EAST BAYFRONT TRANSIT
CLASS ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL STUDY REPORT
EXECUTIVE SUMMARY

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MARCH 2010

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E1 Introduction

Waterfront Toronto (formerly the Toronto Waterfront Revitalization Corporation), was formed with the mandate and responsibility for developing Toronto's waterfront, including the East Bayfront area. The Corporation, which is jointly owned by the City of Toronto, the Province of Ontario and the Government of Canada, undertakes its work based on strong principles of excellence in environmental sustainability and urban design.

Waterfront Toronto is the proponent for all redevelopment activities in the East Bayfront area and the *East Bayfront Transit Environmental Assessment Study* has been carried out under its auspices by the Toronto Transit Commission in partnership with the City of Toronto. Waterfront Toronto has funded the study and plans to implement the recommendations of the study as part of its mandate, including all design and construction costs related to transit facilities required to service the East Bayfront area.

The East Bayfront development area is located generally east of Lower Jarvis Street between Lake Shore Boulevard and the Inner Harbour shorelines, as shown in **Exhibit E1-1**. The area is going through a transformation from derelict brown fields into a mix of higher-density residential and commercial uses. The East Bayfront precinct is a 22-hectare site within this area that ultimately will have 6,000 housing units and 230,000 square metres of office and retail space. George Brown College plans to locate a campus accommodating up to 3,500 full-time and 1,000 part-time students in the area. When fully occupied, these developments are expected to generate additional 4 million riders per year for the TTC.

The City of Toronto adopted the *Central Waterfront Secondary Plan* in 2003, in part, to establish guiding principles for the redevelopment of brown-field sites such as the East Bayfront area. One of the principles established was the need to strongly encourage non-auto-based travel in the newly developing areas and, as shown in **Exhibits E1-2 and E1-3**, the plan envisioned a network streetcars operating in their own right-of-way throughout the Eastern Waterfront. Council reinforced this principle by approving a "transit first" policy for waterfront development whereby surface rapid transit services are to be constructed at the earliest stage of the redevelopment process so that excellent transit services are in place by the time the first developments are occupied, thereby encouraging non-auto travel patterns from the outset.

In December 2005, City Council approved the *East Bayfront Precinct Plan* and the *East Bayfront Class Environmental Assessment Master Plan*. The area subjected to policies in the Precinct Plan extends from Lower Jarvis Street to the west, Parliament Street Slip to the east, Lake Ontario to the south, and Lake Shore Boulevard to the north. The Class EA Master Plan addresses the same area as the Precinct Plan plus the area between Parliament Street and Cherry Street. Both plans included the provision of exclusive transit rights-of-way on the roadways identified in the Secondary Plan.

Concerns were raised at that time that the resulting roadway was too wide on Queens Quay East. As a result, direction was given by Council to minimize curb to curb distance within the public right-of-way to improve pedestrian access. Although the Precinct Plan and the Class EA Master Plan provide a strong framework for the assessment of options and the selection of a preferred approach to providing transit service to East Bayfront, it was recognized that a formal Environmental Assessment study would be required for the approval of the construction of a transit right-of-way. As a result, Council approved the Precinct Plan and the EA Master Plan subject to, among others, the following conditions:

- "the recommended preferred and alternate cross-section design options for Queens Quay East between Lower Jarvis Street and Small Street be identified as 'preliminary, subject to further evaluation' in the context of the upcoming Transit EA Study."
- "the TTC and the TWRC be directed , in the transit EA, to revisit whether smaller rights-of-way are technically feasible and desirable; and
- "the TTC and the TWRC consult with community stakeholders on this matter."

In June 2005, the Toronto Transit Commission authorized TTC staff to undertake Environmental Assessment studies for transit projects in the Eastern Waterfront including a study of transit needs in the East Bayfront area on behalf of Waterfront Toronto. The study has been done in close co-operation with City of Toronto and Waterfront Toronto staff, with a project team made up of representatives of the TTC, City of Toronto City Planning Division, City of Toronto Transportation Services, and Waterfront Toronto guiding the study. A consortium of consultants led by McCormick Rankin Corporation undertook Transit Environmental Assessment studies in the Eastern Waterfront, under the direction of the project team.

The Environmental Assessment Study for transit services in the East Bayfront area was initiated as an Individual Environmental Assessment. In September 2007, the Ministry of the Environment approved an amendment to the Municipal Class Environmental Assessment to permit transit projects to be undertaken under the Municipal Class EA process. The TTC staff elected to formally convert the study to fall under the new Municipal Class EA process for transit projects.

This Executive Summary provides an overview of the accompanying Environmental Study Report, and describes the key decisions that led to the recommendation for streetcars in their own right-of-way on the south side of Queens Quay East to serve the East Bayfront area, with a tunnel section west of Freeland Street connecting to the existing tunnel under Bay Street, and an expansion of the streetcar loop at Union Station to accommodate the new service.

Project:

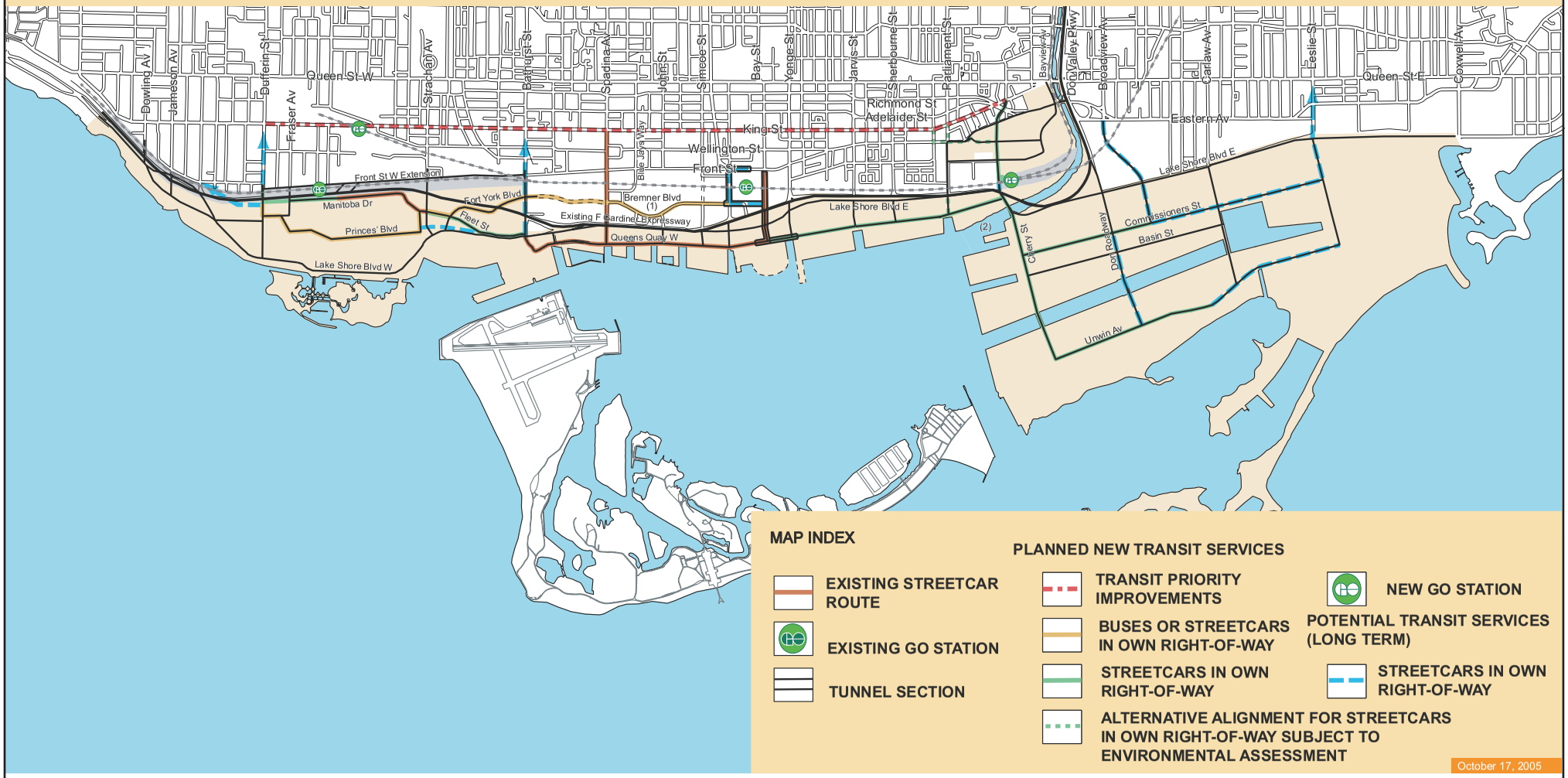
EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Study Area

Figure No.

E1-1



Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Central Waterfront Secondary Plan
Map B: Transit Plan

Figure No.

E1-2

Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Future Transit Network in the Eastern Waterfront

Figure No.

E1-3

E2 Existing Conditions

The East Bayfront Precinct area is currently an underused brown-field site, which has been considered a prime candidate for revitalization for decades. Within the precinct area, lands along the south side of Queens Quay East from Lower Jarvis Street to Parliament Street are in public ownership. The land north of Queens Quay East is owned, in part, by private interests and in part by Waterfront Toronto.

Based on the approved *East Bayfront Precinct Plan* and the *Environmental Assessment Master Plan*, Waterfront Toronto is proceeding with approvals, design and construction of a number of elements of the plan including:

- widening the right-of-way of Queens Quay East to improve public realm and transportation functions;
- construction of the streetcar right-of-way and implementation of streetcar service along Queens Quay East to support development; and
- building of new sewer, watermain, and stormwater infrastructure.

Land uses along Queens Quay, from Bay Street easterly, vary widely from high-density residential and commercial uses west of Freeland Street, to low-density commercial and industrial uses east of Freeland Street. The Redpath Sugar plant is located just west of the Jarvis Street Slip, which is outside the area addressed in the East Bayfront Precinct Plan. A rail spur formerly serving the plant has been terminated. The City has received applications for residential development on the south side of Queens Quay between Yonge Street Slip and Redpath Sugar.

There are minimal historic or heritage features on the site though there are some archaeological remnants as illustrated in **Exhibit E2-1**.

