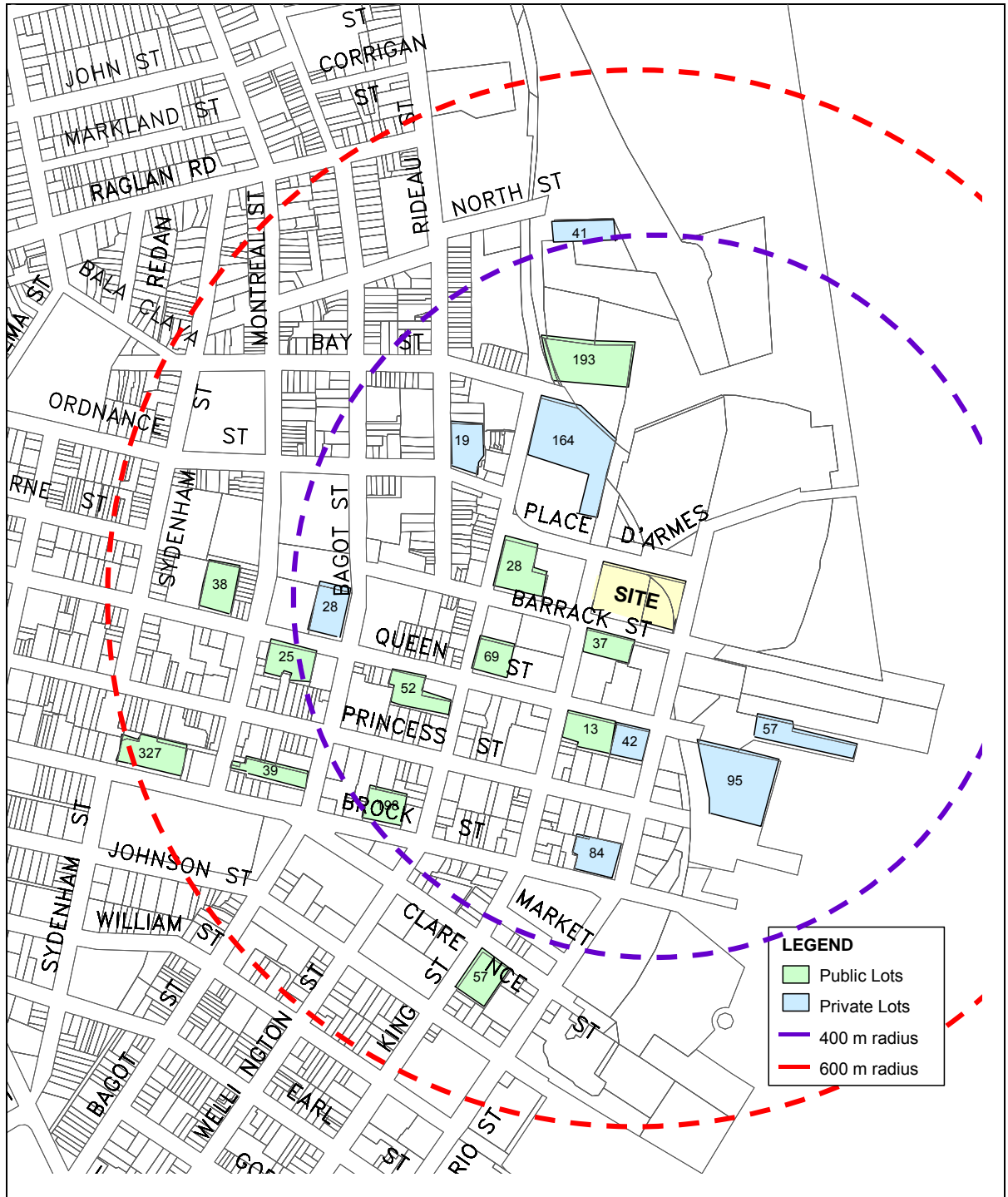
Included in **Exhibit 5-4** is a summary of the existing parking areas within an approximate 600 metre straight-line distance of the Kingston Regional Sports and Entertainment Centre site. This distance is representative of a 720 metre walking distance or a 10-minute walk at an approximate walking speed of 1.2 metres per second. This walking speed is considered average as pedestrian crossing times at most traffic signals are based on this speed. For a distance of 400 metres, it was estimated that this would translate into a 5.5 minute for a younger individual or a 6.6 minute walk for a healthy senior based on walking speeds of 1.2 metres per second and 1.0 metre per second, respectively.

Maximum walking distances of 400 metres are considered acceptable for land development, parking facility and transit system design. For day-to-day operations of a transit system or development we support this assumption; however, the attractiveness of the destination and the frequency of the trip will affect a person's choice on acceptable walking distances.

During major concerts and sporting events, pedestrians are generally willing to walk longer distances to find available and economical parking. In some cases, patrons choose to utilize more remote parking to ensure they have a timely egress away from the pedestrian crowds. A 400 metre walk is approximately a 5 to 5.5 minutes for a younger individual and 6.6 to 7.0 minute walk for a healthy senior. A ten minute walk to the most remote lots would be representative of 720 metres for a younger individual. We have assumed a 600 metre straight line measurement to represent this distance/walking time.

