

1 Port Street East Proposed Marina Environmental Assessment

Draft Report





July 2023

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1. INTRODUCTION

The City of Mississauga (the City) has undertaken an Individual Environmental Assessment (EA) for the 1 Port Street East Proposed Marina Project (1PSEPM Project). An existing private marina, Port Credit Harbour Marina (PCHM), is currently located on the west portion of the site (the wharf) and is privately operated by Centre City Capital Limited. The wharf is owned by Canada Lands Company (Canada Lands or CLC). Centre City Capital Limited leases the space required for PCHM from Canada Lands. Canada Lands and Centre City Capital Limited have reached an agreement to extend the PCHM lease, which was set to expire in 2023. A future mixed-use neighbourhood is proposed to be developed on the wharf which will displace the existing private marina (i.e., the PCHM). The future mixed-use development proposed for the wharf is not a City-led initiative and is not part of this EA. The timing of the development of the wharf is dependent on the landowner (i.e., Canada Lands) and related required approvals.

The City is undertaking the 1PSEPM Project with the objective of expanding the land base around the eastern breakwater to provide continued marina function and services at this site, create public access to the waterfront, new parkland and enhance the site's ecological functions with new terrestrial and aquatic habitat. This part of the Mississauga waterfront has been the subject of many studies. The 1PSEPM Project was identified by the "Inspiration Port Credit" initiative as a key opportunity to "Keep the Port in Port Credit". Figure 1.1 provides a map showing the lands and water lots at 1 Port Street East and the 1PSEPM Project Study Area.



Figure 1.1: Wharf, Lands and Water Lots and the 1PSEPM Project Study Area

1.1. PROPONENT

The City of Mississauga is the proponent for this Project. The City is planning the 1PSEPM Project to ensure it is consistent with the various planning and guiding documents, including Inspiration Port Credit. Pending EA approval from the Province of Ontario, Council approval of the 1PSEPM Project, including funding from external sources, the City will develop and implement the 1PSEPM Project.

1.2. ENVIRONMENTAL ASSESSMENT TERMS OF REFERENCE REVIEW

The 1PSEPM Project is subject to the requirements of the Ontario *Environmental Assessment Act* (EA Act) as an Individual EA. The 1PSEPM Project cannot be planned under the Municipal Engineer's Association (MEA) Municipal Class Environmental Assessment because the proposed undertaking is to create a new land base around the eastern breakwater that would allow for the establishment of a new marina and additional parkland rather than for purposes of flood or shoreline protection as contemplated by the Municipal Class EA.

The public, government agencies, Indigenous communities, interest groups, and landowners have been consulted throughout the EA. All activities carried out during the EA are documented in this EA Report.

To meet the requirements of the *Ontario EA Act*, the 1PSEPM Project Individual EA was conducted in two stages. Stage one involved collecting public input and understanding concerns to develop the Terms of Reference (ToR). The submission and approval of the ToR completed stage one. The ToR was approved by the Minister of the Environment, Conservation and Parks (MECP) on September 16th, 2021. Stage two involves the preparation and submission for approval of the Individual EA in accordance with the approved ToR.

The EA has been prepared in accordance with the requirements of the approved ToR and follows the "Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario" (Ministry of Environment, Conservation and Parks, 2014. Revision 2). This EA contains the following:

- a description of the purpose of the undertaking
- a description of and a statement of the rationale for
 - o the undertaking; and
 - o the alternative methods of carrying out the undertaking.
- regarding the undertaking, the alternative methods of carrying out the undertaking a description of
 - the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly.
 - the effects that will be caused or that might reasonably be expected to be caused to the environment.
 - the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment.
- an evaluation of the advantages and disadvantages to the environment of the undertaking and the alternative methods of carrying out the undertaking and
- a description of any consultation about the undertaking by the proponent and the results of the consultation.

On June 21, 2019, Bill C-69, which includes the *Impact Assessment Act* ("IAA"), new federal legislation governing environmental assessments at the federal level, received Royal Assent. The IAA also created the new Impact Assessment Agency of Canada (the Agency). The IAA came into force on August 28, 2019, repealing its predecessor, the *Canadian Environmental Assessment Act*, 2012 (CEAA 2012). A marina project such as the 1PSEPM Project is not currently described on the Physical Activities Regulations (SOR/2019-285) and does not require a federal EA under the new IAA. Moreover, the lands owned by Canada Lands (a self-financing Federal Crown corporation, CLC, 2019) are not federal lands and their conveyance to the City does not require the Canada Lands to undertake a federal EA under the new IAA.

1.2.1. CONCORDANCE WITH TERMS OF REFERENCE

Table 1.1 provides information regarding the comments made in the 1PSEPM Project ToR and commentary regarding where in the EA this commitment has been addressed, and if not, provides a rationale for this deviation from the ToR.

Table 1.1:Concordance of EA with ToR Commitments

ToR Commitment	ToR Reference	Draft EA Section Title	Draft EA Reference	Comments
The environmental assessment will be based	Section 1.3, Page 4	Study Areas	Section 2.4	The study areas are confirmed and mapped.
on three general study areas (i.e., Project Study Area (PSA), Local Study Area (LSA), Regional Study Area (RSA))		Description of the Environment Potentially Affected by the Undertaking	Section 3	The description of the environment potentially affected by the undertaking is organized in accordance with the three study areas where relevant.
The City will collaborate with the CVC to conserve, enhance and restore the health of the Mississauga shoreline while providing		Description of the Preferred Alternative	Chapter 6	The description of the preferred alternative provides information on how the 1PSEPM Project will serve to conserve, enhance, and restore the health of the Mississauga shoreline while providing public access to the water's edge
public access to the water's edge and protecting viewing to the lake The City will emphasize resilient solutions for	Section 2.2, page 16	Physical Environment, Effects of Establishment	Section 7.1.2	Assesses the resiliency of proposed lakefill to changing lake levels and coastal processes
the natural environment and enhance water quality		Socio-economic Environment, Effects of Establishment	Section 7.3.2	Assesses impacts of public access to the water's edge and on views to the lake.
		Record of Consultation	Chapter 9	Engagement activities with the CVC are described.
The 1PSEPM Project will delineate the boundaries of the land base expansion along the eastern breakwater to permit the relocation of the marina	Section 2.3, Page 17	Description, Evaluation and Rationale for 'Alternative Methods' of Carrying Out the Undertaking	Figure 5-3	Depicts the boundaries of the land base expansion (i.e., the lakefill).
		Description of the Preferred Alternative	Chapter 6	Describes the size of the land base expansion
The final description of the preferred alternative will be further developed and provided in the EA as required under the <i>Ontario EA Act.</i>	Section 2.4, Page 17	Description of the Preferred Alternative	Chapter 6	Provides information on the preliminary design of the preferred alternative.

ToR Commitment	ToR Reference	Draft EA Section Title	Draft EA Reference	Comments
The final description of the preferred alternative will relate to the ability of the 1PSEPM Project to address the identified problem/opportunity, reflect the advantages and disadvantages of the preferred alternative, and include more details on the purpose and rationale for the undertaking.	Section 2.4, Page 18	Advantages and Disadvantages	Chapter 11	This section describes the ability of the final preferred alternative to address the identified problem/opportunity, presents the relative advantages and disadvantages of the preferred alternative and includes more details on the purpose and rationale for the undertaking.
The EA will be prepared in accordance with this ToR	Section 3.1, Page 19	EA Document	All Sections	The EA was prepared in accordance with this ToR as detailed in this table.
The City of Mississauga will submit the EA for review by the public and government agencies.	Section 3.1, Page 19	Approach to Regulatory Consultation and Community Engagement	Section 9.1.3 (pending submission and review by MECP and further public engagement)	The Final EA will describe the timing and approach to regulatory consultation and community engagement on the draft EA and how comments have been addressed in the EA document. Once comments have been addressed the Final EA will be submitted.
 The EA will contain the following: a description of the purpose of the undertaking 	Section 3.1, Page 19	Purpose of the Undertaking	Chapter 2	Provides a description of the purpose of the undertaking.
 The EA will contain the following: a description of and statement of the rationale for the undertaking and alternative methods of carrying out the undertaken 	Section 3.1, Page 19	Purpose of the Undertaking	Chapter 2	Provides a description of the rationale for the undertaking within the overall planning context for the 1PSEPM Project.
 The EA will contain the following: the alternative methods of carrying out the undertaking an evaluation of the advantages and disadvantages to the environment of the undertaking and the alternative methods of carrying out the undertaking. 	Section 3.1, Page 19	Description, Evaluation and Rationale for 'Alternative Methods' of Carrying Out the Undertaking	Chapter 5	Describes the identification and evaluation of 'alternative methods' and describes the advantages and disadvantages of the preferred alternative.

ToR Commitment	ToR Reference	Draft EA Section Title	Draft EA Reference	Comments
 The EA will contain the following: A description of any consultation about the undertaking by the proponent and the results of the consultation 	Section 3.1, Page 20	Public and Agency Review of the Draft EA	Section 1.4 and Chapter 9	Section 1.4 provides information on the public and agency review of the Draft EA and Chapter 9 provides a description of the consultation undertakedn and the results of the consultation
Additional federal and provincial requirements may be identified during the EA. Municipal approvals may also be required and will be identified as part of the EA	Section 3.3, Page 20	Other Approvals	Section 1.3	Identifies the approval required for the 1PSEPM Project, pending EA review by regulators and the City.
The alternative 1PSEPM Project configurations will be described in sufficient detail to adequately identify potential impacts to the environment, evaluate and compare each alternative based on net effectsand their respective advantages and disadvantage	Section 5.2, Section 5.3, Page 33	Description, Evaluation and Rationale for 'Alternative Methods' of Carrying Out the Undertaking	Chapter 5	Describes the 'alternative methods' in terms of small, medium, and large land bases and their key design elements.
The analysis [of Alternative Methods] by indicator will be presented in an evaluation matrix. For this evaluation, the effects from construction and establishment activities will be considered separately for each alternative	Section 5.3, Page 34	Description, Evaluation and Rationale for 'Alternative Methods' of Carrying Out the Undertaking	Section 5.2	Provides an evaluation of 'alternative methods' within a matrix according to relevant criteria. The evaluation notes the criteria that apply to the construction or establishment phases, or both.
A summary of environmental effects and mitigation measures and an assessment of	Section 5.4, Page 39	Detailed assessment of the Preferred Alternative	Chapter 7	Provides a detailed evaluation and a summary of environmental effects and mitigation measures.
1PSEPM Project advantages and disadvantages will be provided in the EA		Advantages and Disadvantages	Chapter 11	Provides a summary of 1PSEPM Project's advantages and disadvantages based on the detailed evaluation.
Table 7-1 presents the scope of the baseline and effects assessment studies proposed to be completed during the EA Stage.	Chapter 7, Pages 67 and 68	Description of the Environment Potentially Affected by the Undertaking	Chapter 3	Provides a description of the existing environmental conditions in the study areas for the physical, atmospheric, biological, socio-economic, and cultural environmental components.

ToR Commitment	ToR Reference	Draft EA Section Title	Draft EA Reference	Comments
	Chapter 7, Pages 67 and 68	Detailed assessment of the Preferred Alternative	Chapter 7	Provides an assessment of the environmental effects of the 1PSEPM Project as defined in Section 6; identifies relevant mitigation measures and residual environmental effects.
1PSEPM Project EA consultation will meet the requirements and best practices for the provincial EA process	Section 8.2, Page 71	Public and Agency Review of the Draft EA	Section 1.4 and Chapter 9	Section 1.4 provides information on the public and agency review of the Draft EA. Chapter 9 provides a description of any consultation undertaken by the proponent and the results of the consultation.
Consultation with agencies, interested parties, stakeholders and public will be ongoing throughout the EA stage of the Project Letters will be sent to regulatory agencies and Indigenous communities to provide notification and request meetings to continue to discuss the 1PSEPM Project and the EA stage	Section 8.2.3, Page 72	Public and Agency Review of the Draft EA	Section 1.4 and Chapter 9	Section 1.4 provides information on the public and agency review of the Draft EA. Chapter 9 provides a description of any consultation undertaken by the proponent and the results of the consultation.
		Record of Consultation	Entire Document	Provides details on consultation undertaken by the City.
Three Public Information Centres (PICs) are planned during the EA Stage	Section 8.2.3, Page 72	Consultation	Chapter 9	Section 9 provides a summary of the three PICs held during the EA Stage.
Once the Draft EA is prepared all interested stakeholders, agencies and Indigenous communities will be notified of the opportunity to review and comment. All comments received will be included in the Final EA.	Section 8.2.3, Page 72	Public and Agency Review of the Draft EA	Chapter 1	Chapter 1 provides information on the public and agency review of the Draft EA.
An open invitation will be extended to Indigenous communities to meet with the Project Team to discuss the proposal in more detail and discuss issues of interest.	Section 8.2.3, Page 73	Indigenous Consultation	Chapter 9	Provides details on consultation with Indigenous communities undertaken by the City.

ToR Commitment	ToR Reference	Draft EA Section Title	Draft EA Reference	Comments
A monitoring plan will be developed during the 1PSEPM Project EA	Chapter 9, Page 74	Monitoring and Adaptive Management	Chapter 8	Provides a general plan for environmental and compliance monitoring.
A strategy and schedule for completing a monitoring plan will be developed and included in the EA.	Chapter 9, Page 74	Monitoring and Adaptive Management	Chapter 8	 Presents an overall strategy and conceptual schedule for Baseline conditions monitoring EA compliance monitoring Environmental performance monitoring
The EA will include a comprehensive list of commitments made by the City of Mississauga during the ToR process, including where and how they have been dealt with.	Chapter 9, Page 74	Introduction	Section 1.4	Provides a table that lists the commitments made by the City during the ToR process and how they have been dealt with.
The EA will include a comprehensive list of commitments made by the City during the preparation of the EA.	Chapter 9, Page 74	EA Commitments	Table 8.1	Provides a table of commitments made by the City during the preparation of the EA

1.3. OTHER APPROVALS

Federal and provincial permits under the following legislation are anticipated to be required as part of the 1PSEPM Project. Municipal approvals may also be required.

1.3.1. OTHER FEDERAL APPROVALS

- *The Federal Fisheries Act* applies to developments that are anticipated to impact fish habitat. The Act prohibits serious harm to fish, and by extension within the Act, fish habitat. In cases where unavoidable impacts are anticipated (after avoidance and mitigation measures are used), the Act's policies require that protection of fish habitat be achieved. Where serious harm to fish is unavoidable, protection is most often achieved by way of employing habitat off-setting measures.
- *Navigation Protection Act* is administered by Transport Canada. Navigable waters include all bodies of water that are capable of being navigated by any type of floating vessel for transportation, recreation, or commerce. The creation of land under the *Navigation Protection Act* requires formal approval under section 5(1)(2).
- Migratory Birds Convention Act (MBCA). This Act is administrated by Environment and Climate Change Canada and regulates potentially harmful human activities that may affect the conservation of migratory birds – both individuals and populations – and their nests. With some notable exceptions, a permit must be issued for any activities that may affect migratory birds identified under Article I of the MBCA, including waterfowl, cranes, rails, shorebirds, pigeons, migratory insectivorous birds, and other migratory nongame birds. In 2019, the Federal government began a review of the MBCA to provide better protection to migratory bird species and to modernize the Act with respect to enforcement issues and issues related to migratory bird hunting.
- Species at Risk Act. The Species at Risk Act (SARA) is also administered by Environment and Climate Change Canada. The SARA contains prohibitions against the killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling, or trading of individuals of endangered, threatened, and extirpated species listed in Schedule 1. The SARA also contains a prohibition against the damage or destruction of their residences (e.g., nest or den). The SARA applies to all species on federal lands as well as aquatic species and migratory birds off federal lands. DFO administers the SARA for aquatic species, while Environment and Climate Change Canada administers the SARA for all other federally listed species at risk including migratory birds. Review under the SARA is typically undertaken in conjunction with requirements under the *Fisheries Act*. A permit is required for activities that may affect species listed on Schedule 1 and which contravene the SARA's general or critical habitat prohibitions.

1.3.2. OTHER PROVINCIAL APPROVALS

- Lakes and Rivers Improvement Act. The Lakes and Rivers Improvement Act is administered by the Ministry of Natural Resources and Forestry (MNRF) and provides for the use of the water of lakes and rivers and regulates improvements in them. The Act requires MNRF approval for construction in lakes and rivers. The Minister of Natural Resources and Forestry is given discretionary powers relating to the repair, reconstruction and removal of dams, maintenance of water levels, and regulation of use of waters or works. A permit under the Lakes and Rivers Improvement Act may be required.
- Conservation Authorities Act and its regulations:
 - Prohibit, regulate or require the permission of the authority for straightening changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland; and
 - Prohibit, regulate or require the permission of the authority for development, if in the opinion of the authority, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by the development.
 - The proposal to infill portions of Lake Ontario along the shoreline is within the jurisdiction of CVC and is therefore subject to the Regulations above. Permits may be required for development along the shoreline within the 1PSEPM Project Study Area.

On May 2, 2019, the Province introduced Bill 108, entitled the More Homes, More Choice Act, as part of its Housing Supply Action Plan. Schedule 2 of this omnibus bill contained proposed revised wording for the amendments to the *Conservation Authorities Act*. On June 6, 2019, Bill 108 passed Third Reading and received Royal Assent. While Bill 108 is now law, its "provisions" (meaning its stipulations) will come into effect at various times. This includes the amendments to the *Conservation Authorities Act*.

The key legislative amendments for conservation authorities can be found in section 21.1 (1) of the amended *Conservation Authorities Act*. They require conservation authorities to provide programs or services that meet the following descriptions and that have been prescribed in regulations:

- Programs and services related to the risk of natural hazards;
- Programs and services related to the conservation and management of lands owned or controlled by the authority, including any interests in land registered on title;
- Programs and services related to the authority's duties, functions and responsibilities as a source protection authority under the Clean Water Act, 2006;
- Programs and services related to the authority's duties, functions and responsibilities under an Act prescribed by the regulations; and

• Enables conservation authorities to provide a program or service other than those listed above, but it must first be prescribed in a provincial regulation.

The changes are primarily focused on clearly defining the core mandatory programs and services provided by conservation authorities, in addition to several other administrative and governance amendments. For example, in February 2023 the CVC informed the City that they can no longer provide comments on certain aspects of Environmental Assessment projects as per the noted regulation,

- *Clean Water Act.* The *Clean Water Act* (CWA), administered by the MECP, sets the legal framework to ensure that communities can protect their municipal drinking water supplies by developing collaborative, locally driven, science-based protection plans. Under *Regulation 288/07* of the Act, local Source Protection Committees are to develop policies to address significant, moderate, and low threats to source water within Intake Protection Zones. Communities will have to conform to policies addressing significant drinking water threats and have regard for policies of the SPP should be considered.
- Endangered Species Act. The Endangered Species Act (ESA), administered by the MECP, protects species identified as being Endangered, Threatened or Extirpated in Ontario. Species status is determined by the Committee on the Status of Species at Risk in Ontario (CASSARO). Under the Act, species are protected (Section 9) as well as their habitats (Section 10). Permits may be required from the MECP for any works within areas identified as habitat of a Species at Risk in Ontario (SARO) and for sampling SARO species. A Section 17 permit for the protection and recovery of a provincial species at risk may be required if SARO species are found in the Project Study Area.

1.4. REVIEW OF THE DRAFT EA

Note to Readers: The following paragraph shall be updated upon completion of the reviews and PIC#3.

The Draft EA was made available for regulatory agency, Indigenous communities and public review between..... and In addition, a Public Information Centre (EA PIC#3) was held......to give the public an opportunity to meet with City staff and the consultant team to discuss the draft EA. Comments and questions were received and addressed in the Final EA report and are dispositioned in Tables

1.5. OVERVIEW OF EA REPORT

This EA report is organized into 11 chapters:

Chapter 1 – Introduction

• Briefly describes the background, goal and objectives of the 1PSEPM Project; introduces the proponent; and provides a summary of the regulatory framework of the EA process and other approvals.

Chapter 2 – Purpose of the Undertaking

• Presents the Problem/Opportunity Assessment and describes the 1PSEPM Project Study Areas and timeline.

Chapter 3 – Description of the Potentially Affected Environment

• Describes baseline environmental and socio-economic conditions in the Regional, Local and Project Study Areas.

Chapter 4 – Evaluation and Rationale for 'Alternatives To' the Undertaking

• Describes the process through which functionally different ways of addressing the identified problem/opportunity ('Alternatives to') were developed and assessed.

Chapter 5 – Development, Evaluation, and Rationale for 'Alternatives Methods' of Carrying Out the Undertaking

• Describes the process through which alternative ways of carrying out the 1PSEPM Project (different sizes of lakefill) were identified and evaluated to choose a preferred alternative.

Chapter 6 – Description of the Preferred Alternative

• Provides a description of the conceptual design for the 1PSEPM Project, including its design, phasing and construction techniques.

Chapter 7 – Detailed Assessment of the Preferred Alternative

• Presents the criteria, indicators, and results of the detailed assessment of environmental effects, including an outline of mitigation measures, net effects, and a summary of effects.

Chapter 8 – Monitoring and Adaptive Management

• Outlines the framework, strategy and activities of the monitoring and adaptive environmental management that will be conducted throughout the 1PSEPM Project's lifespan.

Chapter 9 – EA Amendment Process

• Provides a framework to deal with modifications to the 1PSEPM Project after the completion of the EA.

Chapter 10 – Consultation Record

• Describes the public, agency and Indigenous community consultation programs including input from various interested parties and the proponent's responses.

Chapter 11 – Advantages and Disadvantages

• Summarizes the advantages and disadvantages of the 1PSEPM Project from an environmental and socio-economic standpoint.

2. PURPOSE OF THE UNDERTAKING

The following sections provide a description of the purpose of the 1PSEPM Project. The description is framed in terms of both the "problem" (expanding the land base on the east side of the breakwater to provide continued marina function on the site) and the "opportunity" (enhancing access to the waterfront and increased parkland) which the 1PSEPM Project presents.

2.1. PLANNING CONTEXT

There is a long history of planning, public engagement, scientific and economic studies with respect to the Port Credit waterfront, specifically the 1 Port Street East site. The following provides a summary of the key background documents and initiatives, and how they support the problem and opportunity assessment in this EA, including:

- Inspiration Port Credit
- Port Credit Local Area Plan (2016);
- Mississauga Recreational Boating Demand and Capacity Study (2015);
- Mississauga Marina Business Case (2015);
- 1 Port Street East Comprehensive Master Plan (2016);
- 1 Port Street East Official Plan Amendment 65 (2017); and
- Waterfront Parks Strategy 2019 Refresh.

2.1.1. INSPIRATION PORT CREDIT

"Inspiration Port Credit" was a city-building initiative that contributed to the planning framework for transforming Port Credit into an exceptional, high quality, waterfront village. Inspiration Port Credit focused on the 1 Port Street East site, partially owned by Canada Lands, and 70 Mississauga Road South site, formerly owned by Imperial Oil Limited. These properties are two of the City's key waterfront sites in Port Credit. Their revitalization will assist in delivering the City's Strategic Plan action of creating a model sustainable community on the waterfront.

2.1.2. PORT CREDIT LOCAL AREA PLAN

The Port Credit Local Area Plan as adopted by Mississauga City Council on March 11, 2016, in the form of Official Plan Amendment No. 19 expresses a Vision for Port Credit, as an evolving urban waterfront village. Significant elements, which give Port Credit its sense of place, are intended to be preserved and enhanced, such as the main street village character along portions of Lakeshore Road (east and west), heritage buildings and landscapes, community facilities, residential neighbourhoods, open space, parks, and marina functions along the waterfront. The Vision reinforces the importance of retaining and enhancing the built elements that provide residents with a sense of local community and social activity.

The "Vision" is intended to manage change to ensure an appropriate balance is maintained between growth and preservation of what makes Port Credit a place where people want to live, learn, work and play. The Vision is based on six principles:

- 1. Protect and enhance the urban village character recognizing heritage resources, the main street environment, compatibility in scale, design, mixture of uses and creating focal points and landmarks.
- 2. Support Port Credit as a distinct waterfront community with public access to the shoreline, protected views and vistas to Lake Ontario, the Credit River and active waterfront uses.
- 3. Enhance the public realm by promoting and protecting the pedestrian, cyclist, and transit environment, creating well connected parks and open spaces and reinforcing high quality-built form.
- 4. Support the preservation, restoration, and enhancement of the natural environment.
- 5. Balance growth with existing character by directing intensification to the Community Node, along Lakeshore Road (east and west), brownfield sites and supported infill development in neighbourhoods. Intensification and development will respect the experience, identity and character of the surrounding context and Vision.
- 6. Promote a healthy and complete community by providing a range of opportunities to access transportation, housing, employment, the environment, recreational, educational, community and cultural infrastructure that can assist in meeting the day-to-day needs of residents.

2.1.3. MISSISSAUGA RECREATIONAL BOATING DEMAND AND CAPACITY STUDY (2015)

In 2015, the City completed a study on boating demand and capacity to determine anticipated demand for recreational boating facilities on Mississauga's waterfront. The study concluded that the demand for slips exceeds supply and additional slips are needed in Mississauga. The study determined that marinas and boating facilities increase public access to the waterfront; provide more amenities on the waterfront; act as tourism attractions; enhance the physical appearance of the waterfront; raise real estate property values on the waterfront; and, in nearby neighbourhoods, act as a catalyst for new commercial and residential development. In doing so marinas and boating facilities increase the tax base and create improved aquatic habitat.

2.1.4. MARINA BUSINESS CASE (2015)

In 2015, the City completed a Marina Business Case which was a critical study informing the 1 Port Street East Comprehensive Master Plan. The recommendations of the Business Case emphasized the importance of City involvement in protecting a future marina use at 1 Port Street East. The Business Case concluded that a future marina at 1 Port Street East is an economic, recreational and cultural heritage imperative and of strategic importance to Port Credit and Mississauga. The Business Case looked at several marina models at this site and defined the most sustainable model as a full-service marina with the majority of uses onsite. It also determined that a marina could work within a mixed-use context.

2.1.5. 1 PORT STREET EAST COMPREHENSIVE MASTER PLAN (2016)

Building upon the principles from the Mississauga Official Plan, the Port Credit Local Area Plan, and community engagement activities undertaken during 2014 and 2015, the City prepared a 1 Port Street East Comprehensive Master Plan (2016). The Master Plan describes the City's vision to ensure that an iconic and vibrant waterfront neighbourhood, and destination with a full-service marina be developed at the 1 Port Street East site. The Master Plan reports on two concepts for a potential new marina comprised of floating slips, a potentially expanded land base, and various marina services. One of the principles of the Master Plan speaks to a new development protecting and enhancing natural and cultural heritage resources, including important views, the marina function and marina heritage.

2.1.6. 1 PORT STREET EAST MISSISSAUGA OFFICIAL PLAN AMENDMENT (OPA 65)

Based on the Inspiration Port Credit Comprehensive Master Plan, Mississauga City Council adopted OPA 65 for 1 Port Street East in 2017 that establishes the appropriate development policies for the site including a future marina use on the eastern portion and mixed-use development for the wharf portion of the site. OPA 65 clarified that the lands will be redeveloped in a manner that recognizes the site's rich marine history and waterfront location. The site will be a city-wide and regional destination that offers recreational and leisure activities with public access and views to the waterfront.

The site's key attractions will include a marina and marina-related facilities. The site will feature high quality design and prioritize pedestrians and cyclists. Innovative sustainable design and green building technologies will be showcased, and the site's natural and cultural heritage resources will be protected and enhanced. The site should achieve the following:

- 1. is woven into the fabric of Port Credit and the city
- 2. supports the overall vision of Port Credit as an evolving waterfront village
- 3. celebrates the site's urban waterfront context
- 4. provides for a mix of uses including, residential, office, retail, indoor and outdoor markets, and makerspaces
- 5. links the marine and cultural history of the site together
- 6. draws people to the water's edge to live, work, make, learn, shop and play

2.1.7. WATERFRONT PARKS STRATEGY 2019 REFRESH

The City of Mississauga has refreshed its 2008 Waterfront Parks Strategy outlining a 25-year vision for City parks along the waterfront of Lake Ontario. The strategy promotes the protection and enhancement of the City's waterfront while providing public access along the water's edge and opportunities for recreation, tourism and economic development. The proposed infrastructure improvements are intended to maintain and strengthen the City's historical connection to Lake Ontario.

The refresh builds on the 2008 strategy and addresses current planning trends and intensification along Mississauga's waterfront. As well, the strategy supports the Cycling Master Plan by recommending the implementation of north/ south cycling connections with the waterfront trail closer to the Lake Ontario shoreline and the 1PSEPM Project site. The 2019 Refresh recommended that the City continue to explore the opportunity for a full service marina and expansion of the eastern breakwater for public access.

2.1.8. COUNCIL DIRECTION

In October 2017, City Council authorized staff to execute an agreement of purchase and sale with Canada Lands for the eastern portion of the property at 1 Port Street East, including the basin water lot; the eastern breakwater water lot; and 2 acres of land between Elizabeth Street and Helene Street south of Port Street. The initial conveyance was completed on January 24, 2018, transferring the breakwater and a portion of the water lot into City ownership. The second conveyance will take place once the City obtains approvals (including the EA and Council approval), engages a contractor to undertake the marina construction, and issues a "Ready to Commence Construction" notice to Canada Lands. City Council has also authorized staff to pursue external funding opportunities and undertake the Environmental Assessment.

2.2. ENVIRONMENTAL MANAGEMENT CONTEXT

Several studies have been undertaken that describe issues, opportunities, goals and objectives along the Lake Ontario shoreline and nearshore areas for Mississauga, Toronto, and Lake Ontario, and are applicable to the 1PSEPM Project. A summary of the key background documents and how they support the problem and opportunity assessment are detailed below.

2.2.1. CREDIT RIVER ESTUARY: SPECIES AT RISK RESEARCH PROJECT

In 2014, the CVC completed a comprehensive Species at Risk (SAR) research Project focused on the Credit River estuary from the river mouth to the first riffle upstream at the Mississauga Golf and Country Club and its adjacent lands. The Project aimed at:

- 1. identifying all existing SAR and Species of Conservation Concern (SCC)
- 2. developing a short-list of SAR and SCC species that represent a wide variety of guilds/functional groups
- 3. identifying common habitat requirements and threats to the species

- 4. identifying a range of restoration activities
- 5. identifying data gaps and potential future monitoring activities

Although there were no SAR or SCC identified specifically on the eastern breakwater, a variety of species have been observed at nearby parks and at the mouth of Credit River itself. The report encourages plantings for migratory birds at all municipal parks and makes several recommendations for enhancing habitat in the vicinity of the 1PSEPM Project.

2.2.2. FISH COMMUNITY OBJECTIVES FOR LAKE ONTARIO

In 2017, the Lake Ontario Management Unit of the Ontario Ministry of Natural Resources and Forestry (MNRF) and the Great Lakes Fisheries Section of the New York State Department of Environmental Conservation jointly developed a common set of goals and objectives for fish communities in Lake Ontario (Stewart et al., 2017). These goals and objectives aimed to sustain or increase the abundance of desirable fish to provide sustainable benefits to humans using fish for food, recreation, culture, ecological function, and aesthetics. The goals and objectives that were set by the MNRF and are most relevant to the 1PSEPM Project are those for the nearshore zone of the lake, as follows:

Goal:

To protect, restore, and sustain the diversity of the nearshore fish community, with an emphasis on self-sustaining native fishes, such as Walleye, Yellow Perch, Lake Sturgeon, Smallmouth Bass, Largemouth Bass, Sunfish, Northern Pike, Muskellunge, and American Eel.

Objectives:

- Maintain healthy, diverse fisheries—maintain, enhance, and restore self-sustaining local populations of Walleye, Yellow Perch, Smallmouth Bass, Largemouth Bass, sunfish, Muskellunge, and Northern Pike to provide high-quality, diverse, fisheries.
- Restore Lake Sturgeon populations—increase abundance of naturally produced Lake Sturgeon to levels that would support sustainable fisheries.
- Restore American Eel abundance—increase abundance (recruitment and escapement) of naturally produced American Eel to levels that support sustainable fisheries.
- Maintain and restore native fish communities—maintain and restore native nearshore fish communities.

2.2.3. INTEGRATED WATERSHED MONITORING PROGRAM

The CVC prepared an update of its Integrated Watershed Monitoring Program (IWMP) (CVC, 2020. The update report provides a high-level summary of climate, groundwater, stream, forest, and wetland conditions in the Credit River Watershed. The update report also identifies key issues of concern throughout the watershed. Key issue of concern identified by CVC relevant to the 1PSEPM Project is that a changing climate is expected to increase the magnitude and frequency of extreme events, including ice storms, flooding, high winds, and drought (such as the drought in 2016). Intense storms are expected to become more common, resulting in more frequent flooding and more extensive damage to infrastructure. Older infrastructure (including roads, bridges, stormwater management and wastewater treatment facilities) in many parts of the watershed was not designed for changing climate.

2.2.4. LIVING BY THE LAKE: 2019-2039 - AN ACTION PLAN TO RESTORE THE MISSISSAUGA SHORELINE

The CVC began developing an action plan to restore the Mississauga shoreline by conducting the Lake Ontario Integrated Shoreline Strategy (LOISS). LOISS identified opportunities for the protection and restoration of natural ecosystems along the shoreline, inland, and into the lake in the nearshore environment.

LOISS identified the role of existing features in meeting the needs of wildlife, but also to identified priority areas for both restoration and creation of aquatic and terrestrial habitat to enhance existing features and functions. Implementation of the Project has contributed directly to significant improvements in aquatic habitat and functions within the LOISS study area that extends the length of the shoreline within CVC's jurisdiction, from the Harding Waterfront Estate on the west to Marie Curtis Park on the east, including five kilometres up the Credit River and six kilometres into Lake Ontario.

Based on the findings of the LOISS and the Credit River Estuary Species at Risk Research Project, the CVC developed and approved the Living by the Lake Action Plan in 2018 which envisions a "revitalized shoreline that maximizes access for people while maintaining and restoring health, aquatic and terrestrial habitat features and functions." Actions identified in the vicinity of the 1PSEPM Project include:

- Exploring the feasibility of re-creating wetland habitat at mouth of Credit River to support aquatic species;
- Investigate opportunities to enhance open coast habitat for cold water fish species;
- Study fish use of the nearshore at St. Lawrence Park to inform habitat enhancement and/or protection; and
- Explore opportunities to relocate and improve quality of common tern nesting habitat at PCHM.

The City will collaborate with CVC to conserve, enhance and restore the health of the Mississauga shoreline while providing public access to the water's edge and protecting viewing to the lake.

