1. Introduction

Toronto and Region Conservation (TRCA), in partnership with the City of Toronto, are undertaking an Environmental Assessment (EA) for the Scarborough Waterfront Project (the 'Project'). The Scarborough Bluffs are an iconic feature of the Lake Ontario shoreline; however, due to limited access and existing public safety hazards, the water's edge along this section of the waterfront is not formally accessible to the public.

The Project will fulfill the strategic recommendations of previous planning processes and the City of Toronto Council direction (Resolution PW31.14 adopted on June 10, 2014) to address the existing risk to public safety and public infrastructure due to ongoing shoreline erosion and crest migration, and providing for increased public space while improving and enhancing the natural heritage system. The Scarborough Waterfront Project (SWP) supports and advances TRCA's Living City Policies, and the City of Toronto policies laid out in the Official Plan, which recognize the need to balance waterfront revitalization and public access with natural heritage and natural hazard protection and management. Public ownership of waterfront lands is a key means to managing natural hazards, while providing accessible open space integrated with opportunities for public enjoyment and aquatic and terrestrial enhancements.

In 1971, TRCA was designated the implementing authority for the 1967 Waterfront Plan, and by virtue of this, is responsible for the safe access to recreational spaces along the waterfront. In accordance with Section 28 of the *Conservation Authorities Act*, TRCA regulates development, interference and alterations in or near valleys, streams, wetlands and along the Lake Ontario shoreline. TRCA also has a delegated responsibility, as a Conservation Authority, to represent the provincial interest in natural hazards as described in Section 3.1 of the Provincial Policy Statement (PPS). TRCA provides technical advice to assist our public agency partners in implementing the natural hazard, natural heritage and water management sections of the PPS from a science-based, watershed perspective. With respect to the SWP, TRCA has a role in safeguarding terrestrial aquatic habitats, managing shoreline flood and erosion risk, and providing safe access to public recreational spaces.

The Project Vision is to create a system of greenspaces along the Lake Ontario shoreline which respect and protect the significant natural and cultural features of the Bluffs, enhance the terrestrial and aquatic habitat, and provide a safe and enjoyable waterfront experience.

The Vision of the SWP supports the strategic direction provided by the Official Plan, TRCA policies and other guiding initiatives and documents as will be described in the EA report, and summarized in Section 2 below. The study is being undertaken in accordance with the Ontario *Environmental Assessment Act*, as an Individual EA. The EA is utilizing an Objectives-based approach, where the Project Vision and Objectives were established early in the planning process through extensive public and Stakeholder consultation, and are used to describe the Project and structure the development and evaluation of Alternatives. Ultimately, the Project will identify the Alternative which best meets the Vision and Objectives (the 'Preferred Alternative').

The Project Objectives are to:

1. ***Protect and Enhance Terrestrial and Aquatic Natural Heritage Features and Linkages***
   The existing ecology in the Study Area is impacted by informal access, habitat fragmentation, and historic activities. The SWP will contribute to the better management of use and access of the shoreline, and contribute to the enhancement of the quality, size, shape and connectivity of aquatic and terrestrial habitats.

2. ***Manage Public Safety and Property Risk***
   While many areas of the shoreline are currently informally used by the public, ongoing risks to safety from shoreline erosion and crest migration exist. The creation of a system of greenspaces along the shoreline will comprehensively address existing risks to public safety and public property/infrastructure as a result of shoreline erosion and ongoing bluff crest migration, and provide the opportunity for safe, formal, public access.

3. ***Provide an Enjoyable Waterfront Experience***
   A trail along the waterfront to connect existing greenspaces is recognized as a long-term objective within a number of planning initiatives including the Official Plan and TRCA's Living City Policies. Planning and development of a comprehensive park and trail system to meet these recreational demands will work to relieve pressures on sensitive ecological areas and local communities, while managing informal access and use.

4. ***Consistency and Co-ordination with Other Initiatives***
   Significant community planning has occurred in this area, and there are a number of completed and ongoing studies and plans for this section of the Toronto waterfront. The Project will be consistent, and integrated with, these other initiatives.

5. ***Achieve Value for Cost***
   The Project aims to maximize the benefits in relation to the estimated cost (capital, operations and renewal costs).

TRCA is identified as the Project proponent, and will have responsibility for ensuring the design, construction and management of the Project in accordance with the EA, and other EA approvals as may be required, including compliance with terms and conditions of the EA approvals. As per the 1972 Waterfront Agreement, it is expected that the City of Toronto will be the responsible agency for the operations and maintenance of the future greenspace, including the operations and maintenance monitoring activities, as per the City of Toronto Parks Standards and Parks Plan. TRCA will continue to be the responsible agency for monitoring and renewal of the shoreline protection.

2. Purpose of the Undertaking

There is a long history of progressive and evolutionary planning for the Toronto waterfront. Planning started with the 1967 Waterfront Plan for the Metropolitan Toronto Planning Area, which introduced a shoreline management approach to limit shoreline erosion and creating a system of connected greenspaces and parks along the waterfront. The 1996 Integrated Shoreline Management Plan for the shoreline between Tommy Thompson Park and Frenchman's Bay provided a co-ordinated ecosystem-based approach for addressing erosion protection while providing safe public access and the creation of regional scale parkland and waterfront recreation opportunities. Planning has continued to evolve to better address both the recreational needs of the City of Toronto and the need to manage and protect significant natural spaces.

The Project is being planned using a rational comprehensive planning approach to resolve the remaining access, safety, and habitat enhancement opportunities. Planning is being undertaken in a holistic and integrated manner which is consistent with, and supports, the objectives of other City of Toronto plans and guidelines, including the Beaches Plan, Parks Plan 2013-2017, Bikeway Trails Implementation Plan, and Multi-use Trail Design Guidelines.

2.1 Study Area

Three study areas were considered: the Project Study Area, the Project Area and Regional Study Area (**Figure 1**).

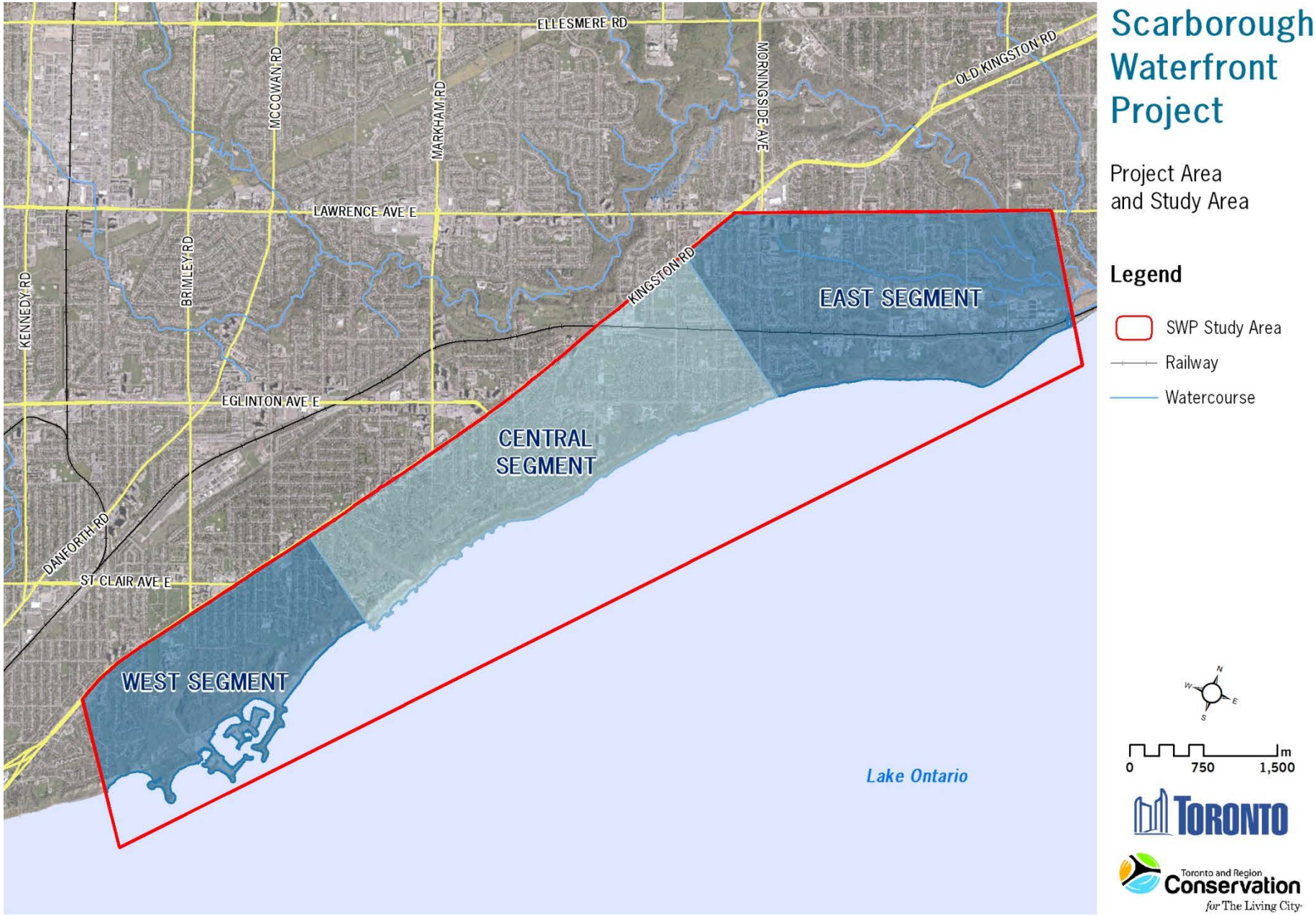
The **Project Study Area** refers to the area where potential effects were assessed, and extends approximately 11 km along the Lake Ontario shoreline from Bluffer's Park in the west to the mouth of the Highland Creek in the east, north to Kingston Road/Lawrence Avenue, and to a maximum of 1 km offshore. To help facilitate the Alternatives development and evaluation process, the Project Study Area was divided into three Shoreline Segments recognizing the distinct characteristics of each Shoreline Segment:

1. **West Segment:** Bluffer's Park to Meadowcliffe
2. **Central Segment:** Meadowcliffe to Grey Abbey
3. **East Segment:** Grey Abbey to East Point Park/Highland Creek

The **Project Area** refers to the area along the shoreline, including both the top and toe of the Bluffs, and the identified access routes, and is the area where Project works are identified.

In addition, for certain technical disciplines larger **Regional Study Areas** were identified to assess potential effects at the appropriate scale. These Regional Study Areas are described in the EA report, as appropriate.

Figure 1: Project Area and Study Area



3. Description and Evaluation of Alternatives

'Alternative Methods' are different ways carrying out the Project, that is to say, different ways of meeting the Project Objectives to address the risk from erosion, poor waterfront access, and limited habitat integrity. Given an understanding of baseline conditions and confirmation of the Problems and Opportunities within each shoreline Segment, Alternatives were developed as follows (**Figure 2**):

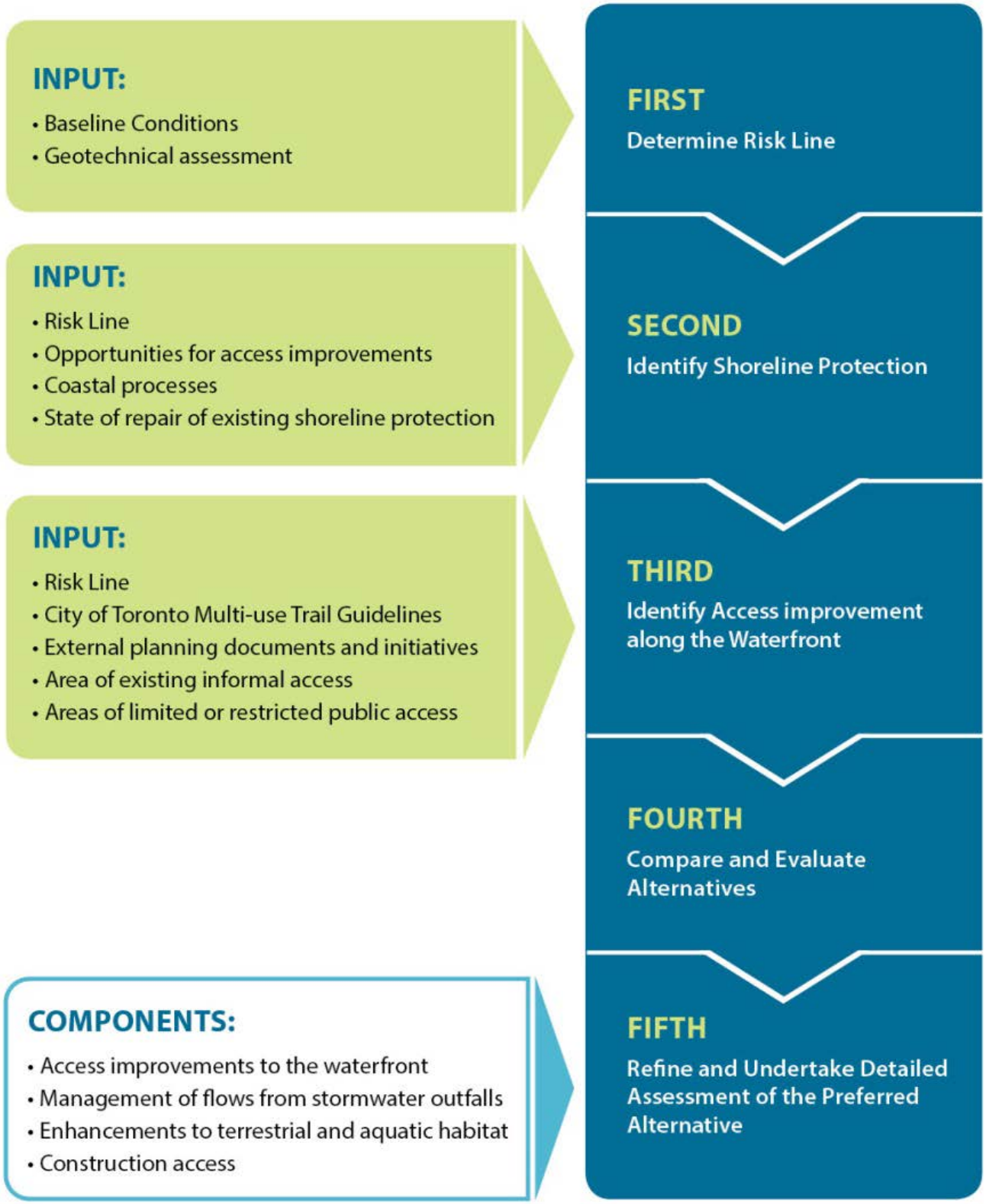
First	Determine risk line associated with slope crest migration and resulting talus accumulation.
Second	Identify shoreline protection options, considering the risk line and condition of existing shoreline protection works.
Third	Identify access improvements through trail routing.
Fourth	Identify Alternatives for each Segment to be evaluated and compared to choose the Preferred Alternative.
Fifth	Refine and undertake Detailed Assessment of the Preferred Alternative.

Through this framework, five distinct Alternatives were generated for the West Segment, two for the Central Segment, and five for the East Segment. Some Alternatives included 'sub-configurations,' which were variations of the same conceptual design (e.g., short-span bridge and long-span bridge). Each Alternative reasonably mitigated or managed risks to public safety, property, and infrastructure, and met the City of Toronto's Multi-use Trail Design Guidelines for a primary to high-capacity trail. Alternatives varied from each other based on the shoreline protection required to mitigate the risk to public safety and infrastructure, trail routing, and resulting differences in function, including habitat enhancement opportunities, arising from the shoreline protection.

For each Segment, the Alternatives were then evaluated against each other and the 'Do Nothing' Alternative, using Criteria and Indicators developed by the Project Team, with review and input from the public and other Stakeholders. The Criteria and Indicators measured the extent to which each Alternative achieved the Project Objectives through a comparison of the net effects, and were ranked relative to each other using a scale of Most Preferred, Preferred, Intermediate Preferred, and Least Preferred.

The complete description and evaluation of the Alternatives is documented in the EA, and a summary of the comparative evaluation by Objective is presented in **Section 3.1** to **Section 3.3**.