The natural environment within the East Bayfront study area has been described in the *East Bayfront Class EA Master Plan*. This report notes that the area is an extensively developed and altered environment considered an urban brown-field site. There is negligible vegetation, with limited diversity of the aquatic habitat in the vicinity of the East Bayfront and no other features of natural environmental significance.

Currently, there are three north-south transit routes serving the area and no east-west services through the area. The TTC's 75 SHERBOURNE, 97B YONGE and the 6 BAY routes provide north-south services to the Queens Quay East/Lower Jarvis area. The 509 HARBOURFRONT and 510 SPADINA streetcar routes, providing frequent services to and from Union Station, are on the periphery of the study area. Both streetcar routes operate along a dedicated right-of-way in the centre of Queens Quay West.

The major transportation connections in terms of east-west roads within the East Bayfront are the Gardiner Expressway, Lake Shore Boulevard, and Queens Quay East. Yonge Street, Bay Street, Sherbourne Street, Jarvis Street, Parliament Street and Cherry Street (on the eastern edge of the study area) provide north-south connections to the waterfront from the neighbourhoods north of the Gardiner/Lakeshore.

○	Built Heritage Resource
△	Cultural Heritage Landscape
□	Approximate site of Archaeological Resource

1	-LCBO office and Warehouse; c.1947
2	-Redpath Sugar Refinery; 1957
3	-Commercial Building (Mid 20th Century)
4	-Remnants of rail spur serving the light industrial area to the west
5	-circa 1870-1886 Don Breakwater
6	-circa 1900 Don mouth Fill Zone
7-9	-circa 1893-1910 Shoreline Development
7-10	-circa 1910-1923 Shoreline Development
11	-Knapp's Roller Boat
12	-circa 1925 Bulkhead/Pierhead Line and Co
13	-circa 1929-1939 Air Harbour
14	-circa 1940-1946 RCAF Equipment Depot No. 1

Project:
EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:
Heritage and Archaeological Resources

Figure No.
E2-1

E3 Problem Statement

The redevelopment of the City's brown field waterfront sites, and in particular the East Bayfront precinct, represents a significant opportunity to attract people and jobs to the City as envisioned in the City's *Official Plan*. The *Official Plan* calls for an intensification of land uses in the city to make best-use of existing infrastructure and to achieve the large environmental and sustainability benefits of a compact urban form. Transit plays a critical role in achieving this objective if it, along with pedestrian and cycling modes of travel, can provide a reasonable alternative to auto travel.

Studies of existing higher-density mixed-use communities in the City indicate that, if an effective transit system is in place, at peak times, non-auto mode splits of 50% to 60% are achievable in mixed-use communities comparable to what is planned for the East Bayfront. Forecasts for the East Bayfront area call for this level on non-auto travel with 40% of all trips are expected to use transit services specifically. This is based on a number of factors including location, proposed land uses and the plan for an integrated transit network in the Eastern Waterfront. When fully developed, the approximate 6,000 residential units, 230,000 square metres of office and retail space, and a college campus accommodating up to 3,500 full-time and 1,000 part-time students, are expected to generate an additional 4 million riders per year for the TTC .

The purpose of the *East Bayfront Transit Environmental Assessment Study* has been to determine the transit facilities required to serve the long-term needs of the study area which achieve the City's and Waterfront Toronto's objectives both for high-quality, reliable transit services and urban design and environmental excellence. Although not part of the core transportation problem, the establishment of the roadway design to accommodate all transportation modes and the confirmation of the associated right-of-way width are also being addressed under this EA study.

Current transit services in the area are beyond a convenient walk for most of the large numbers of travelers expected to and from the new developments planned for the new East Bayfront community. The *East Bayfront Precinct Plan* established a goal of providing frequent and reliable transit service within a 5-minute walk of most residents of the East Bayfront area and current services do not meet this objective.

The redevelopment plans are based on the assumption in the *Central Waterfront Secondary Plan* that a high proportion of all travel to and from the community will be made by transit. To achieve this objective, it is essential that a high-quality transit service be provided. Transit service speed and reliability are important, as is the fundamental requirement for new streetcar facilities to have passenger platforms to provide access for passengers with mobility limitations.

In addition, the developments in the East Bayfront are not occurring in isolation. A fundamental principle of the broader planning for the waterfront area is the need to tie future development into the fabric of city by encouraging linkages between existing communities and future communities. From a transit perspective this is achieved by providing an integrated network of transit services that link both north-south and east-west into and through the community. Transit services in the East Bayfront need to be integrated with redevelopment plans for the West Don Lands, Lower Don Lands, and Port Lands areas to achieve the overall benefits of the broader integrated planning approach being taken in the waterfront area.

E4 Consultation Process

Waterfront Toronto has established a high standard for public and community involvement in its work, and has been successful in engaging both the local community and a wider range of interested community groups and individuals in the planning process for the waterfront. This approach has been incorporated into the planning process for the East Bayfront Transit EA. A thirteen-member Community Liaison Committee was established for the study, which met seven times during the course of the EA study, to provide input and advice on the conclusions being reached and on mechanisms to achieve effective consultation. In addition to three formal public workshop/information centres conducted during the study, a drop-in style information centre was also part of the public input process. The feedback provided through the public input process has resulted in conclusions and a refined design concept that addresses the concerns and issues brought forward by the community. In addition, consultation for the *East Bayfront Transit EA* was carried out in conjunction with the *Queens Quay Revitalization Class EA*, which has a study area that overlaps with the Transit EA. Numerous meetings with major landowners and property developers in the Transit EA study area were carried out by Waterfront Toronto for the benefit of both EA studies. Results from these discussions helped guide the development and selection of the preferred design alternative for the entire Queens Quay corridor.

E5 Approach to Assessment of Alternatives

The assessment was undertaken in three stages. The first related to assessing overall needs, and the identification of a preferred corridor. The second stage looked at alternatives related to the preferred vehicle technology to provide the best quality of transit service in the chosen corridor. The third and final stage examined alternatives related to the preferred way of designing the transportation facilities and public realm to best accommodate the preferred vehicle type. In accordance with the Class EA process, input from the public and key stakeholders was sought at each key decision point.

A significant first step in the needs assessment was the undertaking of travel demand forecasts to better-understand travel needs in the community and, in particular, the need for transit capacity through the study area. A key assumption in the analysis was that an enhanced network of high-quality transit services will be provided in and around the Eastern Waterfront area that will be successful in attracting a high-mode split to transit. Based on an approach used by the City of Toronto for its transportation planning work and preparation of its Official Plan, the travel demand analysis concluded that, assuming full redevelopment in the Eastern Waterfront area, up to 4,250 people will be traveling on transit through the East Bayfront area in the peak direction during a typical weekday morning peak hour. The conclusion was a key input in the selection of the preferred corridor and transit technology.

The next step in the needs assessment was the decision on the number of through auto traffic lanes on Queens Quay East: 2 lanes versus 4 lanes. It should be noted that, from the outset of this study, there has been a preference to adopt as narrow a right-of-way as possible to minimize overall scale of the street while providing the necessary cross-sectional elements.

The traffic operations analyses, undertaken as part of the *East Bayfront Class EA Master Plan*, demonstrated that provision of only 1 through lane in each direction on Queens Quay East (2 lanes in total) adequately supports future development along the corridor, provided that dedicated turn lanes are available at key intersections. There would be limited roadway capacity for through-traffic, but this condition was deemed an acceptable trade-off given the benefits to

the local community itself. The lack of discretionary auto capacity has the potential to discourage transient auto traffic and maintain Queens Quay East as a local roadway for local developments.

This conclusion results in benefits for the East Bayfront from a community and urban design perspective, and provides an opportunity to narrow the traveled portion of Queens Quay East. This conclusion has been an important input into the second stage of the assessment process related to the preferred design for Queens Quay East.

E6 Preferred Corridor – 'Queens Quay Only'

Providing a convenient link to Union Station, while serving the long term residential, employment, and waterfront access needs in the East Bayfront area, is a key requirement of the study. The Project team assessed two corridor options to serve East Bayfront area as illustrated in **Exhibits E6-1 and E6-2**:

1. **'Queens Quay Only':** One transit facility along the Queens Quay East-Bay Street corridor. Trips to/from the East Bayfront and Port Land areas would be served by transit on Queens Quay East.
2. **'Queens Quay Local plus Lake Shore Express':** One transit facility along the Queens Quay East-Bay Street corridor to serve local demands and a second transit facility along Lake Shore Boulevard to provide an express bypass route for those riders passing through the study area.

The Queens Quay East corridor bisects the future development in the precinct and provides the most direct service to and from existing and future development. It also allows for a connection to the existing streetcar tunnel under Bay Street. The Lake Shore corridor is on the northern edge of the study area and, while providing a possible bypass route for transit users passing through the study area, it would provide only limited direct service to existing and future development in the East Bayfront area.

The options were evaluated based on a comprehensive set of evaluation criteria to determine the preferred alternative. The 'Queens Quay Only' option of providing service to Union Station is preferred because it will fully serve developments in the East Bayfront and Port Land areas, provide higher service frequency on Queens Quay East, and result in lower capital cost. The 'Queens Quay Local plus Lake Shore Express' option would require two parallel facilities in close proximity which would, in turn, reduce service frequency on Queens Quay East while incurring higher capital cost. The need for 'Lake Shore Express' to negotiate through traffic around Union Station, as determined in the review of this option, would also result in transit operational delays and create adverse impacts on Front Street from transportation, public realm, and urban design perspectives.

The assessment confirmed the need for transit services on Queens Quay in the East Bayfront to connect with planned services on Cherry Street in the West Don Lands area and to the Port Land area to the south. These connections are elements of the *Lower Don Lands Class EA Master Plan*, which is being undertaken by Waterfront Toronto. The preferred design for these connections will be addressed in that study.

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Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Corridor Alternatives - 'Queens Quay Only"
(Option 1)

Figure No.

E6-1

Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title: Corridor Alteratives - 'Lake Shore Express plus Queens Quay Local' (Option 2)

Figure No.

E6-2

E7 Preferred Technology: Streetcar in Dedicated Right-of-Way

The Project Team began with considering a wide range of possible transit technologies. It was determined that the anticipated travel demand in the corridor does not warrant the expense of fully-grade separated facilities (such as a subway) and these options were screened from further consideration. A number of bus propulsion technologies were identified including those that would eliminate local emissions such as electric or fuel-cell technology buses. The assessment was done based on the best future technology. Therefore, for this comparison, it was assumed that buses, in the future, will have zero local emissions (assuming fuel cell or electric propulsion).

