Appendix D

DRAFT Natural Heritage Report

NATURAL HERITAGE REPORT – EXISTING CONDITIONS

BEACH BOULEVARD COMMUNITY STORMWATER PONDING STUDY MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

prepared for:

Hamilton

prepared by:

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MARCH 2022

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NATURAL HERITAGE REPORT – EXISTING CONDITIONS

BEACH BOULEVARD COMMUNITY STORMWATER PONDING STUDY MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

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1.0 INTRODUCTION

LGL Limited was retained by IBI Group to conduct a natural heritage investigation in support of a flood remediation Master Plan (Phases 1 and 2 Municipal Class EA) for the Beach Boulevard Community in the City of Hamilton. The study area includes Hamilton Beach from the Burlington Bay Canal to Nikola Tesla Boulevard. The study will recommend flood remediation measures, which may include but are not limited to new pumping stations, conveyance systems and outlet locations, designed to alleviate chronic surface and sub-surface flooding in this beachfront community.

2.0 STUDY AREA

The general study area is presented in **Figure 1**.

FIGURE 1. STUDY AREA

3.0 EXISTING CONDITIONS

This section describes the existing conditions in the study area related to natural heritage, including physiography, bedrock and surficial geology and soils; fish and fish habitat: vegetation and vegetation communities; wildlife and wildlife habitat; and, designated natural areas.

3.1 Physiography, Bedrock and Surficial Geology and Soils

3.1.1 Purpose

A secondary source investigation was undertaken to identify physiography, bedrock and surficial geology and soils within the study area.

3.1.2 Data Sources

Information regarding physiography, bedrock and surficial geology and soils within the study area was obtained through:

- Chapman, L.J. and D.F. Putnam. 1984. The Physiography of Southern Ontario. Published for the Ontario Geological Survey Special Volume 2
- Barnett, P.J., Cowan, W.R. and Henry, A.P. 1991. Quaternary geology of Ontario, southern sheet; Ontario Geological Survey, Map 2556, scale 1:1 000 000.

  Ontario Geological Survey 1991. Bedrock geology of Ontario, southern sheet; Ontario Geological Survey, Map 2544, scale 1: 1 000 000.

  Karrow, P.F. 1987. Quaternary Geology of the Hamilton–Cambridge area, southern Ontario; Ontario Geological Survey, Report 255.

3.1.3 Findings

The site is located within the Iroquois sand plain physiographic region (Chapman and Putnam 1984). The Iroquois sand plain was flooded by glacial Lake Iroquois and is comprised mostly of permeable sand deposits. Bedrock consists of the Queenston Formation, which is Upper Ordovician in age, and comprised of shale, limestone, dolostone and siltstone (Ontario Geological Survey 1991). Quaternary geology consists of recent Lake Ontario deposits of stratified sands and gravel, known locally as the Burlington Bar (Karrow 1987). The study area is mostly level and slightly above lake levels in Lake Ontario and Hamilton Harbour.

3.2 Aquatic Habitats and Communities

3.2.1 Purpose

A secondary source investigation and field surveys were carried out to characterize fisheries and aquatic ecosystems within the study area.

3.2.2 Data Sources

LGL conducted a secondary source review to identify the fish community within each water feature located within the Beach Boulevard Flood Remediation study area. The secondary source review included a species at risk screening though the Department of Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Mapping, as well as the 'Make a Map' feature of the Natural Heritage Information Centre (NHIC) of the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) website. An initial data request was sent to Hamilton Conservation Authority (HCA) on April 27, 2021, followed by subsequent data requests on June 2, 2021 and June 24, 2021 to obtain fisheries community information and watershed/subwatershed studies. Correspondence with HCA indicated that no information pertaining to fish or fish habitat was available. Additionally, LGL reviewed several reports related to fish habitat and communities including:

- City of Hamilton Beach Boulevard Community Stormwater Ponding Study (Dillon Consulting 2019);
- Queen Elizabeth Way – Burlington Skyway Bridge to Burlington Street Existing Conditions Drainage Investigation and Preliminary Design of Flood Protection For Beach Boulevard Community (MRC 2008);
- Master Drainage Plan Hamilton Beach (Marshall Macklin Monaghan 1999);
- Lake Ontario – St. Lawrence River Plan 2014 (International Joint Commission 2014);
- Summary of 2017 Great Lakes Basin Conditions and Water Level Impacts to Support Ongoing Regulation Plan Evaluation (Great Lakes – St. Lawrence River Adaptive Management (GLAM) Committee 2018);
- Greenhill, Hannon, Upper Davis and Upper Ottawa Creeks Stewardship Action Plan (Hamilton Conservation Authority 2013); and,
- Hamilton Harbour and Watershed Fisheries Management Plan (Ontario Ministry of Natural Resources and Royal Botanical Gardens 2010).

LGL fisheries specialists conducted a fish habitat assessment at each of the three Eastport Ditches, Red Hill Creek, Hamilton Harbour, Burlington Canal, and along the Lake Ontario shoreline on April 7, 2021 and November 9, 2021 to observe and document existing aquatic habitat conditions. It should be noted that the habitats associated with Red Hill Creek, Hamilton Harbour, Burlington Canal and the Lake Ontario shoreline form the perimeter of the study area and are parts of relatively large

bodies of water when compared with the Eastport Ditches. The weather conditions during the April 7, 2021 site visit were sunny and 10°C, with winds at 9 km/h from the southeast. The weather conditions during the November 9, 2021 site visit were sunny and 1°C, with winds at 9 km/h from the northeast. The fish habitat was assessed within the entirety of the Eastport Ditches and visually from the shorelines in the perimeter habitats, where access was permitted. Physical habitat features were surveyed in sufficient detail to enable mapping and identification of key habitat types. The physical habitat attributes assessed included: (a) instream cover, (b) bank stability, (c) substrate characteristics, (d) stream dimensions, (e) barriers, (f) stream morphology, (g) terrain characteristics, (h) stream canopy cover, (i) stream gradient, (j) aquatic vegetation, (k) ground water seepage areas, and (l) general comments. **Figure 2** presents the location of the watercourse features identified within this section of the study area. An aquatic habitat summary is presented below which describes existing conditions at each of the watercourse features. Representative photographs of the crossings were also taken during investigations and are provided in **Appendix A**.

3.2.3 Watershed Characteristics

The study area lies within three watersheds; Urban Hamilton Core Watershed, Urban Hamilton Beach Strip Watershed, and the Red Hill Creek Watershed. Each of these watersheds, both portions within and adjacent to the study area, are under the jurisdiction of the Hamilton Conservation Authority (HCA) and the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) Guelph District.

Urban Hamilton Core Watershed

The Urban Hamilton Core Watershed encompasses the City of Hamilton’s downtown core, waterfront properties and Port of Hamilton Lands, including the Hamilton Harbour. The majority of this watershed is residential, with significant industrial and commercial land uses. All municipal services within this watershed drain into the Hamilton Harbour. Water levels within the Hamilton Harbour affect shoreline habitats including that of wetlands. Water quality within the Hamilton Harbour has been degraded due to industrial practices, industrial and sewage discharge, contaminated materials and dredging (Hamilton-Halton Source Protection Committee 2017). Several Walleye (*Sander vitreus*) spawning areas have been identified within the Hamilton Harbour by the MNDMNRF (2022). Due to its diversity of habitats, the Hamilton Harbour originally contained coolwater, coldwater, and warmwater fish species, however, although it contains an abundance of species, Brown Bullhead (*Ameiurus nebulosus*) and White Perch (*Morone americana*) are among the dominant species as they are tolerant of high turbidity (Bowlby *et. al*. 2010).

NATURAL HERITAGE

LEGEND

- ARA Survey Location (GU-7012-RED) (Red Hill Creek)
- ARA Survey Location (GU-7013-RED) (Windermere Basin)
- Double-crested Cormorant (*Phalacrocorax auritus*) Nesting Site/Colony
- Walleye (*Sander vitreus*) Spawning Area
- Railway
- Watercourse - Warm Thermal Regime
- Waterbody - Unknown Thermal Regime
- Beach Boulevard Study Area
- Regulation Limit (HCA)
- Deepwater Sculpin (*Myoxocephalus thompsonii*) Distribution (DFO)
- Waterfowl Winter Concentration Area
- Important Bird Area (West End of Lake Ontario)
- Important Bird Area (Hamilton Harbour Waterbird Colonies)
- Environmentally Significant Area (Hamilton Beach Strip) (City of Hamilton)
- Environmentally Significant Area (Van Wagner's Ponds and Marshes) (City of Hamilton)

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Project:	TA9030	**Figure:**	2
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 14,000	**Checked By:**	GNK

Data Sources: City of Hamilton, Hamilton Conservation Authority (HCA), Bird Studies Canada, Department of Fisheries and Oceans Canada (DFO) & Ministry of Natural Resources and Forestry (LIO). Contains information licenced under the Open Government Licence - Ontario.

Urban Hamilton Beach Strip Watershed

The Urban Hamilton Beach Strip Watershed is located entirely along the spit of land that separates Lake Ontario from Hamilton Harbour. This sand bar extends to the Burlington Canal. Land use within this watershed is mostly comprised of residential and commercial zones, with some natural areas along the shoreline. All drainage flows to either Hamilton Harbour or Lake Ontario.

Red Hill Creek Watershed

The Red Hill Creek Watershed is comprised of eight subwatersheds within the City of Hamilton, and covers approximately 68 km^2 (Hamilton Conservation Authority 2013). The watershed contains significant natural features including the Niagara Escarpment, Eramosa Karst/Escarpment, Felker's Falls Escarpment Valley and Red Hill Creek Escarpment Valley, and also contains valleylands, meadows and successional habitats (Hamilton Conservation Authority 2013). As a result of residential, commercial, and industrial development, this watershed is highly urbanized with many of its watercourses subjected to realignment, channelization, increased surface flows from stormwater runoff, and reduced groundwater flows, all of which have contributed to reduced water quality and thermal degradation (Bowlby *et al.* 2010). Channel erosion and changes in stream dimensions are noted throughout the watershed because of altered drainage and increased flows from urban sewer systems during high flow and storm events (Bowlby, McCormack and Heaton 2010). Red Hill Creek discharges into Hamilton Harbour through the highly industrialized Windermere Basin (Bowlby *et al.* 2010). The majority of stream reaches within the headwaters of the Red Hill Creek are small, coldwater riverine habitat. As the watercourse proceeds downstream below the Niagara Escarpment towards the Windermere Basin, thermal degradation occurs due to urbanization and low groundwater contribution to base flow, resulting in an intermediate warmwater riverine zone. Brook Stickleback (*Culaea inconstans)* followed by Northern Redbelly Dace (*Chrosomus eos*) make up the majority of the fish community in coldwater zones above the escarpment while Blacknose Dace (*Rhinichthys atratulus*) followed by Longnose Dace (*Rhinichthys cataractae*) are the most common members of the fish community in coldwater zones below the escarpment (Bowlby *et al.* 2010). The fish community within the intermediate warmwater zone is dominated by Fathead Minnow (*Pimephales promelas*) (Bowlby *et al.* 2010). Although spawning migrations of Atlantic Salmon (*Salmo salar*) were historically observed in Red Hill Creek, the lack of groundwater contribution and varying thermal regimes within the watershed do not currently provide ideal spawning habitat for salmonids (Bowlby *et al.* 2010). In efforts to enhance all the water bodies within the Hamilton Harbour watershed, the Hamilton Harbour and Watershed Fisheries Management Plan (HHWFMP) was created to improve aquatic community, aquatic habitat and planning within each watershed.