The value noted in each parking area in **Exhibit 5-4**, represents an estimated number of available spaces in the evening when a Kingston Regional Sports and Entertainment Centre special event would take place. This value was reduced by 10% to be sensitive to the fact that parking occupancy values are not exact and that full (100%) occupancy may only be attained at prime parking areas.

Exhibit 5-4 - Available Public and Private Parking Areas



Based on typical evening occupancies and those surveyed by Castleglenn Consultants in December 2004, an available parking supply was estimated. This value was reduced by 10% to be sensitive to the fact that parking occupancy values are not exact and that full (100%) occupancy may only be attained at prime parking areas. Included in **Exhibit 5-5** is a summary of the existing parking supply.

Exhibit 5-5 - Available Parking Supply Estimates

Municipal Parking Lots	Parking Capacity	Evening Occupancy	Available Spaces (90% Reduction)	Within 400 metres	Within 600 metres
Anglin Lot	228	6%	193	193	-
Barrack Street Lot	117	73%	28	28	-
Frontenac Lot South	43	11%	34	34	-
Drury Lot	114	33%	69	69	-
King & Queen Lot	43	67%	13	13	-
Angrove Lot	66	12%	52	52	-
Hanson Lot	268	18%	198	198	-
Byron Lot	73	41%	39	-	39
Springer Lot	62	55%	25	-	25
Robert Bruce Lot	100	58%	38	-	38
Four Points Sheraton Lot	77	38%	43	-	43
Chown Lot	438	17%	327	-	327
Municipal Lot Total	1,629	-	1,059	587	472
Private Parking Lots	Parking Capacity	Evening Occupancy	Available Spaces (90% Reduction)	Within 400 metres	Within 600 metres
Holiday Inn Lot	210	50%	95	95	-
OHIP Lot	200	9%	164	164	-
Rideau & Ordnance	40	48%	19	19	-
Fluhrer Lot	50	8%	41	-	41
Gibson Dock	90	30%	57	57	-
Royal Artillery (Bagot)	40	21%	28	28	-
Sugarman/Gilad Lot	160	42%	84	84	-
Four Points Sheraton	100	85%	14	-	14
Kincore Lot (Queen/Ontario)	77	40%	42	42	-
Private Lot Total	967	-	544	489	55
Net Total Off-Street Spaces	2,596	-	1,603	1,076	527

The above values do not account for:

- Private parking lots or areas that are not readily accessible to the general public, but could be used by private individuals that have the right to use them;
- Small parking areas (< 40 stalls) that may be provided for a fee; and

- On-street parking which includes approximately 556 spaces within 600 metres of the Kingston Regional Sports and Entertainment Centre site.

Some of the patrons of restaurants and other downtown facilities whom are currently occupying parking spaces will be future Kingston Regional Sports and Entertainment Centre attendees. We are double counting there parking occupancy in this analysis.

For medium sized events, the majority of the attendees will be able to find parking within a distance of 400 metres. During capacity events, attendees will be able to find parking within the 600 metre distance. In both cases, the majority of the parking is available within public parking facilities. It is also our understanding that the City has received confirmation from some private owners in the study area expressing interest in providing patron parking for Kingston Regional Sports and Entertainment Centre events.

5.5.1 DISABLED PARKING

As the Kingston Regional Sports and Entertainment Centre facility is not providing on-site parking for the general public, this also excludes provisions for disabled parking spaces. It is anticipated that disabled parking spaces will be provided in close proximity to the site at adjacent municipal lots such as the Frontenac Lot located on the south side of Barrack Street directly across the street from the Kingston Regional Sports and Entertainment Centre. All the entrances are wheelchair accessible, however the club entry on Place D’Armes and the lobby entry on Barrack Street located across from the Frontenac Lot will provide direct access to designated wheel chair seating.

5.5.2 VIP AND BUSINESS PARKING

It is anticipated that VIP parking spaces will be accommodated in a nearby parking lot. Parking associated with regular business activities for the Kingston Regional Sports and Entertainment Centre will likely be accommodated in the Frontenac Lot. As the project proceeds and these demands are formalized, the City and the facility operator will need to review mechanisms for securing these and the disabled and business parking spaces in the Frontenac Lot.

5.6 Trip Distribution and Assignment

The trip distribution for the Kingston Regional Sports and Entertainment Centre patrons was estimated from existing traffic patterns and potential catchment area of the site. Included in **Exhibit 5-6** is a summary of the assumptions.

Exhibit 5-6 - Assumed Trip Distribution

To/From	Percentage of Total Trips
South and West	60%
North	25%
East via LaSalle Causeway	15%

The trip assignment for pre and post-game peak hours was based on the location of the parking areas, residual capacity in the transportation system, key pedestrian routes and the trip distribution outlined in **Exhibit 5-6**. Trip assignments for pre-event arrivals and post-event departures are included in **Appendix B**.