The technology options assessed within the Queens Quay East corridor are as follows:

1. bus in mixed-traffic
2. streetcar in mixed-traffic
3. bus in dedicated right-of-way
4. streetcar in dedicated right-of-way

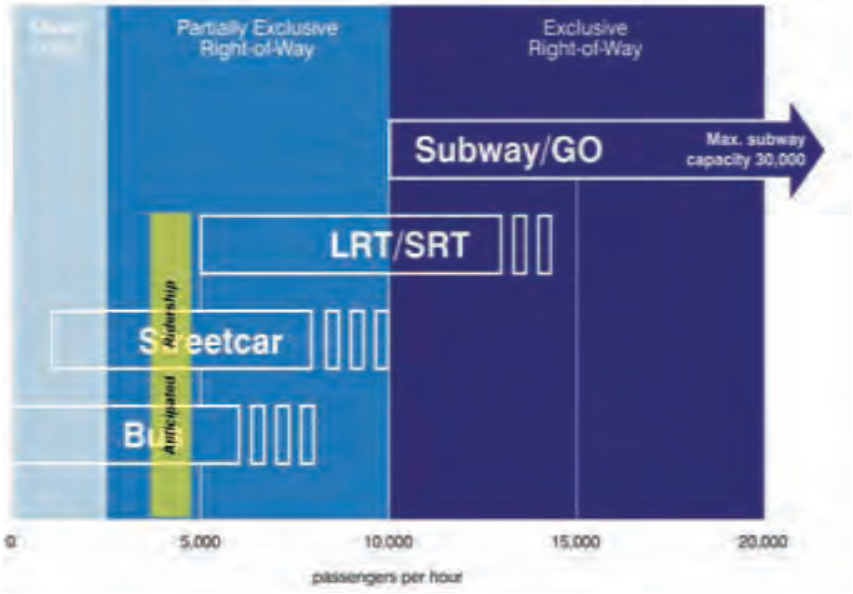
The options are illustrated in **Exhibits E7-1**.

Mixed-traffic operations were screened out as they do not provide a high enough quality of transit service (reliability and speed) to compete effectively with the automobile, attract a high mode-split to transit, and address projected significant future travel demand in the Eastern Waterfront area.

Bus services in a dedicated right-of-way would require significant reconstruction of the existing Bay Street Tunnel to accommodate buses as well as existing streetcar services to/from the west. As a bus carries fewer passengers than a modern streetcar, a bus service would require many more vehicles than a streetcar service to meet the demand. The large number of buses needed to operate the Queens Quay East service, combined with existing streetcar services from the west, would result in significant bunching and delays at Union Station, affecting the reliability and attractiveness of the services. Streetcars, with higher passenger capacity, would be capable of meeting the ridership demand and still operating at manageable headways. Also, buses cannot be integrated well with the existing streetcar services on Queens Quay or future streetcar service on Cherry Street, whereas streetcars will fit seamlessly within the existing network that is prevalent in the downtown area. For these reasons, streetcars in a dedicated right-of-way are preferred over bus.

The Project Team also examined connection issues between Queens Quay and Union Station at the request of the Community Liaison Committee. The concept involves replacing transit in the existing Bay Street Tunnel with a pedestrian 'moving walkway'. Transit vehicles would only operate east-west on Queens Quay and passengers heading north to Union Station would have to transfer at Queens Quay and Bay Street and use the underground 'moving walkway' to get to Union Station. Although the concept would improve streetscape on Queens Quay by eliminating the existing tunnel portal west of Bay Street, the need to transfer between the 'moving walkway' and transit vehicles would create a major inconvenience to transit users, resulting in reduced quality of service and reduced ridership – contrary to the purpose of this EA study. As the concept does not provide a high enough quality of transit service and will adversely impact the ability to attract a high mode-split to transit, the 'moving walkway' option was screened out from further consideration.

Transit ROW's and Technologies



Streetcar in Mixed Traffic (with Platforms)

Bus in Mixed Traffic

Streetcar/LRV in Dedicated Right-of-Way

Bus in Dedicated Right-of-Way

	Project: **EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT**	Figure No. **E7-1**
	Title: Technology/ROW Alternatives	

E8 Preferred Portal Location – Queens Quay between Yonge Street and Freeland Street

The Project Team examined a wide range of options for the location of the transition from the existing streetcar tunnel under Bay Street to a surface right-of-way. The options considered include: Yonge Street, Bay Street, York Street, Harbour Street, and Queens Quay. A high-level assessment was carried out to screen out options based on functional feasibility. Yonge Street, York Street and Harbour Street were screened out from further considerations as all of these options would create an undesirable impact on transit and traffic operations, impose a circuitous and indirect transit access to Union Station from Queens Quay, and result in higher impacts on existing commercial and residential features in the area.

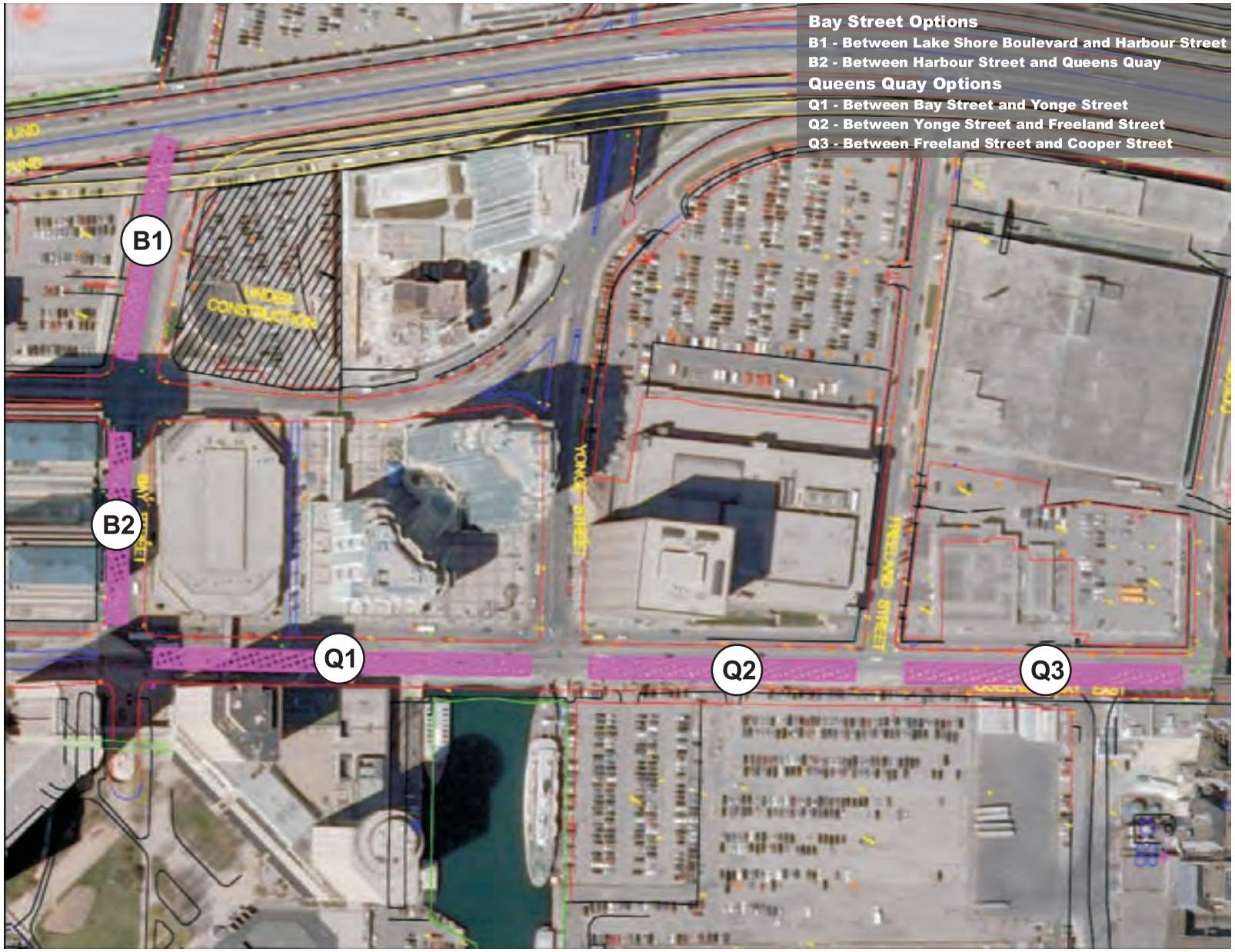
As shown in **Exhibit E8-1**, five short-list alternatives were considered:

1. Option B1 – Bay Street between Lake Shore Boulevard and Harbour Street
2. Option B2 – Bay Street between Harbour Street and Queens Quay
3. Option Q1 – Queens Quay between Bay Street and Yonge Street
4. Option Q2 – Queens Quay between Yonge Street and Freeland Street
5. Option Q3 – Queens Quay between Freeland Street and Cooper Street

The Bay Street options (B1 and B2), would require all streetcars to and from Union Station to enter through the Bay Street/Queens Quay intersection at-grade, mixed with surface traffic and pedestrian movements. There would be one tunnel portal on Bay Street serving all streetcars from Queens Quay West and Queens Quay East. The existing portal on Queens Quay west of Bay Street would be eliminated. Extensive modification to the existing Bay Street Tunnel would also be required.

The Queens Quay options (Q1, Q2, and Q3) require an extension of the existing Bay Street Tunnel easterly from the Bay Street / Queens Quay intersection to a new portal on Queens Quay East. All streetcars to and from Union Station would operate through the Bay/Queens Quay intersection underground, grade-separated from surface traffic and pedestrian movements. There would be two tunnel portals on Queens Quay: the existing portal west of Bay Street and a new portal east of Bay Street.

Option B2, was screened out subsequently as there is inadequate space on Bay Street south of Harbour Street to accommodate the required track geometry at the Bay Street/Queens Quay intersection. The remaining alternatives were evaluated with respect to a wide range of objectives. Impacts on transit service, traffic operations, public realm, and existing commercial and residential features were considered major factors in the selection process. Through a detailed assessment and evaluation process, the option of having the portal on Queens Quay between Yonge Street and Freeland Street (Option Q2), was recommended as the preferred location as it would result in better quality of transit service and minimal impact on pedestrian and traffic operations. The portal would fit within available right-of-way, allow for public realm improvements on Queens Quay, and create the lowest impact on commercial and residential features.



Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Portal Alternatives

Figure No.

E8-1

E9 Preferred Design – Streetcar on the South Side of Queens Quay

The Project Team evaluated two alternative designs for the operation of streetcars on Queens Quay East which were:

1. Dedicated Transit in Centre Median with On-Street Bike Lanes ("Centre Transit")
2. Dedicated Transit South Side with Expanded Public Realm ("South Side Transit")

The two options are illustrated in **Exhibit E9-1** and discussed below:

Option 1 – Dedicated Transit in Centre Median with On-Street Bike Lanes

This option is best from a transit and traffic operations perspective. It is a typical arrangement in Toronto and autos, pedestrians and transit operators are familiar with the arrangement. This option would also provide the best ability to provide transit signal priority at intersections. With transit in the centre of the road, there are opportunities to reduce the number of intersections crossing the transit right-of-way and maintain the desirable distance between traffic signals for an effective operation of transit signal priority. However, transit in the centre median requires that transit stops be fixed from the outset – typically placed opposite a left-turn lane – and has limited flexibility to change operating arrangements over time. In addition, from a passenger perspective, the provision of waiting areas in the middle of the roadway is less desirable than integrating the transit stop into the pedestrian area, as is possible with the other options.

To be consistent with the same concept examined by the *Queens Quay Revitalization Environmental Assessment*, the centre transit option includes on-street bike lanes. Although adequate space exists within the widest parts of Queens Quay east of Jarvis Street to accommodate the Martin Goodman Trail, this cross section cannot be carried throughout the entire *East Bayfront Transit EA* study area due to the narrower right-of-way west of Jarvis Street.

The provision of transit in the median adds to the real and perceived width of the street and creates a sense of isolation for transit passengers because the separation from the sidewalks and adjacent land uses by through traffic. This aspect of the design results in the perception of a wide transportation corridor with limited opportunities for innovative urban design treatments.

Option 2 – Dedicated Transit South Side with Expanded Public Realm

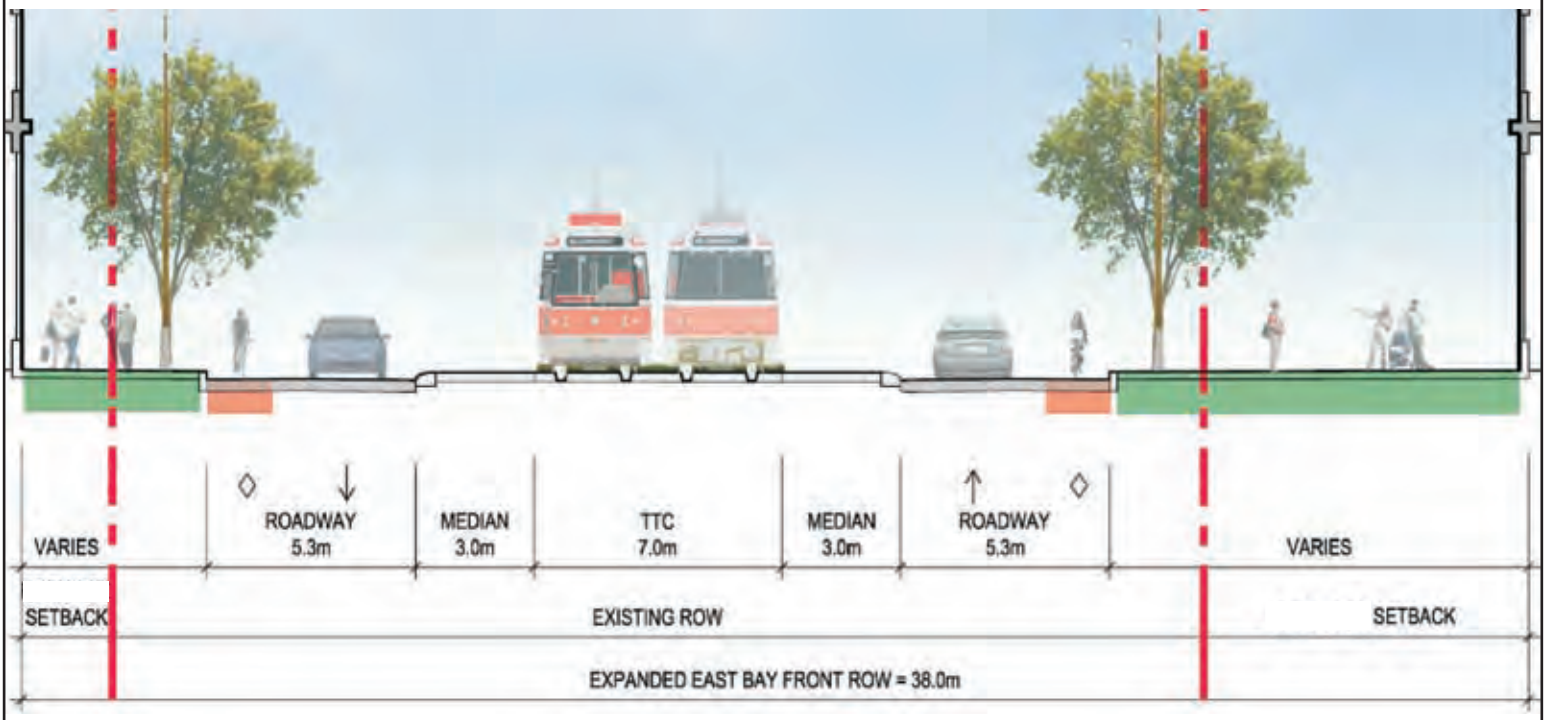
This option provides for a similar level of service for traffic operations as the Centre Transit option but is more challenging from a transit operations perspective. It provides opportunities for urban design treatments that can reduce the scale of the roadway and improve the public realm. A key factor is that the distance for pedestrians crossing general traffic is reduced. The passenger loading and unloading areas are also less impacted by the sense of isolation associated with the middle of the road option. Eastbound passengers, in particular, benefit from having the waiting area integrated with the pedestrian area and having a greater buffer from traffic. The design also incorporates a single median to separate general traffic from the transit right-of-way. This provides the opportunity for a median width that is generous enough to support the healthy growth of trees and to separate the street into corridors that create a comfortable public realm.

With transit on the south side of the road it is difficult to reduce the number of intersections or driveways crossing the transit right-of-way. However, there are strategies that can help reduce the number of signals that streetcars would need to cross, maintain an acceptable distance between transit signals, and allow for effective implementation of transit signal priority.

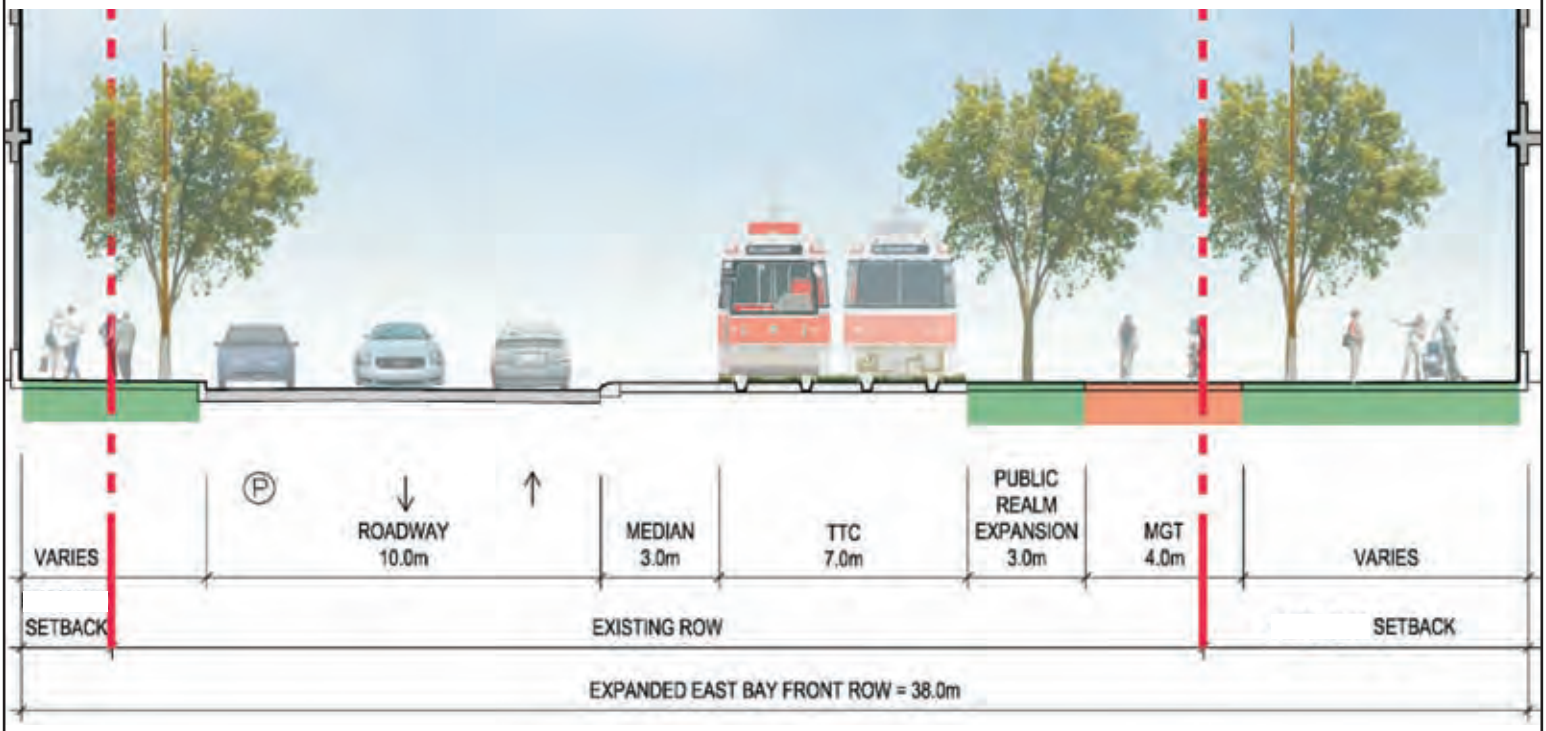
The alternatives were evaluated with respect to transit, traffic, pedestrian and urban design objectives. Option 2 – dedicated transit on the south side of Queens Quay East – is recommended as the Preferred Design for the following reasons:

- Balanced space for all modes of travel;
- Generous and suitably scaled pedestrian boulevards;
- Reduced north-south crossing distance for pedestrians allows more time in the cycle to be dedicated to east-west transit to support the transit oriented development and non-auto goals of the waterfront and city more broadly;
- A continuous Martin Goodman Trail provides a safe and efficient facility for the mix of cyclists who travel along and visit the waterfront – an improvement over today and better overall than on-street bike lanes;
- Traffic can be accommodated on Queens Quay at an acceptable level of service with minor re-routings to Lake Shore Boulevard;
- Adequate access can be provided to all properties south of Queens Quay for all modes of travel;
- A multi-modal street that promotes improved air quality;
- Vastly improved urban tree canopy/a linear park;
- A main street environment that promotes Queens Quay as a place for tourism, employment, cultural activity and residential uses;
- A main street environment that will support and encourage private investment in Toronto's waterfront precincts.

