

Transportation and Traffic Analysis Report

Contract RFS-2019-NAFC-110

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HDR Project 10206938



Ontario Line Technical Advisor

Toronto, Ontario

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Stephan Schmidle, P.Eng, Traffic Management Lead
Martin Kaczmarek, P.Eng, PTOE, Project Engineer
Laura Chong, MCIP, RPP, Project Coordinator

Executive Summary

Metrolinx, an agency of the Province of Ontario, is proceeding with the planning and development of the Ontario Line (the Project), extending from Exhibition/Ontario Place to the Ontario Science Centre in the City of Toronto.

The Project is being assessed in accordance with Ontario Regulation 341/20: Ontario Line Project under the *Environmental Assessment Act*. Ontario Regulation 341/20: Ontario Line Project outlines a Project-specific environmental assessment process that includes an Environmental Conditions Report (ECR), Environmental Impact Assessment Report, and an opportunity for Early Works Report(s) for assessment of works that are ready to proceed in advance of the Environmental Impact Assessment Report. The ECR documents the local environmental conditions of the Ontario Line (OL) Study Area and provides a preliminary description of the potential environmental impacts from the Project. Information outlined in the ECR is used to inform the Early Works Report(s) and Environmental Impact Assessment Report, which study environmental impacts in further detail and confirm and refine preliminary mitigation measures identified in the ECR.

The Project is a new approximately 15.6-kilometre subway line with connections to Line 1 (Yonge-University) subway service at Osgoode and Queen Stations, Line 2 (Bloor-Danforth) subway service at Pape Station, and Line 5 (Eglinton Crosstown) LRT service at the future Science Centre Station. Fifteen stations are proposed, with additional connections to three GO Transit lines (Lakeshore East, Lakeshore West and Stouffville), and the Queen, King, Bathurst, Spadina, Harbourfront, and Gerrard/Carlton streetcar routes. The Project will reduce crowding on Line 1 and provide connections to new high-order rapid transit neighbourhoods. The Project will be constructed in a dedicated right-of-way with a combination of elevated (i.e., above existing rail corridor/roadway), tunnelled (i.e., underground), and at-grade (i.e., at the same elevation as the existing rail corridor) segments at various locations.

The purpose of this Transportation and Traffic Analysis Report is to assess the potential traffic impacts of the Ontario Line Project and propose mitigation and monitoring measures. The construction of the Ontario Line subway and stations will require lane closures and some full closures along the route, impacting pedestrian, cyclist, transit, and automobile movements. Mitigation measures will be provided to ensure adequate connectivity and safe conditions are maintained for all modes.

ES.1 Pedestrian Impacts

Temporary Impacts

Construction of the Ontario Line Stations will result in temporary impacts to pedestrians in the vicinity of the construction sites. These impacts include but are not limited to narrowed pedestrian paths, partial or full closure of sidewalks, protected detours around work areas and closed sidewalks, extension and reopening of an existing but disused underground pedestrian tunnel and a new temporary pedestrian bridge at Exhibition Station, closure of the south

crosswalk at Albert/James intersection, removal of a mid-block pedestrian signal on Queen Street between Yonge Street and James Street, narrowing of the PATH corridor between Eaton Centre and The Bay, temporary traffic signal installation at the driveway of 469 Carlaw Avenue, and removal of unofficial pedestrian connections.

Where possible, sidewalk closures will be mitigated through the provision of protected paths around the closed sidewalks, maintaining the existing network connections. Closures without on-street detours will be required at the following locations:

- Queen Spadina Station: Bulwer Street (south side) east of Spadina Avenue.
- Osgoode Station: Simcoe Street (west side) between Queen Street and the laneway terminating on Simcoe Street.
- Queen Station: Queen Street (south side) from 30 m east of Yonge Street to Victoria Street. James Street (east side) between Queen Street and Albert Street.
- Corktown Station: King Street (south side) between Berkeley Street and 30 m west of Parliament Street.
- Riverside/Leslieville Station: One sidewalk will be closed at Riverside/Leslieville Station.
- Gerrard Station: Sidewalk closure on Carlaw Avenue in the immediate vicinity of the station headhouses.
- Gerrard Portal: Sidewalk closures for utility relocations just north of the Gerrard portal on Langley Avenue, Riverdale Avenue, Pape Avenue, and Carlaw Avenue.
- Thorncliffe Station: Beth Neilson Drive (both sides). The pedestrian connection between Overlea Boulevard and Banigan Drive will be moved from Thorncliffe Park Drive to the future Banigan Drive Connector.

Temporary impacts and mitigation measures for pedestrian connectivity at Exhibition Station, including opening a currently disused pedestrian tunnel and constructing a temporary pedestrian bridge structure, are assessed in the Exhibition Station Early Works Report. A brief summary of these works follows.

The existing disused pedestrian tunnel that runs underneath the railway corridor at Exhibition Station will be reopened, brought up to code to ensure AODA compliance, and extended by approximately 40 metres north-west, terminating just east of Atlantic Avenue. Once the tunnel extension and new headhouse at the end of the extension are constructed, the covered pathway between the current north tunnel headhouse and Atlantic Avenue will be closed. The current headhouse at the north will remain open during construction to facilitate access between the north GO platform, the underground tunnel, and the pedestrian bridge. Access to both GO platforms will be maintained.

A temporary pedestrian bridge structure will be constructed at Exhibition Station during Early Works and completed in August 2023, which will extend over the railway corridor and connect to the existing north headhouse, the reconditioned south headhouse and the future headhouse at the northern end of the tunnel extension. The bridge will not be AODA compliant but will provide additional ingress and egress capacity and reduce the potential congestion in the existing tunnel

during special events at Exhibition Place or Ontario Place. The bridge will be demolished, and the underground tunnel will be decommissioned once Exhibition Station is opened for service. Metrolinx will coordinate with Exhibition Place staff and Event Organizers to further mitigate impacts during event-related pedestrian surge crowd periods.

In addition, there will be some local street sidewalk closures and short-duration sidewalk closures during the weekend and night-time periods. In most cases above, a sidewalk will be available on the opposite side of the street to accommodate detours.

The sidewalk closures on Queen Street East (west of Victoria Street) and James Street (north of Queen Street) will impact adjacent business access throughout the duration of the closures, requiring pedestrians to detour through the accesses internal to the buildings.

A weeklong full closure of the intersection of Gerrard Street and Carlaw Avenue will also be required for the construction of Gerrard Station. For a portion of this closure, all sidewalks will be closed as well.

Permanent Impacts

Construction of the Ontario Line stations is expected to impact the pedestrian level of service at crosswalks and intersection corners due to the increased pedestrian demand associated with the fully built-out stations.

Proposed station ventilation grates installed on James Street and University Avenue for Queen Station and Osgoode Station may impact pedestrian comfort when crossing the grates. In addition, a ventilation tower will be installed within the existing sidewalk at the intersection of James Street and Queen Street West (northeast intersection corner). However, a sidewalk curb realignment on James Street will result in a wider sidewalk by approximately 5.75 metres. The PATH connection between 1 Queen Street and 2 Queen Street (east side of Queen Station) will be converted to a fare-paid area for Queen Station, blocking off free passage.

Exhibition Station will provide an additional connection across the rail corridor between Liberty Village and Exhibition Place. The construction of Liberty New Street will result in a new sidewalk between Dufferin Street and Strachan Avenue on both sides of the street.

The pedestrian clearway under the Queen Street grade separation for the Don Yard to Gerrard Portal section will be widened to comply with the City of Toronto and TTC design standards, improving the pedestrian level of service (LOS).

The construction of Pape Station will result in permanent changes to pedestrian circulation patterns near the station due to modification of the bus loop.

Permanent impacts to pedestrians at Thorncliffe Station include the realignment of the sidewalk along the north side of Overlea Boulevard due to conflicts with the future elevated guideway structure. Realignment will also occur to the south sidewalk on Overlea Boulevard due to the implementation of cycle track and reconfiguration of intersections between Millwood Road and Thorncliffe Park Drive. Pedestrian circulation on the north side of Overlea Boulevard will

improve due to the sidewalk realignment. Sidewalk realignment will also occur at Science Centre Station and Flemingdon Park Station, improving pedestrian circulation. A new multi-use trail will be implemented on the west side of Don Mills Road within the project limits. Any newly constructed or reconstructed sidewalks will meet the City's minimum design width requirements.

A new road connection constructed between Banigan Drive and Overlea Boulevard will be maintained after the completion of the OMSF construction, providing an additional permanent connection and benefit for pedestrians.

Operations and Maintenance Impacts

The increased pedestrian demands generated in the vicinity of Ontario Line stations may coincide with increased delays and worsened pedestrian levels of service for existing pedestrian trips that are not taking the Ontario Line.

ES.2 Cyclist Impacts

Temporary Impacts

The Ontario Line construction works will generally impact cyclists as a result of curb lane reductions on roadways which will shift cyclist trips into the remaining traffic lanes. The bicycle lanes on University Avenue and Simcoe Street will be maintained around the curb lane closures. At locations where the centre lane also has streetcar tracks, advance warning signs are recommended for cyclists to consider rerouting. A 1-metre (m) wide clearance from the streetcar tracks is proposed to allow space for cyclists.

Any impacted bike lanes may be realigned with appropriate delineation, such as pavement markings, bicycle curbs, and flexible delineator posts (where currently provided). Generally, existing widths of bike lanes will be maintained. However, bike lane widths will be reduced to 2.0 m on University Avenue (northbound) and 1.5 m on Simcoe Street (northbound) in the vicinity of the Station work zones.

Full closures at Queen Station, Carlaw Avenue, and Gerrard Street will impact cyclists and require them to detour or use available pedestrian connections while dismounted. In addition, short-duration full closures of Don Valley trails during the erection of bridge superstructure elements are anticipated.

Permanent Impacts

Permanent impacts to cyclists resulting from the construction of the Ontario Line are not expected, with the exception of the York Street conversion which will permanently introduce a southbound sharrow lane between Queen Street and Richmond Street, and a bike lane between Richmond Street and Adelaide Street. New cycling facilities are planned to be constructed by the City along Liberty New Street between Dufferin Street and Strachan Avenue via a two-way cycle track on the south side, Overlea Boulevard between Millwood Road and Don Mills Road on both sides, and on Don Mills Road between Overlea Boulevard and Gateway Boulevard.

Operations and Maintenance Impacts

The new cycling connection on the west side of York Street between Queen Street and Adelaide Street, introduced as part of the Queen Station construction transit detour, will require regular maintenance.

ES.3 Transit Impacts

Temporary Impacts

Temporary impacts to transit resulting from the Ontario Line construction works will generally be in the form of transit stop relocations, bus or streetcar rerouting, increased delays caused by curb lane closures and full closures, or by temporary replacement bus service during track works.

The Route 501 streetcar will be detoured around the full closure of Queen Street (from Bay Street to Victoria Street) via Church Street, Richmond Street, Adelaide Street, and York Street. Temporary bus replacement service will be required for the Route 501 streetcar during the York Street detour track construction. The Victoria Street streetcar tracks will be closed during the southbound closure of Victoria Street.

Closure of James Street and the conversion of Albert Street to two-way operation will result in TTC wheel-trans vehicles having to reverse to reach the accessible stop location near the Eaton Centre. Due to the significant number of pedestrians in this area, traffic control persons will be stationed at the intersection to assist wheel-trans vehicles during the business hours of the Eaton Centre. The intersection of Albert Street and James Street will be modified to facilitate the movements of wheel-trans vehicles.

Transit stop relocations will be required at the intersections of King Street with Bathurst Street, Queen Street with Spadina Avenue, Queen Street with University Avenue, Gerrard Street with Carlaw Avenue, Pape Avenue with Cosburn Avenue, and Carlaw Avenue with Riverdale Avenue. Construction of Science Centre Station will temporarily impact the existing bus loop at Don Mills Road with Eglinton Avenue. Transit stop relocations may impact some passengers by increasing walking distances between their origins and destinations.

For the construction of the proposed interchange stations at Queen and Osgoode, there will be scheduled weekend subway train service shutdowns when works will impact the existing TTC Line 1 platform and concourse levels. Existing TTC subway passengers may also experience delays during weekdays due to reduced widths of the passageways and the PATH (between Eaton Centre and The Bay) and when some fare gates are temporarily closed to facilitate work zones on either side of the paid and non-paid fare zones. All access points will be maintained at both stations with the exception of the existing NE stairs at Osgoode Station connecting to the east sidewalk of University Avenue, which will be closed during construction and permanently replaced with a joint NE station entrance building for TTC and OL.

During support of excavation (SOE) construction and excavation within the Cosburn Avenue right-of-way, traffic lanes will be closed. Buses will have to detour until a temporary road deck

has been installed. The bus loop at TTC's existing Pape subway station will be impacted due to construction. The number and location of bus bays are expected to be modified.

Construction of the OMSF will result in the re-routing of route 88A due to the closure of Beth Neilson Drive for 1.5 years from Pat Moore Drive to South of Tremco access.

Permanent Impacts

Permanent impacts to transit resulting from the Ontario Line construction are generally expected in the form of increased transit ridership, and worsened transit levels of service and passenger queueing conditions due to higher ridership. Sidewalks and transit stops will be typically designed to current City of Toronto and TTC standards. However, reduced widths may be required due to existing constraints.

The York Street conversion will permanently introduce new southbound streetcar tracks, remove two northbound traffic lanes and on-street parking from Adelaide Street to Richmond Street, add a southbound sharrow between Queen Street and Richmond Street, and a bike lane between Richmond Street and Adelaide Street. The new streetcar tracks will allow for increased flexibility and resiliency on the streetcar network after the construction of Queen Station has been completed.

Worsened levels of service at surface transit stops were identified at the intersections of King Street with Bathurst Street, Queen Street with Spadina Avenue, Queen Street with Yonge Street, Queen Street with University Avenue, King Street with Parliament Street, and Front Street with Berkeley Street.

Permanent transit impacts at Pape Station include the future bus loop layout. Permanent impacts to Thorncliffe Station include the provision of a bus loop and an increase in bus traffic on Thorncliffe Park Drive and at the intersection with Overlea Boulevard.

Operations and Maintenance Impacts

Once Liberty New Street is constructed between Dufferin Street and Strachan Avenue, the TTC will re-route bus routes 29, 929, 29A, and 63 to serve Exhibition Station.

ES.4 Automobile Impacts

Temporary Impacts

Temporary impacts to automobiles resulting from the Ontario Line construction works will generally result in increased delays due to lane closures and full roadway closures, haul route traffic, as well as parking restrictions and two-way conversions of streets. Advance Works will be required to be completed prior to the start of station construction works.

The Advance Works for the York Street conversion will require a temporary southbound lane closure/full closure and a northbound lane closure on York Street between Queen Street and King Street, a full closure of York Street intersections for works within the intersections (only one

intersection will be closed at any given point in time), and closure of Pearl Street at the intersection with York Street may be required.

Lane closures will be required at King Bathurst, Queen Spadina, Osgoode, Queen, Moss Park, Corktown, Gerrard, and Riverside/Leslieville Station, the Cherry emergency exit building (EEB), and Bain Avenue, Gowan Avenue, Gamble Avenue, Pape Avenue, Lipton Avenue, Minton Place, Hopedale Avenue, Millwood Road, Overlea Boulevard, Don Mills Road, Eglinton Avenue, and Don Valley Parkway. Side streets at Riverside/Leslieville Station (i.e., Strange Street and De Grassi Street) may be reduced in width or occasionally fully closed.

A long-term (4.5 years) full closure of Queen Street between Bay Street and Victoria Street will occur as a result of the Queen Station construction. Weekend full closures of laneways in the vicinity of station work zones are permitted during the construction of support of excavation walls. A full road closure of Beth Neilson Drive is required for 1.5 years, from Pat Moore Drive to South of Tremco Access, which will impact traffic operations. Weekend full closures will be required on Millwood Road (at Overlea Boulevard), Don Mills Road (south of Eglinton Avenue), Eglinton Avenue (east of Don Mills Road), and the Don Valley Parkway for the erection of bridge superstructure.

Parking prohibitions are expected to be implemented in the vicinity of most station construction work areas; mitigation measures are being explored in some locations, however, in most cases it is expected that other local existing parking facilities will be able to accommodate the lost parking supply.

The accessible loading zone on the south side of Albert Street will be maintained but shifted slightly to the east. An accessible parking space will be closed on James Street. Taxicab standing on James Street and Albert Street will be closed.

The connection between Banigan Drive and Thorncliffe Park Drive will be closed. A new Banigan Road extension, which will connect with Overlea Boulevard in the vicinity of the intersection with Leaside Park Drive, will be provided.

Lane closures on Pape Avenue will impact access for emergency/services vehicles and deliveries, particularly due to potentially increased delays. Alternative access to properties may be required, where traffic lanes of Pape Avenue are realigned to facilitate excavation at the Sammon crossover.

Permanent Impacts

Permanent impacts to automobiles resulting from the completion of the Ontario Line are generally expected to occur in the form of lost parking, increased bus frequencies resulting in higher delays, and additional automobile delays at intersections due to increased pedestrian conflicts near the stations.

The intersections of Dufferin Street with Liberty Street, King Street with Atlantic Street, King Street with Dufferin Street, Strachan Avenue with Fleet Street, King Street with

Bathurst Street, Queen Street with Simcoe Street, and Dufferin Street with Liberty Street are forecasted to operate at-capacity in one or both peak hours.

The number of traffic lanes on York Street will be reduced between Adelaide Street and Richmond Street as a result of the York Street conversion.

Parking spaces on James Street will be removed due to a proposed curb realignment to accommodate station ventilation on the sidewalk. Parking spaces on York Street between Richmond Street and Adelaide Street will also be removed due to the conversion of York Street to a two-way operation. There will be permanent loss of some on-street parking spaces on De Grassi Street near the Riverside/Leslieville Station north building, and potentially on Strange Street as well near the south building. There will be a permanent reduction in the number of parking spaces at the Science Centre.

Permanent impacts related to Thorncliffe Station include additional bus traffic on Thorncliffe Park Drive and the intersection with Overlea Boulevard. A new road connection between Banigan Drive and Overlea Boulevard, located east of Leaside Park Drive, will be maintained after the completion of the OMSF construction, providing a permanent link for automobiles, goods movement, and active transportation.

Operations and Maintenance Impacts

Traffic signals along Liberty New Street, as well as the roadway itself, will have operations and maintenance implications, which will be the responsibility of the City of Toronto.

ES.5 Mitigation Measures

Temporary Impacts

Mitigation measures will be introduced for pedestrians, cyclists, transit, and automobile modes to lessen the impact of the Ontario Line works.

Where possible, 2.1-metre wide protected pedestrian connections around work areas will be provided, except in areas where current sidewalks are less than 2.1 metres which will maintain the current widths. At a limited number of locations, temporary sidewalk widths will be reduced to 1.8 metres, and certain “pinch point” sidewalk widths may be reduced to 1.5 m for short durations of up to one week. Accessibility for Ontarians with Disabilities Act (AODA) compliant curb ramps will be provided in locations where the pedestrian detour path moves from the boulevard onto a protected path on the street. Signage and wayfinding are recommended to be installed to provide advance warning for pedestrian detours and ease of navigation and movement. Traffic control persons will be stationed at midblock sidewalk terminations (e.g., on Bulwer Street east of Spadina Avenue) to mitigate pedestrian crossing safety concerns, and at construction vehicle access points that conflict with the existing or temporary sidewalk. Public information campaigns will also be undertaken to reduce the number of pedestrians and shuttle buses in the affected areas. The installation of a temporary traffic signal will mitigate traffic operations and safety concerns at the Gerrard tunnel boring machine (TBM) site.

A 1 metre object-free zone adjacent to streetcar tracks will be provided to mitigate safety concerns of cyclists travelling on traffic lanes with streetcar tracks. Cyclists will be able to traverse the Queen Street closure on foot through the available sidewalks. Advance warning signs will be provided to notify cyclists of upcoming full closures. Bike share stations on James Street and Stewart Street will be temporarily relocated. Widening of trails is proposed where construction access roads will be co-located with trails.

Temporary bus replacement service will be provided for Route 501 Queen during the construction of the southbound streetcar tracks on York Street. Southbound streetcar tracks will be provided and York Street will be converted to two-way traffic between Queen Street and Adelaide Street to accommodate streetcar detours throughout the construction of Queen Station. Transit stops at the intersections of King Street with Bathurst Street, Queen Street with Spadina Avenue, Queen Street with University Avenue, and along Queen Street between York Street and Church Street will be relocated to accommodate work areas and the full closure of Queen Street. Traffic control persons will be stationed at the intersection of James Street with Albert Street to mitigate conflicts between WheelTrans vehicles and pedestrians, and the south-west corner of the intersection will be modified to accommodate WheelTrans turning maneuvers. Signal timings at intersections impacted by the works will be optimized. Consultation with TTC is recommended to communicate impacts at the stations and to establish suitable mitigation strategies, including public notification in advance of service disruptions.

To mitigate the impacts to automobiles, Albert Street will be converted to two-way traffic between Bay Street and James Street to provide access throughout the full closure of James Street. The traffic signal and traffic signs at the intersection of Bay Street with Albert Street will be updated for the conversion to two-way traffic, and the intersection will be monitored to identify the need for a southbound left phase. Signal timings will be optimized to accommodate the combined impacts of City of Toronto works (including the Gardiner Expressway Rehabilitation project) and Ontario Line station construction works (including lane and roadway closures, and haul route traffic). Clear advance warning signage will be provided to notify drivers of closures or detours. Coordination of lane closures between Eastern Avenue and Gerrard Street is recommended to mitigate traffic impacts. A temporary traffic signal will be provided on Carlaw Avenue to the north of Gerrard Street, as this location will be the main construction access/egress for the Gerrard Portal site.

Permanent Impacts

Measures will be considered to mitigate permanent impacts to pedestrians caused by increased trips in the vicinity of the stations, such as widening crosswalk markings, removing or relocating street furniture near intersection corners, relocating surface transit stops (e.g., westbound at King Street with Berkeley Street) to reduce the walking distance to stations, and signaling intersections (Liberty New Street with Jefferson Avenue, Atlantic Avenue, and Dufferin Street). Ventilation grates will be placed beside the paved portion of the sidewalks, flush with the sidewalks, with an available paved width of 3.0 metres and 2.8 metres between the grate edge and the edge of sidewalk at Queen Station and Osgoode Station, respectively, consistent with the existing clearway widths provided. Station plazas will be included in the station design where appropriate and feasible.

Increasing surface transit frequency/capacity and transit stop areas should be considered where feasible to improve transit conditions under permanent conditions. The signal timings along York Street will be optimized to account for the permanent change in configuration and travel times.

Signalization is proposed at the intersections of Liberty New Street with Atlantic Avenue and Jefferson Avenue to prevent significant automobile spillbacks and delays at Atlantic Avenue and to ensure coordination and improved flow between the two intersections. Increases in cycle lengths and phasing optimizations may be required in some locations experiencing poor conditions in the vicinity of Ontario Line stations. Field conditions will be monitored after opening day, and signal timing optimizations will be applied if required. Extending the westbound left turn lane to 55 metres at Front Street and Parliament Street may be considered by the City of Toronto.

Operations and Maintenance Impacts

Consultation with the TTC is recommended to establish a suitable mitigation strategy that will include public notification in advance of any potential service disruptions or modifications. No monitoring related to the transit network is anticipated to be required during operations.

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Appendix A. Summary of Relevant Planning Documents

Appendix B. Summary of Potential Impacts

Appendix C. Multi-modal Traffic and Transit Management Plan

Abbreviations

AODA	<i>Accessibility for Ontarians with Disabilities Act</i>
BMO	Bank of Montreal
CLOS	Cyclists' Level of Service
EA	Environmental Assessment
ECR	Environmental Conditions Report
EEB	Emergency Exit Building
EIAR	Environmental Impact Assessment Report
HCM	Highway Capacity Manual
LOS	Level of Service
LRT	Light Rail Transit
OCS	Overhead Catenary System
OL	Ontario Line
OMSF	Operations, Maintenance, and Storage Facility
ROW	right-of-way
SOE	Support of Excavation
TTC	Toronto Transit Commission
TTMP	Traffic and Transit Management Plan
V/C	Volume to Capacity

1 Introduction

1.1 Project Overview

Metrolinx, an agency of the Province of Ontario, is proceeding with the planning and development of the Ontario Line (the Project), extending from Exhibition/Ontario Place to the Ontario Science Centre in the City of Toronto.

The Project is a new approximately 15.6-kilometre subway line with connections to Line 1 (Yonge-University) subway service at Osgoode and Queen Stations, Line 2 (Bloor-Danforth) subway service at Pape Station, and Line 5 (Eglinton Crosstown) Light Rail Transit (LRT) service at the future Science Centre Station. Fifteen stations are proposed, with additional connections to three GO Transit lines (Lakeshore East, Lakeshore West and Stouffville), and the Queen, King, Bathurst, Spadina, Harbourfront, and Gerrard/Carlton streetcar routes. The Project will reduce crowding on Line 1 and provide connections to new high-order rapid transit neighbourhoods. The Project will be constructed in a dedicated right-of-way (RoW) with a combination of elevated (i.e., above existing rail corridor/roadway), tunnelled (i.e., underground), and at-grade (i.e., at the same elevation as the existing rail corridor) segments at various locations.

An overview of the Project Footprint is shown in Figure 1-1 and detailed figures showing footprint and project components are shown in Figures 1-2 to 1-20.

1.2 Purpose of the Ontario Line Environmental Impact Assessment Report

The Project is being assessed in accordance with Ontario Regulation 341/20: Ontario Line Project under the *Environmental Assessment Act*. Ontario Regulation 341/20: Ontario Line Project outlines a Project-specific environmental assessment process that includes an Environmental Conditions Report (ECR), Environmental Impact Assessment Report (EIAR), and an opportunity for Early Works Report(s) for assessment of works that are ready to proceed in advance of the EIAR. The ECR documents the local environmental conditions of the Ontario Line Study Area and provides a preliminary description of the potential environmental impacts of the Project. Information provided in the ECR is used to inform the Early Works Report(s) and the EIAR, which study environmental impacts in further detail and confirm and refine preliminary mitigation measures identified in the ECR.

The EIAR includes environmental impact assessment results, proposed mitigation measures, proposed monitoring activities, potentially required permits and approvals, and a record of consultation, among other information, to meet Ontario Regulation 341/20: Ontario Line Project requirements.

1.3 Purpose of the Transportation and Traffic Analysis Report

This Report (Transportation and Traffic Analysis Report) forms part of the EIAR and has been prepared to assess potential traffic impacts and identify proposed mitigation measures and monitoring activities to verify mitigation effectiveness.

The purpose of this Report is to:

- Assess the potential impacts to pedestrians, cyclists, transit, and traffic associated with the construction and operation of the Project; and,
- Identify mitigation measures and monitoring activities for any negative impacts to pedestrians, cyclists, transit, and traffic as a result of the construct and operation activities.

For the purpose of this report, the alignment was based on the design as of January 31, 2022. The potential impacts, mitigation, and monitoring strategies were based on this design. Changes to the alignment after January 31, 2022, were not considered in this report.

This Report has been prepared in accordance with Ontario Regulation 341/20: Ontario Line Project and contains the information outlined in Table 1-1.

Table 1-1. Report Contents in Accordance with Ontario Regulation 341/20: Ontario Line Project

Reg. Section	Requirement	Report Section
Section 15(2)4	A description of the local environmental conditions at the site of the Ontario Line Project.	Section 4
Section 15(2)6	Metrolinx’s assessment and evaluation of the impacts that the preferred method of carrying out the Ontario Line Project and other methods might have on the environment, and Metrolinx’s criteria for assessment and evaluation of those impacts.	Section 5
Section 15(2)7	A description of any measures proposed by Metrolinx for mitigating any negative impacts that the preferred method of carrying out the Ontario Line Project might have on the environment.	Section 5

Reg. Section	Requirement	Report Section
Section 15(2)8	A description of the means Metrolinx proposes to use to monitor or verify the effectiveness of mitigation measures proposed.	Section 5
Section 15(2)9	A description of any municipal, provincial, federal, or other approvals or permits that may be required for the Ontario Line Project.	Section 6

1.4 Project Description

A Project description is provided in the EIAR, under separate cover. Unique to this Report, the Project Footprint has been divided into four segments. Impacts for Exhibition to Don Yard and Don Yard to Gerrard Portal are well defined at the time of writing; whereas impacts for Gerrard Portal to Minton Place Portal and Minton Place Portal to Science Centre are not yet well defined; therefore, detail on these sections will not be as developed. This report details findings from the Ontario Line Station Site Plan Review Transportation Impact Studies, Ontario Line Downtown Construction Closures Multimodal Traffic and Transit Management Plan (TTMP), as well as other TTMP assessments currently underway; additional details for other segment TTMPs will be provided to Ontario Line stakeholders once available.

Report Segments:

- Exhibition to Don Yard
 - Includes: Liberty New Street
- Don Yard to Gerard Portal
 - Includes: Lower Don Bridge and East Harbour
- Gerrard Portal to Minton Place Portal
- Minton Place Portal to Science Centre
 - Includes: Operations, Maintenance and Storage Facility (OMSF)

1.5 Project Footprint and Study Area

The Project Footprint is defined as the area of direct disturbance associated with the construction and operation activities, including anticipated required construction staging and laydown areas. The Project Footprint includes the total area potentially affected by the proposed construction activities and operations of the Project. The extent of proposed physical works from construction and operation includes, but is not limited to, temporary laydown and staging areas, potential road detours, new bridges, tunnelling, and associated openings (including vent shafts and emergency egress buildings), new stations and platforms, portals, retaining walls and

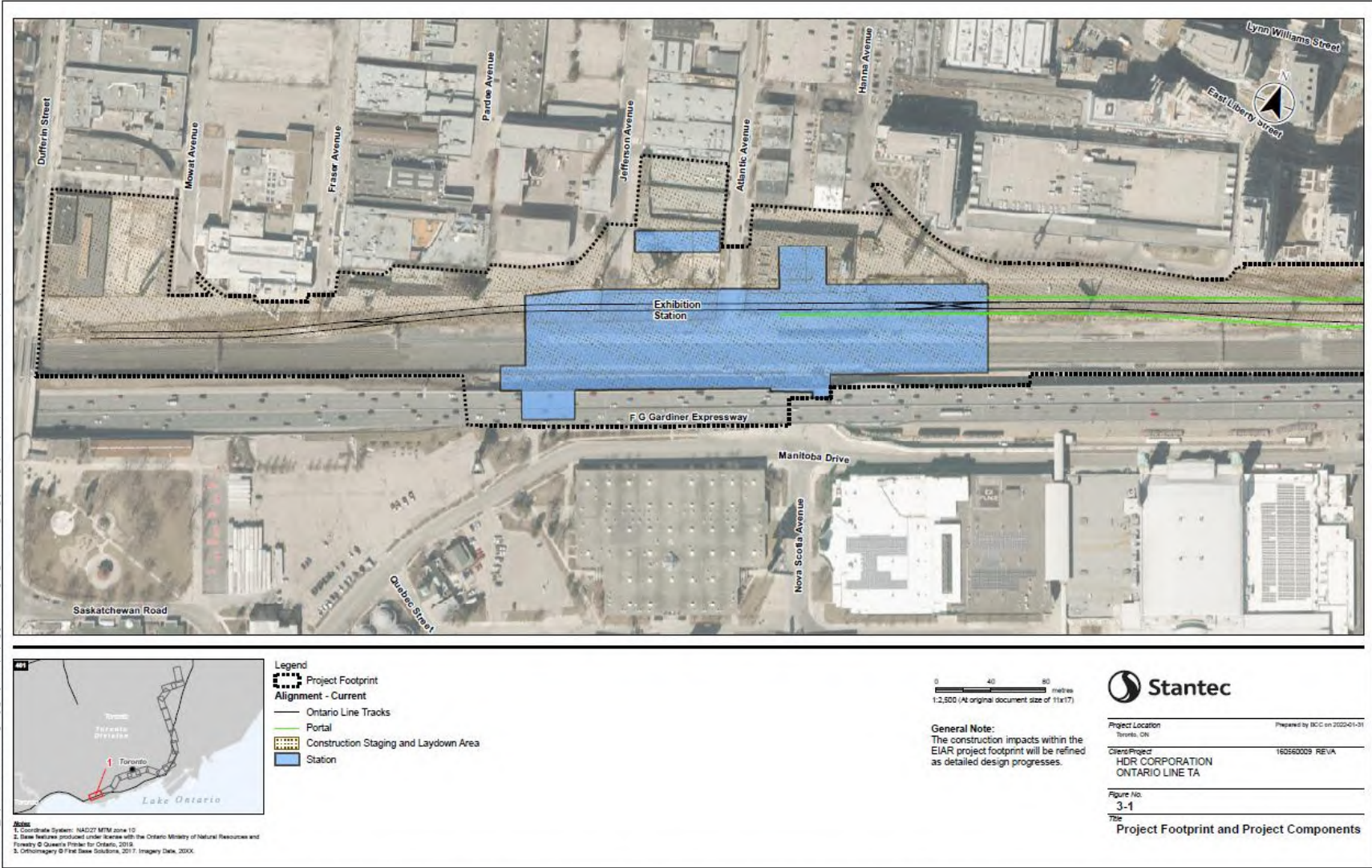
barriers, railway track alignments/realignments, the OMSF, new power supply and transformers, and utility realignments.

Figure 1-1 illustrates the delineation of project components assessed in this report. For the purpose of this report, the study area for the Transportation and Traffic Analysis encompasses the Project Footprint as shown in Figure 1-2 to Figure 1-20.

Figure 1-1. Scope Delineation Map

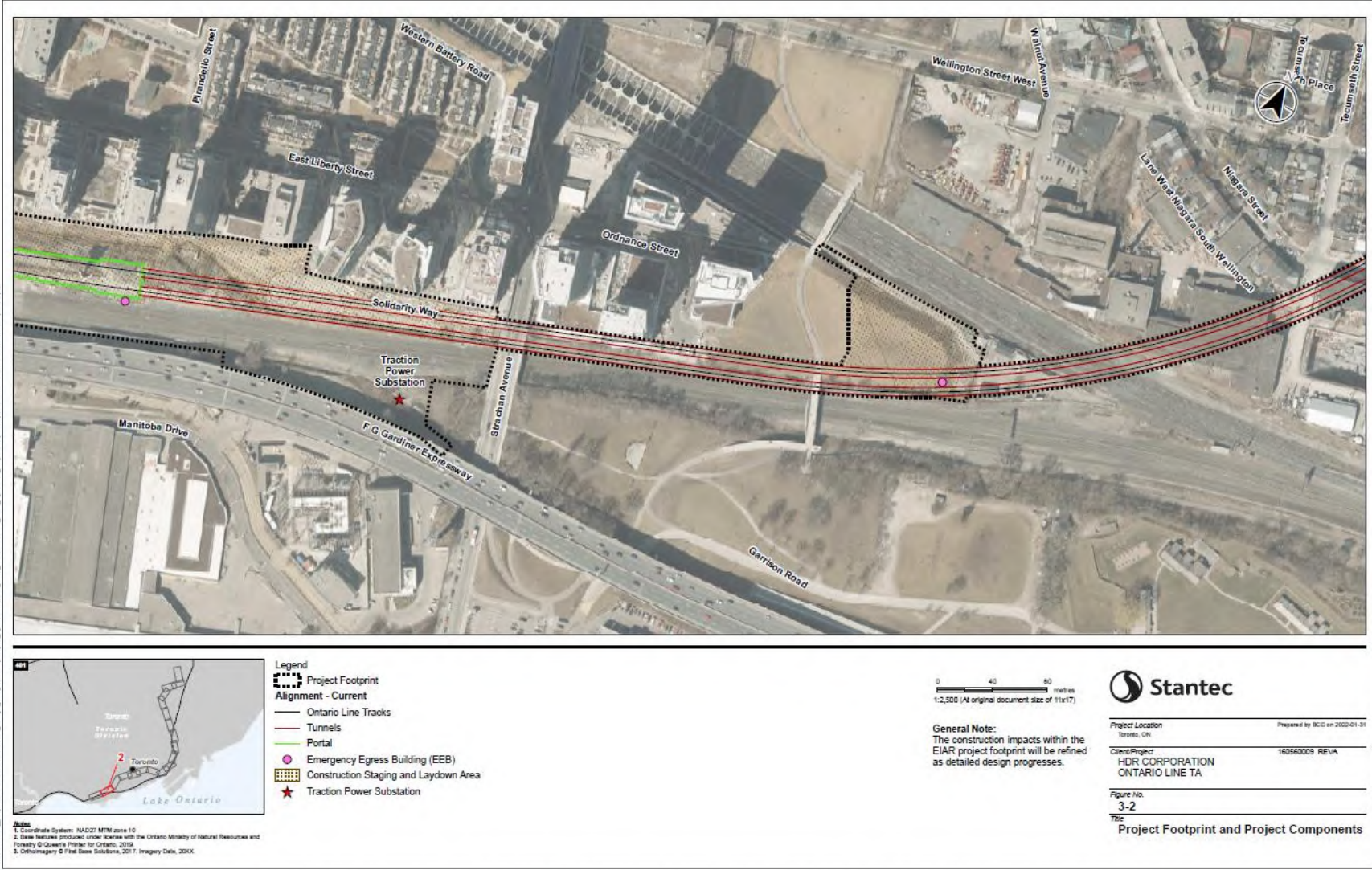


Figure 1-2. Study Area – Exhibition Station



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Figure 1-3. Study Area – Strachan Avenue



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Figure 1-5. Study Area – Queen-Spadina Station and Osgoode Station

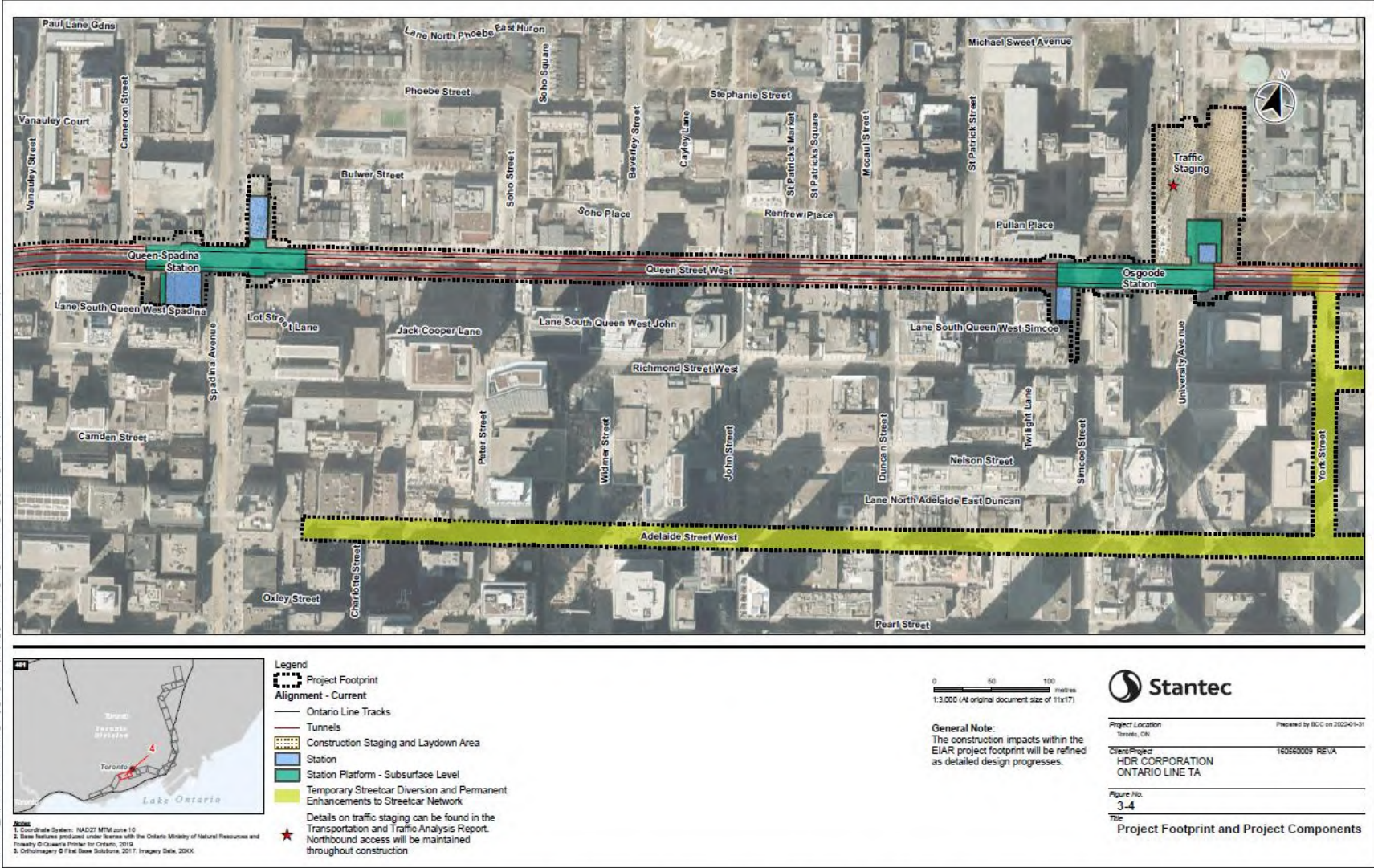
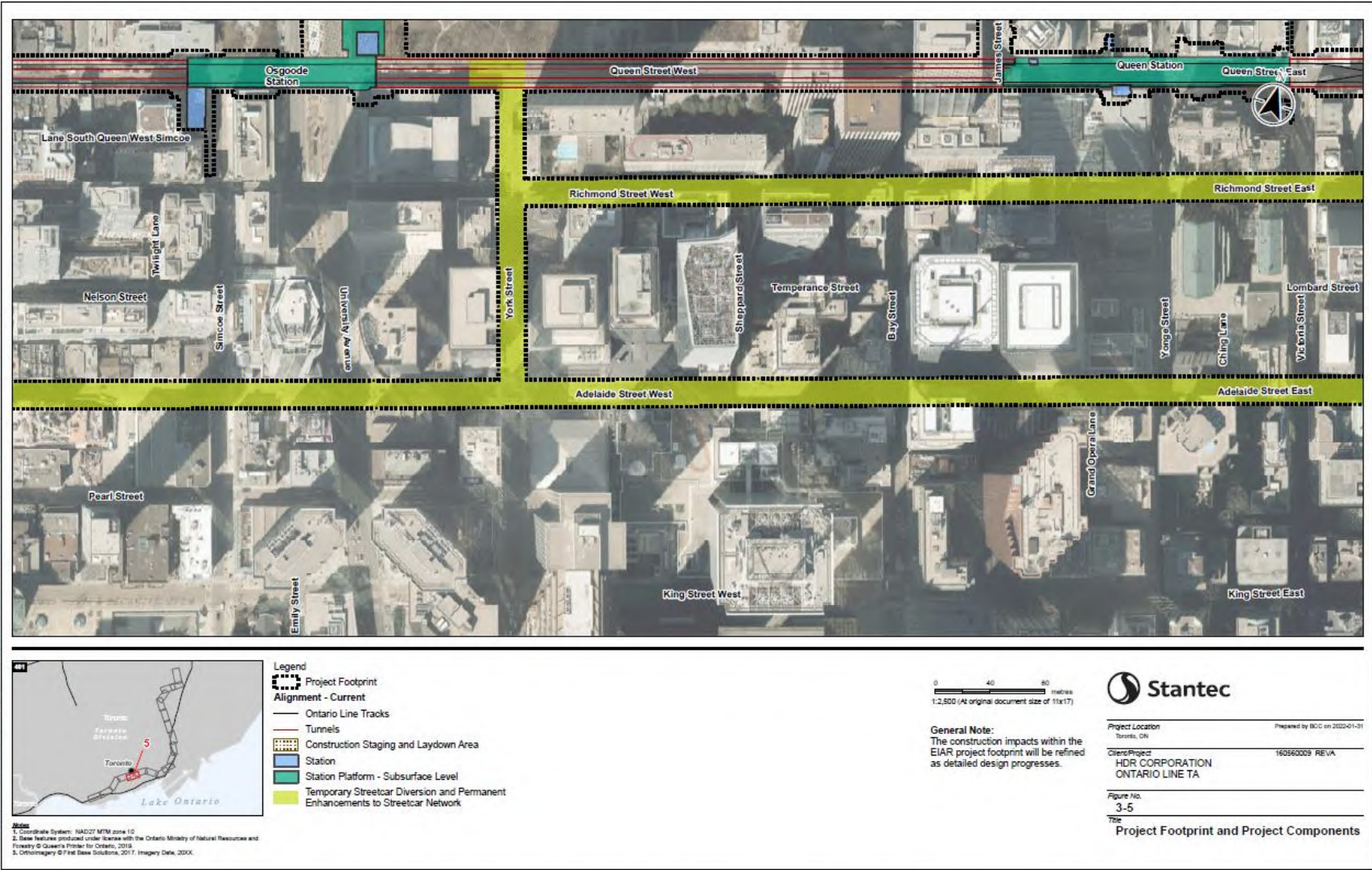
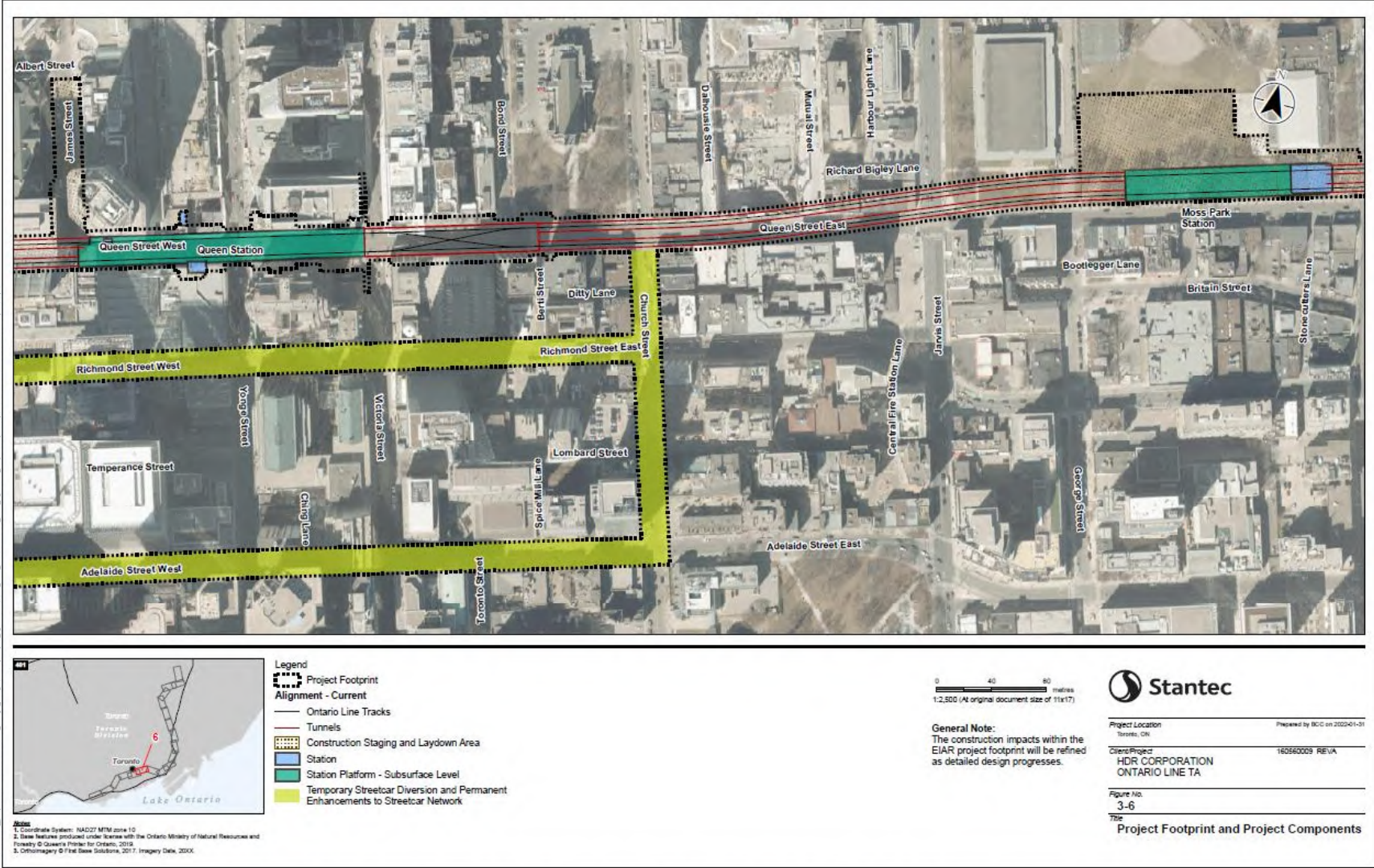


Figure 1-6. Study Area – Osgoode Station and Queen Station



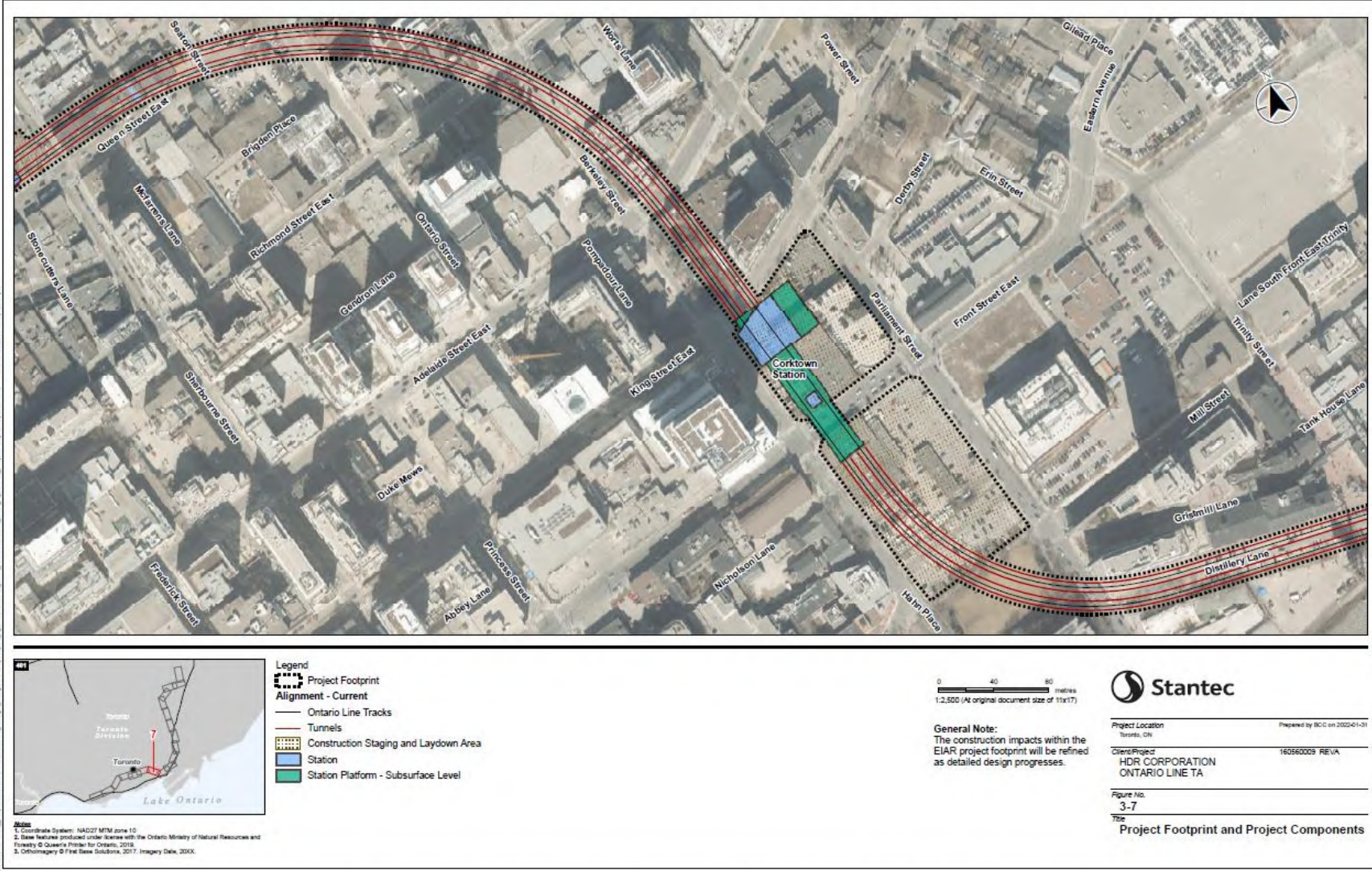
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Figure 1-7. Study Area – Queen Station and Moss Park Station



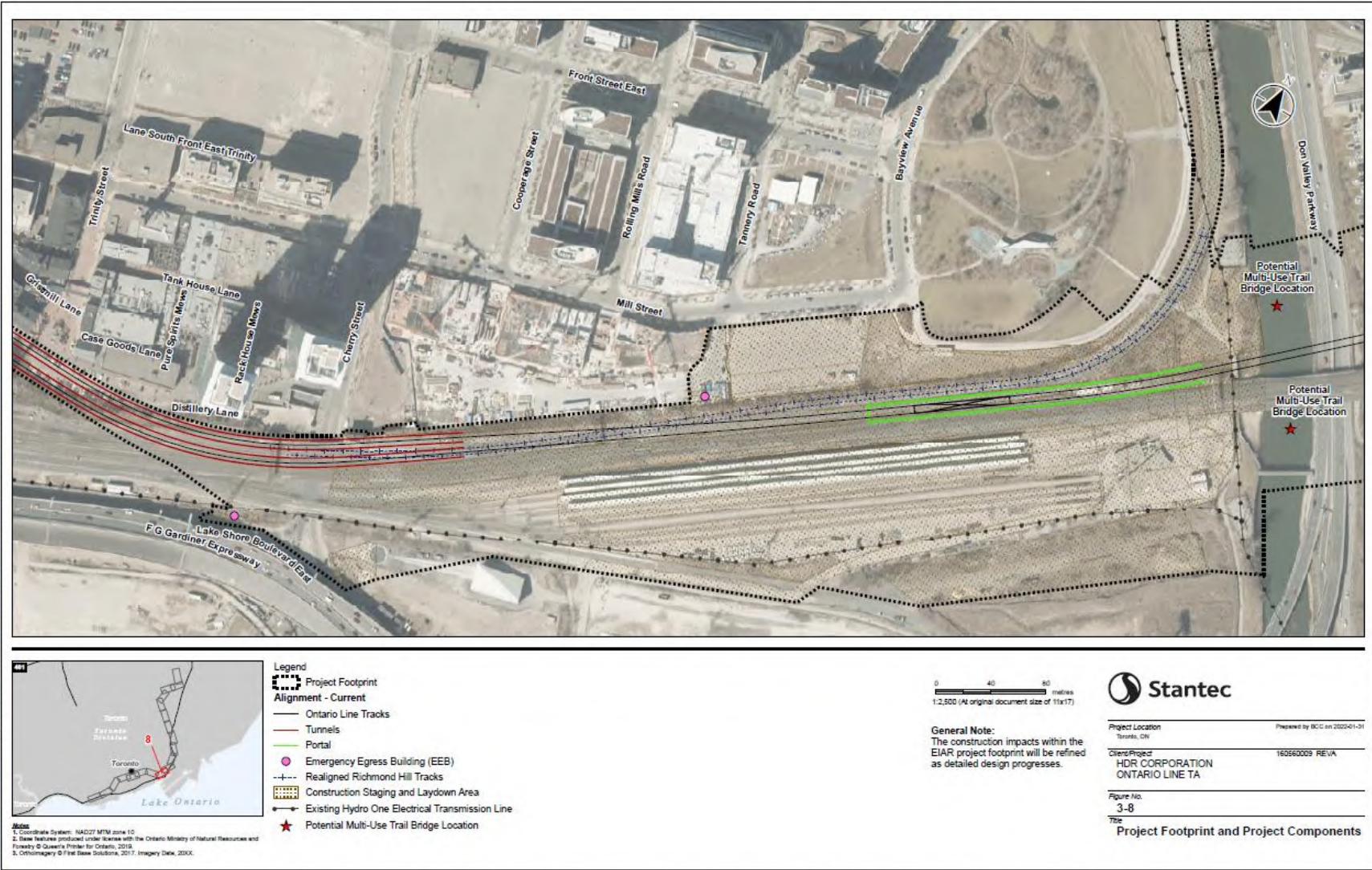
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Figure 1-8. Study Area – Corktown Station



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Figure 1-9. Study Area – Cherry Street



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Figure 1-10. Study Area – East Harbour Station

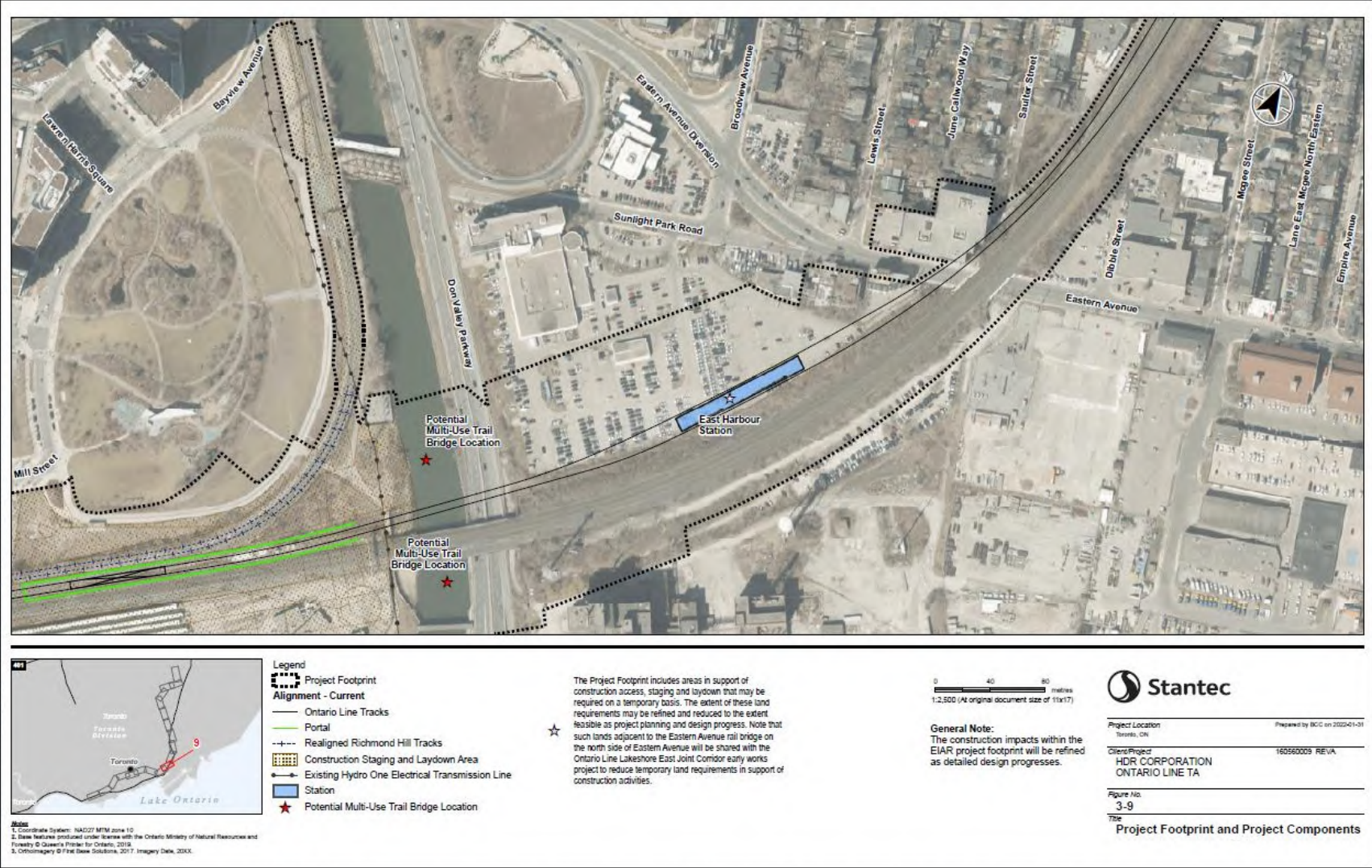
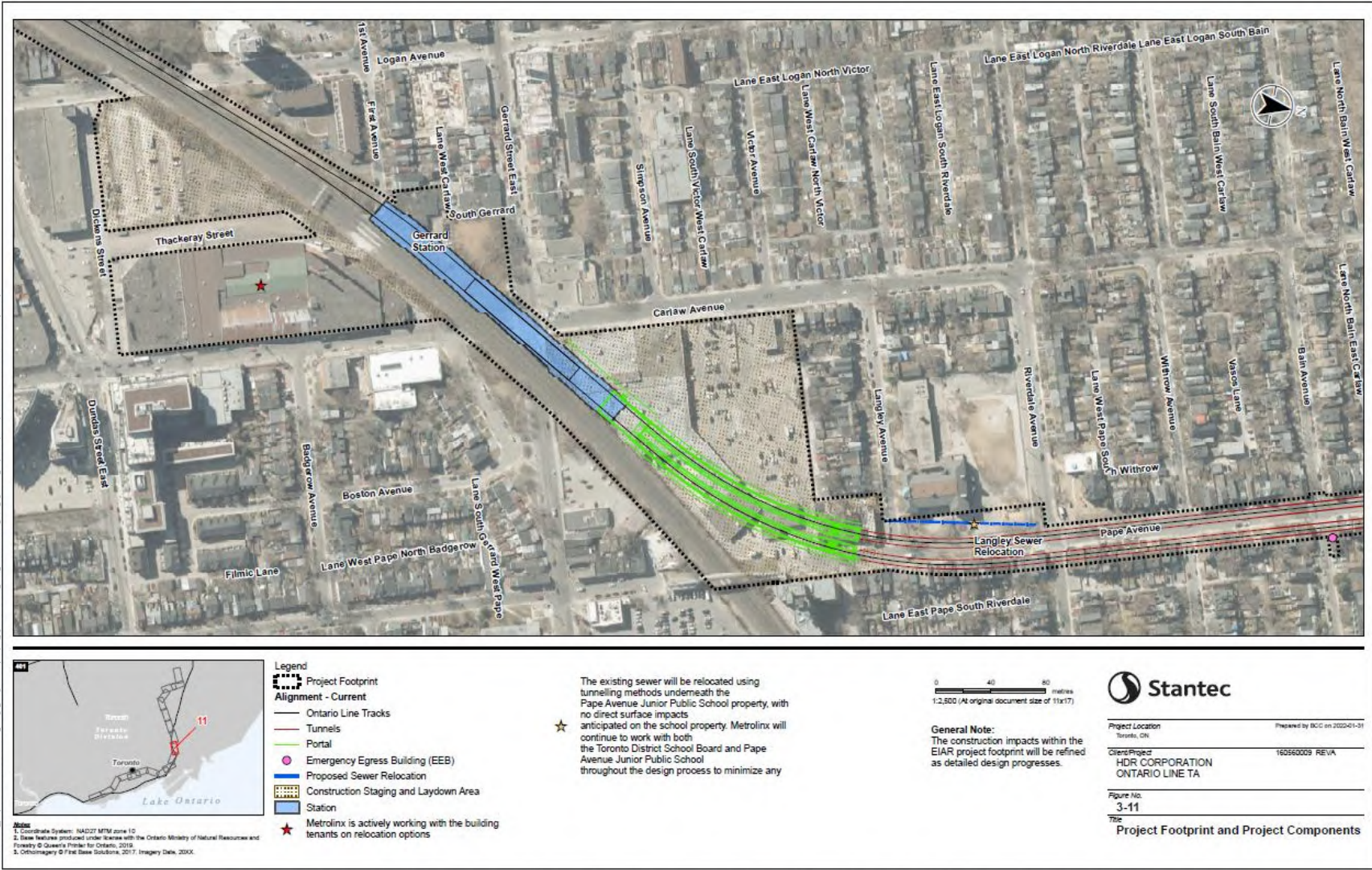
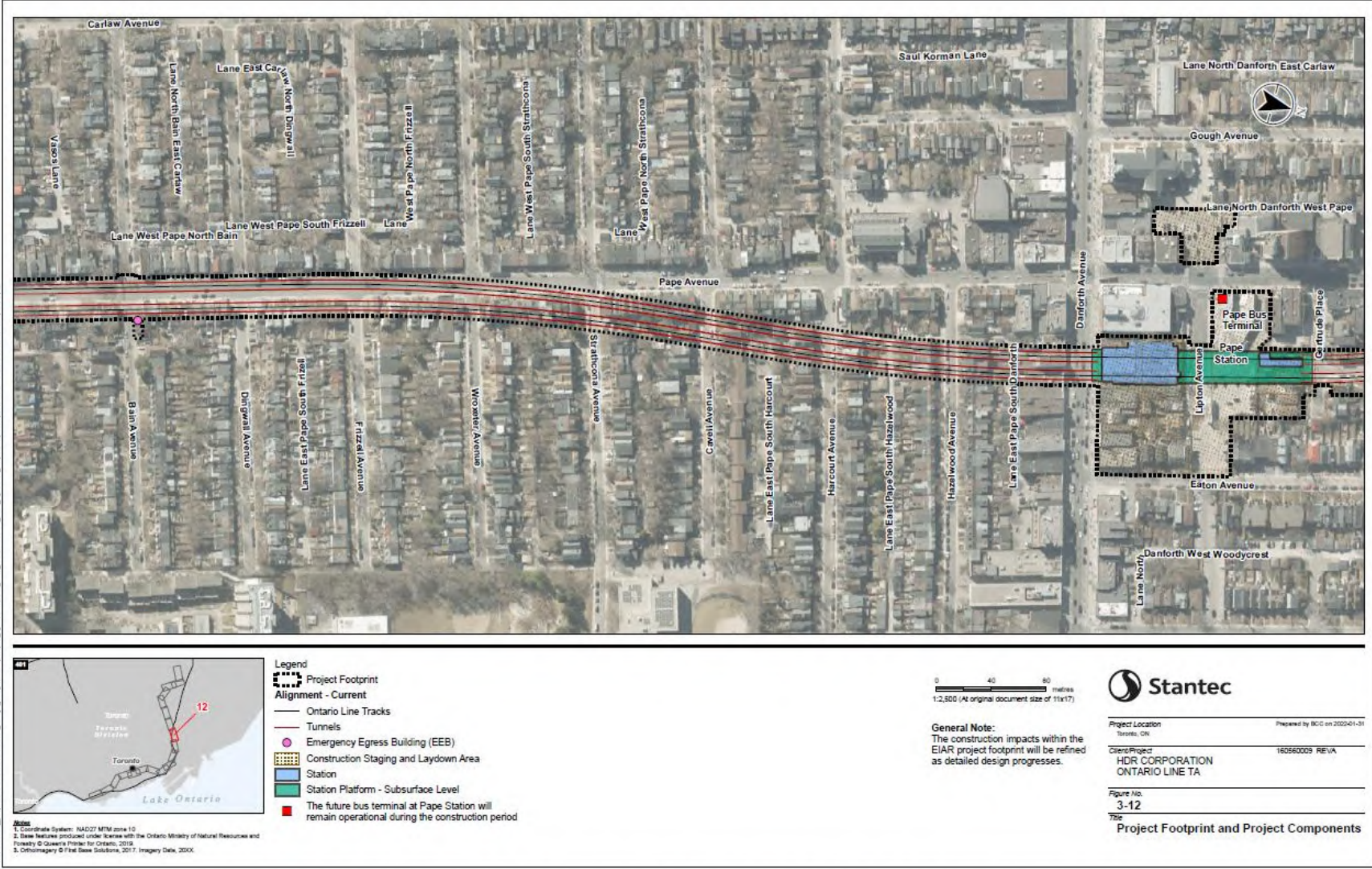


Figure 1-12. Study Area – Gerrard Station



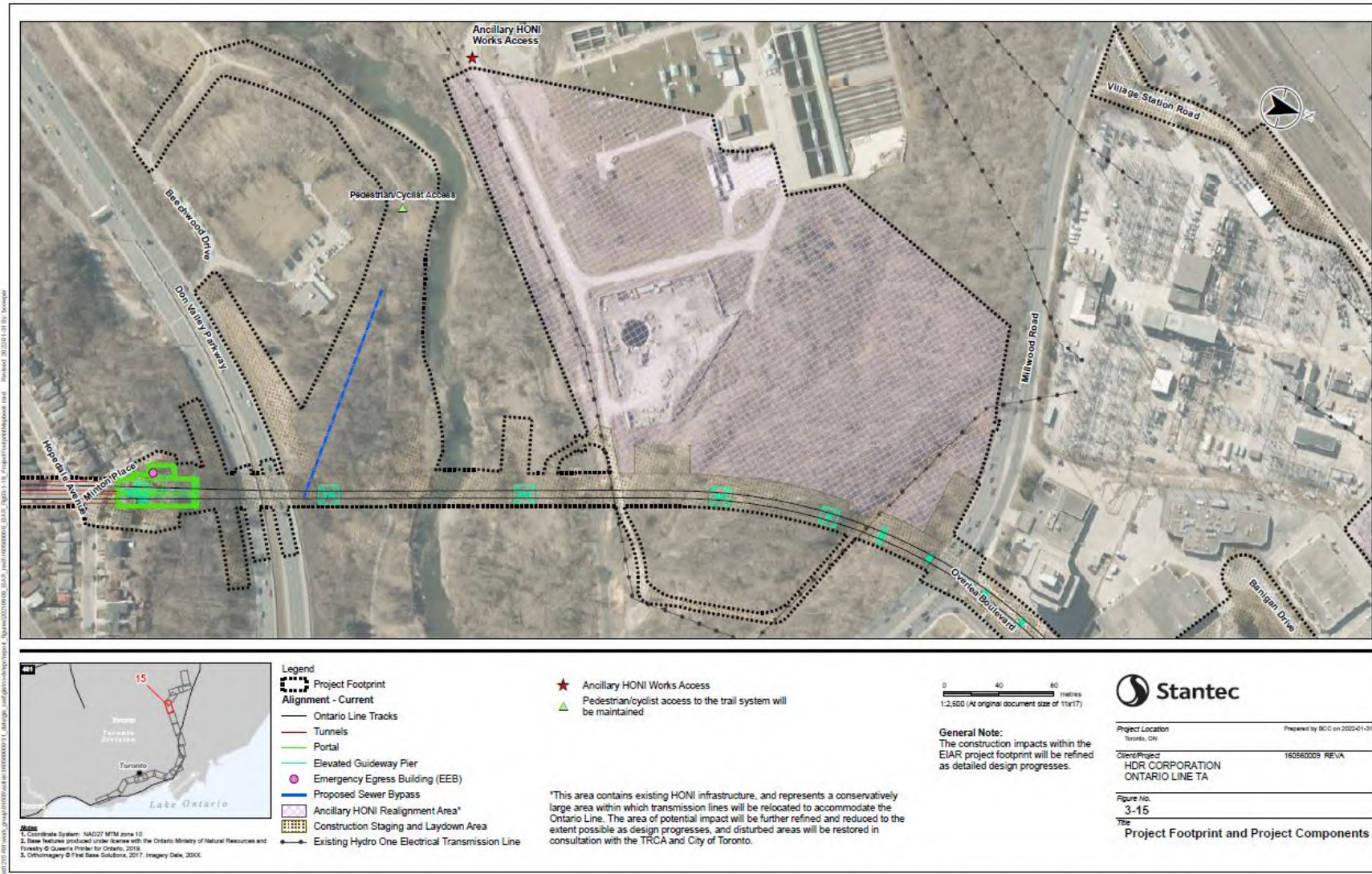
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Figure 1-13. Study Area – Pape Station



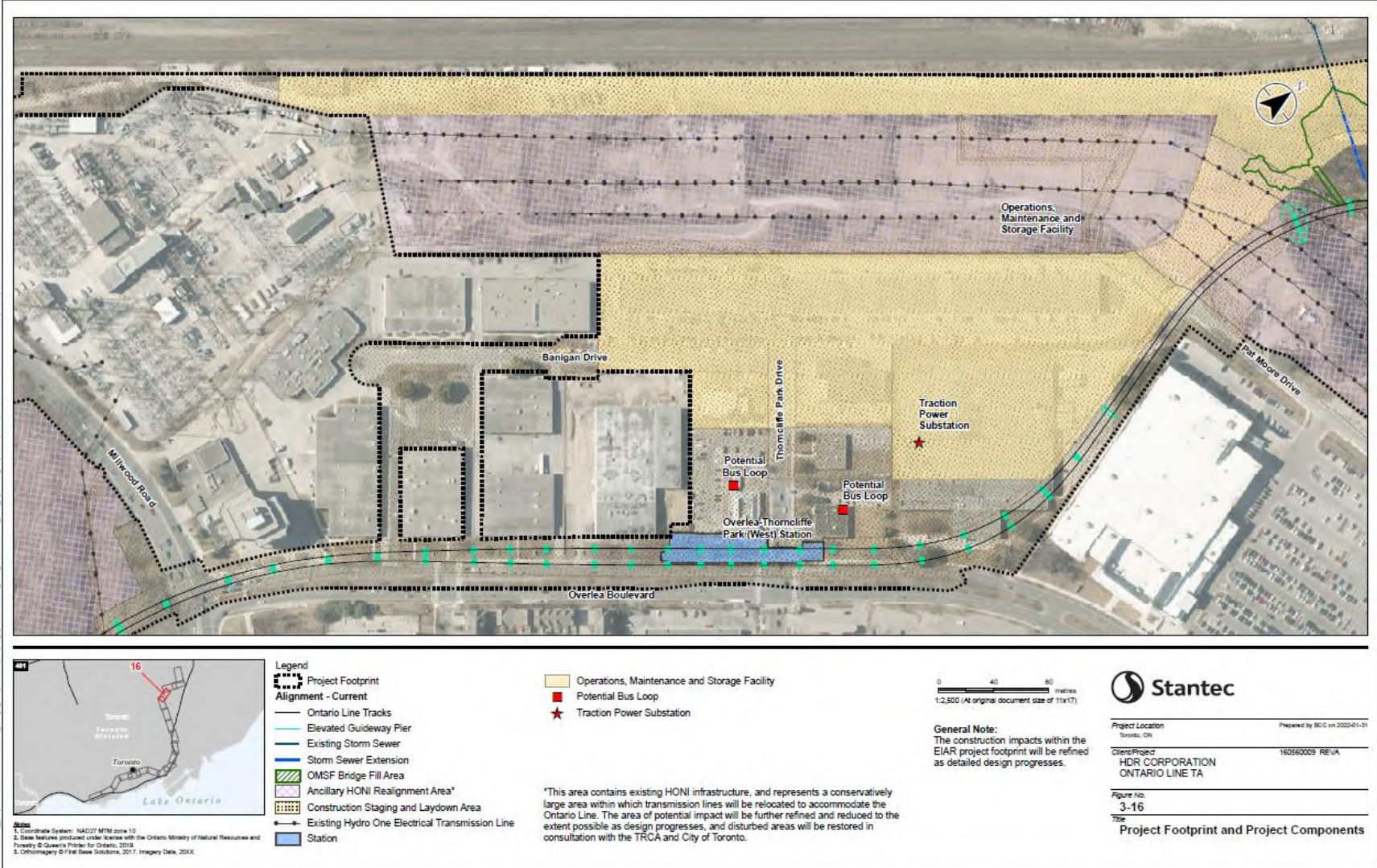
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Figure 1-16. Study Area – Don Valley Parkway



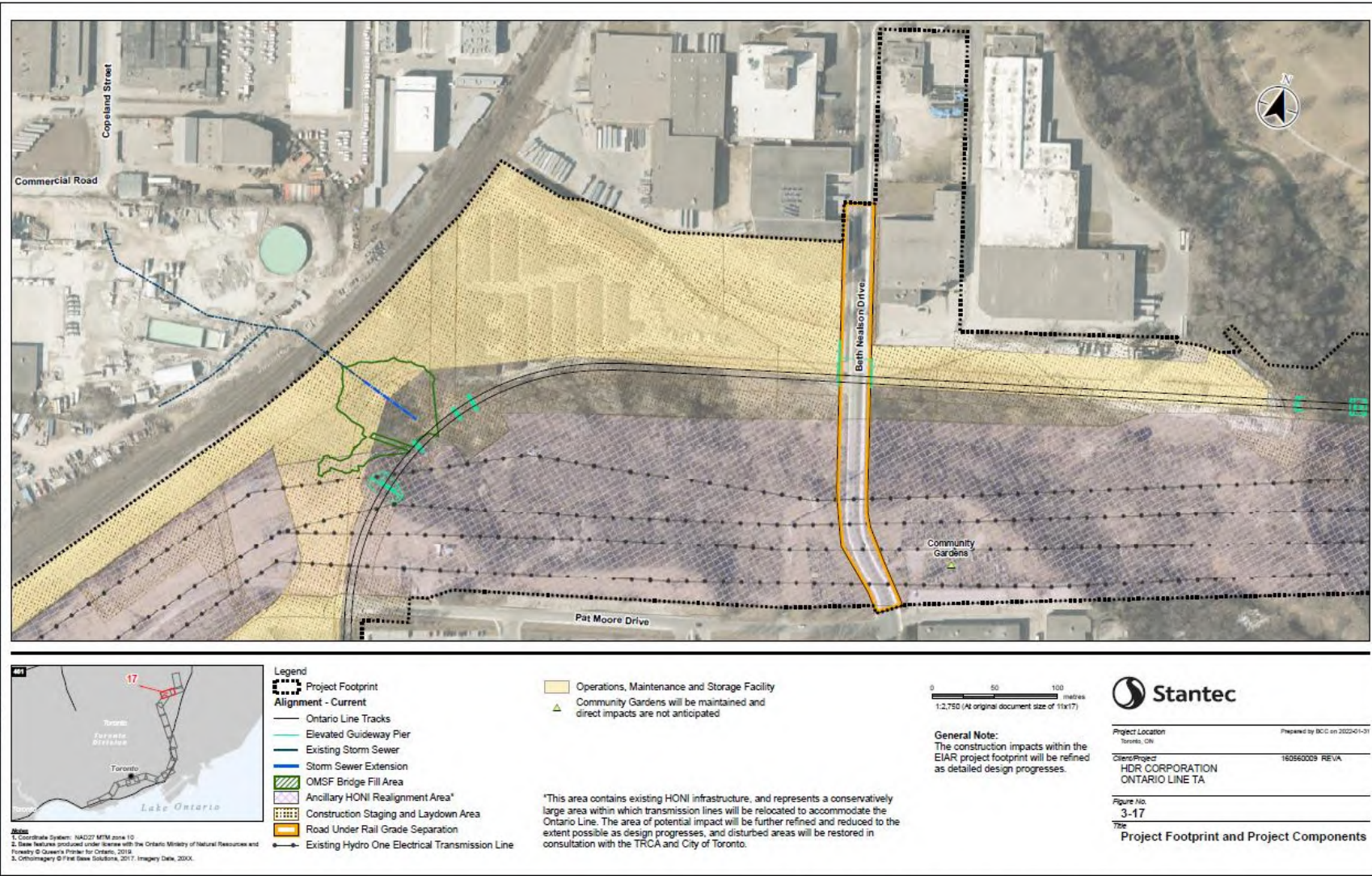
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Figure 1-17. Study Area – Overlea-Thorncliffe Park (West) Station



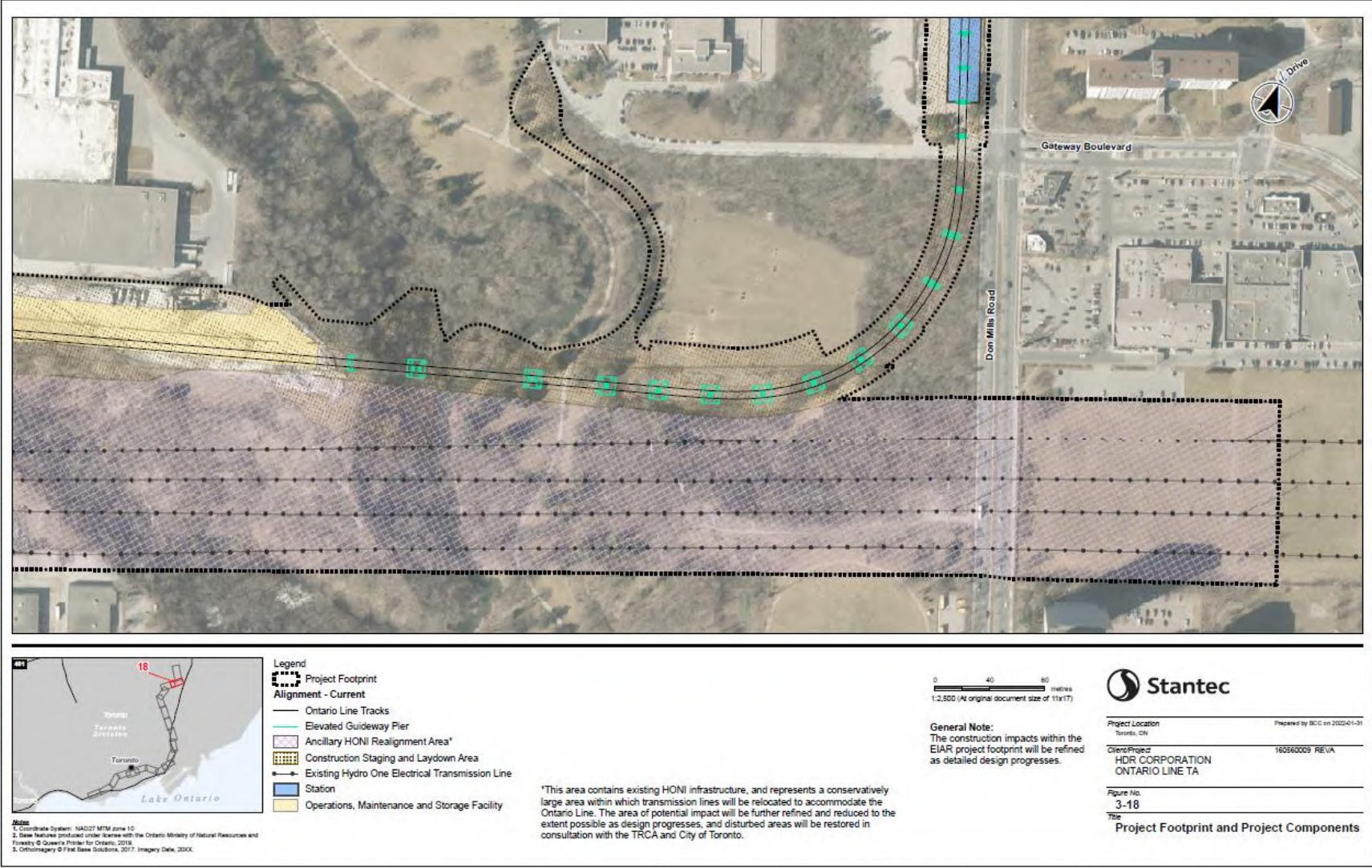
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Figure 1-18. Study Area – Beth Neelson Drive



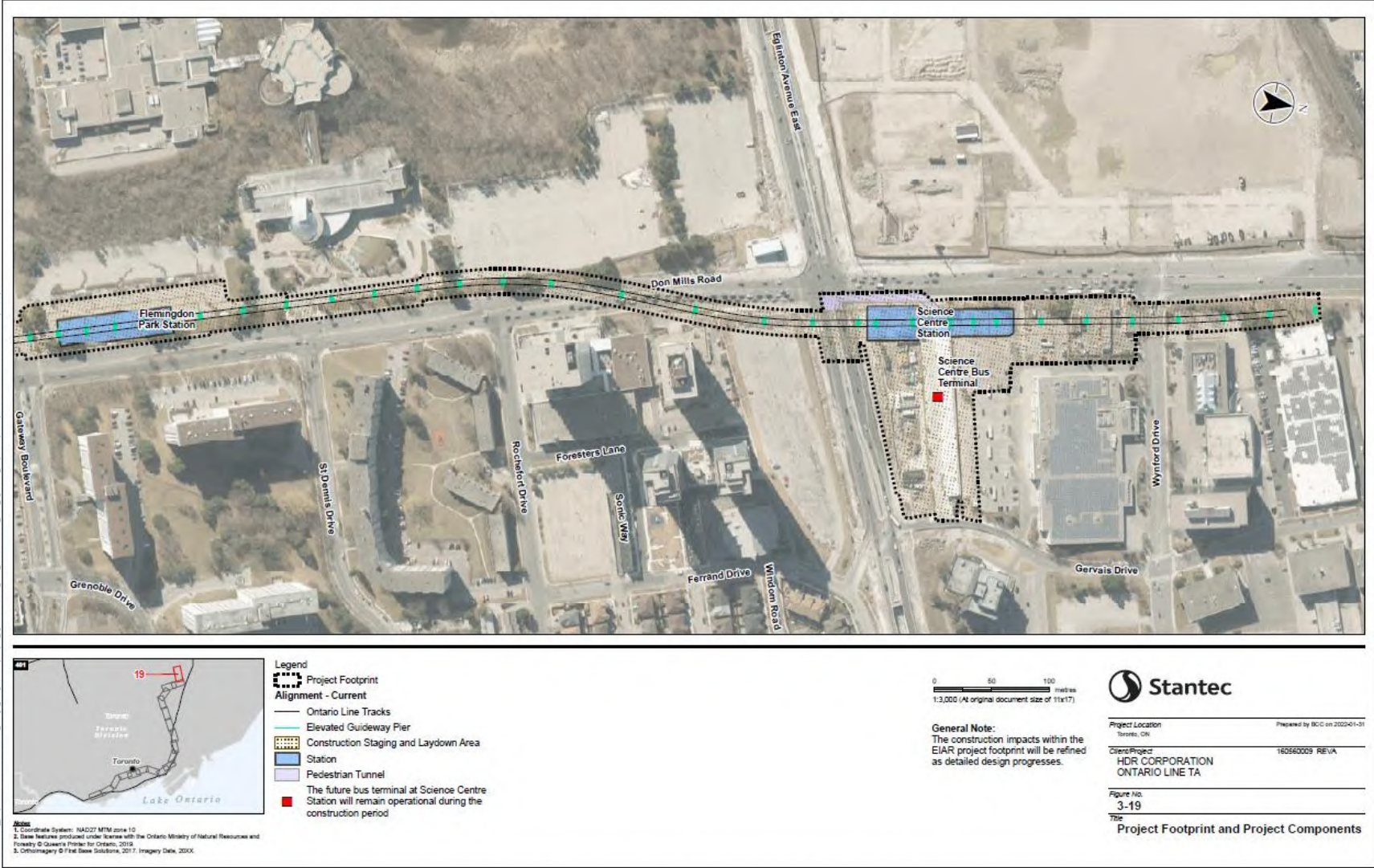
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Figure 1-19. Study Area – Don Mills Road



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Figure 1-20. Study Area – Flemington Park Station and Science Centre Station



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2 Methodology

2.1 Temporary Conditions Analysis

The detailed analysis methodology for downtown station construction temporary conditions is provided in Appendix A of the Ontario Line Downtown Construction Closures – Multi-modal Traffic and Transit Management Plan, prepared by the OLTA, included as Appendix C of this report. It is noted that the analysis methodology varies depending on the Ontario Line segment, station, and time period (advance works, station construction, post-construction, etc.), and the background reports for specific cases should be referenced for further details.

2.2 Permanent Conditions Analysis

2.2.1 Active Transportation

Active transportation was assessed using three different methodologies. The existing walking and cycling infrastructure were assessed using the City of Ottawa’s Multi-Modal Level of Service Guideline (MMLOS). The City of Toronto does not have equivalent MMLOS analysis standards, and due to its detailed assessment of qualitative and quantitative measures, the City of Ottawa MMLOS methodology is regularly applied in the City of Toronto. The City of Ottawa’s MMLOS Guideline assesses pedestrian and cycling infrastructure based on physical geometry as well as other inputs such as signal timings and operating speeds.

Pedestrian operations at the study intersection (crosswalks and corner waiting areas) were also assessed using the Highway Capacity Manual (HCM) 2010 methodology which is integrated within Synchro traffic analysis software.

Sidewalks and surface transit stops within the immediate surroundings of the station were assessed using Fruin’s crowd flow level of service methodology based on pedestrian density when walking on sidewalks and queued/waiting at the transit stops. Table 2-1 shows the levels of pedestrian density that equate to each level of service value.

Table 2-1. Fruin Pedestrian LOS of Sidewalks and Surface Transit Stops

Level of Service (LOS)	Pedestrian Density (people per m ²)		Description
	Walkway	Queued	
A	0	0	Ideal
B	0.308	0.830	Acceptable
C	0.431	1.080	Acceptable
D	0.800	1.540	Somewhat undesirable

Level of Service (LOS)	Pedestrian Density (people per m ²)		Description
	Walkway	Queued	
E	1.076	3.570	Undesirable
F	2.153	5.560	Poor

2.2.2 Traffic Analysis

Intersection operations were assessed using Synchro Traffic Software Version 11. The intersection analysis considers three separate measures of performance:

- The capacity of all intersection movements, represented by the volume to capacity (v/c) ratio;
- The level of service (LOS) for all intersection turning movements as well as for the overall intersection. The overall intersection LOS is based on the average control delay per vehicle (weighted) for the various movements through the intersection; and
- The forecasted queue lengths (95th percentile queue length) and storage requirements.

LOS is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection. HCM definitions are summarized in Table 2-2.

Table 2-2. Highway Capacity Manual Level of Service Definitions

Level of Service (LOS)	Signalized Control Delay per Vehicle (s)	Unsignalized Control Delay per Vehicle (s)	Description
A	≤ 10	≤ 10	Ideal
B	> 10 and ≤ 20	> 10 and ≤ 15	Acceptable
C	> 20 and ≤ 35	> 15 and ≤ 25	Acceptable
D	> 35 and ≤ 55	> 25 and ≤ 35	Somewhat undesirable
E	> 55 and ≤ 80	> 35 and ≤ 50	Undesirable
F	> 80	> 50	Poor

The analysis undertaken in this study also follows the **City of Toronto Guidelines for Using Synchro 11** (January 2021), City of Toronto '**Guidelines for the Preparation of Transportation Impact Studies**', and City of Toronto '**Traffic Signal Operations Policies and Strategies**' (May 2015).

2.3 Overview

Impacts associated with Ontario Line Early Works construction – Exhibition Station, Corktown Station, Lower, East Harbour Station, Don Bridge and Don Yard, and Lakeshore East Joint Corridor – were assessed separately in other reports; therefore, these are not discussed in this report. However, operational impacts of the Early Works components were not assessed as part of those reports and are assessed in this report. Figure 1-1 illustrates the delineation of project components assessed in this report.

3 Planning Context

Provincial, regional, and municipal planning documents, by the City of Toronto and Metrolinx provide the planning context for the Ontario Line. The following is a list of relevant background information that has been reviewed as part of this report. A summary of these reports is included in Appendix A.

Provincial and Regional Policies:

- The Provincial Policy Statement
- 2041 Regional Transportation Plan
- The GO Expansion Program / SmartTrack Stations Program
- 2015 Yonge Relief Network Study
- Ontario Line Initial Business Case
- Ontario Line Preliminary Design Business Case
- GTHA Fare Integration Draft Preliminary Business Case
- New Subway Plan for the Greater Toronto Area

Municipal Policies

- City of Toronto Official Plan
- ActiveTO

Official Plan Amendments

- TOcore and the Downtown Plan
- Official Plan Amendment 469
- Laird in Focus Official Plan Amendment

Master Plans

- NEXT Place Master Plan Final Report
- Lower Don Trail Master Plan

- Don Valley Corridor Transportation Master Plan (2005)

Secondary Plans

- Port Lands Planning Framework
- King Spadina Secondary Plan
- King-Parliament Secondary Plan
- Queen-River Secondary Plan
- Unilever Precinct Secondary Plan

Environmental Assessments and Planning Studies

- Liberty New Street Municipal Class Environmental Assessment
- YongeTOMorrow
- Gardiner Expressway Environmental Assessment
- Broadview Extension EA
- Broadview and Eastern Flood Protection EA
- Port Lands & South of Eastern Transportation and Servicing Master Plan and EA
- Gardiner Expressway and Lakeshore Boulevard East Reconfiguration EA and Urban Design Study

Other Studies

- Downtown Transportation Operations Study
- Waterfront Transit Network
- Waterfront West LRT
- Waterfront East LRT
- King Street Transit Priority Corridor
- TTC 5-Year Service Plan & 10-Year Outlook
- Smart Track
- Gerrard-Carlaw Planning Study
- Laird in Focus Urban Design Guidelines
- Laird in Focus Final Report
- Eglinton Crosstown Light Rail Transit

4 Existing Conditions

A detailed analysis of the existing conditions is provided in the *Ontario Line Project Environmental Conditions Report – Traffic and Transportation Report (2020)*, prepared by AECOM and HDR.

5 Transportation Impacts, Mitigation, and Monitoring Activities

Potential impacts to traffic and transportation operations as a result of the Ontario Line have been assessed. A summary of impacts, mitigation, and monitoring measures for the Ontario Line are provided in Appendix B. The Ontario Line Downtown Construction Closures Multimodal Traffic and Transit Management Plan (TTMP) report is provided in Appendix C which details the analysis methodology, findings, and recommendations for the Downtown Toronto station construction works.

The impacts and mitigation measures identified in this section are a summary of those identified in the Ontario Line Station Site Plan Review Transportation Impact Studies, Downtown TTMP report, as well as preliminary findings from TTMP assessments being prepared for other Ontario Line stations. Other TTMP reports will be provided to the Ontario Line stakeholders once complete. The following sections provide an overview of the impacts/improvements and the mitigation and monitoring efforts required to address the impacts.

Transportation impacts are presented for each segment of the project and divided into the following categories:

- **Temporary Construction Impacts** – Temporary impacts, occurring only during construction activities;
- **Permanent Impacts to Existing Features** – Permanent impacts to existing features located within the footprint of the project that are physically altered to accommodate project facilities; and,
- **Operation and Maintenance Impacts** – Ongoing and long-term impacts associated with operations and maintenance activities.

Each of the above impact categories were further divided to assess specific effects on the following transportation modes:

- Pedestrians
- Cyclists
- Transit Service (including rail)
- Automobile Traffic

5.1 Exhibition to Don Yard

5.1.1 Temporary Construction Impacts

5.1.1.1 Traffic Staging Plans

The latest traffic staging plans for station construction conditions are illustrated in Figure 5-1 through Figure 5-7.

