

APPENDIX G

Friends of the Bluffs Alternate Plan Sensitivity Analysis

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SENSITIVITY TEST OF ALTERNATIVE PLAN FOR THE CENTRAL AND EAST SEGMENTS SUBMITTED BY THE FRIENDS OF THE BLUFFS

In November 2016, the Scarborough Waterfront Project (SWP) Project Team received an Alternate Plan from a member of the public, representing the *Friends of the Bluffs*, for the Central and East Segments of the SWP.

Given the public interest in this plan, TRCA undertook a sensitivity analysis which evaluated the Alternate Plan using the Objectives, Criteria and Indicators used to select the Preferred Alternative. The Alternate Plan submitted is at a coarse level of detail; therefore, a number of assumptions had to be made in interpreting the plan. It is noted that changes to these assumptions could change the anticipated effects; however, the ability of the Alternate Plan to meet Project Objectives will not change, as these are independent of the scale of the effects. **Figure 5-26** depicts the Alternative Plan submitted by the Friends of the Bluffs.

The following assumptions have been made to facilitate the assessment of effects:

- Based on the scale of the drawing, the proposed headland is assumed to be approximately 350 m in length.
- Based on the scale of the drawing, and a 350 m-long headland, the above water portion of the beach, under typical summer water level conditions, would extend approximately 300 m east of the proposed headland, in front of an existing revetment. The underwater toe of the beach, retained by the new headland structure, would extend to approximately Morningside Avenue. It is expected that the underwater beach buildup would assist in stabilization of the existing shoreline works directly behind the beach; however, it is not anticipated to provide notable contributions to stabilization along the toe of the bluff east of the existing protection works.
- It is assumed that there is only one formal access point at the existing Guild construction road.
- As with the other Alternatives considered, this Alternative would need to meet City of Toronto and TRCA requirements for trail width, grade and turning radius wherever possible
- The Alternate Plan includes creation of an activity node at the base of the Guild Park and Gardens that could provide a sand beach, which would require the provision of formal public access to the shoreline in this location.
- No changes to the shoreline or trail to the east of the Guild Park and Gardens, including no new access to the shoreline.

- No changes to the current location of the Waterfront Trail in the vicinity of Copperfield Road and the rail corridor; however it is noted that the trail will likely be constrained in this location as a result of the expansion of the rail corridor.

Table 5-22 outlines the effects assessment of the Alternate Plan in comparison with the Preferred Alternative.

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Figure 5-1 Friends of the Bluffs Alternative Plan.

