CITY OF TORONTO

GLEN ROAD PEDESTRIAN BRIDGE AND TUNNEL ENVIRONMENTAL ASSESSMENT STUDY

ENVIRONMENTAL STUDY REPORT

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CITY OF TORONTO

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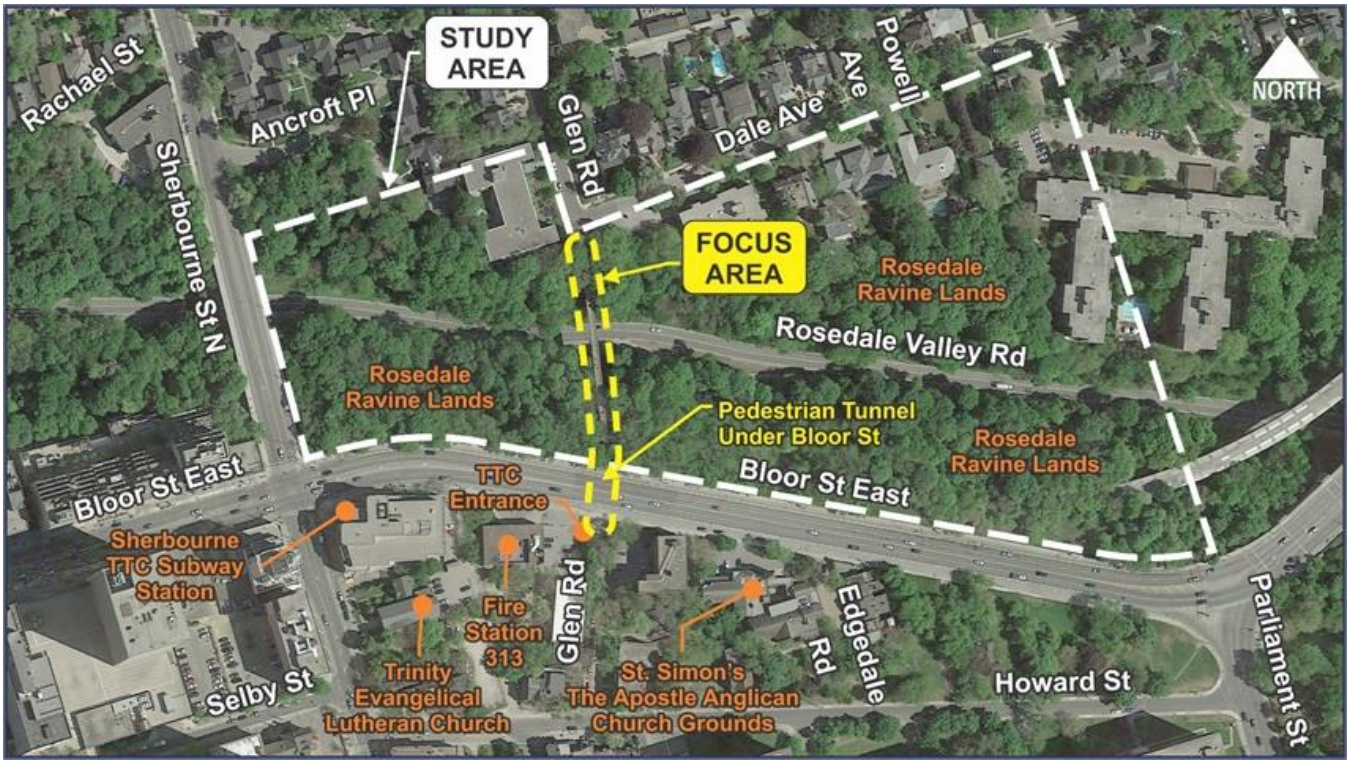
EXECUTIVE SUMMARY

E.1 INTRODUCTION

In the City of Toronto, the Glen Road Pedestrian Bridge extends from Glen Road/Dale Avenue in the north, passing over Rosedale Valley Road and continues as a pedestrian tunnel under Bloor Street East, providing a connection to Glen Road in the south and access to the TTC's Sherbourne Station. The pedestrian bridge and tunnel connect the communities of Rosedale and St. James Town, and are frequently used by local area residents. **Exhibit E-1** illustrates the study area.

The pedestrian bridge was identified as needing major improvements following emergency repairs completed in 2015. There are also ongoing concerns expressed by area residents about personal security in the pedestrian tunnel. Therefore, the City of Toronto has undertaken an Environmental Assessment (EA) Study for improvements to the Glen Road Pedestrian Bridge and Tunnel.

Exhibit E-1: Study Area



Municipal infrastructure projects are subject to the Ontario Environmental Assessment Act (EA Act). The Environmental Assessment (EA) is an approved self-assessment process under the EA Act for a specific group or “class” of projects. Projects are considered approved subject to compliance with an approved EA process. The Municipal Class Environmental Assessment (Municipal Engineers Association October 2000, as amended in 2007, 2011 and 2015) applies to municipal infrastructure projects including roads, bridges, water and wastewater.

The Glen Road Pedestrian Bridge and Tunnel EA Study has been identified as a Schedule 'C' study under the Municipal Class EA (per Appendix 1 – Project Schedules of the Municipal Class EA, Item 30). The main study stages and the associated study schedule, followed Phases 1 to 4 of the Municipal Class EA process.

- Phase 1: identify the problem or opportunity
- Phase 2: identify alternative solutions
- Phase 3: examine alternative methods of implementing the preferred solution
- Phase 4: prepare and file an Environmental Study Report

An Environmental Study Report (ESR) is required for Schedule 'C' projects to document the environmental assessment and decision-making process.

This ESR describes: the problem being addressed, the existing engineering, cultural, social, natural, and environmental considerations, planning and design alternatives that were considered, a description of the recommended alternative and its environmental effects and proposed mitigation measures, and commitments to future work, consultation, and monitoring, associated with the implementation of the project.

The study was carried out under the direction of senior staff of the City of Toronto and managed by WSP on behalf of the City. External technical agencies and stakeholders were consulted throughout the project as well.

E.2 CONSULTATION

The consultation program was extensive and is documented in **Chapter 2** and a detailed consultation report (**Appendix A)**. External agencies (including TRCA and TTC), utilities, emergency service providers, municipalities and other stakeholders, as well as property owners in proximity to the study area were contacted during the study and requested to provide input and to comment on the study findings. The local Councillors and members of the general public were notified of the study through notifications in local newspapers and the City's website, and were invited to contact the project team to join the project mailing list and provide input throughout the study.

Indigenous Community engagement is documented in **Section 2.5**. No Indigenous Community representatives expressed interest in this project.

The Project Team also presented the preliminary recommendations to the Design Review Panel and Toronto Preservation Board.

Key points of contact during the study included

- Notice of Study Commencement / PIC #1 – September 15 and 22, 2016
- PIC #1 – September 28, 2016
- Notice of PIC #2 – October 12, 2017
- PIC #2 – October 24, 2017

E.3 EXISTING CONDITIONS

Chapter 3 provides a summary of the existing conditions in the study area, including socio-economic environment, cultural environment, structural condition of the bridge and tunnel, natural environment, and transportation.

Cultural Environment

A Cultural Heritage Evaluation Report (CHER) was completed, which is provided in **Appendix C**. **Section 3.2.1** provides a summary of the findings in the CHER for the bridge and tunnel.

The first bridge over the Rosedale Ravine was a road bridge related to the opening of South Rosedale for residential development after 1877.

By 1950, the condition of the Glen Road Bridge had significantly deteriorated and the City considered closing it. Council decided to retain the Glen Road Bridge, but close it to vehicular traffic. In 1951, the Glen Road Subway was rebuilt as a pedestrian tunnel. The existing tunnel was built in 1964 during the construction of the Bloor-Danforth TTC Subway. The reconstruction of the Glen Road Pedestrian Bridge, initially identified as the Glen Road South pedestrian bridge, was scheduled for 1973 and completed in 1975.

It is determined that the Glen Road Pedestrian Bridge is of cultural heritage value for contextual reasons. The existing Glen Road Pedestrian Bridge is the third known structure to provide access to South Rosedale at this location. The continued use of the bridge crossing attests to the importance of the connection across the Rosedale Ravine at Glen Road. The bridge, officially renamed the Morley Callaghan Footbridge in 1996, commemorates the noted Canadian author.

The Glen Road Pedestrian Bridge is a rare example of a steel rigid frame bridge with inclined legs in the City of Toronto. Steel rigid frame structures with inclined legs are well suited for river and valley crossings as the angled piers straddled the crossing effectively. The elegant design of this bridge with slender deck, inclined frame sides or “legs” and no intermediate supports is aesthetically pleasing. The bridge has undergone some modifications but retains its original design character. The bridge is a physical and symbolic landmark within the community and acts a gateway to the historic Rosedale community.

Structural Engineering

Pedestrian Bridge

The existing structure is a three span rigid frame steel structure comprising an 89 mm deep laminated timber deck supported by two atmospheric corrosion resistant (ACR) steel plate girders, of variable depth. There are two 29.2 m end spans and one 48.8 m interior span for a total deck length of 107.2 m. The overall width of the bridge is 3.7 m.

The 2014 routine inspection revealed substantial deterioration at a greater rate than expected. Emergency repairs were performed in late 2014 / early 2015 to maintain the structure in a safe condition. Details of the rehabilitation work is documented in **Appendix E**.

The emergency repairs were not intended to be a long-term solution, as corrosion will continue. The estimated remaining life expectancy of the bridge is 5 to 10 years (i.e. replace

between 2020 and 2025). As the bridge continues to age, it is anticipated that extensive rehabilitation work will be required at progressively shorter intervals until such a point that repairs to severely deteriorated primary members are no longer feasible. Moreover, the frequency of on-going maintenance is expected to increase.

Pedestrian Tunnel

The original structure at this location was constructed in 1918 to carry Bloor Street East over Glen Road and consisted of a steel/timber tunnel with a 6.4 m clear span and a 1.7 m wide separated sidewalk. In 1951, Glen Road under Bloor Street East was infilled and the structure was reconstructed as a 1.7 m wide by 2.6 m tall dedicated pedestrian tunnel.

The existing tunnel was subsequently constructed in 1962 and consists of a 26.2 m long rigid frame reinforced concrete box structure with a 2.4 m opening height by 2.9 m clear span with 250 mm thick walls and slabs.

The existing tunnel connects Glen Road (south), Bloor Street East via two staircases on the north and south side, and Glen Road (north) via the pedestrian bridge. The staircases are generally in good condition with evidence of resurfacing.

A site visit was conducted on January 5, 2017 to complete a field investigation and assess the existing condition of the structure. The investigation included a close-up visual assessment of material defects and performance deficiencies, in accordance with the OSIM. The results of the investigation indicated that the tunnel is generally in good condition.

Natural Environment

The study area is located within the Rosedale Extension Environmentally Significant Area (ESA) 62A. The natural feature is 5.1 ha in size and it is characterized as a steep sloped ravine valley dominated by the deciduous forest with Rosedale Valley Road running along the valley floor. A background review and field studies were conducted to characterize existing natural heritage features and functions in support of the EA Study. This included documenting existing vegetation communities and vascular plant species, breeding bird surveys, and identification and evaluation of potential wildlife habitat along with all incidental wildlife observations.

Several overlapping natural heritage features and designated policy areas are present within the Glen Road Pedestrian Bridge study area. These include:

- Natural Heritage System under the City of Toronto Official Plan (2015)
- Rosedale Valley Extension ESA [Site 62A]
- TRCA Regulation 166/06 Lands
- TRCA Terrestrial Natural Heritage System

During the field survey conducted in 2016, a total of 52 plant species were recorded within the study area. No plant SAR or SCC are present within the study area.

Mammal observations, including sightings and evidence of use (e.g. browse, tracks / trails, scat and burrows) were recorded during all field surveys. Observations of potential suitable bat

maternity roosting habitat (cavity / snag trees, structures) within the study area were also noted.

E.4 NEED AND JUSTIFICATION (PHASE 1)

The Glen Road Pedestrian Bridge was identified as needing major improvements following emergency repairs completed in 2015. There are also ongoing concerns expressed by area residents about personal security in the pedestrian tunnel.

E.5 ALTERNATIVE SOLUTIONS (PHASE 2)

Chapter 5 documents the development and evaluation of alternative solutions considering all active transportation users on the pedestrian bridge, and opportunities to improve security in the tunnel area.

Alternative solutions were assessed against their ability to reasonably address the problems and opportunities, usually based on criteria related to the socio-economic, cultural and natural environment, technical, transportation, and cost. These evaluation criteria were refined with input from stakeholders including the public.

Bridge

Four alternative solutions were considered to address the deteriorating condition of the Glen Road Pedestrian Bridge as follows:

- Alternative 1: Do Nothing
- Alternative 2: Rehabilitate the Existing Bridge
- Alternative 3: Replace Bridge in Same Location
- Alternative 4: Replace Bridge in Different Location

The recommended bridge alternative solution is to replace the bridge in the same location. This addresses the long term needs of the bridge, maintains the heritage crossing, and maintains connections to active transportation and transit facilities. It also provides an opportunity to mitigate impacts to the cultural heritage value of the structure by maintaining the existing pedestrian crossing, and provides opportunities to improve urban design elements.

Tunnel

Three alternative solutions were considered for the tunnel as follows:

- Alternative 1: Do Nothing
- Alternative 2: Aesthetic Modifications
- Alternative 3: Replace and Reconstruct a Wider Tunnel

The recommended tunnel alternative solution is to replace and reconstruct a wider tunnel. This provides the best potential to improve natural surveillance around the tunnel by increasing sightlines between the bridge, tunnel, and Glen Road, and the best opportunity to accommodate future increase in active transportation traffic. With the reconstruction of the

tunnel, it also provides the best opportunity to enhance the urban design features in the area with wider tunnel and larger landing areas.

E.6 DESIGN ALTERNATIVES (PHASE 3)

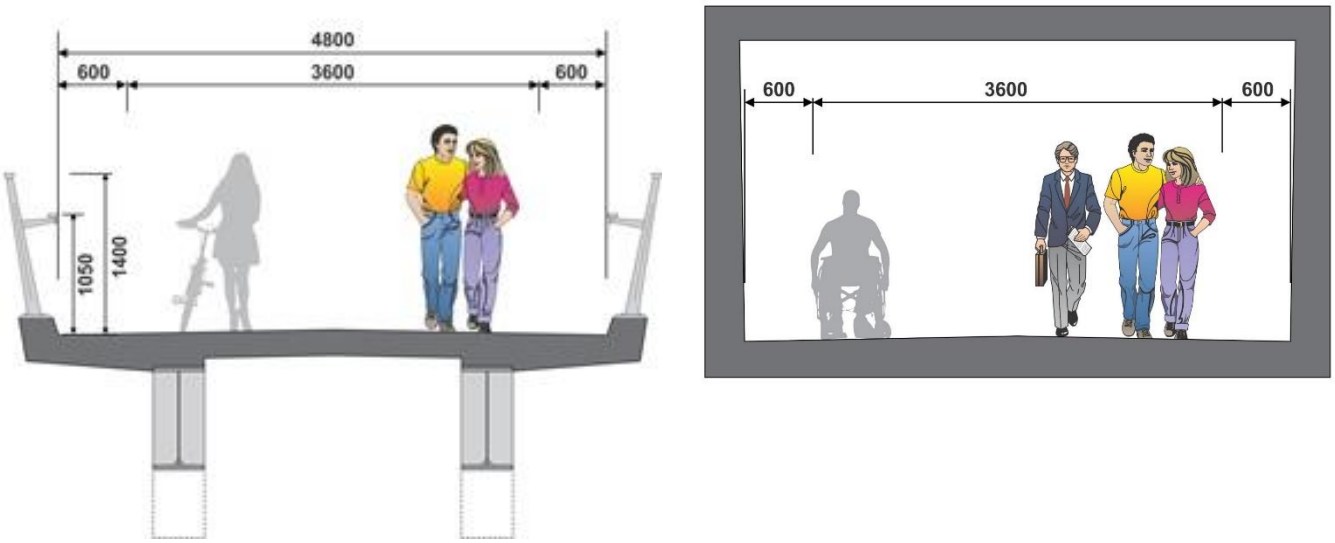
Typical Cross-Section

The Toronto Multi-Use Trail Design Guidelines (2015) consider three types of trails (Secondary, Primary, and High-Capacity), and indicates the minimum, default, and exemplary cross-section elements for each type. Alternate cross-section widths were considered for assessment including 3.9 m (Secondary Trail), 4.2 m (Primary Trail), and 4.8 m (High-Capacity Trail), which are based on the minimum widths for each type of trail. All alternatives included 0.6 m buffer space on each side with a centre path of varying widths, per the Guidelines.

Although the bridge and tunnel are not specifically designated as part of the multi-use trail network, it is considered a High-Capacity Trail due to the volume of pedestrian and cyclist traffic, the wide variety of users, and available destinations including the TTC station and shopping centres. The bridge itself is also considered a destination for users to stop and look over the Rosedale Valley. Thus a 4.8 m width is recommended.

Exhibit E-2 illustrates the proposed cross-section for the bridge and tunnel which includes a 3.6 m center multi-use trail and 0.6 m buffer on each side (totalling 4.8 m).

Exhibit E-2: Recommended Bridge and Tunnel Cross-Section



Bridge Types

The bridge type design alternatives (illustrated in **Exhibit E-3**) were considered based on the study area topography and ability to be sympathetic to the cultural heritage value of the existing bridge, and include the following:

- Alternative 1: Steel Girder with Two Inclined Steel Legs
- Alternative 2: Steel Girder with Two Vertical Concrete Piers

— Alternative 3: Post Tensioned Concrete Box Girder with Two Vertical Concrete Piers

Alternative 1 was identified as the preferred alternative because the bridge design is sympathetic to the cultural heritage value of the existing bridge by maintaining the existing bridge type and location and view from Rosedale Valley. Even though it would have slightly more impacts to the natural environment during construction compared to other alternatives, mitigation measures will be developed to minimize impacts where feasible.

Tunnel Design

The preferred tunnel alternative solution was to reconstruct a wider tunnel. Three tunnel design alternatives (illustrated in **Exhibit E-4**) were considered, including:

— Alternative 1: Reconstruct and Widen Tunnel to the West

— Alternative 2: Reconstruct and Widen Tunnel to Match Glen Road Alignment (to the East)

— Alternative 3: Reconstruct Tunnel on New Alignment (Match North End of Bridge to South End of Tunnel)

Alternative 1 was identified as the preferred alternative as it would provide an improvement to the natural surveillance through the tunnel and would have less impact to existing underground utilities compared to other alternatives.

Exhibit E-3: Renderings of the Bridge Type Design Alternatives

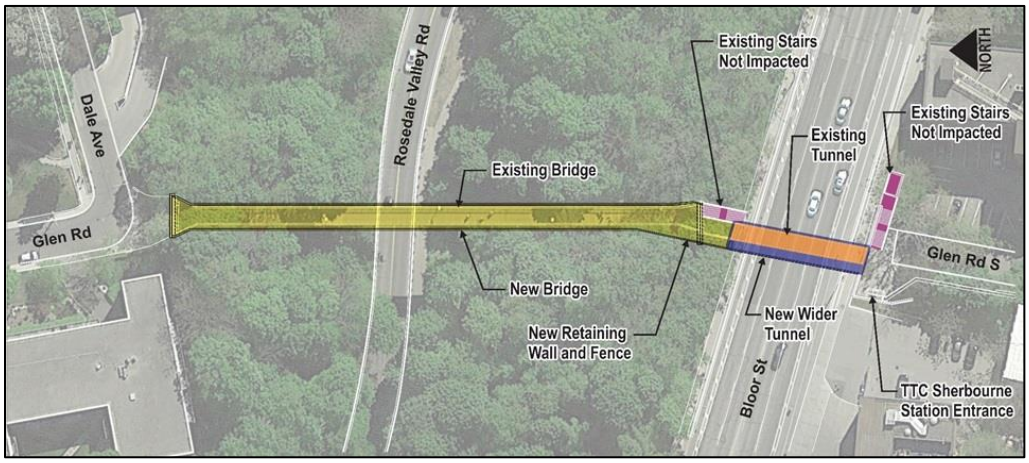
Alternative 1: Steel Girder with Two Inclined Steel Legs (Recommended)

Alternative 2: Steel Girder with Two Vertical Concrete Piers

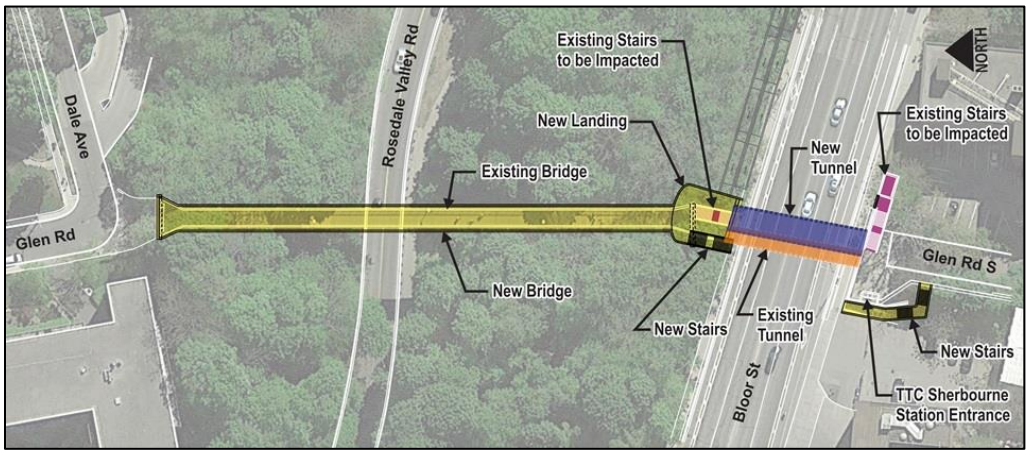
Alternative 3: Post Tensioned Concrete Box Girder with Two Vertical Concrete Piers

Exhibit E-4: Renderings of the Tunnel Widening Design Alternatives

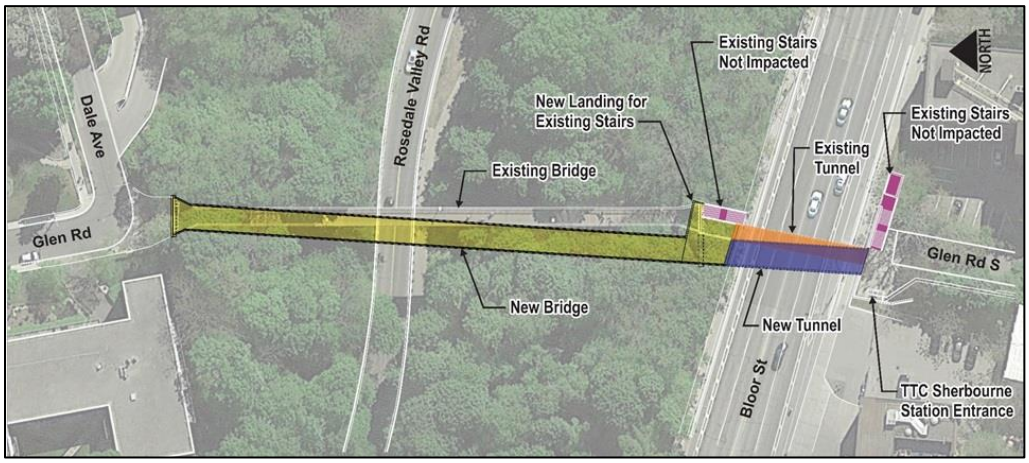
Alternative 1: Reconstruct and Widen Tunnel to the West (Recommended)



Alternative 2: Reconstruct and Widen Tunnel to Match Glen Road Alignment (to the East)



Alternative 3: Reconstruct Tunnel on New Alignment (Match North End of Bridge to South End of Tunnel)



E.7 PRELIMINARY RECOMMENDED PLAN (PHASE 4)

Chapter 7 documents the Preliminary Recommended Plan for the Glen Road Pedestrian Bridge and Tunnel which includes the following:

- **Replace the existing Glen Road Pedestrian Bridge with a new steel-girder structure with steel inclined legs; and**
- **Replace the existing pedestrian tunnel with a new wider tunnel (widen to the west)**
- **A 4.8 m cross-section for the bridge and tunnel including a 3.6 m center multi-use trail and 0.6 m buffers on each side.**

Exhibit E-5 illustrates the overall concept plan for the bridge and tunnel to be described in the following Sections.

Exhibit E-5: Overall Bridge and Tunnel Preliminary Recommended Plan

As outlined in **Section 3.8**, there are a number of existing utilities located in proximity to the tunnel and down in the Rosedale Valley in proximity to the bridge, including Bell, water, hydro, gas, and sanitary. Based on the utility information obtained through field investigations, potential areas of conflict have been identified as noted in **Section 7.5**.

Construction Staging

The Glen Road Pedestrian Bridge and adjacent tunnel will be closed for the duration of construction to allow for the removal of the existing and construction of the new bridge and tunnel. A typical bridge replacement of this type is estimated to take 4 to 5 months. Additional factors prior to construction that may impact the schedule include tree removals and utility relocation, if required. These may take an additional 6 to 12 months depending on the number of tree removals and type of utility relocations.

The typical construction duration for the tunnel, assuming a cast-in-place construction, is estimated to be 5 to 6 months; however, in order to reduce the duration of construction and lane reductions on Bloor Street East, a pre-fabricated structure could be used instead of the cast-in-place. The pre-fabricated option would only be beneficial if the bridge and tunnel were constructed separately, as only then would it be beneficial to reduce the tunnel construction period.

In general, based on the traffic analysis carried out as part of the EA Study, the lane closure proposed for the construction staging of the tunnel is expected to have minimal impact on the traffic operation on Bloor Street East and adjacent intersections. One lane in each direction on Bloor Street East will be maintained, as well as both bike lanes and one sidewalk. There will be no pedestrian access to the bridge, tunnel, or staircases during the removal and replacement of the bridge and tunnel.

Construction of both structures concurrently would result in efficiencies in minimizing traffic impacts and shared work zone/staging areas. The total duration of concurrent construction is estimated to be 7 to 8 months, approximately a single construction season, not including advanced activities such as tree removals and utility relocation. This is subject to priority of infrastructure projects and funding availability at the City.

Preliminary Construction Cost Estimate

The preliminary construction cost estimate for the bridge is $7.2 M, including new structure, removal of existing structure, site access, traffic control, staging, landscaping etc.

The preliminary construction cost estimate for the tunnel is $3.3 M, including cast-in-place structure, removal of existing structure, traffic control, staging, etc. For the pre-fabricated structure, the estimated cost is $3.9 M.

Property Requirements

No permanent property is required for the Preliminary Recommended Plan. Temporary easements may be required during the construction of the bridge and tunnel, which will be identified during detail design.

Preliminary Design (General Arrangement)

The General Arrangement Drawings for the bridge and tunnel are provided in **Section 7.3**.

Urban Design

Urban design aspects of the bridge and tunnel including materials, colour pallete, and lighting have been discussed at a high level during this study to provide guidance for future work, but will be confirmed during detail design.

Based on principles of Crime Prevention Through Environmental Design (CPTED), and public feedback, the urban design for the bridge and tunnel should provide for improved natural surveillance, and create a sense of place for the community and users.

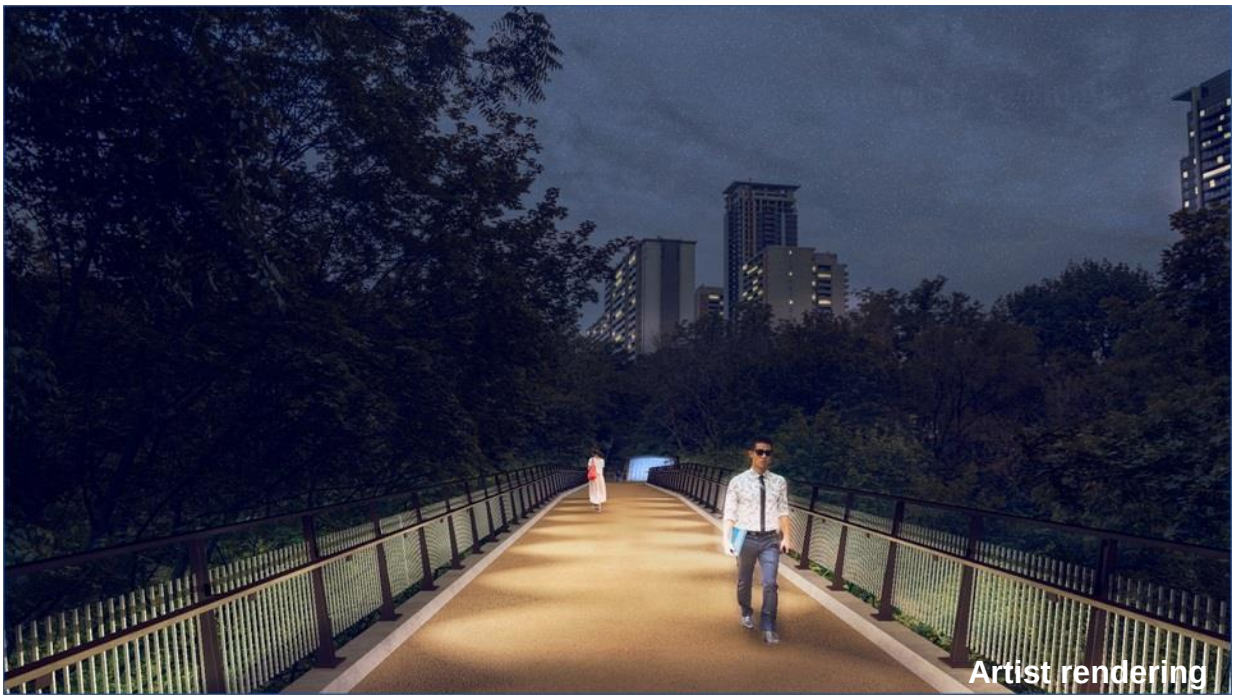
Exhibit E-6 illustrates artist renderings generated to represent a potential design of the future bridge and tunnel. These renderings were generated to provide a sense of the new bridge and tunnel; however, as noted above, the deck, materials, lighting, and colour palette will be

confirmed during detail design, and the concept renderings below do not represent the final design.

Exhibit E-6: Concept Artist Renderings

On Bridge Looking South to Tunnel

On Bridge Looking South to Tunnel at Night



In Tunnel Looking North to Bridge

On Glen Road Looking North to Tunnel

On Glen Road Looking North to Tunnel and TTC Entrance

E.8 IMPACTS, MITIGATIONS AND COMMITMENTS TO FUTURE WORK

Potential impacts, concerns, recommended mitigations, commitments to future works, and other permits and approvals for the Preliminary Recommended Plan are outlined in **Chapter 8**, and summarized in **Table 8-1**.

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1 INTRODUCTION

In the City of Toronto, the Glen Road Pedestrian Bridge extends from Glen Road/Dale Avenue in the north, passing over Rosedale Valley Road and continues as a pedestrian tunnel under Bloor Street East, providing a connection to Glen Road in the south and access to the TTC's Sherbourne Station. The pedestrian bridge and tunnel connect the communities of Rosedale and St. James Town, and are frequently used by local area residents.

The Glen Road Pedestrian Bridge was identified as needing major improvements following emergency repairs completed in 2015. Given the age of the bridge and the cultural heritage value potential, the City of Toronto has undertaken a Schedule C Environmental Assessment (EA) Study to identify options for addressing the condition of the pedestrian bridge and improvements to the tunnel.

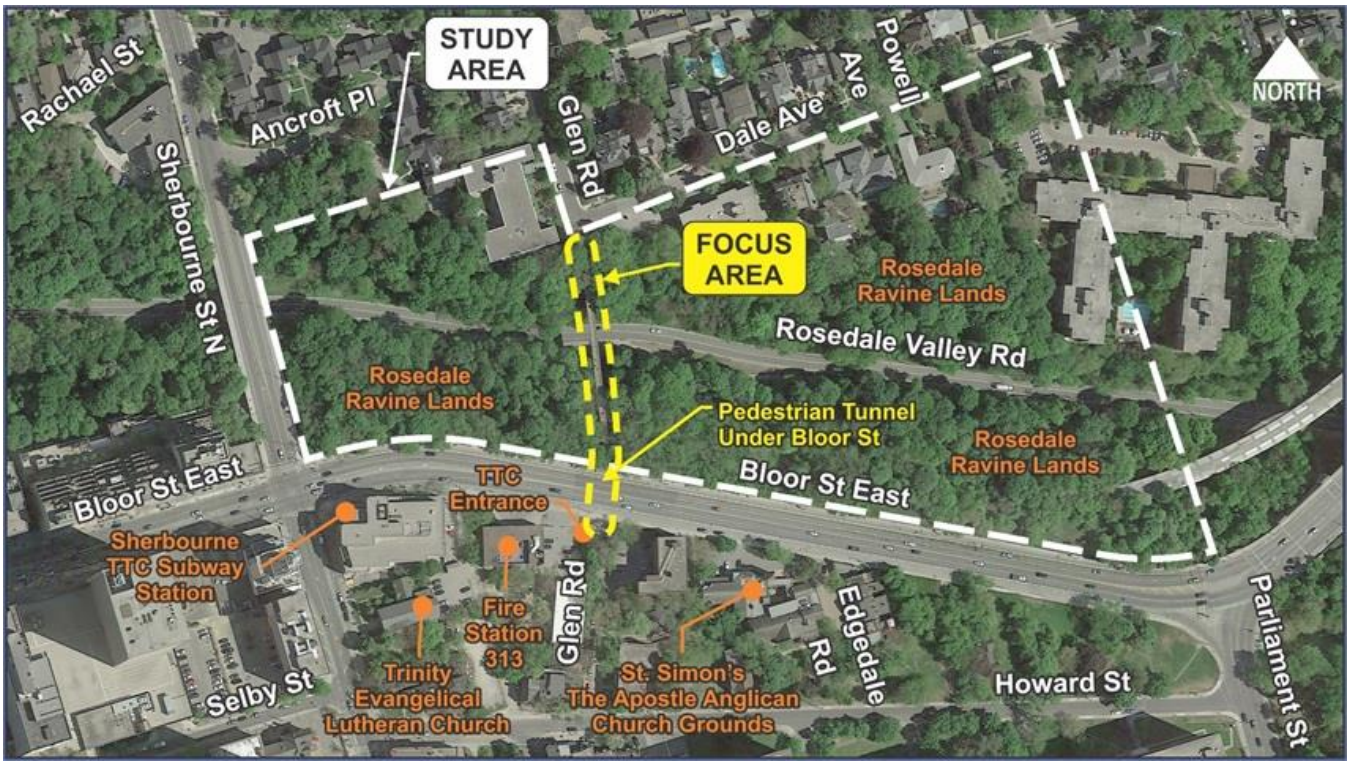
1.1 STUDY AREA

The Glen Road Pedestrian Bridge is located on the north side of Bloor Street East just east of Sherbourne Street. The pedestrian tunnel is located under Bloor Street East connecting the bridge and Glen Road south of Bloor Street East. The Study Area is within City Wards 27 and 28, Toronto Centre-Rosedale.

The pedestrian bridge and tunnel connects Glen Road/Dale Avenue north of the Rosedale Valley, to Glen Road south of Bloor Street East. The tunnel connects to the south side of the bridge and extends underneath Bloor Street East to Glen Road. Connection from the bridge and tunnel to Bloor Street East are provided by staircases located north and south of Bloor Street East.

Exhibit 1-1 illustrates the Study Area, and key features within the surrounding properties.

Exhibit 1-1: Study Area



1.2 ENVIRONMENTAL ASSESSMENT PROCESS

1.2.1 ONTARIO ENVIRONMENTAL ASSESSMENT ACT

Municipal infrastructure projects are subject to the Ontario Environmental Assessment Act (EA Act). The Environmental Assessment (EA) is an approved self-assessment process under the EA Act for a specific group or "class" of projects. Projects are considered approved subject to compliance with an approved EA process. The Municipal Class Environmental Assessment (Municipal Engineers Association October 2000, as amended in 2007, 2011 and 2015) applies to municipal infrastructure projects including roads, bridges, water and wastewater.

1.2.2 MUNICIPAL ENVIRONMENTAL ASSESSMENT PROCESS

The Municipal EA outlines a comprehensive planning process that provides a rational approach to consider the environmental and technical advantages and disadvantages of alternatives and their trade-offs in order to determine a preferred alternative for addressing the problem (or opportunity), as well as consultation with agencies, directly affected stakeholders and the public throughout the process. The key principles of successful environmental assessment planning include:

- Consultation;
- Consideration of a reasonable range of alternatives;
- Consideration of effects on natural, social, cultural, and economic environments and technical components;
- Systematic evaluation;
- Clear documentation; and
- Traceable decision making.

Providing that the EA planning process is followed, a proponent does not have to apply for formal approval under the EA Act.

The EA process is shown on **Exhibit 1-2** and includes:

- Phase 1: identify the problem or opportunity
- Phase 2: identify alternative solutions
- Phase 3: examine alternative methods of implementing the preferred solution
- Phase 4: prepare and file an Environmental Study Report
- Phase 5: proceed to detail design, construction and operation

The classification of projects and activities under the EA process is as follows:

Schedule A: Includes normal or emergency operational and maintenance activities, which are limited in scale and have minimal adverse environmental effects. These undertakings are pre-approved and the proponent can proceed without further assessment and approval.

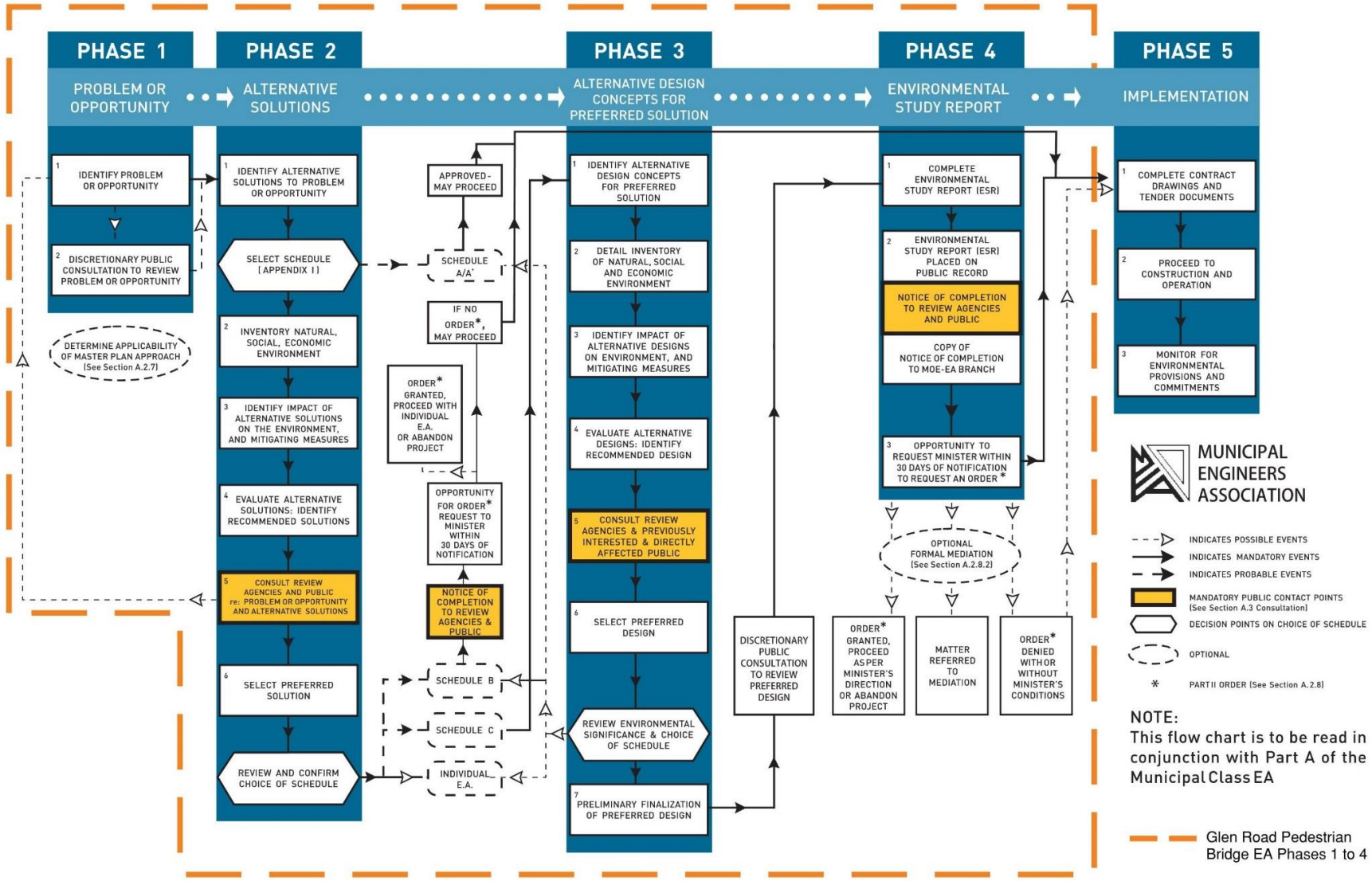
Schedule A+: Introduced in 2007, these projects are also pre-approved. The public is to be advised prior to the implementation of the project.