Figure 5-1. King-Bathurst Station Traffic Staging Plan

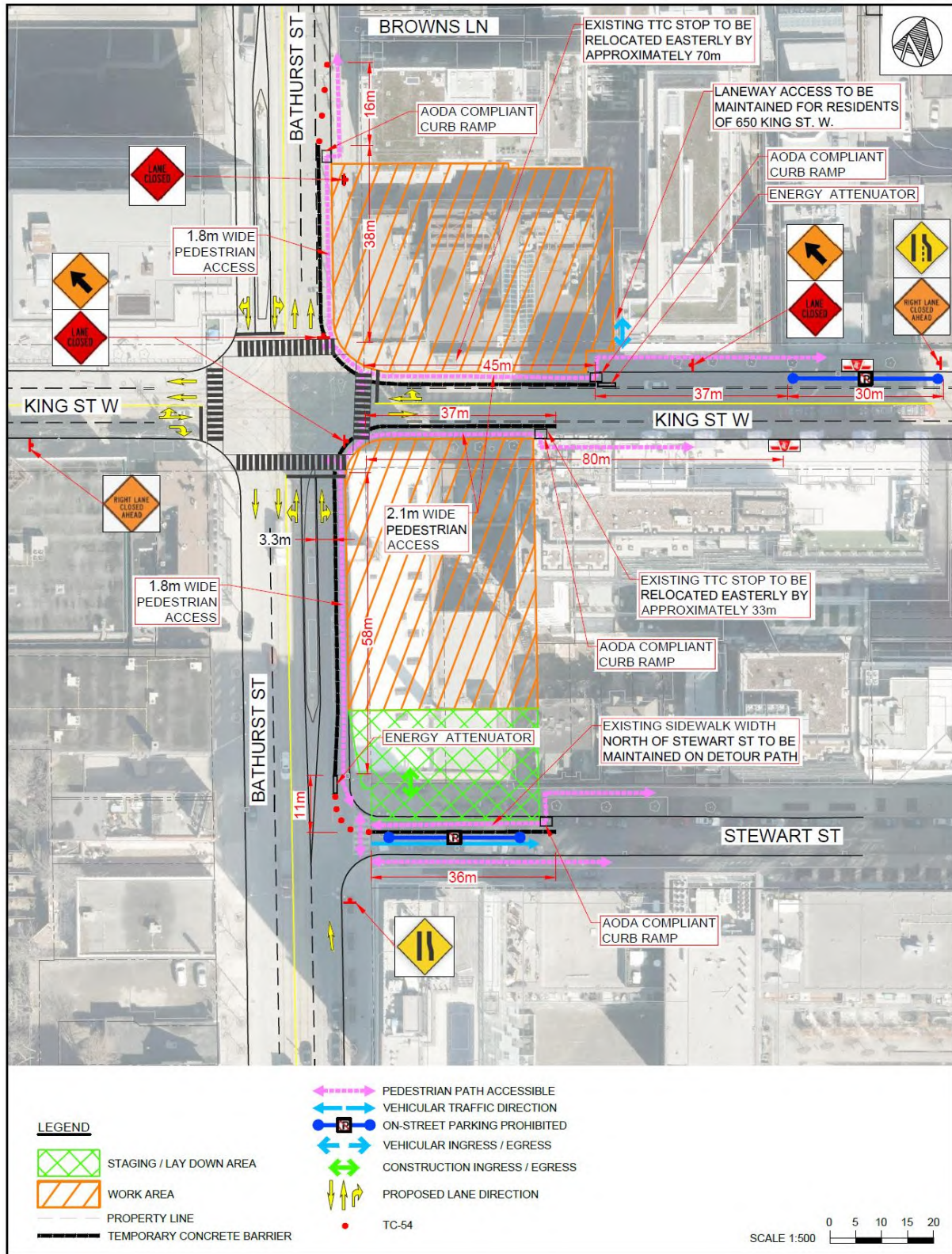


Figure 5-2. Queen-Spadina Station Traffic Staging Plan

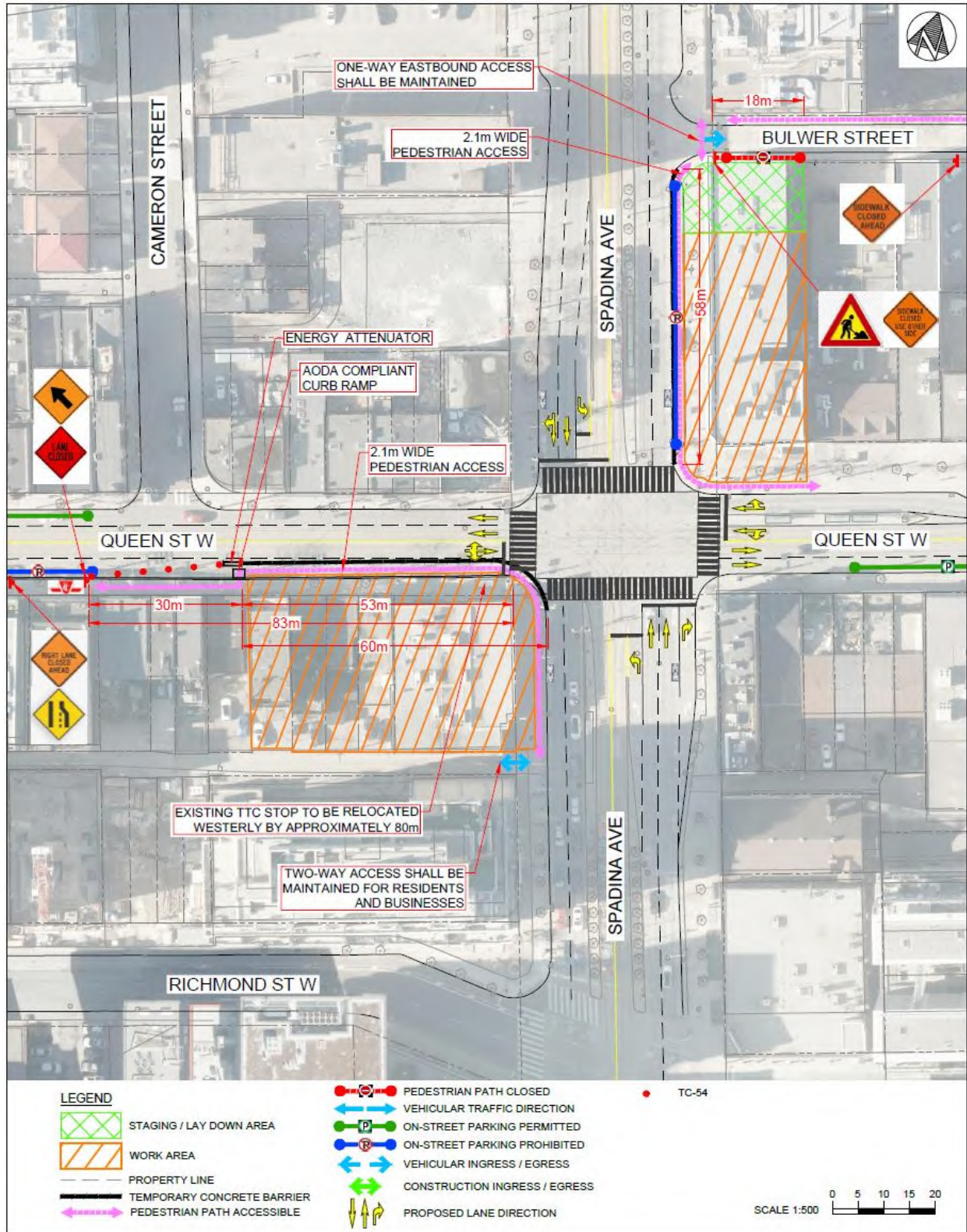


Figure 5-3. Osgoode Station Traffic Staging Plan

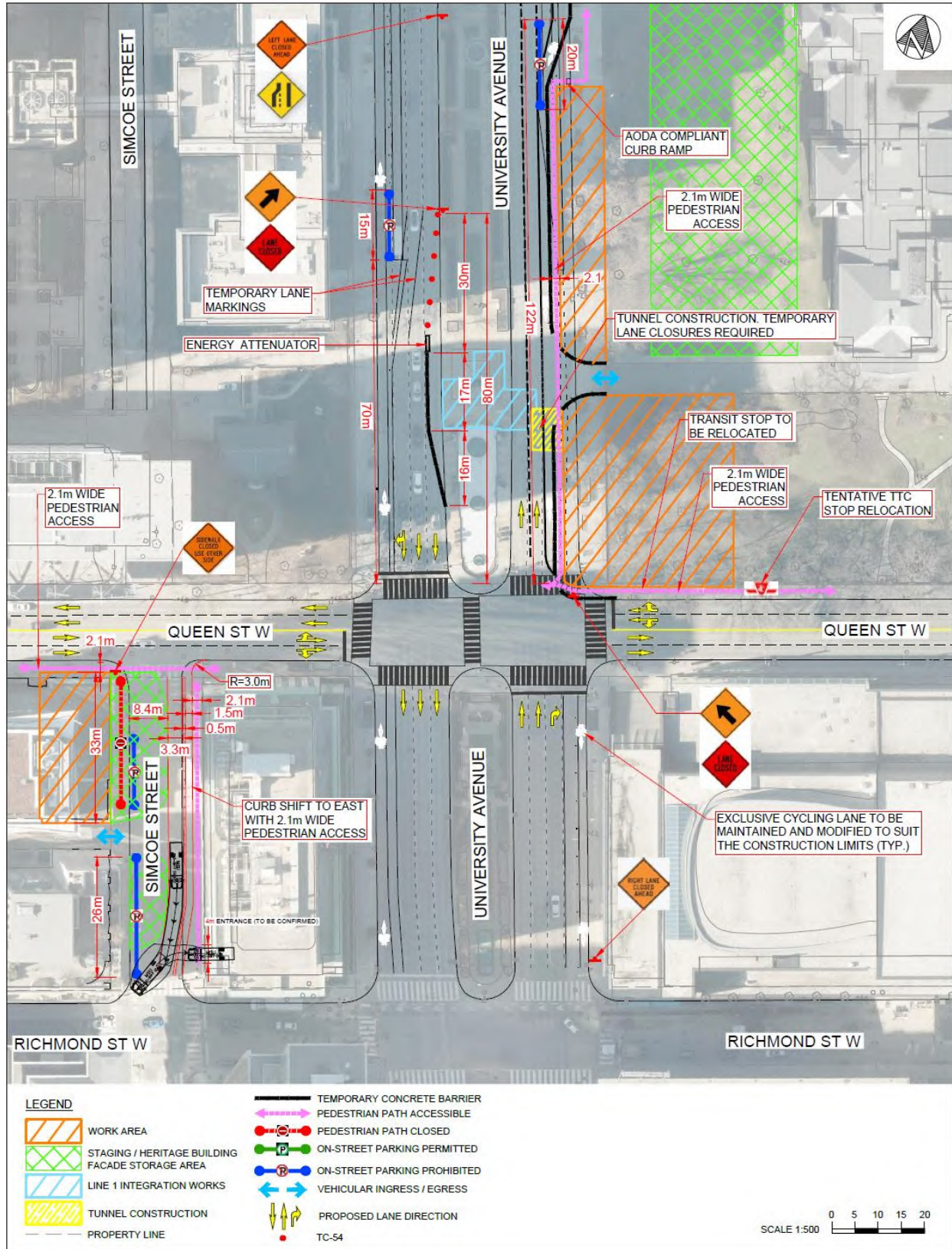


Figure 5-4. Queen Station Traffic Staging Plan

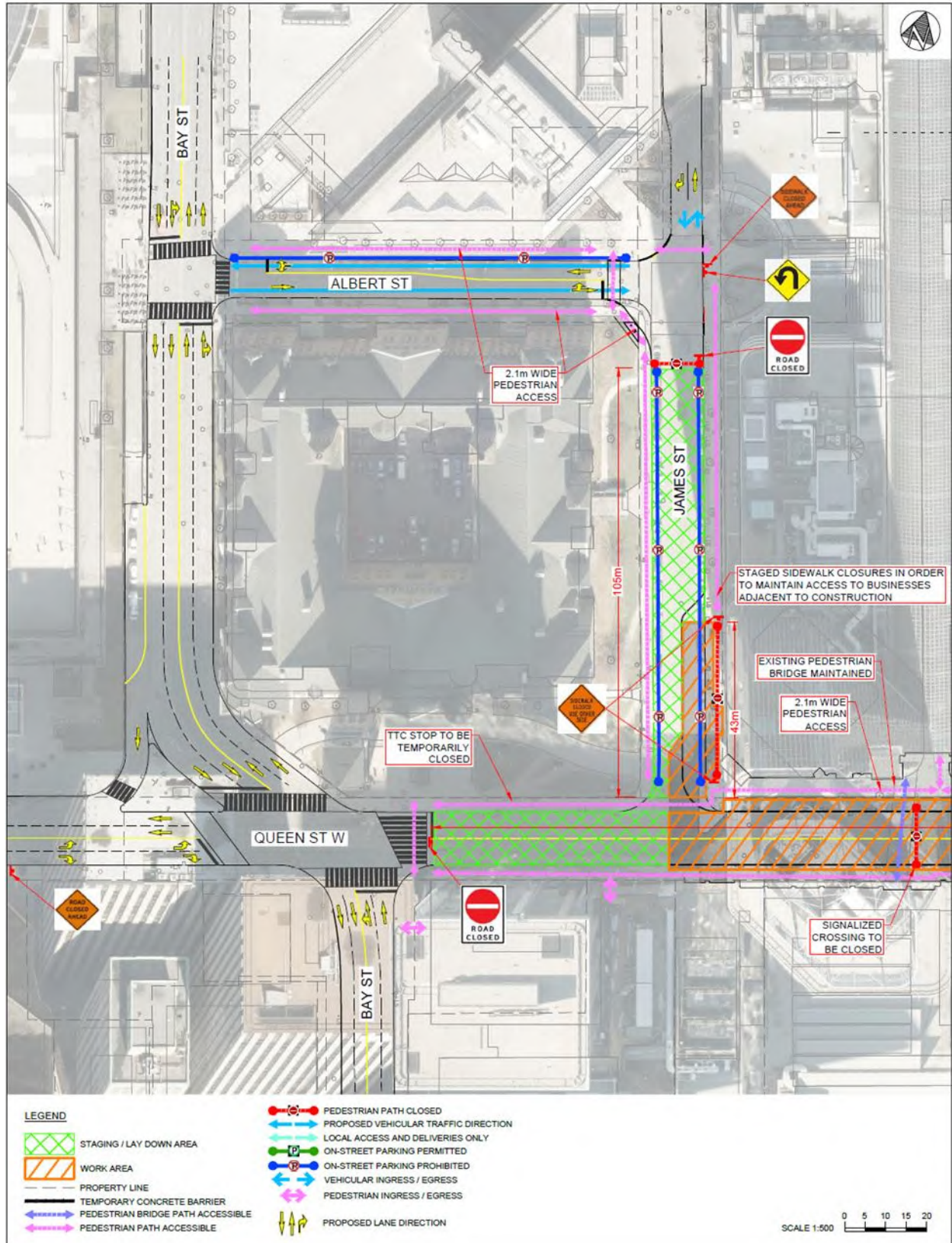


Figure 5-5. Queen Station Traffic Staging Plan

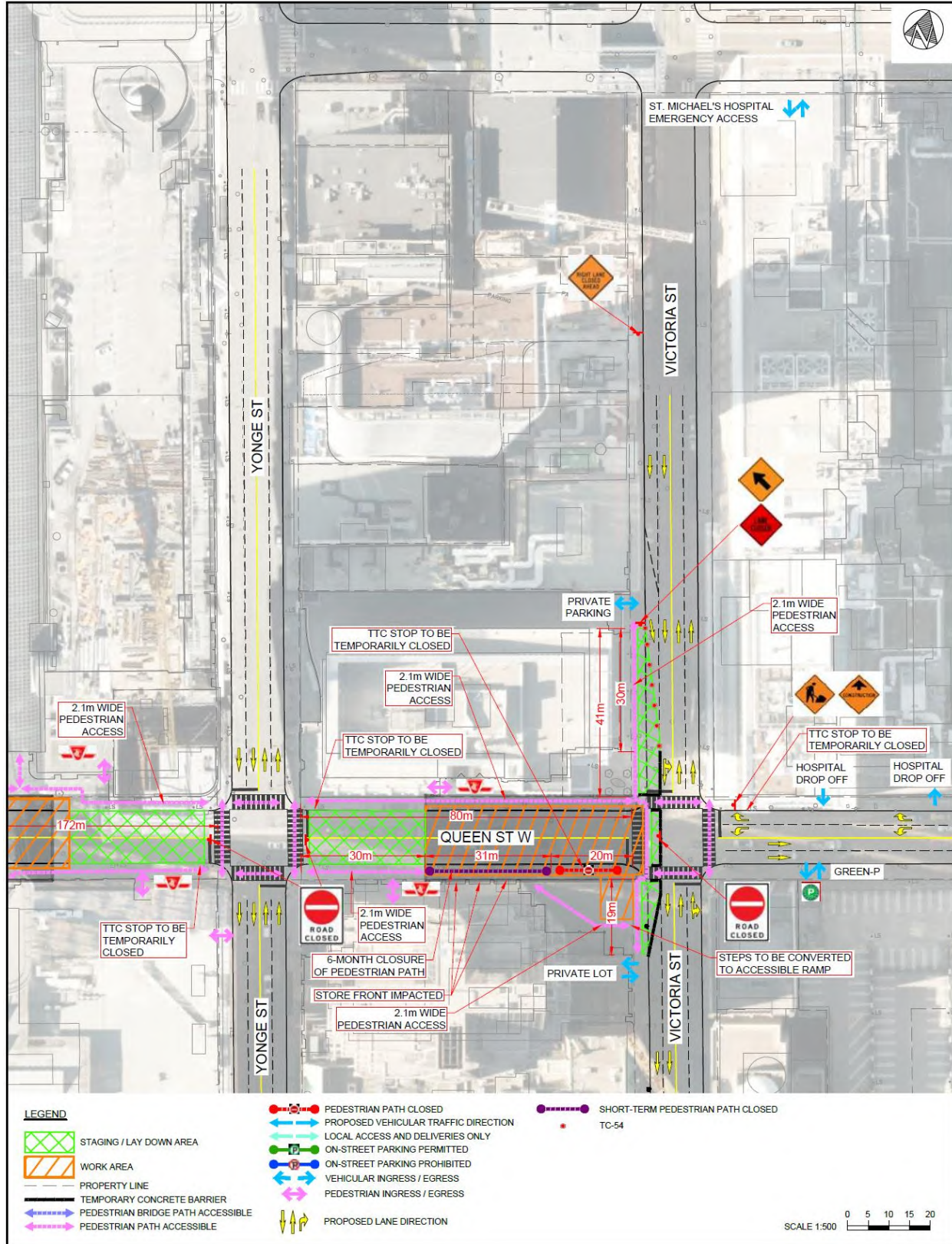


Figure 5-6. Moss Park Station Traffic Staging Plan

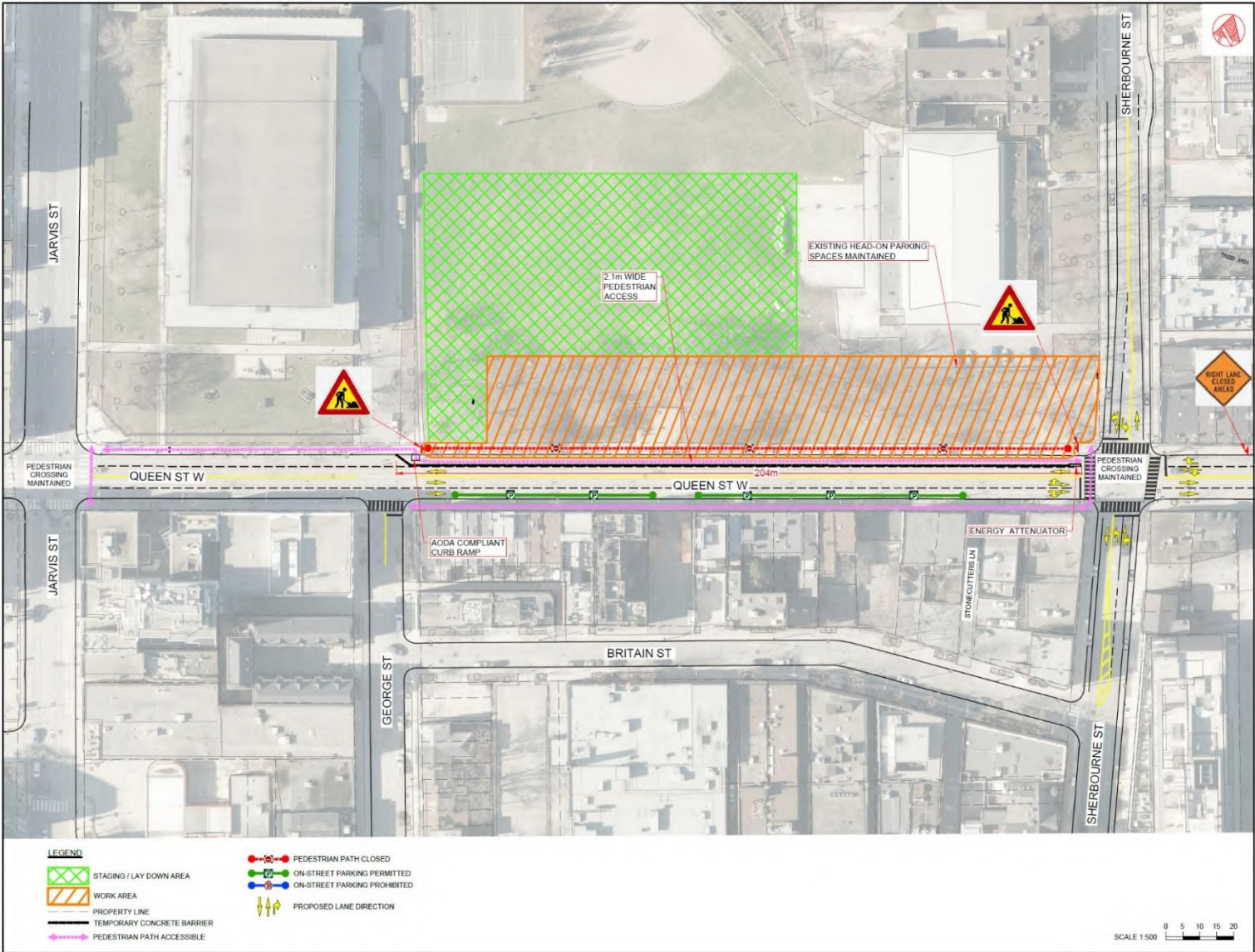
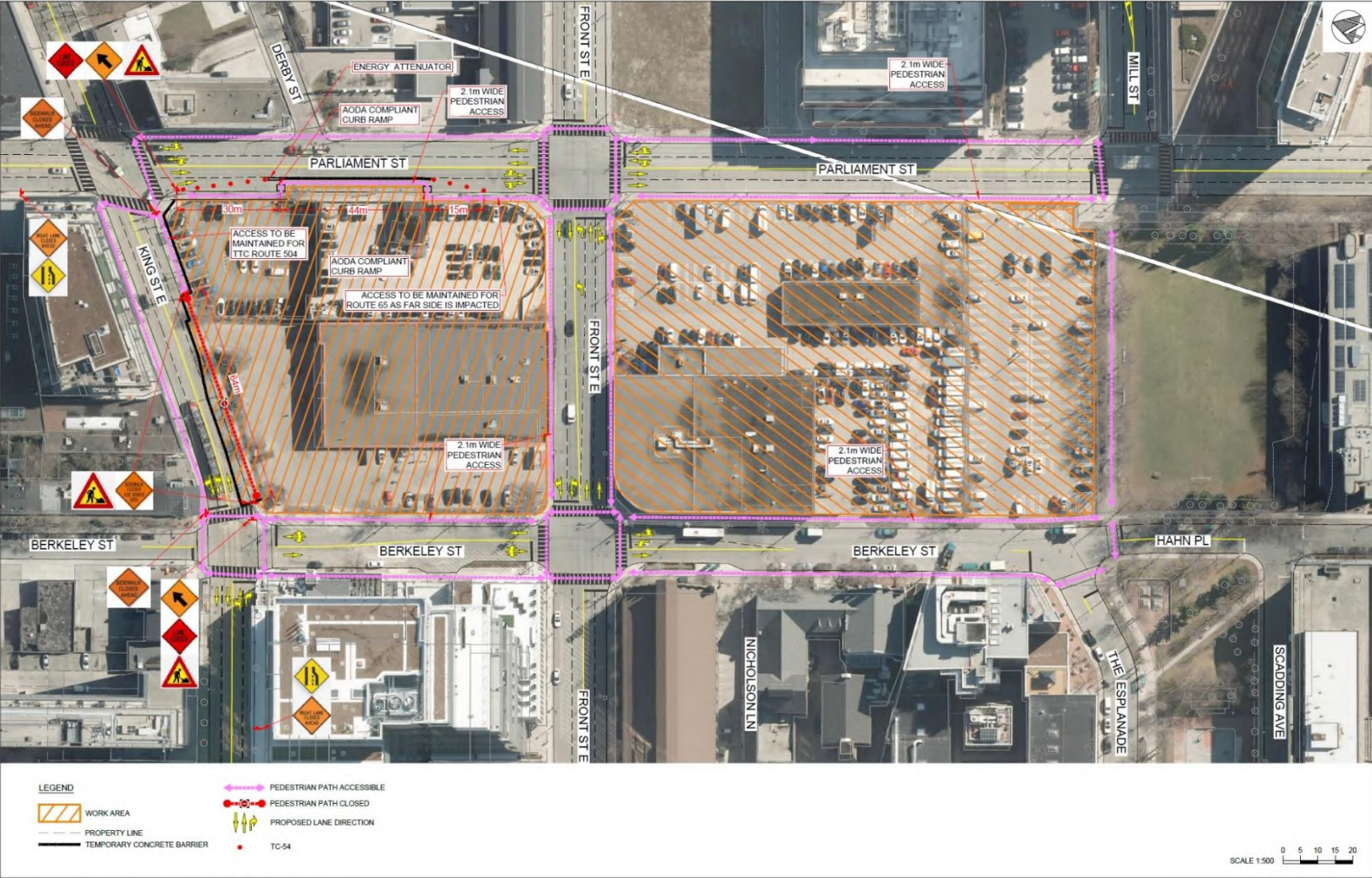


Figure 5-7. Corktown Station Traffic Staging Plan



5.1.1.2 Pedestrians

Temporary Impacts

Construction of the Ontario Line is expected to result in temporary impacts to pedestrians at Exhibition, King Bathurst, Queen Spadina, Queen, Corktown, Moss Park, and Osgoode Station. These impacts include but are not limited to:

- Narrowed pedestrian paths;
- Partial or full closure of sidewalks;
- Protected detours around work areas and closed sidewalks;
- Underground tunnel upgrades and extension at Exhibition Station;
- Temporary bridge structure at Exhibition Station;
- Closure of the south crosswalk at Albert/James intersection;
- Removal of mid-block pedestrian signal on Queen Street between Yonge Street and James Street;
- Narrowing of the PATH corridor between Eaton Centre to The Bay, with a minimum width of 4 metres maintained. Half of the PATH corridor will be under construction at a time; and,
- Removal of unofficial pedestrian connections.

Temporary sidewalk closures will be required at the following locations as a result of Station and tunnel construction:

- Bulwer Street (south side) east of Spadina Avenue;
- Simcoe Street (west side) between Queen Street and the laneway terminating on Simcoe Street;
- Queen Street (south side) from 30m east of Yonge Street to Victoria Street;
- James Street (east side) between Queen Street and Albert Street; and,
- King Street (south side) between Berkeley Street and 30m west of Parliament Street.

Temporary impacts and mitigation measures for pedestrian connectivity at Exhibition Station, including opening a currently disused pedestrian tunnel and constructing a temporary pedestrian bridge structure, are assessed in the Exhibition Station Early Works Report. A brief summary of these works follows.

The existing disused pedestrian tunnel that runs underneath the railway corridor at Exhibition Station will be reopened, brought up to code to ensure AODA compliance, and extended by approximately 40 metres north-west, terminating just east of Atlantic Avenue. Once the tunnel extension and new headhouse at the end of the extension are constructed, the covered pathway between the current north tunnel headhouse and Atlantic Avenue will be closed. The current headhouse at the north will remain open during construction to facilitate access between

the north GO platform and the underground tunnel. Access to both GO platforms will be maintained.

A temporary pedestrian bridge structure will be constructed at Exhibition Station during Early Works and completed in August 2023, which will extend over the railway corridor and connect to the existing north headhouse, the reconditioned south headhouse, and the future headhouse at the northern end of the tunnel extension. The bridge will not be AODA compliant but will provide additional ingress and egress capacity and reduce the potential congestion in the existing tunnel during special events at Exhibition Place or Ontario Place. The bridge will be demolished, and the underground tunnel will be decommissioned once Exhibition Station is opened for service. Metrolinx will coordinate with Exhibition Place staff and Event Organizers to further mitigate impacts during event-related pedestrian surge crowd periods.

The middle portion of the south sidewalk on Queen Street (delineated in purple in Figure 5-5) between Yonge Street and Victoria Street will be closed for a shorter duration (approximately 6 months) compared to the closure west of Victoria Street which will be closed for the full duration of the Queen Station construction. The reopening of the centre portion of the sidewalk will allow pedestrians to detour through the courtyard on the south-west corner of Queen Street/ Victoria Street. The current ramp connecting the courtyard to the Victoria Street sidewalk will be occupied by a work area, and a new ramp will be constructed along the detour path.

Ingress/egress at the properties adjacent to the Queen Street E (west of Victoria Street) and James Street (north of Queen Street) sidewalk closures will be impacted, and pedestrians will be required to detour through the accesses internal to the buildings. The Queen Street businesses will be impacted for a 6-month duration, and the James Street businesses will be impacted throughout the duration of the ventilation shaft construction.

Mitigation and Monitoring

To accommodate pedestrians during construction, protection for a minimum sidewalk width of 2.1 m is required to meet the needs of accessible sidewalk users as per City of Toronto Standards. At a limited number of locations, temporary sidewalk widths are reduced to 1.8 m. At certain “pinch points” sidewalk widths may be reduced to 1.5 m for short durations (up to one week).

In areas where sidewalk widths below 2.1 m are provided in existing conditions, a minimum width consistent with the current sidewalk width will be provided. AODA compliant curb ramps will be provided in locations where the pedestrian detour path moves from the boulevard onto a protected path on the street.

Signage and wayfinding are recommended to be installed to provide advance warning for pedestrian detours and ease of navigation and movement.

For the demolition of buildings adjacent to laneways and sidewalks, additional full closures of laneways and sidewalks will be permitted during weekends.

Contractor will be required to regularly monitor the condition and location of pedestrian wayfinding signage. Monitoring may be considered for crowding at Queen Station due to the sidewalk closure on the south side of Queen Street to identify the potential to reinstate the existing sidewalk width whenever possible during construction.

Access from within the buildings will be maintained for the businesses adjacent to the sidewalk closures on Queen Street East and James Street.

Traffic control persons will be stationed at midblock sidewalk terminations, i.e., on Bulwer Street east of Spadina Avenue to mitigate pedestrian crossing safety concerns, and at construction vehicle access points that conflict with the existing or temporary sidewalk.

5.1.1.3 Cyclists

Temporary Impacts

During construction, the closure of curb lanes is expected along sections of King Street, Bathurst Street, Queen Street, University Avenue, Victoria Street, and Parliament Street, as illustrated in Figure 5-1 through Figure 5-7, resulting in cyclists travelling in the centre lane. At locations where the centre lane also has streetcar tracks, advance warning signs are recommended for cyclists to consider rerouting. A 1 m wide clearance from the streetcar tracks is proposed to allow space for cyclists.

Bike lanes may be realigned with appropriate delineation, such as pavement markings, bicycle curbs and flexible delineator posts (where currently provided). Generally, existing widths of bike lanes will be maintained. However, bike lane widths will be reduced to 2.0 m on University Avenue (northbound) and 1.5 m on Simcoe Street (northbound) in the vicinity of the Station work zones.

At Queen Station, all east-west traffic on Queen Street will be closed between Bay Street and Victoria Street for approximately 4.5 years (Q2 2023 to Q4 2027), which will result in added travel time and delays. Reducing the duration of the full closure may be possible by installing a temporary road deck across Queen Street to accommodate one lane per direction after an initial full closure for the construction of support of excavation and early excavation activities.

The bike-share stations located on James Street and Stewart Street conflict with the proposed Queen Station and King Bathurst Station work areas and will need to be temporarily relocated.

Mitigation and Monitoring

There is a safety concern regarding cyclists riding on traffic lanes with streetcar tracks. This concern is mitigated by providing a 1 metre object-free zone adjacent to streetcar tracks.

Cyclists will have to walk their bikes on sidewalks at the full closure of Queen Street. Longer range trips will be encouraged to detour onto Adelaide Street or Richmond Street. Advance warning signs are recommended to notify cyclists of the closure.

The proposed reconfiguration of York Street for the Route 501 streetcar diversion around the full Queen Street closure includes a dedicated southbound curbside bicycle lane south of Richmond Street and a sharrow lane between Queen Street and Richmond Street.

Bike share stations on James Street and Stewart Street, which are located within sidewalk closures, will be temporarily relocated.

5.1.1.4 Transit

Temporary Impacts

At Exhibition Station, construction will not impact pedestrian access to the Exhibition GO Station and will remain at Atlantic Avenue. However, TTC routing through Exhibition Place will potentially be impacted along Manitoba Drive to facilitate the construction of the south station entrance building and public realm improvements. Metrolinx will work with TTC and event organizers to mitigate pedestrian, traffic and transit impacts during construction.

The following transit impacts are anticipated as a result of preparatory activities for the Ontario Line:

- Temporary bus replacement service for the Route 501 streetcar during the streetcar detour track works on York Street;
- Streetcar detours and transit stop relocations during the full closures of Queen Street between Bay Street and Victoria Street. Detours will follow the York Street streetcar detour route via Richmond Street (westbound), Adelaide Street (eastbound), and Church Street;
- Closure of the Victoria Street streetcar during the full southbound closure of Victoria Street; and
- Increased delays for transit vehicles due to lane reductions shifting traffic to the remaining shared lanes.

The curb lanes on the east leg of King Street in the vicinity of Bathurst Street will be closed in both directions, and the northbound curb lane on Bathurst Street will be closed. Transit stops will be relocated during construction where required and passengers will need to walk to the relocated transit stops.

The curb lane will also be closed on the west leg of the eastbound approach at Queen Street and Spadina Avenue. Streetcars will be unable to stop immediately at the intersection. The eastbound streetcar stop will be relocated westerly.

At Osgoode Station, potential delays to transit due to traffic queues are anticipated. The westbound transit stop at the intersection of Queen Street with University Avenue will be relocated to the east of the work area.

Construction impacts at Queen Station will result in the closure of all east-west traffic on Queen Street and the closure of streetcar stops on Queen Street between Bay Street and

Victoria Street. Streetcars will be detoured onto York Street, Adelaide Street, Richmond Street, and Church Street.

Construction of the streetcar detour will impact Queen Street and King Street (lane closures). The impacts between Adelaide Street and King Street will be due to a laydown area and track welding plant.

Closure of James Street and the conversion of Albert Street to two-way operation will result in TTC wheel-trans vehicles having to reverse to reach the accessible stop location near the Eaton Centre. Due to the significant number of pedestrians in this area, traffic control persons will be stationed at the intersection to assist wheel-trans vehicles during the business hours of the Eaton Centre. The intersection of Albert Street and James Street will be modified to facilitate the movements of wheel-trans vehicles.

Lane configurations and traffic operations on York Street will be modified to accommodate a dedicated streetcar lane southbound between Queen and Adelaide as part of the Queen streetcar detour route. The Queen Street closures and detours will impact transit travel times and delays. Temporary streetcar stops will be provided on Adelaide Street, Richmond Street, and at the northern end of York Street (northbound stop) at Queen Street. Transit signal priority measures are proposed along the York streetcar detour route for the eastbound streetcars.

There are no direct impacts to streetcars at Moss Park due to construction; however, there is potential for more traffic to stop on the westbound centre lane at the intersection of Queen Street with Sherbourne Street because of the far-side curbside lane closure, resulting in increased delays and travel times.

There are no direct impacts to Route 504 streetcars at Corktown due to construction; however, it is anticipated that more vehicular traffic will stop on the eastbound centre lane at the intersection of King Street with Berkeley Street, as the eastbound far-side curb lane closure will be implemented upstream of the intersection.

The transit stops on King Street, Parliament Street, Front Street, and Berkeley Street will be maintained throughout construction; however, sidewalks will be closed on the south side of King Street, between Berkeley Street and the eastbound transit stop at the intersection of King Street with Parliament Street. The sidewalk closure on the south side of King Street may require pedestrians to detour along the north side of King Street or other east-west connections to reach their transit stop.

For the construction of the proposed interchange stations at Queen and Osgoode, there will be scheduled weekend subway train service shutdowns when works will impact the existing TTC Line 1 platform and concourse levels. Existing TTC subway passengers may also experience delays during weekdays due to reduced widths of the passageways and the PATH (between Eaton Centre and The Bay) and when some fare gates are shut down to facilitate work zones on either side of the paid and non-paid fare zones. All access points will be maintained at both stations with the exception of the existing NE stairs at Osgoode Station connecting to the east sidewalk of University Avenue, which will be closed during construction and permanently replaced with a joint NE station entrance building for TTC and OL.

Mitigation and Monitoring

Consultation with TTC is recommended to communicate impacts at Exhibition Station and through Exhibition Place, and to establish a suitable mitigation strategy that will include public notification in advance of any potential service disruptions or modifications.

The following mitigation measures are recommended to reduce the impact of Ontario Line Station construction works on transit:

- Provide temporary bus replacement service for Route 501 Queen during the construction of the southbound streetcar tracks on York Street.
- Construct southbound streetcar tracks and convert York Street to two-way traffic between Queen Street and Adelaide Street to accommodate streetcar detours throughout the construction of Queen Station.
- Relocate transit stops at the intersections of King Street with Bathurst Street, Queen Street with Spadina Avenue, Queen Street with University Avenue, and along Queen Street between York Street and Church Street to accommodate work areas and the full closure of Queen Street.
- Station traffic control persons at the intersection of James Street with Albert Street to mitigate conflicts between WheelTrans vehicles and pedestrians, and modify the south-west corner of the intersection to accommodate WheelTrans turning maneuvers.
- Optimize the intersections of King Street with Bathurst Street, and Queen Street with University Avenue and Sherbourne Street to mitigate the impacts of nearby Station works and the resulting lane closures.

No monitoring is required beyond TTC's regular operational performance monitoring.

5.1.1.5 Automobiles

Temporary Traffic Impacts

Due to construction, there will be lane closures at King Bathurst, Queen Spadina, Osgoode, Queen, Moss Park, and Corktown Station. A long-term (4.5 years) full closure of Queen Street between Bay Street and Victoria Street will occur as a result of the Queen Station construction.

Advanced Works will be required to be completed prior to the start of station construction works. The following street impacts will occur as a result of the construction of the Streetcar Detour along York Street:

- Temporary southbound lane closure / full closure and a northbound lane closure on York Street between Queen Street and King Street.
- Full closure of the following York Street intersections for works within the intersections: Queen Street, Richmond Street, and Adelaide Street. Only one intersection will be closed at any given point in time, and intersection closures will be coordinated with Ontario Line Advance Works contracts and other City/TTC construction projects.
- Closure of Pearl Street at the intersection with York Street may be required.

The following street impacts will occur as a result of Station and tunnel construction:

King Bathurst Station

- Closure of the curb lanes on the east leg of the King Street/Bathurst Street intersection for both directions.
- Closure of the northbound curb lane on Bathurst Street from Stewart Street to north of King Street.
- Lane width reduction and on-street parking removal on the north side of Stewart Street, east of Bathurst Street.

Queen Spadina Station

- Closure of the eastbound approach curb lane at Queen Street/Spadina Avenue.

Osgoode Station

- Northbound curb lane closure on University Avenue between Queen Street and Armoury Street.
- Mid-block centre lane closure on University Avenue north of Queen Street.
- Southbound lane closure on Simcoe Street between Queen Street and Richmond Street.

Queen Station

- Full street closure on Queen Street between Bay Street and Victoria Street (excluding the intersection of Queen Street with Yonge Street).
- Closure of the southbound curb lane on Victoria Street near Queen Street.
- Full closure of James Street while Queen Street is fully closed, resulting in blocked inbound access to the area behind Eaton Centre.

- Two-way conversion of Albert Street during the full closure of James Street. The conversion will reduce the roadway width allocated to westbound traffic, resulting in a shared westbound left and right-turn lane at the intersection of Bay Street and Albert Street.

Moss Park Station

- Closure of the westbound curb lane between Sherbourne Street and George Street. The westbound Queen Street curb lane on the approach to the intersection with Sherbourne Street will terminate as a dedicated right turn lane.

Corktown Station

- Closure of southbound curb lane on Parliament Street between King Street and Front Street.
- Closure of eastbound curb lane on King Street between Berkeley Street and Parliament Street.

Cherry Street Emergency Egress Building (EEB)

- The westbound curb lane on Lake Shore Boulevard will be closed during off-peak periods just west of Cherry Street.

Weekend full closures of laneways in the vicinity of station work zones are permitted during the construction of support of excavation walls.

The combined station construction works and the addition of haul truck trips are expected to increase delays and travel times on the network.

Temporary Parking Impacts

Station construction laydown and work areas will result in lane closures at most stations and a full closure of Queen Street between Bay Street and Victoria Street. The lane/road closures and property takings for the station works will impact both off-street and on-street parking in Downtown Toronto.

The following parking prohibitions are anticipated as a result of Station and tunnel construction works:

- Stewart Street (north side) east of Bathurst Street;
- Bathurst Street (east side) south of Stewart Street;
- Queen Street (south side) west of Spadina Avenue (due to lane closure and relocated transit stop);
- Spadina Avenue (east side) north of Queen Street to Bulwer Street;
- Simcoe Street (west side) south of Queen Street to Richmond Street;

- University Avenue (east and west side) north of Queen Street to Armoury Street;
- Albert Street (north side) east of Bay Street to James Street;
- James Street (west and east side) between Queen and Albert Streets; and,
- Queen Street (north side) west of Sherbourne Street.

The accessible loading zone on the south side of Albert Street will be maintained but shifted slightly to the east. A handicapped parking space will be closed on James Street.

On-street parking will also be removed on York Street between King Street and Richmond Street.

Taxicab standing on James Street and Albert Street will be closed.

Off-street parking will be impacted at Green P parking lots located within the work areas at Corktown Station, specifically 271 Front Street East and 54 Parliament Street. Additionally, there is a potential reduction in the number of parking spaces available at Moss Park Arena. The existing head-on parking spaces will be maintained, however, parallel parking along the south wall of the building may need to be prohibited to maintain vehicle circulation, which would result in a loss of roughly a third of the available parking spaces. The lost parking will be accommodated through nearby on-street (Queen Street, Shuter Street) parking, and off-street parking (e.g., Green P parking at Sherbourne Street and Richmond Street).

Temporary Impacts to Access for Emergency/Service vehicles and Deliveries

Emergency vehicle access to properties adjacent to all downtown Ontario Line station sites will be maintained, except for the full road closure segment at Queen Station. Emergency vehicle routing impacts are expected as a result of the full closure of Queen Street between James Street and Victoria Street. Response times and typical routes will be similar for Paramedic Services Station 40, Fire Station 332, and Fire Station 333. The travel time to St. Michael's Hospital, from just west of the Queen Street closure (i.e., west of Bay Street), will be impacted, with an increased distance from 0.4 km to 0.8 km and a travel time increase from 2 minutes to 3 minutes.

Emergency services routes will also be impacted by intersection closures for the construction of the streetcar detour along York Street.

The closure of James Street to accommodate staging and laydown areas for the Queen Station construction will block inbound access to the Eaton Centre. To mitigate the impact on local access, Albert Street will be temporarily converted to two-way traffic to accommodate inbound movements, allowing vehicles to enter the area from the intersection of Bay Street with Albert Street.

At the intersection of King Street with Bathurst Street, access to the east-west alleyway approximately 35 metres north of King Street on the east side of Bathurst Street and the laneway itself will be closed during construction for staging and laydown area. This access is a private driveway which is part of the property where the King-Bathurst Station will be built.

Access to 650 King Street West will be maintained through the existing driveway of 648 King Street West. Access to the driveway on Stewart Street immediately east of the proposed Station building will be maintained.

Mitigation and Monitoring

The following mitigation measures are recommended to reduce the temporary impact of Ontario Line Station construction works on automobiles:

- Convert Albert Street to two-way traffic between Bay Street and James Street to provide access throughout the full closure of James Street.
- Update the traffic signal and traffic signs at the intersection of Bay Street with Albert Street for the conversion to two-way traffic. The need for providing a protected southbound left-turn phase will be evaluated if queuing is observed.
- Station traffic control persons at the intersection of James Street with Albert Street to mitigate conflicts between vehicles and pedestrians, and modify the south-west corner of the intersection to accommodate vehicular turnaround maneuvers.
- Optimize signal timings in Downtown Toronto along haul routes and key east-west corridors to accommodate the combined impacts of City of Toronto works (including the Gardiner Expressway Rehabilitation project) and Ontario Line station construction works.
- Provide clear advance warning signage to notify drivers of closures or detours.

It is recommended to monitor the operations at the intersection of Bay Street with Albert Street after the conversion of Albert Street to two-way traffic to identify the need for activation of the southbound left protected phase. Monitoring of the northbound left turn at King Street and Strachan Avenue is required to ensure that sufficient operations are maintained with the addition of construction vehicles.

The traffic conditions in the vicinity of the Queen Street closure will be monitored to ensure that robust access to and from Station 40 and St. Michael's Hospital is maintained.

5.1.2 Permanent Impacts to Existing Features

Permanent impacts adjacent to the Ontario Line stations were identified based on analysis of forecasted 2041 conditions. The detailed methodologies and analysis results can be found in the following Station Site Plan Review reports:

- Ontario Line Exhibition Station Site Plan Review – Transportation Impact Assessment, HDR, May 2021
- Ontario Line King-Bathurst Station Transportation Impact Study, HDR, April 2021
- Ontario Line Queen-Spadina Station Transportation Impact Study, HDR, April 2021
- Ontario Line Osgoode Station Site Plan Review – Transportation Impact Study, HDR, April 2021
- Ontario Line Queen-Yonge Station Transportation Impact Study, HDR, April 2021

- Ontario Line Moss Park Station Site Plan Review – Transportation Impact Study, HDR, April 2021
- Ontario Line Corktown Station Site Plan Review – Transportation Impact Study, HDR, April 2021

5.1.2.1 Pedestrians

Impacts

Construction of stations are expected to impact the pedestrian level of service at crosswalks and intersection corners at the following intersections:

- King Street and Bathurst Street
- Queen Street and Spadina Avenue
- Queen Street and Yonge Street
- Queen Street and University Avenue
- Queen Street and Sherbourne Street
- King Street and Berkeley Street
- King Street and Parliament Street
- Front Street and Berkeley Street
- Queen Street – between Simcoe Street and University Avenue

The construction of Liberty New Street will result in a new sidewalk between Dufferin and Strachan on both sides of the street. The 2041 pedestrian level of service analysis undertaken in the Exhibition Station Site Plan Review Transportation Impact Assessment identified poor conditions at the intersection of Liberty New Street and Atlantic Avenue on the north-east and north-west corners if all pedestrians attempt to queue directly on the corner area during the PM and event peak hours. It is expected that pedestrians waiting to cross from the north side of the intersection will spill back into the adjacent plaza areas in periods of high demand.

Exhibition Station will provide an additional connection across the rail corridor between Liberty Village and Exhibition Place.

The PATH corridor between Eaton Centre and The Bay will be widened permanently to accommodate increased demands due to transit. The PATH connection between 1 Queen Street East and 2 Queen Street East (on the east side of Queen Station) will be converted to a fare-paid area for Queen Station, which will eliminate the existing free passage.

The proposed station ventilation grates to be installed on the east sides of James Street for Queen Station and University Avenue for Osgoode Station may result in reduced pedestrian comfort on the facilities when crossing the grates. In addition, a ventilation tower will be located within the existing sidewalk at the northeast corner of the intersection of James Street and Queen Street W. To accommodate the ventilation infrastructure, the James Street curb will be realigned resulting in a wider sidewalk by approximately 5.75 metres.

Mitigation and Monitoring

The following measures may be considered to mitigate permanent impacts to pedestrians:

- Widen the crosswalk markings and make other adjustments to linework as required.
- Remove or relocate sidewalk furniture to accommodate pedestrian volumes and queueing at intersection corners. The location of any barriers or street furniture will be considered in the design of Exhibition Station to ensure adequate queueing space and flow are maintained.
- Relocate the westbound surface transit stop at King Street and Berkeley Street to reduce pedestrian volumes at this intersection and reduce the walking distance between surface transit stop and future station entrances.
- Signalize the intersections of Liberty New Street with Jefferson Avenue, Atlantic Avenue, and Dufferin Street to mitigate future pedestrian congestion during special events.
- Ventilation grates will be placed beside the paved portion of the sidewalks, flush with the sidewalks, with an available paved width of 3.0 metres and 2.8 metres between the grate edge and the edge of sidewalk at Queen Station and Osgoode Station, respectively, consistent with the existing clearway widths provided.

Further mitigation measures may be developed to improve the pedestrian level of service at the intersections adjacent to the Ontario Line stations if congestion is observed.

5.1.2.2 Cyclists

Impacts

Permanent station modifications will not impact cyclists' Level of Service (CLOS) along this segment of the Ontario Line. At Exhibition Station, a two-way cycle track will be provided between Dufferin Street and Strachan Avenue on the south side of Liberty New Street to create a new cycling connection.

The northbound bike lane on York Street can be maintained if the streetcar tracks are not removed following the reopening of Queen Street.

Mitigation and Monitoring

No mitigation or monitoring is required.

5.1.2.3 Transit

Impacts

Due to projected increases in transit ridership, worsening of the transit level of service at surface transit stops is expected at the following intersections:

- King Street and Bathurst Street

- Queen Street and Spadina Avenue
- Queen Street and Yonge Street
- Queen Street and University Avenue
- King Street and Parliament Street
- Front Street and Berkeley Street

Sidewalks and transit stops will be typically designed to current City of Toronto and TTC standards. However, reduced widths may be required due to existing constraints.

The westbound bus bay on Liberty New Street at Exhibition Station, between Atlantic Avenue and Jefferson Avenue, is expected not to have sufficient bus frequencies to accommodate the forecasted passenger demand during event peak hours, which would result in an accumulation of queued boarding passengers in the waiting area throughout the peak hour.

Permanent impacts for York Street as part of the York Street streetcar works include:

- New southbound streetcar tracks;
- Reduction to two northbound traffic lanes;
- Elimination of on-street parking between Adelaide Street and Richmond Street; and,
- A southbound sharrow between Queen Street and Richmond Street and a bike lane between Richmond Street and Adelaide Street.

The southbound streetcar tracks will accommodate the diversion of Route 501 during the full closure of Queen Street and will allow for increased flexibility and resiliency on the streetcar network after the construction of Queen Station has been completed.

Mitigation and Monitoring

To mitigate impacts to transit users and improve transit levels of service, increasing the surface transit stop areas through either the removal or relocation of sidewalk furniture and increasing surface transit frequency/capacity should be considered, where feasible. Station plazas will be included in the station design where appropriate and feasible.

Increased bus frequencies at Exhibition Station should be considered during special event periods when BMO (Bank of Montreal) Field and Budweiser Stage venues finish events at the same time to accommodate the additional transit demand.

Optimized signal timings will be required along York Street to account for the permanent change in configuration and travel patterns.

No monitoring of transit operations will be required beyond TTC's regular operational performance monitoring.

5.1.2.4 Automobiles

Traffic Impacts

Permanent station modification at the Ontario Line stations from Exhibition to Don Yard will result in impacts to traffic operations. At the following intersections listed in Table 5-1, traffic is forecast to operate at capacity or near capacity with significant delays and queuing during one or both peak hours.

Table 5-1. Summary of Impacted Intersections

At Capacity	Near Capacity
Dufferin Street and Liberty Street	Queen Street and University Avenue
King Street and Atlantic Street	Queen Street and Spadina Avenue
King Street and Dufferin Street	
Strachan Avenue and Fleet Street	
King Street and Bathurst Street	
Queen Street and Simcoe Street	
Dufferin Street and Liberty Street	

Left turn queues are anticipated to exceed available storage at Front Street and Parliament Street (westbound) and Queen Street and Sherbourne Street (northbound and southbound).

The number of traffic lanes on York Street will be reduced between Adelaide Street and Richmond Street.

The James Street curb realignment (narrowing of the roadway) near Queen Street will not have permanent impacts on the existing one-lane operations.

Parking Impacts

Parking spaces on James Street will be removed due to a proposed curb realignment to accommodate station ventilation on the sidewalk. Parking spaces on York Street between Richmond Street and Adelaide Street will be removed due to the conversion of York Street to a two-way operation.

Impacts to Access for Emergency/Service Vehicles and Deliveries

There are no permanent impacts to access for emergency/service vehicles or deliveries.

Mitigation and Monitoring

Signalization is proposed at the intersections of Liberty New Street with Atlantic Avenue and Jefferson Avenue to prevent significant spillbacks and delays at Atlantic Avenue and to ensure coordination and improved flow between the two intersections.

Mitigation to improve traffic operations at the intersections highlighted in Table 5-1, depending on the level of impact, may include:

- Optimize cycle lengths and phasing; and
- Increase cycle lengths.

Traffic operations should be monitored after opening day and signal timing optimization or installation of new signals should be applied based on actual field conditions to accommodate the future traffic demands and patterns.

While the queue storage exceedance is considered minor at Queen Street and Sherbourne Street and no mitigation is required, extending the westbound left turn lane to 55 metres at Front Street and Parliament Street may be considered by the City of Toronto.

Signal optimization will be required along York Street as well as updated signage and pavement marking to accommodate the change. No monitoring of automobile operations will be required.

5.1.3 Operations and Maintenance Impacts

5.1.3.1 Pedestrians

The increased pedestrian demands generated in the vicinity of Ontario Line stations may coincide with increased delays and worsened pedestrian levels of service for existing pedestrian trips that are not taking the Ontario Line.

No maintenance impacts to pedestrians are anticipated along this section of the Ontario Line.

5.1.3.2 Cyclists

The new cycling connection on the west side of York Street between Queen Street and Adelaide Street, introduced as part of the Queen Station construction transit detour, will require regular maintenance.

5.1.3.3 Transit

Once Liberty New Street is constructed between Dufferin Street and Strachan Avenue, the TTC will re-route bus routes 29, 929, 29A, and 63 to serve Exhibition Station.

Mitigation and Monitoring

Consultation with the TTC is recommended to establish a suitable mitigation strategy that will include public notification in advance of any potential service disruptions or modifications. No monitoring related to the transit network is anticipated to be required during operations.

5.1.3.4 Automobiles

Traffic signals along Liberty New Street, as well as the roadway itself, will have Operations and Maintenance implications, which will be the responsibility of the City of Toronto.

5.2 Don Yard to Gerrard Portal

5.2.1 Temporary Construction Impacts

5.2.1.1 Pedestrians

Temporary Impacts

There will be temporary sidewalk closures for works at Leslieville and Gerrard Stations. At Riverside/Leslieville Station, one sidewalk will be maintained. Pedestrians will be redirected to existing nearby signalized crosswalks. Sidewalk closures will occur on side streets near the station headhouses, i.e., on Strange Street and De Grassi Street. Pedestrian connectivity will be maintained.

In addition to the above long-duration sidewalk closures there will be weekend and occasional nighttime full roadway closures at Riverside/Leslieville Station which require the closure of both sidewalks.

At Gerrard Station, sidewalk closures on Carlaw Avenue in the immediate vicinity of the station headhouses are proposed. These sidewalks do not serve any pedestrian destinations during construction. A temporary traffic signal will be installed at the driveway of 469 Carlaw Avenue, as it will be the main driveway at the Gerrard Station and TBM site. The temporary traffic signal will feature signalized crosswalks to maintain pedestrian connectivity.

A weeklong full closure of the intersection of Gerrard Street and Carlaw Avenue will also be required for the construction of Gerrard Station. For a portion of this closure, all sidewalks will be closed as well.

Mitigation and Monitoring

Mitigation measures will include public information campaigns to reduce the number of pedestrians and shuttle buses. Additional mitigation measures will be evaluated if non-compliance with sidewalk closures is observed.

The temporary traffic signal will mitigate traffic operations and safety concerns at the Gerrard TBM site.

5.2.1.2 Cyclists

Temporary Impacts

Impacts of construction on cyclists will be due to closing westbound and eastbound curb lanes on Queen Street and the westbound curb lane on Gerrard Street. In consequence, cyclists will have to ride in the inside traffic lane.

There is a safety concern regarding cyclists riding on traffic lanes with streetcar tracks. However, a minimum clearance between streetcar tracks and temporary concrete barriers of 1 metre will be maintained.

Full roadway closures on Queen Street, Carlaw Avenue, and Gerrard Street noted above will also impact cyclists.

Mitigation and Monitoring

Safety concerns are mitigated by providing a 1m object-free zone adjacent to streetcar tracks.

Public information strategies will be developed to mitigate full roadway closures on Queen Street, Carlaw Avenue, and Gerrard Street.

5.2.1.3 Transit

Temporary Impacts

Construction at Gerrard Station will impact routes 72 and 325 on Carlaw Avenue, as the northbound bus stop located just north of Gerrard Street will be relocated to the south of Gerrard Street. The Gerrard streetcar (routes 306 and 506) will be discontinued during the weeklong full closure of the intersection of Gerrard Street with Carlaw Street, and replacement bus services will be provided around the closure site. Removal of the streetcar overhead catenary system (OCS) is expected to be required.

Construction at Riverside/Leslieville Station will impact streetcar routes 501, 503, and 301 on Queen Street East.

Lane closures are expected to cause additional delays due to reduced roadway capacity. Full roadway closures will result in temporary discontinuation of streetcar operation and bus detours around the closure area.

Mitigation and Monitoring

Notification of the public will be required to mitigate impacts to transit riders for full roadway closures. Additional mitigation measures will be developed if operational concerns are observed, as appropriate.

No monitoring is required beyond TTC's regular operational performance monitoring.

5.2.1.4 Automobiles

Temporary Traffic Impacts

As noted above, temporary lane and full road closures will occur at Gerrard Station and Riverside/Leslieville Station. Side roads at Riverside/Leslieville Station, i.e., Strange Street and De Grassi Street, may be reduced in width or occasionally fully closed.

Due to TBM operation, up to six hundred (400) construction vehicles are expected to access the Gerrard Portal site per day.

Delivery of large structural steel elements for the Gerrard Station truss structure is expected to result in nighttime traffic impacts along the haul route due to the size of the vehicle. Hauling of excavated soil and building materials may result in increased delays and travel times along designated haul routes.

Temporary Parking Impacts

Temporary closure of on-street parking is expected on Strange Street and De Grassi Street in the vicinity of the station headhouses.

Temporary Impacts to Access for Emergency/Service Vehicles and Deliveries

There are no temporary impacts to access for emergency/service vehicles and deliveries along this segment.

Mitigation and Monitoring

The following mitigation measures are recommended to reduce the impact of Ontario Line Station construction works on automobiles:

- Traffic and advance notification signage are recommended to be installed for full closures of arterial roadways, and advance public notice is recommended to advise road users of alternative routes.
- Coordination of lane closures between Eastern Avenue and Gerrard Street is recommended to mitigate traffic impacts.
- Modification of traffic signal timing plans in this network area to suit construction conditions and haul routes should be considered.
- A temporary traffic signal will be provided on Carlaw Avenue to the north of Gerrard Street, as this location will be the main construction access/egress for the Gerrard Portal site.

5.2.2 Permanent Impacts to Existing Features

5.2.2.1 Pedestrians

Impacts

The pedestrian clearway under Queen Street grade separation will be widened to comply with the City of Toronto and TTC design standards. This increase is expected to improve pedestrian LOS.

Mitigation and Monitoring

No mitigation or monitoring is required for permanent impacts to pedestrians.

5.2.2.2 Cyclists

No permanent impacts to cyclists are expected.

Mitigation and Monitoring

No mitigation or monitoring is required, as there are no permanent impacts to cyclists.

5.2.2.3 Transit

Impacts

Permanent impacts to Gerrard Station and Riverside/Leslieville Station include increased TTC ridership due to OL transfers. This could potentially lead to longer dwell times but will not impact the transit routes.

Sidewalks and transit stops will be typically designed to current City of Toronto and TTC standards. However, reduced widths may be required due to existing constraints.

Mitigation and Monitoring

Measures to mitigate the increased demand should be coordinated with TTC. Station plazas will be included in the station design where appropriate and feasible.

No monitoring is required beyond TTC's regular operational performance monitoring.

5.2.2.4 Automobiles

Traffic impacts

Gerrard Station and Riverside/Leslieville Station will have no permanent impacts on traffic operations.

Parking Impacts

There will be permanent loss of some on-street parking spaces on De Grassi Street near the Riverside/Leslieville Station north building, and potentially on Strange Street as well near the south building.

Impacts to Access for Emergency/Service Vehicles and Deliveries

No changes to emergency services access are expected.

Mitigation and Monitoring

No mitigation or monitoring is required for permanent impacts to automobiles.

5.2.3 Operations and Maintenance Impacts

5.2.3.1 Pedestrians

No operations and maintenance impacts to pedestrians are anticipated along this section of the Ontario Line.

5.2.3.2 Cyclists

No operations and maintenance impacts to cyclists are anticipated along this section of the Ontario Line.

5.2.3.3 Transit

No operations and maintenance impacts to transit are anticipated along this section of the Ontario Line.

5.2.3.4 Automobiles

No operations and maintenance impacts to traffic are anticipated along this section of the Ontario Line.

5.3 Gerrard Portal to Minton Place Portal

5.3.1 Temporary Construction Impacts

5.3.1.1 Pedestrians

Temporary Impacts

Sidewalk closures are expected to be required along several local streets:

- Minton Place (north of Hopedale Avenue)
- Hopedale Avenue (east of Minton Place)

- Pape Avenue (south of Langley Avenue)
- Gertrude Place/Muriel Avenue (intersection)
- Lipton Avenue

At the TTC's existing Pape subway station and bus loop there will be temporary modifications to access and egress locations.

In addition, sidewalk closures are expected for utility relocations just north of the Gerrard portal on Langley Avenue, Riverdale Avenue, Pape Avenue, and Carlaw Avenue.

Mitigation and Monitoring

Signage and advance notification are recommended to notify station users of any detours. Transit passengers may have to use the traffic signal at Pape Avenue/Lipton Avenue to cross and access potential temporary bus stops on the west side of Pape Avenue. Monitoring is recommended for the temporary stops.

5.3.1.2 Cyclists

Temporary Impacts

Impacts to cyclists during construction have not been confirmed yet.

Mitigation and Monitoring

Mitigation and monitoring are to be determined once impacts are confirmed.

5.3.1.3 Transit

Temporary Impacts

Existing transit services will be maintained throughout this segment. However, traffic lane reductions may result in transit delays.

Bus stops at the intersection of Pape Avenue and Cosburn Avenue (route, 25A and B, 81, 325, 325S, and 925) are expected to be relocated where Pape Avenue is reduced to 1 traffic lane per direction.

During SOE construction and excavation within the Cosburn Avenue right-of-way, traffic lanes will be closed. Buses will have to detour until a temporary road deck has been installed. SOE refers to the temporary shoring systems used to stabilize deep excavation sites, thereby minimizing excavation areas and mitigating ground disturbances at adjacent properties.

The bus loop at TTC's existing Pape subway station will be impacted due to construction, as noted above. The number and location of bus bays are expected to be modified. The roadway connectivity of the bus loop is still being evaluated.

Bus route detours and relocation of bus stops will be required for utility relocations just north of the Gerrard portal on Riverdale Avenue and Carlaw Avenue.

Mitigation and Monitoring

TTC buses may be proposed to stop on the curb lane on Pape Avenue north of Lipton. No monitoring is required beyond TTC's regular operational performance monitoring.

5.3.1.4 Automobiles

Temporary Traffic Impacts

Lane closures on Bain Avenue, Gowan Avenue, Gamble Avenue, Pape Avenue, Lipton Avenue, Minton Place, and Hopedale Avenue will impact traffic operations.

Full closure of the traffic lanes on Cosburn Avenue just west of Pape Avenue will be required for excavations within the roadway.

Lane width reductions are anticipated on local roads including Bain Avenue, Gowan Avenue, Gamble Avenue, Gertrude Place, and Lipton Avenue.

Lane and road closures will be required for utility relocations just north of the Gerrard portal on Langley Avenue, Riverdale Avenue, Pape Avenue, and Carlaw Avenue.

Hauling of excavated soil and building materials may result in increased delays and travel times along designated haul routes.

Temporary Parking Impacts

Public Green P parking lots at Pape Station will be closed during construction.

On-street parking on Gowan Avenue, Gamble Avenue, Gertrude Place, Pape Avenue, Hopedale Avenue and Minton Place will be impacted due to lanes closures. Mitigation opportunities, e.g., replacement of residential on-street permit parking, are still being evaluated. No monitoring is required.

On-street parking spaces will be closed due to the utility relocations just north of the Gerrard portal on Langley Avenue, Riverdale Avenue, Pape Avenue, and Carlaw Avenue.

Temporary Impacts to Access for Emergency/Service Vehicles and Deliveries

Lane closures on Pape Avenue will impact access for emergency/services vehicles and deliveries, particularly due to potentially increased delays. Alternative access to properties may be required, where traffic lanes of Pape Avenue are realigned to facilitate excavation at the Sammon crossover.

Mitigation and Monitoring

The following mitigation measures are recommended to reduce the impact of Ontario Line Station construction works on automobiles:

- Installation of traffic and advance warning signage where appropriate.
- Advance notification of closures to nearby residents and businesses.
- Signage and advance notice to transit customers and other users of the parking lots are recommended. Alternative parking spaces should be provided to accommodate the loss of parking. No monitoring is required.
- Signage and advance notification of lane closures to nearby residents and businesses.
- Modification of traffic signal timing plans in this network area to suit construction conditions and haul routes should be considered.

5.3.2 Permanent Impacts to Existing Features

5.3.2.1 Pedestrians

Impacts

The construction of Pape Station will result in permanent changes to pedestrian circulation patterns near the station due to the modification of the bus loop. The bus loop will be closed for regular service except for WheelTrans, requiring some transit riders transferring between the subways (Ontario Line and TTC's Line 2) and TTC's surface routes to exit the Pape Station headhouse and walk to the bus stop. A signalized crosswalk is located near Pape Station to facilitate safe pedestrian crossing opportunities.

The construction of the Emergency Egress Building on Bain Avenue and the Sammon Avenue Crossover will not result in permanent impacts to pedestrians.

5.3.2.2 Cyclists

Works within this segment will not result in permanent impacts to cyclists.

5.3.2.3 Transit

Impacts

Permanent transit impacts at Pape Station include the future bus loop layout. Locations are to be determined; however, no mitigation or monitoring will be required.

The construction of the Emergency Egress Building on Bain Avenue, the Sammon Avenue Crossover, and the Minton Portal will not result in permanent impacts to transit.

Sidewalks and transit stops will be typically designed to current City of Toronto and TTC standards. However, reduced widths may be required due to existing constraints.

Mitigation and Monitoring

Station plazas will be included in the station design where appropriate and feasible.

No monitoring is required beyond TTC's regular operational performance monitoring.

5.3.2.4 Automobiles

Traffic Impacts

The construction of the Emergency Egress Building on Bain Avenue, the Sammon Avenue Crossover, and the Minton Portal will not result in permanent impacts to traffic operations.

Parking Impacts

There are no permanent impacts to parking along this segment.

Impacts to Access for Emergency/Service Vehicles and Deliveries

No changes to emergency services access are expected.

5.3.3 Operations and Maintenance Impacts

5.3.3.1 Pedestrians

No operations and maintenance impacts to pedestrians are anticipated along this section of the Ontario Line.

5.3.3.2 Cyclists

No operations and maintenance impacts to cyclists are anticipated along this section of the Ontario Line.

5.3.3.3 Transit

No operations and maintenance impacts to transit are anticipated along this section of the Ontario Line.

5.3.3.4 Automobiles

No operations and maintenance impacts to traffic are anticipated along this section of the Ontario Line.

5.4 Minton Place Portal to Science Centre

5.4.1 Temporary Construction Impacts

5.4.1.1 Pedestrians

Temporary Impacts

During construction of Science Centre Station, pedestrian demand is anticipated to increase at the sidewalk level due to the operation of Eglinton Crosstown LRT

Full closure of Beth Nealson will result in the closure of both sidewalks at that location. Mitigation measures are still being evaluated.

The pedestrian connection between Overlea Boulevard and Banigan Drive will be moved from Thorncliffe Park Drive to accommodate pedestrians during the construction of the OMSF.

Mitigation and Monitoring

Mitigation and monitoring are not required for anticipated demand increase at sidewalk level due to the operation of Eglinton Crosstown LRT. However, mitigation measures are still being evaluated for the full closure of Beth Nealson.

5.4.1.2 Cyclists

Temporary Impacts

Cyclists may be impacted by lane closures, due to an increase in traffic volumes in the remaining traffic lanes.

Cyclists will also be impacted for works in the vicinity of bike trails in the Don Valley and south of the Science Centre. Trails will remain open, but there will be temporary intersections of trails with construction access roads. In addition, short-duration full closures of trails during the erection of bridge superstructure elements are anticipated.

Mitigation and Monitoring

Widening of trails is proposed where access roads will be co-located with trails.

Implementation of trail widening will also impact trail operation, but trails will remain open to trail users.

5.4.1.3 Transit

Temporary Impacts

Construction of Science Centre Station will temporarily impact the existing bus loop at Don Mills Road and Eglinton Avenue. Coordination with TTC is recommended to reduce operational impacts and installation of signage to advise transit users of any changes.

Construction of the OMSF will result in the re-routing of route 88A due to the closure of Beth Neilson Drive for 1.5 years from Pat Moore Drive to South of Tremco access.

Mitigation and Monitoring

Coordination with TTC is recommended to develop temporary rerouting and identify temporary stop relocations during any closures.

No monitoring is required beyond TTC's regular operational performance monitoring.

5.4.1.4 Automobiles

Temporary Traffic Impacts

Lane closures on Millwood Road, Overlea Boulevard, Don Mills Road, and Eglinton Avenue will temporarily impact traffic operations.

Weekend full closures will be required on Millwood Road (at Overlea Boulevard), Don Mills Road (south of Eglinton Avenue), and Eglinton Avenue (east of Don Mills Road) for the erection of bridge superstructure.

A full road closure of Beth Neilson Drive is required for 1.5 years, from Pat Moore Drive to South of Tremco Access, which will impact traffic operations.

There will be northbound off-peak lane closures on the Don Valley Parkway for works at the Minton Portal, such as slope stabilization. Weekend full closures of the Don Valley Parkway will be required for the erection of the bridge superstructure.

The connection between Banigan Drive and Thorncliffe Park Drive will be closed. A new Banigan Road extension, which will connect with Overlea Boulevard in the vicinity of the intersection with Leaside Park Drive, will be provided.

Hauling of excavated soil and building materials may result in increased delays and travel times along designated haul routes.

Temporary Parking Impacts

Parking lots of the Science Centre will be impacted by the construction of the Flemington Park Station and of the guideway (piers and superstructure).

Temporary Impacts to Access for Emergency/Service Vehicles and Deliveries

As noted above, a full closure of Beth Neelson Drive will require an access plan for the duration of construction to mitigate impacts to access for emergency/service vehicles and deliveries.

Mitigation and Monitoring

The following mitigation measures are recommended to reduce the impact of Ontario Line Station construction works on automobiles:

- Install traffic and advance notification signage where appropriate and provide advance notification of lane closures to nearby residents and businesses.
- Modification of traffic signal timing plans in this network area to suit construction conditions and haul routes should be considered.
- An access plan should be developed for the duration of construction.

5.4.2 Permanent Impacts to Existing Features

5.4.2.1 Pedestrians

Impacts

Permanent impacts to pedestrians at Thorncliffe Station include the realignment of the sidewalk along the north side of Overlea Boulevard due to conflicts with the future elevated guideway structure. Realignment will occur to the south sidewalk on Overlea Boulevard due to the implementation of bicycle lanes and reconfiguration of intersections between Millwood Road and Thorncliffe Park Drive. Pedestrian circulation on the north side of Overlea Boulevard will improve due to the sidewalk realignment. Sidewalk realignment will also occur at Science Centre Station and Flemingdon Park Station, improving pedestrian circulation. A new multi-use trail will be implemented on the west side of Don Mills Road within the project limits. Any newly constructed or reconstructed sidewalks will meet the City's minimum design width requirements.

The new connection between Banigan Drive and Overlea Boulevard will be maintained after the completion of the OMSF construction, providing an additional permanent connection for pedestrians.

Mitigation and Monitoring

No mitigation or monitoring is required.

5.4.2.2 Cyclists

Impacts

Cycle tracks will be provided on both sides of Overlea Boulevard, from Millwood Road to the east of Thorncliffe Park Drive, and a new multi-use trail will be introduced on the west side on Don Mills Road within the project limits.

Mitigation and Monitoring

No mitigation or monitoring is required.

5.4.2.3 Transit

Impacts

Permanent impacts to Thorncliffe Station include the provision of a bus loop and an increase in bus traffic on Thorncliffe Park Drive and at the intersection with Overlea Boulevard.

Sidewalks and transit stops will be typically designed to current City of Toronto and TTC standards. However, reduced widths may be required due to existing constraints.

Mitigation and Monitoring

Mitigation measures are still being evaluated as part of the design development. Station plazas will be included in the station design where appropriate and feasible.

No monitoring is required beyond TTC's regular operational performance monitoring.

5.4.2.4 Automobiles

Traffic Impacts

Traffic lanes of Don Mills Road will be realigned due to the construction of Flemington Park Station; however, this will have no permanent impact on traffic operations.

Permanent impacts to Thorncliffe Station include additional bus traffic on Thorncliffe Park Drive and the intersection with Overlea Boulevard. In addition to the transit impacts, additional bus traffic will impact traffic operations. The proposed new road connection between Banigan Drive and Overlea Boulevard, located east of Leaside Park Drive, will be maintained after the completion of the OMSF construction, providing a permanent link for automobiles, goods movement, and active transportation.

Parking Impacts

There will be a permanent reduction in the number of parking spaces at the Science Centre.

Impacts to Access for Emergency/Service Vehicles and Deliveries

No changes to emergency services access are expected.

Mitigation and Monitoring

It is recommended to consider updating signal timing to accommodate demand changes. Monitoring is not required.

5.4.3 Operations and Maintenance Impacts

5.4.3.1 Pedestrians

No operations and maintenance impacts to pedestrians are anticipated along this section of the Ontario Line.

5.4.3.2 Cyclists

No operations and maintenance impacts to cyclists are anticipated along this section of the Ontario Line.

5.4.3.3 Transit

No operations and maintenance impacts transit are anticipated along this section of the Ontario Line.

5.4.3.4 Automobiles

No operations and maintenance impacts to traffic are anticipated along this section of the Ontario Line.

6 Permits and Approvals

A range of municipal permits and approvals may be required for the Project, particularly as pertaining to municipally owned lands and infrastructure.

Metrolinx will co-ordinate with the City of Toronto and Toronto Parking Authority for transportation-related permits and approvals (e.g., street occupation permit) prior to construction, as required.

Metrolinx, as a Crown Agency of the Province of Ontario, is exempt from certain municipal processes and requirements. In these instances, Metrolinx will engage with the City of Toronto to incorporate municipal requirements as a best practice, where practical, and may obtain associated permits and approvals.

Metrolinx shall continue to communicate and engage with the City of Toronto during detailed design and construction planning to address municipal concerns.

7 Summary and Conclusions

Potential impacts to traffic operations and all modes as a result of the Ontario Line have been assessed. Potential temporary and permanent impacts are presented in Appendix B.

7.1 Exhibition to Don Yard

Throughout the Downtown segment pedestrians, transit, and traffic operations are anticipated to experience various levels of permanent impacts, e.g., higher auto delays or increased pedestrian volumes. Mitigation will be required to accommodate increased pedestrian demand to provide sufficient sidewalk capacity and space for transfers between surface transit and Ontario Line. Roadway impacts are minimal as vehicles may encounter longer delays while making right turns (where permitted) at intersections adjacent to stations with increased pedestrians.

To service Exhibition Station, Liberty New Street will be constructed. Traffic signals at the intersections of Liberty New Street with Dufferin Street, Atlantic Avenue, and Jefferson Avenue will facilitate pedestrian, transit, and traffic operations. A new multi-use path will be provided along Liberty New Street between Dufferin Street to Strachan Avenue.

7.2 Don Yard to Gerrard Portal

From Don Yard to Gerrard Portal, permanent impacts to pedestrians and cyclists include improvements to the existing sidewalks and pathways. No mitigation or monitoring is required. There will be increased TTC ridership due to OL transfers at East Harbour Station. Traffic operations along this segment will not be impacted.

7.3 Gerrard Portal to Minton Place Portal

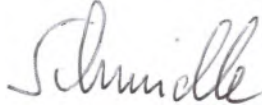
From Gerrard Portal to Minton Place Portal, minor permanent impacts to pedestrians and transit, e.g., at Pape Station, are not anticipated to require mitigation or monitoring.

7.4 Minton Place Portal to Science Centre

From Minton Place Portal to Science Centre, permanent improvements to pedestrians and cyclists will include the provision of multi-use paths along the west side of Don Mills Road, cycle tracks on Overlea Boulevard within the project limits, and widening sidewalks along Overlea Boulevard and Don Mills Road. Mitigation or monitoring will not be required. Additional bus traffic on Overlea Boulevard and Thorncliffe Park Drive will have impacts on transit and traffic operations. Signal optimization may be required to accommodate new demand.

Sign-Off Sheet

This document entitled Transportation and Traffic Analysis Report was prepared by HDR Inc. and its end client Metrolinx. The material in it reflects HDR's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between HDR and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not consider any subsequent changes. In preparing the document, HDR did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that HDR shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 
(signature)

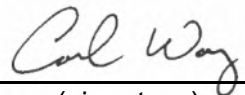
Stephan Schmidle, P.Eng
Traffic Management Lead

Prepared by 
(signature)

Martin Kaczmarek, P.Eng, PTOE
Project Engineer

Reviewed by 
(signature)

Laura Chong, MCIP, RPP
Project Coordinator

Approved by 
(signature)

Carl Wong, P.Eng
Corridor Wide Traffic Lead

Appendix A. Summary of Relevant Planning Documents

Provincial, regional, and municipal planning documents, by the City of Toronto and Metrolinx provide the planning context for the Ontario Line. The following is a list of relevant background information that has been reviewed as part of this report.

Provincial And Regional Policies:

- The Provincial Policy Statement
- 2041 Regional Transportation Plan
- The GO Expansion Program / SmartTrack Stations Program
- 2015 Yonge Relief Network Study
- Ontario Line Initial Business Case
- Ontario Line Preliminary Design Business Case
- GTHA Fare Integration Draft Preliminary Business Case
- New Subway Plan for the Greater Toronto Area

Municipal Policies:

- City of Toronto Official Plan
- City of Toronto Ten Year Capital Plan (2022)
- ActiveTO
- Toronto Ten Year Cycling Network Implementation Plan

Official Plan Amendments

- TOcore and the Downtown Plan
- Official Plan Amendment 469
- Laird in Focus Official Plan Amendment

Master Plans

- NEXT Place Master Plan Final Report
- Lower Don Trail Master Plan
- Don Valley Corridor Transportation Master Plan (2005)

Secondary Plans

- Port Lands Planning Framework
- King Spadina Secondary Plan

- King-Parliament Secondary Plan
- Queen-River Secondary Plan
- Unilever Precinct Secondary Plan

Environmental Assessments and Planning Studies

- Liberty New Street Municipal Class Environmental Assessment
- yongeTOMorrow
- Gardiner Expressway Environmental Assessment
- Broadview Extension EA
- Broadview and Eastern Flood Protection EA
- Port Lands & South of Eastern Transportation and Servicing Master Plan and EA
- Gardiner Expressway and Lakeshore Boulevard East Reconfiguration EA and Urban Design Study

Other Studies

- TTC 5-Year Service Plan & 10-Year Outlook
- Smart Track
- Downtown Transportation Operations Study
- Waterfront Transit Network
- Waterfront West LRT
- Waterfront East LRT
- King Street Transit Priority Corridor
- Gerrard-Carlaw Planning Study
- Laird in Focus Urban Design Guidelines
- Laird in Focus Final Report
- Eglinton Crosstown Light Rail Transit
- EGLINTONconnects Planning Study
- Improving the Esplanade

Provincial and Regional Policies:

Provincial Policy Statement

The Provincial Policy Statement, 2020, provides high level direction on land use planning and development in Ontario. Key directions related to the Ontario Line include:

- Build strong, healthy communities by encouraging density and land uses which support active transportation, are transit-supportive, and freight-supportive;
- Plan for safe, energy efficient, transportation systems that move people and goods;
- Integrate transportation and land use considerations at all stages of the planning process;
- Use TDM strategies to maximize efficiency; and
- Plan for a land use pattern, density, and mix of uses to minimize length and number of vehicle trips, support current and future use of transit and active transportation.

2041 Regional Transportation Plan

The 2041 Regional Transportation Plan (RTP) was completed by Metrolinx in 2018 as an update to the first RTP, *The Big Move*, which was completed in 2008.

GO Expansion Program / SmartTrack Stations Program

The GO Expansion Program led by Metrolinx, aims to transform the GO Transit rail network into a system that will deliver two-way, all-day service every 15 minutes over core segments of the GO Rail network. System-wide infrastructure upgrades will include: adding tracks, expanding stations, electrification of the rail network, new locomotives and train control systems to enable more frequent service.

The SmartTrack Stations Program is a collaboration between Metrolinx and the City of Toronto, which includes five new stations along existing GO rail Corridors within Toronto. In conjunction with the GO Expansion Program, SmartTrack will transform heavy rail infrastructure in Toronto from a regional commuter service into an urban rapid transit network.

Yonge Relief Network Study

The 2015 Yonge Relief Network Study (YRNS) led by Metrolinx explored a broad range of potential solutions to address the problem of overcrowding on Line 1. The study

concluded that a high capacity transit solution in the east end of Toronto will be needed to provide long term relief to Line 1.

Based on a future (post-2031) need for crowding relief on Line 1, the YRNS concludes that continued development and analysis of potential subway options along the north-eastern corridor should be undertaken. Based on the YRNS evaluation, a Relief Line subway option may provide relief post-2031, with an extension to Line 4 at Don Mills providing longer term relief and a complete transit network. Key considerations which should be included in the development of the project include the rate of population and employment growth, impact of fare integration on GO Expansion’s ability to relieve congestion on Line 1, impact of new transit projects above those included in the YRNS base case, and crowding impacts at Bloor-Yonge Station.

Ontario Line Initial Business Case

Metrolinx developed an Initial Business Case (IBC) in 2019 which evaluated the performance of the Ontario Line and Relief Line South compared to a Business as Usual (BAU) scenario as the basis for an investment decision. The BAU assumes that “In Delivery” projects from the *2041 Regional Transportation Plan* are in service, as modified by Ontario’s Transit Plan, and that reasonable improvements to existing surface transit as well as signalling improvements to Line 1 are delivered. **Figure 1** illustrates the options that were considered in the IBC.



Figure 1: Options Considered in IBC (2019)

This Initial Business Case recommended advancing design of the Ontario Line option over the Relief Line.

Ontario Line Preliminary Design Business Case (PDBC)

Metrolinx prepared a PDBC in follow up to the IBC released in 2019. The PDBC compares two operating options, illustrated in **Figure 2**, using an optimized Ontario Line Alignment in order to:

- Present an updated Ontario Line alignment and corresponding service plans that were developed through the preliminary design process; and
- Review the benefits and costs of the revised Ontario Line and compare them to the IBC performance.



Figure 2: Ontario Line PDBC alignment compared to the IBC alignment

The result of this planning and development work is an optimized subway that is forecast to:

- serve up to 388,000 trips each weekday and divert up to 6,000 travelers from Line 1 during the busiest hour of the day, freeing up capacity for other travelers;

- make travel times faster and more predictable – the Ontario Line will save travelers seven minutes per trip on average and also make the Toronto transportation network more integrated and resilient to disruption;
- support urban development and improved access - the Ontario Line connects underserved communities and areas planned for further development by leveraging rail corridors and making use of new tunnels and structures; and
- generate at least \$9.9 to \$11.3 billion in economic benefit for the City of Toronto and the GTHA as a whole, with an expected BCR of 1.05 – meaning for every dollar spent the region will benefit by up to \$1.05.

The following overall conclusions are drawn from the PDBC and IBC comparison:

- overall Ontario Line performance in the Strategic and Economic cases has improved since the IBC – the application of benefits management throughout the planning process has augmented key benefits (such as travel time savings);
- benefits were augmented by improving end to end travel times and optimizing stations for ease of access, egress, and integration with urban form – these changes resulted in quicker trips and reduced crowding across the network;
- costs were minimized and key risks were mitigated throughout the preliminary design and key technical stakeholders engagement process – across the Economic Case and Financial the PDBC costs are either close or below the ‘low end’ estimate presented in the IBC;
- while the PDBC makes use of revised land use forecasts that are in general more conservative than IBC forecasts (which would typically result in lower ridership and benefits) and does not include GO-TTC fare integration, the improved runtimes included in both options generate a comparable level of ridership compared to the IBC;
- the Financial Case notes overall improvements to the financial efficiency of the project – both capital costs and operating costs have been optimized which has resulted this results in a project with a more manageable net financial impact and greater revenue to operating cost ratio; and,
- the PDBC development and preliminary design process has generated a more cost-effective Ontario Line with increased benefits, as is

evidenced by the higher range of BCRs in the PDBC (1.05 compared to 0.76 to 0.88) and higher total benefits.

GTHA Fare Integration Draft Preliminary Business Case

The GTHA Fare Integration Draft Preliminary Business Case evaluated four concepts for fare integration and through an Initial Business Case published by Steer Davies Gleave, in September 2017. The four concepts for fare integration as are follows:

- **Concept 1 Modified Status Quo:** this concept would address issues with the existing transfer policies by omitting double fares and would implement fares by distance for GO Transit.
- a. **Concept 1b Modified Status Quo with Additional Fare by Distance:** in addition to Concept 1, Concept 1b would also implement fares by distance to rapid transit.
 - **Concept 2 Zones:** this concept would create geographic zones across the GTHA and set fares for each zone.
 - **Concept 3 Hybrid:** a combination of the previous concepts, the hybrid fare system would implement flat fares to local transit and fares by distance to rapid transit and GO Transit.
 - **Concept 4 Fare by Distance:** this concept would implement fares by distance at all levels and would remove all transfer fares.

Metrolinx announced plans along with the provincial government to investigate expanding the then implemented Discount Double Fare Program to TTC-905 Transit Agency Transfers. In March 2020, the Discount Double Fare Program was ended between TTC and Metrolinx. The program exceeded its budget in each year it was operating, signaling strong uptake. Despite the end to the Discount Double Fare program, reductions in short distance GO Transit fares implemented during the previous period weremaintained.

New Subway Plan for the Greater Toronto Area

In April 2019, the Province of Ontario announced four new subway projects to be funded by the province and are illustrated in **Figure 1-1**:

1. The Ontario Line
2. The Yonge North Subway Extension
3. The Scarborough Subway Extension
4. The Eglinton Crosstown West Extension

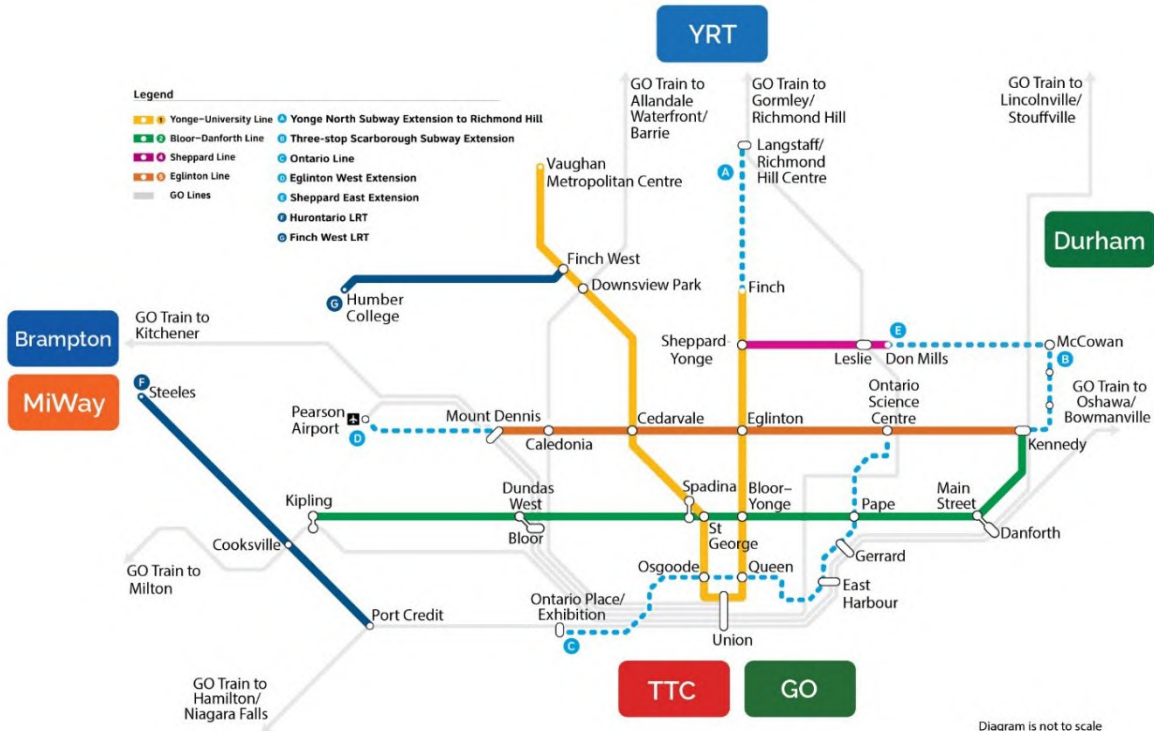


Figure 1-1: Proposed subway network as part of April 2019 Provincial announcement

The Province has advanced several legislative changes and agreements to support the delivery of the four Priority Transit Projects including:

- *Getting Ontario Moving Act (2019)* – transfers responsibility for new subway projects to the province
- *Ontario-Toronto Transit Partnership Preliminary Agreement (2020)* – defines roles and responsibilities between the Province and City of Toronto
- *Building Transit Faster Act (2020)* – enabling legislation giving the province additional powers to expedite delivery of the Priority Transit Projects
- *Memorandum of Understanding (2020)* – an agreement with select utility companies on coordinating utility works for the Priority Transit Projects
- *Ontario-York Region Transit Partnership Preliminary Agreement (2020)* – defines roles and responsibilities in the delivery of the Yonge North Subway Extension

Ontario Rebuilding and Recovery Act, 2020 – proposes amendments to the *Building Transit Faster Act* and *Transit-Oriented Communities Act*, providing the province with regulation-making authority to streamline project delivery and accelerate the completion of other provincial transit project across the GTA.

Municipal Policies

City of Toronto Official Plan

The *City of Toronto Official Plan (2015 Office Consolidation)* guides development and infrastructure decisions on policy matters such as land use, built form, transportation, and the environment. It articulates visions and principles related to city-building, environmental, social, cultural, and economic considerations.

Urban Structure

At the broadest level, the Official Plan sets out a high-level Urban Structure for the city, with the intention of establishing a framework for the integration of land use and transportation planning. The OP directs growth to areas that are best served by transit, and specifically to districts defined as the *Downtown and Central Waterfront*, *Centres*, *Avenues* and *Employment Districts*, which are located throughout the study area. New development in these areas will be compact, dense, and integrated with the transportation network.

The OP recognizes that fully three quarters of Toronto's land area is devoted to neighbourhoods, parks, ravines, water courses and valleys. These are areas that are to remain relatively stable and that will see little physical change. Within the Ontario Line study area between Exhibition and Don Yard, this planned stability applies to a considerable amount of the land beyond the *Downtown and Central Waterfront* and outside of the main corridors that are defined as *Avenues*. The station area and alignment planning for the Ontario Line considers potential implications for these stable areas and attempts to limit the impacts of the Ontario Line construction and operations on these areas, and to site stations within areas that are suited to higher levels of activity and associated development. The OP Urban Structure is illustrated in **Figure 3**.

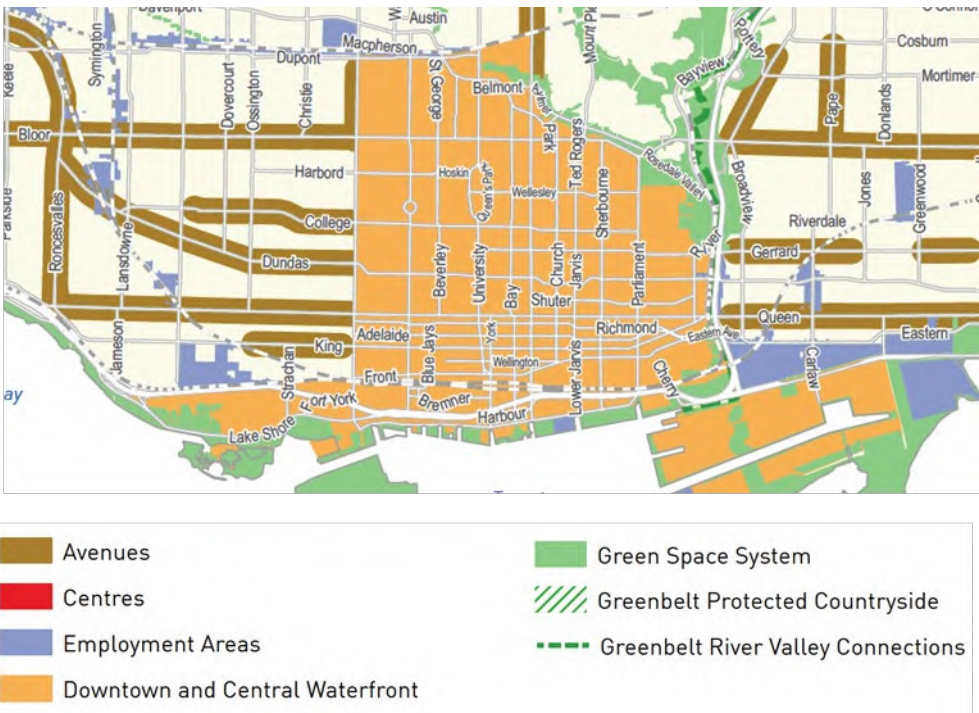


Figure 3: City of Toronto – Urban Structure

Land Use Plan

The Official Plan’s land use designations are tools to implement the objectives of directing growth to some areas while maintaining the stability of other areas. Each land use designation provides general policies for the permitted uses within it. Some OP land use designations define areas that are intended to reinforce existing physical character. These include *Neighbourhoods*, *Apartment Neighbourhoods*, and *Parks and Open Space Areas*. Other Official Plan land use designations define areas for growth. These include *Mixed-Use Areas*, *Regeneration Areas*, and *Employment Areas*.

Growth-oriented land use designations are generally more prevalent within the southern portions of the study area. The majority of *Mixed-Use Areas*, *Regeneration Areas*, and *Employment Areas* are south of Queen Street. Downtown currently has the highest densities of the study area but offers limited opportunities for growth due to the existing built-up context, as does the northern portion of the study area, where most areas are designated as stable residential *Neighbourhoods*. Based on the OP’s land use and urban structure policies, there is greater potential for enhanced transit service to guide growth, support increased densities, and generate transit ridership to the southern and eastern portions of the study area. The OP Land Use Plan is illustrated in **Figure 4**.

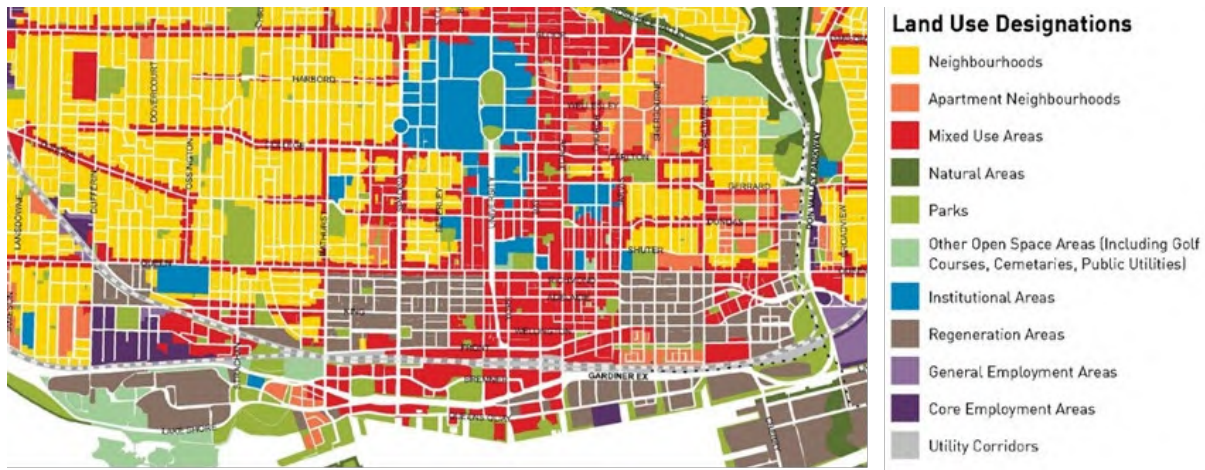


Figure 4: City of Toronto - Land Use Plan

Transportation Policies

One of the main city-building objectives in the Official Plan (OP) is to increase transit mode share relative to the use of automobile. It encourages improvements to the public transit system (e.g. subway extensions, rapid transit services) to achieve a high level of transit accessibility within the City. The general transportation policy direction for transportation planning is to protect and maintain the integrity of the existing transit system and identify opportunities for improvement and future expansion.

The OP strives to link intensification within these areas to investments in transit infrastructure. Many parts of the study area are already undergoing change; however, there are areas with the potential to accommodate significant growth over time. Ontario Line station areas will support areas of the urban structure that have been identified to accommodate significant residential and employment growth, such as the *Downtown and Central Waterfront, Employment Areas, and Avenues*.

Great Streets

The Plan identifies 12 “Great Streets” that will be prioritized for public realm improvements. Those coinciding with Ontario Line include:

- Bathurst Station – King Street West
- Spadina Station – Queen Street West and Spadina Avenue
- Osgoode Station – Queen Street West and University Avenue
- Queen Station – Queen Street West/East and Yonge Street
- Moss Park Station – Queen Street East
- Corktown Station – King Street East, Front Street East, Parliament Street

City of Toronto Ten Year Capital Plan (2022)

The 2022 10-year capital budgets were approved by City Council on February 17, 2022.

Transit Expansion Capital Plan

The City's Transit Expansion Office provides oversight of the City's transit expansion program and continues to advance work, including:

- Amendments to the Ontario-Toronto Agreement in Principle with the Province of Ontario, which includes key terms for the SmartTrack Stations Program;
- A signed revised Ontario-Toronto Agreement in Principle, endorsing the SmartTrack Stations Program;
- Finalizing negotiations for the GO Expansion Master Agreement, Eglinton Crosstown Light Rail Transit Operations and Maintenance Agreement; and,
- Coordinating City feedback on the Province's four priority subway projects (i.e., Ontario Line, Scarborough Subway Extension, Yonge North Subway Extension, and Eglinton Crosstown West Extension) to advance these projects to construction under accelerated timelines, and coordinating City feedback on the implementation of the Province's authorities under the Building Transit Faster Act.

Table 1 lists the planned projects within the Ontario Line study area.

Table 1: Transit Expansion Capital Plan Projects

Project Name	Anticipated Year of Completion	Budget
Eglinton W LRT/Prelim SmartTrack East	2022	\$25,801
SmartTrack Stations	2025	\$1,463,000

Long Term Cycling Network Plan

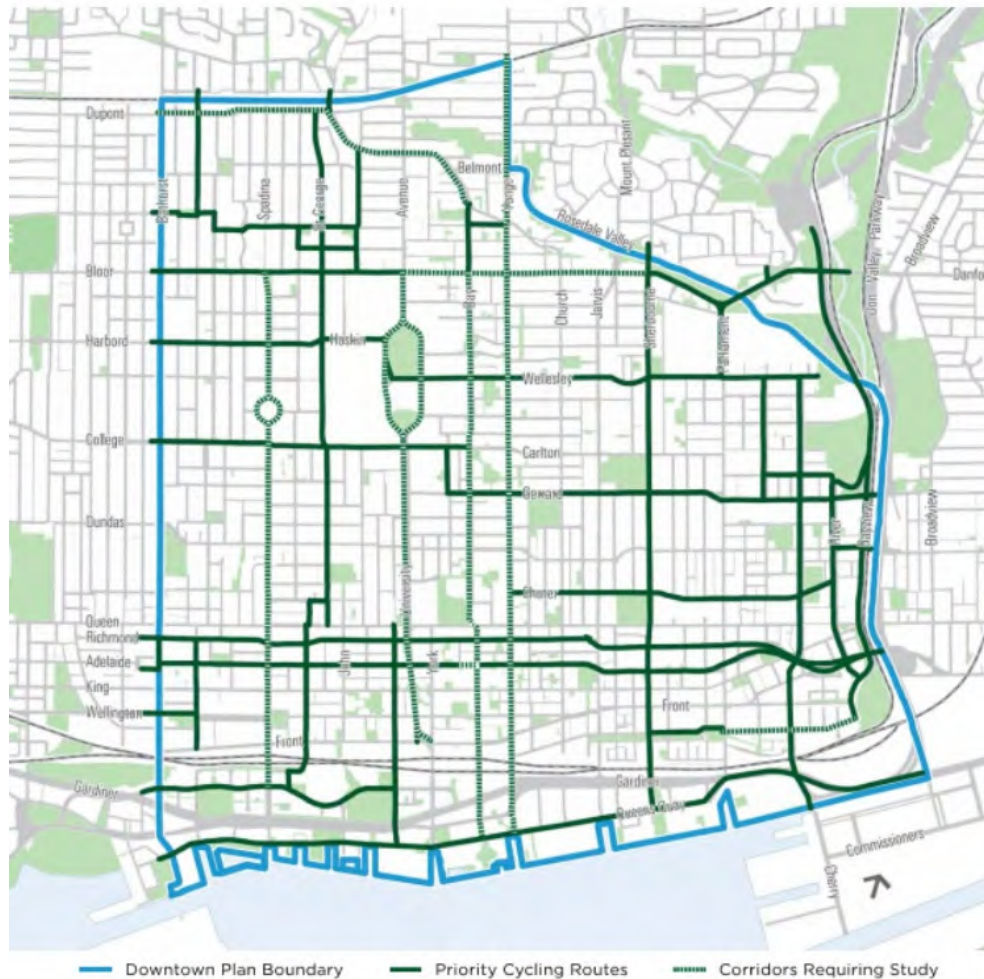


Figure 5: Downtown Long-Term Cycling Network Plan

ActiveTO

ActiveTO is an initiative by the City of Toronto during the COVID-19 pandemic to ensure people have space to move around the city while respecting physical distancing requirements. The initiatives include major road closures for active transportation, temporary and permanent expansion of the cycling network, and the temporary installation of “quiet streets”. Following a review of the 2020 programming, the City has implemented a modified program for 2021.

While much of the program is temporary, the plan accelerated permanent cycling network installations within the downtown and east end which will change the network assumptions for the Ontario Line. These include segments A, 1, 2, 3, 6, and 7 as shown in **Figure 6**.