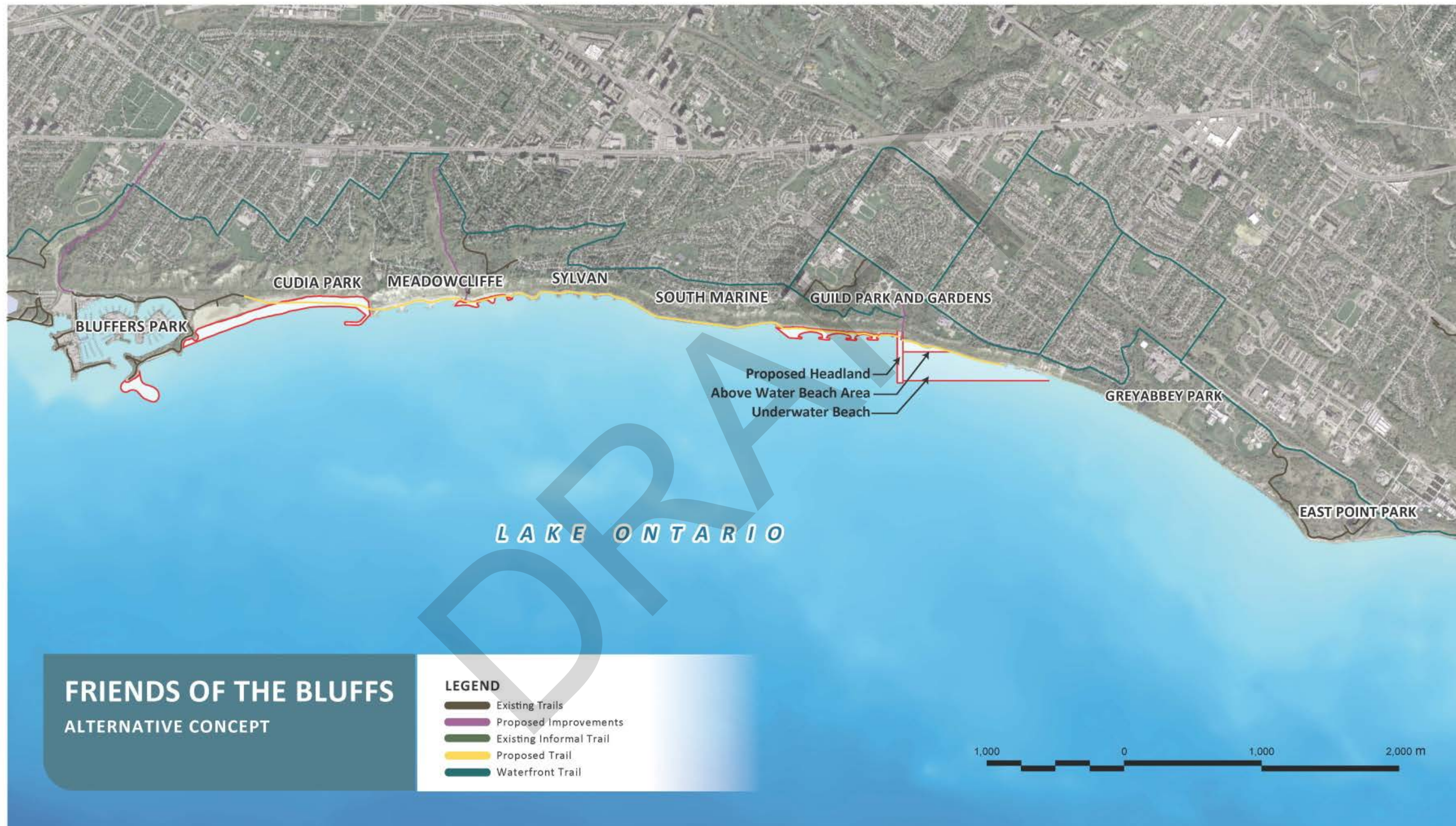


Table 5-1 Effects Assessment of the Alternative Plan in Comparison with the Preferred Alternative.