5.7 Future Total Traffic Volumes, Pedestrian Volumes and Intersection Operations

A future total traffic condition includes the projected Kingston Regional Sports and Entertainment Centre traffic assignments added to the future PM peak background traffic condition. As noted in **Section 3.2**, the existing traffic volumes on study area roadways are significantly less during the periods when large Kingston Regional Sports and Entertainment Centre events are anticipated.

The future background PM peak hour traffic volumes were factored down by a 35% and 65% to reflect typical traffic volumes during the pre-event arrival at the Kingston Regional Sports and Entertainment Centre and the post-event departure, respectively. The Kingston Regional Sports and Entertainment Centre related trips were added to these “factored” background traffic volumes to create future total pre-event and post-event traffic conditions. The resultant traffic volumes for both scenarios are included in **Appendix B**.

In addition, pedestrian volumes were estimated at the intersection crossings in immediate proximity to the site based on typical travel patterns to/from the parking areas with due consideration for the location of the Kingston Regional Sports and Entertainment Centre egress points and the size and location of the primary parking areas, respectively.

Intersection operations were assessed for the future total traffic operating conditions for the two Kingston Regional Sports and Entertainment Centre peak periods. Included in **Exhibit 5-7** and **Exhibit 5-8** are summaries of the future total signalized intersection operations during the pre-event and post-event peak hours.

Exhibit 5-7 – Future Total Signalized Intersection Operations – PM Pre-Event

Intersection	Overall LOS		Critical		Comments
	LOS	V/C	LOS	V/C	
Johnson Street/Ontario Street	B	0.71	-	-	
Johnson Street/King Street	B	0.51	-	-	
Johnson Street/ Bagot Street	B	0.44	-	-	
Brock Street/King Street East	B	0.40	-	-	
Brock Street/Wellington Street	B	0.63	-	-	
Brock Street/Bagot Street	B	0.44	-	-	
Princess Street/Ontario Street	C	0.50	-	-	
Princess Street/King Street	B	0.40	-	-	
Princess Street/Wellington St.	B	0.60	-	-	
Princess Street/Bagot Street	B	0.42	-	-	
Queen Street/Ontario Street	B	0.44	-	-	
Queen Street/King Street East	B	0.76	-	-	
Queen Street/Wellington Street	B	0.52	-	-	
Queen Street/Bagot Street	B	0.60	-	-	
Barrack Street/Ontario Street	B	0.76	-	-	
Barrack Street/King Street East	B	0.57	-	-	
Place D'Armes/Ontario Street	B	0.67	-	-	
Place D'Armes/Wellington St.	B	0.48	-	-	

Exhibit 5-8 – Future Total Intersection Operations – Post-Event

Intersection	Overall LOS		Critical		Comments
	LOS	V/C	LOS	V/C	
Johnson Street/Ontario Street	B	0.32	-	-	
Johnson Street/King Street	A	0.39	-	-	
Johnson Street/ Bagot Street	B	0.24	-	-	
Brock Street/King Street East	B	0.31	-	-	
Brock Street/Wellington Street	A	0.34	-	-	
Brock Street/Bagot Street	A	0.41	-	-	
Princess Street/Ontario Street	B	0.28	-	-	
Princess Street/King Street	A	0.32	-	-	
Princess Street/Wellington St.	A	0.31	-	-	
Princess Street/Bagot Street	B	0.25	-	-	
Queen Street/Ontario Street	A	0.48	-	-	
Queen Street/King Street East	B	0.64	-	-	
Queen Street/Wellington Street	B	0.54	-	-	
Queen Street/Bagot Street	A	0.47	-	-	
Barrack Street/Ontario Street	C	0.74	-	-	
Barrack Street/King Street East	B	0.40	-	-	
Place D'Armes/Ontario Street	A	0.47	-	-	
Place D'Armes/Wellington St.	A	0.27	-	-	

Based on the above analysis, the conclusions are as follows:

- Immediately following a capacity event, the transportation system network in the immediate vicinity of the site will be congested for a limited period of time. As a result, traffic volumes within the vicinity of the Kingston Regional Sports and Entertainment Centre site will be delayed and nearby intersections will be congested until such time that pedestrian traffic has dispersed to the various parking lots. This is the main advantage of the distributed parking supply and has been experienced at major sporting, entertainment and community facilities in downtown locations;
- There is considerable residual capacity on the road network to accommodate similar future traffic growth of up to five years beyond completion of the Kingston Regional Sports and Entertainment Centre facility;
- A majority of the unsignalized intersections are expected to operate at a satisfactory level of service on an hourly basis during both Kingston Regional Sports and Entertainment Centre pre-event and post event peak hours;
- The shared southbound through-right at the all-way stop on Wellington Street and Barrack Street is expected to approach capacity during the pre-event operations;
- The shared eastbound approach on Ordnance Street at Wellington Street is expected to approach capacity during the pre-event peak hour with a majority of the trips turning left onto Wellington Street to access the OHIP and Anglin Bay parking facilities. Motorists have the option of accessing these lots via Bay Street to avoid delays on Ordnance Street; and
- The shared northbound and southbound approaches on King Street at Place D'Armes are expected to operate at level of service "F" during the pre-event and post-event peak hours. This is mainly attributed to the following conflicting movements: significant traffic volumes travelling on Place D'Armes, the northbound left turning volumes on King Street and heavy pedestrian volumes. It is likely that the two adjacent signalized intersections on Place D'Armes at Wellington Street and Ontario Street will create sufficient gaps in the traffic flow to permit the northbound left volumes to turn. Pedestrian traffic will be directed along the south side of Place D'Armes to cross at the traffic signal at Wellington Street to avoid crossing King Street without any form traffic control. However, it is recommended that this intersection be monitored to determine if further remedial action is required. Remedial action may involve the option of implementing some form of manual (human) control at King Street/Place D'Armes for a short period of time before and after major events.

5.8 Pedestrian Operations

The critical design period for pedestrian travel will be immediately subsequent to a capacity event such as a sporting event or concert. In these cases it is expected that the roadways, and to a greater extent, the intersections immediately adjacent to the Kingston Regional Sports and Entertainment Centre site will be dominated by pedestrian travel.

Exhibit 5-9 includes a summary of the potential primary pedestrian routes after a major event, based on the location of major parking areas, potential transit staging areas, accommodations and commercial areas.

The traffic analysis has been adjusted to reflect major pedestrian flows through a reduction in intersection capacity. In addition, transit routing should be planned recognizing that the above routes will be severely restricted immediately subsequent to the event, when they are attempting to load and transport their passengers.

Exhibit 5-9 - Major Pedestrian Routes



5.9 Pick-Up/Drop-Off Areas

A design concept for the ultimate Kingston Regional Sports and Entertainment Centre site has been prepared by consulting firms through a competitive bid. Provisions for passenger loading/unloading areas have not been incorporated into the site design; however, should be actively pursued through the final design of the adjacent road network, where possible.

A lay-by area with the capacity to accommodate two buses plus one bus in the building has been incorporated for a shuttle bus and motor coach pick up/drop-off on the north side of the site adjacent to Place D'Armes. This lay-by area will not accommodate pick-up/drop-off activities for general vehicular traffic and will be signed as 'buses only'. This area and more specifically the club entrance adjacent to the lay-by area will also facilitate disabled persons travelling to/from an event in shuttle buses. The club entry provides direct access to the ramp, which leads into the designated seating area for persons in wheel chairs.

During the post-event period, pedestrian travel demands along King Street, Ontario Street and Barrack Street will limit the potential for motorists to drive directly to the site to pick-up patrons leaving the event. Motorists will discover that it is not beneficial to queue along the roadways directly outside the Kingston Regional Sports and Entertainment Centre site to wait for their passengers, but to prearrange a more remote meeting location for pick-up activities.

5.10 Heavy Vehicle Loading/Unloading

Loading activities will be promoted during off-peak periods in the day and outside the peak periods associate with medium and large-sized event arrivals/departures.

Specific loading facilities have been determined through the site design competition and include two loading bays in the northwest corner of the Kingston Regional Sports and Entertainment Centre site plan with frontage on Place D'Armes. Due to the proximity of the loading docks to the Place D'Armes/King Street intersection, it is critical that operators ensure that assistance is provided when vehicles are manoeuvring in/out of the loading bays. It is recommended that these activities be prohibited during the evening and in proximity to event peak arrival and departure times in order to prevent any potential impacts to traffic operations.

For large events such as major concerts, operators will have to stage the arrival of tractor-trailer units to load/unload in a timely fashion as to avoid extended parking on Place D'Armes or King Street. Staging can be organized between operators at the Kingston Regional Sports and Entertainment Centre site and some remote location where the units will be stored.

5.11 Transit Operations

Public transit will be an integral component of the Kingston Regional Sports and Entertainment Centre site operations, particularly for large evening events at the facility. The trip generation assumptions illustrate a demand of approximately 500 person trips during event arrival and departure.

5.11.1 EXISTING TRANSIT SERVICES AT PROPOSED KINGSTON REGIONAL SPORTS AND ENTERTAINMENT CENTRE SITE

Two existing transit routes currently provide access to the roadways adjacent to the Kingston Regional Sports and Entertainment Centre site, namely Route 12 (Kingscourt/Highway 15) and Route 18: Student Circuit.

Route 12 provides 30 minute headway service during the PM peak period and discontinues service at 9:30-10:00 p.m. This level of service would be acceptable for event arrivals, which are generally distributed over the course of 90 minutes before an event. The present service would not accommodate a large event departure, which may occur after current operating hours of service and would require direct servicing at the event conclusion.