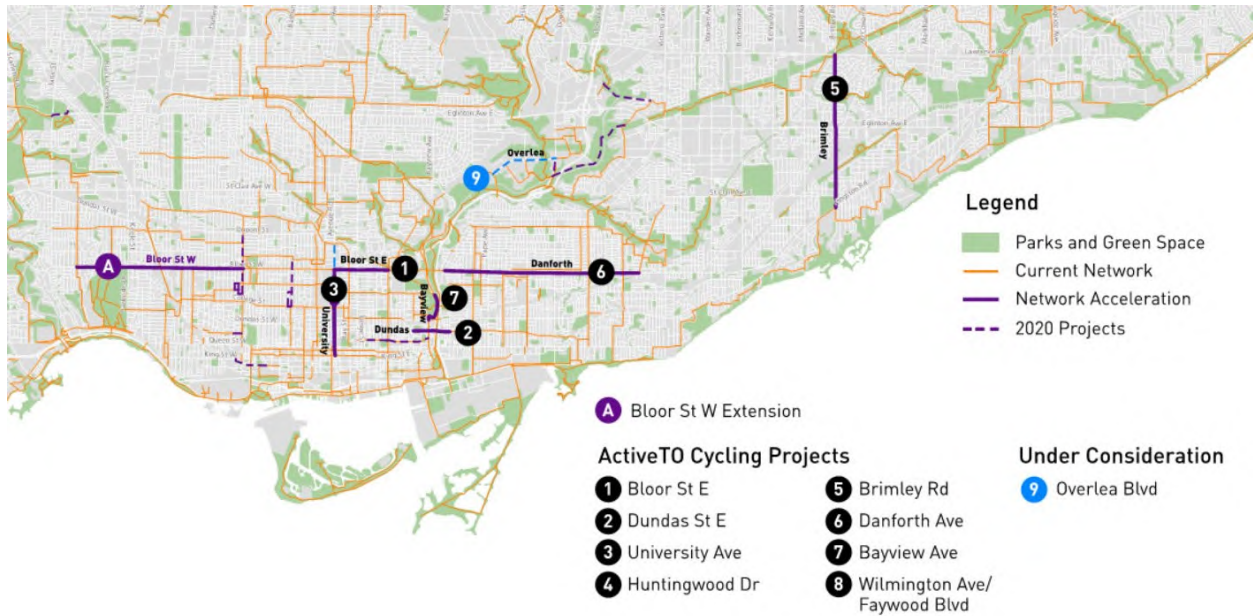


Figure 6: 2020 Cycling Network Plan Installations (excerpt)

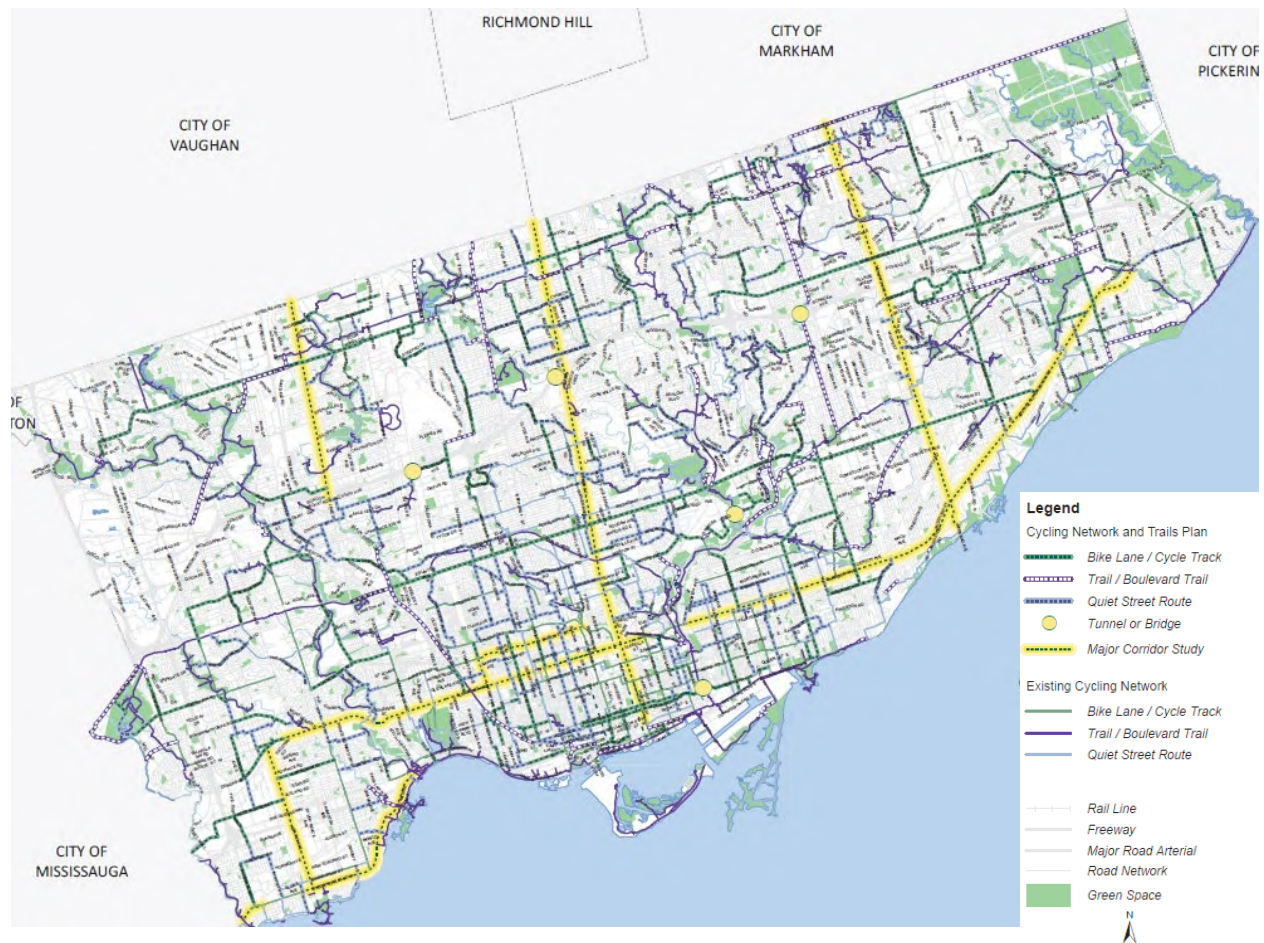
Toronto Ten Year Cycling Network Implementation Plan

Toronto’s Ten Year Cycling Network Implementation Plan, first approved in 2016, updated in 2019, and updated again in 2021, serves as a comprehensive roadmap and work plan, outlining the investments planned by the City of Toronto’s Cycling Unit over 2016-2025.

The Plan identifies approximately 525 centreline kilometers (km) of new infrastructure as illustrated in **Figure 7**. This new network includes:

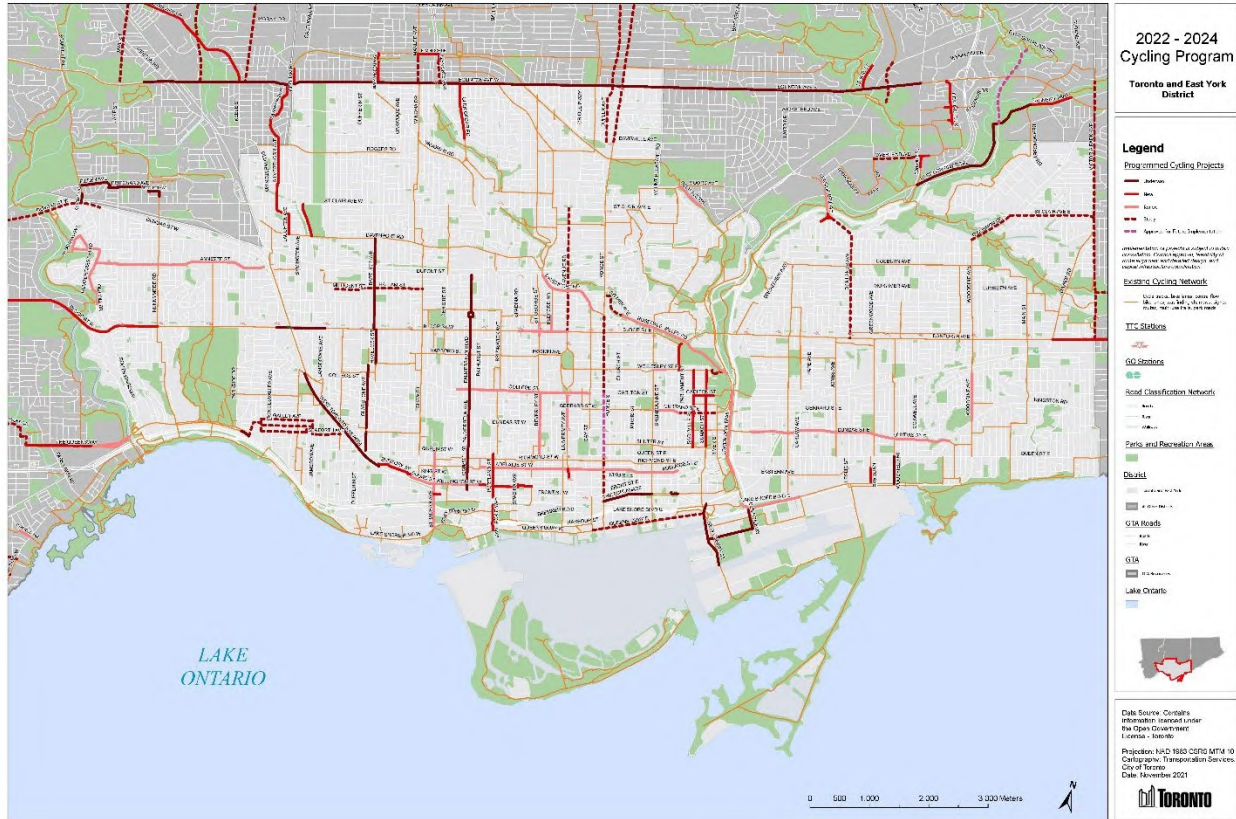
- 280 centreline km of bicycle lanes or cycle tracks on Fast Busy Streets;
- 55 road km of sidewalk-level boulevard trails along Fast Busy Streets; and,
- 190 centreline km of cycling routes along Quiet Streets.

Figure 7: Ten Year Cycling Network Implementation Plan Recommended Routes



The current Near-Term Implementation Program was adopted for 2022-2024. The program proposes approximately 100 centreline km of new bikeways, as well as upgrades to existing routes and studies for future implementation (**Figure 8**).

Figure 8: 2022 – 2024 Cycling Program (Toronto and East York District)



Nine (9) of the cycling corridors are planned within the Ontario Line study area and are projected to be implemented between 2022-2024 (**Table 2**). Projects beyond 2024 have not been approved.

Table 2: 2022 – 2024 Programmed Cycling Projects

Corridor	Programmed Cycling Projects
Strachen Avenue	Renew
Adelaide Street West	Renew
Beverley Street	Renew
Yonge Street	Approved for Future Implementation
Adelaide Street East	Renew
Dundas Street East	Renew
Leaside Bridge	Renew/New

Corridor	Programmed Cycling Projects
Overlea Boulevard	Study
Eglinton Avenue West	Underway

Official Plan Amendments

TOcore and the Downtown Plan

The TOcore study was initiated by Toronto City Planning in 2014 to prepare and implement a new plan for Toronto’s Downtown, which encompasses all proposed Ontario Line downtown stations except Exhibition. It recommends five infrastructure-related strategies covering: community facilities; parks and public realm; mobility; energy; and water.

This initiative resulted in the *Downtown Plan* which is in force as of the June 2019 provincial Notice of Decision of OPA 406 (with 244 modifications). The decision also revised Section 2.2.1 of the OP, amended Map 6, and added a new Map 6A.

Official Plan Amendment 469

Queen Street East between railway crossing at Jimmie Simpson Park and Leslie Street – *Site and Area Specific Policies, Chapter 7, City of Toronto Official Plan*

Queen Street East in Leslieville is a mixed-use area that generally contains non-residential uses at grade with residential uses above and parking at the rear of the properties (**Figure 9**). Most buildings are typically two to three storeys and many date from the late 19th and early 20th century. Their age, materials and details contribute to the area character. Non-residential uses at grade are encouraged in order to respect the existing character and pedestrian amenity of the area.

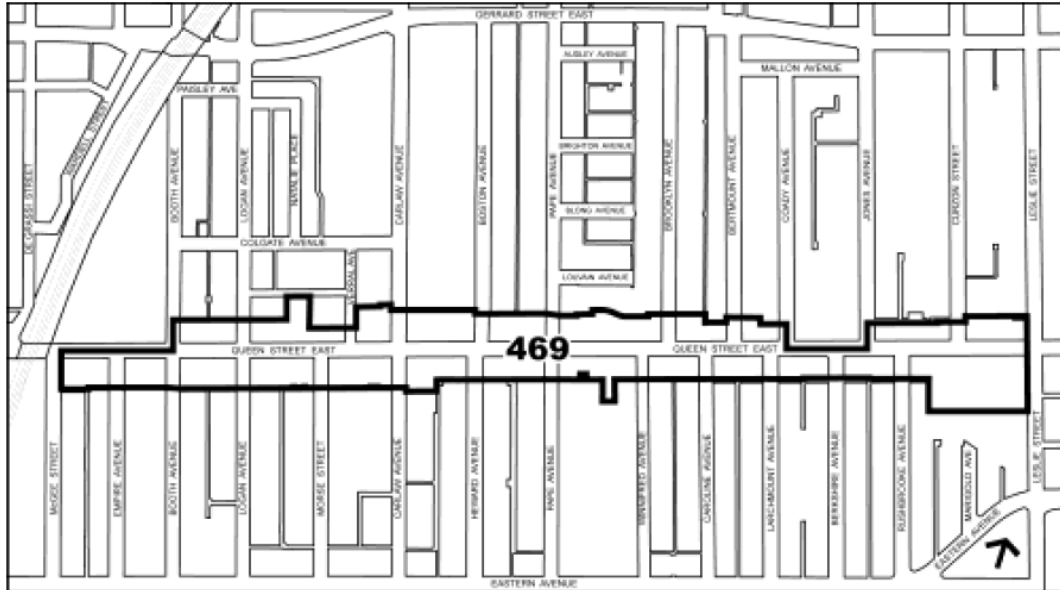


Figure 9: Official Plan Amendment 469 for Queen Street East between the railway crossing at Jimmie Simpson Park and Leslie Street

Laird in Focus Official Plan Amendment

Amendment 450 to the Official Plan for the City of Toronto applies to the lands south of Eglinton Avenue East between the planned Don Avon Drive extension, Vanderhoof Avenue and Aerodrome Crescent, and lands on the west side of Laird Drive between Vanderhoof Avenue and Millwood Road. Changes in the amendment will facilitate the development of the areas identified to support the Eglinton Crosstown Light Rail Transit (ECLRT) investment and create a transit supportive, complete mixed-use community that will integrate with the surrounding area. General policies on mobility include:

- A focus on transit and land use integration, promoting transit-supportive development and ensuring that development is supported by an appropriate level of capacity in the transportation network.
- Safe, convenient, and connected facilities for people on foot and bicycle.
- Support for transit priority measures and streetscape improvements for transit users.
- Encouragement of travel demand management (TDM) strategies and innovative mobility solutions.
- Recognition of the importance of the Leaside Employment Area by encouraging movement of goods along preferred corridors (Eglinton Avenue East and Laird Drive), and encouraging loading and servicing uses to be consolidated and located underground.

Master Plans

NEXT Place Master Plan Final Report

The Next Place Plan Phase 1 Proposals Report for Exhibition Place (May 2020) prepared by the City of Toronto was confirmed on June 24, 2020 by the Exhibition Place Board of Governors. The purpose of the Master Plan was to provide the overall vision, guiding principles and planning framework to guide physical change and usage of the Exhibition Place grounds and guide future development of the Exhibition Place grounds over the long term. The following guiding principles were outlined in the Master Plan:

- Prioritizing Transit / Removing Barriers / Making Connections
- Building a Network of Spectacular Waterfront Parks & Public Spaces
- Promoting a Clean & Green Environment
- Creating Dynamic & Diverse New Places
- Ensuring Openness and Transparency/Responsiveness to Community and Stakeholders

The recommended conceptual strategy consists of three program areas:

- Relax Zone (west end) – focus on passive recreational opportunities and improved connections to Marilyn Bell Park and South Parkdale
- Entertain Zone (central area) – creating and enhancing gathering places, multipurpose public plazas and north-south connections linking between Exhibition GO/TTC/Ontario Line transit hub and Ontario Place
- Exhibit Zone (east end) – new development and public realm improvements to support exhibition and trade functions with enhanced linkages to Coronation Park, Gore Park and Fort York/Bentway provide connectivity to the surrounding green space network

Pertinent highlights from the draft Structure Plan as they relate to the Ontario Line include:

- New and enhanced Gateways and Meeting Places, including an expanded Transit Hub and potential Park Bridge over Lake Shore Boulevard West linking to Ontario Place
- Primary axes/corridors for moving people to and through the site
- Pedestrian and/or multiuse promenade encircling the perimeter of the grounds

- Potential shuttle routes to improve last-mile accessibility through the site

Quick start initiatives identified that are to be coordinated with Ontario Line improvements, include:

- Pedestrian Path at the West Side of the Food Building
- Landscaped Link to Ontario Place
- Transportation Innovation Zone
- Under Gardiner enhancements

Lower Don Trail Master Plan

Completed by the City of Toronto and TRCA, the Lower Down Trail Master Plan outlines a series of projects that aim to revitalize the Lower Don Valley, as well as capitalize on recent or planned developments. The plan identifies projects from the short and medium term, and opportunities for future exploration. The opportunity for a new pedestrian and cycling crossing has been identified in the West Don Lands (south of Eastern Bridge); this opportunity is being explored between the East Harbour station working group and the City of Toronto to identify preliminary crossings.

Don Valley Corridor Transportation Master Plan (2005)

The Don Valley Corridor (DVC) is characterized by its traffic congestion, particularly in the case of the Don Valley Parkway (DVP). Since large volumes of automobile traffic from the Greater Toronto Area (GTA) are concentrated in this corridor, many north-south arteries within this study area are faced with capacity issues. The DVC Transportation Master Plan (TMP) focused on opportunities for increasing the person-carrying capacity of the corridor to alleviate congestion conditions and to better meet anticipated travel demands resulting from continued growth in the GTA. The study aimed to deliver cost-effective solutions that are consistent with the general goals and objectives for urban development and transportation investment as identified in the City of Toronto's new Official Plan, taking into account transportation agencies such as the TTC, GO Transit, MTO, and neighbouring municipal governments including the Region of York. The study area extended from Steeles Avenue to the north, Lakeshore Boulevard/Gardiner Expressway to the south, Leslie Street/Bayview Avenue to the west, and Victoria Park Avenue to the east.

The noteworthy problems and opportunities identified for the study area are summarized below:

- Peak period operations on Don Valley Corridor roads are occurring during extended periods during the day, extending well beyond the traditional 2-hour peak periods;
- There are a number of opportunities to provide improved operations and better/rider information to allow travellers to travel through the corridor without unnecessary delays;
- The vehicle occupancy rates have been dropping in spite of the high-occupancy vehicle (HOV) lanes in the corridor;
- The travel demand between Toronto and York Region is approximately equal in both directions across the Steeles Avenue boundary. A majority of travel is still made by private automobile; and
- Existing transit services do not provide reliable and fast service to the North Downtown from the corridor.

To address the identified opportunities along the corridor, a short list of alternatives were categorized under the following groups of options (or strategies):

1. Increased Transit Use
2. Increased Vehicle Occupancy
3. Increased Vehicular Capacity and System Utilization

These strategies informed the corridor master plan, illustrated in **Figure 10**. In order to measure the effectiveness of the TMP, proposed increases in corridor person carrying capacity were compared with estimated peak hour deficiencies at the South of Steeles, South of Highway 401 and Taylor Creek (south of Don Mills) screenlines. Based on this comparison, it was determined that the proposed initiatives collectively are sufficient to satisfy projected 2011 travel demands. In regard to timing of implementation, there were three stages: Stage 1 being 0-3 years; Stage 2 being 4-10 years; and Stage 3 being beyond 10 years. A prioritization process was developed to determine which stage each element should be implemented in **Figure 10**.

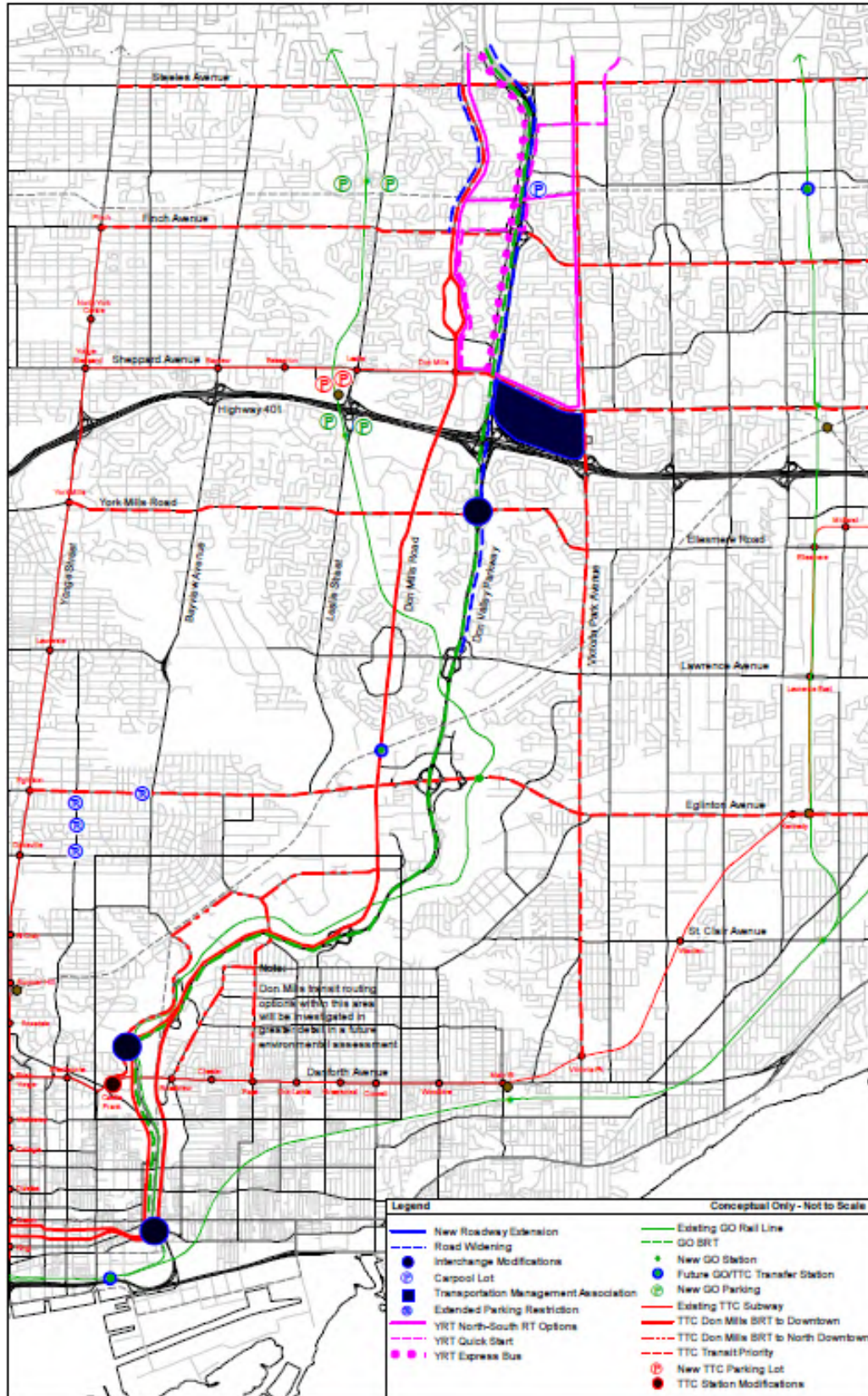


Figure 10: Don Valley corridor Transportation Master Plan – Elements

Secondary Plans

Port Lands Planning Framework

East Harbour Station is bound by Eastern Avenue, Booth Avenue, Lakeshore Boulevard East, and the Don Valley Parkway. While East Harbour Station falls outside the Port Lands Regeneration Area, the proposed East Harbour Station broadly supports themes of the Port Lands Planning Framework by providing the area with a new Ontario Line station, connecting the Port Lands to other transit corridors in the city.

The proposed location for East Harbour Station is within the East Harbour Transit Hub, as initially proposed by First Gulf (and now Cadillac Fairview), as illustrated in **Figure 11**. Aligned with the Plan, East Harbour Station reflects the transportation and servicing plan to accommodate the planned intensification for this area.



Figure 11: Proposed First Gulf East Harbour Master Plan (Source: First Gulf; January 31, 2018)

King Spadina Secondary Plan

In the Downtown, the *King-Spadina Secondary Plan* first enacted in 1996 provides a more flexible planning and zoning framework that has spurred redevelopment of this older industrial district at the west end of the study area. At the southern edge of the Downtown area, three Secondary Plans have been prepared to guide development along the Railway Lands. The *Railway Lands East, Central and West Secondary Plans* have supported the regeneration of the former industrial areas south of Front Street.

King-Parliament Secondary Plan

The *King-Parliament Secondary Plan* consists of mixed-use areas and neighbourhood apartment areas with significant transit demands. The revitalization of Regent Park encourages other alternatives to automobiles for connecting with other areas of the City. Such policies will bring about the benefits of environmental sustainability, improve pedestrian safety and align with the overall city-wide visions for transportation and the environment. Policies applicable to both the King-Parliament and Regent Park Secondary Plans support transit improvement and minimize the use of the automobile. The *Central Waterfront Secondary Plan* (still to be approved by the OMB) guides development mainly south of the rail corridor but includes the West Don Lands precinct in the King-Parliament area.

Queen-River Secondary Plan

The *Queen-River Secondary Plan* area formerly had manufacturing companies and low-density residential homes. It has slowly transitioned to an area with mixed commercial, institutional and residential land uses. The eastern edge of the Secondary Plan area is partially located within the provincially regulated floodplain of the Don Valley. The main objectives of the Secondary Plan policies include minimizing conflicts between different land uses, ensuring new development is compatible with existing land uses (appropriate transitions) and providing a quality public realm.

Unilever Precinct Secondary Plan

The *Unilever Precinct Secondary Plan* was adopted by City Council in June 2018. It provides a comprehensive range of policies to guide the development of the Unilever Precinct into a transit-oriented office and retail employment node with over 50,000 jobs. The Secondary Plan requires development to be coordinated with the delivery of transit infrastructure, providing public space and amenities to support transit, and establishing an appropriate relationship between the scale and form of development with access to transit facilities. The Secondary Plan permits the use of holding provisions in the zoning by-law to ensure transit is in place before development proceeds.

ENVIRONMENTAL ASSESSMENTS AND PLANNING STUDIES

Liberty New Street Municipal Class Environmental Assessment

The Liberty New Street Environmental Assessment was published in 2016. The project is a new east-west, two-lane street from Strachan Avenue to Dufferin Street, just north of the GO/Metrolinx corridor, in the Liberty Village Neighbourhood. The preferred cross-section includes a multi-use path along the south side, a sidewalk on the north side, and areas for green space. The benefits of the project include improving connectivity for all users, opportunities for public realm improvements and elimination of dead-end roads at the north/south roads. The project was proposed to be implemented in four phases. The design of Exhibition Station and access to the Ontario Line are integrating design components of the Liberty New Street; however, changes to the proposed Liberty New Street EA are required to accommodate the Ontario Line alignment and Exhibition Station.

yongeTOmorrow

For the yongeTOmorrow project, a Municipal Class Environmental (EA) focused on the development and evaluation of design alternatives for Yonge Street from Queen Street to College/Carlton Street. The objective of the EA was to explore opportunities to increase pedestrian space and improve the overall experience of moving along Yonge Street.

In February 2021, City Council endorsed the Recommended Design Concept which would increase sidewalk widths by reducing the existing four driving lane cross section to two lanes, and authorized Transportation Services to continue engaging with local stakeholders on details such as:

- pedestrian drop off and pick up areas, and taxi stands;
- locations of turning lanes and laybys; and
- spaces for tour buses on Victoria Street.

From 2021-2023, yongeTOmorrow will undergo detailed design where the following operational elements will be refined:

- Location and timing of pedestrian priority areas;
- Turn movements/restrictions, one-way / two-way driving access, and signal timings;
- Locations of accessible pick-up/drop off, loading, and stopping/standing areas;
- Cafes, vending, street events and public realm activations;

- TTC Bus Operations (Night bus and Subway shuttles);
- Maintenance and winter operations; and
- Approaches to post-implementation monitoring, education and enforcement.

Tender and construction is anticipated from 2023-2025.

Gardiner Expressway Environmental Assessment

The Gardiner Expressway EA is a joint undertaking by Waterfront Toronto and the City of Toronto. The study began in 2009 and was subsequently put on hold in 2010. The comprehensive EA and urban design study identified and evaluated feasible options for the future of the Gardiner Expressway from Jarvis Street to Logan Avenue. Four alternative solutions were originally under consideration:

- Maintain the elevated expressway
- Improve the urban fabric while maintaining the existing expressway
- Replace with a new above- or below-grade expressway
- Remove the elevated expressway and build a new boulevard

Since removal of the expressway would fundamentally change the urban fabric the planned waterfront communities such as the West Donlands, Lower Donlands and Port Lands which may impact ridership.

In February 2014, Waterfront Toronto presented the preliminary evaluation results, which identified the “Removal” option as preferred.

In March 2014, The Public Works and Infrastructure Committee requested that the Deputy City Manager undertake the preparation of an additional ‘hybrid’ option that combines the maintain and replace components to preserve expressway linkage and functionality between the Gardiner Expressway and the Don Valley Parkway and allows for redevelopment of land east of the Don River.

Toronto City Council voted in favour of the ‘hybrid’ option as the preferred alternative.

of the waterfront area, a full removal may provide some opportunities for strong connections between the RL and

Broadview Extension EA

The Broadview Avenue Extension Environmental Assessment (Broadview Extension EA) continues work completed in the 2017 Port Lands Transportation and Servicing Master Plan (TSMP). The Broadview Extension EA will develop conceptual designs and recommendations for:

- Broadview Avenue extension, south between Eastern Avenue and Lake Shore Boulevard
- New East-West Street, between Don Roadway and Booth Avenue in the Unilever Precinct

The project is also developing and evaluating alternative solutions for the design of the Eastern Avenue on-ramp to the Don Valley Parkway north and will consider options to improve access to the Don Valley Parkway.

The EA is being coordinated with the design of East Harbour Station, as well as other studies within the area including the Don Mouth Naturalization and Port Lands Flood Protection Project (led by Toronto and Region Conservation Authority), Lake Shore Boulevard East Public Realm Design (led by Waterfront Toronto), and the Gardiner Expressway East Reconfiguration (led by City of Toronto).

Broadview and Eastern Flood Protection EA

Completed in April 2021, the Broadview and Eastern Flood Protection EA recommended a solution to address:

- flood risk Address flood risk up to and including the Regulatory Flood Event to the 8 ha area of land north of the railway corridor tracks east of the Don River;
- Not increase flood risk elsewhere; and
- Integrate with current and future infrastructure and development initiatives for the area

The study recommended a flood protection landform (FPL) that would provide flood protection for the future Broadview Avenue extension that includes a dedicated streetcar service and transit hub connections to East Harbour station.

Port Lands & South of Eastern Transportation and Servicing Master Plan and EA (TSMP EA)

The TSMP EA studies the infrastructure servicing requirements to support future development in the Port Lands and areas South of Eastern Ave. The study considered a group of related projects, overall systems and/or a number of integrated systems, such as municipal servicing within a street network, within the context of anticipated future growth and in consideration of a wide range factors. In relation to Ontario Line, the study identified a transit hub at the Broadview Avenue extension and the rail embankment where future higher order transit lines – SmartTrack/RER and Relief Line.

Gardiner Expressway and Lakeshore Boulevard East Reconfiguration EA and Urban Design Study

The Study addresses current problems and opportunities in the Gardiner East EA Study area, which includes a 2.4 km section of the Gardiner Expressway and Lake Shore Boulevard between Lower Jarvis Street to just east of the DVP at Logan Avenue. The evaluation of the alternative solutions involved extensive technical work including the completion of traffic modelling as well as an assessment on transit accomodation, including the Downtown Relief Line, Waterfront LRT, Cherry Street LRT, and expansion of GO Transit Service.

Other Planning Studies

TTC 5-Year Service Plan & 10-Year Outlook

TTC's 5-Year Service Plan and 10-Year Outlook, approved by the TTC Board in December 2019, identifies service improvements to public transit service in the City of Toronto in 2020-2024 and beyond. The Plan identifies three initiatives: explore bus transit lanes, or other forms of transit priority, if appropriate, on Eglinton East, Steeles West, Jane, Dufferin and Finch East (**Figure 12**); implement more queue jump lanes, up to three locations per year; and implement more transit signal priority, up to 20 locations per year. The Eglinton East bus priority corridor was implemented in 2020 as part of the RapidTO program.

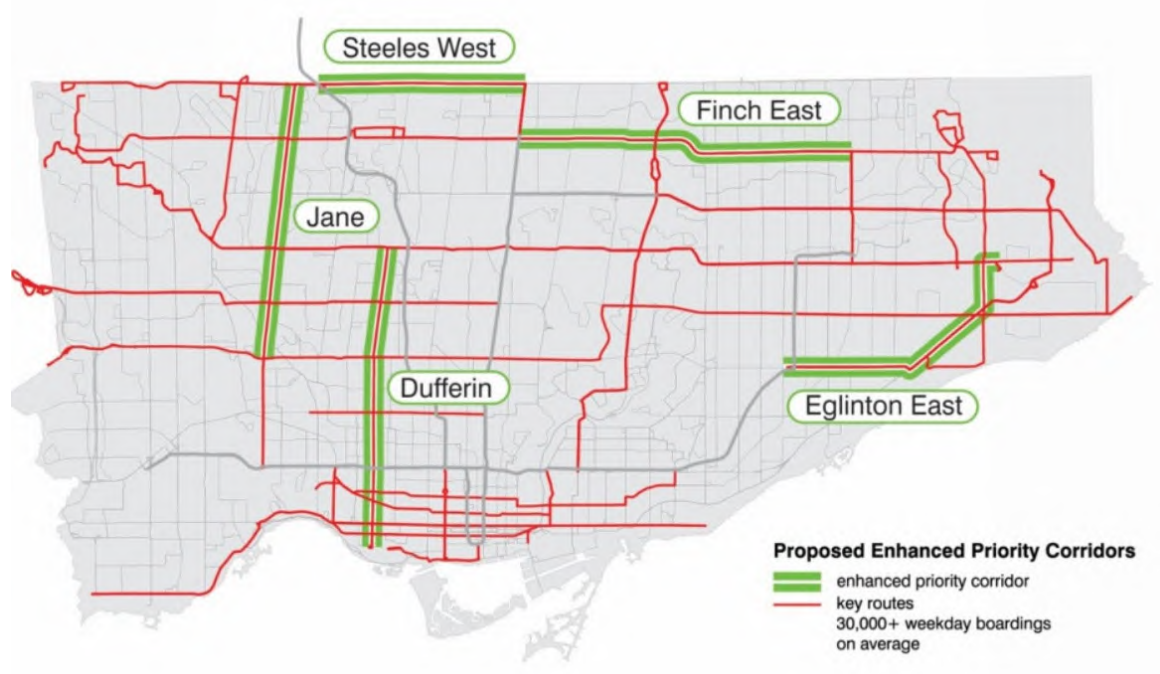


Figure 12: Proposed Enhanced Bus Priority Corridors

In November 2020, a report titled "Surface Transit Network Plan Update" was shared with Executive Committee. It recommended 20 transit priority corridors throughout the City (**Figure 13**) as well as an implementation schedule.

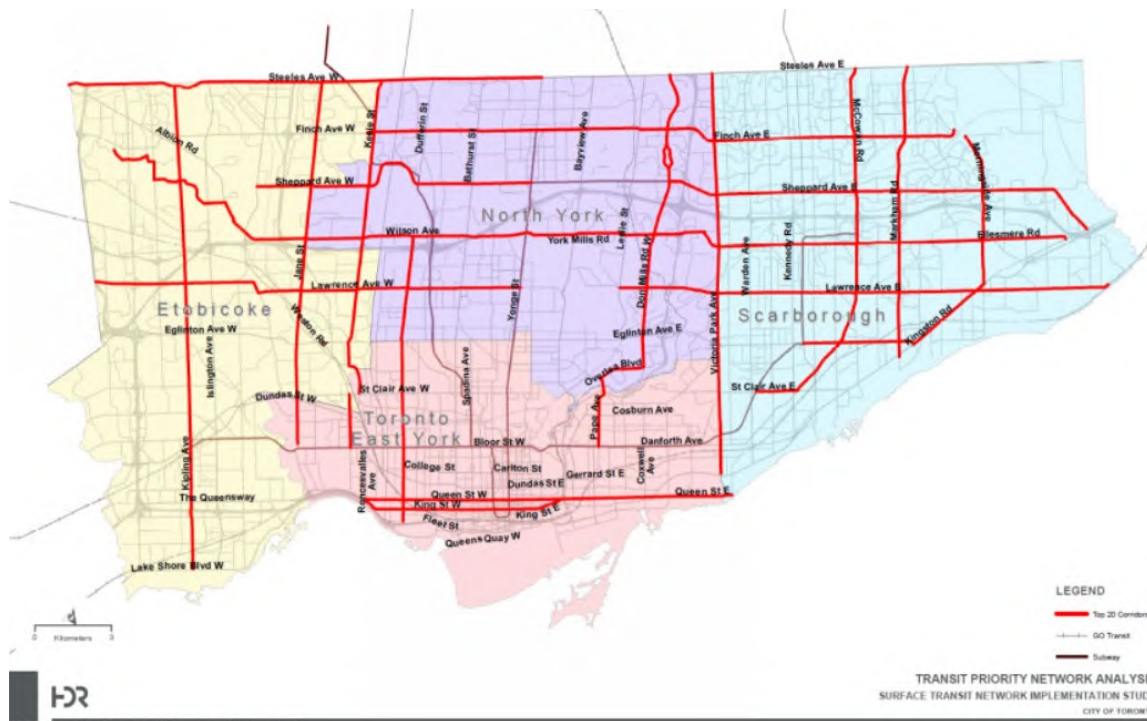


Figure 13: Top 20 Transit Priority Corridors

Four of the corridors overlap with the Ontario Line study area and are projected to be implemented during the Ontario Line construction period (**Table 3**).

Table 3: TTC Priority Corridor Implementation Schedule

Corridor	Engineering Studies	Detailed Design	Project Delivery
Dufferin Street	2022	2023	2024
Don Mills-Overlea-Pape	2024	2025	2026
Queen Street	2026	2027	2028
King Street	2026	2027	2028

Smart Track

The SmartTrack Stations Program is a collaboration between the province of Ontario, City of Toronto and Metrolinx, in which five SmartTrack stations will join GO services, TTC services, as well as the Ontario Line. East Harbour station has been identified to be a major transit hub and serve as a major interchange station for all three services.

Downtown Transportation Operations Study

The Downtown Transportation Operations Study (DTOS) was completed by Transportation Services staff (City of Toronto) in 2013. The purpose of the study was to identify and address congestion and traffic operations issues in downtown Toronto and develop a process to assess transportation initiatives underway. The study area is bound by Lakeshore Boulevard/Harbour Street, Bathurst Street, Queen Street, and Jarvis Street. The study inventoried all existing and future projects that impact downtown traffic operations using a three-stage approach. A total of 17 potential projects were recommended for implementation within two years of budget approvals and falling into four general themes:

- Coordination and communication
- Traffic regulations and management
- Traffic circulation
- Intelligent Transportation Systems (ITS)

Waterfront Transit Network

The City of Toronto, in partnership with the Toronto Transit Commission and Waterfront Toronto completed the Waterfront Transit “Reset” study. The study involved a two-phase, comprehensive assessment of needs and options for transit improvements for the waterfront area between Long Branch in the west and Woodbine Avenue in the east. Phase 1 was completed in 2016 and Phase 2 was completed in 2018, which included a recommended solution for the waterfront transit network to 2041 (**Figure 14**).

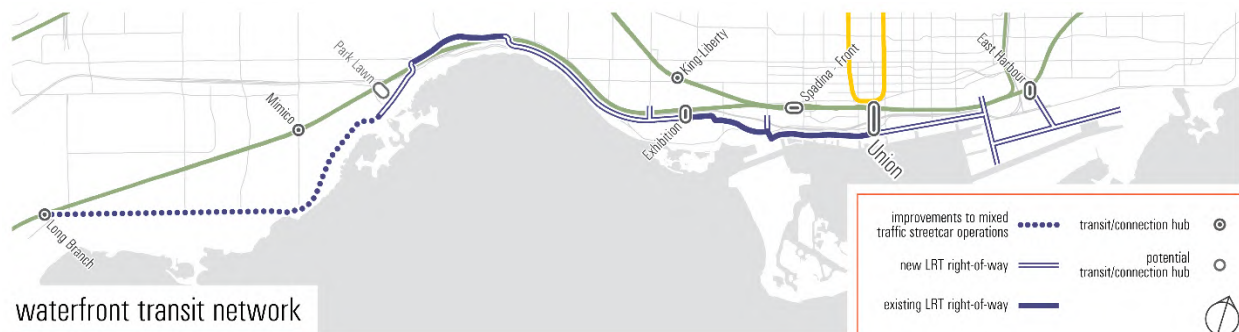


Figure 14: Recommended 2041 Waterfront Transit Network to 2041

Waterfront West LRT

In July 2016, Toronto City Council directed the TTC to initiate the 30% design for an exclusive streetcar right-of-way extension between Exhibition Loop and the Dufferin Gate Loop, illustrated in **Figure 15**. This work was put on hold in 2019 pending

coordination with Metrolinx on the design and operation of the proposed Ontario Line – GO interchange at Exhibition Station and related track work.

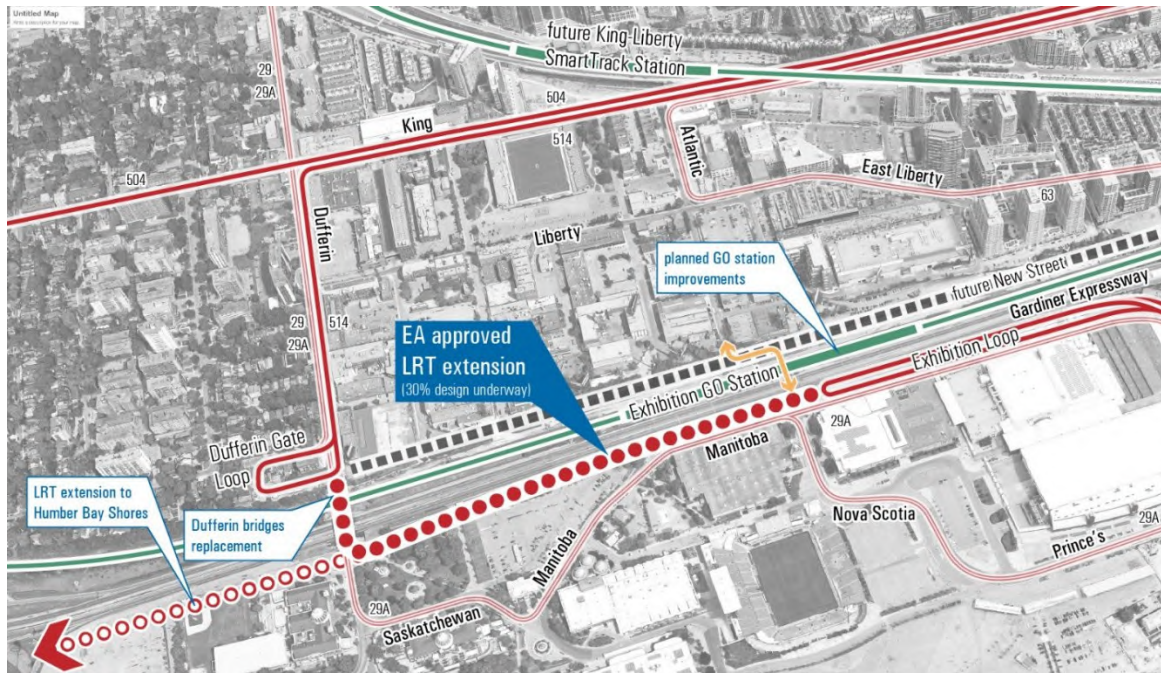


Figure 15: Proposed TTC works around Exhibition Station

Waterfront East LRT

In April 2019, Toronto City Council approved the streetcar option as the preferred technology for the Union Station to Queens Quay Link and directed staff to undertake the preliminary design and engineering phase of the extension of streetcar service to the East Bayfront. The Waterfront East LRT preliminary design and engineering focus area is shown in **Figure 16**. This work is proceeding in partnership between the City, TTC and Waterfront Toronto.

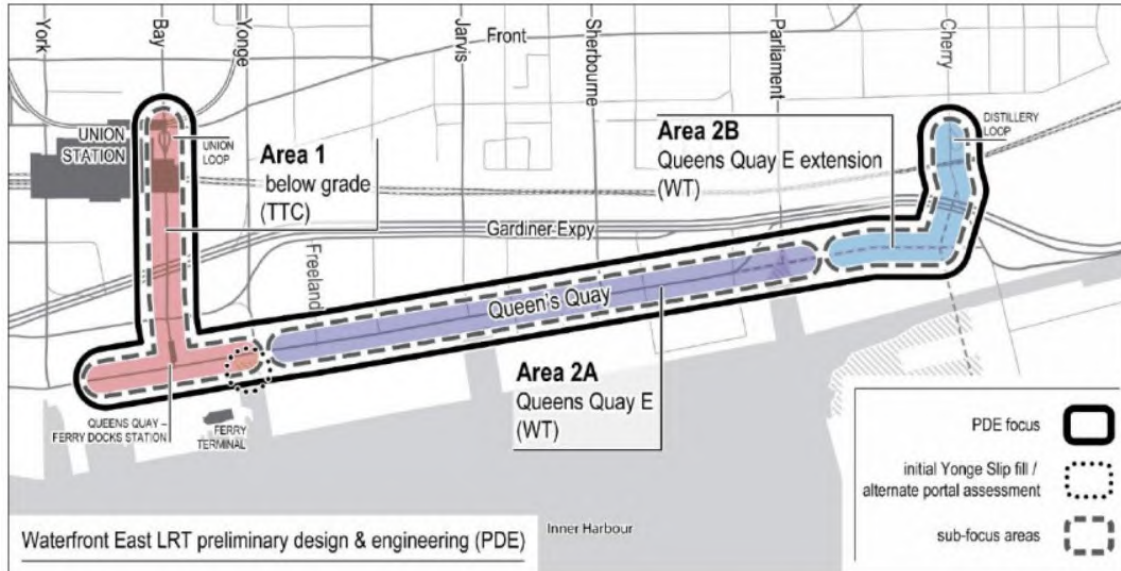


Figure 16: Waterfront East LRT Preliminary Design & Engineering Focus Areas

In December 2020, Council directed the project team to report back prior to the 2022 Budget process on the recommended schedule and funding requirements including phasing options and an updated business case. The Metrolinx Ontario Line team is coordinating with the WELRT project team on construction timelines and structural protections where the WELRT and Ontario Line interact at Cherry Street.

King Street Transit Priority Corridor

The King Street Transit Priority Corridor spans King Street between Bathurst Street and Jarvis Street. The key objects of the corridor include:

- Move people more efficiently
- Support economic prosperity
- Improve place-making

The King Street Transit Pilot was launched on November 12, 2017. Over the course of the following year, the pilot demonstrated its ability to move people more efficiently on transit without compromising the broader transportation road network.

Gerrard-Carlaw Planning Study

The area of Gerrard and Carlaw is currently being studied to address a need for transit supportive land uses in this low-rise residential area. The planning study began in 2018 but has recently shifted focus in response to the Ontario Line project and updated Growth Plan (2019). The Growth Plan has a goal of higher density targets near transit stations. Three sub-areas are now currently under study along Gerrard Street East from the Don Valley Parkway to Jones Avenue.

Laird in Focus Urban Design Guidelines

Urban Design Guidelines for Laird in Focus establish a context for coordinated development and are used as a planning tool to ensure development is consistent with the Official Plan and Site and Area Specific Policy (SASP #568).

Relevant guidelines for Massing and Heights:

- Tallest buildings should be in close proximity to the Eglinton Crosstown LRT Station, with heights of tall buildings decreasing further to the east.
- Integrate Laird LRT station infrastructure as part of new development and act as extension of the public realm, not detract from it.

Laird in Focus Final Report

The Laird in Focus Study developed a vision and framework to guide new development and changes in the area. It provides recommendations regarding land use, planning, built form, public realm, heritage, movement, and servicing, which will inform City policy and guidelines for the area.

Ten Strategic Moves create a framework for transformation within the Laird Drive and Eglinton Avenue East area:

1. Protect Neighbourhoods from the pressures of Intensification by achieving targeted growth on “Mixed Use” lands.
2. Provide a Transition in Height
3. Create New Local Public Streets
4. Create New Parks and Open Spaces
5. Build Community Facilities
6. Realize the Eglinton Avenue Promenade
7. Re-invent Laird Drive as a Main Street
8. Vanderhoof Avenue Green Connector
9. Build a Cycling Network
10. Support Employment Lands

The Structure Plan is a graphic representation of the main ideas underpinning the demonstration (recommended) plan and provides a conceptual framework for the underlying “10 Guiding Principles and Moves” as well as the associated urban design guidelines. It comprises streets and blocks; parks and open spaces; vehicular, pedestrian and cycling movement networks; gateway opportunities; and areas identified for taller development (**Figure 17**).

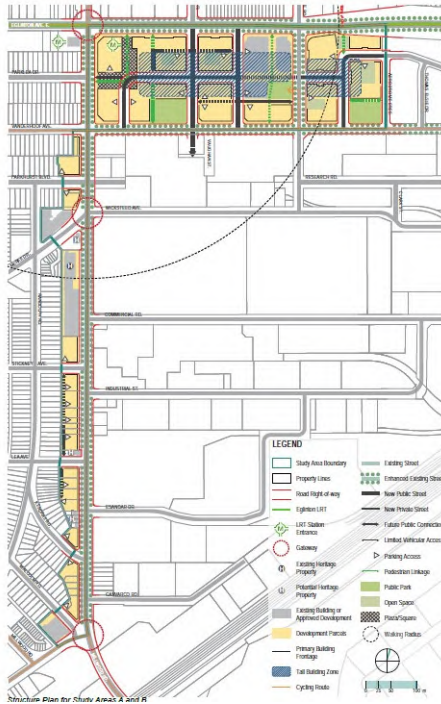


Figure 17: Structure Plan

The Mobility plan (**Figure 18**) establishes a transportation mode hierarchy consistent with the City’s policies:

1. Active transportation;
2. Transit;
3. Transportation demand management (TDM) and innovative mobility strategies;
4. Goods movement; and,
5. Vehicular movement and associated parking.

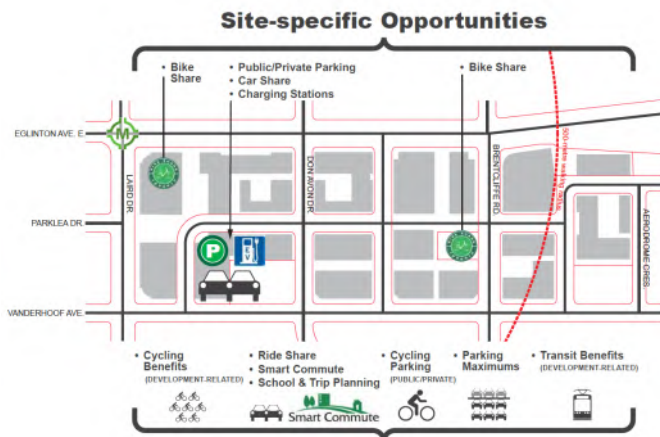


Figure 18: Mobility Plan

The mobility report supplementing the overall planning study determined that approximately 80% of the full build-out scenario could be accommodated with the proposed transportation network. Subsequent testing determined that a 10% reduction to peak hour total person trips, and an additional increase in transit mode share of 10%, would allow for the planned development to be built in full, and be supportable by existing infrastructure.

Fifty mobility recommendations covering all transportation modes were presented, including the following relevant recommendations:

8. Implement grade-separated cycle track recommendations along Eglinton Avenue as per EGLINTONconnects.

10. Undertake a refinement to the City's 10 Year Cycling Network Plan, that includes a continuous grade-separated cycle tracks along Laird Drive between Eglinton Avenue and Millwood Road, and a continuous off-street multi-use path along Vanderhoof Avenue between Laird Drive and the Don Valley trail system.

11. Transform Vanderhoof Avenue into a greenway spine connecting the existing Leaside neighbourhood and the planned development with new and existing parks, as well as the Don Valley trail system to the east.

12. Implement continuous grade-separated cycle tracks along Laird Drive, completing a critical section of the cycling network between Eglinton Avenue and Millwood Road, which will provide safe and comfortable connections to transit and community facilities.

Servicing analysis of water infrastructure concluded the following:

- Future densification along the Eglinton Avenue East frontage will require more in-depth study of the downstream impacts and will require municipal sanitary upgrades.
- Densification along Laird Drive is feasible based on dry-weather flow impacts only.
- Exploring the feasibility of constructing new fully separated storm sewers to alleviate surcharging conditions is recommended.
- It is likely that watermain upgrades may be required in order to intensify the area, but this will be determined once intensification nodes have been determined.

Eglinton Crosstown Light Rail Transit

The Eglinton Crosstown LRT (ECLRT) is one of the first projects to improve transit service in the City of Toronto to be implemented from the Provincial Big Move. The ECLRT is a 19 kilometre corridor that will run across Eglinton Avenue between Weston

Road (Mount Dennis Station) and Kennedy Station in dedicated right-of-way. The ECLRT is currently under construction and is scheduled to be in operation by 2022.

Figure 19 illustrates the alignment of the ECLRT and indicates the aboveground and underground sections of the corridor, as well as the stops, intermodal LRT stops, and the maintenance and storage facility. The ECLRT will have 25 stops, with connections to three (3) subway stations, 54 bus routes, and three (3) GO Rail lines.

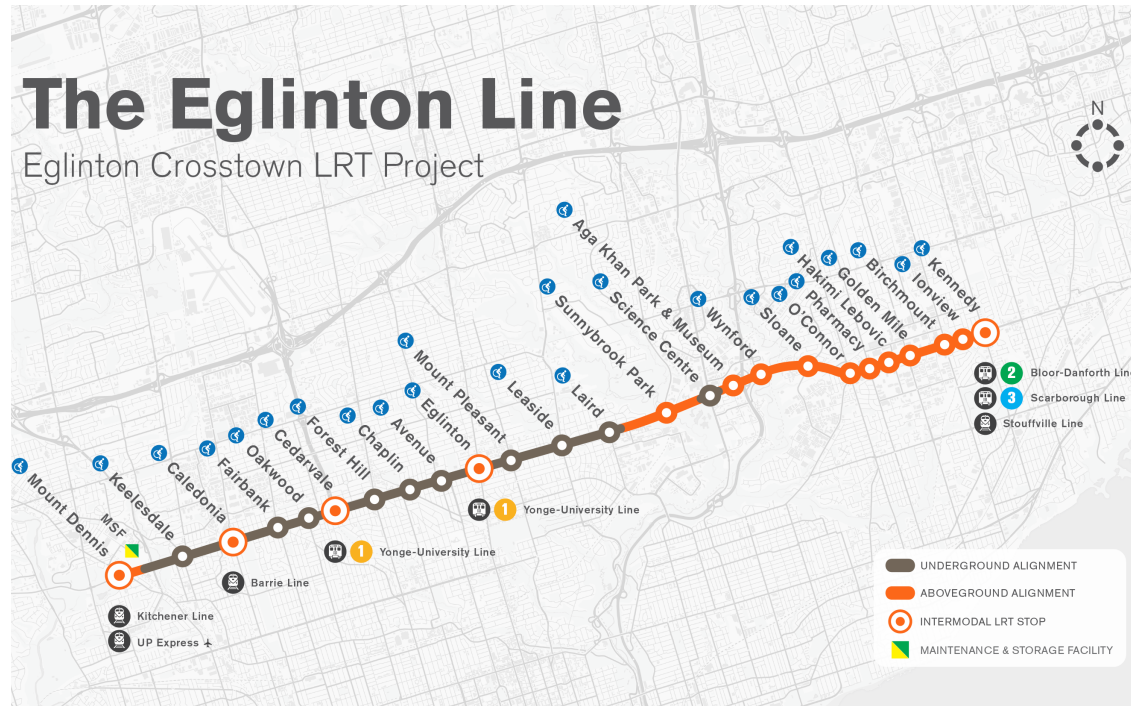


Figure 19: ECLRT Stations and Alignment

Source: Eglinton Crosstown (<http://www.thecrosstown.ca/the-project>)

A section of the ECLRT is located in the Ontario Line Study Area, at Don Mills Road. An interchange between the ECLRT and the Ontario Line is planned at Science Centre station. Additionally, the City of Toronto and Metrolinx are leading planning work to update the previously completed Environmental Assessments extending the ECLRT east to University of Toronto Scarborough (UTSC) and to the west to Pearson Airport.

EGLINTONconnects Planning Study

EGLINTONconnects planning study is a comprehensive plan which developed a Vision, recommendations, and implementation strategies for the future of Eglinton Avenue. The Study area spans 19 kilometres of Eglinton Avenue from Jane Street to Kennedy Road, where the LRT is under construction. This study developed cross-sections of Eglinton Avenue from Black Creek Drive to Brentcliff Road, where the LRT line is underground (**Figure 20**).

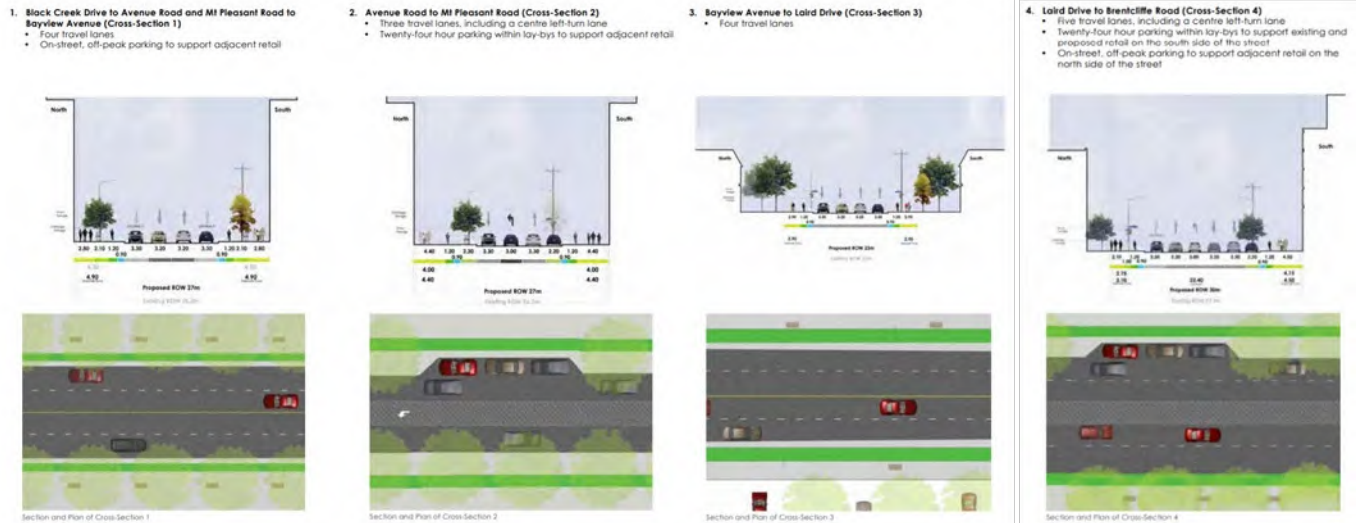


Figure 20: Eglinton Cross-Sections - Black Creek Drive to Brentcliff Road

Source: EGLINTONconnects City of Toronto Planning Study (<https://www.cip-icu.ca/Files/Awards/Planning-Excellence/Eglinton-Connects-Final-Report-Volume-2.aspx>)

Improving the Esplanade

Initiated by the City of Toronto, Improving The Esplanade Project recommendeds changes to the way people move through and experience The Esplanade and Mill Street. The Project’s goals are to:

1. Improve safety for everyone
2. Make walking, cycling and taking transit more attractive
3. Maintain access to local and citywide destinations

The following changes are being proposed for The Esplanade:

- Bi-directional cycle tracks added to the south side of The Esplanade.
- Safety enhancements at all intersections, such as renewed pavement markings, prohibited vehicle turns, and signal timing improvements that separates the movements of vulnerable road users from vehicles.
- The speed limit reduction from 40km/h to 30km/h.
- The Esplanade conversion to one-way westbound from Church Street to Scott Street, from Jarvis Street to Market Street, and from Princess Street to Berkeley Street.
- The Esplanade conversion to one-way eastbound from George Street to Frederick Street.

- Through traffic prohibited in both directions between Sherbourne Street and Princess Street
- George Street southbound conversion to one-way between The Esplanade and Wilton Street to prevent Wilton Street from becoming a bypass and to reduce traffic near St. Michael School.
- The north half of Farquhars Lane northbound conversion to one-way to reduce local traffic infiltration and the traffic volume across the busy Front Street sidewalk.



Figure 21: Summary of The Esplanade Proposed Improvements

Source: City of Toronto – The Esplanade (<https://www.toronto.ca/community-people/get-involved/public-consultations/infrastructure-projects/the-esplanade-mill-street/esplanade-mill-whats-proposed/>)

Appendix B. Summary of Potential Impacts

Appendix B. Summary of Potential Impacts, Mitigation, and Monitoring Measures

Table A: Exhibition to Don Yard

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Segment-Wide	Transit	<ul style="list-style-type: none"> Potential relocation of existing bus/streetcar stops that service these schools, during construction, may impact Toronto District School Board (TDSB) students and employees. 	<ul style="list-style-type: none"> TDSB will be engaged during construction planning. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Exhibition	Auto Access	<ul style="list-style-type: none"> No auto access to the south ends of Mowat Avenue, Fraser Avenue, Jefferson Avenue, Atlantic Avenue, and Hanna Avenue. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Exhibition	Pedestrian	<ul style="list-style-type: none"> Temporary removal of unofficial pedestrian connections through parking lots north of the railway corridor between Dufferin Street and Hanna Avenue. Will be reintroduced through official pedestrian connections between Dufferin Street and Strachan Avenue with the completion of Liberty New Street. 	<ul style="list-style-type: none"> Signage and wayfinding for pedestrians currently navigating through the unofficial connection. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Exhibition	Pedestrian	<ul style="list-style-type: none"> The existing disused pedestrian tunnel at Exhibition Station will be reopened, brought up to code to ensure AODA compliance, and extended further north by approximately 40 metres to accommodate pedestrian flows between Exhibition Place and Liberty Village. A new headhouse will be constructed at the new northern terminus of the pedestrian tunnel. The covered pathway between the current northern terminus headhouse and Atlantic Avenue will be closed once the extension is operational. The pedestrian tunnel will be decommissioned once Exhibition Station is opened for service. 	<ul style="list-style-type: none"> Metrolinx will coordinate with Exhibition Place staff and Event Organizers to further mitigate impacts during event-related pedestrian surge crowd periods. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Exhibition	Pedestrian	<ul style="list-style-type: none"> A temporary pedestrian bridge structure will be constructed at Exhibition Station during Early Works, which will extend over the railway corridor and connect to the existing north headhouse, the reconditioned south headhouse, and the future headhouse at the northern end of the pedestrian tunnel extension. The bridge will improve pedestrian crossing capacity between Exhibition Place and Liberty Village before the new station is constructed. The bridge will not be AODA compliant and will be demolished once Exhibition Station is opened for service. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Exhibition	Transit	<ul style="list-style-type: none"> TTC routing through Exhibition Place potentially impacted specifically along Manitoba Drive to facilitate construction of south station entrance building and public realm improvements. 	<ul style="list-style-type: none"> Metrolinx will work with TTC and event organizers to mitigate pedestrian, traffic and transit impacts during construction. Ensure that the public is notified in advance of any potential service disruptions or modifications. Consult with TTC to establish a suitable mitigation strategy to be implemented. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Exhibition	Traffic	<ul style="list-style-type: none"> Lane closure due to utility construction within Dufferin Street near Springhurst Avenue 	<ul style="list-style-type: none"> Mitigation measures are still being evaluated and will depend on whether the utility works can be coordinated with the City of Toronto's planned replacement of the bridge structures across the rail corridor and the Gardiner Expressway. 	<ul style="list-style-type: none"> No monitoring required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Exhibition	Transit	<ul style="list-style-type: none"> Utility works on Dufferin Street near Springhurst Avenue may impact the streetcar OCS poles and tension wires, potentially resulting in temporary closure of streetcar operations. 	<ul style="list-style-type: none"> A TTC bus bridge may be required if streetcar operations are impacted 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – King/Bathurst	Auto	<ul style="list-style-type: none"> The curb lanes on the east leg will be closed for both directions, auto needs to access King Street through the centre lane. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. Optimize signal timings at King/Bathurst to reduce travel delays and accommodate updated travel patterns. Consider further turn restrictions to reduce auto volumes if necessary. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – King/Bathurst	Transit	<ul style="list-style-type: none"> The curb lanes on the east leg will be closed for both directions; passengers need to walk to relocated stop. 	<ul style="list-style-type: none"> Eastbound and westbound transit stops to be relocated during construction. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – King/Bathurst	Auto	<ul style="list-style-type: none"> The northbound curb lane on Bathurst Street will be closed from Stewart Street to alleyway 30m north of King Street to provide temporary sidewalk. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – King/Bathurst	Pedestrian	<ul style="list-style-type: none"> Construction on the NE and SE corners of the intersection will extend into the current sidewalks. 	<ul style="list-style-type: none"> Sidewalks will be temporarily realigned for NE and SE corners of King/Bathurst. Protect for minimum sidewalk widths requirements needed to accommodate accessible users as per City of Toronto standards. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – King/Bathurst	Cyclists	<ul style="list-style-type: none"> Closures of curb lanes on the east leg in both directions, cyclists have to share the remaining centre lane which has streetcar tracks. 	<ul style="list-style-type: none"> Provide advance warning signage for cyclists to consider rerouting to avoid cycling on the streetcar tracks. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – King/Bathurst	Auto Access	<ul style="list-style-type: none"> Access to east-west alleyway 30 metres north of King Street on east side of Bathurst Street will be closed during construction for staging / laydown area. Access to alleyway to 650 King Street West and the private driveway on Stewart Street immediately east of the proposed station building will be maintained for local residents, deliveries, and emergency services. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Impact – King/Bathurst	Auto	<ul style="list-style-type: none"> Alleyway from Bathurst Street to 650 King Street West (30 metres north of King Street) permanently closed. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Queen/Spadina	Auto	<ul style="list-style-type: none"> Closure of west leg, eastbound approach curb lane, auto needs to divert to the remaining lane. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Queen/Spadina	Transit	<ul style="list-style-type: none"> Closure of west leg, eastbound approach curb lane, streetcar cannot stop immediately at the intersection. 	<ul style="list-style-type: none"> Eastbound streetcar stop needs to be moved further west. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Queen/Spadina	Pedestrian	<ul style="list-style-type: none"> Narrowed pedestrian paths on the NE and SW quadrants of the intersection as a result of construction work areas. 	<ul style="list-style-type: none"> Protect for minimum sidewalk widths needed to accommodate accessible sidewalk users as per City of Toronto standards. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen/Spadina	Cyclists	<ul style="list-style-type: none"> Closure of west leg, eastbound approach curb lane, cyclists need to use the centre lane which has streetcar tracks. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen/Spadina	Parking	<ul style="list-style-type: none"> Closure of west leg, eastbound approach curb lane, parking on the south side of Queen Street will be removed during construction. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen/Spadina	Parking	<ul style="list-style-type: none"> North leg, northbound parking bay on the east side of Spadina Avenue between Queen and Bulwer will be removed during construction. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Queen/Spadina	Pedestrian	<ul style="list-style-type: none"> Closure of sidewalk on the south side of Bulwer Street, east of Spadina Avenue. 	<ul style="list-style-type: none"> Temporary warning signage at the sidewalk closure site and in advance to notify pedestrians to cross the roadway upstream. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Auto	<ul style="list-style-type: none"> Southbound lane closure on Simcoe Street between Queen Street and Richmond Street with gap to permit laneway access/egress. Simcoe Alley: night-time full closure just west of Simcoe Street Northbound auxiliary/parking lane closure on University Avenue between Queen Street and Armoury Street. Mid-block lane closure of the inside southbound traffic lane just north of the intersection of Queen Street and University Avenue. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. Optimize signal timings at Queen/University to reduce travel delays and accommodate updated travel patterns. On-street parking will be removed near the mid-block work site so that the southbound capacity is not reduced. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Parking	<ul style="list-style-type: none"> On-street parking on Simcoe Street adjacent to west curb closed from Queen Street W to Richmond Street. 	<ul style="list-style-type: none"> Temporary relocation of parking spaces south of the laneway is being evaluated. 	<ul style="list-style-type: none"> No monitoring is required.

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Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Parking	<ul style="list-style-type: none"> On-street parking on University Avenue adjacent to northbound bicycle lane closed from Queen Street West to 150m north of Queen Street West. 	<ul style="list-style-type: none"> No mitigation as there are available underground and surface parking lots nearby. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Parking	<ul style="list-style-type: none"> On-street parking on University Avenue adjacent to southbound bicycle lane closed from Queen Street West to 65m north of Queen Street West. 	<ul style="list-style-type: none"> No mitigation as there are available underground and surface parking lots nearby. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Pedestrian	<ul style="list-style-type: none"> West sidewalk closed on Simcoe Street between Queen Street and alleyway. East sidewalk narrowed on Simcoe Street between Queen Street and Richmond Street. 	<ul style="list-style-type: none"> Temporary pedestrian wayfinding signage at the west sidewalk closure site and in advance to notify pedestrians to cross the roadway upstream. Traffic control person at the alleyway. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Cyclists	<ul style="list-style-type: none"> Northbound bicycle lane on Simcoe Street shifted east and narrowed between Queen Street and Richmond Street. 	<ul style="list-style-type: none"> Temporary signage and pavement markings 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Transit	<ul style="list-style-type: none"> Potential delays to transit due to traffic queues. Westbound transit stop at Queen Street and University Avenue will be temporarily relocated further east. 	<ul style="list-style-type: none"> Optimize signal timings at Queen/University to reduce travel delays and accommodate updated travel patterns. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Transit	<ul style="list-style-type: none"> The north-east stairway connection to Osgoode Station will be temporarily closed during construction, increasing walking distance for some passengers. 	<ul style="list-style-type: none"> Maintain all other access points to Osgoode Station during construction and provide wayfinding signage. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Osgoode	Pedestrian	<ul style="list-style-type: none"> Narrowed pedestrian paths on the NE quadrant of the Queen/University intersection as a result of construction work areas. Narrowed pedestrian paths on the SW quadrant of the Queen/Simcoe intersection as a result of construction work areas. Nighttime closure of west sidewalk. 	<ul style="list-style-type: none"> Protect for minimum sidewalk widths needed to accommodate accessible sidewalk users as per City of Toronto standards. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Auto	<ul style="list-style-type: none"> Closure of all east-west traffic on Queen Street between Bay Street and Victoria Street (excluding intersection of Queen and Yonge). Closure of the southbound curb lane and northbound left-turn lane on Victoria Street near Queen Street West 	<ul style="list-style-type: none"> Optimize signal timings for parallel and detour intersections. Provide clear warning signage and advance notice to drivers to mitigate closing day impacts. Turning prohibitions on EBL at Queen/Bay and WBL at Queen/Victoria will be eased during the full Queen Street closure. 	<ul style="list-style-type: none"> Monitor actual field conditions during construction.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Transit	<ul style="list-style-type: none"> Victoria streetcar track closure. Queen Street streetcar detours. 	<ul style="list-style-type: none"> Advance warning to transit riders via messaging and signage. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Transit	<ul style="list-style-type: none"> Closure of all east-west traffic on Queen Street; streetcar to detour onto York Street, Adelaide Street, Richmond Street, and Church Street. Detours, added travel time, and delays. 	<ul style="list-style-type: none"> Re-route 501 streetcar onto Adelaide Street and Richmond Street between York and Church Streets. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Transit	<ul style="list-style-type: none"> Closure of streetcar stops on Queen Street between Bay Street and Victoria Street due to streetcar detour. 	<ul style="list-style-type: none"> Provide stops on the detour route at Bay Street and Yonge Street, and on the northbound approach to Queen/York. Provide temporary stops east-west on Richmond Street and Adelaide Street. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Transit	<ul style="list-style-type: none"> Streetcar tracks on Queen Street closed due to full closure of Queen Street. Streetcar tracks on northbound York Street closed during construction of Queen Street streetcar detour. 	<ul style="list-style-type: none"> Advance warning to transit riders via messaging and signage. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Auto	<ul style="list-style-type: none"> Lane closures on York Street due to construction of the streetcar detour. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Auto	<ul style="list-style-type: none"> Full intersection closures at the intersections of York Street with Queen Street, Richmond Street and Adelaide Street due to construction of the streetcar detour. Closure of the intersection approach of Pearl Street at York Street may be required. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Auto	<ul style="list-style-type: none"> Closure of on-street parking spaces on York Street between Richmond Street and King Street due to construction and operation of the streetcar detour and implementation of a bike lane on York Street. Closure of taxicab standing spaces on York Street between King Street and Adelaide Street. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Pedestrians	<ul style="list-style-type: none"> Narrowed pedestrian paths. Closure of the sidewalk on the south side of Queen Street, west of Victoria Street. Closure of the sidewalk on the east side of James Street, north of Queen Street, due to vent construction. A ventilation tower will be located within the existing sidewalk at the northeast corner of the intersection of James Street and Queen Street W. Closure of the midblock pedestrian signal on Queen Street at the Eaton Centre entrance. Pedestrians will need to detour to the other side of the street from the SE corner of Queen/Yonge and SW corner of Queen/Victoria to by-pass the south Queen sidewalk closure. 	<ul style="list-style-type: none"> Protect for minimum sidewalk widths needed to accommodate accessible sidewalk users as per City of Toronto standards. Temporary warning signage at the sidewalk closure sites and in advance to notify pedestrians to cross the roadway upstream. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Queen Station	Cyclists	<ul style="list-style-type: none"> Closure of all east-west traffic on Queen Street resulting in detours and added travel time. 	<ul style="list-style-type: none"> Cyclists can dismount and walk on the remaining sidewalk; however, longer range trips will be encouraged to detour onto Adelaide Street and Richmond Street. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact - James Street Road Closure – Queen Station	Auto Access	<ul style="list-style-type: none"> Closure of James Street to accommodate staging / lay down area for construction, blocking inbound access to the area behind Eaton Centre and the loading area north of Albert Street. 	<ul style="list-style-type: none"> Albert Street will be converted to two-way traffic to accommodate inbound movements. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact - James Street Road Closure – Queen Station	Parking	<ul style="list-style-type: none"> Closure of James Street, parking on both sides will be unavailable during construction. Taxicab standing will be prohibited. James Street from Albert Street to Queen Street parking spaces removed; 1 accessible parking space removed. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact - Albert Street Road Closure – Queen Station	Auto	<ul style="list-style-type: none"> Two-way conversion of Albert Street will reduce the roadway width allocated to westbound traffic, resulting in a shared left/right movement at the intersection of Bay Street and Albert Street. 	<ul style="list-style-type: none"> Street modification of traffic signal at intersection of Albert Street and Bay Street. 	<ul style="list-style-type: none"> Monitor the operations at the intersection of Bay / Albert to identify whether the protected southbound left turn phase needs to be activated.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact - Albert Street Road Closure – Queen Station	Parking	<ul style="list-style-type: none"> Two-way conversion of Albert Street, parking on north side of Albert Street will be prohibited, and the accessible loading zone on the south side will be relocated slightly east. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Moss Park	Auto	<ul style="list-style-type: none"> Closure of westbound curb lane between Sherbourne Street and George Street resulting in increased delays and travel times westbound due to the one-lane closure. 	<ul style="list-style-type: none"> Provide warning signage approaching the closure site notify drivers in advance of reaching the site. Optimize signal timings at Queen Street / Sherbourne Street to accommodate shifts in traffic patterns and potential westbound delay from the reduced receiving lane capacity. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Moss Park	Transit	<ul style="list-style-type: none"> No direct impact to streetcars; however, more vehicular traffic will be travelling on the westbound streetcar lane, resulting in potential increased delays and travel times. 	<ul style="list-style-type: none"> Optimize signal timings at Queen Street / Sherbourne Street. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Moss Park	Pedestrian	<ul style="list-style-type: none"> Construction area will extend across the existing sidewalk between Sherbourne Street and George Street. 	<ul style="list-style-type: none"> Provide protected pedestrian access around the work area on the westbound lane closure. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Moss Park	Cyclists	<ul style="list-style-type: none"> Closure of westbound curb lane between Sherbourne Street and George Street; westbound cyclists will have to use the remaining centre lane with streetcar tracks. 	<ul style="list-style-type: none"> Provide advance warning signage approaching the closure site to notify cyclists for potential rerouting. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Moss Park	Parking	<ul style="list-style-type: none"> Closure of westbound curb lane, on-street parking on the curb lane will not be permitted. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Moss Park	Parking	<ul style="list-style-type: none"> A portion of the existing parking lot for the Moss Park Arena may have to be temporarily closed. 	<ul style="list-style-type: none"> Discuss with the property owner to identify alternative parking arrangements. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Auto	<ul style="list-style-type: none"> Front Street: Westbound curb lane closed with short-duration encroachment into north sidewalk; Berkeley Street: short-duration northbound curb lane closure. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Auto	<ul style="list-style-type: none"> Berkeley Street: short-duration nighttime full closure just north of King Street; 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Auto	<ul style="list-style-type: none"> Closure of southbound curb lane on Parliament Street between King Street and Front Street. 	<ul style="list-style-type: none"> Optimize signal timings at King Street / Parliament Street to accommodate shifts in traffic patterns and potential southbound delay from the reduced receiving lane capacity. Provide warning signage approaching the closure site notify drivers in advance of reaching the site. 	<ul style="list-style-type: none"> Monitor construction queues and traffic volumes to update signal timings at the intersection of King Street / Parliament Street based on actual field data during construction.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Auto	<ul style="list-style-type: none"> Closure of eastbound curb lane on King Street between Berkeley Street and 30m west of Parliament Street. 	<ul style="list-style-type: none"> Optimize signal timings at King Street / Berkeley Street to accommodate shifts in traffic patterns and potential westbound delay from the reduced receiving lane capacity. Provide warning signage approaching the closure site notify drivers in advance of reaching the site. 	<ul style="list-style-type: none"> Monitor construction queues and traffic volumes to update signal timings at the intersection of King Street / Berkeley Street based on actual field data during construction.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Transit	<ul style="list-style-type: none"> No direct impact to 504 streetcars, but more vehicular traffic travelling on the eastbound streetcar lane on King Street due to the eastbound curb lane closure. 	<ul style="list-style-type: none"> Optimize signal timings at King Street / Berkeley Street. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Transit	<ul style="list-style-type: none"> Pedestrians may need to detour through the north side of King Street, around the south sidewalk closure, when travelling to and from the streetcar stop at Parliament. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Pedestrian	<ul style="list-style-type: none"> Closure of the sidewalk on the south side of King Street, between Berkeley Street and the eastbound transit stop located west of Parliament Street. 	<ul style="list-style-type: none"> Warning signs for pedestrians in advance of the sidewalk closure to allow for detouring. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Pedestrian	<ul style="list-style-type: none"> Construction west of Parliament Street between King Street and Front Street will extend past the existing sidewalks. 	<ul style="list-style-type: none"> Provide protected pedestrian access around the work areas on the southbound lane closure. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Cyclists	<ul style="list-style-type: none"> Closure of eastbound curb lane on King Street between Berkeley Street and Parliament Street, cyclists must use the remaining centre lane. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Corktown	Cyclists	<ul style="list-style-type: none"> Closure of southbound curb lane on Parliament Street between King Street and Front Street, cyclists must use the remaining centre lane. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
General	General	South and North Civil	Permanent Station Impacts - General	Pedestrian and Transit	<ul style="list-style-type: none"> Sidewalks and transit stops will be typically designed to current City of Toronto and TTC standards. However, reduced widths may be required at some stations due to existing constraints. 	<ul style="list-style-type: none"> Provide Station plazas in the station design where appropriate and feasible. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – King/Bathurst	Auto	<ul style="list-style-type: none"> Vehicle congestion and delays will be experienced during the weekday AM and PM peak periods. Pedestrians will also experience congestion at corners and on crosswalks. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimization and implementation of pedestrian priority measures. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto collection of new traffic data without Covid-19 impacts and reflecting conversion of King Street to a transit priority corridor to confirm the existing and forecast traffic volumes, diversions, and operations. Monitor traffic levels and review operations after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – King/Bathurst	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion on crosswalks during the peak periods. Pedestrians will experience congestion on the south-east corner during peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops Increase surface transit headways that connect with OL Consolidation of streetcar platform with sidewalk 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – King/Bathurst	Transit	<ul style="list-style-type: none"> Pedestrians will experience some congestion at the eastbound transit stop during the peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops Increase surface transit headways that connect with OL. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Queen/Spadina	Auto	<ul style="list-style-type: none"> Vehicles will experience congestion and delays during the weekday AM peak period. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimization. 	<ul style="list-style-type: none"> Monitor traffic levels and review operations after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Queen/Spadina	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion on crosswalks during the peak periods. Pedestrians will experience congestion on the southwest and southeast corners of the intersection of Queen Street and Spadina Avenue during peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and SW/SE corner operations (crowding/blocking) after opening day.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Queen/Spadina	Transit	<ul style="list-style-type: none"> Pedestrians will experience some congestion at the eastbound transit stop during peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impact – Osgoode	Cyclists	<ul style="list-style-type: none"> Northbound University Avenue cycling lane will be realigned to accommodate a sidewalk expansion of the east side of University Avenue 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impact – Osgoode	Parking	<ul style="list-style-type: none"> Northbound University Avenue parking lane will be permanently removed to accommodate a sidewalk expansion on the east side of University Avenue 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Queen/Yonge	Auto	<ul style="list-style-type: none"> Intersection operations are acceptable but there may be queue spillback to the upstream westbound and northbound intersections. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimization. 	<ul style="list-style-type: none"> Monitor traffic levels and review operations after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Queen/Yonge	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion on the crosswalks during the peak periods. Pedestrians will experience congestion at the corners of the intersection of Queen Street and Yonge Street during peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and corner operations (crowding/blocking) after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Queen/Yonge	Pedestrian	<ul style="list-style-type: none"> The PATH connection between 1 Queen Street and 2 Queen Street will be converted to a fare-paid area for Queen Station, blocking off free passage. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Queen/Yonge	Transit	<ul style="list-style-type: none"> Pedestrians will experience congestion at the eastbound and westbound transit stops along Queen Street during the peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during preparation SPR submission and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Consider relocating transit stop to the west to avoid overlap of station entrance volumes and surface transit stop waiting area. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – James Street Curb Realignment	Auto	<ul style="list-style-type: none"> No change to the existing 1-lane operation on James Street, however traffic will have less space to weave around stopped vehicles. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – James Street Curb Realignment	Sidewalk	<ul style="list-style-type: none"> Sidewalk will be wider by approximately 5.75 m and less crowded. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – James Street Parking (East Side)	Parking	<ul style="list-style-type: none"> One side (East) of parking will be removed on NB James Street. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Impact – Transit Detour - York Street	Transit	<ul style="list-style-type: none"> Southbound streetcar tracks may be maintained on York Street after completion of OL construction. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimization to reflect streetcar operation and bicycle lanes. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / Simcoe	Auto	<ul style="list-style-type: none"> Intersection operating at capacity during both peak periods with high delays. Effect is partially due to increase in pedestrian travel on south crosswalk. 	<ul style="list-style-type: none"> Ban westbound left turn movement. 	<ul style="list-style-type: none"> Monitor traffic levels and review operations after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / Simcoe	Pedestrian	<ul style="list-style-type: none"> Delays will be experienced on the south sidewalk on Queen Street between Simcoe and University. 	<ul style="list-style-type: none"> Consider increasing sidewalk width by either removing existing Line 1 entrance or widening sidewalk in some other fashion. 	<ul style="list-style-type: none"> Monitor pedestrian use and operations (crowding/blocking) after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / University	Auto	<ul style="list-style-type: none"> Vehicles will experience some congestion and delay on some traffic movements. 	<ul style="list-style-type: none"> Traffic volumes are anticipated to adjust to reflect intersection capacity. No mitigation measures recommended. 	<ul style="list-style-type: none"> Monitor traffic levels and review operations after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / University	Transit	<ul style="list-style-type: none"> Pedestrians will experience congestion at the eastbound transit stop during peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / University	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion on crosswalks at the intersection of Queen Street and University Avenue during peak periods. Pedestrians will experience congestion on the northeast and southwest corners of the intersection during peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and corner operations (crowding/blocking) after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / University	Auto	<ul style="list-style-type: none"> Vehicles will experience delays and congestion on some traffic movements. 	<ul style="list-style-type: none"> Traffic volumes are anticipated to adjust to reflect intersection capacity. No mitigation measures recommended. 	<ul style="list-style-type: none"> Monitor traffic levels and review operations after opening day.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / University	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion on the south and east crosswalks during the weekday AM peak period. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and corner operations (crowding/blocking) after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / Sherbourne	Auto	<ul style="list-style-type: none"> Southbound and northbound left turn queues will exceed available storage length. 	<ul style="list-style-type: none"> Queue storage exceedance is considered minor. No mitigation measures recommended. 	<ul style="list-style-type: none"> Monitor traffic levels and review operations after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Queen / Sherbourne	Pedestrian	<ul style="list-style-type: none"> Crosswalks and right corners for the eastbound, westbound and southbound movements at Queen / Sherbourne will experience delays during peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and corner operations (crowding/blocking) after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - King / Berkeley	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion and delays on the southeast, southwest, and northeast corners of the intersection of King Street and Berkeley Street. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and corner operations (crowding/blocking) after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - King / Parliament	Transit	<ul style="list-style-type: none"> Pedestrians will experience congestion at the eastbound, southbound and northbound surface transit stops during the peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - King / Parliament	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion on the northwest and southeast corners, as well as on the south and west crosswalks of the intersection of King Street and Parliament Street during the weekday AM and PM peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Consider moving WB surface transit stop to King / Berkeley to reduce pedestrian volumes at this intersection and reduce walking distance between surface transit stop and future station entrances 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and corner operations (crowding/blocking) after opening day.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Front / Berkeley	Transit	<ul style="list-style-type: none"> Pedestrians will experience some congestion at the northbound and southbound surface transit stops at the intersection of Front Street and Berkeley Avenue during the weekday AM and PM peak periods. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Front / Berkeley	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience congestion on the east side crosswalk during the weekday AM and PM peak periods. 	<ul style="list-style-type: none"> Widen crosswalk to 5m. 	<ul style="list-style-type: none"> Monitor pedestrian use of crosswalk and corner operations (crowding/blocking) after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Front / Parliament	Auto	<ul style="list-style-type: none"> The WB left turn queue will exceed the available storage length in the PM peak period due to background traffic growth. 	<ul style="list-style-type: none"> City of Toronto may consider extending the westbound left turn lane to 55m. 	<ul style="list-style-type: none"> Monitor traffic levels and review operations after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Impacts – Corktown	Parking	<ul style="list-style-type: none"> Closure of two public parking lots: <ul style="list-style-type: none"> 271 Front Street East 44 Parliament Street 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Operations and Maintenance Impact	Transit	<ul style="list-style-type: none"> TTC to re-route 29, 929, 29A, and 63 bus to serve Exhibition Station once Liberty New Street is constructed between Dufferin and Strachan Avenue. 	<ul style="list-style-type: none"> Ensure that the public is notified in advance of any potential service disruptions or modifications. Consult with TTC to establish a suitable mitigation strategy to be implemented. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Impacts - Exhibition	Parking	<ul style="list-style-type: none"> Approximately 590 public parking spaces (privately owned pay parking) will be removed north of the railway corridor due to Exhibition Station, portal works, and Liberty New Street construction. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition - King-Dufferin Intersection	Auto	<ul style="list-style-type: none"> Vehicles will experience congestion and delays at the intersection of King Street and Dufferin Street during the AM and PM peak periods. 	<ul style="list-style-type: none"> Optimize signal cycle length and phasing to best accommodate changing traffic patterns in the future. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimizations based on actual field conditions to accommodate the future traffic patterns and demands at the intersection after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition - Dufferin-Liberty Intersection	Auto	<ul style="list-style-type: none"> Vehicles will experience congestion and delays at the intersection of Liberty Street and Dufferin Street during the AM peak period. 	<ul style="list-style-type: none"> Optimize signal cycle length and phasing to best accommodate changing traffic patterns in the future. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimizations based on actual field conditions to accommodate the future traffic patterns and demands at the intersection after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition - King-Atlantic Intersection	Auto	<ul style="list-style-type: none"> Vehicles will experience congestion and delays at the intersection of King Street and Atlantic Avenue during the AM peak period. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimization (e.g., increased cycle length at the intersection). 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimizations based on actual field conditions to accommodate the future traffic patterns and demands at the intersection after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition – Strachan/Fleet	Auto	<ul style="list-style-type: none"> Vehicles will experience congestion and delays at the intersection of Fleet Street and Strachan Avenue during the PM peak period. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimizations (e.g., cycle length and phasing). 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimizations based on actual field conditions to accommodate the future traffic patterns and demands at the intersection after opening day.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition - Liberty New /Jefferson	Auto	<ul style="list-style-type: none"> Vehicles may experience delays and queueing during the PM peak hour on the eastbound and southbound approaches. 	<ul style="list-style-type: none"> Intersection signalization to improve the flow of vehicles through the intersection, and to improve progression of transit vehicles. Signal to be coordinated with Liberty New Street / Atlantic Avenue. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimizations based on actual field conditions to accommodate the future traffic patterns and demands at the intersection after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition - Liberty New/Atlantic Intersection	Auto	<ul style="list-style-type: none"> Vehicles will experience congestion and delays at the intersection of Liberty New Street and Atlantic Avenue during both the AM and PM peak hours on all approaches. 	<ul style="list-style-type: none"> Intersection signalization to improve the flow of vehicles through the intersection, and to improve progression of transit vehicles. 	<ul style="list-style-type: none"> Coordinate with the City of Toronto signal timing optimizations based on actual field conditions to accommodate the future traffic patterns and demands at the intersection after opening day.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition - Liberty New/Atlantic	Pedestrian	<ul style="list-style-type: none"> Pedestrians will experience delays and congestion at the northeast and northwest corners of the intersection during the weekday PM peak hour and during events. 	<ul style="list-style-type: none"> Mitigation measures to be developed during SPR development and detail design of the stations. Mitigation measures may include: <ul style="list-style-type: none"> Widen Crosswalk Expand Intersection corner areas Relocate / remove street furniture and other obstructions Relocate bus/streetcar stops 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts – Exhibition - Liberty New – Westbound Bus Bay	Transit	<ul style="list-style-type: none"> Insufficient bus frequencies are forecasted at the westbound bus bay to accommodate special event peak conditions resulting in an accumulation of queued boarding passengers at the waiting area throughout the hour. 	<ul style="list-style-type: none"> Increased bus frequencies should be considered by TTC during special event periods when BMO Field and Budweiser Stage venues finish events at the same time to accommodate forecasted demand. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Exhibition	Pedestrian	<ul style="list-style-type: none"> Temporary multi-use path between Dufferin Street and Strachan Avenue will create new pedestrian connection until Liberty New Street is constructed. Exhibition Station will provide an additional connection across the rail corridor between Liberty Village and Exhibition Place. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Permanent Station Impacts - Exhibition	Cyclists	<ul style="list-style-type: none"> Multi-use path between Dufferin St and Strachan Avenue will create new cycling connection until Liberty New Street is constructed. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts - Exhibition Station	Pedestrians, Cyclists	<ul style="list-style-type: none"> South Liberty Trail closed between Dufferin Street and Atlantic Avenue. 	<ul style="list-style-type: none"> Temporary warning signage at the trail closure site and in advance to notify pedestrians and cyclists to use alternative routes. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts - Exhibition Station	Pedestrians	<ul style="list-style-type: none"> Walkway closed south of condo building at 65, 75, 85 Liberty Street. 	<ul style="list-style-type: none"> Temporary warning signage at the sidewalk closure site and in advance to notify pedestrians to cross the roadway upstream. 	<ul style="list-style-type: none"> No monitoring is required.
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Cherry Street EEB	Pedestrian	<ul style="list-style-type: none"> Lake Shore Boulevard north sidewalk closed just west of Cherry Street 	<ul style="list-style-type: none"> Temporary warning signage at the sidewalk closure site and in advance to notify pedestrians to cross the roadway upstream. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Exhibition and Downtown	West and Downtown	South Civil	Construction Impacts – Cherry Street EEB	Auto	<ul style="list-style-type: none"> Lake Shore Boulevard westbound curb lane closed outside of traffic peak periods just west of Cherry Street. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.

Table B: Don Yard to Gerrard Portal

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Auto	<ul style="list-style-type: none"> Decreased access on Queen Street East, De Grassi Street, and Strange Street due to partial road closures or full road closures for Queen Bridge construction and construction access points. 	<ul style="list-style-type: none"> Provide information to motorists. Coordinate full road closures with the City of Toronto for the road network. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Pedestrian	<ul style="list-style-type: none"> Sidewalk closure on Queen Street East for over-head work for Queen Bridge construction on weekends and nighttime. 	<ul style="list-style-type: none"> Provide public notifications and detour planning. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Cycling	<ul style="list-style-type: none"> Weekend and nighttime full closures will require cyclist detours 	<ul style="list-style-type: none"> Provide warning and advance notification signage. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Parking	<ul style="list-style-type: none"> On-street parking on De Grassi Street and Strange Street impacted. 	<ul style="list-style-type: none"> Mitigation opportunities are still being evaluated. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Parking	<ul style="list-style-type: none"> On-street parking on Queen Street impacted. 	<ul style="list-style-type: none"> Mitigation opportunities are still being evaluated. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Transit	<ul style="list-style-type: none"> Impacts to routes 501, 503 and 301 on Queen Street East due to lane and road closures during weekends and nighttime for bridge construction. Temporary discontinuation of all Gerrard and Queen Streetcar routes due to road closures and OCS deactivation from bridge construction. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Auto	<ul style="list-style-type: none"> No permanent impacts 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Pedestrian	<ul style="list-style-type: none"> Pedestrian clearway under Queen Bridge to be widened to accommodate OL/TTC transfers 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Transit	<ul style="list-style-type: none"> Increased TTC ridership from increased OL transfers from Riverside/Leslieville Station, potentially leading to longer dwell times. Potential for adversely impacting traffic capacity along Queen Street. No permanent route impacts 	<ul style="list-style-type: none"> Transit service improvements to be implemented by TTC 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Auto	<ul style="list-style-type: none"> Queen Street East intermittent off-peak curb lane closures from Boulton Avenue to Empire Avenue. Queen Street East full close from Boulton Avenue to Empire Avenue on weekends. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Pedestrian	<ul style="list-style-type: none"> Queen Street East from Boulton Avenue to Empire Avenue long duration sidewalk closures (1 sidewalk generally maintained, but both sidewalks may be closed during full roadway closures). 	<ul style="list-style-type: none"> Temporary warning signage at the sidewalk closure site and in advance to notify pedestrians to cross the roadway upstream. 	<ul style="list-style-type: none"> Field monitoring of pedestrian compliance.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
LSE Joint Corridor	East	Joint Corridor	Construction Impact Riverside/Leslieville Station	Auto	<ul style="list-style-type: none"> De Grassi Street and Strange Street in the vicinity of Queen Street East, occasional off-peak full closures. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Gerrard Station	Auto	<ul style="list-style-type: none"> Temporary impact to Gerrard/Carlaw intersection as station footprint spans across entire intersection. Weeklong full intersection closure required. Westbound curb lane closed on Gerrard Street between Pape Avenue and Carlaw Avenue. 	<ul style="list-style-type: none"> Advance public notice to all road users, and advisory for alternative routes. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Gerrard Station	Traffic	<ul style="list-style-type: none"> Temporary westbound curb lane closure on Gerrard Street for station construction. 	<ul style="list-style-type: none"> No mitigation required. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Gerrard Station	Pedestrian or traffic	<ul style="list-style-type: none"> Temporary sidewalk closures for station and bridge construction on Carlaw Ave. Lane closures on Carlaw Street would be required if sidewalk closures are not preferred. 	<ul style="list-style-type: none"> Advance public notice to all road users, and advisory for alternative routes. Reduce duration of sidewalk closures. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Gerrard Station	Cycling	<ul style="list-style-type: none"> Temporary impact to cyclists on Gerrard Street, as westbound curb lane closure will result in cyclists riding inside streetcar lane. 	<ul style="list-style-type: none"> Advanced notice of lane closure, and advisory for alternative north-south cycling corridor. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Construction Impact Gerrard Station	Transit	<ul style="list-style-type: none"> Impact to route 506, 306 on Gerrard Street. Impact to route 72 and 325 on Carlaw Avenue. Temporary relocation or closure of transit stops. Temporary discontinuation of all Gerrard and Queen Streetcar routes due to road closures and OCS deactivation from bridge construction. 	<ul style="list-style-type: none"> Advance public notice to all road users, and advisory for alternative routes. Advance notice of route closures, temporary route detours, and signage for temporary streetcar stop relocations 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Permanent Impact Gerrard Station	Auto	<ul style="list-style-type: none"> No permanent impact. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Permanent Impact Gerrard Station	Pedestrian	<ul style="list-style-type: none"> No permanent impact. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Permanent Impact Gerrard Station	Cycling	<ul style="list-style-type: none"> No permanent impact 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
LSE Joint Corridor	East	Joint Corridor	Permanent Impact Gerrard Station	Transit	<ul style="list-style-type: none"> Increased TTC ridership due to increased OL transfers from Gerrard Station, leading to increased dwell times. 	<ul style="list-style-type: none"> Potential increased transit service, to be coordinated with TTC. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
LSE Joint Corridor	East	Joint Corridor	Construction Impact DY / LDB	Auto	<ul style="list-style-type: none"> Off-peak lane closures and weekend full closures of Don Valley Parkway will be required for construction of the Lower Don Bridge. 	<ul style="list-style-type: none"> Closures will be implemented only during off-peak periods and weekends. 	<ul style="list-style-type: none"> No monitoring is required.