Schedule B: Includes projects that have the potential for adverse environmental effects. This includes improvements and minor expansions of existing facilities. These projects are approved subject to a screening process which includes consulting with stakeholders who may be directly affected and relevant review agencies.

Schedule C: Includes the construction of new facilities and major expansions to existing facilities. These undertakings have the potential for significant environmental effects and must proceed under the full planning and documentation procedures outlined in the Municipal Class EA document.

The Glen Road Pedestrian Bridge and Tunnel EA Study has been identified as a Schedule ‘C’ study under the Municipal Class EA (per Appendix 1 – Project Schedules of the Municipal Class EA, Item 30). An Environmental Study Report (ESR) is required for Schedule ‘C’ projects to document the environmental assessment and decision-making process.

Exhibit 1-2: Municipal Environmental Assessment Process



1.2.3 ENVIRONMENTAL STUDY REPORT

This ESR documents the process followed to determine the recommended undertaking and the planning, preliminary design and high level construction staging of the proposed Glen Road Pedestrian Bridge and Tunnel improvements. It describes: the problem being addressed, the existing engineering, cultural, social, natural, and environmental considerations, planning and design alternatives that were considered, a description of the recommended alternative and its environmental effects and proposed mitigation measures, and commitments to future work, consultation, and monitoring, associated with the implementation of the project.

For further information on the Municipal Class EA process, readers are referred to the Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015). The Consultant and City of Toronto Project Managers for this EA Study are also available to discuss this information and can be contacted as follows:

Heather Templeton, P.Eng. Consultant Project Manager WSP 610 Chartwell Road, Suite 300 Oakville, ON L6J 4A5 Tel: 905-823-8500 Email: Heather.Templeton@wsp.com	Lorna Zappone Project Manager City of Toronto, Infrastructure Planning 100 Queen Street West, 22nd Floor, East Tower Toronto, ON M5H 2N2 Tel: 416-392-8650 Email: Lorna.Zappone@toronto.ca

Construction timing for the proposed undertaking is subject to funding allocation. Should selected components of the proposed improvements contemplated by this EA study be implemented over a longer term, it is possible that minor modifications to the recommended undertaking and its impacts on the environment will be identified during future detail design phase. However, these modifications are not anticipated to change the intent of the undertaking. It is expected that any additional impacts to the environment would be addressed through standard mitigating measures, recommended during detail design.

As required by the Municipal Class EA, this ESR is being made available to stakeholders, regulatory agencies, Indigenous communities and the general public for a 45-calendar-day review period. A notice of ESR submission was placed in local newspapers and letters were mailed to notify government agencies, affected property owners and members of the public on the study mailing list. During the review period, parties with outstanding issues are encouraged to bring their project concerns to the attention of the City of Toronto and/or the Consultant Project Manager for resolution.

1.2.4 PART II ORDER

Concerns that are raised during the 45-calendar-day review period that cannot be resolved through discussions with the City, stakeholders, agencies, Indigenous communities or members of the public may request the Minister of the Environment and Climate Change to issue a Part II Order (also referred to as a ‘bump-up’) for the project, thereby requiring an elevated scope of study.

A Part II Order request requires submission of a written request to the Minister of the Environment and Climate Change, prior to the end of the 45-calendar-day review period, outlining the unresolved issue and requesting the Minister to review the matter. Part II Order requests are submitted to:

The Honourable Chris Ballard
Minister of the Environment and Climate Change
77 Wellesley Street West, Floor 11
Toronto, Ontario M7A 2T5
Fax: 416-314-8452
minister.moecc@ontario.ca

Copies of the request must also be sent to the City of Toronto Project Manager (at the address provided above) and Director of the Environmental Approvals Branch at the Ministry of the Environment and Climate Change (MOECC) at the address below:

Director, Environmental Approvals Branch
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
EAASIBgen@ontario.ca

The decision on whether a Part II Order (bump-up) is appropriate or necessary rests with the Minister of the Environment and Climate Change. It is recognized that resolution of concerns directly between the proponent and the person or party raising the concern is always preferable. If, following a request having been made, the proponent has satisfied the concerns of the requester, it is the requester responsibility to withdraw the request. Such withdrawals should be in writing to the Minister and should be copied to the proponent.

If no Part II Order requests are outstanding by the end of the 45-calendar-day review period, the project is considered to have met the requirements of the EA, and the City may proceed to subsequent phases of design and construction subject to meeting any commitments documented in this ESR and obtaining the necessary environmental approvals.

For further information regarding Part II Order requests, including the process and criteria, please go to:

https://www.ontario.ca/environment-and-energy/class-environmental-assessments-part-ii-order

1.2.5 CANADIAN ENVIRONMENTAL ASSESSMENT ACT

The new Canadian Environmental Assessment Act, 2012 (CEAA 2012) and associated regulations came into effect on July 6, 2012. Under CEAA 2012, a federal environmental assessment is required of “designated projects.” A designated project includes one or more physical activities (such as construction, operation or decommissioning of a new railway or highway in a wildlife area, construction of a new damn), that are set out in the regulations under CEAA 2012 or by order of the federal Minister of Environment.

The scope of the Glen Road Pedestrian Bridge and Tunnel EA Study was reviewed against the federal Regulations Designating Physical Activities, and it was determined that the study is not

“designated” and therefore will not require consideration of a federal environmental assessment.

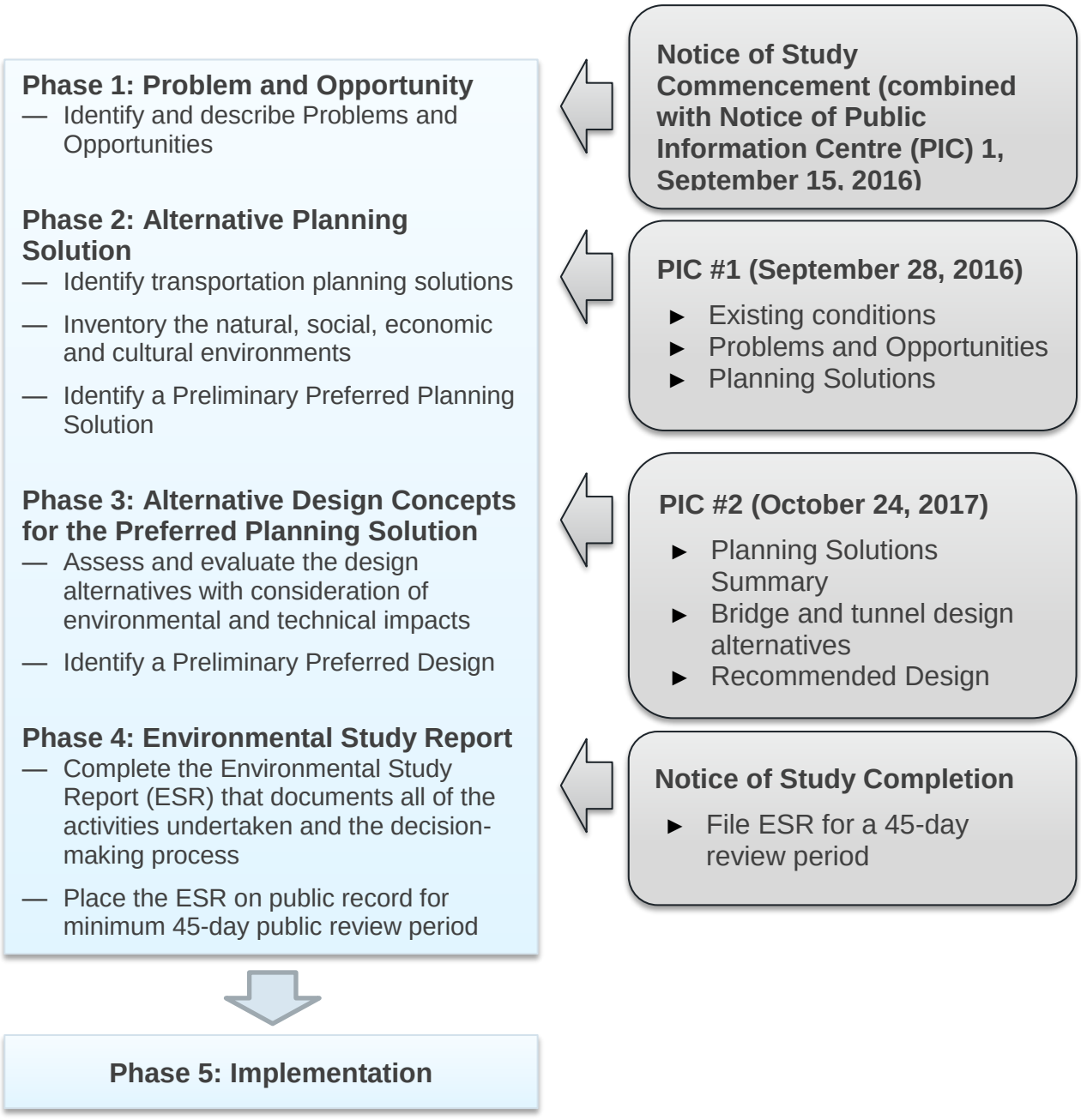
However, the project may still require federal permits / approvals to meet the requirements of other federal legislation (e.g., Federal Fisheries Act Authorization). Any required federal approvals would typically be identified during the EA and obtained during the subsequent design phases.

1.3 STUDY APPROACH

In order to fulfill the EA requirements and to ensure a thorough understanding of the problem being addressed, the alternatives considered and their associated potential environmental impacts and mitigation measures, and to enable consultation with the public and technical agencies, the study followed the EA process as shown in **Exhibit 1-2**.

Given that this is a Schedule C project, the main study stages (Phases 1 to 4 of the Municipal Class EA process) and the associated study schedule are shown in **Exhibit 1-3**.

Exhibit 1-3: Glen Road Pedestrian Bridge and Tunnel EA Study Approach



1.4 STUDY ORGANIZATION

The study organization reflects the general administrative and technical needs of the study as well as the study consultation program. The latter has been developed to ensure that all of those with a potential interest in the study have the opportunity to participate and provide input during the process. The study organization is further described below.

1.4.1 CORE PROJECT TEAM

The study was carried out under the direction of senior staff of the City of Toronto and managed by WSP on behalf of the City. The Core Project Team was comprised of City and Consultant staff:

City Division	Staff Name	City of Toronto Department
Transportation Services	Jeffrey Dea	Manager, Infrastructure Planning
	Lorna Zappone	Project Manager, Infrastructure Planning
	Fiona Chapman	Public Realm/Ped. Projects, Transportation
	Tabassum Rafique	Traffic Planning, Transportation
	Saikat Basak	Cycling, Transportation
	Ann Khan	Traffic Operations, Transportation
	Lukasz Pawlowski	Transportation Services
Planning	Mary MacDonald	Heritage Preservation Services, Planning
	Ragini Dayal	Heritage Preservation Services, Planning
	Eddy Lam	Transportation Planning
	Lara Tarlo	Urban Design, Planning
	Jamie McEwan	Community Planning
Public Consultation	Jason Diceman	Public Consultation
Community Planning	Jason Brander	Community Planning
Engineering and Construction Services	Sun Wai Lee	Bridges & Structures

1.4.2 CONSULTANT TEAM

The team of consultant specialists and their associated roles included:

WSP	Heather Templeton, P.Eng.	Project Management
	Katherine Jim, P.Eng.	EA requirements
	Jay Goldberg, P.Eng.	Project Engineer
	Max Nie, P.Eng.	Structural Engineering
	Dwayne West	Municipal Infrastructure

	Dave McLaughlin , BA, MES, MCIP, RPP	Active Transportation
	Kristen Harrison	Natural Environment
	Vasantha Wijeyakulasuriya, P.Eng.	Geotechnical Review
	Keyur Shah, P.Eng.	Transportation Analysis
Unterman McPhail Associates	Richard Unterman	Cultural Heritage Assessment
New Directions Archaeology Ltd.	Phil Woodley	Archaeological Assessment
DTAH	Mark Langridge	Landscape Architects

1.4.3 TECHNICAL ADVISORY COMMITTEE (TAC)

The Technical Advisory Committee members included:

Staff Name	Organization/Department
Nicholas Trevisan	City of Toronto Ravines and Natural Features Protection
Roger Browne	City of Toronto Traffic Management Centre / Traffic Safety
Jaime Aldana	Toronto Water
Jeffrey Peck	City of Toronto Facilities Management
Shalin Yeboah	City of Toronto Major Capital Infrastructure Coordination
Titus Joseph	City of Toronto Traffic Safety
Shad Hussain	City of Toronto Water Infrastructure Management
Brian Mercer	City of Toronto, Parks, Forestry and Recreation
Randy Jones	City of Toronto, Parks, Forestry and Recreation
Daniel Brent	TRCA
Bruna Peloso	TRCA
Rob Gillard	TTC
Mary-Ann George	TTC

2 CONSULTATION

Consultation is a key component of an EA Study. For the Glen Road Pedestrian Bridge and Tunnel EA Study, consultation was carried out in accordance with Schedule C of the Municipal Class Environmental Assessment. This chapter summarizes comments received and consultation events with members of the public, relevant technical agencies, utilities and Indigenous Communities. A detailed consultation report is provided in **Appendix A**.

2.1 KEY POINTS OF CONTACT

External agencies, utilities, emergency service providers, and property owners adjacent to the study area were contacted directly at key points during the study and requested to provide input to the study and feedback on the decision-making process. The key points of contact are listed in **Table 2-1**.

Notification of the study to property owners, agencies, utilities and Indigenous Communities included a copy of the Notice of Study Commencement. Flyers were delivered by Canada Post Unaddressed AdMail to the area surrounding Glen Road Pedestrian Bridge, bounded by Wellesley Street East, Jarvis Street, and Parliament Street in the south side, and all of South Rosedale east of Jarvis Street in the north; i.e., south of the Craigleigh Gardens ravine, and west of Bayview Avenue. See map of notification area in the Consultation Report (**Appendix A**).

Two Public Information Centres (PICs) were held during the EA Study; one on September 28, 2016 and the other on October 24, 2017. Each PIC notice was placed in the City Centre Mirror newspaper prior to the event, along with flyer circulated and email messages sent to the project mailing list and provide input throughout the study.

All members of the general public were notified of the study through notifications in the local newspapers and the City's website, and were invited to contact the project team to join the project mailing list (subscribers numbered between 400 and 450 throughout the life of the project). Members of the public requesting to be on the mailing list received direct notification of subsequent study milestones at the key points of contact listed in **Table 2-1**.

Notices and study materials (e.g. PIC displays) were also posted on the City of Toronto project website (*toronto.ca/glen-rd-ped-bridge*). Direction to the project website was provided in all notice materials.

Members of the general public who had not requested to be added to the project mailing list were still informed of key project milestones through newspaper notices, flyers, and City website postings.

The comments received from the public are summarized in **Section 2.2** of the ESR and are included in **Appendix A**.

Table 2-1: Key Points of Contact

Date	Notification	Purpose
Notice of Study Commencement / PIC #1 **(published September 15 and 22, 2016)**	Letter/email sent to agencies, Indigenous Communities, and interested stakeholders Email sent to 400 to subscribers on September 14 and 21, 2016 Project website; display panels and comment form online September 14, 2016 Newspaper ad, flyer published in the City Centre Mirror newspaper on September 15 and 22, 2016 13,300 flyers distributed to property owners in the adjacent community	To introduce and invite participation in the study and to request any preliminary comments or pertinent information. Invite interested parties to attend the first PIC on September 28, 2016 to review information and provide input regarding: the problem and opportunities being addressed, the collection of background information, and the evaluation of planning alternatives.
Notice of PIC #2 **(published October 12, 2017)**	Letter/email sent to agencies, Indigenous Communities, and interested stakeholders Email sent to 440 subscribers on October 11, 2017 Project website; display panels and comment form online October 24, 2017 Newspaper ad, flyer published in the City Centre Mirror newspaper on September 15 and 22, 2016 13,800 flyers distributed to property owners in the adjacent community	To notify and invite interested parties to attend the second PIC on October 24, 2017 to review information and provide input regarding: the assessment and evaluation of alternatives and the Preliminary Recommended Plan.

2.2 PUBLIC CONSULTATION

Public consultation for this study was carried out from June 14, 2016 to November 7, 2017, including notices, online survey, public information centres, email correspondence, and other communication activities.

Prior to Notice of Commencement, the team engaged with local stakeholders and bridge users through an online survey and Walk-Shop (walking workshop meeting). This was followed by two points of public consultation (as noted in **Table 2-1**), meeting the Environmental Assessment requirements. A presentation to the City of Toronto Design Review Panel, which invites public audience, was also included.

The public consultation was conducted online and offline. **Table 2-2** is a summary table of the additional public consultation activities completed during this study, followed by further details of key engagement techniques used.

Table 2-2: Additional Public Consultation Activities

	Notification	Meetings	Online
Pre-EA	— Promotional sign on the bridge from June 22 to August 20, 2016 — Email outreach to stakeholder groups sent June 14, 2016	— Stakeholder Walk-Shop on June 23, 2016	— Bridge User Online Survey June 22 to August 20, 2016
Design Review Panel (DRP)	— Email invitation to attend DRP sent to 430 subscribers on July 14, 2017. — DRP slides online and emailed to 448 subscribers on August 4, 2017.	— Study presented at DRP meeting July 18, 2017	— Slides presented to DRP posted online as of August 4, 2017

Starting in June 2016, the project web page hosted introductory information materials and links to related projects. At each phase of public consultation, the web page was updated with complete copies of materials presented at public meetings. The web page URL was as follows:

toronto.ca/glen-rd-ped-bridge

Throughout the study, interested members of the public were invited to subscribe to the project email list:

— Using a form on the study web page

— Within the initial bridge user survey

— At public meetings

— Whenever contacting the public consultation staff for the study

Subscribers numbered between 400 and 450 throughout the life of the project, and were primarily collected through the initial bridge user survey.

Messages promoting the public consultations were also shared by email and on social media by the local Councillors' offices, local resident associations, and interested advocacy groups and residents.

Advertisements for each PIC were placed in the City Centre Mirror newspaper prior to the event.

2.2.1 BRIDGE USER ONLINE SURVEY AND STAKEHOLDER WALK-SHOP

Prior to formal Notice of Commencement for the study, the City conducted two main activities to gain insight in to local community perceptions of the existing Glen Road Pedestrian Bridge.

From June 22 to August 20, 2016, the City hosted a short online survey on the topic: “Why do you cross the Glen Road Pedestrian Bridge?”

The survey was advertised with two signs physically posted on the bridge (**Appendix A**), and also circulated by email by the South Rosedale Resident Association.

Over 540 completed responses were received from the online survey. A summary of information from this survey was included in the display materials for PIC #1 and provided in **Appendix A**.

On June 27, 2016, the City hosted a walking-workshop (‘Walk-shop’) with 18 representatives of local resident associations, active transportation groups, and community. The goal of the meeting was to facilitate discussion of the bridge, its’ heritage features, and role in the local community.

Representatives from the following associations were invited to participant in the Stakeholder Walk-Shop:

— South Rosedale Ratepayers Association

— Multi-residential buildings within South Rosedale

— Bloor East Neighbourhood Association

— Working group for the St. James Town development project

— St. Simon-the-Apostle Anglican Church

— Upper Jarvis Neighbourhood Association

— Toronto Historical Association

— Cycle Toronto Ward 27/28

— Walk Toronto

— St. James Town network

— Toronto Community Housing, St. James Town

Overall, participants appreciated the opportunity to learn and share their perspectives on the bridge and tunnel. A summary of the Walk-shop is included in the **Appendix A**.

2.2.2 PUBLIC INFORMATION CENTRE #1

Public Consultation for Phase 1-2 of this EA (i.e. identification of problem and opportunity, and alternative solutions) was conducted both online and in-person. Display panels prepared for the PIC #1 were posted online, and invited feedback at the time of public notification starting September 14, 2016.

The PIC event was held on September 28, 2016 at the St. Paul's Church on Bloor Street East (drop-in open house).

A total of 73 participants signed in at PIC #1, 14 hard copy and 42 online feedback forms, and 11 emails were received by the end of the comment period on October 14, 2016. The overall feedback was:

— Consistent support for replacing the bridge in its current location, with general preference for a similar simple design;

— Desire for personal security improvements in and around the tunnel connection; and

— Competing views on whether cycling should be accommodated and if so, should cycling be separated.

A copy of the PIC #1 displays and an aggregate list of all comments received is provided in **Appendix A**.

2.2.3 PUBLIC INFORMATION CENTRE #2

For public consultation in Phase 3 of this EA (i.e. alternative design concepts for preferred solution), a brief text description and artist renderings of the proposed bridge design concept were included in the flyer, web page and email update on October 17, 2017, providing opportunity for public feedback on these key recommendations, prior to the event.

PIC #2 was held on October 24, 2017 at the St. Paul's Church on Bloor Street East (drop-in open house). Display panels from PIC #2 were posted online a few hours prior to the event.

A total of 44 participants signed in at PIC #2, 8 feedback forms and 14 emails were received by the end of the comment period on November 7, 2017. The overall feedback was:

— Consistent support for the preliminary recommended design:

- Replace the bridge in the same location with a wider, steel girder incline leg bridge type (very similar to the current structure)
- Replace and widen the tunnel to the west (following the current alignment);

— A range of detail design suggestions, especially related to lighting and railing-fence design;

— Comfort concerns raised about the existing stairs on the north side of Bloor Street East being steep; and

— Range of opinions on provision for cycling on the bridge and in the tunnel.

A copy of the PIC #2 displays and an aggregate list of all comments received is provided in **Appendix A**.

2.2.4 DESIGN REVIEW PANEL

The Design Review Panel (DRP) is comprised of private sector design professionals – architects, landscape architects, urban designers and engineers – who provide independent, objective advice to city staff aimed at improving matters of design that affect the public realm.

The Project Team presented the study to the DRP at a public meeting on July 18, 2017. Local Glen Road area residents were among the audience.

The DRP Presentation materials were posted on the City's project website following the meeting.

General comments and topics from the panel included:

— Consider the possibility of access down to Rosedale Valley and Don Valley Parks

— Consider the possibility for universal accessibility

— Extend the public realm boundary southward

— Consider a "slimmer" bridge structure as per the existing bridge

— Increase presence of bridge and tunnel from Bloor Street East

— Consider integrating tunnel and bridge lighting and railing

— Consider softer and indirect lighting in the tunnel ceiling

— Importance of public art not only in deterring graffiti and also to create ongoing narratives

The relevant section of the minutes from DRP, related to the Glen Road Bridge Study, are included in the **Appendix A**.

2.3 CITY OF TORONTO INTERNAL LIAISON

In addition to the Technical Advisory Committee, which included participation from various City department, the following table notes all of the City departments that were provided study notifications as noted in **Section 2.1**.

City Division / Department	
Parks, Forestry and Recreation — Planning, Design & Development — Supervisor Tree Protection and Policy Review — Parks Operations - District — Construction Management & Capital Projects — Forestry Operations - District — Tree Protection and Planning — Ravine Protection — Urban Forestry Renewal **City Planning** — Community Planning - District — Heritage Services **Toronto Water** — Operations Manager - District — Watermain Asset Planning — Sewer Asset Planning — Water Infrastructure Management **Transportation Services** — Operations Manager - District — Transportation Infrastructure Management, Operational Planning & Policy **Economic Development & Culture** — Business Improvements Areas	**Toronto Public Health** — Public Health **Toronto EMS** — Station Projects — EMS Planning **Toronto Fire** — Chief - Special Projects — District Chief **Toronto Parking Authority** — On-Street Operations and Technical Services **Toronto Transit Commission** — Operations Planning — Transit Stop Planner — Transit Planner **Toronto Police Services** — Traffic Construction Liaison **Toronto Region Conservation Authority** **Parks, Forestry and Recreation** — Urban Forestry Planner **Solid Waste** — Waste Management Planning

2.4 AGENCY CONSULTATION

The following government agencies were provided study notifications as noted in **Section 2.1**. Correspondence with the agencies is noted in **Section 2.7** and documented in **Appendix A**.

- Conseil Scolaire de district Catholique Centre-Sud
- Department of Fisheries and Oceans
- Environment Canada, Great Lakes and Corporate Affairs
- Greater Toronto Airports Authority
- GO Transit/Metrolinx
- Ministry of Agriculture, Food & Rural Affairs
- Ministry of Community Safety & Correctional Services
- Ministry of Economic Development
- Ministry of Education
- Ministry of Energy
- Ministry of Municipal Affairs and Housing
- Ministry of Natural Resources
- Ministry of the Environment and Climate Change
- Ministry of Tourism, Culture and Sport
- Ministry of Transportation
- Toronto and Region Conservation Authority
- Toronto Catholic District School Board
- Toronto District School Board
- Ontario Provincial Police
- Infrastructure Ontario
- Canadian Transportation Agency
- Parks Canada
- Ontario Growth Secretariat
- Hydro One Networks Inc.
- Ministry of Economic Development
- Ontario Power Generation

2.4.1 TECHNICAL ADVISORY COMMITTEE (TAC)

The Project Team met with members of TAC (as noted in **Section 1.4.3**) throughout the project on the following dates:

- June 23, 2016
- August 11, 2016
- August 29, 2017
- November 23, 2017

The members of TAC were provided project updates at the meetings, and reviewed the assessment and evaluation of alternatives, preliminary recommended plans, and key impacts and mitigations. Key issues brought forward by TAC members were reviewed and addressed throughout the study, and are noted in the TAC meeting minutes provided in **Appendix B**.

2.4.2 TORONTO PRESERVATION BOARD (TPB)

City staff presented the Glen Road Pedestrian Bridge and Tunnel EA Study preliminary recommended plan to the TBP for information purposes on November 30, 2017.

2.4.3 WARD COUNCILLORS

Ward 27 and 28 Councillors Kristyn Wong-Tam and Lucy Troisi (previously Pam McConnell) were notified at the key milestones. The Councillors and/or their staff attended the Walk-Shop and both PICs.

2.5 INDIGENOUS COMMUNITIES

In accordance with direction from the Ministry of Aboriginal Affairs in 2013, the Notice of Study Commencement for this study was sent to the Mississauga of New Credit on September 19, 2016.

Subsequently, the Ministry of Aboriginal Affairs provided a revised list of potentially interested Indigenous Communities for projects located in the City as follows:

- Mississaugas of the New Credit First nation
- Alderville First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island
- Kawartha Nishnawbe First Nation

Following the revised direction from the Ministry of Aboriginal Affairs, copies of the Stage 1-2 Archaeological Report and links to the Public Information Centre #2 display panels with the recommended design concepts were sent by email on November 2, 2017 to confirmed formal representative of each of the above six Indigenous communities.

A copy of the letters and follow-up tracking is included in the Appendix 2 of **Appendix A**.

Indigenous Community representatives did not express interest in this project.

2.6 UTILITIES

The following utility companies were provided study notifications as noted in **Section 2.1**. Correspondence with the utilities is noted in **Section 2.7**, and any utility data received is summarized in **Section 3.8**.

- Allstream
- Bell Canada
- CN Rail
- Cogeco Data Services Inc.
- Enbridge Gas Distribution Inc.
- Enbridge Pipeline Inc.
- Imperial Oil
- Prestige Telecom
- Rogers Cable Systems
- Sun-Canadian Pipe Line Company Ltd.
- Tera Span
- Toronto Hydro
- Trans Northern Pipe Line
- Ontario Power Generation
- Hydro One
- Hydro One Networks Inc.
- Enbridge
- Enwave Energy Corporation
- Enbridge Gas Distribution
- CP Rail
- CN Rail

2.7 SUMMARY OF AGENCY AND STAKEHOLDER COMMENTS

Table 2-3 provides a summary of the agency and stakeholder comments received throughout the study up to November 7, 2017, the end of the public comment period, and how they were addressed in the EA.

Table 2-3: Summary of Agency and Stakeholder Comments

Association	Comments / Questions	How the Comment was Addressed
South Rosedale Ratepayers Association (SRRA)	Many residents have concerns about security in the tunnel (especially at night). Majority of correspondence want to keep the bridge or replace it, if necessary, in situ. A few have spoken against it.	The pedestrian tunnel was added to the scope of the study due to comments received from the public regarding security around the tunnel. The study included an assessment of alternatives, which included replacing the bridge in situ.

Association	Comments / Questions	How the Comment was Addressed
Walk Toronto	Inquired what the rough cost projections for the replace and rehabilitate options. Inquired about potential to extend the study on Glen Road to Howard Street.	Accessibility related design elements of the bridge and tunnel are noted in **Section 7.8**.
Bleecker/Wellesley Activity Network	Will the bridge be made accessible?	The Glen Rd Pedestrian Bridge Study materials and comment form were provided online at www.toronto.ca/glen-rd-ped-bridge. Elements of the accessibility design of the bridge and tunnel are noted in **Section 7.3**.
Hydro One Networks Inc.	Hydro One does not own or operate any high voltage underground facilities in the areas identified in your attachments sent 19 September, 2016.	No further action required.
Board of Directors at the Kensington Apartments, 21 Dale Avenue	Overall support for the recommended designs. Stairs on north side of Bloor Street East are steep. Concern about loiterers around the tunnel.	Accessibility is discussed in **Sections 7.3** and **8.3.4**. The recommended alternative addresses loitering and personal security by providing additional natural surveillance.
Ministry of Tourism, Culture & Sport	Interest in the cultural heritage aspects of the study.	The Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment HIA) is provided in **Appendix C**. MTCS was provided a copy of the CHER and HIA for review.

3 EXISTING CONDITIONS

3.1 SOCIO-ECONOMIC ENVIRONMENT

3.1.1 CITY OF TORONTO OFFICIAL PLAN (2015)

The City of Toronto Official Plan is a long-term plan with a vision to create vibrant neighbourhoods, conserve heritage resources, encourage walking and cycling for local trips, and create strong pedestrian and cycling linkages to transit stations. The vision of Toronto's Official Plan is about creating an attractive and safe city that evokes pride, passion and a sense of belonging - a city where people of all ages and abilities can enjoy a good quality of life.

Cultural heritage is an important component of sustainable development and place making. The preservation of our cultural heritage is essential to the character of this urban and liveable city that can contribute to other social, cultural, economic and environmental goals of the City. As a result, heritage conservation is integrated within the policies in many other sections of this Official Plan. The heritage policies of this Plan not only promote the preservation of important heritage buildings and structures but also the public views of them for the enjoyment of Torontonians.

The conservation of natural heritage is also an important element of heritage conservation in Toronto. The Official Plan provides for the conservation of Toronto's urban forest, ravines and river valleys in policies protecting the Natural Heritage Systems.

Given the health benefits of physical activity, active forms of transportation will be encouraged by integrating and giving full consideration to pedestrian and cycling infrastructure in the design of all streets, neighbourhoods, major destinations, transit facilities and mobility hubs throughout the City.

The principals outlined in the Official Plan will guide the development and assessment of alternatives developed for this study.

3.1.2 LAND USES

The pedestrian bridge and tunnel connect two distinct neighbourhoods in the City of Toronto, Rosedale to the north, and St. James Town to the south. Rosedale is a mainly residential neighbourhood with detached homes and mid-rise apartments; St. James Town has mainly residential apartment buildings and mixed-use/commercial properties. The bridge extends over the Rosedale Valley, designated in the City's Official Plan as a natural area.

Future developments and improvement plans around the study area are described in the following Sections.

3.1.2.1 North St. James Town Development (6 Glen Road)

This is an Official Plan and Zoning by-law amendment application to permit the designation and rezoning of three parcels in order that they may be redeveloped for mixed-use purposes. Block 1, located in the northeast quadrant of Sherbourne Street and Howard Street, proposes a 50-storey mixed-use building; Block 2, located between Red Rocket Lane and Glen Road, proposes to conserve 6 semi-detached heritage dwellings and 7 infill townhouses; Block 3, bounded by Bloor Street East, Parliament Street, and Howard Street, proposes one 37-storey tower and a 45-storey tower with retail at ground level.

This development plans to add approximately 1800 new residential units in the immediate vicinity of the Glen Road Pedestrian Bridge and Tunnel, which would potentially add significant volume of traffic on the bridge.

3.1.2.2 St. James Town Community Improvement Plan

The St. James Town Community Improvement Plan (CIP) boundaries are Bloor Street East, Parliament Street, Wellesley Street, and Sherbourne Street. A CIP is a planning tool used to promote revitalization and place making. The project focus is to create safer, accessible and animated open spaces and pedestrian connections. The CIP will provide an implementation plan to help guide potential future investment in the area. Current development applications within the CIP boundary include: Wellesley Community Centre Pool, North St. James Town Development (see above), and 545-565 Sherbourne Street. The Glen Road Pedestrian Bridge and Tunnel EA is adjacent to the CIP boundary.

3.1.2.3 Bloor Street East Streetscape Improvements

The goal of this project is to establish a consistent streetscape along Bloor Street East, and improve user experience.

The streetscape improvements and resurfacing projects on Bloor Street East from St. Paul's Square to Parliament Street were planned to deliver work in 2017 as part of the Transportation Services Capital Plan. An opportunity was identified recently to include the reconstruction of Bloor Street East between Sherbourne Street and Parliament Street, including the intersection, along with these projects. To provide adequate planning and design time necessary for the Bloor Street East Streetscape Improvements and the Intersection Reconstruction project to be completed together, the work has been deferred to 2019.

The Glen Road Pedestrian Bridge and Tunnel EA study relates to the Bloor Street East Streetscape Improvements project as the pedestrian tunnel is under Bloor Street East and access to the tunnel and bridge are currently provided from Bloor Street East, East via two sets of staircases. Additionally, it aims to improve user experience by making it safer and more accessible. Both projects are estimated to start construction in 2019.

3.1.3 OTHER DEVELOPMENT APPLICATIONS

Other development applications in the adjacent area include:

- 387-403 Bloor St E – a proposed residential building and hotel on the southwest corner of Bloor Street East and Sherbourne Street
- 592 Sherbourne St – a proposed residential tower on Sherbourne Street south of Bloor Street East
- 9 Glen Rd – a proposed rental apartment on Glen Road south of Bloor Street East
- 6 Dale Ave – see **Section 3.1.2.1**
- 5 Dale Ave – a proposed four-storey residential building on Dale Avenue.

These development applications, although may not have direct impact on the Glen Road Pedestrian Bridge, do provide context as to the surrounding development project adjacent to the study. These applications provide a sense of intensification coming to the area in the near future.

3.1.4 SOUTH ROSEDALE HERITAGE CONSERVATION DISTRICT (2003)

Developed between the Rosedale Ravine and Park Drive Ravine, South Rosedale is a unique neighbourhood in the City of Toronto. Originally, it was part of the Village of Yorkville and one of the first suburban developments north of the City. It has a clearly discernible character as a picturesque suburb with varied architectural styles. There are good examples of residential architecture from all periods from the nineteenth century to the present. The initial estates were of classical styles, which include late Georgian homes characterized by symmetry, classical decorative details and centred main entrances emphasized with columns and pediment. The District also contains Georgian Revival, English Cottage and other prominent styles popular during the 1901 to 1920 period. The examples evident in South Rosedale are austere, distinctly Canadian interpretations of these styles.

The neighbourhood residents have been interested in pursuing a Conservation District Designation since the 1970's when a study of the neighbourhood was undertaken by Toronto Region Architectural Conservancy ("TRAC") for the purpose of designation. Following a series of public meetings and volunteer initiatives from within the community, the South Rosedale Heritage Conservation District was designated under Part V of the Ontario Heritage Act, on February 7, 2003 under By-Law 115-2003.

The South Rosedale Heritage Conservation District Study (2002) identifies the history and character of the heritage district, and outlines the district guidelines for managing property alteration and development, with a view to the preservation of the existing architectural character of the district.

The Glen Road Pedestrian Bridge is designated part of the South Rosedale Heritage Conservation District.

3.1.5 OTHER RELATED PLANS, POLICIES, AND STUDIES

3.1.5.1 Accessibility

The *Accessibility for Ontarians with Disabilities Act* (AODA) created the development of specific standards of accessibility. The goal of the AODA is to make Ontario fully accessible for people with disabilities by 2025.

The AODA is made up of five standards which fall under the Ontario Regulation 191/11:

Customer Service Standard which helps remove barriers for people with disabilities so they can access goods and services,

Information and Communications Standard helps Ontario businesses and organizations make their information easily accessible to people with disabilities,

Employment Standard helps Ontario businesses and organizations make accessibility a regular part of recruiting, hiring, and supporting employees with disabilities,

Transportation Standard makes sure it is easier for everyone to travel in Ontario, and

Design of Public Spaces Standard ensures new construction and redevelopment of outdoor public spaces are accessible for everyone.

Furthermore, the City of Toronto has developed the 'City of Toronto Accessibility Design Guidelines' (the Accessibility Design Guidelines). The Accessibility Design Guidelines, based on the current Canadian federal and provincial legislation and published standards, consolidate the 'best practices' identified during extensive research and consultation on existing barrier-free standards and guidelines. The Accessibility Design Guidelines state that all accessible design must follow the following principles and objectives:

- Make approaching, entering and using buildings and structures easier. In this respect, accessible design must address a wide variety of internal and external building elements;
- Provide an equivalent level of life safety for everyone, including methods of leaving a building and communicating an emergency;
- Emphasize dignity and independence, providing those features that will allow people to function in their day-to-day activities; and;
- Be non-institutional and successfully integrated with a building's function, form and architectural quality.

Existing conditions at the Glen Road Pedestrian Bridge and tunnel include at-grade access to/from Glen Road in the south and Glen Road/Dale Avenue in the north. In addition, stair access is provided to/from the north and south sides of Bloor Street East, where Bloor Street East is situated above the elevation of the bridge and tunnel.

