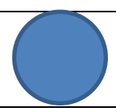
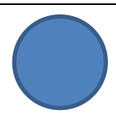
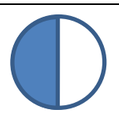
Factor Group/Criteria		Alternative 1: Steel girder with two inclined steel legs	Alternative 2: Steel girder with two vertical concrete piers	Alternative 3: Post tensioned concrete box girder with two vertical concrete piers
1.	***Bridge Engineering***			
	Address existing and future structural needs	✓ All alternatives will address the existing and future structural needs through replacement by a new pedestrian bridge crossing.		
	Address public safety needs for all users	✓ All alternatives are design to accommodate pedestrians and cyclists. ✓ All alternatives are design to required structural standards and address public safety needs for all users.		
	Construction constraints and complexity	✗ Increased access complexity during construction compared to other alternatives as the base of steel legs are located further up the steep embankments in the valley. ✗ Requires complex girder / leg connection and pins at base of piers.	✓ Construction can be accommodated by conventional methods, which is relatively less complex compared to the other alternatives. ✓ Concrete piers would be located further down the embankments which would allow easier access during construction.	✗ Conventional construction may require significant formwork / falsework for cast-in-place concrete, potentially affecting Rosedale Valley Road. ✗ Segmental cast-in-place concrete may necessitate costly equipment. ✗ The use of precast segmental may need additional staging area. ✓ Concrete piers would be located further down the embankments which would allow easier access during construction.
	Structural Durability and Maintenance	✗ Steel girders and legs would require regular maintenance over the long term (coating and related access requirements). ✗ Access to up the steep valley for regular maintenance would be more difficult.	✗ Steel girders would require regular maintenance (re-coating) over the long term. ✓ Concrete piers would have reduced long term maintenance needs.	✓ Concrete box girder and piers have reduced long term maintenance needs.
	Comparative costs including: capital construction, maintenance, property, utility relocation, etc.	Capital: $7.9 M (4.8 m deck width) Maintenance: $1.0M	Capital: $6.1 M (4.8 m deck width) Maintenance: $0.9	Capital: $6.8 M (4.8 m deck width) Maintenance: $0.3
	Summary Bridge Engineering	Complex construction, more long term maintenance required, most costly to construct.	Conventional construction method, long term maintenance required on steel girders. Best balanced in terms of cost and constructability.	Complex construction, however, may have less long term maintenance cost.
				
2.	***Cultural Environment***			
	Impacts to cultural heritage resources, cultural heritage landscapes, cultural heritage buildings. Preservation of cultural heritage values, including:	The Glen Road Pedestrian Bridge is a rare example of a steel rigid frame bridge with inclined legs within the City of Toronto. Steel rigid frame structures with inclined legs were well suited to 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. Few examples of this bridge type have been identified within the province and no other examples have been located to date within Toronto. 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. The Cultural Heritage Evaluation Report (CHER) has 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 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 (see Section 5.3.1 Statement of Cultural Heritage Value and 5.3.2 Heritage Attributes) and is worthy of designation under Part IV of the OHA.		

Factor Group/Criteria		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
	• Design or physical value because it is a rare, unique, representative style, type, material, construction method	✓ Preserves the rare example of a steel girder with inclined legs within the City of Toronto. ✓ Preserves the clean lines and dramatic simplicity and elegance with slender deck, and aesthetically pleasing inclined legs.	✗ Does not maintain design or physical value of the original structure style. ✗ Preserves clean lines on the structure, but vertical piers may disrupt view from Rosedale Valley Road.	✗ Does not maintain design or physical value of the original structure style. ✗ Preserves clean lines on the structure, but vertical piers may disrupt view from Rosedale Valley Road.
	• Historical value because it has direct associations with a theme, event, belief, person, activity, organization or institution; yields information that contributes to an understanding of a community; demonstrates the work of a significant architect, artist, or builder.	✓ All alternatives maintain the bridge crossing attesting to the importance of the connection across the Rosedale Ravine at Glen Road. ✓ Maintaining the original design would be a representative example of the work of the original building company Bridge & Tank Company of Canada Ltd.	✓ All alternatives maintain the bridge crossing attesting to the importance of the connection across the Rosedale Ravine at Glen Road. ✗ Does not maintain original design of building company.	✓ All alternatives maintain the bridge crossing attesting to the importance of the connection across the Rosedale Ravine at Glen Road. ✗ Does not maintain original design of building company.
	• Contextual value because it is important in defining, maintaining, or supporting the character of an area; is physically functionally, visually, or historically linked to its surroundings	✓ Maintains elegant substructure compatible with the natural environment, and historical residential properties. ✓ Maintains the symbolic and physical landmark within the community.	✓ Maintains character of the area. ✗ This design, however, may limit link to surrounding natural area with vertical piers. ✓ Maintains the symbolic and physical landmark within the community.	✓ Maintains character of the area. ✗ This design, however, may limit link to surrounding natural area with vertical piers. ✓ Maintains the symbolic and physical landmark within the community.
	Archaeology	The study area was subject to a Stage 2 archaeological assessment. No archaeological value was identified in the study area.		
	Summary Cultural Environment	Preserves the cultural historical value of the bridge by maintaining the existing structure type and location.	Does not preserve the cultural historical value of the bridge type; does maintain the existing cultural heritage value of the bridge crossing.	Does not preserve the cultural historical value of the bridge type; does maintain the existing cultural heritage value of the bridge crossing.
				