The Preferred Design is described in more detail in the following sections.



Option 1 - Dedicated Transit in Centre Median with On-Street Bike Lanes



Option 2 - Dedicated Transit on South Side with Expended Public Realm

Project: **EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT**

Title: Queens Quay East Streetcar Alignment Alternatives

Figure No. **E9-1**

E10 Description of the Recommended Design

One of the key considerations in selecting transit on the south side was the potential to visually associate the transit right-of-way with the adjacent south side boulevard and Martin Goodman Trail. A fundamental element of the urban design approach in the study has been to consider the street as an urban place, not simply a corridor for movement. This embodies the principles of:

- designing for spatial comfort and human scale;
- making a place not a thoroughfare; and
- orienting to the pedestrian.

The Preferred Design provides an opportunity to visually expand the non-auto portion of the street. Generally, the Queens Quay East right-of-way will be composed of:

- north sidewalk of variable width;
- a roadway generally 10 metres;
- a raised centre median between the roadway and transit right-of-way 3 metres;
- a dedicated transit right-of-way 7 metres;
- a tree-line buffer 3 metres;
- Martin Goodman Trail 4 metres; and
- south sidewalk of variable width.
- **TOTAL RIGHT OF WAY 38 metres**

In general terms, the proposed curb line on the north side of the road will remain similar to where it is today, except at Lower Jarvis Street and Lower Sherbourne Street where provision of a westbound right-turn lane would require the current curb line to be shifted north approximately 3 metres. Roadway modifications are expected to take place along the south side of the road.

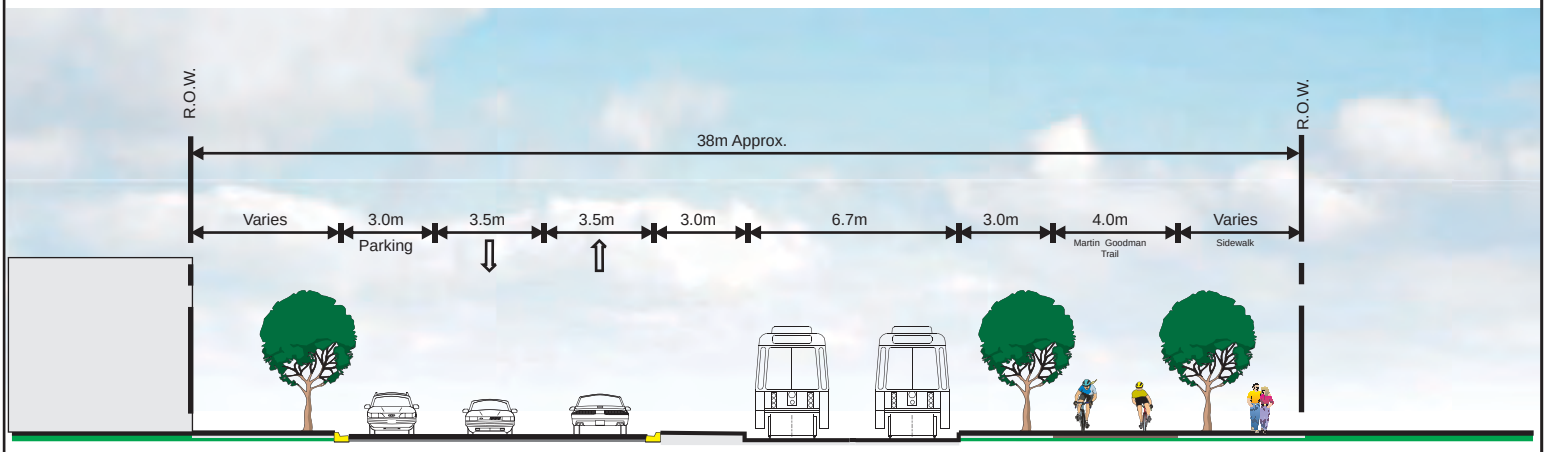
The standard 38 metres right-of-way cannot be maintained, initially, west of Lower Jarvis Street in front of the Redpath Sugar property, where the existing building face on the south side of Queens Quay requires that the right-of-way be narrower. Design elements will be adjusted where necessary to account for these types of right-of-way constraints. The Preferred Design and standard right-of-way will be achieved between Lower Jarvis Street and Yonge Street, over time, as the properties adjacent to the right-of-way are redeveloped.

The recommended design concept is illustrated in **Exhibit E10-1** and typical cross-sections are illustrated in **Exhibit E10-2**.

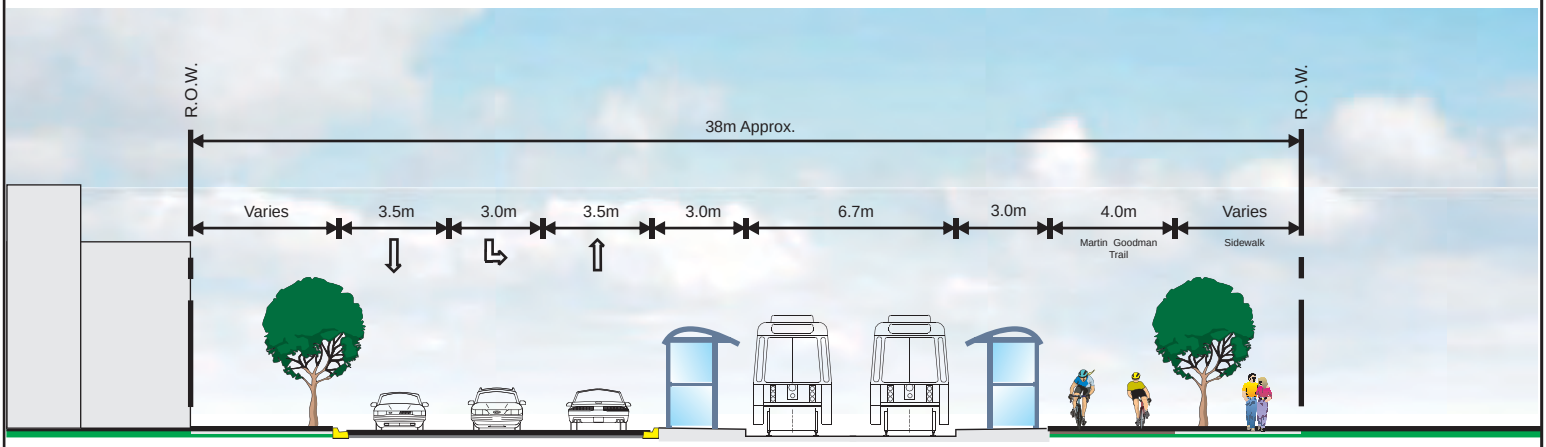
Project:
EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:
South Side Option

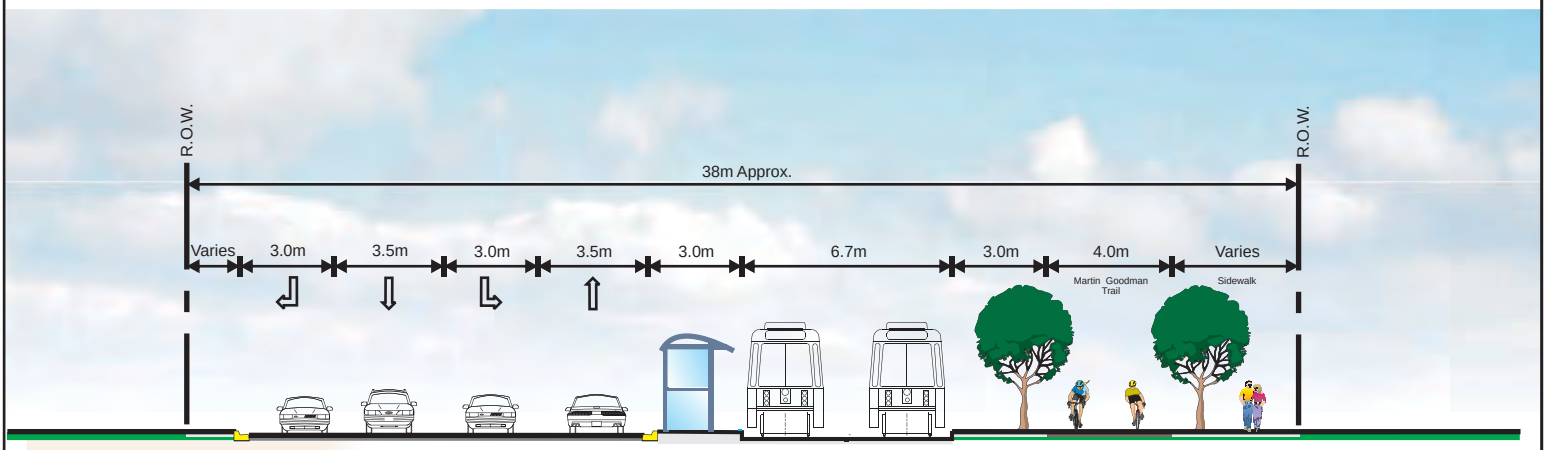
Figure No.
E10-1



Mid-Block with On-Street Parking



Intersection with Facing Platforms and One Turn Lane



Intersection with Two Turn Lanes

Project:
EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:
Typical Cross-Sections

Figure No.
E10-2

E10.1 Transit Right-of-Way

The transit right-of-way will generally be 7 metres wide with overhead traction power suspended from guy wires attached to poles on either side of the right-of-way (i.e. one pole in the median and one pole in the boulevard). Toronto Fire prefers this configuration as the clear 7 metres provides an additional drivable surface – Fire and EMS vehicles can use either the roadway or the transit right-of-way in the event of an emergency. The poles can be stand alone or used in combination with streetlights.