These staircases are generally in good condition structurally. Based on the 1962 existing tunnel layout drawing (**Exhibit 3-4**), the rise and tread, also referred to as the height and depth of the steps, is as follows:

- North stairs - 175 mm and 255 mm, respectively
- South stairs - 165 mm rise

The Accessibility Design Guidelines recommend 180 mm and 280 mm, respectively.

Other design elements of the existing infrastructure that may not be compliant with the Accessibility Design Guidelines include:

- Uneven surface of wood plank bridge deck;
- Narrow access from Glen Road/Dale Avenue due to existing planter;
- Lack of continuity in design elements between the bridge and tunnel (i.e., different materials, widths, lighting, colours, different alignments); and
- Low lighting levels.

See Section 5.5 for details about the opportunities considered for providing barrier-free access to the bridge and tunnel from Bloor Street East.

3.1.5.2 Toronto Ravine Strategy and Ravine By-Law

Since early 2015, the City's Parks, Forestry & Recreation, City Planning, and Toronto Water divisions have been developing a Toronto Ravine Strategy in collaboration with other City divisions and Toronto and Region Conservation Authority (TRCA). While aspects of the ravine system are addressed in a number of City plans/strategies, regulations and bylaws, the Toronto Ravine Strategy aims to have a comprehensive strategy that brings all of these together and focuses specifically on ravines. The final strategy will act as a framework to guide policy, investment and stewardship related to ravines. The Ravine Strategy workshops with stakeholders began in May of 2015 and the completion of the strategy was in September 2017.

3.1.5.3 City of Toronto Streetscape Manual

Streetscaping consists of the visual elements of a street including the paving, lighting, trees, street furniture and sidewalks, framed by buildings and open spaces. These streetscaping elements are important contributors to creating an aesthetic identity for City's roadways and neighborhoods.

The City has an established Streetscape Manual which is an urban design reference tool for improvement of the City's arterial street network. It includes the following hierarchy of street types:

- Main Streets: focus on commercial, residential and mixed-use buildings that generate grade-related activities,
- Green Streets: highlighted by adjacent natural areas, public parks and open spaces, and
- Special Areas: defined as neighbourhood streets with special planning circumstances, e.g., the street is located within a historically significant area, a Centre, a special district, or business improvement areas (BIAs).

The Glen Road Pedestrian Bridge provides a connection to Bloor Street East which is currently undergoing a Streetscape Improvement Study (see **Section 3.1.2.3**).

3.2 CULTURAL ENVIRONMENT

A Cultural Heritage Evaluation Report (CHER) was completed for this study. The following is a summary of the findings in the CHER, which is provided in **Appendix C**.

3.2.1 BUILT HERITAGE AND CULTURAL HERITAGE LANDSCAPES

3.2.1.1 Historical Summary

When the City of Toronto was incorporated in 1834 Bloor Street East formed the northern boundary between the new municipality and the Township of York. By the 1870s, development in Toronto extended to the edge of the Rosedale Ravine. Although some streets were laid out in Rosedale to the north of Bloor Street East, very little development had occurred by this date. Rosedale became part of the City of Toronto in a series of amalgamations from 1883 to 1887.

The first bridge over the Rosedale Ravine was a vehicular bridge related to the opening of South Rosedale for residential development after 1877. This bridge was referred to as both the Howard Street Bridge and the Glen Road Bridge. This bridge was a wood structure commissioned by Edgar Jarvis. The second bridge, also commissioned by Jarvis, was a high-level iron bridge built in 1882. The bridge is shown on Goad's Atlas (1884) (**Exhibit 3-1**). The City of Toronto acquired the Glen Road South Bridge after South Rosedale was annexed in 1887.

After the annexation of Rosedale, the City of Toronto undertook improvements to the local road network in 1891 that included the extension of Sherbourne Street north of Bloor Street East and the introduction of a new bridge crossing over the Rosedale Ravine on Sherbourne Street.

Bloor Street East was extended between 1913 and 1918 and as part of the construction of the Prince Edward Viaduct a grade separation structure was built in 1918 at the south end of the Glen Road South Bridge to carry Bloor Street East over Glen Road. Glen Road would continue as a vehicular bridge underneath Bloor Street.

By 1950, the condition of the Glen Road South Bridge had significantly deteriorated and the City considered closing it. Council decided to retain the Glen Road South Bridge but close it to vehicular traffic. Glen Road underneath Bloor Street East was reconstructed as a pedestrian tunnel in 1964. The reconstruction of the Glen Road Pedestrian Bridge, initially identified as the Glen Road South Pedestrian Bridge, was scheduled for 1973 and completed in 1975.

The Glen Road Pedestrian Bridge underwent an extensive rehabilitation in 2001. The scope of work included replacement of the abutment bearings and pier bearings, localized girder web strengthening, localized brace replacements, addition of intermediate stiffeners along the girders, replacement of the expansion joints, repairs to the retaining wall and the replacement

of the north concrete stairs, and repair of the south concrete stair treads. In addition, the timber deck was replaced and the height of the handrail was increased to 4-ft. 6-in. (1.37 m).

Further work was undertaken on an emergency basis from September 2014 to mid-January 2015 to strengthen the bridge. Notable areas of corrosion included the interior of the girders, the lateral bracing members connecting the two girders and the gusset plates connecting the horizontal brace members to the girders and girder legs. Metal plates were placed over worn sections of the deck. Parts of the retaining walls were also noted as being in poor condition.

A chronological summary of the pedestrian bridge and tunnel is noted as follows:

- 1877 – First bridge over Rosedale Valley made of wood
- 1882 – Second bridge was a high-level iron bridge
- 1918 – Bloor Street East built up over Glen Road
- 1951 – Bridge closed to vehicular traffic; however maintained for pedestrian use
- 1964 – Glen Road underneath Bloor Street East reconstructed as pedestrian tunnel
- 1973 – Construction of the current pedestrian bridge
- 1992 – Officially renamed as the Morley Callaghan Footbridge
- 2001 – Extensive rehabilitation of pedestrian bridge
- 2003 – Glen Road Footbridge designated under Part V of the Ontario Heritage Act within the South Rosedale Heritage Conservation District and added to the City's heritage register
- 2014/2015 – Bridge closed temporarily for emergency repairs

3.2.1.2 Description of Heritage Resources – Bridge

The Glen Road Pedestrian Bridge is a steel rigid frame structure with inclined legs. In its design, the Glen Road Pedestrian Bridge exhibits clean lines and dramatic simplicity. The tapered inclined legs combined with the variable depth girders give the structure an attractive arch shape over the Rosedale Valley Road. The substructure comprises reinforced cast-in-place concrete abutments and inclined steel girder legs (piers), also referred to as "legs". The girder legs are built up I-shaped sections of variable depth. They are set on a 50° angle.

As part of a comparative analysis of other pedestrian bridges, the steel rigid frame bridges with inclined legs are very rare in the Province and City.

3.2.1.3 Description of Heritage Resources – Tunnel

The pedestrian tunnel comprises a concrete box tunnel structure that extends under Bloor Street East between Glen Road to the south and the pedestrian bridge to the north. There is no record of rehabilitation projects for the pedestrian tunnel since it was opened in 1964. The concrete portals and wall tiles have been covered in City art mural or graffiti.

Concrete box structures are common structures types and are still used today. No other notable aspects of technical or scientific merit have been identified for the Glen Road Pedestrian Tunnel.

Exhibit 3-1: Historical Photographs of Bridge

Goad's Atlas (1884)

Glen Road Bridge between Howard Street and Dale Avenue, looking south from Dale Avenue [Toronto Reference Library, Baldwin S 1-901A, J.V. Salmon, 1951].

View south from the Glen Road Bridge towards Howard Street [City of Toronto Archives, Fonds 200, Series 372, Subseries 10, Item 78, March 14, 1913].

3.2.1.4 Cultural Heritage Value – Bridge

It is determined through the application of the “Criteria for Determining Cultural Heritage Value or Interest” under Ontario Regulation 9/06 that the Glen Road Pedestrian Bridge is of cultural heritage value for contextual reasons.

The existing Glen Road Pedestrian Bridge is the third known structure to provide access to South Rosedale at this location. The continued use of the bridge crossing attests to the importance of the connection across the Rosedale Ravine at Glen Road. The bridge, officially renamed the Morley Callaghan Footbridge under By-law No. 1992-0568, to commemorate the noted Canadian author.

The Glen Road Pedestrian Bridge is a rare example of a steel rigid frame bridge with inclined legs in the City of Toronto. Steel rigid frame structures with inclined legs are well suited for river and valley crossings as the angled piers straddled the crossing effectively. The elegant design of this bridge with slender deck, inclined frame sides or “legs” and no intermediate supports is aesthetically pleasing. The bridge has undergone some modifications but retains its original design character. The bridge is a physical and symbolic landmark within the community and acts a gateway to the historic Rosedale community.

Residential buildings along Glen Road to the north and south of the bridge have been designated under the Ontario Heritage Act (OHA). It continues to provide vital linkages across the Rosedale Ravine, is a well-known and familiar structure, and plays an active role in community life. Views are afforded from the bridge over Rosedale Valley Road and to the structure from the roadway.

Heritage attributes, i.e., character defining elements, of the Glen Road Pedestrian Bridge include, but are not limited to the following details:

— Contextual Attributes:

- Toronto Historical Board plaque to Morley Callaghan located in a planted area at the north end of the bridge.
- Metal fencing at the northeast corner of the bridge and rubble walls at the south end of the bridge.
- Views to and from the bridge.

— Design Attributes:

- Three-span, steel rigid frame structure with constructed out of weathering steel components.
- Variable depth girders and tapers inclined legs and no intermediate supports over the valley.
- Attractive arch shape over Rosedale Valley Road.
- Slender deck.
- Timber deck.

- Open panel metal handrail system and lighting.

3.2.1.5 Cultural Heritage Value – Tunnel

It is determined through the application of the “Criteria for Determining Cultural Heritage Value or Interest” under Ontario Regulation 9/06 that the Glen Road Pedestrian Tunnel is of cultural heritage value for contextual reasons.

A grade separation structure has provided access under Bloor Street East at Glen Road since the Bloor Viaduct (Prince Edward Viaduct) was completed in 1918. It was converted to pedestrian use only in 1951 after the Glen Road Bridge was closed to vehicular traffic. The existing tunnel was built in 1964 during the construction of the Bloor-Danforth TTC Subway (**Exhibit 3-2**). The Glen Road Pedestrian Tunnel continues to provide important linkages under Bloor Street East, which gives access via the Glen Road Pedestrian Bridge to the South Rosedale community.

Heritage attributes, i.e., character defining elements, of the Glen Road Pedestrian Tunnel include, but are not limited to the following details:

— Contextual Attributes:

- Tunnel under Bloor Street East providing access to Glen Road, Howard Street and the TTC Bloor-Danforth Subway.
- Stair access to the north and south sides of Bloor Street East.
- Glen Road Pedestrian Bridge.

— Design Attributes:

- No design attributes are identified for the Glen Road Pedestrian Tunnel.

Exhibit 3-2: Historical Photograph of Tunnel Construction (1964)

Construction is ongoing in this photograph of the Glen Road Pedestrian Tunnel [CTA, Fonds 16, Series 2161, File 425, May 4, 1964].

3.2.1.6 Cultural Heritage Recommendations

Through the application of the "Criteria for Determining Cultural Heritage Value or Interest" under Ontario Regulation 9/06, it has been determined that the Glen Road Pedestrian Bridge in the City of Toronto is of cultural heritage value or interest due to its design or physical value, historical or associative value and contextual value and is worthy of designation under Part IV of the OHA.

Furthermore, the Glen Road Pedestrian Tunnel is of cultural heritage value or interest due to its contextual value only. As a result of the limited scope of its cultural heritage value, it is recommended the Glen Road Pedestrian Tunnel not be considered for designation under Part IV of the OHA. However, the cultural attributes of the tunnel, namely, the access under Bloor Street East and the stair access to Bloor Street East should be considered within the identified contextual attributes of the Glen Road Pedestrian Bridge.

3.2.2 ARCHAEOLOGY

A Stage 1-2 Archaeological Assessment was undertaken for this study, including the bridge and tunnel, and was conducted in accordance with the provisions of the Ontario Heritage Act (R.S.O. 1990, c.o. 18) in compliance with the Standards and Guidelines for Consultant Archaeologists (MTCS 2011). The Stage 1-2 Archaeological Assessment is provided in **Appendix D**.

The bridge was originally built in 1882 following urban expansion on the north side of Rosedale Ravine (Unterman 2017). The bridge was built by Edger Jarvis to allow for a connection between Rosedale and the City core. The first depiction of the bridge over Rosedale Valley is illustrated in the 1884 Goads Insurance Map. The bridge was closed to vehicular traffic in 1951 but was maintained for pedestrian use. The current pedestrian bridge was constructed in 1973.

Given the proximity of the study area to documented historic roadways (Bloor Street East, Sherbourne Street), its location with the historic Rosedale community, and its proximity to a historic waterway, there is a high probability of locating historic materials within the study area. A review of 20th century aerial imagery was also completed to assist in documenting more recent changes to the landscape. Imagery from 1954 demonstrates that the study area and its general surroundings were primarily residential properties within the City of Toronto.

The MTCS's Ontario Archaeological Sites Database was consulted to determine whether any archaeological assessments had been previously conducted within the limits of, or immediately adjacent to, the study area. It was determined that there are no reports on record documenting previous archaeological fieldwork within a 50 m radius of the study area.

The City of Toronto developed an Archaeological Potential Model to aid in the planning process within the City. The potential map takes into consideration the proximity of City lands to features of archaeological potential as well as past land disturbances. According to the Archaeological Potential Map, the study area is located on lands that do not have archaeological potential (Toronto 2016b). Steep slopes are noted throughout most of the study area, and the bridge alignment is noted as having been previously disturbed.

The entire study area (100%), identified in Map 5 of **Appendix D** was subject to a Stage 1-2 archaeological assessment. Given that the study area was located primarily with a woodlot on steeply sloping valley lands, ploughing was not feasible. As a result, a test pit assessment was conducted according to Section 2.2.1 of the Standards and Guidelines for Consultant Archaeologists (MTCS 2011:31). Approximately 47% study area was steeply sloped and was not subject to a test pit assessment (Image 1 and Image 14 of **Appendix D)**. Approximately 53% of the study area was visually assessed and was determined to be disturbed. Soils were shoveled into a 6 mm mesh screen and sifted to recover artifacts. The profiles of each test pit were examined for stratified layers and/or disturbance. No archaeological resources were encountered during the assessment.

On the basis of the above information, the study area, which includes the pedestrian bridge and the tunnel, requires no further archaeological assessment.

3.3 STRUCTURAL ENGINEERING – PEDESTRIAN BRIDGE AND TUNNEL

3.3.1 GLEN ROAD PEDESTRIAN BRIDGE

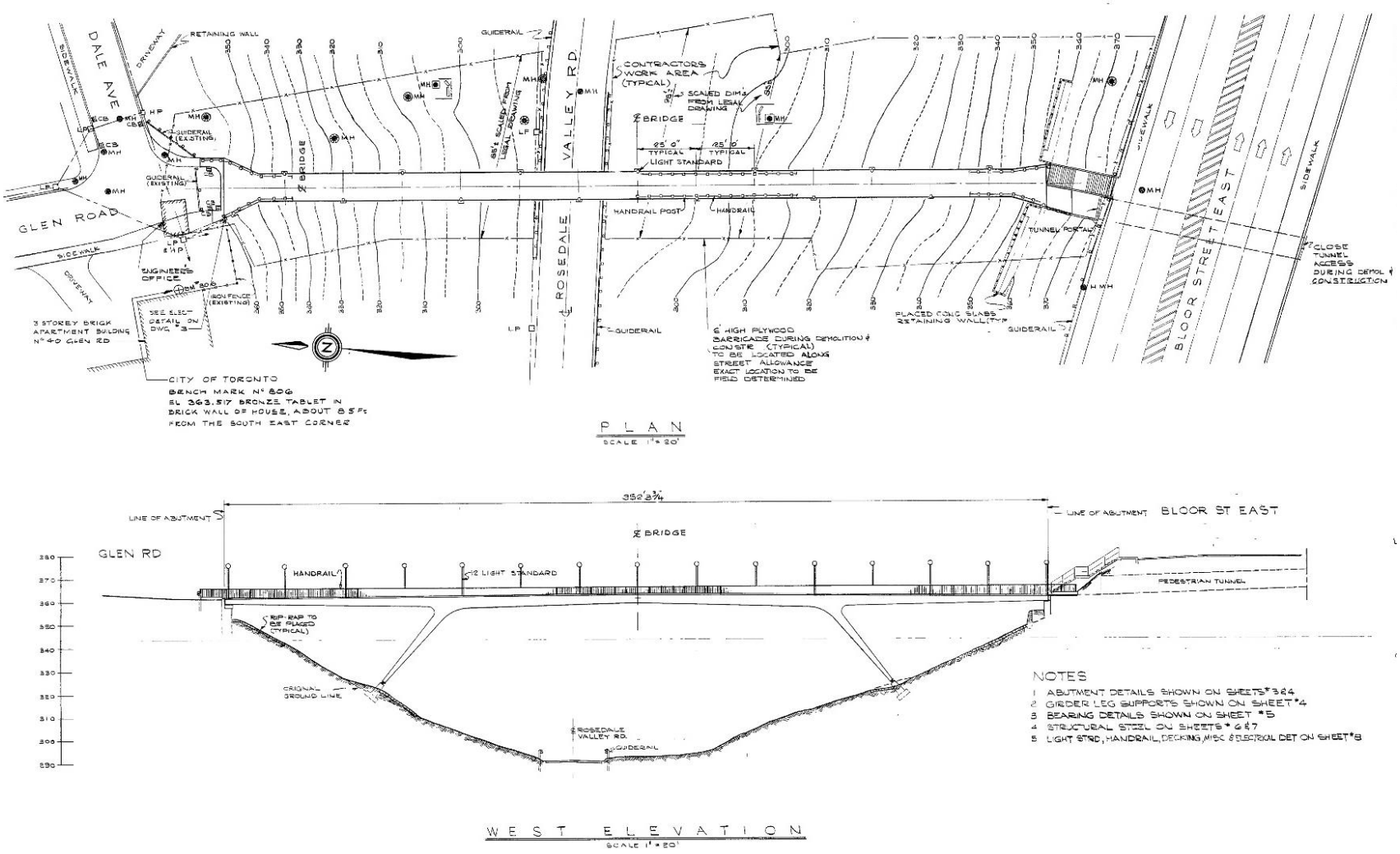
The existing Glen Road Pedestrian Bridge was constructed in 1973. The bridge carries pedestrian traffic over Rosedale Valley Road, from Bloor Street East to Dale Avenue / Glen Road.

The existing structure is a three span rigid frame steel structure comprising an 89 mm deep laminated timber deck supported by two atmospheric corrosion resistant (ACR) steel plate girders, of variable depth. The girders are connected by hollow structural sections (HSS) used as transverse beams as well as lateral bracing. The substructure is comprised of two conventional concrete abutments and two steel inclined pier legs connected integrally to the girders. These legs comprise built-up steel I-shaped sections of variable depth.

There are two 29.2 m end spans and one 48.8 m interior span for a total deck length of 107.2 m. The overall width of the bridge is 3.7 m. The articulation of the bridge is fixed at the piers and free to expand at the abutments. The bridge runs in the north-south direction.

See **Exhibit 3-3** below for the existing bridge's elevation drawing.

Exhibit 3-3: Existing Bridge and Tunnel Elevation (1973)



Albery, Pullerits, Dickson & Associates Ltd., Glen Road South Pedestrian Bridge: General Arrangement, June 1973.

3.3.1.1 2001 Rehabilitation

The bridge was rehabilitated in 2001, which comprised the following works:

- replacement of the abutment and pier bearings;
- increasing the railing height to 1.375 m;
- localized girder web stiffening;
- localized bracing replacements;
- retaining wall repairs;
- replacement of north concrete stairs;
- replacement of expansion joints;
- addition of intermediate stiffeners on the girders; and
- replacement of the timber deck at the abutments with precast deck slabs.

3.3.1.2 2014 Structure Inspection and Evaluation

WSP was retained by the City of Toronto in July 2014 to undertake a biennial visual Ontario Structure Inspection Manual, 2008 (OSIM) inspection of the full structure, including an enhanced inspection of the structural steel components only (including girders and piers), and structural evaluation of the Glen Road Pedestrian Bridge. The results of the structural inspection and evaluation are presented in the Structure Inspection and Evaluation Report dated November 2014. The following summarizes the findings of the inspection and evaluation.

The inspection of the bridge revealed substantial deterioration of various structural components. There were cracks and perforations on the majority of the lateral bracing members and gusset plates connecting the pier legs, to the point that these members were not considered to be providing the required lateral support to the pier legs.

The lower 0.3 m of the girder webs above the legs was noted to have 20% - 30% section loss. The radial stiffeners at the pier and girder connection were severely corroded (50% section loss was estimated). The girder top and bottom flanges were covered with rust flakes up to 25 mm thick. Severe to medium section loss (greater than 10%) was noted in the vertical stiffeners, webs and bottom flanges.

The railing supports on the girder flanges had completely failed at over 50% of the support locations and posed a safety risk to users of the bridge.

It was noted during the inspection that the ACR steel used at this site had not developed the protective patina to mitigate progressive corrosion, and had resulted in the on-going corrosion of the structural steel members.

In order to form a tightly adhering patina, steel must undergo alternating wet and dry cycles. Frequently humid / wet environments and the application of chlorides (such as de-icing salts)

are detrimental to the formation of a patina. Based on observations made on site, suitable environmental conditions are not present. In the absence of a tightly adhering patina, already corroded primary members (composed of ACR steel) will continue to corrode, and in some cases, may exhibit accelerated corrosion rates. This continued corrosion will directly affect member capacities.

The structure was evaluated considering the deterioration at the time of inspection including the loss of lateral bracing members between pier legs. The evaluation results indicated that the bridge had insufficient load carrying capacities for the CHBDC specified pedestrian loading and warranted repairs.

As a result of the inspection and evaluation completed in 2014, the Glen Road Pedestrian Bridge was closed and emergency repairs were performed in late 2014 / early 2015, to maintain the structure in a safe condition. Details of the rehabilitation work is documented in **Appendix E**. The bridge was reopened to the public in January 2015.

3.3.1.3 Structural Deficiencies

Significant rehabilitation was conducted in 2001. The emergency repairs completed in late 2014/early 2015 were required in less than the typical 25 year span between rehabilitation cycles, indicating some acceleration in the rate of deterioration.

Despite the emergency work, the bridge remains in poor condition based on the latest inspection completed. Specifically:

- there is medium to very severe corrosion (with 20% - 30% section loss) on primary members (girders, lateral bracing members, gusset plates, and pier legs);
- the concrete retaining walls have localized areas of disintegration;
- the timber deck has localized areas in poor condition including splitting of the timber; and
- the existing ACR steel has not adequately developed a protective patina (which is imperative for the materials' longevity).

Based on the repair works completed to date, the evaluation findings, and the current rate of primary member deterioration, the estimated remaining life expectancy of the bridge is 5 to 10 years (i.e. replace between 2020 and 2025, however this assumes additional repair from the 2014 emergency repairs), and a detailed visual inspection has been recommended every 12 months. Inspections will focus on the progressive corrosion in the main members and in the connection between bracing members and main members (girders and legs). The result of these inspections may warrant additional works / inspections if any significant deterioration found, including additional emergency repairs and / or bridge closure.

3.3.2 PEDESTRIAN TUNNEL

In 1951, Glen Road under Bloor Street East was infilled and the structure was reconstructed as a 1.7 m wide by 2.6 m tall dedicated pedestrian tunnel. The existing tunnel was subsequently constructed in 1964 and consists of a 26.2 m long rigid frame reinforced concrete box structure with a 2.4 m opening height by 2.9 m clear span with 250 mm thick

walls and slabs. **Exhibit 3-4** illustrates a general elevation of the existing tunnel's elevation looking east, and photographs of the existing tunnel are provided in **Exhibit 3-5**.

The walls of the structure were originally finished with a glazed tile and have since been covered with painted murals/graffiti.

The existing tunnel connects Glen Road (south), Bloor Street East via two staircases on the north and south side, and Glen Road (north) via the pedestrian bridge. The staircases were constructed in 1964 during the construction of the Bloor-Danforth Subway (see **Exhibit 3-2**). The staircases are generally in good condition with evidence of resurfacing.

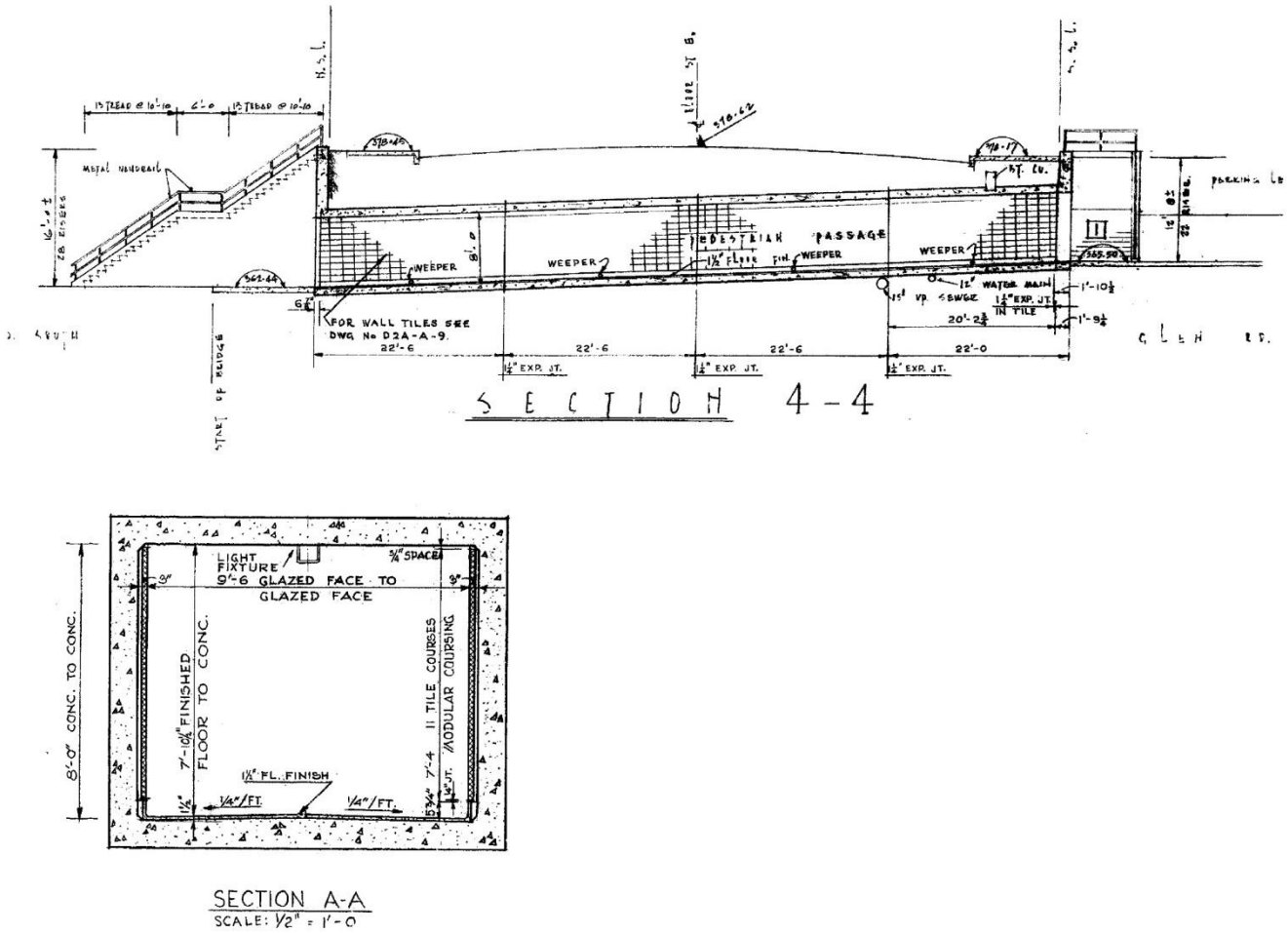
A site visit was conducted on January 5, 2017 to complete a field investigation and assess the existing condition of the tunnel and stairs. The investigation included a close-up visual assessment of material defects and performance deficiencies, in accordance with the OSIM.

A detailed delamination survey of the structure walls was not feasible due to the presence of the surficial tile wall finish.

The following is a summary of the significant findings:

- Soffit – generally in good condition with localized spalling noted near the north entrance and medium to wide cracks noted at the construction joints and parallel to the south entrance fascia.
- Floor Slab – generally in fair to good condition with localized delamination, spalling and medium cracks noted at the south entrance and scaling noted.
- Walls – the reinforced concrete walls of the tunnel were unavailable for inspection due to the presence of the glazed tile finish.
- South Stairs – generally in good condition with evidence of resurfacing.
- North Stairs – generally in good condition with evidence of resurfacing. Noted the east curb has some spalled concrete from previous patches.
- Stair Railings – are generally in fair to poor condition with peeling paint, rust and scaling throughout.
- Retaining Walls – generally in good to fair condition with some local spalls and delamination.

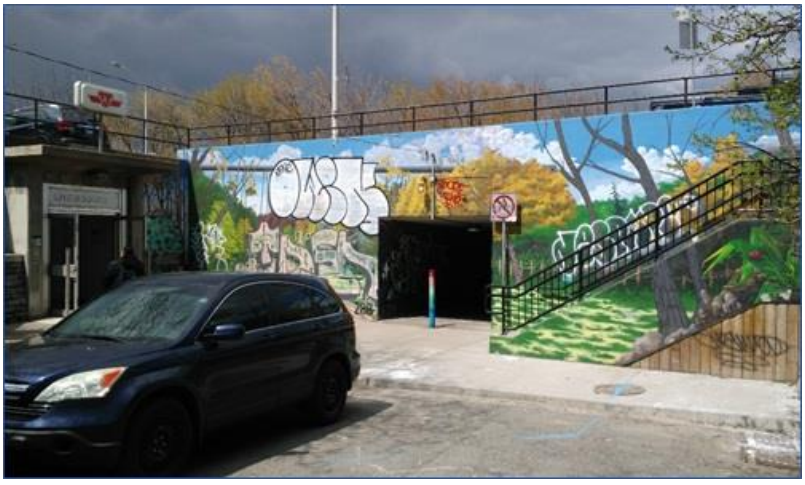
Exhibit 3-4: Existing Tunnel Elevation and Cross-Section



Toronto Transit Commission, Subway Construction Branch: Bloor Danforth Subway, Sherbourne Station, Glen Road Passage, Layout, 1962.

Exhibit 3-5: Existing Conditions of Tunnel

Looking south to tunnel and staircase to Bloor Street East



Looking north to tunnel, staircase to Bloor Street East, and TTC entrance to Sherburne Station

3.4 TRANSPORTATION

3.4.1 WALKING STRATEGY

The Toronto Walking Strategy is an integrated approach that brings together several City divisions and agencies to create physical and cultural environments that encourage walking. The strategy was developed through many discussions with the public, external organizations and relevant City divisions and agencies. Information gathered through public consultation sessions and a walking survey of 1,000 Toronto residents conducted in 2007 showed that approximately 31% of Torontonians choose to walk to work, school, shopping, or leisure and entertainment activities. The Strategy also included the advice of international experts in

pedestrian policy and programming who were delegates of Walk 21 Toronto – a high-profile international conference hosted by Toronto in October of 2007.

The guiding principles outlined within the strategy is in alignment with the City's Official Plan (2015) policies which focuses on creating a walkable Toronto, and highlights the importance of pedestrian activity as a part of a vibrant city. They include the following:

- Universal Accessibility, which states that all private places and spaces should be barrier-free;
- Safety, which states that the safety of the pedestrians take precedence over all other modes of transportation; and
- Design Excellence, which states that high-quality design creates a positive experience for everyone.

The guiding principles that were established for the Toronto Walking Strategy have been considered in developing and assessing the alternatives as part this Study.

3.4.2 TRAIL NETWORK

As City of Toronto grows in size and population, the pressure on protecting the natural areas intensifies. To help guide and inform future trail planning initiatives that will assist the City in protecting its natural areas, the City developed a Natural Environment Trail Strategy (NETS) in 2012-2013.

Through extensive data collection and community involvement, the NETS outlines the following guiding principles which support the goals and principles established for the City of Toronto Parks Plan, City of Toronto Recreation Service Plan, City of Toronto Bike Plan, and the Strategic Forest Management Plan:

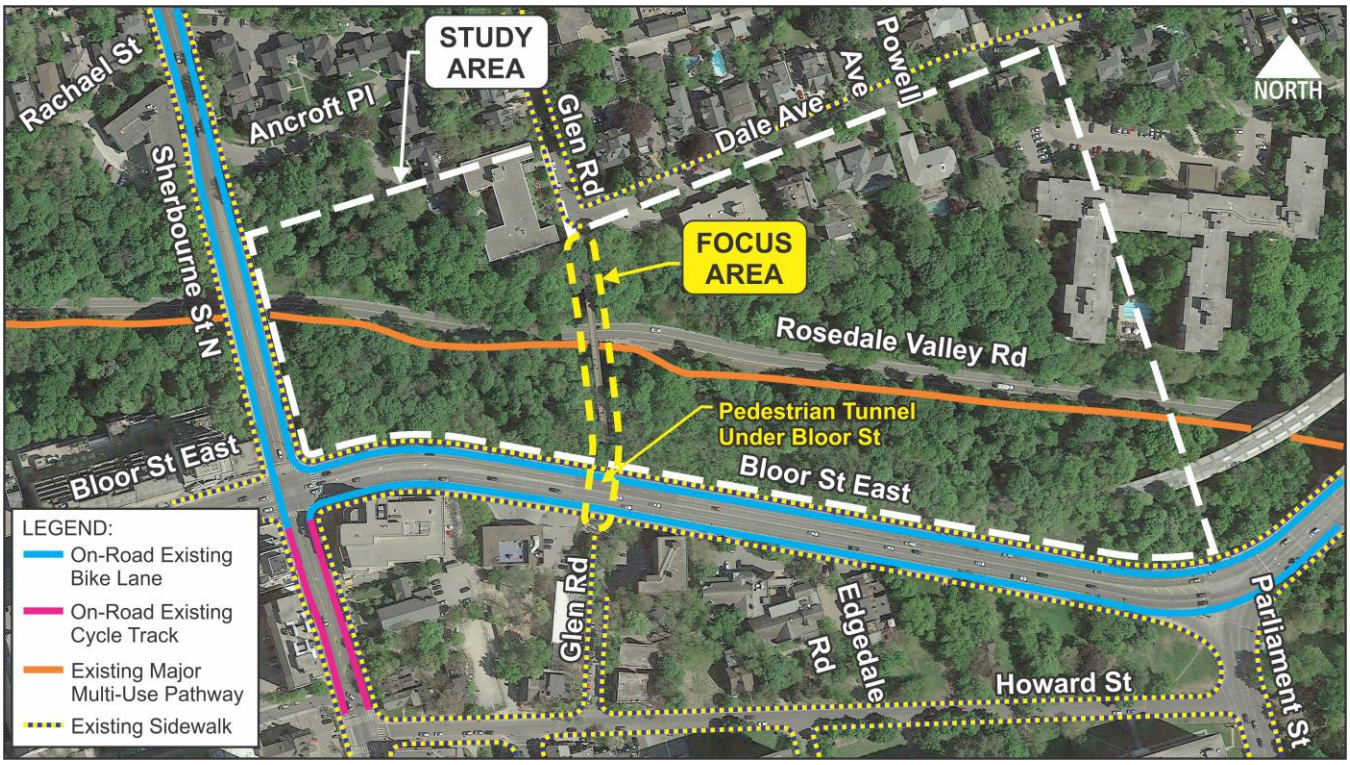
- Parks and Trails as City Infrastructure: trails provide recreational opportunities to residents and visitors, creating connections both within and outside of the City;
- Equitable Access: Trails should provide an inclusive environment to users of varying abilities, including those with physical, sensory and intellectual disabilities;
- Environmental Protection: The trail systems provide opportunities for the public to learn about the function and value of the City's natural environment; and
- Community Engagement: Community involvement is necessary throughout planning, construction and maintenance to endure the long term success of the trail system and protection of natural environment areas.

Although the Glen Road Pedestrian Bridge and Tunnel are not designated part of a trail network they do function as a trail by providing a key pedestrian link across the Rosedale Valley. This also relates to the Toronto Ravine Strategy noted in **Sections 3.1.5.2** that encourage addressing challenges, improving accesses and exploring opportunities related to the City's Ravine and Trail system.

3.4.3 EXISTING ACTIVE TRANSPORTATION DEMAND

The Glen Road Pedestrian Bridge and Tunnel connect to the on-road bike lanes on Bloor Street East via the staircases north and south of Bloor Street East. Just to the west of the bridge and tunnel, the Bloor Street East on-road bike lanes connect to on-road bike lanes on Sherbourne Street north of Bloor Street East, and the on-road cycle track south of Bloor Street East. **Exhibit 3-6** illustrates the active transportation network around the study area.

Exhibit 3-6: Active Transportation Network



Information regarding the existing pedestrian and cyclist trip activity were gathered from various sources such as a pedestrian survey count, a Community Walk-Shop, community consultation, and online surveys. The majority of the community respondents were local residents living in the Rosedale community. The graphs and maps displayed in **Exhibit 3-7** and **Exhibit 3-8** depict the results from the counts performed on site.