3. Natural Environment				
	Potential impacts to existing natural environmental features including: Vegetation and Wildlife	✗ Permanent tree impacts limited at new pier locations. ✓ Relatively less complex construction method also has potentially more temporary tree impacts, which can be mitigated.	✗ Permanent tree impacts limited at new pier locations. ✓ Conventional construction methods limits potential temporary impacts.	✗ Permanent tree impacts limited at new pier locations. ✗ More complex construction method has potentially more temporary tree impacts, which can be mitigated.
Summary of Natural Environment				

Factor Group/Criteria		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
4. Socio-Economic Environment				
	Amount and type of property required	✓ No property requirement.	✓ No property requirement.	✗ Potential temporary property impacts during construction since the use of precast concrete may necessitate on-site fabrication (i.e. additional staging area may be required)
	Supports existing and future community planning	✓ All alternatives will support existing and future community planning by providing connection for active transportation.		
	Potential impact to adjacent residences and business (disruption and nuisance)	✓ Some indirect disruption to adjacent residences and business due to relatively more complex construction, which are largely in the valley.	✓ Some disruption to adjacent residences and business since construction can be accommodated by conventional methods.	✗ Although construction may be accommodated through conventional method, additional staging area may be required for on-site fabrication; therefore, may result in greater disruption to adjacent residences and business.
Summary of Socio-Economic Environment		May have some indirect disruption to adjacent properties, residences, and businesses due to relatively more complex design; however, are largely in the valley.	Relatively less impacts to adjacent properties, residences, and businesses due to conventional construciton methods.	Some additional impacts to adjacent properties, residences, and businesses due to complex design and construction method.
				
5. Transportation Planning				
	Addresses existing and future pedestrian and cycling needs	✓ All alternatives will accommodate both pedestrians and cyclists.		
	Consistent with policy and planning	✓ All alternatives are consistent with the City's policies to encourage walking, cycling and linkages to transit stations.		
	Maintains/improves network connectivity	✓ All alternatives will maintain active transportation network and connection the TTC Sherbourne Station. ✓ All alternatives do note restrict a future connection down to Rosedale Valley Road.		
	Ability to address accessibility requirements for all users	✓ All alternatives are design to AODA requirement s and will address accessibility requirements for all users.		
	Summary Transportation Planning	✓ All alternatives maintain the existing transportation network, and will provide for both cyclists and pedestrians.		
6. *Urban Design*				
	Potential to provide improved: railings, lighting, materials, safety (Crime Prevention through Environmental Design, CPTED)	✓ Provides full opportunity to improve lighting, materials and safety.	✓ Provides full opportunity to improve lighting, materials and safety. ✓ Additional opportunity to provide aesthetic details to concrete piers.	✓ Provides full opportunity to improve lighting, materials and safety. ✓ Additional opportunity to provide aesthetic details to concrete piers.

Factor Group/Criteria		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
	Summary Urban Design			
Overall Summary		Alternative 1 maintains the cultural heritage value of the existing bridge by providing the same structure type in the same location. Although the other alternatives maintain the cultural heritage value of the bridge crossing, they do not maintain the heritage value of the bridge structure itself. Alternative 3 has slightly higher socio-economic impacts due to the more complex structural designs. Alternative 1 is the most costly alternative, followed by 3 and then 2. All alternatives provide potential for similar urban designs. Alternative 2 has slightly less environmental impacts due to the conventional construction methods. **Alternative 1 is the preferred alternative as it better preserves the cultural heritage value of the existing bridge. Although Alternative 1 is more expensive and has slightly more socio and environmental impacts, the preservation of the cultrual heritage value of the bridge is vital.**		

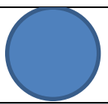
Least Impact/ Most Benefit **Most Impact/ Least Benefit**

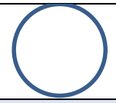
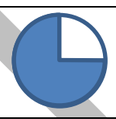
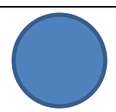
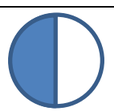

Alternative 1: Steel Girder with Two Inclined Steel Legs
Cost: $7.9M,
Maintenance: $1.0M


Alternative 2: Steel Girder with Two Vertical Concrete Piers
Cost: $6.0M
Maintenance: $0.9M
Option to instead have a single rectangular concrete column as shown for Alternative 3.