Streetcar Tunnel

The proposed streetcar route will begin underground at Union Station Loop and traverse south through the existing streetcar tunnel under Bay Street. At the intersection of Bay Street and Queens Quay, the route will turn east through a reconfigured wye (a triangular streetcar junction) and enter a new running structure under Queens Quay. The new tunnel will continue easterly within the Queens Quay right-of-way until it reaches a new portal located east of Yonge Street. The tunnel will be approximately 10 metres in width, 6 metres in height, and it will be constructed using the cut-and-cover method. Details related to the design of the tunnel will be determined during the Detail Design Phase.

Tunnel Portal

The proposed Queens Quay East service will transition from a fully-underground route at Yonge Street, to a surface route by Freeland Street. The portal for the line will be located between Yonge Street and Freeland Street. Past the portal, the route will ascend to surface along a ramp at a grade of 7.5%, which is similar to the ramp connecting to the existing portal west of Bay Street. This is steeper than desirable but the presence of a major storm sewer culvert running north-south under Yonge Street forces this steep grade. Even so, the sewer will need to be realigned westerly at Queens Quay in order for the streetcar route to reach the surface prior to Freeland Street. The tunnel portal and ramp will be approximately 9 metres in width and they will be constructed using the cut-and-cover method. **Exhibit E10-3** shows a conceptual view of the tunnel portal**.**

Interim Loop at Parliament Street

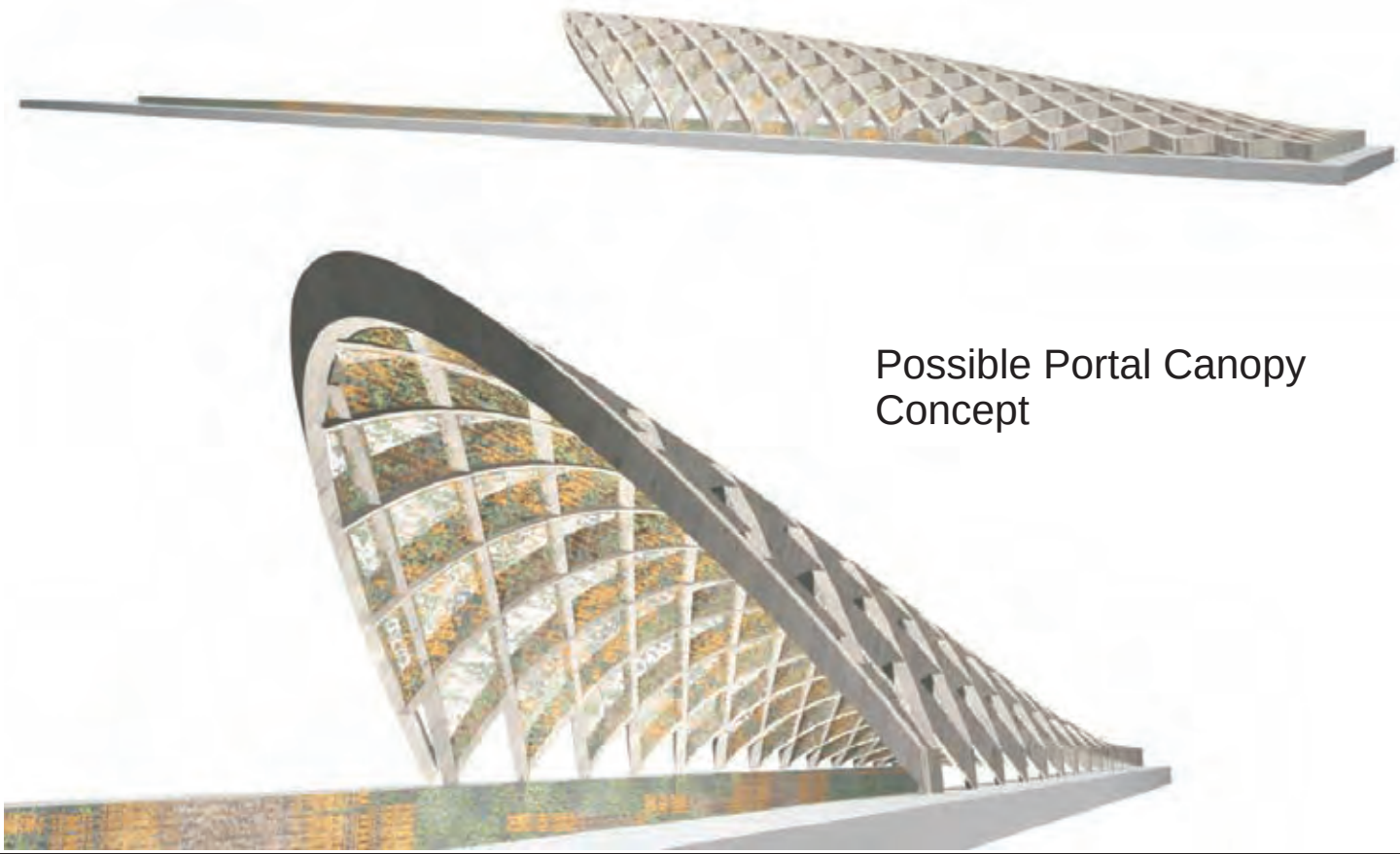
In the short term, the Queens Quay East roadway is expected to terminate east of Parliament Street so an interim streetcar loop will be required to turn streetcars around. This interim loop will be removed when the streetcar line is extended further east. . The preferred location for the interim loop is the east side of Parliament Street immediately north of the approved planned storm water management facility and wave deck in the Parliament Street Slip, as shown in **Figure E10-4**.

The head of Parliament Slip will be backfilled to construct a stormwater retention tank as part of the proposed stormwater management strategy for the East Bayfront development area. The land created by the backfill will provide an opportunity to locate the interim streetcar loop on the east side of Parliament Street. Details of the approved planned storm water management facility in the Parliament Street Slip can be found in the *2009 East Bayfront Class EA Master Plan Addendum – Stormwater Collection and Management System*, prepared and approved in January 2010 per the requirements of the Ontario Environmental Assessment Act.

In the longer term, the extension of the Queens Quay East service to the Port Lands would eliminate the need for the loop, as the service will operate to Cherry Street and Commissioners Street.

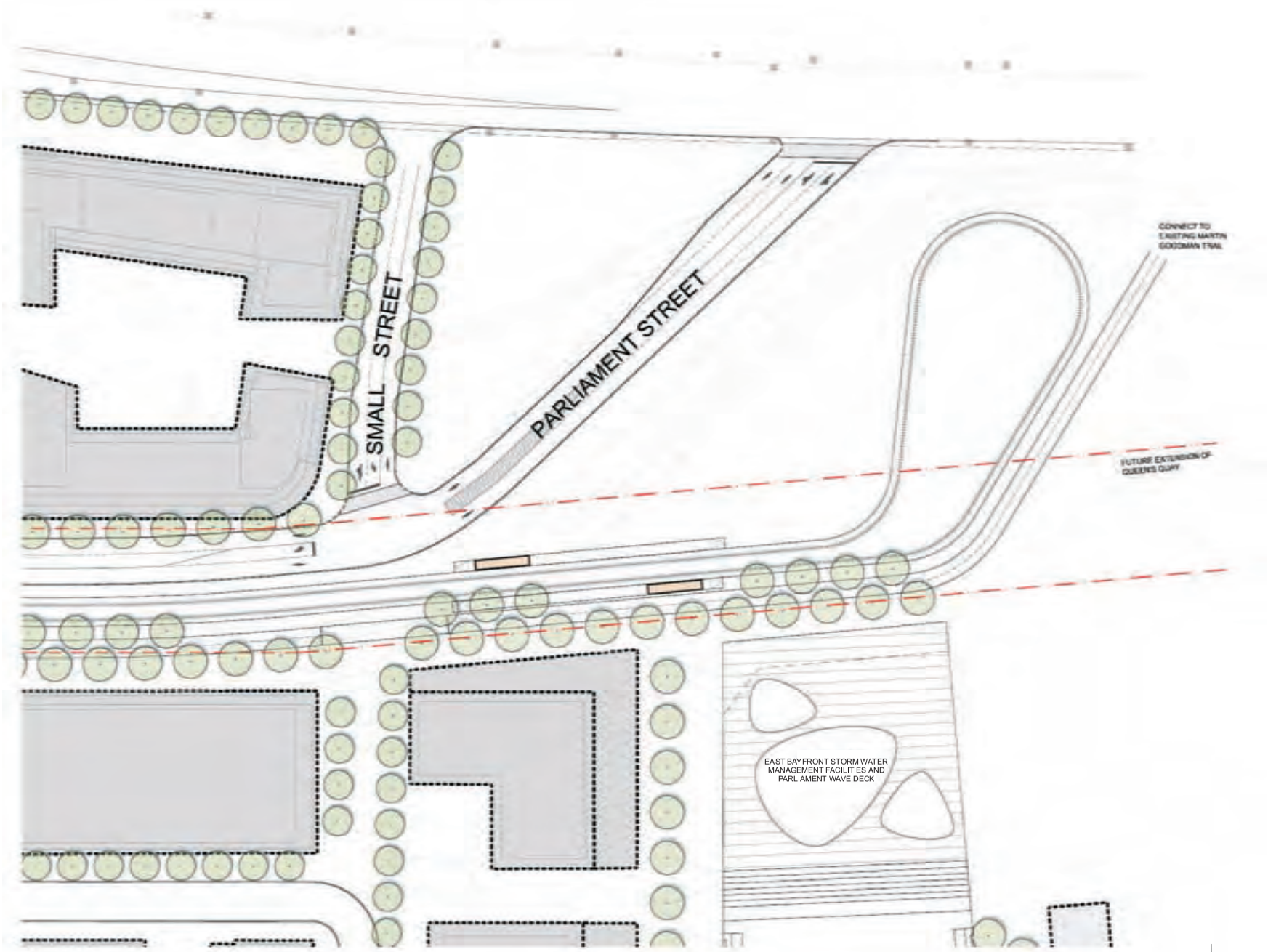
Electrical Substation

An electrical substation will be required in the vicinity of Queens Quay East and Sherbourne Street to provide traction power for the streetcar line. A substation for streetcars is typically an at-grade structure that is approximately 4 metres high with a 4-metre by 12-metre footprint, however, alternative potential configurations are being investigated. The exact location and positioning of the substation will be confirmed during the Detailed Design Phase.