2.2.5. CLIMATE CHANGE ACTION PLAN (2019)

The City developed a Climate Change Action Plan (2019), creating a 10-year road map for tackling climate change. It is the City's first comprehensive climate change action plan. It sets out actions to reduce greenhouse gas (GHG) emissions and help the city adapt to a changing climate over the next ten years. The plan has two goals:

- 1. Reduce GHG emissions 80 per cent by 2050, with a long-term goal of becoming a netzero community.
- 2. Increase resilience and the capacity of the city to withstand and respond to severe weather events (e.g., extreme heat, flooding).

In recent years, there has been damage to the parks along the shoreline due to severe weather events and the introduction of invasive pests and species. The City will emphasize resilient solutions for shoreline treatment to protect infrastructure and the natural environment and to enhance water quality.

2.3. PROBLEM/OPPORTUNITY ASSESSMENT

The purpose of the 1PSEPM Project is to provide an expanded land base for additional waterfront parkland and marina alternatives at the 1 Port Street East site. The 1PSEPM Project is a key element of Inspiration Port Credit's 1 Port Street East Comprehensive Master Plan (2016).

The 1PSEPM Project is intended to help fulfill the vision:

"to ensure that an iconic and vibrant mixed-use waterfront neighbourhood and destination with a full-service marina is developed at the 1 Port Street East Site"

The wharf at 1 Port Street East was constructed in mid-1950s to facilitate commercial shipping on the Great Lakes. The east breakwater (which is the focus of this EA) was added between 1958 and 1961 in two phases. The "Ridgetown" was added in 1974 and the site converted to a recreational marina in about 1974.

Currently, the PCHM is one of the largest privately-operated full-service marinas on the Greater Toronto Area's (GTA) Lake Ontario shoreline. It is also one of the deepest on the north shore of Lake Ontario. The marina caters to seasonal and transient boaters, charter fishing boats, and cruisers. The PCHM is considered by the City of Mississauga and its residents to be an important asset. Previous studies have documented the community desire to continue the marina operations at this site.

Canada Lands currently owns a portion of the 1 Port Street East site and water lot where the existing PCHM is located. As documented in the studies discussed in Section 2.2, the wharf will be redeveloped into a mixed-use residential community. These studies have also identified that an expanded land base along the eastern breakwater can help to accommodate the relocation of the marina.

The 1PSEPM Project will delineate the boundaries of the land base expansion along the eastern breakwater to permit the relocation of the marina.

Simultaneously, expansion of the land base also creates an opportunity to:

- Create new waterfront parkland with safe public access
 - There is no public access associated with the existing privately-owned marina. The public increasingly seeks access to the water's edge through public parkland and along continuous trails and this 1PSEPM Project provides an opportunity to create access where none currently exists.
- Allow for improved aquatic and terrestrial habitat.
 - The existing breakwater was constructed in the late 1950's when the provision of quality aquatic habitat was not part of Project planning. The 1PSEPM Project provides an opportunity for the creation and enhancement of aquatic and terrestrial habitats in the vicinity of the breakwater in a manner that achieves an overall ecological gain that is consistent with the stated objectives of CVC's LOISS.

2.4. STUDY AREAS

The environmental assessment will be based on three general Study Areas.

2.4.1. PROJECT STUDY AREA (PSA)

The Project Study Area (PSA) is shown in Figure 2.1. It includes a portion of the 1 Port Street East property, inclusive of the water lot, located in Port Credit, Mississauga, at the mouth of the Credit River. It is bound by Port Street East to the north, Elizabeth Street to the west, Helene Street South to the east and Lake Ontario to the south. The lands and water lot collectively have an area of approximately 21.4 hectares, comprised of:

- The Breakwater & Ridgetown Water Lot (7.9 ha);
- Elizabeth and Helene Street Rights of Way (0.8 ha); and
- The Basin Water Lot (12.7 ha).

2.4.2. LOCAL STUDY AREA (LSA)

The Local Study Area (LSA) is shown in Figure 2.2. It is comprised of the areas within the Port Credit Community Node Character Area and the Old Port Credit Village Heritage Conservation District. The area is bounded by the CN tracks to the north, Mississauga Road to the west, Elmwood Avenue to the east and Lake Ontario to the South. This area includes the primary access roads from the QEW to the 1PSEPM Project site.

2.4.3. REGIONAL STUDY AREA (RSA)

The Regional Study Area (RSA) is shown in Figure 2.3. The RSA extends beyond the LSA. Depending on the criterion this may include portions of the Credit River watershed up to approximately 5 km upstream, the Lake Ontario shoreline and shoreline neighbourhoods within the boundaries of the city. This Regional Study Area will be used to describe the broader setting for the 1PSEPM Project and used to discuss cumulative effects of the 1PSEPM Project.

Figure 2.1: Project Study Area



Figure 2.2: Local Study Area



SHOREPLAN

Figure 2.3: Regional Study Area



2.5. ENVIRONMENTAL ASSESSMENT TEMPORAL BOUNDARIES

The temporal boundaries for the 1PSEPM Project EA are as follows:

- Construction Phase: The time during which the land base is being constructed, including lakefilling, on-site infrastructure development, habitat creation and site restoration. Construction is subject to EA approval by the Province and City Council Approval of the project to proceed.
- Establishment Phase: The time after the parkland and marina is constructed and officially open to the public for use and during which monitoring and adaptive management of the 1PSEPM Project would be undertaken.

3. DESCRIPTION OF THE ENVIRONMENT POTENTIALLY AFFECTED BY THE UNDERTAKING

3.1. PHYSICAL ENVIRONMENT

3.1.1. SHORELINE

REGIONAL STUDY AREA

Much of the shoreline within the 1PSEPM Project Regional Study Area has been protected with either formal or informal shoreline protection structures.

As part of the CVC Lake Ontario Shoreline Hazards study (Shoreplan, 2005) defined a total of 87 shoreline reaches within the CVC watershed. Amongst other attributes, a general shoreline type and shoreline protection type were assigned to each reach. Table 3.1 and Table 3.2 were developed from that data. The shoreline length values were determined from digital mapping provided by the City of Mississauga and exclude major structures such as piers and breakwaters but include the shoreline within the Port Credit marinas and Lakefront Promenade Park.

Table 3.1:General Shoreline Statistics

Shoreline Type	Length (m)	% of Total Length
All reaches	20,145	
Artificial shoreline	9,003	45
Cohesive shore with protection structure	7,779	39
Cobble sand	1,454	7
Sand beach	834	4
Cohesive shore with protective beach or rubble	799	4
Unprotected cohesive bank or bluff	276	1

Table 3.2: General Shoreline Protection Statistics

Shoreline Protection Type	Length (m)	% of Total Length
Revetment	6,072	30
Wall	4,332	22
Beach	3,495	18
Wall and revetment	2,924	15
Rubble	1,417	7
Headland-beach (artificial)	904	4
None	858	4
Rip-rap berm	143	< 1

SHOREPLAN

The nearshore bottom within the 1PSEPM Project Regional Study Area is composed mainly of shale bedrock, overlain with erodible cohesive tills varying from low plains to low and moderate height bluffs. Extensive filling has created several reaches that are characterized as artificial shores. Examples of beaches within the 1PSEPM Project Regional Study Area include cobble beaches at Rattray Marsh, the Petro Canada Clarkson Refinery, Lakeside Park, and sand beaches at Richard's Memorial Park, Lorne Park Estates and Jack Darling Park, and adjacent to the mouth of Etobicoke Creek.

LOCAL STUDY AREA

Within the Local Study Area, the shoreline of Lake Ontario is protected with various types of shoreline treatments. Excluding the Project Study Area which is described below, the shoreline is protected with armour stone seawalls and revetments, rip rap revetments, steel sheet pile walls and other less formal protection structures. The shoreline of Lake Ontario is typically considered to extend up to Lakeshore Road bridge over the Credit River. The protection works are, for the most part, designed to accommodate various specific waterfront functions. Typical examples are rip-rap revetment within the small mooring basin, a launch ramp and low crested structures to accommodate waterfront walkways.

Protection works on the west bank of the Credit River from the Rivergate apartment to the north side of the Mississauga Canoe Club is under reconstruction by City of Mississauga (City). This work is a part of long-term waterfront improvement plans by the City. The shoreline within the Local Study Area, up to the Lakeshore Road bridge can be considered artificial shoreline. Extensive filling along the original shore of the mouth of the Credit River has occurred in the past.

The Credit River bank north of the Lakeshore Road bridge is protected with armour stone, boulders, rip rap and concrete rubble structures. The shoreline protection on the western side of the river was upgraded in 2022 to include undulating features that provide greater opportunities for fish habitat. More formal structures extend to within approximately seventy metres of the north limit of the railway bridge that forms the limit of the Local Study Area. Informal placement of rubble extends past the railway bridge.

PROJECT STUDY AREA

Within the Project Study Area, 100% of the shoreline is man-made and can be characterized as artificial. The east breakwater consists of large armour stones with a stone core. The west shoreline is formed by a steel sheet pile wharf. The north shore is formed by a conglomerate of structures and informal structures. The land within the Project Study Area is all fill material.

3.1.2. BATHYMETRY

REGIONAL, LOCAL AND PROJECT STUDY AREAS

Figure 3.1 illustrates the bathymetry within the Local and Project Study Areas. Bathymetry reveals both the depth of water and the topography of the lakebed. This information is important in understanding the cost and effects of placement of lakefill and is a key input to the numerical models used to determine the site wave conditions. Figure 3.2 shows the bathymetry used in the nearshore wave transformation model described in Section 3.4. The data presented in Figure 3.2 was synthesized from several Canadian Hydrographic Service survey field sheets.

Figure 3.1: Bathymetry in the Project and Local Study Areas



Figure 3.2: Bathymetry in the Regional Study Area



SHOREPLAN

3.1.3. LAKE WATER LEVELS

REGIONAL, LOCAL AND PROJECT STUDY AREAS

Water levels on Lake Ontario fluctuate on short-term, seasonal, and long-term basis. Water levels of the Great Lakes, including Lake Ontario, are referenced to chart datum. Chart datum is generally selected so that the water level seldom falls below it. The referenced chart datum on the Great Lakes is the International Great Lakes Datum (1985). For Lake Ontario the chart datum is 74.2 m IGLD1985. IGLD1985 elevations are 0.098m higher than CGVD28 elevations at Port Credit (Natural Resources Canada Passive Control Network benchmark 63U3470).

Seasonal fluctuations reflect the annual hydrologic cycle which is characterized by higher net basin supplies during the spring and early part of summer with lower supplies during the remainder of the year. Seasonal water levels on Lake Ontario generally peak in the summer (typically in June) with the lowest water levels generally occurring in the winter (typically in December). The average annual water level fluctuation has been approximately 0.6 metres, but this is changing. Although water levels below chart datum are rare, the lowest monthly mean on record was approximately 0.46 metres below chart datum.

Short-term fluctuations last from less than an hour up to several days and are caused by local and regional meteorological conditions. These fluctuations are most noticeable during storm events when barometric pressure differences and surface wind stresses cause temporary imbalances in water levels at different locations on the lake. These storm surges, or wind-setup, are most noticeable at the ends of the Lake, particularly when the wind blows down the length of the Lake.

Long-term water level fluctuations on the Great Lakes are the result of persistently high or low net basin supplies. More than a century of water level records show that there is no consistent or predictable cycle to the long-term water level fluctuations. Some climate change studies that examined the impact of global warming have suggested that long-term water levels on the Great Lakes will be lower than they are today. Those changes, however, are expected to have a lesser impact on Lake Ontario than on the upper lakes because the Lake Ontario water levels are regulated. For the time being most approving agencies, including CVC, require that the 100year instantaneous water level (the peak water level that has a 1% probability of occurring during any given year) be used for the design and assessment of shoreline protection structures.

MNR (1989) calculated instantaneous water levels for all Canadian shores on the Great Lakes using a combined probability analysis of monthly mean lake levels and storm surges. A coarse grid circulation model was used to interpolate surge values between stations where measured data was used to calculate the surge height return periods. Toronto and Burlington were the data stations either side of the Mississauga sector. The water levels presented in that report were typically used for designs and assessments, but the 2017 and 2019 high water level have led to a re-assessment of those values. CVC recently adopted 100-year design water level values of 76.0m CGVD28 for development east of the Clarkson Pier. Those values are used in this EA. The Project Study Area is east of the Clarkson Pier, where the 100-year design water level is 76.0m CGVD28.

3.1.4. CLIMATE CHANGE

Climate change is expected to impact both water levels and storm conditions. A considerable amount of research has been done on climate change and its expected effects on the Great Lakes, but while results vary considerably, there is consensus on several key points. Overall, storm frequency and intensity are both expected to increase, while mean water levels may fall. Climate change impacts on Lake Ontario water levels are expected to be less than on the other Great Lakes because its water levels are regulated.

McDermid et al. (2015) synthesized available science on the observed and predicted impacts of climate change in the Great Lakes basin. They reported a lack of clarity in the understanding of multiple factors influencing water level projections for the Great Lakes, and a low confidence in the current projections of future water levels resulting from climate change.

Bonsal et al. (2019) noted that disturbances to the water cycle by humans (dams, diversions, and withdrawals) make it difficult to discern climate-related changes. They also noted that most studies of future levels used models that include phenomena that can have significant effects on water balance, such as lake-effect snow, which transfers large amounts of water from the lake to the land. Projected net basin supplies showed changes to the season cycles for 2041-2070 compared with 1961-2000 producing an increase in water levels during the winter and early spring and a decrease in summer and early fall. Overall estimates were a decrease in net basin supply of 1.7% to 3.9% in Lakes Superior, Michigan, Huron, and Erie, and 0.7% in Lake Ontario. On average, under a range of emission scenarios, most regional climate model studies project a lowering of future Great Lake levels by 0.2 m for the 30-year time period, centred on the 2050s, as compared to the 1971–2000 mean. However, there is a considerable range (from a 0.1 m increase to a 0.5 m decrease). They also noted a low confidence in the estimate of future water levels because of climate change. All of the studies they reviewed agreed that there will continue to be large year-to-year and multi-year variability in lake levels, possibly even above and below the historically observed extremes. Given the low confidence in predicted future water levels, the design water level described in Section 3.3 was not changed.

3.1.5. WAVE CONDITIONS

REGIONAL, LOCAL AND PROJECT STUDY AREAS

Due to a scarcity of locally measured wave conditions, a process known as hindcasting is used to develop a long-term wave database suitable for statistical analysis. Hindcasting uses recorded wind data to model the wave conditions expected to have occurred due to those winds. By hindcasting we can produce wave climates which represent expected conditions over a period of years.

Wave conditions within the Regional, Local and Project Study Areas were determined by first hindcasting waves at an offshore location where wave generation is not affected by water depth, then transferring those waves into the nearshore region accounting for the effects of refraction, diffraction, and wave breaking.
A 48-year wave hindcast was completed by using Toronto Island wind data to produce deep water wave conditions offshore of the site. Wind data recorded from January 1, 1973, to December 31, 2020, was used to produce hourly estimates of the deep-water significant wave height, peak wave period and mean wave direction. Wind data prior to 1973 was not used due to the relatively high occurrence of missing data.

The hindcast was prepared using Shoreplan's parametric hindcast model. Toronto Island wind data was selected as the best wind data source for Lake Ontario hindcasting on the basis of extensive calibration and verification exercises carried out on different Shoreplan Projects including the Etobicoke Motel Strip (Shoreplan, 1995), Port Union Road (Shoreplan, 1998) and Frenchman's Bay (Shoreplan, 2009). During those Projects waves hindcast with Trenton, Toronto Island, Burlington, Hamilton, and St. Catharines wind data were compared to measured wave data from a total of twelve buoys deployed at nine locations (Kingston, Point Petre, Main Duck Island, Prince Edward Point, Port Hope, Cobourg, Toronto, Burlington, and Grimsby). All measured wind and wave data was obtained from Environment Canada.

The general purpose of the hindcast calibration and verification undertaken was to determine which measured wind data set best represents the actual over-water winds that generate waves. This was done by hindcasting to sites where wave data had been measured then comparing the hindcast and measured waves. Typical calibrations involved scaling wind speeds to improve the overall match. It was found that Toronto Island wind data provided the best hindcasts for Central and Western Lake Ontario.

The hindcast model has been used for coastal assessments and coastal structure designs at numerous site along western Lake Ontario including Frenchman's Bay, Port Union Road, the Scarborough Bluffs, Ashbridges Bay, Tommy Thompson Park, Ontario Place, Humber Bay Parks, Mimico Linear Waterfront Park, Lakefront Promenade Park, Port Credit, Oakville Harbour, Shell Park, Burloak Waterfront Park, Burlington Beach, Fifty Point, Grimsby Waterfront Parks and the entrance to the Welland Canal.

The deep-water wave climate offshore of Port Credit has a bi-nodal distribution of the total wave power with predominant easterly and southwesterly peaks. Figure 3.3 shows the directional distribution of the highest wave heights and the total wave power from the hindcast data. Figure 3.4 presents wave height and period exceedance curves, which show the percentage of time any given wave height or period is exceeded. Figure 3.5 shows the results of an extreme value analysis completed to determine a design wave height. For structural design the 100-year return period wave condition is used. At the upper 90% confidence interval the 100-year wave condition has a significant wave height of 5.9 m with a peak wave period of 10.5 seconds. That wave comes from the east.

The 100-year offshore wave was transferred into the 1PSEPM Project Study Area using the SWAN two- dimension spectral wave model developed at Delft University of Technology. The model simulates a steady-state spectral transformation of directional random waves co-existing with ambient currents in the coastal zone. It includes features such as wave generation, wave reflection, wave diffraction, and bottom frictional dissipation. Model bathymetry (described in Section 3.2) was developed from Canadian Hydrographic Service field sheets. A flexible grid was used with grid spacing ranging from approximately 5 m in the Project Study Area to 250 m at the offshore boundary.

Figure 3.6 shows the 100-year offshore wave condition transferred inshore at the 100-year instantaneous water level. This represents the upper limit of design conditions usually considered in coastal applications. Extreme values of both offshore wave conditions and water levels are typically considered because both play a major role in determining the nearshore wave condition. Figure 3.7 shows the same model results within the 1PSEPM Project Study Area.



Figure 3.3: Distribution of Highest Hindcast Wave Heights and Total Wave Power

Figure 3.4: Wave Height and Period Exceedance Curves





Figure 3.5: Peak-Over-Threshold Extreme Value Analysis (Easterly Storms)









3.1.6. ICE AND DEBRIS

REGIONAL, LOCAL AND PROJECT STUDY AREAS

Ice cover and winter mean ice cover on Lake Ontario has been declining since the early 1970s, and this is attributed to increasing surface water temperatures. Increases in air temperature are generally coincident with increases in water temperature, with the greatest warming and associated reductions in dissolved oxygen anticipated in the nearshore area. Shore ice, which is ice that forms around the perimeter of the lake, can both protect and damage shorelines, depending upon local conditions (CVC, 2018).

CVC conducted ice monitoring along the shoreline in February 2014 and found that ice accumulation was greatest in protected areas (with complete coverage in the Credit River upstream of Lakeshore Road and in Lakefront Promenade Park embayment and marina) and areas of shallower depth (e.g., Rattray Marsh beach).

Debris from various watercourses and storm sewer systems is typically made up of urban refuse such as plastic bags, water bottles, and take-out containers, as well as woody debris such as sticks and logs which is considered beneficial. Debris is widely scattered across beach shorelines during storm events and tends to collect against structures that extend out into the lake.

3.1.7. LITTORAL SEDIMENT TRANSPORT

REGIONAL, LOCAL AND PROJECT STUDY AREAS

The shoreline from Burlington to Toronto is generally referred to as a non-drift zone due to the lack of littoral (coastal) sediments. On many shores of the Great Lakes, littoral sediment supply originates from erosion of shoreline bluffs and the nearshore lakebed. Within the regional, local and Project Study Areas, most of the shoreline has been hardened, essentially eliminating bluff erosion, and the nearshore lakebed is erosion-resistant bedrock. Some sediment transport does take place because of nearshore bottom deposits, but there is no significant source of new littoral material. Sediment introduced via the watercourses (creeks, rivers, etc.) that discharge into Lake Ontario is typically fine grained and tends to deposit in deeper water offshore of the littoral zone. Littoral Sediment Transport patterns will not be notably altered by any of the alternatives considered.

3.1.8. LAKE AND RIVER WATER QUALITY

REGIONAL AND LOCAL STUDY AREAS

Rainfall and snowmelt run off surfaces rapidly and in unnaturally large amounts in areas of high urban density. This runoff gathers speed and erosional power and takes up contaminants as it travels into receiving waters. Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. Storm sewer overflows and rivers are major sources of bacterial, nutrient, and total suspended solids (TSS) loadings along the Regional and Project Study Areas. Additional pollutants from upstream agricultural areas also contribute. These pollutants can harm fish and wildlife populations, kill native vegetation and foul drinking water supplies (Aquafor Beech Limited, 2011).

A LOISS Background Review identified that the largest watercourse within the Regional Study Area, the Credit River has the greatest effect on most water quality parameters. It contributes 86% of the suspended solids, 66% of the nitrates, and 80% of the heavy metals entering Lake Ontario.

PROJECT STUDY AREA

Golder (2016) reported that within the existing marina basin and immediately east of the eastern breakwater, surface water quality generally met Provincial Water Quality Objectives (PWQO) standards, except for total nickel in one shallow surface water sample and copper at two shallow and deep surface water samples.

3.1.9. SEDIMENTATION AND SEDIMENT QUALITY

REGIONAL AND LOCAL STUDY AREAS

The shoreline from Toronto to Burlington is generally referred to as a non-drift zone due to the lack of littoral (coastal) sediments. On many shores of the Great Lakes, littoral sediment supply originates from erosion of shoreline bluffs and the nearshore lakebed. Within the Regional and Local Study Areas, much of the shoreline has been hardened, essentially eliminating bluff erosion, and the nearshore lakebed is erosion-resistant bedrock. Some sediment transport does take place but there is no significant source of new littoral material.

The Credit River yields the greatest amount of sediment supply to Lake Ontario near the Project Study Area, as the overall size of the Credit River basin is almost three times greater than the next largest basin. The Credit River Adaptive Management Study (Credit Valley Conservation, 2014) estimated that the total sediment yield from the Credit River to Lake Ontario is over 174,000 tonnes per year, and primarily composed of fine sands and silt particles.

Sedimentation and bathymetric studies were completed for the Credit Village Marina basin, the Credit River channel and river mouth (Geomorphic Solutions, 2011). A comparison with data sets from 1989, 1995, 1996, 2010 and 2011 identified areas of sediment loss and gain and revealed that Credit Village Marina basin and the river mouth are experiencing sedimentation.

In 2013, the City of Mississauga completed a dredge project followed by a maintenance dredge in 2022 aimed at restoring the navigability of the Credit River by removing excess sediment in the Credit Village Marina basin and along portions of the Credit River channel near the mouth of the river. The deposition near the mouth of the Credit River is a natural function of decreasing flow velocity as the river mouth widens. Historically, these conditions supported a coastal wetland in this area. Wave action likely also influences deposition in this area.

PROJECT STUDY AREA

Golder (2016) conducted chemical analyses of sediment samples from 11 locations within the Project Study Area. Results were compared to Ontario Ministry of Environment (Ministry of Environment, 2011(b)) Table 9 Standards. Table 9 describes the sediment quality standards for use under Part XV.1 of the Environmental Protection Act. The analytical results indicate that:

- Table 9 standards are exceeded for one or more metal parameters at most of the sediment sample locations. For example, elevated concentrations were reported for copper, nickel and zinc. Copper, zinc and other metal concentrations are comparable to previous concentrations reported in 2011.
- Concentrations of one or more PHC and/or BTEX parameters marginally exceeded Table 9 standards in samples from 9 locations, both within the marina basin and immediately east of the eastern breakwater. PAH was also present at concentrations exceeding Table 9 standards at 6 sediment sampling locations both within the marina basin and immediately east of the eastern breakwater.
- Notably, no exceedances of the Table 9 standard were reported for any samples analyzed for pesticides or PCBs.

3.1.10. SOILS AND GEOLOGY

LOCAL STUDY AREA

The Local Study Area is underlain by shale bedrock of the Georgian Bay Formation. The Georgian Bay Formation is grey shale that is up to 175 m thick, with fracturing limited to the upper few meters of the formation. A variety of surficial deposits are associated with the Iroquois Plain in the Local Study Area. Coarse-textured glaciolacustrine deposits are primarily sand, gravel minor silt and clay that were foreshore and basin deposits. Areas of bedrock are either exposed or thinly drift-covered Georgian Bay Formation shale. Modern alluvium (river deposits) was laid down by the Credit River within its floodplain, along with Stavebank Creek, Kenolli Creek, Mary Fix Creek and others.

PROJECT STUDY AREA

Based on borehole drilling undertaken by Golder (2016) the onshore portion of the 1PSEPM Project site has a relatively consistent soil and geological profile at depth. This profile consists of:

- Asphalt (up to 0.09 m thick) overlying non-cohesive fill material comprised of varying amounts of silt, sand, clay, and gravel.
- Fill materials were encountered at depths of 1.2 to 3.7 m below ground surface (bgs) This fill material contained occasional debris comprised on cinders, concrete, asphalt, wood and/or glass, particularly in the western portions of the site. 2.4 m of riprap boulders were encountered in one borehole.
- Native soil was encountered at 3 m bgs at the edge of the site along the northern property boundary in only one borehole.
- Peat, approximately 0.3 to 0.6 m in thickness was encountered at three boreholes at depths ranging from 2.9 to 5.5 m bgs and a maximum depth of 7.3 bgs at the southern end of the property, nearest the shoreline.
- Sand, silty sand or gravelly sands underly the peat. Cohesive silty clay was encountered at a depth of 2.1 m bgs at the edge of the site along the northern property boundary in only one borehole.
- Weathered shale was encountered at depths ranging from 9.8 to 10.7 m bgs (Golder, 2016).

Golder (2016) conducted chemical analyses of several soil samples from boreholes in the Project Study Area. Results were compared to Ontario Ministry of Environment (formerly Ministry of Environment, 2011(b)) Table 9 Standards. Table 9 describes the soil and groundwater standards for use within 30 m of a water body in a non- potable groundwater condition. The analytical results indicate that:

- Table 9 standards are exceeded for one or more metal parameters at most of the borehole locations. For example, at one representative borehole near the center of the site, metal/metalloid concentrations exceeded Table 9 standards for antimony, arsenic barium, cadmium, copper, lead, mercury, molybdenum and zinc.
- Concentrations of four BTEX parameters exceeded Table 9 standards in samples at two boreholes. PHC (F4) and PAH were also present at concentrations exceeding Table 9 standards at one or more borehole locations.

Golder (2016) measured groundwater levels at the Project site. The water table was encountered at depths ranging from 2.0 to 2.6 m bgs. Groundwater flow is inferred to be south and southeast towards Lake Ontario. Apart from one exceedance of Table 9 standards for chloride, no exceedances were reported at the site for groundwater samples collected and analyzed for inorganics, VOCs, PHCs and PAHs.

Overall, the sources of these contaminants are not fully understood but are likely to be from leaks and spills associated with above-ground storage tanks (ASTs) and piping in the southwestern portion of the Project Study Area, boat storage and various marina activities, including winter salt application to paved areas.

3.1.11. SOURCE PROTECTION AREAS

LOCAL AND PROJECT STUDY AREAS

The Clean Water Act (2006) aims to protect existing and future sources of drinking water. To achieve this, vulnerable areas are delineated around surface water intakes and wellheads for every municipal residential drinking water system that is in a source protection area. The Project and Local Study Areas are located within the Credit Valley Source Protection Area, a surface water Intake Protection Zone (IPZ) and a Highly Vulnerable Aquifer (HVA). Parts of these Local and Project Study Areas may be located in an Event-based Modelling Area (EBA) (Ministry of Environment, Conservation and Parks, 2020).

3.2. ATMOSPHERIC ENVIRONMENT

3.2.1. CLIMATE

The climate for the City of Mississauga is like that of the City of Toronto and the broader GTA. Climate data has been recorded at Pearson International Airport in Mississauga since the 1930's. Based on data between 1981 and 2010, records show that Mississauga has an average daily temperature of 27C but has reached as high as 37C. Winters, like much of southern Ontario, are cold with temperatures reaching an average low of -9C and record lows of -31C. Compared to the rest of Canada and Ontario, the amount of snowfall received during the season is relatively low. On average, Mississauga receives 108cm of snow per year. Precipitation in the form of rainfall is on average 681mm per year (Environment Canada). The average wind speed was 15km/h from the west. The winters in Mississauga are the windiest with the average wind speed between 17.6 km/h and 16.9 km/h from the west or the north. Mississauga experiences the hottest month in July (22 °C avg), the coldest month in January (-5°C avg); the wettest month in April (43.6 mm avg) the windiest month in January (18 km/h) (CustomWeather, 2022).

Although the weather station at Toronto Pearson International Airport covers data for all of Mississauga, Port Credit, having a different topography, has its own micro-climate affected greatly by Lake Ontario. Fog is more common along the lakeshore and along the Credit River valley. The lake, being a heat sink, provides for warmer winter temperatures and cooler summer temperatures. While the wind general comes from the west, in Port Credit, the lake will also provide offshore breezes particularly stronger in the winter.

3.2.2. AIR QUALITY

Air quality in the City of Mississauga is affected by both the emission sources that release pollutants into the air, and by the climate, or atmospheric conditions, such as wind speed, wind direction, and temperature. The climate in the GTA consists of cold and windy winters and typically hot, humid summers.

Air quality in Region of Peel was subject to extensive study along the Hurontario Street corridor from Port Credit to Brampton as part of the Hurontario-Main Light Rail Transit Project (2014). These studies concluded that existing air contaminant levels for the majority of the contaminants are less than their relevant Ambient Air Quality Criteria (AAQC), even when considering the maximum concentrations over multiple stations and multiple years. However, Particulate matter (i.e., PM10, PM2.5), acrolein, benzene, and benzo(a)pyrene do exceed their criteria at least some of the time. PM10 and PM2.5 have maximum concentrations that are above their 24-hour AAQC and CAAQS. These elevated maximums result from high particulate matter events that occur in the GTA from time-to-time. However, for both contaminants, the annual means are well below the thresholds, indicating that on an average day, the ambient concentrations of PM10 and PM2.5 are below the criterion (City of Mississauga, 2014).

The City is committed to improving air quality through a variety of ways. This includes promotion of active transportation solutions (e.g., cycling, walking and e-bikes) through a number of plans and strategies including the Cycling Master Plan and the Pedestrian Master Plan and deep decarbonisation in the transportation and building sectors are all underway by the City. The transformation to electric vehicles and away from gas-fueled cars, the City's move to second generation and electric buses and through energy efficient and net zero buildings all have the benefit of reduced greenhouse gas emissions and other air pollutants, all leading to improvements in air quality. In addition, the City engages with provincial activities in an effort to keep the electricity grid clean and emissions free.

3.2.3. NOISE

REGIONAL AND LOCAL STUDY AREAS

The sources of noise in the Regional and Local Study Areas are both natural (i.e., Lake Ontario) and anthropogenic. Transportation is the major source of noise in Port Credit, including road traffic noise on Lakeshore Road West, Mississauga Road South, and internal roadways within Port Credit, as well as rail traffic on the CN Oakville Subdivision rail line. The Port Credit GO station is located more than 500 m to the northwest of the subject site. Due to distance separation and the presence of existing mid-rise and high-rise residential development between the 1PSEPM Project site and Port Credit GO station, noise from the Port Credit GO station is not expected to influence ambient noise levels at the Project site.

Existing residential, retail and commercial development within Port Credit are not considered significant noise sources and are generally not audible over the ambient road and rail traffic noise (Valcoustics Canada Ltd., 2017).

Overall, the Regional and Local Study Areas can be classified a "Class 1 area", meaning an area with an acoustical environment typical of a major population center, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum" (Ministry of the Environment and Climate Change, 2013).

The closest sensitive receptors (i.e., residences) are located immediately north of the Project site along Port Street and Helene Street. However, there are numerous residences facing the 1PSEPM Project site along Port Street and St. Lawrence Drive to the east of the 1PSEPM Project site.

PROJECT STUDY AREA

The sources of noise in the Project Study Area are both natural (i.e., Lake Ontario) and anthropogenic (i.e., existing marina operations). There are no noise receptors on the Project site.

3.3. BIOLOGICAL ENVIRONMENT

The ecology of natural heritage systems in urban areas are typically composed of fragmented habitats, isolated woodlands and wetlands, lower biodiversity, impacted hydrology with lowered groundwater levels and flashier surface water hydrology, and the presence of invasive species. Urbanization and associated microclimatic changes affect species composition; thus, as habitats simplify, the resources and competitive requirements of many wildlife species are not met (Credit Valley Conservation, 2018).

Historically, the Lake Ontario shoreline in Mississauga was composed of a mix of natural habitats: deciduous and mixed forests, open savannahs and coastal wetlands. Survey records from the early 1800s refer to a 'dense forest' from Burlington to Etobicoke Creek and for 'many miles northward' (Clarkson, 1977).

The area along the Lake Ontario shoreline is highly dynamic by the action of waves, and wind. Terrestrial linkages between the Lake Ontario shoreline and the Credit River are weak on both east and west sides of the river. Low density residential subdivisions and armoured banks of the Credit River provide little cover and access for wildlife between J.C. Saddington and J.J. Plaus Parks and upstream to the forested areas of Credit River valley.

Despite urbanization and changing shoreline conditions over time, there remains the potential for species at risk (SAR) habitat and Significant Wildlife Habitat (SWH) to occur in the Regional Study Area.

3.3.1. AQUATIC HABITAT

REGIONAL AND LOCAL STUDY AREAS

Aquatic habitats have undergone a substantial change from their historic conditions. Land use change, filling, dredging, and disturbance are the most notable historic and current threats to aquatic habitats along the shore of Lake Ontario. Stone hooking, the removal/mining of rock from the lake bottom, has left a legacy along the Mississauga shoreline that has resulted in wholesale changes in, and destruction of, nearshore aquatic habitat through the removal of structure and shelter for fish including the once extirpated Lake Ontario population of Atlantic Salmon (Martin, 2007). The loss of virtually all cobble substrates and the elimination of Lake Trout spawning reefs are also attributed to stone hooking (Whillans, 1979).

The shoreline in the Regional and Local Study Areas consists of erosion protection structures (armour stone, revetments, concrete, rubble, rip rap, etc.) most of the shoreline west of the Project Study Area being artificial.

Night-time water temperatures and daytime air temperatures collected in the summer between 2008 and 2014 averaged 20°C and 21°C, respectively (CVC, 2018). While these averages are important to consider, they are based on a relatively small sample size (nine).