Figure 2: Four Stage Process to Develop and Evaluate Alternatives



3.1 West Segment

Bluffer's Park is a dominant physical feature in this Segment. The boat basin and headlands constructed for the Park in the 1970s have contributed to the stabilization and vegetation of the Bluffs located behind the Park and the accumulation of the sand beach to the east, which is designated as a Blue Flag Beach. The implementation of a berm and wetland along the backshore of this area in 2009 contributed to local water quality and habitat improvements, conditions which must be maintained or improved through the SWP.

The only access to Bluffer's Park is along Brimley Road, although the desire for improved access along this Segment (e.g., secondary access point) has long been identified by Emergency Services as an important consideration. In addition, there is no separated pedestrian or cyclist path along Brimley Road, which has been identified as an area with high cyclist-vehicle incidences. In the summer Bluffer's Park experiences very high use, with parking reaching capacity often early in the day. While a largely informal local trail network exists through Bluffer's Park, there is no east-west connection with the regional trail network, and the Waterfront Trail is setback from the water's edge along residential streets.

This Segment provides the only sheltered embayment habitat for aquatic species and there is limited aquatic habitat diversity along the open coast in the nearshore zone. Along the shoreline, dune vegetation exists in association with the Bluffer's Park Beach. The SWP provides the opportunity to enhance the aquatic habitat and expand the dune vegetation community.

The key geo-physical process related to Alternatives development in this Segment is the ongoing toe erosion and crest migration of the Cudia Park Bluffs. Under existing conditions, the Cudia Park Bluffs will start to self-stabilize over the next several decades, as sediment accumulates at the toe of the slope; however, crest migration would continue until a stable slope is reached. As a result of coastal conditions, the water, at times, is directly against the toe of the slope at Cudia Park Bluffs. While the public is currently using the toe of the slope in this area to connect over to the Meadowcliffe shoreline section (Central Segment), erosion from this part of the Bluff poses a risk to those walking along the shoreline, and is a consideration for any future trail along the toe of the slope. The risk mapping identified the risk line as being within 50 m of the current toe of slope location (**Figure 3**).

All Alternatives for the West Segment, with the exception of the "Do Nothing", include the provision of safe, formal, public access between Bluffer's Park and the Meadowcliffe shoreline (Central Segment) outside of this risk line. The Alternatives differ in how they provide this connection. **Table 1** provides a summary of the comparative evaluation.

Figure 3: West Segment Risk Line

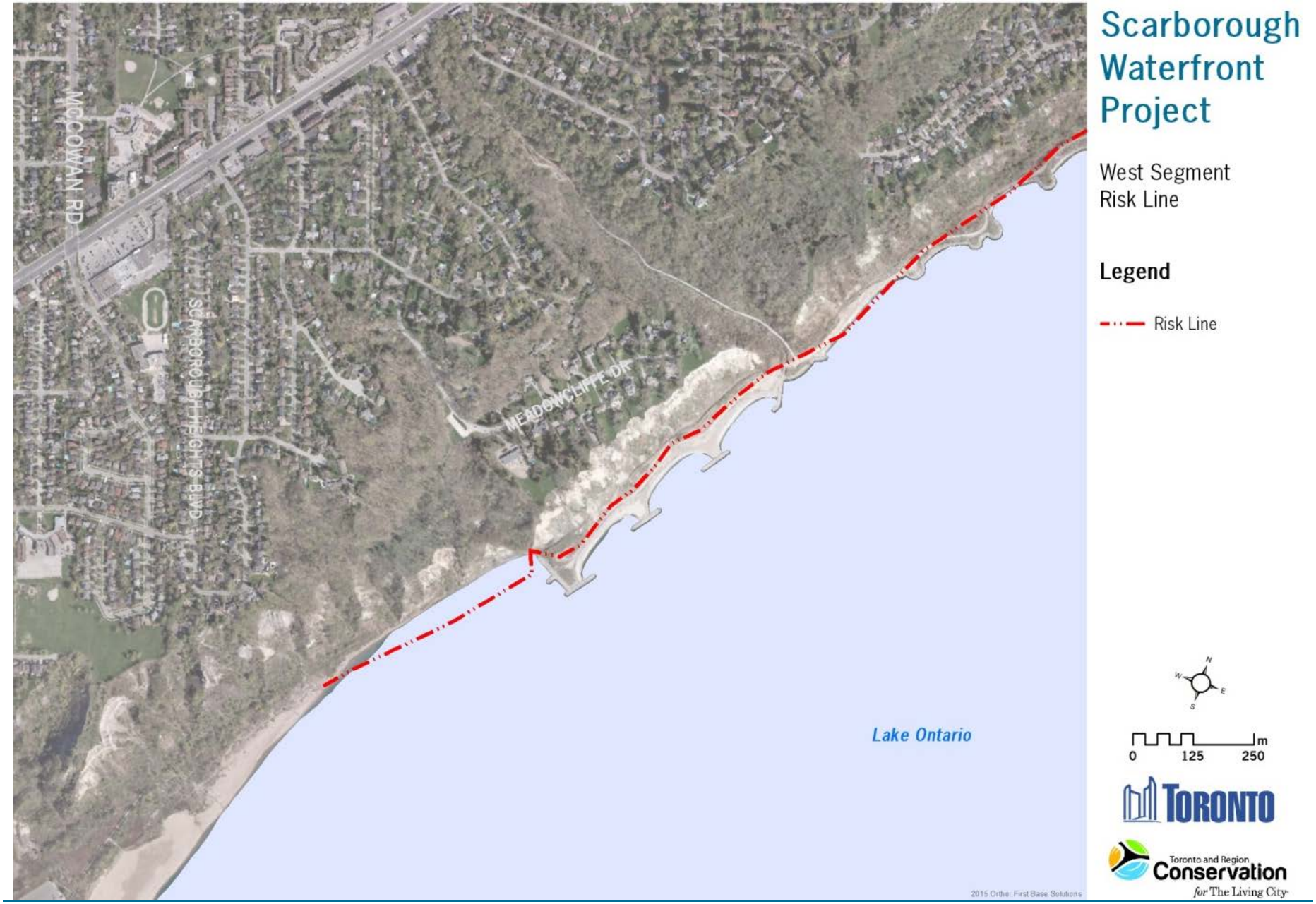


Table 1: Summary of Comparative Evaluation by Objective (West Segment)

Objective	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Natural Environment	IP	P	IP	IP	IP	IP	LP	P	MP
Risk	LP	MP	MP	MP	MP	MP	MP	MP	MP
Experience	IP	P	IP	IP	IP	IP	IP	MP	MP
Co-ordination	LP	MP	MP	MP	MP	MP	MP	MP	MP
Cost	MP	P	IP	LP	P	IP	P	LP	IP
Overall	**Least Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Preferred**	**Intermediate Preferred**	**Least Preferred**	**Preferred**	**Most Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach*
3. *Short Span Bridge*
4. *Long Span Bridge*
5. *Short Span Island-Bridge*
6. *Long Span Island-Bridge*
7. *Causeway*
8. *Narrow Beach*
9 *Wide Beach*

Based on the comparative evaluation, Alternative 5B (Wide Beach) was identified as the Preferred Alternative for the West Segment (**Figure 4**).

3.2 Central Segment

The full length of the Central Segment has been subject to previous shoreline protection works and as such, the Bluffs are at varying stages of reaching their long-term stabilized slope. The existing shoreline protection between the Sylvan and Meadowcliffe shorelines, and the shoreline protection at the Guild Park and Gardens shoreline, were undertaken to provide temporary protection to tableland infrastructure until a comprehensive solution was developed.

While the more recently implemented headland beach systems at Meadowcliffe and Sylvan have improved fish habitat diversity in these areas, there remain sections of shoreline which provide limited aquatic habitat diversity (e.g., the Guildwood Parkway and South Marine Drive revetments). In addition, as the Bluffs have stabilized and vegetated, the corridor function of the area has improved, allowing terrestrial species to move along the shoreline and providing stop-over habitat for migrating bird species. The Project provides the opportunity to comprehensively improve the aquatic habitat.

Within this Segment, two stormwater outfalls discharge directly into Lake Ontario along the shoreline: at the base of Bellamy Ravine (Doris McCarthy Trail), and at the base of the Guild construction access route (which conveys stormwater and overland flows from along the ravine).