Route 18 provides 30 minute evening service between 6:15 and 9:15 p.m. from September through to April (school session). As with Route 12, Route 18 can provide service during a major event arrival, but present service would not accommodate event departure. In addition, when Queen's is not in session, Route 18 will have no service to the site.

The Brock Street Downtown Terminal is a common focal point of many of Kingston Transit routes. It is located less than 600 metres from the proposed Kingston Regional Sports and Entertainment Centre site and can be used for event arrivals; however, may not provide a good level of service for post-event demands.

5.11.2 TRANSIT SERVICE IMPROVEMENTS

Based on discussions with Kingston Transit Staff, there are a number of transit service improvements that could be pursued to improve the level of service during non-event, pre-event, and post-event transit service to the Kingston Regional Sports and Entertainment Centre.

Extend Regular Service Routes

Existing routes could be extended to include one or more roadways adjacent to the Kingston Regional Sports and Entertainment Centre, with due regard for required headways on regular service routes. Careful consideration should be given to the traffic and more importantly the pedestrian congestion that will occur after a major event and how this may impact the schedule adherence of a regularly programmed transit route.

Special Event Routes

Existing transit service provision on Route 12, Route 18 or other downtown routes could be extended to one hour post-event conclusion to accommodate patron egress. The transit operations would be more tailored to event needs and would not be governed by schedule compliance along the remainder of the route, i.e., vehicles would stage on a roadway or off-road site/parking area to wait for the event departure and a relatively full passenger load.

Alternatively, or in addition to the above, special event transit service could be provided, outside the regular service routes, to link large remote parking areas or the downtown terminal.

Increasing Transit Ridership

The option of providing “cost-free” or a reduced price transit ride to an event ticket holder should be pursued by the City and the operator to increase transit ridership and take advantage of the available capacity on Kingston bus routes. This offers an incentive for people to take transit versus travelling to/from events in their cars, as it is perceived to be a free service. It would be structure so as to have no financial impact to the general taxpayer, but rather to have the incremental cost of the transit service funded by the facility users.

The City should explore this option in greater detail including determining the cost of the services and the level of additional services that would be provided as a function of the size of event.

Transit Terminal

Ideally, having a transit terminal within a short walking distance (less than 300-400 metres) of the Kingston Regional Sports and Entertainment Centre site would provide a good level of service for non-event and event related demands. The Kingston TMP identifies the need to provide a more prominent on-road or off-road transit terminal in the downtown core to improve transit level of service and provide an identifiable location for transfers. The Kingston Core Area (Integrated) Transportation Review also identifies the need to relocate the transit terminal to an alternative location in the downtown core area.

In their planning of this transit facility, the City should explicitly consider the benefits to the daily and special events Kingston Regional Sports and Entertainment Centre operations.

5.11.3 ACCESS TO THE KINGSTON REGIONAL SPORTS AND ENTERTAINMENT CENTRE SITE

It would be beneficial to provide conventional transit service directly to the Kingston Regional Sports and Entertainment Centre site during regular business hours and for medium sized events and large event arrivals. These trips could be accommodated via curbside stops on adjacent roadways. During the departure of major events, transit routing and designated pick-up areas should not coincide or cross primary pedestrian departure routes and general vehicle pick-up facilities.

Likewise, any special event transit services and their staging areas should be planned to not coincide with the anticipated traffic and pedestrian congestion post-event. **Section 5.8** outlines the key pedestrian routes that should be avoided.

5.12 Traffic Infiltration Issues

During regular business hours, the potential for traffic “short-cutting” will be low as the travel demands associated with Kingston Regional Sports and Entertainment Centre are low and the road network in the core area of the City operates at a good level of service.

During peak events, there is potential for motorists to avoid delays and seek alternative routes through residential areas, private development driveways and parking areas. Based on a review of the primary parking areas and travel routes, we see the greatest potential for motorists to infiltrate residential areas on Bay Street and through the apartment complex internal driveways at the North Street/Wellington Street intersection.

Once the site is operational, monitoring should be undertaken to determine the actual use of these routes and the level of impact on the few homes on Bay Street. Potential mitigating measures include:

- **Wellington Street Extension** – the first phase of the Wellington Street extension to Montreal Street will provide arterial road access between these prime parking areas and the north road network; and
- **Manual Traffic Control** – During large events manual traffic control and private driveway access prohibitions could be used to ensure that motorists choose an appropriate route to access Rideau Street and Montreal Street.

5.13 Concurrent Events

The City of Kingston hosts a number of annual large attendance events in the Downtown Core Area associated with festivals, theatre productions and civic events. The scheduling of capacity events at the Kingston Regional Sports and Entertainment Centre site concurrently will need to be reviewed on a event-by-event basis to determine:

- If the events are complementary and the activities and patrons may be shared between events;
- Parking demands of the two events and their potential overlap in both time and location; and
- Impacts of any road closures or restrictions to Kingston Regional Sports and Entertainment Centre access.