Flows and sediment from the Credit River are transported to the west, as far away as Tecumseh Creek (CVC 2018). Transport of sediment and particle-bound phosphorus from the watershed exceed PWQO and reduce the water quality in the mouth of the Credit River and nearshore Lake Ontario (CVC 2018). These contributions may provide suitable food resources to harmful algae species, which may feed on the excess nutrients. Additional watershed contributions of chloride in the winter months also pose a risk to existing aquatic habitat.

Port Credit is known for historic and ongoing fisheries research and both recreational and commercial fishing activities. Incidental observations indicate that Burbot (Lota lota), Lake Whitefish (Coregonus clupeaformis), and Herring (Clupeidae sp.) were common occurrences in the past, however, both Burbot and Herring are very uncommon sightings in Port Credit today. It is expected that both wetlands and sheltered embayment's play a critical role in reproduction of these species and the loss of wetland habitat (Faulkner Marsh) may have reduced spawning sites for these species near the mouth of the Credit River (CVC, 2018). Additional spawning areas, such as off-shore shoals, are important spawning sites for Lake Trout and while historically documented, are typically difficult to locate in present day.

The Credit River and Lake Ontario are home to at least 65 cold, cool, and warm-water fish species, including forage, coarse, and sport fish, which are further identified in the Fishes of the Credit River Watershed document, produced by CVC (2002). It is further understood that of the 65 potential fish species, 58 native fish species have been recorded in the Port Credit region, of which 23 are considered lake species (CVC, 2018). It is anticipated that most fish species found within the Credit River and ultimately, Lake Ontario, may utilize the nearshore areas within the Study Area to complete all or some of the life cycles. It is also known that nearshore fish species diversity and productivity is higher than those of offshore habitats (CVC, 2018); two thirds of adult fish species and three quarters of young of the year fish species show a high affinity for sand, gravel or silt substrates, which are often associated with vegetation in the nearshore area (Lane et al. 1996 in CVC 2018).

Fish sampling is an ongoing priority for CVC and is conducted using a boat electrofisher, within the Port Credit Coastal Reach (mouth of the Credit River). The results of fish sampling activities between 2008 and 2014 indicate that the Port Credit Coastal Reach has the highest fish species richness (31) and second highest average number of individuals per 1000 seconds (-210), of all assessed locations (CVC 2018). However, when total fish biomass is considered, the PCHM is typically ranked 3rd or 4th of the 7 locations surveyed. It should also be mentioned that when the total fish biomass is corrected to remove Common Carp from the calculation, the PCHM is roughly tied for 1st, with 3 other locations. This would seem to indicate that the PCHM provides less optimal aquatic habitat for Common Carp, when compared to other embayment's or river mouths assessed. Additionally, when considering embayment's and river mouth sites, embayment's are often the primary contributor to total biomass values and are known to contribute up to 80% of annual total biomass (CVC 2018). A list of documented fish species with potential presence within the Credit River, at the mouth of the Credit River, or within the vicinity of the Local and Project Study Areas is presented in Table 3.3. Not all fish species (or required habitats) will be present within the Regional and Local Study Areas.

Common Name	Scientific Name	Documented Presence in Credit River (Y/N)	Documented Presence in Port Credit Coastal Reach (Y/N)		
Bowfin Family (Family Amiidae)					
Bowfin	Amia calva	Y	Ν		
Catfish Family (Family Ictaluridae)					
Brown Bullhead	Ameiurus nebulosus	Y	Y		
Channel Catfish	Ictalurus punctatus	Y	Ν		
Stonecat	Noturus flavus	Y	Y		
Drum or Croaker Family (Family Sciaenidae)					
Freshwater Drum	Aplodinotus grunniens	Y	Ν		
Freshwater Eel Family (Family Anguillidae)					
American Eel	Anguilla rostrata	Y	Y		

Table 3.3:Documented Fish Presence Near Or Within The Regional and Local Study Area
and Associated Potential Habitat Usage

Common Name	Scientific Name	Documented Presence in Credit River (Y/N)	Documented Presence in Port Credit Coastal Reach (Y/N)	
Goby Family (Family <i>Gobiidae</i>)				
Round Goby	Neogobius melanostomus	N	Y	
Herring Family (Family Clupeidae)				
Alewife (gaspereau)	Alosa pseudoharengus	Y	Y	
Gizzard Shad	Dorosoma cepedianum	Y	Y	
Lamprey Family (Family Petromyzontidae)				
American Brook Lamprey	Lethenteron appendix	Y	N	
Sea Lamprey	Petromyzon marinus	Y	Y	
Minnow Family (Family Cyprinic	dae)			
Goldfish	Carassius auratus	Y	N	
Redside Dace	Clinostomus elongatus	Y	N	
Northern Redbelly Dace	Chrosomus eos	Y	Ν	
Finescale Dace	Chrosomus neogaeus	Y	Ν	
Spotfin Shiner	Cyprinella spiloptera	Y	Y	
Common Carp	Cyprinus carpio	Y	Y	
Brassy Minnow	Hybognathus hankinsoni	Y	Ν	
Common Shiner	Luxilus cornutus	Y	Y	
Redfin Shiner	Lythrurus umbratilis	Y	Ν	
Northern Pearl Dace	Margariscus nachtriebi	Y	Ν	
Hornyhead Chub	Nocomis biguttatus	Y	Y	
River Chub	Nocomis micropogon	Y	γ	
Golden Shiner	Notemigonus crysoleucas	Y	Y	
Emerald Shiner	Notropis atherinoides	Y	γ	
Blacknose Shiner	Notropis heterolepis	Y	Ν	
Spottail Shiner	Notropis hudsonius	Y	γ	
Rosyface Shiner	Notropis rubellus	Y	γ	
Sand Shiner	Notropis stramineus	Y	Ν	
Mimic Shiner	Notropis volucellus	Y	Ν	
Bluntnose Minnow	Pimephales notatus	Y	γ	
Fathead Minnow	Pimephales promelas	Y	γ	
Blacknose Dace	Rhinichthys atratulus	Y	γ	
Longnose Dace	Rhinichthys cataractae	Y	γ	
Creek Chub	Semotilus atromaculatus	Y	Y	
Mudminnow and Pike Family (Family Esocidae)				
Northern Pike	Esox lucius	Y	Y	
Central Mudminnow	Umbra limi	Y	N	

Common Name	Scientific Name	Documented Presence in Credit River (Y/N)	Documented Presence in Port Credit Coastal Reach (Y/N)		
Perch Family (Family Percidae)					
Rainbow Darter	Etheostoma caeruleum	Y	Y		
Iowa Darter	Etheostoma exile	Y	Y		
Fantail Darter	Etheostoma flabellare	Y	Y		
Johnny Darter	Etheostoma nigrum	Y	Y		
Yellow Perch	Perca flavescens	Y	Y		
Logperch	Percina caprodes	Y	Y		
Walleye	Sander vitreus	Y	Y		
Salmon Family (Family Salmoni	dae)				
Pink Salmon	Oncorhynchus gorbuscha	Y	N		
Coho Salmon	Oncorhynchus kisutch	Y	Ν		
Chinook Salmon	Oncorhynchus tshawytscha	Y	Y		
Rainbow Trout	Oncorhynchus mykiss	Y	Y		
Atlantic Salmon	Salmo salar	Y	Y		
Brown Trout	Salmo trutta	Y	Ν		
Brook Trout	Salvelinus fontinalis	Y	Ν		
Sculpin Family (Family Cottidae)				
Mottled Sculpin	Cottus bairdi	Y	Ν		
Slimy Sculpin	Cottus cognatus	Y	Ν		
Smelt Family (Family Osmeridae	e)				
Rainbow Smelt	Osmerus mordax	Y	Ν		
Stickleback Family (Family Gasterosteidae)					
Brook Stickleback	Culaea inconstans	Y	Ν		
Threespine Stickleback	Gasterosteus aculeatus	Y	Ν		
Sturgeon Family (Family Acipenseridae)					
Lake Sturgeon	Acipenser fulvescens	Y	Ν		
Sucker Family (Family Catostomidae)					
Longnose Sucker	Catostomus catostomus	Ν	Y		
White Sucker	Catostomus commersoni	Y	Y		
Northern Hog Sucker	Hypentelium nigricans	Y	Y		
Silver Redhorse	Moxostoma anisurum	Y	Ν		
Shorthead Redhorse	Moxostoma macrolepidotum	Y	Y		
Greater Redhorse	Moxostoma valenciennesi	Ν	Y		
Sunfish Family (Family Centrarchidae)					
Rock Bass	Ambloplites rupestris	Υ	Y		
Pumpkinseed	Lepomis gibbosus	Υ	Υ		

Common Name	Scientific Name	Documented Presence in Credit River (Y/N)	Documented Presence in Port Credit Coastal Reach (Y/N)	
Smallmouth Bass	Micropterus dolomieu	Y	Y	
Largemouth Bass	Micropterus salmoides	Y	Y	
Black Crappie	Pomoxis nigromaculatus	Y	Ν	
Temperate Bass Family (Family Moronidae)				
White Perch	Morone americana	Y	N	
White Bass	Morone chrysops	Y	Y	
Trout-Perch Family (Family Percopsidae)				
Trout-perch	Percopsis omiscomaycus	Y	N	

Figure 3.8 illustrates fish abundance and fish species composition by thermal and trophic guild in the Port Credit area (Credit Valley Conservation, 2018).

Figure 3.8: Port Credit Fish Abundance



⁽Credit Valley Conservation, 2002)

PROJECT STUDY AREA

The Credit River at Lake Ontario can be described as estuary or river mouth habitat. This habitat is a mixing zone where a flowing river mixes with the static water of Lake Ontario. The shoreline of the Port Credit Coastal Reach, which includes the Study Area, is highly engineered, with only 1% left in a natural state as documented by CVC (2018). This engineered shoreline is made up of rock armouring, the Ridgetown, and other breakwater structures.

Substrates found here are generally finer sands and silts that have been carried as bedload by the river and deposited into the river mouth). Transport of sediment and particle-bound phosphorus from the watershed exceed PWQO and reduce the water quality in the mouth of the Credit River and nearshore Lake Ontario (CVC, 2018). These contributions may provide suitable food resources to harmful algae species, which may feed on excess nutrients. Additional watershed contributions of chloride in the winter months also pose a risk to existing aquatic habitat.

Habitat alteration, periodic dredging and the presence of Carp have contributed to the absence of aquatic vegetation beyond very tolerant species that are typically found adjacent to the breakwater (CVC, 2002). Incidental observations indicate that Burbot (*Lota lota*), Lake Whitefish (*Coregonus clupeaformis*), and Herring (*Clupeidae sp.*) were common occurrences in the past, however, both Burbot and Herring are very uncommon sightings in Port Credit today. It is expected that both wetlands and sheltered embayment's play a critical role in reproduction of these species and the loss of wetland habitat (Faulkner Marsh) may have reduced spawning sites for these species near the mouth of the Credit River (CVC, 2018). Figure 3.9 illustrates the aquatic habitat.

Figure 3.9: Aquatic Habitat Mapping



SHOREPLAN

EAST SIDE OF BREAKWATER

Directly east of the existing eastern breakwater, large boulders extend into the water lot for several meters, at an estimated 2:1 slope. The boulders provide stability and erosion protection for the marina and nearshore area, while the bank irregularities and lakebed roughness provide instream cover for a variety of documented fish species. Beyond the large boulders, the lakebed substrate is dominated by coarse sand and cobble, with sand becoming more prevalent along the shoreline. An area of hardpan was documented east of the Project Study Area and was dominated with gravel. Multiple cobble dominated shoals were documented along the eastern edge of the Project Study Area and were oriented both parallel and perpendicular to the existing eastern breakwater. Depending on the severity of weather events and wave action, the boulders along the east side of the existing eastern breakwater may have experienced movement since the time of construction.

Based on the placement and organization of the boulders along the west side of the existing eastern breakwater, it is assumed that a barge was utilized from the west side. Beyond the large boulders, the substrate documented along the west side of the existing eastern breakwater is dominated by sand and cobble, with areas of soft detritus.

No macrophyte presence was observed at the time of the aquatic habitat assessment. Algae and Zebra Mussels (*Dreissena polymorpha*) were documented in places along the shoreline, existing eastern breakwater, and hardpan area. The concentration of Zebra Mussels appeared to increase as water depths increased. Water depths of greater than 8 m were documented within the Project Study Area east of the existing (eastern) breakwater.

No fish were observed during the aquatic habitat assessment.

Aquatic habitat and substrates documented within the Project Study Area east of the existing eastern breakwater do not appear to be limited to the Project Study Area and extend past the water lot boundary. The only exception to this is the large cobble dominated area located toward the terminus of the breakwater. No areas of critical habitat for potential SAR were documented during the field investigation.

WEST SIDE OF BREAKWATER

Directly west of the existing (eastern) breakwater, large boulders extend into the marina for several meters, at an estimated 2:1 slope. The boulders provide stability and erosion protection for the marina and nearshore area, while the bank irregularities and lakebed roughness provide instream cover for a variety of documented fish species.

Significant algal and macrophyte growth was documented, when compared to the east side of the existing eastern breakwater. This may be due to reduced wave action, flow, and potentially increased residence time of water within the marina. Water depths of greater than 2.5 m were documented within the Project Study Area west of the existing eastern breakwater.

Multiple fish species and individuals were observed within the marina, although only Brown Bullhead and Cyprinids Sp. were identified. It is assumed that many other fish species or families were observed but could not be identified. Aquatic habitat and substrates documented within the marina basin appear to be consistent throughout the assessed area. It is assumed that the dense macrophyte growth within the marina basin provides suitable nursery and foraging habitat for many species documented in the Project Study Area. No areas of critical habitat for potential SAR were documented during the field investigation.

WITHIN THE MARINA BASIN

Within the marina basin, the substrate is dominated by sand, with fine sediments and other particulate matter resting in isolated pockets.

Moderate to dense algal and macrophyte growth was documented within the marina basin and provides significant cover and surfaces for important life process (e.g., refuge and spawning) of some fish species with documented presence in the Project Study Area. The density of plant life may be in part due to the sheltered nature of the waters within the marina basin and the potential accumulation of nutrients from overland or other sources.

Multiple fish species (e.g., Brown Bullhead, *Cyprinid Sp.*) were observed within the marina basin and it is expected that multiple life stages are present.

Aquatic habitat and substrates documented within the marina basin do not appear limited and are consistent through the assessed area within the marina basin. No areas of critical habitat for potential SAR were documented during the field investigation. The eastern breakwater appears to be stable on both the east and west side of the assessed area.

3.3.2. VEGETATION

Ecozones are the highest level of ecosystem classification in Ontario. Their boundaries are based on key physical landscape within which human and ecosystem functions are defined and constrained. An ecoregion is a unique area of land and water within an ecozone that is defined by characteristics such as climate variables like temperature, precipitation, and humidity. The Project Study Area is in the ecoregion 7E – Lake Erie - Lake Ontario. The ecoregion covers the northern shorelines along Lake Ontario and Lake Erie and is divided into six ecodistricts. The flora and fauna in Ecoregion 7E are the most diverse in Canada and include several provincially significant plants, animals, and vegetation communities. Sugar maple, American beech, and eastern white pine are widespread. Species with affinities to temperate forests in the United States including tulip tree, sassafras, and Kentucky coffee tree also occur. Plant species associated with alvar and grassland communities are located here (Wester, Henson, Crins, Uhlig, & Gray, 2018).

The ecodistrict covering the Project Study Area is the Toronto ecodistrict, extending from the Rouge River west to Bronte Creek. This region is associated with the Eastern Temperate Deciduous Forest Vegetation and the Niagara Section of the Deciduous Forest Region. Common natural features include upland treed areas, shoreline bluffs, river valley systems, and river/lakefront marshes. Deciduous forest, primarily consisting of American beech and sugar maple, typically occur along rivers (e.g., Credit, Bronte, Sixteen Mile, and Rouge rivers;) or as remnant forests (Wester, Henson, Crins, Uhlig, & Gray, 2018).

3.3.3. FORESTS

REGIONAL AND LOCAL STUDY AREAS

To the west of the Project Study Area, along the Lake Ontario shoreline of Mississauga, deciduous forests, mixed deciduous-coniferous forests and cultural woodlands are some of the most common (though underrepresented) communities. Most of these remnant natural areas are small in size, fragmented by roads, trails and development and are thus isolated from each other. Larger tracts are found at Rattray Marsh Conservation area (approximately 38 ha). Further inland, forested communities remain at Cawthra Woods (approximately 20 ha) and along the main Credit River valley at Dundas Street.

Trees in the Local Study Area are predominantly those in deciduous forest and cultural woodlands. Of note is the Stavebank Oak Forest and Tallgrass Prairie near the southern end of the Credit River Marshes which includes prairie indicator species such as Black Oak (*Quercus velutina*), Indian Grass (*Sorghastrum nutans*) and Big Bluestem (*Andropogon gerardii*) (CVC 2014).

PROJECT STUDY AREA

The Project Study Area is predominately urbanized and paved. Ornamental deciduous and coniferous trees and shrubs exist along most of the perimeter of the 1PSEPM Project site with only 15 clusters of trees growing on the breakwater near the shoreline. None of these trees were planted, rather they are opportunistic with seeds finding the opportunity to root within the rock breakwater. These trees were deciduous tress, predominately silver maple, (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), elms (genus Ulmus), willows (genus Salix) and mulberry (*Morus alba*). It is estimated that there exists approximately 1,700 m2 of vegetation in the Project Study Area.

3.3.4. WETLANDS

REGIONAL AND LOCAL STUDY AREAS

Wetlands make up less than 1% of the Regional Study Area. Rattray Marsh located at the mouth of Sheridan Creek, west of the Project Study Area, is the last remaining large bay-mouth bar coastal wetland between Oshawa and Burlington (CVC, 2018).

Shallow depths due to sedimentation upstream of the CN Rail bridge to just upstream of the QEW overpass has provided suitable conditions for the establishment of the Credit River Marshes coastal wetland complex. These wetlands comprise eight wetland units and are designated as provincially significant by MNRF and as a Centre for Biodiversity by CVC. The marshes themselves support a diverse complex of habitat types, their location, access and structure provide unique habitat for turtles, snakes, amphibians and birds (including waterfowl). The Credit River Marshes rival Rattray Marsh in quality and species richness, providing habitat for reptiles and amphibians including Eastern Milksnakes (*Lampropeltis triangulum*), Common Watersnakes (*Nerodia sipedon*), Snapping Turtles (*Chelydra serpentine*) and Map Turtles (*Graptemys geographica*).

PROJECT STUDY AREA

There are no wetlands located within the Project Study Area.

3.3.5. BIRDS

Most resident and migrant bird species require natural spaces to survive within an urban environment. Birds often face many stresses in urban ecosystems, particularly area-sensitive forest birds. Waterfront parks in particular offer some of the only remaining habitat within the larger landscape. In urban areas, high quality habitat supporting abundant food resources for migrant birds is limited.

In Mississauga, waterfront parks have been known to play an important role in sustaining migratory bird populations by providing habitat and resources for birds before and after their arduous flight around/over Lake Ontario. The Local and Project Study Areas are both located within an important migratory zone, which includes portions of both the Atlantic and Mississippi flyways. Given how much of Mississauga's shoreline is developed, there is not a lot of high-quality habitat for migrating birds to choose from, thus they will use what is available. Storms and severe weather also can force migrating birds to take new migration routes or settle down in place (even if it is not ideal habitat).

REGIONAL AND LOCAL STUDY AREAS

All along the lakeshore in Mississauga are remnant natural features and manicured parks which offer potential stopover and breeding habitat for species of migrant and resident birds. Surveys since 2010 are beginning to document the diversity of birds that make use of the shoreline areas within the Regional Study Area. Some natural areas are known 'hotspots' for birds (for example Rattray Marsh Conservation Area); however, some migrant birds may make use of sub-optimal habitat when large natural tracts are limited and when inclement weather conditions impede further migration.

The vegetated ravines and river valley systems along the north shore of Lake Ontario within the Regional Study Area serve an important role in sustaining migratory bird populations by providing green north/south corridors through largely urban areas. The area west of Port Credit to Burlington has been identified as the Western Lake Ontario Important Bird Area and is most notable for its congregations of waterfowl, particularly overwintering waterfowl.

Sheltered embayments, creek mouths and some non-natural structures, such as the pier and breakwater at marina can also provide important habitat for water birds. Aggregations of waterfowl and cormorants are frequently noted in these areas.

The Ontario Breeding Bird Atlas (OBBA) contains detailed information on the population and distribution status of Ontario birds (2022). The data is presented on 10 km x 10 km squares. The data square that overlaps with the Project Study Areawas used to determine the potential bird species list for that area. It should be noted that the Project Study Area is a small component of the overall bird atlas square, and therefore it is unlikely that all bird species are found within the Project Study Area. Habitat type, availability and size are all contributing factors in bird species presence and use (Birds Canada, 2022).

A total of 84 bird species were recorded in the OBBA in the atlas square (17PJ12) that overlaps with the Subject Lands. Of the species reported in the OBBA in the atlas square, four are of Special concern according to the Ontario Species at Risk list: Peregrine Falcon (*Falco peregrinus*), Common Nighthawk (*Chordeiles minor*), Eastern Wood-Pewee (*Contopus virens*), Bald Eagle (*Haliaeetus leucocephalus*) and Wood Thrush (*Hylocichla mustelina*). Six are Threatened in Ontario: Chimney Swift (*Chaetura pelagica*), Barn Swallow (*Hirundo rustica*), Bank Swallow (*Riparia riparia*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*); and Least Bittern (*Ixobrychus exilis*). There are two endangered species, Red-headed Woodpecker (*Melanerpes erythrocephalus*) and Prothonotary Warbler (*Protonotaria citrea*), that have been identified in the atlas square but only with less than 10% probability of being in the area (Birds Canada, 2022).

PROJECT STUDY AREA

The proximity of the 1PSEPM Project site to the shoreline and key migratory corridors allowed many species of birds to use Project Study Area as a stopover to rest and wait out inclement conditions. This includes the mouth of the Credit River, the wharf and water basin to the east. Some existing buildings and structures at the marina and in Port Credit provide roosting and nesting habitat for some birds.

3.3.6. AMPHIBIANS

Amphibians are key ecological indicators as most spend a portion of their life in both aquatic and terrestrial habitats. Because of this dependency on multiple habitats amphibians are sensitive to ecological stressors and the quality of the ambient environment. Human disturbance, pollution, climate change, and alterations to the hydrologic cycle can have an impact on survival, health, and population size.

REGIONAL AND LOCAL STUDY AREAS

Observations indicate that the natural areas along Lake Ontario shoreline in the Regional Study Area contain seven species of frogs and toads: Green Frog, American Toad, Bullfrog, Wood Frog, Western Chorus Frog, Northern Spring Peeper, and Northern Leopard Frog. Many of these records are historic (greater than 20 years old), and the species are sensitive to urban pressures.

The Ontario Herpetology Atlas contains detailed information on the population and distribution status of Ontario and amphibians (Ontario Nature). The data are presented on 10km x 10 km squares. The data square that overlaps with the Project Study Area was used to determine the potential for amphibian species list for that area. It should be noted that the Project Study area is a small component of the overall herpetofauna atlas square, and therefore it is unlikely that all herpetofauna species are found within the Project Study Area. Habitat type, availability and size are all contributing factors in amphibian species presence and use.

A total of 14 species were recorded in the Ontario Herpetology Atlas in the atlas square (17PJ12) that overlaps with the Project Study Area. Of the 14 herpetofauna species reported in the Ontario Herpetology Atlas as being previously observed within the atlas square, seven species were observed since 2000. Of those seven species only Jefferson Salamander (*Ambystoma jeffersonianum*) is listed as Endangered in Ontario (Government of Ontario, 2022).

Salamander diversity and abundance within the Regional Study Area is low. The most common salamander species is the Red-backed salamander although records of Yellow-spotted Salamander and Jefferson's Salamander exist for the area. The Red-backed salamander is a completely terrestrial species; all other salamanders in the Regional Study Area require wetland habitat to complete a portion of their lifecycle. The relative paucity of other salamander observations in the Regional Study Area may speak to the lack of suitable habitat (i.e., vernal pools, forested wetlands) across the landscape.

PROJECT STUDY AREA

There is no suitable breeding habitat for forest and wetland breeding in the Project Study Area.

3.3.7. REPTILES

REGIONAL, LOCAL AND PROJECT STUDY AREAS

Reptile populations in the larger Lake Ontario shoreline area have not been studied in-depth. Within the larger coastal wetland communities of Rattray Marsh Conservation Area and the Credit River Marshes, turtle observations are common. Similarly, water snake observations are common at the Credit Village Marina. However, it is unknown the extent to which these populations move along the Lake Ontario shoreline. For example, turtles often fare poorly in urban environments, where habitat is limited and fragmented, and encounters with humans are frequent.

The Ontario Herpetology Atlas contains detailed information on the population and distribution status of Ontario reptiles (Ontario Nature). The data are presented on 10km x 10 km squares. The data square that overlaps with the Project Study Areas was used to determine the potential for reptile species list for that area. It should be noted that the Project Study Area is a small component of the overall herpetofauna atlas square, and therefore it is unlikely that all herpetofauna species are found within the Project Study area. Habitat type, availability and size are all contributing factors in reptile species presence and use.

A total of 12 species were recorded in the Ontario Herpetology Atlas in the atlas square (17PJ12) that overlaps with the Project Study area. Of the 12 herpetofauna species reported in the Ontario Herpetology Atlas as being previously observed within the atlas square, eight species were observed since 2000. Of those eight species, three are listed on Ontario's endangered species act: one is Threatened, Blanding's Turtle (*Emydoidea blandingil*); two are Special Concern, Snapping Turtle (*Chelydra serpentine*) and Northern Map Turtle (*Graptemys geographica*) (Government of Ontario, 2022).

3.3.8. INSECTS

The Ontario Insect Atlas contains detailed information on the population and distribution status of Ontario insects. The data is presented on 10 km x 10 km squares. The data square that overlaps with the Project Study Area was used to determine the potential insect species list for that area. Habitat type, availability and size are all contributing factors in insect species presence and use.

A total of 62 species were recorded in the Ontario Insect Atlas as previously being observed within the atlas square (17PJ12) that overlaps with the Project Study area, 50 of which were last seen since 2000. Of the 50 species, two are considered Species at Risk: Monarch (*Danaus plexippus*), listed as a Special Concern species in Ontario and the Mottled duskwing (*Erynnis martialis*), listed as Endangered (Ontario Nature, 2021).

PROJECT STUDY AREA

Milkweed (*Asclepias syriaca*) is a host breeding plant for Monarch. There is no suitable breeding habitat for Monarchs in the Project Study Area.

3.3.9. MAMMALS

REGIONAL AND THE LOCAL STUDY AREA

There has been no comprehensive study for mammals within the Regional Study Area. Many mammals are secretive and difficult to capture and are thus underreported. Common mammals occur within the Regional Study Area. Some less common species such as Red Squirrel and Eastern Chipmunk indicate that some larger habitat patches supporting area- sensitive species exist. Other mammals such as American Mink, Beaver and Muskrat indicate the importance of the shoreline area to species that make use of both terrestrial and wetland communities. Natural areas along the lakeshore and along the Credit River and Lake Ontario tributary creeks are important for the movement of these species and their ability to find adequate resources for food and shelter.

PROJECT STUDY AREA

Eleven mammal species are known to use the Project Study Area for all or some of their life cycle. These species are typical of urban areas and include the Eastern Gray Squirrel, Eastern Chipmunk, Raccoon, and Muskrat.

3.4. SOCIO-ECONOMIC ENVIRONMENT

3.4.1. LAND USE

The land use descriptions in this section are based on the Mississauga Official Plan, 2011. Mississauga Official Plan consists of a principal document and a series of local area plans. Official Plan policies for lands within the Port Credit Community Node and Port Credit neighbourhoods are contained in the Port Credit Local Area Plan (the Area Plan). In conjunction with the Mississauga Official Plan, the Area Plan provides policies for lands in south central Mississauga to guide land use development.

3.4.2. EXISTING LAND USE

LOCAL STUDY AREA

Existing land uses within the Local Study Area are residential, commercial, industrial, institutional, and open space/greenbelt (City of Mississauga, 2012). Port Credit is generally a stable area with a distinct community identity, with a focus on the Lake Ontario waterfront, the harbour and its heritage. The community is anchored by established residential areas at the eastern and western parts of the community and is served primarily by a commercial corridor along Lakeshore Road. Port Credit's heritage can be found in the unique buildings in and around the harbour area and the Lakeshore Road commercial areas. Port Credit's location makes the community a focal point of residential, commercial, open space and tourism and recreation activity on the Mississauga waterfront.

In 2021, the population in the City of Mississauga was 793,634; an increase of approximately 9% from 2016 (i.e., 721,599). The Port Credit BIA listed that the population of the main street and trade area of Port Credit was 27,430 people in 2021 (Environics Analytics, 2022).

Residential development consists of a combination of dwelling types and forms. High-density areas are centrally located near the Port Credit GO Station, medium and high-density development along Lakeshore Road, as well as low density areas characterized by tree-lined streets in grid patterns. Lakeshore Road has a "main street" commercial character with onstreet parking and sidewalks accommodating active pedestrian use. The street is framed by one- to two-storey buildings with small storefront shops. Small-scale industrial and commercial uses exist south of the Canadian National Railway tracks along Queen Street and Queen Street West. Most of the lands in the area are developed except for the Brightwater lands (formerly Imperial Oil) west of Mississauga Road South, which are being developed for mixed-use. Several commercial areas are located along Queen Street and Queen Street West, south of the CN Railway. Other uses along the Port Credit waterfront include a working harbour, fishing, boating and marine services.

3.4.3. FUTURE LAND USE

LOCAL AND PROJECT STUDY AREAS

The land use designations in Port Credit are shown in Figure 3.10 as per Mississauga's Official Plan. This plan describes the future development of Port Credit as an "urban waterfront village", based on the principles of a mixture of land uses, a variety of densities, pedestrian and cycling friendly infrastructure, transit and supportive urban forms, a significant public realm, and public access to the waterfront.

As part of Inspiration Port Credit, the City worked with the community and stakeholders to create the 1 Port Street East Comprehensive Master Plan. The draft Port Credit Local Area Plan identified the site as having potential as a mixed use, water-related development that takes advantage of the site's location in downtown Port Credit and on the lake. The master plan detailed a vision for the entire 1 Port Street East site that ultimately set out permitted uses, densities, heights and building forms as detailed in the Official Plan Amendment (City of Mississauga, 2017).

Figure 3.10: Local Area Plan Land Use Designations



3. Roads shown on this schedule are existing or under construction and are shown for information purposes only. For future roads refer to Schedule 5, Long Term Road Network.

SHOREPLAN

3.4.4. RECREATION

REGIONAL AND LOCAL STUDY AREAS

The nearshore areas of Lake Ontario and the Credit River in the City of Mississauga are prime locations for recreational boating, canoeing and kayaking. Currently there are three marinas along the waterfront in Mississauga – Lakefront Promenade Marina, Credit Village Marina, and the Port Credit Harbour Marina. Marine uses within and in the vicinity of the marinas include motor boating, boat launching, shoreline and boat-based fishing, canoeing, and kayaking.

Centre City Capital Limited operates the PCHM through a lease with Canada Lands, the owner of a portion of the property. Centre City Capital Limited has operated the marina since 1978. Centre City Capital Limited sub-leases space to several businesses complementary to marine use.

PCHM is one of the largest privately-operated full-service marinas on the GTA Lake Ontario shoreline. The depth of water in the marina basin, one of the deepest on the north shore, allows the marina to accommodate boats up to 75 feet in length. The number of slips operated within the existing marina basin has fluctuated over time. The marina caters to seasonal and transient boaters, charter fishing boats, and liveaboards.

Port Credit is also the go-to spot for fishing enthusiasts throughout the GTA and is home to several fishing charter companies. Every summer on the shores of Lake Ontario, the annual Great Ontario Salmon Derby, North America's largest freshwater fishing derby, takes place for a six-week period in July and August. Over a 50-day period, the derby has had an estimated 21,000 people annually. The event attracts fishermen from all over the world and is an important tourist attraction to the City.

A number of waterfront parks are located within the Local Study Area, with the nearest parks to the 1PSEPM Project site:

- St. Lawrence Park is located along St. Lawrence Drive immediately to the east of the 1PSEPM Project site. This is a passive waterfront park with water's edge seating, views to the lake, gathering areas and the waterfront trail.
- Tall Oaks Park is located east of St. Lawrence Park and the 1PSEPM Project site at the foot of Elmwood Avenue South. As the name suggests, it is heavily wooded with old and large trees.

- Port Credit Memorial Park is located along the Credit River north of Lakeshore Road. It is a place to enjoy river activities and explore the area's history related to the Credit River. The park includes a water's edge walkway with seating and views to the river, active recreation opportunities, picnicking, trails and gathering areas. Many of the City's festivals are hosted at Port Credit Memorial Park. The Port Credit library is located within the park and the Port Credit Memorial Arena is located adjacent to the park. The portion of Port Credit Memorial Park that is located on the west side of the river will be redeveloped to include a river promenade with access to lookout points and fishing areas, small civic space to encourage opportunities to watch rowing and canoeing, enhanced coastal edge, parking, and improved streetscape. Marina Park is located along the Credit River's west edge south of Lakeshore Road and serves as an important connection to J.C. Saddington Park. Marina Park will be redeveloped to include a river promenade with passive seating and gathering areas, and lookout points, launch ramps for motorized and non-motorized boats, flexible parking and multi-use event space, car and trailer parking, charter boat area, walkway connections, small pockets of open green space and trees, and improved shoreline.
- Vimy Park, located on Stavebank Road north of Lakeshore Road, annually hosts Remembrance Day ceremonies and contains The Port Credit Cenotaph. Park improvements have been proposed that will be in keeping with the site's heritage significance, increase accessibility and enhance space for local events and commemorative ceremonies. Improvements will include:
 - o New walkways and upgrades to existing connections
 - o New site furnishings such as benches
 - o Pedestrian lighting improvements
 - o Enhancements to existing planting
 - o Expansion of the existing plaza for events
- J.C. Saddington Park is located on the west shore of the Credit River. It is a destination park and includes the waterfront trail, a park pavilion, parking, picnicking, water's edge seating and views to the lake.
- J.J. Plaus Park is located on Stavebank Road South, west of the 1PSEPM Project site. This is a small riverfront park with water's edge seating, the waterfront trail, views to the lake, a restaurant, the public Credit Village Marina and a surface parking area.

The Waterfront Trail runs throughout the Regional and Local Study Areas. The Mississauga section of the Waterfront Trail stretches from the Waterfront Harding Estate in the west to the future Jim Tovey Lakeview Conservation Area in the east. Through Port Credit, the trail is on paved asphalt through parks, with some portions aligned along residential streets. Currently, the 1 Port Street East site is a missing link in the Waterfront Trail network.

