



GUIDING SOLUTIONS IN THE  
NATURAL ENVIRONMENT

# Environmental Impact Study (EIS) Durham Live Tourist Destination Bayly Street and Church Street City of Pickering

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**Triple Property**

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# 1. Introduction

In January 2015, the City of Pickering passed By-law number 7404/15 (A 3/14) which approved the rezoning of an area bounded by CN rail to the north and the west, Church Street South to the east, and Bayly Street to the south, to permit the development of an integrated major tourist destination on certain lands identified as Major Tourist Designation (MTD). The Zoning By-Law Amendment permits a broad range of tourist destination related uses which includes a casino and five-star hotel, convention centre, performing arts centre, outdoor amphitheatre, cinema entertainment, restaurant plaza, waterpark hotel and waterpark, a boutique hotel, tourist centre/botanical gardens, community recreation centre, fitness centre and spa and varying commercial office uses. These uses would in turn permit development of the site as a multi use tourist destination referred to as “Durham Live Tourist Destination”. The MTD designated lands are bounded by CN rail to the north, Church Street South to the east, Bayly Street to the south and by a western limit currently 120 m from the Lower Duffins Creek Provincially Significant Wetland (PSW) to the west (MTD lands), while the remainder of the property was zoned UR (Urban Reserve).

As required by the City of Pickering, the present Environmental Impact Study (EIS) has been prepared in support of the rezoning of the “UR lands to MTD and Natural Heritage System (NHS), for the parcels east of Squires Beach Road, hereinafter referred to as the “subject property” (**Figure 1**). Acceptance of the rezoning application is (in part) contingent on the EIS demonstrating that the proposed development will not have a negative impact on the natural heritage features or their functions, that comprise the Natural Heritage System.

The Terms of Reference (TOR) for this scoped EIS were developed in consultation with the Toronto and Region Conservation Authority (TRCA) and is included in **Appendix A**, as Task 2 under Beacon section.

This EIS report has been prepared in accordance with the TOR and includes the following:

- A summary of provincial and municipal natural heritage polices and legislation that apply to the property;
- Characterization of natural heritage features on the subject property based on a review of background information and site-specific field investigations conducted in 2014, 2017 and 2018;
- A description of the proposed development;
- An assessment of potential negative environmental impacts of the proposed development;
- Recommendations for impact mitigation and net effects; and
- An assessment of the proposed development’s conformity with applicable provincial, municipal, and conservation authority policies and regulations.

## 2. Methodology

### 2.1 Background Review

Background documents and supporting technical documents containing information relevant to the biophysical features of the study area were gathered and reviewed. This included, however was not limited, to the following sources:

- Land Information Ontario (LIO) Geospatial Database maintained by MNRF (MNRF 2018);
- Duffins Creek State of the Watershed Report (TRCA 2002);
- Provincial Policy Statement (2014);
- Durham Region Official Plan (2017);
- City of Pickering Official Plan (2018);
- TRCA regulations and policies; and
- *Endangered Species Act* (0017).

Other sources of information, such as aerial photography and topographic maps, were also consulted prior to commencing field assessments. The Ontario Ministry of Natural Resources and Forestry (MNRF) was contacted to determine records of the presence of Endangered or Threatened species on and adjacent to the site.

### 2.2 Field Investigations

#### 2.2.1 Aquatic Habitat

The subject property was surveyed on June 14, 2018, to confirm the presence or absence of headwater drainage features, watercourses, ponds and fish habitat. Methods from the Ontario Stream Assessment Protocol Section 4 Module 10: Constrained Headwater Sampling (Stanfield *et al.* 2017) were applied to document characteristics of headwater drainage features. Data collected by Beacon during previous investigations into the subject property on December 8, 2017 and April 2014 was also used to describe the drainage features. The following observations were made:

- Presence/absence of a defined channel;
- Presence/absence of standing water;
- Presence/absence of flow; and
- Presence/absence of culverts.

The methods described in the Evaluation, Classification and Management of Headwater Drainage Features Guidelines (CVC and TRCA 2014) (HDF guidelines) were used to assess the drainage features on the subject property. Four main criteria are evaluated for the assessment of drainage features. These are: hydrology, riparian conditions, fish and fish habitat, and terrestrial habitat conditions. Management recommendations are assigned based upon the classification of the four functions. These are:





|  |                 |
|--|-----------------|
| <b>Site Location</b>                             | <b>Figure 1</b> |
| Durham Live - EIS                                |                 |
| First Base Solutions<br>Web Mapping Service 2019 |                 |
| UTM Zone 17 N, NAD 83                            |                 |
|  |                 |
|  |                 |
| 1:12,000   |                 |
|  |                 |
| Project 213227<br>December 2019                  |                 |



- ‘Protection’ for drainage features with important functions;
- ‘Conservation’ for drainage features with valued functions;
- ‘Mitigation’ for drainage features with recharge function, terrestrial linkage or contributing fish habitat; and
- ‘No management Required’ for drainage features with limited Functions.

### 2.2.2 Vegetation Communities

Vegetation surveys took place on June 26, July 05, and September 25, 2018. Data collected by Beacon during previous investigations into the subject property on August 28 and 29, 2014 was also used to describe the vegetation communities. Vegetation units on the subject property were described and mapped on current high-resolution colour ortho-photography of the lands using the Ecological Land Classification System for Southern Ontario (ELC) (Lee *et al.* 1998). This is the standard method used for describing vegetation communities in southern Ontario.

At the same time as vegetation community mapping was undertaken, a floral inventory was conducted which consisted of a compilation of a list of plants observed on the study area. Searches were also conducted for Butternut (*Juglans cinerea*) during these site surveys. This is a relatively common tree species in southern Ontario that is listed as provincially and federally endangered.

### 2.2.3 Breeding Birds

Surveys of avifauna were completed on May 28, June 18 and July 02, 2018. The purpose of the surveys was to document bird species that could potentially be breeding in the study area. Surveys were completed the early morning on days with ideal weather conditions (while the temperature was within 5° C of normal, it was not raining, nor excessively windy). Lands were surveyed using visual observations and call *via* a roving style survey that had observers approach within 50 m of all parts of the subject property.

Potential habitat for two bird species designated as threatened under the provincial *Endangered Species Act* Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*), is present on the subject property. Therefore, as the MNRF protocol requires three breeding bird surveys to confirm absence of this species, the third survey (July 02) was included to meet MNRF expectations. Breeding evidence was noted for each species detected and locations mapped. Survey details are presented in **Table 1**.