Objective	Criteria	Indicator	Indicator Definitions	Preferred Alternative	Alternate Plan
Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages	Extent of aquatic habitat enhanced or diminished			MOST PREFERRED	LEAST PREFERRED
		Ability to increase shoreline morphology by increasing shoreline irregularity	As supported by long-term monitoring data, open coast shorelines with more complex profiles result in increased species richness. Each Alternative results in an impact to shoreline morphology. Increasing the morphology via increasing irregularity improves essential aquatic habitat and benefits local resident and migratory fish (including SAR Atlantic Salmon and American Eel) while providing optimal functional open coast habitat. In particular, a complex shoreline profile provides for increased foraging opportunities, cover and shelter.	Most Preferred Increases aquatic habitat physical morphology to a greater extent, due to increases in shoreline profile irregularity by approximately 23% relative to existing conditions.	Least Preferred Increases aquatic habitat physical morphology to a lesser extent, due to a smaller increase in shoreline profile irregularity by approximately 16% relative to existing conditions.
		Ability to increase shoreline substrate type diversity	As supported by long-term monitoring data, more diverse open coast shorelines support increased species richness. Each Alternative results in an impact to shoreline substrate type composition. Increase the relative amounts of cobble and boulder substrate, in relation to sand, brings the shoreline closer to historical conditions. This increased diversity improves essential aquatic habitat and benefits local resident and migratory fish, including SAR Atlantic Salmon and American Eel, while providing optimal functional open coast habitat. In particular, increased shoreline substrate diversity provides more foraging, cover and shelter opportunities for fish.	Most Preferred 2.5-fold increase in cobble shoreline, relative to existing. 35% reduction in sandy shoreline, relative to existing. 45% increase in armourstone (boulder) shoreline, relative to existing. Overall shoreline substrate type composition of the Preferred Alternative is more diverse, with an increase in the cobble and boulder proportions, relative to sand.	Least Preferred 30% increase in cobble shoreline, relative to existing. 10% increase in sandy shoreline, relative to existing. 20% increase in armourstone (boulder) shoreline, relative to existing. Overall shoreline substrate type composition of the Alternative Plan is less diverse, with a decrease in the proportion of cobble relation to sand.
	Potential for aquatic habitat loss or modification	Alternatives differ in terms of their overall footprint, as indicated by their area of infill. Alternatives with the most infill have the potential to result in the highest amount of existing habitat lost or modified. As this does not consider the quality of habitat, and as the Alternatives' conceptual designs can be refined to minimize the footprint overall, this indicator considers the potential for habitat loss only, as compared to the other Alternatives. Alternatives with small amount of or no infill will be ranked higher.	Most Preferred Total infill area of approximately 260,000 m ²	Least Preferred Total infill area of approximately 326,000 m ²	
Extent of terrestrial habitat attributes enhanced or diminished			MOST PREFERRED	LEAST PREFERRED	
	Potential to create appropriate land-water interface	Potential exists to create land-water interface that benefits terrestrial species. Where the interface provides ease of access for wildlife, and is always out of the water, the Alternative is preferred.	Most Preferred 95% increase in the length of shoreline that will provide a land-water interface that is always out of water, relative to existing conditions.	Least Preferred 45% increase in length of shoreline that will provide a land-water interface that is always out of the water, relative to existing conditions.	

Objective	Criteria	Indicator	Indicator Definitions	Preferred Alternative	Alternate Plan
		Impact to vegetation communities of concern (note: vegetation communities are key criteria for designation of ESAs and ANSIs)	Different Alternatives have varying impact on vegetation communities of concern. Vegetation communities provide habitat for both flora and faunal species.	<p>Most Preferred</p> <p>While a section of Sea Rocket community will be displaced, experience has shown that it is likely to re-establish on the cobble beaches, so no overall impact to this community is anticipated.</p> <p>Although approximately 5,300 m² of L2 to L4 ranked vegetation communities are anticipated to be displaced, the provision of managed public access to and along the shoreline and the decommissioning of 8 km of informal trails at East Point Park will both improve the overall quality of the sensitive habitat at East Point Park, and the overall habitat conditions within the Project Study Area.</p>	<p>Least Preferred</p> <p>While there is no anticipated displacement of vegetation communities of concern, the Alternate Plan does not provide for the decommissioning of informal trails currently fragmenting the sensitive vegetation communities on the tablelands and bluff slopes within East Point Park. Fragmentation, and its effects, is anticipated to worsen as no access to the shore between the Guild Park and Gardens and Beechgrove Drive will be provided for a distance of approximately 2.9 km.</p> <p>The continued unmanaged public access to the shoreline continue to contribute to habitat fragmentation, loss of sensitive native vegetation, displacement of fauna, soil compaction and resultant erosion, altered hydrology, and the spread of invasive species.</p>
	Potential for impact on terrestrial Species at Risk (SAR)	Potential effects to habitat for Bank Swallow	Potential terrestrial SAR present in the Study Area include Bank Swallows. Alternatives that benefit SAR and minimize negative impacts will be preferred	<p>MOST PREFERRED</p> <p>Most Preferred</p> <p>No direct impacts to Bank Swallow habitat. Bank Swallows are anticipated to continue to nest in the upper portions of eroding crest at Grey Abbey, and no shoreline works are proposed below East Point Park.</p>	<p>MOST PREFERRED</p> <p>Most Preferred</p> <p>Same as Preferred Alternative.</p>
Manage Public Safety and Property Risk	Ability to minimize public safety risk and property loss as a result of slope erosion/failure	Ability to provide a trail lakeward of risk line along the shoreline and shoreward of the risk line along the top of the bluff.	Bluff erosion processes can result in slope failure (e.g. landslide). The improvement of existing trails and development of new trails along the toe/top of the slope could result in public safety risks as a result of the potential for slope failure. Alternatives that better accommodate this risk are more preferred.	<p>MOST PREFERRED</p> <p>Most Preferred</p> <p>Alternative provides a safe formal trail system the length of the Study Area, along the shoreline and top of the Bluffs.</p>	<p>LEAST PREFERRED</p> <p>Least Preferred</p> <p>Alternative provides a safe formal trail system from Bluffer's Park to the east end of the Guildwood Parkway shoreline. No safe formal trail system is provided either along the shoreline or top of the Bluffs east of this location.</p>
		Ability to address the potential loss of public property and infrastructure as a result of slope erosion/failure slope crest migration)	Bluff erosion processes can result in slope failure (e.g. landslide), including loss of tableland and erosion of the bluff face. There are varying levels for risk for slope failure within the Study Area which can impact public property and infrastructure.	<p>Most Preferred</p> <p>This Alternative eliminates risk to public property (Grey Abbey Trail (road and associated infrastructure)) and critical public infrastructure (F.J. Horgan WTP).</p> <p>No difference between Alternatives for the West and Central Segments.</p>	<p>Least Preferred</p> <p>This Alternative will only provide toe protection as far as the existing private shoreline protection, and does not eliminate risk to public property (Grey Abbey Trail (road and associated infrastructure) and critical public infrastructure (F.J. Horgan WTP).</p> <p>No difference between Alternatives for the West and Central Segments.</p>