Exhibit 3-7: Pedestrian Bridge User Movement

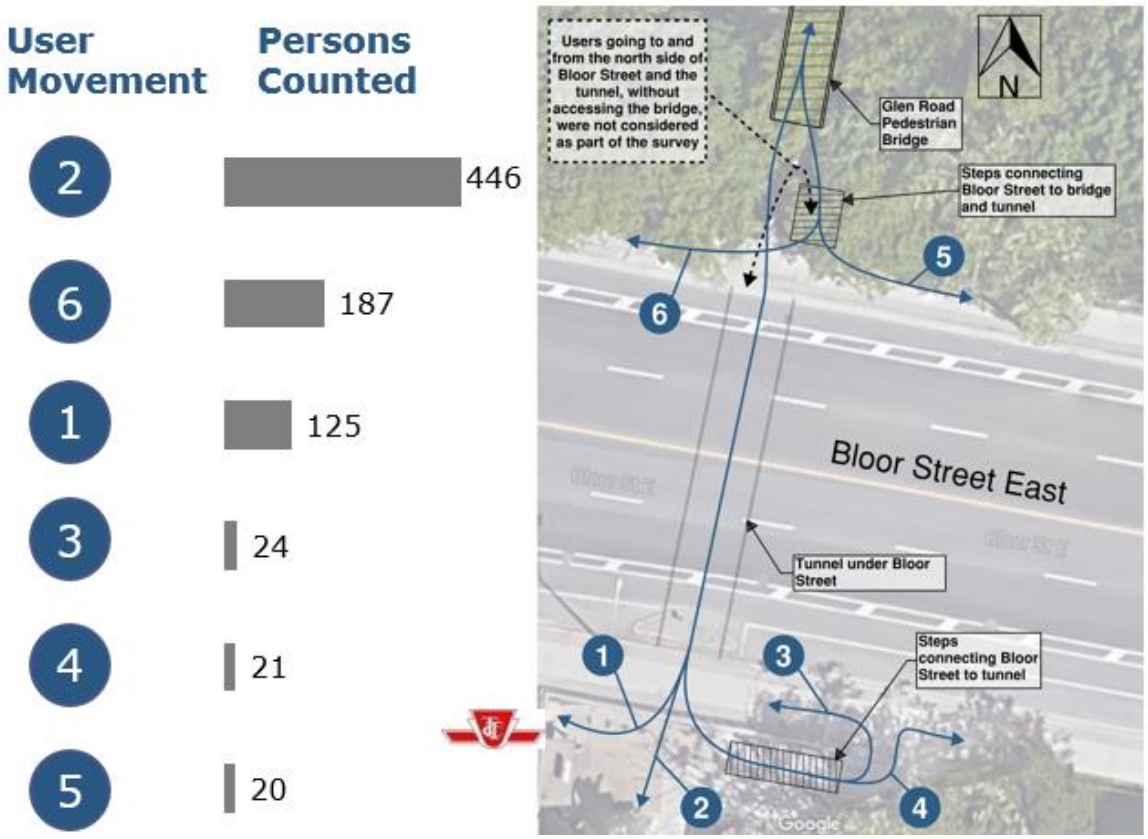
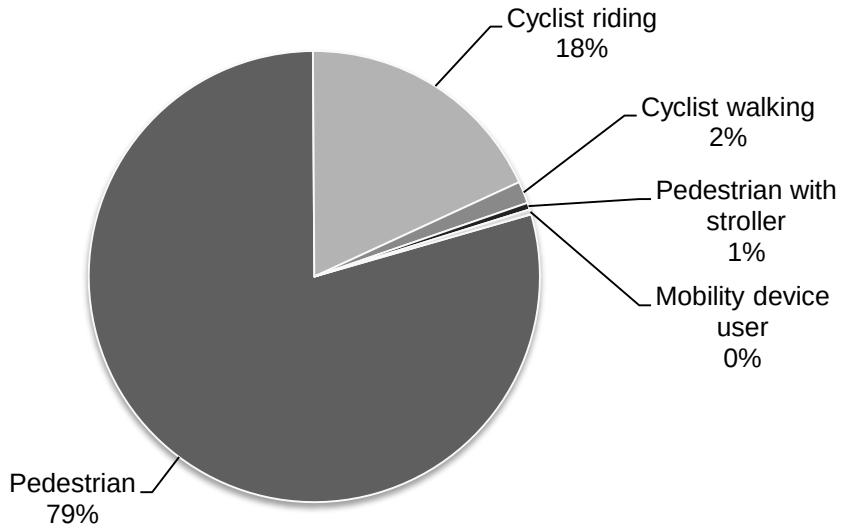


Exhibit 3-8: User Type Breakdown



The pedestrian survey count observed a total of 823 trips on the bridge in 11 hours (an average of 75 users per hour) during the three observed time periods on Wednesday June 22nd 2016 (6:00 AM – 9:00 AM and 4:00 PM - 8:00 PM) and Saturday 25th 2016 (10:00 AM – 2:00 PM). About 80% of the users were pedestrians, 18% were cyclists (riding), and 2% were cyclists (walking).

The observed pedestrian and cyclist trip pattern also revealed southbound (toward the subway and downtown) to be the peak travel direction in the morning and northbound (from subway and downtown) in the evening. Based on observation, a substantial number of trips appeared to be recreational (e.g. dog-walking, jogging, etc.).

Active transportation volume is likely to increase on the bridge and tunnel as developments such as the North St. James Town Development (6 Glen Road) and the St James Town CIP, as noted above, are completed, bringing more residents and open spaces into the area. The introduction of a new intersection for the North St. James Town Development, between Glen Road and Parliament Street may also change trip patterns to and from the bridge and tunnel.

3.4.4 ACCESSIBILITY

At-grade (barrier-free) access is provided between the tunnel and bridge, at Glen Road/Dale Avenue to the north and Glen Road to the south. Access to Bloor Street East is provided via two staircases north and south of the roadway. Accessible routes from the bridge and tunnel to Bloor Street East are provided by Howard Street to Red Rocket Lane or Sherbourne Street to the west, or Edgedale Road to the east.

It is noted that the TTC Sherbourne Station main entrance (at the Bloor Street East intersection) is planned to be made accessible by 2021.

3.4.5 SECURITY

Through public consultation, security concerns were raised, such as lack of adequate lighting, and occurrences of undesirable activities on the bridge and in the tunnel. Crime Prevention through Environmental Design (CPTED) is a strategy formed in 2001 in Ontario to reduce the fear of incidence of crime and improve the quality of life by promoting the implementation of CPTED principles:

- **Natural Surveillance** is a design strategy that uses and/or places natural features in a way that provide an opportunity for users to observe the space around them.
- **Natural Access Control** is design strategy to limit crime opportunity by directing normal access to observable areas and preventing access to unobservable areas.
- **Territorial Reinforcement** is an ‘umbrella’ design strategy that realizes that physical design can create and extend the sphere of influence so that users of a property develop a sense of ownership of that space and offenders or intruders are made to feel unwelcome. This strategy often incorporates natural surveillance and natural access control.

The Glen Road Pedestrian Bridge and Tunnel EA Study provides an opportunity to address the concern regarding security in the tunnel and on the bridge with improved design of access areas and lighting, resulting in improved sightlines.

3.4.6 FUTURE PEDESTRIAN AND CYCLIST DEMAND

The pedestrian and cyclist traffic is likely to increase on the bridge and tunnel as developments such as the North St. James Town Development (6 Glen Road) and the St James Town Community Improvement Plan, as noted above, are completed, bringing more residents and open spaces into the area.

3.5 NATURAL ENVIRONMENT

The study area is located within the Rosedale Extension Environmentally Significant Area (ESA) 62A. The natural feature is 5.1 ha in size and it is characterized as a steep sloped ravine valley dominated by the deciduous forest with Rosedale Valley Road running along the valley floor. A background review and field studies were conducted to characterize existing natural heritage features and functions in support of the EA Study. This included documenting existing vegetation communities and vascular plant species, breeding bird surveys, and identification and evaluation of potential wildlife habitat along with all incidental wildlife observations.

All background materials were collected and reviewed. This information was used to inform and supplement the field program and ensure compliance with applicable policies, regulations, and guidelines. A review of applicable policy and guidelines was also undertaken to ensure study compliance and to provide focus to the field investigations.

The following key sources of information were reviewed to supplement and provide context for field investigations:

- TRCA existing natural heritage data (provided July 7 2016);
- MNRF Aurora District Office Species at Risk data (provided July 18 2016);
- MNRF Natural Heritage Information Centre (NHIC) Land Information Ontario Mapping (2016);
- MNRF Natural Heritage Information Centre (NHIC) Natural Heritage Mapping Tool (2016);
- MNRF Species at Risk website - Regional Species at Risk list (2016);
- Ontario Nature’s Reptile and Amphibian Atlas website (2016);
- Bird Studies Canada’s Breeding Bird Atlas website (2016);
- Ebird Species Maps website (2016);
- ESAs in the City of Toronto (North-South Environmental Inc. et al. 2012);
- City of Toronto Official Plan (2015);

As part of the background data collection, requests for data/information were submitted to York Region, as well as TRCA and Aurora District Ontario Ministry of Natural Resources and Forestry (MNRF) on May 17 2016. Background data and other data sources are listed in the References section of **Appendix F**.

Field studies were conducted to evaluate the resources within the Glen Road Pedestrian Bridge and Tunnel EA study area in 2016. The findings of the field studies of the existing conditions are summarized in **Exhibit 3-9** and the following sections, and further described in **Appendix F**.

Exhibit 3-9: Summary of Natural Environment Existing Conditions

Natural Heritage Policy

- Rosedale Valley Extension Environmentally Significant Area (ESA) 62A
- City of Toronto Natural Heritage System (Official Plan 2015)
- Toronto Region Conservation Authority Regulation 166/06 Lands
- TRCA Terrestrial Natural Heritage System (Terrestrial Natural Heritage System Strategy [TNHSS])

Wildlife

- 21 bird and 2 mammal species recorded in the valley
- 1 Species at Risk (SAR) in the vicinity (Chimney Swift, provincially Threatened bird)
- Cavity trees occur within the valley adjacent to the bridge which may provide potential maternity roosting habitat for bats
- No bird nests were observed on the bridge structure

Vegetation

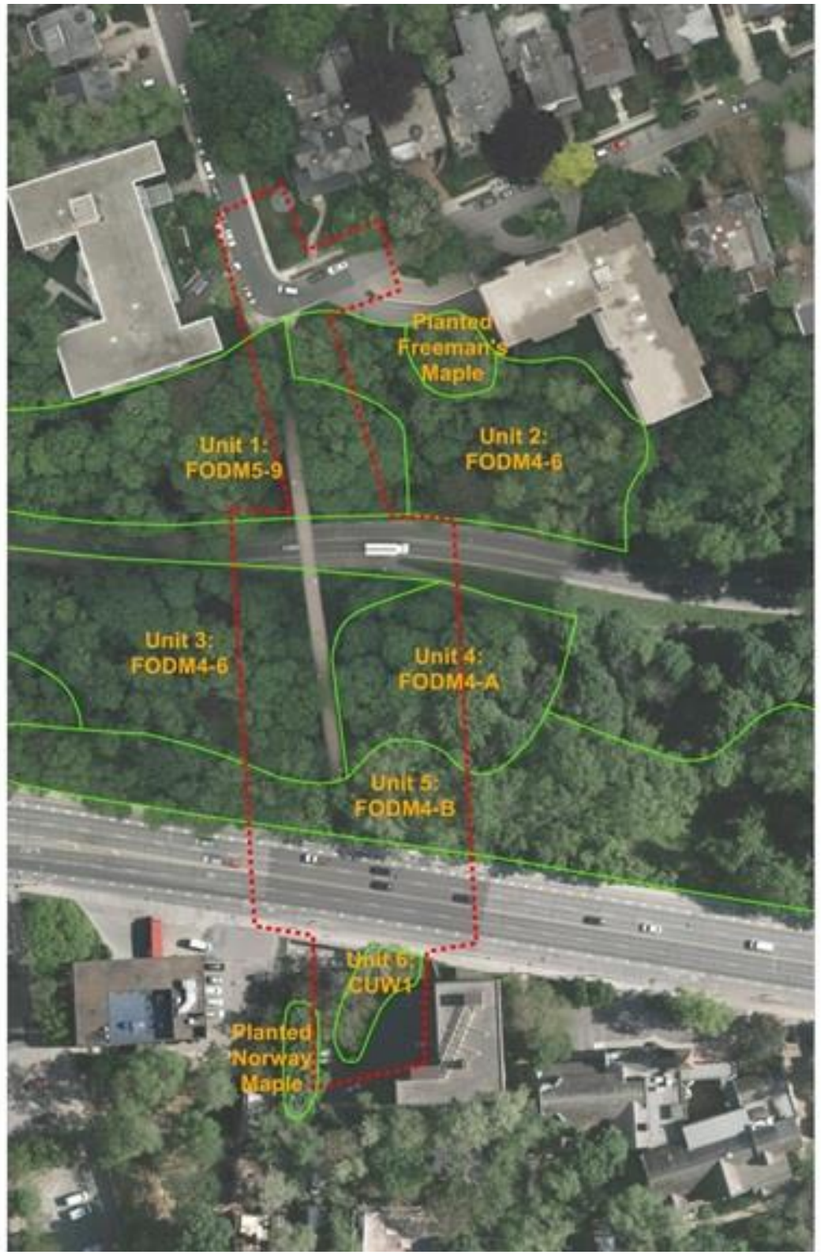
- 52 plant species recorded in the study area, of which 65% are native
- No SAR or Species of Conservation Concern present
- Rosedale Valley within the study area is comprised of 4 forest community types
- Numerous canopy ash trees are dead or in poor condition (likely due to Emerald Ash Borer); has recently caused shift in vegetation community types
- Several aggressive invasive species are prevalent (Norway Maple, Garlic Mustard, Japanese Knotweed)
- Two locally rare species are present in the valley (Northern Red Oak is naturally occurring on the south valley slope and young White Spruce are planted at the top of the north valley slope).

Legend

Survey Location

Vegetation Community

Unit 1: FODM5-9, Dry-Fresh Sugar Maple – Hardwood Deciduous Forest Type
Unit 2: FODM4-6, Dry-Fresh Norway Maple Deciduous Forest Type
Unit 3:FODM4-6, Dry-Fresh Norway Maple Deciduous Forest Type
Unit 4: FODM4-A, Dry-Fresh Norway Maple – Red Oak Deciduous Forest Type
Unit 5: FODM4-B, Dry-Fresh Black Walnut – Maple Forest Type
Unit 6: CUW1, Mineral Cultural Woodland Type



Valley slope with bare soil and patchy ground cover susceptible to erosion.

Vegetation around south end of existing bridge (near Bloor Street East)

Deciduous woodland habitat on steep valley slopes

Glen Road Community Wildflower Garden south of Bloor St. hosts several native flora including three locally rare plants (Snowberry, Woodland Sunflower and Wild Crane's-bill)

3.5.1 SURFACE DRAINAGE AND WATERSHED CHARACTERISTICS

The field investigation found that the study area lies within the Lower Don River subwatershed. There are no surface water drainage features or aquatic habit present within the study area. It is entirely located within the Rosedale Valley, which was formed by a former watercourse that flowed through the valley which was piped in the early 1900's.

3.5.2 ENVIRONMENTALLY DESIGNATED AREAS

Several overlapping natural heritage features and designated policy areas are present within the Glen Road Pedestrian Bridge and Tunnel EA study area. These include:

- **Natural Heritage System under the City of Toronto Official Plan (2015)** – The Rosedale Valley is designated as part of the City's Natural Heritage System, specifically as an ESA:
- **Rosedale Valley Extension ESA [Site 62A]** – this natural feature is 5.1 ha in size and is contiguous with the main Rosedale Valley ESA to the east (13.2 ha). It is characterized as a steep sloped ravine valley dominated by deciduous forest with Rosedale Valley Road running along the valley floor. The feature is significantly impacted by anthropogenic influences including those from Rosedale Valley Road, large accumulations of litter, homeless inhabitants, informal trail creation, highly invasive plant species, and physical disturbance such as dug holes and trampled vegetation (North-South 2012). The feature met City of Toronto ESA criteria due to presence of two (2) significant flora species, Bladder Sedge (*Carex intumescens*) and Pennsylvania Bittercress (*Cardamine pensylvanica*), within the valley.
- **TRCA Regulation 166/06 Lands** - natural and hazardous areas (i.e., steep slopes associated with the Rosedale Valley.
- **TRCA Terrestrial Natural Heritage System** – The Rosedale Valley is designated as part of the Terrestrial Natural Heritage System as part of TRCA's Terrestrial Natural Heritage System Strategy (TNHSS).

3.5.3 VEGETATION

An inventory of existing vegetation was conducted in the fall of 2016 within the focus area, including 15 m on either side of the bridge and tunnel. The majority of the study area consists of steep forested slopes on either side of Rosedale Valley Road, which runs along the bottom of the Rosedale Valley ravine. Several deciduous forest types are present on the valley slopes, characterized by a mix of common native and exotic tree species. The study area also includes the Glen Road Community Wildflower Garden south of Bloor Street East, which provides cultural woodland habitat for several native species. Within the footprint of the existing Glen Road Pedestrian Bridge, vegetation is limited to patchy cover by common vines and exotic invasive flora. Manicured lawn and residential / landscape plantings are also present, associated with condominiums near the north end of the pedestrian bridge and along the east side of Glen Road south of Bloor Street East.

3.5.3.1 Vegetation Communities:

Rosedale Valley within the study area contains four Deciduous Forest types and one Cultural Woodland. The forest types present are not well classified in the original Ecological Land Classification (ELC) (1998) due to a number of cultural influences on the area. Therefore, the community codes from the 2008 iteration of ELC types have been used. The forests existing in this portion of Rosedale Valley are on steep slopes with well-drained soils, dense canopy / sub-canopy cover and limited understory and ground flora.

The vegetation communities existing within the study area, along with their ELC code and names are described below (see **Exhibit 3-9** as reference):

Dry-Fresh Sugar Maple – Hardwood Deciduous Forest Type (FODM5-9)

Unit: 1

The northwest quadrant of the existing bridge is the only portion of the study area that contains a strong native Sugar Maple (Acer saccharum var. saccharum) component. The TRCA had classified this area as FOD5-8 (Sugar Maple-White Ash Deciduous Forest Type). However, due to the influx of Emerald Ash Borer in recent years, White Ash (*Fraxinus americana*) that once provided canopy cover are now dead or in very poor condition, though many are still standing. Other canopy / subcanopy species include occasional American Elm, Norway Maple (*Acer platanoides*), Black Walnut (*Juglans nigra*), and Horse Chestnut (*Aesculus hippocastanum*). Due to dense tree cover, the understory is limited to shade tolerant vines such as Riverbank Grape (*Vitis riparia*), Thicket Creeper (*Parthenocissus vitacea*), and Western Poison Ivy (*Toxicodendron rydbergii*), as well as some Alternate-leaved Dogwood (*Cornus alternifolia*) and Choke Cherry (*Prunus virginiana var. virginiana*). The ground layer includes occasional maple and ash regeneration as well as frequent Zig-zag Goldenrod (*Solidago flexicaulis*) and Garlic Mustard with occasional Canada Goldenrod (*Solidago canadensis*) and Japanese Knotweed (*Polygonum cuspidatum*). English Ivy (*Hedera helix*) is present at the top of the valley slope, near a garden edge associated with the adjacent condominium building.

Dry-Fresh Norway maple Deciduous Forest Type (FODM4-6)

Unit: 2 & 3

Unit 2, located at the northeast quadrant of the existing bridge, was classified as a Sugar Maple dominated area by the TRCA. Surveys conducted in 2016 found that while some Sugar Maple is present, the area is dominated by exotic Norway Maple (note that when young, these species can be difficult to distinguish from a distance). Unit 3 is located in the southwest quadrant and has a similar composition, but is younger and generally more disturbed (e.g., more litter, signs of recreational use, canopy gaps, and slope slumping / erosion issues). Similar to Unit 1, both of these areas have suffered the loss of some mature canopy ash in recent years. Other trees present include Black Walnut, Northern Red Oak (*Quercus rubra*), American Elm, and Horse Chestnut. The understory and ground layers are largely limited to tree regeneration, with abundant Garlic Mustard and a low diversity mix of common native woodland and exotic species. At the top of the north valley slope, several planted species –

Freeman's Maple (*Acer x freemanii*), White Spruce (*Picea glauca*), and Tartarian Honeysuckle (*Lonicera tatarica*) – are present, associated with the adjacent condominium building.

Dry-Fresh Norway maple – Red Oak Deciduous Forest Type (FODM4-A)

Unit: 4

Located in the southeast quadrant of the existing bridge, this area is characterized by a mix of mature super-canopy Red Oak (some over 50 cm dbh) and mid-aged Norway Maple. This area was incorrectly classified previously as being Sugar Maple-Ash dominated (though some ash were previously found in the canopy, surveys in 2016 confirmed that no Sugar Maple are present). Other trees include American Basswood (*Tilia americana*) and Black Walnut (*Juglans nigra*). Some young Horse Chestnut are also present. The understory includes Alternate-leaved Dogwood, Choke Cherry and Wild Red Raspberry (*Rubus idaeus ssp. strigosus*). The ground layer is fairly sparse, with frequent Garlic Mustard and occasional Greater Celandine (*Chelidonium majus*), Upright Yellow Wood Sorrel (*Oxalis stricta*), Enchanter's Nightshade (*Circaea lutetiana ssp. canadensis*) and Zig-zag Goldenrod. Japanese Knotweed, an aggressive invasive species, is abundant in the immediate vicinity of the existing bridge.

Dry-Fresh Black Walnut – Maple Forest Type (FODM4-B)

Unit: 5

This community is located towards the top of the south Rosedale Valley slope in the vicinity of the existing bridge, and extends north to Rosedale Valley Road farther east. Previously classified as dominated by Manitoba Maple, few were found to reach the canopy in 2016, though they were prevalent in the subcanopy and understory layers. This community is characterized by frequent Black Walnut and Norway Maple, with occasional Manitoba Maple and scattered American Elm, ash, Horse Chestnut and Black Locust. Along the edge nearest Bloor Street East, younger trees are generally present. The understory is limited to tree species regeneration with vines such as Riverbank Grape, Thicket Creeper, and Western Poison Ivy. The ground layer is comprised of abundant Garlic Mustard, frequent Enchanter's Nightshade and Wood Avens (*Geum urbanum*) as well as occasional Canada Goldenrod, Greater Celandine and White Avens (*Geum canadense*).

Mineral Cultural Woodland Type (CUW1)

Unit: 6

The Glen Road Community Wildflower Garden, on the east side of Glen Road south of Bloor Street East, has been created to provide woodland habitat for a number of native species. The canopy / subcanopy is limited to one mature Black Locust (likely a landscape planting pre-dating the community garden), with White Mulberry (*Morus alba*), Common Apple (Malus pumila), and American Elm (*Ulmus americana*). The understory consists of frequent Snowberry (*Symphoricarpos albus*) with some Rose (*Rosa sp.*) and Tartarian Honeysuckle (*Lonicera tatarica*). Some of the native wildflowers planted in this garden are Wild Crane's-bill (*Geranium maculatum*), Bloodroot (*Sanguinara canadensis*), Woolly Blue Violet (*Viola sororia*), Solomon's Seal (*Polygonatum sp.*) and Woodland Sunflower (*Helianthus divaricatus*). Invasive Garlic Mustard (*Alliaria petiolata*) is also present. Two of the species recorded – Snowberry and Woodland Sunflower – are locally rare, and are discussed further below.

3.5.4 FLORISTIC INVENTORY

During the field survey conducted in 2016, a total of 52 plant species were recorded within the study area. Of these species, three could not be identified beyond genus due to an absence of identifying characteristics (i.e., seasonal characteristics). Of the identified species, 34 (65%) are native, and 18 (35%) are non-native. Key findings include:

— No plant SAR or SCC are present within the study area.

— One species listed as locally rare in the City of Toronto (Varga et al. 2000) were recorded within the vicinity of the pedestrian bridge, Northern Red Oak (TRCA: L4). This species is naturally occurring on the south valley slope in the vicinity of the existing bridge.

— Four additional locally rare species were identified within the study area within planted areas. White Spruce (TRCA: L3) was planted at the top of the north valley slope, in a landscaped area associated with an adjacent condominium building. The other three species – Wild Crane's-bill (TRCA: L4), Woodland Sunflower (City of Toronto: XU; TRCA: L3), and Snowberry (City of Toronto: XU; TRCA: L2) – are planted in the Glen Road Community Wildflower Garden.

— Coefficient of Conservatism (CC) values for species recorded within the study area range from 0 to 7 with the majority (48%) ranging between 0 and 3 (low habitat sensitivity) and 4 to 6 (moderate habitat sensitivity). The two species that have a CC value of 7 – Woodland Sunflower and Snowberry – were planted within the Glen Road Community Wildflower Garden.

Please note that the CC value of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.

3.5.5 WILDLIFE

3.5.5.1 Avifauna

Breeding bird surveys were conducted within the study area on May 25, June 10 and July 4, 2016. Through the completion of these surveys as well as documentation of supplemental observations made during additional field visits, a total of 21 bird species were observed within the study area. A summary of key results, including level of breeding evidence, is highlighted below:

— Bird species observed were predominantly common, generalist, and urban-adapted; including species associated with the following habitats:

- Forest edge (e.g. American Robin [*Turdus migratorius*], Cedar Waxwing [*Bombycilla cedrorum*] and Chipping Sparrow [*Spizella passerina*]);

- Forest interior (e.g. Hairy Woodpecker [*Picoides villosus*] and Magnolia Warbler [*Setophaga magnolia*]);

— Of the 21 bird species observed, 17 species were recorded as having some 'breeding' evidence in features located adjacent to Right-of-Way (ROW).

— One SAR bird species listed as Threatened provincially and afforded protection under the ESA (2007) was observed within the study area: Chimney Swift (*Chaetura pelagica*). This species was observed foraging above the study area on all three visits. Nesting habitat of the species is not present within the study area.

— Six of the 21 species are considered locally significant by the TRCA. This includes one species ranked L3 (Regional Concern) and five species ranked L4 (Urban Concern). These species were all observed within the study area.

3.5.5.2 Herpetofauna

No herpetofauna (amphibian and reptile) species were observed during the 2016 field surveys. There is no suitable breeding habitat for amphibians (e.g., vernal pools, wetlands) in the study area or immediately surrounding lands. The Fact Sheets for the Rosedale Valley ESA and Rosedale Valley Extension also state that there were no amphibians or reptiles observed in the ESA and confirm that there is no amphibian breeding habitat present in the vicinity (City of Toronto 2012a, City of Toronto 2012b).

The study area and vicinity could support urban-adapted species such as, American Toad (*Anaxyrus a. americanus*), Dekay's Brownsnake (*Storeria dekayi*), Eastern Gartersnake (*Thamnophis s. sirtalis*), Eastern Red-backed Salamander (*Plethodon cinereus*) and Milksnake (*Lampropeltis t. triangulum*). No reptile hibernacula or potential hibernacula sites were noted on the subject property or vicinity.

3.5.5.3 Mammals

Mammal observations, including sightings and evidence of use (e.g. browse, tracks / trails, scat and burrows) were recorded during all field surveys. Observations of potential suitable bat maternity roosting habitat (cavity / snag trees, structures) within the study area were also noted.

In total, two common and expected mammal species were recorded in the study area during the 2016 site visits: Eastern Chipmunk (*Tamias striatus*) and Grey Squirrel (*Sciurus carolinensis*). Furthermore, one additional common mammal species, Eastern Cottontail (*Sylvilagus floridanus*), was confirmed in the study area during 2016 surveys along Dale Avenue for a proposed development project being undertaken.

The study area likely also supports other urban-adapted species such as Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), Red Fox (*Vulpes vulpes*), White-tailed Deer (*Odocoileus virginianus*), Striped Skunk (*Mephitis memphitis*) and Virginia Opossum (*Didelphis virginiana*) and a number of small mammals that often go undetected (for example shrews, voles, mice and bats). All of these species are relatively common throughout southern Ontario and

expected to occur in the study area. A complete list of species found in the study area is provided in **Appendix F**. No SAR or SCC mammals were found in the study area and all species have a provincial S-Rank of S4 or S5 (secure).

Four bat species including Little Brown Bat (*Myotis lucifugus*), Northern Long-eared Bat (*Myotis septentrionalis*), Tri-Coloured Bat (*Perimyotis subflavus*) and Eastern Small-Footed bat (*Myotis leibii*) have potential to occur within the study area. These species are provincially listed as Endangered and are afforded protection under the ESA (2007). Observations of several cavity/snag trees were observed adjacent to the bridge and may provide suitable roosting/maternity habitat for SAR bats. Bat exit surveys conducted in 2015 at buildings along Dale Avenue (as part of an adjacent development project) confirmed the presence of bats flying overhead and within the vicinity of the Glen Road Pedestrian Bridge and Tunnel EA study area. Additional bat surveys would be required during detail design should the proposed works result in tree removal.

3.5.5.4 Lepidoptera and Odonates

No Lepidoptera (butterflies and moths) or Odonates (dragonflies and damselflies) were recorded during the 2016 field surveys. One (1) Odonata species was recorded during 2015 field surveys in the vicinity of the study area along Dale Avenue: Common Green Darner (*Anax junius*). This species is common in Ontario (S-Rank of S5). NHIC data reported an uncommon Odonata species (S-Rank of S2S3), Unicorn Clubtail (*Arigomphus villosipes*), in the vicinity of the study area; however, no habitat for this species occurs in the study area (i.e. ponds, lakes or slow-flowing streams). No insect species were reported through the TRCA data.

Monarch (*Danaus plexippus*), which is provincially and federally listed as Special Concern, was not found in the study area during field surveys and there is no potential breeding habitat (i.e. Common Milkweed) for this SAR species within the study area.

3.5.5.5 Wildlife Movement Corridors

Rosedale Valley Ravine provides a natural wildlife movement corridor stretching east-west across a very developed part of the City. A range of common wildlife, including small mammals and birds likely use this ravine to travel between larger natural areas. The Rosedale Ravine is the first forested ravine system north of the Lake Ontario Shoreline and may function as a natural migratory stopover. The Rosedale Valley ESA is documented as a notable area for migrant songbirds with 3.1% of migrant songbird records from the City of Toronto recorded in Rosedale Valley. This natural wildlife movement corridor provides a linkage between shelter, foraging, breeding and/or wintering habitats and provides a natural route for juvenile dispersal as well as the dispersal of plant seeds that may be carried by wildlife to new habitats. This is important for maintaining biodiversity and sustaining long-term ecological integrity of the natural heritage system as a whole.

3.6 TREE INVENTORY

3.6.1 SITE CONDITIONS

The Glen Road Pedestrian Bridge is located within lands designated as the Rosedale Ravine Lands and is subject to the City of Toronto's Ravine and Natural Feature Protection (RNFP) By-law. A detailed inventory of the existing trees within the study area, and recommendations for tree protection, is provided in the Arborist Report in **Appendix G**.

Vegetation observed on both sides of the bridge is moderately dense, closed canopy and a mixture of mature native and non-native deciduous trees. Due to the dense canopy formed by the semi-mature to mature trees, the understory is minimal and primarily consists of saplings, small trees and a limited amount of shrubs and groundcovers that can tolerate dense shade. Specie composition differs on the north and south sides and therefore will be discussed below in two parts: South Side and North Side.

South Side –Rosedale Valley Drive to Bloor Street East

Vegetation inventoried on the south side, 15 m on either side of the bridge is generally closed canopy with a small opening directly under the bridge. Trees consist predominantly of deciduous semi-mature to mature trees, ranging in size from 10 to 91 cm DBH, the majority of which are 15 to 25 cm DBH. An abundance of Norway Maple (*Acer platanoides*) was observed with the occasional White Ash (*Fraxinus americana*), Horsechesunt (*Aesculus hippocastanum*), Basswood (*Tilia americana*) and Manitoba Maple (*Acer negundo*). To a lesser extent Ironwood (*Ostrya virginiana*), Tree of Heaven (*Ailanthus altissima*), American Elm (*Ulmus americana*), Black Locust (*Robinia psuedoacacia*) and Hawthorn (*Crataegus spp.*) were also observed.

Tree health ranges between good and poor; a majority observed to be in good condition. Signs of decline and defects were observed on a small amount of trees (see **Appendix G** for additional details).

North Side – Rosedale Valley Drive to Glen Road

On the north side vegetation was inventoried 15 m on either side of the bridge and much like the south side the canopy is dense/closed with a small opening directly under the bridge. Trees consist predominantly of deciduous semi-mature to mature trees, ranging in size from 10 to 78 cm DBH, the majority of which are from 15 to 25 cm DBH. Norway Maple was found to be abundant with the occasional White Ash, Sugar Maple (*Acer saccharum*), American Elm, Scotch Elm (*Ulmus glabra*), and Basswood. A rare amount of Ironwood, Horsechesnut, Black Walnut (*Juglans nigra*), Black Cherry (*Prunus serotina*), American Elm (*Ulmus americana*) and Red Oak (*Quercus rubra*) were also observed.

Tree health ranges between good and poor; a majority observed to be in good condition. Signs of decline and defects were observed on a small amount of trees (see **Appendix G** for additional details).

3.6.2 FIELD OBSERVATIONS

The field observations were conducted on November 17 & 18, 2016 along the north and south slopes from the bottom of slope adjacent to Rosedale Valley Road and top of slope at the bridge entry points. The limit of the inventory based on the 'Focus Area' was conducted 15 m on either side of the centre of the bridge. The purpose of the assessment was to identify species and evaluate the health of vegetation within this limit. Tree information recorded included species >10 cm diameter at breast height (DBH), saplings <10 cm DBH, dripline radius, location and general health condition. Trees were identified in accordance with the City of Toronto's Ravine and Natural Feature Protection by-law (Toronto Municipal Code, Chapter 658). All trees over 10 cm DBH have been tagged with aluminum numbered tree tags affixed to the trunk with a galvanized ¼" roofing nail (i.e.: 524). Trees labelled alphabetically were done so due to inaccessibility (enclosed by fencing at abutments)

A total of 153 trees were assessed for this report (tree tag's 524 to 666 and A to G): Eighty-seven (87) trees (524 to 610 & A to F) on the south side; and fifty-six (56) trees (611 to 666 & G) on the north side. Three hundred and ten (310) saplings (trees <10 cm DBH) were observed on both slopes: 162 on the south side; and 148 on the north side.

The assessment of impacts and recommended mitigations is provided in the Arborist Report in **Appendix G**, and summarized in **Chapter 8** of this ESR.

3.7 CONTAMINATION

A Phase One Environmental Site Assessment (ESA) was completed in August 2016, to identify actual and potential sources of environmental liabilities associated with the current and historical operation of the properties within the study area. Properties within the study area were classified as being an Area of Potential Environmental Concern (APEC) with high, moderate or low potential for contamination. Based on the property classification, the need for additional environmental investigations was considered. Details regarding the Phase One ESA and contamination investigation are provided in **Appendix H**.

The following classifications of properties within the Study Area were identified:

APECs with High Potential for Contamination

1 441 Bloor Street East, adjacent to the southwest boundary of the Site.

2 40 Glen Road, adjacent to the northwest boundary of the Site.

APECs with Moderate Potential for Contamination

1 1A Dale Avenue, adjacent to the northeast boundary of the Site.

A contaminant investigation was carried out in accordance with the current best practices, as outlined in the Canadian Standards Association (CSA) Z769-00 (R2013) Phase II Environmental Site Assessment, and in general accordance with the requirements of Ontario Regulation (O.Reg.) 153/04, and the Ministry of the Environmental Climate Change (MOECC) Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario ("MOECC Guidance Document").

The scope of work for the investigation including the sampling and analysis of soil, groundwater, and pavement samples.

Based on the results of the laboratory analysis of the submitted soil samples, exceedances to the MOECC Table 3 SCS were noted. Detectable concentrations of organic nitrogen and TKN were observed.

Based on the results of the laboratory analysis of the submitted groundwater samples, exceedances to the MOECC Table 3 SCS were noted.

The asphalt cores collected and analyzed for asbestos content identified no asbestos fibres in any of the asphalt samples.

Details regarding the Phase One ESA and contamination investigation are provided in **Appendix H**.

3.8 UTILITIES

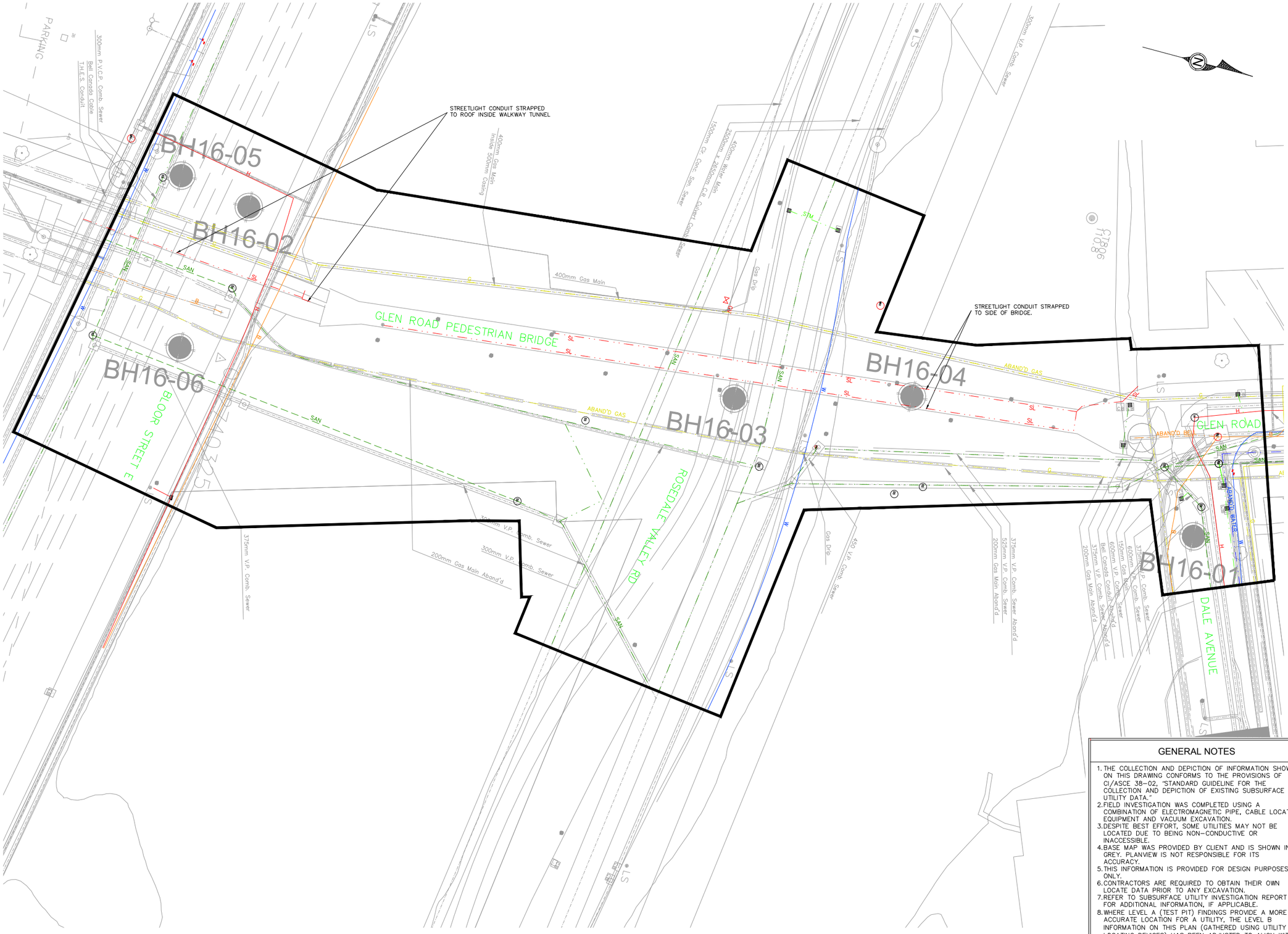
Table 3-1 is a basic summary of the existing utilities present within the study area context. Utility providers were contacted as part of the consultation process to confirm the presence of these utilities. A field investigation was completed using a combination of electromagnetic pipe, cable locate equipment, and vacuum excavation. Some utility information has been extracted from other sources such as engineering drawings and City GIS mapping, to supplement information provided by utility authorities.

Table 3-1: Existing Utilities

Utility	Locations
Bell Canada	Bell Conduits are located in the following locations: — East-west along north side of Bloor Street East — Continuous line between the west side of Glen Road and the south side of Dale Avenue (there is a small portion of the bell conduit line along Glen Road that extends back to the north side bridge entrance that is abandoned) — North-south along Glen Road on the south side of the bridge and tunnel — North-south along the centre line of Glen Road on the north side of the bridge, however it is abandoned
Watermain	Watermain lines run along the following locations: — Along the south side of Bloor Street East — Continuous line between centre of Glen Road and north side of Dale Avenue

	— Continuous line between centre of Glen Road and north side of Dale Avenue, however it is abandoned
Hydro	Hydro lines run along the following locations: — Perpendicularly crosses Bloor Street East and continues east along the north side of Bloor Street East, just south of the bridge — Continues line from west of Glen Road to north side of Dale Avenue
Gas	400 mm gas main lines inside 500 mm casings run along the following locations: — North-south along the stretch of the tunnel on the west side, however, it is abandoned — Underneath existing tunnel, and continuing west of the existing bridge.
Streetlight	Streetlight Conduits are located at the following locations: — Strapped to the roof along east side of the tunnel underneath Bloor Street East — Along both east and west side of the bridge
Sanitary Sewer	Sanitary Sewer are location at the following locations: — East side of the tunnel — Along south side of Bloor Street East — Continuous line between east side of Glen Road and Dale Avenue.