Table C: Gerrard Portal to Minton Place Portal

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Pape	East and North	North Civil	Construction Impact – Segment-Wide	Transit	<ul style="list-style-type: none"> Potential relocation of existing bus/streetcar stops that service these schools, during construction, may impact Toronto District School Board (TDSB) students and employees 	<ul style="list-style-type: none"> TDSB will be engaged during construction planning. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Corridor-Wide	Transit	<ul style="list-style-type: none"> Conversion the peak-period HOV lanes on Pape Avenue to general purpose lanes where Pape Avenue is reduced to one lane per direction, i.e., at Pape Station, Sammon Crossover and Cosburn Station. Lane closure requirements at the Bain Avenue EEB are to be confirmed. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Pape Station	Auto	<ul style="list-style-type: none"> Lane closure along Lipton Avenue to facilitate the construction of new OL Pape station Lane closure (westbound curb lane east of Pape Avenue) along Danforth Avenue. 	<ul style="list-style-type: none"> Appropriate traffic signage should be implemented. Implementation of mitigation measures and design treatments resulting from the construction traffic management plans. Notification of closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Pape Station	Auto	<ul style="list-style-type: none"> Gertrude Place single-lane closure. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Pape Station	Pedestrian	<ul style="list-style-type: none"> Changes of station access / egress locations to the existing Pape Station headhouse and bus loop, requiring some passengers to exit the Station headhouse when transferring between TTC surface routes. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of station changes to TTC station users. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Pape Station	Pedestrian	<ul style="list-style-type: none"> Sidewalk closure on Gertrude Place. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of station changes to TTC station users. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Pape Station	Parking	<ul style="list-style-type: none"> Temporary closure of several parking lots at Pape Station. 	<ul style="list-style-type: none"> Signage and notification to transit customers and other users of lot. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Permanent Impact – Pape Station	Pedestrian	<ul style="list-style-type: none"> Changes to pedestrian circulation patterns near station. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Permanent Impact – Pape Station	Cycling	<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Permanent Impact – Pape Station	Transit	<ul style="list-style-type: none"> Future bus loop and access/egress locations to be determined. The bus loop will be closed for regular service except for WheelTrans. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Pape	East and North	North Civil	Construction Impact – Cosburn Station	Auto	<ul style="list-style-type: none"> Closures of lanes and on-street parking at Gowan, Gamble, and Pape Avenues. 	<ul style="list-style-type: none"> Appropriate traffic signage should be implemented. Implementation of mitigation measures and design treatments resulting from the construction traffic management plans. Notification of closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Cosburn Station	Auto	<ul style="list-style-type: none"> Full closure of traffic lanes on Cosburn Avenue just west of Pape Avenue during SOE construction and excavation within the road right-of-way. 	<ul style="list-style-type: none"> Detour signage for bicyclists and notification for duration of lane closure. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Cosburn Station	Transit	<ul style="list-style-type: none"> Relocation of bus stops on Pape Avenue due to lane closures Bus detours due to full closure of traffic lanes on Cosburn Avenue just west of Pape Avenue during SOE construction and excavation within the road right-of-way. 	<ul style="list-style-type: none"> Detour signage for bicyclists and notification for duration of lane closure. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Cosburn Station	Parking	<ul style="list-style-type: none"> Closure of on-street parking spaces on Pape Avenue. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Permanent Impact – Cosburn Station	Transit	<ul style="list-style-type: none"> Relocation of northbound bus stop at the intersection of Cosburn Avenue and Pape Avenue to shorten crossing distances between bus stop and OL Station. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Sammon Crossover	Auto	<ul style="list-style-type: none"> Lane closures anticipated on Pape Avenue. Alternative access to properties may be required. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Sammon Crossover	Pedestrian	<ul style="list-style-type: none"> Short-term sidewalk closures anticipated along Pape Avenue. Temporary sidewalk provided to avoid long-term closures. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Sammon Crossover	Transit	<ul style="list-style-type: none"> Transit service will be maintained but delays during construction. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Pape	East and North	North Civil	Construction Impact – Sammon Crossover	Parking	<ul style="list-style-type: none"> Closure of on-street parking spaces on Pape Avenue. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Permanent Impact – Sammon Crossover	All Modes	<ul style="list-style-type: none"> No permanent impacts anticipated. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Minton Portal	Pedestrian	<ul style="list-style-type: none"> Sidewalk closures on Minton Place and Hopedale Avenue to accommodate tunnel boring activities. 	<ul style="list-style-type: none"> Pedestrian wayfinding signage to be provided 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Minton Portal	Auto	<ul style="list-style-type: none"> Closure of on-street parking spaces on Minton Place and Hopedale Avenue due to lane closures. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Minton Portal	Transit	<ul style="list-style-type: none"> No transit service in this area. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Pape	East and North	North Civil	Permanent Impact – Minton Portal	All Modes	<ul style="list-style-type: none"> No permanent impacts anticipated. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Pape	East and North	North Civil	Construction Impact – Bain Avenue	Auto	<ul style="list-style-type: none"> Lane closure on Bain Avenue due to Emergency Exit Building construction. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Bain Avenue	Parking	<ul style="list-style-type: none"> Closure of on-street parking spaces on Pape Avenue. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Bain Avenue	Pedestrian	<ul style="list-style-type: none"> Sidewalk closure on Bain Avenue may be required. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Permanent Impact – Bain Avenue	All Modes	<ul style="list-style-type: none"> No permanent impacts due to Emergency Exit Building. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Gerrard Portal	Auto	<ul style="list-style-type: none"> Pape Avenue lane closure, south of Langley Avenue. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Gerrard Portal	Auto	<ul style="list-style-type: none"> Pape Avenue lane closure from Riverdale Avenue to Langley Avenue. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Sammon Crossover	Auto	<ul style="list-style-type: none"> Lane closures of Pape Avenue from Sammon Avenue to Browning Avenue. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Pape	East and North	North Civil	Construction Impact – Sewer relocation	Auto	<ul style="list-style-type: none"> Lane and/or full closures on Langley Avenue, Cosburn Avenue, Riverdale Avenue and/or Pape Avenue. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required
Pape	East and North	North Civil	Construction Impact – Sewer relocation	Transit	<ul style="list-style-type: none"> Bus detours due to lane and/or full closures on Langley Avenue, Cosburn Avenue, Riverdale Avenue and/or Pape Avenue. Relocation of bus stops. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. 	<ul style="list-style-type: none"> No monitoring is required
Pape	East and North	North Civil	Construction Impact – Sewer relocation	Transit	<ul style="list-style-type: none"> Sidewalk closures on Langley Avenue, Cosburn Avenue, Riverdale Avenue and/or Pape Avenue. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required

Table D: Minton Place Portal to Science Centre (Including MSF)

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Thornccliffe	North	North Civil	Construction Impact – Segment-Wide	Transit	<ul style="list-style-type: none"> Potential relocation of existing bus/streetcar stops that service schools, during construction, may impact Toronto District School Board (TDSB) students and employees. 	<ul style="list-style-type: none"> TDSB will be engaged during construction planning. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact – Don Valley Bridge	Auto	<ul style="list-style-type: none"> DVP northbound outside lane closure (off peak and weekend closures) Weekend and/or nighttime directional and lane / full closures for construction of the Don Valley Bridge 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring required.
Thornccliffe	North	North Civil	Permanent Impact - Thornccliffe Station	Auto /Transit	<ul style="list-style-type: none"> Additional bus traffic on Thornccliffe Park Drive and Overlea Boulevard. 	<ul style="list-style-type: none"> Coordinate with City of Toronto and TTC to optimize the traffic signal plans at the intersection. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Thornccliffe	North	North Civil	Permanent Thornccliffe Station and Overlea Guideway	Auto	<ul style="list-style-type: none"> Reduction of median width of Overlea Boulevard to realign westbound traffic lanes, as guideway-supporting piers will be installed in the north boulevard. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Permanent Thornccliffe Station and Overlea Guideway	Auto	<ul style="list-style-type: none"> Overlea Boulevard realigned at the intersection with Millwood Road. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Permanent Impact- Thornccliffe Station	Pedestrian	<ul style="list-style-type: none"> Sidewalk realignment on the north side of Overlea Boulevard due to guideway-supporting piers on current sidewalk along Overlea Boulevard. New and reconstructed sidewalks will meet the City's minimum design widths, resulting in widening at some locations. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Permanent Impact- Thornccliffe Station	Pedestrian	<ul style="list-style-type: none"> Sidewalk realignment on the south side of Overlea Boulevard due to the implementation of bicycle lanes and reconfiguration of intersections between Millwood Road and Thornccliffe Park Drive. New and reconstructed sidewalks will meet the City's minimum design widths, resulting in widening at some locations. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact - Thornccliffe Station and Overlea Guideway	Auto	<ul style="list-style-type: none"> Millwood Road southbound lane closure near Overlea Boulevard. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact - Thornccliffe Station and Overlea Guideway	Auto	<ul style="list-style-type: none"> Overlea Boulevard lane closures. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact - Overlea Guideway	Auto	<ul style="list-style-type: none"> Lane closures on Don Mills Road and Eglinton Avenue for utility relocations and pier construction. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Temporary traffic signal may be required at the intersection of Don Mills Rd and Eglinton Ave East 	<ul style="list-style-type: none"> Monitoring of traffic operations at the intersection.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Thornccliffe	North	North Civil	Permanent Impact – Don Mills Crossing	Auto/Pedestrian	<ul style="list-style-type: none"> Roadway shift for Don Mills median pier. Existing roadway width and sidewalk preserved. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact- Flemingdon Park Station	Pedestrian and Cycling	<ul style="list-style-type: none"> A new multi-use trail will be implemented on the west side of Don Mills Road within the project limits. 	<ul style="list-style-type: none"> No mitigation is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact- Science Centre Station	Transit	<ul style="list-style-type: none"> Station construction will impact the existing bus loop at Don Mills Road & Eglinton Avenue. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Coordination with TTC to reduce operational impact. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Thornccliffe	North	North Civil	Construction Impact- Science Centre Station	Auto	<ul style="list-style-type: none"> Don Mills Road lane closures 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact- Science Centre Station	Auto	<ul style="list-style-type: none"> Eglinton Avenue east and westbound lane closures immediately east of Don Mills Road. Several weekend full closures. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of lane closure to nearby residents and businesses. For full closure provide advance notification on Don Valley Parkway and implement ramp closures at the interchange of DVP and Eglinton Avenue. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Construction Impact- Science Centre Station	Pedestrian	<ul style="list-style-type: none"> Increased pedestrian demand at station sidewalk level due to operation of Eglinton Crosstown LRT. 	<ul style="list-style-type: none"> No monitoring is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	MSF – Construction	Auto	<ul style="list-style-type: none"> The connection between Banigan Drive and Thornccliffe Park Drive will be closed during the construction of the MSF. 	<ul style="list-style-type: none"> A new connection will be constructed between Banigan Drive and Overlea Boulevard, to the east of Leaside Park Drive. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	MSF – Construction	Pedestrian	<ul style="list-style-type: none"> Sidewalk closures on Thornccliffe Park Drive and a portion of Banigan Drive during MSF construction will temporarily remove a pedestrian connection to the to the businesses north of Banigan. 	<ul style="list-style-type: none"> The new connection between Banigan Drive and Overlea Boulevard will provide a new link for pedestrians near the Thornccliffe Park Drive closure. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	MSF – Permanent	Auto	<ul style="list-style-type: none"> The new connection between Banigan Drive and Overlea Boulevard will be maintained after the completion of the OMSF construction. 	<ul style="list-style-type: none"> No monitoring is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	MSF – Permanent	Pedestrian	<ul style="list-style-type: none"> The new connection between Banigan Drive and Overlea Boulevard will be maintained after the completion of the MSF construction. 	<ul style="list-style-type: none"> No monitoring is required. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	MSF - Construction	Auto	<ul style="list-style-type: none"> Beth Neilson Drive full closure for 1.5 years, from Pat Moore Drive to South of Tremco access. 	<ul style="list-style-type: none"> Traffic signage and detour signage as appropriate. Notification of street closure to nearby residents and businesses. Develop access plan for duration of construction. 	<ul style="list-style-type: none"> No monitoring is required.

Segment	Public Segment	Contract	Impact Type	Transportation Mode	Potential Effect	Mitigation Measure (s)	Monitoring
Thornccliffe	North	North Civil	MSF - Construction	Transit	<ul style="list-style-type: none"> Reroute of 88A due to Beth Neelson Drive closure for 1.5 years from Pat Moore Drive to South of Tremco access. 	<ul style="list-style-type: none"> Coordinate with TTC to develop temporary reroute and identify temporary stop relocations during closure. 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Thornccliffe	North	North Civil	Flemingdon Park Station Construction and Pier Construction	Auto	<ul style="list-style-type: none"> Occasional southbound curb lane closure from Gateway Boulevard to north of Gateway Boulevard on Don Mills Road. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.
Thornccliffe	North	North Civil	Flemingdon Park Station Construction and Pier Construction	Transit	<ul style="list-style-type: none"> Bus stop relocation on Gateway Boulevard at Don Mills Road intersection northwest Corner 	<ul style="list-style-type: none"> Advance notification for transit riders 	<ul style="list-style-type: none"> No monitoring is required beyond TTC's regular operational performance monitoring.
Thornccliffe	North	North Civil	Flemingdon Park Station Construction and Pier Construction	Auto	<ul style="list-style-type: none"> Don Mills Road lane closures south of Eglinton Avenue Intersection Full weekend or nighttime closures. 	<ul style="list-style-type: none"> Temporary warning signage at the closure site and in advance to notify drivers of the condition. 	<ul style="list-style-type: none"> No monitoring is required.

Appendix C. Multi-modal Traffic and Transit Management Plan

Ontario Line

Downtown Construction Closures

Multi-modal Traffic and Transit Management Plan

Contract RFS-2019-NAFC-110

PO 214244

HDR Project 10206938



Ontario Line Technical Advisor

TORONTO, ONTARIO

January 26, 2022

Doug Jackson, PE: Project Manager
Matt DeMarco, PMP: Deputy Project Manager
Tyrone Gan, P. Eng. Principal-In-Charge



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Project Team

Discipline Lead	Carl Wong, P.Eng.
Segment Discipline Lead	Dan Lu, P.Eng.
Project Engineer	Martin Kaczmarek, P.Eng.



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1 Executive Summary

The Ontario Line (OL) will be a 15.6 kilometre, 15-stop fully automated rapid transit route between Ontario Science Centre and Exhibition/Ontario Place and will provide major relief from the TTC Line 1 subway and other busy transit lines across the City. Construction of the Ontario Line stations and tunnels in Downtown Toronto is expected to begin in the summer of 2022 with the selection of the South Civis proponent (Project Co). Street occupancy for construction is proposed to start in October 2022 and will last 4-7 years. The proposed Ontario Line route is illustrated below in **Figure 1-1**.

This Multi-Modal Traffic and Transit Management Plan report was prepared to: 1) summarize the proposed road and lane closures to facilitate construction of the Downtown OL stations and the Traffic Management Plans (TMP) for the Ontario Line work zone areas; 2) identify the proposed construction activities planned by others within the same area and timeframe; 3) outline the impacts to different road users; and 4) propose mitigation measures for anticipated network-wide and work zone area impacts. A key element of the overall construction strategy is the proposed full closure of Queen Street between Bay Street and Victoria Street to efficiently construct one of the busiest OL stations to integrate with the existing Queen Station at the intersection of Queen and Yonge Streets. This report includes a detailed comparative assessment for the full closure and partial closure of Queen Street to identify the schedule, cost, travel time, and constructability benefits and implications of each alternative to construct the expanded Queen Station.

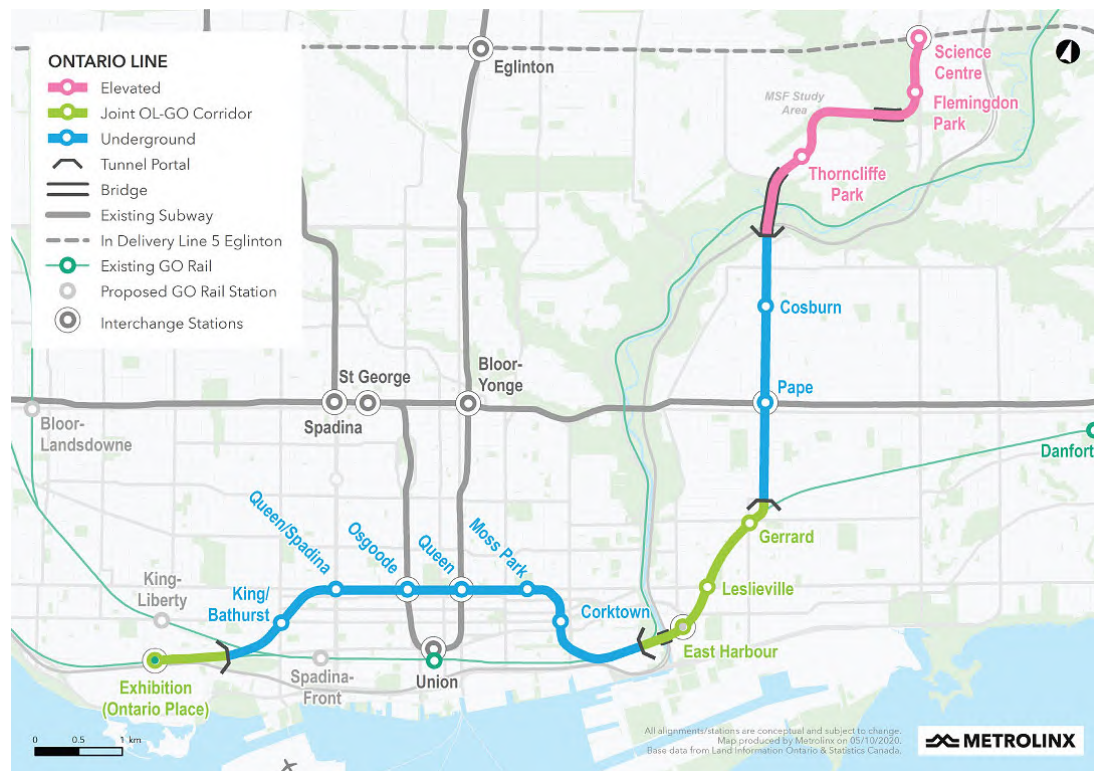


Figure 1-1: Ontario Line Route (Source: Metrolinx.com)

Proposed Works

A summary of the proposed Ontario Line works and the associated traffic lane, parking lane, sidewalk, and bicycle lane closures, along with their high-level impacts, is provided in **Table 1-1** and **Table 1-2**. The configurations of the traffic staging plans were made in consultation with the Ontario Line Traffic and Transportation Working Table, which comprised of the Ontario Line Technical Advisor (OLTA), Metrolinx, City of Toronto, and the TTC. In addition to the Ontario Line works, City-led projects were accounted for in the analysis of operational impacts to the Downtown transportation network and transit routes. The City-led projects considered roads, bridges, transit, and water projects. The transportation projects in the network analysis included major delay drivers from their construction such as the YongeTOmorrow, University Avenue ActiveTO project, Gardiner Expressway rehabilitation, Toronto Water projects for sewer main, sewer manhole, and watermain works, and TTC streetcar track renewal on King Street. These combined projects represent the most significant impact that would be experienced at the same time as the Ontario Line construction. Additional projects are considered and coordinated with the City (roads, bridges, transit, and utility) as their planned construction plans and required closures become available; however, their impact to the overall network or their durations will be significantly less compared to the above City-led projects.

Automobile Impacts

From an automobile perspective, there is one full road closure (Queen Street) and numerous partial lane closures that will impact the public travelling way adjacent to the construction work zones for the Downtown OL Stations. A computer traffic model was developed and calibrated as the analysis tool to document the impacts to autos for the downtown focused study area bounded by Dundas Street, Parliament Street, Front Street, and Bathurst Street to identify impacts of the Ontario Line and City-led closures. The key automobile impacts include:

- The full closure of Queen Street is estimated to increase network travel times by 17% during the AM peak and 7% during the PM peak. The network travel time impact will be up to 29% during the AM peak period and up to 33% during the PM peak period when City closures are added in combination with the Ontario Line works.
- The above impacts represent the increases after applying signal optimization. Signal optimizations are estimated to reduce network-wide PM peak period travel time impacts from 36% to 33%.
- The travel time impacts are more significant during the PM peak period due to the spillback through the focus area network stemming from outbound commuter flows heading towards the Gardiner Expressway.
- On a corridor level, travel time impacts of up to 6 minutes are estimated during the AM peak period along adjacent east-west and north-south corridors near Queen Street. Up to 29 minutes of additional travel time is estimated during the PM peak period with the City-led (roads, bridges, transit, sewer, watermain) and Ontario Line closures in place due to the constrained congested conditions during the base scenario, diverted trips away from the Gardiner lane restrictions and Queen Street closure, as well as the lane restrictions imposed on key east-west corridors (Dundas Street, Richmond Street,



Adelaide Street, Front Street, and Wellington Street) from the sewer and watermain works.

- The closure of Queen Street will result in increases to adjacent east-west corridor volumes by up to 23% on Dundas Street in the AM and PM and 18% on Richmond Street in the PM adjacent to Yonge Street. The volumes diverted from Queen Street range between 1000-1100 vph in existing conditions for the AM and PM peak respectively.

Pedestrian and Cyclist Impacts

For all Ontario Line worksites, pedestrian sidewalks and crosswalks are provided on one or both sides of the impacted corridors. There are limited impacts for pedestrians to access nearby businesses.

For cyclists, dedicated bike lanes are maintained on all corridors where they are currently provided, impacts to shared facilities will require similar detours as auto or dismounting to traverse the impacted corridors as pedestrians.

A new bicycle lane connection will be introduced on the west side of York Street, with a dedicated lane between Richmond Street and Adelaide Street and a shared lane between Queen Street and Richmond Street.

Transit Impacts

Transit access for all existing TTC routes will be maintained. Some transit stops require to be moved upstream or downstream to avoid work sites, as well as the 501 streetcar detoured onto parallel streets. Travel delays due to road closures were analyzed in the Aimsun model alongside automobiles; the following key transit impacts were identified:

- The AM peak will experience relatively low transit impacts; up to 11 minutes of additional travel time is estimated for Route 501 Queen eastbound during the AM peak period due to the diversion to Adelaide Street, and increased congestion from Gardiner Expressway detours and sewer and watermain construction lane reductions. During the PM peak, up to 35 minutes of additional travel time is estimated for Route 501 Queen; the higher impacts during the PM peak are due to higher congestion on the Richmond Street and Adelaide Street detour routes.
- Due to planned streetcar track renewal, Route 504 is estimated to experience up to 10 minutes of additional travel time during the AM and up to 33 minutes in the PM. This stems from the potential bus replacement which will increase travel time variability and vehicle bunching.

Emergency Vehicle Impacts

Emergency vehicle routing impacts are expected as a result of the full closure of Queen Street between Bay Street and Victoria Street. Response times and typical routes will be similar for Paramedic Services Station 40, Fire Station 332, and Fire Station 333.



The response times from St. Michael's to the west side of the Queen Street closure will be marginally impacted, with an increased distance from 0.4 km to 0.8 km and a travel time increase from 2 minutes to 3 minutes.

Haul Routes

Trucks for the Ontario Line worksites are expected to primarily use the Gardiner Expressway and Don Valley Parkway to remove spoil and deliver construction materials. Access to most station construction sites will abide by existing turning and truck restrictions, except at Queen and Yonge where paid duty officers may be required to direct truck movements. At all other sites, traffic control persons will be stationed. Various spoils handling are being considered, which will be confirmed by Project Co.

During station excavation works, it is estimated that the majority of sites will generate an average of approximately 20 trucks per day. Queen Spadina, Osgoode, and Queen Station, are expected to generate an average of approximately 25 trucks per day during station excavation. A maximum of 15 trucks within a single hour is expected at all sites during station excavation and construction works. During tunnelling operations, an average of approximately 70 trucks per day and a maximum of 25 trucks within an hour are estimated at the Corktown Station site. These estimates assume 18 months of station excavation, 24 months of station construction, 18 months of portal construction works, and 250 working days per year.

Mitigation Measures:

To ensure all impacted road users will be aware of the works, advance notices and consultation with businesses, business improvement area (BIA), local residents, and impacted property owners will be undertaken. Advance portable variable message signs (PVMS) should be provided ahead of the construction area.

RoDARS reporting of planned impacts onto connected navigation services (i.e., Google Maps, Waze) and social media (i.e., Twitter) is recommended which could influence travel behaviours and reduce auto trips.

In addition to the messaging and communications to road users, targeted Mitigation Measures for City-Led construction projects include:

- Signal optimization along Yonge Street and adjacent detour routes to mitigate the impacts of the YongeTOMorrow project.
- Signal optimization along key east-west corridors in Downtown Toronto, including Dundas Street, Queen Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street, to mitigate the impact of traffic diversions during the Gardiner Expressway Rehabilitation project as well as the Toronto Water works. The results of the PM peak period analysis indicate that network-wide impacts can be reduced from 36% to 33% with the addition of signal optimization measures.



- Provide replacement bus service along King Street during the King Street Tracks Renewal Program with an increased transit frequency to maintain the same level of corridor passenger capacity.

The targeted mitigation measures for Ontario Line works include:

- Constructing streetcar tracks along York Street southbound from Queen Street to Adelaide Street to mitigate the impact of the Queen Street Station construction closures on TTC services. Streetcar stops will be provided on Richmond Street and Adelaide Street throughout the construction period.
- Transit stops conflicting with construction closures will be relocated downstream or upstream of the current location to allow for continued service in the area. The relocation of streetcar stops will require corresponding relocations of curb cuts or ramps to maintain accessibility.
- New transit signal priority measures should be considered along the 501 Queen streetcar detour route to mitigate delays to transit.
- Signal optimizations at intersections near the construction sites to mitigate the impact of traffic diversions from the Queen Street closure and other Ontario Line and City-led works.
- Converting Albert Street to two-way operation to mitigate the impact of the James Street and Queen Street closures, and signal head improvements and timing optimizations will be applied to the intersection of Bay Street with Albert Street. Install a new eastbound signal head at the entrance to Old City Hall from Albert Street to accommodate traffic entering from Bay Street during the conversion.
- Protect pedestrians with energy attenuators and temporary concrete barriers along detour paths, and install AODA compliant ramps where the sidewalk path detours through a lane closure.



Table 1-1: Station Works and Impacts Summary

Location	King Bathurst Station	Queen Spadina Station	Osgoode Station	Moss Park Station	Corktown Station	
Description of Work	Excavation and construction of King Bathurst Station headhouses, tunnelling for tracks.	Excavation and construction of Queen Spadina Station headhouses, tunnelling for tracks.	Excavation and construction of Osgoode Station new headhouses and integration, tunnelling for tracks.	Excavation and construction of Moss Park Station headhouse, tunnelling for tracks.	Excavation and construction of Corktown Station headhouses, tunnelling for tracks.	
Proposed Dates	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	
Proposed Duration Overall	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years	
General Description of Required Closures	Lane closures to accommodate the NE and SE headhouses at the intersection of King Street and Bathurst Street resulting in protected pedestrian paths and transit stop relocations.	Lane closure to accommodate the SW headhouse at the intersection of Queen Street and Spadina Avenue; headhouse construction will result in protected pedestrian paths and a transit stop relocation.	Lane closures to accommodate the NE and SW headhouses at the intersections of Queen Street / University Avenue and Queen Street / Simcoe Street, resulting in pedestrian detours and a transit stop relocation.	Lane closure to accommodate the Moss Park Station construction NW of the intersection of Queen Street and Sherbourne Street resulting in a protected pedestrian path, loss of vehicular capacity and on-street parking.	Lane and sidewalk closures around the Corktown Station blocks to accommodate the station construction, resulting in pedestrian detours and vehicular capacity impacts.	
Partial Road Closures	Work Associated	Excavation and Station construction.	Excavation and Station construction.	Excavation and Station construction.	Excavation and Station construction.	Excavation and Station construction.
	Facilities Impacted	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on NB Bathurst St (Stewart St to 30 m north of King). ▪ Curb lane closure on WB King approach (until 45 m east of Bathurst). ▪ Curb lane closure on EB King St receiving (until 35 m east of Bathurst St). ▪ Parking restriction on north and south side of Stewart Street (until 35 m east of Bathurst St). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths on King Street and 1.8 m on Bathurst Street. ▪ Existing sidewalk width on north side of Stewart Street will be maintained on protected path. <p>Bike Lanes: No impact.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on EB Queen St approach (up to 50 m west of Spadina). ▪ Parking bay closure on east side of Spadina Avenue, north of Queen Street. <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths on Queen Street and Spadina Avenue. ▪ Closure of sidewalk on south side of Bulwer Street, from Spadina Avenue to 20 m east of Spadina Avenue. <p>Bike Lanes: No impact.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on University NB receiving (until 100 m north of Queen St) with 20 m parking closure. ▪ Centre lane closure on University SB approach (from 30 m to 50 m north of Queen St) with 15 m parking closure. ▪ Curb lane closure and parking restriction on Simcoe SB (Queen St to Richmond St). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths around the lane closures / restrictions. ▪ Closure of sidewalk on west side of Simcoe Street adjacent to lane closure (Queen to alleyway). <p>Bike Lanes: Narrowed bicycle lanes (1.5 m bicycle lane and 0.5 m buffer) on Simcoe, from Queen to Richmond.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on WB Queen (from Sherbourne St to George St). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide path on Queen Street. <p>Bike Lanes: No impact.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on EB King / Berkeley receiving (until 55 m east of Berkeley St). ▪ Curb lane closure on SB Parliament Street (from King to Front). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths along Front, Parliament, and Berkeley. ▪ Closure of sidewalk on south side of King Street (from Berkeley St to 30 west of Parliament St). <p>Bike Lanes: No impact.</p>
	Business Access Impacts	Pedestrian access to businesses adjacent to the headhouses will be maintained.	Pedestrian detour around the Bulwer Street south sidewalk which connects to backs of businesses will be required.	Pedestrian access to Osgoode Station entrance near NE headhouse will be closed.	Reduced parking capacity at Moss Park Arena.	No business access impacts.
	Duration	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years
	Rerouting Options	Vehicles: No rerouting required. Pedestrians / Cyclists: No pedestrian rerouting required.	Vehicles: No rerouting required. Pedestrians / Cyclists: Pedestrians to detour around the south Bulwer Street sidewalk closure via the north side of Bulwer Street.	Vehicles: No rerouting required. Pedestrians / Cyclists: Pedestrians to detour around Simcoe Street sidewalk closure via east side of Simcoe Street.	Vehicles: No rerouting required. Pedestrians / Cyclists: No pedestrian or cyclist rerouting required.	Vehicles: No rerouting required. Pedestrians / Cyclists: Pedestrians to detour around the sidewalk closure via north side of King Street.
	Traffic Staging Drawing	Figure 4-1: King Street / Bathurst Street - Traffic Staging Plan	Figure 4-4: Spadina Avenue / Queen Street - Traffic Staging Plan	Figure 4-7: University Avenue / Queen Street (Osgoode Station) - Traffic Staging Plan	Figure 4-30: Moss Park Station - Traffic Staging Plan	Figure 4-33: Corktown Station - Traffic Staging Plan
	Transit Impacts	Route No. 504 – stop relocations, marginal delays due to lane reductions.	Route No. 501 – stop relocations, marginal delays due to lane reduction.	Route No. 501 – stop relocations only	Route No. 501 – marginal delays due to lane reduction.	Route No. 504, 65, 121 – marginal delays due to lane reduction.
	Proposed Transit Reroute	No rerouting required.	No rerouting required.	No rerouting required.	No rerouting required.	No rerouting required.



Table 1-2: Queen Station Works and Impacts Summary

Location		Queen Station
Description of Work		Excavation and construction of Queen Station.
Proposed Dates		Q2 2023 - Q4 2027
Proposed Duration Overall		Approx. 4.5 years
General Description of Required Closures		Full road closures on Queen Street and James Street, a partial road closure on Victoria Street, and two-way conversion required on Albert Street to accommodate the Queen Station construction near the intersection of Queen Street and Yonge Street, resulting in transit, auto, and pedestrian detours.
Partial Road Closures	Work Associated	Staging and laydown area for Queen Station construction.
	Facilities Impacted	Roads: ▪ One SB curb lane closure on Victoria Street (30 m north of Queen St to 5 m south of Queen St). Sidewalks: ▪ Protected 2.1 m wide paths around the lane closure. Bike Lanes: No impact.
	Business Access Impacts	No business access impacts.
	Duration	Approx. 4.5 years
	Rerouting Options	Vehicles: No rerouting required. Pedestrians / Cyclists: No rerouting required.
	Traffic Staging Drawing	Figure 4-10 & Figure 4-11 Queen Closure - Traffic Staging Plan
	Transit Impacts	No impacts.
	Proposed Transit Reroute	No rerouting is required.
	Preconditions	N/A
Full Road Closures	Work Associated	Excavation and Station construction.
	Facilities Impacted	Roads: ▪ Full closure of Queen Street (from Bay St to Victoria St). ▪ Full closure of James Street (from Queen St to Albert St). ▪ Two-way conversion of Albert Street (Bay St to James St) and York Street (Queen St to Adelaide St). Sidewalks: ▪ Protected 2.1 m wide paths around the work sites. ▪ Closure of sidewalk on south side of Queen Street for 6 months from 50 m west of Victoria St to 20 m west of Victoria St, and 4.5-year closure from Victoria St to 20 m west of Victoria St. ▪ Closure of sidewalk on east side of James Street (from Queen St to 40 m north of Queen St). Bike Lanes: No impact.
	Business Access Impacts	Access to retail storefronts at 1 Queen Street East will be closed from the sidewalk. The mid-block at-grade signalized crossing between Eaton Centre and Hudson's Bay will be deactivated.
	Duration	Approx. 4.5 years
	Rerouting Options	Vehicles: Via adjacent east-west corridors (Dundas St, Richmond St, Adelaide St, Front St). Pedestrians / Cyclists: Pedestrians to detour around Queen Street sidewalk closure via north side of Queen Street for 6 months until the sidewalk connection to the south-west Queen St / Victoria St plaza is opened. Pedestrians walking along James Street will be required to detour via the west side of James Street during the closure period.
	Traffic Staging Drawing	Figure 4-10 & Figure 4-11 Queen Closure - Traffic Staging Plan
	Transit Impacts	Route No. 501 detours with increased travel times of up to 35 minutes EB and 28 minutes WB during AM and PM peaks.
	Proposed Transit Reroute	Reroute via York Street, Richmond Street (Westbound), Adelaide Street (Eastbound), and Church Street.
Preconditions	Utility early works, York Street conversion to accommodate streetcar detour, and Albert Street two-way conversion to accommodate James Street closure.	

2 Introduction

2.1 Construction Overview

The Ontario Line is one of four priority subway projects under development in the Greater Toronto Area (GTA). The fully automated line will run from Ontario Science Centre, south to Pape Station on Line 2, then connect to Line 1 at both Queen and Osgoode Stations, before continuing west to Exhibition/Ontario Place.

This project is the largest single subway expansion in Toronto’s history and will provide much-needed expanded subway service to Toronto to make it faster and easier for hundreds of thousands of people to get where they need to be each day. The current planned route for Ontario Line is illustrated below in **Figure 2-1**.

Construction of the Ontario Line stations and tunnels in Downtown Toronto is expected to begin in the summer of 2022 with the selection of the South Civils proponent (Project Co). Street occupancy is expected to begin in late 2022 and will last 4-7 years.

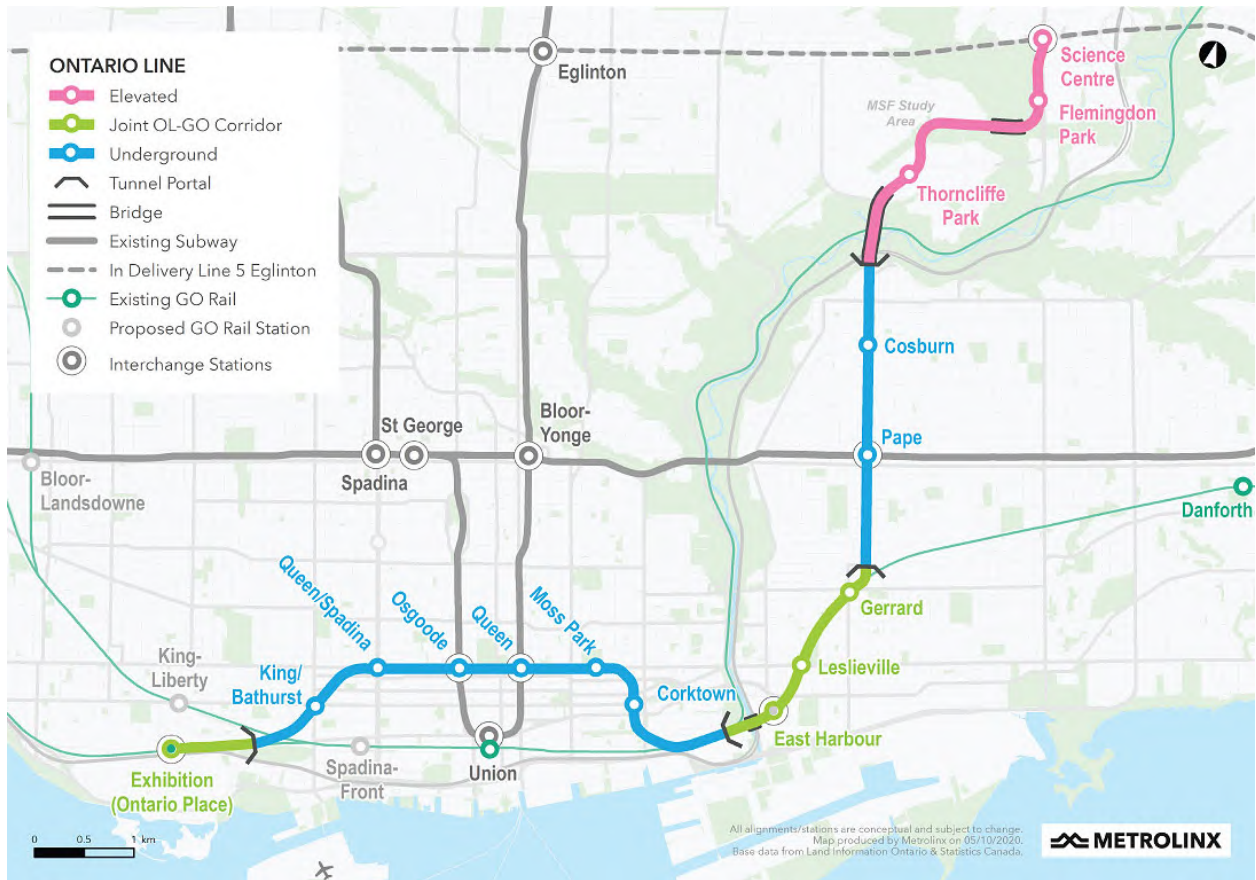


Figure 2-1: Ontario Line Route (Source: Metrolinx.com)

2.2 Objectives

The purpose of this report is to: (1) summarize the Traffic Management Plans (TMP) for the downtown station work areas (2) identify the proposed construction activities planned by others within the same area and timeframe; (3) outline the impacts; and (4) propose mitigation measures for anticipated network deficiencies. The report will further detail the construction planning options considered at Queen Station detailing the transportation rationale for pursuing a full closure of automobile traffic on Queen and James Streets during construction.

This report is intended to provide stakeholders (including City of Toronto, TTC, and others) with technical information to support the required road closures to construct the Ontario Line stations outlined in the scope. It is intended as an initial assessment of the Ontario Line closures, impacts, and mitigation measures to seek approval for the full closure of Queen Street and other Ontario Line closure, and a detailed TTMP will be submitted by Project Co.

2.3 TTMP Assessment Approach

This report covers the major station and tunnel construction activities to be undertaken by South Civils Project Co between Bathurst and Cherry Streets as illustrated in **Figure 2-2**.

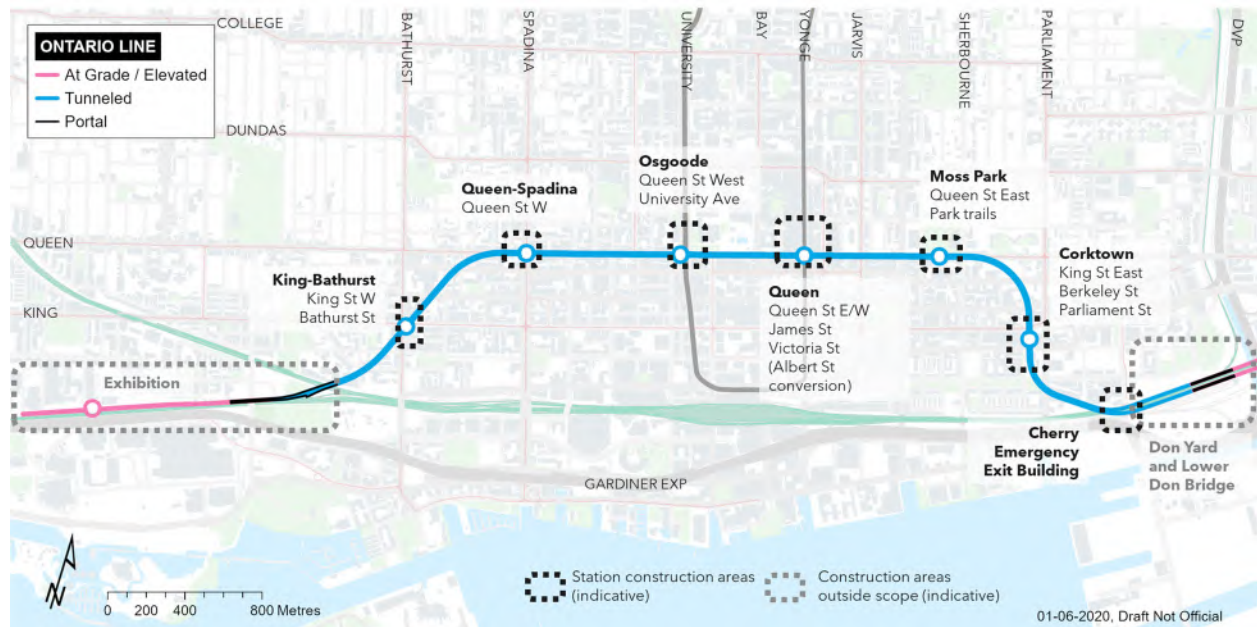


Figure 2-2: Downtown Ontario Line Construction Areas

The scope for the Traffic Management analysis includes:

- Review of the existing conditions near each of the Downtown work areas, including the community types, roadway, cycling, pedestrian, and transit networks, and the existing travel patterns;
- Detailed microsimulation modelling of Downtown Toronto to assess vehicular and transit impacts;

- Identification of temporary impacts to all modes resulting from the construction works, including access/egress, travel time impacts for transit and autos, auto delay and queueing impacts at intersection movements, traffic diversion and infiltration potential, emergency vehicle routing impacts, and recommended haul routes; and
- Identification of mitigation measures for identified impacts on the network.

Additional analysis at Queen Station includes:

- Multi-modal cost comparison for a full Queen Street closure and partial 2-lane Queen Street closure scenario supported by microsimulation modelling bound by Dundas Street, Parliament Street, Front Street, and Bathurst Street;
- Evaluate the construction scheduling and cost implications of undertaking a partial 2-lane Queen Street closure over a full Queen Street closure for Queen Station construction; and
- Identify targeted mitigation measures for identified impacts on the network.

It is noted that some of the detailed aspects of construction configurations included in this report are subject to approval from the City of Toronto, and details may be subject to change as the project continues to develop and additional stakeholder inputs are incorporated into the designs. The temporary configuration of Albert Street, including the on-street parking, turnaround space, WheelTrans loading and operations, etc., are being coordinated with the City of Toronto and TTC. This TTMP will be refined as further coordination related to the Ontario Line closures and City-led projects is carried out with the City.

2.4 Exclusions

There are ongoing analyses and documentation that will be provided as the planning and design progress to delivery:

- Exhibition Station (already circulated) and North Civil segments (East of Cherry Street), which are analyzed in separate TTMP reports
- Preparatory/Advanced/Early Works – Utility relocation, streetcar track construction, and other preparatory work leading up to the South Civil constructions and closures are expected to cause shorter-term impacts to the transportation network that precedes the closures identified in this report, and will be addressed in separate work packages.
- Construction Management Plan (CMP) – To be completed by Project Co based on the final design and includes an updated TMP.
- Station Design Plans – Station-specific future conditions, and the adjacent road and sidewalk configurations, are addressed as part of the Site Plan Review (SPR) process.
- Transit Oriented Communities (TOC) – Future condition analysis for transit-oriented community developments is also addressed as part of separate traffic impact studies.
- Operations and Maintenance – Post civil work for the Rolling Stock, Systems, Operations and Maintenance (RSSOM) scope are expected to have fewer and shorter-term impacts as the South Civil construction, which does not require a separate set of analysis.

3 Existing Conditions

3.1 Existing Land Use

The land use designations in Downtown Toronto are illustrated in **Figure 3-1**, taken from the City of Toronto Official Plan Map 18 (February 2019) with the proposed locations of Ontario Line stations identified.

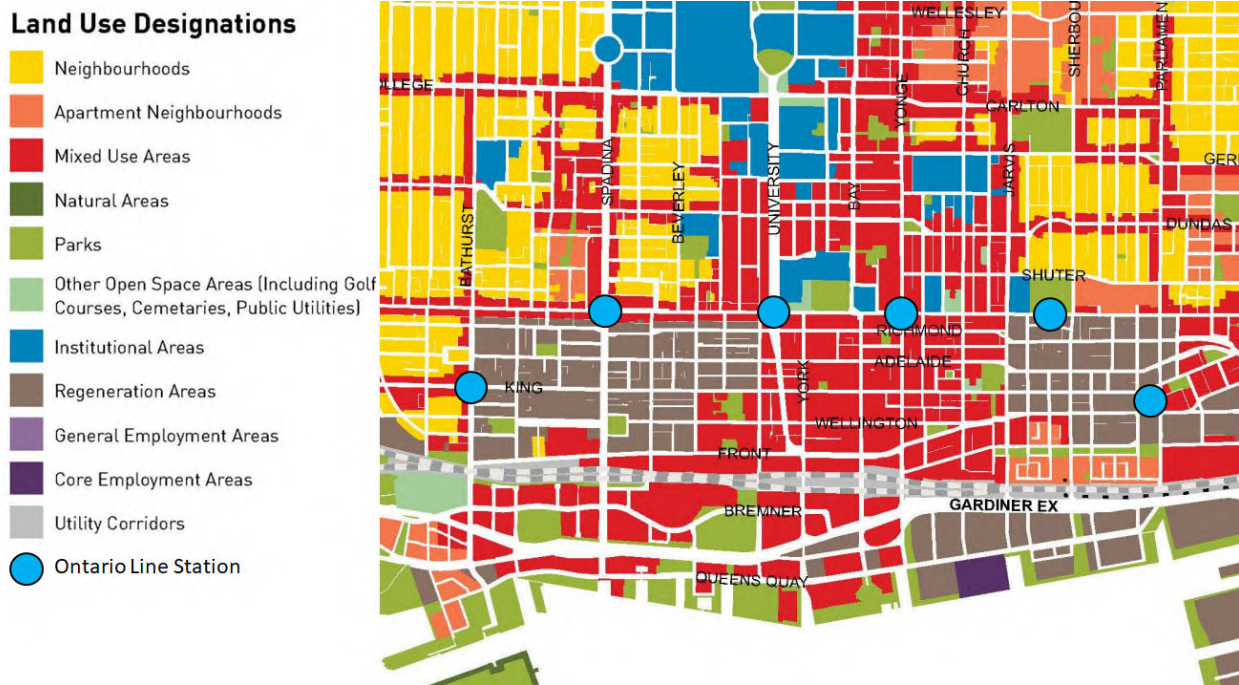


Figure 3-1: Land Use Designations (Map 18, City of Toronto Official Plan)

King/Bathurst Station

The neighbourhood around King/Bathurst Station is mainly characterized by Neighbourhood and Regeneration Area land uses, with some nearby Mixed-Use Area and Parks uses. King/Bathurst Station will be located on the edge of the Financial District with many nearby residential apartments, offices, and retail stores.

Queen/Spadina Station

The neighbourhood around Queen/Spadina Station is characterized generally by a mix of Neighbourhood, Apartment Neighbourhood, Mixed Use Area, and Regeneration Area uses, with some nearby Parks uses. Queen/Spadina Station will be located on the edge of Alexandra Park and Fashion Districts, and nearby to Chinatown. The area is characterized by mid-rise buildings which host retail, residential, and office uses. Chinatown is a nearby tourist destination, and Queen Street serves as a retail strip nearby as well as serving many nearby restaurants.



Osgoode Station

The neighbourhood around Osgoode Station is characterized generally by a Mixed-Use Area land use, with nearby Institutional Area, Parks, Regeneration Area, and Other Open Space Area. Osgoode Station is located on the edge of the Financial District and Grange Park District, with a local area characterized by tourist attractions, offices, and some residential towers.

Queen Station

The neighbourhood around Queen Station is characterized generally by a Mixed-Use Area land use, with some nearby Institutional Area, Parks, and Other Open Space Area. Queen Station is located on the edge of the Financial District, adjacent to the Eaton Centre Mall, and a short distance away from Toronto City Hall and Old City Hall.

Moss Park Station

The neighbourhood around Moss Park Station is characterized by Park and Regeneration Area, with nearby Institutional Area, Mixed Use Area, and Apartment Neighbourhood. Moss Park Station will be located in the Moss Park District at Moss Park. The future station will improve access to the George Brown College St. James Campus, the Moss Park Armoury, and the local retail and residential uses.

Corktown Station

The neighbourhood around Queen Station is characterized by a Regeneration Area, with some nearby Mixed-Use Area and Parks. Corktown Station will be located adjacent to Corktown District; the existing area around the future station location currently has car dealerships (Nissan and Porsche), retail, and residential buildings.

3.2 Existing Street Network

The street network in the study area is generally characterized by a fine-grain network that provides many alternate multi-modal routes between trip origins and destinations. The network accommodates some of the highest pedestrian, cyclist, and transit mode shares in the City alongside automobile volumes. Due to the significant pedestrian volumes at intersections, many of the left turning and right turning movements at major intersections Downtown have turning restrictions that only allow through or right turning movements to reduce lane blockages during peak periods.

Key roadways within the Downtown Toronto network are described below. All roadways are under the jurisdiction of the City of Toronto.

Dundas Street

Dundas Street is a two-way east-west major arterial street with a posted speed limit of 40 km/h and a four-lane cross-section. There are eastbound and westbound streetcar stops approximately every 200 metres within the study focus area. Auxiliary turn lanes are generally not provided on Dundas Street within the focus area except at the Bathurst Street intersection. Connections to the Toronto Transit Commission (TTC) Line 1 subway route are available at Dundas Street / University Avenue (St. Patrick Station), and Dundas Street / Yonge Street (Dundas Station).

**Queen Street**

Queen Street is a two-way east-west major arterial street with a posted speed limit of 40 km/h and a four-lane cross-section. There are eastbound and westbound streetcar stops approximately every 200 metres within the study focus area. Auxiliary turn lanes are not provided on Queen Street within the focus area. Connections to the TTC Line 1 subway route are available to Queen Street / University Avenue (Osgoode Station), and Queen Street / Yonge Street (Queen Station). Turn restrictions exist for the left turns on all approaches to the intersection with Bay Street throughout the daytime (7:00 AM to 7:00 PM Mon-Fri, 7:30 AM to 6:30 PM Sat), for left and right turns on all approaches to the intersection with Yonge Street at all times, and the eastbound and westbound left turns at Victoria Street throughout the daytime. Approximately 600 eastbound and 500 westbound vehicle trips cross Yonge Street during the PM peak hour, with the opposite trend during the AM peak hour.

Richmond Street

Richmond Street is a one-way westbound major arterial street with a posted speed limit of 40 km/h. Richmond Street generally has a three-lane cross-section within the study area until Peter Street at which point the street continues with a two-lane cross-section until Bathurst Street. Auxiliary left turn lanes are provided at Spadina Avenue, Peter Street, and Jarvis Street. Richmond Street has a protected bicycle lane on the north side of the roadway between Parliament Street and Niagara Street.

Adelaide Street

Adelaide Street is a one-way eastbound major arterial street with a posted speed limit of 40 km/h and generally has a three-lane cross-section within the focus area. Eastbound left auxiliary turn lanes are provided at Church Street, Jarvis Street, and Parliament Street, and a westbound left is provided at Jarvis Street. A protected bicycle lane is provided on the south side of the roadway.

King Street W

King Street is a two-way east-west major arterial street with a posted speed limit of 40 km/h and a four-lane cross-section. The King Street Transit Priority Corridor extends from Bathurst Street to Jarvis Street, along which vehicles are required to turn right at signalized intersections. Eastbound and westbound streetcar stops are located approximately every 200 metres. Connections to the TTC Line 1 subway route are available at King Street / University Avenue (St. Andrew Station), and King Street / Yonge Street (King Station).

Bathurst Street

Bathurst Street is a two-way north-south major arterial street with a posted speed limit of 40 km/h and has a four-lane cross-section. A northbound right turn lane is provided at the intersection with Adelaide Street. Northbound and southbound streetcar stops are located approximately every 200 metres on Bathurst Street within the focus area.

Spadina Avenue

Spadina Avenue is a two-way north-south major arterial street with a posted speed limit of 40 km/h and a six-lane cross-section (including two exclusive north-south streetcar lanes in the centre of the street) north of Richmond Street, and an eight-lane cross-section to the south of Richmond Street. Auxiliary left turn lanes are provided at Dundas Street, Queen Street, southbound at Adelaide Street, northbound at King Street, and in both directions at Front Street. Northbound and southbound streetcar stops are located approximately every 200 metres on Spadina Avenue and bicycle sharrow lane markings are painted in the curbside lane in both directions.



University Avenue	University Avenue is a two-way north-south major arterial street with a posted speed limit of 40 km/h and an eight-lane cross-section north of Adelaide Street and a wide landscaped median. University Avenue has a six-lane cross-section between Adelaide Street and Wellington Street with no median; south of Wellington Street, the roadway narrows to a four-lane cross-section and has a northbound left auxiliary lane at the intersection with Front Street. Connections of Ontario Line to the TTC Line 1 subway route are provided at Front Street (Union Station), Queen Street (Osgoode Station), and College Street (Queen's Park Station).
Bay Street	Bay Street is a two-way north-south major arterial street with a posted speed limit of 40 km/h and a four-lane cross-section. Auxiliary turn lanes are provided at Front Street, Wellington Street (northbound), and Dundas Street (northbound). North-south bus stops are provided approximately every 150 metres on Bay Street within the focus area, at every major signalized intersection except Richmond Street.
Yonge Street	Yonge Street is a two-way north-south major arterial street with a posted speed limit of 40 km/h and a four-lane cross-section. A northbound left turn auxiliary lane is provided at the intersection with Front Street. Connections to the TTC Line 1 subway route are provided at Front Street (Union Station), Queen Street (Queen Station), and Dundas Street (Dundas Station). North-south bus stops are located approximately every 150 metres within the focus area.
Jarvis Street	Jarvis Street is a two-way north-south major arterial street with a posted speed limit of 40 km/h and a four-lane cross-section south of Queen Street. North of Queen Street, within the focus area, Jarvis Street has a five-lane cross-section with a managed centre lane that changes direction based on peak period directional flows.
Lake Shore Boulevard	Lake Shore Boulevard is a two-way east-west major arterial street with a posted speed limit of 60 km/h. Through the study area, it has a 6-lane cross-section, with three through-lanes per direction, and auxiliary left-turn lanes at major intersections.
York Street	York Street is a minor arterial street with a posted speed limit of 40 km/h which operates as a one-way northbound street between Front Street and Richmond Street, and a two-way north-south street between Richmond Street and Queen Street. York Street begins as a single lane at the intersection with Front Street, widening to four northbound lanes between Wellington Street and Richmond Street. Auxiliary northbound left turn lanes are provided at the intersections with Wellington Street and Richmond Street, and dedicated left and right turn lanes are provided at the intersection with Queen Street. Streetcar tracks are currently provided on the second lane from the right-most curb lane along York Street, providing connections from Wellington Street, King Street, and Richmond Street.
Victoria Street	Victoria Street is a two-way north-south collector street with a posted speed limit of 30 km/h. Victoria has a four-lane cross-section north of Adelaide Street, however, due to on-street parking on the east and west sides of the roadway, only two traffic lanes are typically available for general traffic. South of Adelaide Street, Victoria Street operates with a single northbound lane, with on-street parking on the east and west sides on the street.

Albert Street

Albert Street is a one-way westbound local street with no posted speed limit and a single traffic lane. On-Street parking is provided along the north side of Albert Street. Albert Street is not intended to be used as a throughway and mainly provides access to Old City Hall or to the on-street parking on the north side and accessible loading zone on the south side.



James Street

James Street is a one-way northbound local street with a posted speed limit of 30 km/h and a single traffic lane. On-street parking is provided on the east and west sides of James Street. James Street is not intended to be used as a throughway and mainly provides access to the parking and loading area for the Bell Trinity Square building or to the on-street parking.

3.2.1 Existing Congestion Hotspots

Congestions were modelled hotspots for the AM and PM periods, as discussed in **Section 5.1**. The intersections with significant delays and spillbacks in the existing condition model are illustrated in **Table 3-1** and **Table 3-2**. Travel time validation was carried out at a corridor level for both peak period models along Dundas Street, Queen Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street using historical data, shown in **Appendix A**.

Table 3-1: AM Peak Hour Modelled Hotspots

Model Conditions	Description
	<p>Bay Street (between Wellington Street and Richmond Street): The southbound approach capacity at Bay / Wellington is constrained by a significant southbound right demand which is unable to be processed due to the number of pedestrians crossing the intersection. Creates congested conditions upstream approximately 500 metres to Queen Street.</p>
	<p>Richmond Street (between Church Street and Parliament Street): Significant westbound congestion spilling back from Church / Richmond due to high demand. AM peak hour congestion extends approximately 650 metres upstream.</p>

Model Conditions	Description
	<p>Eastbound Gardiner Off-Ramp to Jarvis Street: High demand on the off-ramp results in significant spillbacks onto the Gardiner, restricting upstream eastbound through movements on the mainline, creating congested conditions on the Gardiner Expressway beyond Strachan Avenue approximately 3.5 km upstream.</p>

Table 3-2: PM Peak Hour Modelled Hotspots

Model Conditions	Description
	<p>Queen Street & Yonge Street: Congested conditions extend approximately 600 metres back from the intersection due to high demand.</p> <p>University Avenue & Richmond Street: The westbound left movement from Richmond Street is constrained by high conflicting pedestrian crossing volumes on the south crosswalk, creating congestion upstream and constraining the westbound through capacity.</p>
	<p>Adelaide Street (from Jarvis Street to Peter Street): Congested conditions eastbound along Adelaide Street extend approximately 1.7 km from the intersection, caused by high demand on the eastbound approach and exacerbated by southbound congestion along Jarvis Street which constrains the eastbound right movements from Adelaide Street.</p>

Model Conditions	Description
	<p>Eastbound Gardiner Off-Ramp to Jarvis Street: High demand on the off-ramp results in significant spillbacks onto the Gardiner, restricting upstream eastbound through movements on the mainline, creating congested conditions on the Gardiner Expressway beyond Strachan Avenue approximately 3.5 km upstream.</p>
	<p>York Street-University Ave (from Lake Shore Boulevard to Front Street) Southbound demand creating queues that spill back up to Front Street.</p> <p>Lakeshore Boulevard (from York Street to Bathurst Street) High demand on the eastbound approach to the intersection results in significant congestion extending approximately 2.0 km upstream to Bathurst Street.</p>
	<p>Dundas Street (between Bay St and University Ave): Westbound left vehicles queuing at Bay Street and waiting to turn onto Chestnut Street result in queueing and congestion spilling back on Dundas Street approximately 650 metres, past Victoria Street.</p>

3.3 Existing Cycling Network

The Downtown transportation network hosts several on-street and off-street cycling routes. The City’s cycling network expansion and renewal works are guided by the 10 Year Cycling Network Plan (2016) as well as a detailed three-year rolling implementation programme as illustrated in **Figure 3-2**.

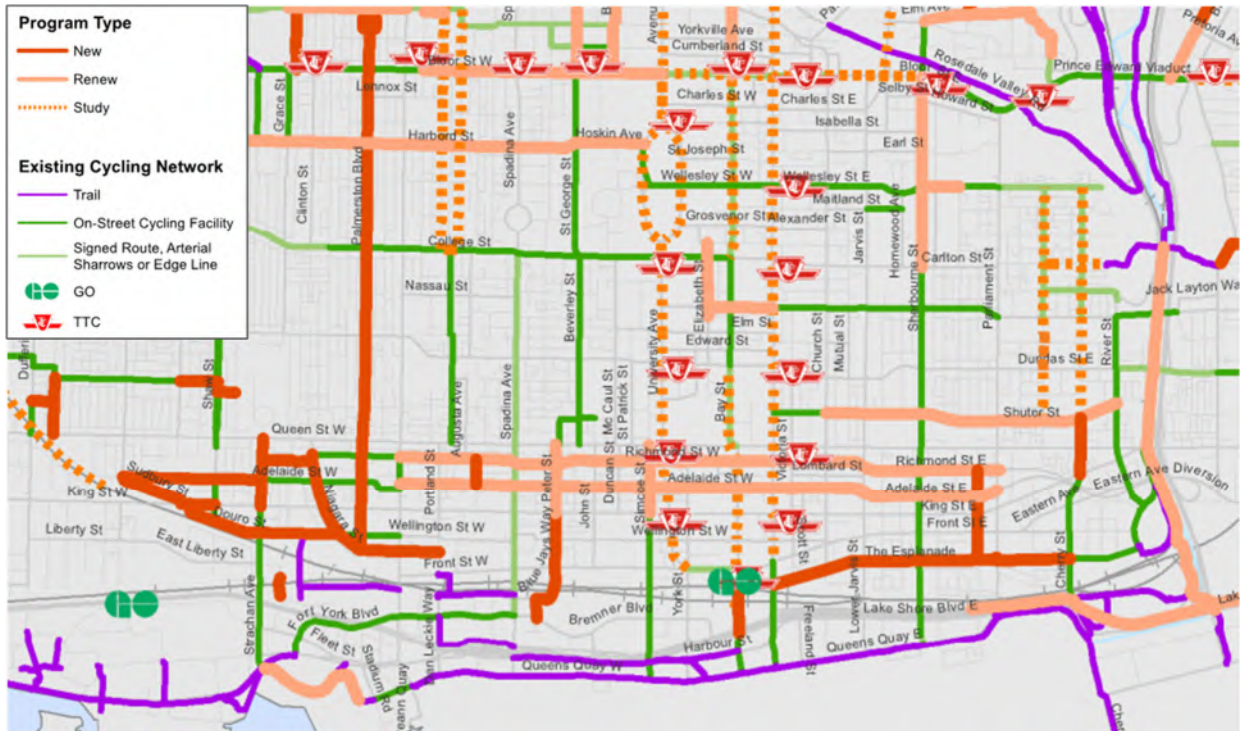


Figure 3-2: City of Toronto Near-Term Implementation Program (2019-2021)

The protected east-west bicycle lanes on Richmond Street and Adelaide Street provide good east-west options for cyclists throughout Downtown Toronto.

Although not a protected route, King Street between Bathurst Street and Jarvis Street also provides an improved experience for cyclists due to the turning restrictions for autos as part of the King Street Transit Priority Corridor. Bicycles are permitted on King Street and are provided with bicycle ramps (at select locations) through transit stop pads.

University Avenue underwent temporary bike lane conversion between Bloor Street and Adelaide Street, providing a dedicated cycling lane protected by a parking lane.

Additional plans are in place to study bicycle lane implementation for Yonge Street and Bay Street. However, the City of Toronto identified that bike lane implementation on Yonge Street will end north of the study area considered as part of this report.

Most of the other north-south cycling routes are currently located on minor arterial roads, such as Simcoe Street and Berkley Street, and cyclists are often required to share roadways with vehicles for portions of their trips.

Further, as part of the City’s COVID-19 pandemic response, a number of the “Study” routes identified above were either temporarily or permanently outfitted with cycle tracks as part of the ActiveTO initiative (**Figure 3-3**). Within the focus area, this included:

- University Avenue between Bloor and Adelaide – curbside cycle tracks in both directions (temporary)
- Douro-Wellington between King and Niagara – bike lanes and cycle tracks (permanent)
- Shuter Street between Victoria and River – bike lanes and cycle tracks (permanent)
- Dundas Street East at DVP – bike lanes and cycle tracks (temporary)
- Weekend closures of Lakeshore Boulevard and Bayview Avenue

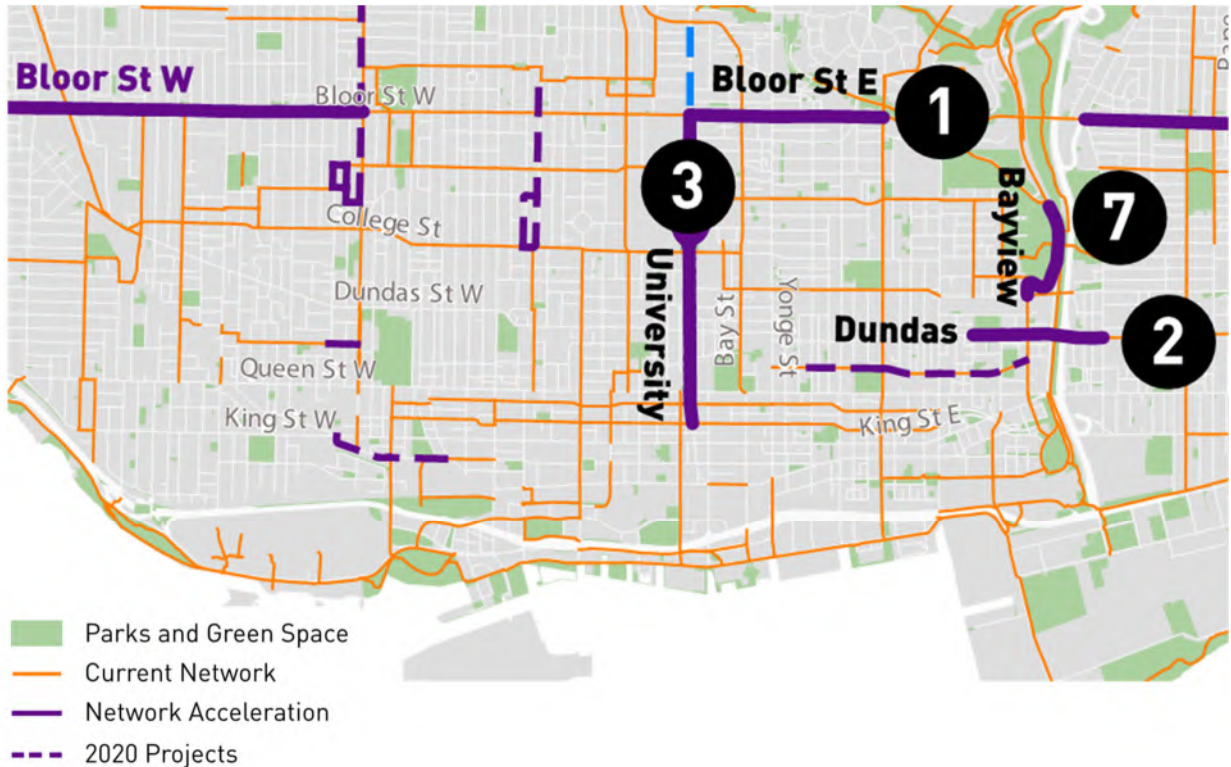


Figure 3-3: ActiveTO Cycling Projects (2020)

3.4 Existing Pedestrian Facilities

The City of Toronto Sidewalk Inventory Map extracted from the City of Toronto website is illustrated in **Figure 3-4**. As is shown in the map, under existing conditions the areas around all of the proposed Downtown Ontario Line stations are well served by sidewalks, with pedestrians having several nearby alternate routes to take.



Figure 3-4: City of Toronto Sidewalk Inventory

3.5 Existing Transit Operations

The TTC operates streetcar services along Dundas Street, Queen Street, King Street, Bathurst Street, and Spadina Avenue within the focus area. All of the surface routes provide direct access to the Toronto Subway System via Line 1 (Yonge-University-Spadina) at St. Patrick, Dundas, Osgoode, Queen, St. Andrew, King, or Union Station. Access to Line 2 (Bloor-Danforth) is provided at Bathurst, Spadina, Bay, and Sherbourne Station. Typical route frequencies for key Downtown routes, extracted from the *Toronto Transit Commission Service Summary, May 12, 2019 to June 22, 2019* are summarized in **Table 3-3**. The Downtown Map of TTC services is provided for reference in **Figure 3-5**.

Table 3-3: TTC Transit Route Headways (TTC Service Summary, May 12, 2019 to June 22, 2019)

	May 12, 2019 to June 22, 2019		Monday to Friday					Saturday				Sunday/Holiday			
	All-Day, Every Day ¹	10-minute Service ²	Morning Peak	Midday	Afternoon Peak	Early Evening	Late Evening	Morning	Afternoon	Early Evening	Late Evening	Morning	Afternoon	Early Evening	Late Evening
Subway Routes															
1 Yonge-University	•	•	2	4	3	4	5	4	4	5	5	5	4	5	5
2 Bloor-Danforth	•	•	2	3	3	4	5	5	5	5	5	5	5	5	5
Bus Routes															
5 Avenue Rd			13	30	20	22		22	22	22		20	20	20	
6 Bay	•		5	11	7	15	25	16	14	20	24	16	14	20	24
7 Bathurst	•	•	8	8	8	8	9	9	8	9	10	10	8	9	10
65 Parliament	•		13	13	11	18	16	16	16	15	15	15	15	15	15
72 Pape	•	•	6	10	7	9	9	9	9	9	9	9	9	9	9
75 Sherbourne	•		5	8	8	13	17	13	10	30	30	20	20	30	30
97 Yonge	•		15	15	15	15	15	15	15	15	15	15	15	15	15
121 Fort York-Esplanade	•		13	20	18	20	23	18	16	18	18	20	15	18	20
Streetcar Routes															
501 Queen	•	•	4	5	5	5	9	5	4	6	9	7	4	8	9
504 King	•	•	3	4	3	4	5	4	3	4	5	4	4	5	5
505 Dundas	•	•	4	4	4	5	8	5	4	6	9	6	5	8	10
509 Harbourfront	•	•	7	7	7	8	10	7	6	9	9	8	7	9	10
510 Spadina	•	•	4	4	5	4	8	4	4	5	8	5	4	6	7
511 Bathurst	•	•	3	4	3	5	5	6	4	5	5	6	5	7	8

Notes:

¹ All-Day, Every Day: route operates at all times, seven days a week over all or portions of the route. Consult individual route summary for details.

² 10-Minute Service: route operates every ten minutes or better at all times the route is operated, over all or portions of the route. Consult individual route summary for details.

Combined service intervals shown where route includes multiple branches, refer to individual route service summaries for branch-level service.

Dark Gray highlight indicates periods of frequent service of 10 minutes or better over all or portions of the route.

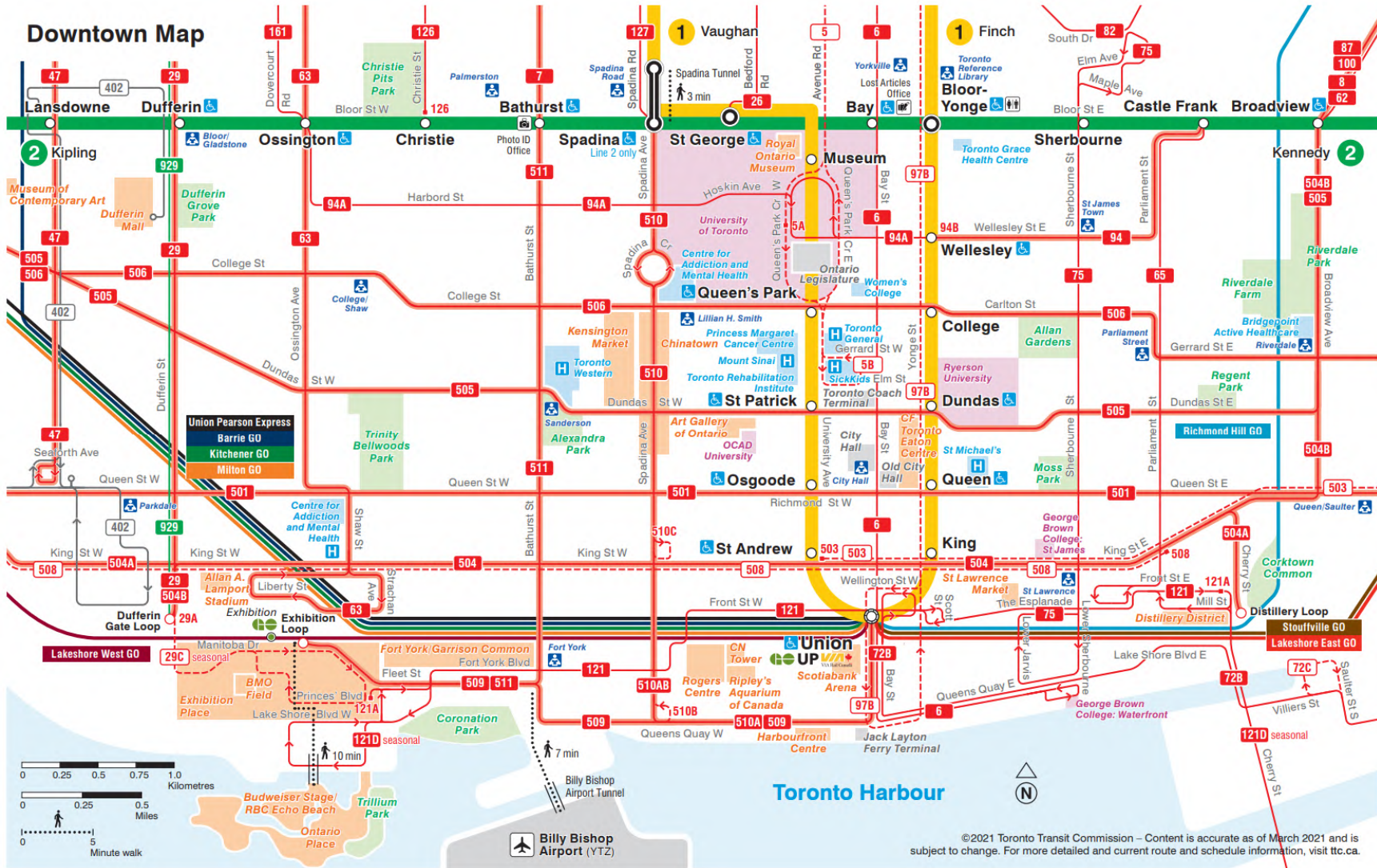


Figure 3-5: TTC Downtown Route Map

3.6 Existing Travel Demand Patterns

To examine the existing (Pre-COVID) vehicular travel patterns Downtown, a Select Link analysis was conducted using the GTA v4 EMME model, as illustrated in **Figure 3-6**. The Select Link plot identifies existing travel patterns through the potential closure site. Updates to the GTA model were undertaken to account for the recent reconfiguration of University Avenue (construction of bike lanes in each direction), the King Street Transit Priority Corridor, and the latest Queens Quay configuration.

Based on the EMME analysis, it was identified that approximately 54% of trips start and end in Downtown Toronto, and 46% start and/or end outside of Downtown Toronto. This indicates that there is a slight majority in short distance trips within Downtown Toronto (between DVP and Bathurst) for which there are alternative routes and modes available such as the subway, TTC buses / streetcars, walking, or cycling. The minority of trips (46%) starting and/or ending outside of Downtown Toronto generally travel via University Avenue, Bay Street, Yonge Street, Jarvis Street, Queen Street West, and Queen Street East, and would have many alternative routes available to use for their trips.

Specifically, at the intersection of Queen Street and Yonge Street, it was observed that 96% of auto traffic started and ended in Downtown Toronto (between Spadina and Jarvis), whereas less than 1% was through traffic that had started and ended outside of Downtown Toronto. Trips originating and destined outside of Downtown Toronto have alternate routes such as Lakeshore and the Gardiner.



Figure 3-6: Queen Street Select Link Analysis

3.7 Existing Traffic Restrictions

Existing traffic and turn restrictions were assessed throughout Downtown Toronto to analyze potential trucking routes for muck/spoil removal and delivery of construction materials to the work sites. The assessments considered turning restrictions, truck restrictions, travel distance, and road closures to identify preferred routes. The key restrictions on vehicles in the vicinity of the Downtown stations are illustrated in **Figure 3-7**.

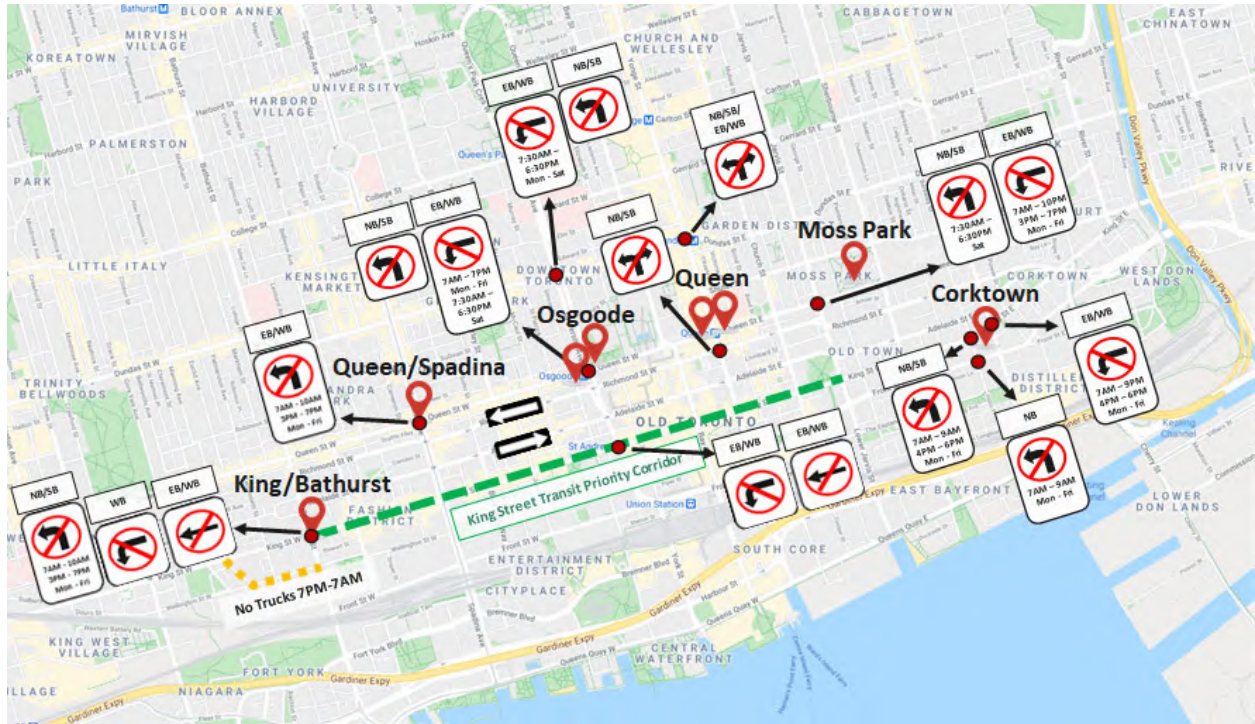


Figure 3-7: Key Vehicular Restrictions

4 Construction Staging and Road Closures

4.1 Ontario Line Construction

The following section provides a high-level overview of the construction activities anticipated at each of the Project Co work sites within the study area. These descriptions are based on the closures identified in the Reference Concept Design (RCD) and Project Specific Output Specifications (PSOS); Project Co will be responsible for finalizing the construction and traffic and transit management plans as per the Project Agreement. The configurations of the traffic staging plans were made in consultation with the Ontario Line Traffic and Transportation Working Table, which comprised of the Ontario Line Technical Advisor (OLTA), Metrolinx, City of Toronto, and the TTC.

4.1.1 King/Bathurst Station Construction

The Ontario Line tunnel(s) and most of the station's concourse and platform level will be constructed using mining techniques; therefore, the surface construction impacts will be limited to approximately the headhouse areas on the northeast and southeast corners where excavation and construction access will impose spatial constraints on the existing transportation network. All crosswalks and pedestrian connections will be maintained within the area throughout construction. The construction impacts at King/Bathurst Station are expected to begin in Q4 2022 and remain in place until substantial completion of the Station; current estimates foresee the construction extending until Q4 2027.

Construction impacts will include:

- Lane closures on both curb lanes on the east leg of King Street and Bathurst Street. The eastbound curb lane is closed off under existing conditions due to the placement of street furniture and a transit platform, however, these will need to be relocated under construction conditions.
- Lane closure on the northbound Bathurst Street receiving curb lane (for approximately 30 m north of King Street), which currently operates as an auxiliary right turn lane. This auxiliary lane is mainly used for vehicles accessing the Adelaide Street corridor and northbound right-turn traffic can continue to use the auxiliary turn lane north of Browns Lane throughout the construction period.
- Partial narrowing of the northbound approach curb lane on Bathurst Street down to a 3.3-metre width from King Street to Stewart Street.
- Closure of the east-west private alleyway approximately 35 metres north of King Street, behind the north headhouse. Service vehicles to the adjacent condo building at 650 King Street West will need to maneuver within the existing driveway.
- On-street parking will be prohibited for a short segment of Stewart Street to accommodate an access to the construction staging / laydown area.
- All sidewalks around the headhouse work site on Bathurst Street and King Street will be maintained, with a minimum width of 2.1 metres along King Street and 1.8 metres along Bathurst Street. Pedestrian's access will be maintained on both sides of Stewart Street.



- The existing TTC stops located on the westbound approach and eastbound receiving lane to the intersection of King Street with Bathurst Street will be relocated easterly approximately 70 metres and 35 metres, respectively.

The details of the traffic staging plan are illustrated in **Figure 4-1**.

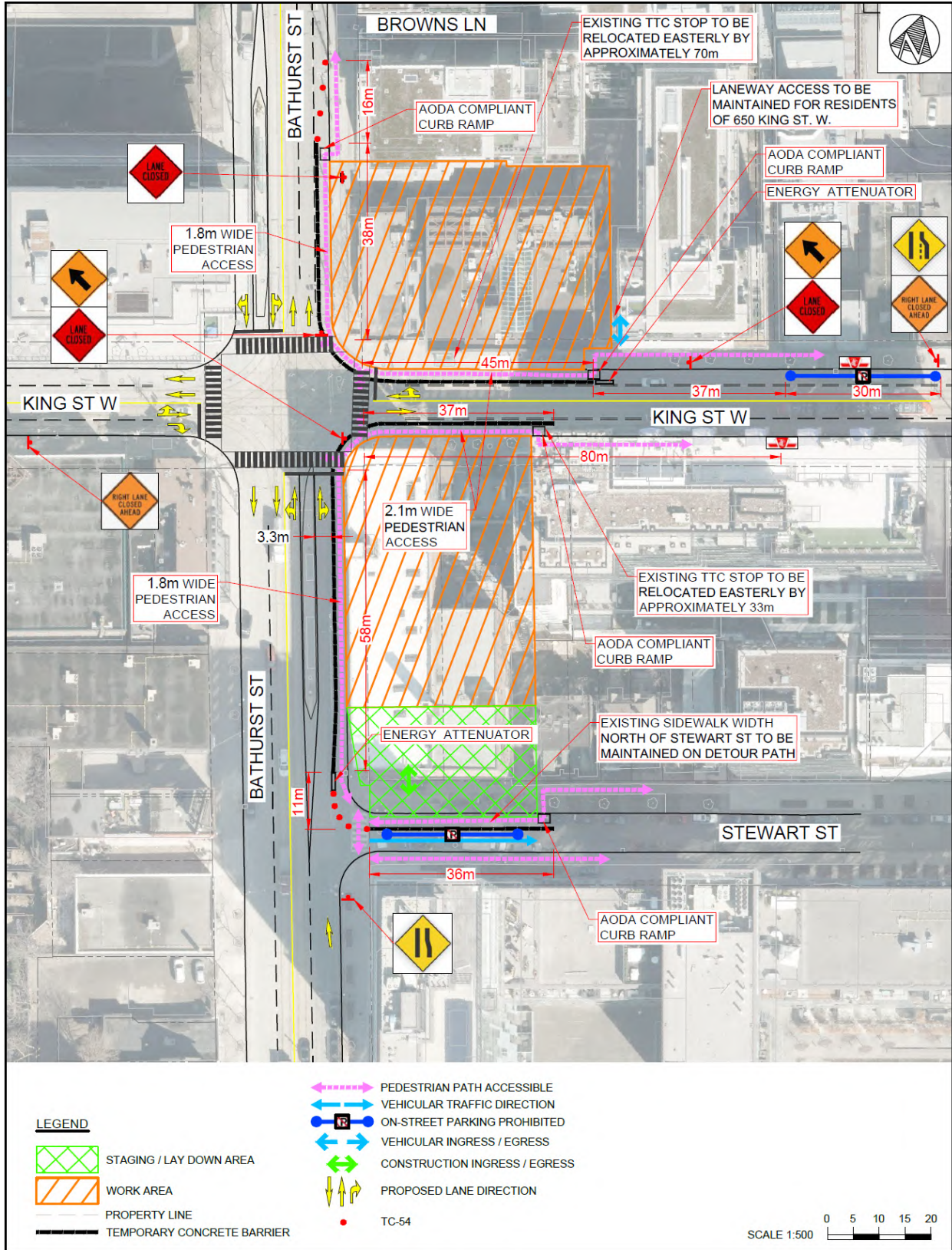


Figure 4-1: King Street / Bathurst Street - Traffic Staging Plan

A summary of road closure impacts is described in **Table 4-1**.

Table 4-1: Construction Impact Summary at King Bathurst Station

Impact types	Impact Descriptions
Local Auto Access	Access to the east-west alleyway 35 metres north of King Street on the east side of Bathurst Street will be closed during construction due to the overlapping work area. Access to the alleyway to 650 King Street West and to the southeast corner on Stewart Street will be maintained for local residents, deliveries, and emergency services; however, the width of Stewart Street will be reduced along the length of the parking closure.
On-Street Parking	On-street parking impacts as a result of the King / Bathurst Station construction are expected to occur for approximately 15 metres on the north side of Stewart Street east of Bathurst Street to reserve access for construction vehicles.
Transit Stop	The eastbound and westbound transit stops at the intersection of King Street and Bathurst Street are located approximately 53 metres and 18 metres east of the intersection, respectively. The eastbound and westbound stops will be relocated further east by approximately 35 metres and 70 metres, respectively, throughout the King Bathurst Station construction.
Pedestrian	Pedestrian access will be maintained around the King Bathurst Station worksite. The existing sidewalk on the northeast and southeast corners of King/Bathurst will be maintained at a minimum width of 2.1 m on King Street and 1.8 m on Bathurst Street. The sidewalks on both sides of King Street and the sidewalk on east side of Bathurst Street will be delineated into the curbside traffic lanes, which will be protected from traffic with temporary barriers, TC-54s, and energy attenuators.
Door Access	Door access to nearby residential buildings and businesses will be maintained as the sidewalk detours will only be required in front of the head house construction sites.
Cycling	There are currently no dedicated cycling lanes passing through the construction sites at the King Bathurst station. Where cyclists currently share the right of way with traffic, the remaining lanes will continue to allow cyclists to share the road.
Emergency Vehicles	There are no road closures that would require emergency vehicles to detour from the area. Emergency (fire/EMS) vehicles will continue to be able to traverse through the King/Bathurst intersection.
Haul Routes	The potential inbound and outbound haul routes are illustrated in Figure 4-2 and Figure 4-3 , respectively. There are no turn or truck restrictions noted along the haul routes. Bathurst Street will primarily be used by trucks entering the construction sites via a northbound right turn into the NE work site and an eastbound approach from Bathurst Street to the staging area on the north side of Stewart Street. Trucks are likely to make westbound right turns out of the NE work site, travel up Bathurst Street, and continuing eastbound on Adelaide Street, heading to Spadina Avenue and then southbound towards the highway. Trucks exiting the Stewart Street staging area will continue eastbound and onto Portland Street southbound to either Wellington Street or Front Street.

With a station excavation of approximately 72,000 m³, the total number of trucks handling spoils at King/Bathurst Station will be 7,200. Assuming a period of 18 months for station excavation and 250 working days per year results in an average of approximately 20 trucks per day at King Bathurst Station. On a daily basis, the average could be exceeded due to delivery of materials; a peak condition could be up to 15 trucks per hour given the road network and operational challenges of loading the trucks.

Station construction will require approximately 10,000 trucks to accommodate deliveries of shotcrete, concrete, reinforced steel, station finishes, escalators, elevators, etc. within 24 months. With an assumed 250 working days per year, an average of 20 trucks per day will be generated by the site. After excavation, there will be fewer trucks per day; however, during certain peaks, concrete trucks could be up to 15 trucks per hour.

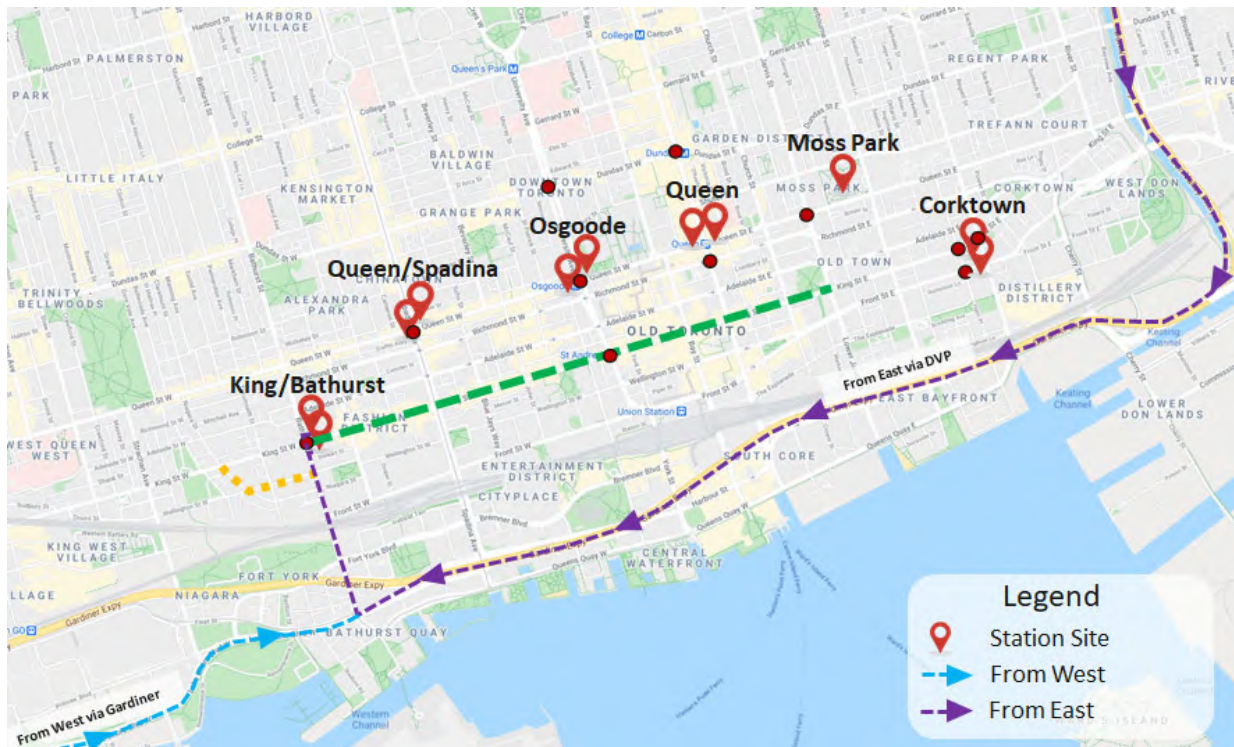


Figure 4-2: Inbound Haul Routes | King/Bathurst Station

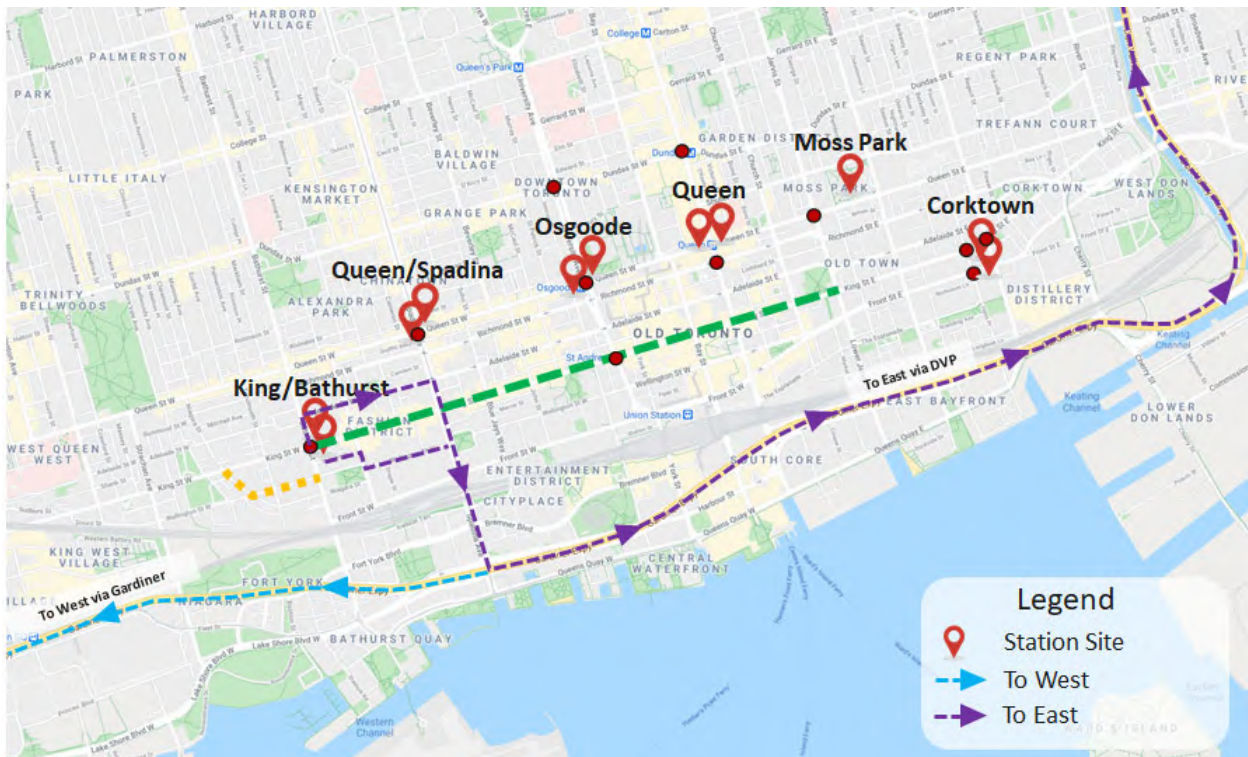


Figure 4-3: Outbound Haul Routes | King/Bathurst Station

4.1.2 Queen/Spadina Station Construction

The Ontario Line tracks will be tunnelled at the Queen/Spadina site and the construction impacts will mainly be caused by head house construction, where excavation and construction access will impose spatial constraints on the existing transportation network. All crosswalks and pedestrian connections will be maintained within the area throughout construction. The construction impacts at Queen/Spadina Station are expected to begin in Q4 2022 and remain in place until substantial completion of the Station; current estimates foresee the construction extending until Q4 2027.

Construction impacts will include:

- Lane closure on the eastbound approach curb lane on Queen Street to accommodate the southwest headhouse construction. The closure will impact the peak period operations due to the closure of the curbside through/right lane and will also impact off-peak on-street parking on the south side of Queen Street.
- All sidewalks around the headhouse work site on Queen Street and Spadina Avenue will be maintained at a minimum width of 2.1 m, with the exception of the south side of Bulwer Street which will have a closure on the south side from Spadina Avenue to 20 m east of Spadina Avenue.
- The eastbound Route 501 streetcar stop will need to be relocated westerly by approximately 80 metres.
- The northbound parking bays on Spadina Avenue north of Queen Street will be closed to accommodate the northeast headhouse construction and a protected pedestrian path.

The details of the traffic staging plan are illustrated in **Figure 4-4**.

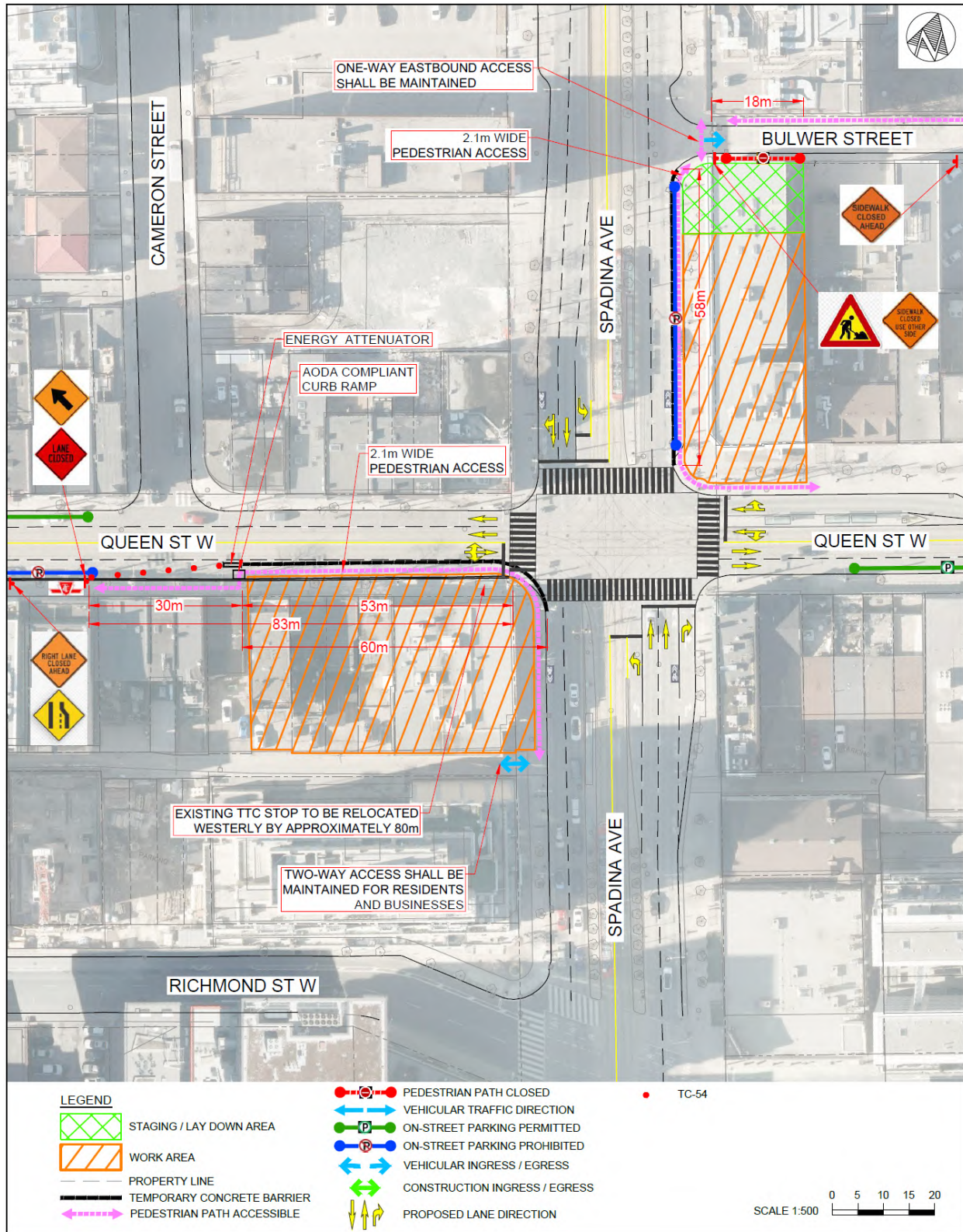


Figure 4-4: Spadina Avenue / Queen Street - Traffic Staging Plan

A summary of road closure impacts is described in **Table 4-2**.

Table 4-2: Construction Impact Summary at Queen Spadina Station

Impact types	Impact Descriptions
Local Auto Access	No local accesses will be closed as a result of the Queen / Spadina construction; access to Graffiti Alley and Bulwer Street will be maintained, except for short duration weekend closure of Graffiti Alley during building demolition.
On-Street Parking	Parking on the east side of Spadina Avenue just north of Queen Street will be closed to facilitate pedestrian access. On-street parking eastbound on Queen Street approaching Spadina Avenue will be prohibited to accommodate the transit stop relocation.
Transit Stop	The eastbound transit stop at the intersection of Queen Street and Spadina Avenue is located 3 metres west of the intersection and will be impacted by the eastbound lane closure for Station construction. As a result, the eastbound transit stop will be relocated approximately 80 metres west. The westbound transit stop will remain in place.
Pedestrian	<p>Pedestrian access will be maintained around the Queen Spadina Station worksites with the exception of Bulwer Street which will have a closure of the south sidewalk from Spadina Avenue to 20 m east of Spadina Avenue. Pedestrians will be required to detour via the north side of Bulwer Street.</p> <p>The sidewalks surrounding the southwest headhouse will be delineated into the eastbound curb lane on Queen Street, which will be protected from traffic with temporary barriers, TC-54s, and energy attenuators. The east sidewalk on Spadina Avenue will be delineated into the existing parking bay on the east side of Spadina Avenue, north of Queen Street. The sidewalks surrounding both headhouse sites will be maintained with a minimum width of 2.1 m.</p>
Door Access	Door access to nearby residential buildings and businesses will be maintained. Sidewalk detours will mainly be required in front of the head house construction sites, however, the south sidewalk closure and may result in a minor impact to pedestrians accessing the alleyway. Access to Graffiti Alley will be maintained throughout the construction.
Cycling	There are currently no dedicated cycling lanes passing through the construction sites at the Queen Spadina station. Where cyclists currently share the right of way with traffic, the remaining lanes will continue to allow cyclists to share the road.
Emergency Vehicles	There are no road closures that would require emergency vehicles to detour from the area. Emergency (fire/EMS) vehicles will continue to be able to traverse through the Queen/Spadina intersection.
Haul Routes	The potential inbound and outbound haul routes are illustrated in Figure 4-5 and Figure 4-6 , respectively. There are no turn or truck restrictions noted along the haul routes. Trucks entering the southwest work site are likely to enter via a right turn from Queen Street, arriving from Bathurst Street. Spadina Avenue will primarily be used by trucks entering the northeast work site, by turning right from Spadina Avenue. Trucks exiting from the northeast

quadrant work area can turn right onto Spadina Avenue and make a U-turn at the signalized intersection with Sullivan Street.