Alternative 3: Post Tensioned Concrete Box with Two Vertical Concrete Piers
Cost: $6.7M
Maintenance: $0.3M
Option to instead have two cylindrical columns as shown in Alternative 2.

Glen Road Pedestrian Bridge EA Study
Tunnel Alternative Solutions Assessment

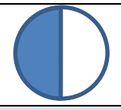
Factor Group/Criteria		Do Nothing No Tunnel Improvements	Alternative 1 Aesthetic Modifications	Alternative 2 Replace and Reconstruct Wider Tunnel
1. Socio-Economic Environment				
a.	Amount and type of property required	✓ No property requirements	✓ No property requirements	✓ No property requirements
b.	Supports existing and future community planning	✓ Maintains existing connection between Dale Avenue and Glen Road. × Maintains existing tunnel width which may limit additional pedestrian traffic in future as the area develops.	✓ Maintains existing connection between Dale Avenue and Glen Road. × Maintains existing tunnel width which may limit additional pedestrian traffic in future as the area develops.	✓ Maintains existing connection between Dale Avenue and Glen Road. ✓ Supports future development and anticipated increase in pedestrian/cyclist traffic with wider tunnel and bridge.
c.	Potential impact to adjacent residences and business (disruption and nuisance)	• Disruption only during construction of bridge replacement.	• Disruption only during construction of bridge replacement. × Minor disruption to pedestrian/cyclist tunnel traffic during aesthetic treatments.	• Disruption during construction of bridge replacement. × Extensive disruption to tunnel and Bloor Street traffic.
d.	Ability to address public security needs for all users using CPTED principles: • Open sightlines and illuminations for natural surveillance • Access control to bridge and tunnel • Identification of community space engendering a sense of protectiveness • Maintenance and management of facility	• Maintains existing sightlines or lighting for natural surveillance. × Does not provide sense of community space as there will be no improvement to the existing tunnel. • Access points to tunnel and bridge remain as existing.	✓ Opportunity to improve lighting to allow for better sightlines for natural surveillance. ✓ Potential to provide sense of community space through aesthetic designs and opportunity for public arts. • Access points to tunnel and bridge remain as existing.	✓ A wider tunnel and better lighting would improves sightlines for natural surveillance. ✓ Potential to provide sense of community space through aesthetic designs and opportunity for public arts. ✓ Potential reconstruction of access points to tunnel and bridge.
Socio-Economic Environment Summary				
2. Transportation Planning				
a.	Addresses existing and future pedestrian and cycling needs	• Existing tunnel complies with minimum design requirements for active transportation use. • Cyclists would have to dismount when crossing the bridge or tunnel (per existing condition).	• Existing tunnel complies with minimum design requirements for active transportation use. • Cyclists would have to dismount when crossing the bridge or tunnel (per existing condition).	✓ New tunnel would provide additional width for added capacity of cyclists and pedestrians. • Cyclists would have to dismount when crossing the bridge or tunnel (per existing condition)..
b.	Maintains/improves network connectivity	• Maintains existing network connectivity for pedestrians and cyclists.	• Maintains existing network connectivity for pedestrians and cyclists.	• Maintains existing network connectivity for pedestrians and cyclists.
c.	Impacts to existing access points	• Maintains existing access points from Glen Road (to the north and south) and Bloor Street. • Does not prevent installation of AODA ramp.	• Maintains existing access points from Glen Road (to the north and south) and Bloor Street. • Does not prevent installation of AODA ramp.	• Maintains existing access points from Glen Road (to the north and south) and Bloor Street. • Does not prevent installation of AODA ramp.
d.	Reduce conflict points for cross-traffic at south entrance to tunnel (adjacent to TTC Sherbourne Station)	× Does not reduce conflict points between different directions of travel.	× Does not reduce conflict points between different directions of travel.	✓ Provides better sightlines at conflict points.
Transportation Planning Summary				
3. Urban Design				
a.	Potential to provide improved design for bridge or tunnel	• Maintains existing conditions.	✓ Provides potential for aesthetic improvements to existing tunnel and new bridge.	✓ Provides potential for enhanced aesthetic improvements to the new and wider tunnel, opportunities for public art, etc.