Objective	Criteria	Indicator	Indicator Definitions	Preferred Alternative	Alternate Plan
	Improve Emergency Services access to the waterfront	Ability to provide additional Emergency Services access along the waterfront	Currently emergency services vehicles access to the shoreline is largely limited to Bluffer's Park along Brimley Road, to the shoreline between Meadowcliffe and Grey Abbey along the Guild construction route; and to the tablelands at East Point Park. Alternatives which provide opportunity for additional emergency services vehicle access along the entire shoreline Segments are more preferred.	MOST PREFERRED Most Preferred Allows for continuous emergency services vehicle access for the length of the Project Study Area.	LEAST PREFERRED Least Preferred Does not allow for continuous emergency services vehicle access for the length of the Project Study Area (access is not provided east of the Guild construction access road to Beechgrove Drive).
	Ability to protect source water protection areas	Potential for impacts on water quality at water intake pipe locations	Water supply intake pipe locations are considered as source water protection areas by the Province. Water quality within these source water protection areas cannot be negatively impacted.	MOST PREFERRED Most Preferred No impacts.	LEAST PREFERRED Unknown Potential impacts are unknown at this time as insufficient information is known. Given the extent of the groyne, impacts on local water quality are possible.
Provide an Enjoyable Waterfront Experience	Improve public access to the waterfront	Potential to provide continuous formal public access along the shoreline	Various planning documents identify a trail along the water's edge as a long term objective. The project considers a trail along the shoreline that includes both top and toe of Bluffs. Improved public access along the water's edge includes consideration for increased formal public access and continuous connections. Alternatives which are better able to provide continuous formal public access along the water's edge are preferred.	MOST PREFERRED Most Preferred Provides continuous formal public access along the greatest length of shoreline – from Bluffer's Park to the west end of East Point Park. Formal access is provided across a greater length along the top of the Bluffs (from the west end of East Point Park to Beechgrove Drive).	LEAST PREFERRED Least Preferred Provides continuous formal public access along a shorter length of shoreline – from Bluffer's Park to the eastern end of the Guildwood Parkway shoreline. There is no formal public access along the top of the Bluffs from Guild Park and Gardens to Beechgrove Road; however, informal access is provided along a short unsigned connection of the Waterfront Trail through Grey Abbey Park. The remainder of the existing Waterfront Trail connects through residential streets. Trail connection through East Point Park is not formalized.
		Ability to accommodate a primary to high-capacity multi-use trail (width)	Within the Greater Toronto Area, the Waterfront Trail experiences significant demand, and user conflicts along shared paths have been reported. The provision of a primary to high-capacity multi-use trail is recognized as an opportunity to alleviate these pressures. While existing physical and environmental constraints may limit the ability to accommodate such a trail, Alternatives which provide the greatest opportunity for a primary or high-capacity multi-use trail outside the hazard line within the Segment are preferred.	Most Preferred Accommodates a primary to high-capacity multi-use trail width requirement across the length of the Project Study Area shoreline.	Least Preferred The primary to high-capacity multi-use trail width requirement can only be accommodated from Bluffer's Park to the east end of the Guildwood Parkway shoreline.
		Ability to meet AODA grade standard	Improved access along the shoreline includes opportunities to provide physical AODA accessibility. Alternatives which are better able to accommodate a suitable grade are preferred.	Most Preferred AODA grade standard is met for the greatest distance – from Bluffer's Park Beach to the west end of East Point Park.	Least Preferred AODA grade standard is met for a shorter distance – from Bluffer's Park Beach to below Guild Park and Gardens.