With a station excavation of approximately 90,000 m³, the total number of trucks handling spoils at Queen/Spadina Station will be 9,000. Assuming a period of 18 months for station excavation and 250 working days per year results in an average of approximately 25 trucks per day at Queen Spadina Station. On a daily basis, the average could be exceeded due to delivery of materials; a peak condition could be up to 15 trucks per hour given the road network and operational challenges of loading the trucks.

Station construction will require approximately 12,000 trucks to accommodate deliveries of shotcrete, concrete, reinforced steel, station finishes, escalators, elevators, etc. within 24 months. With an assumed 250 working days per year, an average of approximately 25 trucks per day will be generated by the site. During certain peaks there could be up to 15 trucks per hour arriving at the site.

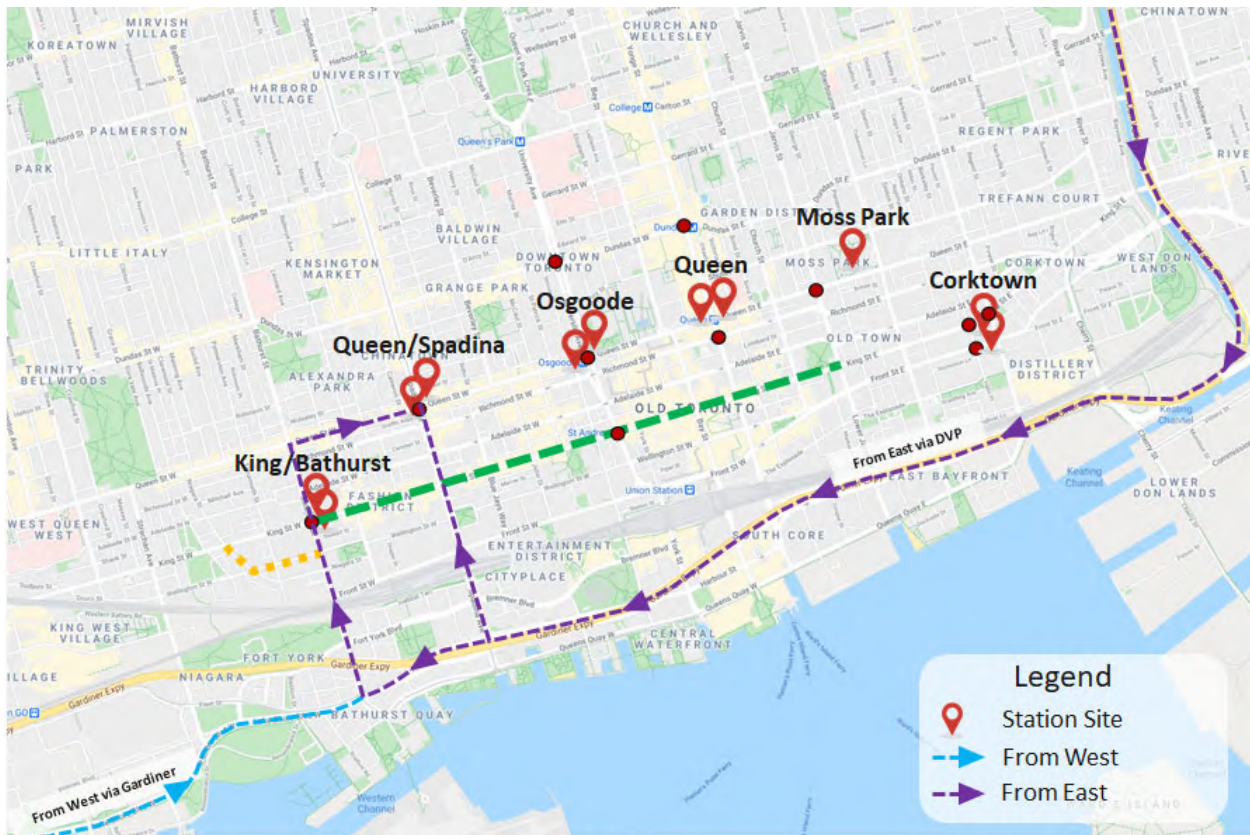


Figure 4-5: Inbound Haul Routes | Queen/Spadina Station

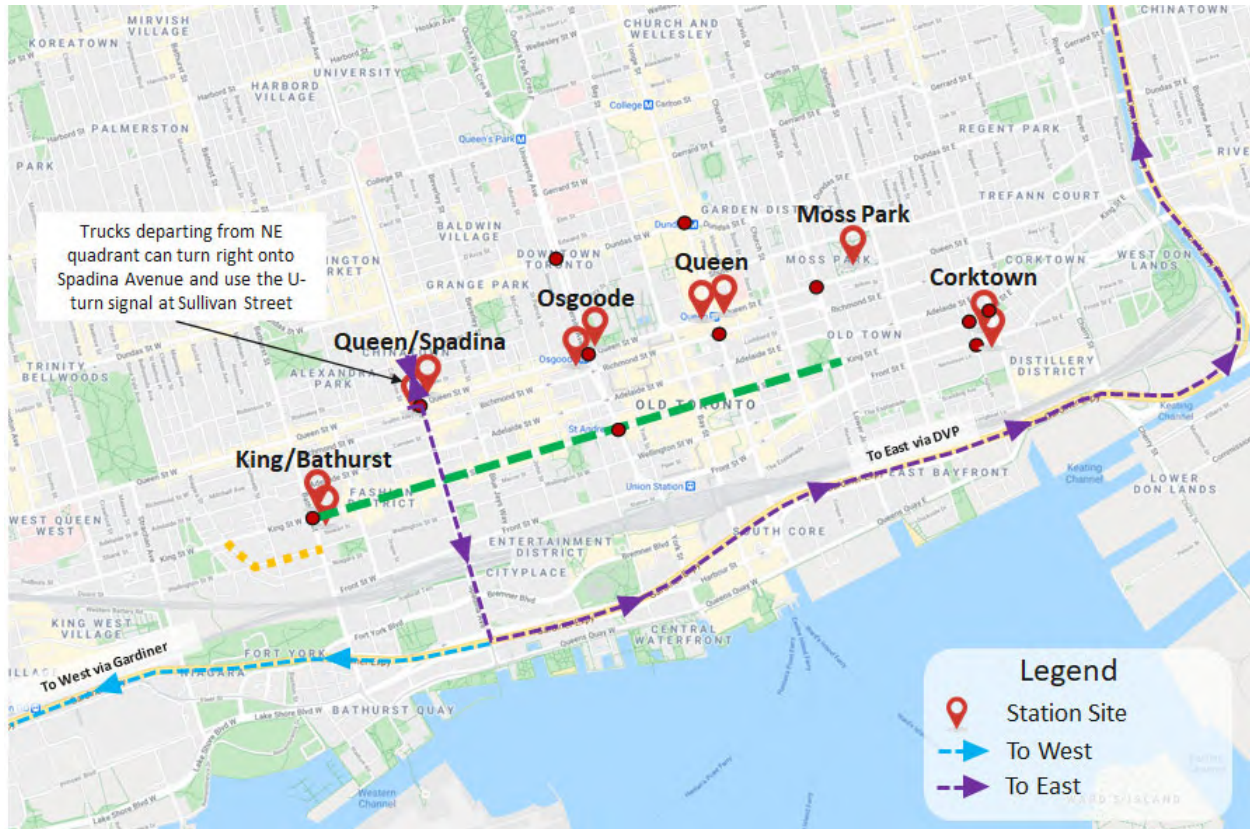


Figure 4-6: Outbound Haul Routes | Queen/Spadina Station

4.1.3 Osgoode Station Construction

The Ontario Line tracks will be tunnelled at Osgoode Station and the construction impacts will mainly be caused by head house construction, where excavation and construction access will impose spatial constraints on the existing transportation network. All crosswalks and pedestrian connections will be maintained within the area throughout construction. The bicycle lanes on University Avenue will be maintained throughout construction. The construction impacts at Osgoode Station are expected to begin in Q4 2022 and remain in place until substantial completion of the Station; current estimates foresee the construction extending until Q4 2027.

Construction impacts will include:

- Lane closure on the northbound receiving curb lane on University Avenue north of Queen Street West to accommodate the northeast headhouse construction. On-street parking, approximately 20 metres, at the northern end of the lane closure will be prohibited. The northbound curb lane on the south approach to the intersection will be converted to a dedicated right turn lane. Two receiving lanes and one bike lane will be maintained northbound during weekdays, however, during the weekend and night-time periods there is a potential for further closure to the northbound approach which would narrow the northbound receiving leg to a single lane to construct the underground tie-in to the existing Osgoode Station.
- Mid-block lane closure of the left-most lane on the southbound approach to the intersection of Queen Street and University Avenue. On-street parking will be removed

for approximately 15 metres near the lane closure taper so that the southbound capacity is not reduced.

- Lane closure on the southbound receiving lane and right-side parking lane on Simcoe Street from Queen Street to Richmond Street to accommodate the southwest headhouse construction and to provide for staging and heritage building façade storage areas.
- Night-time closures of the alleyway west of Simcoe Street between Queen Street and Richmond Street may be required.
- Shifting of the east curb line on Simcoe Street, resulting in a reduced sidewalk, bicycle lane, and travel lane; the remaining area will be allocated to the staging and heritage areas for construction. A reduced bicycle lane width of 1.5 metres will be maintained, with a 0.5-metre-wide buffer. The southern staging and heritage area will be kept clear near the 250 University Avenue garbage pick-up access to accommodate turning maneuvers.
- Closure of the sidewalk on the west side of Simcoe Street, from Queen Street to the alleyway north of Richmond Street. The east sidewalk on Simcoe Street will be reduced from 4.4 metres in existing conditions to 2.1 metres during construction.
- The westbound TTC stop at Queen Street and University Avenue will be relocated easterly by approximately 20 metres.

The details of the traffic staging plan are illustrated in **Figure 4-7**.

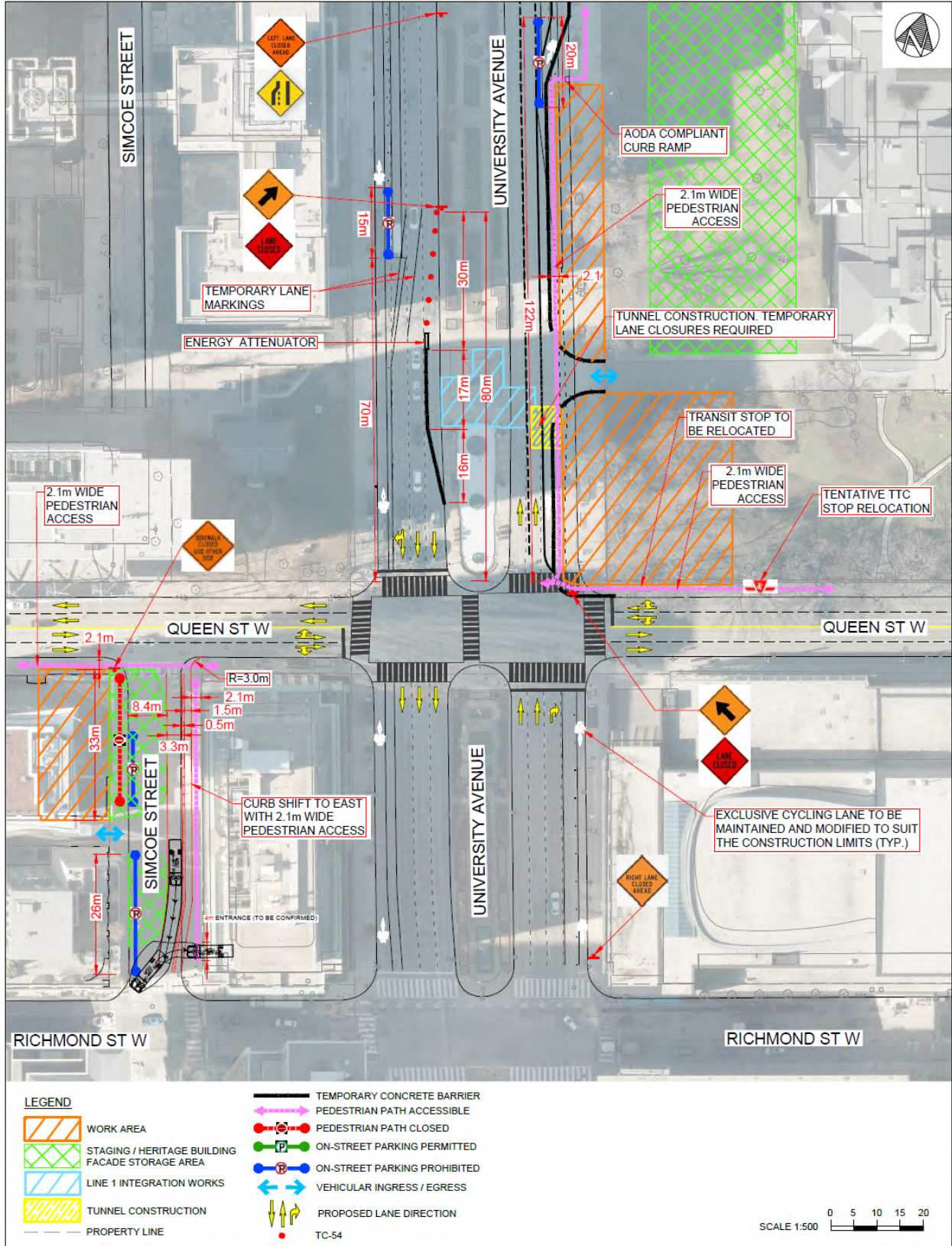


Figure 4-7: University Avenue / Queen Street (Osgoode Station) - Traffic Staging Plan

A summary of road closure impacts is described in **Table 4-3**.

Table 4-3: Construction Impact Summary at Osgoode Station

Impact types	Impact Descriptions
Local Auto Access	All local accesses will be maintained throughout construction; however, additional lane closures may be required during the weekends to install the tunnel connection. Night-time and weekend closures of the alleyway west of Simcoe Street south of Queen Street may be required.
On-Street Parking	As a result of the Osgoode Station construction at Queen Street / University Avenue, portions of the southbound on-street parking on Simcoe Street and University Avenue will be restricted; northbound parking on University Avenue north of Osgoode Hall and southbound near the lane closure taper will be restricted due to the construction work areas. The southbound portion of Simcoe Street between Queen Street and the midblock alleyway will be blocked off to accommodate construction access and a staging area.
Transit Stop	The westbound transit stop at the intersection of Queen Street and University Avenue is located 6 metres east of the intersection and will need to be relocated approximately 20 metres further east throughout the Osgoode Station construction period. The eastbound transit stop will not be affected by the Station construction.
Pedestrian	Pedestrian access will be maintained around the Osgoode Station worksite. The sidewalks surrounding the southwest head house will be maintained on the south side of Queen Street and east side of Simcoe Street with a minimum width of 2.1 m. Pedestrian access will be impacted on the west side of Simcoe Street; north-south travelling pedestrians will be required to use the sidewalk on the east side of Simcoe Street. The sidewalks surrounding the northeast head house will be maintained with a minimum width of 2.1 m. The sidewalk on the north side of Queen Street and the east side of University Avenue will be maintained at a minimum width of 2.1 m and delineated into the curbside traffic lanes, which will be protected from traffic with temporary barriers.
Door Access	There are no impacted business door fronts adjacent to the Osgoode headhouses. Pedestrian access to the Osgoode Station entrance adjacent to the northeast head house will be closed at the onset of construction.
Cycling	The Osgoode Station construction will close the northbound curbside lane on University Avenue, north of Queen Street; however, the protected cycling lane will be maintained throughout construction around the work area. Queen Street has no existing dedicated cycling facility, cyclists will continue to share the road. A reduced bicycle lane width of 1.5 metres will be maintained on Simcoe Street between Queen Street and Richmond Street, with a buffer of 0.5 metres.
Emergency Vehicles	There are no road closures that would require emergency vehicles to detour from the area. Emergency (fire/EMS) vehicles will continue to be able to traverse through the Queen/University intersection.

Haul Routes	<p>The potential inbound and outbound haul routes are illustrated in Figure 4-8 and Figure 4-9, respectively. There are no turn or truck restrictions noted along the haul routes.</p> <p>Access to the work sites will likely be through York Street-University Avenue for vehicles arriving from and exiting towards the west, Richmond Street for vehicles arriving from the east, and Adelaide Street for vehicles exiting towards the east. Trucks turning from the northeast quadrant work area can turn right onto University Avenue and make a U-turn at the median U-turn location just south of Armoury Street. Alternatively, trucks can continue north on University Avenue, turn northbound right at University Avenue / Dundas Street, and continue east on Dundas Street.</p> <p>With a station excavation of approximately 96,000 m³, the total number of trucks handling spoils at Osgoode Station will be 9,600. Assuming a period of 18 months for station excavation and 250 working days per year results in an average of approximately 25 trucks per day at Osgoode Station. On a daily basis, the average could be exceeded, with a peak condition of up to 15 trucks per hour being possible given the road network and operational challenges of loading the trucks.</p> <p>Station construction will require approximately 12,000 trucks to accommodate deliveries of shotcrete, concrete, reinforced steel, station finishes, escalators, elevators, etc. within a 24-month period. With an assumed 250 working days per year, an average of approximately 25 trucks per day will be generated by the site. During peaks there could be up to 15 trucks per hour arriving at the site.</p>
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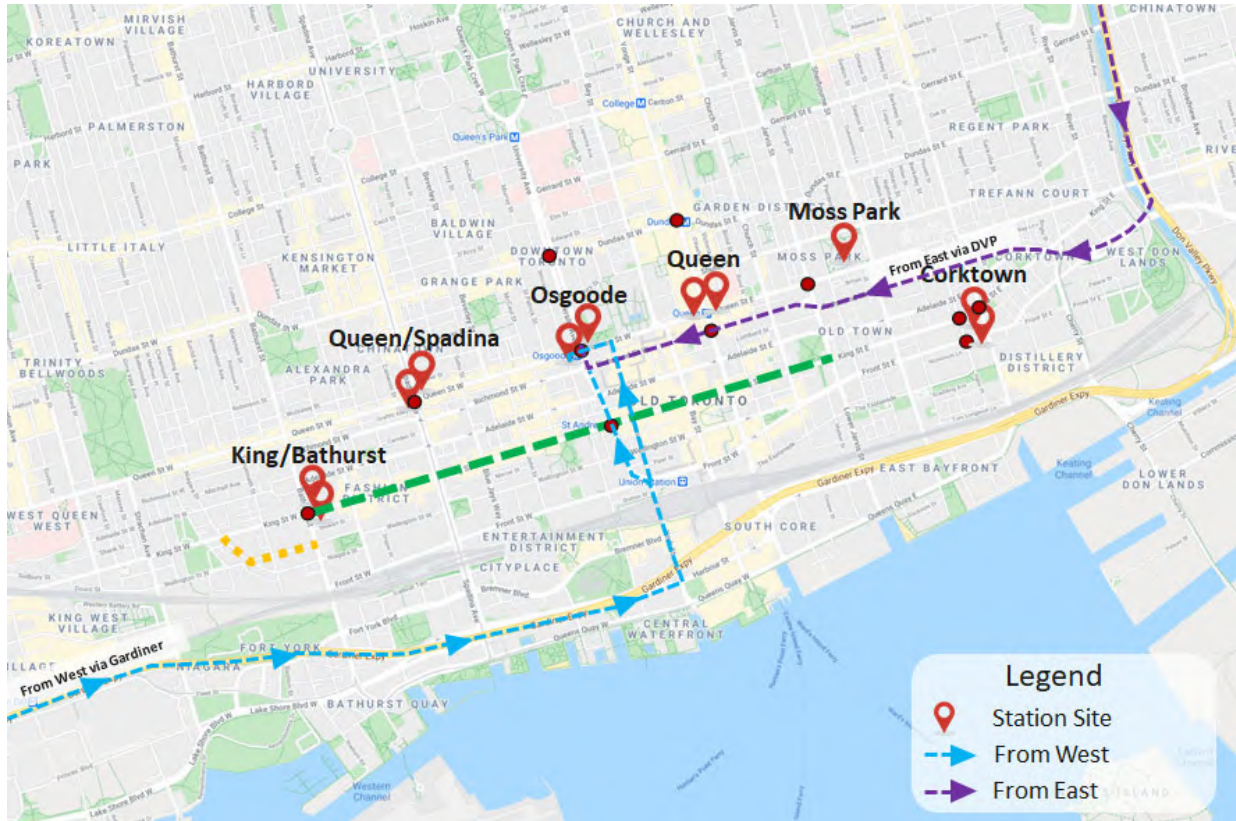


Figure 4-8: Inbound Haul Routes | Osgoode Station

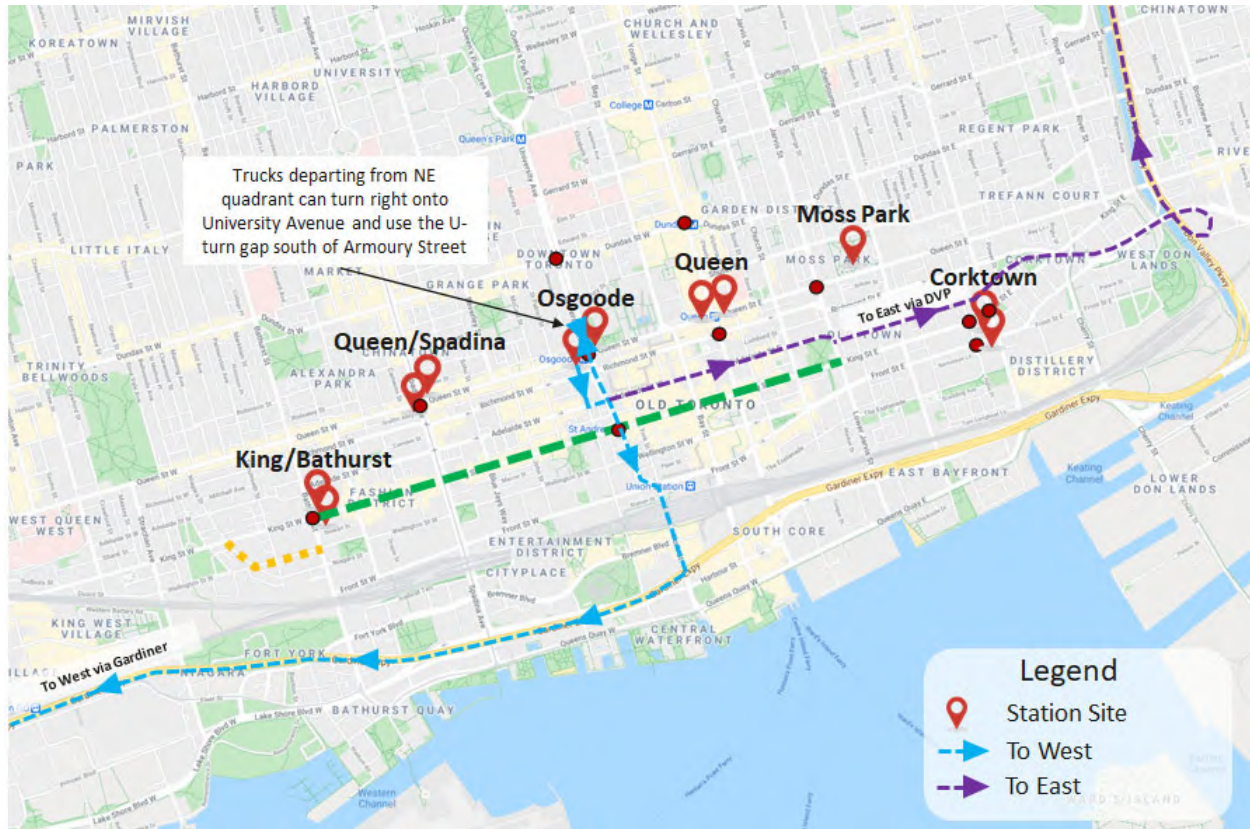


Figure 4-9: Outbound Haul Routes | Osgoode Station

4.1.4 Queen Station Construction

The Ontario Line Queen Station is centred on the intersection of Queen Street and Yonge Street in the heart of Downtown Toronto. The expected method of building this station is tunnelling through bedrock and excavation from the surface to create the station cavern and interface with the existing TTC Line 1 Queen Station.

As detailed in this report, most of the proposed extended closures downtown are limited to curb lane reductions and temporary re-routing of sidewalks and cycling facilities. The exception is at Queen Station where Metrolinx is proposing the temporary closure of all traffic lanes on either side of Yonge Street and James Street for up to 4.5 years, as well as the southbound curb lane on Victoria Street.

The existing Queen Station is unique for both its age (nearly 70 years old) and its layout - specifically the 1954-completed station included a pre-built station platform below the existing Line 1 platforms in anticipation for the now-defunct plans for an underground Queen Streetcar – also known as “Lower Queen Station.” To mitigate the risks of tunnelling under the existing structure while maintaining a reasonable transfer time for future riders, two ~15 m wide excavation pits are proposed on either side of the existing station structure on Queen Street West and East. This will permit the constructor to safely mine the 60 m length under the station structure without disruption to Line 1 service. Laydown areas are also required immediately adjacent to the excavation pits to support the mining operation. Upon completion, portions of the excavated areas will be outfitted with the remainder of the Ontario Line station structure that

extends beyond the 60 m long mined portion under Lower Queen. A traffic detour is required on James Street to construct fire ventilation systems to the surface and the emergency exit into the basement level of the Eaton Centre. All proposed construction areas will protect for pedestrian and business access throughout construction, but vehicles and streetcars would need to be detoured. The section below details the rationale for the recommendation to proceed with a 4.5-year auto detour scenario compared to a 6-year two-lane operation scenario. Further documentation of the integrated planning, design, and construction concept development is provided in the *Queen Station Option Selection Report*.

The contractor will be obliged to comply with the start/end dates specified in the Project Agreement. To provide additional certainty, as well as time for engagement and approvals, Metrolinx is proposing strict start and end dates in the contract in addition to financial penalties for lane and sidewalk closures. The lane closures around Queen Station are proposed to being no earlier than Q2 2023 and reopen no later than Q4 2027 (4 years and 6 months), specifically:

- **Queen Street** between Bay Street and Victoria Street – all traffic lanes closed, resulting in the displacement of approximately 1,000-1,100 vehicles per hour during the AM and PM peaks.
 - The Queen/Bay intersection will operate as a “T” intersection with only the eastbound through and westbound movements being restricted; the eastbound left and right turning movements will be allowed throughout construction.
 - The Queen/Victoria Street intersection will operate as a T-intersection with the north, south, and east approaches remaining open; the westbound left and right turning movements will be allowed throughout construction. North-south lanes on Yonge Street will remain open throughout construction.
- **James Street** from Queen Street West to Albert Street – all traffic lanes closed.
- **Victoria Street** at Queen Street – southbound curb lane closed.
- Yonge and Victoria Streets will remain open to all pedestrian, bicycle, and vehicular north-south traffic.
- Full pedestrian access will be maintained along Bay, Queen, and Victoria Streets except for a section on the south side of Queen Street East from east of the TTC entrance to Victoria Street.
 - The sidewalk segment on the south side of Queen Street, from Victoria Street to 20 metres west of Victoria Street, will be closed throughout the full duration of the Queen Station construction.
 - The segment 30 metres further to the west will be closed for 6 months, after which it will be re-opened to connect to the courtyard on the south-west corner of Queen Street and Victoria Street. Since the work area on the south-west corner of the intersection will occupy the ramp to the courtyard, a new ramp will be constructed to the south along the pedestrian detour path.
- The southern portion of the east sidewalk on James Street north of Queen Street will be closed for a shorter duration than the overall station construction while the ventilation shaft is being constructed.

- All existing crosswalks will be maintained except the mid-block pedestrian crossing between the Bay and Eaton Centre, and the south crosswalk at the intersection of James Street with Albert Street. Above and below grade crossings will be maintained for the majority of the construction period. The underground PATH connection will not be impacted during construction.
- **Albert Street** will be converted to two-way traffic to accommodate movements in the area during the full closure of James Street. Parking will be prohibited on the north side of Albert Street, and the south crosswalk at the intersection with James Street will be closed to mitigate conflicts caused by vehicle turnaround maneuvers. The south-west corner at the intersection with James Street will be pushed back to provide space for Wheel-Trans and mobility vehicle turnarounds. Improvements will also be made to the signals at the intersection of Bay Street and Albert Street. New signal heads will be installed at the intersection to show green ball signals on the signal heads, instead of the current southbound through and northbound through green arrows that are shown, as well as a southbound left turn arrow.
- The 501 streetcar will be detoured from Queen Street via York Street, Richmond Street, Adelaide Street, and Church Street.
- **York Street** is proposed to be converted to two northbound and two southbound lanes between Queen Street and Adelaide Street to accommodate the 501 streetcar detour as detailed in Section 4.1.4.7. The centre southbound lane will be a dedicated streetcar lane, with the curbside lane between Queen Street and Richmond Street operating as a shared lane for bicycles and right turning traffic, and the curbside lane between Richmond Street and Adelaide Street providing a dedicated bicycle lane. New signal heads will need to be installed along York Street, and signals will need to be optimized to account for the new configuration. The relocation of the eastbound bicycle lane on Adelaide Street from the south side to the north side will result in conflicts between the southbound left turns for cyclists and streetcars, and may require separate phases for the two modes.
- Signal optimizations will be applied to intersections throughout Downtown Toronto to mitigate impacts from the construction activities.

The proposed traffic staging plan is illustrated in **Figure 4-10** and **Figure 4-11**.

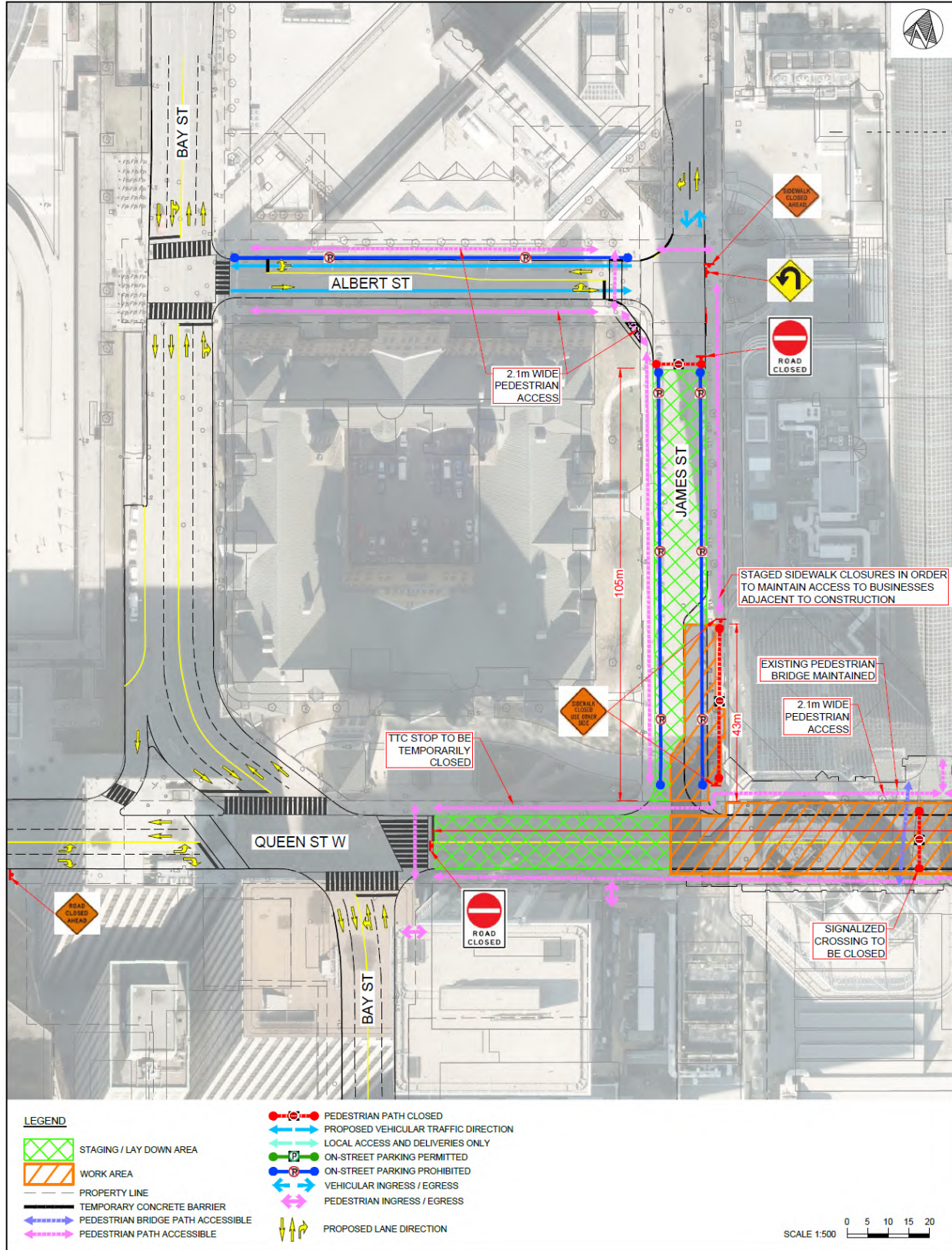


Figure 4-10: Queen Closure - Traffic Staging Plan

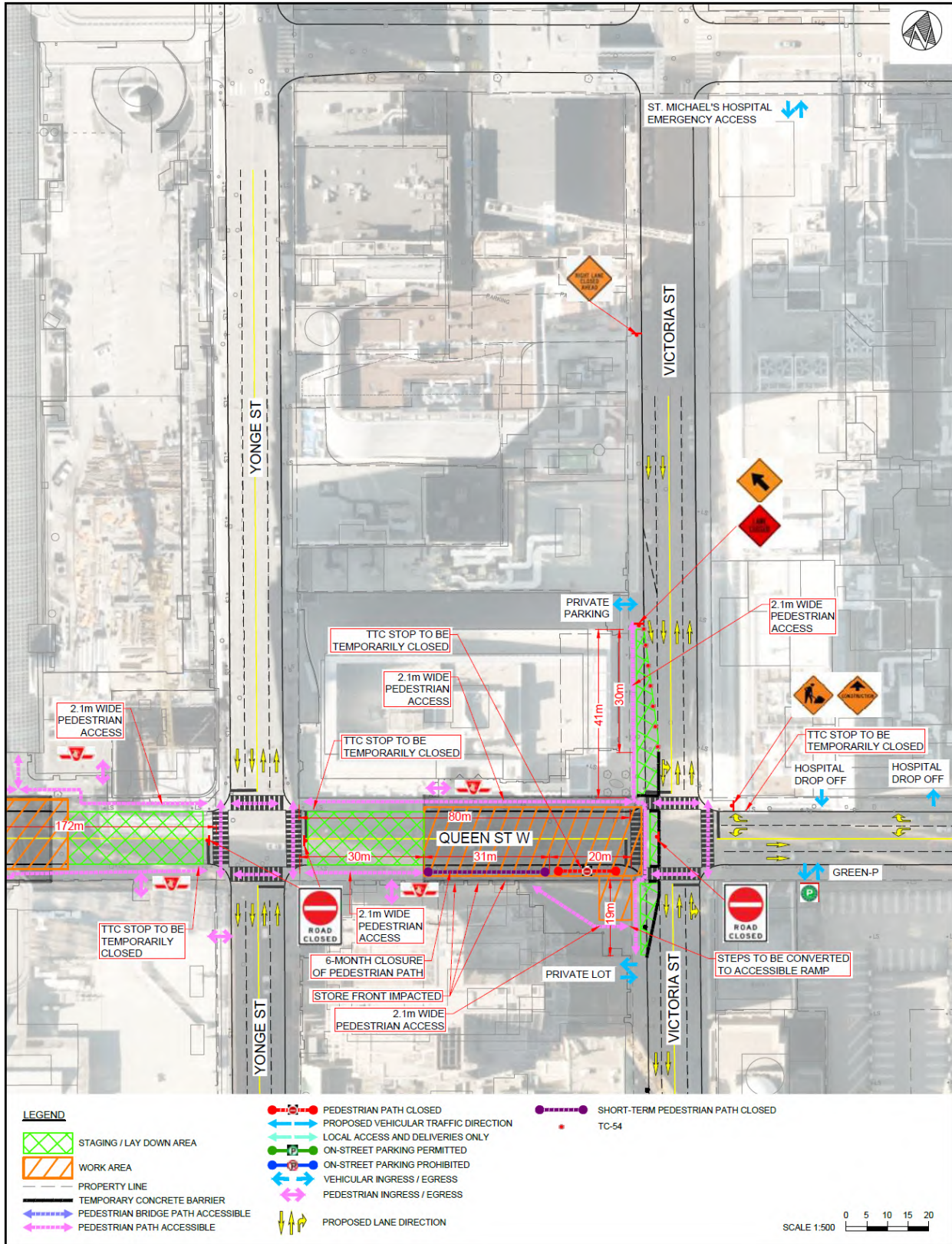


Figure 4-11: Queen Closure - Traffic Staging Plan

4.1.4.1 QUEEN STATION – ALTERNATIVE SCENARIO – MAINTAIN 2 LANES ON QUEEN STREET DURING MINING, FULL DETOUR AT BEGINNING AND END OF CONSTRUCTION

In addition to the lane closures on Queen Street proposed above, an alternative construction scenario was evaluated against the preferred full-closure approach described above. The objective was to identify a feasible alternative that could allow at least one traffic lane per direction to remain open and was assessed from a design, risk, constructability, community/business impact, cost, and traffic operations perspective. The analysis undertaken for the TTMP first considered the trade-offs between the full closure and partial closure of Queen Street to identify the preferred approach, and then carried forward the preferred approach into subsequent analysis scenarios to identify the future impacts and required mitigation measures.

Compared to the full closure, the partial closure of Queen Street is expected to further complicate the construction of the station and impact the schedule and cost of the project, while providing fewer benefits to traffic operations and travel time over the increased duration of construction. Details of this comparison are provided in **Sections 4.1.4.2 to 4.1.4.4**.

Details of the partial closure are expected to resemble the full closure scenario, with the exception that two traffic lanes will be maintained with steel plate decking on one side of Queen Street at a time. This scenario will also involve transit detours similar to the full closure since streetcar tracks will not be maintained. The traffic staging plan is illustrated in **Figure 4-12** and **Figure 4-13**. The following summarizes the impacts of the partial Queen Street closure:

- Duration:
 - To build the Support of Excavation (SOE), it will require 10 months of less than 2 lanes operating (periodical closures and staging of traffic between 2 lanes operating and 0 lanes operating).
 - After this, a full closure of 3 months would be required on each side of Yonge Street to enable the construction of the deck beams after the SOE is constructed.
 - Following this, the operation of 2 lanes on the south of Queen Street could be predominantly uninterrupted until the structure is completed with another stage of periodical closures and staging of approximately 3 months, with a potential total of 16 months of operating with less than 2 lanes on Queen Street.
- Schedule and Cost Implications:
 - Significant cost of decking and deck beam supports; a full closure may still require some decking though to a lesser extent.
 - Large risk and contingency will be built into the Project Co's cost for traffic management within the constrained site.
 - Very constrained site for access and truck movements:
 - More difficult openings for coordination with activities below the decking
 - Adds time to the schedule and increases the project cost
 - With traffic barriers (2.0 m), lanes (6.0 m) and sidewalks (4.0 m) this would enable only a 7.0-metre-wide shaft into the challenging site for muck removal and station construction

- Large schedule risks due to the most complicated station for downtown Ontario Line being potentially on the critical path. With the additional constraints of a two-lane closure, it is expected that a minimum of 6 months, up to 12 months, will be added to the station construction schedule.

4.1.4.2 QUEEN STATION – CONSTRUCTION SCHEDULE IMPACTS

The construction durations by activity for the Queen Street full closure and 2-lane closure are summarized below in **Table 4-4**. The construction of Queen Station under a partial closure of Queen Street will result in a very constrained work area, complicating the construction activities, reducing efficiency, and increasing the timeline for all activities.

Overall, the construction of the Station with a partial closure will extend the duration by 12 months and put the Station on the critical construction path, 4-5 months beyond the Osgoode Station critical path of the full closure schedule. It is estimated that the partial closure will extend the opening date of the Ontario Line by 5 months. The detailed construction schedules for the Queen Street full closure and partial closure are illustrated in **Figure 4-14** and **Figure 4-15**, respectively.

Table 4-4: Scenario Construction Schedule Impacts

Activity	Full Closure	Partial Closure	Considerations
Secant Piles and Decking	7 months	+1 month	Secant pile installation with partial closure limits the number of drill rigs that can be mobilized.
Cut & Cover Excavation	7 months	+1 month	Muck hauling, transporting and installing support of excavation elements will impact the schedule.
SEM Excavation	14 months	+2 months	Four major SEM excavation operations will be supported from Queen Station, requiring 80 to 90 dump trucks, 15 to 20 shotcrete deliveries and rock bolt and lattice girder deliveries daily. The partial enclosure will impact the efficiency.
Cavern Concrete Work	12 months	+4 months	Cavern concrete placements are very large, ranging from 300 m ³ to 500 m ³ requiring multiple reinforcing steel deliveries as well. The partial closure will impact this activity.
Interior Structures	12 months	+4 months	The base case is to complete a level of structure work every 2 to 3 months in each cut-and-cover, the delivery of reinforcing steel, formwork, and concrete and removal of SOE steel will be impacted by the partial closure.
Total		+12 months	

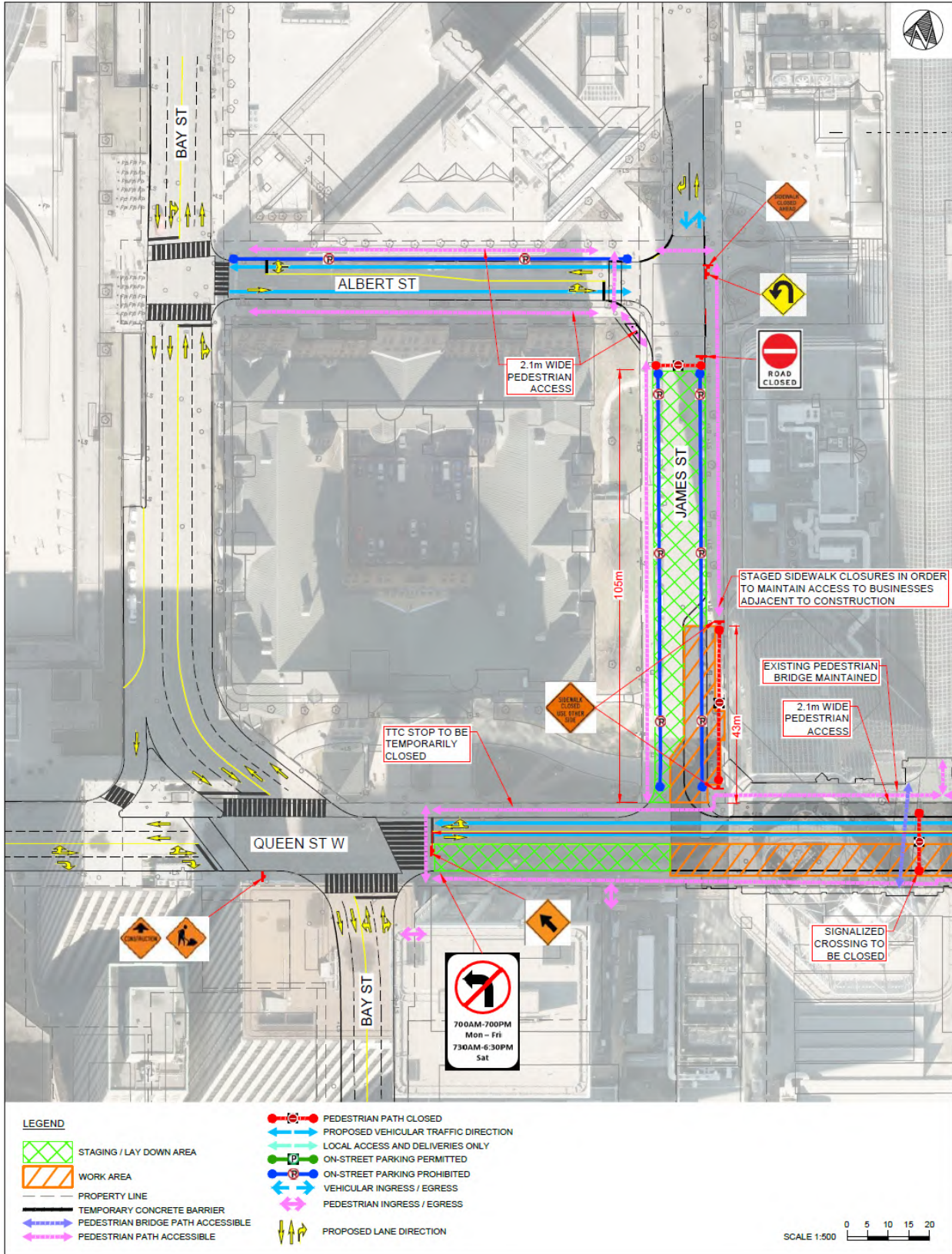


Figure 4-12: Partial Queen Street Closure (South Construction) - Traffic Staging Plan

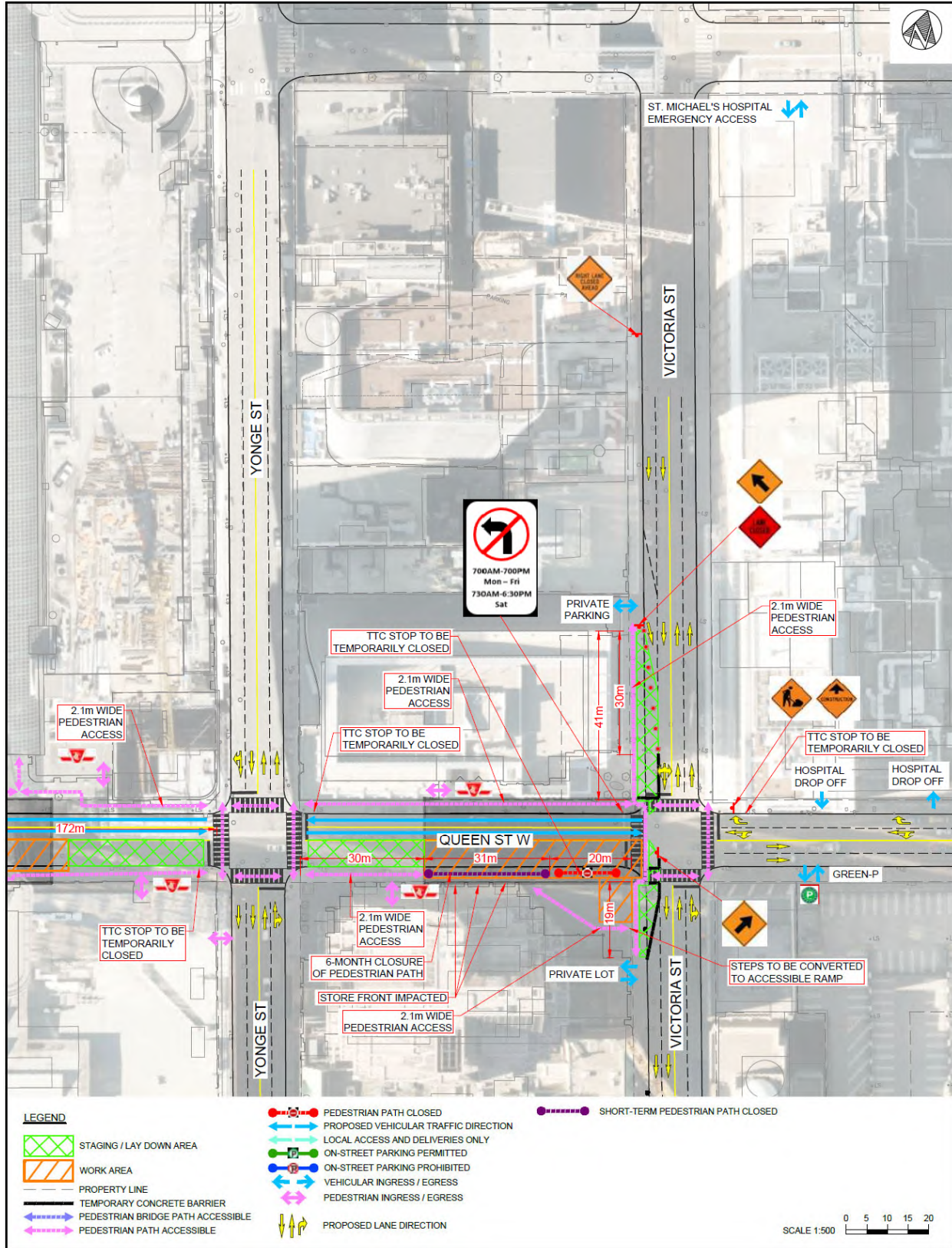


Figure 4-13: Partial Queen Street Closure (South Construction) - Traffic Staging Plan

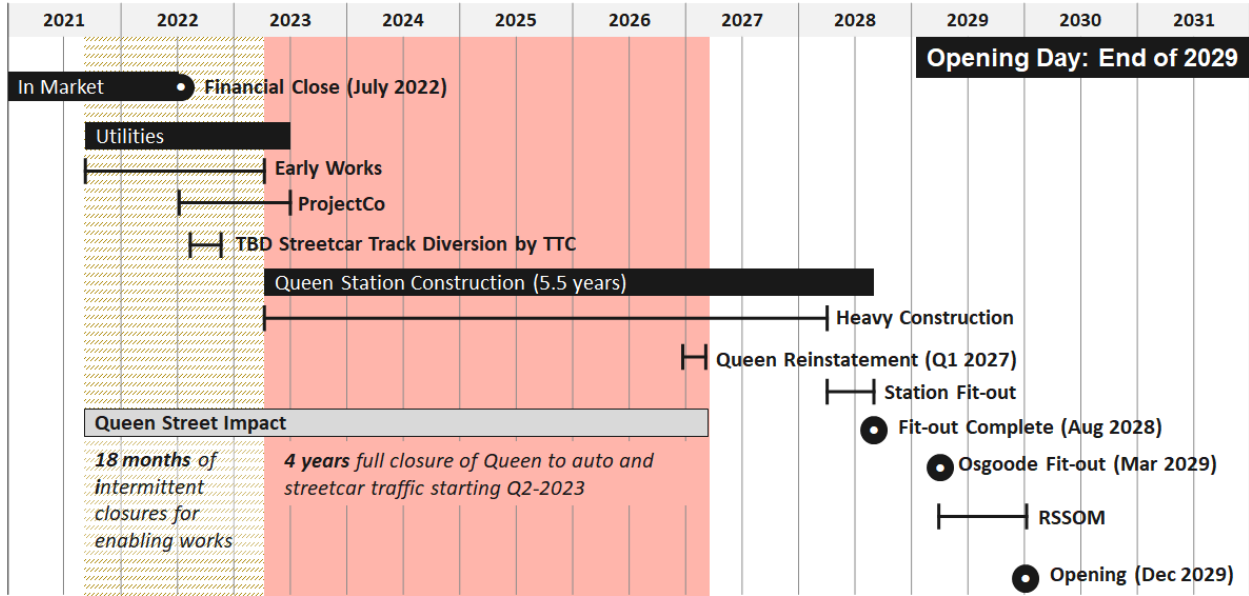


Figure 4-14: Queen Street Full Closure Construction Schedule

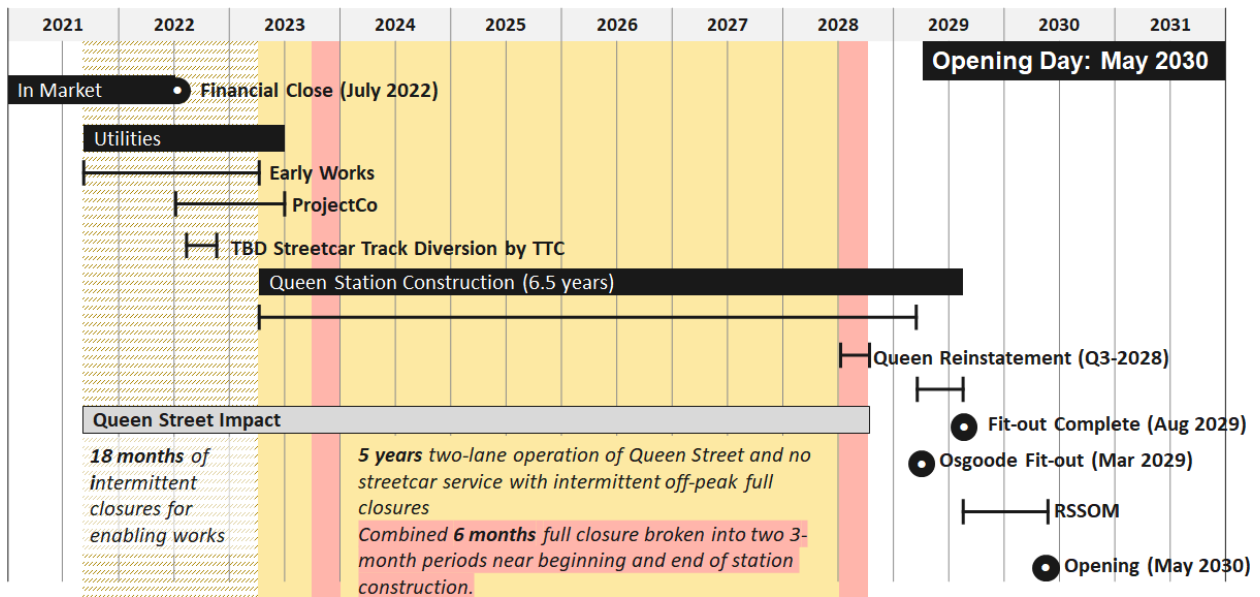


Figure 4-15: Queen Street 2-Lane Closure Construction Schedule

4.1.4.3 QUEEN STATION – STATION CONSTRUCTION AND INDIRECT COSTS

The increase in station construction costs and other indirect costs of the partial closure relative to the full closure of Queen Street are detailed in **Table 4-5**. Compared to the full closure, maintaining two lanes on Queen Street is expected to cost approximately \$228M additional in construction cost. The value of time cost associated with increased automobile and transit travel times in either scenario is shown in the breakdown in **Sections 4.1.4.4**.

Table 4-5: Queen Partial Closure | Station Construction and Indirect Cost Premium

Cost Item	Cost Premium	Cost Type
Increased station duration of 12 months	\$6 M	Indirect Costs
Increased OL duration of 6 months (Civil & RSSOM)	\$40 M	Indirect Costs
Secant Piles and Decking	\$1 M	Additional Labour and Equipment
Cut & Cover Excavation	\$1 M	Additional Labour and Equipment
SEM Excavation	\$1 M	Additional Labour and Equipment
Cavern Concrete Work & Interior Structures	\$5 M	Additional Labour and Equipment
Additional Staging and Phasing requirements	\$1 M	Additional Labour and Equipment
Owner Professional Services due to delay (Civil & RSSOM)	\$33 M	
Additional Design based on 8% Construction Cost	\$3 M	
Escalation Cost due to delay of full project (Civil & RSSOM)	\$55 M	
Owners Reserve Contingency	\$2 M	
P3 Risk	\$1 M	
Short Term Finance Cost	\$42 M	
Post Contract PCC	\$14 M	
HST	\$4 M	
Capitalized Interest during construction	\$19 M	
Total	▲ \$228M	

4.1.4.4 QUEEN STATION – NETWORK TRAVEL TIME COSTS

To compare the potential impact of each construction scenario, an Aimsun microsimulation exercise was conducted for the AM and PM peak period conditions. The calibration process for the Aimsun model is detailed in **Appendix A**, while the operational impacts can be found in **Section 5** and **Appendix B**.

Peak period corridor Synchro models previously prepared for the City of Toronto for corridor signal optimization were used to extract corridor travel times for each of the periods available. The total corridor travel times for each period were used to develop peak period conversion rates, as summarized in **Table 4-6**. The conversion factors for the off-peak, night-time, and

weekend periods were calculated relative to the PM peak period as it represented the critical period across all corridors in the Synchro models.

The 3-hour AM and PM peak period aggregated network total travel times were extracted from the Aimsun models for the base “Do Nothing” scenario, Queen Street 2-lane closure, and the Queen Street full closure. The Queen Street 2-lane closure and full closure model scenarios analyzed the Queen Street works in isolation and do not include other Ontario Line or City-led works. The base network total travel times for streetcars and buses extracted from the Aimsun model were multiplied by the average surface transit ridership per vehicle in the downtown area (14.4 persons per vehicle). The average transit vehicle ridership within the modelled focus area was estimated through TTC’s on-off ridership counts per transit stop within the focus area.

The period travel times were averaged to represent the peak hours, and the conversion factors were applied to estimate the off-peak, night-time, and weekend travel times. For this analysis, it was assumed that there are 3 hours in the weekday AM and PM peak periods, 6 hours in the weekday off-peak period, and 12 hours in the weekday night period. Weekends were assumed to have 3 hours of peak traffic, 9 hours of off-peak, and 12 hours of night traffic conditions. A split of 250 weekdays and 115 weekends was applied to the calculation of yearly travel times, as shown in **Table 4-7**.

The yearly total travel times for the Queen Street 2-lane closure and full closure were compared to the Do Nothing condition to determine the impact of the isolated closures.

A value of time (VoT) of \$22.36 was applied to the travel times. This value was estimated based on a VoT methodology from the September 2016 U.S. Department of Transportation report titled *Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis*, which recommends using 50% of average wages for commuting and personal trips. According to the Canadian Mortgage and Housing Corporation, the 2019 real median total household income before taxes for the Toronto Metro Area was \$87,400. This value was divided by an assumed 1,950 work hours per year and adjusted for 2019-2020 inflation (-0.22%).

As shown in **Table 4-8**, the full closure of Queen Street has an annual network travel time cost that is \$12.5 M higher than the partial 2-lane closure, however, due to the longer duration of the partial 2-lane closure, the overall cost of travel times on the network would be lower for the full closure by \$13.2 M.

Table 4-6: Peak Period Conversion Factors

Corridor	Arterial Travel Time % Factor			
	PM	Off-Peak	Night	Weekend
Queen Street	100%	70%	36%	79%
Bay Street	100%	86%	44%	71%
Bathurst Street	100%			77%
University Avenue	100%	83%	36%	71%
Yonge Street	100%	86%		
Total	100%	78%	37%	76%

Table 4-7: Peak to Yearly Travel Time Conversion

Scenario	Network Total Travel Time (hrs)					Weekday TT (hrs)	Weekend TT (hrs)
	AM	PM	Off-Peak	Night	Weekend		
Do Nothing	2,357	7,610	5,953	2,845	5,774	99,754	105,035
Queen 2-Lane	2,679	7,926	6,200	2,963	6,014	104,571	109,397
Queen Full Close	2,775	8,032	6,283	3,003	6,095	106,149	110,860

Table 4-8: Total Scenario Costs

Scenario	Yearly TT (hrs)	Increase from Base		Closure Duration (yrs)		Annual Cost (\$M)	Total Scenario Cost (\$M)
		%	hrs	Partial	Full		
Do Nothing	36,860,023						
Queen 2-Lane	38,565,960	5%	1,705,936	5	0.5	\$38.1 M	\$216.0 M
Queen Full Close	39,128,321	6%	2,268,297	0	4	\$50.7 M	\$202.8 M
Difference:						\$12.5 M	-\$13.2 M

Based on this analysis, for the respective duration of construction, it is expected that travel delays to the Downtown core (bounded by Bathurst Street, Dundas Street, Parliament Street, and Front Street) will be lower with the Queen Street full closure compared to maintaining two lanes. Therefore, a full closure of Queen Street is recommended from a travel delay and construction cost perspective.

4.1.4.5 QUEEN STATION – AUTO ACCESS IMPACTS – WEST OF YONGE STREET

In order to provide a construction staging and laydown area, James Street will be closed to all vehicular traffic between Albert Street and Queen Street for the duration of construction to provide for a construction staging and laydown area. During this time, Albert Street, which currently operates under westbound one-way traffic, will be converted to two-way traffic to maintain goods movement, deliveries, and garbage pick-up / drop-off for nearby buildings, and to accommodate access to and from the Queen Station construction area. A peak of 15 trucks per hour with an average of 20 trucks per day are expected along Albert Street to access the Ontario Line staging area on James Street.

Temporary signage and pavement markings will be required to ensure that the conversion to two-way traffic is clear to road users. As a result of the conversion to two-way traffic, there will be added southbound left-turning traffic at the intersection of Bay Street with Albert Street. New signal heads will be installed at the intersection of Bay Street with Albert Street to accommodate the conversion to two-way traffic on Albert Street, and the signals will have the capability to provide a protected southbound left turn phase. Based on analysis of forecasted conditions at the intersection, it is expected that Bay Street and Albert Street will operate with residual capacity, and the southbound left phase will not be activated unless poor conditions are identified on the southbound left movement during construction.

Due to the limited width of Albert Street (9 metres), on-street parking cannot be maintained on both sides of the roadway while also accommodating two-way traffic. The on-street parking on the north side of Albert Street will need to be restricted with regulatory signage, and the

stopping restriction on the south side of Albert Street will need to be enforced throughout the two-way operation. The accessible loading zone on the south side of Albert Street will be maintained to provide convenient access to Old City Hall. A loss of 11 spaces on the west side of James Street, 11 spaces on the east side of James Street, and 10 spaces (7 general, 3 taxi spaces) on Albert Street will be removed as a result of the construction activity and two-lane conversion.

On-street parking will be prohibited on both sides of James Street due to the construction staging and laydown area. It is expected that vehicles currently using the on-street parking on Albert Street and the parking on James Street will use other underground parking areas nearby, such as the Green P parking available on the west side of Bay Street and the parking at Shuter Street, west of Yonge Street, for Eaton Centre. The James Street laydown impacts on access and parking are illustrated in **Figure 4-16** and **Figure 4-17**, respectively.

Turning maneuvers were evaluated at the intersection of Albert Street and James Street to identify potential conflicts following the conversion to two-way traffic. Modifications to the southwest corner will be required to accommodate the turnaround of WheelTrans vehicles within the intersection, as well as ensuring a safe stoppage at the east curb to service WheelTrans customers. The existing south and west sidewalks will need to be delineated. The south crosswalk will also be disabled to mitigate wide-swinging vehicle conflicts with pedestrians. The turnaround maneuver for WheelTrans is illustrated in **Figure 4-18**. The revised configuration has been incorporated into the Queen Station traffic staging plan in **Figure 4-10**.



Figure 4-16: James Street Laydown | Access Impacts



Figure 4-17: James Street Laydown | Parking Impacts

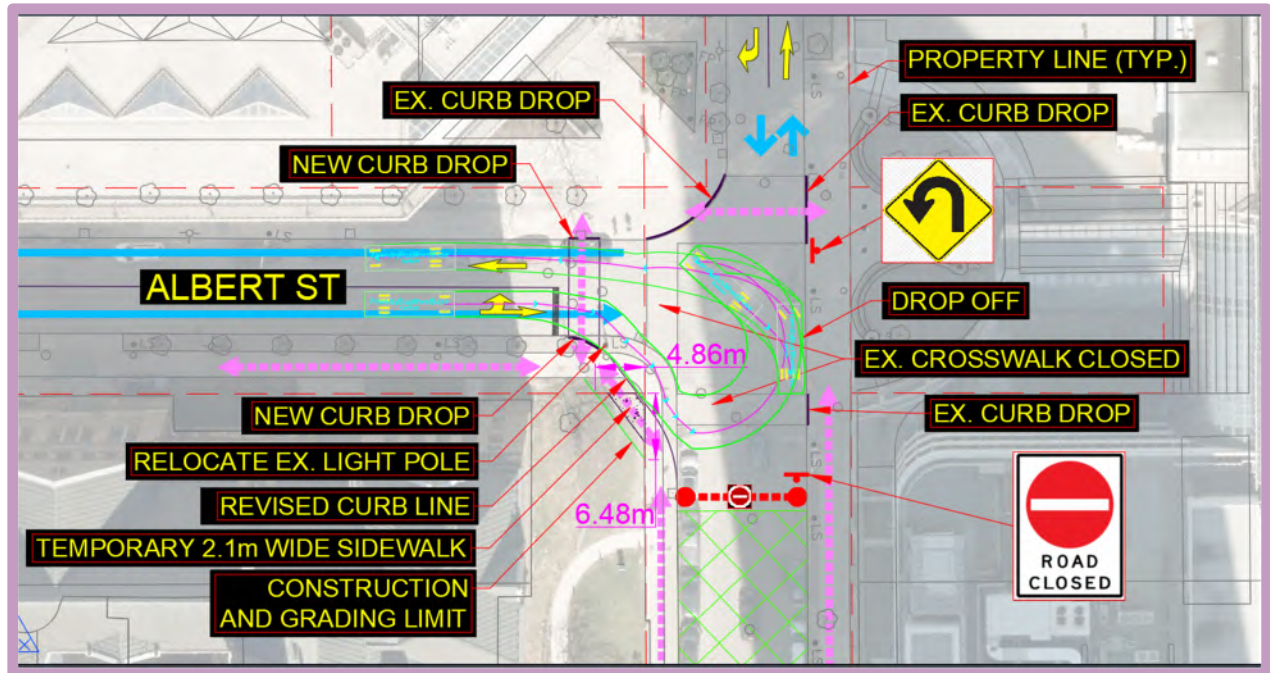


Figure 4-18: Albert Street - WheelTrans Drop-off at Eaton Centre

4.1.4.6 QUEEN STATION – ACCESS AND DETOUR PLANS – EAST OF YONGE STREET

Victoria Street will be reduced by one lane in the southbound direction to accommodate a construction laydown and staging area. The restricted area will extend approximately 40 metres north and 20 metres south of the intersection of Queen Street with Victoria Street to minimize the impact to driveway entrances and maintain goods movement, deliveries, garbage pick-up/drop-off, and parking access to nearby buildings. The restricted area will not extend beyond the parking and van delivery access to 1 Queen Street East, located on the west side of Victoria Street, south of Queen Street; local access will be maintained to the driveway throughout the construction period.

On-street parking is currently provided on the west side of Victoria Street. No mitigation measures will be applied for the on-street parking near the intersection with Queen Street. Alternative parking available nearby includes the Green P Queen Victoria parking garage with accesses on the south side of Queen Street, and on the north side of Richmond Street, east of Victoria Street. The Victoria Street access and parking impacts due to laydown areas are illustrated in **Figure 4-19**.

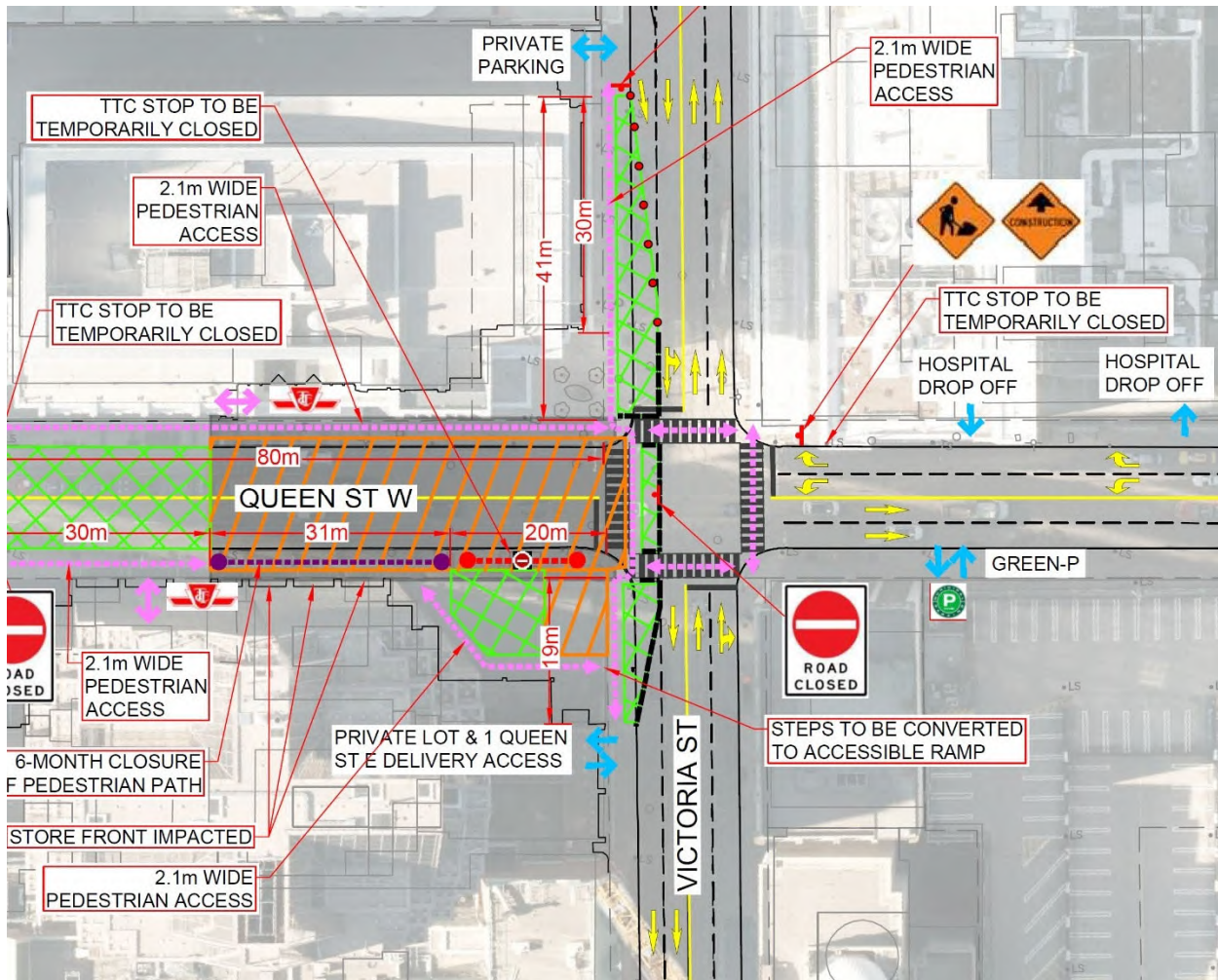


Figure 4-19: Victoria Street Laydown | Access & Parking Impacts

4.1.4.7 QUEEN STATION – TRANSIT DETOUR IMPACTS

The construction of Queen Station will require a detour of the Route 501 Queen streetcar away from the Queen / Yonge intersection. The preferred east-west detour route is via York Street, Richmond Street, Adelaide Street, and Church Street, as illustrated in **Figure 4-20**, to maintain the east-west transit service.

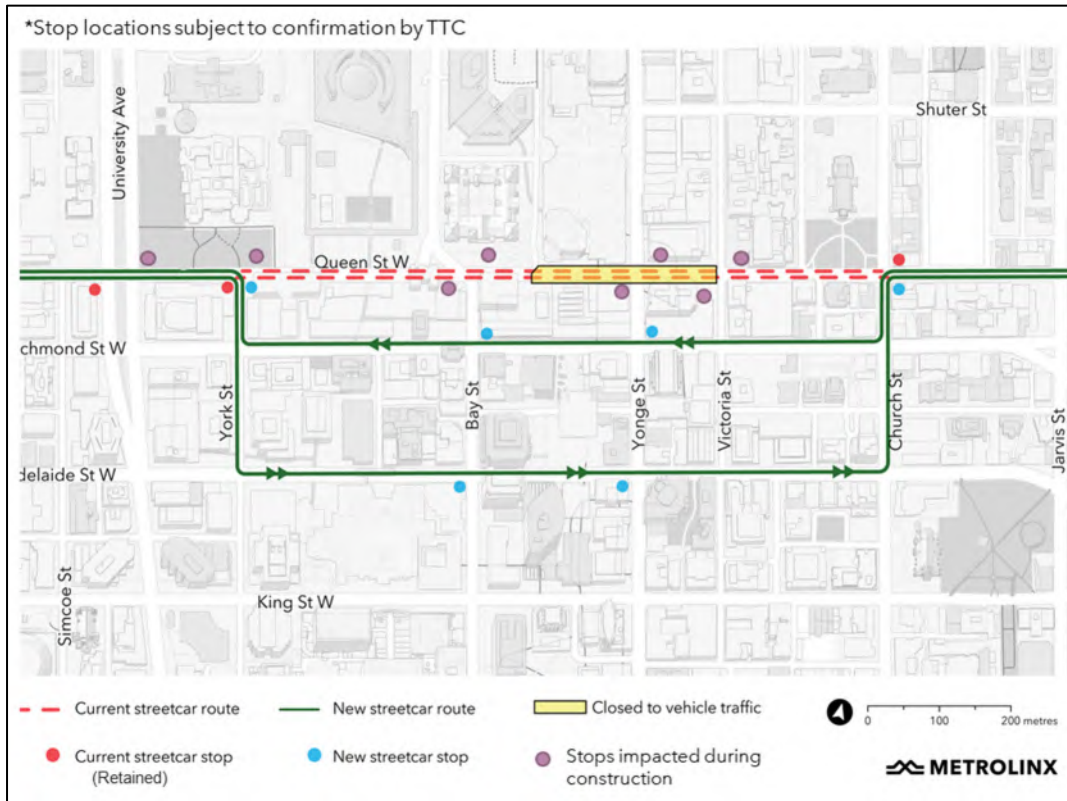


Figure 4-20: Transit Stop Impacts of Queen Station Construction

Except for York Street, all proposed detour streets and turning points currently have tracks and track switches that could accommodate the streetcar detour routes. Additionally, the current configuration of York Street south of Richmond Street is one-way northbound, which would require reconfiguration to allow for a southbound track to Adelaide Street.

A sensitivity analysis was undertaken to identify the preferred configuration of York Street throughout the construction of Queen Station. The preferred configuration is detailed below, and a conceptual design is illustrated in **Figure 4-21**. The final configuration requires approval from the City.

The details of the sensitivity analysis, including the alternatives considered for the configuration of York Street, can be found in **Appendix C**.

The analysis provides alternative evaluation, the rationale for the preferred scenario, combined traffic impact with Queen Street closure, and the sensitivity of York Street to reduced traffic lanes. Key features of the preferred alternative include:

- The detour features a bidirectional cross-section between Adelaide Street and Queen Street.
- Northbound and southbound streetcar tracks will be located in the centre lanes; the northbound streetcar will operate in mixed traffic, while the southbound will have a dedicated streetcar lane.
- The existing southbound automobile connection will be maintained between Queen Street and Richmond Street to allow for continued southbound access to the underground parking driveway south of Queen Street. The southbound curbside lane can be painted with “sharrows” to indicate to drivers that the roadway should be shared with cyclists.
- The southbound curb side lane will be a dedicated cycle track between Richmond Street and King Street.
- The southbound streetcar turning radius will require centre-to-centre lane turns from Queen Street eastbound to York Street southbound, which creates an opportunity to provide dedicated cycling facilities on the southbound between Richmond Street and Adelaide Street.
- The existing northbound-only configuration would remain south of Adelaide Street; however, the two westmost lanes south of Adelaide Street could be considered for parking or a contra-flow cycling lane.

The eastbound bicycle lanes currently located on the south side of Adelaide Street will be relocated to the north side of Adelaide Street by the City and may require separate bicycle and transit phases on the southbound approach to the intersection with York Street due to the southbound left conflicts.

The details of the required closure and staging for the construction of the new tracks and switches along York Street are currently still in the development process.

Details of the microsimulation analysis are provided in **Appendix C**. A supplement to the Appendix will include a traffic analysis memo for any traffic detour impacts caused by reduced northbound lanes. However, given the low existing volumes on York Street (350 vph in the peak hour), the converted York Street is expected to have the residual capacity to continue serving existing traffic volumes.

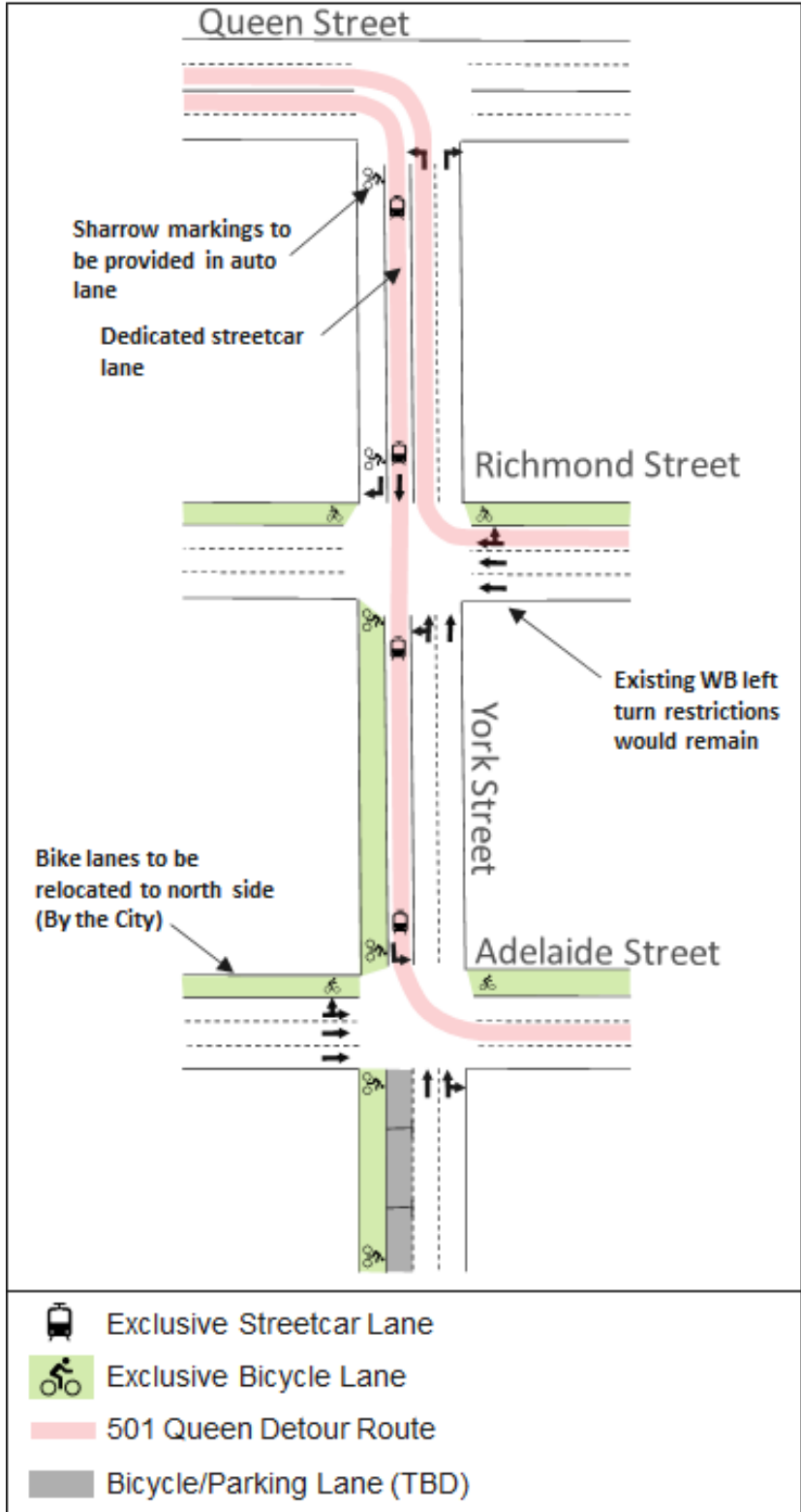


Figure 4-21: York Street Track Diversion Concept

4.1.4.8 QUEEN STATION – TRANSIT STOP IMPACTS

Several transit stops will be impacted by the construction of Queen Station and the resulting track diversion for the Route 501 streetcar, including:

- Queen Street westbound at University Ave: To be relocated to 20 m east of its existing location (28 m east of the University Ave ROW)
- Queen Street westbound at York Street: To be relocated nearside to the northbound approach on York Street at Queen Street West
- Queen Street eastbound at Bay Street: To be relocated to Adelaide Street
- Queen Street westbound at Bay Street: To be relocated to Richmond Street
- Queen Street eastbound at Yonge Street: To be relocated to Adelaide Street
- Queen Street westbound at Yonge Street: To be relocated to Richmond Street
- Queen Street eastbound at Victoria Street: To be disabled during construction
- Queen Street westbound at Victoria Street: To be disabled during construction

The impacted and relocated stops are illustrated in **Figure 4-20**. Signage will be provided in the vicinity of the impacted transit stops to notify passengers of eliminated and relocated transit stops, and provide wayfinding signage to the nearest available stop.

4.1.4.9 QUEEN STATION – PEDESTRIAN AND DOOR ACCESS IMPACTS

Pedestrian access will be maintained for the majority of approaches near the Queen Station work site. Sidewalk access will be maintained with a minimum width of 2.1 metres on both sides of Queen Street between Bay Street and Victoria Street, except for the south side of Queen Street from 30 metres east of Yonge Street to Victoria Street, as shown in **Figure 4-23**. The south sidewalk from 30 metres east of Yonge Street to 60 metres east of Yonge Street will be closed for approximately 6 months, after which the sidewalk will be re-opened to connect to the courtyard on the south-west corner of the intersection with Victoria Street. A minimum width of 2.1 metres will be maintained along the pedestrian detour path through the courtyard. The accessible ramp between the courtyard and the west sidewalk on Victoria Street will be occupied by a construction work area, and the steps to the south of the work area will be converted to a ramp. The south sidewalk from Victoria Street to 20 metres west of Victoria Street will be closed throughout the duration of the Queen Station construction works.

The main access to 1 Queen Street East will be maintained as well as all accesses to the TTC subway at Queen Station; however, the 6-month closure of the south sidewalk 20 metres west of Victoria Street will impact the storefronts along the length of the closure including an INS Market convenience store and two other adjacent retail storefronts. Alternative accesses to these businesses inside the building of 1 Queen Street East will be maintained during the 6-month closure period, after which the pedestrian detour path on the south side of Queen Street will provide access to the businesses.

The existing signalized pedestrian crossing 70 metres west of Yonge Street will be disabled. The pedestrian bridge connecting Eaton Centre and Hudson’s Bay will remain in operation, as well as below-ground PATH connections.

The 5-year closure impacts are illustrated in **Figure 4-22** for the segment between James Street and Yonge Street, and **Figure 4-23** for the segment between Yonge Street and Victoria Street.

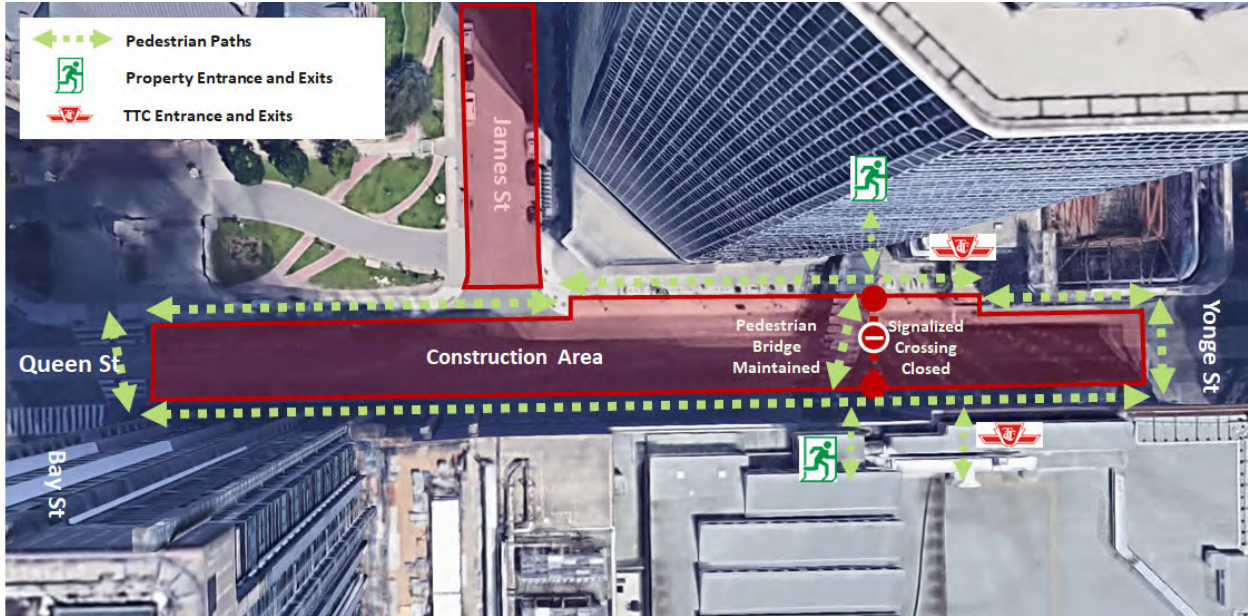


Figure 4-22: Queen Street Closure Pedestrian Impacts (West side) – James Street to Yonge Street



Figure 4-23: Queen Street Closure Pedestrian Impacts (East side) – Yonge Street to Victoria Street

4.1.4.10 QUEEN STATION – SHORT-TERM TEMPORARY SIDEWALK IMPACT

Besides the long-term sidewalk impacts identified above, temporary short-term closures near the intersection of Yonge Street and James Street will be required, as illustrated in **Figure 4-24**. During the construction of the ventilation shaft, a temporary sidewalk closure on James Street will be required which will require coordination with local businesses. During business hours, the sidewalks will need to be decked over and all fire exits and accesses to businesses nearby will be maintained during their hours of operation.

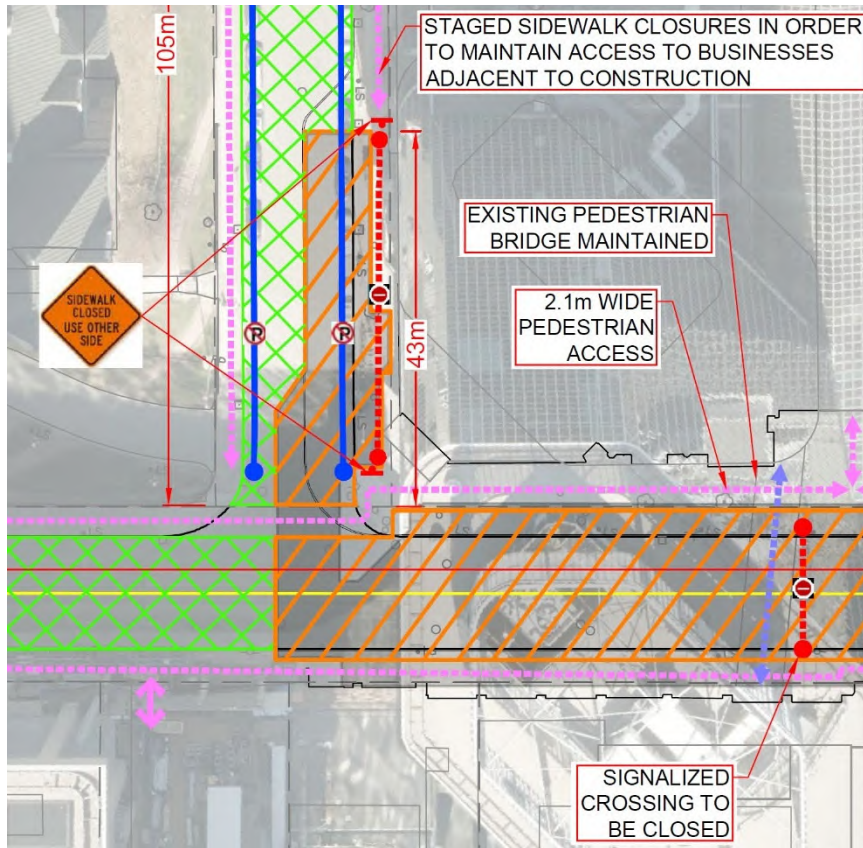


Figure 4-24: Queen Street Closure Pedestrian Impacts – Queen Street and James Street

Utility relocation is also expected to temporarily impact the north sidewalks west of Yonge Street, and the south sidewalk east of Yonge Street. Based on the information currently available, it is expected that these temporary closures will occur before the full closures of Queen Street expected from Q2 2023 to Q4 2027. The temporary closures for utility relocations are expected to require weekend and night closures and/or street occupations of less than 365 days. The staging for temporary utility relocation will be developed as part of an Advanced Work package.

4.1.4.11 QUEEN STATION – CYCLING IMPACTS

There are currently no bicycle lanes passing through the Queen Station construction sites. Where cyclists currently share the right of way with traffic, the streets that are not fully closed will continue to allow cyclists to share the road. Due to the full closure on Queen Street, cyclists will be encouraged to detour to alternate routes. Alternatively, cyclists will also be able to dismount and walk their bicycles on the sidewalks that will be maintained throughout construction. Richmond Street and Adelaide Street provide physically separated cycling facilities near Queen Street, which are high-quality alternative routes for cycling traffic.

A new bicycle lane connection will be introduced on the west side of York Street, with a dedicated lane between Richmond Street and Adelaide Street and a shared lane between Queen Street and Richmond Street.

4.1.4.12 QUEEN STATION – EMERGENCY VEHICLE IMPACTS

Emergency vehicle routing impacts are expected as a result of the full closure of Queen Street between James Street and Victoria Street. The typical and closure routes and travel times are illustrated in **Figure 4-25** to **Figure 4-27** for the fire trucks and paramedic trucks. Separate routes were assessed departing from Paramedic Services Station 40 and St. Michael's Hospital, as the hospital would be expected to respond to incidents.

The travel times are based on PM peak hour conditions for autos from Google Maps, as this period would reflect the worst-case conditions, and a significant travel time reduction relative to Google Maps resulting from the emergency vehicles' higher priority (yielding of the right-of-way for non-emergency vehicles) is not expected because of the constrained right-of-way and congested conditions in Downtown Toronto. The destination points on the maps are based on points that will be the most impacted by the closure of Queen Street, which is immediate to the east and west of the closure.

As shown in **Figure 4-25**, the Queen Street closure is not expected to impact the travel time for fire trucks in the area. The travel time from both Fire Station 332 and Fire Station 333 to Queen Street / Victoria Street is 5 minutes and both routes have a distance of 1.3 kilometres. The typical and closure routes to both destinations from Fire Station 332 will remain unchanged, and this station will best serve the destination just west of the closure, at Queen Street / James Street.

As shown in **Figure 4-26**, Station 40 is the closest station for paramedic services and no impact to the preferred routes will occur as a result of the Queen Street closure. The response from St. Michael's will be slightly impacted, as shown in **Figure 4-27**, increasing the route distance to the far-side destination from 0.4 km to 0.8 km, and travel time from 2 minutes to 3 minutes.

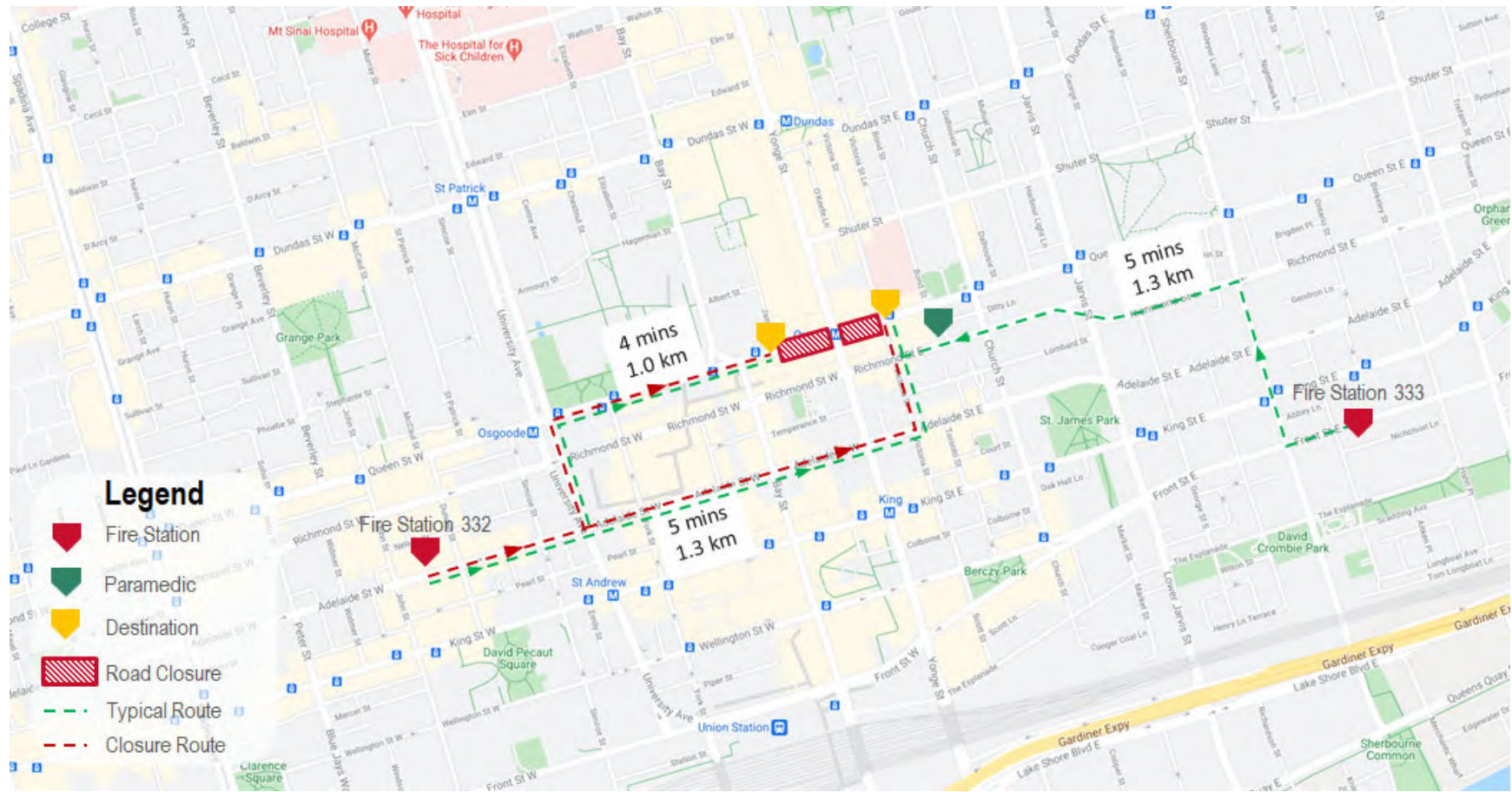


Figure 4-25: Queen Full Closure | Fire Truck Travel Times

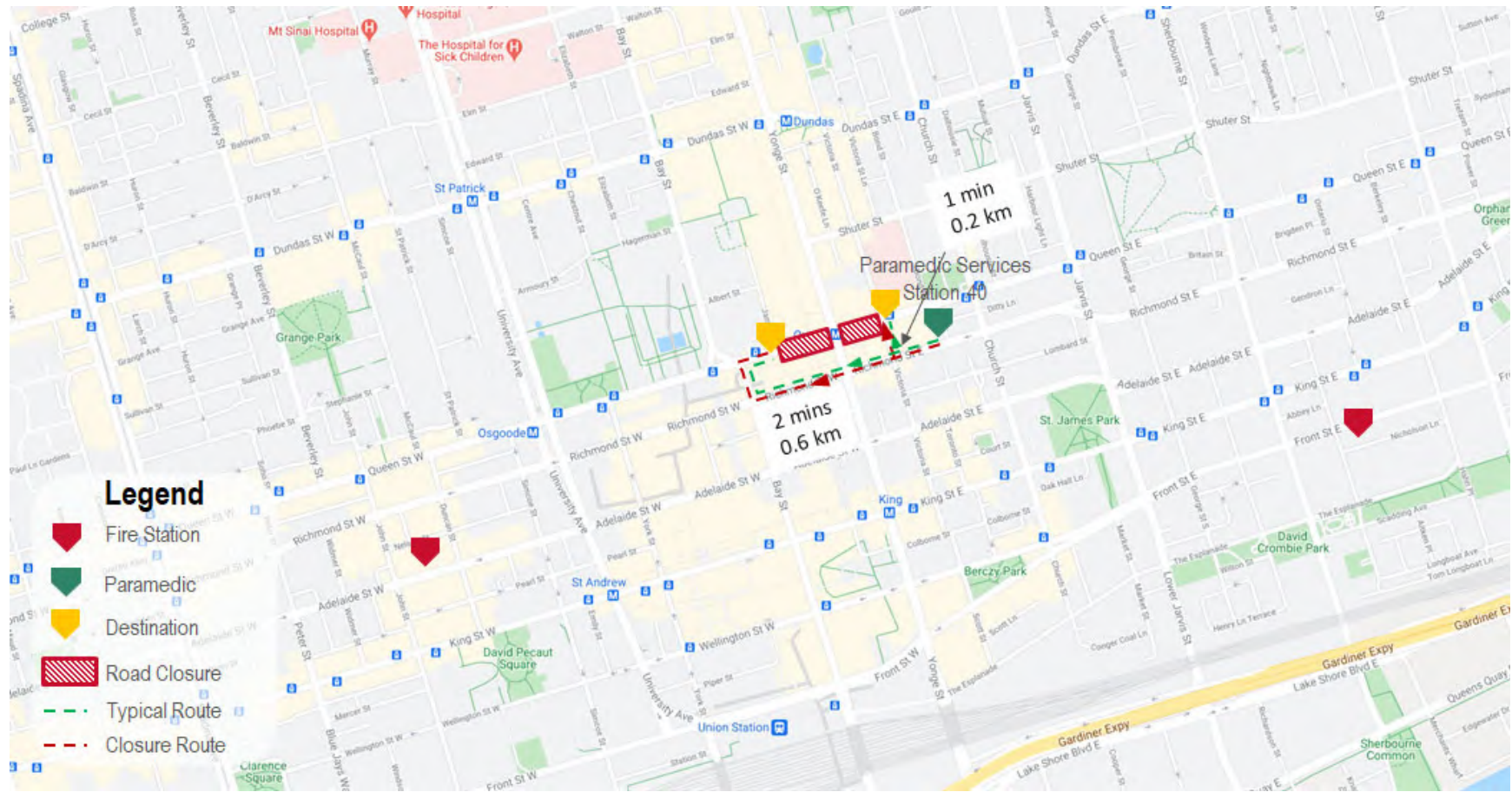


Figure 4-26: Queen Full Closure | Paramedic (Station 40) Travel Times

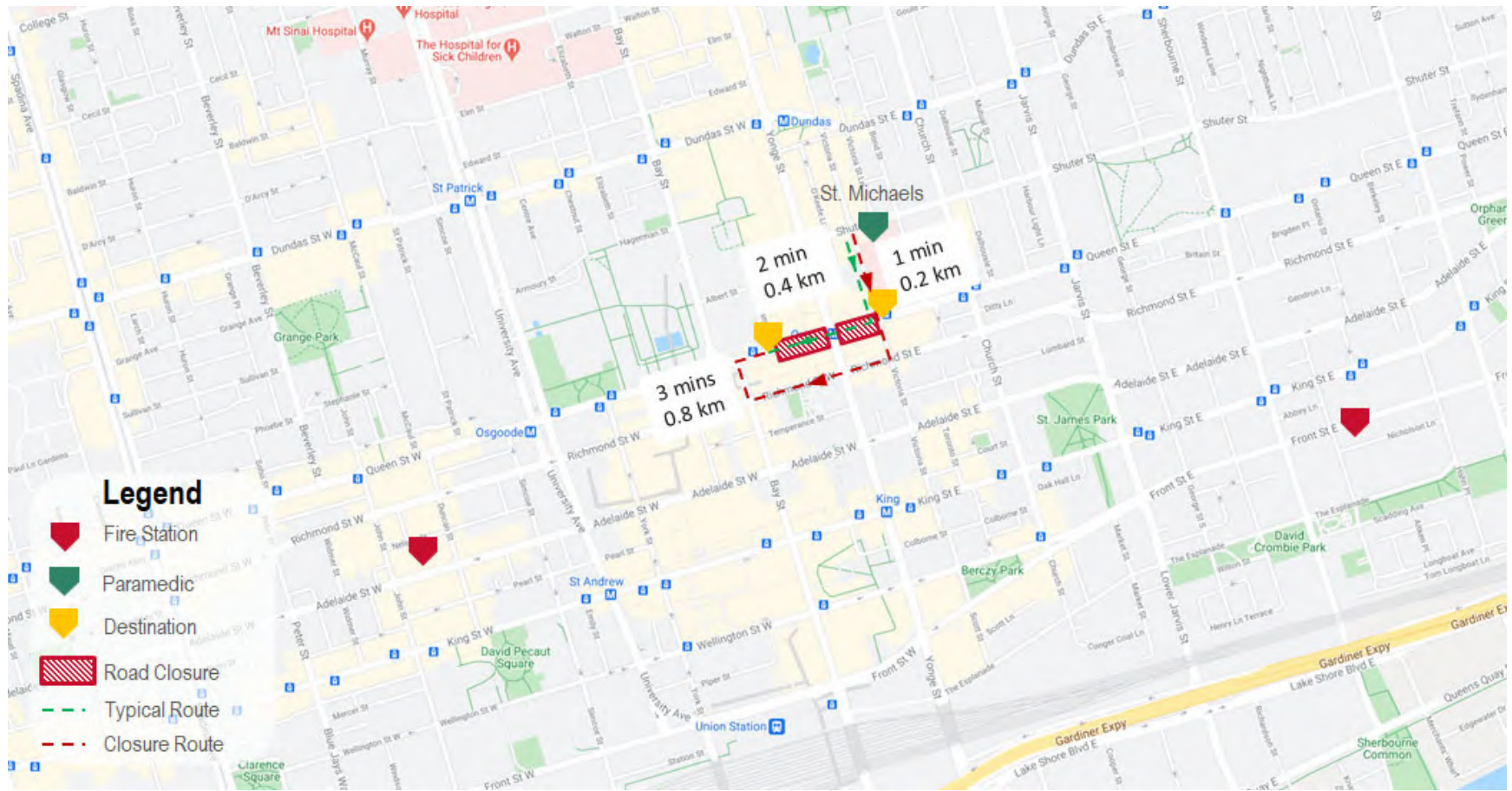


Figure 4-27: Queen Full Closure | Paramedic (St. Michael's) Travel Times

4.1.4.13 QUEEN STATION – HAUL ROUTES

The potential inbound and outbound haul routes are illustrated in **Figure 4-28** and **Figure 4-29**, respectively. There are no turn or truck restrictions noted along the haul routes. Trucks are expected to travel to and from the staging and laydown areas located along James Street via Albert Street and Bay Street. A traffic control person will be stationed at the intersections of Albert Street with James Street and Queen Street with Victoria Street. All movements will be allowed for trucks entering and exiting the staging areas on the east and west sides of Queen Street and Yonge Street as long as a paid duty officer is stationed at the intersection. Trucks entering the Yonge Street staging areas are likely to travel along Bay Street, Adelaide Street, and Yonge Street when arriving from the west, and via Richmond Street when arriving from the east. Trucks arriving at the Victoria Street staging area will need to enter via a southbound approach, and will likely travel via Dundas Street and Shuter Street when arriving from the west and east, respectively.