A shoreline construction access route runs along the water's edge throughout this Segment, which is used by the public as an informal trail. This informal trail is located at varying distances from the slope toe, with some sections almost directly adjacent to the slope toe. Based on the risk mapping, there are two shoreline sub-sections that do not have an adequate land base at the toe of the Bluff to provide a minimum separation distance for a trail from potential Bluff failure: the shoreline immediately west of Sylvan and the shoreline south of the Guild Park and Gardens (**Figure 5**).

All Alternatives for the Central Segment, with the exception of the "Do Nothing", involve extension of the land base immediately west of Sylvan and along the Guild Park and Gardens shoreline to provide

Figure 4: West Segment Preferred Alternative Concept

Figure 5: Central Segment Risk Line

long-term stability to the shoreline works, and safe public access along the shoreline, lakeward of the risk line. The Alternatives differ in the type shoreline protection proposed. **Table 2** provides a summary of the comparative evaluation.

Table 2: Summary of Comparative Evaluation by Objective (Central Segment)

Objective	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Natural Environment	LP	MP	IP
Risk	LP	MP	MP
Experience	LP	MP	P
Co-ordination	LP	MP	MP
Cost	MP	IP	P
Overall	**Intermediate Preferred**	**Most Preferred**	**Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

Alternative 1 (Headland Beach) was ranked Most Preferred for four of the five Project Objectives, and Intermediate Preferred in terms of the *Achieve Value for Cost* Objective. It was determined by the Project Team that the additional benefits of Alternative 1 (Headland Beach) justify its additional costs; therefore it was identified as the Preferred Alternative for the Central Segment (**Figure 6**).

3.3 East Segment

The shoreline through the East Segment is generally unaltered and no shoreline protection exists, with the exception of approximately 490 m of privately owned shoreline where landowners and the City have installed private shoreline protection works in an attempt to address toe erosion. As a result, the crest will continue to migrate throughout much of this Segment (**Figure 7**).

At the western end of Grey Abbey Park, Greyabbey Trail (e.g., the road and associated infrastructure) is at risk from erosion within the planning timeframe of the Project (approximately 60 years). Erosion rates east of Grey Abbey Ravine are less and critical public infrastructure is set further back from the slope crest, therefore it will not be at risk within at least 100 years or longer (beyond the planning timeframe of the Project). This evaluation of risk to public infrastructure on the tablelands is based on the MNRF's *Understanding Natural Hazards: Great Lakes – St. Lawrence River System and Large Inland Lakes, River and Stream Systems and Hazardous Sites* technical guidelines (MNR, 2001).

In addition to the public infrastructure along the tablelands, there are two stormwater outfalls along the shoreline which discharge directly into Lake Ontario: at the base of Morningside Avenue, and at the base of the Beechgrove Drive extension. There is evidence of erosion resulting from overland flow just north of the outfall at the base of the Beechgrove Drive extension.

The shoreline from the eastern end of Guildwood Parkway to Beechgrove Drive is currently inaccessible. Approximately 540 m of this shoreline is in private ownership, which limits public access. As such, the Waterfront Trail is located on residential streets and is set well back from the water's edge. The proposed expansion of the Metrolinx Lakeshore East rail corridor, which crosses east-west through this Segment, may constrain some portions of both the off-road and on-road connections of the existing Waterfront Trail.

Figure 6: Central Segment Preferred Alternative Concept

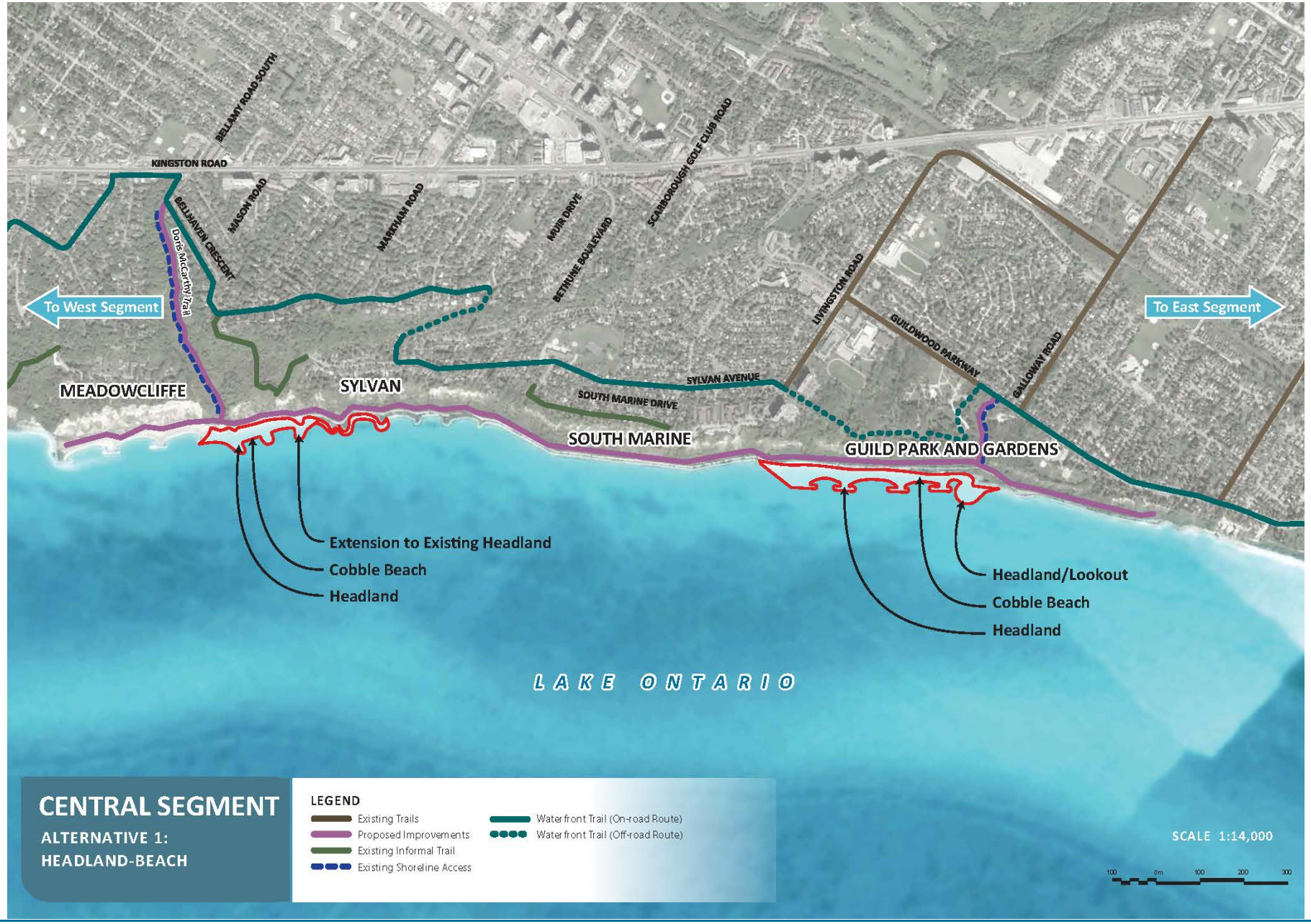
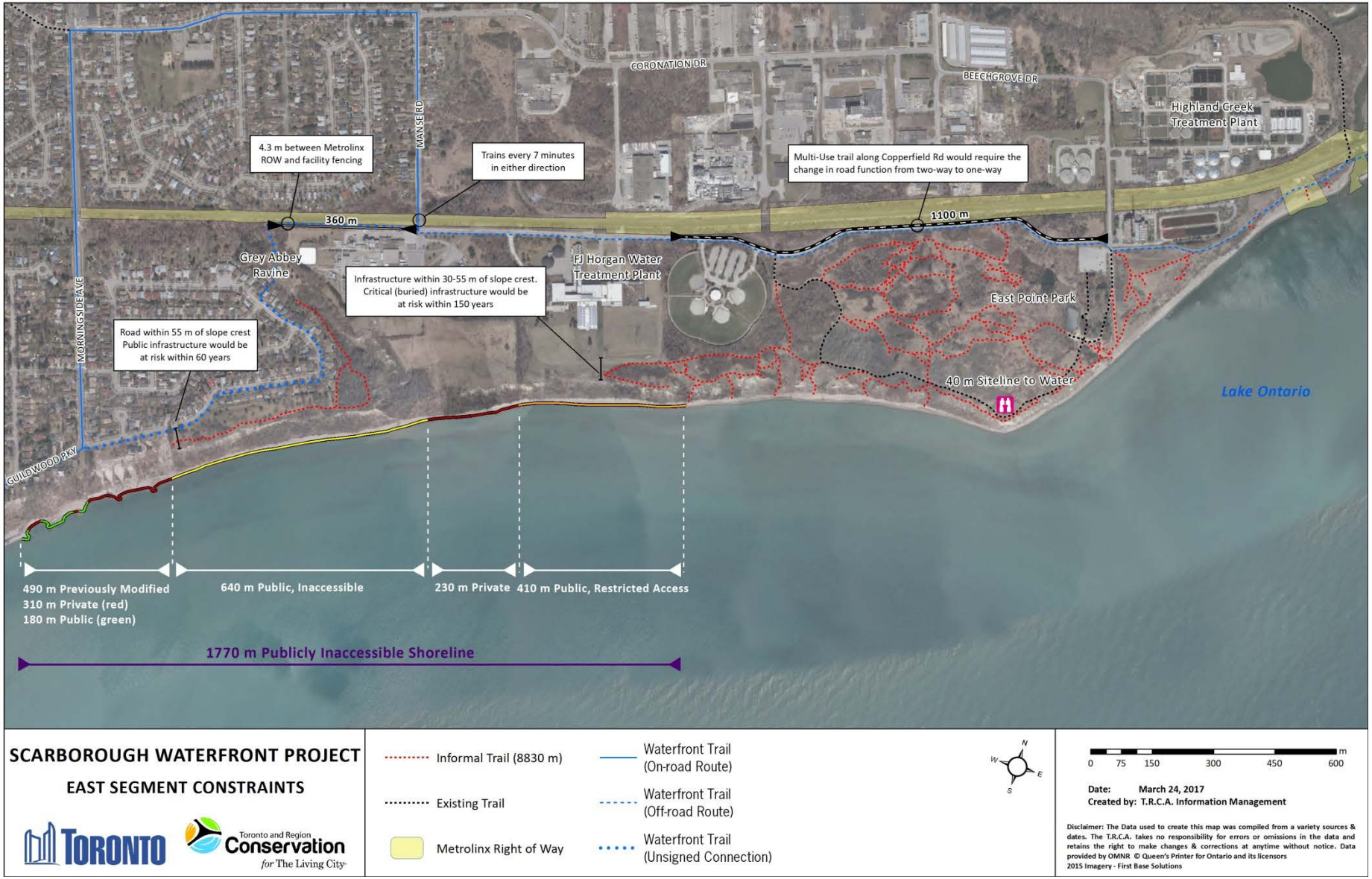