5.14 Sensitivity Testing

As noted in **Section 5.2**, the design event for the facility is a 5,000 person event. Current planning and business plans illustrate the potential for a limited number of events to exceed the 5,000 attendance level. Provided below is a summary of the traffic and parking implications of a 6,000 person event.

5.14.1 TRAFFIC OPERATIONS

An additional 1,000 patrons represent an increase of about 300 vehicle trips in the downtown core and approximately an additional 160 trips to/from the Kingston Regional Sports and Entertainment Centre site. This is based on the modal split and vehicle occupancy assumptions that are outlined in **Section 5.4** and summarized in outlined in **Exhibit 5-10**.

Exhibit 5-10 - Trip and Parking Generation Analysis for 1,000 Patrons

Mode of Travel	Mode Share	Patrons	Parking Required	Vehicle Trips to/from the Site
Drive and Park Off-Site	75%	750	300	60 ¹
Pick-Up/Drop-Off Only	5%	50	0	50
Transit Only Passengers	10%	100	0	0
Walk Only	5%	50	0	0
Intercity buses, tour buses, private buses/shuttles, etc.	5%	50	1	2
Total	100%	1,000	301	112
Notes:				
1) Assumes that 10% of the “drive and park-off site” patrons will drive directly to the site and then search for readily available parking.				

Reviewing the intersection capacity analysis undertaken for the future total pre-event and post-event traffic operations, there is substantial residual capacity in the study area road network to accommodate an additional 300 passenger vehicle trips. Likewise, the additional 112 vehicle trips to the Kingston Regional Sports and Entertainment Centre site, distributed to the four boundary roadways of the site, will have little impact on overall intersection performance. Given these relative impacts, intersection analysis was not required to substantiate these conclusions.

5.14.2 PARKING

An additional 300 parking spaces may be required to accommodate 1,000 patrons during a larger event. This assumes that travel mode and other choices will not change with a large event. With larger draw events, there is potential for:

- Vehicle occupancies to rise towards 3.0 and 3.5 persons per vehicle, which represents an overall even vehicle mix of 2, 3 and 4 person vehicles and less single occupant vehicle arrivals;
- Special transit services to remote lots; and

- Special event tours/shuttles provided by organizations, groups and private entities from within the City and outlying communities.

The 300+ parking space demand, if it materializes may be accommodated through:

- Greater utilization of the existing parking areas within a 600 metre straight-line distance of the Kingston Regional Sports and Entertainment Centre. The preceding analysis assumed a 90% utilization of the estimated 1,800 available parking spaces (180 space reduction);
- On-street parking supply being utilized to a greater extent within the study area (100 to 130 available spaces within 600 metres of the Kingston Regional Sports and Entertainment Centre site); and
- Double counting of the parking occupancy in this analysis. Some of the patrons of restaurants and other downtown facilities whom are currently occupying parking spaces will be future Kingston Regional Sports and Entertainment Centre attendees.

Should these additional parking demands be identified through a monitoring program, a number of mitigating measures are outlined in the following section.

6. IMPROVEMENT OPTIONS AND MITIGATING MEASURES

Based on the above review, the following are improvement options and mitigating measures that could be undertaken to address potential transportation concerns during peak demand events at the Kingston Regional Sports and Entertainment Centre facility. These operational improvements are in addition to those physical and operational transportation improvements already planned in the study area.

6.1 Parking Management and Traveller Information

The many benefits of a distributed parking facility are outlined in **Section 5.5**. The primary disadvantage of a distributed parking supply system is the fact that patrons typically do not have a single parking destination to which they can select a travel route.

Repeat attendees to the Kingston Regional Sports and Entertainment Centre site and those familiar with the downtown core, will quickly learn the location and availability of parking areas and will choose their preferred parking area and alternates based on walking distance/convenience, post-event congestion, price and availability. Some will choose to park close to the Kingston Regional Sports and Entertainment Centre site, pay a premium price, with the understanding that they may experience substantial delay during the egress of the event.

Conversely, infrequent users will rely on both advance information and “event day” direction. For a distributed system, the worst-case scenario exists where a large majority of new patrons drive directly to the Kingston Regional Sports and Entertainment Centre site and begin circulating the area roadways looking for parking, with little or no assistance. This scenario will occur; however, it can be minimized through the following:

- **Advance traveller information and parking information** – many large venue facilities for example the City of Victoria’s Save on Foods Memorial Centre, provide web and telephone-based information systems to allow patrons to determine the parking opportunities at or in the vicinity of the site. This will be a necessary service for

the distributed parking system proposed, especially with the number of lots to be utilized; and

- **Event day traffic control and direction** – As the parking supply is a mix of private and public lots that are not dedicated to Kingston Regional Sports and Entertainment Centre use, it generally will not be feasible to permanently sign them as Kingston Regional Sports and Entertainment Centre event lots. A system of temporary wayfinding guide signage and trailblazing will in most likelihood need to be instituted to identify prime parking areas for the Kingston Regional Sports and Entertainment Centre and best redirect motorists once these lots become full. A preliminary review of the anticipated travel routes to the Kingston Regional Sports and Entertainment Centre site indicates that there are good opportunities to strategically locate parking availability information signs to assist unfamiliar motorists with primary and alternative parking locations.