With a station excavation of approximately 90,000 m³, the total number of trucks handling spoils at Queen Station will be 9,000. Assuming a period of 18 months for station excavation and 250 working days per year results in an average of approximately 25 trucks per day at Queen Station. On a daily basis, the average could be exceeded, with a peak condition of up to 15 trucks per hour being possible given the road network and operational challenges of loading the trucks. Station construction will require approximately 12,000 trucks to accommodate deliveries of shotcrete, concrete, reinforced steel, station finishes, escalators, elevators, etc. within a 24-month period. With an assumed 250 working days per year, an average of approximately 25 trucks per day will be generated by the site. During peaks there could be up to 15 trucks per hour arriving at the site.

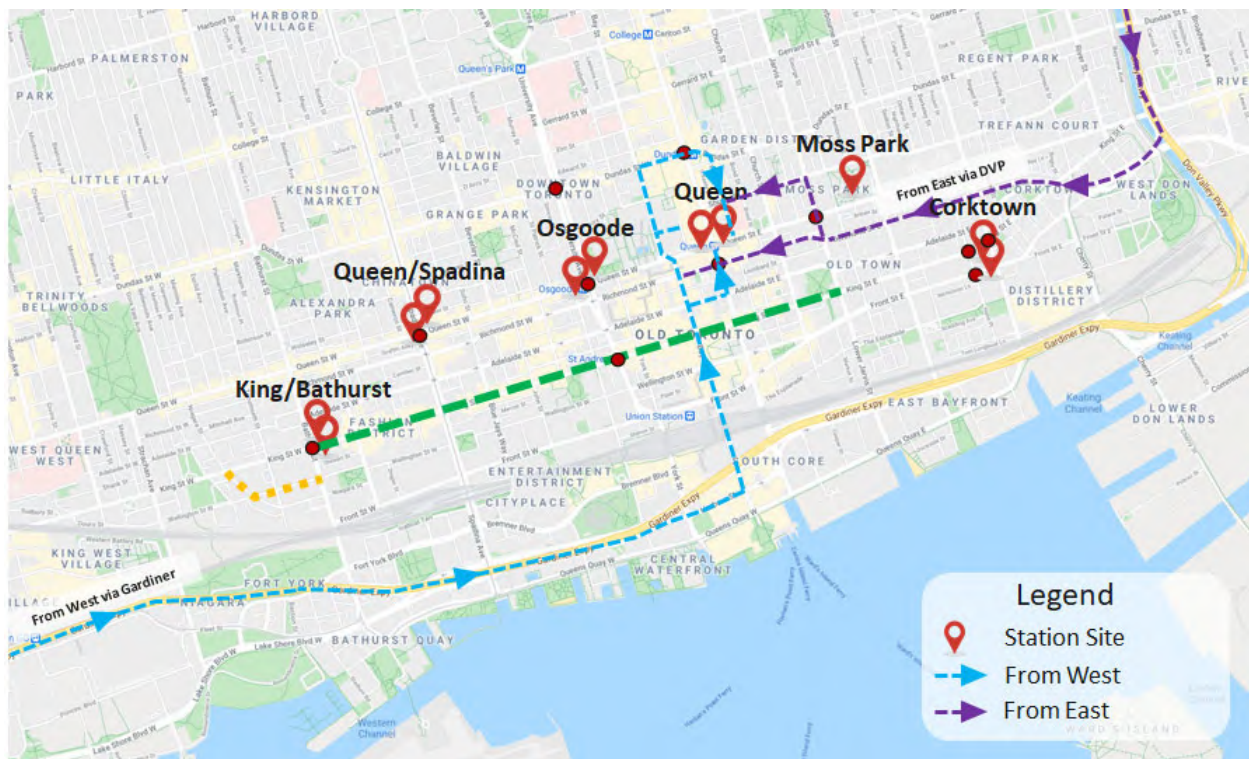


Figure 4-28: Inbound Haul Routes | Queen Station

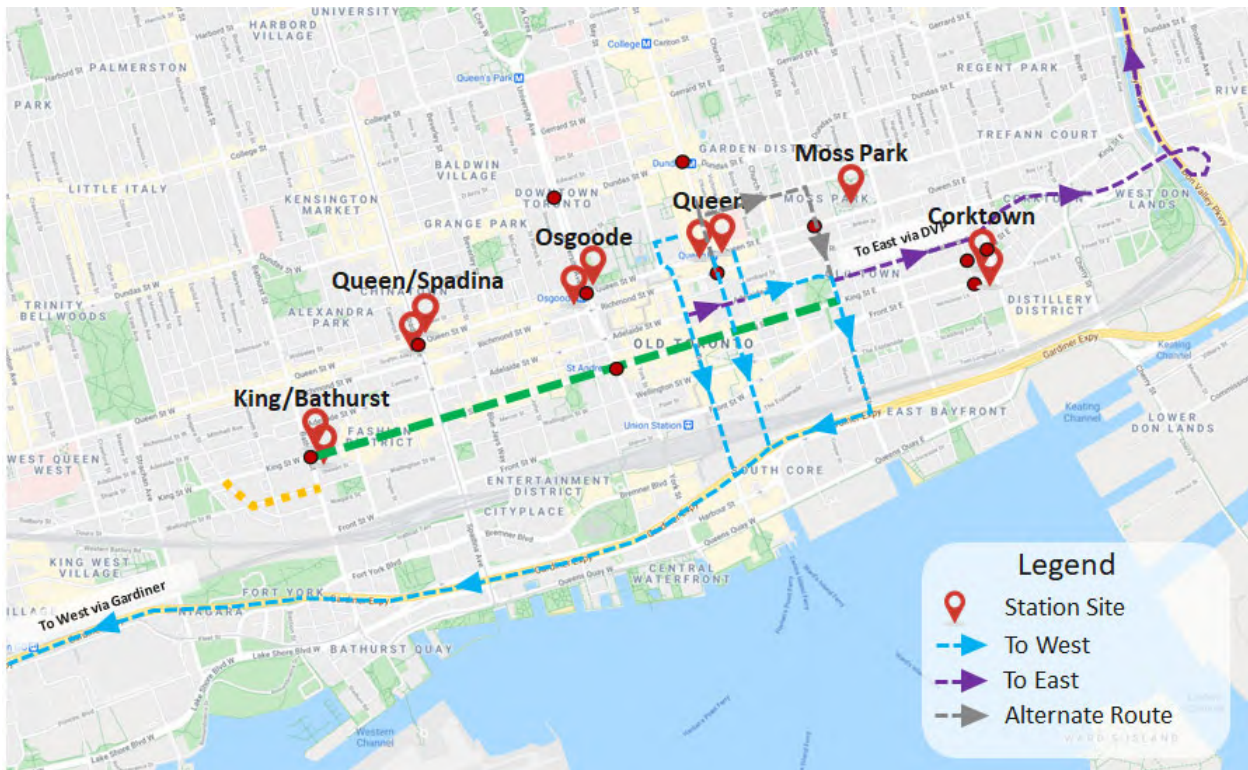


Figure 4-29: Outbound Haul Routes | Queen Station

4.1.5 Moss Park Station Construction

The Ontario Line tracks will be tunnelled at Moss Park Station and the construction impacts will mainly be caused by head house construction, where excavation and construction access will impose spatial constraints on the existing transportation network. The construction impacts at Moss Park Station are expected to begin in Q4 2022 and remain in place until substantial completion of the Station; current estimates foresee the construction extending until Q4 2027.

Construction impacts will include:

- Lane closure on the westbound curb lane on Queen Street between George Street and Sherbourne Street to accommodate construction deliveries and staging. The closure will impact the AM peak traffic and non-AM peak on-street parking that currently utilizes the lane.
- Pedestrian access will be maintained on the north side of Queen Street through a 2.1-metre-wide protected path on the lane closure. Pedestrians will be protected with temporary concrete barriers and an energy attenuator at the east end of the lane closure. An AODA-compliant ramp will be provided at the western end of the closure to accommodate movements from the boulevard to path on the roadway.
- A portion of the Moss Park Arena parking lot will be taken up by the work area for Moss Park Station. Head-on parking spaces will be maintained, and the parallel parking spaces on the southern end of the building will be removed.

The details of the traffic staging plan are illustrated in **Figure 4-30**.

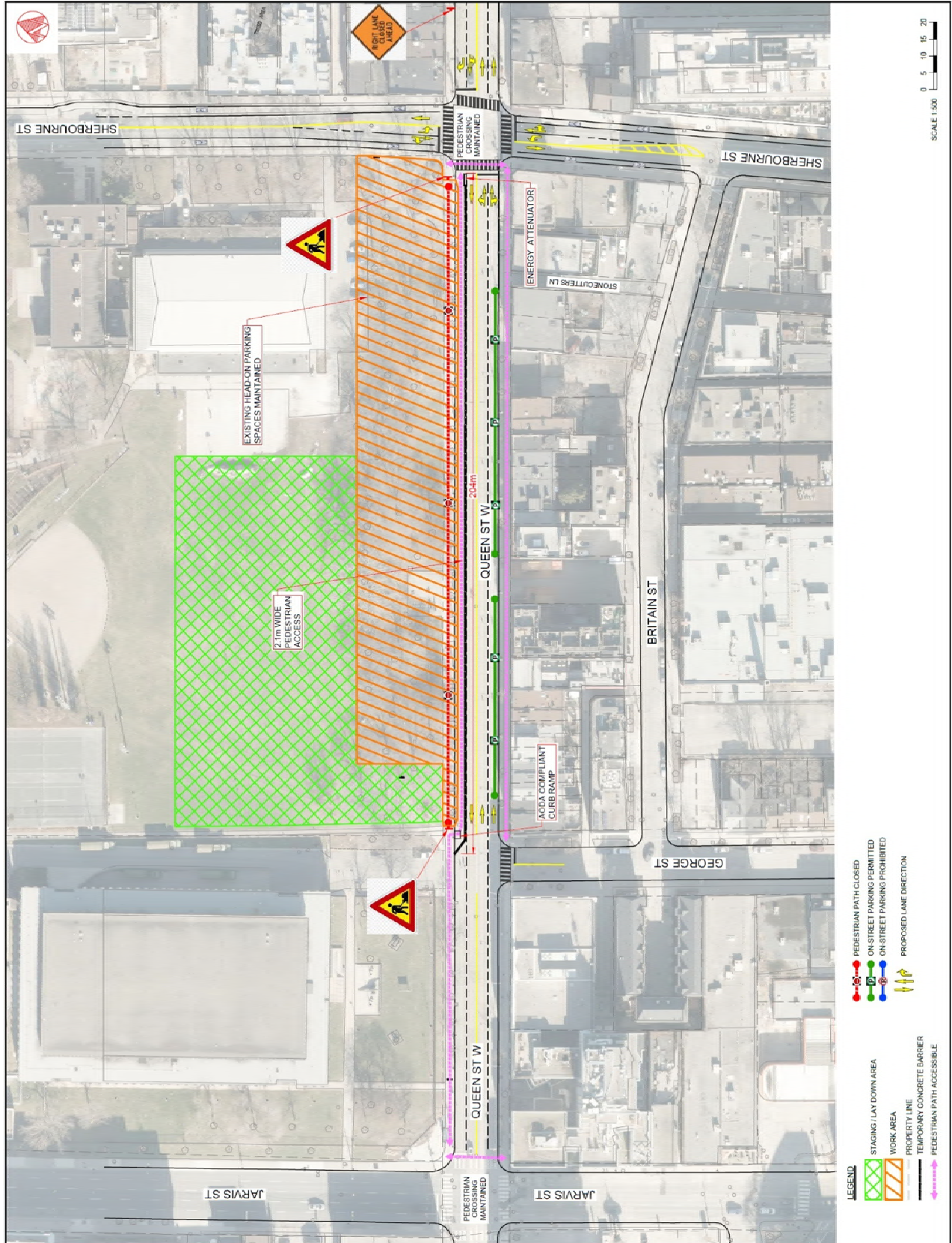


Figure 4-30: Moss Park Station - Traffic Staging Plan

A summary of road closure impacts is described in **Table 4-9**.

Table 4-9: Construction Impact Summary at Moss Park Station

Impact types	Impact Descriptions
Local Auto Access	There are no impacts to local accesses, except for a potential reduction in the number of parking spaces available at Moss Park Arena. The existing head-on parking spaces will be maintained, however, parallel parking along the south wall of the building may need to be prohibited to maintain vehicle circulation.
On-Street Parking	As a result of the Moss Park Station construction near Queen Street / Sherbourne Street, approximately 190 metres of on-street parking on the north side of Queen Street will be disabled.
Transit Stop	The westbound lane closure on Queen Street will not affect the existing transit stop locations around Moss Park.
Pedestrian	Pedestrian access will be maintained on the north side of Queen Street through a 2.1-metre-wide protected path on the lane closure. Pedestrians will be protected with temporary concrete barriers and an energy attenuator at the east end of the lane closure. An AODA-compliant ramp will be provided at the western end of the closure to accommodate movements from the boulevard to path on the roadway. Access is to be maintained to the Moss Park Armory building west of the construction works.
Door Access	There is no door access impact to adjacent businesses at this work site.
Cycling	The existing Bike Share station at Moss Park will be temporarily disabled. There are currently no dedicated cycling lanes passing through the construction sites at the Queen Spadina station. Where cyclists currently share the right of way with traffic, the remaining lanes will continue to allow cyclists to share the road.
Emergency Vehicles	There are no road closures that would require emergency vehicles to detour from the area. Emergency (fire/EMS) vehicles will continue to be able to traverse through Queen Street and the Queen/Sherbourne intersection.
Haul Routes	<p>The potential inbound and outbound haul routes are illustrated in Figure 4-31 and Figure 4-32, respectively.</p> <p>The Moss Park Station construction will result in the closure of the westbound curbside lane on Queen Street, between Sherbourne Street and George Street. Trucks will enter the work site via a westbound right movement from Queen Street which will be accommodated via Jarvis Street, Dundas Street, and Sherbourne Street for trucks arriving from the west, and Richmond Street and Sherbourne Street for trucks arriving from the east. Trucks exiting the site will make a southbound right movement onto Queen Street or a southbound through movement if using the Moss Park Armory driveway. These exiting trucks are expected to turn onto George Street before heading towards Jarvis Street and Adelaide Street due to the westbound left weekday peak period turning restriction at the intersection of Queen Street with Jarvis Street.</p>

With a station excavation of approximately 80,000 m³, the total number of trucks handling spoils at Moss Park Station will be 8,000. Assuming a period of 18 months for station excavation and 250 working days per year results in an average of approximately 20 trucks per day at Moss Park Station. On a daily basis, the average could be exceeded, with a peak condition of up to 15 trucks per hour being possible given the road network and operational challenges of loading the trucks.

Station construction will require approximately 11,000 trucks to accommodate deliveries of shotcrete, concrete, reinforced steel, station finishes, escalators, elevators, etc. within 24 months. With an assumed 250 working days per year, an average of approximately 20 trucks per day will be generated by the site. During peaks there could be up to 15 trucks per hour arriving at the site.

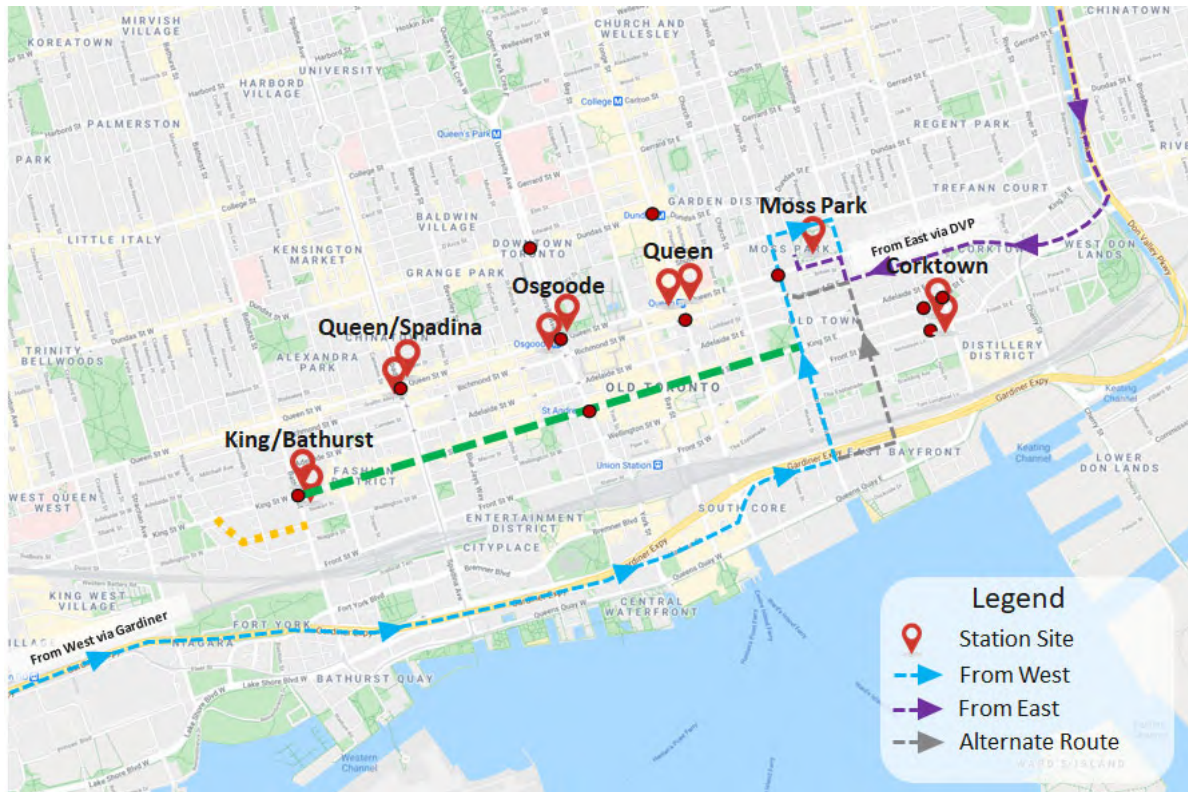


Figure 4-31: Inbound Haul Routes | Moss Park Station

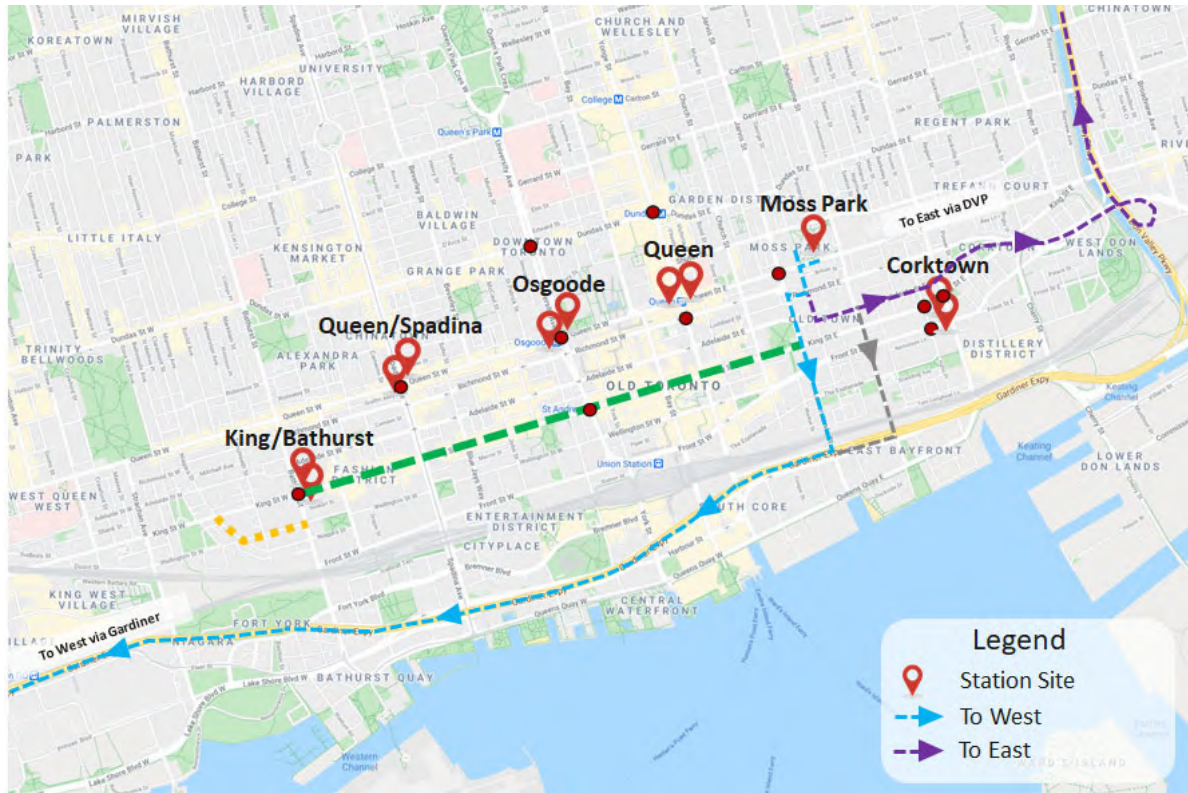


Figure 4-32: Outbound Haul Routes | Moss Park Station

4.1.6 Corktown Station Construction

Corktown Station will have cut-and-cover construction techniques applied to accommodate the staging and tunnelling of the tunnel boring machines. The entire blocks west of Parliament Street, north and south of Front Street will be used for staging and laydown to accommodate excavation and station construction. The construction impacts at Corktown Station are expected to begin in Q4 2022 and remain in place until substantial completion of the Station; current estimates foresee the construction extending until Q4 2027.

Construction impacts will include:

- Lane closure on the eastbound receiving curb lane on King Street, east of Berkeley Street. This closure will impact peak through traffic and off-peak on-street parking along the closed segment.
- Lane closure on the southbound curb lane on Parliament Street between King Street and Front Street. This closure will impact operational conditions for southbound vehicles on Parliament Street.
- Pedestrian sidewalk on the north side of King Street, from Berkeley Street to the eastbound transit stop located to the west of Parliament Street. Access to all crosswalks will be maintained.
- The pedestrian route that connects The Esplanade and Mill Street between Berkeley Street and Parliament Street will remain open. Access to a future cycling connection at this location to be constructed by the City will also remain.

The details of the traffic staging plan are illustrated in **Figure 4-33**.

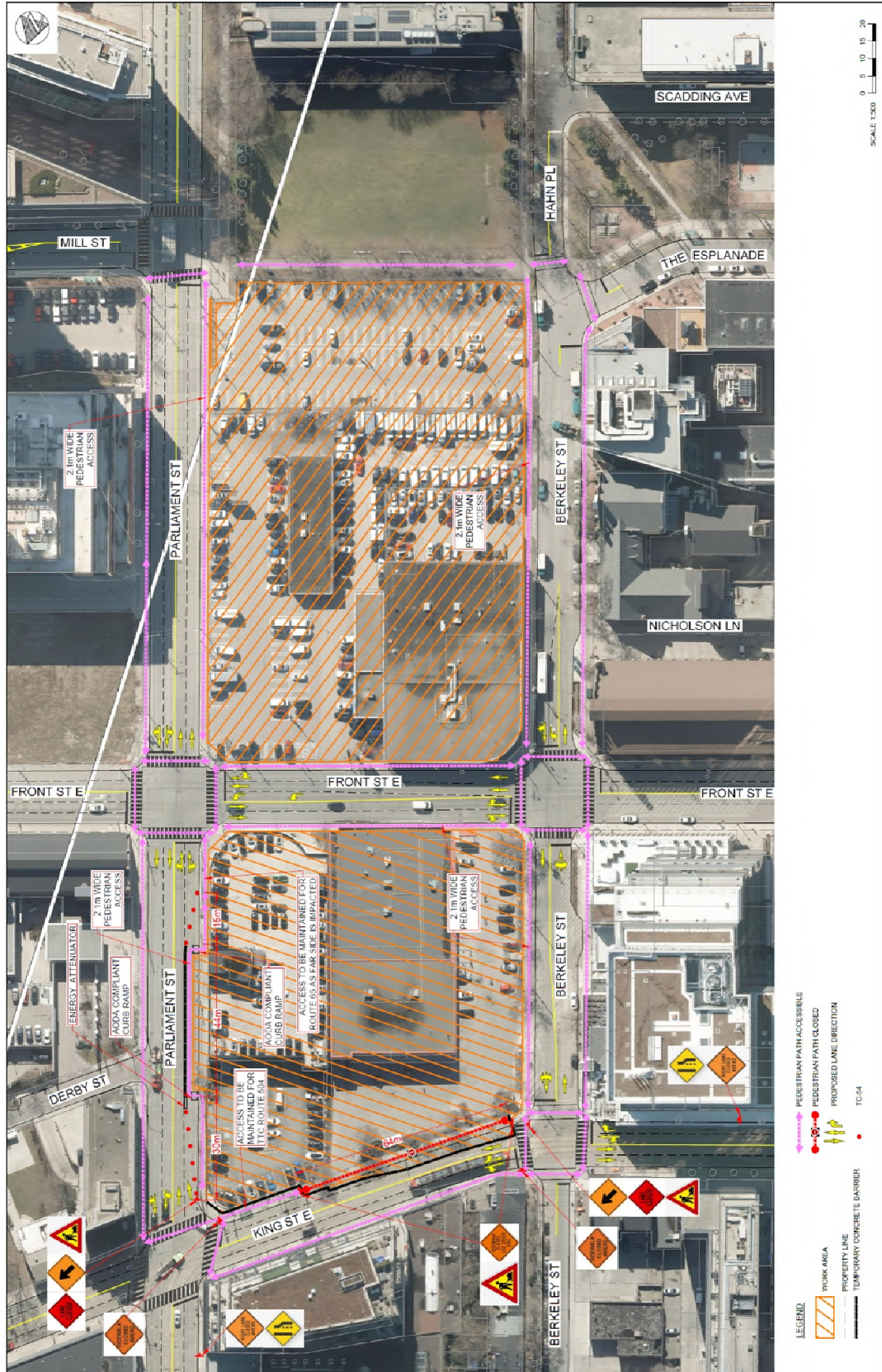


Figure 4-33: Corktown Station - Traffic Staging Plan

A summary of road closure impacts is described in **Table 4-10**.

Table 4-10: Construction Impact Summary at Corktown Station

Impact types	Impact Descriptions
Local Auto Access	No local auto or on-street parking impacts are expected at the Corktown Station construction site.
Parking	On-street parking in the area will not be affected. Public Green P parking lots located at 271 Front Street E and 54 Parliament Street will be removed as a result of the station construction.
Transit Stop	The active transit stops around Corktown Station will be maintained throughout construction.
Pedestrian	Temporary lands will be required surrounding the Corktown Station construction sites resulting in the work areas encroaching beyond the sidewalks on King Street, and on Parliament Street between King Street and Front Street. Protected pedestrian paths with a minimum width of 2.1 metres will be provided around all work areas, with the exception of the south side of King Street east of Berkeley Street, which will be closed up to the eastbound transit stop located to the west of Parliament Street. The detour path on the west side of Parliament Street between King Street and Front Street will be protected with temporary concrete barriers and an energy attenuator, and the crossings between the boulevard and the roadway will have AODA-compliant ramps. Pedestrians currently using the south side of King Street east of Berkeley Street will be expected to detour via the north side of King Street, Front Street, or other alternative corridors.
Door Access	There are no door access impacts to the area, as properties at the station and tunnelling sites will be closed.
Cycling	There are currently no dedicated cycling lanes passing through the construction sites at the Corktown station area. Where cyclists currently share the right of way with traffic, the remaining lanes will continue to allow cyclists to share the road. The City will construct a dedicated cycling connection south of the Corktown site between Berkeley Street and Mill Street, which will not be impacted by OL construction during and after its installation.
Emergency Vehicles	There are no road closures that would require emergency vehicles to detour from the area. Emergency (fire/EMS) vehicles will continue to be able to traverse through the area.

Haul Routes	<p>The potential inbound and outbound haul routes are illustrated in Figure 4-34 and Figure 4-35, respectively. Trucks entering the north and south sites at Corktown Station will likely be required to enter via southbound right movements from Parliament Street. Vehicles from the west will travel up Sherbourne Street and then King Street when entering the north site, and Front Street when entering the south site. Arrivals from the east will use Richmond Street for the north site and Front Street for the south site, making westbound left turns at the intersections with Parliament Street. The Eastern Avenue to Don Valley Parkway ramp is expected to be closed from 2022 to 2023 as a result of Phase 1 of the Broadview Avenue Expansion project, which will divert truck traffic further north temporarily to the Queen Street on-ramp to the Don Valley Parkway.</p> <p>With a station excavation of approximately 75,000 m³, the total number of trucks handling spoils at Corktown Station will be 7,500. Assuming a period of 18 months for station excavation and 250 working days per year results in an average of 20 trucks per day at Corktown Station. On a daily basis, the average could be exceeded, with a peak condition of up to 15 trucks per hour being possible given the road network and operational challenges of loading the trucks.</p> <p>Station construction will require approximately 11,000 trucks to accommodate deliveries of shotcrete, concrete, reinforced steel, station finishes, escalators, elevators, etc. within a 24-month period. With an assumed 250 working days per year, an average of approximately 20 trucks per day will be generated by the site. During peaks there could be up to 15 trucks per hour arriving at the site.</p> <p>The tunnelling operations at Corktown Station will extend from April 2024 to Sept 2025 during which time approximately 260,000 m³ of tunnelled muck will be handled at the site, resulting in 26,000 truck trips. With an assumed 250 working days per year and an 18-month tunneling period, an average of approximately 70 trucks per day will be generated by the site</p>
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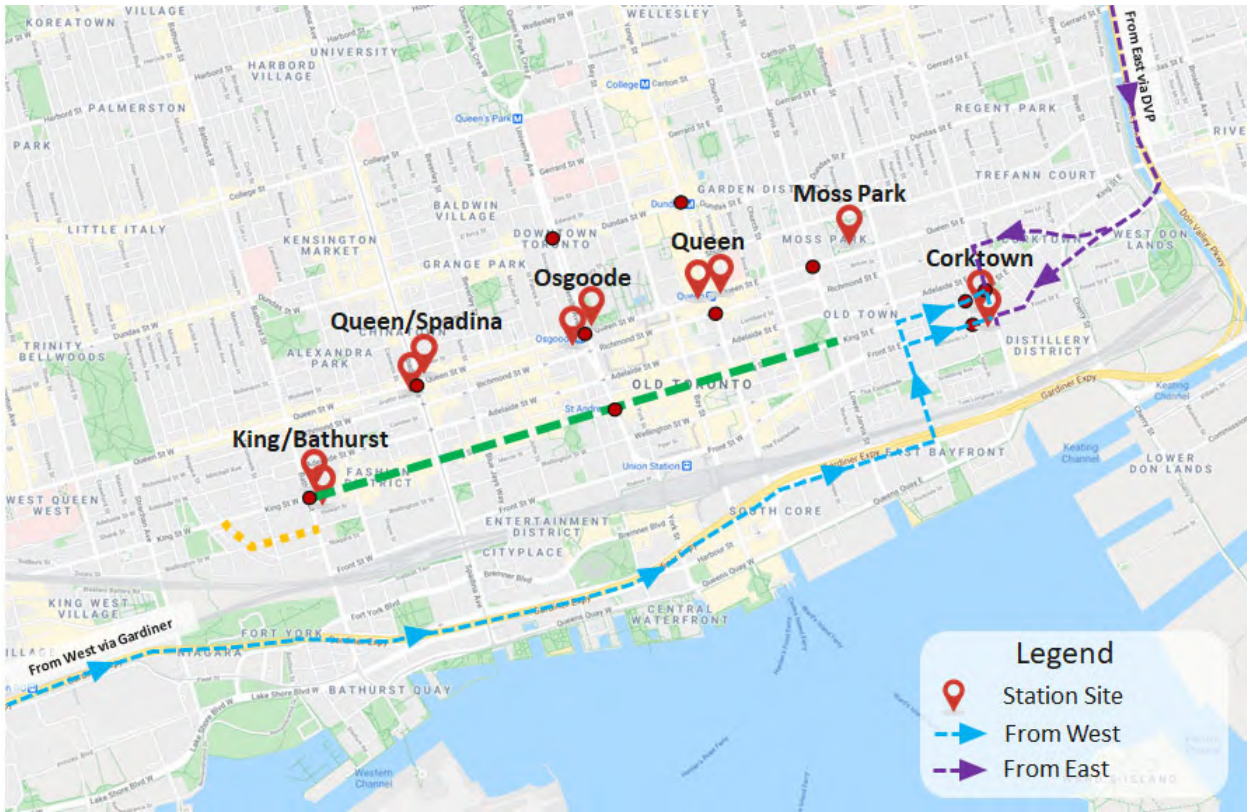


Figure 4-34: Inbound Haul Routes 2022-2029 | Corktown Station

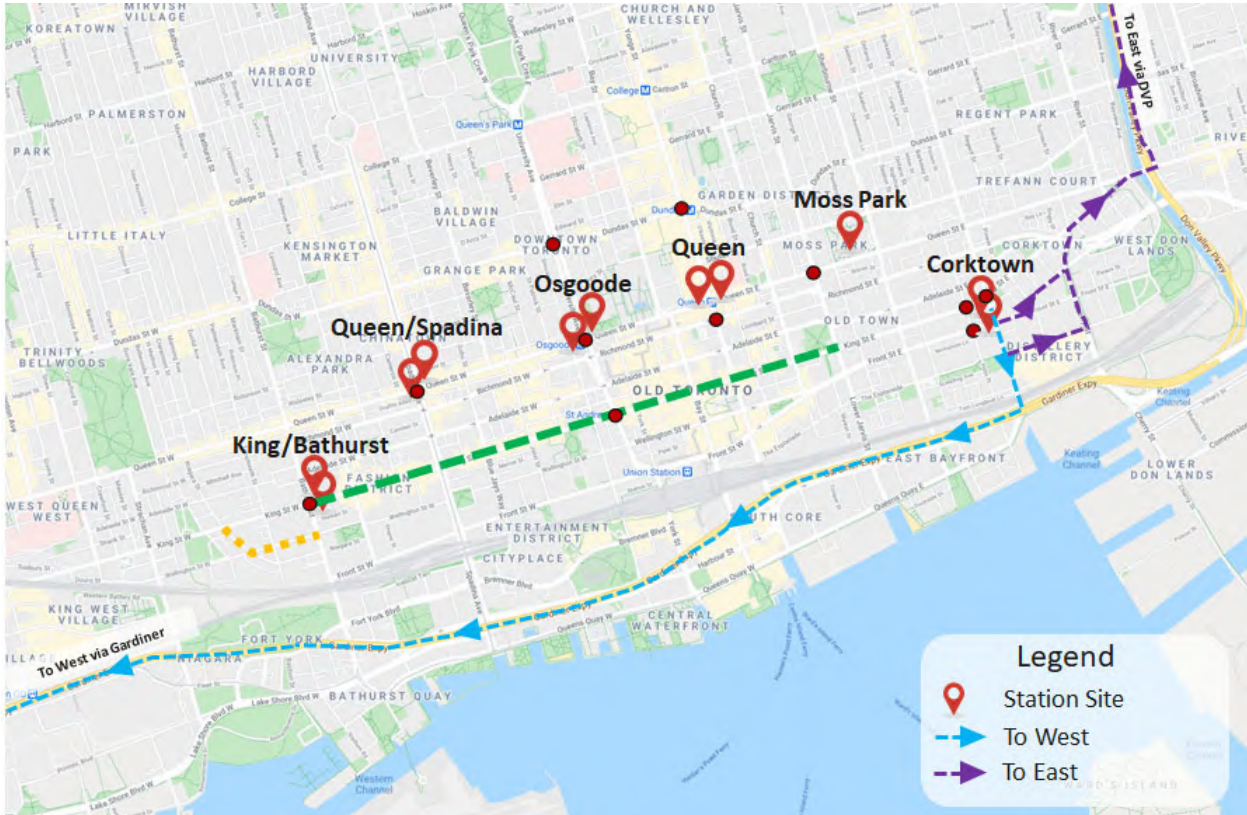


Figure 4-35: Outbound Haul Routes 2022-2023 | Corktown Station

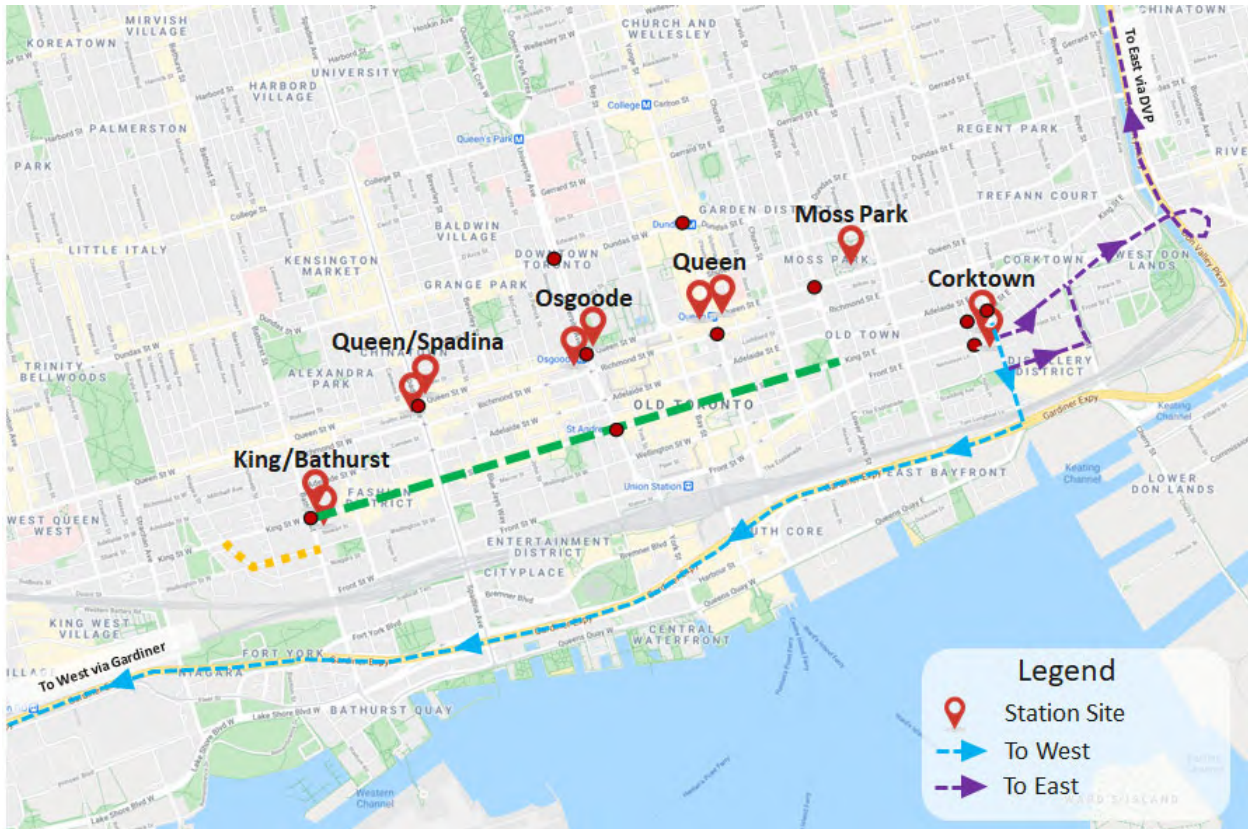


Figure 4-36: Outbound Haul Routes 2023-2029 | Corktown Station

4.1.7 Cherry Street Emergency Exit Building Construction

The intersection of Cherry Street with Lake Shore Boulevard will be impacted by the construction of an Ontario Line Emergency Exit Building (EEB) near the intersection, as illustrated in **Figure 4-37**. The Cherry EEB construction site will be located northwest of the intersection, and the staging / laydown area will be located to the northeast. The construction impact caused by Ontario Line is expected to require:

- Sidewalk/Multi-use path closure on the northwest corner of Lake Shore Boulevard / Cherry Street.
- Off-peak lane closure westbound on Lake Shore Boulevard.

The construction plan in **Figure 4-37** accounts for the future configuration of Lake Shore Boulevard and Cherry Street, which is based on planned construction by the City in the next five years and includes the following:

- Cherry Street south of Lake Shore Boulevard will be relocated further west to align with Cherry Street north of Lake Shore Boulevard, and a new bridge over the Keating Channel will be constructed west of the current location.
- The channelized southbound right turn lane will be removed, and the movement will be shifted to a single shared southbound left, through, and a right turn lane.



- The channelized westbound right turn lane will be removed, and the movement shifted to a shared through and right turn curbside lane.
- Lake Shore Boulevard will be realigned resulting in a near perpendicular intersection with Cherry Street.
- Pedestrian crosswalks will be provided on all approaches, and bicycle signals and crossing will be provided on the west side of the intersection.
- Dedicated bus lanes will be added to the east side of Cherry Street south of Lake Shore Boulevard, with a median separating the lanes from the general-purpose lanes.

The impacts as a result of the Cherry EEB construction will be limited to a closure of the multi-use path and an off-peak curb lane closure on the northwest corner of the intersection, extending just west of the intersection corner until 65 metres west of Cherry Street. North-west corner access will be maintained throughout construction to accommodate detours through the south side of Lake Shore Boulevard. The closure of the westbound curb lane will require coordination with the Port Land Flood Protection works and the Gardiner East rehabilitation projects, during the expected time of Cherry EEB construction in 2025.

As part of the modelling exercise, the channelized southbound right turn lane was removed and redirected to the current through lane; the future re-alignment of Cherry Street and Lake Shore Boulevard (and Logan Ramp Removal) will be analyzed as part of the Joint Corridor East construction closures traffic management plan.

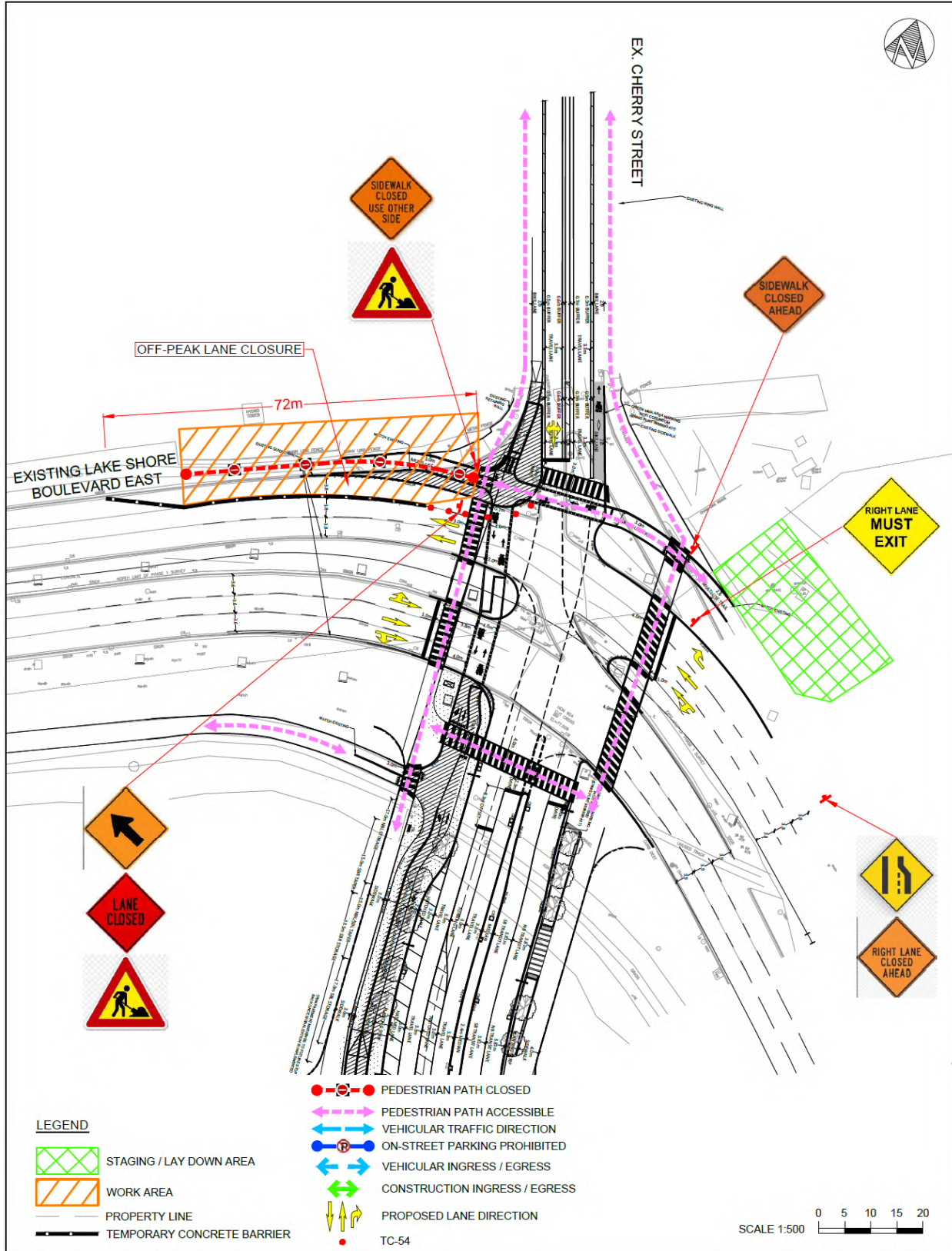


Figure 4-37: Cherry Street EEB Construction Impacts (Base Plan Source: Waterfront Toronto)

4.2 City of Toronto Planned Construction

The following projects are expected to overlap with the construction of the Ontario Line stations and comprise the future background impacts to the study area network. A conservative analysis was undertaken in the analysis in this report assuming that all City-led projects will overlap with the Ontario Line works concurrently. These projects are summarized as **Scenario 1** in subsequent automobile and transit travel time analyses.

4.2.1 YongeTOmorrow

The YongeTOmorrow project will see the reconfiguration of Yonge Street between Queen Street and College Street. The project will prioritize active transportation and reduce the vehicular right-of-way to a single lane of traffic in each direction with off-street bays for curbside activity and bus stops. The northbound segment between Queen Street and Richmond Street was also reduced to a single lane, with the left-most northbound lane at Yonge Street / Richmond Street being converted to a left turn lane. At the time of modelling, the expectation is that Yonge Street would have a one-lane configuration between Gerrard Street and Shuter Street and was modelled through a curbside lane closure; the reconfiguration of Yonge Street further south will not impact the study findings.

The reduction in north-south capacity along Yonge Street is expected to result in a diversion of traffic demand to adjacent corridors. To mitigate the impacts of the future YongeTOmorrow configuration and resulting diversions, signal optimization will be required along Yonge Street and the detour routes detailed in **Appendix B**.

The physical design of Yonge Street adopted by City council as part of the study is illustrated in **Figure 4-38**.

4.2.2 University Avenue TOCore Plans

The TOCore study has reviewed moving University Ave's northbound traffic lanes from east of the centre median to combine with the southbound lanes on the west. However, this project is still in its conceptual stage and not yet funded for construction. The number of lanes shown in the preliminary TOCore design indicates 3 traffic lanes per direction (with no indication of usage by mode), it is assumed that the existing capacity will be provided upon completion and does not impact the Ontario Line construction.

However, new protected bicycle lanes have been installed along University Avenue in the summer of 2020 between Adelaide Street and Bloor Street, removing one existing lane per direction. The bicycle lanes were installed as part of the City of Toronto's ActiveTO program, which planned to implement 25 kilometres of new cycling infrastructure in the City. Mitigation measures will not be required along University Avenue as part of the bicycle lane conversion, as the configuration is consistent with current conditions.

The University Avenue bicycle lane configuration was included in the City-led projects and Ontario Line works beyond the Queen Station construction.

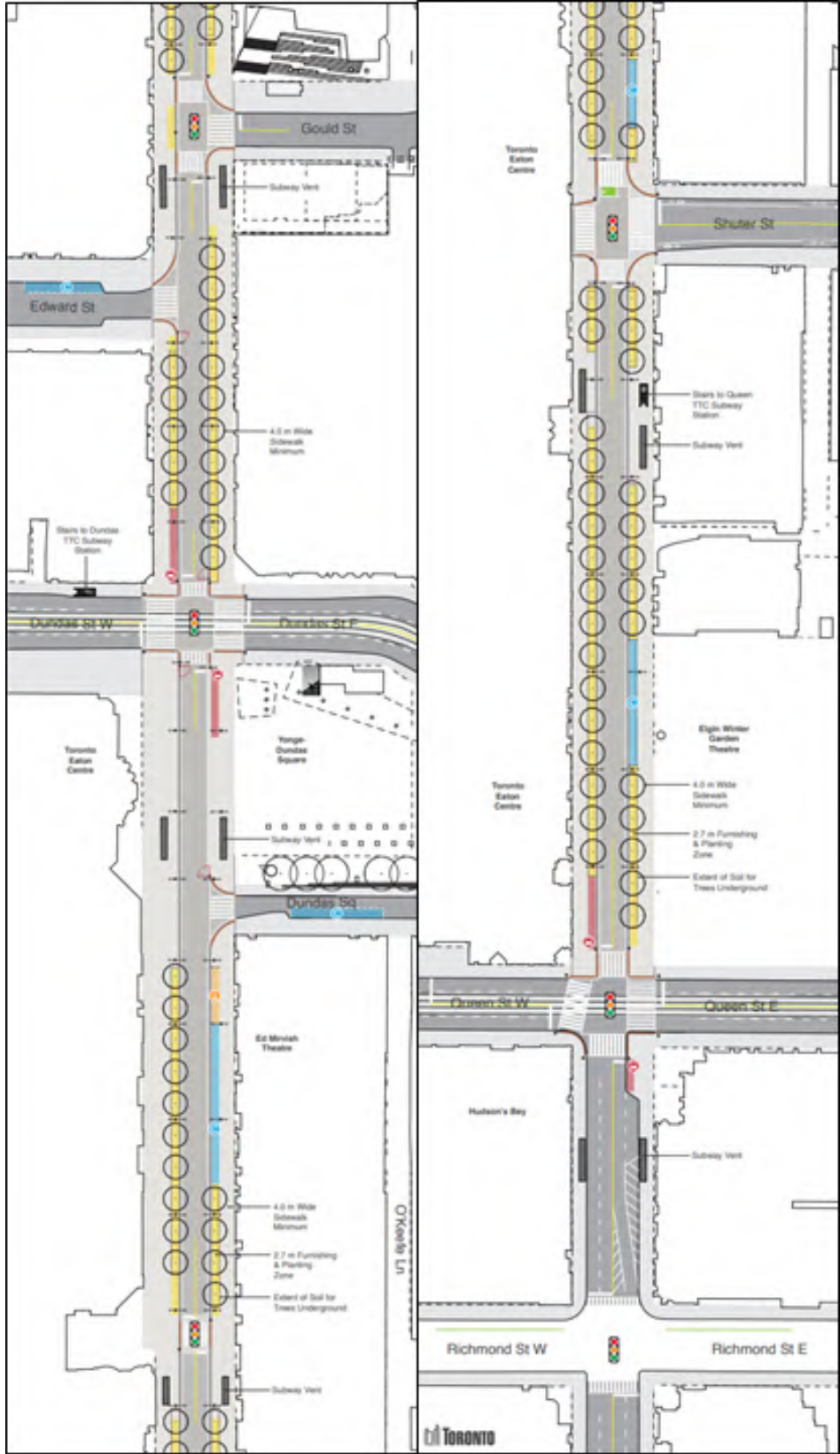


Figure 4-38: YongeTOmorrow Yonge Street Configuration (Source: City of Toronto)

4.2.3 Gardiner Expressway Rehabilitation

A summary of Gardiner Expressway segments and their anticipated construction timelines is provided in **Figure 4-39**. Segment 2 (Dufferin Street to Strachan Avenue), segment 4 (Grand Magazine Boulevard to York Street), and segment 5 (Gardiner East EA, east of Cherry Street) could coincide with the Ontario Line closure horizon; the most relevant segment is expected to be segment 4 which was included in the model as a single lane closure per direction within the segment limits.

The reduction in capacity along the Gardiner Expressway during construction works is expected to result in diversion of traffic volumes to other east-west corridors in Downtown Toronto. Signal optimizations will be required along the detour corridors to mitigate the impacts of the diverted traffic.

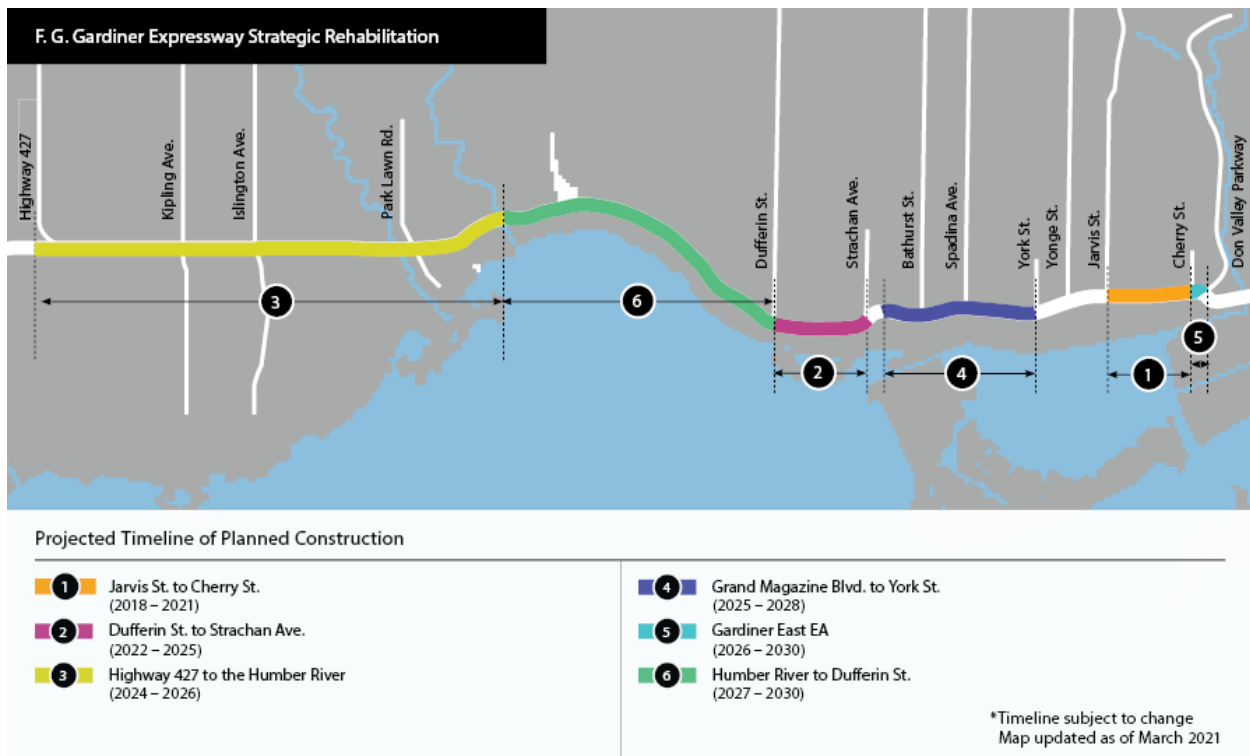


Figure 4-39: Gardiner Expressway Rehabilitation Schedule (Source: City of Toronto)

4.2.4 King Streetcar Tracks Renewal Program (TTC)

The 2024 analysis horizon assumed for the study will coincide with the King Streetcar Track Reconstruction project, which is expected to run from 2023 to 2024. Other nearby planned track replacements include Queen Street (2021), Adelaide Street (2022), Spadina Avenue (2027); as the timeline for the King Street and Spadina Avenue track replacements do not overlap, the King Street replacement was carried forward as part of the modelled City-led construction works due to its expected greater impact. Also, the Adelaide Streetcar track renewal is a requirement for the Queen Streetcar detour during construction, and is expected to take place before Ontario Line construction begins at Queen Street and Yonge Street.

The King Street track replacement will result in lane closures down to a single lane per direction or moving full closures of the roadway along rolling sections of a few blocks at a time. Details of the track replacement staging plans are not currently available, and for modelling purposes it has been assumed that a single lane per direction will be maintained on King Street; this condition is similar to existing conditions due to on-street streetcar passenger areas, patios, and furniture throughout the King Street Transit Priority Corridor.

Streetcars will not be able to run along King Street during the time of track replacement. It is expected that as a mitigation measure, buses will run along King Street with a higher frequency than the current streetcar route to provide the same passenger capacity along the corridor. Signal optimization and bus transit priority may also be required.

4.2.5 Additional City of Toronto Planned Projects

Additional projects that are planned and to be delivered by the City of Toronto include projects from Transportation Services (roads and bridges), TTC (streetcar tracks), and Toronto Waters (water mains and sewers).

The projects identified by the City have been screened and selected for additional sensitivity analysis based on geographic relevance to the Ontario Line work areas, the level of impact by mode, and the expected construction timeline. However, at the time of this study, the respective impact, duration, and road closures for the majority of the works are still unknown. Furthermore, the projects identified in the City's list are not expected to be major drivers of delay.

Therefore, further refinements will be made upon the initial council briefing in Fall 2021, with the expectation that additional directives on the scope of analysis will be made between the initial and final briefing. The modelling tools developed for this study will also be provided back to the City of Toronto and Ontario Line Project Co for further coordination.

4.2.6 Toronto Water Projects

A comprehensive list of sewer main, sewer manhole, and watermain projects was provided by Toronto Water for review and incorporation into the TTMP. The list was reviewed and each item categorized to identify which projects should be accelerated or deferred, are not relevant to the analysis, fall outside of the construction timeline or study area, should be coordinated with other work in the same area, or should be included in the Aimsun models for further analysis. The categorized Toronto Water works are illustrated in **Figure 4-40** to **Figure 4-42** for each type of work.

For the purposes of the analysis, it was assumed that sewer main and watermain works would result in a one-lane reduction per direction, and that one lane would be closed adjacent to the manholes. The following works were added to the Scenario 1 analysis:

Sewer Mains:

- Adelaide Street, from Bay Street to Victoria Street
- Front Street, from Bay Street to Scott Street
- Richmond Street, from Peter Street to Spadina Avenue
- Richmond Street, from Simcoe Street to John Street



- Wellington Street, from Clarence Street to Blue Jays Way

Sewer Manholes:

- Dundas Street at Pembroke Street
- Dundas Street at Poulett Street
- Front Street at Windsor Street
- Wellington Street at Simcoe Street

Watermains:

- Dundas Street, from Church Street to Sherbourne Street
- Front Street, from Bathurst Street to Spadina Avenue



Figure 4-40: Toronto Water - Sewer Main Works

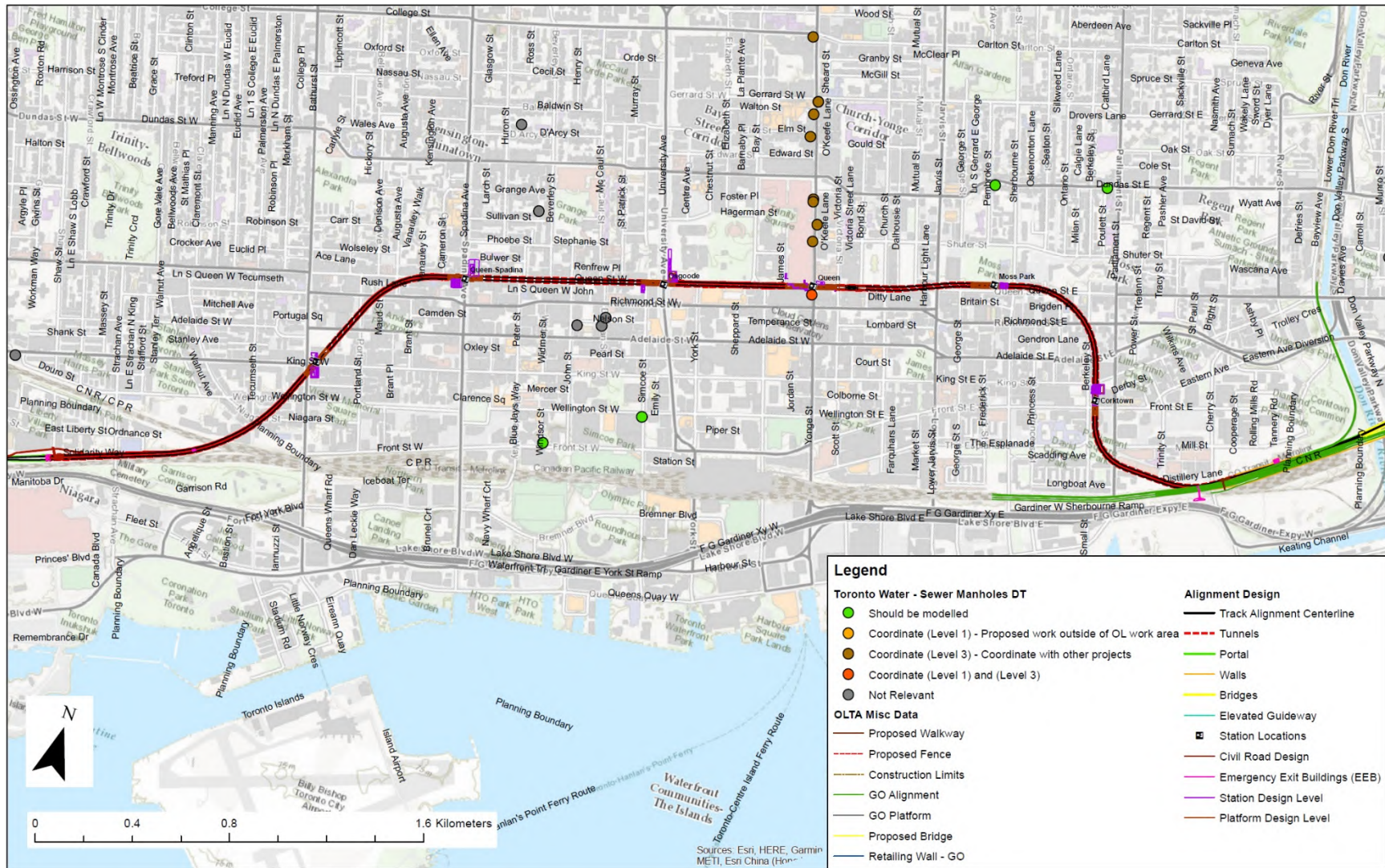


Figure 4-41: Toronto Water - Sewer Manhole Works



Figure 4-42: Toronto Water - Watermain Works

4.3 Early Works and Utility Relocation

4.3.1 York Street and Adelaide Street

As noted in **Section 4.1.4.7**, York Street will undergo a two-way conversion to accommodate the streetcar detours. Furthermore, Adelaide Street will require streetcar track renewal and installation of overhead contact system (OCS) power wires to enable streetcar detour. Therefore, before Ontario Line construction, both of these track installation and renewal projects must take place before Queen Street closure, and the impact during their construction will be addressed in a separate scope.

4.3.2 Yonge Street

As part of the Early Works that will occur before the Queen Station construction, hydro utility and watermain works will be required across the north side of the intersection of Yonge Street with Queen Street.

The hydro works across Yonge Street will maintain access north-south through the intersection. During all stages of hydro works, Yonge Street will be maintained with at least one lane per direction, similar to the assumptions made for the Yonge Tomorrow impact.

Watermain works will also be conducted on Yonge Street. These works can be implemented using trenchless techniques to minimize the duration of impacts to traffic operations along Yonge Street. Similarly, at least one traffic lane per direction will be provided at all times.

The impact of this early work, which does not coincide with other road closures caused by Queen Street, will be documented in a follow-up report for the early works.

4.3.3 Victoria Street

Watermain works will be required on Victoria Street just south of Queen Street as part of Early Works, resulting in the southbound and northbound lane closures. The watermain works will have to be implemented before the full closure of Queen Street. In addition, a combined sewer across Victoria Street will be constructed south of Queen Street, requiring lane closures on Victoria Street. Evaluation of the construction methods (to minimize impacts to the existing streetcar tracks on Victoria Street) is still underway, e.g., directional drilling for the combined sewer.

4.4 Road Closures Summary Matrices

Table 4-11: Ontario Line Station Works and Impacts Summary

Location	King Bathurst Station	Queen Spadina Station	Osgoode Station	Moss Park Station	Corktown Station	
Description of Work	Excavation and construction of King Bathurst Station headhouses, tunnelling for tracks.	Excavation and construction of Queen Spadina Station headhouses, tunnelling for tracks.	Excavation and construction of Osgoode Station new headhouses and integration, tunnelling for tracks.	Excavation and construction of Moss Park Station headhouse, tunnelling for tracks.	Excavation and construction of Corktown Station headhouses, tunnelling for tracks.	
Proposed Dates	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	Q4 2022 - Q4 2027	
Proposed Duration Overall	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years	
General Description of Required Closures	Lane closures to accommodate the NE and SE headhouses at the intersection of King Street and Bathurst Street resulting in protected pedestrian paths and transit stop relocations.	Lane closure to accommodate the SW headhouse at the intersection of Queen Street and Spadina Avenue; headhouse construction will result in protected pedestrian paths and a transit stop relocation.	Lane closures to accommodate the NE and SW headhouses at the intersections of Queen Street / University Avenue and Queen Street / Simcoe Street, resulting in pedestrian detours and a transit stop relocation.	Lane closure to accommodate the Moss Park Station construction NW of the intersection of Queen and Sherbourne resulting in a protected pedestrian path, loss of vehicular capacity and on-street parking.	Lane and sidewalk closures around the Corktown Station blocks to accommodate the station construction, resulting in pedestrian detours and vehicular capacity impacts.	
Partial Road Closures	Work Associated	Excavation and Station construction.	Excavation and Station construction.	Excavation and Station construction.	Excavation and Station construction.	Partial Road Closures
	Facilities Impacted	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on NB Bathurst St (Stewart St to 30 m north of King). ▪ Curb lane closure on WB King approach (until 45 m east of Bathurst). ▪ Curb lane closure on EB King St receiving (until 35 m east of Bathurst St). ▪ Parking restriction on north and south side of Stewart Street (until 35 m east of Bathurst St). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths on King Street and 1.8 m on Bathurst Street. ▪ Existing sidewalk width on north side of Stewart Street will be maintained on protected path. <p>Bike Lanes: No impact.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on EB Queen St approach (up to 50 m west of Spadina). ▪ Parking bay closure on east side of Spadina Avenue, north of Queen Street. <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths on Queen Street and Spadina Avenue. ▪ Closure of sidewalk on south side of Bulwer Street, from Spadina Avenue to 20 m east of Spadina Avenue. <p>Bike Lanes: No impact.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on University NB receiving (until 100 m north of Queen St) with 20 m parking closure. ▪ Centre lane closure on University SB approach (from 30 m to 50 m north of Queen St) with 15 m parking closure. ▪ Curb lane closure and parking restriction on Simcoe SB (Queen St to Richmond St). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths around the lane closures / restrictions. ▪ Closure of sidewalk on west side of Simcoe Street adjacent to lane closure (Queen to alleyway). <p>Bike Lanes: Narrowed bicycle lanes (1.5 m bicycle lane and 0.5 m buffer) on Simcoe, from Queen to Richmond.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on WB Queen (from Sherbourne St to George St). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide path on Queen Street. <p>Bike Lanes: No impact.</p>	<p>Roads:</p> <ul style="list-style-type: none"> ▪ Curb lane closure on EB King / Berkeley receiving (until 55 m east of Berkeley St). ▪ Curb lane closure on SB Parliament Street (from King to Front). <p>Sidewalks:</p> <ul style="list-style-type: none"> ▪ Protected 2.1 m wide paths along Front, Parliament, and Berkeley. ▪ Closure of sidewalk on south side of King Street (from Berkeley St to 30 west of Parliament St). <p>Bike Lanes: No impact.</p>
	Business Access Impacts	Pedestrian access to businesses adjacent to the headhouses will be maintained.	Pedestrian detour around the south Bulwer Street sidewalk which connects to backs of businesses will be required.	Pedestrian access to Osgoode Station entrance near NE headhouse will be closed.	Reduced parking capacity at Moss Park Arena.	No business access impacts.
	Duration	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years	Approx. 5 years
	Rerouting Options	<p>Vehicles: No rerouting required.</p> <p>Pedestrians / Cyclists: No pedestrian rerouting required.</p>	<p>Vehicles: No rerouting required.</p> <p>Pedestrians / Cyclists: Pedestrians to detour around the south Bulwer Street sidewalk closure via the north side of Bulwer Street.</p>	<p>Vehicles: No rerouting required.</p> <p>Pedestrians / Cyclists: Pedestrians to detour around Simcoe Street sidewalk closure via east side of Simcoe Street.</p>	<p>Vehicles: No rerouting required.</p> <p>Pedestrians / Cyclists: No pedestrian or cyclist rerouting required.</p>	<p>Vehicles: No rerouting required.</p> <p>Pedestrians / Cyclists: Pedestrians to detour around the sidewalk closures via north side of King Street, west side of Berkeley Street, east side of Parliament Street, south side of Front Street, and the mid-block connection between Mill St and The Esplanade.</p>
	Traffic Staging Drawing	Figure 4-1: King Street / Bathurst Street - Traffic Staging Plan	Figure 4-4: Spadina Avenue / Queen Street - Traffic Staging Plan	Figure 4-7: University Avenue / Queen Street (Osgoode Station) - Traffic Staging Plan	Figure 4-30: Moss Park Station - Traffic Staging Plan	Figure 4-33: Corktown Station - Traffic Staging Plan
	Transit Impacts	Route No. 504 – stop relocations, marginal delays due to lane reductions.	Route No. 501 – stop relocations, marginal delays due to lane reduction.	Route No. 501 – stop relocations only	Route No. 501 – marginal delays due to lane reduction.	Route No. 504, 65, 121 – marginal delays due to lane reduction.
	Proposed Transit Reroute	No rerouting required.	No rerouting required.	No rerouting required.	No rerouting required.	No rerouting is required.



Table 4-12: Queen Station Works and Impacts Summary

Location		Queen Station
Description of Work		Excavation and construction of Queen Station.
Proposed Dates		Q2 2023 - Q4 2027
Proposed Duration Overall		Approx. 4.5 years
General Description of Required Closures		Full road closures on Queen Street and James Street, a partial road closure on Victoria Street, and two-way conversion required on Albert Street to accommodate the Queen Station construction near the intersection of Queen Street and Yonge Street, resulting in transit, auto, and pedestrian detours.
Partial Road Closures	Work Associated	Staging and laydown area for Queen Station construction.
	Facilities Impacted	Roads: ▪ One SB curb lane closure on Victoria Street (30 m north of Queen St to 5 m south of Queen St). Sidewalks: ▪ Protected 2.1 m wide paths around the lane closure. Bike Lanes: No impact.
	Business Access Impacts	No business access impacts.
	Duration	Approx. 4.5 years
	Rerouting Options	Vehicles: No rerouting required. Pedestrians / Cyclists: No rerouting required.
	Traffic Staging Drawing	Figure 4-10 & Figure 4-11 Queen Closure - Traffic Staging Plan
	Transit Impacts	No impacts.
	Proposed Transit Reroute	No rerouting is required.
	Preconditions	N/A
Full Road Closures	Work Associated	Excavation and Station construction.
	Facilities Impacted	Roads: ▪ Full closure of Queen Street (from Bay St to Victoria St). ▪ Full closure of James Street (from Queen St to Albert St). ▪ Two-way conversion of Albert Street (Bay St to James St) and York Street (Queen St to Adelaide St). Sidewalks: ▪ Protected 2.1 m wide paths around the work sites. ▪ Closure of sidewalk on south side of Queen Street for 6 months from 50 m west of Victoria St to 20 m west of Victoria St, and 4.5-year closure from Victoria St to 20 m west of Victoria St. ▪ Closure of sidewalk on east side of James Street (from Queen St to 40 m north of Queen St). Bike Lanes: No impact.
	Business Access Impacts	Access to retail storefronts at 1 Queen Street East will be closed from the sidewalk. The mid-block at-grade signalized crossing between Eaton Centre and Hudson's Bay will be deactivated.
	Duration	Approx. 4.5 years
	Rerouting Options	Vehicles: Via adjacent east-west corridors (Dundas St, Richmond St, Adelaide St, Front St). Pedestrians / Cyclists: Pedestrians to detour around Queen Street sidewalk closure via north side of Queen Street for 6 months until the sidewalk connection to the south-west Queen St / Victoria St plaza is opened. Pedestrians walking along James Street will be required to detour via the west side of James Street during the closure period.
	Traffic Staging Drawing	Figure 4-10 & Figure 4-11 Queen Closure - Traffic Staging Plan
	Transit Impacts	Route No. 501 detours with increased travel times of up to 35 minutes EB and 28 minutes WB during AM and PM peaks.
	Proposed Transit Reroute	Reroute via York Street, Richmond Street (Westbound), Adelaide Street (Eastbound), and Church Street.
Preconditions	Utility early works, York Street conversion to accommodate streetcar detour, and Albert Street two-way conversion to accommodate James Street closure.	

5 Traffic Impact Assessment and Mitigation Measures

5.1 Auto Impacts

In order to assess the travel time impacts on vehicular traffic (automobile and transit), a microsimulation model exercise was conducted for the AM and PM peak periods. The models consider all types of vehicles (automobiles, trucks, buses, streetcars) as well as conflicts with pedestrians. The detailed analysis methodology, study area, base model background, model calibration, validation, and detailed outputs can be found in **Appendix A** and **Appendix B**. The extents of the model are illustrated in **Figure 5-1**. For the modelling analysis in this report, the results mainly focus on the area bound by Dundas Street, Parliament Street, Front Street, and Bathurst Street.



Figure 5-1: Aimsun Model Study Area

5.1.1 Overall Network Impacts

The total travel times within the focus area bound by Dundas Street, Parliament Street, Front Street, and Bathurst Street, are summarized in **Figure 5-2** and **Figure 5-3**. The network total travel times are the aggregated travel time outputs for all vehicle types within the focus area, including automobiles, trucks, streetcars, and buses. The scenarios include:

- **Queen 2-Lane Closure** and **Queen Full Closure** scenarios reflect the impact of the Queen Station construction (described in **Section 4.1.4**) works in isolation.
- **Scenario 1** includes all City-led construction works (**Section 4.2**) without any Ontario Line works in place.
- **Scenario 2** includes Scenario 1 (City-led) works plus all Ontario Line works in Downtown Toronto. Two iterations of this scenario were run, one without any signal timing optimizations and one with signal timing optimizations. The applied optimizations are detailed in **Appendix B.1**.

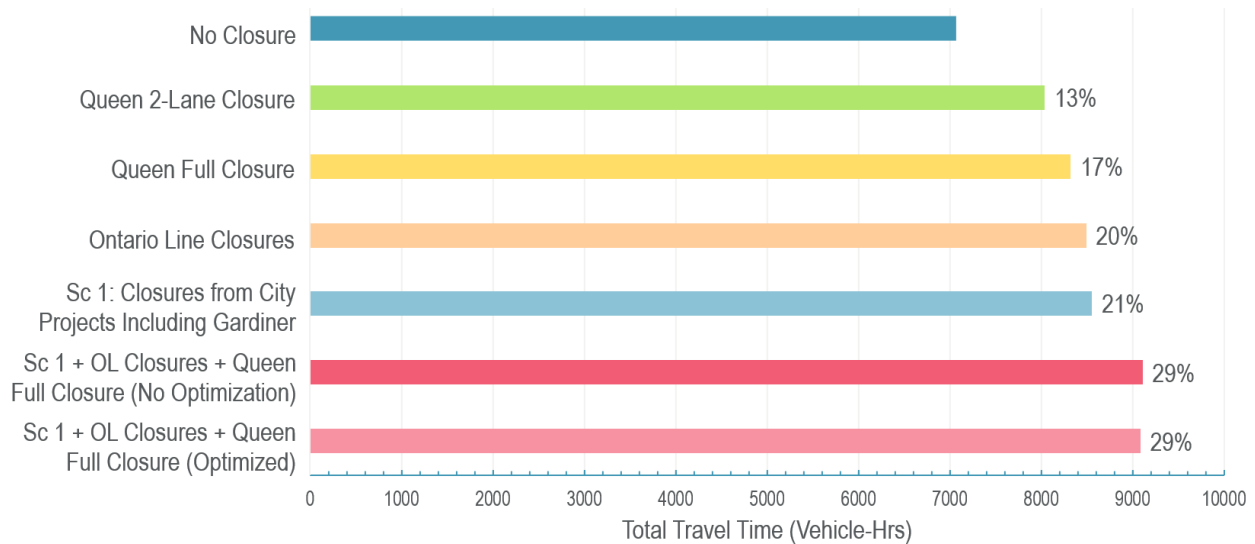


Figure 5-2: AM Peak Network Total Travel Times

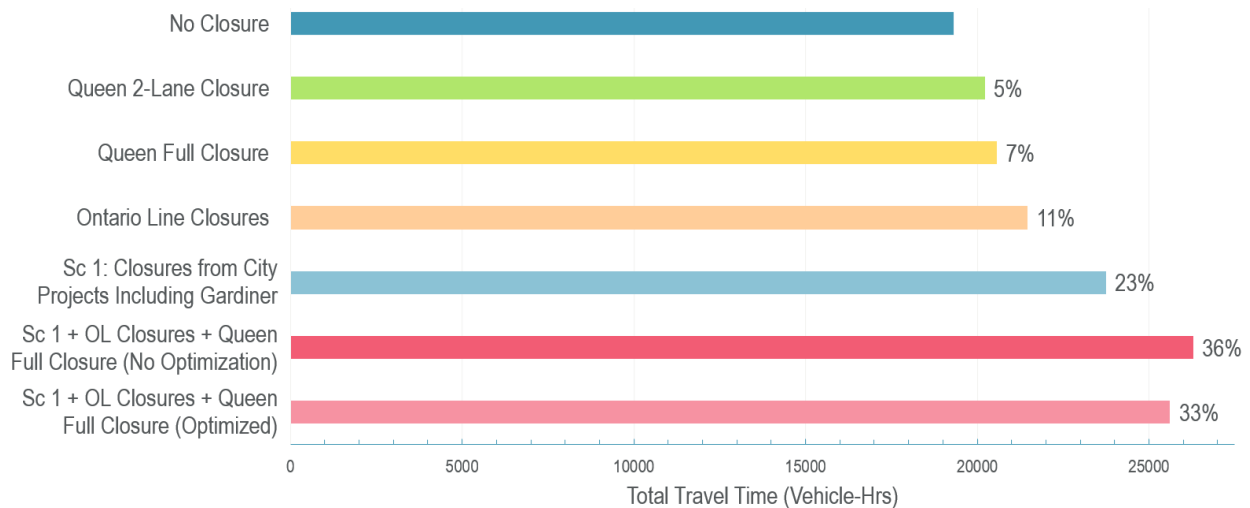


Figure 5-3: PM Peak Network Total Travel Times

The following trends are observed based on the network total travel time results:

- The full closure of Queen Street between Bay Street and Victoria Street is expected to result in a total travel time increase of 17% and 7% during the AM and PM peak periods, with a partial 2-lane closure increasing the total travel time by 13% and 5%, respectively. With the full closure of Queen Street and all other OL closures in place, the total travel time will increase by 20% and 11% during the AM and PM peak periods, respectively.
- With only the City-led construction projects (roads, bridges, transit, watermains, sewers) in place, including the Gardiner Expressway rehabilitation, a 21% increase from the base travel time is estimated during the AM period, with a 23% increase from the base during the PM peak. The impact is expected to be slightly higher during the PM peak period due to the exacerbated queueing experienced southbound towards the Gardiner. East-west diversions away from the Gardiner will also draw increased traffic through the focus area due to the lane restrictions from the rehabilitation works, while the watermain and sewer works cause lane restrictions on key east-west corridors in the focus area (Dundas Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street).
- In terms of vehicle-hours, a similar impact is observed across the AM and PM period focus areas for the full closure and 2-lane closure; however, the City-led and combined closures scenarios experience higher delays in the PM due to higher base delays and outbound commuter traffic being constrained when travelling towards the Gardiner Expressway.
- With the City-led, Ontario Line, and full Queen closure works in place, a 29% and 33% increase in total travel time is estimated during the AM and PM peak periods, respectively. Without the signal timing modifications applied to the models, the networks are estimated to experience 29% and 36% increases during the AM and PM peaks. The AM peak period experiences a negligible improvement in performance due to the minor timing adjustments applied (summarized in **Appendix B**) while the PM peak period may experience improvements of 3%.
- The addition of Ontario Line works to the City-led works results in an increase of 8% during the AM peak and 10% during the PM peak period due to the constrained east-west corridors and traffic diversions. It is noted that this condition reflects the worst-case scenario in which all works overlap; in the event that insufficient throughput is available east-west in Downtown Toronto, it is expected that vehicles will divert further away from the work areas via corridors north of Dundas Street.
- The largest impact from future construction works during both periods will come from the Gardiner Expressway rehabilitation and Toronto Water works, due to the significant volumes that currently use the affected corridors.
- It is worth noting that since the initial development of the Aimsun models, the City of Toronto has implemented LPIs (leading pedestrian intervals) at many signalized intersections throughout the City as part of the Vision Zero initiative. The LPIs at intersections have not been added to the microsimulation models, as additional post-implementation data would be required to capture the impact on roadway capacity and travel patterns. It is expected that the introduction of LPIs will impact both existing and construction scenarios as less green time is provided to vehicles.

5.1.2 Corridor Travel Times

The east-west corridor travel times within the focus area bounded by Parliament Street, Dundas Street, Front Street, and Bathurst Street are summarized in **Figure 5-4** and **Figure 5-5**, with the north-south travel times summarized in **Figure 5-6** and **Figure 5-7**. The corridor travel times were compared for key corridors that provide alternate routes during the Queen Street closure. The travel time results are representative of average travel times experienced by all vehicle types along the corridors.

Existing travel time data is shown as the “No Closure” condition (based on the City’s HERE travel time data and Waterfront travel time data), with the percentage increases/decreases modelled between the calibrated base scenario and construction scenarios applied to the existing travel time to provide an estimate of travel time impacts on each corridor.

The following trends are observed based on the corridor travel time results:

- AM peak period travel time impacts from the Queen Street closure are relatively minor on both north-south and east-west corridors, indicating that there is sufficient capacity to accommodate traffic diversions caused by the closure.
- The impacts to the network with both the Ontario Line and City-led projects are generally relatively minor during the AM peak period due to the dominant inbound commuter flow demand being delayed outside of the focus area by the Gardiner Expressway lane restrictions. An exception is noted when the City-led projects are combined with the Ontario Line works; Dundas Street will experience higher travel times of 4 minutes eastbound and 6 minutes westbound as a result of the constrained throughput from watermain works while traffic diverts east-west away from the Gardiner Expressway lane restrictions and Queen Street closure.
- During the PM peak, corridor travel time increases upwards of 8 minutes are estimated in the Queen Full Closure and Queen 2-Lane Closure scenarios on Richmond Street across the focus area. Lower impacts are observed on the adjacent east-west corridors in the Queen 2-Lane Closure scenario relative to the Queen Full Closure.
- Up to 2 minutes of additional travel time is estimated during the PM period on north-south corridors in the Queen Full Closure and Queen 2-Lane Closure scenarios, with some corridors experiencing slight travel time improvements due to changes in travel patterns.
- The impacts from City-led only projects (Scenario 1), including the Gardiner Expressway rehabilitation and Toronto Water works, will mainly impact westbound and southbound travel times by upwards of 21 minutes of additional travel time on Richmond Street and 9 minutes southbound on Jarvis Street during the PM period. As noted above, this increase in travel time is associated with vehicles diverting away from the constrained conditions and high congestion on the Gardiner Expressway, and is also a result of the constrained conditions on Dundas Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street caused by sewer and watermain works.
- The combination of the Ontario Line and City-led construction works is estimated to increase travel times by up to 29 minutes on Richmond Street and 9 minutes southbound on Jarvis Street are estimated during the PM period. These exacerbated

conditions are mainly due to the closure of Queen Street and the resulting diversion of east-west trips to adjacent corridors that have been constrained by sewer and watermain works.

- During both the AM and PM peaks, the largest impacts are anticipated to be caused by the addition of the Gardiner Expressway rehabilitation and Toronto Water works as they will significantly reduce the networks east-west throughput while also diverting traffic east-west through the focus area.

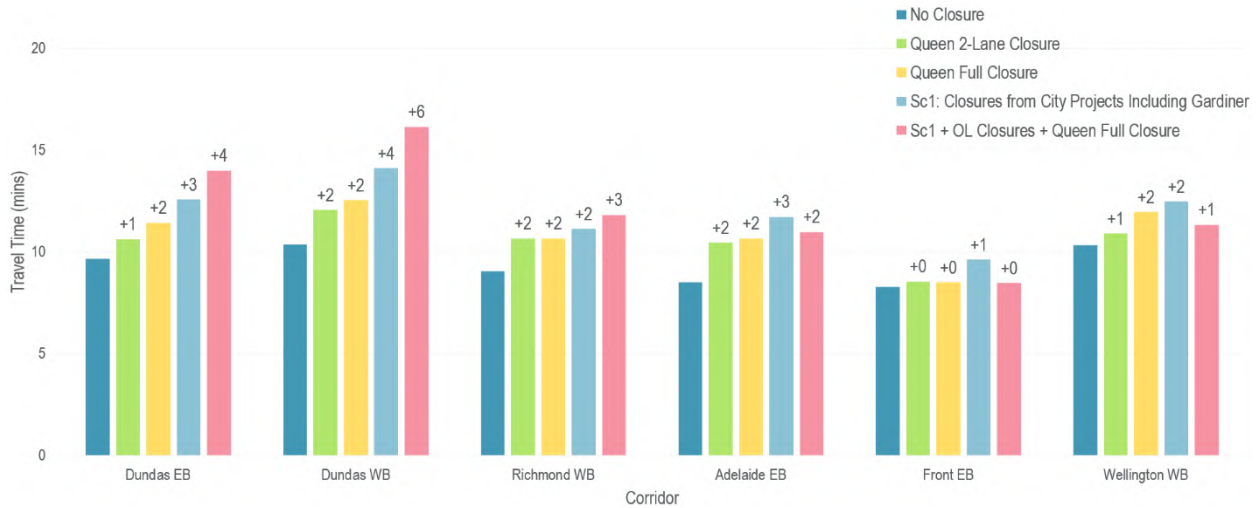


Figure 5-4: AM Peak East-West Corridor Travel Times

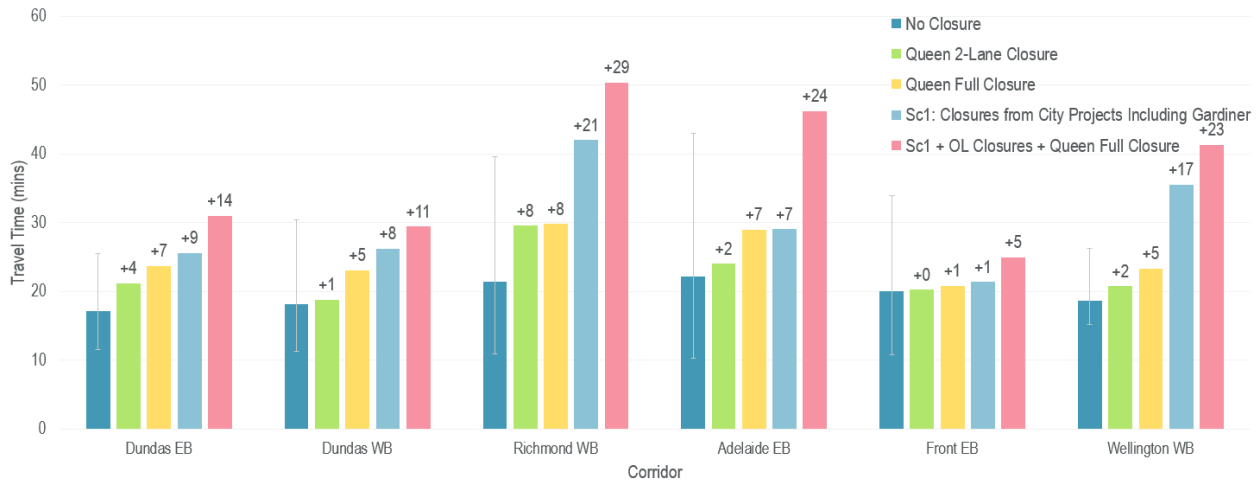


Figure 5-5: PM Peak East-West Corridor Travel Times

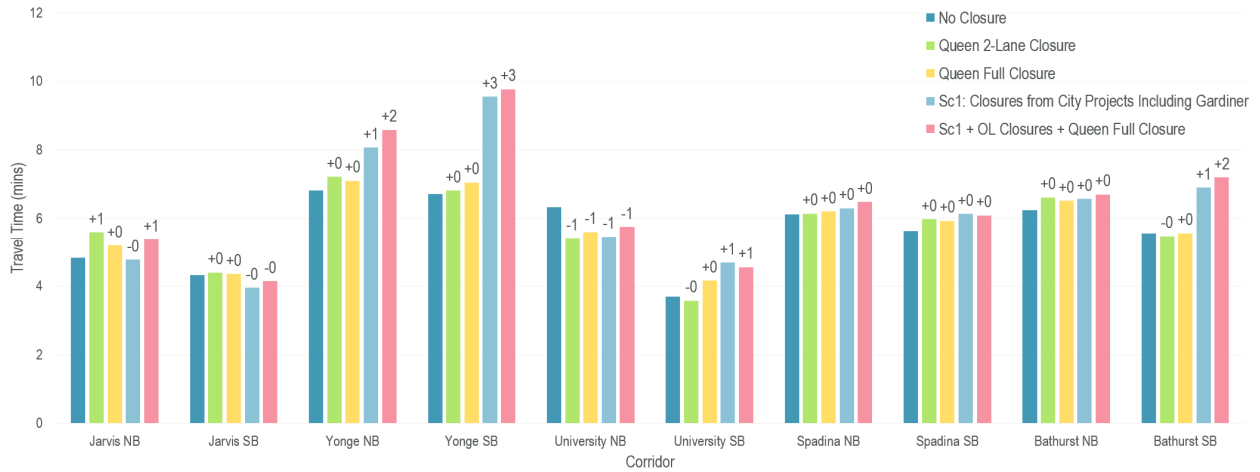


Figure 5-6: AM Peak North-South Corridor Travel Times

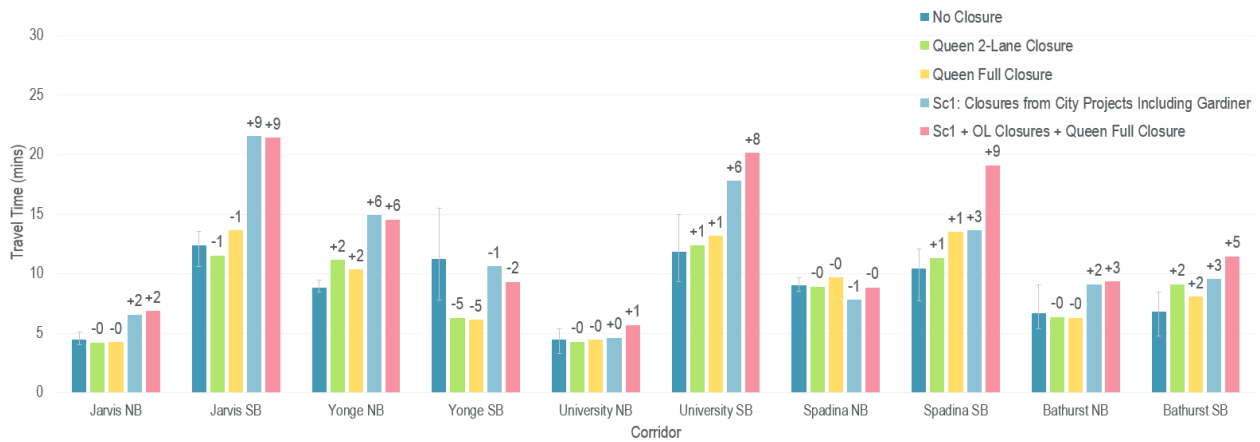


Figure 5-7: PM Peak North-South Corridor Travel Times

5.1.3 Traffic Diversions

The east-west and north-south volumes within the focus area were assessed along key screenlines, which included north-south screenlines at Bathurst Street, Spadina Avenue, University Avenue, Yonge Street, Jarvis Street, and Parliament Street, and east-west screenlines near Queen Street. A map of the screenline locations and the intersection approaches is illustrated in **Figure 5-8**.

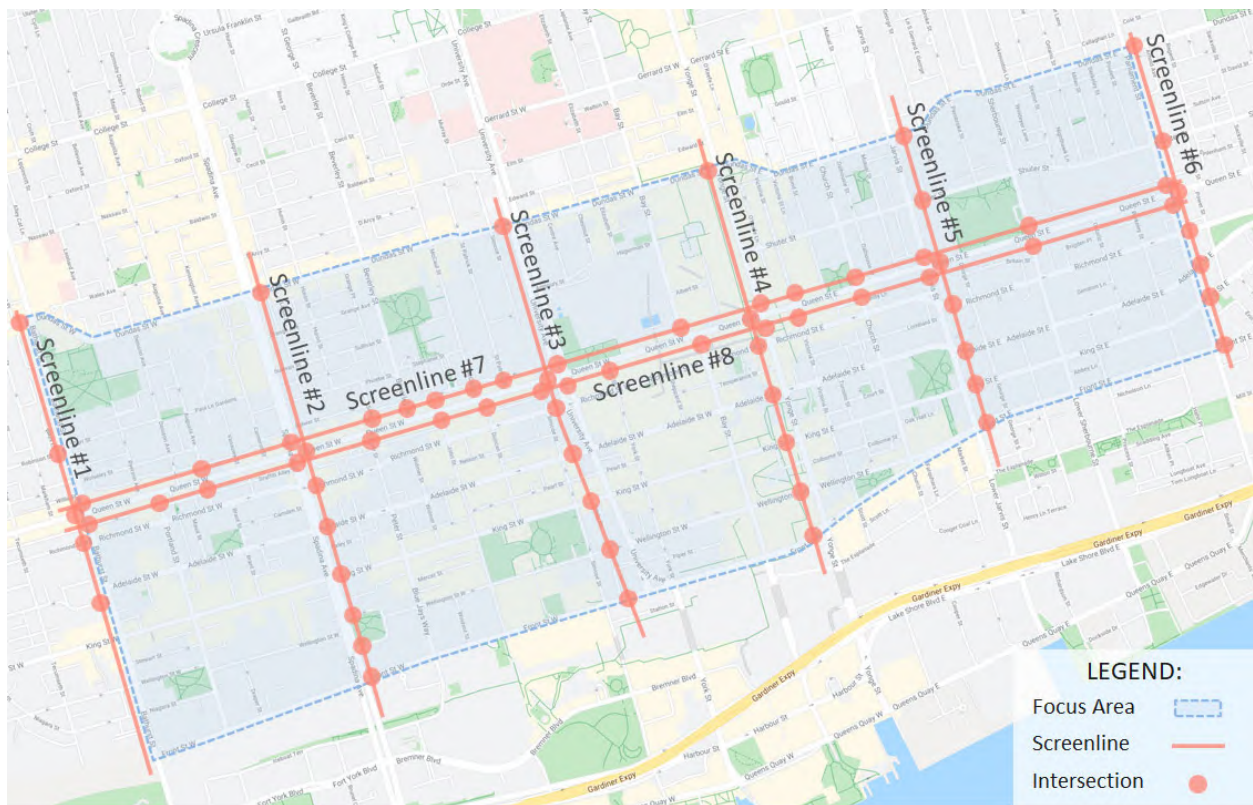


Figure 5-8: Volume Screenline Locations

A detailed breakdown of the AM and PM peak hour volumes processed at the screenlines can be found in **Appendix D**. These volumes reflect the average hourly recorded volumes across the 3-hour simulation period in the AM and PM peak period Aimsun models. The volume and percent difference columns indicate the change in processed volumes relative to the base scenario with no closures applied. **Table 5-1** and **Table 5-2** provide a preview of the detour volumes near the screenline at Yonge Street (#4), with existing turning movement volumes used for the Do Nothing condition, and simulated percentage changes applied to the construction scenarios. The tables below indicate the combined eastbound and westbound demands, and the average of demands to the east and to the west of Yonge Street.