**Table 1. Breeding Bird Survey Details**

| Date:              | May 28, 2018 | June 18, 2018 | July 2, 2018 |
|--------------------|--------------|---------------|--------------|
| Start Time:        | 05:30 am     | 05:00 am      | 05:15 am     |
| End Time:          | 09:15 am     | 09:30 am      | 08:45 am     |
| Temperature (°C):  | 19°C         | 22 °C         | 20 °C        |
| Wind speed (km/h): | 0-5 km/h     | 0-5 km/h      | 0-5 km/h     |
| Cloud cover (%):   | 0 %          | 0 %           | 0 %          |
| Precipitation:     | None         | None          | None         |

### 2.2.4 Breeding Amphibians

Breeding amphibian surveys were completed on April 22, May 12 and June 10, 2014 as well as on May 01, May 23 and July 5, 2018 after dusk and during suitable temperature conditions (see Table 1 Table 2 below). Amphibian breeding surveys were conducted according to Environment Canada’s Marsh Monitoring Program protocol (Gartshore *et al.* 2004). The survey dates are spaced to record amphibian species that call during different times in the spring. These surveys are conducted to record the presence or absence of breeding amphibians in potentially suitable habitat. Species, calling locations and approximate numbers of calling individuals were recorded and mapped. The survey method provides an indication of amphibian abundance during the breeding season using the following scale:

- 0 No calls;
- 1 Individuals of one species can be counted, calls not simultaneous;
- 2 Some calls of one species simultaneous, numbers can be reliably estimated; and
- 3 Full chorus, calls continuous and overlapping (not countable).

All areas that contained potential breeding amphibian habitat (e.g., ponds, wetlands) were surveyed from a distance that would enable calling amphibians to be heard.

**Table 2. Amphibian Survey Details**

| Survey Date    | Weather                                  |
|----------------|--|
| April 22, 2014 | Temp.:12°C, Wind: 0, Precip.: None       |
| May 12, 2014   | Temp.:16°C, Wind: 1, Precip.: Light Rain |
| June 10, 2014  | Temp.:21°C, Wind: 0, Precip.: None       |
| May 1, 2018    | Temp.:13°C, Wind: 2, Precip.: None       |
| May 23, 2018   | Temp.:23°C, Wind: 0, Precip.: None       |
| July 5, 2018   | Temp.:21°C, Wind: 0, Precip.: None       |

### 2.2.5 Endangered Bats

Following Step 1 of the Ministry of Natural Resources and Forestry Guelph District’s “*Survey Protocol for Species at Risk Bats within Treed Habitats*” guidelines (MNR 2017), Beacon completed an identification of vegetation communities that could provide potential maternity roost habitat. In accordance with Steps 2 and 3 of the same guidelines, snag surveys, and possibly acoustic monitoring, should be completed throughout suitable communities to identify candidate maternity roost habitat for endangered bats. As no treed areas are proposed for removal, no specific bat habitat assessment has been carried out on the subject property.

### 2.2.6 Incidental Wildlife

Incidental observations of wildlife species, including visual observation, tracks and scat, were made during field investigations that were primarily for other purposes. No specific survey protocols were undertaken for mammals or reptiles.

## 2.3 Water Balance Analysis

A water balance analysis has been prepared for the subject property by Palmer Environmental Consulting Group Inc. (Palmer) and Sabourin Kimble & Associates Ltd. (SKA). The purpose of the water balance is to identify measures that can be employed in the design to minimize the impacts of proposed development on surface and groundwater resources to the fullest extent possible.

Due to the presence of wetlands on the subject property, a feature-based water balance analysis was also prepared to demonstrate that development of the subject property will not have a negative impact on the function of these features.

The feature-based water balance analysis has modelled surface and groundwater water contributions to these features under pre-development and post development conditions. The results of this analysis has been used to refine the design and associated storm drainage plan to eliminate a negative impact to the wetlands.

## 3. Policy Review

### 3.1 Provincial Policy Statement (2014)

Policy 2.1 of the Provincial Policy Statement (MMAH 2014) (PPS) provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and resources. The PPS defines eight natural heritage features, providing planning policies for each. The *Natural Heritage Reference Manual* (OMNR 2010) is a technical document used to help assess the natural heritage features listed below:

- Significant wetlands;
- Significant coastal wetlands;
- Habitat of endangered or threatened species;
- Fish habitat;
- Significant woodlands;
- Significant valleylands;
- Significant Areas of Natural and Scientific Interest (ANSIs); and
- Significant wildlife habitat.

Each of these features is afforded varying levels of protection subject to guidelines, and in some cases, regulations. Identification of these features is made in a variety of ways. Significant wetlands and significant coastal wetlands are identified by protocols provided by MNR as are criteria for Significant Woodlands (they have not been provided to date). Habitat of endangered or threatened species is also determined by the MNR once a species has been identified on a property through site specific investigation or through existing information. Fish habitat is governed by the federal *Fisheries Act* and variously applied by Fisheries and Oceans Canada (DFO). The identification of the remainder of these PPS features is the responsibility of the municipality (or other planning authority).

There is a Provincially Significant Wetland (i.e., Lower Duffins Creek PSW), as defined by Section 2.1 of the PPS (MMAH 2014), within the subject property. Significant in regard to wetlands means, as per Section 6.0 Definitions of the PPS:

*“an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time.”*

Woodlands are located within the subject property. The woodland to the south would likely meet the test for significance on account of its extent and other characteristics. In regard to woodlands, significant means, as per Section 6.0 Definitions of the PPS:

*“an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario Ministry of Natural Resources.”*

The Duffins Creek valley land areas, located northeast of the subject property, would meet any test of a significant valleyland.

### 3.2 Durham Regional Official Plan (2017 Office Consolidation)

The Regional Municipality of Durham published its latest Official Consolidated Plan in May 2017. In *Schedule A - Map A4 - Regional Structure* of the Durham Official Plan, the subject property is shown as 'Employment Area' with 'Major Open Space Area' on the northeast corner.

The Official Plan contains several policies intended to preserve, conserve and enhance the Region's natural environment.

The Region of Durham Official Plan defines Key Natural Heritage Features (KNHFs) as the following:

- Significant habitat of endangered and threatened, special concern and rare species;
- Fish habitat;
- Wetlands;
- Life Science Areas of Natural and Scientific Interest (ANSIs);
- Significant valleylands;
- Significant woodlands;
- Significant wildlife habitat;
- Sand barrens, savannahs and tallgrass prairies; and
- Alvars.

The Official Plan also recognizes the following Key Hydrologic Features (KHF):

- Permanent and intermittent streams;
- Wetlands;
- Lakes and their littoral zones;

- Kettle lakes and their surface catchment areas;
- Seepage areas and springs; and
- Aquifers and recharge areas.

On *Schedule B – Map ‘B1d’* wetlands and woodlands of the subject property are considered to be potential KNHFs and KHFs. The subject property is outside of the Greenbelt Natural Heritage System and Oak Ridges Moraine Conservation Plan Area.

The Official Plan defines Significant Woodlands (off the Oak Ridges Moraine) as:

*“an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history.”*

The deciduous swamps and coniferous forest on southern portions of the subject property would likely meet significance criteria.

According to Section 2.3.14 of the Official Plan the location and extent of key natural heritage and/or hydrologic features shown on Schedule ‘B’ – Map ‘B1’ may be further confirmed through appropriate studies such as a watershed plan or an environmental impact study in accordance with Policy 2.3.43.