Factor Group/Criteria		Do Nothing No Tunnel Improvements	Alternative 1 Aesthetic Modifications	Alternative 2 Replace and Reconstruct Wider Tunnel
b.	Potential improvement of landing areas at access points	• Urban design opportunities limited to landing areas of bridge only.	✓ Provides opportunity to improve existing landing areas at tunnel.	✓ Provides additional space for landing area north and south of tunnel for enhanced designs. ✓ Potential reconstruction of north bridge access to allow cyclists on bridge.
***Urban Design* Summary**				
4. Structural Engineering				
a.	Structural Improvements (Capacity, Service Life, Deficiencies etc.)	• Existing tunnel structure is about 55 years old and will likely require a rehabilitation in the upcoming years and full replacement in about 20 years (assume 75 year service life). × No immediate structural work for tunnel, does not address local concrete deterioration.	✓ Rehabilitation work on tunnel and address localized deterioration. ✓ Maintains existing structure. ✓ Structural life of existing tunnel may be extended by an additional 20-45 years until replacement is required. • Tunnel will ultimately have to be replaced at the end of the service life	✓ Addresses structural improvements for the tunnel. • Tunnel could be replaced with wider structure to match the width of the bridge × The remaining life of the existing tunnel (about 20 years) will become a “throw away”. ✓ The new tunnel is expected to have a service life of about 75 years.
b.	Potential Utility Impacts	✓ No utility impacts.	✓ No utility impacts.	× Potential impacts to utilities adjacent to the existing tunnel including gas and sanitary. × May require temporary bypass pumping for utility replacement.
c.	Constructability (Constraints and Complexity)	✓ No constructability concerns other than regarding the bridge replacement itself.	✓ Repairs would be limited to localized areas only and aesthetic modification such as lighting, tunnel wall finishes, and other design elements. ✓ Construction / repair required are anticipated to be done by conventional methods (relatively low complexity).	✓ Work can be completed using conventional methods. × Relatively moderate complexity due to utility impacts (west of existing tunnel only) and traffic staging on Bloor Street; however maintaining existing tunnel alignment.
d.	Construction Staging (Duration, Risk Complexity, Traffic Impacts, etc.)	✓ Construction duration limited to bridge replacement, as there will be no construction associated with the tunnel. ✓ Minimal complexity and minimal traffic impacts on local roads; do not anticipate traffic impacts on Bloor Street.	✓ Minimal construction staging required for the tunnel. Work is anticipated to be completed under full service of the tunnel with hoarding and protection systems as required.	× Moderately complex staging requirements for tunnel replacement including traffic impacts on Bloor Street. × Roadway protection system and shoring required. × Relatively low risk as most construction will be focused on existing tunnel location. × Tunnel closure required during construction of bridge and tunnel.
Structural Engineering Summary				
5. Cost				
a.	Comparative costs including: capital construction, operation/ maintenance, contingency, etc. (Remaining service life of tunnel is 20 years) ***See Tunnel Cost Schedule for life cycle assessment***	• Replacement of bridge only; no tunnel improvements. • Replace tunnel in 20 years. • Total Net Present Value - $2.46 M	• Aesthetic modifications - $0.3 M • Extend service life of tunnel up to 45 years; replace tunnel in 45 years. • Future rehabilitation work and eventual replacement of structure. • Total Net Present Value - $1.31 M	• Tunnel reconstruction - $4.16 M • Future rehabilitation work • Total Net Present Value - $4.32 M

Factor Group/Criteria		Do Nothing No Tunnel Improvements	Alternative 1 Aesthetic Modifications	Alternative 2 Replace and Reconstruct Wider Tunnel
Cost Summary				
6. Cultural Environment				
a.	Impacts to cultural heritage resources • Bridge type • View from Rosedale Valley • View from bridge deck	• All alternatives provide opportunity to maintain the heritage value of the bridge by allowing for any bridge type, including the inclined steel leg. All alternatives would require some changes to the structural design and connection to the tunnel landing area. • All alternatives maintain the existing connection to Rosedale neighbourhood.		
b.	Archaeology	• No archaeological potential .		
Cultural Environment Summary				
7. Natural Environment				
a.	Potential impacts to existing natural environmental features including: Vegetation Wildlife	× Impacts to natural environment around replacement of bridge only.	×	×
Natural Environment Summary				
Summary		Do Nothing does not address the existing security issues associated with the tunnel.	Alternative 1 addresses the existing security issues associated with the tunnel, by providing additional lighting, and a more comfortable environment; however it is limited by the existing tunnel structure and alignment. This alternative would not improve sightlines between the tunnel, bridge and Glen Road.	Alternative 2 address the existing security issues associated with the tunnel by providing additional lighting, and a more comfortable environment with a wider tunnel. This is considered to be a long term solution as the new tunnel will have a service life of 75 years. Based on the sightline assessment, the additional tunnel width would provide some enhancement to the sightlines between the tunnel, the bridge, and Glen Road. This alternative could be combined with Alternative 2 as part of a "phased approach".
		Not Carried Forward	**Not Carried Forward**	**Carry Forward**