3.2.4 Findings

Beach Boulevard Drainage Systems

There are two drainage networks within the Beach Boulevard Community that operate independently of one another to convey storm water into either Hamilton Harbour or the Eastport Ditch. The Beach Boulevard Community is comprised of 17 residential streets that run westerly between Beach Boulevard and the QEW right-of-way. Stormwater runoff from the west ends of these streets is collected by municipal infrastructure or ditches and is conveyed beneath the QEW right-of-way, where it is intercepted by surface runoff from the QEW right-of-way. All Beach Boulevard Community drainage and QEW drainage contributed into the drainage network between Dunraven Avenue and Wickham Drive is directed into Hamilton Harbour by a large diameter storm sewer (MRC 2008). Alternatively, Beach Boulevard Community drainage and QEW drainage contributed into the drainage network between Wickham Drive and Kirk Avenue are directed into the Eastport Ditch and conveyed into Red Hill Creek (MRC 2008). A well-vegetated 2 m deep, flat-bottomed ditch was created along Eastport Drive (Eastport Ditch) and the QEW with significant depth and cross-sectional area to compensate for the extremely flat longitudinal gradient (MRC 2008). The Eastport Ditch water levels are coincident with the water levels within the Hamilton Harbour, and the groundwater levels within the Beach Strip which likely contributes to flooding (MRC 2008). Additionally, field investigations conducted by MRC (2008) during the winter of 2005 were not able to identify several pipe outlets into the Eastport Ditch and noted that they were likely covered beneath sediment or covered by dense, overgrown vegetation.

Eastport Ditch 1

Eastport Ditch 1 is located along the west side of Eastport Drive approximately 295 m south of the Windermere Basin Park entrance. This ditch was created in the late 1990s to redirect drainage from Windermere Basin into the Red Hill Creek (MRC 2008). To facilitate this, a berm with a series of sewers underneath was constructed to transport storm water from Eastport Ditch 2 upstream, towards Eastport Ditch 1. These sewers collect surface runoff from the QEW right-of-way and municipal storm water infrastructure which outlet into a large 1400 mm Corrugated Steel Pipe (CSP) sewer, and eventually into Eastport Ditch 1 (MRC 2008).

Flow enters the Eastport Ditch 1 via a CSP reinforced with rip rap. The culvert was wet with standing water during the April 7, 2021 site visit and a small pool approximately 0.3 m wide, 0.5 m wide and 5 cm deep was observed at the downstream end of the CSP. This ditch is approximately 143 m long, confined by its steep banks approximately 2 m in height and is trapezoidal/U-shaped with a flat bottom (approximately 1 m to 1.2 m wide). The lower banks are reinforced with rip rap while the upper portions are well vegetated with deciduous trees, shrubs and grasses. For the first 10 m downstream of the CSP, very low flow was observed as the channel consisted mostly of rip rap, large

boulders, riparian grasses, and debris. Overhanging deciduous trees are also present. Approximately 10 m further downstream, the channel becomes wetted with dimensions of 0.05 m wide and 1 cm deep, however, rip rap along the banks had dried algae indicative of recent higher flows. Substrates consist of silt, gravel and muck while instream cover consists of sparse algae and some large woody debris (LWD). During the November 9, 2021, site visit, instream cover consisted of Duckweed (*Lemna minor*) and deciduous overhanging shrubs. Further downstream for approximately 40 m, the wetted dimensions increase to 1 m in width and range between 5 cm to 10 cm in depth, with approximately 20 cm to 25 cm of detritus and muck atop rip rap. Although severely corroded, a CSP culvert is present which appeared to be functional as it was wet during the April 7, 2021, site visit. Further downstream, and for the remainder of the downstream portion of the ditch, the channel deepened to 30 cm, with approximately 50 cm of detritus and muck overlying the bottom of the ditch. This drainage feature exhibits a straight planform with a morphology dominated by one long run. It has a very low gradient with nearly stagnant flows throughout the entirety of the ditch and, as a result, it appears that the water level, at least in the downstream half of the ditch, is dependent upon the water level in Red Hill Creek. A 1600 mm diameter culvert (MRC 2008) reinforced with rip rap is present at the downstream end of the ditch and conveys flow into Red Hill Creek. Leeches and a school of Fathead Minnow were observed in this drainage feature on April 7, 2021.

This drainage feature is permanent and constitutes direct fish habitat, as a result of its connectivity to Red Hill Creek. Although the thermal regime of this drainage ditch has not been evaluated by MNRF, it is identified as warmwater based on its fish community and direct connectivity to Red Hill Creek. In addition to historic fish data provided by MNRF (LIO), fish sampling conducted by LGL on November 9, 2021, identified two warmwater species, Fathead Minnow and Goldfish (*Carassius auratus*) utilizing this drainage ditch. LGL also identified White Sucker (*Catostomus commersonii*) within the drainage ditch during this sampling event. No species at risk are present within the study area; however, one provincially tracked species, American Eel (*Anguilla rostrata*), is identified as having the potential to be found within the study area through the Natural Heritage Information Center (NHIC) managed by MNDMNRF.

Eastport Ditch 2

Located on the east side of Eastport Drive and situated adjacent to the QEW right-of-way, Eastport Ditch 2 flows in a southerly direction along Eastport Drive. Originally, water from this ditch outleted into the Windermere Basin; however, in the late 1990’s fill was placed to create a berm separating Eastport Drive and the industrial development and facilitated the placement of a large diameter sewer along the west side of Eastport Drive (MRC 2008). This sewer is a 1400 mm diameter CSP that is approximately 520 m long with several pipes from the Beach Boulevard community and sewers from the

QEW connecting to it (MRC 2008). The CSP crosses Eastport Drive perpendicularly and outlets into Eastport Ditch 1 on the west side of Eastport Drive, which has been redirected to flow into Red Hill Creek (MRC 2008).

Flow enters Eastport Ditch 2 via a CSP which LGL fisheries specialists were unable to locate during their April 7, 2021, or November 9, 2021 field investigations as it has likely been buried in sediment. It is likely that this pipe outlet has been buried in sediment for nearly 15 years as field investigators from MRC (2008) that conducted field work in the winter of 2005 did not find this pipe outlet and suggested it was likely buried in sediment or dense vegetation. It should be noted that significantly more water was present within Eastport Ditch 2 during the November 2021 site visit than was present in April of the same year. Much of the description below is from the April 7, 2021 site visit.

The ditch displays a straight planform and is confined by its banks, which are 0.5 m in vertical height and lined with rip rap. Wetted dimensions in the upstream portion of the ditch are 3 m wide and range from 10 cm to 15 cm deep; however, it is estimated that 20 cm to 30 cm of muck is present beneath the substrate's surface. As noted by MRC (2008), the Eastport ditches were constructed to be 2 m in depth, therefore, it is likely that 0.5 m to 1 m of muck/sediment has collected below the surface of the water. Other substrates consist of silt, cobble, boulders and detritus. Much refuse was noted within the channel consisting of car tires, couches, a mattress, and other various kinds of litter. Riparian vegetation consists of deciduous trees, shrubs and grasses. Numerous dead Common Carp (*Cyprinus carpio*) were observed within the upstream portion of the channel during the April 2021 site visit. Two gated perched concrete culverts with aprons are located approximately 90 m downstream, which contribute flow to the channel (although dry during the April 7, 2021 site visit, but wet during the November 9, 2021 site visit). The bottom of the channel and both banks have been reinforced with cabled concrete blocks for 4 m upstream and 20 m downstream of the perched culverts. A small CSP is located within the concrete of the upstream right bank that also contributes flow. As the reinforced banks end, the channel banks and substrates return to their more naturalized state, with vegetated banks, dry and mucky conditions, and no apparent flow, although evidence of recent wet conditions was present in April 2021 (there were no dry areas in the ditch in November 2021). Two CSP culverts filled with muck are observed within the dry portion of ditch (April 2021). The channel continues to remain dry for approximately 200 m downstream with several stagnant pools ranging from 1 m and 3 m wide, 5 m to 15 m long and 5 cm to 10 cm deep dispersed throughout. A small patch of *Phragmites* is present further downstream spanning the width of the channel, restricting flow to a width of 0.1 m wide and depth of 1 cm for approximately 20 m. As the channel opens again, it widens to 3.5 m, with depths ranging between 35 cm and 50 cm. A narrow thalweg is apparent in the center of the ditch however, as it flows downstream, it becomes oriented close to the downstream

right bank. The banks vary in height between 0.5 m to 1 m and are lined with rip rap. Riparian vegetation consists of cattails, *Phragmites*, grasses, trees and shrubs. Substrates are similar to that within the upstream portion of channel, including silt, muck, and debris. Several schools of Goldfish were observed. Further downstream the channel alternates between dense patches of *Phragmites* with little to no flow, and wet conditions (wetted dimensions ranging between 2.5 m to 3 m wide and between 10 cm and 20 cm deep) with *Phragmites* localized to the outer edges of the ditch. These areas contained very turbid water with debris and ample algae growth. These habitat characteristics occur for approximately 200 m further downstream, before a pool (1.5 m wide, 10 m long and 10 cm in depth with approximately 20 cm of detritus below the surface) is present. Immediately downstream, a dense stand of cattails occupies the width of the ditch and restricts flow. A dry, narrow channel (0.8 m wide) emerges from the cattails and continues for approximately 10 m before it slightly meanders to the west, reaching the downstream CSP of Eastport Ditch 2. At this CSP, the ditch becomes piped and continues southerly along Eastport Drive and flows discharge into Eastport Ditch 1.