Figure 7: Constraints in the East Segment



As part of the rail corridor expansion, train traffic is expected to increase (i.e., either direction every seven minutes), further constraining the Waterfront Trail at the rail crossing on Manse Road.

The shoreline through East Segment provides limited aquatic habitat diversity as a result of historical stonehooking activities, which removed thousands of tonnes of stone and rock from the nearshore areas. There is no formal access connecting the tableland to the shoreline in the East Segment, and as a result, there are a number of informal foot trails down the bluff face throughout East Point Park, fragmenting the sensitive bluff communities, and reducing the integrity of the habitat. These pressures on the natural environment will continue to increase, as population numbers and density continue to grow.

While the shoreline through this Segment is used by the public, the available land base along the toe of the Bluffs is dependent on lake levels, with higher levels reducing or restricting the area of shoreline for walking. While the shoreline is accessed by the public, the risk mapping identifies the entire shoreline within the risk line, presenting an ongoing risk to public safety (**Figure 8**).

The Project provides the opportunity to improve public access to a currently inaccessible section of the Toronto waterfront, while addressing existing risks to public safety, and contributing to enhancements in terrestrial and aquatic habitat.

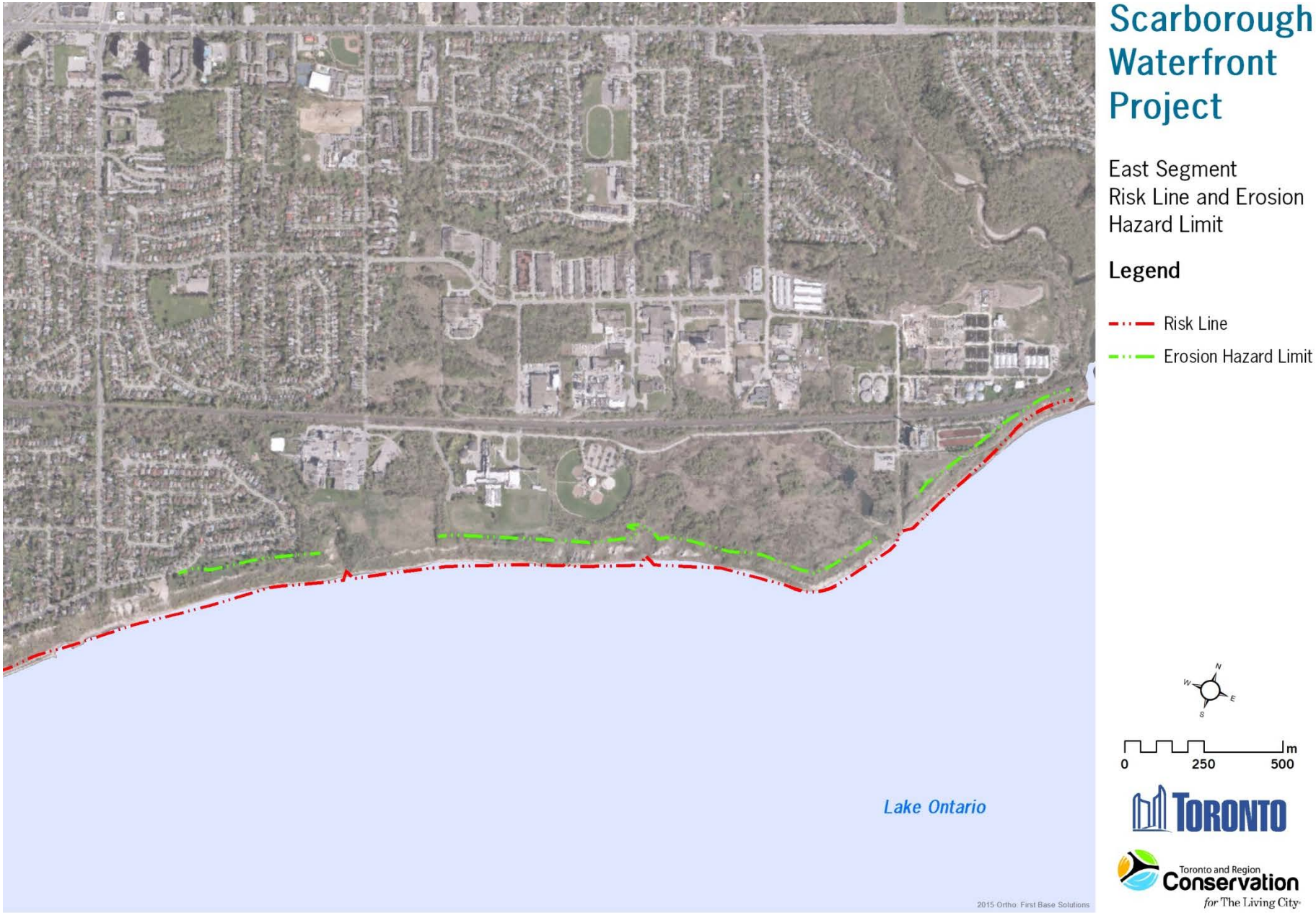
All Alternatives for the East Segment, with the exception of the "Do Nothing", provide improved public access to a currently inaccessible section of the waterfront, address existing risks to public safety, and contribute to improvements to the aquatic and/or terrestrial habitat. All Alternatives considered for East Segment, with the exception of the "Do Nothing" and Alternative 5 (Top of Bluffs Connection Over Grey Abbey Ravine), also involve an extension of the land base to comprehensively address the long-term risk to public property and infrastructure. The Alternatives differ in the type of shoreline protection proposed, and the location of the trail, which varies between the top and toe of the Bluffs. **Table 3** provides a summary of the comparative evaluation.