Section 2.3.16 of the Durham Region Official Plan states that:

*“within Urban Areas and Rural Settlements, the vegetative protection zone [to Key Natural Heritage Features] shall be determined through an environmental impact study, in accordance with Policy 2.3.43 “*

which states that:

*“any proposal for development or site alteration in proximity to key natural heritage or hydrologic features shall be required to include an Environmental Impact Study as part of a complete application.”*

### **3.3 City of Pickering Official Plan (2018)**

The City of Pickering published its latest Official Consolidated Plan (Edition 8) dated October 2018. It builds on the framework presented in the Region of Durham’s Official Plan and protects natural heritage features through the Open Space System, which incorporates three types of natural areas: core areas, corridors and linkages.

Land uses for Natural Areas in the Open Space System are restricted and include conservation, environmental protection, restoration, education, passive recreation, existing residential and agricultural uses.



Official Plan Amendment (OPA) No. 27 to the City of Pickering Official Plan Edition 8 was approved by the Region of Durham on December 20, 2017. This OPA incorporates the relevant natural heritage policies of provincial and municipal plans as well as updated natural heritage systems mapping. This amendment establishes a Natural Heritage System for the City to replace the Open Space System for natural heritage features. The Natural Heritage System is comprised of and protects KNHF and HSF. KNHF and HSF for the City's Natural Heritage System are consistent with those identified in the PPS and Region of Durham OP.

Schedule I – Land Use Structure identifies the subject property as Prestige Employment Areas with inclusion of Natural Areas of the Open Space System in the western portion.

Schedule IIIA identifies portions of the subject property as Natural Heritage System, locally comprised of Significant Woodlands, Wetlands and Stream Corridor on the western half and Significant Valleylands on the northeast corner are shown on Schedule IIIB and Schedule IIIC.

According to the Official Plan, part of the subject property identified as D55 corresponds to a:

*“deferred portion of the ‘Natural Areas’ designation (Schedule I), and the identification of a portion of the ‘Natural Heritage System’, ‘Significant Woodlands’, and ‘Wetlands’ on Schedules IIIA, IIIB and IIC respectively, in relation to lands located west of Church Street and north of Bayly Street (Roll Number 180102002201100), pending further discussion between the land owner, the Ministry of Natural Resources and Forestry, the Toronto and Region Conservation Authority, the Region of Durham, and the City of Pickering.”*

This portion currently corresponds to agricultural lands that had previously supported wetland features. In February 2015, MNRF staff indicated that a review of aerial imagery showed that this area was formerly a wetland “arm” with a surrounding regenerating field and hedgerow. The aerial imagery review indicated that these areas were converted to agriculture uses by a previous landowner sometime after the spring of 2008 and before the spring of 2010 and that this alteration also occurred after the wetland became provincially significant in January 2007. Based on the imagery review and despite the current conditions, MNRF have included this area as part of the PSW complex and mapped it as such. Currently this area is not wetland and has been farmed for over a decade..

Section 16.51 of the Official Plan requires that within the Open Space System, outside of the Oak Ridges Moraine and the Seaton Urban Area, development or site alteration proposed within the minimum area of influence of a KNHF or HSF requires a natural heritage evaluation to be completed in conformance with Section 16.10. Table 18 summarizes the minimum area of influence and prescribes the following minimum protection zone for KNHF and HSF:

- Wetlands – all land within 30 m of any part of the feature;
- Fish habitat - all land within 30 m of any part of the feature;
- Significant valleylands - all land within 30 m of stable top of bank;
- Significant woodlands – all land within 10 m from the dripline of woodlands; and
- Permanent and intermittent streams inside the Pickering urban area – all land within 10 m of the stable top of bank or the limit of the floodplain, whichever is the greater

Section 16.51(c) states that vegetation protection zones smaller than those specified in Table 18 in the South Pickering urban area will be supported:

*“...where the conservation authority determined it to be appropriate, and where it can be demonstrated that there is no increase in risk to life or property; no impact to the control of flooding, erosion, dynamic beach, or pollution; and where a net environmental benefit can be established on the property.”*

### **3.4 Toronto and Region Conservation Authority Regulations (Ontario Regulation 166/06) (2006)**

The Toronto and Region Conservation Authority (TRCA) regulates land use activities in and adjacent to wetlands, watercourses and valleylands under Ontario Regulation 166/06 (Regulation for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) made under the *Conservation Authorities Act*. A permit must be obtained from the TRCA prior to development or site alteration within a regulated area.

The subject property is regulated as it includes portions of the Lower Duffins Creek PSW and is partially located within 15 m from the Long-Term Stable Top of Bank defining the Duffins Creek valleyland limit to the northeast.

#### ***3.4.1 Toronto and Region Conservation Authority Living City Policies for Planning and Development (2014)***

The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority (LCP) was approved by the Authority Board on November 28, 2014. The document replaces TRCA's previous policy document, the Valley and Stream Corridor Management Program (1994).

The LCP has been developed to guide the implementation of TRCA's legislated and delegated roles in the planning approval process. It was developed to conform with provincial legislation including the Oak Ridges Moraine Conservation Plan, the Greenbelt Plan, the Places to Grow Growth Plan, and the PPS.

The LCP contains policies related to terrestrial resources, water resources, natural features and areas, natural hazards, and potential natural cover and buffers. Section 7.3 contains TRCA's policies for how to define, protect, enhance, and secure a Natural Heritage System. The policies described in Section 7.3.1.4. have been identified with the goal of protecting lands that have the potential to be restored in order to enhance existing natural cover and manage natural hazards. Section 7.3.1.4. prescribes the following buffers to natural features and natural hazards in order to meet this goal:

- Valley or Stream Corridors – a 10 m buffer from the greater of the long term stable top of slope/bank, stable toe of slope, regulatory flood plain, meander belt, and any contiguous natural features or areas;
- Woodlands - a 10 m buffer from the dripline and any contiguous natural features or areas;
- Wetlands – a 30 m buffer from Provincially Significant Wetlands and a 10-metre buffer for all other wetlands and any contiguous natural features or areas;
- Lake Ontario Shoreline – a 10 m buffer from the greater limit of the flood hazard, erosion hazard and/or dynamic beach hazard and any contiguous natural features or areas;

- Any additional distances prescribed by federal, provincial, or municipal requirements or standards (e.g., Greenbelt); and
- Any additional distances demonstrated as necessary through technical reports.

### **3.5 *Endangered Species Act (2007)***

Ontario's *Endangered Species Act, 2007 (ESA)* came into effect on June 30, 2008 and replaced the former 1971 Act. Under the ESA, species in Ontario are identified as extirpated, endangered, threatened, or special concern and each species is afforded different levels of protection. The ESA protects species listed as endangered or threatened by the Committee on the Status of Species at Risk in Ontario (COSSARO).

Section 9 of the ESA generally prohibits the killing or harming of an endangered or threatened species, as well as the destruction of its habitat. Section 10 of the ESA prohibits the damage or destruction of the habitat of all endangered or threatened species. A permit from Ministry of the Environment, Conservation and Parks (MECP) is required under Section 17(2) (c) of the ESA for any works proposed within habitat of an endangered or threatened species.