Least Impact/ Most Benefit **Most Impact/ Least Benefit**

		Alternative 2A Reconstruct and Widen Tunnel to the West	Alternative 2B Reconstruct Tunnel to Match Glen Road Alignment (to the East)	Alternative 2C Reconstruct Tunnel on New Alignment (match north end of bridge to south end of tunnel)
1.	**Socio-Economic Environment**			
a.	Amount and type of property required	✓ No property requirements	✓ No property requirements; new tunnel alignment would be within City's right-of-way.	✓ No property requirements; new tunnel alignment would be within City's right-of-way.
b.	Supports existing and future community planning	✓ Bridge and tunnel connection between Dale Avenue and Glen Road will be maintained. ✓ Bridge will be replaced with a new structure. ✓ Supports future development and anticipated increase in pedestrian/cyclist traffic with wider tunnel and bridge.		
c.	Potential impact to adjacent residences and business (disruption and nuisance)	× Disruption during construction of bridge replacement. × Extensive disruption to tunnel and Bloor Street traffic.	× Disruption during construction of bridge replacement. × Extensive disruption to tunnel and Bloor Street traffic. × Impacts to parking lot for 451 Glen Road for construction of AODA ramp; parking lot property is owned by the City.	× Disruption during construction of bridge replacement. × Extensive disruption to tunnel and Bloor Street traffic.
d.	Ability to address public security needs for all users using CPTED principles: • Open sightlines and illuminations for natural surveillance • Access control to bridge and tunnel • Identification of community space engendering a sense of protectiveness • Maintenance and management of facility	✓ A wider tunnel and better lighting would improves sightlines for natural surveillance. • Access points to tunnel and bridge remain as existing. ✓ Potential to provide sense of community space through aesthetic designs and opportunity for public arts.	✓ A wider tunnel and better lighting would improve sightlines for natural surveillance. × However, the new aligment of the tunnel would not allow a direct light of sight from the sidewalk of Glen Road south. • Access points to tunnel and bridge will be adjusted to relocate staircases and provide ramps. ✓ Potential to provide sense of community space through aesthetic designs space and opportunity for public arts.	✓ A wider tunnel and better lighting would significanlty improve sightlines for natural surveillance and potential for improved lighting. • Access points to tunnel and bridge remain as existing. • Landing area north of Bloor Street may result in areas with poor visibility adjacent to stairs ✓ Potential to provide sense of community space through aesthetic designs and opportunity for public arts.
Socio-Economic Environment Summary		No property impacts. All alternatives support future community planning. Some disturbance to adjacent residences, businesses and users during construction of tunnel. Improved sightlines between tunnel, bridge, and Glen Road providing natural surveilance addressing public security needs.	No property impacts. All alternatives support future community planning. More disturbance to adjacent residences, businesses and users during construction of tunnel as staircases also need to be reconstructed north and south of Bloor Street. Reduces sightlines between tunnel, bridge, and Glen Road; does not address public security needs as much as Alternative 1.	No property impacts. All alternatives support future community planning. Some disturbance to adjacent residences, businesses and users during construction of tunnel. Improved sightlines between tunnel, bridge, and Glen Road, but creates areas with poor visibility on north side of tunnel.
				
2.	**Transportation Planning**			
a.	Addresses existing and future pedestrian and cycling needs	✓ Bridge will be replaced and new tunnel provides additional width for added capacity of cyclists and pedestrians. • Cyclists would have to dismount when across the bridge or tunnel (per existing conditions).		
b.	Maintains/improves network connectivity	✓ Maintains existing network connectivity for pedestrians and cyclists.	✓ Maintains existing network connectivity for pedestrians and cyclists.	• Maintains network connectivity. × Creates a slight "jog" from the north staircase to the bridge/tunnel; survey conducted as part of the EA Study indicated the move between bridge to Bloor Street via the north staircase is the second most used movement in the area (most used movement is between bridge/tunnel to Glen Road).