The City's Waterfront Parks Strategy Refresh (Dillon Consulting, 2019) identified the following overarching priorities that are relevant to the 1PSEPM Project:

- Establish new waterfront parks concurrent with the Inspiration community redevelopments.
- Strengthen the cohesiveness of the waterfront parks system while acknowledging the unique character of each park.
- Expand water-based recreational activities.
- Expand support facilities (picnic and shade) and amenities (food and rentals) to enhance the visitor experience.
- Improve views and visibility to Lake Ontario.
- Protect, enhance and expand the protection of sensitive and/or natural features while maintaining views and visibility to Lake Ontario and the Credit River.
- Expand parkland securement through acquisition, land conveyance, public private partnerships; land easements and/or protection agreements for shoreline access.
- Ensure high quality designs and maintenance of public spaces, including public recreational marina facilities.

The strategy acknowledges that opportunities for shore fishing are essential along the lake and encourages the provision of safe and accessible locations for angling purposes.

PROJECT STUDY AREA

The Project Study Area includes a portion of the 1 Port Street East property, inclusive of the water lot, located in Port Credit, Mississauga, at the mouth of the Credit River. As such there are no official recreational areas within the Project Study Area. The Waterfront Trail runs along the south side of Port Street adjacent to the 1PSEPM Project site.

3.4.5. VISUAL AND AESTHETICS

The Port Credit Local Area Plan (City of Mississauga, 2021) contains many provisions intended to protect views of Lake Ontario from Port Credit. Providing views towards Lake Ontario respects Port Credit's identity as a waterfront community. Provision of public access to the waterfront and protection of views to Lake Ontario are important components of Port Credit. Figure 3.11 illustrates areas of Port Credit that currently have views of Lake Ontario and are considered important for preservation by the City (City of Mississauga, 2021)





The most prominent and direct views of the Project Study Area are from two multilevel hotels, and condominium residences facing the lake along Port Street and St. Lawrence Drive. St. Lawrence Park includes a gazebo that directly faces the existing breakwater and boasts open water views of Lake Ontario. More distant views of Lake Ontario and the Project Study Area are possible from multi-storey residential building north of Lakeshore Road West, at the intersection of Lakeshore Road and Hurontario Street, and west of the Credit River along Front Street South.

Currently, land-based "open lake views" (or vistas) from the Project Study Area to Lake Ontario are partially screening by perimeter vegetation and limited as public access to the Project Study Area is restricted.

Direct and prominent views of the site exist from the east side to the wharf at the PCHM. Direct and prominent views of the 1PSEPM Project site also exist from Lake Ontario.

3.4.6. TRAFFIC AND TRANSPORTATION

LOCAL STUDY AREA

Port Credit is served by four major corridors: Lakeshore Road which runs east-west through Port Credit, Mississauga Road which runs north from Lakeshore Road, the Queen Elizabeth Way (QEW) highway, and Hurontario Street, which runs north from central Port Credit. All roads in the Local Study Area are under the jurisdiction of the City of Mississauga, with the nearest regional arterial road being Cawthra Road to the east of Hurontario Street.

Lakeshore Road is an east-west major arterial roadway that extends through the entirety of the City of Mississauga, providing connections to the QEW at Mississauga Road and Hurontario Street. As Lakeshore Road is the only continuous east-west roadway link south of the QEW, it is important to allow for efficient movement of goods for primary and secondary truck trip generators in the Local and Regional Study Areas.

In Port Credit, Lakeshore Road West becomes Lakeshore Road East at the Credit River, Lakeshore Road operates with four travel lanes with a posted speed limit of 50 km/h, and with lay-by parking on both sides of the street. Lakeshore Road West has signalized intersections with Mississauga Road. Lakeshore Road East has signalized intersections at Stavebank Road, Elizabeth Street, Helene Street and Hurontario Street.

Traffic conditions along the Lakeshore Road corridor can become congested, particularly on left turn movements at signalized intersections, during the weekday peak hours due to the relatively high traffic volumes carried during these periods (BA Consulting Group Ltd., 2017). During the AM peak hour, Lakeshore Road at the Credit River and Hurontario crossings are congested in the eastbound direction. During the PM peak hour, the Credit River crossing is congested in both directions. At the intersection level, there are existing operational issues at Stavebank Road and Mississauga Road (HDR, 2019). Truck volumes are relatively consistent along Lakeshore Road through most of Port Credit, generally ranging between 50 – 175 vehicles during peak hours. Recent construction Projects along Lakeshore Road and the Hurontario LRT line have contributed to growing congestion in the short term with additional trucks utilizing Lakeshore Road for access to construction sites.

In the future (2041 horizon), predicted auto volumes along Lakeshore Road were Projected to reach approximately 2,730 vehicles per hour in the westbound direction (PM peak hour peak direction) across the Credit River on Lakeshore Road. This volume exceeds capacity (approximately 2,000 vehicles per hour per direction). This demand is a result of the expended growth in the Lakeshore Road corridor that is expected to grow by approximately 56,000 people and 16,500 jobs between 2011 and 2041. Much of this growth will be focused in

Port Credit (i.e., new developments at 70 Mississauga Road, 1 Port Street, Port Credit GO Station area, and the Lakeview Employment Area) (HDR, 2019).

In general, all parking types (e.g., on-street, off-street and layby) are utilized more during weekdays than on weekends. Public on-street parking is most utilized in Port Credit area between Hurontario Street to Mississauga Road, whereas public off-street parking is also highly utilized in Port Credit. Layby parking is highly utilized in the Port Credit (75% on weekdays); therefore, there is a need to maintain layby parking (HDR, 2019). There are three public parking locations within the areas of Port Credit nearest the Project site: Stavebank Road south with 109 spaces, 26 Lakeshore Road East (Port Credit Library) with 158 spaces and 80 Port Street parking garage with 43 spaces. Additionally, there are private parking lots and street parking available.

The Port Credit Local Area Plan includes a detailed section on how the development of the Port Credit area would support the creation of a "Multi-Modal City". For development sites, the Plan gives direction that traffic should be directed towards signalized intersections and vehicular turning movements consolidated at other locations.

PROJECT STUDY AREA

Access to the 1PSEPM Project site is via Port Street. This is an east-west minor collector road under the jurisdiction of the City of Mississauga that runs between Stavebank Road and Hurontario Street. Port Street has a two-lane cross-section and a posted speed limit of 40 km/h, with parking permitted on both sides of the street. Helene Street runs perpendicular to Port Street between Lakeshore Road and the Project site. It has a two-lane cross-section and a posted speed limit of 40 km/h, with parking permitted on both sides of the street.

3.4.7. BUSINESS ACTIVITY

LOCAL STUDY AREA

Port Credit is a unique hub for shopping, events, music and activities on the waterfront. It has a wide array of restaurants, retail stores, business offices all within walking distance from the Credit River or from Lake Ontario. Most of these businesses are located along Lakeshore Road. Two hotels are located across from the PCHM on Stavebank Road, the Ports Hotel and the Waterside Inn.

PCHM is one of the largest privately-operated full-service marinas on the GTA's lakefront and includes marina-related businesses. At present, the PCHM offers the following amenities:

- Approximately 470 slips;
- Seasonal docking, storage, including Indoor storage;
- 35 Ton travel Lift (all year);
- Washroom facilities and laundry;
- Fenced property with restricted access;
- Marine store, canvas & boat top repairs, boat cleaning tenant businesses; and
- New & brokerage boat sales tenant businesses (Port Credit Harbour Marina, 2022).

3.4.8. COMMERCIAL FISHING

REGIONAL AND LOCAL STUDY AREAS

Ontario's commercial fisheries contribute millions of dollars to the province's economy every year. The Ministry of Natural Resources and Forestry (MNRF) sets annual quotas and issues annual licences for the commercial harvest of fish, primarily in the Great Lakes. More than 500 active commercial fishing licences are held in Ontario. Lake Ontario has the smallest commercial fishery of all the Great Lakes. Harvested species include Yellow Perch, Lake Whitefish, Bullhead, and American Eel. Vessels used in Lake Ontario's commercial fishing industry are primarily steel built fish tugs built in the mid-1900s. The modern harvesting techniques used by the commercial fishing industry in Lake Ontario are primarily gill netting, trap netting and trawling. Fish monitoring trawl sites exist offshore from Port Credit (Canadian Seabed Research , 2017).

3.5. INDIGENOUS COMMUNITIES

The Project Study Area is located in the unceded territory of Lake Ontario which is currently under a Water Claim by the Mississaugas of the Credit First Nation (MCFN). The lands immediately adjacent to the study area are formerly the Reserve of the MCFN. There are no current Reserve lands within the regional, local or Project Study Area.

3.5.1. MISSISSAUGAS OF THE CREDIT FIRST NATION

Several Indigenous communities have an interest in the lands and waters in the Port Credit area. MCFN have the most direct interest in the lands and waters in the Project and Local Study Areas, the lakebed and the waters of Lake Ontario. They are a Mississauga Ojibwa First Nation.

The Anishinaabe, sometimes known as the Objibwa and ancestors to all Mississaugas, occupied the lands north of Lake Superior and the area around Georgian Bay. They controlled and exercised stewardship over approximately 3.9 million acres of lands, waters, and resources in Southern Ontario. Their territory extended from the Rouge River Valley westward across to the headwaters of the Thames River, down to Long Point on Lake Erie and then followed the shoreline of Lake Erie, the Niagara River, and Lake Ontario until arriving back at the Rouge River Valley (Mississauga of the Credit, n/d). The American revolution and the events that followed had a profound effect for the MCFN. Between 1781 and 1820, MCFN entered into a number of treaties with the Crown that reflected the Crown's understanding of ownership and title to the lands and waters of their traditional territory.

By 1820, only 200 acres on the Credit River were all that remained of the 3.9 million acre territory. The remaining members settled in a small mission village on the banks of the Credit River, where they were able to cultivate some land and grow their economy based on agricultural pursuits, but continued to exercise established treaty rights (e.g., hunting, fishing, gathering etc.). Over the years and throughout various treaty negotiations, MCFN ancestors stressed the importance of the rivers, lakes, and waters to MCFN.

Today, the First Nation governs the 2,392.6-hectare parcel of New Credit 40A Indian Reserve known as Reserve 40B near Hagersville, Ontario. This reserve is located near the Six Nations of the Grand River in Brantford. Although their community is concentrated on this reserve, the MCFN's relationship to their traditional territory remains central to their identity as a people. They have strong beliefs that they have been entrusted with the stewardship and care of the lands, waters, and resources by the Creator. The MCFN consider this to be a sacred trust that lies at the heart of who they are and is foundational to their responsibility to future generations.

The MCFN made claims to land on which the City of Mississauga is founded through the disputed Toronto Purchase of 1787. In 2010, the Government of Canada agreed to compensation for the lands, based on the ancient value of the land, extrapolated to current dollars.

In 2016 the MCFN filed an Aboriginal Title Claim to Waters within the Traditional Lands of the Mississaugas of the Credit. The First Nation continues to revere water as a spiritual being that must be accorded respect and dignity. Water is vital to the survival of the MCFN and all other forms of life. The MCFN assert that they have unextinguished Aboriginal title to all water, beds of water, and floodplains contained in their treaty lands and territory.

Other Indigenous communities with known or suspected historical occupation of the Local and Project Study Areas are the Six Nations of the Grand River as represented by the Elected Chief and Council and the Haudenosaunee Confederacy Chiefs Council, and the Huron Wendat Nation. Other Indigenous communities and organizations (e.g., Métis Nation of Ontario, Indigenous Network) may also have an interest in the EA.

3.5.2. HURON WENDAT NATION

The term "Wendake Sud", represents the ancestral territory of the Huron-Wendat Nation in Ontario. The Huron-Wendat Nation stretches from Lake Nipissing in the north to Lake Ontario in the south and Île Perrot in the east to the vicinity of Owen Sound in the west. Formerly occupied by more than 100,000 Huron-Wendat, this territory is today marked by archaeological sites which bear witness to this strong occupation of the territory (Huron-Wendat Nation, 2022).

3.5.3. SIX NATIONS OF THE GRAND RIVER

Six Nations of the Grand River, Ontario, is the common name for both a reserve and a Haudenosaunee First Nation. The Six Nations are the Mohawk, Seneca, Oneida, Cayuga, Onondaga and Tuscarora nations. Six Nations is the largest First Nation reserve in Canada by population, and the second largest by size. The Six Nations reserve is bordered by the County of Brant, Norfolk County, and Haldimand County. There are several individual communities within the reserve, the largest of which is Oshweken (Government of Ontario, 2021).

3.5.4. HAUDENOSAUNEE CONFEDERACY CHIEFS COUNCIL

There are six nations that make up the Haudenosaunee Confederacy. These are the Mohawks, Oneidas, Onondagas, Cayugas, Senecas, and the Tuscororas. Members of individual nations within the confederacy may live off-reserve or in reserve communities in Canada and the United States. Six Nations of the Grand River is a reserve where all six members of the Haudenosaunee are represented. In 1924, the federal government imposed an elected Council structure under the *Indian Act*; however, the traditional Council model continues to function in opposition to this model.

The Haudenosaunee Grand Council of Chiefs continues to meet and direct national Haudenosaunee policies (Haudenosaunee Confederacy, 2022). The Haudenosaunee Confederacy Chiefs Council has legislated the Haudenosaunee Development Institute (HDI) to represent HCCC their interests in the development of lands within areas of Haudenosaunee jurisdiction, including but not limited to the land prescribed by the Haldimand Proclamation and the 1701 Treaty Area. HDI has established and administers a regulatory framework which identifies, registers, and regulates development in compliance with several regulatory obligations including the Haudenosaunee Green Plan (HGP) and the Haudenosaunee Development Protocol (HDP). HDI is also charged with ensuring that the perpetual care and maintenance of the Haudenosaunee is maintained with respect to Haudenosaunee interests.

3.6. CULTURAL ENVIRONMENT

3.6.1. REGIONAL AND LOCAL STUDY AREAS

The Regional and Local Study Areas have a long history of human use and settlement since time immemorial and continuing through to the present- day industrial uses and parkland. Portions of this area would originally have had a very high potential for Indigenous community sites of the pre-contact and post-contact periods. Remnants of these past occupations have been found in abundance along the Credit River, however the vast majority of them have been destroyed due to modern-day development and urbanization. Extensive lake filling and dredging activities were the primary disturbances within and adjacent to the Project Study Area.

In 1988, the City of Mississauga defined by by-law Old Port Credit village south of Lakeshore Road West on the west side of the Credit River as an area to be examined for possible future designation as a heritage conservation district. In 2004, the City enacted the Old Port Credit Village Heritage Conservation District (HCD) Plan. This plan guides physical changes to the area over time to ensure that modifications contribute to the area's special character. The area to which the HCD Plan applies was one of the topics examined through a 2017 update process regarding the District. Among the updates made, the HCD Plan was refined such that the eastern boundary of the District encompasses the entire Credit River, as well as the City-owned property located on the northeast side of the harbour.
3.6.2. PROJECT STUDY AREA ARCHEOLOGICAL IN-WATER ASSESSMENT

In the summer of 2019, a marine archaeological in-water assessment and background research were undertaken at the 1PSEPM Project site. Side scan sonar and magnetometer were used to investigate the area, and any targets found using these methodologies were further investigated using forward looking sonar (on a remote operated vehicle) and video. Background research indicated that the Project Study Area had been heavily modified via development, dredging, redevelopment and additional periodic dredging.

Only one target was found during the marine archaeological survey. This target consisted of at least two very large metal frames with uprights in some places and cut rectangular holes. This target lay immediately adjacent to the Ridgetown. Examination confirmed that the Ridgetown was not lying on any part of the target. Given that the area of the Ridgetown was dredged prior to its being positioned as a breakwater, it is unlikely that the target was in this location at that time. It is possible that the development of this breakwater (Ridgetown) may have had materials associated with the development that were discarded after its completion. This is not any type of structure that could have been transported by any natural means, and only by intentional disposition. No additional cultural targets were located, and the remaining area of the marine archaeological survey is considered clear of cultural/archaeological concerns.

4. EVALUATION AND RATIONALE FOR 'ALTERNATIVES TO' THE UNDERTAKING

4.1. DESCRIPTION OF 'ALTERNATIVES TO' THE UNDERTAKING

The Ontario EA Act requires the identification and evaluation of 'Alternatives To' the undertaking, including the consideration of the "Do Nothing" alternative. 'Alternatives To' the undertaking are defined as different ways to solve the identified problem or address the identified opportunity. The 1PSEPM Project is an opportunity to move forward with the implementation of the City-approved 1 Port Street East Comprehensive Master Plan and ensure the continuation of the site's historic marina function, which is key to the cultural identity of Mississauga and the Port Credit community.

Various planning studies undertaken with significant public and stakeholder engagement looked at the long-term vision for this part of Port Credit. It was clear that the community wanted to keep the marina in Port Credit and the deep-water harbour at this location was considered an asset that gave this site a unique advantage over any other. Following extensive study, including a Marina Business Case (2015), 1 Port Street East Comprehensive Master Plan (2016) and Official Plan Amendment (2017), which were approved by City Council, the City identified that a marina was most appropriate on the lands between Elizabeth and Helene Street, an expanded eastern breakwater, and the entire waterlot. The existing harbour basin is a natural location for a marina and the costs associated with creating a harbour basin in other locations would be prohibitive. Based on the previous studies, Canada Lands, the owners of the 1 Port Street East site, executed an agreement for a phased transfer of the breakwater, 2 acres of land, and the deep-water harbour to the City for the purposes of developing a marina on the eastern portion of this site. Therefore, alternative sites for a new marina outside of Port Credit have not been considered and the City's intention has consistently been to explore replacing the marina services and facilities within the existing basin.

A marina at this site supports Port Credit's cultural heritage and character, as this site has historically accommodated marine functions due to the protected harbour basin. For these reasons no additional sites along the Mississauga waterfront were assessed as alternatives and focus has been placed on the expansion of the land base along the breakwater at the 1 Port

Street East site to permit relocation of the marina and associated operations. The 'Alternatives To' that are subject to evaluation are defined as:

- 1. Do nothing. This alternative will not create additional parkland or preserve a future public marina function at the site. The second conveyance of land and water lot from Canada Lands to the City would not take place, leaving the development of the entire property at the discretion of the Canada Lands.
- 2. Create a new land base. This alternative involves creating a new land base around the eastern breakwater that would allow for the establishment of a new marina and additional parkland in accordance with the City's approved 1 Port Street East Comprehensive Master Plan. To a large extent, the location and extent of filling will determine what can be created or constructed on this new land base.

4.2. EVALUATION OF 'ALTERNATIVES TO' THE UNDERTAKING

These 'Alternatives To' are evaluated in a qualitative manner in Table 4.1 in terms of their environmental effects and their main advantages and disadvantages with respect to their ability to address the 1PSEPM Project 'problem' and 'opportunity'. An overall rationale for the selection of the 'Alternative To' that will be carried forward to the development of 'Alternative Methods' based on net effects, advantages, and disadvantages.

Table 4.1:Evaluation of Alternatives to the Undertaking

Environmental Component	Criteria	Do Nothing	Create a New Land Base
	Resiliency to changing lake levels and coastal processes	The long-term integrity of the existing pier and the eastern breakwater will continue to be at risk from changing lake levels and coastal processes	A new land base can be designed with sufficient flexibility with respect to changing coastal processes and lake levels to ensure its the long-term integrity and wharf protection.
Physical Environment	Effects on water quality in the Local Study Area	Until the commencement of construction on the wharf, there is no potential for changes to water quality	Construction will result in temporary increased turbidity from lakefilling. Mitigation is available to minimize adverse effects.
	Potential for disturbance of contaminated soils	Until the commencement of construction on the wharf, there is no potential for disturbance of contaminated soils	Construction has the potential to disturb contaminated soil. Mitigation is available to minimize adverse effects.
Atmospheric Environment	Change to air quality	Until the commencement of construction on the wharf, there is no potential for changes to air quality	Dust from construction activities, trucks hauling fill and emissions from construction equipment may be sources of nuisance effects. Mitigation is available to minimize adverse effects.
	Changes to ambient noise conditions	Until the commencement of construction on the wharf, there is no potential for change in noise levels	Noise from construction activities and trucks hauling fill may be sources of nuisance effects. Mitigation is available to minimize adverse effects.
		Until the commencement of construction on the wharf, there is no potential for loss or disturbance of terrestrial habitat	Some existing vegetation on the existing property and eastern breakwater would be lost and/or disturbed. Mitigation will is available to minimize adverse effects.
Biological Environment	Area and quality of terrestrial habitat	Any development of the wharf and the water basin to the east of the wharf will be at the discretion of the Canada Lands. No potential for improvement to terrestrial habitat on property owned by the City.	Creating a new land base offers opportunities to improve terrestrial habitat and enhance migratory bird habitat and habitat connectivity through new plantings.

Environmental Component	Criteria	Do Nothing	Create a New Land Base	
		Until commencement of construction on the wharf, there is no potential for effects on aquatic habitat	Although lakefilling activities may cover some existing low-quality aquatic habitat, this alternative provides the opportunity to create better habitat conditions.	
	Area and quality of aquatic habitat	Until the commencement of construction on the wharf, there is no compensation required with respect to fish habitat.	Removal of existing aquatic habitat will likely require an authorization under the Fisheries Act, and habitat compensation will be stipulated under this authorization in order to meet the Habitat Policy Guiding principle of "No Net Loss". A new land base can be designed so that it is self-compensating, so that the creation of new aquatic habitat as part of Project design will compensate for the removal of existing aquatic habitat.	
	Potential to maintain or improve connections for aquatic species	Existing connections for aquatic species are maintained. No opportunities to improve connections for aquatic species.	A new land base with enhanced aquatic habitat may maintain or improve the ability of aquatic species to move within the nearshore areas and upstream in the Credit River.	
Socio- economic Environment	Area of open space or park land created	Without the conveyance of additional land and water lot from Canada Lands to the City, no additional land base is created such that it can be made available for public amenities, parks and trails. Any parkland would be limited to the wharf development and not guaranteed.	Creating a new land base offers opportunities to establish parkland that support passive recreational activities for visitors and residents of the City of Mississauga and beyond.	
	Potential for changes to use of waterfront for recreation	Any development of the wharf and the water basin to the east of the wharf will be at the discretion of Canada Lands. This development may change the use of the waterfront for recreation.	Creating a new land base will change how the public use and access the site. Changes in activities should be compatible with activities associated with the marina and marina activities to avoid conflict.	

Environmental Component	Criteria	Do Nothing	Create a New Land Base
	Potential for change to navigation	Any development of the wharf and the water basin to the east of the wharf will be at the discretion of the Canada Lands. Changes to navigation are not likely.	The placement of lakefill may alter navigation patterns in the harbour basin and on the eastern side of the pier during construction. Safe navigation will be maintained during the establishment phase.
	Disruption to use and enjoyment of property during construction and establishment	Until the commencement of construction at the wharf, there is no potential for disruption to use and enjoyment of residential properties, community facilities and institutions.	Construction activities may produce temporary nuisance effects that can disrupt people's use and enjoyment of their property, community facilities and institutions. Mitigation is available to minimize adverse effects.
	Changes in community character	The ultimate loss of marina functions along the waterfront will result in irreversible harm to the unique character of Port Credit.	Creating a new land base offers the opportunity to maintain marina functions along the waterfront and the unique character of Port Credit. The presence of new recreational and commercial land uses has the potential to enhance community character.
	Effects on business operations during construction and establishment	The ultimate loss of marina functions at the 1 Port Street East site will result in adverse effects on business operations. No potential for generating positive effects to business operations. Existing businesses might cease operations and jobs could be lost.	Creating a new land base offers the opportunity to maintain marina functions along the waterfront and maintain numerous full-time and part-time marine- related jobs and business operations. Construction and establishment activities will produce temporary nuisance effects that may result in short-term disruption to business operations. Mitigation is available to minimize adverse effects. Construction and establishment activities will generate business opportunities to improve business activity and enhance operations.
Cultural Environment	Potential for displacement of marine- and land- based archaeological resources, and built heritage resources due to construction	Until the commencement of construction of the wharf, there is no potential for effects on cultural heritage value of built heritage resources and cultural heritage landscapes	Construction has the potential for the displacement of unknown archaeological resources onshore and in the lake. A new land base would create a new feature that can be integrated with the cultural landscape of Port Credit's shoreline.

Environmental Component	Criteria	Do Nothing	Create a New Land Base	
	Potential for effect from construction and operations on traditional uses of lands by Indigenous communities	No potential effects on traditional uses of lands and waters	A new land base must allow for the use of lands and waters by Indigenous communities.	
Cost	Capital and Costs	Avoids the capital costs of new construction.	A new land base will require funding for construction.	
	Maintenance and Repair Costs	Costs for ongoing maintenance and repairs for the existing breakwater.	A new land base will require funding for maintenance and repairs.	

The 'do nothing' alternative does not create a new land base that would allow for the protection and development of a new marina. Therefore, this alternative does not meet the purpose of the 1PSEPM Project. There are no clear advantages to this alternative other than the avoidance of new construction costs and adverse environmental effects on various environmental components during construction. The main disadvantages of the 'do nothing' alternative are:

- Doing nothing would stall the implementation of the City-approved 1 Port Street East Comprehensive Master Plan with respect to the continuation of the site's historic marina function, which is key to the cultural identity of the Port Credit community. The 'Do Nothing' alternative would forego the creation of new waterfront parkland, improved waterfront trail through this area, and improved aquatic and terrestrial habitat.
- The long-term integrity of the existing wharf and the eastern breakwater will continue to be at risk from changing lake levels and coastal processes. City costs for ongoing maintenance and repairs remain and may rise over time.

New land can be created through lakefilling to allow for the establishment of a marina and supporting facilities and infrastructure; provide public access to the waterfront, improvements to the waterfront trail system and new parkland at the 1 Port Street East site. The disadvantages of this alternative relate to its potential for adverse environmental effects on various environmental components during construction. Measures are available (e.g., traffic controls, dust management, noise abatement, spill management) to mitigate these adverse environmental impacts. The main advantages of this alternative are:

- Promotes the implementation of the City-approved 1 Port Street East Comprehensive Master Plan with respect to the continuation of the site's historic marina function;
- Avoids the ultimate loss of marina functions at this site and its adverse effects on recreational boating, business operations and community character of Port Credit;
- A new land base can be designed with sufficient flexibility with respect to changing coastal processes and lake levels to ensure its long-term integrity; and
- Creating a new land base offers opportunities to enhance terrestrial and aquatic habitats and establish parkland that can support passive recreational activities for visitors and residents of Mississauga and beyond.

It is noteworthy that any development of the wharf will be at the discretion of the Canada Lands. The ultimate development of the existing wharf is likely to create nuisance effects like those associated with creating a new land base.

In conclusion, the "create a new land base" alternative has been carried forward to the development of 'Alternative Methods'.

5. DESCRIPTION, EVALUATION AND RATIONALE FOR 'ALTERNATIVE METHODS' OF CARRYING OUT THE UNDERTAKING

The following sections describe the iterative steps that were used in developing alternative 1PSEPM Project configurations ('Alternative Methods'). 'Alternative methods' are different ways of implementing the preferred 'Alternative to'. The alternatives were assessed as to their ability to achieve the purpose of the 1PSEPM Project. Criteria and indicators were used to assess the potential for adverse and positive environmental effects and reflected all components of the environment. For this Project, 'alternative methods' are different configurations of lakefill around the eastern breakwater.

5.1. METHODOLOGY

There is a four-step process that was outlined in the Terms of Reference, which is used to identify and evaluate the Alternative Methods:

- Step 1 Determination of Footprint for Alternatives.
- Step 2 Identification of Desired Design Elements; parkland, trail, marina elements.
- Step 3 Comparative Evaluation of Alternatives

Step 4 – Confirm and refine the Undertaking and complete the Detailed Assessment of the Preferred Alternative

5.1.1. STEP 1 – DETERMINATION OF FOOTPRINT FOR ALTERNATIVES

The first step in defining the alternative 1PSEPM Project configurations was to develop a range of footprints up to a maximum spatial extent. This range of footprints was determined through consideration of physical constraints.

The smaller the land base the fewer opportunities to provide a full range of marina services and public amenities. The larger the land base the greater the opportunity to provide a full range of marina services, increased public access, parkland and other amenities. The alternative footprints are defined below:

- Do Nothing
- Alternative 1: Small Lakefill Footprint (Figure 5.1)
- Alternative 2: Medium Lakefill Footprint (Figure 5.2)
- Alternative 3: Large Lakefill Footprint (Figure 5.3)

These alternatives are considered bounding, that is, the final land base and the final 1PSEPM Project configuration is likely to fall between these three distinct footprints in terms of size.



Figure 5.1: Alternative 1: Small Lakefill Footprint







Figure 5.3: Alternative 3: Large Lakefill Footprint

5.1.2. STEP 2 – IDENTIFICATION OF DESIRED DESIGN ELEMENTS

The footprint alternatives determined in Step 1 were further refined to include the key design elements listed below:

- The approximate number, locations and sizes of boating slips
- Marina services, including public parking, on-site winter boat storage
- Open space or parkland area, including trail connections and opportunities for recreation; opportunities to provide views of Lake Ontario and back to the City
- Aquatic and terrestrial habitat features

These design elements are conceptual in nature, allowing them to be evaluated, and could be subsequently implemented by the City in a flexible and adaptive manner. Major changes to these design elements following EA approval would be subject to an amendment procedure, review and approval by the MECP and other regulators as required. What might be considered a major change is considered in Chapter 10 of this EA.

5.1.3. STEP 3 – COMPARATIVE EVALUATION OF SHORT LIST OF ALTERNATIVES

The purpose of Step 3 was to evaluate the three alternatives and the "do nothing" alternative to identify a single (1) preferred alternative to be carried forward for more detailed development and assessment. This evaluation of alternatives was accomplished by establishing an order of preference between the three alternatives developed in Steps 1 and 2. The evaluation method used criteria and indicators to structure information and facilitate the comparison of alternatives against each other. The evaluation criteria and indicators were refined through consultation with a wide range of regulators, stakeholders, and members of the public.

The comparison of alternatives required the explicit consideration of trade-offs thereby keeping the more desirable attributes over those considered to be less desirable. The alternative identified as preferred at the end of Step 3 has the greatest potential to meet the Project need and provide the desired marina facilities and parkland and public access while minimizing effects associated with construction and establishment. The detailed assessment of the preferred alternative is presented in Step 4.

The Comparative evaluation of alternatives involved three tasks as detailed below:

- Refinement of comparative evaluation criteria and indictors originally presented in the ToR
- Assessment of effects; and
- Comparative evaluation to identify the preferred alternative.

The evaluation criteria and indicators used for the comparative evaluation were developed from the preliminary list of criteria and indicators presented in the approved ToR and refined by the City and consultant team based on information available about each alternative and review comments received from stakeholders including:

SHOREPLAN

- City of Mississauga;
- Credit Valley Conservation ;
- Canada Lands;
- The public;
- Interest and community groups;
- Indigenous communities; and
- Federal and provincial regulatory agencies.

In general, the data for the effects assessment were collected as part of baseline studies (see Chapter 3). Baseline data was used with the descriptions of the alternatives, and basic Project assumptions to determine how each alternative would potentially affect the environment. Some of these basic assumptions were:

- The construction techniques used to extend the land base are similar regardless of the size of the footprint.
- The duration of the Stage 1 construction period (i.e., lakefilling) will be approximately 3 months for the smallest footprint, 7 months for the medium footprint and 14 months for the largest footprint. The 14 month construction period may be discontinuous to accommodate allowable in-water work windows for fisheries as specified by approving agencies. Timing is also dependent on fill availability and weather conditions. These times are construction times for the lakefill and protection only and assume that protection is being implemented at the same time as the lakefill is proceeding. The assessment of construction related effects assumed that the construction schedule would be optimized to minimize disruption.
- Best Management Practices (BMPs) to mitigate construction effects would be implemented. While the effects assessment indicates that construction related disruption effects are likely to occur, in all cases these effects will be temporary and like the effects associated with infill development, road and infrastructure construction. The assessment of operation related effects recognizes that operational effects from marina services and from those using the marina will be like existing conditions or current operations of the marina.

This assessment resulted in a relative comparison of the alternatives for each criterion and indicator. For some of the criteria and indicators, the effects assessment concluded that there were no differences between any of the alternatives. These criteria and/or indicators were screened from the evaluation as they do not assist in decision-making. Table 5.1 details which criteria and/or indicators were screened from the evaluation.

Environmental Component	Criteria	Indicator(s)	Approach to Assessment	Screened/Used in Comparative Evaluation	Rationale for Screening of Criteria
Physical Environment	Resiliency of proposed lakefill to changing lake levels and coastal processes	Ability of proposed alternative to withstand changing lake levels (i.e., flooding hazards) and coastal processes (shoreline erosion) including future changes associated with climate change.	Professional judgement based on coastal process modeling	Screened	Each of the alternatives will be designed to be resilient. Each alternative requires repairs to the breakwater outside the fill area to provide additional resiliency. Therefore, same for all alternatives.
	Effects on surface water quality in the Local Study Area Changes to surface water quality from placement of fill (turbidity, etc.) and spills associated with construction equipment		Professional judgement based on past Project experience	Used in evaluation	The potential for changes to surface water quality is related to the size of the lakefill and location within the lake. Therefore, this criterion helps to differentiate between the alternatives.
	Potential for disturbance of contaminated soils	Area of contaminated soils to be managed/remediated for 1PSEPM Project	Comparison with existing conditions	Screened	Each of the alternatives has the same potential for disturbance of contaminated soils or sediments. Therefore, same for all alternatives.
	Ability to manage contaminated soils and groundwater	Ease of remediation/risk management	Comparison with existing conditions	Screened	Each of the alternatives has the same potential for disturbance of contaminated soils or sediments and will require similar remediation efforts (if required). Therefore, same for all alternatives.
	Risk to existing and future municipal drinking water	Changes in risks to municipal drinking water from Project activities.	Potential for use of groundwater as a source of drinking water. Comparison with proximity of water intakes.	Screened	Water intakes are not in proximity to the Project site and turbidity from fill placement will not likely extend beyond the Local Study Area Groundwater in the Local or Project Study Areas is not used as a source of drinking water. Therefore, same for all alternatives.