Objective	Criteria	Indicator	Indicator Definitions	Preferred Alternative	Alternate Plan
		Ability to provide formal direct public access to the water	The public desires opportunities for direct access to the water. Alternatives that provide direct access to the water are more preferred.	Most Preferred 4.7-fold increase in the length of shoreline that will provide formal direct public access to the water. Previously inaccessible areas are now accessible.	Least Preferred 3.4-fold increase in the length of shoreline that will provide formal direct public access to the water. Existing inaccessible areas remain inaccessible, due to private property and critical public infrastructure.
	Potential for changes to the use of the waterfront for recreation			MOST PREFERRED	LEAST PREFERRED
		Potential for change in character of sandy shorelines	The existing sand beach at Bluffer's Park and sandy shoreline at East Point Park are valued by the public. Negative impacts and changes to these shorelines are to be minimized, and Alternatives that achieve this and provide opportunities for enhancement will be considered preferred.	Most Preferred Overall, the length of sandy shoreline is reduced by 35%. Of the existing sandy shoreline altered, 93% is currently inaccessible, and 25% has been previously modified.	Least Preferred Overall, the length of sandy shoreline is increased by 10%. The existing sandy shoreline east of Guildwood Parkway remains inaccessible. Implementation of the Alternative Plan would prevent the formation of the Bluffer's Park expanded sand beach for several decades, as sediment transport processes would be halted until the proposed sand beach below Guildwood Parkway was completely filled in.
		Potential impacts to the Blue Flag Beach at Bluffer's Park	Water quality is one of many criteria considered in the designation of a Blue Flag Beach. Impacts and changes to the water quality at Bluffer's Park blue flag beach are to be avoided, and Alternatives that achieve this will be considered most preferred.	Most Preferred No potential for impacts.	Most Preferred No potential for impacts.
		Potential for impact on navigation and boating infrastructure	Changes or modifications of sediment supply or sediment transport may impact navigational depths and /or dredging requirements of existing boating facilities at Bluffer's Park. Alternatives that minimize sediment supply will be preferred.	Most Preferred Sediment supply will be eliminated.	Most Preferred Same as Preferred Alternative.
Consistency and Coordination with Other Initiatives	Ability to integrate with City and other agency plans and initiatives			MOST PREFERRED	LEAST PREFERRED
		Ability to integrate with new and proposed plans or initiatives	There are many plans and initiatives underway within the Study Area including for example: Metrolinx Regional Express Rail (RER) Program. The Alternatives will need to integrate, and accommodate these other initiatives. Alternatives that can best accommodate these plans/initiatives will be preferred.	Most Preferred This Alternative can be integrated with the identified plans and initiatives. The Alternative includes a tableland connection on the west side of East Point Park with a connection to an existing top-of-bank trail in front of the F.J. Horgan Water Treatment Plant. The trail would be rerouted away from the Metrolinx rail track which is proposed for expansion.	Least Preferred A section of the tableland trail between Grey Abbey Park and Copperfield Road runs along the south edge of the Metrolinx rail track. Planned expansion of the rail track by Metrolinx to accommodate the Regional Express Rail project could impact this section of the trail and could require its rerouting.
		Consistency with the goals of the Fish Community Objectives for Lake Ontario.	The Fish Community Objectives for Lake Ontario were created to maintain and increase target fish species in Lake Ontario. Alternatives which are able to advance these objectives are more preferred.	Most Preferred Provides additional contributions to the advancement of applicable fish community objectives.	Most Preferred Provides additional contributions to the advancement of applicable fish community objectives.