Table 3: Summary of Comparative Evaluation by Objective (East Segment)

Objective	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Natural Environment	IP	P	LP	IP	LP	IP	LP	P	MP	IP
Risk	LP	P	MP	P	MP	P	MP	MP	MP	IP
Experience	IP	IP	IP	IP	IP	IP	IP	IP	P	P
Co-ordination	LP	P	P	P	P	P	P	MP	MP	IP
Cost	MP	P	P	IP	LP	LP	LP	P	P	P
Overall	**Intermediate Preferred**	**Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Preferred**	**Most Preferred**	**Intermediate Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9 *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

Figure 8: East Segment Risk Line and Erosion Hazard Limit



Alternative 4B (Headland Beach to East Point Park) was identified as the Preferred Alternative for the East Segment, with a ranking of Most Preferred for four Objectives (**Figure 9**). While Alternative 4B (Headland Beach to East Point Park) has a relatively higher cost than half of the Alternatives proposed, it was determined by the Project Team that the additional benefits of the Alternative justify its additional cost.

4. Description of the Preferred Alternative

Following public, agency, and Stakeholder consultation on the Preferred Alternative, refinements were undertaken to the shoreline protection features and the following components were further defined:

- aquatic and terrestrial habitat features; and,
- access improvements to the shoreline.

4.1 Refinements to the Shoreline Protection

In response to public, agency, and Stakeholder consultation, refinements were undertaken to the shoreline protection which reduced the overall footprint; further enhanced the aquatic habitat; increased the length of sand shoreline maintained; and minimized the size of cobble required along the proposed cobble beaches. A summary of the key refinements to the conceptual design are summarized below, and are fully described in the EA report.

4.1.1 West Segment

Refinements to the West Segment Preferred Alternative include:

- The overall footprint of the expanded headland at Bluffer's Park was reduced, while still contributing to naturalization objectives and public access benefits, and reductions in sedimentation at the boat basin entrance (**Figure 10**).
- Addition of a cobble beach as a component of the expanded headland at Bluffer's Park to further contribute to cold water aquatic habitat.
- Interim build-out state defined through construction of a temporary groyne mid-way along the beach, in addition to a raised berm, which provides for immediate safe access to Meadowcliffe (Central Segment) and allows the remainder of the Bluffer's Park sand beach to gradually accumulate over time.

Figure 9: East Segment Preferred Alternative Concept

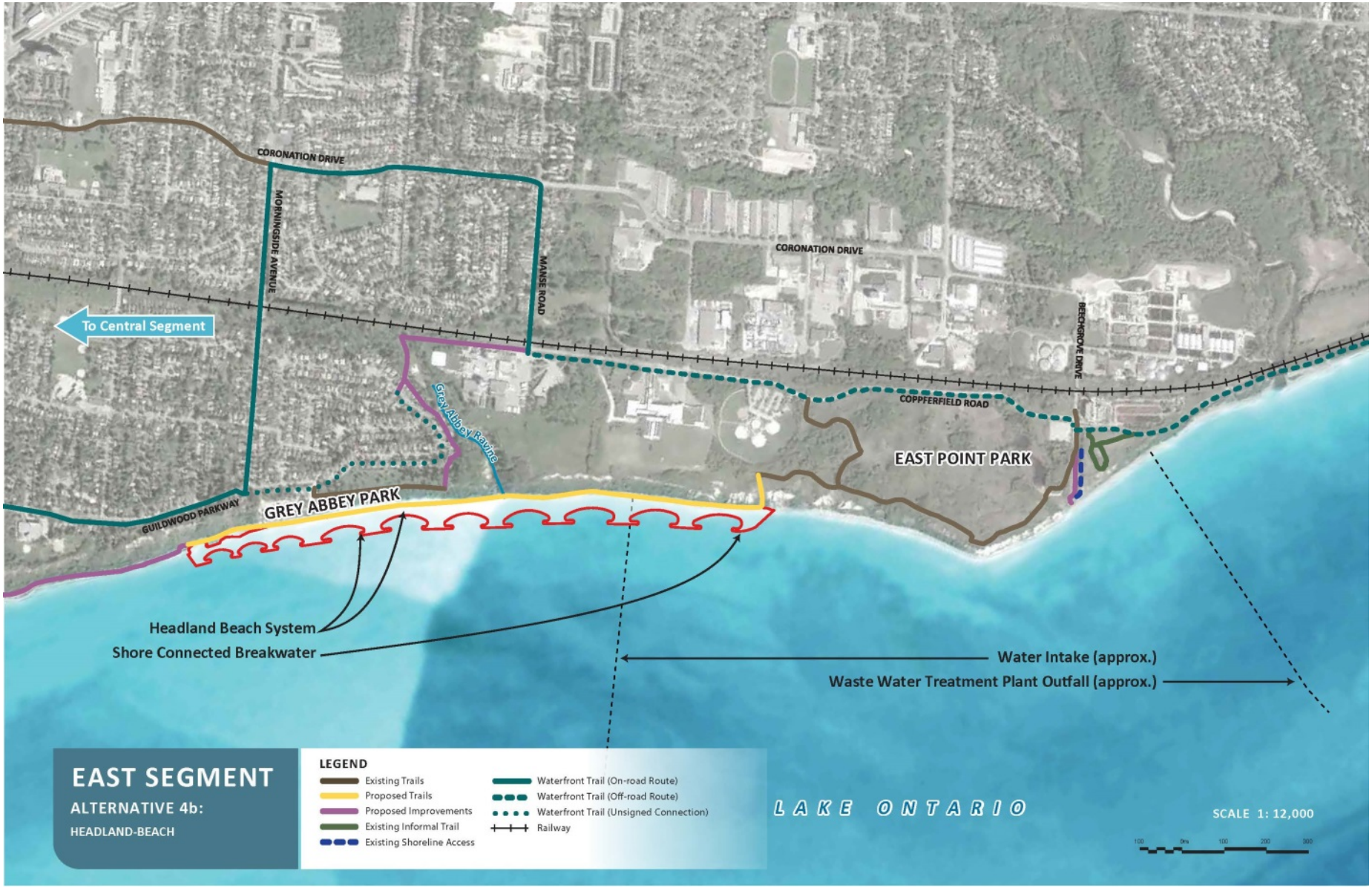


Figure 10: West Segment Refined Preferred Alternative Concept

4.1.2 Central Segment

Refinements to the Central Segment Preferred Alternative include:

- The overall footprint was minimized, while still providing safe, formal public access along the waterfront; long-term protection to the shoreline works; and further enhancing aquatic habitat (**Figure 11**).
- The eastern-most headland of the original headland beach system proposed at the base of Doris McCarthy Trail/Bellamy Ravine was found to sit within the recommended 20 m protection buffer of a marine archaeological resource. This resource is considered to have a high level of heritage value both provincially and locally. Resultantly, the eastern headland was pulled back outside the recommended 20 m protection buffer to avoid impact to the resource.
- The risk line along the Guild shoreline was produced on the basis of a conservative EA-level preliminary slope stability analysis (sections at 200 m to 300 m spacing, critical over-steepened locations only), and the existing construction access route along the shoreline in this section is within close proximity to the risk line. However, additional analysis has been done in this area to determine that a primary to high-capacity multi-use trail can be moved out of the risk line within the existing land base while still achieving aquatic habitat improvements through refinements to the revetment and enhancements to the nearshore area.
- Public gathering spaces at the base of Doris McCarthy Trail/Bellamy Ravine and the Guild construction access route.
- The addition of two small coastal wetlands on both the eastern and western sides of the public gathering space at the base of the Guild construction access route, and a shoreline wetland feature adjacent to the public gathering space at the base of the Doris McCarthy Trail/Bellamy Ravine have been identified.