This drainage feature is permanent and provides direct fish habitat. Although it is piped at the upstream and downstream ends, the presence of fish within the features indicates that one or both pipes do not form a barrier to fish passage, which likely can occur during high flow conditions and/or flooding events. During the November 9, 2021, field investigations, three fish species were captured during sampling: Green Sunfish (*Lepomis cyanellus*), Fathead Minnow and Common Carp. The fish assemblage present suggests this drainage feature supports a warmwater thermal regime. No species at risk are present within the study area; however, one provincially tracked species, American Eel, is identified as having the potential to be found within the study area through the Natural Heritage Information Center (NHIC) managed by MNRF.

Eastport Ditch 3

This drainage feature is located along the west side of Eastport Drive, situated between Eastport Drive and the Hamilton Harbour basin. Flow is contributed to Eastport Ditch 3 via a 600 mm CSP on the upstream right bank, however, LGL could not locate this outfall during either April 7, 2021 or November 9, 2021 field investigations. Flows in and out of this ditch are unknown as its connectivity to surrounding water (Eastport Ditch 2, storm water system, Tollgate Ponds, Hamilton Harbour), if any, are not visible. The ditch has a wetted width of 5 m and depth of approximately 2 m. It is confined within steeply sloped banks; the upstream left bank is an earth berm which contains the holding pond (Tollgate Ponds) and is approximately 5 m high while the upstream right bank is approximately 2 m high and entirely rip-rap. Substrates, where visible, consist of silt, muck and debris. The ditch is straight, and morphology consists of one long pool as flow is stagnant. Eastport Ditch 3 is divided by berm comprised of fill

located approximately 285 m downstream a berm vegetated with deciduous shrubs. Eastport Ditch 3 continues downstream for another 120 m. This area was dry during the April 7, 2021 visit with patches of substrate and algae growth present indicating recent water presence. During the November 9, 2021 site visit, this portion of Eastport Ditch 3 was wet and densely vegetated with Duckweed. Riparian vegetation consisting of *Phragmites*, grasses, and deciduous trees and shrubs were also observed. This area contained a large amount of garbage and debris as well.

This drainage feature is permanent and likely constitutes indirect fish habitat. This drainage feature provides poor quality fish habitat; however, given its proximity to Hamilton Harbour, fish may access this drainage feature via culvert access or during flooding events. No thermal regime has been prescribed by the MRNF; however, given the little influx of flow, it is likely warmwater. No fish community records have been identified for this drainage feature, nor were any fish observed or captured during LGL field investigations, as site conditions did not provide a safe working environment for fish sampling. No species at risk are present within the study area, however, one provincially tracked species, American Eel, is identified as having the potential to be found within the study area through the Natural Heritage Information Center (NHIC) managed by MNRF.

Red Hill Creek

An approximately 1 km reach of Red Hill Creek forms the perimeter of the southwest portion of the study area and it is the watercourse into which water from Eastport Ditches 1 and 2 flow. This portion of Red Hill Creek comprises the last reach of the watercourse before it discharges into Hamilton Harbour just outside of the study area. The 1 km reach is bounded by the Eastport Drive crossing/Beach Boulevard intersection at the upstream end and the Pier 24/25 Gateway bridge at the downstream end. The north/east shoreline of this reach is located entirely within Windermere Basin Park. The banks are steeply sloped and comprised of rip rap boulders and concrete rubble/debris. Substrates nearshore, where visible, were of the same materials overlaid by silt. Instream cover is provided by substrates and large woody debris. Morphology is flat/run and the water, during the time of the site visits, was moderately turbid. No instream vegetation, submerged or emergent, was observed. The riparian areas of both banks was fairly well vegetated with grasses, shrubs and trees which grew almost down to the water’s edge, depending on bank slope heights. The vegetation in Windermere Basin Park consists mainly of open meadow with scattered deciduous trees. Two species of fish were observed within the watercourse during site investigations: Common Carp and Gizzard Shad (*Dorosoma cepedianum*).

Hamilton Harbour
Hamilton Harbour forms the northeastern boundary of the study area from the Burlington Canal south to the “Tollgate Ponds”, a length of approximately 1.5 km. The shoreline in this section of the harbour is comprised of steep, rock (armourstone, rubble) slopes. This rock protection extends into the lakebed and comprises the nearshore substrates. From Garmin LakeVu data, the bathymetry of the nearshore area is a gradually sloping shallow area (0.3-3.0 m) that extends approximately 120 m into the harbour. West of this shallow area there is a steep drop off that reaches depths of approximately 20 m over a short distance. Although no fish were observed during the site investigations, the Hamilton Harbour shoreline is likely used by a several fish species for a variety of life history functions.

Burlington Canal
The Burlington Canal is a human-made channel that divides the Hamilton Beach area from the Burlington portion of the beach that comprises the northern boundary of the study area. It is approximately 835 m long and 85 m wide. There are no banks as the canal edges are formed by vertical sheet piling walls with groynes that extend approximately 385 m into Lake Ontario and 115 into Hamilton Harbour. South of the harbour groyne there is a boat launch. Bathymetry mapping (Garmin LakeVu) indicated that the canal exhibits a steep drop from the sheet pile wall of approximately 1.5 m to 3.0 m to as deep as 12 m. The canal likely experiences strong wind-driven currents and contains transitional habitats for fish moving between habitats in Lake Ontario and Hamilton Harbour.

Lake Ontario Shoreline
The open shoreline of Lake Ontario forms the eastern boundary of the study area. It is characterized by a riparian area comprised of sand that is between 12 m and 20 m in width. There is a section of armourstone/boulder rock protection at the north end near the Burlington Canal, but most of the substrates in the area are comprised solely of sand. Garmin LakeVu mapping illustrates a gradually sloping bathymetry for approximately 385 m out to a depth of 20 m. Due to the open lake exposure to winds, wave scour, currents and weather-related phenomena (e.g. ice in winter), habitats for fish along the beach are likely limited to fish moving through the area in search of more suitable habitats within Hamilton Harbour or elsewhere along the Lake Ontario shoreline.

A summary of fish habitat conditions found at each watercourse is presented in **Table 1**.

TABLE 1.
EXISTING FISH COMMUNITY AND FISH HABITAT CONDITIONS SUMMARY TABLE

Watercourse/ Waterbody	Flow*	Thermal Regime	Fish Habitat	Fish Species Present	Substrate Type	Vegetation	Species at Risk/ Critical Habitat Present	In Water Works Timing Window
Eastport Ditch 1	Permanent	Warmwater	Direct	Not provided by HCA (MNRF, 2019) Goldfish, White Sucker, Fathead Minnow (LGL 2021)	Silt, muck, gravel, boulders, detritus	Grasses, cattails (*Typha* sp.), Phragmites, Duckweed (*Lemna minor)*	American Eel	July 1 – March 31
Eastport Ditch 2	Permanent	Warmwater	Direct	Not provided by HCA (MNRF, 2019) Common Carp, Green Sunfish, Fathead Minnow (LGL 2021)	Silt, muck, gravel, boulders, detritus	Grasses, cattails (*Typha* sp.), Phragmites, Duckweed (*Lemna minor)*	American Eel	July 1 – March 31
Eastport Ditch 3	Permanent	Warmwater	Indirect	Not provided by HCA Blacknose Dace, Fathead Minnow, Johnny/Tesselated Darter, Longnose Dace, Northern Redbelly Dace, Pumpkinseed, Rainbow Trout, Redside Dace, White Sucker (MNRF, 2019) Not sampled by LGL	Silt, muck, gravel, boulders, detritus	Grasses, cattails (*Typha* sp.), Phragmites, Duckweed (*Lemna minor)*	American Eel	July 1 – March 31
Red Hill Creek	Permanent	Warmwater	Direct	Not provided by HCA Blacknose Dace, Bluntnose Minnow, Creek Chub, Green Sunfish, Pumpkinseed, White Sucker (MNRF, 2017 (2022) Not sampled by LGL	Silt, gravel, cobble, boulders	Grasses	American Eel	July 1 – March 31
Hamilton Harbour	Permanent	Unknown	Direct	Not provided by HCA Threespine Stickleback, Emerald Shiner, Longnose Dace, Muskellunge, Tessellated Darter, White Sucker, Lake Trout, Common Carp, Spottail Shiner, Round Whitefish, Alewife, Northern Pike, Central Mudminnow, River Chub, Goldfish, Coho Salmon, Central Stoneroller, Rock Bass, Lake Whitefish, Blacknose Dace, Pumpkinseed, Creek Chub, Walleye, Bluegill, Johnny Darter, Mottled Sculpin, Round Goby, White	Boulders	N/A	Deepwater Sculpin, American Eel	June 15 – September 15

TABLE 1.
EXISTING FISH COMMUNITY AND FISH HABITAT CONDITIONS SUMMARY TABLE

Watercourse/ Waterbody	Flow*	Thermal Regime	Fish Habitat	Fish Species Present	Substrate Type	Vegetation	Species at Risk/ Critical Habitat Present	In Water Works Timing Window
				Bass, White Perch, Bluntnose Minnow, Lake Chub, Gizzard Shad, Smallmouth Bass, Rainbow Smelt, Logperch, Black Crappie, Yellow Perch, Common Shiner, Bowfin, Rainbow Trout, Longnose Sucker, Chinook Salmon, Sea Lamprey, Brook Trout, Brown Bullhead, Shorthead Redhorse, Golden Shiner, Spotfin Shiner, Brown Trout, Fathead Minnow, Longnose Gar, Channel Catfish, Brook Stickleback, Freshwater Drum, Slimy Sculpin, Largemouth Bass, Walleye (MNRF, 2021) Not sampled by LGL				
Burlington Canal	Permanent	Unknown	Direct	Not provided by HCA Threespine Stickleback, Emerald Shiner, Longnose Dace, Muskellunge, Tessellated Darter, White Sucker, Lake Trout, Common Carp, Spottail Shiner, Round Whitefish, Alewife, Northern Pike, Central Mudminnow, River Chub, Goldfish, Coho Salmon, Central Stoneroller, Rock Bass, Lake Whitefish, Blacknose Dace, Pumpkinseed, Creek Chub, Walleye, Bluegill, Johnny Darter, Mottled Sculpin, Round Goby, White Bass, White Perch, Bluntnose Minnow, Lake Chub, Gizzard Shad, Smallmouth Bass, Rainbow Smelt, Logperch, Black Crappie, Yellow Perch, Common Shiner, Bowfin, Rainbow Trout, Longnose Sucker, Chinook Salmon, Sea Lamprey, Brook Trout, Brown Bullhead, Shorthead Redhorse, Golden Shiner, Spotfin Shiner, Brown Trout, Fathead Minnow,	Boulders, unknown	N/A	American Eel	June 15 – September 15