Likewise, it is recommended that the City provide information to tour bus and shuttle operators regarding pick-up/drop-off areas, the lack of on-site bus parking facilities and potential off-site/remote parking opportunities.

6.2 Parking Supply

The analysis of the parking demands and supply indicates that sufficient parking will be available for a typical capacity event. For larger events or in the case where multiple special events are planned, the transit system, tour bus/shuttle operations and additional parking may be called upon to supplement the existing parking supply. From a parking perspective, there are a number of large remote parking areas at malls/commercial, or institutional areas that could be used in extreme cases as park and ride lots. It would be beneficial to locate the park and ride facilities on existing transit routes however, these opportunities would be reviewed on an event-by-event basis and would form part of a special event planning process.

6.3 Parking Access

Based on a review of the parking locations, size and access has identified the following potential operational concerns and potential solutions:

- **Egress activities at the Anglin Bay and OHIP lots** – for a limited period of time subsequent to a major event, motorists will experience delays in exiting the parking areas due to the size of the lot and the access provided. The Wellington Street extension and/or a second access to the Anglin Bay lot would reduce the delay. Monitoring of actual operating conditions will determine the need for the latter improvement.
- **Hanson Lot and Chown Lot Egress** – Both these large parking structure have a single egress with one payment station, which restricts the exit processing and capacity. To a certain extent, their distance from the Kingston Regional Sports and Entertainment Centre site will serve to disperse patron departures after the event; however, implementation of a prepayment “special event” flat rate would facilitate timely egress. Both parking structure accesses are on the north side of Brock Street and thus only permit outbound right turns, a turning movement that should be relative unchallenged in the evening.

6.4 Taxi Stands

Based on preliminary discussions with the Kingston Area Taxi Commission we see benefits of providing temporary taxi stand areas on one or both sides of Barrack Street west of King Street in proximity of the Food Basics for taxis to queue.

6.5 Traffic and Pedestrian Control

Based on a review of the pre-event and post-event traffic and pedestrian operations, we do not see a need to restrict traffic movements along the boundary roads of the Kingston Regional Sports and Entertainment Centre site or within the study area. Monitoring of the parking and stopping activities, especially along King Street and Barrack Street, will need to be undertaken once the site is operational.

Immediately following a capacity event, the transportation system network in the immediate vicinity of the site will be congested for a limited period of time. As a result, traffic volumes within the vicinity of the Kingston Regional Sports and Entertainment Centre site will be delayed and nearby intersections will be congested until such time that pedestrian traffic has dispersed to the various parking lots. This is the main advantage of the distributed parking supply and has been experienced at major sporting, entertainment and community facilities in downtown locations;

The King Street/Place D'Armes intersection is currently planned with side street stop control on King Street. This intersection represents a key pedestrian corridor to/from the Anglin Bay and OHIP lots, and is a primary roadway corridor for Kingston Regional Sports and Entertainment Centre related traffic. During peak arrival and departures from capacity events, northbound left turn vehicles may experience considerable delays in crossing/entering Place D'Armes. However, it is expected that the traffic signal control at the adjacent intersections of Place D'Armes/Ontario Street and Place D'Armes/Wellington Street will provide sufficient breaks in Place D'Armes traffic to facilitate these side street travel demands and occasionally allow pedestrians to cross. Measures will be taken to restrict pedestrians from crossing at this location and directing them to cross at the traffic signal at Wellington Street/Place D'Armes to avoid potential safety implications. This critical intersection will need to be monitored once the site is operational, to review the need for manual traffic control during peak arrival and departure periods of a capacity event.

6.6 Transportation Demand Measurement Initiatives

Transportation demand measurements (TDM) are a series of strategies that the City of Kingston is taking to reduce auto demand during the peak commuter hours. These initiatives encourage people to choose alternative modes of travel such as carpooling, cycling, walking in order to reduce single occupant travel.

The Kingston Transportation Master Plan and the Core Area (Integrated) Transportation Review have both identified the need for TDM initiatives. In keeping with this, it is recommended that the Kingston Regional Sports and Entertainment Centre site support relevant TDM activities such as parking management, walking, ridesharing, cycling and pathways, and transit enhancement.

Active modes such as providing bike racks, sufficient sidewalk/pathways to/from the site and managing parking supply consistent to that, which is included in the TMP and states:

“Account for potential changes on the current supply [parking] through development of existing parking lots. Over time replace existing lots lost through development at similar levels of supply

to exert upward pressure on price. This should coincide with improved transit service in the downtown.” Section 9.3, Kingston Transportation Master Plan dated July 2004.

Additional modes recommended to be incorporated in the design and operation of the Kingston Regional Sports and Entertainment Centre include:

- Reduced fare or cost-free transit service for ticket holders funded by the facility users;
- Readily available transit services through modified/special routes or a downtown transit terminal;
- Promoting a walking environment as opposed to having people get into their cars at the site, i.e., no on-site parking; and
- Providing sufficient bicycle racks in a safe and secure area.