Table 5-1: AM Peak Traffic Flows and Diversion (Yonge Street Screenline)

Corridor	Do Nothing (Traffic Counts)	Queen 2-Lane Closure	Queen Full Closure	City-Led Projects + Gardiner	Queen Full Closure + Other OL + City-Led Projects + Gardiner
Dundas	1,037	1,108 (+7%)	1,199 (+16%)	1,036 (-0%)	1,092 (+5%)
Queen	860	590 (-31%)	0 (-100%)	1,025 (+19%)	0 (-100%)
Richmond	1,447	1,514 (+5%)	1,630 (+13%)	1,438 (-1%)	1,575 (+9%)
Adelaide	639	634 (-1%)	688 (+8%)	527 (-17%)	548 (-14%)
Wellington	1,209	1,189 (-2%)	1,206 (-0%)	1,347 (+11%)	1,216 (+1%)
Front	293	342 (+17%)	356 (+22%)	310 (+6%)	343 (+17%)

Table 5-2: PM Peak Traffic Flows and Diversion (Yonge Street Screenline)

Corridor	Do Nothing (Traffic Counts)	Queen 2-Lane Closure	Queen Full Closure	City-Led Projects + Gardiner	Queen Full Closure + Other OL + City-Led Projects + Gardiner
Dundas	1,136	1,250 (+10%)	1,341 (+18%)	914 (-20%)	947 (-17%)
Queen	1,040	833 (-20%)	0 (-100%)	943 (-9%)	0 (-100%)
Richmond	1,260	1,444 (+15%)	1,458 (+16%)	1,155 (-8%)	1,236 (-2%)
Adelaide	1,115	1,103 (-1%)	1,099 (-1%)	912 (-18%)	685 (-39%)
Wellington	850	877 (+3%)	893 (+5%)	953 (+12%)	922 (+8%)
Front	413	460 (+11%)	480 (+16%)	412 (-0%)	411 (-0%)

The following observations are made on the screenline flow results:

- Significant increases (diversion) are generally not observed eastbound and westbound across the network except at the screenline west of Bathurst Street which experienced a 19-22% eastbound and up to 9% westbound increase during the AM and PM peak periods as a result of City works and Ontario Line construction works combined. Relatively large increases during the PM peak were also observed westbound on Front Street, east of Jarvis Street during the City-led projects scenario (+38%), and northbound on Victoria Street north of Queen Street during the combined scenario (+92%); however, these roadways experienced a lower demand in the base scenario compared to the main corridors adjacent to Queen Street.
- The tables above show that demands across Yonge Street generally decrease during the PM peak period with all closures in place, due to the constrained capacities along the east-west diversion routes. The AM peak period shows increased volumes on Dundas Street, Richmond Street, Wellington Street, and Front Street due to the higher amount unused capacity in the base model.
- The full closure of Queen Street diverts vehicles to adjacent corridors, resulting in AM peak hour increases across the Yonge Street screenline of approximately 23% eastbound on Dundas Street, 9% on Adelaide Street, and 30% on Front Street. In the westbound direction, increases of approximately 9% on Dundas Street, 17% on Richmond Street, and 7% on Front Street are observed with only the Queen Street closure in place.
- During the PM peak hour, increases across the Yonge Street screenline of approximately 23% eastbound on Dundas Street, 6% on Adelaide Street, and 4% on Front Street are observed with only the full Queen Street closure in place. In the westbound direction, increases of 12% on Dundas Street, 18% on Richmond Street, and 3% on Wellington Street are observed.
- Large increases of approximately 300-400 trips in the AM peak hour and 550 trips in the PM peak hour are observed southbound on York Street due to the conversion to two-way traffic.
- The full closure of Queen Street generally results in an increase in north-south trips as vehicles are required to divert to alternate corridors to complete their trips.

A key consideration of the full Queen Street closure is the relatively low number of through trips that will be displaced, approximately 400 eastbound and 600 westbound trips during the AM peak hour, and approximately 600 eastbound and 500 westbound trips during the PM peak hour. As a conservative limitation of the microsimulation modelling, all of the trips currently travelling through the closure site are forced to divert through other east-west corridors within the model following the same origin-destination pair, and would not be reflective of the diversion of trips to less congested alternatives or changes in trip behaviours that would result in the trips not being taken. This effect would be more prominent with a combination of high-impact closures throughout the Downtown network and on the Gardiner Expressway, which would deter some drivers from taking their trip in the first place.

5.2 Transit Impacts

The Ontario Line station construction works and other City-led construction works will impact transit service across Downtown Toronto. Transit impacts will generally be limited to transit stop relocations as a result of construction work areas occupying existing transit stops, and operational impacts resulting from lane reductions and the detour around the closure of Queen Street.

The transit travel times for major east-west transit routes within the focus area extracted from the Aimsun model are summarized in **Figure 5-9** and **Figure 5-10**. The transit travel times reflect Aimsun transit travel time results along routes 505, 501, and 504 between Bathurst Street and Parliament Street. Other local transit routes carried over from the King Street Pilot Project models were maintained in the Ontario Line modelling, such as the Downtown Express buses, but for the purposes of the analysis only the three key corridor streetcar lines were compared and discussed. The detour route taken for Route 501 in all scenarios with the Queen Street closure (partial and full) is illustrated in **Figure 4-20**. The travel time results are representative of average transit travel times experienced by all buses and streetcars along the routes within the focus area. While new transit signal priority (TSP) parameters were not yet developed for the 501 detour route during the TTMP, they are designed and evaluated as part of the preparatory work for streetcar track replacement and rehabilitation on York Street and Adelaide Street. Therefore, transit impacts could potentially be lessened when TSP is in place.

The following trends are observed based on the route transit travel time results:

- The AM peak period is generally characterized by low impacts to transit except Route 504 which experiences a significant increase in travel time, upwards of 10 minutes eastbound and 6 minutes westbound, largely due to the King Street track replacement which is assumed to run bus replacement service with increased frequencies. The increased bus frequencies along King Street were observed to result in bunching and increased delay along the King Street corridor.
- Route 501 Queen is estimated to experience increased travel times upwards of 11 minutes during the AM period as a result of increased congestion along the route.
- Relatively minor transit travel time impacts from the Queen Full Closure and Queen 2-Lane Closure scenarios are forecasted on Dundas Street and King Street during the PM

peak period, with increases upwards of 3 minutes forecasted between Bathurst Street and Parliament Street.

- Larger travel time impacts are forecasted on Route 501 eastbound and westbound as a result of the route detours onto Richmond Street and Adelaide Street around the Queen Street closure site. Increases upwards of 11 minutes eastbound and 4 minutes westbound are estimated during the PM Queen Full Closure scenario. A more significant impact occurs eastbound due to the longer diversion to and from Adelaide Street.
- As part of the City-led construction scenario, where Route 501 is maintained on the existing path, relatively high impacts are forecasted during the PM peak period on Dundas Street eastbound (13 minutes) and westbound (9 minutes), Queen Street eastbound (12 minutes) and westbound (18 minutes), and on King Street (19 minutes) due to increased congestion associated with diversions away from the Gardiner Expressway combined with constrained east-west corridors due to sewer and watermain works.
- The conversion of streetcars on King Street to buses with short headways will exacerbate operational conditions on King Street significantly during the PM period, resulting in an increase of 19 minutes travel time eastbound and westbound on average. It is noted that higher variability in travel times was observed on King Street following the conversion due to vehicles bunching at transit stops.
- The combined impacts relating to transit route detours, sewer and watermain works, Gardiner and Queen Street volume diversions, and temporary King Street bus conversions during the PM are expected to result in high transit route travel time impacts on Route 505 eastbound (30 minutes), Route 505 westbound (15 minutes), Route 501 eastbound (35 minutes), Route 501 westbound (28 minutes), Route 504 eastbound (33 minutes), and Route 504 westbound (19 minutes).

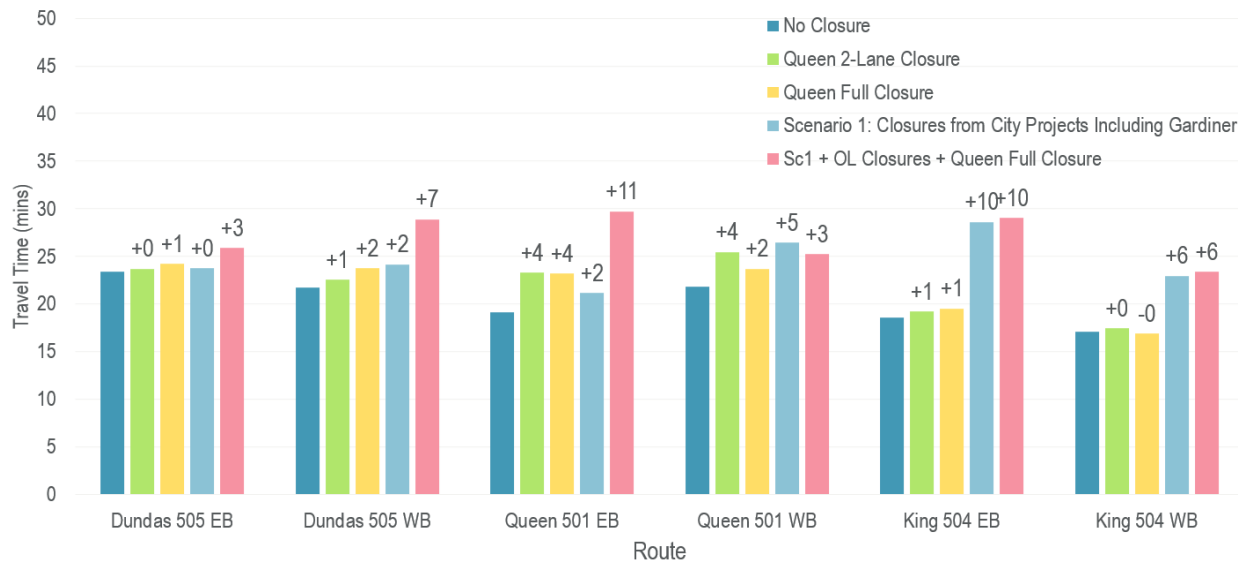


Figure 5-9: AM Peak Transit Travel Times

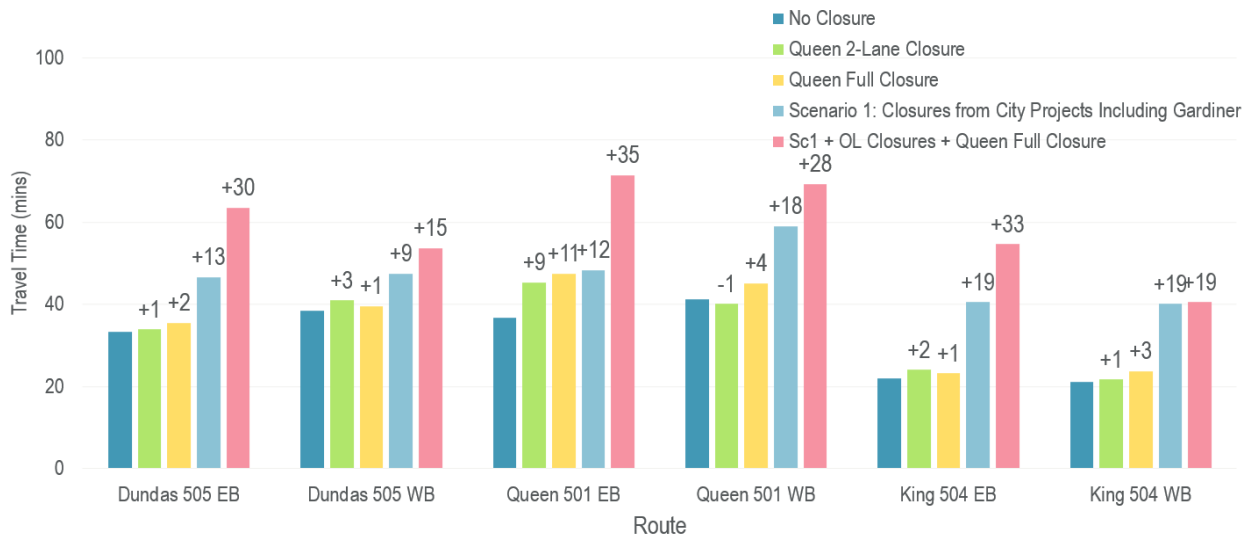


Figure 5-10: PM Peak Transit Travel Time

5.3 Active Transportation Impacts

Headhouse construction work areas will result in some detours of sidewalks and dedicated cycling lanes, requiring the implementation of protected detours around the work areas. Pedestrian access will be maintained around all of the Downtown station construction sites, except for sidewalk closures at Queen Spadina Station (Bulwer St), Osgoode Station (Simcoe St), Queen Station (James St and Queen St), and Corktown Station (King St), as detailed in **Section 4.1**. All detoured sidewalks will be maintained at a minimum width of 2.1 metres, as well as existing sidewalk paths maintained on the opposite side of the road. An exception is noted where the sidewalks do not have at least 2.1 metres in existing conditions; pedestrian detour paths at these locations will maintain at least the current width. AODA compliant curb ramps will be provided where the pedestrian path detours down onto a lane closure, and energy attenuators and temporary concrete barriers will be installed to protect pedestrians from vehicle conflicts.

The following pedestrian detours will be required throughout construction:

- Queen Spadina Station:** East-west pedestrians on Bulwer Street will be directed to use the sidewalk on the north side of Bulwer Street. The nearby north-south crossing of Bulwer Street will be maintained at the intersection with Spadina Avenue, and mid-block crossings may be accommodated when a traffic control person is present.
- Osgoode Station:** North-south travelling pedestrians will be directed to use the sidewalk on the east side of Simcoe Street. Nearby east-west crossings of Simcoe Street will be maintained at the intersections with Queen Street (directly north of the closure) and Richmond Street (35 metres south of the closure).
- Queen Station:** Pedestrians on James Street will be directed to use the west side of the street during the temporary east side closure for ventilation construction. Pedestrians east of Yonge Street will be directed to use the north sidewalk on Queen Street to bypass the south closure between the TTC entrance and Victoria Street. The middle

portion of the south sidewalk, from 20 m west of Victoria Street to 50 m west of Victoria Street, will be reopened after 6-months and will provide a connection to Victoria Street via the courtyard on the southwest corner of the intersection of Victoria Street with Queen Street. Access to all TTC entrances will be maintained. All crosswalks will be maintained to accommodate the pedestrian detour routes at the Queen/Victoria, Queen/Yonge, and Queen/Bay intersections.

- **Corktown Station:** East-west pedestrian movements around Corktown Station will be directed to use the north side of King Street E to bypass the closure on the south side of King Street E between Berkeley Street and the eastbound transit stop at the intersection of King Street E with Parliament Street. All other pedestrian paths will be maintained within the current right-of-way, with the exception of the west side of Parliament Street between King Street E and Front Street, which will provide a protected pedestrian path on the southbound lane closure. All crosswalks will be maintained to accommodate pedestrian detours in the area.
- **Cherry Emergency Exit Building:** The existing path on the north side of Lake Shore Boulevard, west of Cherry Street, will be closed during the Cherry EEB construction. Pedestrians will be required to detour via the south side of Lake Shore Boulevard.

Except for University Avenue adjacent to Osgoode Station, there are currently no bicycle lanes passing through the construction sites at the Ontario Line Downtown stations. The Osgoode Station construction will close the northbound curbside lane on University Avenue, north of Queen Street; however, the protected bicycle lane will be maintained throughout construction around the work area. The existing bicycle lane on Simcoe Street between Richmond Street and Queen Street will be impacted by the shifting of the eastern curb, and will be maintained with a 1.5 m bicycle lane and 0.5 m buffer throughout construction.

In the case of full closure during the construction of Queen Station, cyclists will be encouraged to detour to alternate routes. Alternatively, cyclists will be able to dismount and walk their bicycles on the pedestrian facilities that will be maintained throughout construction.

A new bicycle lane connection will be introduced on the west side of York Street, with a dedicated lane between Richmond Street and Adelaide Street and a shared lane between Queen Street and Richmond Street.

5.4 Recommendations / Mitigation Measures

The following mitigation measures are recommended to be applied to the network to mitigate the operational impacts of the Ontario Line and City-led construction works, and to continue regular transit service throughout the closure of Queen Street and the replacement of the King Street streetcar tracks.

Details of the recommended mitigation measures are documented in **Appendix B**.

General Mitigation Measures:

- Advance notices and consultation with businesses, BIA, local residents, and impacted property owners.

- Advance detour signage ahead of construction area.
- RoDARS reporting of planned impacts onto connected navigation services (i.e., Google Maps, Waze) and social media (i.e., Twitter), influence travel behaviours and reduce auto trips.

Targeted Mitigation Measures for City-Led Works:

- Signal optimization along Yonge Street and adjacent detour routes to mitigate the impacts of the YongeTOMorrow project.
- Signal optimization along key east-west corridors in Downtown Toronto, including Dundas Street, Queen Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street, to mitigate the impact of traffic diversions during the Gardiner Expressway Rehabilitation project as well as the constrained conditions from Toronto Water works.
- Provide replacement bus service along King Street during the King Street Tracks Renewal Program with an increased transit frequency to maintain the same level of corridor passenger capacity.

Mitigation Measures for Ontario Line Works:

- Constructing streetcar tracks along York Street southbound from Queen Street to Adelaide Street to mitigate the impact of the Queen Street Station construction closures on TTC services. Streetcar stops will be provided on Richmond Street and Adelaide Street throughout the construction period.
- Transit stops conflicting with construction closures will be relocated downstream or upstream of the current location to allow for continued service in the area. The relocation of streetcar stops will require corresponding relocations of curb cuts or ramps to maintain accessibility.
- New transit signal priority measures should be considered along the 501 Queen streetcar detour route to mitigate delays to transit.
- Signal optimizations at intersections near the construction sites to mitigate the impact of traffic diversions from the Queen Street closure and other Ontario Line and City-led works. Refer to **Appendix B** for signal optimizations applied in the Aimsun modelling exercise.
- Converting Albert Street to two-way operation to mitigate the impact of the James Street and Queen Street closures, and signal head improvements and timing optimizations will be applied to the intersection of Bay Street with Albert Street. Install a new eastbound signal head at the entrance to Old City Hall from Albert Street to accommodate traffic entering from Bay Street during the conversion.
- Protect pedestrians with energy attenuators and temporary concrete barriers along detour paths, and install AODA compliant ramps where the sidewalk path detours through a lane closure.



6 Implementation Plan

The traffic staging plans illustrated in **Section 4** are reflective of the long-term construction configurations during station excavation and station construction works. The works will generally occupy the illustrated work areas and laydown areas without the need for transition between different stages. Additional traffic staging plans and transition plans will be developed by Project Co for any differentiation and interim configuration needed to complete the works, which will require the approval of the Traffic and Transportation Committee consisting of the City of Toronto, TTC, and various stakeholders.

7 Property Access and Business Continuity Plan

A property access and business continuity plan will be developed by Metrolinx and OLTA in collaboration with City of Toronto, which will address impacts identified in **Section 4** such as loss of street parking, closed sidewalk and door fronts, and property easements.

8 Construction Impact Summary

8.1 King/Bathurst Station Impact Summary

A summary of the construction impacts for King/Bathurst Station is provided below in **Table 8-1**.

Table 8-1: King/Bathurst Station Evaluation Summary

Case	Measure	Impacts and Mitigation	
Strategic	Surface Transportation Impacts	Walking	Sidewalk detours will be maintained with 2.1 m paths on King and 1.8 m paths on Bathurst around construction sites.
		Cycling	No bicycle lane impacts; cyclists will need to share the lane with mixed traffic including autos and streetcars.
		Transit	Relocation of the eastbound and westbound TTC stops to the east by 33 m and 70 m, respectively. Potential increased delays westbound due to lane reduction at the intersection approach.
		Auto	Potential increased delays at the intersection due to the lane reductions on Bathurst Street and King Street.
	Business Access	Businesses adjacent to the worksites will not be impacted.	
	Delivery Access	Alleyway access on Bathurst north of King will be closed due to the work area; access will be maintained at 650 King for residents, deliveries, emergency services.	
	Emergency Access	Minor impact to travel time due to east-west lane closure on King Street.	
Duration	Schedule	Approximately 5 years of construction beginning Q4 2022 to Q4 2027.	

8.2 Queen/Spadina Station Impact Summary

A summary of the construction impacts for Queen/Spadina Station is provided in **Table 8-2**.

Table 8-2: Queen/Spadina Station Evaluation Summary

Case	Measure	Impacts and Mitigation	
Strategic	Surface Transportation Impacts	Walking	Closure of the south side of Bulwer from Spadina to 20 m east of Spadina. Sidewalk detours will be maintained with 2.1 m accesses around construction sites.
		Cycling	No bicycle lane impacts; cyclists will need to share the eastbound lane with autos and streetcars.
		Transit	The existing TTC stop located on the eastbound approach to the intersection will be relocated westerly approximately 80 metres. Potential increased delays eastbound due to lane reduction at the intersection approach.
		Auto	Potential increased eastbound delay due to the lane reduction at the intersection. Parking restrictions EB on Queen and NB on Spadina.

Case	Measure	Impacts and Mitigation
	Business Access	Businesses adjacent to the worksites will not be impacted.
	Delivery Access	Minor impact due to the parking restrictions eastbound on Queen and northbound on Spadina.
	Emergency Access	No roadways or alleyways will be closed off to emergency services.
Duration	Schedule	Approximately 5 years of construction beginning Q4 2022 to Q4 2027.

8.3 Osgoode Station Impact Summary

A summary of the construction impacts for Osgoode Station is provided below in **Table 8-3**.

Table 8-3: Osgoode Station Evaluation Summary

Case	Measure	Impacts and Mitigation
Strategic	Surface Transportation Impacts	Walking Sidewalk closure on the west side of Simcoe Street, south of Queen Street. Sidewalk detours will be provided along University Avenue; 2.1 m accesses will be maintained.
		Cycling University bicycle lane northbound will be maintained throughout construction with 1.5 m lane and 0.5 m buffer.
		Transit Osgoode Station access adjacent to the northeast headhouse will be temporarily closed during construction. Westbound near-side transit stop to be shifted 20 m east.
		Auto A slight reduction in capacity northbound due to lane restriction on University Avenue may increase auto delays.
	Business Access	Impacts to Osgoode Hall and surrounding sidewalks during construction.
	Delivery Access	Minor impact due to the parking restrictions southbound on Simcoe Street, south of Queen Street.
	Emergency Access	No roadways or alleyways will be closed off to emergency services.
Deliverability	Schedule	Approximately 5 years of construction beginning Q4 2022 to Q4 2027.

8.4 Queen Station Impact Summary

A summary of the construction impacts for Queen Station is provided below in **Table 8-4**.

Table 8-4: Queen Station Evaluation Summary

Case	Measure	Impacts and Mitigation
Strategic	Surface Transportation Impacts	Walking Sidewalks are maintained on both sides of Queen with periodic interruptions. Closure of south sidewalk, west of Victoria Street to 30 metres east of Yonge Street. Short-term 6-month closure of the south sidewalk from 50 m west of Victoria to 20 m west of Victoria. The north sidewalk on the

Case	Measure	Impacts and Mitigation
		west side of Yonge Street and the south sidewalk on the east side of Yonge Street at the intersection with Queen will be temporarily closed prior to the full closure due to utility relocations.
	Cycling	Diversion required, or dismount and use the sidewalk.
	Transit	4-year streetcar diversion; adds 4-11 mins to 501 travel time between Bathurst and Parliament during PM. Up to 35 mins added with City and OL projects combined.
	Auto	Diversion of all auto traffic at Queen Street closure for 4 years; average 7% increase to peak period travel times compared to do-nothing. Closure of James Street, and southbound lane closure on Victoria Street.
	Business Access	Impacts to businesses along sidewalk closure length; will affect retail storefronts at 1 Queen Street East for 6 months.
	Delivery Access	Impacts on James Street, Victoria Street and mitigation measures required on Albert Street.
	Emergency Access	Firetruck and paramedic station access routes will not be affected; however, detours will be required from St. Michaels, adding 2-3 minute to the estimated travel time.
Deliverability	Schedule	Approximately 4.5 years from Q2 2023 to Q4 2027.

8.5 Moss Park Station Impact Summary

A summary of the construction impacts for Moss Park Station is provided below in **Table 8-5**.

Table 8-5: Moss Park Station Evaluation Summary

Case	Measure	Impacts and Mitigation	
Strategic	Walking	Protected pedestrian path to be provided around the work area with a minimum of 2.1 m width.	
	Surface Transportation Impacts	Cycling	No bicycle lanes impacted. Cyclists on Queen Street westbound will need to route through the single remaining lane along the restricted section.
		Transit	Increased delays westbound may occur due to the lane restrictions on Queen Street.
		Auto	Reduction in capacity westbound due to lane restriction on Queen Street may increase auto delays.
	Business Access	Business accesses will not be impacted due to construction. Some potential reduction to parking spots at Moss Park Arena.	
	Delivery Access	Delivery access will not be impacted due to construction.	
	Emergency Access	No roadways or alleyways will be closed off to emergency services.	

Case	Measure	Impacts and Mitigation
Deliverability	Schedule	Approximately 5 years of construction beginning Q4 2022 to Q4 2027.

8.6 Corktown Station Impact Summary

A summary of the construction impacts for Corktown Station is provided below in **Table 8-6**.

Table 8-6: Corktown Station Evaluation Summary

Case	Measure	Impacts and Mitigation	
Strategic	Walking	Sidewalk closure on King Street (Berkeley Street to Parliament Street). Sidewalks at transit stops will be maintained.	
	Surface Transportation Impacts	Cycling	No bicycle lanes impacted. Cyclists on King Street eastbound will need to route through the single remaining lane.
		Transit	Transit stops will be maintained around the work areas; increased delays may occur due to the lane restriction on King Street.
		Auto	Slight reduction in capacity due to lane restriction on King Street may increase auto delays.
	Business Access	Business accesses will not be impacted due to construction.	
	Delivery Access	Delivery access is not expected to be impacted in the area.	
	Emergency Access	No roadways or alleyways will be closed off to emergency services.	
	Deliverability	Schedule	Approximately 5 years of construction beginning Q4 2022 to Q4 2027.

9 Conclusions

The following summarizes the conclusions from the analysis of the Downtown Closures Multi-modal Traffic and Transit Management Plan:

Pedestrian & Access Impacts:

- **King Bathurst:** Protected pedestrian paths will be provided around the work areas, with a minimum width of 2.1 metres on King Street and 1.8 metres on Bathurst Street. The current width on the north side of Stewart Street will be maintained around the staging area.
- **Queen Spadina:** The south side of Bulwer Street, from Spadina Avenue to 20 metres east of Spadina Avenue, will be closed throughout the Station construction duration. Pedestrians will be expected to detour through the north side of Bulwer Street. The other pedestrian connections around the Queen/Spadina construction sites will be maintained through protected pedestrian detours with a minimum width of 2.1 metres.
- **Osgoode:** Pedestrian connectivity impacts are expected for the west sidewalk on Simcoe Street between Queen Street and the mid-block alleyway north of Richmond Street, at which location pedestrians would be directed to detour across the east side of Simcoe Street. Additionally, the Osgoode Station entrance adjacent to the northeast head house at Queen Street / University Avenue may be temporarily closed during construction.
- **Queen Station:** Pedestrian connectivity will be maintained around the Queen Street closure except for the east side of James Street from Queen Street to 40 metres north of Queen Street, and the south portion of Queen Street from Victoria Street to 30 metres east of Yonge Street which will impact 3 retail storefronts for 6 months. After the 6-month period, the south sidewalk section from 20 metres west of Victoria Street to 50 metres west of Victoria Street will re-open to connect to Victoria Street via the courtyard located on the south-west corner of Queen Street and Victoria Street. The main access to 1 Queen Street East will be maintained throughout construction. The north sidewalk on the west side of Yonge Street and the south sidewalk on the east side of Yonge Street will be temporarily closed before the full closure due to utility relocations.
- **Moss Park:** A protected pedestrian path will be provided around the work area with a minimum width of 2.1 metres.
- **Corktown:** The south side of King Street, between Berkeley Street and the eastbound transit stop at the intersection of King Street with Parliament Street will be closed throughout construction. Pedestrians will be required to detour via the north side of King Street or through other nearby connections. Pedestrian paths with a minimum width of 2.1 metres will be provided around all other work areas.
- **Cherry Emergency Exit Building:** The existing path on the north side of Lake Shore Boulevard, west of Cherry Street, will be closed during the Cherry EEB construction. Pedestrians will be required to detour via the south side of Lake Shore Boulevard.

Cycling Impacts:

- Except for University Avenue adjacent to Osgoode Station, there are currently no bicycle lanes passing through the construction sites at the Ontario Line downtown stations. Where cyclists currently share the right of way with traffic, the remaining lanes will continue to allow cyclists to share the road.
- Bicycle lanes will be maintained along University Avenue and Simcoe Street throughout construction; however, no accommodations will be made for cyclists around the other construction areas as no current facilities are provided at these locations.
- Due to the proximity, Richmond Street and Adelaide Street can be used as alternate east-west routes and provide dedicated cycling facilities. Cyclists will also be able to dismount to traverse the closure sites with the pedestrian facilities.
- The two-way reconfiguration of York Street will introduce a dedicated bicycle lane between Richmond Street and Adelaide Street, and shared lane between Queen Street and Richmond Street, providing additional connections for cyclists.

Local Auto Access & On-Street Parking Impacts:

- The **King/Bathurst Station** construction is expected to impact on-street parking on Stewart Street east of Bathurst Street for approximately 40 metres. Access to the east-west alleyway 35 metres north of King Street on the east side of Bathurst Street will be closed during construction.
- The **Queen/Spadina Station** construction will close the on-street parking bay located northbound on Spadina Avenue just north of Queen Street. On-street parking eastbound on Queen Street approaching Spadina Avenue will be prohibited to accommodate the transit stop relocation.
- For the **Osgoode Station** construction, 20 metres of the northbound parking and 15 metres of the southbound parking on University Avenue, north of Queen Street, will be prohibited to accommodate the north-east work area and mid-block University works, respectively. Southbound parking on Simcoe Street between Queen Street and Richmond Street will be prohibited to accommodate the staging and heritage building façade storage areas.
- For **Queen Station**, due to the full closure of Queen Street and James Street, Albert Street will be converted to two-way traffic to accommodate local vehicular access. On-street parking will be suspended on the north side of Albert Street, while the “No Stopping” regulation on the south side of Albert Street will be enforced to ensure the safe and unobstructed flow of traffic, as well as maintain access for WheelTrans vehicles and goods deliveries. An advanced southbound left signal phase can be considered for the intersection of Bay Street/Albert Street if poor conditions are observed on the southbound approach during construction. The accessible loading zone on the south side of Albert Street, just east of Bay Street, will be shifted slightly east to mitigate vehicular conflicts and to maintain convenient access to Old City Hall. A cul-de-sac

turnaround will be located at the intersection of Albert Street with James Street, requiring a slight modification to the southwest corner of the intersection geometry.

- For **Queen Station**, Victoria Street will be reduced by one lane southbound at the intersection with Queen Street to accommodate a construction staging and laydown area. Vehicles using the on-street parking on Victoria Street on the west side of Victoria Street are expected to use other nearby parking facilities.
- For **Moss Park Station**, approximately 190 metres of on-street parking will be blocked on the north side of Queen Street west of Sherbourne Street as a result of the Station construction. Furthermore, off-street parking spaces at Moss Park Arena may be impacted.
- For **Corktown Station**, the construction works will not impact on-street parking or local automobile access.

Emergency Vehicle Impacts

- Emergency vehicle access to properties adjacent to all downtown Ontario Line station sites will be maintained, except for the full road closure segment at Queen Station.
- Emergency vehicle routing impacts are expected as a result of the full closure of Queen Street between James Street and Victoria Street. Response times and typical routes will be similar for Paramedic Services Station 40, Fire Station 332, and Fire Station 333.
- The response times from St. Michael's to the west side of the Queen Street closure will be marginally impacted, with an increased distance from 0.4 km to 0.8 km and a travel time increase from 2 minutes to 3 minutes.

Haul Routes

- The haul routes to and from the Downtown Ontario Line Station construction sites can be accommodated without changes to current traffic bylaws on turning movements and truck restrictions.
- Station excavation will generate a maximum volume of 15 trucks per hour, with an average of approximately 20 to 25 trucks per day for each of the Ontario Line sites.
- Station construction will generate a maximum volume of 15 trucks per hour, with an average of approximately 20 to 25 trucks per day is estimated for each of the Ontario Line sites.
- The portal works at Corktown Station are estimated to generate an average of approximately 70 trucks per day, with a maximum hourly demand of 25 trucks in an hour.

Overall Network Impacts

- The full closure of Queen Street between Bay Street and Victoria Street is expected to result in a total travel time increase of 17% and 7% during the AM and PM peak periods, with a partial 2-lane closure increasing the total travel time by 13% and 5%, respectively.

With the full closure of Queen Street and all other OL closures in place, the total travel time will increase by 20% and 11% during the AM and PM peak periods, respectively.

- With only the City-led construction projects (roads, bridges, transit, watermains, sewers) in place, including the Gardiner Expressway rehabilitation, a 21% increase from the base travel time is estimated during the AM period, with a 23% increase from the base during the PM peak. The impact is expected to be slightly higher during the PM peak period due to the exacerbated queueing experienced southbound towards the Gardiner. East-west diversions away from the Gardiner will also draw increased traffic through the focus area due to the lane restrictions from the rehabilitation works, while the watermain and sewer works cause lane restrictions on key east-west corridors in the focus area (Dundas Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street).
- In terms of vehicle-hours, a similar impact is observed across the AM and PM period focus areas for the full closure and 2-lane closure; however, the City-led and combined closures scenarios experience higher delays in the PM due to higher base delays and outbound commuter traffic being constrained when travelling towards the Gardiner Expressway.
- With the City-led, Ontario Line, and full Queen closure works in place, a 29% and 33% increase in total travel time is estimated during the AM and PM peak periods, respectively. Without the signal timing modifications applied to the models, the networks are estimated to experience 29% and 36% increases during the AM and PM peaks. The AM peak period experiences a negligible improvement in performance due to the minor timing adjustments applied (summarized in **Appendix B**) while the PM peak period may experience improvements of 3%.
- The addition of Ontario Line works to the City-led works results in an increase of 8% during the AM peak and 10% during the PM peak period due to the constrained east-west corridors and traffic diversions. It is noted that this condition reflects the worst-case scenario in which all works overlap; in the event that insufficient throughput is available east-west in Downtown Toronto, it is expected that vehicles will divert further away from the work areas via corridors north of Dundas Street.
- The largest impact from future construction works during both periods will come from the Gardiner Expressway rehabilitation and Toronto Water works, due to the significant volumes that currently use the affected corridors.

Corridor Travel Times

- AM peak period travel time impacts from the Queen Street closure are relatively minor on both north-south and east-west corridors, indicating that there is sufficient capacity to accommodate traffic diversions caused by the closure.
- The impacts to the network with both the Ontario Line and City-led projects are generally relatively minor during the AM peak period due to the dominant inbound commuter flow demand being delayed outside of the focus area by the Gardiner Expressway lane restrictions. An exception is noted when the City-led projects are combined with the Ontario Line works; Dundas Street will experience higher travel times of 4 minutes eastbound and 6 minutes westbound as a result of the constrained throughput from

watermain works while traffic diverts east-west away from the Gardiner Expressway lane restrictions and Queen Street closure.

- During the PM peak, corridor travel time increases upwards of 8 minutes are estimated in the Queen Full Closure and Queen 2-Lane Closure scenarios on Richmond Street across the focus area. Lower impacts are observed on the adjacent east-west corridors in the Queen 2-Lane Closure scenario relative to the Queen Full Closure.
- Up to 2 minutes of additional travel time is estimated during the PM period on north-south corridors in the Queen Full Closure and Queen 2-Lane Closure scenarios, with some corridors experiencing slight travel time improvements due to changes in travel patterns.
- The impacts from City-led only projects (Scenario 1), including the Gardiner Expressway rehabilitation and Toronto Water works, will mainly impact westbound and southbound travel times by upwards of 21 minutes of additional travel time on Richmond Street and 9 minutes southbound on Jarvis Street during the PM period. As noted above, this increase in travel time is associated with vehicles diverting away from the constrained conditions and high congestion on the Gardiner Expressway, and is also a result of the constrained conditions on Dundas Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street caused by sewer and watermain works.
- The combination of the Ontario Line and City-led construction works is estimated to increase travel times by up to 29 minutes on Richmond Street and 9 minutes southbound on Jarvis Street are estimated during the PM period. These exacerbated conditions are mainly due to the closure of Queen Street and the resulting diversion of east-west trips to adjacent corridors that have been constrained by sewer and watermain works.

During both the AM and PM peaks, the largest impacts are anticipated to be caused by the addition of the Gardiner Expressway rehabilitation and Toronto Water works as they will significantly reduce the networks east-west throughput while also diverting traffic east-west through the focus area.

Transit Travel Times

- The AM peak period is generally characterized by low impacts to transit except Route 504 which experiences a significant increase in travel time, upwards of 10 minutes eastbound and 6 minutes westbound, largely due to the King Street track replacement which is assumed to run bus replacement service with increased frequencies. The increased bus frequencies along King Street were observed to result in bunching and increased delay along the King Street corridor.
- Route 501 Queen is estimated to experience increased travel times upwards of 11 minutes during the AM period as a result of increased congestion along the route.
- Relatively minor transit travel time impacts from the Queen Full Closure and Queen 2-Lane Closure scenarios are forecasted on Dundas Street and King Street during the PM peak period, with increases upwards of 3 minutes forecasted between Bathurst Street and Parliament Street.
- Larger travel time impacts are forecasted on Route 501 eastbound and westbound as a result of the route detours onto Richmond Street and Adelaide Street around the Queen

Street closure site. Increases upwards of 11 minutes eastbound and 4 minutes westbound are estimated during the PM Queen Full Closure scenario. A more significant impact occurs eastbound due to the longer diversion to and from Adelaide Street.

- As part of the City-led construction scenario, where Route 501 is maintained on the existing path, relatively high impacts are forecasted during the PM peak period on Dundas Street eastbound (13 minutes) and westbound (9 minutes), Queen Street eastbound (12 minutes) and westbound (18 minutes), and on King Street (19 minutes) due to increased congestion associated with diversions away from the Gardiner Expressway combined with constrained east-west corridors due to sewer and watermain works.
- The conversion of streetcars on King Street to buses with short headways will exacerbate operational conditions on King Street significantly during the PM period, resulting in an increase of 19 minutes travel time eastbound and westbound on average. It is noted that higher variability in travel times was observed on King Street following the conversion due to vehicles bunching at transit stops.
- The combined impacts relating to transit route detours, sewer and watermain works, Gardiner and Queen Street volume diversions, and temporary King Street bus conversions during the PM are expected to result in high transit route travel time impacts on Route 505 eastbound (30 minutes), Route 505 westbound (15 minutes), Route 501 eastbound (35 minutes), Route 501 westbound (28 minutes), Route 504 eastbound (33 minutes), and Route 504 westbound (19 minutes).

Queen Station Alternative Evaluation

- The Queen Street 2-lane partial closure will result in a 12-month increase in the overall construction of Queen Station, and put Queen Station on the critical construction path, extending the overall opening date of Ontario Line by 5 months.
- The station construction and other indirect costs associated with the partial closure will increase the cost by an estimated \$228 M.
- The full closure of Queen Street has an annual construction cost that is \$12.5 M higher than the partial 2-lane closure, however, due to the longer duration of the partial 2-lane closure, the overall cost of travel times on the network would be lower for the full closure by \$13.2 M.

Mitigation Measures

General Mitigation Measures:

- Advance notices and consultation with businesses, BIA, local residents, and impacted property owners.
- Advance detour signage ahead of construction area.
- RoDARS reporting of planned impacts onto connected navigation services (i.e., Google Maps, Waze) and social media (i.e., Twitter), influence travel behaviours and reduce auto trips.

Targeted Mitigation Measures for City-Led Works:

- Signal optimization along Yonge Street and adjacent detour routes to mitigate the impacts of the YongeTOMorrow project.
- Signal optimization along key east-west corridors in Downtown Toronto, including Dundas Street, Queen Street, Richmond Street, Adelaide Street, Wellington Street, and Front Street, to mitigate the impact of traffic diversions during the Gardiner Expressway Rehabilitation project as well as the constrained corridors from Toronto Water works.
- Provide replacement bus service along King Street during the King Street Tracks Renewal Program with an increased transit frequency to maintain the same level of corridor passenger capacity.

Mitigation Measures for Ontario Line Works:

- Constructing streetcar tracks along York Street southbound from Queen Street to Adelaide Street to mitigate the impact of the Queen Street Station construction closures on TTC services. Streetcar stops will be provided on Richmond Street and Adelaide Street throughout the construction period.
- Transit stops conflicting with construction closures will be relocated downstream or upstream of the current location to allow for continued service in the area. The relocation of streetcar stops will require corresponding relocations of curb cuts or ramps to maintain accessibility.
- New transit signal priority measures should be considered along the 501 Queen streetcar detour route to mitigate delays to transit.
- Signal optimizations at intersections near the construction sites to mitigate the impact of traffic diversions from the Queen Street closure and other Ontario Line and City-led works. Refer to **Appendix B** for signal optimizations applied in the Aimsun modelling exercise.
- Converting Albert Street to two-way operation to mitigate the impact of the James Street and Queen Street closures, and signal head improvements and timing optimizations will be applied to the intersection of Bay Street with Albert Street. Install a new eastbound signal head at the entrance to Old City Hall from Albert Street to accommodate traffic entering from Bay Street during the conversion.
- Protect pedestrians with energy attenuators and temporary concrete barriers along detour paths, and install AODA compliant ramps where the sidewalk path detours through a lane closure.

Appendix A: Microsimulation Modelling Approach and Calibration

An analysis was undertaken to understand the operational impact of the Ontario Line and City-led projects on the downtown network. The process for the analysis was as follows:

- The Aimsun microsimulation model developed by Parsons for the December 2019 King Street Modelling Study was provided by the City of Toronto and applied as the base model for the subject study.
- Modelled travel times on Dundas Street, Queen Street, Richmond Street, Adelaide Street, Front Street, and Wellington Street were compared against observed data, however, it was determined that additional calibration measures would be required to use the model for diversion impacts relating to Queen Street closures.
- The origin-destination (OD) trips, section user-defined costs, acceleration factors and reaction times were adjusted as part of the model calibration to bring the modelled travel times closer to observations.
- Results in the AM peak period model were observed to become significantly exacerbated without new path files. As a result, new path files were generated for each construction scenario in the AM model. This condition was not observed in the PM peak hour, and the original path files were maintained. The new path files for the AM peak period were generated using a static assignment scenario with the Frank and Wolfe assignment engine.
- Various model scenarios were run to identify the impact of a full Queen Street closure, partial 2-lane Queen Street closure, City-led construction projects, and other Ontario Line construction works. Scenarios were modelled to identify the isolated impacts of construction works and the cumulative impacts on the network.
- The models were run with dynamic traffic assignments to allow vehicles to find alternate routes around the closure site and other congested areas.

Vehicular flows, delays, travel times, and queues were extracted from the model for all scenarios to identify the isolated and combined impacts of construction works on the study area network.

A.1 King Street Transit Project Model

The Aimsun AM and PM peak period models developed by Parsons as part of the King Street Transit Project were provided by City of Toronto staff to HDR for use as a base to conduct the Queen Street closure sensitivity analysis.

Figure A-1 illustrates the study area which extends as far as Broadview Avenue to the east, Danforth Avenue / Bloor Street to the north, and Parkside Drive to the west.



Figure A-0-1: Aimsun Model Study Area

The development, calibration, and validation of the model were documented as part of the King Street Transit Priority Corridor modelling study; the standards of which follow the City's Guidelines for Aimsun Modelling. The scenario that was provided from the King Street modelling study represents the 2018-2019 condition of the geometric configurations and travel patterns of the downtown core after the King Street transit project was implemented. Specifically, the following details were identified as part of the model documentation:

- All CLRVs replaced by LFLRVs (Low Floor Vehicles)
- Farside stops were used at most locations in the Priority Corridor
- The 514 Cherry route was discontinued as of October 2018 and two branches for the 504 King route
- King route was reconfigured as routes 504A and 504B
- The EB Gardiner Expressway off-ramp to York/Bay/Yonge Street(s) was replaced with the new Simcoe Street off-ramp, and improvements to Harbour Street were implemented, including lane configurations, traffic management, and signal timing plans.
- Includes a newly installed traffic signal at Yonge Street at The Esplanade in June 2017 (TCS2345)

The data that was incorporated into this scenario are listed in **Table A-2**.

Table A-2: King Street Pilot Project Scenario Data (Source: Parsons/City of Toronto)

DATA	SOURCE(S)	DATE(S)
Pilot Traffic Regulations	City of Toronto	The geometry, traffic management/regulations, and transit stop locations were all confirmed by a set of drawings provided by the City in November 2017.
Turning Movement Counts (TMC)	City of Toronto	Several batches received from the City; the latest batch in March 2019. No TMCs were available for the WKND NGHT period.
Signal Timing Plans	City of Toronto	Received in August 2018. New timing plans for three signals near the reconfigured EB Gardiner Expwy Ramp and the new signal at Yonge Street/The Esplanade was provided by the City in March 2019.
Transit Schedules	TTC	TTC Service Summary (October 7, 2018 to November 17, 2018)
Transit Dwell Times	Project Team and TTC	Videos from Curbside Surveys completed by the Project Team in November 2018. Samples were reviewed by the Project Team to provide initial estimates of dwell time and TTC provided input to those initial estimates
Auto Travel Times	City of Toronto	Received in February 2019.
Transit Travel Times	TTC	Received in March 2019.

A.2 Calibration and Validation Standards

A high-level QAQC process was undertaken prior to carrying to model over to the calibration and validation stage. As part of the QAQC process, the lane configurations, turning restrictions, and simulation conditions were observed in the vicinity of the Ontario Line stations. Signal timing plans at the focus area intersections were not available prior to the scenario analyses.

The calibration and validation of the King Street Pilot Project models was done in accordance with the City of Toronto’s Guidelines for Aimsun Modelling and the US Federal Highway Administration (FHWA) Traffic Analysis Toolbox Volume III – Guidelines for Applying Traffic Microsimulation Modeling Software.

The table below (**Table A-3**) summarizes the calibration standards targeted for the King Street Pilot Project model King Street focus area, and the areas beyond for the AM, off-peak, and PM peak periods.

Table A-3: King Street Pilot Project Calibration Targets

Criteria	Target	
	King Corridor	Other
GEH <=5	75-85%	-
GEH <=10	95%	85%
Mean GEH	<5	<5
Mean Absolute Difference	-	-
Mean Relative Difference %	<10%	<10%
R ²	>0.90	>0.90
RMSNE (Root Mean Square of Normalized Error)	<5-7%	<5-7%

The Aimsun model was validated through the use of automobile and transit travel times. The focus of the validation was the King Street corridor, which targeted a 15%/1 minute difference in travel time or within one observation standard deviation for both automobiles and transit before

the implementation of the King Street Pilot Project. Route 504 King and Route 514 Cherry were used for the transit travel time validation. Automobile validation standards for all other corridors in the model were assumed to be validated if the modelled travel times fell within the minimum and maximum travel times observed through Google or iPeMs travel time data. Transit routes on the other corridors were assumed to be validated if modelled travel times were within 25% of the observed travel time.

A.3 Base Model Calibration

The reported validation status of the King Street Transit Project scenario selected as the base condition is illustrated in **Table A-4**.

Table A-4: King Street Pilot Scenario Validation (Source: Parsons/City of Toronto)

	Criteria	Target ^a	AM	OFF	PM
King Street TMCs	GEH ≤5	>75-85%	82%	70%	79%
	GEH ≤10	>95%	97%	100%	97%
	Mean GEH	<5	3.2	3.5	2.9
	Mean Relative Difference %	<10%	2.9%	-4.7%	6.7%
	R ²	>0.9	0.94	0.90	0.87
	RMSNE (Root Mean Square of Normalized Error)	<5-7%	2%	3%	2%
All TMCs	GEH ≤5	-	71%	72%	71%
	GEH ≤10	>85%	94%	98%	92%
	Mean GEH	<5	3.9	3.7	3.8
	Mean Relative Difference %	<10%	0.3%	-16%	10%
	R ²	>0.9	0.88	0.9	0.84
	RMSNE	<5-7%	2%	3%	2%

A model run of the existing conditions was conducted to capture the baseline conditions, before lane closures and traffic management measures are applied, to verify that the model received is performing as documented. The validation status of the base model run was found to be similar to what was documented for the King Street modelling study.

It was identified that the model required additional calibration adjustments before it could be used to analyze Queen Street and the adjacent corridors, due to significantly higher travel times on most corridors than were observed in existing conditions data. The travel times were considered calibrated in the King Street modelling study for corridors apart from King Street if the travel times fell within the minimum and maximum observed travel times. For the purposes of this study, adjustments were applied to bring the modelled and observed travel time averages closer together for the east-west corridors in the focus area so that the model reflects typical

conditions. A focus area bound by Dundas Street, Jarvis Street, Front Street, and Bathurst Street was assessed during recalibration.

The following adjustments were applied to the AM peak period model so that the corridor travel times and flows were brought closer to observed conditions:

- **Acceleration Factor Overrides:** A 0.50 acceleration factor adjustment was applied to Richmond Street, Wellington Street, and Adelaide Street. A 2.0 acceleration factor adjustment was applied to Dundas Street (westbound), and a 0.75 adjustment to Queen Street (westbound).
- **Signal and Stop Reaction Adjustments:** The signal and stop reaction times were increased by 1.5 seconds on Richmond Street, Wellington Street, and Adelaide Street, and by 1.0 second on Queen Street (westbound). Reaction times were decreased on Dundas Street westbound by 3.0 seconds.
- **Section User-defined Costs:** A 15.0 user-defined cost was applied to the westbound direction of Dundas Street to shift vehicles to other routes.

The following adjustments were applied to the PM peak period model:

- **Acceleration Factor Overrides:** Acceleration factors of 3.0 m/s² were applied to Dundas Street (both directions), Queen Street (eastbound), Front Street, and Wellington Street between Bathurst Street and Jarvis Street.
- **Signal and Stop Reaction Adjustments:** The signal and stop reaction times were reduced by 3 seconds on Dundas Street (both directions), Queen Street (eastbound), Front Street, and Wellington Street between Bathurst Street and Jarvis Street.
- **Section User-defined Costs:** User-defined costs were added to links to help shift vehicles to other routes and better reflect the existing travel patterns and flow volumes on the network. A cost of 25.0 was added to Queen Street westbound between Bathurst Street and Jarvis Street, and 100.0 to Front Street eastbound between York Street and Bay Street.
- **Origin-Destination Trips:** Significantly higher travel demand was modelled eastbound through the focus study area than was observed in available existing volume data, particularly on Dundas Street, Adelaide Street, and Front Street. To bring the modelled travel demand closer to observations, the trips originating at several zones roughly west of University Avenue and destined east of University Avenue were reduced. The origins and destinations of trips passing through specific links in the study area were reviewed to identify the key zones to adjust.

Figure A-2 and **Figure A-3** illustrate the validation status of the turning movement volumes following calibration adjustments in the model, and **Figure A-4** and **Figure A-5** illustrate the travel time comparison of key corridors between Bathurst Street and Jarvis Street which was used to guide the recalibration effort. As shown, the calibration parameters added to the model helped bring the corridor travel times much closer to observed conditions in both periods, and reduced the variability of travel times between model replications.

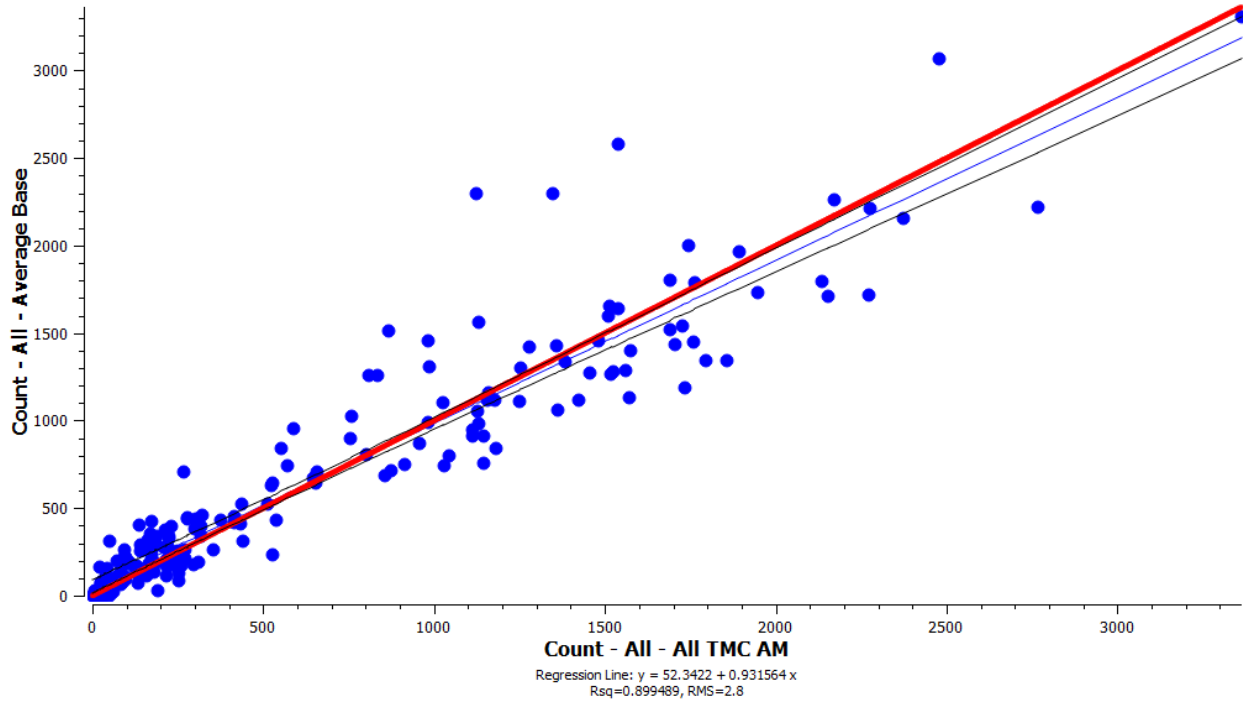


Figure A-0-2: AM Peak Validation Results

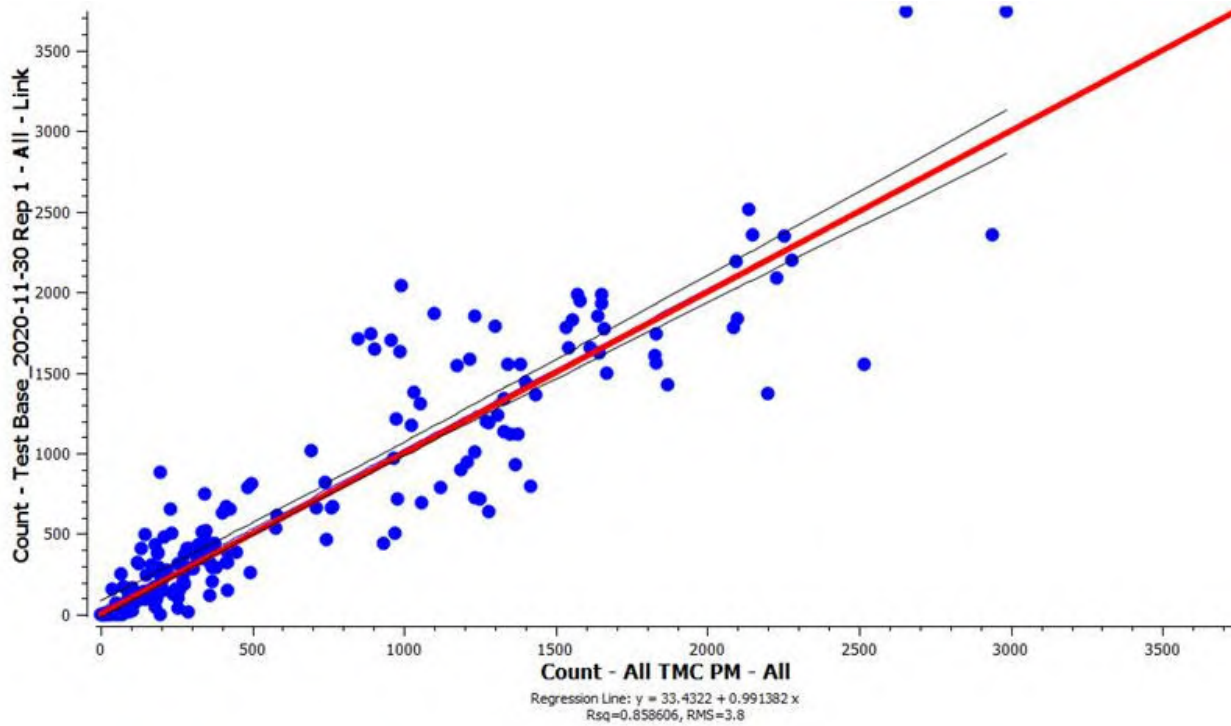


Figure A-3: PM Peak Validation Results

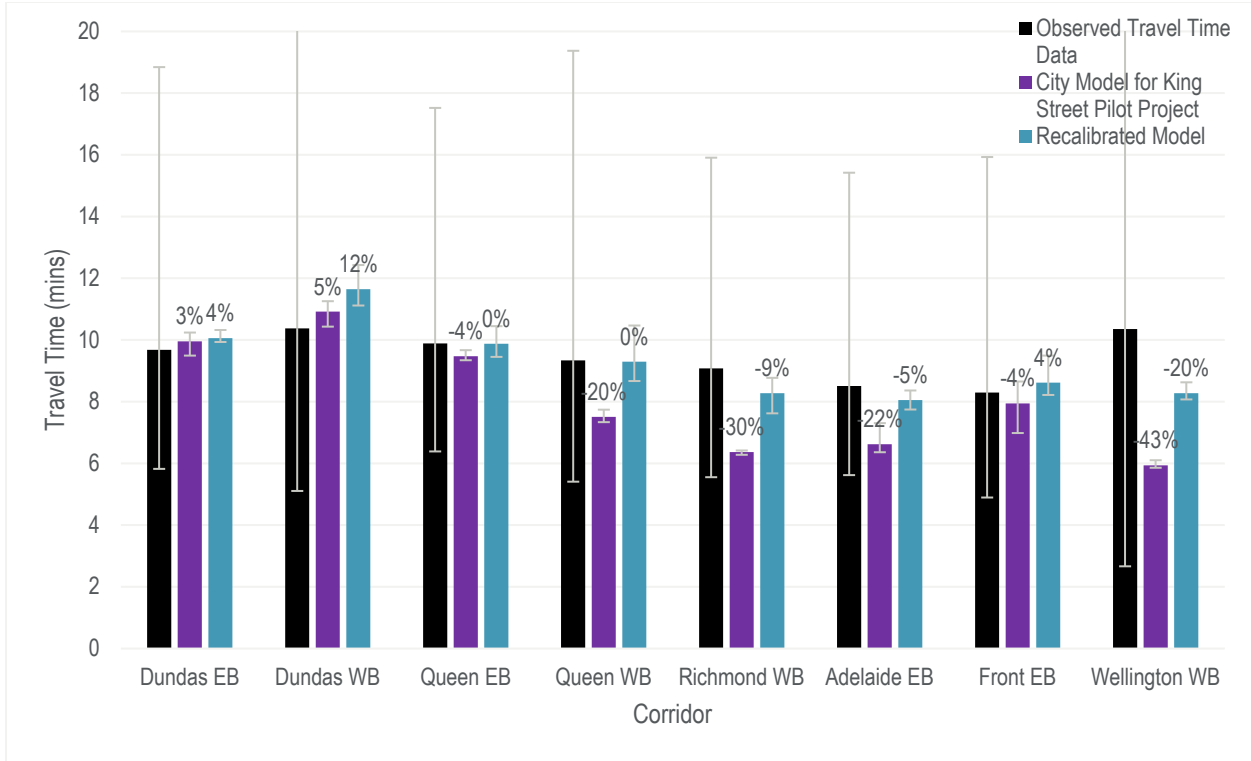


Figure A-4: AM Peak Model Travel Time Validation

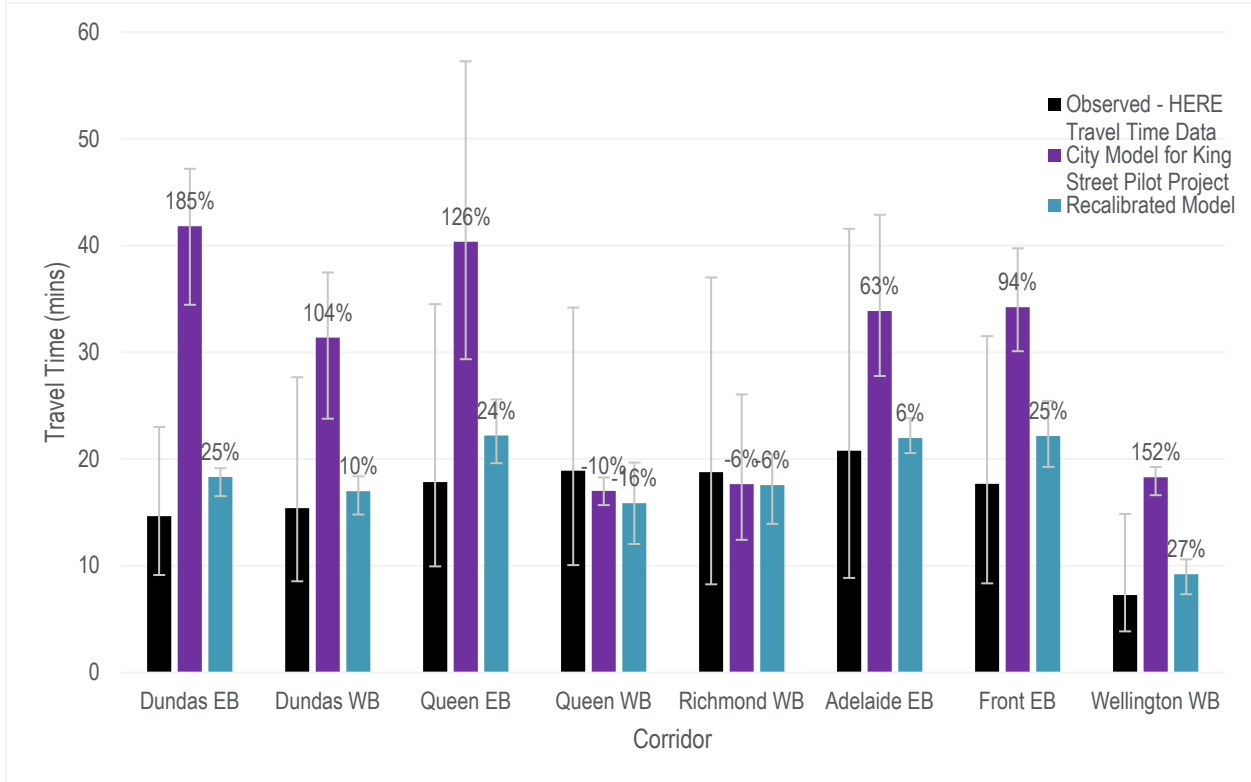


Figure A-5: PM Peak Model Travel Time Validation

Appendix B – Microsimulation Traffic Impacts

B.1 Modelling Assumptions and Optimizations

Modelling assumptions and optimizations were applied to the construction scenarios in an attempt to objectively model the ideal conditions for each scenario. These model changes included applying signal optimizations to corridors that were experience impacts due to construction road closure, and minor user-defined cost adjustments to the PM peak where the assignment to certain routes was higher than expected and as a result caused isolated areas of congestion.

The following transit assumptions were applied to the models:

- The “No Closure” scenario uses existing transit routes, headways, and transit signal priority parameters.
- The “Queen 2-Lane Closure”, “Queen Full Closure”, and “Scenario 1 + OL Closures + Queen Full Closure” scenarios use the diverted transit routes which detour to Richmond Street and Adelaide Street to by-pass the Queen Station construction.
- The “Scenario 1” and “Scenario 1 + OL Closures + Queen Full Closure” scenarios use the bus replacement service on King Street.

Signal optimizations were applied to improve the flow of vehicles within the focus area. Due to the low congestion observed during the AM peak, signal optimizations were limited to the Bay Street hotspot which extended through the intersections of Bay Street with Wellington Street and King Street.

Optimizations to Richmond Street and Adelaide Street were applied to all construction scenarios during the PM peak, which included increasing cycle lengths and allocating a greater amount of green time to east-west approaches. Cycle length increases and increased east-west green time allocations were also applied to Queen Street in the Queen 2-Lane Closure scenario to simulate optimized conditions. Detailed signal timing changes applied are summarized in **Table B-1** and **Table B-2** for the AM and PM peak models, respectively.

Table B-1: AM Peak Signal Optimizations

Intersection	Movements	Base	2-Lane Closure Opt.	Full Closure Opt.
Wellington / Bay	NBL	12 s	12 s	12 s
	NB	46 s	51 s	51 s
	SB	34 s	39 s	39 s
	E-W	34 s	29 s	29 s
	Cycle Length	80 s	80 s	80 s
King / Bay	N-S	35 s	40 s	40 s
	E-W	35 s	40 s	40 s
	Cycle Length	70 s	80 s	80 s

**Table B-2: PM Peak Signal Optimizations**

Intersection	Movements	Base	2-Lane Closure Opt.	Full Closure Opt.
Queen / Bathurst	N-S	37 s	47 s	47 s
	E-W	43 s	53 s	53 s
	Cycle Length	80 s	100 s	100 s
Queen / Spadina	NBL + SBL	12 s	12 s	12 s
	N-S	37 s	37 s	37 s
	E-W	41 s	51 s	41 s
	Cycle Length	90 s	100 s	90 s
Queen / York	E-W	35 s	58 s	43 s
	NB	35 s	42 s	57 s
	Cycle Length	70 s	100 s	100 s
Queen / Bay	N-S	39 s	39 s	39 s
	E-W	41 s	61 s	41 s
	Cycle Length	80 s	100 s	80 s
Queen / Yonge	N-S	40 s	40 s	54 s
	E-W	40 s	60 s	26 s
	Cycle Length	80 s	100 s	80 s
Queen / Victoria	E-W	45 s	55 s	45 s
	N-S	35 s	45 s	55 s
	Cycle Length	80 s	100 s	100 s
Queen / Church	EBL	11 s	17 s	17 s
	EBTR	38 s	58 s	48 s
	WBLTR	27 s	41 s	31 s
	N-S	32 s	42 s	32 s
	Cycle Length	70 s	100 s	80 s
Queen / Jarvis	N-S	45 s	50 s	45 s
	E-W	30 s	50 s	30 s
	Cycle Length	75 s	100 s	75 s
Queen / Sherbourne	E-W	35 s	55 s	35 s
	N-S	35 s	45 s	35 s
	Cycle Length	70 s	100 s	70 s
Queen / Parliament	E-W	40 s	60 s	40 s
	N-S	30 s	40 s	30 s
	Cycle Length	70 s	100 s	70 s
Richmond / Bathurst	N-S	37 s	47 s	47 s
	E-W	43 s	53 s	53 s
	Cycle Length	80 s	100 s	100 s
Richmond / Spadina	N-S	41 s	46 s	46 s
	E-W	49 s	54 s	54 s
	Cycle Length	90 s	100 s	100 s
Richmond / University	N-S	52 s	47 s	47 s
	E-W	48 s	53 s	53 s
	Cycle Length	100 s	100 s	100 s
Richmond / York	N-S	53 s	48 s	48 s
	WB	47 s	52 s	52 s
	Cycle Length	100 s	100 s	100 s
Richmond / Bay	N-S	39 s	49 s	49 s
	WB	41 s	51 s	51 s
	Cycle Length	80 s	100 s	100 s
Richmond / Yonge	N-S	35 s	45 s	45 s
	WB	45 s	55 s	55 s



Intersection	Movements	Base	2-Lane Closure Opt.	Full Closure Opt.
	Cycle Length	80 s	100 s	100 s
Richmond / Victoria	N-S	35 s	43 s	43 s
	WB	45 s	57 s	57 s
	Cycle Length	80 s	100 s	100 s
Richmond / Church	N-S	35 s	51 s	51 s
	WB	45 s	49 s	49 s
	Cycle Length	80 s	100 s	100 s
Richmond / Jarvis	NBL	11 s	12 s	12 s
	NB	39 s	49 s	49 s
	SB	28 s	37 s	37 s
	E-W	41 s	51 s	51 s
	Cycle Length	80 s	100 s	100 s
Adelaide / Spadina	SBL	12 s	12 s	12 s
	SB	49 s	49 s	49 s
	NB	37 s	37 s	37 s
	E-W	41 s	51 s	51 s
	Cycle Length	90 s	100 s	100 s
Adelaide / York	SBL	-	34 s	34 s
	NB	51 s	31 s	31 s
	EB	49 s	35 s	35 s
	Cycle Length	100 s	100 s	100 s
Adelaide / Bay	N-S	37 s	33 s	33 s
	EB	43 s	67 s	67 s
	Cycle Length	80 s	100 s	100 s
Adelaide / Yonge	N-S	35 s	35 s	35 s
	EB	45 s	65 s	65 s
	Cycle Length	80 s	100 s	100 s
Adelaide / Victoria	EB	42 s	62 s	62 s
	SBL	11 s	-	-
	N-S	27 s	38 s	38 s
	Cycle Length	80 s	100 s	100 s
Wellington / Bay	N-S	43 s	39 s	39 s
	WB	37 s	41 s	41 s
	Cycle Length	80 s	80 s	80 s
Wellington / Yonge	NBL	11 s	-	-
	NB	51 s	51 s	51 s
	SB	40 s	51 s	51 s
	WB	29 s	29 s	29 s
	Cycle Length	80 s	80 s	80 s

User-defined costs which varied from those applied as part of the initial model recalibration effort included increasing the westbound cost on Queen Street between Jarvis Street and Bathurst Street from 25 to 50, and adding a cost of 50 eastbound on Queen Street between Bathurst Street and Victoria Street to the PM model. These costs were applied to Queen Street only in the Queen 2-Lane Closure scenario due to significant demand and congestion eastbound and westbound on the corridor. It is expected that the model was over-assigning vehicles to the remaining eastbound and westbound lane through the construction site and the additional costs were applied to increased perceived costs that occur during construction, prompting vehicles to find alternate routes upstream of the closure. The same stretch of user-

defined cost adjustment was maintained for the westbound direction, and a shorter stretch of Queen Street was adjusted eastbound in an attempt to help shift vehicles upstream of the closure site.

In addition to the lane closures applied as part of the Gardiner Expressway construction, a Gardiner construction behaviour adjustment was applied to all scenarios with the Gardiner construction active in both the AM and PM models. The behaviour adjustment increased the lane-change aggressiveness from 0% to 40% on the weaving segment between the Gardiner on-ramp from York Street and the off-ramp to Spadina Avenue to simulate the increased aggressiveness of drivers in congested conditions which slightly mitigates the westbound queue spillback on the Gardiner Expressway.

B.2 Intersection Delays

The levels of service and maximum queues at key intersections near the Queen Street closure site are summarized in **Table B-3** and **Table B-4** for the AM and PM peak period, respectively. The results represent the average delay and maximum queues that are experienced on link sections connected to the intersection turning movements. For the analysis, a 5.5-metre average vehicle length was assumed per vehicle waiting in a queue.

As shown in the results summaries, the AM peak period operates with less delay at all study area intersections due to lower levels of congestion. The combined scenario with the City-led and Ontario Line projects in place generally experiences the highest delays. The changes in travel patterns resulting from lane restriction, and the closure of Queen Street result in some intersections experiencing slightly improved operations in the combined scenario compared to the standalone scenarios with only the Queen Street closures or the City-led construction works. The largest impacts observed during the AM peak period were at the southbound left movement at Queen Street and Victoria which went from an LOS of “D” to LOS of “E” and a maximum queue of 48 metres to 113 metres, and Bay Street and Adelaide Street northbound right which went from a maximum queue of 69 metres to 114 metres during the full closure as a result of diverted trips.

The PM base condition without any closures operates with relatively high delay at the intersections near the Queen Station closure site and will generally experience exacerbated conditions during the closure scenarios. During the City-led and combined scenario with both City and Ontario Line works, movements largely operate with high delays and an LOS of “F”.

The largest PM peak construction impact on queueing is observed on the westbound left movement at Richmond Street and Yonge Street, which will exacerbate the existing 238 metre maximum queue to 543 metres during the City-led Projects scenario. It is expected that this impact is due to the lane restrictions imposed on Yonge Street north of Queen Street, which shift southbound through vehicles on Yonge Street to the westbound left movement from Richmond Street.



Table B-3: AM Peak Period Key Intersection Measures of Effectiveness

Intersection	Movement	No Closure		Queen 2-Lane Closure		Queen Full Closure		Sc1: City-Led Projects with Gardiner		Sc1 + OL Closures + Queen Full Closure	
		LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)
Queen Street & Bay Street	NBT	A	30	A	26	A	39	B	47	B	36
	NBR	B	26	B	25	-	-	C	22	-	-
	SBT	D	37	D	37	F	36	C	35	F	35
	EBT	B	44	D	22	-	-	B	46	-	-
	EBR	B	25	B	30	D	63	B	23	E	53
	WBT	A	29	A	9	-	-	C	42	-	-
	WBR	B	29	A	41	-	-	D	86	-	-
Queen Street & Yonge Street	NBT	A	19	A	28	A	23	A	20	B	37
	SBT	A	31	B	37	B	39	B	39	B	27
	EBT	A	20	A	3	-	-	A	37	-	-
	WBT	B	59	B	36	-	-	C	65	-	-
Queen Street & Victoria Street	NBL	D	31	-	-	-	-	F	29	-	-
	NBT	D	27	D	26	C	16	D	24	D	29
	NBR	D	29	E	46	D	37	C	30	E	52
	SBL	D	48	E	95	E	109	E	68	E	113
	SBT	D	21	D	45	E	75	D	25	E	63
	SBR	C	31	D	56	-	-	D	55	-	-
	EBT	B	48	C	86	-	-	B	65	-	-
	EBR	C	53	B	13	-	-	C	64	-	-
	WBT	B	45	C	42	-	-	B	53	-	-
WBR	C	36	C	54	D	65	C	48	D	69	
Dundas Street & Bay Street	NBL	F	88	F	88	F	81	F	94	F	80
	NBT	D	52	D	45	D	44	D	45	C	37
	NBR	D	59	D	51	D	50	D	46	D	56
	SBT	C	55	C	57	C	59	C	55	C	54
	SBR	D	81	C	48	E	81	E	84	D	74
	EBT	B	47	C	82	D	96	C	63	D	100
	EBR	C	55	C	84	D	85	C	65	D	84
	WBT	D	118	D	132	E	163	D	145	C	72
WBR	D	51	D	54	E	70	D	72	C	33	
Dundas Street & Yonge Street	NBT	C	46	C	52	C	45	D	30	D	30
	SBT	C	44	C	45	C	49	F	42	F	41
	EBT	D	79	E	160	F	191	D	119	F	192
	WBT	C	85	C	97	D	104	C	92	C	75
Dundas Street & Victoria Street	NBL	C	31	C	30	C	30	C	34	C	32
	NBT	B	12	B	13	B	12	B	11	C	12
	NBR	A	17	A	13	A	15	A	18	B	22
	SBL	C	9	C	9	C	9	C	8	D	7
	SBT	C	15	C	13	C	14	C	12	C	13
SBR	B	1	B	4	B	4	B	6	B	6	



Intersection	Movement	No Closure		Queen 2-Lane Closure		Queen Full Closure		Sc1: City-Led Projects with Gardiner		Sc1 + OL Closures + Queen Full Closure	
		LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)
	EBL	C	20	C	22	C	21	C	20	C	23
	EBT	B	32	B	32	B	36	B	31	C	45
	EBR	B	35	B	40	B	50	B	77	C	103
	WBT	B	38	B	47	B	47	B	41	B	36
	WBR	B	7	A	7	C	8	C	7	B	7
Richmond Street & Bay Street	NBT	C	44	C	48	C	53	C	45	C	45
	SBT	F	56	E	61	F	59	E	63	F	59
	WBT	A	34	A	33	A	48	A	37	A	52
	WBR	B	32	B	39	B	64	B	86	B	70
Richmond Street & Yonge Street	NBT	B	25	B	31	B	28	B	24	B	27
	SBT	A	14	A	26	A	36	A	12	A	14
	WBL	B	45	A	21	A	23	B	31	A	26
	WBT	A	45	A	33	A	44	A	45	A	33
	WBR	B	23	A	20	B	25	B	24	B	19
Richmond Street & Victoria Street	NBL	C	32	C	42	C	43	C	23	C	41
	NBT	C	37	B	10	B	9	B	19	B	9
	SBT	C	14	B	6	B	8	C	7	B	8
	SBR	B	51	A	19	A	25	C	61	A	17
	WBL	B	8	C	4	C	9	A	4	D	6
	WBT	B	63	B	69	C	83	B	56	C	76
	WBR	C	44	C	58	D	39	C	53	D	54
Adelaide Street & Bay Street	NBT	D	25	C	24	C	23	D	24	D	24
	NBR	D	69	D	88	D	114	D	95	D	98
	SBT	F	61	F	69	F	60	F	67	F	64
	EBL	D	97	E	81	E	80	D	111	F	102
	EBT	D	61	D	63	E	63	D	48	E	51
	EBR	E	157	F	144	F	140	E	131	F	123
Adelaide Street & Yonge Street	NBT	A	16	A	17	A	19	A	15	A	16
	NBR	A	23	A	26	A	30	A	28	B	57
	SBL	C	53	D	44	C	51	D	53	C	24
	SBT	B	44	C	36	C	39	C	45	B	34
	EBL	A	22	B	34	B	33	B	28	C	30
	EBT	A	14	B	37	B	39	B	28	C	29
	EBR	A	20	B	28	B	24	B	24	D	34
Adelaide Street & Victoria Street	NBT	C	59	C	30	C	28	C	29	C	31
	NBR	C	28	B	22	B	22	B	21	B	22
	SBL	B	15	B	14	C	13	B	15	B	12
	EBL	C	50	D	24	D	26	D	33	D	21
	EBT	B	40	C	42	C	44	C	34	D	32

Notes:

Dark Gray highlight indicates movements that have been prohibited as a result of the Queen Station construction

Table B-4: PM Peak Period Key Intersection Measures of Effectiveness

Intersection	Movement	No Closure		Queen 2-Lane Closure		Queen Full Closure		Sc1: City-Led Projects with Gardiner		Sc1 + OL Closures + Queen Full Closure	
		LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)
Queen Street & Bay Street	NBT	E	54	E	50	F	61	E	49	F	58
	NBR	E	90	E	89	-	-	E	89	-	-
	SBT	E	39	E	39	F	40	F	40	F	37
	EBT	D	44	C	24	-	-	E	44	-	-
	EBR	E	39	B	40	F	52	E	37	F	68
	WBT	E	66	C	34	-	-	E	59	-	-
	WBR	F	46	C	33	-	-	F	46	-	-
Queen Street & Yonge Street	NBT	C	61	B	54	B	61	D	56	C	57
	SBT	F	125	E	110	E	109	E	145	E	162
	EBT	D	61	C	33	-	-	D	61	-	-
	WBT	C	68	A	31	-	-	D	76	-	-
Queen Street & Victoria Street	NBL	F	55	-	-	-	-	F	51	-	-
	NBT	E	34	D	52	E	52	F	36	F	52
	NBR	E	51	F	87	F	96	E	43	F	95
	SBL	F	127	F	140	F	116	F	147	F	118
	SBT	F	93	F	132	F	140	F	66	F	175
	SBR	F	84	F	59	-	-	F	65	-	-
	EBT	C	79	E	182	-	-	C	67	-	-
	EBR	F	255	D	483	-	-	F	206	-	-
	WBT	C	62	B	40	-	-	C	59	-	-
WBR	E	70	D	51	F	77	F	76	F	101	
Dundas Street & Bay Street	NBL	F	88	F	86	F	91	F	88	F	85
	NBT	F	31	F	29	F	25	F	26	F	18
	NBR	F	84	F	86	F	80	F	74	F	75
	SBT	E	48	D	51	F	40	F	43	F	50
	SBR	F	200	E	135	F	179	F	142	F	158
	EBT	D	98	D	105	E	106	F	107	F	100
	EBR	D	97	E	94	E	96	F	114	F	116
	WBT	F	184	F	193	F	198	F	195	F	198
	WBR	F	121	F	117	F	118	F	89	F	114
Dundas Street & Yonge Street	NBT	C	46	C	42	C	45	C	28	C	28
	SBT	D	56	C	50	C	50	F	37	F	39
	EBT	F	210	F	197	F	194	F	203	F	205
	WBT	E	92	E	91	F	91	E	88	F	90
Dundas Street & Victoria Street	NBL	F	57	F	59	F	58	F	61	F	61
	NBT	F	29	E	21	F	25	F	24	F	26
	NBR	E	57	E	59	E	58	F	53	F	54
	SBL	E	26	E	17	D	11	F	21	E	14
	SBT	D	24	C	21	D	22	E	43	E	45
SBR	D	13	D	15	D	22	D	17	D	15	



Intersection	Movement	No Closure		Queen 2-Lane Closure		Queen Full Closure		Sc1: City-Led Projects with Gardiner		Sc1 + OL Closures + Queen Full Closure	
		LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)	LOS	Max Queue (m)
	EBL	C	13	C	17	C	17	F	20	F	14
	EBT	B	67	B	52	B	48	E	76	E	66
	EBR	E	121	C	92	D	140	E	212	F	208
	WBT	D	51	D	53	E	56	D	53	D	54
	WBR	D	20	D	26	D	22	D	25	D	22
Richmond Street & Bay Street	NBT	D	52	E	54	F	51	E	53	F	40
	SBT	F	65	F	65	F	72	F	67	F	65
	WBT	C	68	B	55	D	82	B	51	E	70
	WBR	F	127	D	102	F	118	F	180	F	89
Richmond Street & Yonge Street	NBT	B	66	B	64	B	59	C	55	B	40
	SBT	F	71	D	70	F	67	E	71	E	71
	WBL	F	238	F	299	F	215	F	543	F	388
	WBT	B	49	C	58	D	71	D	41	D	62
	WBR	C	29	C	17	D	17	D	18	D	17
Richmond Street & Victoria Street	NBL	F	39	F	121	F	132	F	51	F	131
	NBT	F	64	E	53	E	54	F	62	E	50
	SBT	F	68	F	45	D	30	F	58	E	46
	SBR	E	50	F	57	C	52	F	63	E	61
	WBL	F	53	F	45	F	44	F	40	F	43
	WBT	E	77	F	87	F	87	F	83	F	81
	WBR	F	116	F	98	F	91	F	77	F	83
Adelaide Street & Bay Street	NBT	E	28	F	21	F	18	F	24	F	13
	NBR	E	81	F	65	F	72	F	57	F	72
	SBT	F	73	F	75	F	76	F	74	F	74
	EBL	F	81	E	64	F	66	E	92	F	70
	EBT	E	73	D	78	E	83	E	69	F	67
	EBR	F	132	F	114	F	94	F	130	F	90
Adelaide Street & Yonge Street	NBT	B	35	D	41	E	45	D	44	F	62
	NBR	D	130	E	173	F	149	F	150	F	253
	SBL	F	72	F	63	F	63	F	63	F	67
	SBT	F	63	F	67	F	66	F	72	F	69
	EBL	D	35	D	28	D	28	D	26	E	22
	EBT	C	38	D	41	D	43	C	29	E	30
	EBR	F	46	D	53	E	50	D	74	E	59
Adelaide Street & Victoria Street	NBT	F	108	F	94	F	94	F	98	F	89
	NBR	F	84	F	86	F	96	F	99	F	85
	SBL	F	66	F	68	F	69	F	69	F	66
	EBL	F	26	E	39	E	40	E	23	E	34
	EBT	C	44	C	37	C	35	C	32	D	28

Notes:

Dark Gray highlight indicates movements that have been prohibited as a result of the Queen Station construction

B.3 Intersection Hotspots and Mitigation Measures

The intersection hotspots and mitigation measures in the ultimate scenario with all closures in place are summarized in **Table B-5 and Table B-6** for the AM and PM peak periods, respectively. The hotspots in this scenario are considered for mitigation as it is not expected that a condition with only City-led or Ontario Line projects will arise, and mitigation measures will need to consider shifts in traffic patterns from all projects.

Table B-5: AM Peak Period Hotspot and Mitigation Measures

Intersection	Hotspot Condition	Mitigation
Bay Street / Wellington Street	The intersection will experience significant congestion on the southbound approach. Queue spillbacks occur southbound as the intersection is unable to provide sufficient gaps in the pedestrian flow on the west approach to process the southbound right turning demand. This condition is observed to occur in the existing condition and all closure scenarios.	Optimize the signal cycle length and splits at the intersection as shown in Table B-1 and B-2 .
Church Street / Richmond Street	Significant congestion and queues spilling back from the westbound approach due to high demand. This condition occurs in all scenarios.	Optimize the signal cycle length and splits at the intersection as shown in Table B-1 and B-2 .
Gardiner Expressway (Eastbound towards Jarvis Street)	Significant inbound commuter demand during the AM peak period results in spillbacks from the eastbound approach to Jarvis Street / Gardiner Off-Ramp. The condition occurs in all scenarios and is exacerbated by the Gardiner Expressway works.	Optimize the signal cycle length and splits at the intersection as shown in Table B-1 and B-2 . Advanced notice should be prepared to increase public awareness of the rehabilitation construction before the work begins to mitigate impacts early on in the construction.
Adelaide Street / Bay Street	Significant queueing extends from the eastbound approach to the intersection due to the mixed traffic with the streetcar diversion and the additional detour traffic around the Queen Street closure. This condition occurs in all closure scenarios with the Queen Street closure works.	Optimize the signal cycle length and splits at the intersection and along the streetcar detour route as shown in Table B-1 and B-2 .

Table B-6: PM Peak Period Hotspot and Mitigation Measures

Intersection	Hotspot Condition	Mitigation
Dundas Street / Chestnut Street	The intersection will experience significant congestion on the east-west approaches. Queue spillbacks occur westbound as the intersection does not have any left turning restrictions or east-west left turn lanes. Vehicles turning westbound left at the intersection block a westbound through lane and restrict the approach capacity. This condition is observed to also occur in all closure scenarios.	None; same condition as existing and an increase in westbound left trips is not expected as a result of construction works in the Downtown area.



Intersection	Hotspot Condition	Mitigation
York Street / Lake Shore Boulevard	Significant congestion and queues spilling back from the eastbound approach due to high demand. This condition occurs in all scenarios.	Optimize the signal cycle length and splits at the intersection as shown in Table B-1 and B-2 .
Richmond Street / York Street	The critical point on Richmond shifts slightly east relative to existing, from University to York, due to the lowered capacity caused by the streetcar detour. The condition occurs in all closure scenarios.	Increase the westbound green phase to mitigate congestion from diverted trips as shown in Table B-1 and B-2 .
Adelaide Street / Victoria Street	Eastbound left from Adelaide constrained by crossing pedestrians and downstream spillbacks caused by the streetcar detour, spilling back onto Adelaide and limiting eastbound through capacity. Condition occurs in all closure scenarios.	Increase the intersection cycle length and allocate more time to the eastbound approach as shown in Table B-1 and B-2 .
Dundas Street / Bay Street	High demand at the intersection results in queue spillbacks. East-west congested condition occurs in all closure scenarios and existing conditions; northbound congestion occurs due to diversions from full Queen Street closure.	Optimize the signal cycle length and splits at the intersection as shown in Table B-1 and B-2 .
Dundas Street / Victoria Street	Northbound approach on Victoria exacerbated due to detouring vehicles around the Queen closure. Condition occurs in all scenarios.	Optimize the signal cycle length and splits at the intersection as shown in Table B-1 and B-2 .
Dundas Street / Yonge Street	Southbound approach on Yonge becomes exacerbated as a result of the lane reduction from YongeTOMorrow. It is expected that demand north-south along Yonge Street will shift to other gates as a result of the lane reductions.	Optimize the signal cycle length and splits at the intersection once the YongeTOMorrow changes are implemented to base the timings on actual in-field data as shown in Table B-1 and B-2 .
Gardiner Expressway (Eastbound towards Bathurst Street)	Eastbound lane restriction for Gardiner construction limits the throughput on the highway, causing significant queue spillbacks to the westerly model limits.	Advanced notice should be prepared to increase public awareness of the rehabilitation construction before the work begins to mitigate impacts early on in the construction. Eastbound alternate route signal timings Downtown should be optimized to accommodate the increased traffic diverting from the Gardiner and Queen Street as shown in Table B-1 and B-2 .
Gardiner Expressway (Westbound towards Rees Street)	Westbound lane restriction for Gardiner construction causes significant spillbacks beginning at the weaving section on the Gardiner between the York on-ramp and the Lake Shore / Spadina off-ramp, spilling back approx. 3.0 km to the Don Valley Parkway interchange.	Advanced notice should be prepared to increase public awareness of the rehabilitation construction before the work begins to mitigate impacts early on in the construction. Westbound alternate route signal timings Downtown should be optimized to accommodate the increased traffic diverting from the Gardiner and Queen Street as shown in Table B-1 and B-2 .