Possible Portal Canopy Concept

	Project: **EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT**	Figure No. **E10-3**
	Title: Tunnel Portal on Queens Quay East between Yonge Street and Freeland Street	



Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Interim Streetcar Loop at Parliament Street

Figure No.

E10-4

E10.2 Roadway and Intersections

Roadway

The recommended design provides for one traffic lane per direction. At some intersections one auxiliary turn lane is provided. A right-turn lane as well as a left-turn lane is provided at Redpath Sugar Main Driveway, Jarvis Street, Sherbourne Street and Street 'D'.

The right-turn lane at Freeland Street and Street 'D' requires the lane to cut into the centre median, while the right-turn lane at Jarvis Street and Sherbourne Street requires that the north curb line to be shifted north. The right turn lane at Redpath's main driveway is an interim condition until the TTC platform requires extension to accommodate longer transit vehicles.

On-street parking is provided at mid-block locations, wherever possible, along the north side of the street. The pavement width is generally 10 metres from the north curb line to the centre median. At intersections where both a left-turn and a right-turn lane are provided, the width is increased to 13 metres. The final roadway width will be confirmed during the Detail Design Phase.

It should be noted that detailed design of the intersection at Freeland Street, Lower Jarvis Street, and Lower Sherbourne Street will need to accommodate turning movements of TTC buses that currently operate through these intersections.

Intersections

With the preferred south side transit alignment, it is necessary to introduce traffic signal control at all road crossings of the streetcar tracks to avoid conflicts between turning vehicles and streetcars. The Queens Quay East intersections with Freeland Street, Redpath West Driveway, Redpath Centre Driveway, Lower Jarvis Street (a T-intersection), Richardson Street, Lower Sherbourne Street, and Street 'D' will all operate under traffic signal control.

To minimize delays to transit vehicles at these signalized intersections, the recommended transit signal priority strategies on Queens Quay East will include:

- enabling east-west transit movements to occur at the same time as the east-west through traffic phases;
- the two-stage pedestrian crossing design at Lower Jarvis Street which removes streetcars/LRVs from traffic signal control;
- the signal at the Redpath Centre Driveway will operate under complete transit pre-emptive control and not allow for north-south pedestrian crossings of Queens Quay; and
- reduction of posted speed limit to 40 km/h on Queens Quay to allow for the safe operation of the signals without coordination with adjacent or nearby signals.

For safety reasons, and to avoid conflicts between turning vehicles and streetcars on the TTC transit right-of-way, the phasing strategy requires that turning movements across the streetcar tracks at the various intersections (i.e. eastbound right turn and westbound left turn movements) operate only during protected turn phases and from an exclusive turn lane (left or right). No permissive movements or right turns on red will be permitted on turning movements across the streetcar tracks (i.e. westbound and northbound right turn movements) due to safety and operational considerations. The proposed signalization plan and turn prohibitions are illustrated in **Exhibit E10-5**.

Project:
EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:
Recommended Intersection Controls on Queens Quay East

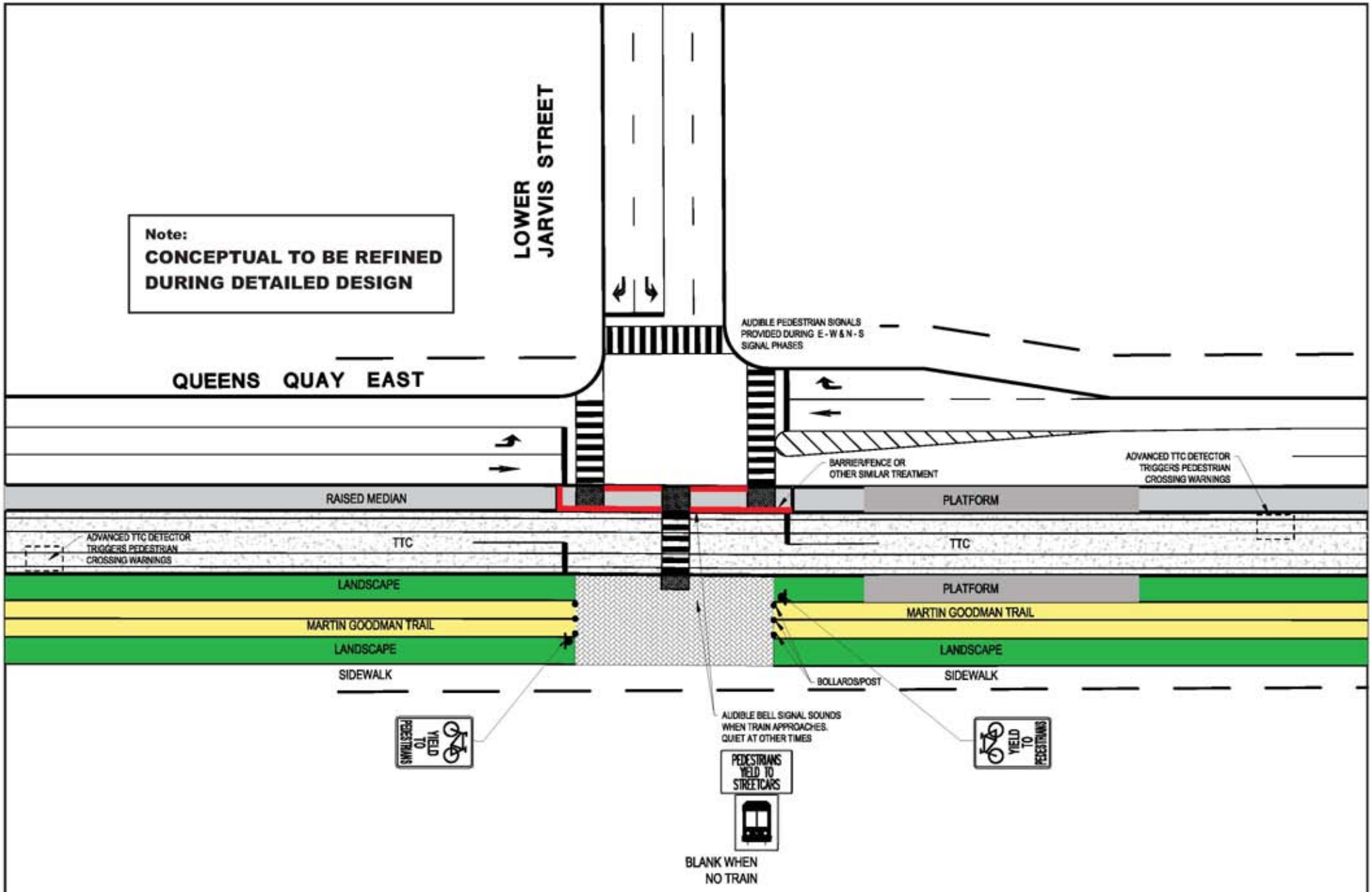
Figure No.
E10-5

Pedestrian Crossing at T-Intersections

The Preferred Design features a T-intersection at Lower Jarvis Street, where no roadway extends south of Queens Quay East. Recognizing that there will be no vehicular movements crossing the streetcar tracks at this T-intersection, a two-stage pedestrian crossing arrangement has been adopted to reduce delays to transit operations by minimizing the need for transit vehicles to stop at this intersection. The arrangement separates the activation of the pedestrian crossings over the roadway from the streetcar portions of Queens Quay East. The arrangement also serves to reduce the roadway width that pedestrians are required to cross as part of a single crossing.

The two-stage arrangement, illustrated in **Exhibit E10-6**, includes a full traffic signal control of the roadway portion of Queens Quay East, with pedestrian crossings of the roadway on the east and west sides of the intersection, and a separate single pedestrian crossing of the streetcar tracks. The pedestrian crossing of the streetcar tracks operates independent of the main road traffic signal but provides a protected crossing facility for pedestrians. The crossing will operate with visual 'walk' and 'don't walk' signals and an audible 'don't walk' warning – similar to a railroad style warning system. The audible 'don't walk' warning will advise pedestrians of the presence of an approaching streetcar and that they should wait until the tracks are cleared. Physical measures and related design features will guide pedestrians – including the visually impaired – between the two sets of crossing facilities.

It may be possible to apply this concept to other locations on Queens Quay East, notably at Street ‘A’, Bonnycastle Street, and Small Street. However, the resulting multiple closely-spaced traffic signals may require that they be coordinated, for safe auto movement, in a way that is very detrimental to streetcar operations. For this reason, any future proposals for the installation of additional signals on Queens Quay East – including the signals suggested for Small Street, Bonnycastle Street, and Street ‘A’ – will need to be supported by an independent technical audit to ensure that such signals can be installed in a way that allows safe traffic operations and does not adversely affect streetcar operations.



Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Figure No.

E10-6

Title:

2 - Stage Pedestrian Crossing at T - Intersections

E10.3 Pedestrian Zone and Boulevard Space

The transit-on-the-south-side option offers the potential to visually expand the public realm through the use of consistent colour/texture treatments for both the pedestrian area and the transit right-of-way. Generous boulevard space, and a continuous median, provides considerable space for street trees and additional planting to reduce the "scale" of the street. Bollards, curbs and trees will be used to delineate the transit right-of-way from the sidewalk. A three metre wide median will separate the streetcar tracks from the roadway. The median will serve as the platform for transit stops and, will feature a surface treatment in keeping with the unique design for the street to be developed in the detailed design phase.