7. CONCLUSIONS

Based on the above reviewed, the proposed location of the Kingston Regional Sports and Entertainment Centre within the North Block optimizes the existing infrastructure in the areas of traffic, parking and transit services. The following have been concluded:

Traffic Volume and Operations

- The study area intersections are generally operating at a good level of service during the AM and PM peak weekday travel periods;
- The primary constraint in the study area is at the Ontario Street/Barrack Street intersection during the PM peak hour, coincident with vehicle demands to the LaSalle Causeway and peaks from the Wolfe Island Ferry exits;
- The design event for the Kingston Regional Sports and Entertainment Centre facility is a 5,000 patron evening sporting event or concert;
- The Kingston Regional Sports and Entertainment Centre peak arrival and departure periods for an evening capacity event will occur outside the typical AM and PM road network peak travel periods;
- The distributed parking system will assist in reducing travel demands in the immediate vicinity of the site and on any one downtown route;
- The road network, including many of the intersections in the general vicinity of the proposed Kingston Regional Sports and Entertainment Centre site, will undergo a number of physical and operational improvements, as part of the City capital works programs in the next few years;
- The Wellington Street extension, if and when constructed will improve traffic access to the Kingston Regional Sports and Entertainment Centre facility and the associated parking areas;
- In general, the improved road network can accommodate:
 - The existing traffic volumes during an evening event;

- Additional traffic associated with general traffic growth in the City and development specific growth; and
- The traffic demands associated with travel to/from the Kingston Regional Sports and Entertainment Centre site and its associated parking areas.
- Little impact on the Wolfe Islands Ferry operations will occur due to the operation of the Kingston Regional Sports and Entertainment Centre;
- Follow-up monitoring can be used to fine tune special event signal timings and review critical areas such as the King Street/Place D'Armes intersection.

Pedestrian Operations

- Sidewalks exist on one or both sides of the roadways within the study area;
- Further improvements to pedestrian facilities in the vicinity of the Kingston Regional Sports and Entertainment Centre including pedestrian access to link sidewalk facilities through any redevelopment initiatives should be considered;
- Primary pedestrian routes between the Kingston Regional Sports and Entertainment Centre site and its associated parking areas are generally facilitated by traffic signal controlled intersections;
- The pedestrian operations at the King Street/Place D'Armes intersection will need to be monitored subsequent to operation of the site to determine if manual traffic control or a high form of pedestrian control is required during capacity events;

Transit Operations

- Existing transit service in the downtown area would not properly serve an Kingston Regional Sports and Entertainment Centre capacity event in terms of routing and frequency;
- Modified transit service to the Kingston Regional Sports and Entertainment Centre site, special event transit service and/or the location of a transit terminal in close proximity to the Kingston Regional Sports and Entertainment Centre site will improve the transit service to the site and improve usage;
- Any modified transit service should properly account for the pedestrian congestion that will occur immediately subsequent to the event conclusion and the conflict that would occur with transit vehicles.

Parking Supply and Demand

- The Kingston Regional Sports and Entertainment Centre site is being planned with limited on-site parking for buses and will rely on existing off-site public and private parking areas;
- There is sufficient residual capacity in the parking areas in the vicinity of the Kingston Regional Sports and Entertainment Centre site to support a design event (5,000 patrons);

- The facility operator will need to work with the City of Kingston to determine the number of dedicated parking spaces that will be required in the Frontenac Lot to service business and disabled persons needs;
- In general, patrons will be able to find available parking within 400 metres of the Kingston Regional Sports and Entertainment Centre site for the majority of the events at the Kingston Regional Sports and Entertainment Centre site;
- For capacity events, some patrons will be required to park at facilities that are located within a 10 minute walk of the Kingston Regional Sports and Entertainment Centre site; and
- A distributed system will reduce traffic congestion and travel demand in the vicinity of the Kingston Regional Sports and Entertainment Centre site and make good use of existing parking facilities.

8. RECOMMENDATIONS

Based on the above conclusions, it is recommended that the City of Kingston:

- Provide a copy of this report to affected stakeholder groups and internal City departments for their information and/or action;
- Continue to pursue the construction of roadway improvements in the study area;
- Initiate planning for improved transit service to the Kingston Regional Sports and Entertainment Centre site for day-to-day operations and special events;
- Take into account the service benefits to the Kingston Regional Sports and Entertainment Centre when considering the location of an improved transit terminal in the downtown;
- Create a mechanism/policy to incorporate events planning for the Kingston Regional Sports and Entertainment Centre with current City special events planning;
- Develop a monitoring program to review traffic, parking and pedestrian operations once the site is operational, specifically the operations of the King Street/Place D'Armes intersection and the traffic infiltration potential in the Anglin Bay area; and
- Initiate a detail parking management plan to review signing plans for parking lot location identification and trailblazing to alternate parking areas.