Objective	Criteria	Indicator	Indicator Definitions	Preferred Alternative	Alternate Plan
		Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens.	Significant community planning has occurred for the Guild Park and Gardens site. The Management Plan was developed to provide a framework to guide the management of the site. Alternatives which best advance the framework of the Management Plan are more preferred.	Most Preferred Contributes to the goals and objectives of the Management Plan for Guild Park and Gardens.	Most Preferred Contributes to the goals and objectives of the Management Plan for Guild Park and Gardens.
	Compatibility with existing land uses	Compatibility with existing land use (industrial).	Industrial land uses exist within the Project Study Area. Alternatives which minimize impacts on existing industrial areas are more preferred.	MOST PREFERRED Most Preferred The trail runs along the water's edge for its full length and is furthest away from industrial properties.	LEAST PREFERRED Least Preferred The trail will remain closest to industrial properties, as it runs along Copperfield Rd.
		Compatibility with existing land use (residential).	Residential land uses exist within the Project Study Area. Alternatives which minimize impacts on existing residential areas are more preferred.	Most Preferred This Alternative is compatible with residential land use as it provides an opportunity to relocate the trail to open space. Limited private property would need to be acquired from the crest of the slope to the shore.	Least Preferred This Alternative is not compatible with residential land use as the Waterfront Trail alignment will remain in residential areas. No private property required, as safe public access is not provided east of Guildwood Parkway. Additionally, the new beach proposed at the base of the Guild Park and Gardens will likely attract a greater volume of users to this area, while limited opportunities to improve access will be provided. As a result, it is anticipated that limited access will likely result in users parking on residential streets and seeking informal or trespass access down the slope of the Bluffs.
	Potential impact on archaeological resources, built heritage resources, and cultural heritage landscapes	Potential to impact known or potential archaeological sites.	Impacts to archaeological resources (terrestrial and/or marine) need to be minimized or mitigated. Alternatives that best achieve this will be considered as preferred.	MOST PREFERRED Most Preferred The marine archaeological assessment identified three targets in proximity to the proposed shoreline works: at the base of the Doris McCarthy Trail (Alexandria shipwreck); at the Guild Park and Gardens shoreline (barge hulls/wreckage). Mitigation is possible. The tablelands at East Point have been identified as holding potential for terrestrial archaeology resources; therefore, a Stage 2 assessment would be conducted prior to any ground disturbing activities.	MOST PREFERRED Most Preferred The marine archaeological assessment identified three targets in proximity to the proposed shoreline works: at the base of the Doris McCarthy Trail (Alexandria shipwreck); at the Guild Park and Gardens shoreline (barge hulls/wreckage). Mitigation is possible. There would be no impact to potential resources on the tablelands.
Achieve Value for Cost		Estimated capital cost	Estimated cost to construct (relative to each other)	High level relative costs for the Alternatives have been developed. Less expensive Alternatives will be scored higher.	LEAST PREFERRED Least Preferred Would cost approximately 15% more than the Alternate Plan.