## **4. Existing Conditions**

### **4.1 Physical Resources**

#### **4.1.1 *Landforms and Land Use***

The subject property is situated within the Lower Main Duffins Subwatershed of the Duffins Creek Watershed and the Iroquois Plain physiographic region and drumlinized clay plain physiographic landform (Chapman and Putnam 2007).

On the subject property, farmed fields are generally associated with a series of shallow drumlin-like features formed by Newmarket Till, that are oriented north-northwest to south-southeast. These features form heights of land interspersed by low-lying areas, consisting of glaciolacustrine silty clay deposits, that contain headwater drainage features and associated marshes and swamp (wetland) forests. There are also several uncultivated upland areas that are comprised of a mix of old field, thicket and upland forest.

#### **4.1.2 *Groundwater Resources***

The depth of shallow groundwater is dependent on topographic position and seasonally variable. Palmer observed shallow groundwater levels near wetland features and in low lying areas between the drumlins are found at around 2.3 m below ground surface. Deeper groundwater levels are found in higher upland drumlinized areas (Palmer 2018).

The findings of the hydrogeological study (Palmer 2018), suggest an average (geometric mean) hydraulic conductivity of  $4.5 \times 10^{-7}$  cm/s in Newmarket Till, based on well response tests completed on site. The hydraulic conductivity of the glaciolacustrine clay underlying PSW areas was estimated from soil grain size to be  $3.7 \times 10^{-9}$  cm/s.

The findings of the hydrogeological study reveal that the wetland complex forming the PSW is predominantly supported by surface water runoff due to the low permeability of underlying clay deposits that restrict deep vertical migration: “*low lying areas underlain by glaciolacustrine silt and clay trap water and limit the recharge and discharge potential of these areas*” (Palmer 2018; Palmer 2019).

Based on the long-term monitoring results and the seasonal hydroperiod of the wetland, it was concluded that, within the subject property, all wetland units forming part of the PSW were primarily a surface water supported feature with limited groundwater contributions (Palmer 2019).

### 4.1.3 Surface Water Drainage

Overall, drainage at the subject property is highly complex and controlled by the undulating landscape and roadside drainage ditching (Palmer 2018). There is a ridge running north-south on agricultural lands east of the PSW and another ridge running east-west south of Kellino Street.

Portions located north of the east-west ridge drain north through two ephemeral drainage features (as detailed in the following section). Surface water exits the site at a culvert under the CN rail and Hwy. 401 corridor.

South of the east-west ridge:

- On portions west of the north-south ridge, runoff is directed westwards to the PSW eastern treed swamp which infrequently spills southwards into the Bayly Street drainage ditching, during short periods in winter and spring (Palmer 2019); and
- Portions east of the north-south ridge drain toward a low area then (when the low area surcharges) to the existing ditch on Bayly Street mentioned above.

Surface water in the drainage ditch flows west and is joined by flow from the south side of Bayly Street, before turning north and re-entering the PSW. The PSW complex within the western half of the property is drained by a tributary to Duffins Creek flowing from south to north exiting the site at a culvert under the CN rail corridor (Palmer 2019).

A more detailed description of the drainage features is provided in the following section.

## 4.2 Aquatic Resources

Assessment of headwater drainage features (HDFs) has been completed in a study area including the subject property and other lands west of Squires Beach Road. Five HDFs were identified on the study area, three of which being located within the subject property i.e. HDF C, HDF D, and HDF E. These HDFs drain towards the north at a very low gradient towards culverts under the railway tracks and Hwy.

401. North of the 401 these HDFs merge before they join the main branch of the Lower Duffins Creek. (Figure 2A).

**4.2.1 Head Water Drainage Features**

**Feature C**

Feature C includes a main branch as well as a smaller contributing feature (See Figure 2A).

The main branch flows in northerly direction within the study area and may receive flows from south of Bayly Street. South of Kellino Street this feature predominantly consists of 10 m to 40 m wide areas densely vegetated by cattails.

At Kellino Street this feature passes through a 1 m diameter corrugated steel pipe (CSP) culvert. North of Kellino Street a poorly defined channel was observed that appears to be constructed (i.e., straightened with uniform steep banks). The channel is overgrown by grasses and herbaceous vegetation. This feature exits the subject property through a 0.5 m CSP culvert under the CN railway right-of-way. North of the CN railway right-of-way this feature is diverted under Hwy. 401 through a 2.5 m wide 1 m tall concrete box culvert. No standing water was observed in this feature on December 8, 2017 and on June 14, 2018. South of the subject property standing water, without flow, was observed north and south of Bayly Street.

Feature C also includes a contributing feature that originates east of Squires Beach Road and south of Kellino Street. This contributing feature directs surface drainage towards the confluence with the main branch of Feature C. This feature predominantly consists of 15 to 25 m wide areas densely vegetated by cattails. This feature was entirely dry on December 8, 2017 and on June 14, 2018. No standing water, flow or evidence of a channel was observed within this channel during any of the visits.

Based on all observations to date and on the Hydrogeological Assessment Report (Palmer 2019) this feature is considered intermittent (i.e. water flows for several months during the year due to flow contributions from wetlands).

**Table 3. Feature C HDF Classification**

| <b>Function</b>       | <b>Classification</b>  |
|-----------------------|------------------------|
| Hydrology             | Contributing or Valued |
| Riparian              | Important (Wetland)    |
| Fish and Fish Habitat | Contributing           |
| Terrestrial Habitat   | Valued                 |

In accordance with the HDF Guidelines the management recommendation for Feature C is 'Conservation'.



# Existing Conditions - Aquatic

## Figure 2A

Durham Live - EIS

### Legend

- Subject Property
- Constructed Channel (Beacon 2018)
- Drainage Channel/Watercourse (Beacon 2018)
- Drainage Channel Removed in 2019 to Facilitate Construction of the Casino (Beacon 2019)
- ➔ Flow Direction
- Lower Duffin Creek PSW, Staked Wetland Boundary (TRCA & MNR July 2014)
- Culvert



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0 50 100 200 Metres



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Photograph 2. Feature C, looking north from Kellino Street (April 2014)

### **Feature D**

Feature D is a wide, shallow swale within a cropped corn field which drains portions of land north and south of Kellino Street but does not drain the forested wetland south of Kellino Street. It passes under Kellino Street through a 1 m diameter CSP culvert. North of Kellino Street the feature flows through a fallow agricultural field as a shallow swale. Some herbaceous vegetation was observed in the swale. This feature was dry to the north and south of Kellino Street during 2018 investigations. During previous investigations completed in April 2014 standing water was observed through the agricultural field with minimal flow in a northerly direction. In June 2014 no water was present in the feature. On December 8, 2017 this feature was dry at the culvert under Kellino Street. This feature is diverted north under the CN railway right-of-way through a 0.5 m concrete pipe culvert which was dry on December 08, 2017. North of the CN right of way the feature is diverted under Hwy. 401 by a 0.8 m by 0.5 m tall concrete box culvert.