4.1.3 East Segment

Refinements to the East Segment Preferred Alternative include:

- The overall footprint of the headland beach system was minimized, providing safe, formal public access along the water's edge to the east side of Grey Abbey Ravine and along the tablelands from the east side of the ravine through East Point Park. The refined headland beach system provides long-term erosion protection for the shoreline west of Grey Abbey Ravine, further enhances aquatic habitat beyond existing conditions, and maintains informal access to the sandy shoreline east of Grey Abbey Ravine (**Figure 12**).
- Refinement to the headland beach system to add diversity to the headlands, allow for vegetation of some headlands, and minimize the cobble size required.

Figure 11: Central Segment Refined Preferred Alternative Concept

Figure 12: East Segment Refined Preferred Alternative Concept

- Location of the trail transition from the shoreline to the tablelands was shifted approximately 650 m west to maintain a greater extent of sand shoreline. The tableland connection will be made by way of a corkscrew ramp with an expected ramp width of 2.4 m and grade of 7.5%.
- The trail along the tablelands will be designed to screen the adjacent industrial and infrastructure uses and to prohibit access. The trail would continue through East Point Park, connecting to the Port Union Waterfront Park to the east of the Project Study Area.

4.2 Aquatic and Terrestrial Habitat Enhancements

4.2.1 Terrestrial Habitat

Enhancements to terrestrial habitat associated with the Preferred Alternative include creating new naturalized habitat and enhancing the quality of the existing habitat. Terrestrial habitat features include meadow and successional habitats, as well as sand dune, beach, forest and wetland habitats.

Further, by contributing to the decommissioning of informal trails which currently fragment significant vegetation communities, particularly through the dune communities at Bluffer's Park and along the tablelands and bluff face at East Point Park, the functional size of these habitats will be increased. The proposed terrestrial habitat enhancements, by Segment, are presented in **Table 4**.

Table 4: Terrestrial Habitat Enhancements by Project Study Area Segment

Habitat Type	West	Central	East	Total
	Approximate ha			
Beach	6.4	--	--	6.4
Sand Dunes	1.3	--	--	1.3
Meadow	1.6	0.4	1.6	3.6
Successional	1.8	1.5	2.1	5.4
Wetlands	--	0.2	0.1	0.3
Wet Features	--	0.1	--	0.1
Forest	--	--	0.5	0.5
Manicured	--	0.3	--	0.3
Unvegetated shoreline	1.6	1.2	1.8	4.6

4.2.2 Aquatic Habitat

Enhancements to aquatic habitat associated with the Preferred Alternative include retrofitting existing shoreline structures and enhancing and/or designing the proposed structures such that their ecological value is maximized. An overview of the aquatic naturalization and habitat enhancements proposed is provided in **Table 5**, and where possible, combinations of techniques will be used. Specific locations, configuration and dimensions of the habitat enhancement features will be determined during the Detailed Design phase of the Project.

Table 5: Potential Aquatic Habitat Enhancement Techniques Overview

Naturalization/Habitat Enhancement Technique	Target/Benefit
Surcharging (Revetments and Headlands/Groynes)	▪ Improves habitat quality by diversifying habitat structure and shoreline profile
Shoreline Shoals	▪ Adds structural elements to improve nearshore habitat quality: improves foraging opportunities, increases essential habitat for cool and cold water species (open coast) and improves submergent vegetation (sheltered embayment)
Boulder Pavement Restoration	▪ Replaces coarse substrate to re-instate substrate diversity and increase habitat structural elements.

4.3 Access Improvements

Improvements to access routes to the water's edge were considered to connect the broader community to the future Waterfront Trail along the water's edge. While new opportunities for access to the shoreline were considered, constraints associated with private property, steep grades and significant vegetation communities limited access to existing routes along much of the Project Study Area. These site access routes include:

- Brimley Road South
- Doris McCarthy Trail/Bellamy Ravine
- Guild Construction Access Route
- Beechgrove Drive

4.3.1 Brimley Road

Brimley Road provides the only access to Bluffer's Park, with grades varying between 4% (upper third) to 17% (lower third), and limited safe access for pedestrians and cyclists. While a separated informal off-road path does exist on the east side of the road for the lower third of the ravine, pedestrians and cyclists need to walk along the road shoulder above this section without adequate separation from traffic. Pedestrian usage of the roadway can be significant during summer weekends when Bluffer's Park parking spaces are all occupied. Additionally, the ravine containing Brimley Road South is the site of a former landfill that limits the ability to cut into the ravine.

An at-grade path is proposed as it addresses the existing safety risks to pedestrians and cyclists, with limited cut required into the ravine. A path will extend from south of Barkdene Hills, to the entrance of Bluffer's Park, along the east side of Brimley Road.

4.3.2 Doris McCarthy Trail/Bellamy Ravine

Within the Bellamy Ravine the Doris McCarthy trail runs down to the shoreline. The grade is steep (up to 13%) along the upper and lower third sections of the trail. Bellamy Creek runs through the ravine along the west side of the trail, with sections of the existing trail bench cut into the steep side slopes.

It was determined that the impact to the natural heritage, and the overall cost, did not justify the benefit achieved in reducing the trail grade. Additionally, the lack of parking and formal trailhead infrastructure would have limited the broader regional use of the trail. As such, the Project Team recommends that the trail is not re-graded; however, other mitigation measures to improve accessibility, such as level rest areas, will be explored as part of Detailed Design.

4.3.3 Guild Construction Access Route

Adjacent to the Guild Park and Gardens, an existing construction access route provides informal access for pedestrians and cyclists to the shoreline. The grade of the construction access route is relatively steep (approximately 13%), with steep side slopes along sections.

It was determined that the impact to the natural heritage, and the overall cost, did not justify the benefit achieved by either reducing the grade of the construction access route, or creating an extensive switchback trail, as significant cut, fill and vegetation removal would be required for either option. As such, the Project Team recommends that in lieu of extensive works, other mitigation measures to improve accessibility, such as level rest areas, be explored as part of Detailed Design.

4.3.4 Beechgrove Drive

The stretch of Beechgrove Drive, south of Copperfield Road, is an unopened construction access route approximately 200 m long and terminates approximately 3 to 4 m above the sandy shoreline at an informal base node east of East Point Park. The overall grade of Beechgrove Drive is relatively uniform at 15%. As it is not possible to improve the grades along this access without having significant impacts on the adjacent areas and/or a large headland on the shore, the Project Team has recommended that improvements to the Beechgrove Drive extension are not included as part of the Project.

4.4 Operations and Maintenance

The SWP will require ongoing maintenance for a number of the design components. This includes shoreline protection features, naturalization components, recreational trails, and site access routes. A description of the maintenance activities associated with each of the design components of the SWP Preferred Alternative is detailed in the EA document.

4.5 Construction

It is anticipated that construction will proceed from west to east, and may take approximately 12 years; however, this timeframe will be refined as the construction activities are further described through refinements to the Preferred Alternative, and material and funding availability confirmed as part of Detailed Design.

4.5.1 Construction Access

Alternative construction access routes were developed by considering existing access to the shoreline. Two potential access points were identified:

- Brimley Road to Bluffer's Park
- Existing Guild Construction Access Route

It is proposed that Brimley Road be used in the off-peak season (October to April) for the construction of the West Segment and potentially Sylvan, while it is proposed that the Guild construction access route be used year-round to construct the remainder of the Central and East Segments.

A Traffic Impact Assessment (TIA) was undertaken to characterize current traffic patterns and to model future traffic patterns with the additional construction traffic along both proposed routes. The results of this analysis determined that the addition of construction traffic along Brimley Road between October and April would not have an impact on the existing conditions; however, discussions with the City of Toronto Transportation Services will continue in order to confirm the use of Brimley Road as an appropriate construction access route.

The TIA also analyzed the feasibility of various routes through Guildwood Village from Kingston Road to the Guild construction access route, including Morningside Avenue, Galloway Road and Guildwood Parkway. The results of the analysis identified a preferred inbound route along Morningside Avenue, and a preferred outbound route along Galloway Road.

Additional mitigation measures are described in the EA report, and will be comprehensively explored further as part of Detailed Design. Additional opportunities for construction access will also be explored as part of Detailed Design.

4.5.2 Construction Activities

Following acquisition of required unpatented Crown water lots and private property, and after receipt of all required permits and approvals, construction activities will commence.

It is anticipated that during the winter months materials will be stockpiled on the eastern headland in Bluffer's Park to permit construction through the summer months when access along Brimley Road is not possible. During Detailed Design the possibility of construction of the Bluffer's Park headland from the water using barges will be investigated in an attempt to minimize impacts on local residents and roadways.