Table 5.1:Criteria and Indicators for Comparative Evaluation of Alternative Methods



Environmental Component	Criteria	Indicator(s)	Approach to Assessment	Screened/Used in Comparative Evaluation	Rationale for Screening of Criteria
Biological Environment		Total area of terrestrial habitat created, enhanced, disrupted, or lost	GIS measurement of areas and qualitative assessment of potential for change to terrestrial habitat	Used in comparative evaluation	Size of lakefill and Project design features will determine opportunities for habitat creation or enhancement; and potential for disruption or loss. Therefore, this criterion helps to differentiate between the alternatives.
	Area and quality of	Potential effects on terrestrial Species at Risk (SAR) and Significant Wildlife Habitat (SWH)	Qualitative assessment based on professional judgement	Screened	SAR habitat creation is not likely in a managed park environment. Therefore, same for all alternatives.
	terrestrial habitat	Potential for creation of habitat for nuisance species	Qualitative assessment based on professional judgement	Screened	Habitat creation for nuisance species is not likely in a managed park environment. Therefore, same for all alternatives
		Qualitative assessment of improvement to terrestrial habitat for enhancement of migratory bird habitat and habitat connectivity.	Qualitative assessment based on professional judgement	Used in comparative evaluation	Size of lakefill and Project design features will determine opportunities for improvements to habitat and connectivity. Therefore, this criterion helps to differentiate between the alternatives.
	Area and quality of aquatic habitat	Total area and types of aquatic habitat disrupted or removed	GIS measurement and assessment based on field work	Used in comparative evaluation	Size of lakefill and Project design features will determine potential for habitat disruption and amount of habitat removed. Therefore, this criterion helps to differentiate between the alternatives.

Environmental Component	Criteria	Indicator(s)	Approach to Assessment	Screened/Used in Comparative Evaluation	Rationale for Screening of Criteria
		Potential effects on aquatic Species at Risk (SAR) and Significant Wildlife Habitat (SWH)	Qualitative assessment based on professional judgement	Screened	Lake Sturgeon has been recovered near mouth of Credit River (last record 2006) but habitat in footprint not considered critical. Project is not anticipated to effect mouth of Credit River. Therefore, same for all alternatives
		Potential for the creation of habitat for nuisance species	Qualitative assessment based on professional judgement	Screened	Created habitat can be designed to avoid nuisance species. Therefore, same for all alternatives
Poten or imp conne aquati		Amount of self- compensation with respect to fish habitat (i.e., Opportunity to incorporate fish habitat creation and enhancement opportunities into design)	Qualitative assessment based on professional judgement and field work.	Used in Comparative Evaluation	Lakefill will result in habitat removal and alteration which will require compensation pursuant to the Federal Fisheries Act. Therefore, this criterion helps to differentiate between the alternatives.
	Potential to maintain or improve connections for aquatic species	Qualitative assessment of connections for movement of aquatic species within Lake and Credit River	Qualitative assessment based on professional judgement	Screened	Size and location of Project footprint follows existing breakwater thus, will not create a new barrier or facilitate the movement of aquatic species within the lake. Therefore, same for all alternatives
Socio- economic Environment	Area of open space or parkland created	Total area to be made available for recreation including trails and parkland.	GIS measurements	Used in Comparative Evaluation	Size of lakefill will determine opportunities for the provision of parkland and trails for recreation. Therefore, this criterion helps to differentiate between the alternatives.

Environmental Component	Criteria	Indicator(s)	Approach to Assessment	Screened/Used in Comparative Evaluation	Rationale for Screening of Criteria
	Potential for changes to use of waterfront for recreation	Potential for use of area for new activities such as fishing, birding etc. Compatibility of recreational activities with boating and marina business activities.	Qualitative assessment based on professional judgement. Comparison with existing conditions.	Screened	All of the alternatives provide greater area for recreational uses but do not change the recreational activities undertaken at the waterfront. Recreational activities will remain compatible with boating and marina business activities. Therefore, same for all alternatives.
		Changes to navigable area because of Project implementation.	Qualitative assessment based on professional judgement	Screened	The enlarged breakwater will be a navigational constraint for all alternatives. Therefore, same for all alternatives.
	Disruption to use and enjoyment of property during construction and establishment	Effects of construction (noise, dust, traffic, site visibility) at residential properties, community facilities and institutions.	Qualitative assessment based on professional judgement	Used in Comparative Evaluation	Size of lakefill will determine duration of construction and therefore duration of construction related effects. Size of lakefill will determine site visibility. Therefore, this criterion helps to differentiate between the alternatives.
		Effects of marina operations (air quality, noise, dust, traffic, site visibility) at residential properties, community facilities and institutions.	Qualitative assessment based on professional judgement	Used for comparative evaluation	Each of the alternatives except the "do nothing" require the 2-acre existing lot at 1 Port Street East to be developed which is the only area with potential for development of marina businesses. Size of lakefill, parking and boat slips available for use will determine effects of marina operations.

Environmental Component	Criteria	Indicator(s)	Approach to Assessment	Screened/Used in Comparative Evaluation	Rationale for Screening of Criteria
	Changes in community character	Effects of marina operation on the unique character of Port Credit and its marina functions along the waterfront.	Qualitative assessment based on professional judgement	Used for comparative evaluation	Each of the alternatives will "Keep the Port in Port Credit" and in Mississauga. Each of the alternatives except the "do nothing" require the 2-acre existing lot at 1 Port Street to be developed which is the only area with potential for development of marina businesses. Size of lakefill will determine opportunities for the provision of parking and boat slips, parkland and trails for recreation. Size of lakefill will determine site visibility and effects on community character. Therefore, this criterion helps to differentiate between the alternatives.
	Effects on non- marina business operations during construction and establishment	Adverse effects on non- marina business operations from increased noise, dust, traffic and site visibility) to business operations during construction and establishment	Qualitative assessment based on professional judgement	Evaluated for construction phase. Screened for establishment phase.	Size of lakefill will determine duration of construction and therefore duration of construction related effects. Effects during establishment phase are similar for each alternative.
Cultural Environment	Potential for displacement of built heritage resources due to construction	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area	Presence of cultural heritage resources in the Project footprint	Screened	Baseline studies indicated that there are no cultural heritage resources present in the Project footprint. Cultural heritage landscape in the Local Study Area is affected the same by all alternatives.

Environmental Component	Criteria	Indicator(s)	Approach to Assessment	Screened/Used in Comparative Evaluation	Rationale for Screening of Criteria
	Potential displacement of marine- and land- based archaeological resources	Archaeological resources within footprint of land creation and associated parkland	Presence of archaeological resources in the Project footprint	Screened	Baseline studies indicated that there are no archaeological resources present in the Project footprint. Therefore, same for all alternatives.
	Potential for effect from construction and operations on traditional uses of lands by Indigenous communities.	On-going traditional uses of lands within 1PSEPM Project Study Area	Qualitative assessment based on professional judgement	Screened	With mitigation, 1PSEPM Project construction will create nuisance effects similar for all alternatives. Establishment of the project might improve the ability of Indigenous communities to access areas that were previously private use only. Therefore, same for all alternatives.
Cost	Potential to phase implementation of land creation and park development	Ease of construction	Professional judgement	Screened	The same construction techniques will be used for all alternatives.
	Capital Cost	Estimated capital cost	General high level cost estimates	Used in Comparative Evaluation	Capital costs will vary depending on the size and complexity of the alternative. Therefore, this criterion helps to differentiate between the alternatives.
	Sustainability of active and informal parkland	Qualitative assessment of maintenance and repair requirements of "park" space	Professional judgement	Used in Comparative Evaluation	Type of maintenance and repair activities would be similar for all alternatives, but costs for maintenance and repairs would depend on size of the lakefill. Therefore, this criterion helps to differentiate between the alternatives.

Environmental Component	Criteria	Indicator(s)	Approach to Assessment	Screened/Used in Comparative Evaluation	Rationale for Screening of Criteria
	Cost of management and soil contamination	Total cost associated with remediation / risk management	Professional Judgement	Screened	The management of contaminated soil would be similar for all alternatives. Therefore, the same for all alternatives.

The 1PSEPM Project is about expanding the land base around the eastern breakwater to provide continued marina function and services at this site, as well as create opportunities for public access to the waterfront, new parkland, and enhancements to the site's ecological functions. The evaluation of 'Alternative Methods' was structured to assess the ability of each alternative to achieve this purpose. The purpose of the effects assessment is to measure the benefits and effects between alternatives.

Once the effects assessment was completed, the alternatives were ranked first, second, third and fourth. In general, this was done by looking at the differences between the alternatives visà-vis the confidence level of the assessment methods. If the differences were very small the alternatives were rated the same; only major differences are reflected in the ratings.

5.1.4. STEP 4 – CONFIRM, REFINE THE UNDERTAKING AND COMPLETE THE DETAILED ASSESSMENT OF PREFERRED ALTERNATIVE

Following the comparative evaluation and the selection of the preferred alternative, the final step in the assessment is to confirm and refine the undertaking for the purposes of the detailed assessment. The detailed assessment will examine how the preferred alternative meets the purpose of the undertaking; it describes the net environmental effects; how it minimizes adverse effects and/or maximizes positive effects; and summarizes its advantages and disadvantages, according to the following components of the environment (and Project costs), namely:

- Physical Environment;
- Atmospheric Environment;
- Biological Environment;
- Socio-economic Environment;
- Cultural Environment (including Interests of Indigenous Communities); and
- Cost.

5.2. COMPARATIVE EVALUATION OF LAKEFILL FOOTPRINT ALTERNATIVES

The comparative evaluation combined the information presented by indicator to reflect a preference by criterion and then combined the information presented by criterion to reflect a preference for each environmental component. Finally, the preferences by component were combined to present the preferred alternative, in effect rolling up the detailed information into a decision. Trade-offs between alternatives are identified and discussed in the following sections with the intent of providing the reader with a traceable decision-making process.

Table 5.3 summarizes the evaluation of the alternatives for each environmental component.

Environmental Component	Criteria	Indicator(s)	Do Nothing Alternative	Smallest Lakefill Footprint	Medium Lakefill Footprint	Largest Lakefill Footprint
Physical Environment	Effects on surface water quality in the Local Study Area	Changes to surface water quality from placement of fill (turbidity, etc.) and spills associated with construction equipment	No change to surface water quality as there are no construction activities	Surface water quality will potentially be affected locally by turbidity from the placement of fill for the shortest duration of construction. Turbidity will tend to disperse less widely in nearshore areas without any mitigation. Mitigative measures will reduce any impacts to surface water quality to negligible levels.	Surface water quality will potentially be affected locally by turbidity from the placement of fill for a moderate duration of construction. Turbidity will tend to disperse less widely in nearshore areas without any mitigation. Mitigative measures will reduce any impacts to surface water quality to negligible levels.	Surface water quality will potentially be affected locally by turbidity from the placement of fill for the longest duration of construction. While construction is occurring near the shore, turbidity will tend to disperse less widely in nearshore areas without any mitigation. When construction is occurring further out into Lake Ontario, turbidity will be dispersed widely in deeper sections of Lake Ontario without any mitigation. Mitigative measures will reduce any impacts to surface water quality to negligible levels.
Physical Environment Summary			First Ranked	Second Ranked	Second Ranked	Second Ranked

Table 5.2: Comparative Evaluation of Alternative Methods (i.e., Lakefill Footprints)

Environmental Component	Criteria	Indicator(s)	Do Nothing Alternative	Smallest Lakefill Footprint	Medium Lakefill Footprint	Largest Lakefill Footprint
Biological Environment	Area and quality of terrestrial habitat	Total area of terrestrial habitat created, enhanced, disrupted or lost	No terrestrial habitat created, enhanced, disrupted or lost.	Smallest area (500 m ²) available for potential habitat creation or enhancement. Potential for expansion of habitat for Common Terns (only Species at Risk in vicinity of Project)	Moderate area (4590 m ²) available for potential habitat creation or enhancement Potential for expansion of habitat for Common Terns (only Species at Risk in vicinity of Project)	Largest area (18,000 m ²) available for potential habitat creation or enhancement. Potential for expansion of habitat for Common Terns (only Species at Risk in vicinity of Project)
		Qualitative assessment of improvement to terrestrial habitat for enhancement of migratory bird habitat and habitat connectivity.	No potential for improvements.	Enhancement of habitat connectivity is least due to area and the very nearshore location.	Enhancement of habitat connectivity is moderate due to area.	Enhancement of habitat connectivity is greatest due to largest area and location furthest into Lake Ontario.
	Area and quality of aquatic habitat	Total area and types of aquatic habitat disrupted or removed	No aquatic habitat disrupted or removed.	Smallest area (approx. 6,300 m ²) of habitat removed. Habitat with relatively higher productivity potential removed (shallow - 1-3m -depth sand dominated and cobble habitat).	Moderate area (11,000 m ²) of habitat removed. Habitat with relatively higher productivity potential removed as in Alternative 1 with additional (approx. 4,700 m ²) nearshore habitat (=/>3 - 5m depth) with similar substrate distribution removed.	Largest area of habitat (29,600 m ²) removed. Habitat with relatively higher productivity potential removed as in Alternatives 1 and 2 with additional (approx. 18,600 m ²) nearshore habitat (5m -8m depth) with similar substrate distribution removed.

Environmental Component	Criteria	Indicator(s)	Do Nothing Alternative	Smallest Lakefill Footprint	Medium Lakefill Footprint	Largest Lakefill Footprint
		Amount to self- compensation with respect to fish habitat (i.e., Opportunity to incorporate fish habitat creation and enhancement opportunities into design)	None	Smallest perimeter and shallowest depths affected, therefore least opportunity for beneficial habitat to be incorporated into design. However, opportunity for on-site compensation within part of waterlot not used for lakefill.	Moderate perimeter and medium depths affected, therefore medium opportunity for beneficial habitat to be incorporated into design. However, opportunity for on-site compensation within part of waterlot not used for lakefill.	Largest perimeter and deepest depths affected, therefore greatest opportunity for beneficial habitat to be incorporated into design. However, limited opportunity for on-site compensation thus off-site compensation will likely be required.
Biological Environment Summary			Fourth Rank no potential to enhance aquatic and terrestrial habitat	Third Rank Highest potential to enhance aquatic habitat on site. Limited potential to enhance terrestrial habitat	Second Rank Potential to enhance aquatic habitat on site. Moderate potential to enhance terrestrial habitat.	First Rank Potential to enhance aquatic habitat however, largest area of aquatic habitat removed and off- site compensation may be required. Greatest potential to enhance terrestrial habitat
Socio- economic Environment	Area of parkland created	Total area to be made available for recreation including trails and parkland.	Existing breakwater has no recreational value. No new area available for recreation.	Smallest new area (1,800 m ²) available for recreation including trails and parkland. Approximately 9% of land created will be available for park use providing limited opportunities to create quality park experiences.	Moderate new area (6,800 m ²) available for recreation including trails and parkland. Approximately 40% of land created will be available for park use providing moderate opportunities to create quality park experiences.	Largest new area (18,000 m ²) available for recreation including trails and greenspace. Approximately 52% of land created will be available for park use providing the greatest opportunity to create quality park experiences.

Environmental Component	Criteria	Indicator(s)	Do Nothing Alternative	Smallest Lakefill Footprint	Medium Lakefill Footprint	Largest Lakefill Footprint
	Ability to accommodate marine facilities and services	Area available to accommodate marina facilities and services	None	Smallest area available and sufficient area for working marina facilities and ~200 slips. Smallest area with a limited number of slips provides for a low potential for a working marina's business viability.	Moderate area available and sufficient area for working marina facilities and ~200 slips. Moderate area with a limited number of slips provides for a low potential for a working marina's business viability.	Largest area available and sufficient area for working marina facilities and ~450 slips. Largest area with the largest number of slips provides for the greatest potential for a working marina's business viability.
	Disruption to use and enjoyment of property during construction and establishment	Effects of construction (noise, dust, traffic, site visibility) at residential properties (including live aboards), community facilities and institutions.	Nuisance effects from construction activities will not occur.	Nuisance effects (noise and dust) from construction activities will occur along roads and areas nearest the construction activities. Nuisance effects are mitigable and will occur for the shortest duration of construction. Visibility of construction activities will be limited within south Port Credit in the Local Study Area.	Nuisance effects (noise and dust) from construction activities will occur along roads and areas nearest the construction activities. Nuisance effects are mitigable and will occur for a moderate duration of construction. Visibility of construction activities will be limited within south Port Credit in the Local Study Area.	Nuisance effects (noise and dust) from construction activities will occur along roads and areas nearest the construction activities. Nuisance effects are mitigable and will occur for the longest duration of construction. Visibility of construction activities will be limited within south Port Credit in the Local Study Area

Environmental Component	Criteria	Indicator(s)	Do Nothing Alternative	Smallest Lakefill Footprint	Medium Lakefill Footprint	Largest Lakefill Footprint
		Effects of marina operations (air quality, noise, dust, traffic, site visibility) at residential properties, community facilities and institutions.	Nuisance effects from marina operations will not occur.	Effects from marina operations will be less than existing and limited within south Port Credit. New land base and associated uses will be visible from a small area of south Port Credit in the Local Study Area and along the shoreline.	Effects from marina operations will be less than existing and limited within south Port Credit. New land base and associated uses will be visible from a slightly larger relative area of south Port Credit in the Local Study Area and along the shoreline. Size of viewshed is not substantially different from the smallest lakefill footprint.	Effects from marina operations will be similar to existing and limited within south Port Credit in the Local Study Area New land base and associated uses will be visible from largest relative area of south Port Credit and along the shoreline.

Environmental Component	Criteria	Indicator(s)	Do Nothing Alternative	Smallest Lakefill Footprint	Medium Lakefill Footprint	Largest Lakefill Footprint
	Changes in community character	Effects of marina operation on the unique character of Port Credit and its marina functions along the waterfront.	The "do nothing" alternative does not keep the port in Port Credit following CLC redevelopment of the wharf. Negative effect on community character as the marina may disappear as a result of changes to land use. Marina is considered part of community character.	The footprint offers the smallest opportunity to maintain marina functions, enhance recreational uses of the waterfront and connect the waterfront with the rest of the Local Study Area.	The footprint offers a moderate opportunity to maintain marina functions, enhance recreational uses of the waterfront and connect the waterfront with rest of the Local Study Area.	The footprint offers the best opportunity to maintain marina functions, enhance recreational uses of the waterfront and connect the waterfront with the rest of the Local Study Area
	Effects on non- marina related business operations during construction and establishment	Adverse effects on non-marina related business operations from increased noise, dust, traffic and site visibility) to business operations during construction and establishment	character. Nuisance effects from construction activities will not occur. Nuisance effects will occur but are mitigable. They are most likely to occur along roads and areas nearest the construction activities for the shortest duration of construction.	Nuisance effects will occur but are mitigable. They are most likely to occur along roads and areas nearest the construction activities for a moderate duration of construction.	Nuisance effects will occur but are mitigable. They are most likely to occur along roads and areas nearest the construction activities for the longest duration of construction.	

Environmental Component	Criteria	Indicator(s)	Do Nothing Alternative	Smallest Lakefill Footprint	Medium Lakefill Footprint	Largest Lakefill Footprint
Socio- economic Summary			Fourth Ranked No potential to provide marina or parkland	Third Ranked Provides for ~200 slips Least potential to provide parkland (~9 % of lakefill area) Nuisance effects are mitigable and will occur for shortest duration	Second Ranked Provides for ~200 slips Moderate potential to provide parkland (~40% of lakefill area) Nuisance effects are mitigable and will occur for moderate duration	First Ranked Provides for ~450 slips Greatest potential to provide parkland (~52% of lakefill area) Nuisance effects are mitigable and will occur for longest duration
Cost (Capital Cost of lakefill and land creation	Estimated capital cost of lakefill and land creation (i.e., high level cost estimates for only lakefill and creation of new land for park. Does not include the cost for buildings, marina facilities or surface features of the parkland)	No cost	Low capital cost. ~10% of capital costs relate to land for park.	Moderate capital cost. ~40% of capital costs relate to land for park.	High capital cost. ~53% of capital costs relate to land for park.
	Sustainability of active and informal parkland	Qualitative assessment of maintenance and repair requirements of "park" space	Cost of maintenance and repair of safety hazards.	Low maintenance and repair cost due to small size of lakefill and parkland.	Moderate maintenance and repair cost due to moderate size of lakefill and parkland.	High maintenance and repair cost due to largest size of lakefill and parkland.
Cost Summary			First Ranked	Second Ranked	Third Ranked	Fourth Ranked

Table 5.3:Alternative Methods Evaluation Summary

Environmental Component	Do Nothing Alternative	Small Lakefill Footprint	Medium Lakefill Footprint	Large Lakefill Footprint
Physical Environment Summary	First Rank	Second Rank Similar effects for all alternatives	Second Rank Similar effects for all alternatives	Second Rank Similar effects for all alternatives
Biological Environment Summary	Fourth Rank No potential to enhance aquatic and terrestrial habitat	Third Rank Least potential to enhance aquatic habitat on site and minimizing need for off-site fisheries offsets. Limited potential to enhance terrestrial habitat.	Second Rank Moderate potential to enhance aquatic habitat on site and minimizing need for off-site fisheries offsets. Moderate potential to enhance terrestrial habitat	First Rank Greatest potential to enhance aquatic habitat on site, however largest area of aquatic habitat removed and off-site offsets may be required. Greatest potential to enhance terrestrial habitat
Socio-economic Summary	Fourth Rank No potential to provide marina or parkland.	Third Rank Provides for ~ 200 slips. Least potential to provide parkland ~9 % of lakefill area. Nuisance effects are mitigable and will occur for shortest duration.	Second Rank Provides for ~200 slips. Moderate potential to provide parkland ~40 % of lakefill area. Nuisance effects are mitigable and will occur for moderate duration.	First Rank Provides for ~450 slips. Greatest potential to provide parkland ~52% of lakefill area. Nuisance effects are mitigable and will occur for longest duration.
Cost Summary	First Rank No capital cost but no marina or parkland created. Costs for maintenance and repair would be incurred for safety hazards.	Second Rank Low capital costs for land creation with space for a marina and very small parkland ~10% created	Third Rank Moderate capital costs for land creation but similar size marina to the smallest footprint and moderate parkland created	Fourth Rank Highest capital costs for land creation, largest marina, and largest area of parkland created

The overall conclusions of the comparative evaluation of lakefill footprint alternatives, and their advantages and disadvantages are:

- The Do-Nothing alternative is most preferred for cost, and effects to the physical environment while least preferred for the biological and socio-economic environment as there is no potential to enhance aquatic and terrestrial ecology and no new marina nor parkland. Overall, the Do-Nothing alternative was the fourth ranked alternative.
- Alternative 1 Small Lakefill Footprint provides the lowest number of slips and smallest area of new parkland. It has few opportunities to create terrestrial or aquatic habitat enhancements. However, construction and the nuisance effects from construction activities will be for the shortest duration. Nonetheless, construction associated nuisance effects are mitigable. Overall, the Small Lakefill Footprint alternative was the third ranked alternative.
- Alternative 2 Medium Lakefill Footprint provides the lowest number of slips (equal to the Small Lakefill Footprint alternative) and moderate opportunity for the creation of new parkland. It also provides a moderate opportunity to create terrestrial and aquatic habitat enhancements. Nuisance effects from construction activities will be for a moderate duration and are mitigable. Overall, the Medium Lakefill Footprint alternative was the second ranked alternative.
- Alternative 3 Large Lakefill Footprint provides the opportunity to create the largest area of parkland relative to the marina space required for parking, boat storage and marina facilities. It also provides for a similar sized marina to what exists today (greatest number of slips). With a larger footprint, perimeter, and location jetting into deeper waters in Lake Ontario this alternative has the greatest potential to enhance aquatic habitat, however, represents the largest area of existing aquatic habitat removed/altered and off-site compensation may be required. Baseline studies indicate that existing fish habitat that would be lost is not limiting in Lake Ontario, and new habitat created has the potential to be greater quality that what would belost. With a large land base, this alternative offers the most potential to enhance terrestrial habitat over what exists now. Conversely, as the largest footprint alternative, it also has the highest cost and will take the longest to construct resulting in construction nuisance effects for the longest period. However, the effects from construction are short-term and mitigable while the lakefill area and its benefits will exist for the long-term. Overall, the Large Lakefill Footprint alternative was the first ranked alternative, and therefore the preferred alternative.

The large lakefill footprint alternative will now be subject to Step 4 of the evaluation process. This step involves the confirmation of the preferred alternative (Section 5.3) and refining the undertaking for the purposes of the detailed assessment (Chapter 6). The detailed assessment is provided in Chapter 7. It examines how the preferred alternative meets the purpose of the undertaking; it describes the net environmental effects taking into consideration the implementation of mitigation measures; how it minimizes adverse effects and/or maximizes positive effects; and summarizes its advantages and disadvantages, according to the following components of the environment (and Project costs), namely:

- Physical Environment
- Atmospheric Environment
- Biological Environment
- Socio-economic Environment
- Cultural Environment (including Interests of Indigenous communities)
- Cost

5.3. CONFIRMATION WITH PUBLIC AND STAKEHOLDERS

The evaluation of the alternatives and the selection of the Large Footprint as the preferred alternative was presented to the public and stakeholders at two Public Information Centers (PICs) to gain their feedback. Chapter 8 provides a summary of these PICs. In general, respondents to on-line surveys available during the virtual PICs and during an in-person pop-up event confirmed that the evaluation of alternatives and the selection of the Large Lakefill Footprint as the preferred alternative was appropriate. Most respondents expressed satisfaction with the evaluation by indicating that:

- The evaluation did not miss any environmental effects from the construction in assessing the preferred large lakefill footprint alternative (82.3%);
- The evaluation did not miss any environmental effects from establishment (operation once construction is completed) in assessing the preferred large lakefill footprint alternative (83.8%)

When asked if they had any questions for the Project team about this 1PSEPM Project or the preferred large lakefill footprint alternative, only three (3) of the 130 responses could be considered as an expression of opposition to the City's selection. Rather, most of the questions asked of the City were regarding detailed design aspects of the marina and its operation. Most responses were in support of the City's section of the Large Lakefill Footprint alternative.

The 1PSEPM Project is about expanding the land base around the eastern breakwater to provide continued marina function and services at this site, as well as create opportunities for public access to the waterfront, new parkland, and enhancements to the site's ecological functions. With this understanding, most of the comments received were focused on the marina design and operations rather than on the nature of the land base.

All comments and questions received through the online surveys were reviewed by the 1PSEPM Project team to assist in the refinement and description of the undertaking (i.e., the 1PSEPM Project). Matters related to specific marina operations were provided to the City's Community Services Department for consideration during detailed marina design, park planning, and operation.

6. DESCRIPTION OF THE PREFERRED ALTERNATIVE

This chapter describes the conceptual design of the 1PSEPM Project preferred alternative, construction techniques to build the preferred alternative, and the proposed phasing plan for construction.

6.1. OVERVIEW OF THE CONCEPTUAL DESIGN

The conceptual design for the 1PSEPM Project is a lakefill expansion to the existing breakwater. It includes the following components:

- Shoreline configuration and protection features;
- Naturalization; and
- Conceptual recreational features and amenities.

The various components are described in their built-out state in the following sections. The conceptual design of the 1PSEPM Project is presented on Figure 6.1

6.2. SHORELINE CONFIGURATION AND PROTECTION FEATURES

The 1PSEPM Project preferred alternative requires approximately 240,000 m³ of fill material. The shoreline protection features of the 1PSEPM conceptual design consists of an armour stone revetment. The south end includes an island breakwater structure, also protected with an armour stone revetment, which will shelter an aquatic habitat area. The island breakwater structure will have a lower crest elevation than the main breakwater and has the main function of reducing the effect of open lake waves on the aquatic habitat area. The island breakwater will be separated from the main lakefill structure over the full range of water levels and will not allow for public access.

The following subsections describe the conceptual details of these shoreline protection features based on a preliminary assessment of coastal conditions. Figure 6.2 shows a site plan overview of the preferred alternative's lakefill configuration. Typical cross sections A and B, which are described below, are shown on Figure 6.3.

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Figure 6.1 1PSEPM Project Preferred Alternative

SHOREPLAN



Figure 6.2 1PSEPM Project Preferred Alternative Lakefill Configuration


Figure 6.3 Armour Stone Revetment Typical Cross-Sections

6.2.1. ARMOUR STONE REVETMENTS

Armour stone revetments are a common type of shoreline protection structure on the Great Lakes. A revetment is a sloping structure consisting of outer layer(s) of primary armour stone protection and sub-layer(s) of secondary armour stone and/or rip rap. The description provided below is based on a conceptual design appropriate for an Environmental Assessment. Detailed design of the project will confirm and refine design elements described herein.

The slope of the revetment can vary but 2H:1V is the most common and is the proposed slope for most of the 1PSEPM Project preferred alternative, with the exception of certain areas on the south side of the structure where slopes are reduced to approximately 3H:1V. These slopes generally provide suitable stability for the underlying soil or fill material and can be partially built within the reach of shore-based equipment. Parts of the construction of the lakefill and protection structure and the delivery of material may be undertaken over water with the use of a barge.

The lake bottom elevation around the toe of the structure varies between approximately 75.0m near the interface with the mainland, and approximately 66.0 m at the lakeward most point of the structure. This means under design high water levels, the depth at the toe of the revetment will vary between approximately 1.0 and 10.0 m. Typical average summer water levels will vary between 75.1 m and 74.8 m.

The crest of the revetment on the breakwater will vary between approximately 78.0 m and 79.0 m. The cap stone crest is set approximately 0.5 m above the top of the fill and core material behind the protection structure. Crest armour stones will be placed horizontally across the top of the slope to widen the structure crest. These stones will be selected and placed such that gaps or crevices between the stones will be minimized. The structure was conceptually designed to minimize wave overtopping, though some overtopping will occur under 1:100 year design conditions, as described in 3.1.5. Significant wave spray will also be generated and carried across the structure. The toe of the revetment will be embedded in the lakebed after being cleared of any loose sediment or soft material. The toe will likely consist of one or two stones placed horizontally on the lakebed in front of the revetment slope. Typical section of the proposed revetment along the east side of the lakefill is presented on Figure 6.3.

The revetment is expected to consist of two typical sections. The first approximately 40 m of revetment, starting at the shore, is expected to be a single layer of specially placed armour stone, backed by a layer of rip rap, and finally a layer of geotextile. Special placement noted here describes armour stone placed tightly in a single layer to produce uniform, smooth and stable surface. The armour layer will be approximately 1.0 m thick, and the rip rap layer will be approximately 0.9 m thick. The primary armour layer stones are expected to be in the order of 3 to 5 tonnes each. Section A on Figure 6.3 shows a typical concept level cross-section through the single armour layer portion of the revetment.

The rest of the revetment slopes will be protected by a double layer of randomly placed primary armour stone, a layer of secondary armour stone, and a layer of rip rap underlain by geotextile. The primary layer of armour stone is expected to vary between 1.8 m to 3.4 m thick, the secondary layer between 0.8 m to 1.2 m thick, and the rip rap between 0.6 m to 0.9 m thick. The primary and secondary armour stones are expected to vary in the order of 2 tonnes to 10 tonnes and 0.4 tonnes 1.2 tonnes, respectively. The stone sizes will increase with distance from the shore, consistent with the increase in wave design height further offshore. Section B on Figure 6.3 shows a typical concept level cross-section through the double armour layer portion of the revetment.

As noted above, the placement of the stones will consist of "special placement" in the first segment of the breakwater closest to land, then transition to "random" placement moving lakeward. Random placement means each stone is placed individually and keyed in so that it touches adjacent stones on at least three sides, while special placement refers to stones individually placed and keyed very tightly so that they touch adjacent stones on all four sides. Random placement of armour stone can proceed at a faster pace than special placement, thus reducing the cost per tonne placed, though will increase the tonnage of stone placed because randomly placed armour stone generally required two layers of stone whereas special placement consists of one layer. Randomly placed structures are generally less susceptible to sudden failure than a single layer "special placement" revetment. The crevices between randomly placed stones tend to be larger than between special placement stones. This generally reduces wave uprush when compared to a specially placed structure. The details of the structures will be refined in the detailed design phase and the most appropriate design will be implemented.

SHOREPLAN

6.2.2. AQUATIC HABITAT

The 1PSEPM Project preferred alternative will remove some existing aquatic habitat on the lake bottom and will provide enhanced fish habitat areas at the south part of the preferred alternative. The south end of the preferred alternative includes an embayment area protected with an island breakwater to provide improved semi-sheltered aquatic habitat. The exposed side of the island breakwater will be protected with a double layer armour stone breakwater similar to that described in Section 6.2.1. Smaller stone material will line the sheltered interior of the island breakwater. The base of the channel between the island and the main lakefill will be lined with, boulder and cobble sized stones to provide a substrate for aquatic habitat. A conceptual plan of this area is illustrated on Figure 6.4. Section C on Figure 6.4 shows a typical concept level cross-section through the island breakwater, habitat embayment, and revetment. This embayment includes approximately 2,400 sq. meter of high quality aquatic habitat. Further discussion of the aquatic habitat improvements is provided in Section 7.3.



Figure 6.4 Armour Stone Revetment and Aquatic Habitat Typical Cross-Sections

The shore of the main lakefill along the north side of the embayment is proposed to have a crest elevation of approximately 78.0 m with side slopes of approximately 2H:1V or flatter. The slopes will extend down to meet the boulder and cobble substrate at the bottom of the fish habitat area. The bed elevation of the boulder and cobble substrate is proposed to vary in elevation between 72.5 m and 73.0 m at the "entrances", and down to an elevation of 70.0 m in the center of the fish habitat area. The higher elevations at the entrances will help to reduce the severity of waves that enter the area and the depth variance throughout the area will increase the habitat diversity.

Structural aquatic habitat features may be incorporated along the toe of the revetment. Large cobble or boulder sized material would be needed to resist currents generated during storms. Smaller material is expected to be unstable during major storms. A typical conceptual plan of aquatic habitat along the toe of the revetment is shown on Figure 6.5.

Aquatic habitat in Lake Ontario consists of the areas of the lake bottom below the elevation of 75.32 m IGLD85. This elevation was established by the Department of Fisheries and Ocean (DFO, 2004). Aquatic habitat is further subdivided into distinct depth zones based on depth below elevation 75.32 m. The zones are 0 m to 2 m, 2 m to 5 m, 5 m to 10 m, and greater than 10 m. The total area affected by the implementation of the preferred alternative is approximately 13,000 m² of aquatic habitat modified and 29,000 m² of aquatic habitat lost. Table 6.1 below shows the areas of aquatic habitat modified and lost in the four depth zones affected by the preferred alternative. As noted above the proposed embayment includes approximately 2,400 sq. meter of high-quality aquatic habitat versus the generally lower quality habitat that currently exists. Further discussion of the aquatic habitat improvements is provided in Section 7.3.