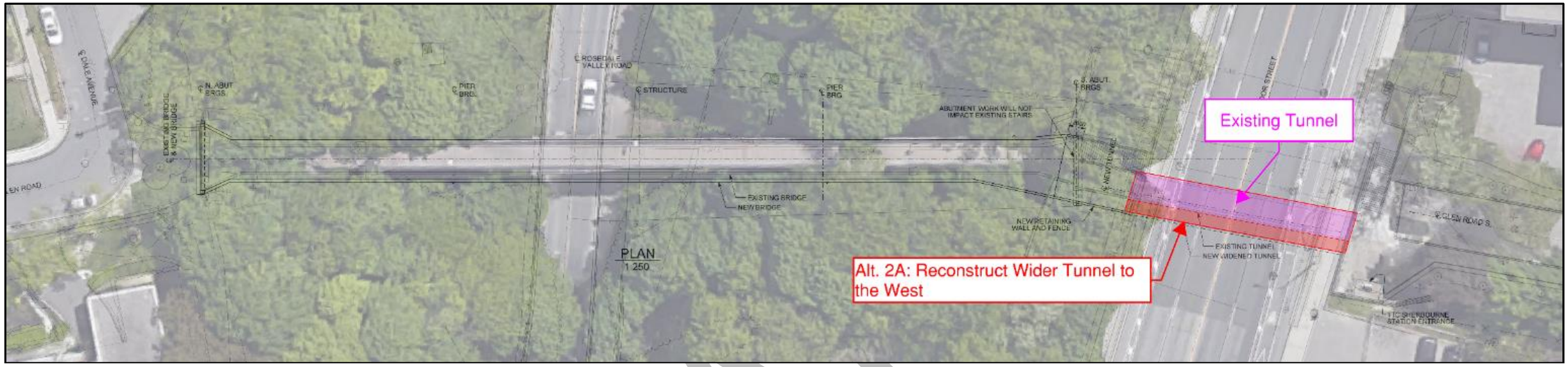
		Alternative 2A Reconstruct and Widen Tunnel to the West	Alternative 2B Reconstruct Tunnel to Match Glen Road Alignment (to the East)	Alternative 2C Reconstruct Tunnel on New Alignment (match north end of bridge to south end of tunnel)
c.	Impacts to existing access points	✓ Maintains existing access points from Glen Road (to the north and south) and Bloor Street. ✓ Does not prevent installation of AODA ramp or elevator.	✓ Existing stair access to/from Bloor Street would be impacted. • Relocation of staircases north or south of Bloor Street, would be required, and installation of AODA ramp or elevator.	✓ Maintains existing access points from Glen Road (to the north and south) and Bloor Street. ✓ Does not prevent installation of AODA ramp or elevator.
d.	Reduce conflict points for cross-traffic at south entrance to tunnel (adjacent to TTC Sherbourne Station)	✓ Provides better sightlines at conflict points.	× Sightline may be limited from Glen Road sidewalk to the new tunnel entrance	✓ Provides better sightlines at conflict points.
Transportation Planning Summary		All alternatives provide for future pedestrian and cyclist needs. Does not impact existing accesses (staircases). Provides good sightlines at points of interest. Does not prevent providing AODA access.	All alternatives provide for future pedestrian and cyclist needs. Impacts existing accesses (staircases) north and south of Bloor Street. Reduces sightlines at points of interest from existing conditions. Requires providing AODA accesses.	All alternatives provide for future pedestrian and cyclist needs. Does not impact existing accesses (staircases). Provides good sightlines at points of interest. Does not prevent providing AODA access.
				
3. Natural Environment				
a.	Potential impacts to existing natural environmental features including: Vegetation Wildlife	× Impacts to natural environment around replacement of bridge. × Additional natural impacts around north tunnel entrance with additional landing area.	× Impacts to natural environment around replacement of bridge. × Additional natural impacts around north tunnel entrance with additional landing area and new alignment of the tunnel.	× Impacts to additional natural environment around replacement of bridge due to new alignment of bridge over the Rosedale Valley.
Natural Environment Summary				
4. Structural Engineering				
a.	Structural Improvements (Capacity, Service Life, Deficiencies etc.)	✓ Addresses structural improvements for the tunnel. ✓ The new tunnel is expected to have a service life of about 75 years.		
b.	Potential Utility Impacts	× Potential impacts to utilities on west side of the existing tunnel including gas and sanitary. Utilities would be relatively the least amongst the three alternatives. × May require temporary bypass pumping for utility replacement.	× Potential impacts to utilities on east side of the existing tunnel including sanitary, two gas lines, and water main. Utilities impact most significant under this alternative. × May require temporary bypass pumping for utility replacement.	× Potential impacts to utilities on west side of the existing tunnel including gas and sanitary. Utilities relative more than Alternative 2A but less than 2B. × May require temporary bypass pumping for utility replacement.
c.	Constructability (Constraints and Complexity)	✓ Work can be completed using conventional methods. × Relatively moderate complexity due to utility impacts (west of existing tunnel only) and traffic staging on Bloor Street; generally maintaining existing tunnel alignment.	✓ Work can be completed using conventional methods. × Relatively high complexity due to utility impacts and traffic staging on Bloor Street on new tunnel alignment.	✓ Work can be completed using conventional methods. × Relatively high complexity due to utility impacts and traffic staging on Bloor Street. × Minor adjustments to bridge landing at north end due to new alignment.