Based on all observations to date and on the Hydrogeological Assessment Report (Palmer 2019) this feature is considered ephemeral (i.e. water flows for a short period of time in response to localized precipitation, e.g. spring freshet or storm events).

**Table 4. Feature D HDF Classification**

| Function              | Classification |
|-----------------------|----------------|
| Hydrology             | Contributing   |
| Riparian              | Limited        |
| Fish and Fish Habitat | Contributing   |
| Terrestrial Habitat   | Limited        |

In accordance with the HDF guidelines the management recommendation for Feature D is 'Mitigation'.



**Photograph 3. Feature D, looking north toward Kellino Street (April 2014)**

**Feature E**

Feature E is an indistinct swale within an active agricultural field which starts north of the 1 m diameter CSP culvert under Kellino St. No swale was observed south of Kellino Street. This feature does not have any vegetation associated with it north or south of Kellino St. Within the subject property it is completely cropped through. On December 8, 2017 and in April 2014 this feature was dry within the study area. This HDF exits the subject property through a culvert under railway. Based on review of aerials photographs it then flows west to join HDF D. As having no functions (conveyance, fish habitat), Feature E is not expected to impose environmental constraints in accordance with the HDF guidelines.



## **Removal of Feature D and Feature F**

Existing conditions have been established based on 2014, 2017 and 2018 field work. As construction of the casino is already underway on the northeast parcel, Feature D and Features E have been removed during the year 2019.

### **4.3 Terrestrial Resources**

The subject property contains a mix of terrestrial environmental conditions, including naturalized wetlands and woodlands, cultural habitats, and farmed and fallow agricultural lands. The general site context is within suburban and urban developments, as it is surrounded by the City of Pickering and Town of Ajax, as well as adjacent to provincial Highway 401. Ecological communities are restricted to those areas outside of agricultural lands, in the central-west section of the property. **Figure 2B** presents the location of the communities detailed below.

#### **4.3.1 Vegetation Communities**

Terrestrial vegetation communities on the subject property vary from agricultural lands to cultural meadows and thickets regenerating from disturbance, mature forest, and portions of the Lower Duffins Creek Provincially Significant Wetland. Non-native and invasive species figure prominently in most habitats within the study area, particularly in cultural communities, reflecting their history of disturbance. Within the Lower Duffins Creek Wetland on the property, swamp and marsh communities occur, associated with deciduous and coniferous forests.

##### **Agricultural (AG)**

Agricultural lands on the subject property are either currently growing corn or are previous corn fields which have now gone fallow. Fallow agricultural lands contain a diverse mix of agricultural weed species: Common Plantain (*Plantago major*), Green Foxtail (*Setaria viridis*) Canada Bluegrass (*Poa compressa*), Meadow Horsetail (*Equisetum arvense*), Common Shepherd's Purse (*Capsella bursa-pastoris*), Creeping Thistle (*Cirsium arvense*), Bull Thistle (*Cirsium vulgare*), Lady's Thumb (*Persicaria maculosa*), Tall Sweet Clover (*Melilotus officinalis*) and Evening Primrose (*Oenothera biennis*).

Existing conditions have been established base on 2014 and 2018 field work. As construction of the casino is already underway on the northeast parcel, agricultural fields have been replaced by anthropogenic areas (ANT) in this location. The spatial extent of these areas has been delineated based on recent aerial imagery.

##### **4.3.1.1 Cultural Communities**

###### **Mineral Cultural Meadow (CUM1a)**

Cultural Meadows on the property occur where lands previously cleared are regenerating meadow communities. They generally are represented by non-native or invasive species, although some pioneering native species do occur. Common species include New England Aster (*Symphotrichum*

*novae-angliae*), Heath Aster (*Symphyotrichum ericoides*), Common Milkweed (*Asclepias syriaca*), Smooth Brome (*Bromus inermis*), Tall Goldenrod (*Solidago altissima*), Queen Anne's Lace (*Daucus carota*), Greater Burdock (*Arctium lappa*), White Sweet Clover (*Melilotus alba*), Creeping Thistle and Red Raspberry (*Rubus idaeus*). Other less prominent species in the unit include: Goat's Beard (*Tragopogon dubius*), Birds Foot Trefoil (*Lotus corniculatus*), English Plantain (*Plantago lanceolata*), Redtop (*Agrostis gigantea*), Old Panic Grass (*Panicum capillare*), Common Tansy (*Tanacetum vulgare*) and Common Reed (*Phragmites australis*).

In the northwest end of the property, cultural meadows are dominated by European Swallow-wort (*Apocynum androsaemifolium*). This invasive vine occurs in a variety of habitats and given its growth form limits habitat use as a meadow.

#### Mineral Cultural Meadow (CUM1b)

This Cultural Meadow differs from others in the general area due its different history of anthropogenic use: it appears soil has been removed and the surface compacted, preventing the establishment of forbs, shrubs or trees. The vegetative cover of the habitat is dominated (over 50%) by upland species cover. The community is dominated by Panicgrass, with some seepage indicators such as Golden Sedge (*Carex aurea*) and Slender False Foxglove (*Agalinis tenuifolia*) and Variegated Horsetail (*Equisetum varigatum*) near the fringes of the MAM2-10 wetland that abuts this community. The only trees in this community are shrub-like White Birch (*Betula papyifera*) and White Cedar (*Thuja occidentalis*). Also found are Viper's Bugloss (*Echium vulgare*), Russian Olive (*Elaeagnus angustifolia*), Coltsfoot (*Tussilago farfara*), Early Goldenrod (*Solidago juncea*), Yarrow (*Achillea millefolium*), Boneset (*Eupatorium perfoliatum*), Selfheal (*Prunella vulgaris*) and New England Aster.

Included within this Cultural Meadow, a Common Reed Meadow Marsh (MAM2) community (not delineated on existing conditions mapping) was identified within the ditch to the south containing evidence of remnant fen species, including Variegated Horsetail and Loesel's Twayblade (*Liparis loeselii*), within an area dominated by non-native invasive Common Reed (*Phragmites australis* spp. *australis*). The orchid Loesel's Twayblade is an indicator of steady water levels in the substrate and only four individuals were detected after thorough search, all within the ditch, between the dense *Phragmites* stand and the toe of slope.

#### Mineral Cultural Thicket (CUT1)

Mineral Cultural Thickets units occur in a couple locations, where shrub cover is greater than 25%. In most cases, these communities are dominated by European Buckthorn (*Rhamnus cathartica*) and Tartarian Honeysuckle (*Lonicera tatarica*). Other species include Staghorn Sumac (*Rhus typhina*), Russian Olive, Autumn Olive (*Elaeagnus umbellata*), Manitoba Maple (*Acer negundo*), Wild Grape (*Vitis riparia*), Choke Cherry (*Prunus virginiana*), Ground Ivy (*Glechoma hederacea*), Yellow Avens (*Geum aleppicum*) and Poison Ivy (*Toxicodendron radicans*).