Aquatic Habitat Depth Zone	Aquatic Habitat Modified	Aquatic Habitat Lost
0 m to 2 m	100 m ²	4,100 m ²
2 m to 5 m	1,000 m ²	8,100 m ²
5 m to 10 m	11,900 m ²	16,900 m ²
greater than 10 m	0 m ²	0 m ²
Total	13,000 m ²	29,100 m ²

Table 6.1Aquatic Habitat Areas Modified and Lost

6.2.3. RECREATIONAL SPACES AND MARINA

The conceptual design illustrates the intended parkland and trails that are proposed to be built on top of the expanded breakwater. Approximately 18,000 m² (1.8 ha) of parkland will be created from this intended design. Recreational trails and walkways will be developed with the appropriate resources and practices to preserve water quality. Additionally, design of trails will ensure the safety of park users and the sustainability of the surrounding vegetation. A plan of the recreational spaces and marina is presented on Figure 6.6.







Figure 6.6 Recreational Spaces and Marina

SHOREPLAN

There are primary trail and walkway systems that generally follow the edges of the breakwater and border sections of passive park space. The trail system will meet the appropriate trail standards for the City of Mississauga. The trails and walkways are proposed to connect to the Waterfront Trail in St. Lawrence Park to the east. Trails and walkways will be constructed above Lake Ontario's 100-year flood level to minimize flooding, damage, and maintenance costs.

A walkway on the west site of the breakwater will accommodate boaters using the marina and will also be shared with the general public. A walkway on the east side provides an expanded tree-lined promenade overlooking the lake connecting to the end of the breakwater.

A floating main dock is proposed to be installed on the marina side of the existing breakwater. This dock will run along the length of the breakwater and will have floating docks extending out perpendicular to the main dock which will provide access to approximately 450 proposed boat berthing slips. The main floating dock will be connected to the mainland at the north end but there will also be intermittent access ramps spaced along its length that lead from the main floating dock to the west breakwater pathway. Naturalized plantings will be established along the top of the revetment between the access ramps. The layout of the marina docks will be finalized during detailed design. The layout does not impact the lakefill operations.

Marina services and facilities will be located on the 1 Port Street East existing land base site. This portion of site is approximately 2 acres and currently a parking lot. The City will determine during detailed design the nature and size of the structure to occupy this space. Once these plans are finalized, the City will pursue the necessary approvals for the construction of the building. Any businesses choosing to lease space in the marina building will be responsible for securing any required approvals which are separate from this EA document.

6.2.4. PARKING AREA

The landward half of the expanded breakwater is proposed to be designated as a summer parking area. Visitors would be able to park to access the marina or the nearby parkland at the end of the breakwater. The parking lot is proposed to have approximately 275 parking spaces. During the winter months, when the Marina is not being used and there is less foot traffic in the park area, the parking lot can be used as a boat storage area an important aspect of marina business operations. The use of the parking area for winter storage of boats is illustrated on Figure 6.7. A recreational trail is proposed to be installed on the eastern side of the parking lot running behind the crest of the shore protection to provide continuous pedestrian access from the mainland to the end of the breakwater.



Figure 6.7 Parking Area Used for Boat Storage

SHOREPLAN

6.2.5. STORMWATER MANAGEMENT

The site will be graded so that stormwater, as well as wave overtopping water and wave spray, will be directed towards the marina basin via overland flow. A bioswale will be constructed along the edge of the marina basin to remove debris and pollution before the surface runoff enters the basin. The bioswale will accept and infiltrate the runoff from parking areas during the early stages of storm events, which is when deleterious substances, including hydrocarbons and sediments are washed from impervious surfaces. A perforated subdrain below the bioswale will collect the filtered water which will be conveyed to the adjacent marina basin via storm sewers and outfall structures.

6.3. MAINTENANCE ASSOCIATED WITH THE 1PSEPM PROJECT PREFERRED ALTERNATIVE

6.3.1. BREAKWATERS

Maintenance requirements for the expanded breakwater structures will be focused on the rehabilitation and repair of the structures over their design life. Maintenance of any structural protection is a fundamental requirement for long term functionality. Even structures designed to withstand 1:100-year design conditions will not last 100 years if they are not maintained.

For the first two years following construction and warranty period, the revetments require visual inspections by City staff and/or a professional engineer experienced in the assessment of marine structures. One inspection should take place in the fall when the water levels are approaching their annual low. A second inspection should take place in the spring to look for any damage associated with late fall, winter, and early spring storms. Assuming that no repair work is required within the first two-year period, the visual inspections can be subsequently carried out annually by a City staff and/or a professional engineer or technician experienced in the assessment of civil infrastructure. Those inspections should take place in the spring. Any problem areas should be referred to a professional engineer experienced in the assessment of marine structures, for a more detailed review.

Once the structures have a good stability record for at least five years, they may be inspected less frequently. A routine inspection interval of three to five years should be sufficient. A visual inspection should also be carried out following major storm events, irrespective of the routine inspection interval. For the purposes of this discussion, a major event may be defined as a storm that causes noticeable damage along other portions of Mississauga's Lake Ontario shoreline.

For newly constructed structures it is common practice to recommend that 0.5 to 1.0% of the construction budget be accrued annually to establish a maintenance fund for that structure. That fund is typically spent on an as-needed basis rather than at a constant annual rate. If the structure is properly built out of suitable material, there should be no need for routine maintenance work for several years. It is common for new structures to not require routine maintenance for a period of 15 to 20 years, or more. However, there is always a risk that design conditions could be exceeded in any given year, and the structure could be damaged or armour stones deteriorate at unforeseen rate.

6.3.2. FACILITIES

Maintenance of the marina, park space, trails and parking lot will follow the City's maintenance practices.

6.4. SITE ACCESS ROUTE

Construction access to the site would be achieved by entering the marina area from Port Street East. This will also be the access point once construction is complete.

Construction materials, specifically the stone material required to build out the breakwater and construct the shore protection, will have to be brought in from outside the City of Mississauga. Typically, stone material is acquired from Quarries or pits located North and West of the City of Mississauga. At this point in time, it is assumed that roughly half of the fill and stone material will be delivered over land using trucks and the remainder will be delivered over water via barge.

Typically, trucks accessing the site will use the highways then arterial roads. It is noted that there is construction related traffic concerns in the Port Credit area. Therefore, during detailed design the City may choose to designate truck routes to manage construction traffic. Consideration for disruption of the immediate area around the routes due to heavy vehicular traffic as well as overall efficiency of travelling on city roads versus the highway will also be considered.

6.5. CONSTRUCTION PHASING

The construction of the 1PSEPM Project preferred alternative will occur in two distinct stages. Stage 1 is the land creation and protection by placing the breakwater fill material and armour stone revetment shoreline protection. Followed by Stage 2, which includes the construction of site, the marina and park construction.

6.5.1. STAGE 1 LAND CREATION

Construction of the expanded breakwater and the shoreline protection in Stage 1 is anticipated to occur over a period of approximately 14 months depending on fill availability, approvals, weather and in-water working periods. Upon receipt of all required approvals, construction access to the site will be established. Temporary construction access may include the installation of a mud mat, temporary granular base, perimeter fencing, silt barriers, etc. Clearing of vegetation, such as trees growing out of the existing breakwater, will be completed.

A staging area will be constructed at the site entrance near Elizabeth Street south of Port Street East including a site trailer, materials and equipment storage, as well as appropriate parking for site workers.

The lakefill process will begin with the construction of an access berm that construction equipment will use to access the rest of the site. Once a sufficient length of the access berm has been created, construction of the shore protection will begin, lagging just behind the construction of the access berm. Material will be delivered to site by water using barges, or over land by trucks. Trucks can drive onto the access berm to deliver stone and clean fill material directly to the area being constructed and are expected to be the primary delivery mode in the early stages. Delivery of clean fill and stone materials by barge will become more significant as the construction proceeds further offshore into deeper water. Armour stone from the existing breakwater will be salvaged to the extent that is economically viable. The salvage operation will lag behind the berm and protection construction so that there is no loss of protection to the existing breakwater. A schematic of the fill placement is illustrated on Figure 6.8.

Once a sufficient length of the access berm and shore protection has been constructed to provide adequate shelter, filling of the gap between the existing breakwater and the new structures with clean fill material may begin. The construction schedule for the Phase 1 of the project was developed based on continuous supply of granular fill material from pits or quarries. It is anticipated that clean fill material may be available from various City of Mississauga and other public agency infrastructure projects. The use of that fill material, properly tested, can be accommodated. In addition, the use of clean fill material from local private sources can be used at the site. Armour stone and rip rap material will be acquired from Ontario quarries.

All in-water work will be completed during an appropriate in-water work timing window, as set out by Fisheries and Oceans Canada, to comply with fisheries regulations. The in-water work timing window will be established prior to construction during the approvals phase.

Any disturbed areas will be temporarily stabilized as is feasible during on-going construction activities until final site restoration can be completed. Where possible opportunities for progressive rehabilitation will be explored. In addition, all construction debris and mud tracking will be collected, removed, or cleaned up from the site and adjacent roadways on an on-going basis and in a timely fashion.





As noted above, the filling program proposed for the construction of the landform assumes that clean fill material will be supplied from commercial quarries or pits. This assumption allows for the development of a schedule and construction methodology. It also reflects experience with similar lakefill sites. It has been assumed that construction will include the use of both trucking and barging to supply the material required for the Stage 1 construction. Supply of clean fill material by marine transport has become possible over the past several years with a number on contractors with suitable equipment operation in the area. Water depth in the outer part of the lakefill also allows for this operation to occur. The supply of fill material by marine transport is considered important due to the narrow width of the lakefill, which hinders truck movement and the location of the site near a developed commercial and residential location where an increase in truck traffic is desired to be minimized.

It is assumed that approximately 2,000 tonnes of clean fill material per day can be supplied by barge. The potential supply rates will vary at the time of construction depending on equipment and fill availability.

It is assumed that trucking will supply material at a rate of six trucks per hour for an eight-hour day. This rate of supply is expected to allow for controlled movement of trucks on the site, dumping and grading of the fill material in a controlled fashion.

Together, the trucking and barging will require in the order of 200 days to supply material, which equates to 10 full months at 20 working days per month. Considering potential weather related down time for the barging and construction related delays in the trucking, it is reasonable to assume the Stage 1 construction will take in the order of 14 months of operations to complete. That time may extend over a longer period to accommodate approvals, weather and in-water working periods. Under normal conditions, no work should be undertaken on weekends.

6.5.2. STAGE 2 SITE SERVICING AND LANDSCAPING

This phase of the 1PSEPM Project will include the construction of the parking lot, park features, trails, landscaping, signage, aquatic habitat features, etc. Construction of the new marina buildings and associated structures, as determined during detailed design, will also occur at this stage. The elements of Stage 2 will be subject to further refinement and approvals during detailed design.

Stage 2 construction, inclusive of servicing and landscaping would begin at the completion of the Stage 1 and is anticipated to take approximately 14 months of construction, depending on fill availability, approvals, weather and in-water working periods. Access and staging would remain similar to that of Stage 1 utilizing the same areas, resources and locations for construction and logistical efficiencies. Erosion and sediment control measures (ESC) established in Stage 1 could either remain or be adjusted to accommodate the initial works of Stage 2 work.

Stage 2 construction will begin at the far (southeast) end of the site and working back to the mainland area. Proposed servicing and utilities can be installed and backfilled, and rough grading and earthworks can be conducted on the whole site as required (and subject to the finished site after Stage 1). Hardscape work can all be done in conjunction with each other (parking lot / landscape paving / stone items and structures etc.) to make construction more efficient and cost effective. Starting from the furthest point out and working back towards the entry to the site would be the most efficient way to implement the hardscape work. Parking lot paving could be left at base coat asphalt to facilitate the remaining construction works and then topcoat can be placed as a final item and line painting.

Once hardscape and paving are completed, attention can move to soft landscape works, all vegetative work (trees / shrubs / aquatics / perennials / grasses etc.) can commence. Vegetation to be planted will be native, non-invasive species resilient to the coastal conditions associated with the north shore of Lake Ontario. Topsoil and fine grading to shape and provide final contouring and shaping to the landscaped areas.

All staging areas would be incorporated into the construction works as required to achieve the full build-out of the project.

7. DETAILED ASSESSMENT OF THE PREFERED ALTERNATIVE

The detailed assessment examines how the 1PSEPM Project preferred alternative meets the purpose of the undertaking and addresses the problems and opportunities as discussed in Chapter 2. The detailed assessment describes the net environmental effects; and how the preferred alternative minimizes adverse effects and/or maximizes positive effects according to the following components, namely:

- Physical Environment;
- Atmospheric Environment;
- Biological Environment;
- Socio-economic Environment;
- Cultural Environment (including Interests of Indigenous Communities); and
- Costs.

Using the criteria developed for the Comparative Evaluation of Alternatives (Chapter 5 Table 5.1) as a basis, a set of indicators were defined for construction and establishment to structure and, where possible, quantify the effects of the construction and establishment of the 1PSEPM Project preferred alternative on the environment. Table 7.1 details the criteria and indicators used for the detailed assessment.

Environmental Component	Criteria	Indicator(s)	Approach to Assessment
Physical Environment	Resiliency of proposed lakefill to changing lake levels and coastal processes	Ability of proposed alternative to withstand changing lake levels (i.e., flooding hazards) and coastal processes (shoreline erosion) including future changes associated with climate change.	Professional judgement based on coastal process modeling
	Effects on surface water quality in the Local Study Area	Changes to surface water quality	Professional judgement based on past Project experience
Atmospheric	Changes to Air Quality	Changes to Air Quality from Dust	Professional judgement based on past Project experience
Environment	Changes to ambient noise	Changes to ambient noise	Professional judgement based on past Project experience
Biological Environment	Area and quality of terrestrial habitat	Total area of terrestrial habitat created, enhanced, disrupted or lost	GIS measurement of areas and qualitative assessment of potential for change to terrestrial habitat

Table 7.1	Criteria a	and Indicator	s for Deta	iled Ass	sessment
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Environmental Component	Criteria	Indicator(s)	Approach to Assessment
		Potential effects on terrestrial Species at Risk (SAR) and Significant Wildlife Habitat (SWH)	Qualitative assessment based on professional judgement
		Potential for creation of habitat for nuisance species	Qualitative assessment based on professional judgement
		Qualitative assessment of improvement to terrestrial habitat for enhancement of migratory bird habitat and habitat connectivity.	Qualitative assessment based on professional judgement
		Total area and types of aquatic habitat disrupted or removed	GIS measurement and assessment based on field work
		Potential effects on aquatic Species at Risk (SAR) and Significant Wildlife Habitat (SWH)	Qualitative assessment based on professional judgement
	Area and quality of aquatic habitat	Potential for the creation of habitat for nuisance species	Qualitative assessment based on professional judgement
		Amount of self-compensation with respect to fish habitat (i.e., Opportunity to incorporate fish habitat creation and enhancement opportunities into design)	Qualitative assessment based on professional judgement and field work.
	Potential to maintain or improve connections for aquatic species	Qualitative assessment of connections for movement of aquatic species within Lake and Credit River	Qualitative assessment based on professional judgement
	Area of open space or parkland created	Total area to be made available for recreation including trails and parkland.	GIS measurements
Socio-economic Environment	Potential for changes to use of waterfront for recreation	Potential for use of area for new activities such as fishing, birding etc. Compatibility of recreational activities with boating and marina business activities.	Qualitative assessment based on professional judgement, comparison with existing conditions.
		Changes to navigable area as a result of Project implementation.	Qualitative assessment based on professional judgement
	Disruption to use and enjoyment of property during construction and establishment	Effects of construction (noise, dust, traffic, site visibility) at residential properties, community facilities and institutions.	Qualitative assessment based on professional judgement

Environmental Component	Criteria	Indicator(s)	Approach to Assessment
		Effects of marina operations (air quality, noise, dust, traffic, site visibility) at residential properties, community facilities and institutions.	Qualitative assessment based on professional judgement
	Changes in community character	Effects of marina operation on the unique character of Port Credit Village and its marina functions along the waterfront.	Qualitative assessment based on professional judgement
	Effects on non-marina business operations off-site during construction and establishment	Adverse effects on non-marina business operations off-site from increased noise, dust, traffic and site visibility) to business operations during construction and establishment	Qualitative assessment based on professional judgement
	Potential for displacement of built heritage resources due to construction	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area	Presence of cultural heritage resources in the Project footprint
Cultural Environment	Potential displacement of marine- and land-based archaeological resources	Archaeological resources within footprint of land creation and associated parkland	Presence of archaeological resources in the Project footprint
	Potential for effect from construction and operations on traditional uses of lands by Indigenous communities.	On-going traditional uses of lands within 1PSEPM Project Study Area	Qualitative assessment based on professional judgement
Cost	Potential to phase implementation of land creation, naturalization and park development	Ease of construction	Professional judgement
	Capital Cost	Estimated capital cost	High level cost estimates

7.1. IDENTIFYING NET EFFECTS

For each indicator, the effects to existing conditions (Chapter 3) due to 1PSEPM Project preferred alternative works and activities (Chapter 6) were predicted. In some cases, no effects were predicted due to the application of mitigation or avoidance measures. Where net effects were predicted (i.e., effects remaining after mitigation is applied), they were classified as positive, negative, or negligible. Positive effects (e.g., improved habitat) are generally associated with establishment/post-establishment and were quantified where possible. Effects that were either negative or negligible tended to be associated with construction activities. Negligible effects are generally short-term, localized, do not occur frequently, and can be minimized to a large extent through mitigation; these are often typical of construction projects. Examples of these include air and noise emissions from construction equipment. Negative effects are those that mitigation could not minimize the effect to the extent that it became negligible, thus, the effect was considered a net negative effect of the 1PSEPM Project.

7.2. PHYSICAL ENVIRONMENT

7.2.1. EFFECTS OF CONSTRUCTION

Criterion:	Effects on surface water quality in the Local Study Area
Indicator:	Changes to surface water quality
Potential Effect:	Increased turbidity and reduced water quality from runoff due to onshore earthworks and vehicle movements

EFFECTS ASSESSMENT

Land based construction activities for the 1PSEPM Project are expected to be limited to vegetation removal and mobilization of land-based area for construction staging. The Project site is largely aved, has curbs and is serviced by municipal storm sewers along Port Street, so substantial off-site runoff from is not expected. However, on-site construction vehicle movement creates the potential for sedimentation that can affect surface water quality or deposit fine sediment into the existing marina basin and potentially the nearshore area of Lake Ontario. Site runoff is unlikely to change in response to flows generated by localized and short-lasting storms, long lasting precipitations, snowmelt, or rain or melting snow.

MITIGATION MEASURES

Mitigation measures are warranted to minimize adverse effects on surface water quality during construction.

- Construction of the Project should aim to maintain the existing asphalt cover for as long as possible to maintain current drainage patterns and avoid exposing erosion susceptible soils.
- Stockpiling of materials and staging equipment shall be undertaken in designated locations as far away from the lake as possible.

- Soil movement and management activities are to be conducted in accordance with the Ontario Regulation 406/19 and the MECP's Rules for Soil Management and Excess Soil Quality Standards.
- An "Erosion and Sediment Control Plan" will be developed during detailed design and applied for the duration of construction activities.

NET EFFECT

Taking into the consideration the effective implementation of mitigation measures, the net effect of the Project on surface water quality due to onshore earthworks and vehicle movements is considered *Negligible*.

Criterion:	Effects on surface water quality in the Local Study Area
Indicator:	Changes to surface water quality
Potential Effect:	Increased turbidity and reduced water quality from disturbance of sediments from the lakebed, from placed material and from vessel movement during construction.

EFFECTS ASSESSMENT

Construction activities for the 1PSEPM Project preferred alternative are expected to involve land creation and protection by placing the armour stone shoreline protection and lakefill materials on the lake bottom.

The placement of armour stone on the lake bottom to create the shore protection structure will result in the disturbance and resuspension of existing sediments from the lake bottom into the water column resulting in increased turbidity and potentially reduced surface water quality. Turbidity is a reduction in water clarity. Water is considered turbid when the presence of suspended particles becomes conspicuous and considered to be impaired or of lower quality.

Sediment re-suspension is unavoidable to some extent and occurs whenever materials are placed onto a lake bottom. However, the degree of sediment re-suspension and turbidity generated from material placement will depend on many site and operation-specific variables, including:

- characteristics of the substrate (e.g., grain size, specific gravity, etc.);
- nature of the material placement operation (e.g., armour stone size, placement rate, and placement method); and,
- site hydrology, hydraulics, hydrodynamics (e.g., current, vessel wakes).

Experience with sediment re-suspension and turbidity under a wide variety of dredging operations (i.e., having a greater impact than material placement on the lake bottom) have shown that in most cases re-suspended sediment concentrations:

- are greater near the bottom (as compared to higher in the water column).
- rapidly decrease with distance from the area of disturbance; and

 resettle close to the area of disturbance within a few hours or less, and only a small fraction takes longer to resettle. Resettling distances are greater when the particle size distribution is smaller (i.e., silt/clays rather than sand/gravels) and when the water currents are not fast enough to mobilize the sediments being disturbed.

In the case of the lakefill area for the 1PSEPM Project preferred alternative, the existing (eastern) breakwater creates a strong barrier to nearshore currents creating a relatively calm embayment to the east where the lakefill is to be constructed. Therefore, because currents in the area are low, wave action and wind direction are likely the key factors in determining whether, and how far, sediments move and are redistributed within the lake. However, lakebed substrate where the lakefill is to be constructed is dominated by coarse sand and cobble, with sand becoming more prevalent along the shoreline. An area of hardpan and multiple cobble dominated shoals along the eastern edge of the placement area also exist. These types of sediment are less likely to be resuspended and will likely resettle quickly near the area of disturbance. For the portion that may be resuspended, sediments are likely to be transported towards the shore and east side of the created landform by wave action.

Apart from turbidity, some chemicals from the contaminated sediment, in the marina basin west of the breakwater, may also be disturbed. This sediment contamination is to be expected in a marina basin used for many years by pleasure watercraft. Contaminated sediments in the area where the lakefill is to be constructed are possible but not likely.

All of the above comments must be considered with the view that major storms and wave action have the ability to re-suspend fine to coarse sediment within the entire construction area. Any resuspension of sediment during construction process is short duration and extremely localized in comparison to natural storm occurrences.

Finally, vessels such as barges and supporting watercraft operating in shallower waters may also contribute to the resuspension of lake bottom sediments through propeller action and anchoring.

MITIGATION MEASURES

Mitigation measures are warranted to minimize adverse effects on surface water quality during construction.

- Follow best management practices in "Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario" (Gordon & Fletcher, 2011 (c)).
- Utilize only clean fill for lakefill construction.
- Restrict operation to days when acceptable thresholds of suspended sediment concentrations can be achieved.
- An operational protocol shall be developed and implemented to achieve an acceptable threshold for suspended solids concentration in the surrounding waters.
- The City will consult with Ontario's MECP, the CVC and the federal DFO in developing its detailed design.

NET EFFECT

Taking into the consideration the effective implementation of mitigation measures, the net effect of the Project on surface water quality from disturbance of sediments from the lakebed, from placed material and from vessel movement during construction is considered *Negligible*.

Criterion:	Effects on surface water quality in the Local Study Area
Indicator:	Changes to surface water quality
Potential Effect:	Reduced soil, groundwater, and surface water quality from operation, refueling and routine maintenance of vehicles, vessels, and machinery.

EFFECTS ASSESSMENT

The operation, refueling and routine maintenance of construction equipment and smaller machinery will tend to occur at the work site daily. Vehicle, construction equipment and machinery operation can cause potential soil contamination from drips, leaks and spills released from fueling; and improper storage of petroleum, oils and lubricants (POL) and other hazardous materials on-site. Although vehicles and most machinery are mobile, some equipment cannot practically be relocated for fueling and maintenance. The most common form of potential soil contamination on construction work sites occurs from drips and spills released from fueling nozzles and gas can spouts as they are moved between the fuel tank and the vehicle or equipment. Being a frequent activity, the potential for drips and minor spills is a common and a frequently occurring potential environmental hazard, having the potential to contaminate soil, groundwater, and surface water.

Accidental fuel spills from vehicles, heavy equipment and small machinery during construction activities also have the potential to cause noticeable odors. These emissions are small in scale and very localized to the immediate vicinity of a spill or waste collection site.

Vessel operation in Lake Ontario may result in emissions to water. These include deck run-off and wash water, POL, and potentially discharges of grey or black water from sewage treatment systems. These direct emissions to water will result in reduced surface water quality in the immediate vicinity of the vessel. Because currents in the area are low, wave action and wind direction are likely the key factors in determining whether, and how far, discharges are distributed within the lake.

MITIGATION MEASURES

Mitigation measures are warranted to minimize adverse effects on surface water quality during construction.

The City shall ensure that contractor(s) develop a construction phase "Spills Management Plan" to maintain spills response capability, contain and clean-up all spills immediately upon detection. This management plans shall:

- Define project and site-specific objectives.
- List the applicable legislative and regulatory requirements.

- Describe the on-site roles and responsibilities with respect to spills prevention and emergency response procedures, including procedures for:
 - o reporting a spill
 - o stopping the spill if possible
 - o containing the spill
 - o protecting the area of the spill; and
 - o removing the material for storage or disposal.
- Describe monitoring and reporting requirements.

The City shall ensure that contractor(s) implement the following Best Management Practices:

- Vehicles, vessels, and machinery must be checked for leakage of lubricants or fuel and must be in good working order.
- Keep floating oil booms on hand if oily residue sheens or floating debris are detected.
- Store all POLs and chemicals in secure containers and preferably in a secure storage trailer.
- All construction waste and debris will be disposed of in accordance with applicable provincial guidelines and regulations.
- Where possible, refuel equipment on impermeable pads, liners or using drip pans at least 30 m from the lake.
- Vehicles remaining stationary for more than 30 minutes shall use drip pans. Drip pans shall be emptied into oil absorbing sheets or waste POL containers for disposal. Every vehicle to carry a spill kit to control spills from that vehicle.
- The construction site shall have a single, prominently marked location for the storage of POL and other hazardous or potentially contaminating materials (e.g. solvents). These storage areas shall not be located within thirty metres of Lake Ontario. An approved spill kit shall be available at all storage locations.

Any spill and the response taken should be reported to immediately to the City and the MECP Spills Action Centre.

NET EFFECT:

Taking into the consideration the effective implementation of mitigation measures, the net effect of the Project on surface water quality from leaks and spills during construction is considered *Negligible*.

7.2.2. EFFECTS OF ESTABLISHMENT

Criterion:	Resiliency of proposed lakefill to changing lake levels and coastal processes
Indicator:	Changing lake levels (i.e., flooding hazards) and coastal processes (shoreline erosion) including future changes associated with climate change.
Potential Effect:	The lakefill may result in changes in the water levels and circulation patterns along the Lake Ontario shoreline that may result in local flooding, changes to sediment movement and deposition patterns in Lake Ontario.

EFFECTS ASSESSMENT

The conceptual design of the lakefill has taken into consideration the ability of lakefill to withstand changing lake levels (i.e., flooding hazards) and coastal processes (wave action, shoreline erosion) including future changes associated with climate change.

MITIGATION MEASURES

None

NET EFFECT

The lakefill will not be affected by and will have No Net Effect on water levels and circulation patterns along the Lake Ontario shoreline that may result in local flooding, changes to sediment movement and deposition patterns in Lake Ontario. The existing breakwater has already affected coastal processes along the Lake Ontario shoreline. The new lakefill adjacent to the breakwater will not change existing conditions in any notable way.

Criterion:	Effects on surface water quality in the Local Study Area
Indicator:	Changes to surface water quality
Potential Effect:	Reduced surface water quality from stormwater discharges

EFFECTS ASSESSMENT

The conceptual design of the preferred alternative (i.e., large lakefill footprint) includes grading to direct storm water to a bioswale along the western edge of the lakefill. The bioswale will accept and infiltrate the runoff from parking areas during the early stages of storm events, which is when deleterious substances, including hydrocarbons and sediments are washed from impervious surfaces. A perforated subdrain below the bio-swale will collect the filtered water which will be conveyed to the adjacent marina basin via storm sewers and outfall structures. The conceptual design includes approximately 10,000 m² of the Project site being allocated to parking. Parking areas are well known to be sources of many types of pollutants such as oil, gas, sediment, heavy metals, nutrients, and trash.

Impervious surfaces (i.e., paved parking areas, trails, covered buildings) on the shore or on the lakefill will contribute to stormwater runoff into Lake Ontario during rainfall and snowmelt events. Changes in stormwater discharges to Lake Ontario have the potential to result in reduced water quality in the marina basin and the nearshore area of the Lake through increased contaminant, sediment, and nutrient loadings. Increased temperature from stormwater discharges may also contribute to aquatic habitat alteration.

MITIGATION MEASURES

Mitigation measures are warranted to minimize adverse effects on surface water quality from stormwater discharges during establishment.

- If required, consideration shall be given to the use of additional Low Impact Development (LID) practices during detailed design, incorporating (where feasible) permeable paving, bioretention and infiltration areas, oil/grit separators, retention ponds, sand filters, grassed swales, vegetated filter strips. The City will be guided by its Green Development Standards (2012) where relevant.
- The detailed design will designate snow storage areas on-site if required. The City will consider lower impact road salt alternatives for use in winter maintenance operations as per City practices.
- The City will consult with the MECP and CVC in developing its detailed design.

NET EFFECT

Taking into consideration the effective implementation of design and mitigation measures, the net effect of the Project on surface water quality during establishment is considered Negligible.

7.3. ATMOSPHERIC ENVIRONMENT

7.3.1. EFFECTS OF CONSTRUCTION

Criterion:	Change to air quality
Indicator:	Changes to air quality from increased dust
Potential Effect:	Increased dust levels from, heavy equipment use/vehicle movement, soil/fill storage and fill placement.

EFFECTS ASSESSMENT

Construction activities such as vehicle movements and the movement and placement of fill have the potential to generate dust. Dust may be a nuisance to residents, recreational users and businesses adjacent to the site (both on land and in the water) and along access routes.

MITIGATION MEASURES

• Minimize vehicle movement on/over exposed soils.

- Regularly clean city streets used by trucks or other vehicles entering / exiting the project site (by sweeping or water application)
- Apply dust suppression measures (water) should dust levels be a concern on-site or due to a public complaint.

NFT FFFFCT

Negligible effect as mitigation measures are proven to be effective. Construction activities near sensitive receptors onshore will occur for a short period of the overall construction time. Most fill operations that might generate dust will occur with increasing distance away from residents and recreational users.

Criterion:	Changes to ambient noise
Indicator:	Changes to ambient noise
Potential Effect:	Increased ambient noise levels nearest construction activities and along haul roads. Increased underwater noise levels from vessel operations and fill placement.

EFFECTS ASSESSMENT

Construction activities such as vehicle movements and the use of construction equipment have the potential to generate noise. The noisiest activities will be the dumping of rocks and the backup beepers on construction equipment. Noise may be a nuisance to residents, recreational users and businesses adjacent to the site (both on land, in the marina basis and in the lake) and along access routes. Noise may be generated underwater during the placement of fill affecting fish.

MITIGATION MEASURES

- All equipment used by contractors should be well maintained and fitted with engine mufflers.
- Construction site hoarding will be installed around the worksite to provide shielding from noise generating activities.
- Activities that could create excessive noise will be restricted to daylight hours and adhere to the intent of the Mississauga's municipal noise control by-laws and polices.
- No construction will be permitted on weekends or on statutory holidays, unless • exemption from by-law is granted by the City.
- Vehicles, vessels, and equipment to be in good repair, equipped with noise emission controls as applicable and operated within operating specifications.
- To the extent possible, vessel engines and propellers will be shutdown if anchored to reduce unnecessary underwater noise during their operation.

NET EFFECT

Negligible effect as mitigation measures are proven to be effective and construction activities near residents and recreational users will occur for a short period of the overall construction time. Most fill operations that might generate noise will occur with increasing distance away from residents and recreational users.

7.4. BIOLOGICAL ENVIRONMENT

7.4.1. EFFECTS OF CONSTRUCTION

Criterion:	Area and quality of terrestrial habitat
Indicator:	Total area of terrestrial habitat created, enhanced, disrupted, or lost
Potential Effect:	Approximately 1,700 m ² of terrestrial habitat will be removed and/or disturbed by major construction activities.

EFFECTS ASSESSMENT

Approximately 1,700 m² of terrestrial habitat will be removed and/or disturbed by construction activities, including site perimeter plantings and clusters of mature trees on the existing breakwater. As discussed in Section 3.3.1, this habitat is of limited value given it consists of ornamental trees and the vegetation on the breakwater which is often overtopped. It is anticipated that birds will avoid the area under active construction. Most of the bird species currently using this part of the shoreline are urban tolerant and therefore, used to human activities. However, during migration seasons for song birds, which are typically more sensitive to human activities (including potentially Species at Risk). Migrating birds may need to take new migration routes or settle down in places that are not ideal habitat.

MITIGATION MEASURES

- Minimize the removal of existing trees to the extent possible, particularly along Port Street and adjacent to St Lawrence Park. Tree protection measures will be determined during detailed design by the City. Removals will be offset by compensatory planting as part of the proposed park (wildlife friendly native, non-invasive trees and shrubs within the landscaping plan). For example, consideration in will be given to creating a naturalized habitat that is less actively used by the public to give migrating song birds important habitat during migration.
- Comply with measures of the Migratory Birds Convention Act: vegetation removal will occur outside of breeding bird period (typically April 15-August 31). Major construction, particularly vegetation removal, will be outside of the spring bird migration window (mid-March to early June).

NET EFFECT

Negligible

Criterion:	Area and quality of terrestrial habitat
Indicator:	Potential effects on terrestrial Species at Risk (SAR) and Significant Wildlife Habitat (SWH)
Potential Effect:	No SAR habitat or SWH have been identified within the Project study area

EFFECTS ASSESSMENT

No SAR habitat or SWH have been identified within the Project study area.

MITIGATION

None Warranted

NET EFFECT

None

Criterion:	Area and quality of terrestrial habitat
Indicator:	Potential for the introduction of nuisance plant species into the terrestrial environment
Potential Effect:	Increased potential for the transport of nuisance and invasive plant species to the site via construction equipment

EFFECTS ASSESSMENT

There is an increased potential for the transport of nuisance and invasive plant species to the site via construction equipment. The movement of equipment and personnel could promote the introduction of invasive species to the new landform. Invasive plant species threaten and can alter existing terrestrial habitats and disrupt ecosystem functions. Once established, invasive species can: degrade wildlife habitat and biodiversity, including increasing competition with tree seedlings. Once established, invasive species become costly and difficult to control or eradicate. Ensure proper cleaning and treatment of equipment to minimize the potential risk of transmission of invasive species is an important practice.

MITIGATION

- Implement measures outlined tin the City of Mississauga's "Invasive Species Management Plan & Implementation Strategy" (City of Mississauga, 2021).
- Apply best management practices regarding cleaning of vehicles and equipment entering, exiting, and operating on-site. All contractors involved will follow the Ontario Invasive Plant Council's "Clean Equipment Protocol for Industry" (June 2016).