TABLE 1.
EXISTING FISH COMMUNITY AND FISH HABITAT CONDITIONS SUMMARY TABLE

Watercourse/ Waterbody	Flow*	Thermal Regime	Fish Habitat	Fish Species Present	Substrate Type	Vegetation	Species at Risk/ Critical Habitat Present	In Water Works Timing Window
				Longnose Gar, Channel Catfish, Brook Stickleback, Freshwater Drum, Slimy Sculpin, Largemouth Bass (MNRF, 2021) Not sampled by LGL				
Lake Ontario Shoreline	Permanent	Unknown	Direct	Not provided by HCA Threespine Stickleback, Emerald Shiner, Longnose Dace, Muskellunge, Tessellated Darter, White Sucker, Lake Trout, Common Carp, Spottail Shiner, Round Whitefish, Alewife, Northern Pike, Central Mudminnow, River Chub, Goldfish, Coho Salmon, Central Stoneroller, Rock Bass, Lake Whitefish, Blacknose Dace, Pumpkinseed, Creek Chub, Walleye, Bluegill, Johnny Darter, Mottled Sculpin, Round Goby, White Bass, White Perch, Bluntnose Minnow, Lake Chub, Gizzard Shad, Smallmouth Bass, Rainbow Smelt, Logperch, Black Crappie, Yellow Perch, Common Shiner, Bowfin, Rainbow Trout, Longnose Sucker, Chinook Salmon, Sea Lamprey, Brook Trout, Brown Bullhead, Shorthead Redhorse, Golden Shiner, Spotfin Shiner, Brown Trout, Fathead Minnow, Longnose Gar, Channel Catfish, Brook Stickleback, Freshwater Drum, Slimy Sculpin, Largemouth Bass (MNRF, 2021) Not sampled by LGL	Sand, boulders	N/A	American Eel	June 15 – September 15

3.2.5 Species at Risk

A review of the MNRF Natural Heritage Information Centre (NHIC) database and DFO Species at Risk mapping identified one aquatic species at risk, American Eel*,* as present within the Beach Boulevard Municipal Class EA study area. DFO mapping also indicates that a distribution of Deepwater Sculpin (*Myoxocephalus thompsonii*) is located within a pocket of the Hamilton Harbour approximately 100 m west of the study area.

American Eel is regulated provincially as "Endangered" under the Ontario *Endangered Species Act, 2007* (ESA) and listed as "Threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). American Eel is not regulated or afforded protection under the federal Species at Risk Act (SARA). Deepwater Sculpin is regulated federally under SARA and COSEWIC as "Special Concern". Deepwater Sculpin is not afforded protection under the ESA.

3.3 Vegetation and Vegetation Communities

3.3.1 Purpose

The geographical extent, composition, structure and function of the vegetation communities were identified through air photo interpretation and field investigations. Air photos were interpreted to determine the limits and characteristics of the vegetation communities in the study area. Multi-season botanical field investigations were undertaken within the study area on May 27th, July 21st, and October 7th, 2021. The field investigations of the vegetation communities were undertaken within the Beach Boulevard Flood Remediation study area.

The vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application (Lee et al. 1998).* A plant list and a description of the general structure of vegetation were obtained during the field investigations. Plant species status was reviewed for Ontario (Oldham 2009) and Hamilton (2014). Vascular plant nomenclature follows Newmaster et al. (1998) with a few exceptions that have been updated to Newmaster et al. (2005).

3.3.2 Data Sources

- Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. *Ecological Land Classification for Southern Ontario: First Approximation and Its Application*. Natural Heritage Information Centre;
- Newmaster, S.G., A. Lehela, P.W.C. Uhlig, S. McMurray and M.J. Oldham. 1998. *Ontario Plant List*. Ontario Ministry of Natural Resources, Ontario Forest Research Institute, Sault Ste. Marie, Ontario, Forest Research Information Paper No. 123, 550 pp. + appendices;
- Newmaster, S.G. 2005. *Flora Ontario - Integrated Botanical Information System (FOIBIS)* 2006 species scientific names obtained March 2007 from the University of Guelph;

- Oldham, M.J. 2009. *Natural Heritage Resources of Ontario: Rare Vascular Plants.* Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario;
- Ontario Ministry of Natural Resources and Forestry. 2020. *Natural Heritage Information Centre*. Website available online at: https://www.ontario.ca/environment-and-energy/natural-heritage-information-centre. Accessed June 2017, Ministry of Natural Resources and Forestry. Peterborough, Ontario;
- Hamilton Conservation Authority. 2014. *Hamilton Natural Areas Inventory Project 3rd Edition: Species Checklist Document*.

3.3.3 Findings

Vegetation communities identified within the study area consist of a mixture of cultural communities and natural/semi-natural communities including: forest, wetlands, and, sand dunes.

Cultural communities include Dry-Moist Old Field Meadow (CUM1-1), Mineral Cultural Thicket (CUT1), Mineral Cultural Savannah (CUS1), and Mineral Cultural Woodland (CUW1). In general, the cultural vegetation communities were identified in areas where regular or past disturbances have occurred (i.e. adjacent to roadways or previous industrial sites) and were observed to be in a disturbed state. These areas contained a high proportion of invasive and/or non-native plant species that are disturbance tolerant. Overall, the quality of these communities is considered to be low.

As noted above, the natural/semi-natural features identified with the study area include forest, wetland and sand dune communities. A single deciduous forest (FOD4) type was identified within the study area. Two FOD4 communities were identified within the study area including a linear community adjacent to the Queen Elizabeth Way and a small community adjacent to the Watefront Trail. Given the close proximity of these communities to infrastructure, they were observed to be highly influenced by anthropogenic disturbance and generally supported a high proportion of non-native, disturbance tolerant plant species. In general, the deciduous forest communities within the study area would be considered to be of low quality.

A total of three wetland community types were identified within the study area including Meadow Marsh (MAM and MAM2-2), Shallow Marsh (MAS) and Swamp Thicket (SWT2-2). The wetlands within the study area were generally associated with the drainage features within the study area. The wetlands within the study area generally supported a low diversity of plant species and would be considered to be of low to moderate quality.

A large sand dune system was identified along the Waterfront Trail adjacent to Lake Ontario and extends the entire length of the study area. The sand dunes consisted of a

mixture of Open Sand Dunes (SDO and SDO1-1), Shrub Sand Dune (SDS1), and Tree Sand Dune (SDT1 and SDT1-1) communities. Restoration efforts have been undertaken within the north portion of the sand dunes including the removal of non-native plant species and the planting of native dune plant species including short-liguled beach grass (Ammophila breviligulata) and Indian grass (Sorghastrum nutans). Restoration efforts where most evident in the SDO1-1 communities where the species composition was almost entirely native plant species. Anthropogenic disturbance was widespread across the dunes including the planting of ornamental, non-native plant species by adjacent landowners and previous clearing of the hydro corridor which resulted in the removal of a large portion of tree cover. Overall, the sand dunes are considered to be of moderate habitat quality.

Overall, the vegetation communities identified within the study area are considered widespread and common in Ontario and are secure globally with the exception of one community. A review of the NHIC indicates that the Little Bluestem-Switch Grass-Beach grass Open Dune (SDO1-1) community identified along the Waterfront Trail is considered a S2 (Imperilled) vegetation community within Ontario. The limits of the vegetation communities are delineated in **Figure 3** and described in **Table 2.**

Flora

A total of 136 plant species have been recorded within the study area. Four of these plants could only be identified to genus and are not included in the following calculations. Of the 132 plant species identified, 51 (39%) plant species identified are native to Ontario and 81 (61%) plant species are considered introduced and non-native to Ontario. A list of vascular plants is presented in **Appendix B**. Definitions of the acronyms and species ranks used in **Appendix B** are described in **Appendix C**.

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
Terrestrial-Natural/Semi-Natural			
BBO	OPEN BEACH/BAR		
BBO1	Mineral Open/Beach Bar		• Subject to active shoreline processes: ice scour, wave energy, erosion and deposition (BB). • Tree cover ≤ 25%, shrub cover ≤ 25% (O). • Unconsolidated mineral substrate (1).
SDO	OPEN SAND DUNE		
SDO1	Open Sand Dune	**Emergent Trees/Shrubs:** includes Siberian elm (*Ulmus pumila*), staghorn sumac (*Rhus hirta*), and cottonwood (*Populus deltoides*). **Ground Cover:** includes riverbank grape (*Vitis riparia*), bouncing bet (*Saponaria officinalis*), short-liguled beach grass (*Ammophila breviligulata*), downy chess (*Bromus tectorum*), and Jerusalem artichoke (*Helianthus tuberosus*).	• Active rolling sand hills formed by shoreline processes and aeolian processes (SD). • Tree cover ≤ 25%, shrub cover ≤ 25% (O). • Vegetation cover from patch to barren to continuous meadow (1).
SDO1-1	Little Bluestem-Switch Grass-Beachgrass Open Dune	**Emergent Trees/Shrubs:** includes Siberian elm (*Ulmus pumila*), staghorn sumac (*Rhus hirta*), and cottonwood (*Populus deltoides*). **Ground Cover:** includes scouring-rush (*Equisetum hyemale* var. *affine*), short-liguled beach grass, riverbank grape, and Indian grass (*Sorghastrum nutans*).	• Active rolling sand hills formed by shoreline processes and aeolian processes (SD). • Tree cover ≤ 25%, shrub cover ≤ 25% (O). • Vegetation cover from patchy to barren to continuous meadow (1). • Little bluestem, switch grass, or beachgrass dominant (-1).
SDS	SHRUB SAND DUNE		
SDS1	Shrub Sand Dune	**Canopy:** includes cottonwood, Siberian elm, fruit tree (*Prunus* sp.), and staghorn sumac. **Ground Cover:** includes riverbank grape, downy chess, Jerusaleum artichoke, short-liguled beach grass and Kentucky blue grass (*Poa pratensis* ssp. *pratensis*).	• Active rolling sand hills formed by shoreline processes and aeolian processes (SD). • Tree cover ≤ 25%, shrub cover > 25% (S). • Vegetation cover from patchy to barren to continuous thicket, scattered to dense shrub cover (1).