Appendix C – York Street Alternatives Analysis

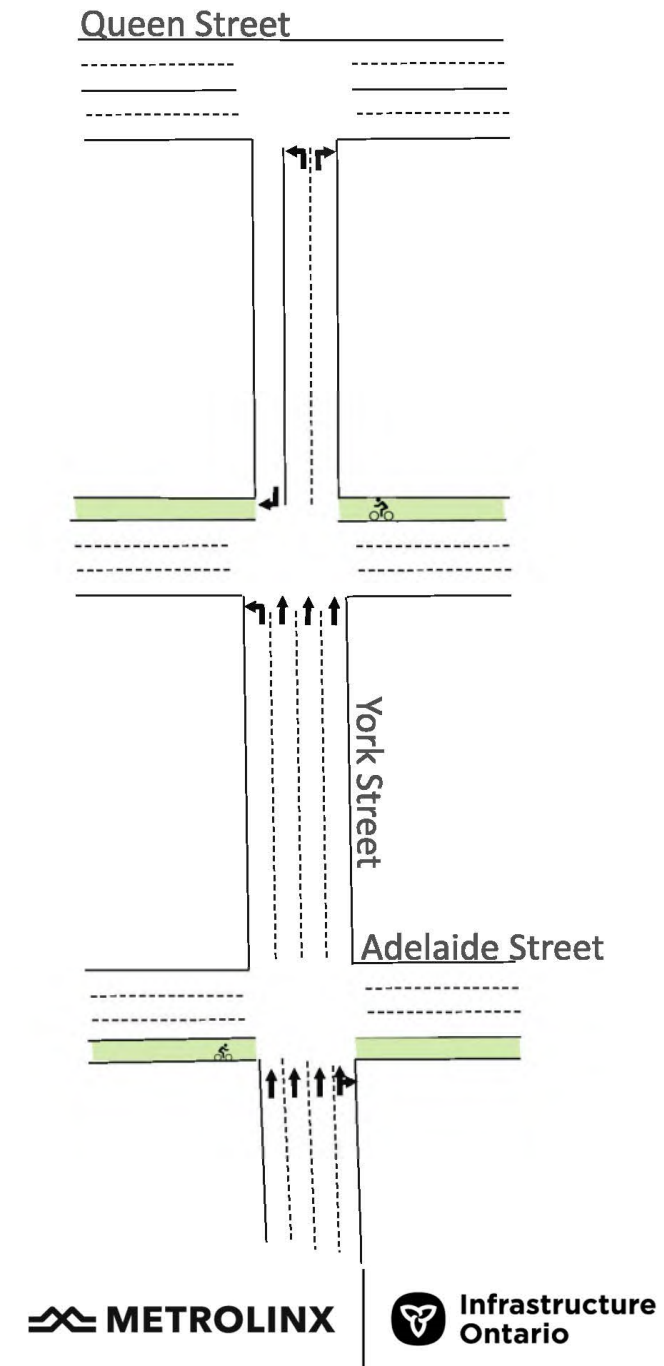
York Street Two Conversion Alternatives

For Discussion with City of Toronto/TTC
Jun 21st, 2021



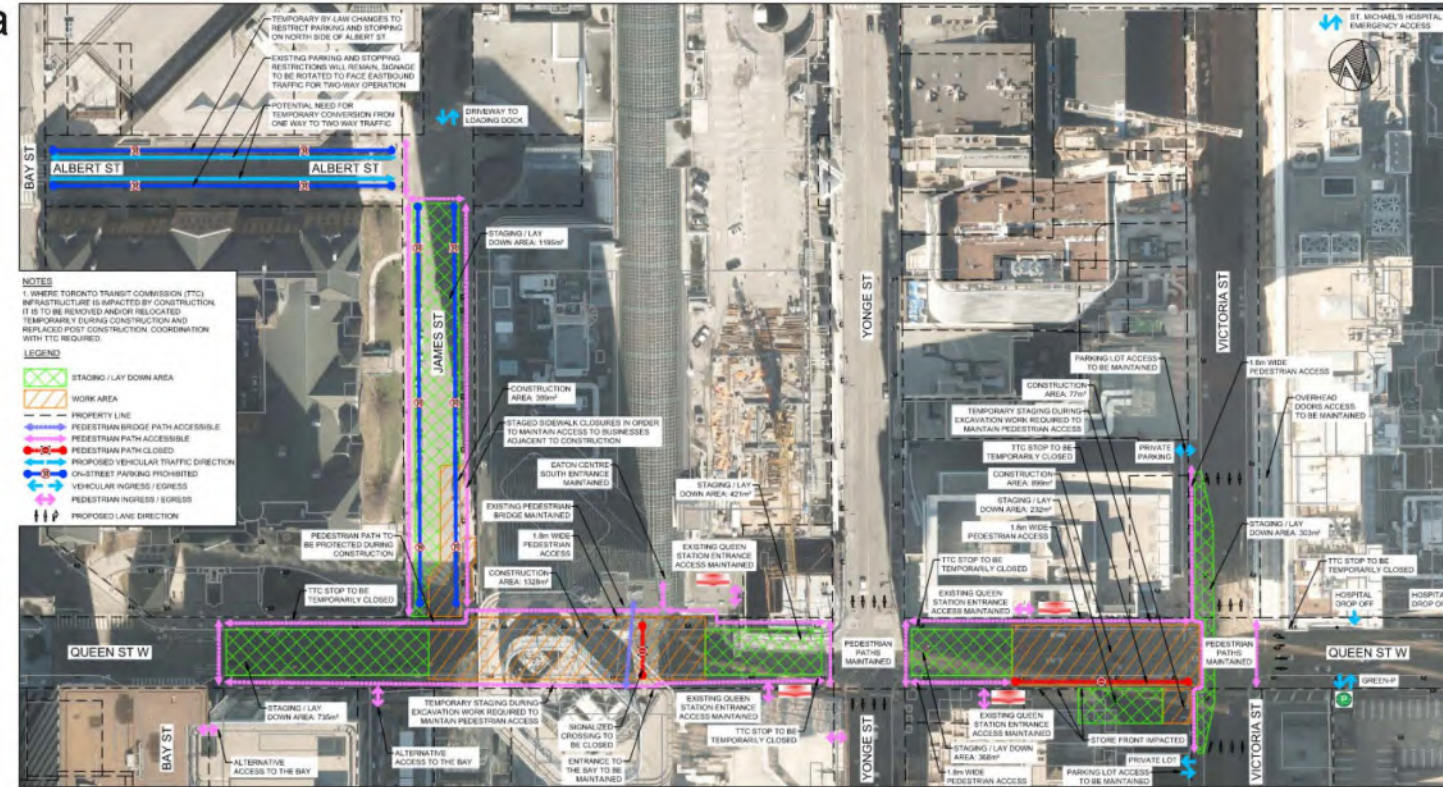
Existing Conditions

- The segment of York Street from King Street north to Richmond Street currently features a four-lane, northbound-only, one-way cross-section
 - The easterly curb lane is frequently occupied by on-street parking and stopping
 - A single northbound streetcar track exists in the second-rightmost lane (running from Wellington Street to Queen Street with junctions at King and Richmond Streets)
- The segment of York Street from Richmond Street north to Queen Street is currently bidirectional, featuring a two-lane northbound and one-lane southbound cross-section
 - On-street parking and stopping is prohibited in this segment
 - The northbound streetcar track continues in the leftmost northbound lane, terminating at and providing access to eastbound and westbound Queen streetcar tracks



Queen Station Construction

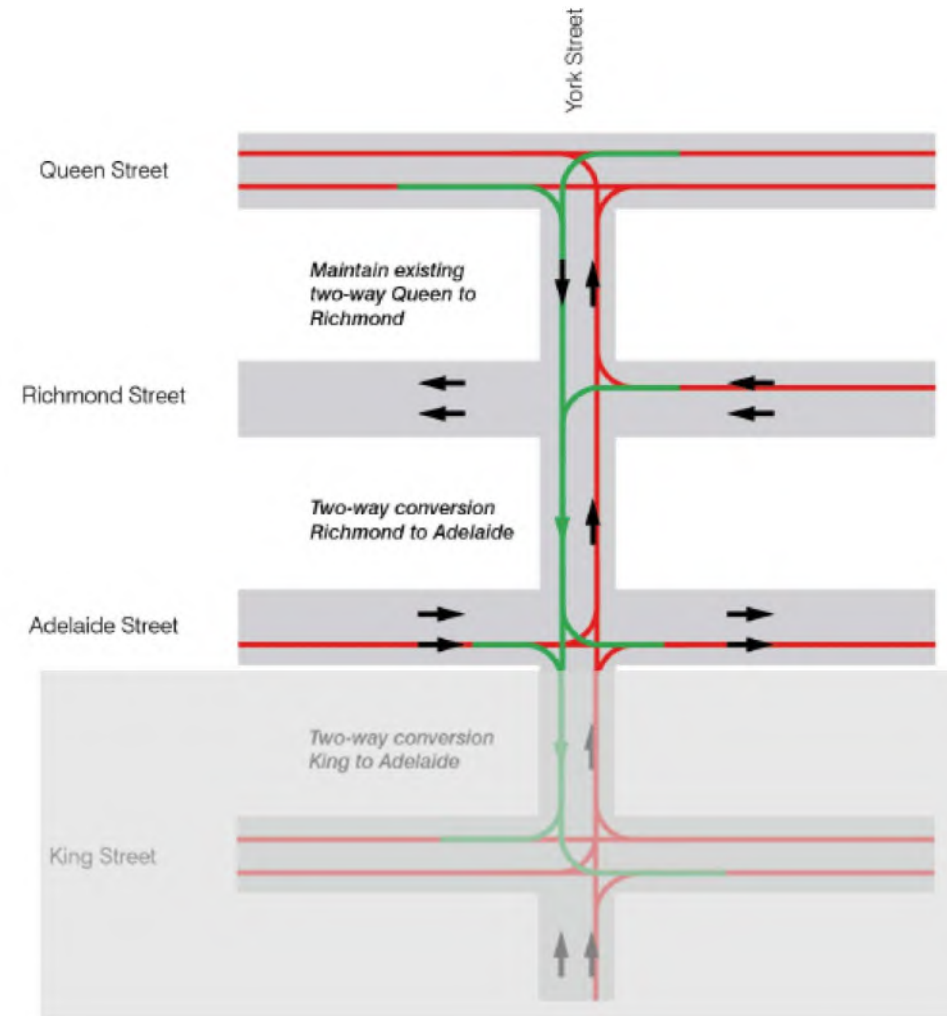
- Construction of Queen Station will result in either a partial 2-lane or full road closure on Queen Street between Bay Street and Victoria Street
- A detour is required in any construction scenario as streetcar tracks cannot be maintained on decking
- Streetcar route diversions will be required for Route 501 Queen throughout the 4-year full closure construction period (Q2 2023 to Q2 2027)
- The detour points are at York St, Victoria St, and Church St, where the nearest existing track switch points are available
- TTC will renew east-west tracks on Adelaide St (Yonge St-York St) as part of their capital plan 2022



TTC Streetcar Track Needs

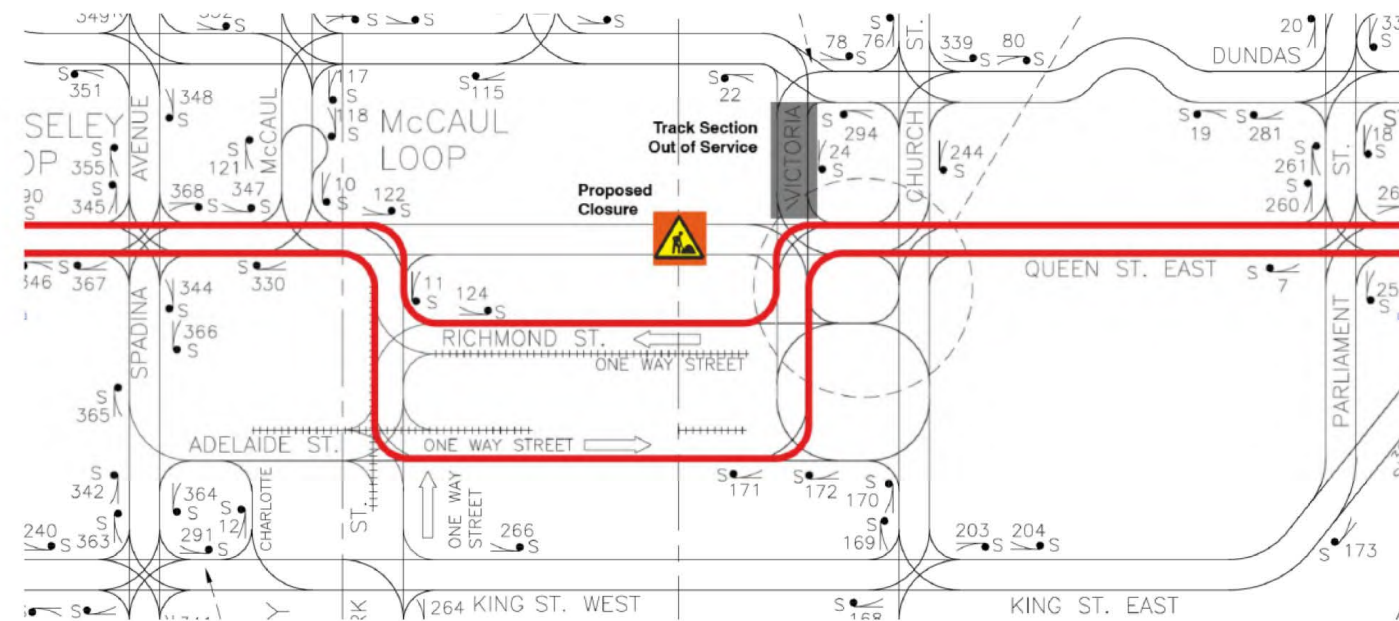
- TTC has identified potential to improve the diversion of Queen streetcars around the Yonge/Queen closure due to Ontario Line construction through use of York Street as a bidirectional diversion route
 - York needs to be converted to bidirectional, two-way operation between Queen and Adelaide streets
 - A southbound streetcar track needs to be constructed between Queen and Adelaide Streets
- *Note, that previous concepts included an extension down to King Street, however, it is our current understanding that the southbound track installation will stop at Adelaide only*

Expanded Scope Adelaide + York Street (Ontario Line Diversion)



TTC Streetcar Track Needs

- Westbound Queen streetcars would divert via Victoria, Richmond, and York
- Eastbound Queen streetcars would divert via York, Adelaide, and Victoria
- TTC prefers two-way operation of York as far south as Adelaide to provide network redundancy and flexibility





Alternatives

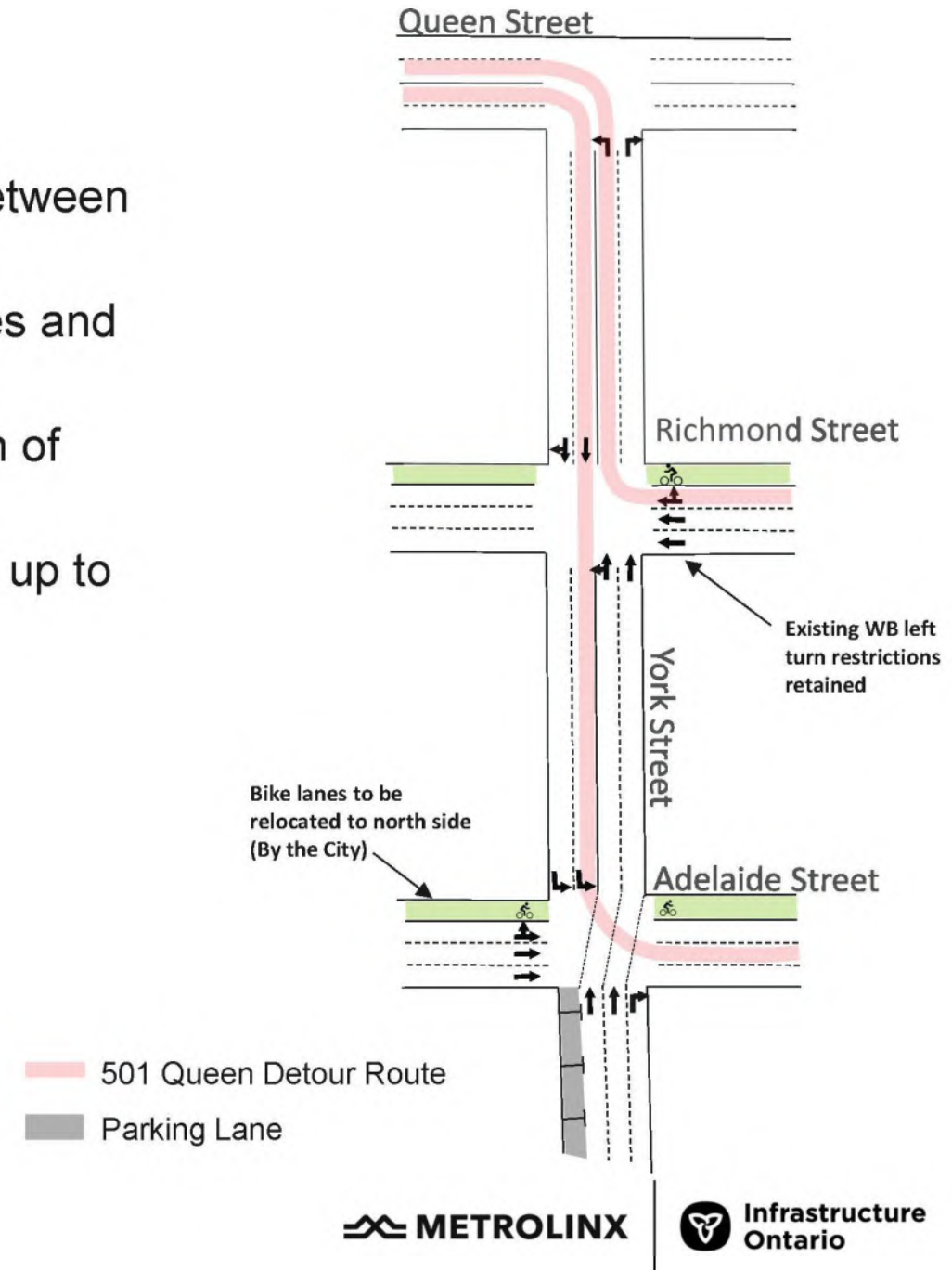
6

ONTARIO LINE | YORK STREET TWO WAY ALTERNATIVES



York Street Alternative 1: Two-lane full-access

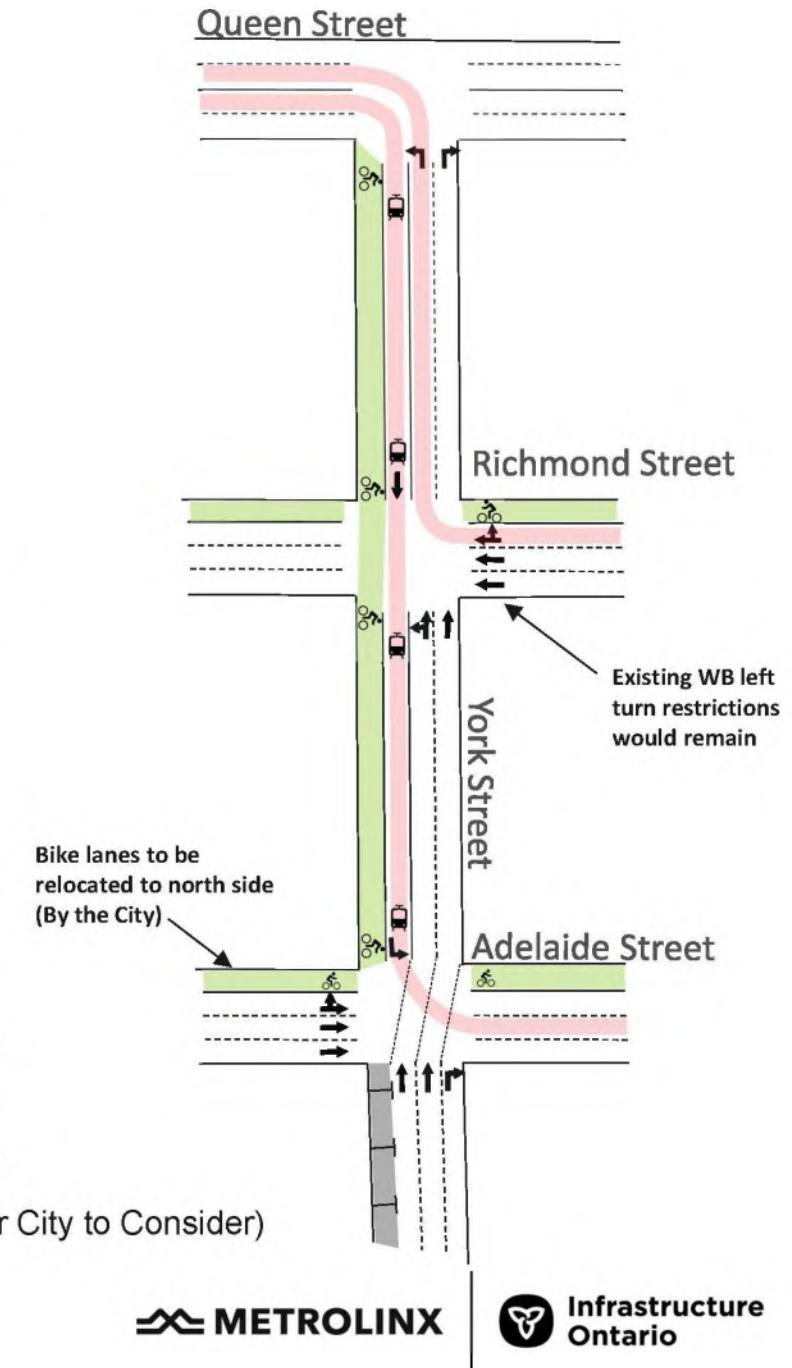
- Alternative 1 features a two-lane, bidirectional cross-section between Adelaide and Queen Streets.
- Northbound and southbound streetcar tracks in the centre lanes and operate in mixed traffic.
- The existing northbound-only configuration would remain south of Adelaide Street.
- Existing parking on the westmost lane on York St could extend up to Adelaide Street as there could only be 2 NB through lanes.



York Street Alternative 2a: Streetcar Single SB Lane

- Alternative 2a features a bidirectional cross-section between Adelaide and Queen Streets.
- Northbound and southbound streetcar tracks in the centre lanes; the northbound streetcar operates in mixed traffic, while the southbound becomes a dedicated lane.
- The southbound streetcar turning radius will require centre-to-centre lane turns from Queen EB to York SB, which creates an opportunity to provide dedicated cycling facilities on the southbound direction between Queen Street and Adelaide Street.
- The existing northbound-only configuration would remain south of Adelaide Street.
- The westmost lane could be considered for parking or cycling.

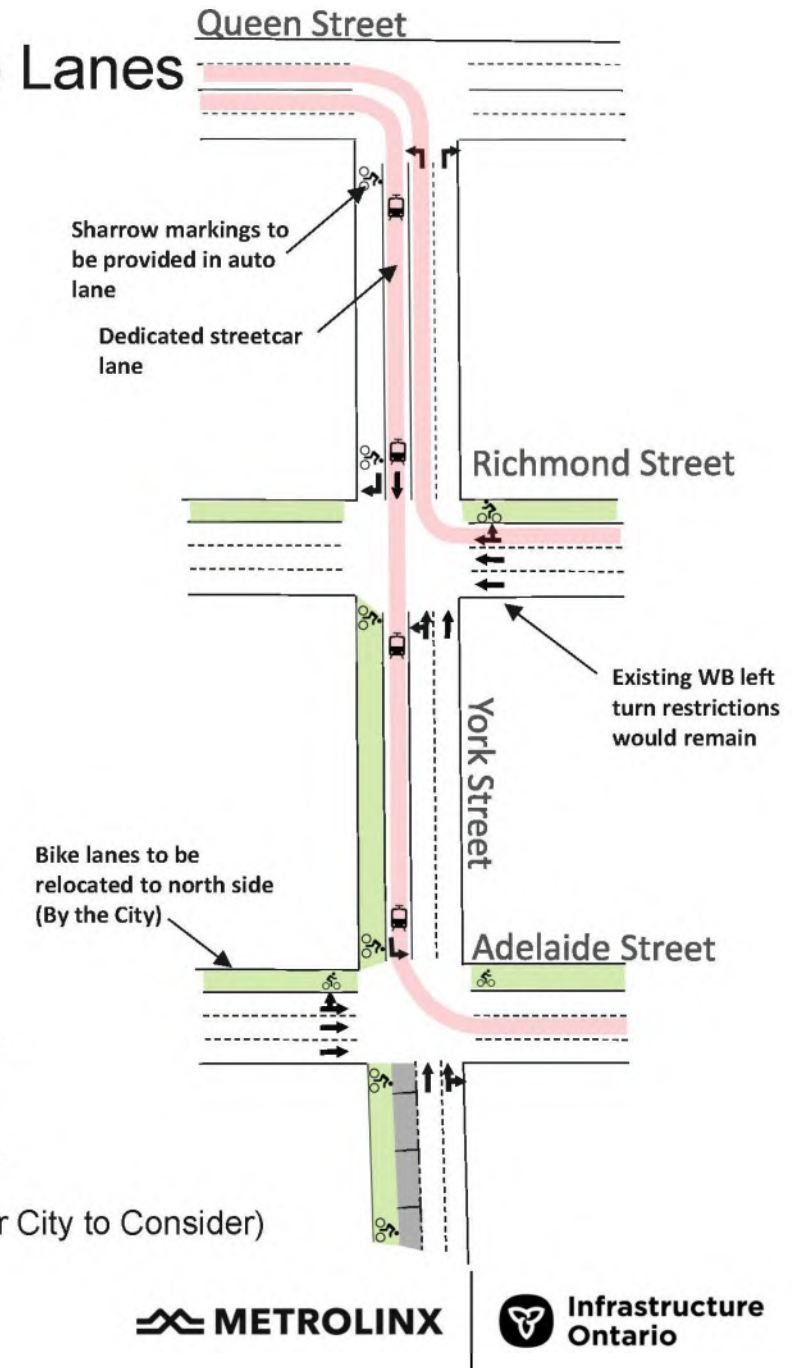
- Exclusive Streetcar Lane
- Exclusive Bicycle Lane
- 501 Queen Detour Route
- Bicycle/Parking Lane (For City to Consider)



York Street Alternative 2a* (revised): Separate Streetcar and Auto Lanes

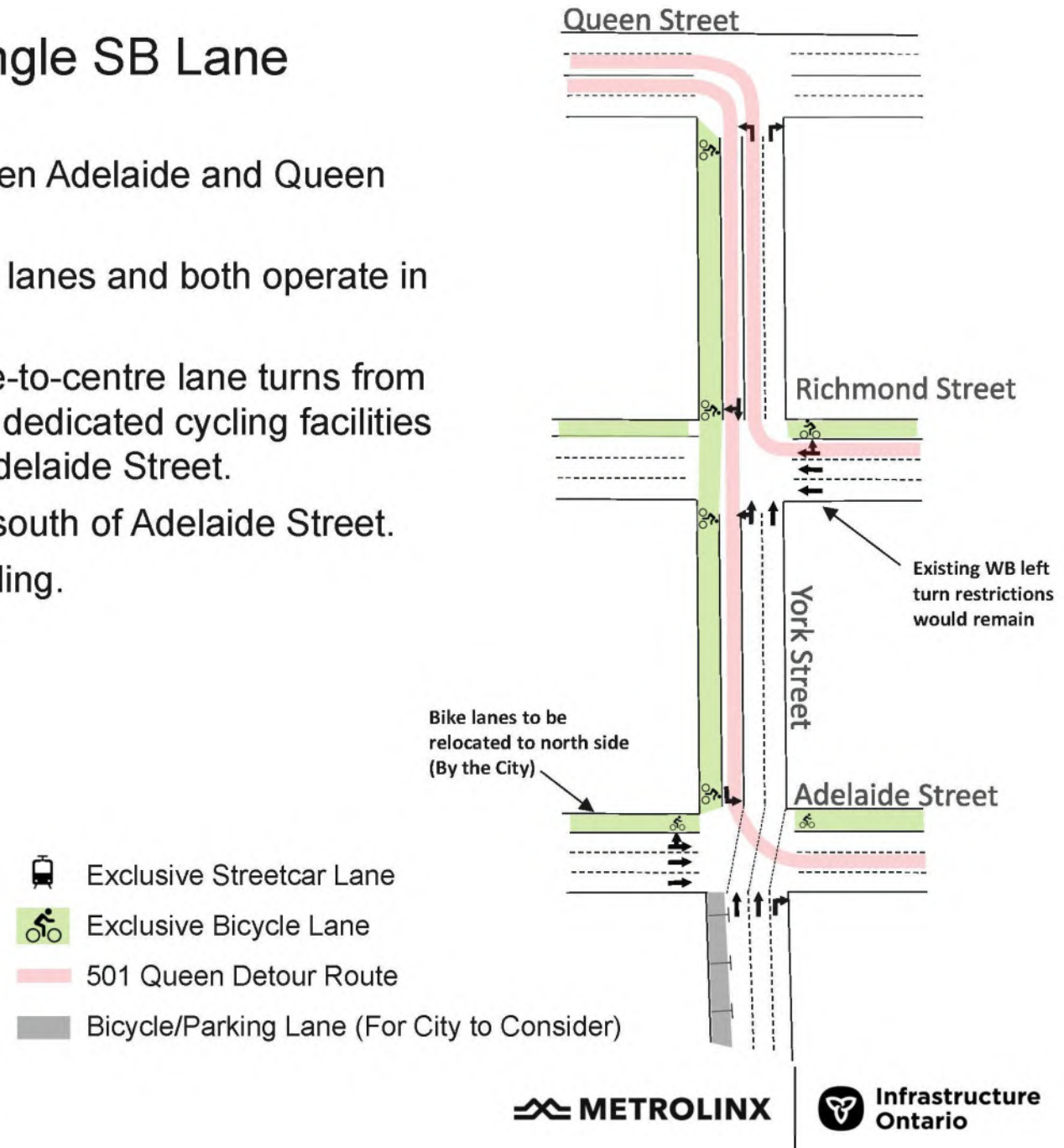
- Alternative 2a (revised) features a bidirectional cross-section between Adelaide and Queen Streets.
- Northbound and southbound streetcar tracks in the centre lanes; the northbound streetcar operates in mixed traffic, while the southbound becomes a dedicated lane.
- Maintains existing SB auto connection between Queen Street and Richmond Street, this lane can be painted with “sharrows”.
- The southbound streetcar turning radius will require centre-to-centre lane turns from Queen EB to York SB, which creates an opportunity to provide dedicated cycling facilities on the southbound direction between Richmond Street and Adelaide Street.
- The existing northbound-only configuration would remain south of Adelaide Street.
- The westmost lane south of Adelaide Street could be considered for parking or a contra-flow cycling lane.

- Exclusive Streetcar Lane
- Exclusive Bicycle Lane
- 501 Queen Detour Route
- Bicycle/Parking Lane (For City to Consider)

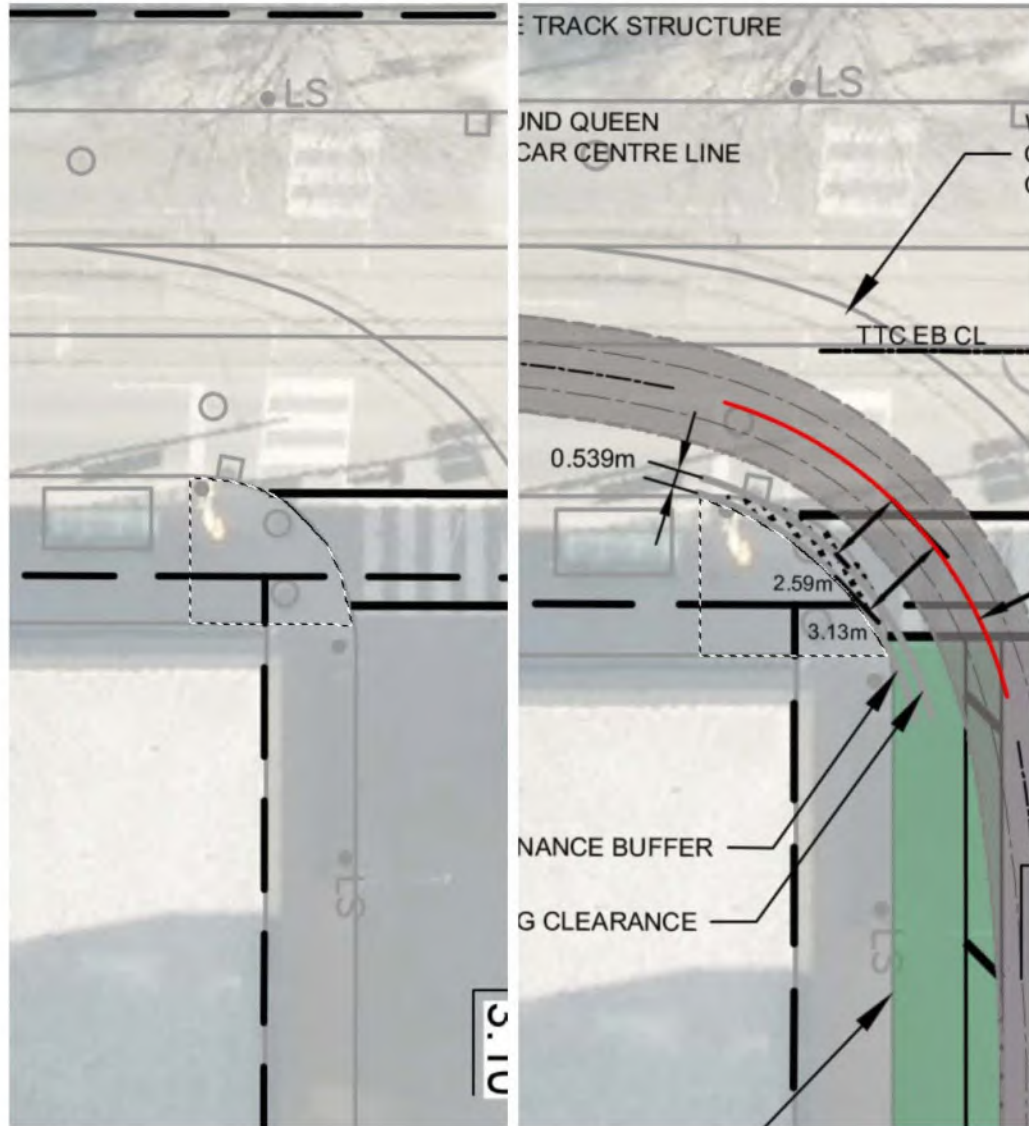


York Street Alternative 2b: Mixed Traffic Single SB Lane

- Alternative 2b features a bidirectional cross-section between Adelaide and Queen Streets.
- Northbound and southbound streetcar tracks in the centre lanes and both operate in mixed traffic.
- The southbound streetcar turning radius will require centre-to-centre lane turns from Queen EB to York SB, providing an opportunity to provide dedicated cycling facilities on the southbound direction between Queen Street and Adelaide Street.
- The existing northbound-only configuration would remain south of Adelaide Street.
- The westmost lane could be considered for parking or cycling.



York St and Queen St South-West Corner Curb Cut – All Alternatives

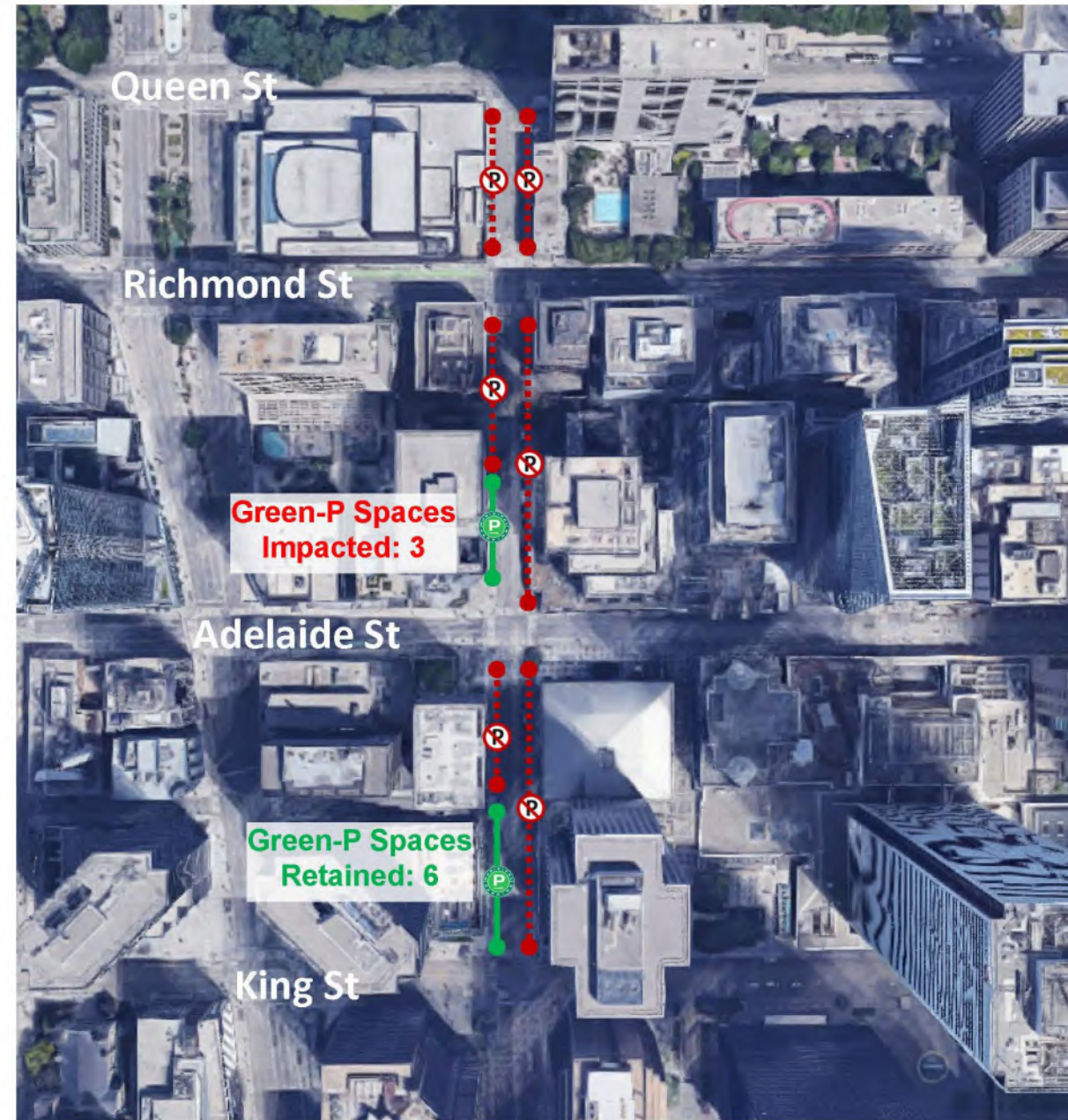


- Curb cut at SW corner to accommodate streetcar tracks reduces pedestrian waiting area by approximately 3 m²
- Pedestrian queuing density analysis indicates the SW corner is expected to continue to perform at pedestrian LOS C or better in the AM and PM peaks

11 ONTARIO LINE | YORK STREET TWO WAY ALTERNATIVES

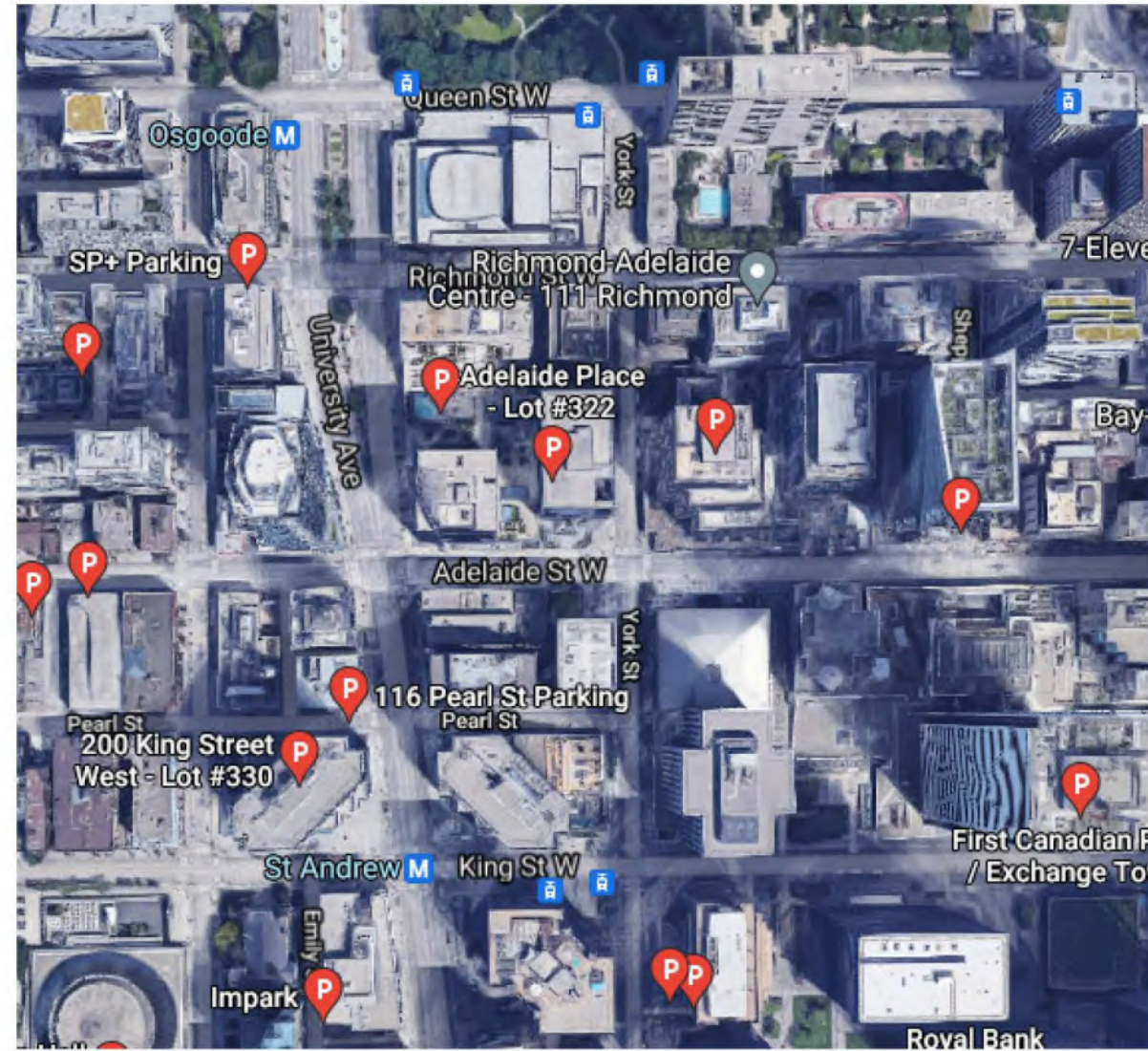
Parking Impacts – All Alternatives

- Total of less than 10 parking spaces impacted
- Existing (3) parking spaces between Richmond St and Adelaide St will need to be removed
- Existing (6) parking spaces between Adelaide St and King will be retained



Parking Impacts

- Potential alternative parking lots in the area:

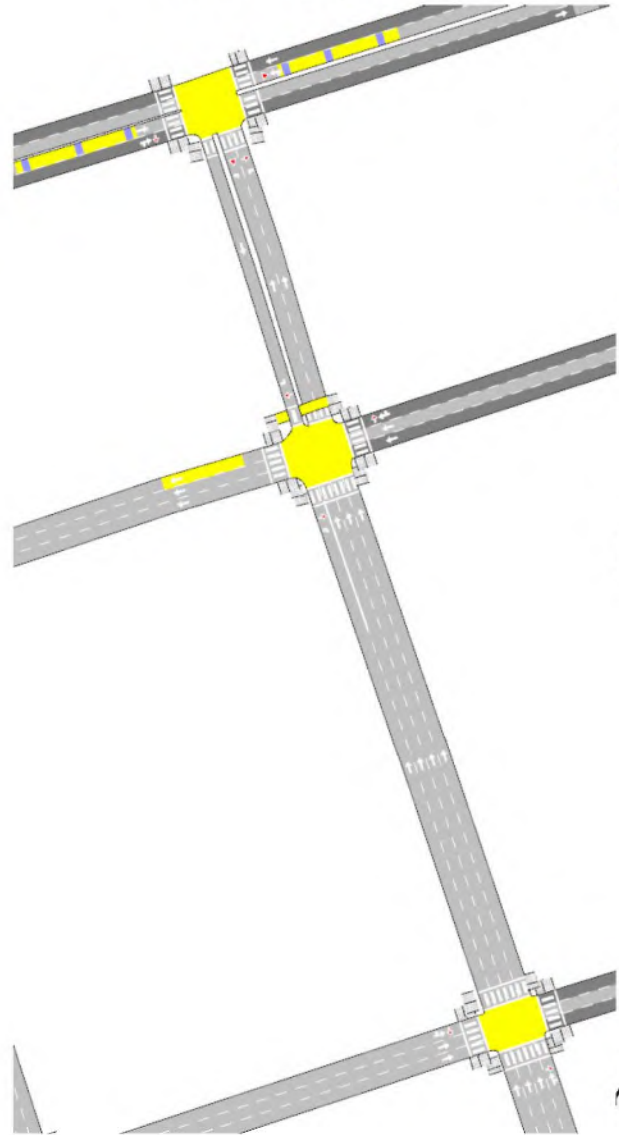




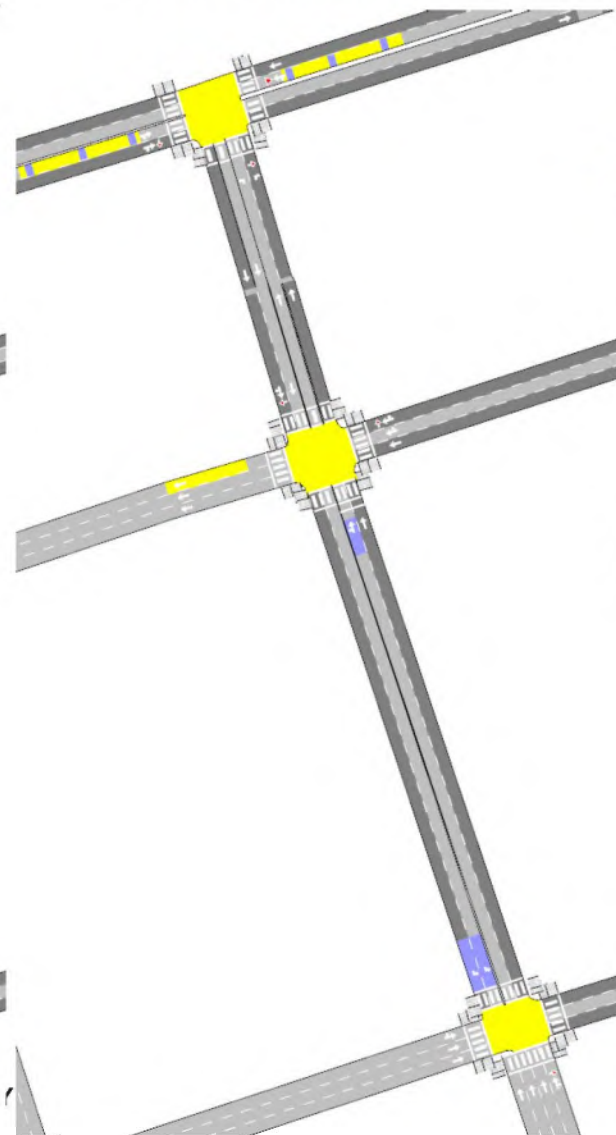
Concept Evaluation

Network Configurations

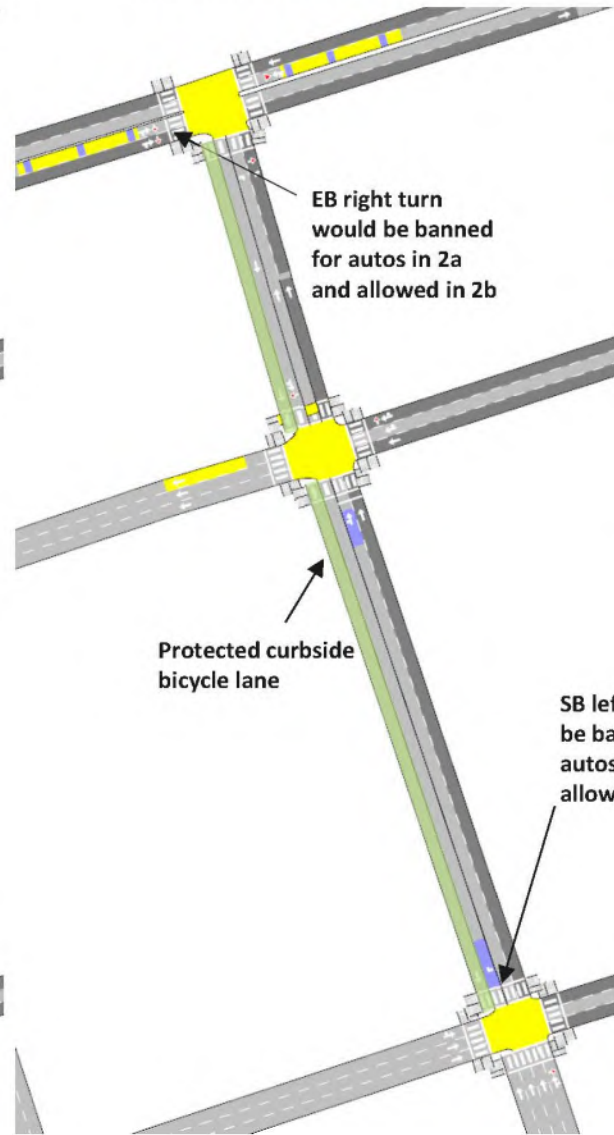
Existing (Base)



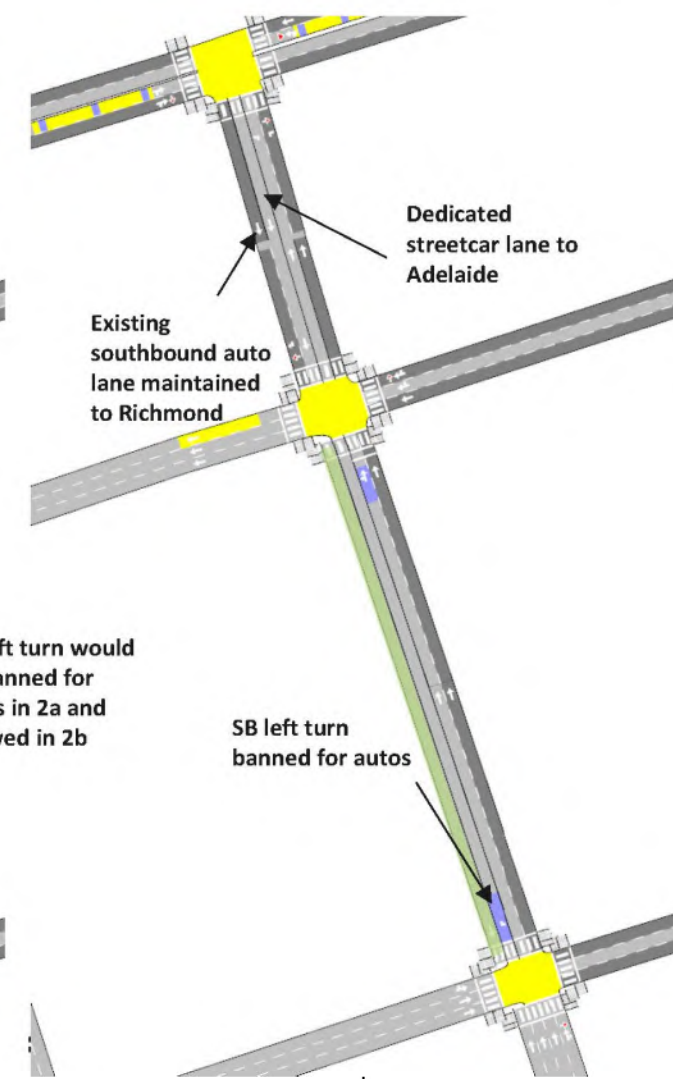
York Street Alternative 1:
Two-lane full-access



York Street Alternative 2:
Mixed Traffic Single
Southbound Lane



York Street Alternative 2a
(modified):
Dedicated SB Streetcar
Lane with Auto Lane to
Richmond



Evaluation Criteria

Traffic Evaluation using Aimsun Model

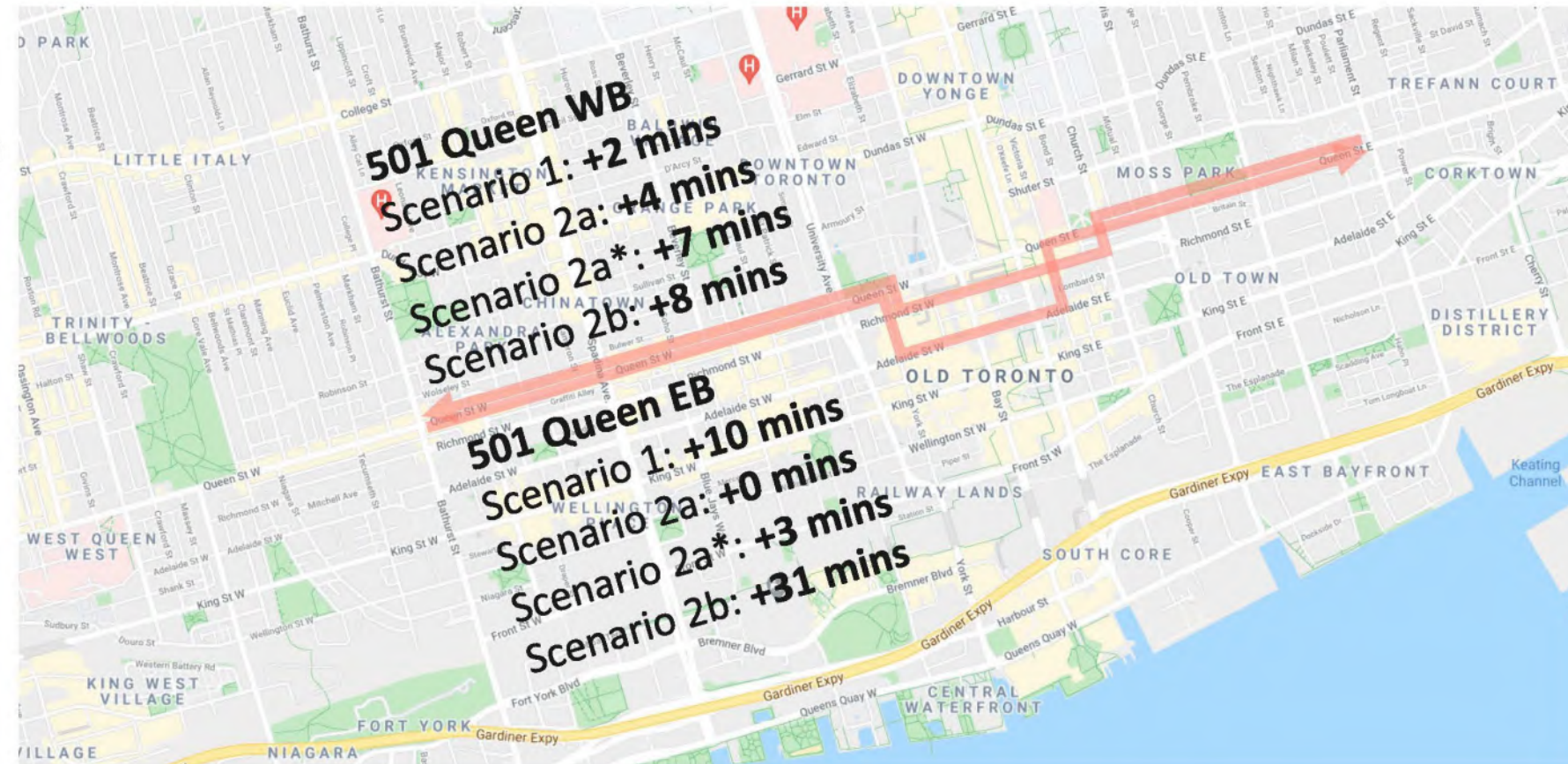
- Transit Travel Time between Bathurst Street and Parliament Street
- Sub-area Auto Delay
 - Larger area bounded by Dundas, Jarvis, Front, and Bathurst
 - Sub area bounded Queen, Bay, Adelaide, and University

Additional Consideration

- Auto Travel Times on adjacent corridors
- Traffic operations and turning movement impacts on York Street
- Observed queues during simulation

Transit Travel Times

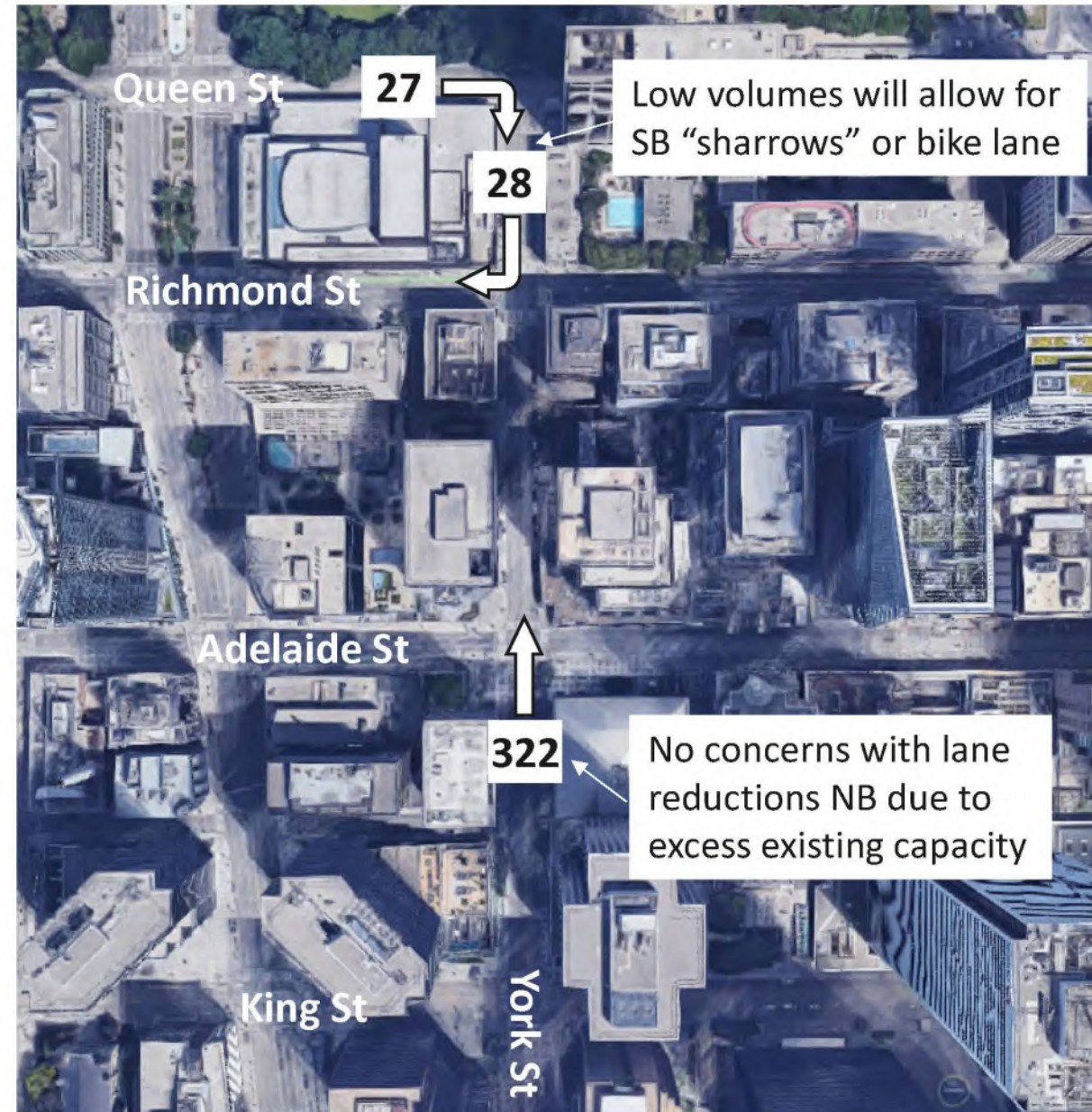
- Transit travel times are worse in both directions when it operates in a shared southbound lane on York Street
- Dedicated streetcar lane southbound on York Street performs best for 501 Queen EB



Measure	Scenario 1	Scenario 2a	Scenario 2a*	Scenario 2b
Transit	WB +2 min EB +10 min	WB +4 min EB +0 min	WB +7 min EB +3 min	WB +8 min EB +31 min

Movement Volumes (AM Peak)

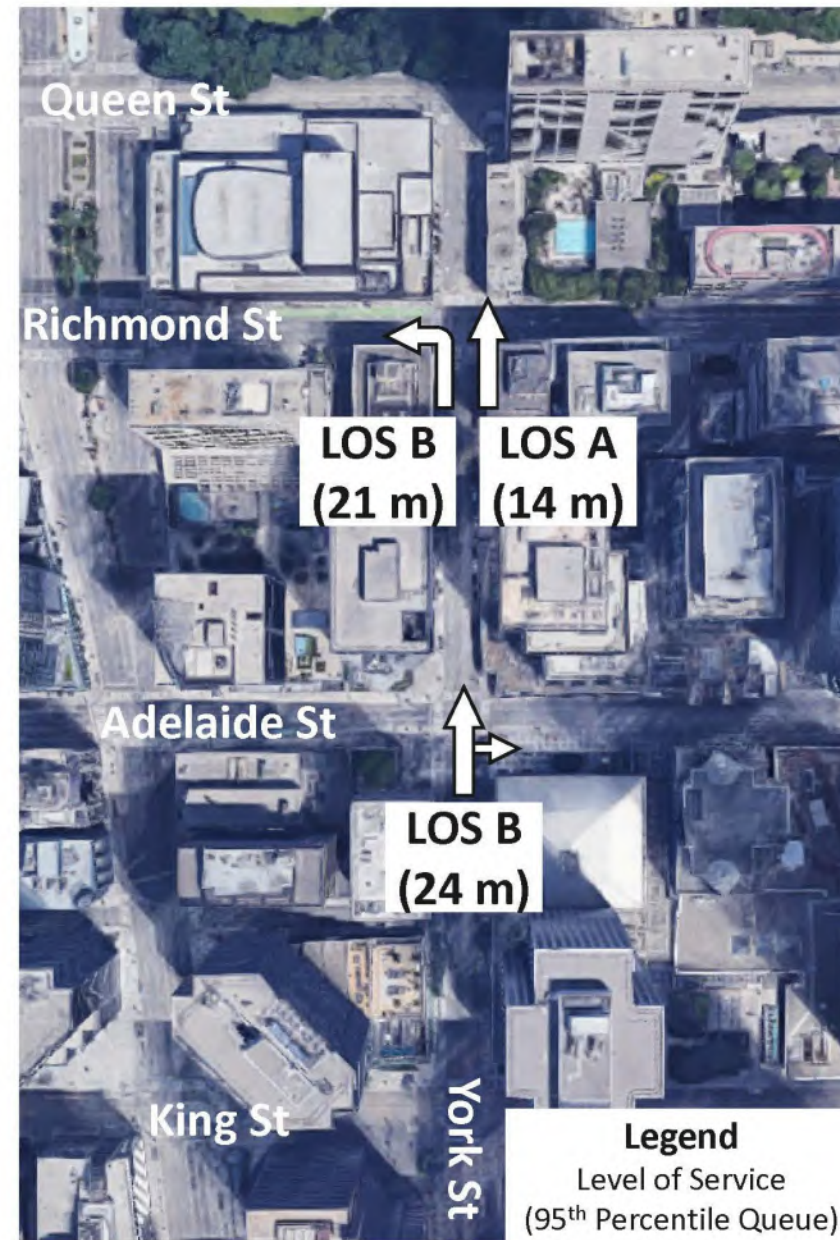
- Low existing turning volumes EBR at Queen / York and SBR at York / Richmond
 - Low SB conflict between autos and cyclists in Scenario 2a and 2a* would allow for “sharrows” or bicycle lane
- Northbound through capacity constraints along York not observed in model scenarios following reduction to 2 lanes due to low demand



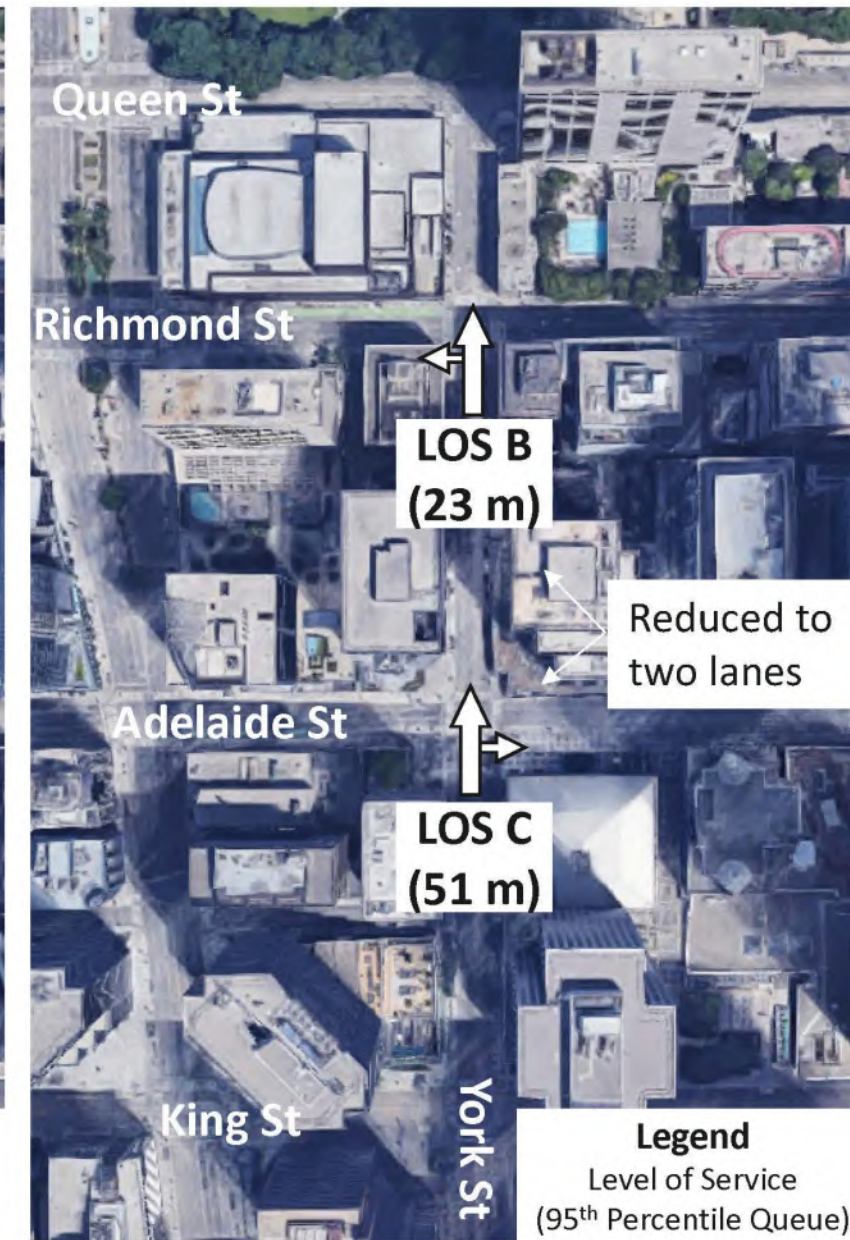
Existing AM Peak Hour Turning Demand

NB Operational Impacts

- Northbound lane reductions analyzed using Synchro
- York St NB will continue to operate well with two lanes at both Adelaide St and Richmond St
- 95th percentile queues will remain within storage length between signalized intersections



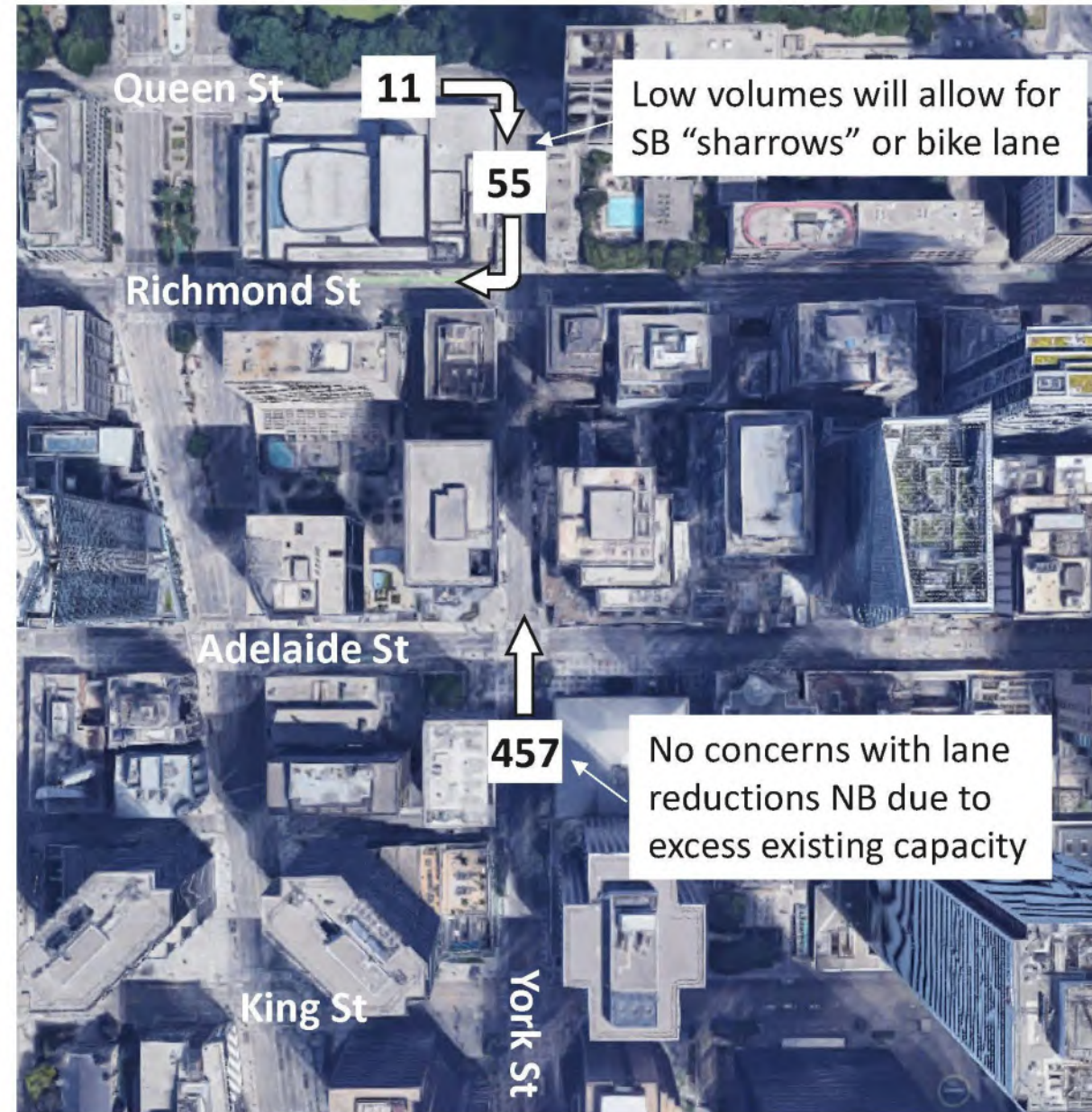
Existing AM Peak Hour



With Northbound Lane Reductions

Movement Volumes (PM Peak)

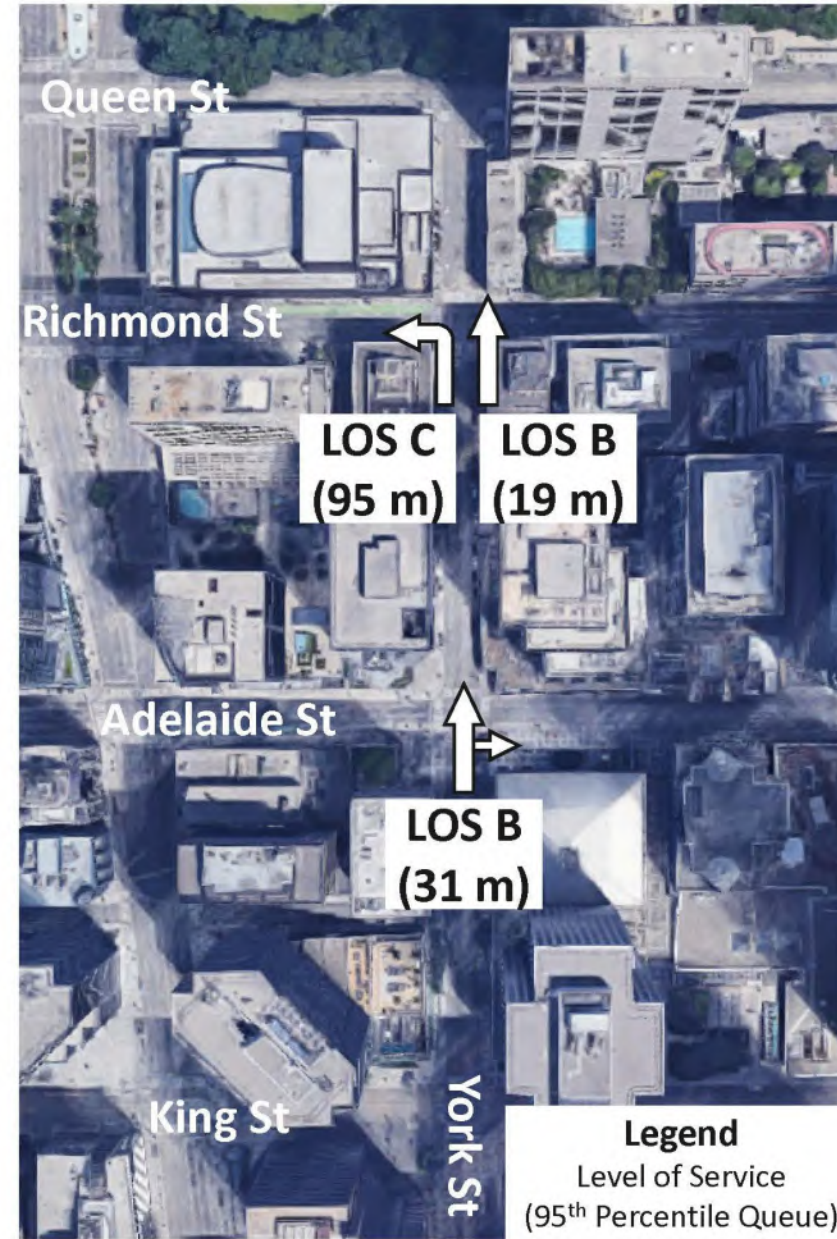
- Low existing turning volumes EBR at Queen / York and SBR at York / Richmond
 - Low SB conflict between autos and cyclists in Scenario 2a and 2a* would allow for “sharrows” or bicycle lane
- Northbound through capacity constraints along York not observed in model scenarios following reduction to 2 lanes due to low demand



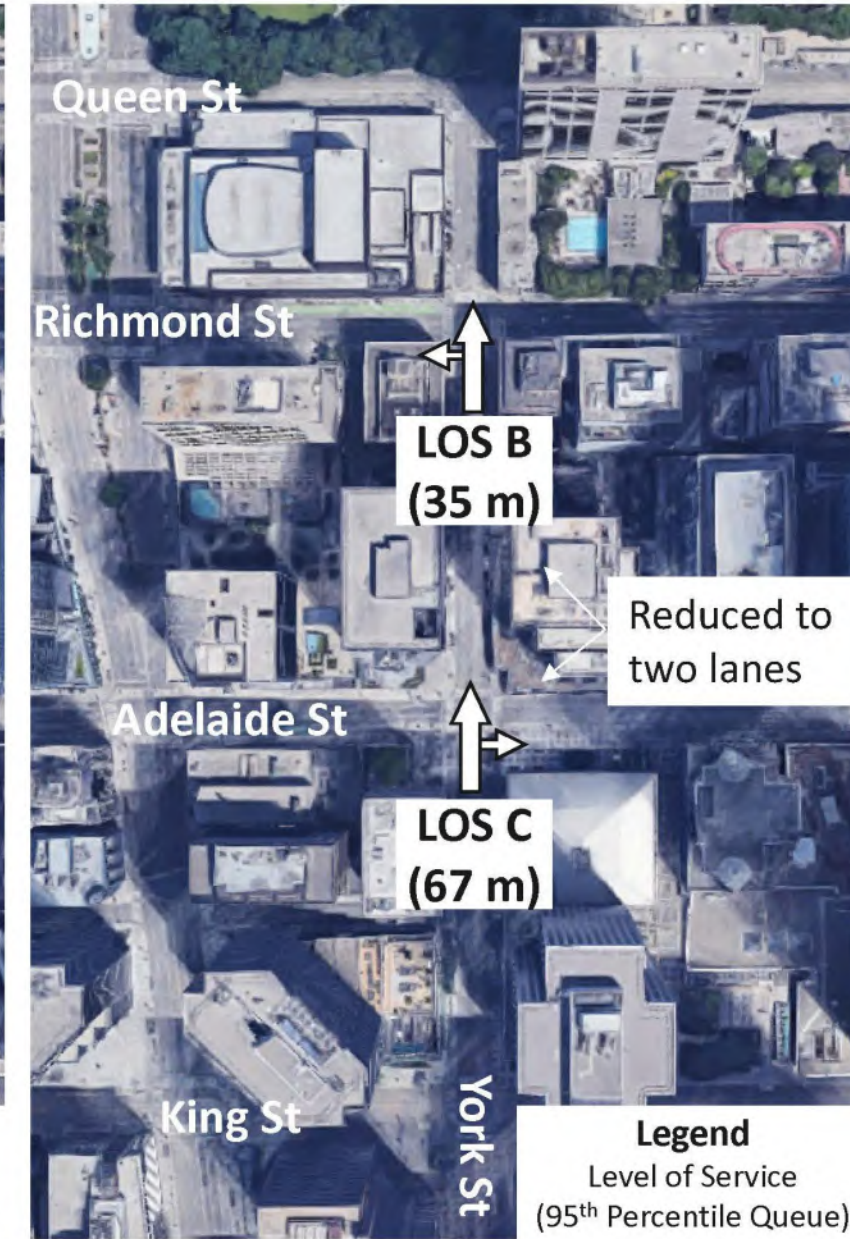
Existing PM Peak Hour Turning Demand

NB Operational Impacts

- Northbound lane reductions analyzed using Synchro
- York St NB will continue to operate well with two lanes at both Adelaide St and Richmond St
- 95th percentile queues will remain within storage length between signalized intersections



Existing PM Peak Hour



With Northbound Lane Reductions

Network Delays

- On a larger network level, the percentage change of the detour (and Queen Street Closure) is expected to generate lesser overall delay.
- All four scenarios are still expected to add some delays due to streetcar diversion and road closure. However, Scenario 2a* causes the lowest impact overall.

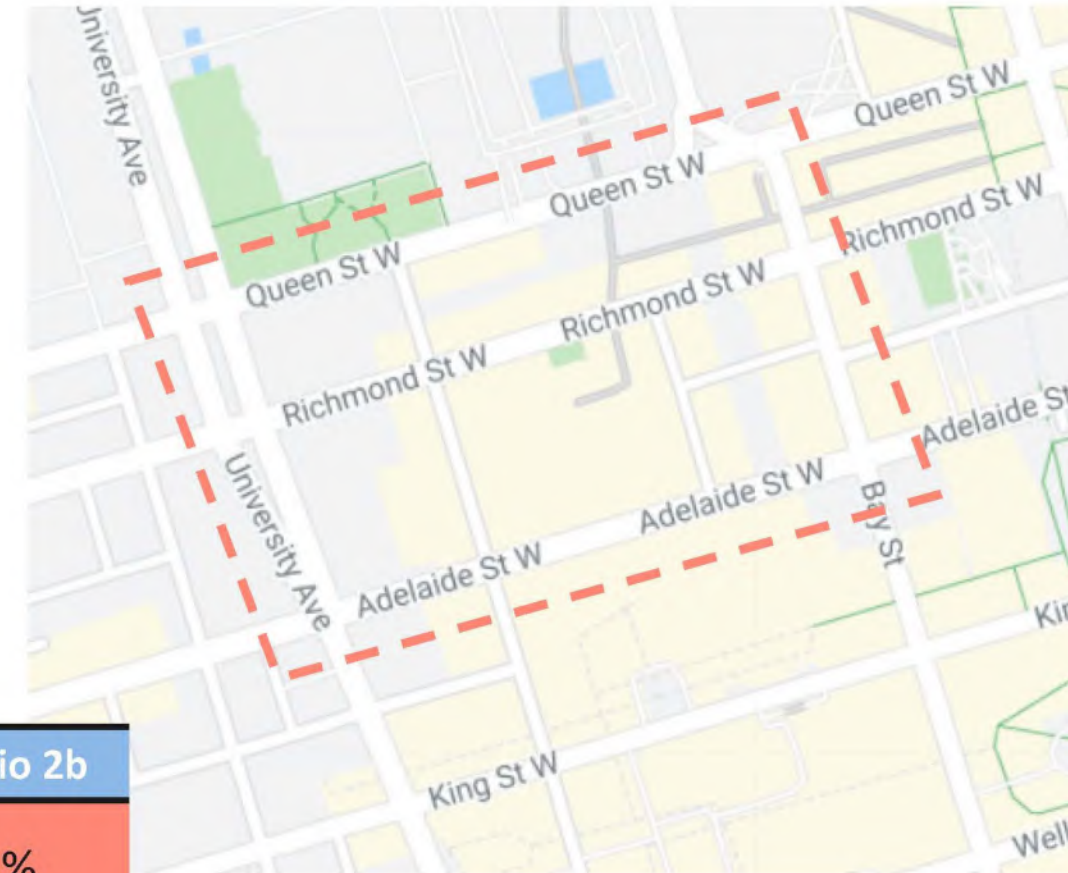
Links	
Centroids	
Centroid Connector	



Measure	Scenario 1	Scenario 2a	Scenario 2a*	Scenario 2b
Network-wide Delay (Percent change from base)	+7%	+4%	+3%	+8%

Sub-Network Delays

- On a sub network level, all four scenarios are expected to add some delays due to streetcar diversion. However, Scenario 2a causes the lowest impact overall.
- Total network delays in the area bounded by Queen, University, Adelaide, and Bay are the lowest in Scenario 2a.
- Highest total delays and queues are experienced in Scenario 1.



Measure	Scenario 1	Scenario 2a	Scenario 2a*	Scenario 2b
Sub-Area Network Delay (Percent change from base)	+42%	+24%	+34%	+35%

Evaluation Summary

- Traffic-wise, all four scenarios are expected to observe some impacts due to streetcar diversion and the Queen Street closure
- Scenario 2a* would provide the best conditions for transit users and cyclists and address City concerns

Measure	Scen. 1	Scen. 2a	Scen. 2a*	Scen. 2b
Auto	Red	Light Red	Light Red	Red
Transit	Light Red	Green	Green	Red
Cycling	Red	Green	Green	Green
Pedestrian	Grey	Grey	Grey	Grey
Cost	Grey	Grey	Grey	Grey



Appendix D – Aimsun Screenline Volumes



Table D-0-1: AM Peak Screenline Flows

Screenline	Direction	Corridor	Existing Base	Queen Full Closure				City Works			All Closures (Optimized)		
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	
Screenline #1: West of Bathurst	EB	Dundas	475	487	11	2%	564	89	19%	546	71	15%	
		Robinson	32	30	-2	-7%	30	-2	-7%	31	-1	-4%	
		Queen	701	737	35	5%	798	97	14%	823	121	17%	
		Richmond	63	69	5	9%	69	5	9%	69	5	8%	
		Adelaide	57	69	12	21%	119	62	108%	117	60	106%	
	Overall EB			1,329	1,390	62	5%	1,580	251	19%	1,585	257	19%
	WB	Dundas	348	349	1	0%	366	19	5%	359	11	3%	
		Robinson	100	112	12	12%	105	5	5%	106	5	5%	
		Queen	458	500	41	9%	511	52	11%	522	63	14%	
	Overall WB			907	961	54	6%	982	75	8%	987	80	9%
Screenline #2: East of Spadina	EB	Dundas	596	660	64	11%	675	79	13%	676	81	14%	
		Queen	733	758	25	3%	813	80	11%	739	5	1%	
		Adelaide	1,031	945	-86	-8%	996	-36	-3%	1,002	-29	-3%	
		King	41	48	8	19%	72	32	77%	77	36	89%	
		Clarence	106	83	-23	-21%	4	-102	-96%	4	-102	-96%	
		Front	757	819	62	8%	678	-79	-10%	680	-77	-10%	
	Overall EB			3,264	3,315	50	2%	3,239	-26	-1%	3,179	-85	-3%
	WB	Dundas	359	363	3	1%	368	9	2%	369	10	3%	
		Sullivan	50	21	-29	-58%	22	-28	-56%	21	-29	-58%	
		Queen	457	526	70	15%	543	87	19%	549	92	20%	
		Richmond	609	513	-96	-16%	503	-105	-17%	485	-123	-20%	
		King	28	38	10	35%	51	22	79%	50	21	75%	
		Clarence	90	73	-16	-18%	0	-90	-100%	0	-90	-100%	
Overall WB			1,941	1,898	-43	-2%	1,865	-76	-4%	1,870	-71	-4%	
Screenline #3: West of University	EB	Dundas	563	641	78	14%	600	37	7%	641	78	14%	
		Queen	633	557	-76	-12%	754	121	19%	527	-105	-17%	
		Adelaide	930	650	-280	-30%	657	-272	-29%	607	-322	-35%	
		King	154	119	-35	-23%	148	-7	-4%	131	-24	-15%	
		Front	506	647	141	28%	581	74	15%	625	119	23%	
	Overall EB			2,786	2,614	-172	-6%	2,739	-47	-2%	2,532	-254	-9%
	WB	Dundas	633	629	-5	-1%	619	-15	-2%	612	-21	-3%	
		Queen	653	620	-34	-5%	667	13	2%	663	10	1%	
		Richmond	876	791	-85	-10%	835	-41	-5%	774	-102	-12%	
		King	112	44	-68	-61%	71	-41	-37%	55	-57	-51%	
		Wellington	727	793	66	9%	766	39	5%	772	44	6%	
Overall WB			3,194	3,096	-98	-3%	3,163	-31	-1%	3,105	-89	-3%	
EB	Dundas	482	594	111	23%	482	0	0%	573	91	19%		



Screenline	Direction	Corridor	Existing Base	Queen Full Closure			City Works			All Closures (Optimized)			
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	
Screenline #4: West of Yonge	EB	Eaton	75	95	20	26%	91	16	21%	91	16	21%	
		Queen	447	0	-447	-100%	623	176	39%	0	-447	-100%	
		Adelaide	769	837	68	9%	624	-145	-19%	683	-86	-11%	
		King	108	65	-44	-40%	79	-29	-27%	100	-8	-8%	
		Front	494	640	146	30%	548	54	11%	596	102	21%	
	Overall EB			2,376	2,230	-146	-6%	2,448	72	3%	2,044	-332	-14%
	WB	Dundas	621	679	59	9%	617	-4	-1%	590	-30	-5%	
		Eaton	237	262	26	11%	121	-116	-49%	251	14	6%	
		Queen	438	0	-438	-100%	432	-6	-1%	0	-438	-100%	
		Richmond	1,213	1,418	205	17%	1,237	23	2%	1,370	156	13%	
		King	121	63	-59	-48%	67	-54	-45%	66	-55	-46%	
	Wellington	978	948	-30	-3%	1,064	86	9%	943	-35	-4%		
	Front	505	541	37	7%	524	19	4%	522	17	3%		
Overall WB			4,113	3,912	-201	-5%	4,062	-51	-1%	3,742	-371	-9%	
Screenline #5: East of Jarvis	EB	Dundas	257	295	38	15%	190	-67	-26%	215	-43	-17%	
		Shuter	78	110	32	41%	146	68	87%	124	46	59%	
		Queen	289	155	-133	-46%	350	61	21%	165	-123	-43%	
		Adelaide	554	562	8	1%	477	-76	-14%	471	-83	-15%	
		Adelaide	37	52	15	42%	44	7	20%	58	22	59%	
		King	69	70	0	0%	79	9	14%	82	12	18%	
	Front	359	372	13	4%	350	-9	-3%	394	35	10%		
	Overall EB			1,642	1,615	-27	-2%	1,636	-7	0%	1,509	-133	-8%
	WB	Dundas	492	517	25	5%	332	-160	-32%	305	-187	-38%	
		Shuter	165	200	35	21%	226	61	37%	241	76	46%	
		Queen	577	518	-59	-10%	659	82	14%	522	-55	-9%	
		Richmond	1,435	1,346	-89	-6%	1,416	-19	-1%	1,357	-78	-5%	
		King	270	211	-59	-22%	227	-42	-16%	268	-1	0%	
Front	635	701	66	10%	697	62	10%	722	87	14%			
Overall WB			3,573	3,493	-80	-2%	3,558	-15	0%	3,416	-157	-4%	
Screenline #6: East of Parliament	EB	Dundas	404	420	16	4%	333	-72	-18%	329	-75	-19%	
		Shuter	110	121	11	10%	162	52	47%	140	30	27%	
		Queen	273	188	-85	-31%	299	26	10%	210	-63	-23%	
		Adelaide	447	431	-16	-3%	429	-18	-4%	402	-45	-10%	
		King	241	161	-80	-33%	154	-87	-36%	162	-78	-33%	
	Front	425	484	60	14%	478	53	12%	499	74	17%		
	Overall EB			1,900	1,807	-93	-5%	1,855	-45	-2%	1,742	-158	-8%
	WB	Dundas	475	490	14	3%	433	-43	-9%	442	-33	-7%	
		Shuter	41	42	1	3%	45	5	11%	76	35	86%	
		Queen	456	478	23	5%	556	101	22%	449	-7	-2%	
Richmond		1,748	1,752	4	0%	1,815	67	4%	1,762	14	1%		
King		361	244	-117	-32%	263	-98	-27%	311	-50	-14%		



Screenline	Direction	Corridor	Existing Base	Queen Full Closure			City Works			All Closures (Optimized)			
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	
		Front	668	681	13	2%	684	15	2%	710	41	6%	
		Overall WB	3,749	3,687	-62	-2%	3,796	47	1%	3,749	0	0%	
Screenline #7: North of Queen	NB	Bathurst	906	890	-16	-2%	886	-20	-2%	889	-17	-2%	
		Augusta	109	142	34	31%	150	42	38%	149	41	38%	
		Spadina	409	404	-6	-1%	384	-26	-6%	385	-24	-6%	
		Spadina	14	14	0	0%	14	0	0%	14	0	0%	
		Soho	38	38	1	1%	36	-2	-5%	38	0	0%	
		Beverley	207	262	55	27%	223	16	8%	244	37	18%	
		John	154	128	-26	-17%	136	-19	-12%	126	-29	-19%	
		McCaul	162	197	35	21%	192	30	18%	188	26	16%	
		St Patrick	208	208	0	0%	199	-9	-4%	201	-7	-4%	
		University	911	919	7	1%	926	14	2%	894	-18	-2%	
		Bay	523	651	129	25%	729	206	39%	654	131	25%	
		Yonge	400	436	36	9%	400	0	0%	444	44	11%	
		Victoria	162	190	28	17%	158	-3	-2%	198	36	23%	
		Church	491	479	-12	-2%	540	49	10%	483	-8	-2%	
		Jarvis	307	296	-10	-3%	319	12	4%	333	26	9%	
	Sherbourne	287	284	-3	-1%	267	-21	-7%	241	-46	-16%		
	Parliament	314	360	45	14%	325	11	3%	345	31	10%		
			Overall NB	5,603	5,899	296	5%	5,883	280	5%	5,827	224	4%
	SB	Bathurst	412	404	-9	-2%	392	-20	-5%	381	-31	-7%	
		Augusta	126	138	12	10%	159	33	26%	152	25	20%	
		Spadina	510	438	-71	-14%	460	-49	-10%	453	-57	-11%	
		Spadina	15	15	0	0%	15	0	0%	15	0	0%	
		Soho	46	72	26	56%	72	26	57%	72	27	58%	
		Beverley	265	270	5	2%	272	7	3%	265	0	0%	
		John	29	37	8	26%	37	7	26%	36	7	24%	
		McCaul	150	190	40	27%	179	29	20%	187	37	25%	
		St Patrick	258	255	-3	-1%	250	-8	-3%	239	-20	-8%	
		University	1,374	1,370	-4	0%	1,379	4	0%	1,317	-58	-4%	
Bay		204	252	48	24%	213	10	5%	256	53	26%		
Bay		274	222	-52	-19%	267	-7	-3%	210	-64	-23%		
Yonge		393	414	21	5%	392	-1	0%	299	-94	-24%		
Victoria	167	199	32	19%	201	34	20%	209	42	25%			
Church	430	484	54	13%	507	78	18%	521	91	21%			
Jarvis	550	491	-59	-11%	490	-60	-11%	523	-27	-5%			
Sherbourne	279	277	-2	-1%	294	15	5%	290	10	4%			
Parliament	531	539	9	2%	545	14	3%	551	20	4%			
		Overall SB	6,012	6,065	53	1%	6,124	112	2%	5,975	-38	-1%	
Screenline #8: South of Queen	NB	Bathurst	916	933	17	2%	945	29	3%	921	6	1%	
		Portland	90	51	-39	-44%	62	-28	-32%	56	-34	-38%	



Screenline	Direction	Corridor	Existing Base	Queen Full Closure			City Works			All Closures (Optimized)			
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	
	NB	Augusta	51	58	7	15%	60	9	17%	59	8	15%	
		Spadina	571	543	-29	-5%	525	-46	-8%	504	-67	-12%	
		Spadina	14	14	0	0%	14	0	0%	14	0	0%	
		Peter	47	96	49	104%	105	58	125%	104	57	121%	
		John	274	272	-3	-1%	294	20	7%	280	6	2%	
		Duncan	202	173	-29	-14%	235	33	16%	168	-34	-17%	
		University	867	966	98	11%	863	-5	-1%	907	40	5%	
		York	313	454	140	45%	346	33	11%	474	160	51%	
		Bay	528	558	30	6%	595	67	13%	558	30	6%	
		Yonge	402	438	35	9%	401	-2	0%	447	44	11%	
		Victoria	134	129	-5	-4%	94	-40	-30%	139	5	4%	
		Church	344	312	-32	-9%	313	-31	-9%	302	-42	-12%	
		Jarvis	359	352	-7	-2%	355	-4	-1%	370	11	3%	
		Sherbourne	286	304	17	6%	272	-14	-5%	272	-14	-5%	
		Parliament	439	449	10	2%	428	-11	-3%	444	4	1%	
	Overall NB			5,839	6,099	260	4%	5,906	67	1%	6,018	179	3%
	SB	Bathurst	474	485	11	2%	485	10	2%	495	21	4%	
		Portland	217	175	-42	-19%	200	-17	-8%	217	0	0%	
		Augusta	78	56	-21	-27%	59	-19	-24%	54	-24	-30%	
		Spadina	423	382	-41	-10%	411	-12	-3%	410	-13	-3%	
		Spadina	15	15	0	-1%	15	0	0%	15	0	-1%	
		Peter	114	107	-7	-6%	109	-5	-5%	120	6	5%	
		John	343	366	23	7%	360	17	5%	393	50	15%	
		Duncan	107	151	44	42%	150	44	41%	153	46	43%	
		Simcoe	215	171	-45	-21%	183	-32	-15%	178	-37	-17%	
		University	1,410	1,329	-81	-6%	1,379	-31	-2%	1,297	-114	-8%	
		York	96	476	379	393%	130	34	35%	369	272	282%	
		Bay	304	320	15	5%	310	6	2%	311	7	2%	
		Yonge	392	414	22	6%	391	-1	0%	299	-93	-24%	
		Victoria	140	53	-87	-62%	170	30	21%	48	-92	-66%	
		Church	538	690	152	28%	588	50	9%	727	188	35%	
		Jarvis	538	534	-4	-1%	566	28	5%	548	9	2%	
Sherbourne		270	301	31	11%	308	37	14%	299	28	10%		
Parliament	551	558	7	1%	585	34	6%	555	4	1%			
Overall SB			6,227	6,583	356	6%	6,399	172	3%	6,486	259	4%	



Table D-0-2: PM Peak Screenline Flows

Screenline	Direction	Corridor	Existing Base	Queen Full Closure				City Works			All Closures (Optimized)		
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	
Screenline #1: West of Bathurst	EB	Dundas	589	638	49	8%	716	127	22%	607	18	3%	
		Robinson	76	72	-3	-4%	71	-5	-7%	71	-5	-7%	
		Queen	700	534	-166	-24%	521	-179	-26%	416	-284	-41%	
		Richmond	43	45	2	4%	45	2	4%	44	1	3%	
		Adelaide	109	149	40	37%	134	26	24%	100	-9	-8%	
	Overall EB			1,517	1,438	-79	-5%	1,487	-30	-2%	1,238	-279	-18%
	WB	Dundas	1,073	1,067	-5	-1%	1,001	-72	-7%	934	-138	-13%	
		Robinson	42	40	-2	-6%	36	-6	-15%	34	-8	-19%	
		Queen	647	614	-33	-5%	707	60	9%	687	40	6%	
	Overall WB			1,762	1,721	-41	-2%	1,744	-18	-1%	1,656	-106	-6%
Screenline #2: East of Spadina	EB	Dundas	800	774	-26	-3%	645	-155	-19%	491	-309	-39%	
		Queen	790	625	-165	-21%	622	-169	-21%	461	-329	-42%	
		Adelaide	766	747	-19	-2%	694	-72	-9%	539	-227	-30%	
		King	57	51	-6	-10%	73	16	28%	88	31	54%	
		Clarence	107	115	8	7%	21	-86	-80%	12	-95	-89%	
		Front	592	611	18	3%	485	-107	-18%	510	-82	-14%	
	Overall EB			3,112	2,923	-189	-6%	2,540	-572	-18%	2,101	-1,011	-32%
	WB	Dundas	820	866	46	6%	978	158	19%	900	80	10%	
		Sullivan	70	68	-2	-2%	68	-2	-2%	68	-2	-2%	
		Queen	431	380	-51	-12%	498	67	16%	476	45	10%	
		Richmond	847	733	-114	-13%	658	-190	-22%	563	-285	-34%	
		King	105	101	-4	-4%	126	21	20%	105	1	1%	
		Clarence	240	256	16	7%	21	-219	-91%	9	-231	-96%	
	Front	598	619	20	3%	488	-110	-18%	467	-131	-22%		
Overall WB			3,111	3,024	-88	-3%	2,837	-274	-9%	2,588	-523	-17%	
Screenline #3: West of University	EB	Dundas	865	886	21	2%	658	-207	-24%	519	-345	-40%	
		Queen	639	548	-90	-14%	473	-165	-26%	420	-218	-34%	
		Adelaide	1,119	803	-316	-28%	854	-265	-24%	447	-672	-60%	
		King	104	101	-4	-3%	126	22	21%	95	-9	-9%	
		Front	579	587	8	1%	512	-67	-12%	480	-99	-17%	
	Overall EB			3,306	2,924	-381	-12%	2,624	-681	-21%	1,962	-1,344	-41%
	WB	Dundas	989	976	-13	-1%	1,082	92	9%	981	-8	-1%	
		Queen	567	501	-66	-12%	622	55	10%	512	-55	-10%	
		Richmond	1,195	995	-200	-17%	880	-315	-26%	711	-483	-40%	
		King	58	60	2	3%	98	40	68%	74	15	26%	
		Wellington	554	570	15	3%	539	-16	-3%	504	-51	-9%	
		Front	304	267	-38	-12%	247	-57	-19%	226	-78	-26%	
	Overall WB			3,668	3,368	-299	-8%	3,468	-200	-5%	3,008	-660	-18%
EB	Dundas	906	1,116	211	23%	587	-318	-35%	652	-254	-28%		



Screenline	Direction	Corridor	Existing Base	Queen Full Closure			City Works			All Closures (Optimized)		
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff
Screenline #4: West of Yonge	EB	Eaton	116	119	3	2%	112	-4	-3%	104	-12	-11%
		Queen	943	0	-943	-100%	850	-93	-10%	0	-943	-100%
		Adelaide	1,351	1,429	78	6%	1,141	-210	-16%	754	-597	-44%
		King	92	129	37	41%	171	79	86%	202	111	121%
		Front	737	768	31	4%	612	-125	-17%	632	-105	-14%
		Overall EB	4,144	3,561	-583	-14%	3,474	-670	-16%	2,344	-1,800	-43%
	WB	Dundas	718	803	84	12%	688	-30	-4%	706	-13	-2%
		Eaton	17	34	17	103%	14	-3	-18%	26	10	59%
		Queen	549	0	-549	-100%	474	-75	-14%	0	-549	-100%
		Richmond	870	1,031	161	18%	771	-99	-11%	831	-39	-5%
		King	146	162	17	11%	143	-3	-2%	160	14	10%
		Wellington	933	964	31	3%	973	41	4%	941	8	1%
	Overall WB	3,427	3,185	-242	-7%	3,216	-211	-6%	2,832	-595	-17%	
	Screenline #5: East of Jarvis	EB	Dundas	921	886	-35	-4%	459	-462	-50%	472	-449
Shuter			243	248	6	2%	327	84	35%	226	-17	-7%
Queen			850	583	-268	-31%	775	-76	-9%	479	-371	-44%
Adelaide			1,160	1,063	-97	-8%	1,007	-153	-13%	871	-289	-25%
Adelaide			80	95	15	19%	81	1	1%	93	13	16%
King			30	29	-1	-4%	73	44	146%	55	25	84%
Front		461	493	32	7%	485	24	5%	463	2	0%	
Overall EB		3,745	3,397	-348	-9%	3,207	-539	-14%	2,660	-1,086	-29%	
WB		Dundas	506	611	105	21%	362	-145	-29%	395	-111	-22%
		Shuter	204	176	-28	-14%	190	-14	-7%	150	-54	-26%
		Queen	362	271	-90	-25%	405	43	12%	254	-108	-30%
		Richmond	897	755	-142	-16%	732	-164	-18%	706	-190	-21%
		King	297	317	20	7%	360	64	21%	389	93	31%
		Front	504	516	12	2%	696	192	38%	634	130	26%
Overall WB	2,769	2,646	-123	-4%	2,745	-24	-1%	2,528	-242	-9%		
Screenline #6: East of Parliament	EB	Dundas	887	883	-4	0%	642	-245	-28%	605	-282	-32%
		Shuter	362	336	-25	-7%	368	6	2%	336	-25	-7%
		Queen	730	605	-125	-17%	694	-36	-5%	600	-130	-18%
		Adelaide	697	707	10	1%	635	-62	-9%	593	-104	-15%
		King	415	436	22	5%	427	12	3%	419	4	1%
		Front	754	746	-7	-1%	678	-75	-10%	662	-92	-12%
	Overall EB	3,844	3,714	-130	-3%	3,444	-400	-10%	3,215	-629	-16%	
	WB	Dundas	412	461	49	12%	353	-59	-14%	325	-86	-21%
		Shuter	95	81	-14	-15%	112	17	18%	92	-3	-3%
		Queen	311	249	-62	-20%	347	35	11%	276	-35	-11%
		Richmond	1,230	1,199	-31	-3%	1,209	-21	-2%	1,158	-72	-6%
King		314	330	16	5%	353	39	13%	448	134	43%	



Screenline	Direction	Corridor	Existing Base	Queen Full Closure			City Works			All Closures (Optimized)			
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	
		Front	473	503	30	6%	497	24	5%	536	64	13%	
		Overall WB	2,834	2,822	-12	0%	2,871	37	1%	2,836	1	0%	
Screenline #7: North of Queen	NB	Bathurst	1,010	982	-28	-3%	587	-424	-42%	542	-468	-46%	
		Augusta	304	264	-40	-13%	304	0	0%	251	-53	-17%	
		Spadina	691	656	-35	-5%	692	1	0%	599	-92	-13%	
		Spadina	13	13	0	2%	13	0	2%	13	0	1%	
		Soho	49	46	-3	-6%	41	-8	-16%	38	-11	-23%	
		Beverley	286	270	-16	-6%	255	-32	-11%	232	-54	-19%	
		John	59	59	0	0%	54	-5	-8%	48	-11	-18%	
		McCaul	263	236	-27	-10%	234	-29	-11%	189	-74	-28%	
		St Patrick	96	114	18	18%	84	-12	-12%	98	2	3%	
		University	1,138	1,218	79	7%	937	-201	-18%	1,003	-135	-12%	
		Bay	374	438	65	17%	331	-42	-11%	338	-35	-9%	
		Yonge	325	244	-81	-25%	268	-57	-18%	229	-96	-30%	
		Victoria	163	338	175	107%	231	68	42%	313	150	92%	
		Church	549	382	-167	-30%	520	-29	-5%	394	-155	-28%	
	Jarvis	533	476	-57	-11%	573	40	8%	522	-11	-2%		
	Sherbourne	569	536	-33	-6%	445	-123	-22%	414	-154	-27%		
	Parliament	501	540	40	8%	488	-13	-3%	533	33	7%		
			Overall NB	6,922	6,811	-111	-2%	6,059	-864	-12%	5,758	-1,165	-17%
	SB	Bathurst	507	574	67	13%	577	70	14%	581	74	15%	
		Augusta	242	229	-13	-5%	206	-36	-15%	134	-108	-45%	
		Spadina	385	380	-5	-1%	422	37	10%	417	32	8%	
		Spadina	13	13	0	0%	13	0	0%	13	0	-1%	
		Soho	51	52	1	2%	51	1	2%	51	1	1%	
		Beverley	178	147	-31	-18%	191	13	8%	172	-6	-3%	
		John	51	53	2	4%	53	1	3%	53	1	2%	
		McCaul	190	139	-50	-27%	158	-32	-17%	142	-48	-25%	
		St Patrick	175	143	-33	-19%	169	-6	-4%	141	-35	-20%	
		University	1,046	981	-64	-6%	874	-172	-16%	831	-214	-20%	
Bay		200	296	96	48%	160	-41	-20%	175	-25	-12%		
Bay		266	163	-103	-39%	272	6	2%	132	-134	-50%		
Yonge		364	482	118	33%	416	52	14%	437	73	20%		
Victoria		193	244	51	26%	202	9	5%	285	91	47%		
Church	313	318	5	1%	324	11	3%	277	-36	-12%			
Jarvis	638	642	4	1%	488	-150	-24%	563	-76	-12%			
Sherbourne	172	221	49	29%	165	-7	-4%	189	17	10%			
Parliament	385	366	-19	-5%	322	-63	-16%	275	-110	-29%			
		Overall SB	5,369	5,443	74	1%	5,064	-305	-6%	4,867	-503	-9%	
Screenline #8: South of Queen	NB	Bathurst	1,000	1,023	23	2%	706	-294	-29%	646	-353	-35%	
		Portland	218	194	-25	-11%	187	-31	-14%	179	-40	-18%	



Screenline	Direction	Corridor	Existing Base	Queen Full Closure			City Works			All Closures (Optimized)			
			Vol	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	Vol	Vol Diff	% Diff	
	NB	Augusta	116	121	5	4%	120	4	3%	117	1	1%	
		Spadina	896	827	-69	-8%	835	-62	-7%	710	-186	-21%	
		Spadina	13	13	0	2%	13	0	1%	13	0	2%	
		Peter	177	157	-19	-11%	158	-18	-10%	179	3	1%	
		John	299	267	-31	-10%	258	-40	-14%	256	-43	-14%	
		Duncan	150	113	-37	-25%	141	-10	-6%	115	-35	-23%	
		University	1,065	1,190	124	12%	855	-210	-20%	934	-132	-12%	
		York	458	506	48	10%	595	137	30%	533	75	16%	
		Bay	540	419	-120	-22%	526	-14	-3%	287	-252	-47%	
		Yonge	329	249	-80	-24%	280	-49	-15%	244	-85	-26%	
		Victoria	245	405	160	65%	184	-62	-25%	305	60	24%	
		Church	396	344	-52	-13%	410	14	3%	308	-89	-22%	
		Jarvis	589	524	-65	-11%	612	23	4%	560	-29	-5%	
		Sherbourne	339	334	-5	-2%	281	-58	-17%	277	-62	-18%	
	Parliament	642	707	65	10%	626	-16	-2%	678	36	6%		
	Overall NB			7,472	7,395	-77	-1%	6,787	-685	-9%	6,342	-1,130	-15%
	SB	Bathurst	476	537	61	13%	498	21	4%	501	25	5%	
		Portland	150	133	-17	-11%	132	-18	-12%	106	-44	-29%	
		Augusta	43	41	-3	-6%	37	-6	-14%	34	-9	-22%	
		Spadina	386	410	24	6%	482	96	25%	447	61	16%	
		Spadina	13	13	0	0%	13	0	0%	13	0	-1%	
		Peter	109	105	-4	-4%	130	21	19%	111	2	2%	
		John	219	134	-85	-39%	149	-70	-32%	140	-80	-36%	
		Duncan	134	68	-66	-49%	115	-19	-14%	79	-55	-41%	
		Simcoe	299	187	-112	-37%	325	26	9%	191	-108	-36%	
		University	1,081	906	-175	-16%	867	-214	-20%	735	-346	-32%	
		York	45	627	582	1304%	37	-7	-16%	339	294	659%	
		Bay	324	316	-9	-3%	312	-13	-4%	281	-43	-13%	
Yonge		357	477	120	34%	414	57	16%	434	77	21%		
Victoria		246	154	-92	-37%	294	48	20%	189	-57	-23%		
Church	386	461	75	19%	437	51	13%	458	72	19%			
Jarvis	707	724	17	2%	499	-208	-29%	577	-130	-18%			
Sherbourne	200	190	-9	-5%	148	-52	-26%	182	-18	-9%			
Parliament	404	397	-7	-2%	370	-35	-9%	240	-164	-41%			
Overall SB			5,582	5,882	301	5%	5,260	-321	-6%	5,057	-524	-9%	