#### Sumac Mineral Cultural Thicket (CUT1-1)

These Cultural Thickets are dominated by Staghorn Sumac, with Horse Chestnut (*Aesculus hippocastanum*), Tartarian Honeysuckle, European Buckthorn and Red-osier Dogwood (*Cornus*



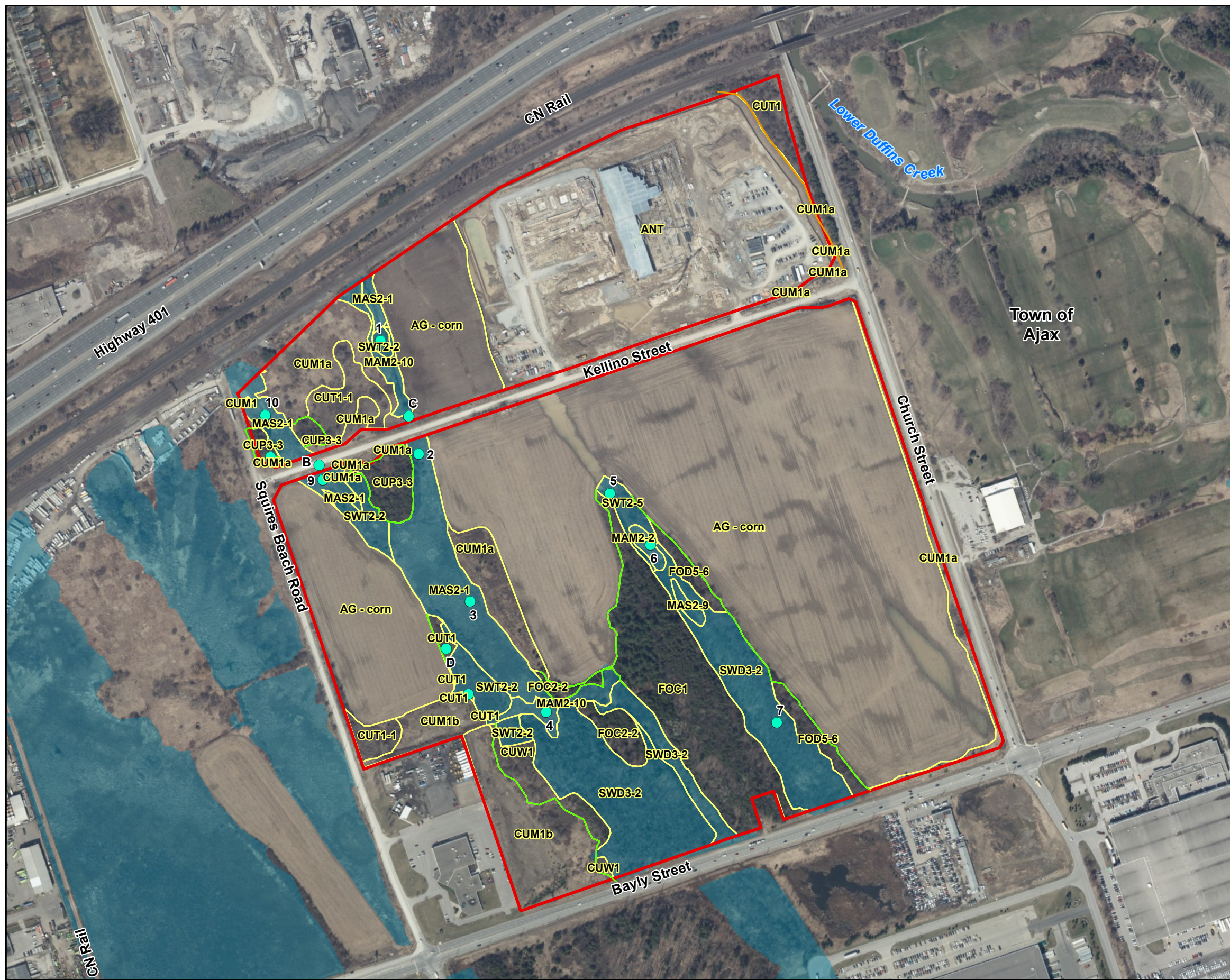
# Existing Conditions - Terrestrial

# Figure 2B

Durham Live - EIS

### Legend

- Subject Property
- ELC Communities
- Staked Dripline (TRCA April 2014)
- Staked Top of Bank (TRCA April 2014)
- Lower Duffin Creek PSW, Staked Wetland Boundary (TRCA & MNRF July 2014)
- Amphibian Survey Locations



| Code    | Community Description                               |
|---------|---|
| FOC1-2  | Dry - Fresh White Pine - Red Pine Coniferous Forest |
| FOC2-2  | Dry - Fresh White Cedar Coniferous Forest           |
| FOD5-6  | Dry - Fresh Sugar Maple - Basswood Deciduous Forest |
| SWD3-2  | Silver Maple Mineral Deciduous Swamp                |
| SWT2-2  | Willow Mineral Thicket Swamp                        |
| SWT2-5  | Red-osier Mineral Thicket Swamp                     |
| MAS2-1  | Cattail Mineral Shallow Marsh                       |
| MAS2-9  | Forb Mineral Shallow Marsh                          |
| MAM2-2  | Reed-canary Grass Mineral Shallow Marsh             |
| MAM2-10 | Forb Mineral Meadow Marsh                           |
| CUP3-3  | Scotch Pine Coniferous Plantation                   |
| CUW1    | Mineral Cultural Woodland                           |
| CUT1-1  | Sumac Mineral Cultural Thicket                      |
| CUT1    | Mineral Cultural Thicket                            |
| CUM1    | Mineral Cultural Meadow                             |
| AG      | Agricultural  |
| ANT     | Anthropogenic                                       |

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*sericea*) associates. Understory species include Urban Avens (*Geum urbanum*), Creeping Thistle, Smooth Brome, Orchard Grass (*Dactylis glomerata*), European Swallow-wort and Garlic Mustard (*Alliaria petiolata*).

#### Mineral Cultural Woodland (CUW1)

Mineral Cultural Woodland occurs in the southwest and has a canopy of less than 60% cover by trees including: Trembling Aspen (*Populus tremuloides*), Manitoba Maple, Black Cherry (*Prunus serotina*) and American Elm (*Ulmus americana*). Shrubs include: European Buckthorn, Red-osier Dogwood, Red Raspberry, Common Lilac (*Syringa vulgaris*), European Swallow-wort and apple species (*Malus* sp.).

#### Scotch Pine Coniferous Plantation (CUP3-3)

This plantation type occurs in two locations near Kellino Street, both contain the same dominant species. These communities are dominated by planted Scotch Pine (*Pinus sylvestris*) with some young White Ash (*Fraxinus americana*) regeneration. Shrubs that occur in this community include; Common Apple (*Malus pumila*), Red-osier Dogwood, European Buckthorn, Tatarian Honeysuckle and Wild Grape. The ground cover is predominantly Tall Goldenrod and European Swallow-wort.