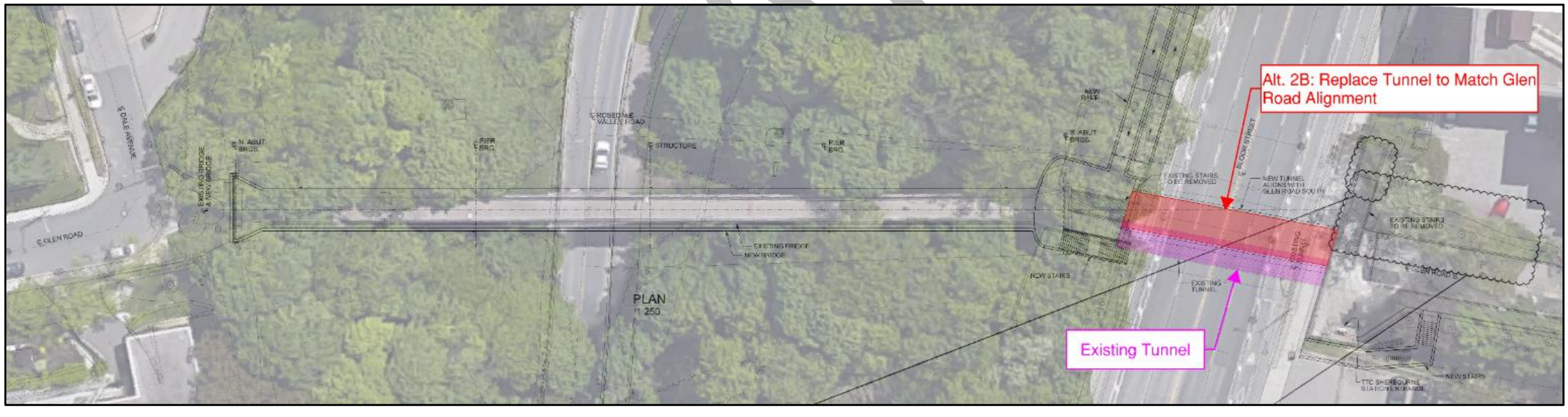
		Alternative 2A Reconstruct and Widen Tunnel to the West	Alternative 2B Reconstruct Tunnel to Match Glen Road Alignment (to the East)	Alternative 2C Reconstruct Tunnel on New Alignment (match north end of bridge to south end of tunnel)
d.	Construction Staging (Duration, Risk Complexity, Traffic Impacts, etc.)	× Moderately complex staging requirements for tunnel replacement including traffic impacts on Bloor Street. × Roadway protection system and shoring required. × Relatively low risk as most construction will be focused on existing tunnel location. × Tunnel closure required during construction of bridge and tunnel.	× Major staging requirements for tunnel replacement including Bloor Street. × Roadway protection system and shoring required for building new tunnel. × Relatively high risk as construction of tunnel in new location with multiple crossing utility lines. ✓ Tunnel closure required during construction of bridge; potential to maintain existing tunnel during majority of construction.	× Major staging requirements for tunnel replacement including Bloor Street. × Roadway protection system and shoring required. × Relatively moderate risk as most construction will be focused on existing tunnel location. × Tunnel closure required during construction of bridge and tunnel.
Structural Engineering Summary		Minimal impacts to existing utilities. Conventional construction and staging methods.	Higher potential of impacting existing utilities on east side of tunnel. Complex construction and staging methods due to required replacement of tunnel and staircases.	Minimal impacts to existing utilities. Medium complexity of construction and staging, as replacing tunnel on new alignment.
				
5. Urban Design				
a.	Potential to provide improved design for bridge or tunnel	✓ Provides potential for enhanced aesthetic improvements to the new and wider tunnel, opportunities for public art, etc.	✓ Provides potential for enhanced aesthetic improvements to the new and wider tunnel, opportunities for public art, etc. × Existing wildflower garden potentially removed due to installation of accessible ramps.	✓ Provides potential for enhanced aesthetic improvements to the new and wider tunnel opportunities for public art, etc.
b.	Potential improvement of landing areas at access points	✓ Provides additional space for landing area north and south of tunnel for enhanced designs. ✓ Potential reconstruction of north bridge access to allow cyclists on bridge.	✓ Provides additional space for landing area north and south of tunnel for enhanced designs. Some additional opportunities available with relocation of staircases. ✓ Potential reconstruction of north bridge access to allow cyclists on bridge.	✓ Provides additional space for landing area north and south of tunnel for enhanced designs. ✓ Potential reconstruction of north bridge access to allow cyclists on bridge.
***Urban Design* Summary**				
6. Cost				
a.	Comparative costs including: capital construction, operation/ maintenance, contingency, etc. (Remaining service life of tunnel is 20 years) ***See Tunnel Cost Schedule for life cycle assessment***	• Net present day value for tunnel reconstruction - $4.16 M	• Tunnel reconstruction - $5.10 M • Additional cost for new staircases and alternate access to Bloor Street	• Net present day value for tunnel reconstruction on new alignment - $5.10 M
Cost Summary				
7. Cultural Environment				
a.	Impacts to cultural heritage resources • Bridge type • View from Rosedale Valley • View from bridge deck	• All alternatives provide opportunity to maintain the heritage value of the bridge by allowing for any bridge type, including the inclined steel leg. All alternatives would require some changes to the structural design and connection to the tunnel landing area. • All alternatives maintain the existing connection to Rosedale neighbourhood.		