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
SDT	TREED SAND DUNE		
SDT1	Treed Sand Dune	**Canopy:** includes Siberian elm, cottonwood, black locust (*Robinia pseudo-acacia*), and Manitoba maple (*Acer negundo*). **Understory:** includes black locust, staghorn sumac, choke cherry (*Prunus virginiana* var. *virginiana*), and black walnut (*Juglans nigra*). **Ground Cover:** includes garlic mustard (*Alliaria petiolata*), downy chess, short-ligueled beach grass, American wild mint (*Mentha arvensis*), and Canada goldenrod (*Solidago canadensis*).	• Active rolling sand hills formed by shoreline processes and aeolian processes (SD). • 25% < tree cover ≤ 60% (T). • Vegetation cover from savannah to woodland (1).
SDT1-1	Cottonwood Treed Dune	**Canopy:** includes cottonwood and Siberian elm. **Understory:** includes cottonwood, staghorn sumac, Manitoba maple, black walnut, and black locust. **Ground Cover:** includes riverbank grape, awnless brome (*Bromus inermis* spp. *inermis*), field cress (*Lepidium campestre*), horseweed (*Conyza canadensis*), and catnip (*Nepeta cataria*).	• Active rolling sand hills formed by shoreline processes and aeolian processes (SD). • 25% < tree cover ≤ 60% (T). • Vegetation cover from savannah to woodland (1). • Cottonwood dominant (-1).
FOD	DECIDUOUS FOREST		
FOD4	Dry-Fresh Decidous Forest	**Canopy**: includes Austrian pine (*Pinus nigra*), Siberian elm, black walnut, Manitoba maple, Norway maple (*Acer platanoides*), and cottonwood. **Understory:** includes eastern white cedar (*Thuja occidentalis*), Japanese barberry (*Berberis thunbergii*), common buckthorn (*Rhamnus cathartica*), choke cherry, and staghorn sumac. **Ground Cover**: includes Kentucky blue grass, awnless brome, creeping Charlie (*Glechoma hederacea*), catnip, garlic mustard, dame's rocket (*Hesperis matronalis*), and Japanese knotweed (*Polygonum cuspidatum*).	• Tree cover > 60% (FO). • Deciduous trees > 75% of canopy cover (D). • Tree species associations that are relatively common or a result of disturbance (4).
Terrestrial-Cultural			
CUM	CULTURAL MEADOW		

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
CUM1-1	Dry – Moist Old Field Meadow	**Emergent Trees/Shrubs:** includes white spruce (*Picea glauca*), Japanese barberry, cottonwood, and Russian olive (*Elaeagnus angustifolia*). **Ground Cover:** includes Japanese knotweed, Canada goldenrod, orchard grass (*Dactylis glomerata*), common ragweed (*Ambroisa artemisiifolia*), Kentucky bluegrass, nipplewort (*Lapsana communis*), and common dandelion (*Taraxacum officinale*).	• Cultural community (CU). • Tree cover and shrub cover < 25% (M). • Mineral soil (1). • This community can occur on a wide range of soil moisture regimes (Dry-Moist) (-1).
CUT/CUM	CULTURAL THICKET/CULTURAL MEADOW		
CUT1/CUM1	Mineral Cultural Thickhet/Mineral Cultural Meadow	**Canopy:** includes sweet gum (*Liquidambar styraciflua*), white mulberry (*Morus alba*), common buckthorn, and cottonwood. **Ground Cover:** includes Japanese knotweed, Canada thistle (*Cirsium arvense*), Kentucky bluegrass, Timothy (*Phleum pratense*), catnip, and orchard grass.	• Cultural communities (CU). • Tree cover <25%; shrub cover >25% (T). • Mineral soil (1). • Cultural communities (CU). • Tree cover and shrub cover < 25% (M). • Mineral soil (1).
CUT	CULTURAL THICKET		
CUT1	Mineral Cultural Thicket	**Canopy:** includes Siberian elm, white mulberry, balsam poplar (*Populus balsamifera* ssp. *balsamifera*), black locust, and honey locust (*Gleditsia triacanthos*). **Understory:** includes common apple (*Malus pumila*), choke cherry, red panicled dogwood (*Cornus racemosa*), tree of heaven (*Ailanthus altissima*), and Russian olive (*Elaeagnus angustifolia*). **Ground Cover:** includes false Soloman's seal (*Maianthemum racemosum* spp. *racemosum*), periwinkle (*Vinca minor*), smooth rose (*Rosa blanda*), mossy stonecrop (*Sedum acre*), garlic mustard, and dame's rocket.	• Cultural communities (CU). • Tree cover <25%; shrub cover >25% (T). • Mineral soil (1).
CUT	CULTURAL THICKET		
CUT1-1	Sumac Cultural Thicket	**Canopy**: includes staghorn sumac and Manitoba maple. **Ground Cover:** includes Kentucky bluegrass, awnless brome, Japanese knotweed, and riverbank grape.	• Cultural communities (CU). • Tree cover <25%; shrub cover >25% (T). • Mineral soil (1). • Sumac dominant (-1).

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
CUS	CULTURAL SAVANNAH		
CUS1	Mineral Cultural Savannah	**Canopy:** includes white spruce, cottonwood, Russian olive, red osier dogwood (*Cornus sericea* ssp. *sericea*), and Manitoba maple. **Groud Cover:** includes snowberry (*Symphoricarpus albus*), Kentucky bluegrass, reed canary grass (*Phalaris arundinacea*), wild carrot (*Daucus carota*), Canada goldenrod and, teasel (*Dipsacus fullonum ssp. sylvestris*).	• Cultural communities (CU). • <25% tree cover shrub ≤ 35% (S). • Mineral soil (1).
CUW	CULTURAL WOODLAND		
CUW1	Mineral Cultural Woodland	**Canopy:** includes Norway spruce (*Picea abies*), Austrian pine, cottonwood, and white birch (*Betula papyrifera*). **Understory:** includes white mulberry, Russian olive, staghorn sumac, and Manitoba maple. **Groud Cover:** includes Kentcuky bluegrass, European stinging nettle (*Urtica dioica* ssp. *dioica*), dame's rocket, and catnip.	• Cultural communities (CU). • 35% < tree cover < 60% (W). • Mineral Soil (1).
Wetland			
MAM	MEADOW MARSH		
MAM2	Mineral Meadow Marsh	**Emergent Trees/Shrubs**: includes cottonwood and willow. **Ground Cover:** includes European reed (*Phargmites australis* ssp. *australis*), and Canada goldenrod.	• Tree or shrub cover <25% (MA). • Flooding seasonal, species less tolerant of prolonged flooding (M). • Mineral soil (2).
MAM2-2	Reed-Canary Grass Mineral Meadow Marsh	**Emergent Trees/Shrubs**: includes red osier dogwood and crack willow (*Salix fragilis*). **Ground Cover:** includes European reed, reed canary grass and broad-leaved cattail (*Typha latifolia*).	• Tree or shrub cover <25% (MA). • Flooding seasonal, species less tolerant of prolonged flooding (M). • Mineral soil (2). • Reed-canary grass dominant (-2).
MAS	SHALLOW MARSH		
MAS	Shallow Marsh	**Emergent Trees/Shrubs**: includes red osier dogwood and crack willow (*Salix fragilis*), cottonwood, and Manitoba maple.	• Tree or shrub cover <25% (MA).

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
		Ground Cover: includes reed canary grass, European reed, and broad-leaved cattail (*Typha latifolia*) and purple loosestrife (*Lythrum salicara*).	• Water up to 2 m deep, with standing or flowing water for much of the growing season (S).
SWT	THICKET SWAMP		
SWT2-2	Willow Mineral Thicket Swamp	**Canopy:** includes willow species (*Salix* ssp.), cottonwood, bur oak (*Quercus macrocarpa*), and red osier dogwood. **Ground Cover**: includes European reed, dame's rocket, and Japanese knotweed.	• Tree or shrub cover >25% and dominated by hydrophytic shrub and tree species (SW). • Deciduous tree cover <25%; hydrophytic shrubs > 25% (T). • Mineral soil (2). • Willows are dominant (-2).

3.3.4 Species at Risk

No plant species that are regulated under the Ontario *Endangered Species Act* (ESA) or the Canada *Species at Risk Act* (SARA) were encountered during LGL's botanical investigation within the study area (those plant species regulated as Endangered, Threatened, or Special Concern). A description of provincial species ranks is provided in **Appendix C**.

Provincially/Locally Rare Plant Species

Five plant species that are considered rare or uncommon within Hamilton were identified within the study area. In addition, short-liguled beach grass is considered provincially rare. **Table 3** provides a list of the rare species that were identified, the applicable SRank and which vegetation community each species was identified within. The majority of rare species occurrences were within the dune system along the Waterfront Trail. A description of species rank definitions is presented in **Appendix C**.

TABLE 3.
SIGNIFICANT PLANT SPECIES IDENTIFIED WITHIN THE STUDY AREA

Scientific Name	Common Name	SRank	Hamilton	Vegetation Community							
				CUM1-1	CUT1	FOD4	SDO	SDO1-1	SDS	SDT	SDT1-1
Celtis occidentalis	common hackberry	S4	h		X	X					
Ammophila breviligulata	short-liguled beach grass	S3	H				X	X	X	X	X
Elymus canadensis	nodding wild rye	S4S5	H	X							
Schizachyrium scoparium	little bluestem	S4	H				X				
Sorghastrum nutans	Indian grass	S4	H					X			

H – indicates a rare species in Hamilton, h – indicates an uncommon species in Hamilton

3.4 Wildlife and Wildlife Habitat

3.4.1 Purpose

Field investigations were conducted with the purpose of documenting wildlife and wildlife habitat and to characterize the nature, extent, and significance of wildlife usage within the study area. In addition to targeted breeding bird and anuran call surveys, incidental observations of wildlife species were also documented during each site visit. Direct observations, calls and tracks were used to record wildlife presence within the study area. Field investigations were conducted on April 8, May 13, June 10, June 20 and July 10, 2021.

3.4.2 Data Sources

Information regarding wildlife and wildlife habitat within the study area was obtained through:

- The Natural Heritage Information Centre data available through *Make a Map* (MNRF 2021);
- Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. Editors: Michael D. Cadman, Donald A. Sutherland, Gregor G. Beck, Denis Lepage, and Andrew R. Couturier. Ontario Breeding Bird Atlas. 2001 – 2005;
- Couturier, A. 1999. Conservation Priorities for the Birds of Southern Ontario. Bird Studies Canada;
- Ministry of Natural Resources and Forestry (MNRF). 2000. *Significant Wildlife Habitat Technical Guide*. Fish and Wildlife Branch – Wildlife Section; and,
- Schwetz, N. 2014. Hamilton Natural Areas Inventory Project 3rd Edition - Species Checklist Document. Report prepared by the City of Hamilton, Hamilton Conservation Authority, and Hamilton Naturalists Club
- Dobbyn, J.S. 1994. *Atlas of the Mammals of Ontario*. Federation of Ontario Naturalists. Toronto.

Secondary source data from the Ministry of Natural Resource and Forestry (NHIC) was reviewed to screen for wildlife, wildlife habitat and records of species at risk found within the study area and its immediate vicinity. Natural heritage data from HCA was also reviewed.