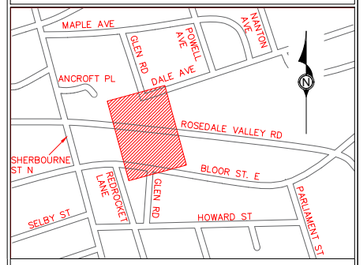
The potential impacts of these existing utilities during construction are noted in **Chapter 7**, and will be confirmed during detail design.



GENERAL NOTES

1. THE COLLECTION AND DEPICTION OF INFORMATION SHOWN ON THIS DRAWING CONFORMS TO THE PROVISIONS OF CI/ASCE 38-02, "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."
2. FIELD INVESTIGATION WAS COMPLETED USING A COMBINATION OF ELECTROMAGNETIC PIPE, CABLE LOCATE EQUIPMENT AND VACUUM EXCAVATION.
3. DESPITE BEST EFFORT, SOME UTILITIES MAY NOT BE LOCATED DUE TO BEING NON-CONDUCTIVE OR INACCESSIBLE.
4. BASE MAP WAS PROVIDED BY CLIENT AND IS SHOWN IN GREY. PLANVIEW IS NOT RESPONSIBLE FOR ITS ACCURACY.
5. THIS INFORMATION IS PROVIDED FOR DESIGN PURPOSES ONLY.
6. CONTRACTORS ARE REQUIRED TO OBTAIN THEIR OWN LOCATE DATA PRIOR TO ANY EXCAVATION.
7. REFER TO SUBSURFACE UTILITY INVESTIGATION REPORT FOR ADDITIONAL INFORMATION, IF APPLICABLE.
8. WHERE LEVEL A (TEST PIT) FINDINGS PROVIDE A MORE ACCURATE LOCATION FOR A UTILITY, THE LEVEL B INFORMATION ON THIS PLAN (GATHERED USING UTILITY LOCATING DEVICES) HAS BEEN ADJUSTED TO ALIGN WITH MORE PRECISE TEST PIT INFORMATION, IF APPLICABLE.

KEY MAP (N.T.S)



CITY OF TORONTO

LEGEND

G	GASMAIN
B	BELL CANADA
FO	YORK REGION FIBER
TV	ROGERS CABLE
GTEL	GROUP TELECOM
CN	CN RAIL COM/SIGNAL
W	WATERMAIN
TC	TRAFFIC CONTROL
SL	STREETLIGHT
H	HYDRO
STM	STORM SEWER
SFM	SANITARY FORCE MAIN
SAN	SANITARY SEWER
	LEVEL B
	LEVEL C
	LEVEL D
	TEST PIT

SEAL:

CLIENT: MMM GROUP

NO.	DATE	DESCRIPTION	BY
2	15-FEB-17	LEVEL B ISSUED TO CLIENT	SM
1	8-FEB-17	LEVEL B SURVEY	SM

PLANVIEW Utility Services Ltd.

SUBSURFACE UTILITY INVESTIGATION

DESCRIPTION: LEVEL B SURVEY

AREA: GLEN ROAD PEDESTRIAN BRIDGE

DRAWN BY:	PLANVIEW NO.:	CLIENT NO.:
PLANVIEW	16-3-0023	

DRAWING NO.:	REVISION:	SCALE: 1:250
EXHIBIT 3-10	0	SHEET SIZE: 22x34
		DATE: 15-FEB-17

4 NEED AND JUSTIFICATION

Considering the transportation planning policy context, the existing conditions of the Glen Road Pedestrian Bridge and Tunnel, and planned developments in the area, the following problems and opportunities were identified:

- There is significant development plans in proximity to the study area for further intensification with the addition of high-rise residential apartments.
- The Glen Road Pedestrian Bridge is of cultural heritage value for contextual reasons and is a rare example of a steel rigid frame bridge with inclined legs within the City of Toronto.
- The emergency repairs completed in late 2014/early 2015 were required in less than the typical 25 year span between rehabilitation cycles, indicating some acceleration in the rate of deterioration.
- Despite the emergency work, the bridge remains in poor condition based on the latest inspection completed. Based on the repair works completed to date, the evaluation findings, and the current rate of primary member deterioration, the estimated remaining life expectancy of the bridge is 5 to 10 years (i.e. replace between 2020 to 2025, however this assumes additional repair from the 2014 emergency repairs), and a detailed visual inspection has been recommended every 12 months.
- Through public consultation, security concerns were raised, such as lack of adequate lighting, and occurrences of undesirable activities on the bridge and in the tunnel were voiced.
- Active transportation volume is likely to increase on the bridge and tunnel as developments such as the North St. James Town Development (6 Glen Road) and the St James Town CIP.

4.1 PROBLEM AND OPPORTUNITY STATEMENT

Phase 1 of the EA process involves the identification and description of the problem and opportunity. The Problem and Opportunity Statement was compiled based on the needs and justifications of the study noted above, and is as follows:

> *The Glen Road Pedestrian Bridge is a heritage structure, extending from Bloor Street East in the south to Glen Road in the north, passing over the Rosedale Valley. At the south end of the bridge, under Bloor Street East, is a pedestrian tunnel which provides a connection to Glen Road in the south and the TTC's Sherbourne Station.*
>
> *The bridge was identified as needing major improvements. Emergency repairs completed in 2015, extending the timeframe to undertake this Environmental*

Assessment Study, which will determine the future of the bridge. Concerns about personal safety in the pedestrian tunnel have been identified.

Opportunities to increase natural surveillance in the tunnel area will also be considered.

Alternatives will be developed and evaluated, considering all active transportation users. Opportunities to improve safety in the tunnel area will be considered.

5 ALTERNATIVE SOLUTIONS

The Environmental Assessment for Municipal Road Projects, Schedule 'C' requires that, once the need is determined (Phase 1), planning alternatives (alternative solutions) be considered (Phase 2). This ensures that there is reasonable and adequate justification to proceed with the proposal and that the need for the project is clearly demonstrated.

Chapter 3 of this report provides a summary of the existing conditions in the study area (socio-economic environment, cultural environment, structural condition of the bridge and tunnel, natural environment, and transportation). **Chapter 4** identified the need to address the deteriorating condition of the bridge while preserving the cultural heritage value of the bridge within the context of its environment. Additionally, there is a need to improve the natural surveillance on the bridge, in the tunnel and at the approaches to improve security for those who use the bridge and tunnel.

Planning alternative solutions represent reasonable means of addressing the stated problems and opportunities. They provide an opportunity to examine, in a broad and general perspective, fundamentally different ways of addressing the problems and opportunities identified. A 'doing nothing' scenario is usually included as a "base case" for comparison.

5.1 EVALUATION CRITERIA AND METHODOLOGY

Alternative solutions were assessed against their ability to reasonably address the problems and opportunities, usually based on criteria related to the socio-economic, cultural and natural environment, technical, transportation, and cost. These evaluation criteria were refined with input from stakeholders including the public.

The evaluation methodology used for the study alternatives included documenting the benefits and impacts in relation to the given criteria, which was reviewed with the Project Team, agencies, stakeholders, and the publics. A preliminary preferred solution(s) was identified based on a qualitative evaluation of the benefits and impacts.

Table 5-1 describes the evaluation criteria used to assess the alternatives. Some of the criteria are only relevant to either the bridge or the tunnel, and therefore not all criteria are used for both evaluations.

Table 5-1: Evaluation Criteria

Evaluation Criteria	Description
Engineering 	— Address existing and future structural needs — Minimize construction constraints and complexity — Minimize utility impacts
Cultural Heritage 	— Effects on cultural heritage resources and landscapes in terms of: • Design or physical value • Historical or associative value • Contextual value
Transportation Planning 	— Address existing and future active transportation needs — Maintain/improve network connectivity — Minimize impacts to existing access points
Natural Environment 	— Potential temporary and permanent impacts to existing natural environmental features including vegetation and wildlife
Socio-Economic 	— Support existing and future community planning — Potential temporary and permanent impacts to adjacent properties — Provide improved natural surveillance (Crime Prevention through Environmental Design, CPTED)
Urban Design 	— Potential to provide improved aesthetic design features on bridge, tunnel and landing areas through: • Lighting • Materials • Streetscape
Cost 	— Comparative costs including: • Capital construction • Operation/maintenance • Utility relocation

Although the bridge and tunnel are adjacent, forming a single path, each has its own distinct problems and opportunities, and were therefore evaluated independently of each other. However, in order to provide a consistent experience through the bridge and tunnel, the overall effect of the bridge or tunnel design as a whole was considered throughout the design and assessment process.

5.2 BRIDGE ALTERNATIVE SOLUTIONS

Four alternative solutions were considered to address the deteriorating condition of the Glen Road Pedestrian Bridge as follows:

- Alternative 1: Do Nothing
- Alternative 2: Rehabilitate the Existing Bridge
- Alternative 3: Replace Bridge in Same Location
- Alternative 4: Replace Bridge in Different Location

The four bridge alternative solutions are described below, and the assessment and evaluation is presented in **Section 5.2.5**.

5.2.1 ALTERNATIVE 1: DO NOTHING

The 'Do Nothing' alternative is the status quo, and the bridge would remain 'as is'. This alternative would allow the bridge to deteriorate until such a time that the conditions would require closure and removal of the structure likely within 5 to 10 years.

5.2.2 ALTERNATIVE 2: REHABILITATE THE EXISTING BRIDGE

Rehabilitating the existing bridge would address deteriorating sections of the existing bridge to achieve a safe structure in the short term. This alternative attempts to address the deteriorating condition of the structure while maintaining the heritage value of the bridge, and the connections between communities of Rosedale and St. James Town, and connections to Bloor Street East and the TTC Sherbourne Station.

5.2.3 ALTERNATIVE 3: REPLACE BRIDGE IN SAME LOCATION

This alternative would replace the bridge with a new one in the same location. The north and south limits of the bridge, at Dale Road/Glen Road in the north and at the tunnel to the south, would generally remain in the same location (minor adjustments may be considered).

5.2.4 ALTERNATIVE 4: REPLACE BRIDGE IN NEW LOCATION

This alternative would replace the existing bridge with a new one in a different location. The north and/or south limits of the bridge would be located in a new location(s). The change in location would be a significant shift (i.e., more than just a minor adjustment as noted for Alternative 3).

5.2.5 ASSESSMENT AND EVALUATION OF BRIDGE ALTERNATIVE SOLUTIONS

All four alternative solutions were evaluated based on the evaluation criteria summarized in **Table 5-1**. A summary of the assessment and evaluation is provided below for each alternative and summarized in **Table 5-2**. The detailed assessment and evaluation tables are provided in **Appendix I**.

Alternative 1 – Do Nothing

This alternative does not address the structural needs of the bridge, maintain the existing heritage value of the bridge, or the active transportation connections associated with it. Some natural benefits to the valley if the bridge was removed. The cost of this alternative would include the ongoing structural inspections and eventual removal of the structure. Does not provide opportunity for urban design improvements.

Alternative 2 – Rehabilitate the Existing Bridge

This alternative would require frequent and progressively more expensive rehabilitations and structural investigations yet does not address the long term structural needs of the bridge, as even with rehabilitation, the structure would eventually be required to be removed due to continuing deterioration of the primary bridge elements. Therefore, this alternative does not maintain the heritage value of the bridge, the crossing or the active transportation connections in the long term. Some natural benefits to the valley if the bridge was removed. Does not provide opportunity for urban design improvements.

Alternative 3 – Replace Bridge in Same Location

This alternative addresses the long term structural needs of the bridge, and can best maintain the heritage value of the bridge and the crossing by providing a new bridge in the same location. The new bridge could also be designed to be sympathetic to the heritage value of the existing bridge, and maintains the historical and active transportation connections. This alternative has a moderate cost compared to the other alternatives, and there would be cost savings in using the existing landing areas for the new bridge. Potential for some additional natural environment impacts to the valley. Provides opportunity for urban design improvements.

Alternative 4 – Replace Bridge in New Location

This alternative addresses the long term structural needs of the bridge, and can maintain some of the heritage value of the existing bridge, but as it would be in a different location, it would maintain less value than Alternative 3. The location for the bridge crossing would change the existing connections to the active transportation network and would alter the existing connection to the Sherbourne Subway Station. This alternative would be more expensive than Alternative 3 due to the additional costs of building new abutments and foundations in new locations. Provides opportunity for urban design improvements.

Summary: Alternative 3 is the preferred bridge alternative solution as it addresses the long term needs of the bridge, maintains the heritage crossing, and maintains connections to active transportation and transit facilities. It also provides an opportunity to mitigate impacts to the cultural heritage value of the structure by maintaining the existing pedestrian crossing, and provides opportunities to improve urban design elements.

Table 5-2: Assessment and Evaluation of Bridge Alternative Solutions

Criteria	Alternative 1 Do Nothing	Alternative 2 Rehabilitate the Existing Bridge	Alternative 3 Replace Bridge in Same Location	Alternative 4 Replace Bridge in New Location
Bridge Engineering	✘ Does not address structural needs	✘ Does not address long term structural needs	✓ Addresses long term structural needs	✘ Addresses long term structural needs, but need to determine new bridge location
Cultural Heritage	✘ Once bridge is removed, does not maintain heritage value of bridge or crossing	✘ Does not maintain heritage value of bridge crossing in long term	✓ Maintains heritage value of bridge crossing	✘ Removes heritage value of current crossing
Transportation Planning	✘ Once bridge is removed, does not maintain connection to transit station or active transportation network	✘ Does not maintain connection to transit station or active transportation network in long term	✓ Maintains connection to transit station and active transportation network in long term	✘ Removes direct connection to transit station, but maintains connection to active transportation network
Natural Environment	✓ Potential improvements to environment under the bridge once it is removed	✓ Potential improvements to environment under the bridge once it is removed	✘ Some potential impacts with new foundation and potentially wider structure	✘ Most impact to build bridge in new location
Socio-Economic Environment	✘ Once bridge is removed, no connection from Rosedale to Bloor Street East and transit facilities	✘ Eventually removes connection from Rosedale to Bloor Street East and transit facilities	✓ Maintains connections from Rosedale to Bloor Street East and transit facilities	✓ Maintains connection from Rosedale to Bloor Street East, but no direct connection to transit
Urban Design	✘ No opportunity for design improvements	✘ No opportunity for design improvements	✓ Opportunity for design improvements	✓ Opportunity for design improvements
Cost	• Minimum cost to remove bridge once deemed unsafe	• Cost for rehabilitation with increasing frequency and cost to remove bridge once deemed unsafe	• Cost to replace structure	• Most expensive to build bridge in new location
Evaluation Summary	**Not Recommended**	**Not Recommended**	**Carry Forward**	**Not Recommended**

5.2.6 RECOMMENDED BRIDGE ALTERNATIVE SOLUTION

Based on the assessment provided in **Section 5.2.5** and **Table 5-2**, the recommended bridge alternative solution is to replace the bridge in the same location. This addresses the long term needs of the bridge, maintains the heritage crossing, and maintains connections to active transportation and transit facilities. It also provides opportunity to mitigate impacts to the cultural heritage value of the structure, and opportunities to improve urban design elements.

5.3 TUNNEL ALTERNATIVE SOLUTIONS

Based on extensive consultation with the area councillors and community stakeholders, the original scope of work was expanded to include the pedestrian tunnel which is immediately south of the pedestrian bridge. The Glen Road Pedestrian Bridge and Tunnel EA Study provides an opportunity to improve the natural surveillance around the tunnel, expand the active transportation capacity of the tunnel, and improve the urban design features in and around the tunnel to provide a sense of place for the neighbourhoods north and south.

Three alternative solutions were considered for the tunnel as follows:

— Alternative 1: Do Nothing

— Alternative 2: Aesthetic Modifications

— Alternative 3: Replace and Reconstruct a Wider Tunnel

The three tunnel alternative solutions are described below and the assessment and evaluation is presented in **Section 5.3.4**.

5.3.1 ALTERNATIVE 1: DO NOTHING

The ‘Do Nothing’ alternative is the status quo, and the tunnel would remain ‘as is’. The tunnel would remain in service for another 20-45 years, until it would require replacement.

5.3.2 ALTERNATIVE 2: AESTHETIC MODIFICATIONS

This alternative would provide aesthetic improvements to the existing tunnel including new lighting, materials, and art work. The existing tunnel dimension would remain the same.

5.3.3 ALTERNATIVE 3: REPLACE AND RECONSTRUCT A WIDER TUNNEL

In addition to aesthetic modifications of Alternative 2, this alternative would replace the existing tunnel with a wider tunnel structure, as well as improved lighting, materials and art work.

5.3.4 ASSESSMENT AND EVALUATION OF TUNNEL ALTERNATIVE SOLUTIONS

All three alternative solutions were evaluated based on the evaluation criteria summarized in **Table 5-1**, however Cultural Heritage and Natural Environment were not considered

distinguishing criteria for the tunnel, and were not included in this assessment. A summary of the assessment and evaluation is provided below for each alternative and summarized in **Table 5-3**, and the detailed assessment and evaluation tables are provided in **Appendix I**.

Do Nothing – No Tunnel Improvements

This alternative does not improve the natural surveillance around the tunnel, or provide for the future increase in active transportation. Although no capital costs, the life cycle costs are more than Alternative 2, and include the eventual replacement of the tunnel at the end of the service life.

Alternative 1 – Aesthetic Modifications

This alternative improves the natural surveillance around the tunnel by providing improved lighting, and by improving the materials and art in the tunnel and approaches. This alternative, however, is limited in the improvements available as the physical tunnel structure remains the same. The sightlines between the bridge, tunnel, and Glen Road would not be improved with this alternative. This alternative has costs associated with tunnel improvements, the new lighting and materials provided for the tunnel, and it has the lowest life cycle cost, as complete replacement of the tunnel is deferred the longest.

Alternative 2 – Replace and Reconstruct Wider Tunnel

This alternative has the best opportunity to improve the natural surveillance by widening the physical tunnel structure, and improving the sightlines between the bridge, tunnel, and Glen Road. This alternative also includes aesthetic improvements of Alternative 1, to improve the lighting, and urban design in the tunnel and approaches. This is the most costly alternative and has additional impacts to Bloor Street East during construction, but can accommodate future increases in pedestrian traffic from the proposed developments in the area.

Summary: Alternative 2 is the preferred tunnel alternative solution as it provides the best opportunity to enhance the natural surveillance in the tunnel and approaches. Although this is the most expensive alternative, it provides the most benefits, and there could be cost savings in combining the bridge and tunnel replacements.

Table 5-3: Assessment and Evaluation of Tunnel Alternative Solutions

Criteria	Do Nothing No Tunnel Improvements	Alternative 1 Aesthetic Modifications	Alternative 2 Replace and Reconstruct Wider Tunnel
Socio-Economic Environment	✓ Maintains existing connection between bridge and Glen Road, south of Bloor Street East, until tunnel needs to be removed. ✘ Does not improve sightlines or lighting for natural surveillance.	✓ Maintains existing connection between bridge and Glen Road, south of Bloor Street East, and extends service life of tunnel. ✘ Opportunity to improve lighting to allow better sightlines for natural surveillance limited to existing tunnel.	✓ Maintains existing connection between bridge and Glen Road, south of Bloor Street East, and extends service life of tunnel more than Alternative 1. ✓ Opportunity to improve lighting and sightlines with wider structure to improve natural surveillance.
Transportation Planning	✘ Maintains existing tunnel conditions. ✘ Maintains existing conflict points between pedestrians and cyclists.	✘ Maintains existing tunnel conditions. ✘ Maintains existing conflict points between pedestrians and cyclists.	✓ Provides additional width for added tunnel capacity. ✓ Minimizes conflict points and provides better sightlines.
Urban Design	✘ Maintains existing tunnel conditions.	✘ Potential for aesthetic improvements limited to existing tunnel. ✘ Provides opportunity to improve existing landing areas at tunnel.	✓ Provides potential for enhanced aesthetic improvements to the new and wider tunnel, opportunities for public art, etc. ✓ Provides additional space for landing area north and south of tunnel for enhanced designs.
Structural Engineering	✘ Existing tunnel will require replacement in 20 years. ✓ No utility impacts, constructability or staging concerns	✓ Extends service life of tunnel from 20 to 40 years until replacement is required. ✓ No utility impacts, constructability or staging concerns	✓ Replacement of tunnel during bridge construction. ✓ New tunnel service life is 75 years. ✘ Potential utility impact and staging requirements along Bloor Street East, and reduction to 2 lanes.
Cost	• Replace tunnel in 20 years at end of service life • Total capital cost plus future maintenance as present day value - $2.46 M	• Aesthetic modifications - $0.3 M • Total capital cost plus future maintenance as present day value - $1.31 M	• Tunnel reconstruction - $4.16 M • Total capital cost plus future maintenance as present day value - $4.32 M
Evaluation Summary	**Not Recommended**	**Not Recommended**	**Carried Forward**

Most preferred/ Least impacts ... Least preferred/ Most impacts

5.3.5 RECOMMENDED TUNNEL ALTERNATIVE SOLUTION

Based on the assessment provided in **Table 5-3**, the recommended tunnel alternative solution is to replace and reconstruct a wider tunnel. This provides the best potential to improve natural surveillance around the tunnel by increasing sightlines between the bridge, tunnel, and Glen Road, and the best opportunity to accommodate future increase in active transportation traffic. With the reconstruction of the tunnel, it also provides the best opportunity to enhance the urban design features in the area with wider tunnel and larger landing areas.

5.4 REVIEW DURING FIRST ROUND OF CONSULTATION

The existing conditions, problem and opportunity statement, and bridge alternative solutions were presented at the first Public Information Centre (PIC). No specific changes to the bridge alternative solutions were suggested by the public at PIC #1. The overall general feedback was as follows:

- Consistent support for replacing the bridge in its current location, with general preference for a similar simple design;
- Desire for personal security improvements in and around the tunnel connection; and
- Competing views on whether cycling should be accommodated and if so, should cycling be separated.

Additional information on PIC #1 and how comments were addressed is included in **Appendix A**.

5.5 CONFIRMATION OF THE RECOMMENDED ALTERNATIVE SOLUTION

After considering all the feedback received from the public, and community stakeholders during the first Public Information Centre, and the technical evaluation summarized in **Sections 5.2.5** and **5.3.4**, the recommended alternative solutions are to:

- **Replace the bridge in the same location, and**
- **Replace and reconstruct a wider tunnel**

These have the greatest potential to address the problems and opportunities summarized in **Chapter 4**. These provide opportunities to:

- Address the deteriorating condition of the bridge structure;
- Increase natural surveillance around the tunnel with improved sightlines, lighting, and redesign of accesses;
- Accommodate additional capacity for active transportation users with a wider bridge and tunnel;
- Improve the bridge, tunnel and landing areas with enhanced aesthetic treatments.

6 DESIGN ALTERNATIVES

Phase 3 of the EA process involves the development and evaluation of alternative design concepts. Having established the need for improvements to the Glen Road Pedestrian Bridge and Tunnel (Phase 1 discussed in **Chapter 3** and **4**), and selected a recommended solution (Phase 2 discussed in **Chapter 5**), this next study phase involved the following activities:

- Developed a bridge and tunnel cross-section concept for the recommended planning alternative (**Section 6.1**);
- Developed and reviewed bridge type design concepts (**Section 6.2**);
- Developed and reviewed tunnel reconstruction design concepts (**Section 6.3**);
- Developed the bridge and tunnel Recommended Design Alternative (**Section 6.4**)
- Review barrier-free access alternatives (**Section 6.5**)
- Reviewed input gathered from public and agency during the second round of public consultation (**Section 6.6**)
- Refined the preliminary preferred design based on feedback received from agencies and the public and identified a preliminary Recommended Design.

The bridge and tunnel design alternatives (noted in **Chapter 6**), were developed and evaluated separately. However, in order to provide a consistent design through the bridge and tunnel, the overall effect of the bridge or tunnel design as a whole was considered throughout the design and assessment process.

6.1 BRIDGE AND TUNNEL CROSS-SECTION ASSESSMENT

The existing bridge and tunnel cross-section widths are 3.1 m and 2.9 m respectively. Prior to developing bridge and tunnel design alternatives, alternate cross-section widths were considered. Considerations for the cross-section widths included the types and volumes of users, seasonal activity, City's multi-use path design guideline, and maintenance and operations.

Based on the pedestrian survey conducted for bridge users (see **Section 3.4.3**), it was found that the bridge and tunnel were used by a wide variety of user types including, pedestrians, cyclists, strollers, dog walkers etc. It was also noted that although there is a sign directing cyclists to dismount on the bridge, most do not dismount, based on the survey results. As the bridge is a key connection to the Sherbourne TTC Station, it is a connection used year-round, with added recreational traffic in the non-winter seasons. The bridge also provides an excellent view of the Rosedale Valley; pedestrians frequently stop in the middle of the bridge.

The bridge cross-section should also accommodate maintenance vehicles for snow removal and some snow storage, while still providing adequate space for pedestrians.

In order to provide a unified design across the bridge and tunnel, the bridge and tunnel cross-sections were assumed to be the same (i.e., have the same overall width). The cross-section

alternatives were developed based on the Toronto Multi-Use Trail Design Guidelines (2015). The Guidelines consider three types of trails (Secondary, Primary, and High-Capacity), and indicates the minimum, default, and exemplary cross-section elements for each type. Alternate cross-section widths were considered for assessment including 3.9 m (Secondary Trail), 4.2 m (Primary Trail), and 4.8 m (High-Capacity Trail), which are based on the minimum widths for each type of trail. All alternatives included 0.6 m buffers on each side with a centre path of varying widths, per the Guidelines.

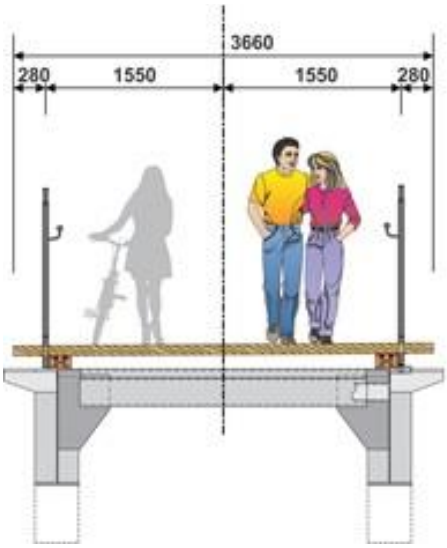
Although the bridge and tunnel are not specifically designated as part of the multi-use trail network, it is considered a High-Capacity Trail due to the volume of pedestrian and cyclist traffic, the wide variety of users, and available destinations including the TTC station and shopping centres. The bridge itself is also considered a destination for users to stop and look over the Rosedale Valley. Thus a 4.8 m width is recommended.

Exhibit 6-1 illustrates the existing and proposed cross-section for the bridge and tunnel, which includes a 3.6 m center multi-use trail and 0.6 m buffers on each side (totalling 4.8 m). The wider cross-section provides sufficient space for the variety of users to comfortably use the bridge and tunnel together, and the additional buffer gives users the opportunity to stop along the bridge without impeding on other traffic.

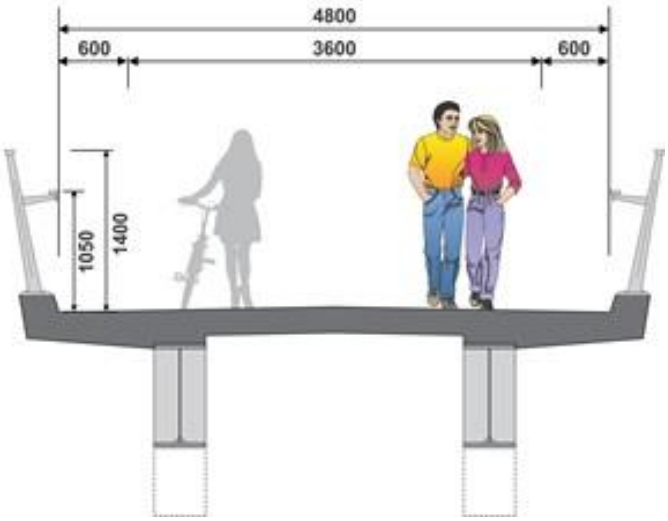
The new deck will be concrete with potential additional coating for accessibility and aesthetics. The full concrete deck will allow for adequate drainage of water and salt/de-icing, away from the steel substructure to prevent enhanced deterioration.

Exhibit 6-1: Existing and Proposed Bridge and Tunnel Cross-Section

Existing



Proposed



6.2 BRIDGE TYPE DESIGN ALTERNATIVES

The bridge type design alternatives were considered based on the study area topography and ability to be sympathetic to the cultural heritage value of the existing bridge, and include the following:

- Alternative 1: Steel Girder with Two Inclined Steel Legs
- Alternative 2: Steel Girder with Two Vertical Concrete Piers
- Alternative 3: Post Tensioned Concrete Box Girder with Two Vertical Concrete Piers

Exhibit 6-2 to **Exhibit 6-4** provide illustrations of the three bridge type alternatives (the existing bridge is marked by a dashed line). The three bridge type design alternatives are described below and the assessment and evaluation is presented in **Section 6.2.4**.

A fourth alternative, steel pre-fabricated truss with two vertical concrete piers, was also reviewed by the Project Team, but not carried forward as part of the design alternatives based on early screening, although this alternative was considered to have the lowest cost.

6.2.1 ALTERNATIVE 1: STEEL GIRDER WITH TWO INCLINED STEEL LEGS

This design alternative has the same bridge type as the existing bridge, which has steel girders and inclined steel legs. The location of the inclined leg footings would be slightly different than the existing structure, and the angle between the inclined legs and the bridge deck would also be slightly adjusted, to optimize the bridge span lengths. The construction of this bridge would be more complicated than a standard structure, as it is not a common design, and would require additional staging on the valley slopes.

Exhibit 6-2: Renderings of the Bridge Type Design Alternative 1

Alternative 1: Steel Girder with Two Inclined Steel Legs

6.2.2 ALTERNATIVE 2: STEEL GIRDER WITH TWO VERTICAL CONCRETE PIERS

This design alternative is similar to Alternative 1, with vertical concrete piers. The construction of the concrete piers is a more standard construction method, and does not require as much penetration on the valley slopes as Alternative 1.

Exhibit 6-3: Renderings of the Bridge Type Design Alternative 2

Alternative 2: Steel Girder with Two Vertical Concrete Piers

6.2.3 ALTERNATIVE 3: POST TENSIONED CONCRETE BOX GIRDER WITH TWO VERTICAL CONCRETE PIERS

This design alternative is similar to Alternative 2, as it has two vertical concrete piers, but it also has a post tensioned concrete box girder, instead of the steel girder in Alternatives 1 and 2. Due to the complex design of this alternative it would not be considered for pre-fabrication, which is typically only considered for more standard designs. This alternative would be required to be formed on-site, and would require significant formwork/ falsework for cast-in-place concrete, potentially affecting Rosedale Valley Road with additional and longer closures, if conventional construction methods are used.

Exhibit 6-4: Renderings of the Bridge Type Design Alternative 3

Alternative 3: Post Tensioned Concrete Box Girder with Two Vertical Concrete Piers

6.2.4 ASSESSMENT AND EVALUATION OF BRIDGE DESIGN ALTERNATIVES

All three bridge type design alternative were evaluated based on the evaluation criteria summarized in **Table 5-1**, however Transportation Planning was not considered a distinguishing criteria for the tunnel and was not included in this assessment. A summary of the assessment and evaluation is provided below for each alternative and summarized in **Table 6-1**. The detailed assessment and evaluation tables are provided in **Appendix I**.

Alternative 1: Steel Girders with Inclined Steel Legs

This is considered to be a unique bridge type which would add complexity to the design, construction, and staging, however would preserve the existing structure type by maintaining the inclined steel legs. This alternative would most preserve the heritage value of the existing bridge, and the clean lines and clear view from Rosedale Valley.

The potential for temporary impacts to existing natural vegetation is greater than for a conventional bridge, due to an increased staging area requirement.

There are no permanent property impacts, however there would be temporary disruption to adjacent properties during construction.

All alternatives provide opportunity to improve urban design features.

This is considered the high cost alternative; however all are in a relatively similar range (within 10% of each other).

Alternative 2: Steel Girders with Concrete Piers

This design alternative is considered to be a common structural design, and therefore the construction and staging could be accommodated by conventional methods. This design alternative, however, would not maintain the design or physical heritage value of the original structure as much as Alternative 1. It would also diminish the clear view from Rosedale Valley, as the concrete piers would be located in proximity to Rosedale Valley Road.

The potential for temporary impacts to existing natural vegetation is minimized due to a conventional construction method.

There are no permanent property impacts, however there would be temporary disruption to adjacent properties during construction.

All alternatives provide opportunity to improve urban design features.

The concrete piers would have reduced long term maintenance needs. This is considered the lowest cost alternative; however all are in a relatively similar range (within 10% of each other).

Alternative 3: Post Tensioned Concrete Box Girder with Concrete Piers

This design alternative is considered to be a common structural design, and therefore the construction and staging could be accommodated by conventional methods; however this requires significant cast-in place concrete formwork.

This alternative would not maintain the design and physical heritage value of the original structure. As with Alternative 2, it would also diminish the clear view from Rosedale Valley, as the concrete piers would be located in proximity to Rosedale Valley Road.

The potential for temporary impacts to existing natural vegetation is higher than the other alternatives due to the structure being formed on-site.

There are no permanent property impacts, however there would be temporary disruption to adjacent properties during construction longer than Alternatives 1 and 2.

All alternatives provide opportunity to improve urban design features.

The concrete piers and girder would have reduced long term maintenance needs. This is considered the moderate cost alternative; however all are in a relatively similar range (within 10% of each other).

Summary: Alternative 1 was identified as the preferred alternative because the bridge design is sympathetic to the cultural heritage value of the existing bridge by maintaining the existing bridge type and location and view from Rosedale Valley. Even though it would have slightly more impacts to the natural environment during construction compared to other alternatives, mitigation measures will be developed to minimize impacts where feasible.

Table 6-1: Bridge Type Design Alternatives Assessment and Evaluation

Criteria	Alternative 1: Steel Girders with Inclined Steel Legs	Alternative 2: Post Tensioned Concrete Box Girder with Concrete Piers	Alternative 3: Concrete Box with Concrete Piers
Structural Engineering	✖ Complex bridge design and construction method. ✖ Increased access complexity of steel legs during construction on valley slopes.	✓ Conventional bridge design and construction method. ✓ Relatively easier access of concrete piers during construction.	✖ Conventional construction method, but requires significant cast-in-place concrete formwork. ✖ Relatively easier access of concrete piers, but additional access required for concrete box construction.
Cultural Heritage	✓ Bridge type sympathetic to the cultural heritage value of the existing bridge by maintaining the existing bridge type and location, and view from Rosedale Valley.	✖ Bridge type not sympathetic to the cultural heritage value of the existing bridge type or view from Rosedale Valley.	✖ Bridge type not sympathetic to the cultural heritage value of the existing bridge type or view from Rosedale Valley.
Natural Environment	• Permanent impacts to valley vegetation limited at new bridge footings; similar for all alternatives. ✖ Temporary impacts to valley vegetation from larger construction area relatively moderate due to complex design.	• Permanent impacts to valley vegetation limited at new bridge footings; similar for all alternatives. ✓ Temporary impacts to valley vegetation from construction relatively less, due to conventional construction methods.	• Permanent impacts to valley vegetation limited at new bridge footings; similar for all alternatives. ✓ Temporary impacts to valley vegetation from larger construction area relatively high, due to more complex design and staging.
Socio-Economic Environment	✓ No permanent property impacts. ✖ Temporary disruption to adjacent properties due to construction methods; largely in valley.	✓ No permanent property impacts. ✖ Temporary disruption to adjacent properties due to construction methods; largely in valley.	✓ No permanent property impacts. ✖ Additional temporary impacts to adjacent properties for additional staging of on-site fabrication; largely in valley. ✖ Potentially longer disruption due to construction duration.
Urban Design	✓ All alternatives provide opportunity to improve lighting and materials of the bridge. ✓ All alternatives provide additional opportunity for aesthetic details to the bridge girders and legs.		
Cost	• Capital cost for structure: $7.9 M • Total life cycle maintenance: $1.0M	• Capital cost for structure: $6.1 M • Total life cycle maintenance: $0.9	• Capital cost for structure: $6.8 • Total life cycle maintenance: $0.3
Evaluation Summary	**Recommended**	**Not Recommended**	**Not Recommended**

Most preferred/ Least impacts — Least preferred/ Most impacts

6.3 TUNNEL DESIGN ALTERNATIVES

The preferred tunnel alternative solution was to reconstruct a wider tunnel (see **Section 5.3.5**). Three tunnel design alternatives were considered, including:

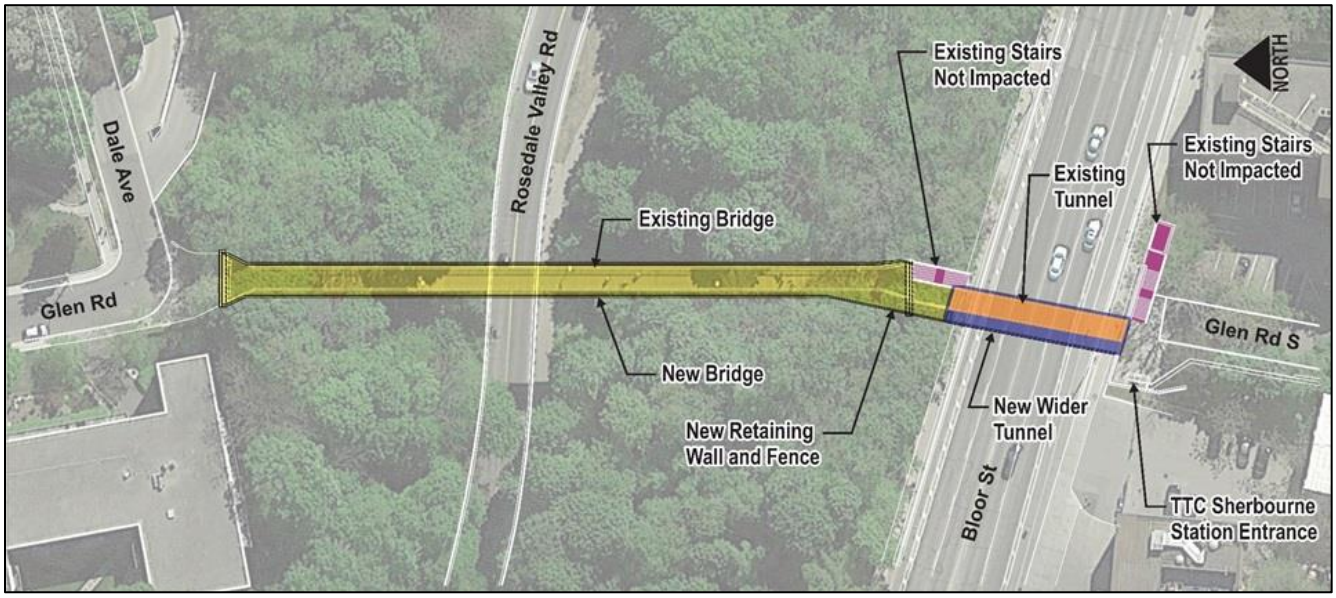
- Alternative 1: Reconstruct and Widen Tunnel to the West
- Alternative 2: Reconstruct and Widen Tunnel to Match Glen Road Alignment (to the East)
- Alternative 3: Reconstruct Tunnel on New Alignment (Match North End of Bridge to South End of Tunnel)

Exhibit 6-5 and **Exhibit 6-7** provides an illustration of the three tunnel widening alternatives in relation to the bridge connection. The three tunnel widening design alternatives are described below and the assessment and evaluation is presented in **Section 6.3.4**.