Objective	Criteria	Indicator	Indicator Definitions	Preferred Alternative	Alternate Plan
		Potential amount of waterlot and property acquisition required (relative to each other).	Some Alternatives could require Crown waterlots (measured between the outmost extent of the Alternative and the shoreline), private property and/or easements across private property. Alternatives that minimize impacts to Crown waterlots and private property are Preferred.	Least Preferred Will require the acquisition of more private property and Crown waterlots due to the headland-beach system proposed below Grey Abbey Ravine and east to East Point Park.	Most Preferred Will require the acquisition of no private property and fewer Crown waterlots as no shoreline works are proposed east of Guildwood Parkway.
	Maintenance and operations costs	Relative maintenance and operation costs of the shoreline and erosion works.	Alternatives that would be expected to have lower maintenance and operations cost would be preferred.	MOST PREFERRED Most Preferred Low overall maintenance requirements.	LEAST PREFERRED Least Preferred Low overall maintenance requirements. Maintenance of existing works will be required, but most are private. Erosion works will be required in the future at Grey Abbey.
OVERALL RANKING OF ALTERNATIVES				MOST PREFERRED	LEAST PREFERRED

It is noted from the above evaluation that the Alternate Plan fails to achieve a number of the Project Objectives.

Naturalization Objective

- The Alternate Plan does not provide for the decommissioning of informal trails currently damaging vegetation communities on the tablelands and bluff slopes within East Point Park. In fact, the Alternate Plan has the potential to make this situation worse as it does not provide access to the shore between the Guild Park and Gardens and Beechgrove Drive, a distance of ~3.7 km. Managed formal public access to the shoreline helps to prevent informal trails which are contributing to the loss of native vegetation, habitat fragmentation, displacement of fauna, soil compaction and resultant erosion, altered hydrology, and the spread of invasive species.
- The Alternate Plan does not provide comparable opportunities to improve aquatic habitat along the shoreline through the creation of a more diverse shoreline below Grey Abbey Ravine and east to East Point Park.

Safety Objective

- Recreational users along the existing sandy shoreline at East Point Park will be within the risk line for slope failure, and as such use of this area will be at their assumed risk.
- Greyabbey Trail (road and associated infrastructure) at the western end of Grey Abbey Park will be at risk from erosion within 60 years.
- EMS access to the shoreline between the Guild Park and Gardens and Beechgrove Drive will not be improved.

Experience Objective

- The Alternate Plan may result in the loss or displacement of the existing Waterfront Trail between Greyabbey Trail and Beechgrove Drive, as the Metrolinx rail expansion will constrain the existing on-road connection through an increasing train frequency to every seven minutes, and potentially make the resulting off-road connection very narrow and unsafe.
- The new beach proposed at the base of the Guild Park and Gardens will be attractive to users but there will be limited opportunities to access the area as trail improvements are impossible without significant impacts to vegetation communities of concern and private properties. The creation of a beach without appropriate access will likely result in users parking on residential streets and seeking informal or trespass access down the slope of the Bluffs potentially causing greater environmental damage to sensitive bluff communities.

- Achieving Blue Flag beach status requires that a number of criteria be met including the provision of washrooms and parking which cannot be achieved at the base of the Guild Park and Gardens, given the access issues.
- The creation of a long headland to achieve sand accumulation in the Central Segment will preclude the accumulation of sand at Bluffer's Park Beach, so the Preferred Alternative for the West Segment, wide beach, cannot be achieved. There is the potential to fill the beach in the Alternate Plan through purchased material, such that sand will reach Bluffer's Park; however, this is a very expensive option.

Coordination Objective

- The Alternate Plan has the potential to create significant problems for adjacent residential properties either with respect to loss of the public infrastructure due to erosion, parking problems associated with access, and increased use of the Waterfront Trail within residential areas.
- The Alternate Plan does not consider the projected population increase in the City of Toronto (32% increase over the next 25 years) or the resultant pressure of increased use on greenspace.

Value for Money Objective

- The cost of the Alternate Plan is 15% less than the cost of the Preferred Alternative; however, the lower cost does not offset the other disadvantages listed above.