The standard construction techniques to be utilized for the main Project components are further described in the EA.

5. Detailed Assessment of the Preferred Alternative

A detailed assessment of the Preferred Alternative was undertaken using the Criteria and Indicators developed for the comparative evaluation of Alternatives as a basis for identifying the net effects of construction and/or operation/establishment of the Project. It was determined that the positive benefits of the Project in providing safe public access to a section of the Toronto waterfront that is currently inaccessible, while enhancing the aquatic and terrestrial environments, exceeds any potential negative effects during construction. A summary of the results by Project Objective is provided below.

5.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages

Objective 1 is to protect and enhance terrestrial and aquatic natural features and linkages within the Project Study Area. The Project Study Area habitat will undergo changes along the Lake Ontario shoreline, tablelands and construction access routes and laydown areas both during and following construction. Approximately 2.90 ha of terrestrial habitat is anticipated to be removed to facilitate construction, while approximately 17.6 ha of new naturalized habitat is to be created as part of the Project. Approximately 20 ha of nearshore open coast aquatic habitat is to be lost and 16 ha altered, with an overall reduction in the length of sand shoreline. However, the shoreline irregularity will be increased, along with increases in the length of cobble and armourstone (boulder) shoreline, providing more diverse aquatic habitat overall, relative to existing conditions.

Overall, the Preferred Alternative for the SWP provides an improvement to the ecological conditions within the Project Study Area through the provision of functional nearshore open coast and terrestrial habitat. The loss or alteration of poorer quality habitat is offset by the creation of higher quality aquatic and terrestrial habitat, while disruptions to fish and terrestrial wildlife are offset by the implementation of appropriate mitigation measures during construction. Therefore, the Preferred Alternative meets the Objective to protect and enhance terrestrial and aquatic features and linkages.

5.2 Objective 2: Manage Public Safety and Property Risk

Objective 2 seeks to manage risks associate with natural slope crest migration at both the toe and top of slopes, public safety risk from wave uprush/overtopping, resiliency to climate change, improve access for Emergency Services, protect water quality, and manage safety risks for pedestrians and cyclists accessing the shoreline. The Criteria and Indicators assessed for this Objective are only applicable in the operation/establishment phase.

Implementation of the SWP will result in a positive change to managing public safety risk and public property risk related to slope erosion/failure, wave uprush/overtopping, resilience to climate change, access for Emergency Services, protection of water quality and management of safety risks for pedestrians and cyclists accessing the shoreline. Therefore, the Preferred Alternative for the SWP meets the Objective to manage public safety and public property risk.

5.3 Objective 3: Provide an Enjoyable Waterfront Experience

The purpose of Objective 3 is to ensure that any changes to the waterfront resulted in an enjoyable waterfront experience. A large number of Criteria and Indicators were assessed for this Objective for both construction and operation/establishment.

The construction period for the SWP is approximately 12 years; however, the actual construction activities are unlikely to be in any one location for the entire duration so the location of effects will change as construction activities occur in different places. Most nuisance effects from construction for recreational users will be short-term and localized.

Implementation of the SWP results in a positive change to the waterfront experience for recreational users. Recreational users will experience some construction nuisance effects that may detract from their experience at times but these are anticipated to be localized and short-term effects. Once operational the SWP will create a positive recreational experience when compared with existing conditions.

5.4 Objective 4: Consistency and Co-ordination with Other Initiatives

Objective 4 measures consistency and co-ordination with other initiatives; therefore, the Preferred Alternative was evaluated for alignment with plans, policies and existing land uses.

Overall, the SWP supports and integrates well with City and other agency plans and initiatives. There are three marine archaeology sites for which effects will be avoided or mitigated. The SWP is compatible with existing land uses, with the exception of the industrial facility in the vicinity of East Point Park as industrial representatives have raised concern regarding the proximity of the facility to the proposed trail. It is also recognized that the Guildwood community will experience a cumulative effect from disturbances associated with construction activities and construction traffic from multiple projects over an extended period of time. Given the nature of cumulative effects it is necessary to put in place mitigative measures that address the effects from all sources. To this end, TRCA will work with Metrolinx, the City of Toronto and the TTC to put in place a plan to co-ordinate construction traffic through the neighbourhood to minimize ongoing effects. These negative cumulative effects are relatively short-term and are outweighed by the positive long-term benefits of the SWP locally and regionally. Therefore, the SWP meets the Objective of integrating with City and other agency plans and initiatives.

5.5 Objective 5: Achieve Value for Cost

Objective 5 measures the Project's ability to achieve value for cost by maximizing the benefits in relation to the estimated capital and renewal costs. The estimated capital cost for the Project is $170 million and includes a 50% contingency and acquisition of approximately 28 ha of water lots and approximately 14 ha of private property. Renewal costs of $2,500 per linear metre of new shoreline protection works, as required, are anticipated, but not until the structures have been in place for

approximately 25 years. Based on support from the City of Toronto, the SWP achieves value for cost by managing risks to users and public infrastructure and providing a public amenity.

6. Monitoring and Adaptive Environmental Management

A comprehensive monitoring program is a critical element of the Project and provides several functions throughout the life of the SWP:

1. **Baseline conditions monitoring** during pre-design and Detailed Design will continue to provide data that will inform Detailed Design elements and identify changes to the existing environment that may affect Project outcomes.
2. **EA compliance monitoring** will ensure compliance with EA commitments and ensure that the Project is constructed according to the final design elements; and,
3. **Environmental performance monitoring** will measure if the Project functions as intended during operation/establishment phase and facilitate adaptive environmental management (AEM) of the new system.

A comprehensive AEM approach will be used to address long-term environmental change, maintain flexibility in strategies to achieve desired outcomes, and to ensure that up-to-date information is available for Detailed Design. This will ensure that the Project continues to function as designed and Project Objectives continue to be achieved through positive feedback mechanisms.

The AEM framework is a cycle of monitoring, evaluation, adaptation, and learning that will allow designers and project managers to maximize project benefits while minimizing negative effects. The details of the plan will be defined during Detailed Design as Project designs are finalized.

7. EA Amendment Process

The AEM strategy may trigger proposed modifications to the Project design and/or construction scheduling if Project effects are not anticipated or Objectives are not being achieved. A detailed method to identify the types of modifications that will trigger further environmental approval (EA amendments) will be developed for this purpose.

TRCA will be responsible for reviewing monitoring data and identifying opportunities to alter or improve the project management, design and/or construction phasing. When a need to modify the Project is identified, an internal effects assessment will be conducted to assess the impact of the modifications on environmental components (as predicted in the EA) and desired Project outcomes. Wherever possible, any proposed modifications will minimize adverse environmental effects and/or maximize Project benefits. This effects assessment will determine the need (or lack thereof) for further review by the appropriate regulatory body, such as the MOECC. If modifications to the Project do not

worsen the predicted effects and do not represent a major perceived change from the perspective of the public and/or agencies, they can be easily implemented through the existing regulatory process.

8. Consultation

All consultation activities that took place as part of the Project EA are documented in the EA report. Consultation for the Project was co-ordinated according to the MOECC's *Code of Practice: Consultation in Ontario's Environmental Assessment Process* (MOECC, 2007).

Throughout the Project, the Project Team strove to provide appropriate, flexible, and convenient opportunities for consultation, and provide clear documentation of all consultation activities. Throughout the Terms of Reference (ToR) and EA phases of the Project, various opportunities for the public, agencies and other Stakeholders to provide input into the Project were provided. Consultation initiatives brought diverse Stakeholders and community members together, and a range of interested parties were invited to, and participated in, the consultation activities undertaken in support of the Project.

In addition to the Project website (www.trca.ca/swp), and the Project Newsletter (by email subscription), the SWP has included two Public Information Centres (PICs) as part of the TToR phase, and three PICs for the EA phase of the Project. In addition to the PICs, regular Stakeholder Committee meetings were held to provide a forum for various residents, community and interest groups to provide insight and feedback to the Project Team.

The Project Team also strived to engage with the local community, including direct outreach in parks and at community events, presentations to local community groups and associations, meetings with interested residents, and regular updates with the local Councillors, MPPs and MPs.