6.3.1 ALTERNATIVE 1: RECONSTRUCT AND WIDEN TUNNEL TO THE WEST

This alternative replaces the existing tunnel with a new wider structure, and widens to the west (i.e., holds the east wall of the tunnel). The existing tunnel would need to be completely replaced, as the current concrete box structure was not designed to accommodate the additional width.

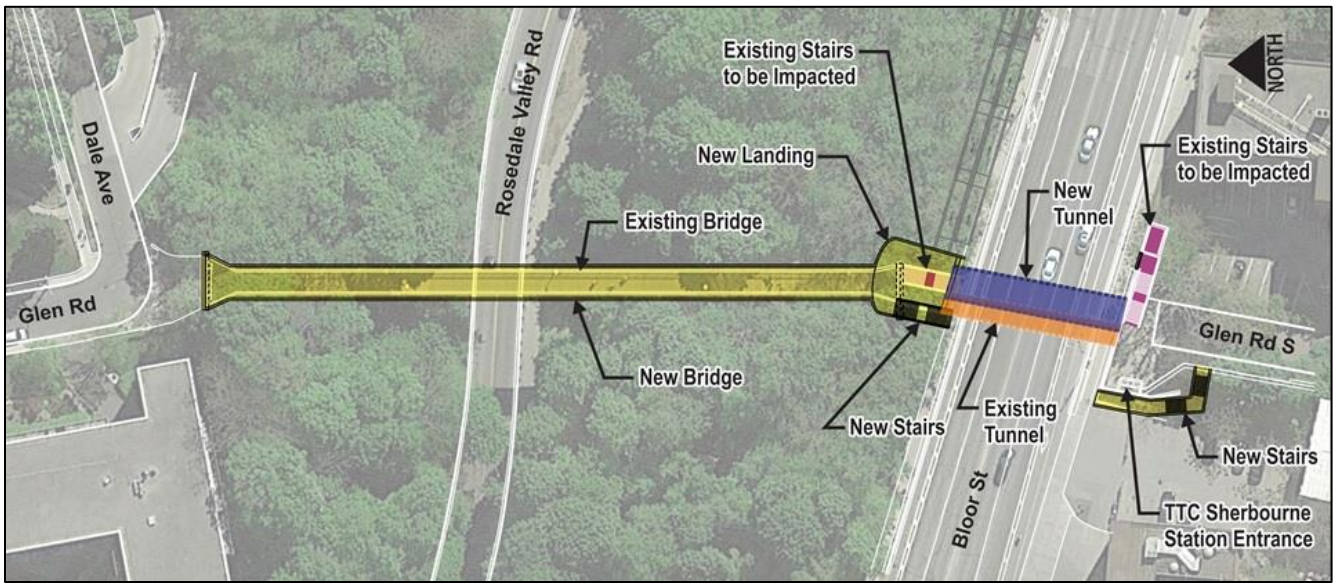
Exhibit 6-5: Alternative 1: Reconstruct and Widen Tunnel to the West



6.3.2 ALTERNATIVE 2: RECONSTRUCT TUNNEL TO MATCH GLEN ROAD ALIGNMENT (TO THE EAST)

This alternative replaces the existing tunnel with a new wider structure, and places the new tunnel on the same alignment as Glen Road to the south. This alternative was considered in order to provide better sightlines for pedestrians walking up Glen Road, to enable them to see through the tunnel.

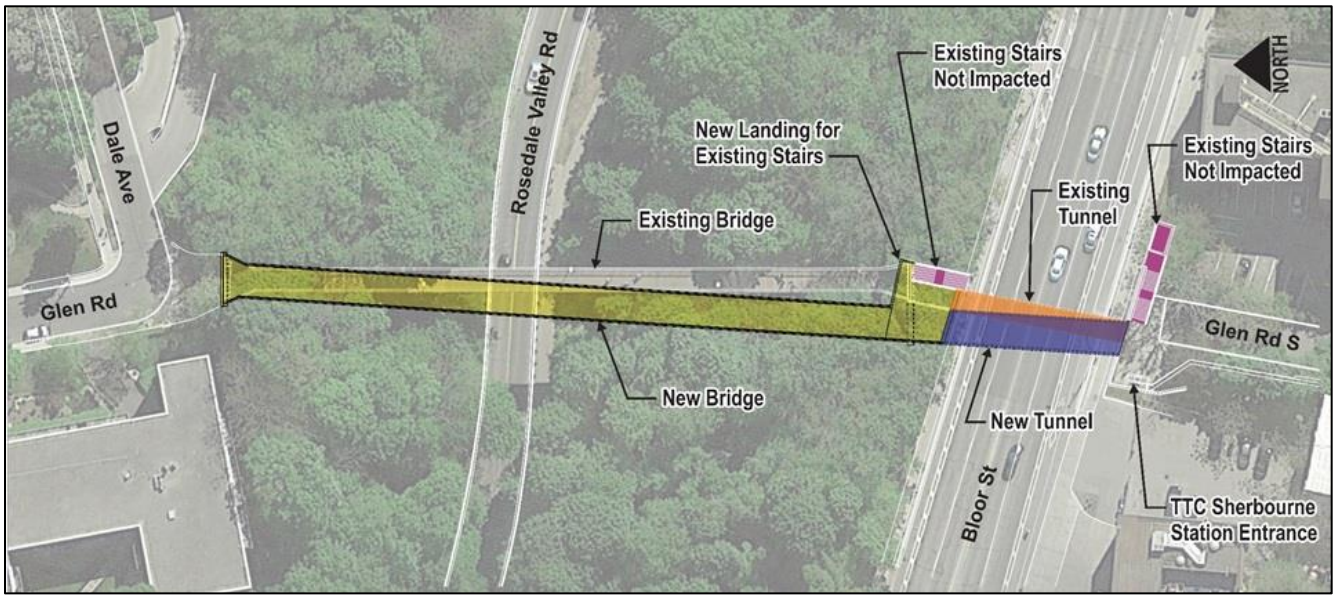
Exhibit 6-6: Alternative 2: Reconstruct and Widen Tunnel to Match Glen Road Alignment (to the East)



6.3.3 ALTERNATIVE 3: RECONSTRUCT TUNNEL ON NEW ALIGNMENT (MATCH NORTH END OF BRIDGE TO SOUTH END OF TUNNEL)

This alternative replaces the existing tunnel with a new wider structure, and places the new tunnel on a new alignment with the bridge. The new alignment is a direct line between the north end of the bridge and the south end of the tunnel.

Exhibit 6-7: Alternative 3: Reconstruct Tunnel on New Alignment (Match North End of Bridge to South End of Tunnel)



6.3.4 ASSESSMENT AND EVALUATION OF TUNNEL DESIGN ALTERNATIVES

All three design alternatives were evaluated based on the evaluation criteria summarized in **Table 5-1**, however Cultural Heritage was not considered distinguishing criteria for the tunnel, and was not included in this assessment. A summary of the assessment and evaluation is provided below for each alternative and summarized in **Table 6-2**. The detailed assessment and evaluation tables are provided in **Appendix I**.

All alternatives provide opportunity to improve the urban design in and around the tunnel.

Alternative 1: Reconstruct and Widen Tunnel to the West

All alternatives addresses the existing and future active transportation needs.

This alternative improves the natural surveillance around the tunnel by improving the sightlines between Glen Road, the bridge, and the tunnel.

This alternative has conventional construction methods and widening the tunnel to the west also minimizes the potential utility impacts, and impacts only the gas lines located west of the tunnel.

This alternative does not impact the existing access points to Bloor Street East, but does have some natural impacts around the tunnel entrance with additional landing area.

All alternatives provide potential for enhanced urban design features.

It has the relativley lowest cost as it does not impact utilities and remains on the same tunnel alignment.

Alternative 2: Reconstruct Tunnel to Match Glen Road Alignment (to the East)

All alternatives addresses the existing and future active transportation needs.

This alternative would not improve the natural surveillance around the tunnel, as it reduces the sightlines between the tunnel and the bridge, and the TTC entrance, albeit providing some improvements to the sightlines for people going to/from Glen Road.

The staircases north and south of Bloor Street East would be impacted, requiring reconstruction, relocation and additional staging.

This alternative has some additional natural environment impacts in Rosedale Valley due to the new landing area north of the tunnel.

All alternatives provide potential for enhanced urban design features.

The estimated cost for the reconstruction of the tunnel is slightly more than Alternative 1 due to the complexity, staging and utility impacts.

Alternative 3: Reconstruct Tunnel on New Alignment (match north end of bridge to south end of tunnel)

All alternatives addresses the existing and future active transportation needs.

This alternative decreases the natural surveillance between the tunnel and the TTC entrance from the existing, and also creates an area north of the tunnel (between the tunnel and the staircase) that does not have good natural surveillance or sightlines from the tunnel. A jog is introduced between the bridge/tunnel alignment and the north staircase to Bloor Street East, which may impede pedestrian and cyclist traffic.

This alternative has the most impacts on the natural environment due to the new alignment of the bridge, and the new landing area north of the tunnel in a new location.

All alternatives provide potential for enhanced urban design features.

The estimated cost for the reconstruction of the tunnel is the same as Alternative 2, which is slightly more than Alternative 1 due to the complexity, staging and utility impacts.

Summary: Alternative 1 was identified as the preferred alternative as it would provide an improvement to the natural surveillance through the tunnel, on the bridge and would have less impact to existing underground utilities, and no impacts to the existing access points.

Table 6-2: Tunnel Design Alternatives Assessment and Evaluation

Criteria	Alternative 1: Reconstruct and Widen Tunnel to the West	Alternative 2: Reconstruct Tunnel to Match Glen Road Alignment (to the East)	Alternative 3: Reconstruct Tunnel on New Alignment (match north end of bridge to south end of tunnel)
Transportation Planning	✓ Addresses existing and provides for future active transportation needs ✓ Does not impact existing access points.	✓ Addresses existing and provides for future active transportation needs ✖ Impacts existing access points on north and south sides of Bloor Street East; (removal and relocation of stairs).	✓ Addresses existing and provides for future active transportation needs ✖ Creates jog between staircase and bridge. ✓ Does not impact existing access points.
Socio-Economic Environment	✓ Less temporary disturbance to adjacent properties during construction of tunnel. ✓ Improved sightlines providing natural surveillance.	✖ Additional temporary disturbance to adjacent properties during construction due to removal and relocation of staircases. ✖ Reduces sightlines limiting effectiveness of natural surveillance.	✓ Some temporary disturbance to adjacent properties during construction of tunnel. ✖ Improved sightlines, but creates areas with poor visibility on north side of tunnel limiting effectiveness of natural surveillance.
Structural Engineering	✓ Minimal impacts to existing utilities (gas). ✓ Conventional construction and staging methods.	✖ Higher potential impact to utilities on east side of tunnel (sanitary, Bell, gas). ✖ More complex construction and staging methods to also replace staircases.	✓ Minimal impacts to existing utilities (gas). ✖ Medium complexity of construction and staging replacing tunnel on new alignment.
Natural Environment	✖ Some natural impacts around north tunnel entrance with additional landing area.	✖ Additional natural impacts around north tunnel entrance with larger landing area, new access points, and new alignment.	✖ Greatest impacts around replacement of bridge due to new alignment of bridge and tunnel.
Urban Design	✓ Provides potential for enhanced aesthetic improvements to the new and wider tunnel.		
Cost	• Net present day value for tunnel reconstruction - $4.16 M	• Net present day value for tunnel reconstruction - $5.10 M ✖ Additional cost for new staircases and alternate access to Bloor Street East.	• Net present day value for tunnel reconstruction on new alignment - $5.10 M
Evaluation Summary	**Recommended**	**Not Recommended**	**Not Recommended**

Most preferred/ Least impacts — Least preferred/ Most impacts

6.4 RECOMMENDED DESIGN ALTERNATIVE FOR BRIDGE AND TUNNEL

Based on the results of the EA Study and technical analysis completed, the preliminary recommended preferred design is:

- **Replace the bridge in the same location with a steel girder inclined leg bridge type;**
- **Replace and widen the tunnel to the west; and**
- **A 4.8 m cross-section for the bridge and tunnel including a 3.6 m center multi-use trail and 0.6 m buffers on each side.**

These recommendations will:

- Address the deteriorating condition of the bridge structure
- Maintain the cultural heritage value of the unique bridge design, crossing, and view from Rosedale Valley.
- Improve natural surveillance around the tunnel with improved sightlines, lighting, and redesign of accesses.
- Accommodate additional capacity for future growth in active transportation.
- Improve the bridge, tunnel and landing areas with enhanced aesthetics treatments.

6.5 BARRIER-FREE ACCESS ALTERNATIVES

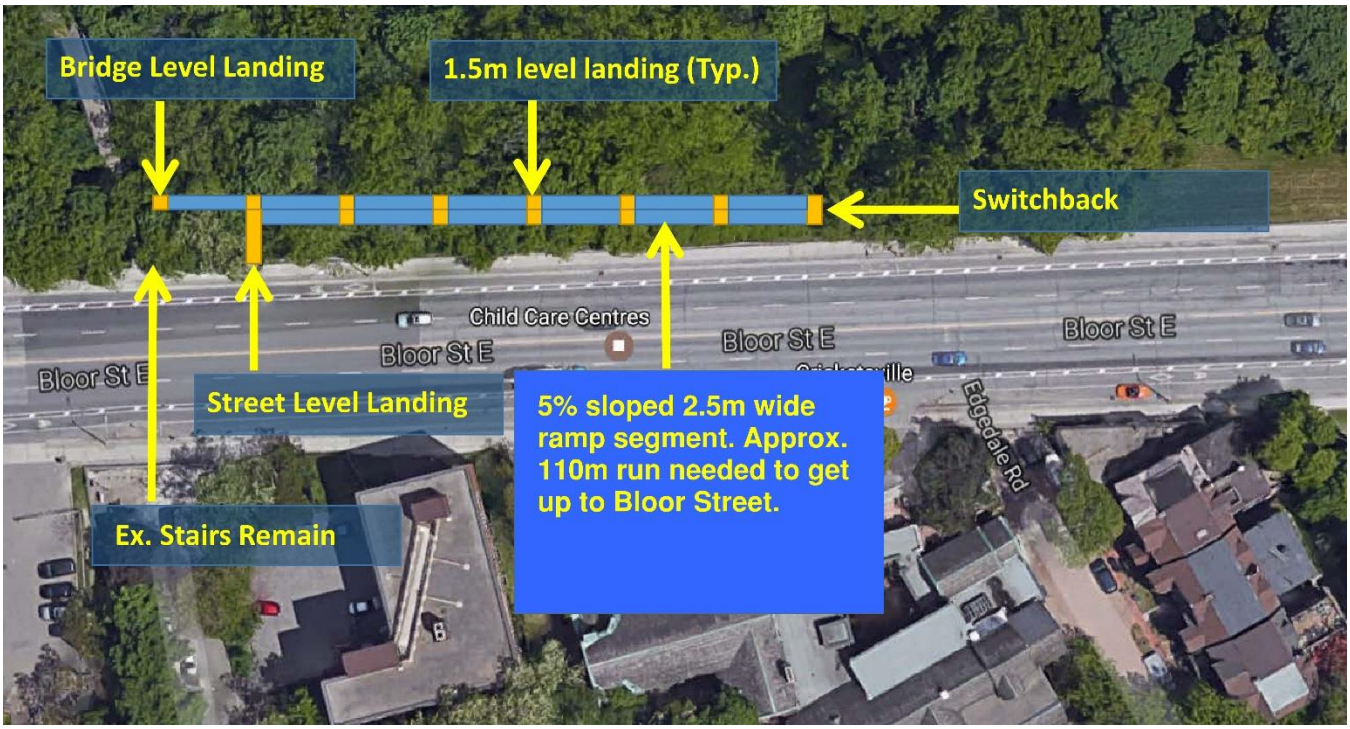
Throughout the study, members of the public commented on the existing stairs on the north side of Bloor Street East, which provides access to the bridge and tunnel. Comments were that using the stairs was uncomfortable due to the step height and lack of centre hand rail.

Based on the information available regarding the existing staircases on the north and south sides of Bloor Street East, including structural drawings and site investigation, as well as review of construction methodology and staging (see **Section 7.7**), the existing staircases are not anticipated to be physically/directly impacted by the bridge or tunnel construction.

However, in light of the public comments the Project Team and Technical Advisory Committee identified and considered opportunities for potential improvements to the stairs, including three options for providing barrier-free access from Bloor Street East to the bridge and tunnel.

Barrier-free access options that were given conceptual level consideration are described below, and illustrated in **Exhibit 6-8** to **Exhibit 6-10**.

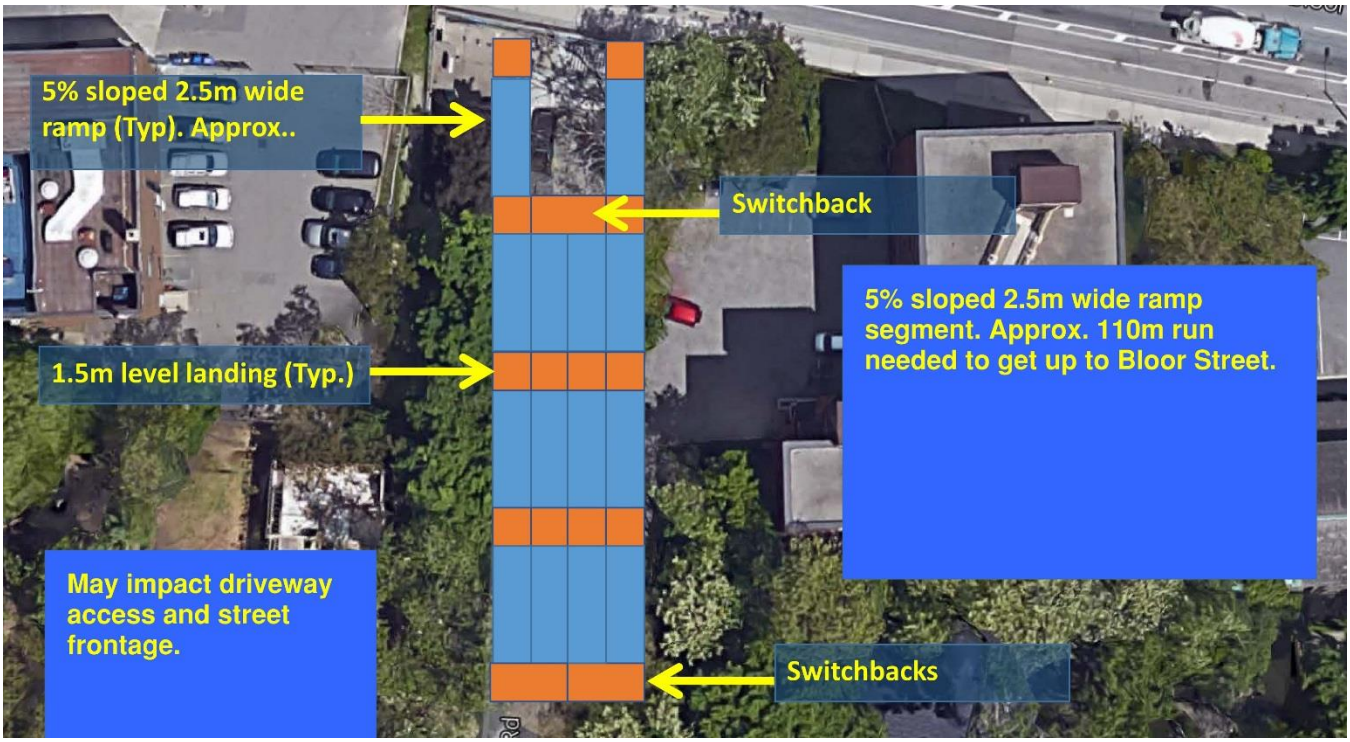
Exhibit 6-8: North Side Ramp Concept Alternative



North Side Ramp Concept Alternative:

- North side of Bloor Street East, east of existing stairs, parallel to Bloor Street East
- Approximately 110 m total length x 2.5 m in width
- One (1) switchback
- 5% approximate grade and level landing areas, per the Accessibility Design Guidelines
- Anticipated tree and vegetation impacts along Bloor Street East and in the Rosedale Valley.

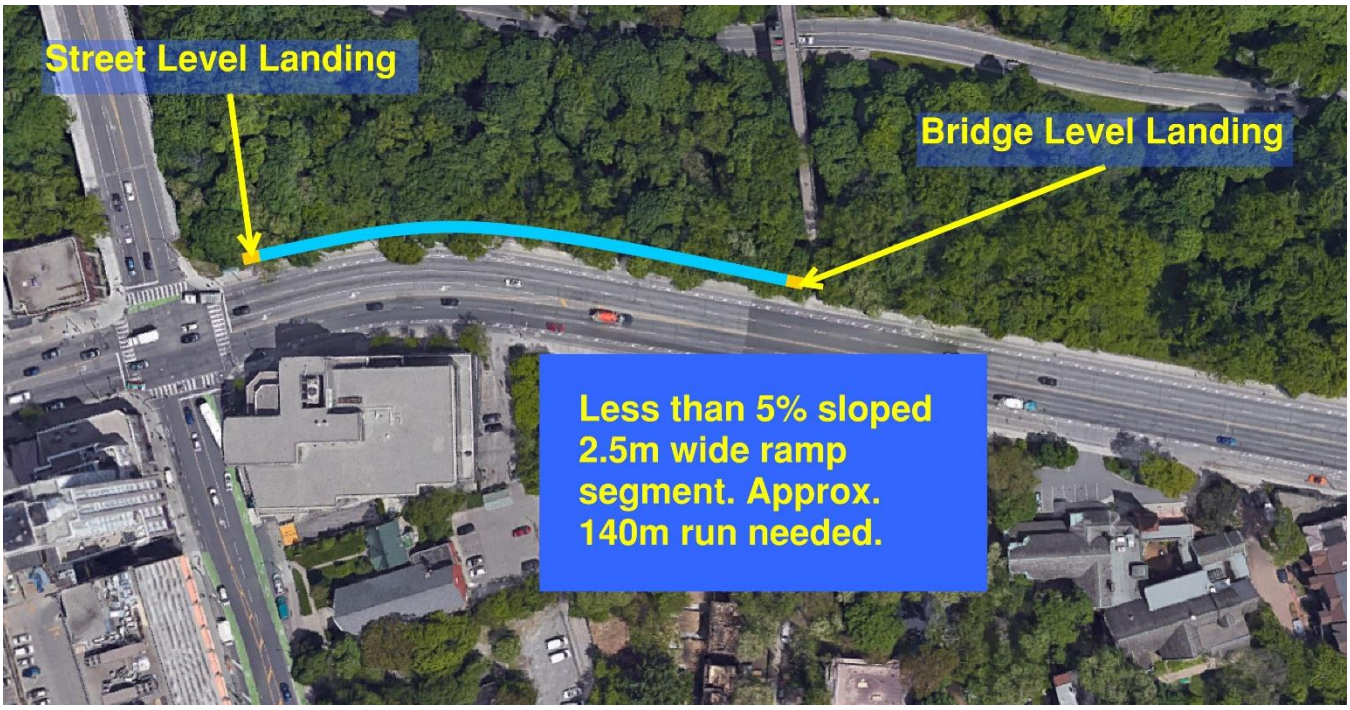
Exhibit 6-9: South Side Ramp Concept Alternative



South Side Ramp Concept Alternative:

- South side of Bloor Street East
- Generally, the same location as the existing stairs, but positioned perpendicular to Bloor Street East
- Approximately 110 m total length x 2.5 m in width
- Three (3) switchbacks
- 5% approximate grade and level landing areas, per the Accessibility Design Guidelines
- Impacts to the Glen Road urban garden and access to residential building for maintenance and on-site parking

Exhibit 6-10: Ravine-Path Concept Alternative



Ravine-Path Concept Alternative:

- North side of Bloor Street East, west of the existing stairs
- Extends from just west of Sherbourne Street to the bridge/tunnel landing area.
- Approximately 140 m total length 2.5 m in width*
- No switchbacks (construct into valley slope; with supports for level path)
- Approximate grade less than 5% and level landing area, per the Accessibility Design Guidelines
- Impacts to trees and ravine can be minimized

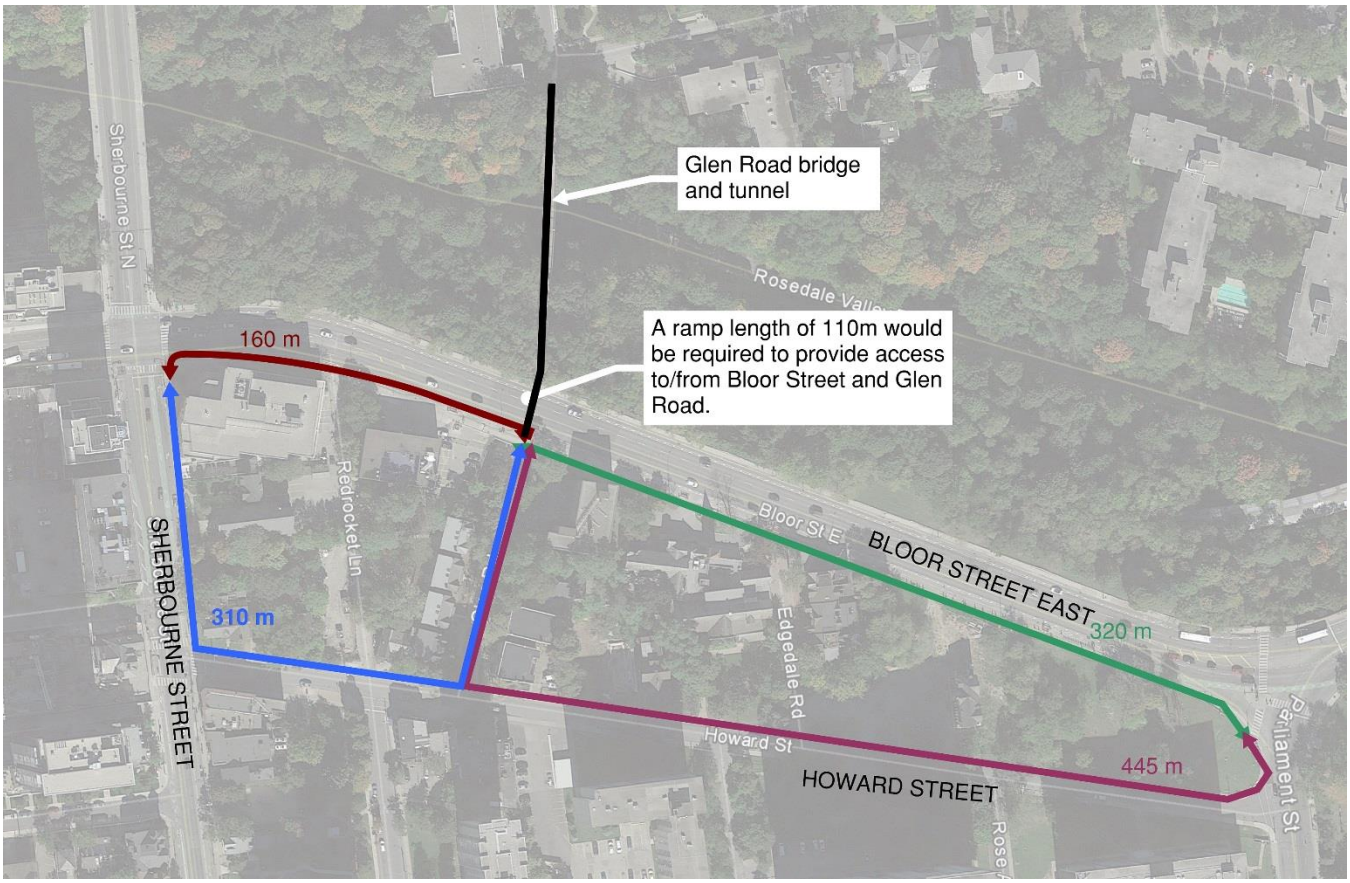
The ravine path to be designed based on the City's Trail Design Guidelines and the Accessibility Design Guidelines, as applicable.

The distances of the alternatives were compared to the existing out-of-way travel which represents the distance from the staircase on the south side of Bloor Street East to Sherbourne Street, approximately 160 m.

The ramp/run length for Options 1 and 2 equals a total of 270 m; 300 m for Option 3.

These options offered a minimal reduction in travel distance compared to the approximate 310 m distance of the adjacent existing alternate accessible route, from the at-grade south end of the tunnel to the Sherbourne Street/Bloor Street East intersection (see **Exhibit 6-11**).

Exhibit 6-11: Alternative Barrier-Free Routes



Alternative Barrier-Free Routes

Due to ongoing and progressive corrosion of the bridge and in order to meet the replacement date of 2020, there is some urgency in completing this EA study.

Given the magnitude of the impacts identified with all three conceptual alternatives and the marginal difference in travel distances provided it was recommended that a further review of this location be undertaken at a later date. This review will include scope of work, applicable standards and guidelines and approval requirements and will be prioritized against similar reviews throughout the City as part of the City's overall objective to be fully accessible by 2025.

In the meantime, modifications to the existing stairs on the north side of Bloor Street East will be made. These modifications include installing non-slip strips and a centre hand railing, and will be done either through the Glen Road Pedestrian Bridge and Tunnel design project or through another Transportation Services program.

6.6 REVIEW DURING SECOND ROUND OF CONSULTATION

6.6.1 DESIGN REVIEW PANEL

A presentation to the Design Review Panel was made on July 17, 2017 (prior to PIC #2), of the preliminary recommended preferred alternative. The Design Review Panel was generally supportive of the proposed recommendation to replace the bridge in the same location with a steel-inclined leg structure and widening the tunnel to the west. The Design Review Panel provided positive feedback and constructive advice provided at the meeting. The panel also commented about the importance of maintaining a connection to Bloor Street East and potential to connect to the valley. Minutes from the Design Review Panel meeting, including their specific comments on the Study are provided in **Appendix A**.

A future presentation to the Design Review Panel will be scheduled during detail design to review the finer design elements of the bridge and tunnel.

6.6.2 PUBLIC INFORMATION CENTRE #2

The bridge and tunnel assessment of alternative solutions, bridge and tunnel design alternatives, and the Preliminary Recommended Plan was presented at the second Public Information Centre (PIC).

No specific changes to the bridge or tunnel alternatives were suggested by the public at PIC #2. The overall feedback was as follows:

— Consistent support for the preliminary recommended design:

- Replace the bridge in the same location with a wider, steel girder incline leg bridge type (very similar to the current structure)
- Replace and widen the tunnel to the west (following the current alignment);

— A range of detail design suggestions, especially related to lighting and railing-fence design;

— Comfort concerns raised about the existing stairs on the north side of Bloor Street East being steep; and

— Range of opinions on provision for cycling on the bridge and in the tunnel.

Comments related to detail design items have been documented and will be further reviewed at that time.

Concerns regarding the north staircase from Bloor Street East was considered under the general category of accessibility which is discussed in **Sections 6.5** and **7.4**.

6.7 CONFIRMATION OF THE RECOMMENDED DESIGN ALTERNATIVE

After considering all the feedback received from the public, and community stakeholders during the second PIC, and the technical evaluations summarized in **Sections 6.2.4** and **6.3.4**, the recommended design alternatives are to:

- **Replace the bridge in the same location with a steel girder inclined leg bridge type;**
- **Replace and widen the tunnel to the west; and**
- **A 4.8 m cross-section for the bridge and tunnel including a 3.6 m center multi-use trail and 0.6 m buffers on each side.**

7 DESCRIPTION OF THE PRELIMINARY RECOMMENDED PLAN

The major features for the Glen Road Pedestrian Bridge and Tunnel preliminary recommended plan are described in **Sections 7.1** to **7.10**.

The information should be reviewed in conjunction with **Chapter 6**, which describes the design alternatives considered, and how the overall plan was developed. While refinements may occur during the future detail design phase, any changes should not alter the intent of the recommended undertaking or its components. During the future detail design phase, there will be further consultation with technical agencies, utilities, and the public.

The Preliminary Recommended Plan for the Glen Road Pedestrian Bridge and Tunnel include the following:

- **Replace the existing Glen Road Pedestrian Bridge with a new steel-girder structure with steel inclined legs; and**
- **Replace the existing pedestrian tunnel with a new wider tunnel (widen to the west)**
- **A 4.8 m cross-section for the bridge and tunnel including a 3.6 m center multi-use trail and 0.6 m buffers on each side.**

Exhibit 7-1 illustrates the overall concept plan for the bridge and tunnel to be described in the following Sections.

Exhibit 7-1: Overall Bridge and Tunnel Preliminary Recommended Plan

7.1 STRUCTURE – BRIDGE AND TUNNEL

7.1.1 BRIDGE

Exhibit 7-3 is the General Arrangement for the recommended bridge structure.

The recommended bridge type is a three-span steel-girder structure with two inclined steel legs, and a concrete deck. The total span of the structure is 100 m (30 m for each end span and 40 m centre span). The steel girder depth varies across the length of the bridge from 1.55 m at the ends to 1.05 m at the centre span; the varying girder depth is due to the inclined leg structure type, which has less strain at the centre span, allowing for reduced girder depth and a more economical design.

To ensure adequate drainage, a 1.0% longitudinal slope has been provided sloping away from mid-span, and a 2.0% cross-fall is provided transversely from mid-cross-section (see **Section 7.2**).

The alignment of the structure is proposed to be pivoted by approximately 1.7 degrees towards the west (i.e., the north approach of the bridge would stay at the same location and pivot towards the tunnel) in order to provide better sightlines between the bridge and the tunnel.

The new bridge piers have been offset from the location of the existing piers to provide an efficient span arrangement (i.e., end span length is a specific ratio to main span length) required to minimize the depth of the girders, as well as to avoid any potential conflicts in foundations between the existing footings and new footings. The existing pier foundations may remain in place after construction of future piers (to be confirmed during detail design); however, they would be hidden/buried in fill.

Based on the information available regarding the existing staircases on the north and south sides of Bloor Street East, including structural drawings and site investigation, as well as review of construction methodology and staging (see **Section 7.7**), the existing staircases are not anticipated to be physically/directly impacted by the bridge or tunnel construction. Potential impacts will be confirmed during detail design.

Construction materials such as steel have seen changes in their properties over time. The type of structural steel to be used will be confirmed during detail design; however, it will likely be a type that is widely available and economical. Consideration will also be given to its appearance and whether it complements the surrounding environment.

Additional design elements for the bridge, including deck materials, railing type, and lighting are discussed in **Section 7.10**, and will be confirmed during detail design.

7.1.2 TUNNEL

Exhibit 7-4 is the General Arrangement for the recommended tunnel structure.

The recommended tunnel is a concrete cast-in-place structure. The recommended tunnel maintains the same height and length of the existing structure, 2.4 m and 26.8 m respectively.

The tunnel cross-section width will be widened to 4.8 m, the same as the bridge, as noted in **Section 7.2**.

Additional design elements for the tunnel, including deck materials, railing type, and lighting are discussed in **Section 7.10**, and will be confirmed during detail design.

7.2 CROSS-SECTION – BRIDGE AND TUNNEL

The design and consideration of the bridge and tunnel cross-section assessment is provided in **Section 6.1**. Considerations for the cross-section widths included the types and volumes of users, seasonal activity, and maintenance.

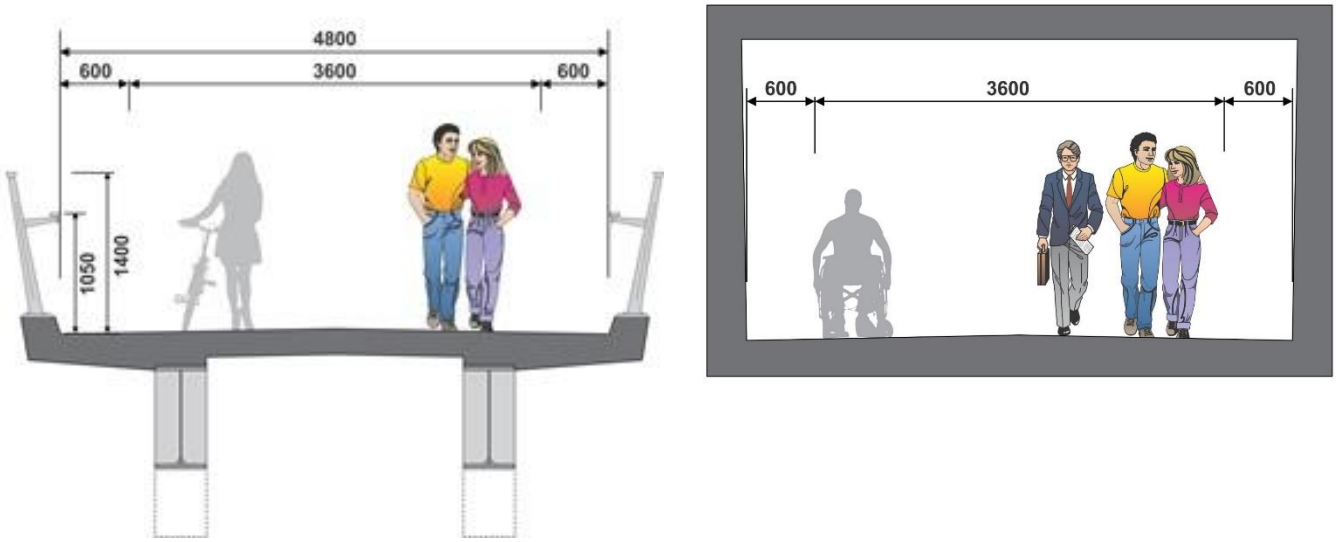
The following summarizes the key features of the recommended cross-section for the bridge and tunnel:

- 3.6 m centre two way path
- 0.6 m buffers on each side
- 1.4 m high railings (bridge)

The cross-section provides for the existing and potential future active transportation users with a generous middle path. The buffer space along the sides provide room for users to stop along the bridge and look out onto the valley, without impacting other users.

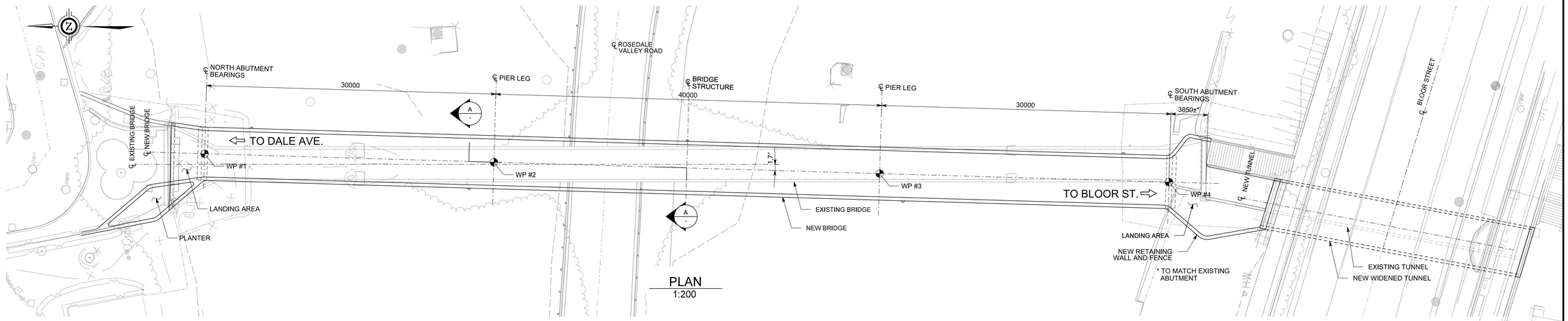
Specific details regarding the type of railing, deck materials, and lighting are discussed in **Section 7.10**, and will be confirmed during detail design.