E10.4 Martin Goodman Trail

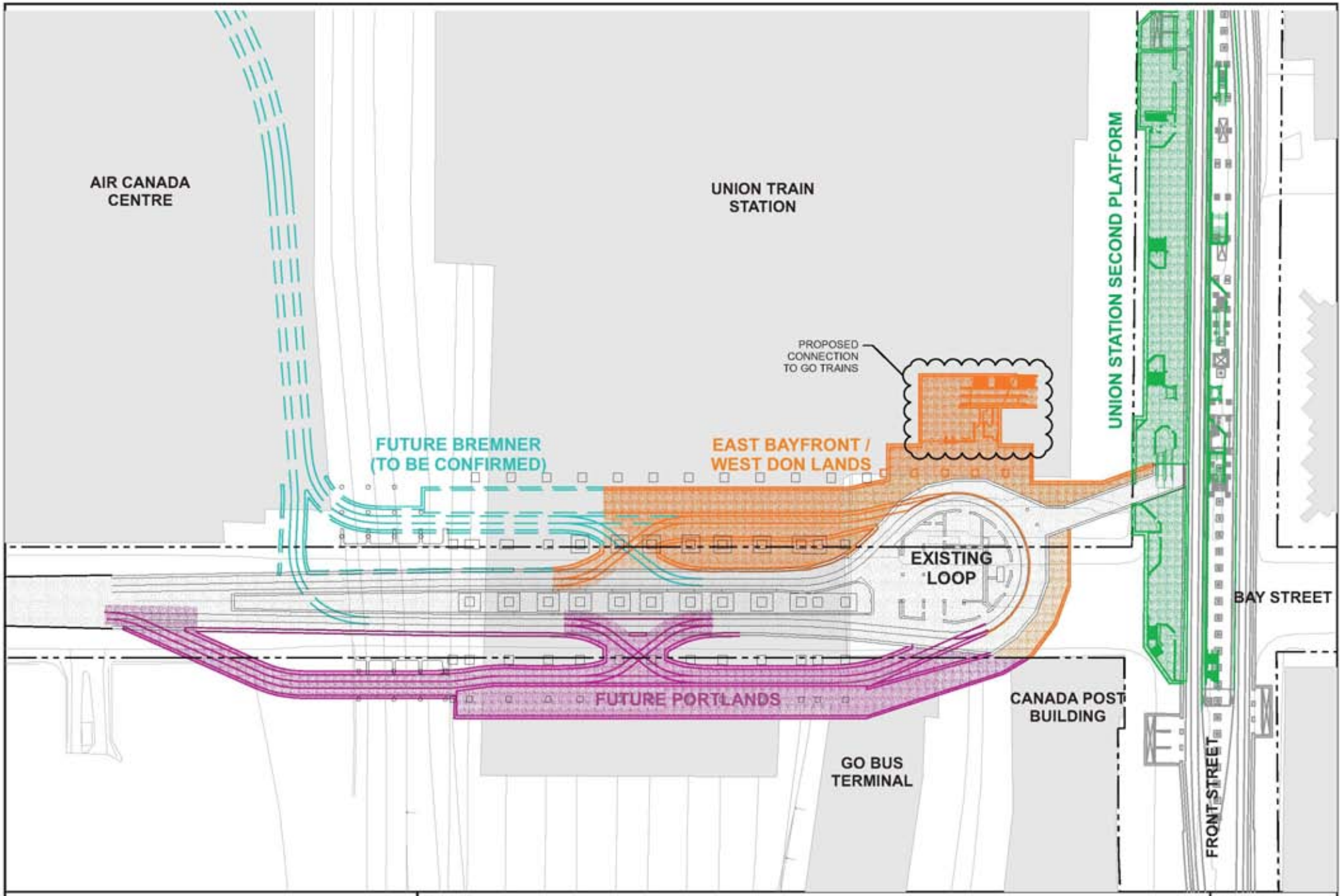
The proposed design will provide for continuation of the Martin Goodman Trail throughout the corridor from Spadina Avenue to Parliament Street. The trail is a multi-use facility that runs for 22 kilometres along Lake Ontario and forms part of the 900-kilometre Waterfront Trail. The trail will be generally 4-metre wide and framed by two rows of trees, wherever possible, along the south side of the transit right-of-way. One row of trees will separate the TTC right-of-way from the trail; the other will define the edge between the trail and the pedestrian boulevard. Each tree will be provided sufficient soil to meet the City's desired target. The Martin Goodman Trail, a multi-use trail, will be primarily for non-pedestrian movements and activities.

E10.5 Union Station Loop Expansion

The existing underground streetcar loop at Union Station is the eastern terminus for 509 Harbourfront and 510 Spadina streetcar lines. The loop is located directly south of Union Subway Station on the same level as the subway platforms. The loop provides a direct connection via a tunnel walkway to the fare-paid area of the subway station's east mezzanine. The streetcar loop features one platform for unloading and another for loading passengers.

As the loop currently operates at, or over, its maximum capacity at busy times, an expansion of its loading areas will be required in order to accommodate future transit demands destined to/originating from the Eastern Waterfront as developments occur in the East Bayfront, West Don Lands, and Port Lands areas. Additional transit demands are also anticipated in areas west of Union Station and south of the rail corridor where developments continue to occur on the remaining former railway lands. Future Waterfront West Light Rail Transit, part of the *Transit City Light Rail Plan* initiatives, is also expected to carry additional passengers into the streetcar loop, possibly via a connection from Bremner Boulevard. All of these current/future plans contribute to the projected increase in passenger activities at the streetcar loop.

The current streetcar loop must be expanded to accommodate the proposed streetcar service on Queens Quay East as well as future services on Cherry Street in the West Don Lands and the Port Lands areas. The feasibility of routing the future Waterfront West LRT to Union Station via Bremner Boulevard is currently under investigation by the *Waterfront West LRT Union Station to Exhibition Place Class EA*. Although the need to provide a connection to Bremner Boulevard is still to be confirmed, the proposed loop expansion concept does not preclude a future connection and loading area for Waterfront West LRT via Bremner Boulevard. The proposed loop expansion concept is illustrated in **Exhibit E10-7**.



Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Union Station Streetcar Loop Expansion

Figure No.

E10-7

E10.6 Extension to Cherry Street

Although Queens Quay East service is proposed to terminate, initially, at an interim loop at Parliament Street, it is expected that the streetcar service will be extended easterly to Cherry Street in conjunction with the future roadway extension of Queens Quay East and re-development of the Lower Don Lands area. Streetcar service on Queens Quay East will connect with future streetcar service on Cherry Street through the West Don Lands area and into the Port Lands, as called for in the Central Waterfront Secondary Plan. The concept is illustrated in **Exhibit E10-8**.

Waterfront Toronto is undertaking a *Municipal Class EA Master Plan* for the Lower Don Lands area and EA approval for the extension to Cherry Street will be part of that study.

Project:

EAST BAYFRONT TRANSIT ENVIRONMENTAL ASSESSMENT

Title:

Future Connection to Cherry Street

Figure No.

E10-8

E11 Property Requirements and Access Issues

The Preferred Design would result in a widening of Queens Quay East from the current 27- to 30-metre right-of-way to approximately 38 metres. While this is less than the width originally prescribed in the *Central Waterfront Secondary Plan*, property will be required on Queens Quay East to accommodate widened sidewalks and the Martin Goodman Trail.

Property Requirements

Most of the land required for the proposed road and transit facilities are within the existing road right-of-way, are under public ownership, or in the process of being transferred to public ownership. One property will need to be acquired to proceed with construction of the major elements of the plan:

- There is an agreement between the City of Toronto and property owners for 25 Queens Quay East (MT 27 Develop*ment) to protect for a 9m building setback along* the northern edge of the development site to achieve the 38-metre public right-of-way, while accommodating the Martin Goodman Trail and southern pedestrian promenade.

To conform to the *East Bayfront Class EA Master Plan* recommendation for an ultimate 38m right-of-way on Queens Quay, and to provide for the functional elements in the preferred plan, eight privately-owned properties will be subject to property taking at the time of site re-development and this will be negotiated on a site-by-site basis.

Access to Redpath Sugar

Redpath Sugar (95 Queens Quay East) currently maintains a main driveway off Queens Quay East at the west side of their property (West Driveway), and a secondary truck driveway (Centre Driveway) and a minor access point to the east. The proposed design will improve Redpath's driveways by providing traffic signal control across the transit right-of-way, while the minor access point at the eastern edge of Redpath's property will become a flagged entrance. Truck activity at the Centre Driveway is typically five or six trucks per hour in the morning peak period, and the minor access point is used infrequently to bring special equipment on to the west side of the Jarvis Street Slip.

The Preferred Design requires the installation of two closely-spaced signals at the Redpath site; however, this will significantly affect the speed and reliability of streetcar service through the area. These concerns will be mitigated by ensuring that the operation of the signal at the Centre Driveway is under complete transit pre-emption, and that it is controlled independently from the adjacent traffic signals, i.e. Redpath West Driveway and Lower Jarvis Street. Based on operations simulations and traffic assessments it has been concluded that this arrangement can be operated safely, and with minor delays to transit and truck movements, as long as the auto traffic speeds on Queens Quay are limited to 40 km/h and an acceleration lane is provide for right turning trucks out of the site traveling to the east. This acceleration lane has been incorporated into the Preferred Design.

As this arrangement is undesirable from a longer-term transit and traffic operations perspective, the signal at the Redpath Centre Driveway will be removed if the sugar processing and storage plant at 95 Queens Quay East is redeveloped for other uses.

Access to Loblaws

Loblaws (102 Queens Quay East) currently maintains a one-lane ramp off Queens Quay East that provides access for delivery trucks servicing the loading dock on the second level of the food store. The truck ramp is currently oriented in a manner that facilitates inbound trucks making a right-in from westbound Queens Quay and outbound trucks making a left-out to eastbound Queens Quay. To a lesser extent, the current ramp can also accommodate some inbound trucks making a left-in from eastbound Queens Quay and a right-out to westbound Queens Quay within the existing roadway.

The Preferred Design of Queens Quay East, as a result of a reduction of the current road width, would limit the maneuverability of inbound heavy trucks making a left-in from eastbound Queens Quay East. To mitigate this impact, it is recommended that the current truck ramp be widened and straightened to accommodate inbound trucks making a left-in movement from eastbound Queens Quay. The proponents will continue to consult with Loblaws during detailed design to ensure that existing truck vehicle operations at the Queens Quay access can be accommodated in the final design.

E12 Conclusion

Providing improved transit service into the East Bayfront development area on a “transit first” basis, where a high-quality of transit service is provided in conjunction with the first development to take place, will provide a strong encouragement for the community to become highly transit-oriented. The recommended option of providing streetcars in a dedicated right-of-way on the south side of Queens Quay provides excellent coverage and access to high-quality transit services for the East Bayfront and surrounding areas. It also provides an opportunity to create a unique pedestrian and public realm for Queens Quay, consistent with the City of Toronto and Waterfront Toronto’s objectives for urban design excellence in Toronto’s waterfront.