NET EFFECT

Negligible

Criterion:	Area and quality of aquatic habitat
Indicator:	Loss and disruption of aquatic habitat
Potential Effect:	During construction, a total of approximately 29,000 m ² of aquatic habitat will be removed as lakefill construction occurs and approximately 13,000 m ² will be altered. This includes the east side of the expanded lakefill and the underwater portion of the aquatic habitat feature at the south end. This replaces the existing bottom strata.

EFFECTS ASSESSMENT

The Study Area provides a variety of substrates at varying depths that likely afford aquatic habitat opportunities for several fish species and life stages of fish with documented presence in or near the study area. The preferred alternative will result in the largest area of lakebed infill and as a result require the removal of approximately 29,000 m² of fish habitat. This is in addition to the replacement of like for like habitat along the eastern face of the existing breakwater that is replicated in the proposed marina design.

During construction, a total of approximately 29,000 m² of aquatic habitat will be removed as lakefill construction occurs and approximately 13,000 m² will be altered. This includes the east side of the expanded lakefill and the underwater portion of the aquatic habitat feature at the south end. The proposed lakefill will replace the existing bottom strata.

MITIGATION MEASURES

The fish habitat creation component of the 1PSEPM Project preferred alternative proposes to create and enhance aquatic habitat at the southern (lakeward) terminus of the proposed lakefill. Here, the proposed shoreline will be sculpted westward to create a lakeward facing embayment that will be protected by an armour stone island to be created further out into the lake adjacent to the headland. The proposed feature will create approximately 2,400 sq. m of semi-sheltered moderately shallow water area where substrate can be selected, and structural habitat provided at varying depths. The east side of the lakefill may permit additional opportunities to flatten the side slope and /or create a shallow underwater terrace along portions of the wall to be sheltered by the island and create littoral areas to provide productive areas for forage fish reproduction and feeding.

The island breakwater and embayment will be constructed with materials that provide a variety of substrate for aquatic vegetation and fish habitat. It is anticipated that the lee side of the island will provide quality spawning and foraging habitat for open coast fish species such as Alewife, Lake Trout and juvenile salmonids; sheltered habitat for important Lake Ontario feeder fish species such as Emerald Shiner, Lake Chub and Spottail Shiner as well as nearshore fish species such as White Sucker, Common Carp and Longnose Dace.

It should be noted that the design of the aquatic habitat area and the shore protection structure is still at the conceptual level and details of the substrate and habitat features will be further developed by the project team in consultation with the regulatory agencies and Indigenous Communities. The detailed design will ensure that breeding habitat for the Common Carp species shall not be promoted.

The offset plan to be developed, in conjunction with DFO and Indigenous Communities, as part of the Fisheries Act Authorization will provide appropriate habitat offsets to counterbalance total aquatic habitat removal. This entails investments in the creation of fish habitat off-site.

In water construction activities will occur within appropriate restriction timing windows for fish, where possible, to protect fish and fish habitat. As appropriate, areas will be cleared of fish prior to fill placement. Any fish entrapped in fill areas will be removed to the lake.

All machinery, equipment, and vessels that will be used during construction shall follow regulations and best practices on clean equipment/vessel protocols to avoid spreading non-native invasive plants and animals (fish, mussels, crabs, etc.) on hauls and ballast tanks.

NET EFFECT

Negligible with appropriate offsetting of remaining aquatic habitat losses.

Criterion:	Area and quality of aquatic habitat
Indicator:	Potential effects on aquatic Species at Risk (SAR) and/or habitat
Potential Effect:	No areas of critical habitat for potential SAR or aquatic SAR were documented during the field investigation.

EFFECTS ASSESSMENT

There are no areas of critical habitat for aquatic SAR were documented during the field investigation.

MITIGATION MEAURES

None warranted.

NET EFFECT

None.

7.4.2. EFFECTS OF ESTABLISHMENT

Criterion:	Area and quality of terrestrial habitat
Indicator:	Potential for the creation of habitat for nuisance species.
Potential Effect:	Increased potential for the establishment of nuisance and invasive species at the site.

EFFECTS ASSESSMENT

The establishment of the park area creates the opportunity for the establishment of nuisance and invasive species at the site. These species are often opportunistic with vegetation species arriving on the wind or being transported to the site by animals, birds or humans, and faunal species (such as geese) self transporting to site.

MITIGATION MEASURES

- In order to minimize the establishment of nuisance and invasive species at the site, best management practices regarding parkland design and nuisance species management will be applied. (e.g., consider minimizing Canada Goose foods (turf grass) and maximizing native herbaceous plantings that block turf grass/paths from the water.)
- With respect to Canada Geese, City staff monitor geese populations annually across waterfront areas, including parks and marina facilities. A Goose Management program that has proven to control the population of resident geese within waterfront areas of the city.

NET EFFECT

Negligible. Best Management Practice employed by the City have proven to be effective.

Criterion:	Area and quality of terrestrial habitat
Indicator:	Potential for improvement to terrestrial habitat
Potential Effect:	On a portion of the 18,000 m ² of parkland created, native species will be planted to compliment other Lake Ontario shoreline and inland migratory bird habitat and increased habitat connectivity

EFFECTS ASSESSMENT

On a portion of the 18,000 m² of parkland created, native non-invasive species of trees, shrubs and other vegetation will be planted that may be used by urban tolerant wildlife and birds. The newly created area may function as a stopover for migratory birds. This potential terrestrial habitat has the potential to compliment other Lake Ontario shoreline and inland migratory bird habitat and increased habitat connectivity. It is noted that because this is a park setting that includes soft landscape and hard surfaced pathways not all of this area will be planted and support ecological functions. Moreover, it will be heavily used by people making it low quality new habitat.

The City's Natural Heritage and Urban Forest Strategy (2014) promotes the protection, expansion and restoration of the Natural Heritage System, its features, and increasing the City's urban tree canopy cover. The planting of native trees and naturalized (trees/shrubs/herbaceous plants) habitat area/areas support this strategy.

MITIGATION MEASURES

• Vegetation to be planted should be wildlife friendly native, non-invasive trees, shrubs and grasses. The City's plantings should be guided by its Green Development Standards (2012) where relevant.

NET EFFECT

None.

Criterion:	Area and quality of aquatic habitat
Indicator:	Potential for creation or enhancement of aquatic habitat
Potential Effect:	Potential creation of 2,400 m ² of aquatic habitat associated with the lakefill and aquatic habitat features included in the design.

EFFECTS ASSESSMENT

The project will create 2,400 m² of aquatic habitat primarily associated with the aquatic habitat feature at the south end of the site.

The fish habitat creation component of the 1PSEPM design proposes to create and enhance aquatic habitat at the southern (lakeward) terminus of the proposed lakefill. Here, the proposed shoreline will be sculpted westward to create a lakeward facing embayment that will be protected by an armour stone island to be created further out into the lake adjacent to the headland. The proposed feature will create approximately 2,400 m² of semi-sheltered moderately shallow water area where substrate can be selected, and structural habitat provided at varying depths. The east side of the lakefill may permit additional opportunities to flatten the side slope and /or create a shallow underwater terrace along portions of the wall to be sheltered by the island and create littoral areas to provide productive areas for forage fish reproduction and feeding.

The island breakwater and embayment will provide a variety of substrate for aquatic vegetation and fish habitat. It is anticipated that the lee side of the island will provide quality spawning and foraging habitat for open coast fish species such as Alewife, Lake Trout and juvenile salmonids; sheltered habitat for important Lake Ontario feeder fish species such as Emerald Shiner, Lake Chub and Spottail Shiner as well as nearshore fish species such as White Sucker, Common Carp (non-native invasive species) and Longnose Dace.

It should be noted that the design of the aquatic habitat area and the shore protection structure is still at the conceptual level and details of the substrate and habitat features will be further developed by the project team in consultation with the regulatory agencies and Indigenous Communities. The offset plan to be developed, in conjunction with DFO and Indigenous Communities, as part of the Fisheries Act Authorization will provide appropriate habitat offsets to counterbalance total aquatic habitat removal. This will likely entail investments in the creation of fish habitat off-site.

MITIGATION MEASURES

Additional off-site compensation will be required to ensure a no net loss of aquatic habitat.

NET EFFECT

None.

7.5. SOCIO-ECONOMIC ENVIRONMENT

7.5.1. EFFECTS OF CONSTRUCTION

Criterion:	Potential for changes to use of waterfront for recreation
Indicator:	Disruption from construction nuisance effects of recreational activities undertaken at waterfront parklands and trails (e.g., cycling), on the lake, and in Port Credit Village.
Potential Effect:	Recreational users may be disrupted by construction noise, dust and traffic.

EFFECTS ASSESSMENT

Throughout the construction period, recreational users in the vicinity of the 1 Port Street site may experience nuisance effects such as noise and dust which may affect their recreational experience. While the duration of construction is estimated to be approximately 14 months, depending on fill availability, approvals, weather and in-water working periods, nuisance effects will be more pronounced when construction activities are closer to shore. None of these effects will preclude recreational use during construction.

MITIGATION MEASURES

Mitigation of these effects includes:

- Implement mitigation measures for air quality, noise, etc.
- Adhere to selected haul route for delivery of lakefill materials, if mandated by City.
- Avoid the use of the existing parking lots and loss of street parking.
- Maintain safe public access to waterfront trail along Port Street and provide alternative routes (if necessary)
- The City will coordinate all activities at the marina and vessel activity in the harbour for the duration of construction so as to avoid unnecessary interference with area users.
- The City shall ensure that notice and details of the Project has been provided to PCHM to be distributed to users. In addition, construction information will be posted to the project website.
- Maintain watch for boat traffic and communicate with other vessels to maintain safe operations.

Utilized the existing 311 system available to Mississauga residents and business
operators for registering of public complaints and allow for their resolution in
accordance with the City's policies.

NET EFFECT

Minor Adverse Effects.

Criterion:	Potential for changes to use of waterfront for recreation
Indicator:	Loss of recreational amenities
Potential Effect:	Loss of a small beach to the east of the breakwater along St. Lawrence Park.

EFFECTS ASSESSMENT

A portion of the small beach to the east of the breakwater along St. Lawrence Park will be lost because of construction of the lakefill. This area of the beach is very small, and the public is not encouraged to access this area.

MITIGATION MEASURES

A similar sized beach will be established naturally over time where the northeast edge of the lakefill connects to the existing shoreline.

NET EFFECT

None - Reestablishment of a similar beach over time will likely result in a no net loss of beach area.

Criterion:	Effects on business operations during construction
Indicator:	Effects on business operations from increased noise, dust, traffic and site visibility to business operations during construction
Potential Effect:	Disruption of business operations in vicinity of Project site and along haul routes.

EFFECTS ASSESSMENT

Throughout the construction period, businesses in the vicinity of the 1 Port Street East site and along the haul routes may experience nuisance effects such as noise and dust. While the duration of construction is estimated to be approximately 14 months, depending on fill availability, approvals, weather and in-water working periods, and the actual construction period will be longer, nuisance effects will be more pronounced when construction activities are closer to shore. None of these effects will preclude business activities during construction.

MITIGATION MEASURES

- Implement mitigation measures for air quality and noise. Comply with all municipal bylaws.
- No construction work on weekends and statutory holidays and between 7pm and 7am unless special permissions are obtained.
- Adhere to selected haul route(s) for delivery of lakefill materials, if designated by the City at the time of construction.
- Regularly inform local business operators in the Local Study Area of the 1PSEPM Project schedule and timing of construction activities
- Monitor and effectively respond to public complaints in a timely manner.

NET EFFECT

Minor Adverse Effects.

Criterion:	Effects on business operations during construction
Indicator:	Increased business activity presence of workforce and City spending on goods and services during construction and establishment
Potential Effect:	Increased business activity

EFFECTS ASSESSMENT

During construction there will be a small workforce that may choose to purchase goods and services within Port Credit.

MITIGATION MEASURES

Encourage purchasing of goods and services from local business operations.

NET EFFECT

Positive Effects.

7.5.2. EFFECTS OF ESTABLISHMENT

Criterion:	Area of open space or parkland created
Indicator:	Total area to be made available for recreation including trails
Potential Effect:	Creation of 18,000 m ² of parkland for community use and enjoyment

EFFECTS ASSESSMENT

The project will create 18,000 m² of parkland and trail for community and visitor use and enjoyment. Public access and use of the existing marina site is not permitted. The waterfront trail will connect through this area from St. Lawrence Park in the east to J.J. Plaus Park in the west and permit users to access the multi-use trail providing vistas back to Port Credit.

MITIGATION MEASURES

None Warranted

NET EFFECT

Positive

Criterion:	Disruption to use and enjoyment of property during establishment
Indicator:	Effects of park and marina operations (air emissions, noise, dust, and traffic) at residential properties, community facilities and institutions.
Potential Effect:	Marina and park operations are similar to existing conditions.
	There is potential for increased activity by park users by virtue of the larger park space thus, some community members may experience altered enjoyment of their private properties and community features as a result of this increased use.

EFFECTS ASSESSMENT

There is potential for increased activity by park users by virtue of the larger park space thus, some residents living near the marina and some visitors may experience increased noise and traffic during periods of peak use. This may result in increased enjoyment of recreational spaces and/ or reduced enjoyment of private properties and community features (e.g., St. Lawrence Park, Trail) as a result of this increased use.

This project creates land to move the existing marina from the western wharf to the new land created around the eastern breakwater. As such, no significant change to current traffic patterns associated with the marina operation is anticipated. Marina and park operations are similar to existing conditions. There will be parking for the marina and parkland areas created as part of the 1PSEPM Project preferred alternative development.

MITIGATION MEASURES

Marina operations will comply with all municipal bylaws including, noise by-laws.

NET EFFECT

Negligible.

Criterion:	Disruption to use and enjoyment of property during establishment
Indicator:	Effects of visibility of new lakefill area including park activities and marina operations at residential properties, community facilities and institutions.
Potential Effect:	Local residents living in dwellings facing Lake Ontario may experience a change to their use and enjoyment of their properties due to the visibility of the new lakefill and marina facilities, including parkland, parking areas and winter boat storage.

EFFECTS ASSESSMENT

Residents living in dwellings facing Lake Ontario may experience a change to their use and enjoyment of their properties due to the visibility of the new lakefill and marina facilities, including parkland, parking areas and winter boat storage. Currently, some residents see the breakwater, the existing docking facilities and the buildings and operations associated with the existing Port Credit Harbour Marina.

The new lakefill area will be landscaped however, it will take time for vegetation to grow such that it provides a visual screen. During the winter months, fencing and surveillance will be needed around winter boat storage. It is during the winter that the visual impact may be greater. For some residents, views of the parking and winter boat storage may be considered unpleasant, particularly if not fully screened by vegetation plantings along the east side of the lakefill. In most cases, views of the lake will remain unobstructed. For others, screening of the existing PCHM and new views of the parkland created at the end of the lakefill might be considered as a positive change.

MITIGATION MEASURES

- City will ensure that parkland is continuously maintained and that all parking and winter boat storage meets City requirements.
- Develop, implement, and maintain vegetation to screen, where possible, the parking/boat storage area from local residences.

NET EFFECT

Minor Adverse Effect

Criterion:	Changes in community character
Indicator:	Opportunity to enhance the unique character of Port Credit Village and its marina functions along the waterfront.
Potential Effect:	"Keeping the Port in Port Credit" and the establishment of additional waterfront parkland will enhance the unique character of Port Credit Village.
EFFECTS ASSESSMENT

The relocation of the marina within the Port Credit Harbour basin and the provision of additional parkland is consistent with the desire to "keep the Port in Port Credit' and enhances the unique character of Port Credit Village. The Project is consistent with the vision developed through the Inspiration Port Credit process and as outlined in the Port Credit Local Area Plan. Specifically, the Project:

- supports Port Credit as a distinct waterfront community with public access to the shoreline, protected views and vistas to Lake Ontario, and active waterfront uses;
- enhances and promotes the pedestrian and cyclist environment, creating well connected and balanced parks and open spaces and reinforcing high quality-built form;
- supports the enhancement of the natural environment; and
- promotes a healthy and complete community by providing a range of opportunities to access the environment, recreational, educational, community and cultural infrastructure that can assist in meeting the day- to-day needs of residents.

The 1PSEPM Project also supports the objectives of the Comprehensive Master Plan, that the Mississauga City Council adopted OPA 65 for 1 Port Street East in 2017. In this context, the 1PSEPM Project should help the City achieve the following:

- supports the overall vision of Port Credit as an evolving waterfront village;
- celebrates the site's urban waterfront context; and
- draws people to the water's edge to live, work, make, learn, shop and play.

MITIGATION MEASURES

None warranted.

NET EFFECT

Positive.

Criterion:	Effects on business operations
Indicator:	Potential for effects on local business operations
Potential Effect:	With the larger community space enabled by the lakefill, there is potential for increased activity that may increase noise, air emissions and traffic in the area. At the same time this will draw additional potential customers to local businesses.

EFFECTS ASSESSMENT

The project will create a new parkland and trails which will enhance connectivity across the waterfront in Port Credit. This has the potential to affect local businesses both positively and negatively. The park and connectively will draw additional people to use the area creating additional potential customers for area businesses. Businesses may also experience nuisances related to traffic and/or noise.

MITIGATION MEASURES

None

NET EFFECT

Positive.

7.6. CULTURAL ENVIRONMENT

7.6.1. EFFECTS OF CONSTRUCTION

Criterion:	Potential for displacement of built heritage resources due to construction
Indicator:	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area
Potential Effect:	Cultural Heritage study found no built heritage resources within the footprint of the project.

EFFECTS ASSESSMENT

There are no built cultural heritage resources within the footprint of the project nor immediately adjacent to the 1PSEPM project site therefore, there will be no displacement nor disturbance of heritage resources.

MITIGATION MEASURES

None Warranted

NET EFFECT

None.

Criterion:	Potential displacement of marine- and land-based archaeological resources
Indicator:	Significance of archaeological resources within footprint of land creation and associated park area
Potential Effect:	A marine archaeological study found no archaeological resources were found with in the footprint of the project.

SHOREPLAN

EFFECTS ASSESSMENT

There are no marine or land based archaeological resources within the footprint of the project therefore, there will be no displacement of archaeological resources.

MITIGATION MEASURES

None Warranted

NET EFFECT

None.

Criterion:	Potential for effect from construction on traditional uses of lands by Indigenous communities.
Indicator:	Extent of traditional uses of lands and waters within 1PSEM Project Study Area
Potential Effect:	Construction activities can potentially limit the ability for Indigenous communities to use the land and water for traditional uses.

EFFECTS ASSESSMENT

The 1PSEPM Project falls within the unceded territory of the Mississaugas of the Credit First Nation (MCFN). The City understands that the MCFN filed an Aboriginal Title Claim to Waters within the Treaty territory of the Mississaugas of the Credit. The Mississaugas of the Credit First Nation assert that they have unextinguished Aboriginal title to all water, beds of water, and floodplains contained in their treaty lands and territory. As such, the MCFN may consider this 1PSEPM Project as infringing on their rights and interests.

The 1PSEPM Project also falls within an area of known or suspected historical occupation by the Six Nations of the Grand River as represented by the Elected Chief and Council and the Haudenosaunee Confederacy Chiefs Council (HCCC). The HCCC has delegated the Haudenosaunee Development Institute ('HDI') to represent HCCC interests in the development of lands within the traditional territory of the Haudenosaunee. HDI is also charged with ensuring that the perpetual care and maintenance of the Haudenosaunee interests is maintained. In addition, the Huron Wendat Nation currently located in Wendake, Quebec (Nation Huronne-Wendat) have historic ties and interests in areas along the north shore of Lake Ontario and they hold rights to engagement for all matters dealing with cultural heritage. As such, these Indigenous communities may also consider this 1PSEPM Project as infringing on their rights and interests.

MITIGATION MEASURES

• The City acknowledges the potential infringement of rights and interests with respect to the lands, waters, and resources claimed by Indigenous communities and is consulting with these Nations to determine if there are impacts and if further mitigation is required.

• The City will continue to engage and communicate with Indigenous communities regarding their inherent rights and interests in relation to the 1PSEPM Project.

NET EFFECT

The results of this EA demonstrate that net adverse effects on the environment from the 1PSEPM Project are either minor or negligible in nature. As such, the City does not consider the 1PSEPM Project as infringing on any interest that Indigenous communities may have with respect to the lands, waters, and resources in the Project study areas. While requests for compensation, accommodation or considerations in relation to Aboriginal rights are not within the role or capacity of the City to provide beyond mitigation measures for adverse environmental impacts considered in the EA, the City will support any such request to the Province and work with the communities to resolve such concerns.

7.7. **COSTS**

This capital cost of the conceptual design for the preferred alternative will be refined following the EA. The capital cost will include:

- Construction of berm and placement of fill material
- Shore protection
- Landscaping
- Site servicing

The cost of contingency, design, approvals and administration will also be part of the capital cost estimate. Additional cost estimates will also be prepared for the marina. The capital costs for the project would need to be approved by Council following the EA approval by MECP.

8. MONITORING AND ADAPTIVE MANAGEMENT

8.1. MONITORING

The development of a monitoring plan is an important part of the EA. A monitoring program serves several functions throughout the life of the 1PSEPM Project:

- EA compliance monitoring will ensure compliance with EA commitments and ensure that the 1PSEPM Project is constructed according to the conceptual design requirements assessed in the EA and final design elements.
- Environmental performance monitoring will determine if the 1PSEPM Project functions as intended during the establishment and post establishment phases. Monitoring information will be used to determine if the aquatic habitat is functioning as anticipated or if modifications are required.

8.1.1. EA COMPLIANCE MONITORING

EA compliance monitoring for the 1PSEPM Project will address the following key issues related to the physical and biological effects and mitigation measures identified for the 1PSEPM Project by ensuring:

- compliance with all commitments made in the EA including the implementation of mitigative measures as identified in the EA;
- compliance with erosion and sediment control plans;
- compliance with stormwater management plans;
- compliance with turbidity management protocol;
- the implementation of aquatic habitat mitigation measures;
- compliance with avoidance of migratory breeding bird periods;
- the implementation of best management practices during construction (e.g. air quality mitigation measures for dust, vehicle emissions management, noise management);
- compliance with all federal, provincial and municipal permits, licenses and approvals;
- compliance with fuel storage and handling and spill response plans; and
- document the as-built features immediately following construction completion.

EA compliance monitoring will continue until final grading and the establishment phase is completed. Once completed, the environmental performance monitoring program (see Section 8.1.3) will begin. Table 8.1 lists the commitments made during the EA. The City will adhere to these commitments if the project proceeds.

Project Phase	Commitment	EA Report Section Title	EA Report Section
Detailed Design	The conceptual design detailed in Chapter 6 will be refined during detailed design. The park design will include a public engagement process.	Description of the Preferred Undertaking	6.0
	The City will ensure that an "Erosion and Sediment Control Plan" is developed that will apply for the duration of construction activities.	Physical Environment, Effects of Construction	7.1 7.1.1
	The City will ensure that contractor(s) develop a construction phase "Spills Management Plan".	Physical Environment, Effects of Construction	7.1 7.1.1
	The City will develop a fish and fish habitat offset plan as part of the <i>Fisheries Act</i> Authorization.	Biological Environment, Effects of Construction	7.2 7.2.1
	Develop a "Stormwater Management Plan" for the established lakefill.	Physical Environment, Effects of Establishment	7.2 7.2.1
	The City will develop a monitoring plan consisting of EA compliance monitoring and environmental performance monitoring.	Monitoring	8 8.1
Construction	All in-water work will be completed during an appropriate in-water work timing window, as set out by Fisheries and Oceans Canada, to comply with fisheries regulations.	Stage 1 Land Creation	6.5.1
	The City will implement the mitigation measures identified for effects of Construction on all environmental components	Detailed Assessment of the Preferred Alternative	7.0
	The City will ensure that construction follows best management practices in "Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario"	Physical Environment, Effects of Construction	7.1 7.1.1
	The City will ensure that vegetation removals will be offset by compensatory planting as part of the proposed park (wildlife friendly native, non-invasive trees and shrubs within the landscaping plan)	Biological Environment, Effects of Construction	7.2 7.2.1
	The City will ensure that notice and details of the Project construction has been provided to PCHM to be distributed to users. In addition, construction information will be posted to the project website	Socio-economic Environment, Effects of Construction	7.4 7.4.1
Establishment	The City will undertake visual inspections of the breakwater revetments as detailed in Section 6.3.1.	Breakwaters	6.3.1

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Project Phase	Commitment	EA Report Section Title	EA Report Section
	The City will maintain the marina, park space, multi-use trails and parking lot in accordance with current maintenance practices.	Facilities	6.3.2
	The City will implement the mitigation measures identified for effects of Establishment on all environmental components.	Detailed Assessment of the Preferred Alternative	7.0
	The City will implement the existing Goose Management program on the 1PSEPM Project site.	Biological Environment, Effects of Establishment	7.3 7.3.2
	Marina operations will comply with all municipal bylaws.	Biological Environment, Effects of Establishment	7.4 7.4.2

8.1.2. ENVIRONMENTAL PERFORMANCE MONITORING

For the 1PSEPM Project, the purpose of environmental performance monitoring is to determine whether the Project design is achieving is desired outcomes during and after the establishment phase, in term of:

- Resiliency of the lakefill to changing lake levels and coastal processes; and
- Amount and quality aquatic habitat created or enhanced.

Results of Environmental Performance Monitoring may trigger adaptive management measures where necessary and/or form the refinement of the as-built features of the lakefill and/or requirements of additional aquatic habitat compensation. Monitoring would commence at the completion of the 1PSEPM Project construction, following final grading and cover stabilization and as-built documentation has been completed.

The specific details and measures to be included in the environmental performance monitoring program for the 1PSEPM Project will be developed through the detailed design and construction phases.

9. CONSULTATION RECORD

9.1. CONSULTATION OBJECTIVES

1PSEPM Project EA consultation activities met the requirements and best practice for the provincial EA process.

The following objectives guided EA consultation activities:

- 1. To meet the consultation requirements for the provincial Individual EA.
- 2. To provide opportunities to participate in the consultation process to anyone interested.
- 3. To provide clear, concise information about the 1PSEPM Project that is easy for the public to understand.
- 4. To create opportunities for meaningful two-way exchange of information between the proponents, their consultants, and consultation participants, including Indigenous communities and groups.
- 5. To produce accurate and comprehensive reports that capture all feedback and advice received.
- 6. To thoroughly review and consider all feedback and advice received through the consultation and demonstrate how that feedback and advice has influenced the 1PSEPM Project.

9.2. APPROACH TO REGULATORY CONSULTATION AND COMMUNITY ENGAGEMENT

The consultation process was designed to directly inform decision-making at key points in the EA. At each of these points, the public and agencies had the opportunity to provide their feedback and advice through the consultation mechanisms discussed above. The key points in the EA process are:

- Development and evaluation of 'Alternative Methods'.
- Selection of preliminary Preferred Alternative; and
- Confirmation and refinement of Preferred Alternative;
- Assessment of impacts and mitigation measures
- Recommendations regarding monitoring and adaptive management plans.

Targeted consultation was undertaken on an as required basis with key stakeholders including representatives from:

• The local and surrounding neighbourhoods (including the general public, representatives of resident associations, and organizations with recreational, environmental, cultural, heritage, business, and other interests); and

- The City of Mississauga, the Province of Ontario, and the Government of Canada.
- Agencies (Credit Valley Conservation)

9.3. PUBLIC AND STAKEHOLDER ENGAGEMENT

9.3.1. NOTIFICATIONS

Consultation with the agencies, interested parties, stakeholders and public were ongoing throughout the EA Stage of the 1PSEPM Project. Consultation began with the publication and distribution of the Notice of Commencement for the EA and updates to the City's 1PSEPM Project webpage. Notifications of virtual PICs were emailed to those on the project mailing list and mailed to surrounding area residents and businesses. Emails were also sent to regulatory agencies and Indigenous communities to provide notification and request meetings to continue to discuss the 1PSEPM Project and the EA Stage.

9.3.2. PUBLIC INFORMATION CENTRE #1

A virtual Public Information Centre (PIC) #1 took place online from February 17 to March 17, 2022. A recorded presentation was provided to explain the lakefill alternatives assessed and the preliminary preferred lakefill alternative. The public had access to the PIC materials online and hard copies were mailed upon request. This allowed residents to participate when it was convenient for them.

The City notified interested stakeholders of the PIC through an email to those on the mailing list, mailing to area residents and businesses, a notice in Mississauga News, eBlasts to the Project email list, social media advertising and posts, roadway signage, and posters at Port Credit Harbour Marina.

The public provided feedback through an online survey on the alternatives considered, the evaluation criteria and the results of the evaluation.

The City prepared a summary document with an overview of PIC #1, and responses to questions submitted through the survey. The City received 130 completed surveys and over 550 views to the online presentation. Topics of discussion and questions centered around the following:

- Marina continuity
- Environmental components
- Fishing boats
- Costs
- Marina services
- Wharf re-development by the Canada Lands Company
- Parkland
- Status of the Ridgetown
- Traffic and parking

SHOREPLAN

Responses to questions posed and a summary of the PIC were posted on the Project website. The feedback gathered informed the evaluation of the alternatives and the preferred lakefill alternative. In general, those providing feedback were supportive of the evaluation of alternatives and the preferred alternative.

To be notified of future engagement opportunities, including the next PIC participants were asked to subscribe to news alerts to be kept up to date on the Project by email.

9.3.3. PUBLIC INFORMATION CENTRE #2

A virtual Public Information Centre (PIC) #2 was held for a month starting on August 25, 2022. A recorded presentation was provided on the Project website and available through YouTube to present the preferred lakefill alternative, the preliminary design of the parkland space and marina along with an overview of key environmental effects. The public provided feedback through an online survey focusing on the Preferred Large Lakefill Alternative and the key features of the marina and parkland.

The City received 130 completed surveys and approximately 500 views of the online presentation. Topics of discussion and questions centered around the following:

- Amount of parking and the configuration of parkland and parking
- Impact of the Project on aquatic life, birds, and waterfowl
- Providing opportunities for recreation (e.g., a beach area for swimming and access for kayaks, canoes and paddle boards, a boat launch for personal watercraft)
- The resilience of the lakefill
- Noise from construction and noise from operation of the marina
- Construction duration
- Traffic impacts on Lakeshore Road
- Site visibility and landscaping

A 1PSEPM Project EA "Pop-up Event" took place on Saturday, August 27, 2022, at Credit Village Marina. Staff were onsite to answer questions and discuss the Environmental Assessment Public Information Centre #2 materials that were available at the event.

Participants of the pop-up event were asked to complete an online survey. The City prepared a summary document available on the Project website with an overview of PIC #2 and responses to questions submitted through the survey.

9.3.4. SUMMARY OF PUBLIC COMMENTS AND RESPONSES

Table 9. 1 provides a summary of the comments received from the public throughout the EA planning phase. Responses were developed by the City and the consultant team following each PIC.

Table 9.1:Summary of Public Comments and Responses

Theme	Comments or Questions	Comment Consideration / Question Response
Marina continuity	Is there an update on the Port Credit Harbour Marina lease?	At PIC#2 (August/September 2022) the City provided and update and advised participants that Canada Lands and Centre City Capital Ltd. have reached an agreement to extend the marina lease for the management of the Port Credit Harbour Marina. This lease extension allows for the continued operations of the existing marina and boating seasons while the City works on its marina plans.
Environmental components	How will the City manage potential Canada geese population issues on the new lakefill parkland?	City staff monitor geese populations annually across waterfront areas, including parks and marina facilities. Each year City staff work with various partners to implement a proven comprehensive Goose Management program that controls the population of resident geese within waterfront areas of the City. The Goose Management program will continue annually and will be applied to the new marina area.
	Is there a way to protect the small beach area east of the breakwater, which may be impacted by the lakefill construction?	This small beach largely falls within the project footprint and will be removed. However, the beach will be re-established very slowly after the new lakefill is in place. The loss of this beach was identified as an impact of the project in Section 7 of the EA.
	Will there be any impact to the nearby water treatment plant and the water flow in the lake?	Water flow in the lake will not change, as the new lakefill will not alter the water circulation patterns created by the existing breakwater. No impact on the water treatment plant is anticipated.
	How confident is the project team that the large lakefill alternative will not have long-term negative effects on marine life and ecology?	A goal of the project is to enhance lake and fish habitat and improve it over existing conditions. Lakefill projects along the north shore of Lake Ontario are being designed to create fish habitat and monitoring data has demonstrated the success of these efforts. Fisheries and Oceans Canada and Credit Valley Conservation will be consulted during permitting.
	What kind of stormwater controls are being considered for the parking area and for the park?	The approach to storm water management is detailed in Section 6.5.2 of the EA. A storm water management plan will be developed during detailed design that outlines the design features and best management practices.
	Can you provide more details on the parking lot?	Detailed design of the parking lot will follow the EA. It is anticipated that the parking lot will serve the marina and park users.

Theme	Comments or Questions	Comment Consideration / Question Response
	What kind of environmental controls and spill response is there for the marina?	The City's two marinas are currently part of, and in good standing, with the Clean Marine Eco-Rating Program. This environmental program allows marina operators and businesses to follow best environmental practices to reduce and prevent water, air and land pollution associated with recreational boating activities in Ontario. The City also has protocols in place in the event of an environmental incident such as a spill. The City's existing protocols and the participation in the Clean Marine Eco-Rating Program would be extended to the proposed marina at 1 Port Street East.
	What will the green space be planted with? The marina parking area should be environmentally friendly and consider permeable parking.	Consideration to the use of permeable paving, and the type of plantings in the green space will be determined during detailed design, with emphasis on naturalized landscaping with native, non-invasive plants species.
	What will the water quality be like with 450 slips and boats?	The project is creating the land base to move the existing marina operation. There is no anticipated change in marina use such that water quality would change and with the implementation of the Clean Marine Eco-Rating Program there is potential for improvements in water quality.
	Are there provisions that can mitigate against algae?	There are ongoing algae issues all along the north shore of Lake Ontario. Considerable scientific research is underway to understand the algae issue and recommend ways it may be managed. It is not anticipated that the proposed lakefill project will alter the algae issues at this site
	How is this proposal being considered in the context of other improvements to the waterfront and the Credit River by the City?	The EA considers the impacts of the 1PSEPM Project in the context of existing and future baseline conditions, including other City improvements in proximity to the site. Waterfront parks are at capacity and new waterfront parkland would help to alleviate the pressure on existing parks.
	Will this project be net zero carbon?	We are pleased to say that at the same time as the City approved the Climate Change Action Plan, Council also approved the Corporate Green Building Standard (December 2019) and the proposed marina building, should it be built, would be subject to these standards.
Fishing boats	What is happening with regards to the fishing boats?	The new marina will offer a variety of slip sizes to accommodate a wide range of boats, including commercial operations. Programming of the marina is an operational matter that will need to be undertaken following the EA in consultation with stakeholders.
Marina services	Can boaters coming from other places arrive at the Marina for a day?	Yes, the proposed marina will accommodate slips for transient boaters.