3.4.3 Wildlife Habitat

The study area is located along a relatively narrow spit of land between Lake Ontario and Hamilton Harbour. Overall, lands within the study area are highly disturbed as a result of residential development and wide-spread industrial land use. Natural heritage features were identified in association with Red Hill Creek, which is located in the southwest section of the study area. Red Hill Creek may provide important function for aquatic bird and herpetofauna species. Red Hill Creek and portions of Hamilton Harbour (in the vicinity of the study area) may function as waterfowl stop-over areas in the spring and fall. Eastport Ditch is also located between Eastport Drive and the QEW along much of the study area; however, this drainage feature was found to be highly disturbed and offered limited habitat function for wildlife species. Windermere Basin Park contained several ephemeral meadow marsh communities; however, these features were found to be dominated by invasive vegetation (*Phragmites spp*.) and targeted surveys did not find significant function for anuran or bird species.

No interior forest habitat was identified within the limits of the study area. Interior forest is generally defined as forested cover located at least 100 m from non-forested land cover. Only relatively small and highly disturbed deciduous forest communities were identified at several locations across the study area. Based on the habitat types present, wildlife species which occupy woodland edges, open country/agricultural, aquatic and anthropogenic communities are expected to occupy the study area.

There are no provincially significant wetlands (PSWs) or areas of natural and scientific interest (ANSIs) located within the study area; however, there are several natural heritage areas that are associated with municipal parks including Hamilton Beach, Windemere Basin Park, Skyway Park, Reg Wheeler Park, Nixon Park, Kinsman Park, Dieppe Veterans Memorial Park, and Jimmy Lomax Park. The Hamilton Beach Strip, located along the Lake Ontario and Hamilton Harbour shorelines, is designated as an Environmentally Sensitive Area (ESA). The West End of Lake Ontario and Hamilton Harbour Waterbird Colonies are recognized as Important Bird Areas (IBA) and Waterfowl Winter Concentration Areas.

3.4.4 Fauna

Targeted breeding bird and anuran call surveys were conducted within the study area.

Anuran Surveys

The purpose of these surveys was to document the occurrence of frog and toad species, identify potential breeding areas, and estimate breeding population levels. Anuran surveys were conducted between April 8 and July 20, 2021, and each evening's survey began one half hour after sunset and ended prior to midnight (see **Table 4**).

Methodologies outlined in the Great Lakes Marsh Monitoring Program (2000) (https://www.birdscanada.org/volunteer/glmmp/index.jsp?targetpg=glmmpfrog) were used including calling index codes to estimate the abundance of frogs and toads at each station.

We also estimated the number of calling individuals if possible. Call level index codes were assigned to all calling frog and toad species at each survey location as follows:

Code 1: individual calls do not overlap and calling individuals can be discretely counted;

Code 2: calls of individuals sometimes overlap, but numbers of individuals can still be estimated; and,

Code 3: overlap among calls seems continuous (full chorus), and a count estimate is impossible.

TABLE 4.
SUMMARY OF DATE OF WILDLIFE INVENTORY, TASK, WEATHER AND PERSONNEL

Date of Inventory	Task	Weather	Personnel Involved
April 8, 2021	Anuran survey	Partly cloudy, 9°C, wind 8km/h NW	David Smith (LGL)
May 13, 2021	Anuran survey	Clear, 14°C, wind 5km/h E	David Smith (LGL)
June 20, 2021	Anuran survey	Overcast, 23°C, wind 1km/h S	Jordan Pietroniro (LGL)

Stations were strategically placed where amphibian breeding habitat was suspected, based on air-photo interpretation and a ground-truthing review of the study area (see **Figure 3**). Field investigations within the study area were conducted on three separate nights during the spring and summer of 2021, ran from one half hour after sunset and ended prior to midnight and were conducted during appropriate weather conditions. Investigations were undertaken during periods of peak anuran breeding activity and vocalization.

Three anuran breeding stations were established within or immediately adjacent to the study area. Stations #1 and #2 were located within meadow marsh habitat (wet depressions dominated by Phragmites spp. within Windermere Basin Park) and Station #3 was located immediately northeast of the study area, within roadside ditch habitat (see **Figure 3**). No evidence of anuran breeding evidence was documented during 2021 surveys. No herpetofauna species were identified during field investigations.

Breeding Bird Surveys

Breeding bird surveys were conducted on two mornings during the 2021 breeding bird season (June 10 and July 10, 2021) to document breeding bird evidence (BBE) and to characterize the nature, extent and significance of breeding bird usage of the habitats within the study area. Breeding bird survey methodology and breeding bird behaviours used as evidence of breeding success were categorized according to the Breeding Bird Atlas five-year surveys organized by Bird Studies Canada (Cadman et al., 2007). Fourteen breeding bird point count stations were established and bisected the study area from east to west (see **Figures 3.1-3.12**). Wandering transects were also used to record incidental bird species.

Thirty-eight bird species were documented during targeted breeding bird surveys conducted within the study area. Based on BBE criteria, six species were categorized as ‘confirmed breeding’, 21 species as ‘probable breeding’ and 11 species as ‘possible breeding’. Species identified as ‘confirmed breeding’ were categorized based on adults observed carrying food (for young) and nests with young. Specifically, Tree Swallow (*Tachycineta bicolor*) and House Wren (*Troglodytes aedon*) were recorded using man-made nest boxes associated with Breeding Bird Station # 4. Species diversity and

breeding evidence was highest within aquatic and meadow habitats associated with Breeding Bird Station # 1-4. The bird species identified during field investigations are species typically associated with open-country/agricultural, forest edge, aquatic and anthropogenic habitat types. Results of breeding bird surveys are summarized in **Appendix D**.

Notably, Barn Swallow (*Hirundo rustica*), Chimney Swift (*Chaetura pelagica*) and Peregrine Falcon (*Falco peregrinus*) (all species at risk) were identified within the study area; however, no evidence of nesting by these species was identified. Migratory bird species are expected to be nesting across much of the study area.

3.4.5 Findings

A summary of the wildlife species recorded is presented in **Table 5**.

Mammal Species

Two mammal species were recorded in the study area during field investigations. Several eastern cottontail (*Sylvilagus floridanus*) were observed along trails within Windermere Basin Park. Scat from American mink (*Neovison vison*) was noted along rocky shorelines associated with Windermere Basin Park. A modest assemblage of mammal species which occupy aquatic, treed and open country/anthropogenic habitats are expected to occupy the study area. Small areas of deciduous forest habitat found across the study area contained trees which would be considered limited in their suitability to support bat roosting habitat.

3.4.6 Species at Risk

A number of the bird species recorded within the study area are protected under the *Migratory Birds Convention Act* (MBCA). Both mammal species and several bird species recorded are afforded protection under the *Fish and Wildlife Conservation Act.*

Endangered and threatened species are identified by the MNRF using procedures established by the Committee on the Status of Species at Risk in Ontario (COSSARO). Species and their habitats are protected under the *Endangered Species Act*, 2007. In order to address the most current species at risk (SAR) requirements, LGL completed a SAR habitat screening, whereby available data for the area was screened for SAR occurrences. Targeted breeding bird, anuran breeding surveys, and habitat analysis was used to determine presence of species at risk during 2021 field investigations.

TABLE 5.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA BY LGL (2021)

Wildlife	Scientific Name	Common Name	SARA	ESA	Legal Status	Other
Birds	*Larus delawarensis*	Ring-billed Gull			MBCA	A
	Larus argentatus	Herring Gull			MBCA	C
	Sterna hirundo	Common Tern			MBCA	Cq
	Cygnus olor	Mute Swan			MBCA	I; R
	Branta canadensis	Canada Goose			MBCA	I; C
	Falco peregrinus anatum	Peregrine Falcon	No Status	SC	FWCA(P)	R
	Anas platyrhynchos	Mallard			MBCA	C
	Anas clypeata	Northern Shoveler			MBCA	R
	Phalacrocorax auritus	Double-crested Cormorant			MBCA	A
	Ardea Herodias	Great-blue Heron			MBCA	U
	Charadrius vociferous	Killdeer			MBCA	A
	Actitis macularius	Spotted Sandpiper			MBCA	C
	Zenaida macroura	Mourning Dove			MBCA	A
	Columba livia	Rock Dove			-	I; A
	Picoides pubescens	Downy Woodpecker			MBCA	C
	Vireo gilvus	Warbling Vireo			MBCA	C
	Cyanocitta cristata	Blue Jay			FWCA (P)	A
	Chaetura pelagica	Chimney Swift	THR	THR	MBCA	U
	Corvus brachyrhynchos	American Crow			MBCA	C
	Stelgidopteryx serripennis	Northern Rough-winged Swallow			MBCA	C
	Hirundo rustica	Barn Swallow	THR	THR	MBCA	A
	Tachycineta bicolor	Tree Swallow			MBCA	A
	Poecile atricapillus	Black-capped Chickadee			MBCA	A
	Sitta carolinensis	White-breasted Nuthatch			MBCA	C
	Troglodytes aedon	House Wren			MBCA	C
	Turdus migratorius	American Robin			MBCA	C
	Drumetella carolinensis	Gray Catbird			MBCA	C
	Stumus vulgaris	European Starling			-	I; A
	Bombycilla garrulous	Cedar Waxwing			MBCS	C
	Dendroica petechial	Yellow Warbler			MBCA	A
	Spizella passerine	Chipping Sparrow			MBCA	A
	Icterus galbula	Northern Oriole			MBCA	C
	Melospica melodia	Song Sparfrow			MBCA	A

TABLE 5.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA BY LGL (2021)

Wildlife	Scientific Name	Common Name	SARA	ESA	Legal Status	Other
	Cardinalis cardinalis	Northern Cardinal			MBCA	A
	Agelaius phoeniceus	Red-winged Blackbird			-	A
	Quiscalus quiscula	Common Grackle			-	A
	Carduelis tristis	American Goldfinche			MBCA	A
	Passer domesticus	House Sparrow			-	I; A
Mammals	*Sylvilagus floridanus*	Eastern Cottontail			FWCA (G)	C
	Neovison vison	American Mink			FWCA (F)	C

All acronyms used in this table are defined in **Appendix B** (Acronyms and Definitions Used in Species Lists).

COSEWIC - Committee on the Status of Endangered Wildlife in Canada:
END - Endangered
THR – Threatened
SC - Special Concern

ESA - *Ontario Endangered Species Act*, 2007
END – Endangered
THR – Threatened
SC - Special Concern

Other:
SWH - SWH-TG Area Sensitive Species
INT - Interior Species
NY - Nest with young seen or heard.
Other: (Nature Counts Project: Hamilton Natural Areas Inventory 2003); R-rare, C-common, U-uncommon, EXT-extirpated, I-introduced, UNC-uncertain, A-abundant, M-migrant
For definitions of species ranks, refer to Appendix D.