Photograph 4. Scotch Pine Coniferous Plantation (CUP3-3) (August 2014)

#### 4.3.1.2 Upland Communities

##### Dry – Fresh Pine Coniferous Forest (FOC1)

This community is dominated by White Pine (*Pinus strobus*) with White Cedar and lesser amounts of White Ash. The sub-canopy consists primarily of White Cedar and White Ash. The shrub layer includes; Tatarian Honeysuckle, Red-osier Dogwood and Guelder-rose Viburnum (*Viburnum opulus*). The ground cover is mostly Canada Goldenrod, Meadow Horsetail, Wild Geranium (*Geranium maculatum*) and Graceful Sedge (*Carex gracillima*).

##### Dry – Fresh White Cedar Coniferous Forest (FOC2-2)

This small edge community is dominated by White Cedar with associates of White Ash, American Elm and Black Cherry. The sub-canopy is dominated almost entirely by White Cedar. The understory and ground cover is virtually absent due to the closed canopy.

##### Dry – Fresh Sugar Maple - Basswood Deciduous Forest (FOD5-6)

This forest type occurs in the south and is associated with deciduous swamps of the Lower Duffins Creek PSW. It is dominated by Sugar Maple (*Acer saccharinum*), with Basswood (*Tilia americana*) and Black Cherry associates. The understory contains the invasive shrubs European Buckthorn and Tatarian Honeysuckle. It also contains native forbs common to hardwood forests in southern Ontario: May-apple (*Podophyllum peltatum*), Zig-zag Goldenrod (*Solidago flexicaulis*), Jack-in-the-pulpit (*Arisaema triphyllum*) and Virginia Waterleaf (*Hydrophyllum virginianum*).

#### 4.3.1.3 Wetland Communities

##### Reed Canary Grass Meadow Marsh (MAM2-2)

This wetland occurs as an inclusion within Swamp habitat in the Lower Duffins Creek PSW. It is dominated and entirely occupied by Reed Canary Grass.

##### Forb Mineral Meadow Marsh (MAM2-10)

This community occurs between Shallow Marsh and Deciduous Swamp within the Lower Duffins Creek PSW. It is dominated by wetland forbs including: Spotted Joe-pye Weed (*Eupatorium maculatum*), Spotted Water-hemlock (*Cicuta maculata*), Autumn Bentgrass (*Agrostis perennans*), Purple-stemmed Aster (*Symphotrichum puniceum*), Purple Loosestrife (*Lythrum salicaria*), Sensitive Fern (*Onoclea sensibilis*), Spotted Jewel-weed (*Impatiens capensis*) with small amounts of cattails and patches of Red-osier Dogwood shrubs.

### Cattail Mineral Shallow Marsh (MAS2-1)

This community type is almost entirely vegetated by either Narrow-leaved Cattail (*Typha angustifolia*) or Hybrid Cattail, with occurrences of Common Reed, Purple Loosestrife, Spotted Jewel-weed, Panicked Aster, Swamp Milkweed (*Asclepias incarnata*), Freeman's Maple (*Acer freemanii*), Northern Bugleweed (*Lycopus uniflorus*), Black Bulrush (*Scirpus atrovirens*) and Sensitive Fern.



**Photograph 5. Cattail Mineral Shallow Marsh (MAS2-1) within the PSW (June 2018)**

### Forb Mineral Shallow Marsh (MAS2-9)

This wetland community is located within deciduous swamp of the Lower Duffins Creek PSW. It is dominated almost exclusively by Devil's Beggars Ticks (*Bidens frondosa*), with Spotted Jewel-weed, Broad-leaved Cattail (*Typha latifolia*) and Rice Cutgrass (*Leersia oryzoides*).

### Willow Mineral Thicket Swamp (SWT2-2)

This wetland community forms part of the Lower Duffins Creek PSW. The community is dominated by willows that are usually between two and ten metres in height. Various Willow shrub species occur including: Pussy Willow (*Salix discolor*), Meadow Willow (*S. petiolaris*) and Heart-leaved Willow (*S. eriocephala*) with patches of Red-osier Dogwood. Typical groundcover includes cattails (*Typha angustifolia* and *T. latifolia*) and Purple Loosestrife.



### Red-osier Mineral Thicket Swamp (SWT2-5)

This wetland community occurs in one area within the Lower Duffins Creek PSW. The community is dominated by Red-osier Dogwood with various Willow shrub species occur including: Pussy Willow, and Basket Willow (*S. purpurea*). Typical groundcover includes; Reed-canary Grass, Spotted Jewelweed, Wetland Asters and Purple Loosestrife.

### Silver Maple Mineral Deciduous Swamp (SWD3-2)

This forested wetland forms the majority of the Lower Duffins Creek PSW found on the site. It has a canopy >60% dominated by trees: Silver Maple (*Acer saccharinum*), Red Maple (*Acer rubrum*), Manitoba Maple and Black Ash (*Fraxinus nigra*) and understory species including: Meadow Willow, Heart-leaved Willow, Red-osier Dogwood, Broad-leaved Cattail, Bulbiferous Water-hemlock (*Cicuta bulbifera*), Bladder Sedge (*Carex intumescens*), Rice Cutgrass and Panicked Aster (*Symphotrichum lanceolatum*).



Photograph 6. Silver Maple Mineral Deciduous Swamp (SWD3-2) within the PSW (August 2014)

#### 4.3.2 Flora

A list of plant species observed on the subject property is presented in **Appendix B**.

The subject property contains a variety of terrestrial habitats, from agricultural lands, to cultural communities, to natural forests and wetlands. Due to the small size of these communities and their disconnection from other habitats due to the surrounding city, the “edge effects” on these communities

are significant. This limits diversity and increases the spread of invasive species. On the subject property, approximately 40% of vascular plant species inventoried are non-native to the province.

A total of 128 taxa were identified on the subject property, with 126 being identified to species. A total of 51 species are considered SNA, indicating they are exotic or invasive in Ontario. The remaining 77 species are considered S5 or S4S5, indicating they are common and secure in the province. Three species, Loesel’s Twayblade, Early Goldenrod, and Spotted Water-hemlock are considered Uncommon in Durham Region (Varga, 2005), and Autumn Bentgrass is considered rare. In the GTA (Varga, 2005), Variegated Horsetail and Common Evening-primrose are considered Uncommon.

Of the native species, 43 are considered L5 in the GTA (TRCA Ranks), indicating the species is able to withstand high levels of disturbance, generally secure throughout the jurisdiction including the urban matrix, and may be of very localized concern in highly degraded areas. TRCA ranks 25 species L4, indicating they are able to withstand some disturbance, generally secure in rural matrix, of concern in urban matrix. Slender False Foxglove, Loesel’s Twayblade, Autumn Bentgrass and Strict Blue-eyed Grass are considered L3, able to withstand minor disturbance, generally secure in natural matrix; considered to be of regional concern.