Exhibit 7-2: Recommended Bridge and Tunnel Cross-Section

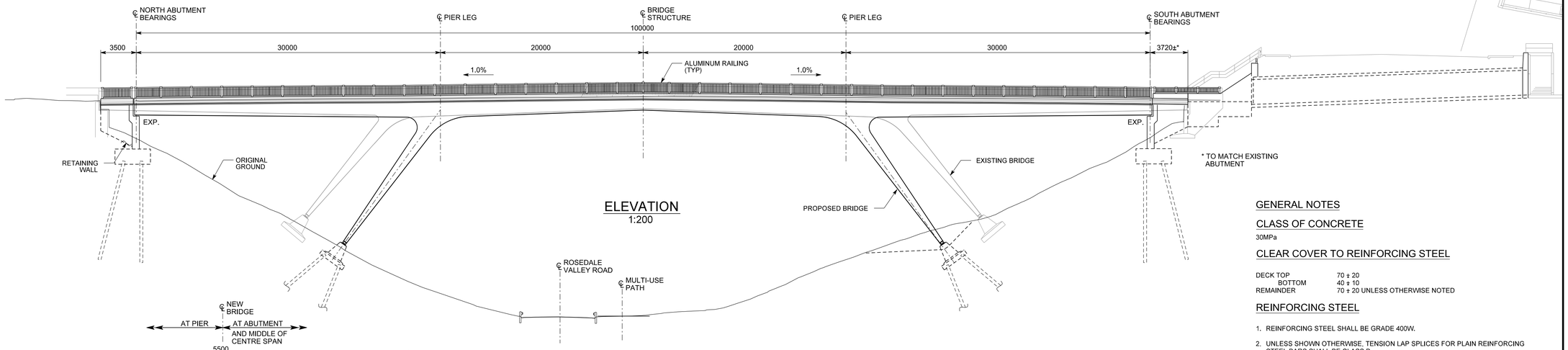


7.3 PRELIMINARY DESIGN (GENERAL ARRANGEMENT)

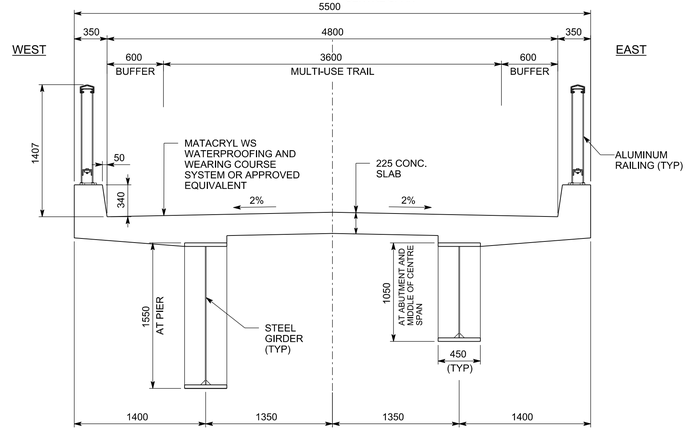
The General Arrangements Drawings for the bridge and tunnel are provided in **Exhibit 7-3** and **Exhibit 7-4** respectively.



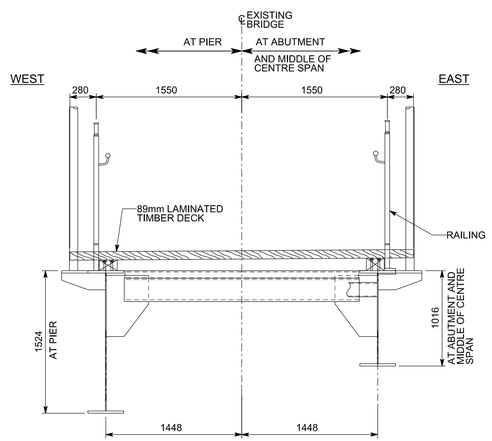
PLAN
1:200



ELEVATION
1:200



PROPOSED BRIDGE SECTION
1:30
A



EXISTING BRIDGE SECTION
1:30
A

DRAFT

GENERAL NOTES

CLASS OF CONCRETE

30MPa

CLEAR COVER TO REINFORCING STEEL

DECK TOP	70 ± 20
BOTTOM	40 ± 10
REMAINDER	70 ± 20 UNLESS OTHERWISE NOTED

REINFORCING STEEL

1. REINFORCING STEEL SHALL BE GRADE 400W.
2. UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES FOR PLAIN REINFORCING STEEL BARS SHALL BE CLASS B.
3. STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500MPa, UNLESS SPECIFIED OTHERWISE.
4. BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
5. BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1 UNLESS INDICATED OTHERWISE.

CONSTRUCTION NOTES

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DETAILS AND ELEVATIONS OF EXISTING STRUCTURE THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR AND THE PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.

wsp
CONSULTANTS

No.	DATE	REVISIONS	INITIAL	SIGNED

DESIGN y2016det.dgn y2016pd.dgn y2016pd1.dgn
DIGITAL INFORMATION

TORONTO Engineering & Construction Services

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LUIS DE JESUS, P. ENG.
MANAGER
BRIDGES, STRUCTURES AND EXPRESSWAYS

GLEN ROAD SOUTH PEDESTRIAN BRIDGE

ALTERNATIVE 1: STEEL GIRDER WITH TWO INCLINED STEEL LEGS

PRELIMINARY GENERAL ARRANGEMENT

DESIGN	K. YUSEK	DRAWN	G. LI	CHECKED	M. NIE	CONTRACT No.
SCALE	AS NOTED			DRAWING NUMBER	EXHIBIT 7-3	SHEET P1
DATE	SEPTEMBER, 2017					

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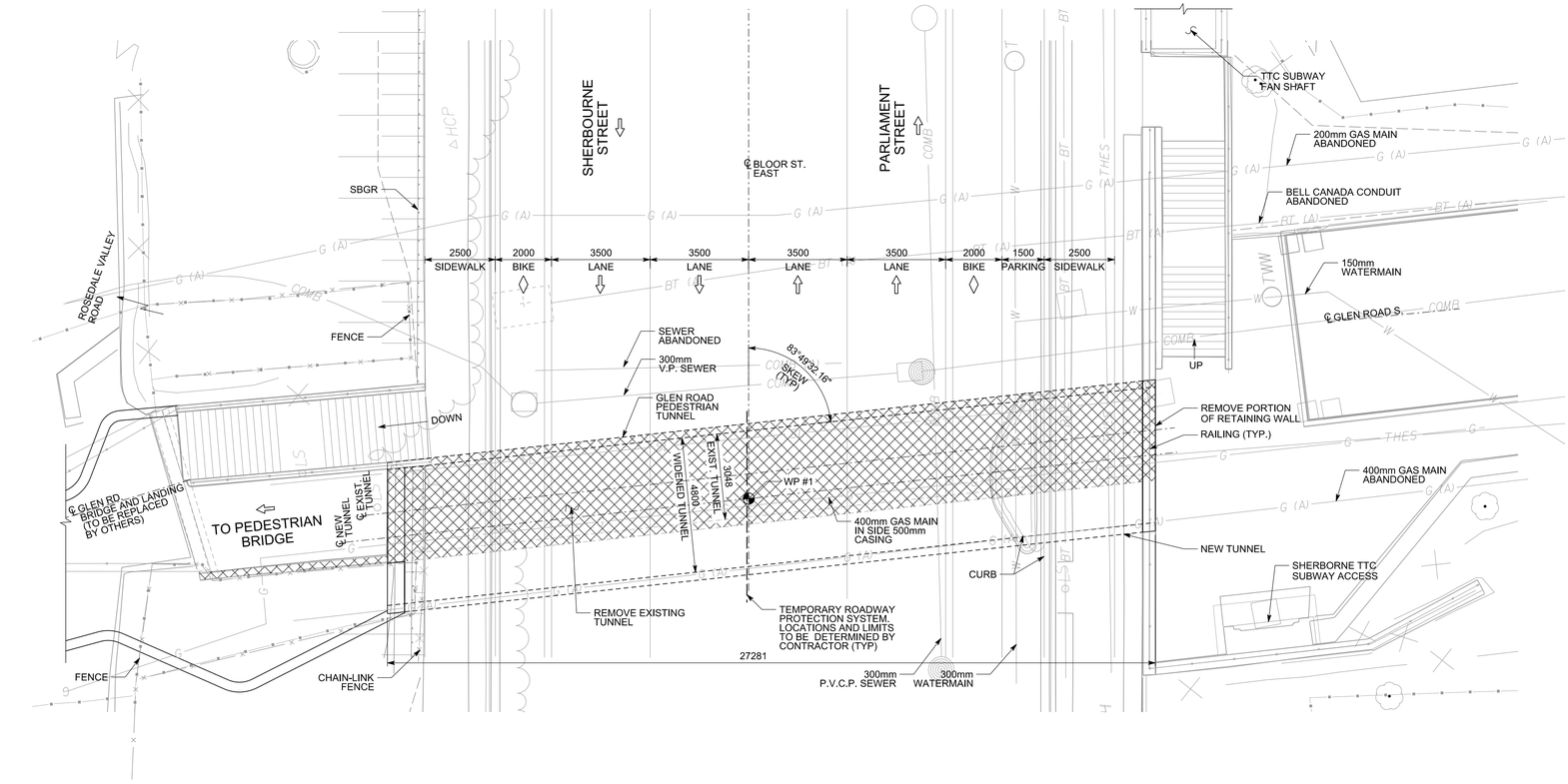
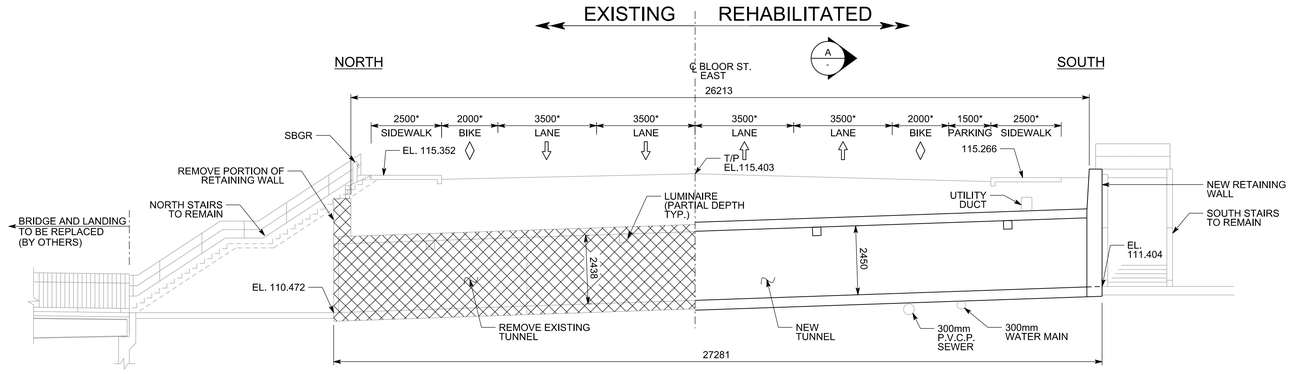
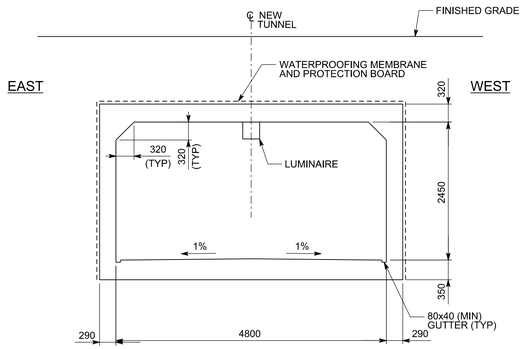




LONGITUDINAL SECTION
1:100

* NOTE: DIMENSIONS SHOWN ARE PERPENDICULAR TO ℄ BLOOR ST. EAST



SECTION
1:50

GENERAL NOTES

CLASS OF CONCRETE
30MPa

CLEAR COVER TO REINFORCING STEEL

BOTTOM OF TOP SLAB	40 ± 10
BOTTOM OF BOTTOM SLAB	100+25
REMAINDER	70 ± 20 UNLESS OTHERWISE NOTED

REINFORCING STEEL
1. REINFORCING STEEL SHALL BE GRADE 400W.
2. UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES FOR PLAIN REINFORCING STEEL BARS SHALL BE CLASS B.
3. BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1 UNLESS INDICATED OTHERWISE.

CONSTRUCTION NOTES
1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DETAILS AND ELEVATIONS OF EXISTING STRUCTURE THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR AND THE PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.
2. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE AND SHALL BE CONFIRMED BY CONTRACTOR.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE LOCATION AND PROTECTION OF ALL UTILITIES, SERVICES, STRUCTURES, ETC. AT ALL TIMES.
4. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF THE TUNNEL KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME, AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
5. CONTRACTOR TO PROVIDE TEMPORARY ROAD WAY PROTECTION SYSTEM DURING THE WORK. ROAD WAY PROTECTION SYSTEM TO BE DESIGNED TO PERFORMANCE LEVEL 2.

ABBREVIATIONS
WP - DENOTES WORKING POINT

APPLICABLE STANDARD DRAWINGS
OPSD 3101.150 MINIMUM GRANULAR BACKFILL REQUIREMENT

WSP CONSULTANTS

DESIGN y2016det.dgn y2016pd5.dgn

DIGITAL INFORMATION

No.	DATE	REVISIONS	INITIAL	SIGNED

TORONTO Engineering & Construction Services

FRANK CLARIZIO, P.ENG.
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MICHAEL D'ANDREA, M. E. SC., P.ENG.
CHIEF ENGINEER AND EXECUTIVE DIRECTOR, ENGINEERING & CONSTRUCTION SERVICES

LUIS DE JESUS, P. ENG.
MANAGER
BRIDGES, STRUCTURES AND EXPRESSWAYS

GLEN ROAD SOUTH PEDESTRIAN BRIDGE
OPTION D: REPLACEMENT WITH WIDER TUNNEL ON EXISTING ALIGNMENT
PRELIMINARY GENERAL ARRANGEMENT

DESIGN	W.V.RUYVEN	DRAWN	G. LI	CHECKED	M. NIE	CONTRACT No.	
SCALE	AS NOTED			DRAWING NUMBER	EXHIBIT 7-4	SHEET	P4
DATE	SEPTEMBER, 2017						

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7.4 ACCESSIBILITY

The recommended plan to replace the bridge and tunnel includes improvements to accessibility elements, based on the Accessibility Design Guidelines, as follows:

- New bridge deck surface to provide a consistent non-slip surface (material to be determined in detail design);
- Widened bridge, tunnel and approaches;
- Continuity in design elements between the bridge and tunnel (i.e. same width, and similar materials, lighting, colouring, and alignment); and
- Enhanced illumination on the bridge, in the tunnel and at the approaches.

As detailed in **Section 6.5**, opportunities were considered for providing barrier-free access to the bridge and tunnel from Bloor Street East, and given the magnitude of the impacts and the marginal difference in travel distances provided, it was determined that a further review of this location be undertaken in the future.

In the meantime, the City has committed to undertake modifications to the existing stairs on the north side of Bloor Street East. These minor modifications include installing non-slip strips and a centre hand railing.

7.5 UTILITIES

As outlined in **Section 3.8**, there are a number of existing utilities located in proximity to the tunnel and down in the Rosedale Valley in proximity to the bridge, including Bell, water, hydro, gas, and sanitary. The utility information reflects the data received to date and field surveys, which will be confirmed during detail design.

Based on the utility information obtained through field investigations, potential areas of conflict have been identified in the following areas:

- Utility relocations of the existing hydro ducts along the north side of Bloor Street East is expected. These utility relocations have been proposed in order to facilitate construction access for the south abutment of the bridge over Rosedale Valley Road and may result in additional costs or implications to the schedule.
- Temporary support of the existing Toronto Hydro Energy Services (T.H.E.S) and Bell Canada duct structures along the south side of Bloor Street East is expected
- Utility relocation of the existing 300 mm watermain along the south side of Bloor Street East may be required
- Potential conflict of 400 mm gas main underneath tunnel and in valley at north and south abutments

Relevant utilities were notified at key milestones and will be contacted again during detail design to confirm the conflicts and potential mitigations, as well as construction coordination. Potential utility relocations would be completed prior to the construction of the bridge or tunnel, and could affect the project schedule.

Consultation with the TTC about potential impacts from the tunnel widening on TTC infrastructure is ongoing and will continue through detail design.

7.6 FOUNDATION INVESTIGATION

A Foundation Investigation was carried out to determine the sub-surface conditions at the site by means of boreholes, field and laboratory tests. The Foundation Investigation and Design Report is provided in **Appendix J**. Based on the information obtained, the engineering characteristics of the subsurface soils have been assessed and site conditions described to develop geotechnical recommendations regarding the design of the bridge and tunnel structures.

According to surficial geology of the Greater Toronto Area Map -3062 (Scale: 1:200 000), regionally, the project site lies within glacial lake deposits (silt and clay). According to bedrock geology of Ontario Map MNDM-2544 (Scale: 1:1 000 000), the bedrock underlying the site comprises Georgian Bay Shale, limestone, dolostone and siltstone of the Upper Ordovician.

The fieldwork undertaken during May 2017 consisted of carrying out six (6) boreholes to investigate the subsurface conditions. Two boreholes were located at the tunnel (east and west of the tunnel), one borehole was located at each of the location of the bridge leg foundations, one was located at the bottom of the valley, and one was located north of the bridge at Glen Road and Dale Road.

Due to significant fill thicknesses, and/or inadequate integrity of the upper horizon of the underlying native silty clay deposit, shallow foundations are not recommended for the bridge abutments. The foundation type will be confirmed during detail design.

At the pier locations, limited geotechnical information could be obtained due to the constraints on the method of drilling; however, assuming the subsurface profile follows a trend similar to the borehole on Bloor Street East, the underlying silty clay till beneath the fill can be considered as a founding stratum for spread footings as an option. This will be confirmed in detail design based on the results of a slope stability analysis.

The technical considerations identified in the Foundation Investigation and Design Report (**Appendix J**) have been considered in the structural design of the bridge and tunnel.

7.7 CONSTRUCTION STAGING

7.7.1 BRIDGE

This section describes the construction staging of the bridge only; however these staging recommendations remain whether delivered as an individual or combined bridge and tunnel project.

The Glen Road Pedestrian Bridge and Tunnel will be closed for the duration of construction; therefore, it will not be possible to maintain pedestrian access at the site during construction.

Erection of the steel legs and girders will likely require one crane to be used in three locations, as follows:

— Crane pad at the south end of the bridge to erect the south pier, south span girder segments, and girder segments over the south pier;

— Crane pad at the north end of the bridge to erect the north pier, north span girder segments, and girder segments over the north pier; and

— Crane pad at the south side of Rosedale Valley Road to erect the centre span girder segments.

Once erected, the pier legs would initially be tied back to anchors for support until the girders are placed and connected to the legs.

Concrete pumps for pouring the concrete deck will be required in locations similar to the cranes.

The site can be accessed for construction purposes from Glen Road / Dale Avenue, Rosedale Valley Road, and Bloor Street East. An access ramp will be required to access the south end of the bridge from Bloor Street East. Site access will be further reviewed during detail design with the appropriate City departments and agencies.

A typical bridge replacement of this type is estimated to take 4 to 5 months, during which time the bridge will be closed to the public. Some closure of Rosedale Valley Road will be required during installation of the piers and girders. Additional factors prior to construction that may impact the schedule may include tree removals and utility relocation, if required. These may take an additional 6 to 12 months depending on the number of tree removals and type of utility relocations.

7.7.2 TUNNEL

This section describes the construction staging of the tunnel only, assuming that the bridge and tunnel are constructed separately. **Section 7.7.3** discusses the implications of combining the bridge and tunnel construction projects.

The proposed work shall be undertaken in two construction stages utilizing lane reductions, to maintain Bloor Street East traffic at all times, including one lane in each direction, both bike lanes and sidewalk on one side,

During Stage 1, traffic will be reduced to a single lane in each direction and lanes shifted to the south side of Bloor Street East. Excavation and removals for the north portion of the existing tunnel will then take place. Once removals are complete, foundation preparation, formwork, casting, and curing shall take place. Once the concrete has cured, the proposed embankment shall be backfilled and compacted.

Similar to Stage 1, Stage 2 traffic will be reduced to a single lane in each direction and lanes shifted to the north side of Bloor Street East. Excavation and removals for the south portion of the existing culvert will then take place. Once removals are complete, foundation preparation, formwork, casting, and curing shall take place. Once the concrete has cured, the proposed embankment shall be backfilled and compacted.

Once the above stages are complete, two-way traffic will be restored to the previously existing configuration. Potential changes, or alternate staging options could be reviewed during detail design.

Assuming a cast-in-place construction, the typical duration for this type of project is estimated to be 5 to 6 months; however, in order to reduce the duration of construction and lane reductions on Bloor Street East, a pre-fabricated structure could be used instead of the cast-in-place. The pre-fabricated option would only be beneficial if the bridge and tunnel were constructed separately, as only then would it be beneficial to reduce the tunnel construction period.

Additional factors prior to construction that may impact the schedule may include utility relocation. This may take an additional 6 to 12 months depending on the type of utility relocations.

7.7.3 BRIDGE AND TUNNEL COMBINED STAGING

The construction of both the pedestrian bridge and tunnel will require lane reductions on Bloor Street East to facilitate construction of an access ramp for the bridge and to facilitate staged construction for the tunnel.

If construction of the pedestrian bridge and tunnel were to proceed during two different construction seasons, lane reductions would be required during each season.

Construction of both structures concurrently would result in efficiencies in minimizing traffic impacts and shared work zones/staging areas. During the first stage, it is anticipated that work on the north half of the tunnel may occur at the same time as construction on the bridge is taking place. It is anticipated that the bridge construction may be the controlling operation; therefore, there may be no benefit to using precast over cast-in-place concrete in the tunnel. Once the Bloor Street East access ramp is no longer required for work on the bridge and work on the north half of the tunnel is complete, then traffic may be shifted to permit construction of the south portion of the tunnel.

The total duration of the concurrent construction of the bridge and tunnel is estimated to be 7 to 8 months, approximately a single construction season, not including advanced activities such as utility relocation.

This is subject to priority of infrastructure projects and funding availability at the City.

7.7.4 TRAFFIC IMPACT ASSESSMENT – TUNNEL CONSTRUCTION

A detailed traffic analysis was completed for the tunnel construction staging to identify expected queues and delays on Bloor Street East, as well as provide optimized signal timing plans. The Traffic Analysis Report is provided in **Appendix K**.

The pedestrian tunnel is located directly under Bloor Street East, therefore the construction for the widening will be conducted in two stages in order to maintain traffic on Bloor Street East in both directions during construction.

Each construction stage will include closure of two vehicular lanes on Bloor Street East by reducing traffic to one lane in each direction. During construction the vehicular traffic will be shifted to the south and then to the north, while constructing the opposite portion of the pedestrian tunnel. It has been identified that dedicated bike lanes bicycle will be maintained during construction stages. Description of construction stages are summarized below:

- Stage 1 will consist of working on the south side of the pedestrian bridge/tunnel. As a result, the traffic on the eastbound and westbound directions will be shifted to the north side. This will be achieved by merging two travel lanes in each direction into single lane prior to the construction zone with approximately 30 meters of taper length.
- Similarly, Stage 2 will consist of working on the north side of the pedestrian bridge/tunnel. As a result, the eastbound and westbound lanes will be shifted to the south side of Bloor Street East.

Under both the construction stages, the overall delay for the Sherbourne Street and Bloor Street East intersection is expected to increase nominally from 19 seconds to 21 seconds during morning peak hour, and from 23 seconds to 29 seconds during afternoon peak hour. The Bloor Street East and Parliament Street intersection is not expected to experience any significant impacts with the lane closures on Bloor Street East.

Without any modifications to the signal timings, the delays for the westbound left-turn movement at the Sherbourne Street and Bloor Street East intersection is expected to increase to 119 seconds, which is Level-of-Service (LOS) F, compared to 60 seconds (LOS E) without lane closures on Bloor Street East. Similarly, LOS for the northbound right-turn movement is expected to drop from LOS D to E during Stage 2, with a delay of 59 seconds and queue length of 131 m. All other intersection movements will experience a slight increase in their delays and drop in LOS.

With changes in the signal timings, the potential delays for the westbound left-turn movement and the northbound right-turn movements are expected to improve. The analysis results confirm that with the optimized signal timings, all the individual turning movements at the Bloor Street East and Sherbourne Street intersection are expected to operate with an acceptable LOS (i.e. LOS D or better).

In general, based on the traffic analysis carried out as part of the EA Study, the lane closure proposed for the construction staging of the tunnel is expected to have minimal impact on the traffic operation on Bloor Street East and adjacent intersections.

Potential changes, or alternate staging options could be reviewed during detail design.

7.8 PRELIMINARY CONSTRUCTION COST ESTIMATE

A preliminary construction cost estimate summary for the bridge and tunnel is presented in **Table 7-1** and **Table 7-2**, respectively. The costs are in 2017 dollars and include the cost of the new structures, and removal and replacement of existing structures and associated staging costs. These costs do not include the future maintenance costs which were estimated for evaluation purposes in **Chapter 6**.

The construction costs in the assessment of alternatives was a high level cost for all alternatives. Further refinement of the construction costs were conducted for the preliminary recommended plan, based on a more detailed staging and utility information. As such, these costs differ slightly than those identified during the evaluation of alternatives in **Chapter 6**. The updated costs do not reflect a significant change to the assessment of alternatives, and the recommended alternatives remain the same.

As noted in **Section 7.7.2**, the tunnel can be constructed as either cast-in-place or pre-cast concrete. The pre-cast option was assumed during the assessment of alternatives, however both cost estimates are provided below.

Table 7-1: Preliminary Construction Cost Estimate for Bridge

Major Items	Cost (M)
New Structure	$3.0 M
Removal of Existing Structure	$0.5 M
Access from Rosedale Valley Road	$1.2 M
Traffic Control and Roadway Staging on Bloor Street East	$0.2 M
Landscaping	$0.4 M
Miscellaneous (Utility Relocation, Lighting, etc.)	$0.2 M
Subtotal	$5.5 M
Contingency (30%)	$1.7 M
Total	**$7.2 M**

Table 7-2: Preliminary Construction Cost Estimate for Tunnel

Major Items	Cost (M)	
	Cast-in-Place	Pre-Cast
New Structure	$1.1 M	$1.6 M
Removal of Existing Structure	$0.3 M	$0.3 M
Traffic Control, Roadway Staging, and Restoration on Bloor Street East	$1.0 M	$1.0 M
Miscellaneous Civil Works, Lighting, etc.	$0.1 M	$0.1 M
Subtotal	$2.5 M	$3.0 M
Contingency (30%)	$0.8 M	$0.9 M
Total	**$3.3 M**	**$3.9 M**

7.9 PROPERTY REQUIREMENTS

No permanent property is required for the Preliminary Recommended Plan. Temporary easements on Glen Road and Dale Avenue may be required during the construction of the bridge and tunnel, which will be identified during detail design.

7.10 URBAN DESIGN

Urban design aspects of the bridge and tunnel including materials, colour pallete, and lighting, as described in this section, have been discussed at a high level during this study to provide guidance for future work, but will be confirmed during detail design. **Exhibit 7-5** illustrates artist renderings of the bridge and tunnel based on the urban design aspects noted in this section.

The Glen Road Pedestrian Bridge is currently situated within the Rosedale Valley with connections to the Rosedale neighbourhood, as well as to St. James Town via connection through the pedestrian tunnel.

The current bridge is a steel structure with a wooden deck and dark steel railing.

Through the EA study public consultation, the general feedback received regarding the design of a new structure is to maintain the simple clean lines and open views of the existing structure. Providing a new structure that plays off the existing area context, materials and colours also plays homage to the historical value of the original structure.

The landing areas for the bridge and tunnel were also identified to have potential for improved urban design and landscaping. Three areas were identified for potential improvements; north of the bridge, the bridge and tunnel connection, and the south tunnel entrance/TTC entrance. Additional landing area has been provided at the north end of the bridge, and at the bridge and tunnel connection to provide for enhanced urban design which will be further developed during detail design.

Based on principles of Crime Prevention Through Environmental Design (CPTED), and public feedback, the urban design for the bridge and tunnel should provide for improved natural surveillance, and create a sense of place for the community and users. One of the CPTED principles, to provide natural surveillance, has already been incorporated into the design by widening the tunnel and pivoting the bridge alignment slightly to increase sightlines between the bridge, tunnel and Glen Road. The opportunities for other CPTED principles, such as natural access control, and territorial reinforcement to be included in the final urban design plan will be confirmed during detail design.

7.10.1 BRIDGE DECK

The existing wooden deck of the bridge is seen to be a factor in the faster than anticipated deterioration of the existing structure, as salting the bridge during the winter promotes corrosion of the steel structure underneath. In addition, a wooden deck often has “bumps” due to weathering of the wood and does not provide a smooth walking surface which would minimize the potential for tripping hazard. It is therefore not recommended to maintain a wooden deck; however, there are alternatives to providing a simple concrete platform.

Concrete can be coloured to provide a more natural look, or a surface material/membrane can be provided for additional weather protection and improved friction for bridge users.

7.10.2 BRIDGE RAILING

The railing should be made of high quality material that is durable and low maintenance. One option for the pedestrian hand rail may be to provide a durable wood to provide a sense of connection to the surrounding natural features, as well as to the original wooden deck. Various railing options will be explored during detail design.

7.10.3 LIGHTING

Existing lighting is provided via five light poles spaced across the bridge which serve the basic function in illuminating the bridge at night. The lighting for the new bridge will be provided across the length of the bridge. An example may be lighting under the rail system that projects down onto the deck.

New lighting will be provided in the tunnel and at the approaches to ensure sufficient illumination to meet the required standards. Various lighting options will be explored during detail design.

7.10.4 LANDSCAPE OPPORTUNITIES

There are opportunities for additional landscaping at the three landing areas noted above; north of the bridge, at the bridge and tunnel connection, and south of the tunnel with the TTC entrance. There is currently a planter at the north end of the bridge which contains a memorial plaque erected in 1992 by the Toronto Historical Board, now known as Heritage Toronto, commemorating Canadian author Morley Callaghan. The existing planter with plaque will be temporarily removed for the construction of the bridge. The plaque will be reinstalled at a location to be determined in detail design, along with the potential to replace the planter.

Further consultation and coordination with TTC is needed regarding improvements to the area adjacent to the TTC Sherbourne Station entrance.

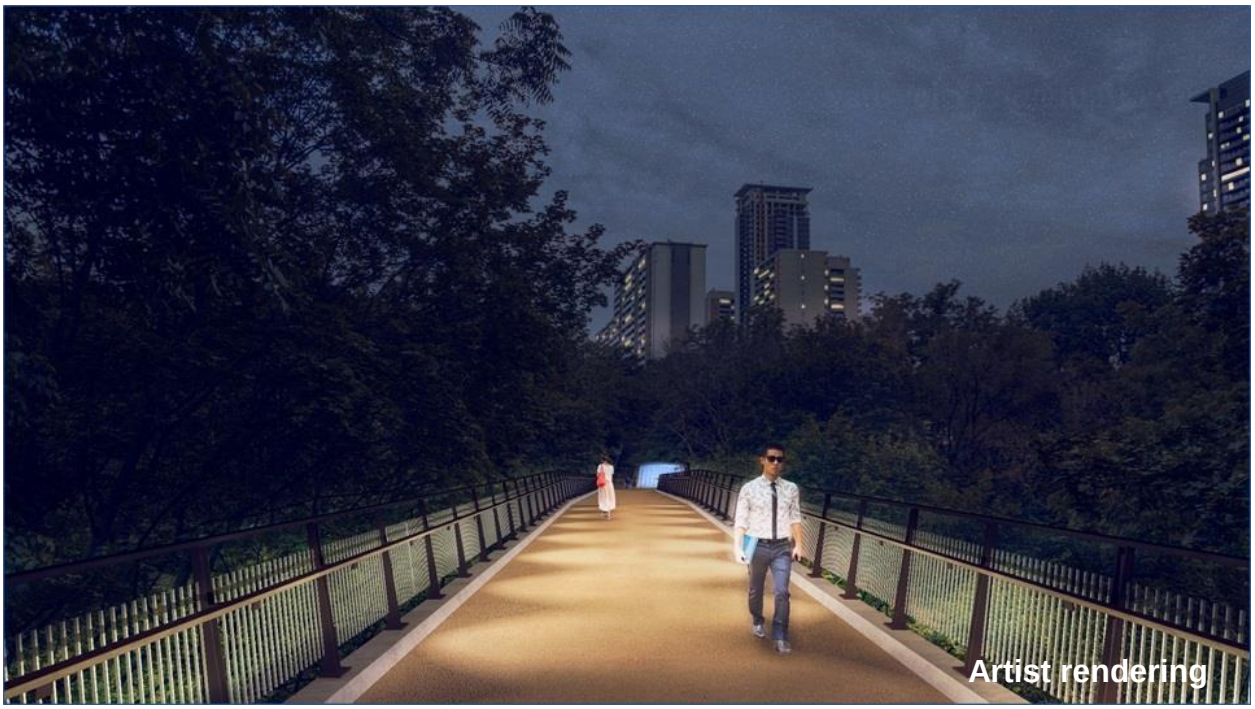
7.10.5 CONCEPT RENDERINGS

Artist renderings were generated to represent a potential design of the future bridge and tunnel. These renderings were generated to provide a sense of the new bridge and tunnel; however, as noted above, the deck, materials, lighting, and colour palette will be confirmed during detail design, and the concept renderings below do not represent the final design.

Exhibit 7-5: Concept Artist Renderings

On Bridge Looking South to Tunnel

On Bridge Looking South to Tunnel at Night



In Tunnel Looking North to Bridge

On Glen Road Looking North to Tunnel

On Glen Road Looking North to Tunnel and TTC Entrance

8 IMPACTS, MITIGATIONS AND COMMITMENTS TO FUTURE WORK

8.1 CULTURAL ENVIRONMENT

8.1.1 CULTURAL HERITAGE RESOURCES

A summary of the existing cultural heritage assessment of the bridge and tunnel is noted in **Section 3.2.1**. A Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment was prepared based on the preferred alternative – see **Appendix C**. The proposed alternative replaces the bridge in the same location, with the same bridge type as the existing bridge. Replacing the existing bridge causes direct impact to the heritage value of the existing bridge; however, this is mitigated by replacing it with the same bridge type.

The CHER recommends that a Cultural Heritage Documentation Report be prepared for the Glen Road Bridge. The new bridge should be designed to reflect the original materials and context of the bridge (see **Section 7.10**), and be sympathetic to the built heritage value of the structure.

8.1.2 ARCHAEOLOGY

As noted in **Section 3.2.2** a Stage 1-2 Archaeological Assessment was undertaken for this study, and is provided in **Appendix D**. No archaeological resources were encountered during the assessment. On the basis of the above information, the study area, which includes the pedestrian bridge and the tunnel, requires no further archaeological assessment.

Should previously unknown or unassessed deeply buried archaeological resources be uncovered during development, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological field work, in compliance with Section 48(1) of the Ontario Heritage Act.

8.2 NATURAL ENVIRONMENT

Mitigation of negative effects to the natural environmental features are identified during the EA process as the design alternatives are developed, refined and evaluated. Some negative effects cannot be completely avoided; therefore additional mitigation measures are identified in order to minimize these effects. This section outlines the potential impacts of the preferred design on natural environmental features and the recommended mitigation measures to address the potential impacts.

It should be noted that the preferred alternative construction works, including the extent of the direct impacts as a result of design details for the bridge and tunnel, and their associated grading requirements (e.g., cross-sections, structural embankment slopes, grading limits), and therefore the assessment of their associated impacts, are preliminary. This impact assessment will be further developed and finalized during detail design, in consultation with stakeholders, agencies and the public.

8.2.1 ANTICIPATED AREAS OF IMPACT

The proposed works include the replacement of an existing bridge with a similarly sized and designed bridge. As such, the area of permanent impacts are generally restricted to the area of the existing bridge. Specifically, they include:

- Bridge footings: New footings will be required for the proposed bridge design. Existing bridge footings will be removed.
- Abutments: Small adjustments to the existing abutments at the top of the Rosedale Valley at Bloor Street East and Glen Road may be required. Any increases to abutment areas are permanent impacts.

Detailed areas of temporary impact are not known at this preliminary design stage. To provide a preliminary assessment of potential impacts associated with bridge construction two estimated areas of impact have been developed:

- Construction Impact Zone: An area around footings and abutments will be impacted during construction to accommodate grading, excavation, etc. Some permanent grade changes may be required in these areas.
- Potential Impact Zone: This area has been identified within 10m of the estimated Construction Impact Zone and provides a preliminary indication of areas within which impacts may occur through construction. Portions of these areas may be impacted to accommodate equipment and material movement, valley access and staging.

8.2.2 ENVIRONMENTALLY DESIGNATED AREAS

The proposed works will affect areas contained within or contiguous to several overlapping natural heritage designations, including:

- TRCA Regulation 166/06 Lands – natural and hazardous areas (i.e. steep slopes associated with Rosedale Valley)
- TRCA Terrestrial Natural Heritage System – Rosedale Valley
- City of Toronto Natural Heritage System (Official Plan 2015) – Rosedale Valley Extension Environmentally Significant Area (ESA) [Site 62A]

Areas of permanent impact are those between the new bridge plan and existing bridge, which is very small; the overall permanent impacts to these features associated with the proposed bridge are minor. It is not anticipated that proposed works on the bridge structure will impact the form and function of the woodland valley feature

8.2.3 VEGETATION AND FLORA

The proposed bridge will be slightly wider than the existing (1.7 m wider), but will generally retain the same footprint; as such, permanent impacts associated with the bridge will be minimal. Impacts to vegetation will generally be due to removals to accommodate construction. Tree pruning and removals will be required to accommodate equipment access, movement, storage and clearance requirements.

Vegetation communities impacted by the proposed bridge replacement will include: FODM5-9 (Unit 1), FODM4-6 (Units 2 & 3), FODM4-A (Unit 4), FODM4-B (Unit 5). Tree and ground vegetation

removals / disturbance will occur to accommodate construction. Permanent impacts are anticipated to be minor. These vegetation communities extend beyond the limit of the current study through the Rosedale Valley and are well represented beyond the study limits.

No Species at Risk or provincially rare species were observed during field investigations through preliminary design. One locally significant species, Northern Red Oak (TRCA L4) may be impacted due to construction. Other locally significant species are not anticipated to be impacted as they are generally associated with planted / horticultural areas outside of the anticipated construction area.

8.2.4 GENERAL VEGETATION AND HABITAT PROTECTION MEASURES

The mitigation measures outlined below provide a series of general measures to minimize impacts to the local vegetation communities and their associated habitat functions and wildlife, as well as restore and where possible enhance the existing features and functions. The recommended vegetation measures address shorter term, construction-related impacts as well as long term / permanent impacts.