Theme	Comments or Questions	Comment Consideration / Question Response
	Where will boats be launched from?	There will not be a public boat launch at this location. Boat launching facilities are provided by the City at other waterfront locations, including Lakefront Promenade Marina and the future launch planned for Marina Park.
	Will winter boat storage be provided?	The conceptual design presented in Section 6 of the EA proposes the location and amount of boat storage possible. A more precise estimate of area for parking/storage for boats versus parkland will be an outcome of the detailed design process after the EA
	What is being proposed for boat security?	Security for boats will be addressed as part of the detailed design and development of detailed operation plan.
	Comments about not enough boat storage being provided on the lakefill.	Section 6 of the EA proposes the area required for parking and winter boat storage and the number of slips associated with the marina. The considerations around the location and amount of boat storage will be addressed during detailed design.
	What is the existing slip count in relation to the preferred large lakefill alternative?	The estimated number of slips at existing marina is 470, and the number of boats using the existing marina facility is approximately 250. The large lakefill alternative includes approximately 450 slips. The approximate mix of the slip sizes will be updated in the next phase of the study during detailed design.
	How can the public be assured that variances will not be approved to remove the marina aspect of this project?	The approved Master Plan and Official Plan Amendment for this site identifies a marina to be provided on the lands between Elizabeth and Helene streets. The City has been working with Canada Lands based on this work. Canada Lands and the City executed an agreement for a phased transfer of the breakwater, 2 acres of land, and the deep-water harbour to the City for the purposes of developing a marina on the eastern portion of this site. This EA is building on previous work and studying alternatives to expand the land base for additional waterfront parkland and marina related function. The aim is to "Keep the Port in Port Credit". A decision on the project will be made by Council following EA approval.
	Questions with respect to how sewage from boats will be managed, provision of fuel, marina operations, safety and security, and management of litter in the park.	The City appreciates and notes all feedback received regarding the features and the operation of the marina. These issues will be addressed during detailed design and the development of a detailed operation plan. The public will have future consultation opportunities during the detail design phase of the project.

Theme	Comments or Questions	Comment Consideration / Question Response
Wharf re-development by the Canada Lands Company	What is the future of the wharf development owned by Canada Lands?	A future mixed-use neighbourhood is permitted as per an approved Master Plan and Official Plan Amendment to be developed on the wharf portion of lands where the existing Port Credit Harbour Marina and service building is currently located. The timing of the development of the wharf is dependent on the landowner and related required approvals and will likely involve comprehensive community consultation. A future mixed-use development of the Canada Lands Company property is not subject to the EA Act and not within the scope of the 1PSEPM Project EA.
Parkland	Will the park be available year-round?	The park will be accessible to the public year-round, subject to weather condition.
	Is there a plan to have public washrooms on this site?	The City intends on providing a public washroom on site.
	What public attractions are planned for the future parkland, if any?	The programming and design details for the parkland will be determined during detailed design following the EA. The public will have an opportunity to provide feedback throughout that process.
	How does the City know more parkland is needed?	The City's waterfront parks are highly used and are currently at capacity. This project presents a unique opportunity to provide new waterfront parkland and trail access along the water's edge where none currently exists. This site provides a unique opportunity to provide views of Port Credit, Lake Ontario, and beyond. The City's Waterfront Parks Strategy Refresh (2019) supports additional waterfront parkland, expanding continuous public shoreline access, and improving views and visibility to Lake Ontario. Specifically for the 1 Port Street East site, the Waterfront Parks Strategy Refresh recommends continuing to explore the opportunity for a full service marina and expansion of the eastern breakwater for public access.
	How will the park area be maintained?	The park area will be maintained in accordance with the City's current park maintenance standards and best practices.
Status of the Ridgetown	Will there be access to the Ridgetown as part of this project?	Lakefilling around the Ridgetown is not proposed as part of the 1PSEPM Project EA. Public access to the Ridgetown is not permitted or planned for safety reasons.
	Can anything be done to remove or beautify the boat (the Ridgetown) at the south end of the breakwater?	The Ridgetown is part of the breakwater creating the harbour basin. It cannot be removed without creating significant impacts. Beyond serving its function as part of the breakwater, the Ridgetown is outside the scope of this project.

Theme	Comments or Questions	Comment Consideration / Question Response
Traffic and parking in Port Credit / Lakeshore Road	How will the increased traffic due to boaters and park visitors be addressed?	This project creates land to move the existing marina from the wharf to the new land created around the eastern breakwater on the east side of the harbour basin. There will be parking for the marina created as part of the site development. Section 7.4 of the EA indicates that no significant change to current traffic patterns associated with the marina operation is anticipated.
	How will traffic be impacted on Lakeshore?	During construction there is anticipated to be approximately 50 truck loads or 100 truck movements per day or approximately 12 per hour. Adding 12 vehicle movements per hour to the existing traffic volumes creates an imperceptible change. Opportunities to further minimize traffic by bringing more materials to site by barge will also be considered. There will be little or no change to traffic once the site is operational as there is no change to the capacity of the marina. Increased traffic may occur as a result of how the parkland is used.
Amount of parking and the configuration of parkland and parking	Concerns raised with respect to configuration of parkland and parking. Comment received that it is undesirable to have to walk through or past a parking lot to access the park area.	The trail on the eastern side of the lakefill will have vegetation screening from the parking area providing a park-like quality to the walk to the park. This is challenging to show on the drawings due to scale. Details of the park and parking design will be refined in the detailed design phases following the EA.
	A number of comments were received about the amount of parking proposed for the lakefill area. Some respondents thought there was too much parking while others thought there should be more parking.	The amount of parking provided is consistent with the requirements set out in previous planning documents. Many people commented that there should be no parking or winter storage at the site however, one of the purposes of the project is to create land to permit the relocation of the marina from the west side of the basin to the east side of the basin. There is limited land available for the proposed marina at the 1 Port Street East site, therefore parking and winter storage will be located on the lakefill to make the marina economically viable. The parking provided will be available to both marina users and park user.
	Will there be adequate parking for vehicles with trailers designated?	No, there will not be designated parking for vehicles with trailers.
	Will the parking be paid and overnight?	There have been no decisions around paid parking or parking hours. Parking operation details will be addressed in detailed design.
Impact of the Project on aquatic life, birds, and waterfowl	Concerns were raised about the effect on birds and waterfowl currently using the area.	Construction activities will likely disturb the birds and waterfowl currently using the area. However, the species using the area are very tolerant of urban activities and will relocate to another part of the waterfront while construction is occurring. Dependent on timing, studies will be done prior to the start of construction to ensure nesting is not occurring.

Theme	Comments or Questions	Comment Consideration / Question Response
Providing opportunities for recreation (e.g., a	Suggestion to provide a beach area for swimming access	Coastal conditions in this area are not conducive to the creation of a beach as part of the 1PSEPM Project.
beach area for swimming and access for kayaks, canoes and paddle boards, a boat launch for personal watercraft)	Comments with respect to provision of a location to launch kayaks, canoes and paddle boards at the 1 Port Street East site.	There are no formal launching facilities for non-motorized boats planned for this site. Non-motorized launching facilities will be provided nearby at Marina Park and Lakefront Promenade Park.
The resilience of the lakefill	What consideration is being given to strong east wind, wave action and hazardous winter weather conditions?	The design of the lakefill takes into consideration the ability to withstand changing lake levels (flooding hazards) and coastal processes (wave action, shoreline erosion) including future changes associated with climate change. The design of shore protection will consider wave spray and reduce risks associated with severe waterfront conditions. Access may be limited during severe weather conditions
	What will be the increase in height of the lakefill compared to the existing breakwater?	The height of the lakefill will be higher than the existing rubble breakwater. The south tip of the landfill will be the highest and will gradually reduce in height as it approaches the existing shore. The south tip of the landform is anticipated to be in the order of 4 metres above average summer water level and the lakefill will match existing land elevation at the shore.
Noise from construction and noise from operation of the marina	Concerns about noise from construction and noise from operation of the marina (noisy boaters blasting music for example).	Construction activities will abide by the City's Noise Control By-law, which limits the noise impacts and hours of construction. The operation of the marina and the behaviour of individual boaters is an existing condition and is not anticipated to change because of the lakefill.
	Assuming the existing marina will be retained in some form during construction of the new landfill, what would be the effect on boaters continuing to use that marina, e.g. dust, noise, interference with access?	There may be some impacts to navigation and use within the basin for short periods of time. Boaters may experience construction noise and dust for short periods of time as a result of construction activities. Access to the existing marina is not anticipated to change.
Construction duration	Will construction be done over 14 consecutive months or is it intended to be spread over several years?	It is anticipated that the construction of the lakefill will take approximately 14 months to complete. However, there may be pauses in construction due to weather conditions, or times when construction may not be permitted because of permit conditions. This will add additional time to the total construction period.

Theme	Comments or Questions	Comment Consideration / Question Response
Site visibility and landscaping	Will the trees and landscaping on the east side of the lakefill ensure that the parking lot is not visible from St Lawrence Park and Tall Oaks Park?	There will be trees and landscaping along the east side of the lakefill to provide some visual screening. The type of vegetation to be planted will be determined during detailed design. Visual screening will be an important parameter in selection of plant material.

9.4. ENGAGEMENT WITH INDIGENOUS COMMUNITIES

The 1PSEPM Project Team has been and continues to be engaged with Indigenous communities as per the Crown's Duty to Consult as delegated by MECP. Indigenous communities that have a documented history of occupying territory that includes the 1PSEPM Project or Regional Study Areas and have potential or established treaty rights in the area of the Project or its vicinity will continue to be sent the information for the Project as it progresses. This information includes regular updates and information with respect to potential environmental impacts. As well, an open invitation extended to Indigenous communities to meet with the Project Team to discuss the proposal in greater detail and discuss issues of interest. Letters and emails were sent prior to each PIC to inform the Indigenous communities of the PICs as well as to invite the communities to meet with the City.

The following Indigenous communities were contacted during the EA process:

- Mississaugas of the Credit First Nation
- Six Nations of the Grand River
- The Haudenosaunee Confederacy Chiefs Council as represented by HDI; and
- Huron Wendat Nation

The Haudenosaunee Confederacy Chiefs Council has been in discussions with the City. In June 2022, Haudenosaunee Development Institute (HDI), sent a letter to the City stating that they believe the Haudenosaunee rights and interests were not considered or incorporated into the current Individual EA Terms of Reference for the Project. The City acknowledges HDI's position.

The Huron-Wendat Nation informed the Project Team that they would like to continue to be notified of any future archaeological work associated with this Project. The City has continued to keep the Huron-Wendat Nation involved in the EA process and will inform Indigenous communities should the need for additional archaeological work arise.

Because the City acknowledges the potential infringement of rights and interests with respect to the lands, waters, and resources claimed by Indigenous communities, the City continues to consult with the MCFN and others as necessary to determine if there are impacts and if further mitigation is required.

Table 9.2 summarizes correspondences, meetings and other events held with Indigenous communities.

Date	Туре	Summary
MCFN		
February 1, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1 to MCFN.
February 17 to March 17, 2022	PIC#1	EA PIC #1 a pre-recorded presentation and an on-line survey. Presentation focused on the status of the 1PSEPM Project and EA process.

Table 9.2: Indigenous Engagement

Date	Туре	Summary
March 24, 2022	Email	Request for a meeting and involvement in the 1PSEPM Project sent to MCFN.
August 11, 2022	Letter	Notice of PIC#2 sent to MCFN, with encouragement to actively participate in the EA process, contact the City of Mississauga's staff directly with comments or to discuss other ways the City can engage the community in the EA process.
August 25 to September 22, 2022	PIC#2	EA PIC #2 included a pre-recorded presentation and an on-line survey. Presentation focused on alternative means of carrying out the 1PSEPM Project and EA status.
September 1, 2022	Letter	Update on EA and request for involvement in the 1PSEPM Project sent to MCFN.
November 15, 2022	Meeting	Introductory meeting with MCFN about the 1PSEPM Project and the status of the EA.
March 1, 2023	Meeting	Presentation to MCFN on status of the 1PSEPM Project and EA, including the presentation of the preferred alternative. Q&A focused on environmental concerns, Aboriginal Treaty Rights and interests in relation to the 1PSEPM Project and MCFN expectations regarding future engagement with the City.
March 3, 2023	Email and Letter	MCFN's letter outlines their Aboriginal Treaty Rights and interests with respect to the 1PSEPM Project and requested the City to undertake a parallel consultation process to determine how Aboriginal and treaty rights can be respected as part of any proposed development plans, including in stewardship and environmental processes; with the goal of ensuring that the final EA submitted to the government can be done with MCFN's full support and that there are no outstanding concerns about unaddressed impacts on our Aboriginal or treaty rights.
April 28, 2023	Meeting	Follow-up meeting with MCFN.
July 2023	Meeting	Follow-up meeting with MCFN regarding review of the Draft EA
HDI		
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
February 17 to March 17, 2022	PIC#1	EA PIC #1 a pre-recorded presentation and an on-line survey. Presentation focused on the status of the 1PSEPM Project and EA process.
June 8, 2022	Meeting	Update on EA and request for involvement in the 1PSEPM Project. HDI advised the City that the Project will impair infringe and otherwise interfere with Aboriginal Rights and interests. HDI asked for the City of Mississauga to commence discussions with respect to accommodations to infringements of Haudenosaunee rights and requested engagement to proceed on the Inspiration Port Credit Charting the Future Course Master Plan.
June 9, 2022	Email	HDI confirmed their view that the Project will impair, infringe, and otherwise interfere with Aboriginal Rights and interests. HDI confirmed their request for the City of Mississauga to commence discussions with respect to accommodations to infringements of Haudenosaunee rights and requested engagement to proceed on the Inspiration Port Credit Charting the Future Course Master Plan.

Date	Туре	Summary
August 11, 2022	Email and Notice	Notice of PIC#2 and encouragement of HDI to actively participate in the EA process, contact the City of Mississauga's staff directly with comments or to discuss other ways the City can engage the community in the EA process.
August 25 to September 22, 2022	PIC#2	EA PIC #2 included a pre-recorded presentation and an on-line survey. Presentation focused on alternative means of carrying out the 1PSEPM Project and EA status.
September 19, 2022	Letter	City response to June 9, 2022 Email from HDI and provision of additional information requested at the June 9, 2022 meeting.
Six Nations of the Gra	nd River	
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
February 17 to March 17, 2022	PIC#1	EA PIC #1 a pre-recorded presentation and an on-line survey. Presentation focused on the status of the 1PSEPM Project and EA process.
August 11, 2022	Email and Notice	Notice of PIC#2 and encouragement of the Six Nations of the Grand River to actively participate in the EA process, contact the City of Mississauga's staff directly with comments or to discuss other ways the City can engage the community in the EA process.
August 25 to September 22, 2022	PIC#2	EA PIC #2 included a pre-recorded presentation and an on-line survey. Presentation focused on alternative means of carrying out the 1PSEPM Project and EA status.
Huron Wendat Nation	้า	
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
February 17 to March 17, 2022	PIC#1	EA PIC #1 included a pre-recorded presentation and an on-line survey. Presentation focused on the status of the 1PSEPM Project and EA process.
August 11, 2022	Email and Notice	Notice of PIC#2 and encouragement of the Huron Wendat Nation to actively participate in the EA process, contact the City of Mississauga's staff directly with comments or to discuss other ways the City can engage the community in the EA process.
August 25 to September 22, 2022	PIC#2	EA PIC #2 included a pre-recorded presentation and an on-line survey. Presentation focused on alternative means of carrying out the 1PSEPM Project and EA status.

9.4.1. AGENCY CONSULTATION

Following the approval of the Terms of Reference, the City maintained contact regulatory agencies throughout the EA Stage of the Project. Regular contact began with the publication of the Notice of Commencement for the EA and notifications of online and virtual PICs, due to Covid-19.

Table 9.3 summarizes correspondence, meetings and other events held with regulatory agencies. This does not include contacts made during the preparation of the EA requesting available data.

Table 9.3:Record of Agency Consultation

Date	Туре	Summary
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
August 15, 2022	Email and Notice	Notice of PIC#2
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
August 15, 2022	Email and Notice	Notice of PIC#2
March 30, 2022	Letter	Response expressed an interest in understanding how much coldwater habitat (by area and depth) may be impacted by the proposed alternatives. They would like to continue to be circulated on this project as it moves toward detailed design and as more sampling and habitat information becomes available.
April 6, 2022	Email	Response to MNDMNRF indicated the City's intention to only lakefill within the City's waterlot and that further fish and fish habitat studies are to be conducted with respect to the preferred alternative in the next phase of the EA. The City will continue to circulate MNDMNRF on this project.
August 15, 2022	Email and Notice	Notice of PIC#2
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
March 17, 2022	Letter	 Response indicated MHSTCI's interest in this Environmental Assessment (EA) project relates to its mandate of conserving Ontario's cultural heritage, which includes: archaeological resources, including land and marine; built heritage resources, including bridges and monuments; and cultural heritage landscapes.
August 15, 2022	Email and Notice	Notice of PIC#2
August 16, 2022	Email	Invitation to the 1 PSEPM Project Pop-Up Event
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
August 15, 2022	Email and Notice	Notice of PIC#2
August 16, 2022	Email	Invitation to the 1 PSEPM Project Pop-Up Event
February 2, 2022	Email and Notice	Notice of Commencement of EA and Notice of PIC#1
August 15, 2022	Email and Notice	Notice of PIC#2
August 16, 2022	Email	Invitation to the 1 PSEPM Project Pop-Up Event
August 16, 2022	Email	Request to meet to discuss the project and the refinement of the preferred alternative together with the detailed assessment of the effects.

SHOREPLAN

Date	Туре	Summary
August 17, 2022	Email	Providing information regarding availability of information on the City's website and suggesting and meeting date with CVC staff.
September 8, 2022	Meeting	Regular Project update meeting between the City and CVC to discuss CVC concerns and what does CVC wants to see/review.
December 14, 2022	Email	Sending Technical Memorandum on Coastal Design Hazard Considerations as requested by CVC
January 10, 2023	Email	Provides CVC comments on Technical Memorandum on Coastal Design Hazard Considerations
January 16, 2023	Email	Provides Consulting Team's responses to CVC 's comments on Technical Memorandum on Coastal Design Hazard Considerations
January 19, 2023	Email	Sending Technical Memorandum on Aquatic and Terrestrial Ecology as requested by CVC
February 9, 2023	Email	Notice from CVC that can no longer provide comments on certain aspects of Environmental Assessment projects as per recent regulatory changes. CVC provided observations on the Aquatic Ecology Technical Memo

10. ENVIRONMENTAL ASSESSMENT AMENDMENT PROCESS

The 1PSEPM Project is estimated to take approximately 14 months of construction to complete, depending on fill availability, approvals, weather and in-water working periods, , and will exist in perpetuity as part of the Mississauga waterfront. The dynamism inherent with construction Projects suggest that there might be a need for some Project modifications (i.e., adaptive measures) between the time of EA approval and the time that full establishment of the marina, parkland features, created terrestrial and aquatic habitat features are achieved.

The AEM approach outlined in Chapter 8 will identify the need for Project modifications where necessary. Adaptive measures and other changes identified during the period between EA approval and detailed design will be screened by the City of Mississauga to determine if additional regulatory approval (e.g., EA addendum, CVC permitting, public consultation) is required before proceeding. To facilitate this process, a Project-specific approach for assessing modifications to design or construction phasing have been established.

This chapter outlines the existing regulatory tools through which post-approval EA modifications can be made and describes the Project specific approach that will be used for post approval review of modifications proposed for the 1PSEPM Project.

10.1. REGULATORY PROVISIONS FOR POST EA MODIFICATIONS

Section 11.4 of the EA Act includes provisions for amending a Project design in situations where there is a change in circumstances or new information becomes available following EA approvals. Currently, post-approval modifications to a Project occur on a Project specific basis through amendment provisions included in an EA application or approval documents. The Minister of Environment Conservation and Parks can approve amendments to an approved undertaking when post-approval modifications are proposed where provisions for amendments have been included in the EA document.

10.2. THE 1PSEPM PROJECT APPROACH TO POST EA MODIFICATIONS

Chapter 8 outlined an environmental performance monitoring program that will be implemented to identify if modifications to the 1PSEPM Project are required. As such, there may be design modifications that result from changing circumstances over the time during the establishment phase. Thus, a clear method to identify the types of modifications that will trigger further environmental approval is needed.

The City of Mississauga is responsible for reviewing monitoring data and identifying opportunities to alter or improve the Project. When Project modifications are identified, the city will prepare a technical memorandum to document the proposed modifications and their potential effects. The technical memo will draw upon the appropriate expertise to determine the effects of proposed modifications in relation to the predicted effects outlined in the EA. This will form the basis from which the magnitude (i.e., minor or major) of the proposed modifications:

1. The need for modifications (e.g. new information from monitoring program)

- 2. A description of the design and functions
- 3. A description of the proposed modifications
- 4. An assessment of how modifications will affect Project outcomes
- 5. An assessment of the predicted effects on the environment
- 6. A comparison of the anticipated effects from proposed modifications to the effects predicted from the original design
- 7. A conclusion on the magnitude of the proposed modification (minor or major)

The technical memo will be circulated to the appropriate stakeholders, including the MECP, for review. The technical memorandum will assess the magnitude of the proposed change in relation to the predicted effects outlined in the EA and the desired Project outcomes by screening the proposed modifications against a set of criteria. The final determination of magnitude (major modification vs. minor modification) will be done in consultation with the MECP. If the proposed modification increases the likelihood of achieving desired Project outcomes and/or does not change or reduces the environmental effects identified in the EA, then the modification will be considered minor and will not trigger any further action. Where there is the potential to increase the environmental effects identified in the EA, then the modification may be considered major and the appropriate regulatory body will determine the need for any additional regulatory requirements. In addition, there may be the need for additional consultation with the broader EA stakeholder community.

All technical memoranda and/or addenda will be submitted to the MECP for inclusion in the project files as part of the public record. Documentation and compliance with modification procedures and clarification of the assessment of any proposed changes may be subject to MECP review.

10.3. SCREENING QUESTIONS FOR POST-EA MODIFICATIONS

Proposed Project modifications will be screened against a set of criteria to determine the magnitude (minor or major) of modifications on the environmental effects predicted in the EA. Table 10.1 includes proposed screening questions.

Screening Questions	Yes - Action	NO - Action
Does the proposed modification affect a condition of approval of the EA or any other approval or permit?	City in consultation with MECP will determine if further regulatory action is required	Proceed if the answer to all other screening questions is NO.
Does the proposed modification result in lakefill beyond the City's waterlot or City owned property?	City to determine if modifications are to proceed and additional mitigations required	Proceed if the answer to all other screening questions is NO.

Table 10.1Proposed Screening Questions

Screening Questions	Yes - Action	NO - Action
Does the proposed modification change the amount of parkland or access to the waterfront?	City to determine if modifications are to proceed and additional mitigations required	Proceed if the answer to all other screening questions is NO.
Does the proposed modification reduce the anticipated quality and/or function of the aquatic habitat feature on-site?	City in consultation with DFO/MECP will determine if further regulatory action and/or aquatic habitat compensation is required	Proceed if the answer to all other screening questions is NO.

This screening process will guide the preparation of a technical memorandum that the city will submit to the appropriate stakeholders for review (in consultation with the MECP). If the proposed modification results in an increase or worsening of the identified effects, further regulatory action may be required to assess the effects and identify appropriate mitigation. Any further regulatory action may require public consultation and/or broader agency consultation.

Table 10.2 provides examples of major vs. minor modifications. These are only provided as general examples and a final determination of magnitude will follow screening and consultation with the MECP.

Table 10.2Examples of Minor vs. Major Project Modifications

Minor Project Modifications	Major Project Modifications
Adjusting the conceptual layout regarding the areas of parkland, parking, winter storage.	Shrinking the area of the proposed aquatic habitat feature.
Adjusting the landscaping as proposed in the conceptual layout.	
Adjusting the orientation and size of the public access trail.	

11. ADVANTAGES AND DISADVANTAGES

In concluding the EA, the overall advantages and disadvantages of the 1PSEPM Project are assessed. Advantages are positive net effects to the natural and human environment, and disadvantages are negative net effects. The purpose of this section is to provide an overall conclusion as to whether, in comparison to the "Do Nothing" Alternative, the negative net effects of the 1PSEPM Project are acceptable, based on a balanced assessment against the positive benefits. As noted in Section 4.2, the "Do Nothing" alternative does not create the new land base that would permit the development of a new marina therefore, not meeting the purpose of the undertaking. However, the EA Act requires this final comparison of the undertaking to the "Do Nothing" alternative to develop final conclusions.

Table 11.1 summarizes the key advantages and disadvantages of the 1PSEPM Project.

Table 11.1: Advantages and Disadvantages of the 1PSEPM Project

 Creation of 2400 m² of higher quality aquatic habitat. Additional habitat will be create off-site to compensate for habitat loss Planting of native vegetation within a park setting providing new rest area for migratory birds Addition of 18,000 m² of parkland along the waterfront including the waterfront site trail would ophage to train potential and local. Lakefilling will result in the loss or alteration of 29,000 m² of common aquatic habitat 	Advantages	Disadvantages
 Planting of native vegetation within a park setting providing new rest area for migratory birds Addition of 18,000 m² of parkland along the waterfront including the waterfront site trail Lakefilling will result in the loss or alteration of 29,000 m² of common aquatic babitat 	• Creation of 2400 m ² of higher quality aquatic habitat. Additional habitat will be create off-site to compensate for habitat loss	
 Addition of 18,000 m² of parkland along the waterfront including the waterfront site trail Lakefilling will result in the loss or alteration of 29,000 m² of common aquatic babitat 	Planting of native vegetation within a park setting providing new rest area for migratory birds	
 Would enhance tools in potential and local business activity New views from the created landform to Lake Ontario and back towards Port Credit Relocation rather than loss of marina operations and services, including approximately 450 boat slips, winter boat storage, and potential for a marina service building. Consistent with several City of Mississauga Waterfront Parks Strategy goals including improving trail connections and providing more natural, sustainable ecological features; Consistent with the Visioning for Inspiration Port Credit and Master Plan; Consistent with the Lake Ontario Integrated Shoreline Study priorities including the creation of fish habitat along existing shoreline erosion structures and incorporate fish habitat features in 	 Addition of 18,000 m² of parkland along the waterfront including the waterfront site trail would enhance tourism potential and local business activity New views from the created landform to Lake Ontario and back towards Port Credit Relocation rather than loss of marina operations and services, including approximately 450 boat slips, winter boat storage, and potential for a marina service building. Consistent with several City of Mississauga Waterfront Parks Strategy goals including more natural, sustainable ecological features; Consistent with the Visioning for Inspiration Port Credit and Master Plan; Consistent with the Lake Ontario Integrated Shoreline Study priorities including the creation of fish habitat along existing shoreline erosion structures and incorporate fish habitat features in 	 Lakefilling will result in the loss or alteration of 29,000 m² of common aquatic habitat Minor vegetation removal along 1 Port Street site perimeter and on existing breakwater Nuisance effects from construction (dust, noise, vehicle emissions) for approximately 14 months for local residents, businesses and recreational users Increased truck and vehicle traffic from construction for approximately 14 months affecting residents, businesses, recreational users and road users along the haul / access route. Some residents may experience a change in views from their residences

A review of Table 11.1 clearly illustrates that the outcomes of the 1PSEPM Project are strongly beneficial for all aspects of the environment, resulting in a rejuvenated waterfront that will allow improved public access to the water's edge, keep the marina at a size similar to the existing, and be a destination for residents and visitors alike. The 1PSEPM Project will achieve the purpose of the project set out in the ToR and reaffirmed in the EA by providing an expanded land base for additional waterfront parkland and marina at the 1 Port Street East site.

The disadvantages of the 1PSEPM Project will primarily occur during construction. Temporary negative effects include minimal nuisance effects (i.e., air, noise and traffic) to residents, recreational users and businesses, all of which will be minimized by best management practices. The permanent loss or alteration of aquatic habitat will be offset by creation of a new higher quality aquatic habitat feature, the replacement of like for like habitat along the eastern edge of the new landform, and, where possible, the incorporation of structural aquatic habitat features along the toe of the revetment. Additional habitat will be created off-site in compensation for the habitat removal and alternation. In general, the new habitat features will result in higher quality and higher functioning habitat.

In conclusion, the negative net effects of the 1PSEPM Project, most of which occur during construction and are temporary or negligible, are more than offset by the much greater positive contributions of the 1PSEPM Project, particularly related to on-going marina operations and the provision of new parkland and access to the waterfront.

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GLOSSARY

Term	Definition
Adaptive management	A learning process where management of an ecological system is adjusted based on future changes to the system.
Alternative Methods	Different ways of implementing a Project. For the 1PSEPM Project, these include the amount of habitat created, the extent of linkages created, and size of the land creation footprint, among others.
Alternative 1PSEPM Project configuration	See "Alternative Methods"
Alternatives To	Different ways of approaching and dealing with a problem or opportunity. For the 1PSEPM Project, these are: 'Do Nothing' or 'Status Quo'; Create a new land base.
Archaeological resources	An object, material or physical feature that may have cultural heritage value or interest.
Artificial shoreline	The edge of a body of water that has been significantly modified by humans.
Baseflow	The amount of moving of water entering stream channels from groundwater sources in the drainage of large lakes.
Bathymetry	The measurement of the depth of water in oceans, seas, or lakes.
Bioswale	A channel designed to concentrate and convey stormwater runoff while removing debris and pollution through filtration and deposition.
Breakwater	A structure built on a coast for protecting a beach or harbour from the effects of weather and sediment.
Brownfield	Relating to a former industrial or commercial site where future use is affected by real or perceived environmental contamination
Built heritage resources	Significant buildings, structures, monuments, installations or remains associated with architectural, cultural, social, political, economic or military history and identified as being important to a community.
Coastal processes	Natural forces that affect the areas near and along a shoreline, which include erosion, waves, and changes in water levels.
Cultural heritage landscape	A defined geographic area of heritage significance which has been modified by human activities and is valued by a community.
Cultural woodland/thickets/ communities	Ecological areas that are heavily influenced by historic or ongoing human disturbance.
Depositional zone	An area in a watercourse where sediment build-up occurs.
Dredging	The digging, gathering, or pulling out of sediment to deepen harbours and waterways.
Duty to Consult	A legal requirement for the Crown to consult with Indigenous communities when a Project may have an adverse effect on the rights of Indigenous communities in some way. The duty to consult may extend to municipalities by express statute and delegation by the Crown.
Embayment	A recess in a coastline which forms a bay.

Term	Definition
Extirpated	Describes the situation in which a species or population no longer exists within a certain geographical location
First Nations	Various Indigenous peoples in Canada who are neither Inuit nor Métis.
Flood conveyance channel	A structure constructed to safely transfer floodwaters within or away from developed or developing areas.
Fluvial	Of or found in a river.
Flyway	A seasonal route followed by birds migrating to and from their breeding areas.
Footprint	The size and shape of the land creation for the 1PSEPM Project.
Gabion	Caged riprap (rock or other material) used along shorelines to control erosion.
Geomorphology	The study of landforms, the processes that created them, and the history of their development.
Geotechnical	Related to soil and bedrock.
Glacial till	Rock and soil material that has been carried by a glacier as it moves and is left behind when the glacier melts or retreats.
Guild (related to birds)	Groups of species in a community that exploit the same set of resources in a similar manner, but are not necessarily closely related.
Important Bird Area	An area recognized as being globally important habitat for the conservation of bird species.
Indigenous Communities	Communities or groups of First Nations, Métis or Inuit people.
Infilling	See "Lakefill"
Lakefill	An area of land bordering a lake that was originally underwater, but has been raised above the surface of the water by adding materials such as soil, stones, etc.
Littoral (drift, zone, processes)	Related to the part of a sea, lake or river that is close to the shore.
Marine archaeological resource	Site where evidence of past human activity is preserved that is fully or partially submerged or that lies below or partially below the high-water mark of any body of water.
Mitigation measures	Recommended actions to reduce, avoid or offset the potential adverse effects of a Project.
Multi-use trail	A trail that is shared by bicycles and pedestrians.
Navigable waterway	Any body of water which can be safely crossed by vessels.
Nearshore	See "Littoral".
Nuisance effects	Results of Project activities that cause inconvenience or annoyance to people or businesses in the vicinity of the Project.
Parameters of concern	Characteristics of water which are measured to determine its quality.
Preferred Alternative	The alternative means for carrying out the 1PSEPM Project that was selected through a comparative evaluation of potential alternative lakefill footprints.
Proponent	The person, body, or government agency that proposes, owns, manages, or controls a Project.

Term	Definition
Reasoned trade-off analysis	A process where the effects of decreasing one or more key factors and simultaneously increasing one or more other key factors in a decision, design, or Project are determined.
Remediation	The removal of pollution or contaminants from soil, groundwater, sediment, or surface water.
Resident species	A type of animal that spends the majority of its life-cycle in one area and does not migrate.
Resilience	The capacity of an ecosystem to respond to disturbance by resisting damage and recovering quickly.
Riparian habitat	Habitat (the natural environment in which organisms live) that is located at the interface between land and a river or stream.
Riprap	Rock or other material used to protect shorelines from erosion.
Sedimentation	The process by which naturally-occurring particles suspended in water are transported and eventually settle at the bottom of a water body or watercourse.
Shoreline treatment	A measure which is applied to the edge of a water body in order to change its characteristics.
Slip (for a boat)	A slip is a location for a boat to moor which is outlined by a pier on each side of the boat, unlike the dock, which has a pier on one side only. A slip can also serve multiple vessels within a single area, the shore-sides of which are lined with piers. The essential characteristic of a slip is that it's open on one end only.
Stonehooking	The historic/past mining of sand, gravel, stone and blocks of shale from the shoreline of a lake.
Substrate	A substance or layer that underlies something, or on which some process occurs, in particular the surface or material on or from which an organism lives, grows, or obtains its nourishment.
Terrestrial	Related to the earth's land area, including its man-made and natural surface and sub-surface features, and its interfaces and interactions with the atmosphere and surface waterbodies.
Undertaking	An enterprise or activity (i.e., a "Project") by the government or a company.
Upland habitat	The dry habitat along the sides of a watercourse (i.e., river or creek).
Viewscape	Those features of an area which provide a range of sights and are considered a community asset. These may include pleasing vistas, scenes and views, among others, that provide a sense of place and character.
Vista	A broad sweeping view of a landscape or open water.
Water lot	One of a regular system of pieces of land which are partly or wholly covered by a water body.