Legal Status:
MBCA - *Migratory Birds Convention Act*
ESA - E*ndangered Species Act*
SARA - *Species at Risk Act*
FWCA - *Fish and Wildlife Conservation Act*
(P) Protected Species (G) Game species (F) Furbearing mammals

Of the wildlife species recorded within the study area, two species are regulated under the Ontario *Endangered Species Act, 2007* (ESA) and one species is listed by COSSARO but is not regulated under the ESA. A query for rare species was conducted using the Natural Heritage Information Centre (NHIC) Ontario GeoHub database (MNRF 2022), which identified ten wildlife species at risk, as previously recorded within or in the vicinity of the study area. A discussion of potential SAR within the study area is presented below. Four bat species were also identified as having the potential to occupy the study area based on a habitat screening conducted by LGL. A SAR Screening (**Appendix E**) has been prepared with the benefit of biophysical inventories and includes general recommendations for mitigation, as appropriate.

3.4.7 Locally Significant Species

Several species classified as ‘Rare’ or ‘Uncommon’ by the Nature Counts Project: Hamilton Natural Areas Inventory (Schwetz, N. 2014). Each of these species are discussed below.

Great Blue Heron (Uncommon)
Great blue herons depend on wetlands where they feed on fish, amphibians, reptiles, small mammals, insects and birds. They are colonial nesters and build stick nests in trees. There were no observations of nesting great blue herons in the study area. Individuals were observed wading through Red Hill Creek, presumably hunting.

Chimney Swift (Uncommon)
Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large, uncapped chimneys. No observations of nesting by this species was identified within the study area; however, nesting within industrial portions of the study area could occur. Observations were limited to individuals foraging individuals over meadow and aquatic habitats.

Peregrine Falcon (Rare)
The Peregrine Falcon is found in a wide range of habitats, from Arctic tundra to sea coasts, prairies and urban centres. These falcons usually build solitary nests on cliff ledges or crevices, but they sometimes build their nests on the ledges of tall buildings or bridges, always near an abundant source of prey. Individuals were observed flying over the study area. A breeding pair is known to nest annually on the Burlington Canal Lift Bridge structure, adjacent to the study area.

Mute Swan (Introduced; Rare)
Mute Swans are not native to North America (native to Europe). In North America this species is found in wide variety of wetland areas including all types of marshes, lakes, park ponds, often in close association with humans, but also in some remote wild areas. Observations of individuals in the study area was limited to foraging/feeding; no nests were identified.

3.4.8 Significant Wildlife Habitat, Ecoregion 7E

Significant Wildlife Habitat (SWH) has been identified as a natural heritage area for the purposes of Section 2.1 of the PPS. The PPS 2020 defines wildlife habitat as: *"Areas where plants, animals, and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species."*

Wildlife habitat is considered significant by the province where it is:

> *"Ecologically important in terms of features, functions, representation, or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System. Criteria for determining significance may be*

recommended by the Province, but municipal approaches that achieve the same objective may also be used."

SWH Criteria Schedules for Ecoregion 7E (MNRF 2015) was referenced to identify potential SWH within or in immediate proximity to the study area.

Data for ELC and the identified/potential wildlife assemblage and habitat was compiled and assessed according to the criteria outlined in MNRF's Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015). Targeted SWH surveys were not conducted; however, data collected from 2021 anuran breeding surveys, breeding bird surveys, incidental observations and habitat review were undertaken to identify potential SWH Criteria Schedules for Ecoregion 7E. The analysis is provided in **Appendix F**. Site specific mitigation to address potential impacts to SWH will be prescribes, as appropriate, during a later phase of the project.

3.5 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources and Forestry (MNRF), Hamilton Conservation Authority and upper and lower-tier municipalities. A review of relevant background data was undertaken to identify designated natural areas within and adjacent to the study. Designated natural areas within the vicinity of the study area are presented on **Figure 2**.

3.5.1 Provincially Significant Wetlands (PSWs)

There are no Provincially Significant Wetlands located within or 120 m beyond the limits of the study area.

3.5.2 Areas of Natural and Scientific Interest (ANSIs)

There are no Areas of Natural and Scientific Interest (ANSIs) located within or 120 m beyond the limits of the study area.

3.5.3 Environmentally Significant Area (ESAs)

A review of the City of Hamilton mapping indicates that the Hamilton Beach Strip Environmentally Significant Area (ESA) is located within the study area. Within the study area the Hamilton Beach Strip ESA is located along the Waterfront Trail adjacent to Lake Ontario and in addition, a small portion is adjacent to the Hamilton Harbour. The limits of the Hamilton Beach Strip ESA are presented in **Figure 2**

Additionally, the Van Wagner's Ponds and Marshes ESA is located outside of the study area, but within 200 m of the southern portion of the study area. The limits of the Van Wagner's Ponds and Marshes ESA are presented in **Figure 2**.

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
CUM1-1	Dry-Moist Old Field Meadow Type
CUS1	Mineral Cultural Savannah Ecosite
CUT1	Mineral Cultural Thicket Ecosite
CUT1-1	Sumac Cultural Thicket Type
CUW1	Mineral Cultural Woodland Ecosite
D	Disturbed
FOD4	Dry-Fresh Deciduous Forest Ecosite
M	Manicured
MAM2	Mineral Meadow Marsh Ecosite
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type
MAS	Shallow Marsh
SDO1	Open Sand Dune Ecosite
SDO1-1	Little Bluestem-Switchgrass-Beachgrass Open Dune Type
SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
SDT1-1	Cottonwood Treed Dune Type
SWT2	Mineral Thicket Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

Data Sources: LGL Limited field surveys, City of Hamilton & Ministry of Natural Resources and Forestry (LIO). Contains information licenced under the Open Government Licence - Ontario.

0 20 40 60 80 m

EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.1
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
CUM1-1	Dry-Moist Old Field Meadow Type
CUS1	Mineral Cultural Savannah Ecosite
CUT1	Mineral Cultural Thicket Ecosite
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CUW1	Mineral Cultural Woodland Ecosite
D	Disturbed
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MAM2	Mineral Meadow Marsh Ecosite
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type
MAS	Shallow Marsh
SDO1	Open Sand Dune Ecosite
SDO1-1	Little Bluestem-Switchgrass-Beachgrass Open Dune Type
SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
SDT1-1	Cottonwood Treed Dune Type
SWT2	Mineral Thicket Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

Data Sources: LGL Limited field surveys, City of Hamilton & Ministry of Natural Resources and Forestry (LIO). Contains information licenced under the Open Government Licence - Ontario.

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EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.2
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
CUM1-1	Dry-Moist Old Field Meadow Type
CUS1	Mineral Cultural Savannah Ecosite
CUT1	Mineral Cultural Thicket Ecosite
CUT1-1	Sumac Cultural Thicket Type
CUW1	Mineral Cultural Woodland Ecosite
D	Disturbed
FOD4	Dry-Fresh Deciduous Forest Ecosite
M	Manicured
MAM2	Mineral Meadow Marsh Ecosite
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type
MAS	Shallow Marsh
SDO1	Open Sand Dune Ecosite
SDO1-1	Little Bluestem-Switchgrass-Beachgrass Open Dune Type
SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
SDT1-1	Cottonwood Treed Dune Type
SWT2	Mineral Thicket Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

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EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.3
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
CUM1-1	Dry-Moist Old Field Meadow Type
CUS1	Mineral Cultural Savannah Ecosite
CUT1	Mineral Cultural Thicket Ecosite
CUT1-1	Sumac Cultural Thicket Type
CUW1	Mineral Cultural Woodland Ecosite
D	Disturbed
FOD4	Dry-Fresh Deciduous Forest Ecosite
M	Manicured
MAM2	Mineral Meadow Marsh Ecosite
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type
MAS	Shallow Marsh
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SDO1-1	Little Bluestem-Switchgrass-Beachgrass Open Dune Type
SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
SDT1-1	Cottonwood Treed Dune Type
SWT2	Mineral Thicket Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

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EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.4
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
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CUT1	Mineral Cultural Thicket Ecosite
CUT1-1	Sumac Cultural Thicket Type
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SDO1	Open Sand Dune Ecosite
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SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
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EXISTING CONDITIONS

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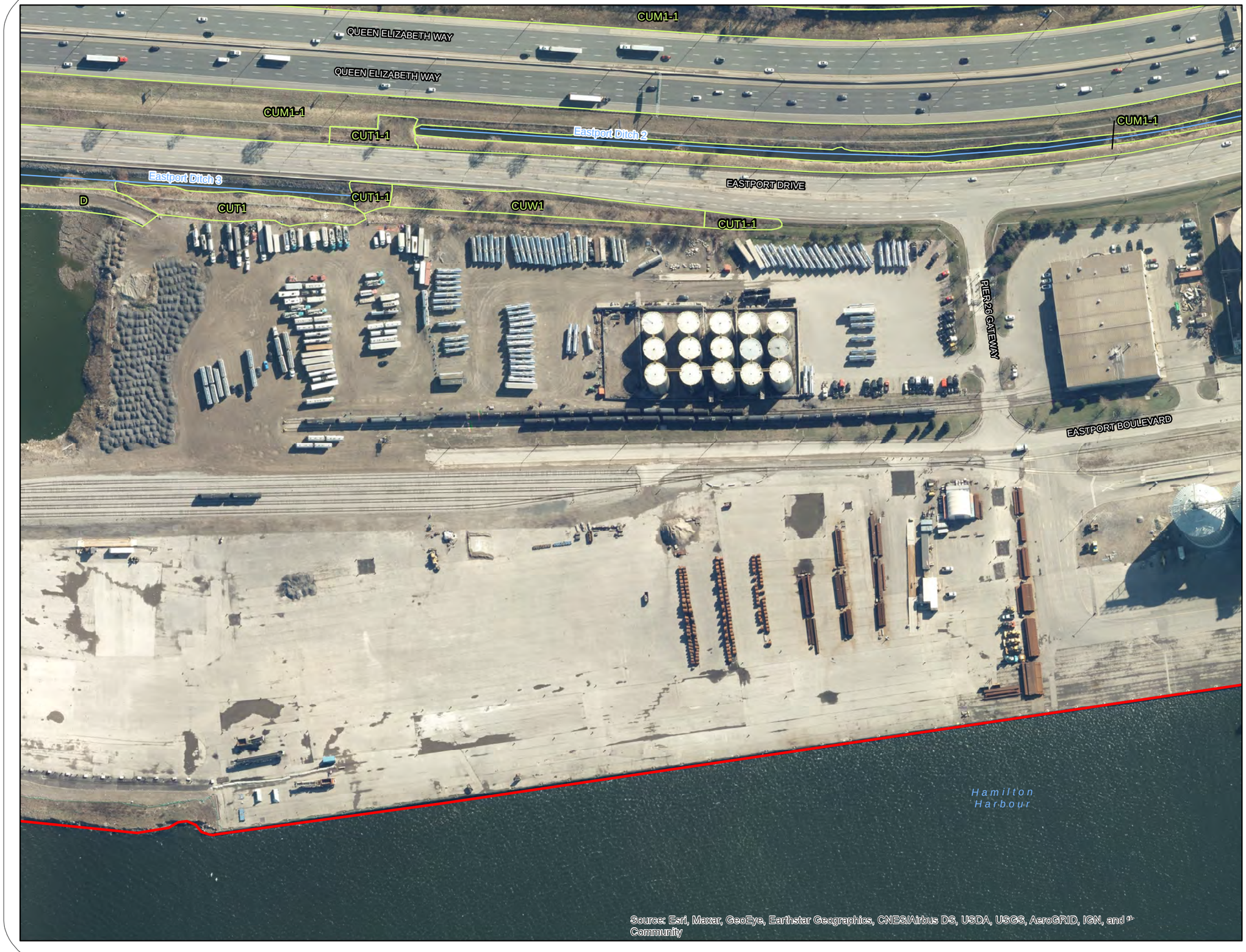
Project:	TA9030	**Figure:**	3.5
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC



LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
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EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.6
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
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EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.7
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
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SDT1-1	Cottonwood Treed Dune Type
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0 20 40 60 80 m

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EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.8
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
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SDT1-1	Cottonwood Treed Dune Type
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0 20 40 60 80 m

N

EXISTING CONDITIONS

LGL LIMITED
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Project:	TA9030	**Figure:**	3.9
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
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CUT1-1	Sumac Cultural Thicket Type
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SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
SDT1-1	Cottonwood Treed Dune Type
SWT2	Mineral Thicket Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

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0 20 40 60 80 m

N

EXISTING CONDITIONS

LGL LIMITED
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Project:	TA9030	**Figure:**	3.10
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
CUM1-1	Dry-Moist Old Field Meadow Type
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CUW1	Mineral Cultural Woodland Ecosite
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MAS	Shallow Marsh
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SDO1-1	Little Bluestem-Switchgrass-Beachgrass Open Dune Type
SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
SDT1-1	Cottonwood Treed Dune Type
SWT2	Mineral Thicket Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

Data Sources: LGL Limited field surveys, City of Hamilton & Ministry of Natural Resources and Forestry (LIO). Contains information licenced under the Open Government Licence - Ontario.

0 20 40 60 80 m

EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.11
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

LEGEND

- Amphibian Monitoring Station
- Breeding Bird Point Count Station
- Eastport Ditch Drainage System
- Beach Boulevard Study Area

Vegetation Communities

- Vegetation Community Boundary

BBO1	Mineral Open Beach/Bar Ecosite
CUM1-1	Dry-Moist Old Field Meadow Type
CUS1	Mineral Cultural Savannah Ecosite
CUT1	Mineral Cultural Thicket Ecosite
CUT1-1	Sumac Cultural Thicket Type
CUW1	Mineral Cultural Woodland Ecosite
D	Disturbed
FOD4	Dry-Fresh Deciduous Forest Ecosite
M	Manicured
MAM2	Mineral Meadow Marsh Ecosite
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type
MAS	Shallow Marsh
SDO1	Open Sand Dune Ecosite
SDO1-1	Little Bluestem-Switchgrass-Beachgrass Open Dune Type
SDS1	Shrub Sand Dune Ecosite
SDT1	Treed Sand Dune Ecosite
SDT1-1	Cottonwood Treed Dune Type
SWT2	Mineral Thicket Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

Data Sources: LGL Limited field surveys, City of Hamilton & Ministry of Natural Resources and Forestry (LIO). Contains information licenced under the Open Government Licence - Ontario.

0 20 40 60 80 m

N

EXISTING CONDITIONS

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Project:	TA9030	**Figure:**	3.12
Date:	March, 2022	**Prepared By:**	JJP
Scale:	1 : 2,000	**Checked By:**	LMC

3.5.4 City of Hamilton Official Plan

Based on a review of Schedule B (Natural Heritage System) of the City of Hamilton Urban Official Plan (2013) a portion of the study area is identified as 'core areas' and 'linkages' of the City of Hamilton Natural Heritage System. In addition, a review of all pertinent schedules of the City of Hamilton Official Plan (2013) was undertaken and the following designations were identified in the study area:

- Schedule B-4 (Detailed Natural Heritage Features Wetlands) a portion of the study area is identified as a Key Natural Heritage and Key Hydrological Feature - Wetlands;

- Schedule B-5 (Detailed Natural Heritage Features Lakes and Littoral Zones) a portion of the study area is identified as a Key Hydrological Feature - Lakes and Littoral Zones;

- Schedule B-6 (Detailed Natural Heritage Features Environmentally Significant Areas) a portion of the study area is identified as Local Natural Area - Environmentally Significant Area; and,

- Schedule B-8 (Detailed Natural Heritage Features Streams) a portion of the study area is identified as a Key Hydrological Feature - Streams.

3.5.5 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

A portion of the study area along the Lake Ontario and Hamilton Harbour waterfront is regulated under Ontario Regulation 161/06 (HCA) Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. A permit will be required from HCA for development within these regulated areas. The regulated areas are presented in **Figure 2.**

4.0 PROJECT DESCRIPTION

[to be prepared]

5.0 IMPACT ASSESSMENT AND MITIGATION

This section focuses on the potential effects on significant environmental features and outlines the environmental protection/mitigation measures proposed to manage adverse effects related to terrestrial and aquatic ecosystems. Environmental effects are identified based on natural heritage issues/concerns anticipated associated with preliminary design plan and grading impacts. The proposed environmental protection/mitigation measures will need to be reviewed and updated as necessary during detail design.

5.1 Soils, Erosion and Sediment Control, and Surface Water

5.2 Aquatic Habitats and Communtities

5.3 Vegetation and Vegetation Communities

5.4 Wildlife and Wildlife Habitat

[to be prepared]

6.0 CONCLUSIONS AND RECOMMENDATIONS

[to be prepared]

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APPENDIX A
PHOTOGRAPHIC RECORD OF WATERCOURSE CROSSINGS

PROJECT #TA9076
April 2020

PHOTO APPENDIX

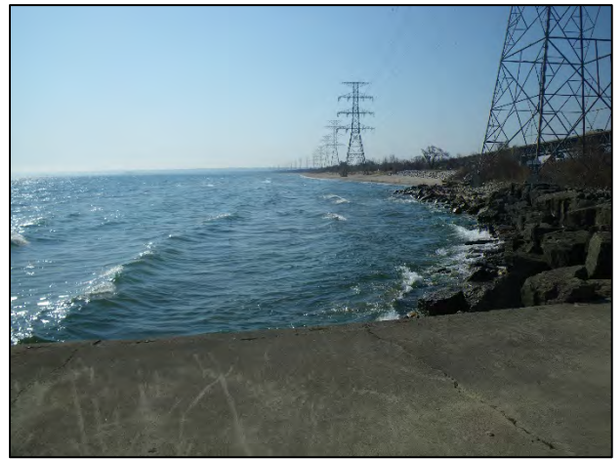
Burlington Canal, Lake Ontario open coast, Hamilton Harbour

LGL LIMITED
environmental research associates

East portion of the Burlington Canal facing east

Central portion of the Burlington Canal facing west. Note lift bridge (Eastport Drive) in foreground and Burlington Skyway (QEW) in background

West portion of the Burlington Canal facing west into Hamilton Harbour



Open coast of Lake Ontario facing south along Hamilton Beach

East shoreline of Hamilton Harbour facing south. Note boat launch in foreground and Burlington Skyway to left

PROJECT #TA9766
April 2021

PHOTO APPENDIX
Red Hill Creek

LGL LIMITED
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Upstream end of Red Hill Creek facing downstream (NW) from Eastport Drive crossing. Note CSP outlet from Eastport Ditch 1 along shoreline

Typical shoreline of Red Hill Creek in upstream portion investigated facing downstream (NW)

Typical shoreline of Red Hill Creek in middle section investigated facing upstream (S)

Red Hill Creek facing W across channel to rehabilitated wetland separated from watercourse by berm

Downstream (north) portion of Red Hill Creek showing shoreline, riparian area and instream woody debris. Note Pier 24/25 Gateway bridge in background

Downstream portion of Red Hill Creek facing upstream (SE)

PROJECT #TA9076
April/November 2021

PHOTO APPENDIX
Eastport Ditch 1

LGL LIMITED
environmental research associates

Downstream end of outlet to Red Hill Creek, facing S. Note Eastport Drive crossing in upper left

Upstream end of outlet to Red Hill Creek, facing SE

Eastport Ditch 1 facing upstream (NW) from outlet culvert

Eroded storm water outlet pipe midway upstream in ditch, facing NW. Note sediment accumulation

Downstream end of outlet pipe from Eastport Ditch 2, facing downstream (SE)

Downstream end of Eastport Ditch 1 at the end of the growing season showing dense riparian and emergent vegetation growth. Facing downstream (SE). Outlet to Red Hill Creek in background

PROJECT #TA9076
April/November 2021

PHOTO APPENDIX
Eastport Ditch 2

LGL LIMITED
environmental research associates

Upstream end of CSP pipe connecting downstream end of Eastport Ditch 2 to Eastport Ditch 1, facing upstream (NW)

Downstream portion of Eastport Ditch 2, facing upstream (NW)

Same area as previous photo but at end of growing season showing dense vegetation growth and duckweed

Areas of standing open water and sparse vegetation separated by dry/dryer areas of dense emergent vegetation are typical. Facing downstream (SE)

Outlet from storm water system of Beach Boulevard community, facing east

North end of Eastport Ditch 2, facing north

PROJECT #TA9076
April/November 2021

PHOTO APPENDIX
Eastport Ditch 3

LGL LIMITED
environmental research associates

South end of Eastport Ditch 3 at end of growing season. Facing south

South end of Eastport Ditch 3 prior to growing season. Facing northeast

Middle portion of Eastport Ditch 3 showing bermed area at end of growing season. Facing south

Middle portion of Eastport Ditch 3 in same area as previous photo but prior to growing season. Facing south

North portion of Eastport Ditch 3, facing northwest (November 2021)

North end of Eastport Ditch 3. Note no obvious connection to Hamilton Harbour or Tollgate Ponds. Facing west

APPENDIX B
VASCULAR PLANT LIST

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