The following mitigation measures are to be implemented in order to minimize impacts to vegetation, associated habitat features and functions, and wildlife within and adjacent to the bridge during and following construction. More detailed list of specific tree protection mitigation measures can be found in the Arborist Report in **Appendix G**.

— Removal and disturbance of vegetation will be restricted to that required for construction.

— Retain vegetation under the existing bridge, including ‘topping’ of trees and retention of standing trunks of trees in order to maintain root mats and promote coppice growth, if feasible.

  - In areas requiring only temporary disturbance (e.g., areas of equipment movement, in temporary storage / work areas) vegetation will be retained wherever feasible or cleared only (i.e., no grubbing) to promote more rapid re-growth.

— Vegetation clearing and retention zones will be delineated clearly on the Contract documents and in the field (e.g., protective fencing) to minimize the risk of vegetation impacts beyond the construction limits.

— All appropriate vegetation clearing techniques (e.g., trimming of damaged branches and roots, felling away from retained vegetation communities) will be used to avoid impacts / damage to non-impacted.

— Erosion and sediment control measures (including any dewatering and related management measures, as required through detail design) will be implemented rigorously, and inspected and maintained throughout construction per an approved ESC plan.

— All construction-related and generated materials (including equipment, sediment in dewatering discharge and runoff from exposed soils, stockpiled soils or other materials from clearing and grubbing) will be properly stored / contained, maintained, filtered and otherwise handled and managed throughout and following construction:

  - Temporary stockpiling, access and construction staging areas will be located in defined areas that avoid vegetated areas that would not otherwise be impacted wherever possible, and properly contained to prevent any migration of materials from the site.
  - ‘Excess material’ from the construction activity will be removed off-site or re-used or placed only in those areas identified in the Contract documents.

- Equipment will be in good working order and ‘clean’ (i.e., free of leaks and soil transported to or from off-site).
- The Clean Equipment Protocol for Industry, as prepared by the Peterborough Stewardship Council and the Ontario Invasive Plant Council (May 2016) will be adhered to.
- Exposed temporarily disturbed surfaces will be re-stabilized and re-vegetated as soon as possible (within 30-45 days) following construction using seeding and native vegetation replacement techniques, as appropriate and as determined through detail design.
- All unnecessary disturbance of the steep valley slopes will be avoided to maintain slope and vegetation integrity. Areas that don’t require disturbance will be fenced to prevent inadvertent construction access or disturbance. Vegetation will be retained under the new bridge except where removal is required to construct the abutments. Where tree removals are required, trees will be cut but not grubbed to retain the trunks to provide bank stability, if feasible.
- Specific post-construction restoration plans will be implemented, as appropriate and as determined through detail design.
- Regular environmental monitoring / inspection will be undertaken throughout construction to ensure that protection measures are implemented, maintained and repaired properly and remedial measures are initiated and completed properly where warranted.
- The Construction Supervisor will be responsible for ensuring that these measures and any others that may be deemed appropriate to protect and restore natural features are implemented and that immediate action is taken to correct any deficiencies or other environmental concerns. Any changes to these measures will be reviewed with the Contract Administrator, who will determine the need for client and then agency review, prior to implementation. Specific issues will be drawn to the attention of the Contract Administrator who will notify agency staff directly if required. No permanent impact to wildlife movement is anticipated to occur as a result of the bridge replacement. The existing structure affords some wildlife movement opportunities through the Rosedale Valley and the proposed bridge will retain similar conditions after construction. Some impact to wildlife movement during construction has potential to occur and should be considered through mitigation to maintain connectivity.

8.2.5 WILDLIFE AND WILDLIFE HABITAT

Wildlife habitat impacts are generally similar to those described above for vegetation. Several forest vegetation communities, providing wildlife habitat elements and functions, will be impacted by the proposed works. However as outlined, the vegetation communities and associated habitats being impacted extend beyond the study area along the valley corridor. Minor permanent removals localized in the bridge area will occur; the habitats will generally be retained and will remain intact in terms of function compared to existing conditions.

In general, most wildlife will move away from noise and disturbance to avoid harm. However nesting migratory birds protected under the federal Migratory Birds Convention Act (1994) and Species at Risk (i.e. Barn Swallow) require specific consideration. Vegetation adjacent to the existing and proposed alignment provides potential habitat for nesting of various migratory birds and the existing bridge is suitable for Barn Swallow nesting (Threatened). Potential impacts to nesting migratory birds and their habitats include disturbance to nesting activity or possibly loss of nests and/or young during construction, depending on timing of vegetation removal. Impacts can generally be addressed by implementing proper clearing windows and standard awareness mitigation. No nesting, for Species at

Risk (Barn Swallow) or other bird species, was observed on the bridge structure at the time of field surveys.

Bat species afforded protection under the provincial Endangered Species Act (2007) have potential to occur within the Rosedale Valley and suitable bat maternity habitat (cavity / snag trees) was identified within the vicinity of the bridge structure. Detailed surveys to assess presence / absence were not completed as part of the preliminary design study. Consideration for this species and potential impacts to suitable maternity roosting and / or other protected habitats at the time of future works will need to be considered and any potential impacts to these species be addressed, as appropriate in consultation with the Ministry of Natural Resources and Forestry (MNRF).

Chimney Swift was observed during field investigations as fly-overs. No suitable nesting habitat was observed during surveys and no impacts are anticipated to this species as a result of the proposed bridge or associated construction.

No permanent impact to wildlife movement is anticipated to occur as a result of the bridge replacement. The existing structure affords some wildlife movement opportunities through the Rosedale Valley and the proposed bridge will retain similar conditions after construction. Some impact to wildlife movement during construction has potential to occur and should be considered through mitigation to maintain connectivity.

The recommended mitigation measures, which are designed for avoiding or minimizing intrusion as well as minimizing potential for secondary and indirect effects, will also be refined and finalized at that stage. The mitigation measures developed during detail design will be included in the Contract documents for implementation during construction.

The mitigation measures outlined above are designed to minimize effects to vegetation and protect adjacent vegetation areas, which in turn protect the associated wildlife habitat functions. In addition to these general habitat protection measures, it is also necessary to ensure the protection of breeding birds, as well as other wildlife that may nest, forage or otherwise use areas where construction is proposed. Nesting migratory birds, Species at Risk and some other Species of Conservation Concern are further protected by specific legislative requirements. Wildlife-specific mitigation measures are outlined below, as well as specific measures to address migratory birds and wildlife movement.

For the protection of wildlife generally, the Contractor will ensure that:

— Any wildlife (e.g., bird, snake, mammal) incidentally encountered during construction will not be knowingly harmed. Animals within the construction zone will be allowed to move away from the area on their own, if at all possible.

— In the event that an animal encountered during construction does not move from the construction zone, or is injured, the Contract Administrator will be notified immediately.

8.2.5.1 Migratory Birds

As noted previously, migratory birds and their nests, eggs and young are protected under the MBCA (1994) and Regulations (2014) under that Act. No work is permitted to proceed that would result in the destruction of active nests (i.e., nests with eggs or young birds), or the wounding or killing of bird species protected under the MBCA.

To ensure compliance with the MBCA, a due diligence approach is recommended, as follows:

— Awareness of the potential for nesting activity within the project limits during the Regional Nesting Period.

— Avoidance of activities that may disturb or harm nesting migratory birds.

- It is anticipated that construction activities will overlap with the Regional Nesting Period. Vegetation clearing (including grubbing and tree/shrub/grass removal) and any construction activities in areas where migratory birds might nest are recommended to occur such that they avoid the Regional Nesting Period (approximately April 1 to August 31). The Contractor will be made aware that occasionally bird species will precede or exceed the approximate breeding bird season window.

— Prevention and Mitigation of potential impacts on migratory birds:

- No nests will be removed or birds or nests disturbed in accordance with the MBCA.
- The Contractor will be advised that all temporary brush and lose soil piles should be tarped or otherwise inspected regularly to prevent nesting as they provide potentially suitable nesting sites for some species.
- If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area might result in a contravention of the MBCA (i.e., potential harm or stress to nests, birds, eggs or young), all activities will stop and the Contractor Administrator will be notified immediately. The Contract Administrator will then contact Environment Canada for direction.

8.2.6 WILDLIFE MOVEMENT

Wildlife within the project area is generally acclimated to the presence of the existing bridge and development along the base of the valley and adjacent table lands. Movement of these wildlife species is generally anticipated to be hindered by the existing bridge and similarly, will not be permanently impacted by the proposed bridge beyond existing conditions.

Temporary impacts to movement may occur during construction as a result of temporary exclusion or protection fencing. Consideration should be given to maintaining wildlife movement during construction through the following:

— Provide exclusion fencing along areas of construction to minimize ingress of animals.

— Utilize exclusion fencing or protection fencing to guide wildlife to areas of safe passage.

— Review temporary fencing overall design to ensure passage is still possible across the construction area (east-west) along the valley.

No permanent wildlife movement mitigation has been identified based on the proposed preliminary design.

8.2.7 WILDLIFE SPECIES OF CONSERVATION CONCERN

Generally, mitigation recommendations for vegetation and general wildlife will provide general mitigation for wildlife species of conservation concern that may occur within the study area. Specific considerations are provided below:

— Chimney Swift (Threatened) was observed in the vicinity of the bridge; habitat is not present on the bridge or immediately adjacent areas and this species is likely foraging in this area with nesting habitat available in relatively proximity. No specific mitigation is recommended for this species.

— If possible, construction activities should avoid locally rare species that occur within the project area (Northern Red Oak, TRCA L4), species location will be confirmed through detail design and considered for avoidance and protection (i.e. tree protection measures), if feasible.

Additional mitigation for Species of Conservation Concern may be required pending any required updates for Species at Risk screening current at the time of detail design / construction. Specific consideration will be given to Barn Swallow nesting potential on the bridge and presence and / or potential impact to Species at Risk Bats when detailed construction impact areas have been determined through detail design.

8.2.8 TREE IMPACTS

The Preliminary Recommended Plan to replace the bridge in its current location is likely to require tree removals.

Tree injury is considered where a tree protection zone overlaps the footprint of the existing and proposed pier locations. This is based on the assumption that new piers will require construction and the old piers will be removed. Five (5) trees will likely be 'injured' based on the location of the new piers.

The construction of new piers and removal of existing ones is likely to cause significant damage to the root zone of trees within close proximity, in particular for the new piers where excavation would be required to construct the footings. A minimal amount of trees, one (1), are required to be removed as there are few trees located directly under the bridge and within proximity of existing and proposed piers; however, the majority of tree impacts will be on account of the construction staging of the bridge which will be confirmed during detail design.

Given the implementation of the mitigation measures, including protection of trees beyond the construction and staging limits, significant impacts to trees are not anticipated.

Trees beyond the limits of the proposed and existing piers can be preserved. In particular mature trees in good condition should be preserved where possible. Tree protection fencing and the minimum tree protection zone is to be applied in accordance with the Cities Tree Protection Policy and Specifications for Construction near Trees, to be determined at the detail design stage.

The City of Toronto's Ravine and Natural Feature Protection By-law applies to trees of any size within areas designated as 'Ravine'. Exact impacts to trees to be confirmed as part of the detailed design stage. At that time, and if required a *'Ravine and Natural Feature Permit Application'* will be completed and appended to this report.

The City of Toronto's Tree injury policy is defined as: the minimum tree protection zone not being protected. Exact quantity and impacts to trees to be confirmed as part of the detailed design stage. At that time any trees identified as 'injured' will be included on the *'Ravine and Natural Feature Permit Application'*.

Tree protection and mitigation recommendations are detailed in **Appendix G**.

8.3 SOCIO-ECONOMIC ENVIRONMENT

8.3.1 COMMUNITY AND DEVELOPMENT IMPACTS

Section 3.1.2 provides an overview of the current and future land uses and development applications within and adjacent to the study area. No businesses or residences will be directly impacted by the Preliminary Recommended Plan. The new bridge and widened tunnel will continue to provide a linkage for active transportation between the Rosedale and St. James Town communities.

8.3.2 PROPERTY REQUIREMENTS

No permanent property impacts are required by the Preliminary Recommended Plan. Some temporary easements along Glen Road and Dale Avenue may be required for and during the construction staging, which will be further assessed during detail design.

8.3.3 ACCESS

Access to the bridge and tunnel will be closed during construction. Detour routes will be signed. Efforts will be made to minimize the duration of closure to the bridge and tunnel.

8.3.4 ACCESSIBILITY

As detailed in **Section 6.5**, opportunities were considered for providing barrier-free access to the bridge and tunnel from Bloor Street East, and given the magnitude of the impacts and the marginal difference in travel distances provided, it was determined that a further review of this location be undertaken in the future.

In the meantime, modifications to the existing stairs on the north side of Bloor Street East will be made. These modifications include installing non-slip strips and a centre hand railing, and will be done either through the Glen Road Pedestrian Bridge and Tunnel design project or through another Transportation Services program.

8.3.5 PROVISION FOR ACTIVE TRANSPORTATION

The bridge and tunnel design is intended to support and promote all modes of active transportation including provision for pedestrians and cyclists. The 4.8 m wide bridge deck and tunnel are proposed to accommodate the wide variety of users of the bridge and tunnel, based on the Toronto Multi-Use Trail Guidelines. The bridge and tunnel are currently designated through By-law for pedestrian use only, and requires that cyclists dismount while on the bridge and in the tunnel. This will continue to apply to the future bridge and tunnel.

The existing sidewalk on Bloor Street East may be temporarily closed on one side during construction of the bridge and tunnel, and pedestrians will be directed to the other side of the street. The bicycle lanes along Bloor Street East can be maintained during construction, when Bloor Street East will be reduced to one lane in each direction.

8.3.6 STREETSCAPE AND LANDSCAPE

There will be opportunity for streetscape / landscape in the landing areas: north of the bridge, at the bridge and tunnel connection, and at the south end of the tunnel, adjacent to the TTC Sherbourne Station entrance. The design of these areas will build on that illustrated in **Exhibit 7-5**. A detailed Landscape / Streetscape Plan will be developed during detail design.

Consultation with the TTC about potential impacts from the tunnel widening on TTC infrastructure is ongoing and will continue through detail design. This should also include coordination with TTC regarding the improvements to the area at the tunnel and the TTC Sherbourne Station entrance.

The City is also moving forward with the Bloor Street East Streetscape Improvement project (see **Section 3.1.2.3**) which identifies streetscape improvements and resurfacing on Bloor Street East from St. Paul's Square to Parliament Street. Coordination between this project and the Glen Road Pedestrian Bridge and Tunnel EA should be planned for potential thematic connections.

8.3.7 NOISE

Based on the Ontario Ministry of Transportation (MTO) / Ministry of the Environment and Climate Change (MOECC) Noise Protocol, where a new roadway is proposed adjacent to Noise Sensitive Area (NSA), it is required that future noise levels without the proposed improvements be compared to the future noise level with the proposed improvements. The parameters in a noise analysis include changes in vehicle traffic volume, and changes in the road operating conditions (e.g. posted speed, truck percentage, etc.) on the subject roadway as a result of the proposed improvements. In the case of this EA Study, a noise analysis per the MTO/MOECC Noise Protocol is not applicable since the proposed undertaking is related to pedestrian traffic only.

Construction activities will be planned so as to abide by the City of Toronto noise by-laws. By-law exemption will be sought, if required.

8.3.8 CLIMATE CHANGE

The Ministry of the Environment and Climate Change (MOECC) guide, *Consideration of Climate Change in Environmental Assessment in Ontario,* sets out the Ministry's expectations and supports the province's Climate Change Action Plan by outlining climate change considerations for environmental assessment studies.

The guide notes 'climate consideration' within a project means that consideration has been given to methods to reduce greenhouse gas emissions and developing a design that is more resilient to future changes in climate and helps maintain the ecological integrity of the local environment in the face of a changing climate. Specifically, proponents are encouraged to consider mitigation (how the project might mitigate climate change) and adaptation (measures to adapt to climate change or make the project more resilient to the effects of climate change). Considering how a project may contribute to climate change, through its greenhouse gas emissions or its effects on the natural landscape, is important to the planning process as it allows proponents to consider climate mitigation measures to avoid, minimize, or offset such effects.

The City of Toronto is managing emissions and greenhouse gases through sustainable transportation infrastructure planning and implementation.

The City of Toronto Walking Strategy outlines policies which focuses on creating a walkable Toronto, and highlights the importance of pedestrian activity as a part of a vibrant city. The recommendations from this EA support the City's initiatives by maintaining a key pedestrian link, and widening the bridge and tunnel to accommodate all modes of active transportation and future growth.

8.3.9 AIR QUALITY

During construction of the roadway, dust is the primary contaminant of concern. Other contaminants including NOx and VOC's may be emitted from equipment used during construction activities. Due to the temporary nature of construction activities, there are no air quality criteria specific to construction activities. However, the Environment Canada *"Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities"* document provides several mitigation measures for reducing emissions during construction activities. Mitigation techniques discussed in the document include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, and limiting exposed areas which may be a source of dust and equipment washing.

It is recommended that these best management practices be followed during construction of the bridge and tunnel to reduce any air quality impacts that may occur. It is noted that MOECC recommends that non-chloride dust suppressants be applied. MOECC also recommends referring to the following publication in developing dust control measures: Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities. Report prepared for Environment Canada. March 2005.

8.4 CONTAMINATION OVERVIEW

A Phase One Environmental Site Assessment, and Contamination Investigation was prepared as part of the EA Study, and can be found in **Appendix H**. A summary of the Phase One ESA and Contamination Investigation finding are provided in **Section 3.7**.

High and moderate areas of potential environmental concern (APECs) are located adjacent to or near the pedestrian bridge. As such, a subsurface investigation, including chemical analysis of soil and groundwater, was recommended to be completed in areas of future bridge foundations to define the environmental conditions that may be encountered during construction (for the purpose of health and safety) and to support excess material management.

Based on the results of the laboratory analysis of the submitted soil and groundwater samples, exceedances to the MOECC were noted (for further detail please see **Appendix H**).

The asphalt cores collected and analyzed for asbestos content were identified as non-detect, meaning that no asbestos fibres were observed in any of the asphalt samples.

Based on the results of the Contaminant Investigation, the following recommendations are made:

- Excess surficial soil and groundwater generated during bridge foundation construction in areas identified as exceeding MOECC Site Condition Standards should be managed as contaminated material or groundwater in accordance with MOECC regulations and disposed of at a MOECC licensed receiving facility, and should be managed with appropriate health and safety precautions. Additional soil sampling may be warranted to determine the vertical limit of the soil to be managed as contaminated at these locations;
- In general, groundwater generated during bridge foundation construction must be tested to ensure it is compliant with City of Toronto Sewer-Use Bylaw prior to discharging to sewers; and

— An MOECC licenced well contractor should be retained to decommission the four monitoring wells on the Subject Property, as outlined in O. Reg. 903 under the Ontario Water Resources Act. The decommissioning should be overseen by a qualified environmental consultant and copies of the well decommissioning records should be provided to the City of Toronto or a City of Toronto representative (i.e. Contract Administrator).

8.5 TRANSPORTATION

The proposed bridge and tunnel alternatives as described in **Chapter 7** supports the design and development of complete communities by providing safe walking opportunities for the surrounding neighbourhoods. The bridge and tunnel connect users to the TTC Sherbourne Station, the Rosedale neighbourhood, the St. James Town community and other destinations.

The bridge and tunnel will be closed during construction which will impact current users' access across the valley and to the TTC Sherbourne Station. Mitigations to reduce the duration of construction will be reviewed further during detail design. Signage notifying local residents of the expected closure, and alternate routes across Rosedale Valley, such as Sherbourne Street, should be provided.

8.6 UTILITIES

Sections 3.8 and **7.5** note the existing utilities in the study area, and the potential utility impacts, respectively. The detail drawings prepared for the project will provide data related to the location of all existing utilities determined through the various data collection tasks during detail design. All existing utilities will be staked out in the field prior to the initiation of construction and protected from damage during construction.

Should the necessity for relocation of any existing utilities be identified, a Composite Utility Relocation Plan would be required to illustrate the proposed relocations. Subsequently, the relocations would be arranged with the relevant utility and the works would be completed prior to the start of the project.

Utility relocations of the existing hydro ducts along the north side of Bloor Street East is expected, and as a result, a Composite Utility Relocation Plan will be required. These utility relocations have been proposed in order to facilitate construction access for the south abutment of the bridge over Rosedale Valley Road and may result in additional costs or implications to the schedule.

Temporary support of the existing Toronto Hydro Energy Services (T.H.E.S.) and Bell Canada duct structures along the south side of Bloor Street East is expected. These utility relocations have been proposed in order to facilitate construction of the tunnel and may result in additional costs or implications to the schedule.

Utility relocation of the existing 300 mm watermain along the south side of Bloor Street may be required. The existing watermain crosses underneath the existing tunnel. Vertical profile for the watermain was not available for review at the time of the study; therefore, there may be potential conflict with the proposed tunnel west of the existing tunnel. If there is a need to relocate this watermain during construction from May to October, the relocation time is suggested to be completed within two weeks; if the construction time is outside of this window, the relocation time could be longer. Further coordination with Toronto Water should be planned during detail design.

8.7 DESIGN AND CONSTRUCTION

The mitigation of construction impacts will follow the Environmental Construction Guidelines for Municipal Road, Sewage and Water Projects, issued by the Municipal Engineers Association.

Potential Impacts During Construction

The following sections describe the potential environmental impacts during construction and proposed mitigating measures. The following potential adverse effects are identified:

- disruption/removal of existing vegetation
- construction noise and air quality
- disruption to vehicle traffic
- mud and dust during construction

The mitigation and monitoring conditions included in the following sections indicate a commitment on the part of the City to mitigate potential environmental impacts and undertake a monitoring program during and after construction.

Permit approval will be required from TRCA for all installation, structures, site alteration, etc. within areas regulated pursuant to Ontario regulation 166/06.

No nesting, for Species at Risk (Barn Swallow) or other bird species, was observed on the bridge structure at the time of field surveys. However, bat species afforded protection under the provincial Endangered Species Act (2007) have the potential to occur within Rosedale Valley and suitable bat maternity habitat was identified within the vicinity of the bridge. Consideration of this species and potential impacts will need to be considered in consultation with MNRF and will determine if a permit is required.

It is intended that the works proposed are executed in such a manner, which to the fullest possible extent, minimizes any adverse effects on the natural environment of the project area. The contractor will be responsible to ensure all their personnel are sufficiently instructed so that the work is carried out in a manner consistent with minimizing environmental impact. The City will assign a qualified environmental inspector whose responsibility will be to ensure compliance with the environmental objectives.

Disposal of Excess Material

Surplus excavated material shall be removed to locations arranged by the Contractor. Prior to the disposal of any surplus excavated material, the Contractor will provide the Engineer with a sketch of the dumping site(s) showing access thereto. A written statement from the property owner(s) agreeing to allow the disposal of fill within any area associated with valleys, wetlands, shoreline, and other hazardous lands that are regulated pursuant to Ontario Regulation 166/06 requires the written permission of TRCA.

The Contractor is responsible for obtaining all approvals.

Upon completion of the disposing, levelling and grading of surplus excavated material on any property, the Contractor shall obtain a written statement from the property owner(s) releasing the Contractor and City from any claims and accepting the condition of the property as satisfactory.

Measures for Proper Tree Removal and Preservation of Residual Plant Communities

A Tree Protection Plan will be further developed during detail design. This plan will provide guidelines for protecting trees during construction, as well as minimizing soil compaction and making wise use of the removed timber resource. The plan should also include recommendations for during and post-construction maintenance including hazard tree monitoring, pruning, insect and disease control, aerating, watering and mulching. Also see terrestrial mitigation and timing window under **Section 8.2**.

Mud and Dust Control

The Contractor shall take such steps as may be required to prevent dust nuisance resulting from his operations. The Contractor shall be responsible for all dirt and mu that is tracked onto the roadways from vehicles entering or leaving the job site. The Contractor shall, upon requires from the Engineer, immediately proceed with cleanup operations, or in the opinion of the Engineer, the Contractor has not or cannot sufficiently remove the mud from the road, the Engineer will proceed with the necessary clean up.

8.8 PERMITS AND APPROVALS

Following the successful completion of the EA process documented in this ESR, all EA requirements will have been met. Other approval requirements will be addressed for the project during detail design which may include:

- Notifications / permissions from respective utilities and municipal services with facilities in the area;
- A permit from TRCA would be required prior to any development/site alteration within the TRCA regulated areas (O.Reg. 166/06);
- A PTTW application will not be required for this project;
- Some utilities and municipal services works will require separate permits under TRCA's O.Reg. 166/06;
- Necessary construction permits to be obtained with MOECC and TRCA per **Section 8.7**;
- A Road Occupancy Permit will be required for the construction period, which will be obtained prior to the initiation of the construction;
- A TTC permit or approval will be required for the tunnel project pending further ongoing consultation with TTC;

The Canadian Environmental Assessment Act (CEAA) does not apply to this project.

8.9 SUMMARY OF MITIGATIONS AND COMMITMENTS TO FUTURE WORKS

Table 8-1 provides a summary of the impacts, mitigations and commitments to future works as discussed in **Chapter 8**.

Table 8-1: Summary of Identified Impacts/Concerns and Proposed Mitigations/Commitments to Future Works

Environmental Issue / Concern	Concerned Agencies	Proposed Mitigations / Commitments to Future Work
CULTURAL ENVIRONMENT		
Built Heritage and Cultural Heritage Landscapes		
— The Glen Road Pedestrian Bridge in the City of Toronto is of cultural heritage value or interest due to its design or physical value, historical or associative value and contextual value and is worthy of designation under Part IV of the OHA. The Preliminary Recommended Plan will replace Glen Road Pedestrian Bridge with a new structure.	MTCS	— The CHER recommends that a Cultural Heritage Documentation Report be prepared for the Glen Road Bridge. The new bridge should be designed to reflect the original materials and context of the bridge and be sympathetic to the built heritage value of the structure.
Archaeological Resources		
— Stage 1-2 Archaeological Assessment was undertaken. Based on the assessment, the study area, which includes the pedestrian bridge and the tunnel, requires no further archaeological assessment.	MTCS	— Should previously unknown or unassessed deeply buried archaeological resources be uncovered during development, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. — The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological field work, in compliance with Section 48(1) of the Ontario Heritage Act.

Environmental Issue / Concern	Concerned Agencies	Proposed Mitigations / Commitments to Future Work
NATURAL ENVIRONMENT		
Vegetation and Flora		
— The proposed bridge will be slightly wider than the existing (1-2 m), but will generally retain the same footprint; as such, permanent impacts associated with the bridge will be minimal. Impacts to vegetation will generally be due to removals to accommodate construction. — Vegetation communities impacted by the proposed bridge replacement will include: FODM5-9 (Unit 1), FODM4-6 (Units 2 & 3), FODM4-A (Unit 4), FODM4-B (Unit 5). — No Species at Risk or provincially rare species were observed during field investigations through preliminary design. One locally significant species, Northern Red Oak (TRCA L4) may be impacted due to construction.	MOECC MNRF RNFP	— Removal and disturbance of vegetation will be restricted to that required for construction. — Retain vegetation under the existing bridge, including 'topping' of trees and retention of standing trunks of trees in order to maintain root mats and promote coppice growth, if feasible. • In areas requiring only temporary disturbance (e.g., areas of equipment movement, in temporary storage / work areas) vegetation will be retained wherever feasible or cleared only (i.e., no grubbing) to promote more rapid re-growth. — Vegetation clearing and retention zones will be delineated clearly on the Contract documents and in the field (e.g., protective fencing) to minimize the risk of vegetation impacts beyond the construction limits. — All appropriate vegetation clearing techniques (e.g., trimming of damaged branches and roots, felling away from retained vegetation communities) will be used to avoid impacts / damage to non-impacted.
Tree Impacts		
— The Preliminary Recommended Plan to replace the bridge in its current location is likely to require tree removals and tree injury.	MOECC MNRF RNFP	— The City of Toronto's Ravine and Natural Feature Protection By-law applies to trees of any size within areas designated as 'Ravine'. Exact impacts to trees to be confirmed as part of the detailed design stage. At that time, and if required a *'Ravine and Natural Feature*

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		Permit Application' will be completed and appended to this report. — The City of Toronto's Tree injury policy is defined as: the minimum tree protection zone not being protected. Exact quantity and impacts to trees to be confirmed as part of the detailed design stage. At that time any trees identified as 'injured' will be included on the *'Ravine and Natural Feature Permit Application'*.
Wildlife		
— Several forest vegetation communities, providing wildlife habitat elements and functions, will be impacted by the proposed works. — No permanent impact to wildlife movement is anticipated to occur as a result of the bridge replacement.	MOECC MNRF RNFP	— The habitats will generally be retained and will remain intact in terms of function compared to existing conditions. — The mitigation measures developed during detail design will be included in the Contract documents for implementation during construction. — Any wildlife (e.g., bird, snake, mammal) incidentally encountered during construction will not be knowingly harmed. Animals within the construction zone will be allowed to move away from the area on their own, if at all possible. — In the event that an animal encountered during construction does not move from the construction zone, or is injured, the Contract Administrator will be notified immediately.
— Bat species afforded protection under the provincial Endangered Species Act (2007) have potential to occur within the Rosedale Valley and suitable bat maternity habitat (cavity / snag trees) was identified within the vicinity of the bridge structure. Detailed	MOECC MNRF RNFP	— Consideration for this species and potential impacts to suitable maternity roosting and / or other protected habitats at the time of future works will need to be considered and any potential impacts to these species

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surveys to assess presence / absence were not completed as part of the preliminary design study.		be addressed, as appropriate in consultation with the Ministry of Natural Resources and Forestry (MNRF).
Migratory Birds		
— Potential impacts to nesting migratory birds and their habitats include disturbance to nesting activity or possibly loss of nests and/or young during construction, depending on timing of vegetation removal.	MOECC MNRF RNFP	— Impacts can generally be addressed by implementing proper clearing windows and standard awareness mitigation. — Awareness of the potential for nesting activity within the project limits during the Regional Nesting Period. — Avoidance of activities that may disturb or harm nesting migratory birds. — It is anticipated that construction activities will overlap with the Regional Nesting Period. Vegetation clearing (including grubbing and tree/shrub/grass removal) and any construction activities in areas where migratory birds might nest are recommended to occur such that they avoid the Regional Nesting Period (approximately April 1 to August 31). The Contractor will be made aware that occasionally bird species will precede or exceed the approximate breeding bird season window. — Prevention and Mitigation of potential impacts on migratory birds: — No nests will be removed or birds or nests disturbed in accordance with the MBCA. — The Contractor will be advised that all temporary brush and lose soil piles should be tarped or otherwise inspected regularly to prevent nesting as they provide potentially suitable nesting sites for some species.

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		— If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area might result in a contravention of the MBCA (i.e., potential harm or stress to nests, birds, eggs or young), all activities will stop and the Contractor Administrator will be notified immediately. The Contract Administrator will then contact Environment Canada for direction.
Wildlife Movement		
— Temporary impacts to movement may occur during construction as a result of temporary exclusion or protection fencing.	MOECC MNRF RNFP	— Provide exclusion fencing along areas of construction to minimize ingress of animals. — Utilize exclusion fencing or protection fencing to guide wildlife to areas of safe passage. — Review temporary fencing overall design to ensure passage is still possible across the construction area (east-west) along the valley.
Species of Conservation Concern		
— Chimney Swift (Threatened) was observed in the vicinity of the bridge; habitat is not present on the bridge or immediately adjacent areas and this species is likely foraging in this area with nesting habitat available in relatively proximity.	MOECC MNRF RNFP	— No specific mitigation is recommended for this species. — If possible, construction activities should avoid locally rare species that occur within the project area (Northern Red Oak, TRCA L4), species location will be confirmed through detail design and considered for avoidance and protection (i.e. tree protection measures), if feasible. — Additional mitigation for Species of Conservation Concern may be required pending any required updates for Species at Risk screening current at the time of detail design / construction. Specific consideration will be given to Barn Swallow nesting potential on the bridge and

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		presence and / or potential impact to Species at Risk Bats when detailed construction impact areas have been determined through detail design.
General Vegetation and Habitat		
— General construction related impacts to vegetation and habitats.	MOECC MNRF RNFP	— Erosion and sediment control measures (including any dewatering and related management measures, as required through detail design) will be implemented rigorously, and inspected and maintained throughout construction per an approved ESC plan. — All construction-related and generated materials (including equipment, sediment in dewatering discharge and runoff from exposed soils, stockpiled soils or other materials from clearing and grubbing) will be properly stored / contained, maintained, filtered and otherwise handled and managed throughout and following construction: — Temporary stockpiling, access and construction staging areas will be located in defined areas that avoid vegetated areas that would not otherwise be impacted wherever possible, and properly contained to prevent any migration of materials from the site. — 'Excess material' from the construction activity will be removed off-site or re-used or placed only in those areas identified in the Contract documents. — Equipment will be in good working order and 'clean' (i.e., free of leaks and soil transported to or from off-site). — The Clean Equipment Protocol for Industry, as prepared by the Peterborough Stewardship Council and the

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		Ontario Invasive Plant Council (May 2016) will be adhered to. — Exposed temporarily disturbed surfaces will be re-stabilized and re-vegetated as soon as possible (within 30-45 days) following construction using seeding and native vegetation replacement techniques, as appropriate and as determined through detail design. — All unnecessary disturbance of the steep valley slopes will be avoided to maintain slope and vegetation integrity. Areas that don't require disturbance will be fenced to prevent inadvertent construction access or disturbance. Vegetation will be retained under the new bridge except where removal is required to construct the abutments. Where tree removals are required, trees will be cut but not grubbed to retain the trunks to provide bank stability, if feasible. — Specific post-construction restoration plans will be implemented, as appropriate and as determined through detail design. — Regular environmental monitoring / inspection will be undertaken throughout construction to ensure that protection measures are implemented, maintained and repaired properly and remedial measures are initiated and completed properly where warranted. — The Construction Supervisor will be responsible for ensuring that these measures and any others that may be deemed appropriate to protect and restore natural features are implemented and that immediate action is taken to correct any deficiencies or other environmental concerns. Any changes to these measures will be

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		reviewed with the Contract Administrator, who will determine the need for client and then agency review, prior to implementation. Specific issues will be drawn to the attention of the Contract Administrator who will notify agency staff directly if required. No permanent impact to wildlife movement is anticipated to occur as a result of the bridge replacement. The existing structure affords some wildlife movement opportunities through the Rosedale Valley and the proposed bridge will retain similar conditions after construction. Some impact to wildlife movement during construction has potential to occur and should be considered through mitigation to maintain connectivity.
Socio Economic Environment		
— No businesses or residences will be directly impacted by the Preliminary Recommended Plan.		— No mitigation required.
— No permanent property impacts are required by the Preliminary Recommended Plan. Some temporary easements may be required for and during the construction staging, which will be further assessed during detail design.	Local residents	— Consultation with impacted property owners and area residents to be provided prior to construction.
— Access to the bridge and tunnel will be closed during the construction process.	Local residents	— Detour routes will be signed. — Efforts will be made to minimize the duration of closure to the bridge and tunnel.
— Provision for active transportation — The existing sidewalk on Bloor Street East may be temporarily closed on one side during construction of the bridge and tunnel.	Local residents and active transportation users	— The bridge and tunnel design is intended to support and promote all modes of active transportation including provision for pedestrians and cyclists. The 4.8 m wide bridge deck and tunnel are proposed to accommodate the wide variety of users of the bridge and tunnel.

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		— Bike lanes will be maintained on Bloor Street East during construction. — Pedestrians will be directed to the other side of the street during construction with signage. — All structural elements will designed to meet AODA standards.
— Potential for streetscape and landscaping	City Local residents TTC	— There will be opportunity for streetscape / landscape in the landing areas: north of the bridge, at the bridge and tunnel connection, and at the south end of the tunnel and TTC Sherbourn Station entrance. The design of these areas will build on that illustrated in **Section 7.10**. A detailed Landscape / Streetscape Plan will be further developed during detail design. — Further coordination with TTC will be planned during detail design regarding enhanced opportunities around the Sherbourne Station entrance and the pedestrian tunnel. — Coordination between the Bloor Street East Streetscape Improvements and the Glen Road Pedestrian Bridge and Tunnel EA should be planned for potential thematic connections.
— Construction noise issues.	Local residents	— Construction activities will be planned so as to abide by local noise by-laws. By-law exemption will be sought, if required.
— Climate Change	MOECC	— The recommendations from this EA support the City's Walking Strategy by maintaining a key pedestrian link, and upgrading the facility to accommodate all modes of active transportation and future growth.

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— Air quality and dust control	MOECC	— Mitigation techniques discussed in Environment Canada *"Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities"* document include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, and limiting exposed areas which may be a source of dust and equipment washing.
Contamination Overview		
— A Phase One Environmental Site Assessment, and Contamination Investigation was prepared as part of the EA Study. Based on the results of the laboratory analysis of the submitted soil and groundwater samples, exceedances to the MOECC Table 3 SCS were noted.	MOECC	— Excess surficial soil and groundwater generated during bridge foundation construction in areas identified as exceeding MOECC Site Condition Standards should be managed as contaminated material or groundwater in accordance with MOECC regulations and disposed of at a MOECC licensed receiving facility, and should be managed with appropriate health and safety precautions. Additional soil sampling may be warranted to determine the vertical limit of the soil to be managed as contaminated at these locations; — In general, groundwater generated during bridge foundation construction must be tested to ensure it is compliant with City of Toronto Sewer-Use Bylaw prior to discharging to sewers; and — An MOECC licenced well contractor should be retained to decommission the four monitoring wells on the Subject Property, as outlined in O. Reg. 903 under the Ontario Water Resources Act. The decommissioning should be overseen by a qualified environmental consultant and copies of the well decommissioning records should be provided to the City of Toronto or a

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		City of Toronto representative (i.e. Contract Administrator).
Transportation		
— Maintain connection over Rosedale Valley to connect users to the TTC Sherbourne Station, the Rosedale neighbourhood, the St. James Town community and other destinations.	Local residents	— Mitigations to reduce the duration of construction could be implemented.
— Reduction of Bloor Street East to one lane in each direction, and short term closure of Rosedale Valley Road during construction.	City	— A traffic / construction management plan to be developed during detail design.
Utilities		
— Potential impacts to existing utilities during construction (see **Section 7.5**)	Utility Companies	— All existing utilities will be staked out in the field prior to the initiation of construction and protected from damage during construction. — Should the necessity for relocation of any existing utilities be identified, a Composite Utility Relocation Plan would be required to illustrate the proposed relocations. — The relocations would be arranged with the relevant utility and the works would be completed prior to the start of the project.
Design and Construction		
— The following potential adverse effects are identified: disruption/removal of existing vegetation, construction noise and air quality, disruption to vehicle traffic, mud and dust during construction.		— It is intended that the works proposed are executed in such a manner, which to the fullest possible extent, minimizes any adverse effects on the natural environment of the project area. See Natural Environment section above.

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		— Surplus excavated material shall be removed to locations arranged by the Contractor. — A Tree Protection Plan will be developed during detail design. — The Contractor shall take such steps as may be required to prevent dust nuisance resulting from his operations.
Permits and Approvals		
— Approval requirements will be addressed for the project during detail design.		— Notifications / permissions from respective utilities and municipal services with facilities in the area; — A permit from TRCA would be required prior to any development/site alteration within the TRCA regulated areas (O.Reg. 166/06) — A PTTW application will not be required for this project. — Some utilities and municipal services works will require separate permits under TRCA's O.Reg. 166/06 — Necessary construction permits to be obtained with MOECC and TRCA per **Section 8.7**.