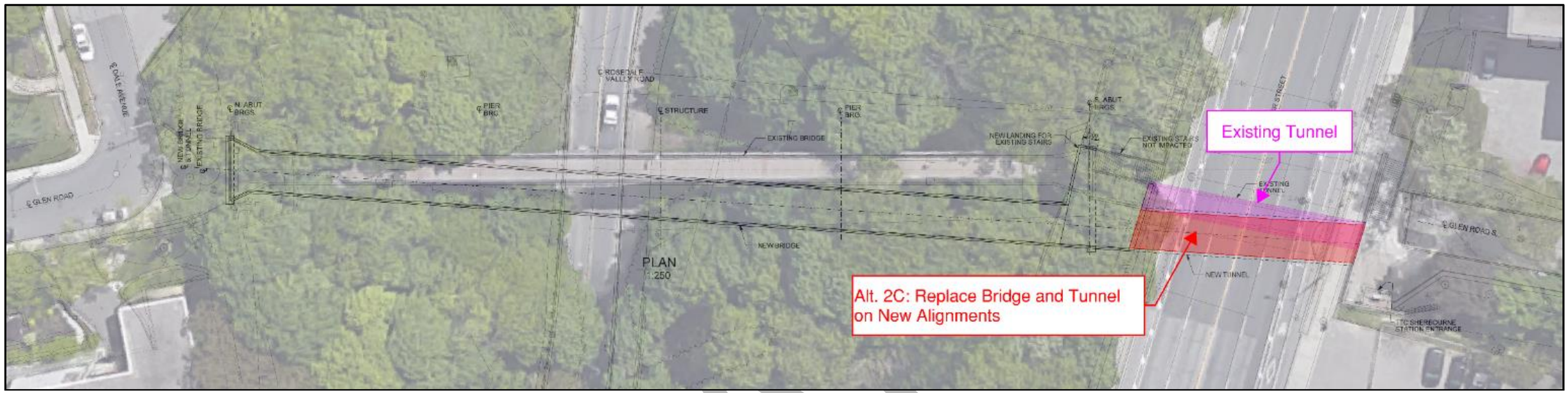
		Alternative 2A Reconstruct and Widen Tunnel to the West	Alternative 2B Reconstruct Tunnel to Match Glen Road Alignment (to the East)	Alternative 2C Reconstruct Tunnel on New Alignment (match north end of bridge to south end of tunnel)
b.	Archaeology	• No archaeological potential.		
Cultural Environment Summary				
Summary		Alternative 2A would address the existing security issues associated with the tunnel by providing additional lighting, and a more comfortable environment with a wider tunnel. Based on the sightline assessment, the additional tunnel width would provide some enhancement to the sightlines between the tunnel, the bridge, and Glen Road. Widening the tunnel to the west minimizes the potential utility impacts. This alternative could be combined with Alternative 2 as part of a "phased approach".	Alternative 2B would not address the existing security issues associated with the tunnel, as it reduces the sightlines between the tunnel and the Glen Road sidewalk. Staircases on both the north and south side will be impacted and will have to be reconstructed. This alternative would have the most impacts to utilities, most complex in constructability and the highest cost.	Alternative 2C would address the existing security issues associated with the tunnel by providing additional lighting, and a more comfortable environment with a wider tunnel. Based on the sightline assessment, aligning the bridge and tunnel provides the best sightlines; however, this alternative also create spaces where there would be poor visibility. By realigning the tunnel away from the north staircase, a "jog" is created between the bridge/tunnel and staircase. Alternative 2C would also have more footprint impacts in the valley and utilities impact compared to Alternative 2B.
		Preferred	**Not Preferred**	**Not Preferred**

Least Impact/ Most Benefit

Most Impact/ Least Benefit


Existing Tunnel
Alt. 2A: Reconstruct Wider Tunnel to the West
PLAN
1:250


Alt. 2B: Replace Tunnel to Match Glen Road Alignment
Existing Tunnel
PLAN
1:250


Existing Tunnel
Alt. 2C: Replace Bridge and Tunnel on New Alignments
PLAN
1:250
EXISTING BRIDGE
NEW BRIDGE
NEW TUNNEL
EXISTING TUNNEL
NEW LANDING FOR EXISTING STAIRS
EXISTING STAIRS NOT IMPACTED
N. ABUT BRGS
S. ABUT BRGS
PIER BRG
CROSSTOWN VALLEY ROAD
STRUCTURE
DALE AVENUE
GLEN ROAD
GLEN ROAD S.
ITC SHERBOURNE STATION ENTRANCE