### 4.3.3 Amphibians

The results of the nocturnal amphibian call surveys are summarized in **Table 7**. Amphibian vocalizations were studied at ten locations in 2014 and four locations in 2018 throughout the subject property illustrated on **Figure 2B**. Two species were documented within the wetlands on the subject property:

- American Toad (*Anaxyrus americanus*) in the Forb Meadow Marsh communities north of Kellino Street and south of Hwy. 401 (survey location C); and
- Wood Frog (*Lithobates sylvaticus*) within the Silver Maple Deciduous Swamp north of Baily Street (survey location 7) and within the Willow Thicket Swamp and Cattail Shallow Marsh communities west of Squires Beach Road (survey location 8).

Hwy. 401 creates substantial background noise and as such it is possible these species are present in higher numbers than were detected during surveys.

The amphibian species that were recorded are known to overwinter terrestrially. Species that overwinter aquatically (i.e. Green Frog [*Lithobates clamitans*] and Northern Leopard Frog [*Lithobates pipiens*]) and therefore require a permanent source of water, were absent.

**Table 5. 2018 Amphibian Call Survey Findings**

| Location | Survey 1             | Survey 2   | Survey 3   |
|----------|----------------------|------------|------------|
| A (2018) | None heard           | None heard | None heard |
| B (2018) | None heard           | None heard | None heard |
| C (2018) | American Toad (cc 2) | None heard | None heard |
| D (2018) | None heard           | None heard | None heard |
| 1 (2014) | None heard           | None heard | None heard |
| 2 (2014) | None heard           | None heard | None heard |
| 3 (2014) | None heard           | None heard | None heard |
| 4 (2014) | None heard           | None heard | None heard |



| Location  | Survey 1         | Survey 2   | Survey 3   |
|-----------|------------------|------------|------------|
| 5 (2014)  | None heard       | None heard | None heard |
| 6 (2014)  | None heard       | None heard | None heard |
| 7 (2014)  | Wood Frog (cc 3) | None heard | None heard |
| 8 (2014)  | Wood Frog (cc 2) | None heard | None heard |
| 9 (2014)  | None heard       | None heard | None heard |
| 10 (2014) | None heard       | None heard | None heard |

\*cc refers to calling code discussed in Section 2.2.4.

#### 4.3.4 Reptiles

No turtle species were observed in the study area. No species of snake were observed but at least Common Gartersnake (*Thamnophis sirtalis*) would be expected to occur.

#### 4.3.5 Breeding Birds

A total of 32 species of breeding birds was recorded on the subject property with an additional six species observed foraging over the site and not breeding (**Appendix C**). The majority of breeding species encountered were birds that are commonly encountered in urban and urbanizing landscapes, including the following observed in high abundance: Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospiza melodia*), Northern Cardinal (*Cardinalis cardinalis*), American Robin (*Turdus migratorius*) and European Starling (*Sturnus vulgaris*). Other abundant species included American Goldfinch (*Spinus tristis*), Common Grackle (*Quiscalus quiscula*), Killdeer (*Charadrius vociferus*) and Brown-headed Cowbird (*Molothrus ater*).

As discussed in the preceding sections, vegetation is predominantly composed of a variety of wetland, thicket and moist meadow communities along with woodland units abutting the survey area. The species composition encountered was reflective of this habitat diversity and contained an abundance of species associated with wetlands or thicket habitat including: Red-winged Blackbird, Yellow Warbler (*Setophaga petechia*), Gray Catbird (*Dumetella carolinensis*), Willow Flycatcher (*Empidonax traillii*) and Swamp Sparrow (*Melospiza georgiana*). Additionally, several species typically found in wooded habitats were encountered such as: Red-tailed Hawk (*Buteo jamaicensis*), Red-eyed Vireo (*Vireo olivaceus*), Red-bellied Woodpecker (*Melanerpes carolinus*) and Northern Flicker (*Colaptes auratus*).

The MNRF classifies birds that require larger tracts of suitable habitat in which to breed, or those that have a higher breeding success in larger areas of suitable habitat, as “area-sensitive” species. Two area-sensitive species were recorded on the subject property. The American Redstart (*Setophaga ruticilla*) is considered a forest-sensitive species, requiring more extensive woodland habitat in which to breed successfully. The second species of this sort is the Savannah Sparrow (*Passerculus sandwichensis*), a grassland-sensitive species that generally requires large areas of open habitat in which to breed. It is, however, a common breeder in a wide variety of such open habitats, including old-field and agricultural edge habitat. Two Savannah Sparrow territories were present.

The TRCA ranks species of regional conservation concern as L1 (highest concern) through L5 (least concern) based on variables including patch sensitivity and tolerance to disturbance. Two avian species ranked as a species of regional concern (L1 to L3) were recorded breeding on the subject property. American Redstart and Chestnut-sided Warbler (*Setophaga pensylvanica*) are migratory songbirds,

being two of the more commonly encountered wood warblers in southern Ontario but both are generally absent from urban areas. One pair of each of these species was noted.

No species ranked as S1 through S3 (Critically Imperiled through Vulnerable) by the province, or species protected under the ESA were recorded during the 2018 breeding bird season. Barn swallow (*Hirundo rustica*) are designated as threatened aerial insectivores and several were observed foraging on and adjacent to the site. However, Barn Swallow nesting structures are not present on the subject property.

Potential habitat for two threatened bird species, Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*), is present on the subject property. However, neither species was present, likely on account of the urban matrix that is surrounding.

### 4.3.6 Mammals

#### 4.3.6.1 Incidental Observations

During the field subject property area, including Red Squirrel (*Sciurus vulgaris*), Virginia Opossum (*Didelphis virginiana*), White-tailed Deer (*Odocoileus virginianus*), Eastern Cottontail (*Sylvilagus floridanus*), Eastern Chipmunk (*Tamias striatus*), and Eastern Coyote (*Canis latrans*). All of these species are common to abundant in the Durham Region and are urban tolerant. Several other common species would be expected to occur.

#### 4.3.6.2 Bat Habitat

Tree snags represent important habitat for bats as they exploit tree cavities, and leaf clusters (as is the case with Tri-colored Bat) for maternity roosting purposes. Recent guidance (MNR 2017) for bats dictates that non-cultural forested and swamp ELC communities (e.g. FOD, FOM, FOC, SWD) are to be assessed for potential treed habitat for endangered bats. The forested communities (FOC1-2, FOC2-2, SWD3-2) located on the southern portion of the property could potentially be suitable maternity roosting habitat for endangered bats.

## 5. Assessment of Natural Heritage Features

The findings of the background review and field investigations have been relied upon to confirm whether the subject property supports any of the natural heritage components recognized under the PPS, and the Region and City policies. Designated natural heritage features are shown on **Figure 2C**.

### 5.1 Provincially Significant Wetlands

The subject property contains portions of the Lower Duffins Creek Wetland Complex, that is primarily represented by swamp forested communities and marshes, a Provincially Significant Wetland (PSW) as defined by Section 2.1 of the PPS (MMAH 2014).

The limits of the PSW and associated Significant Woodlands (see section 5.25.2) or contiguous vegetation were staked with TRCA and MNRF on July 15, 2014. Descriptions of these wetland communities are provided in Section 4.3.1.

## 5.2 Significant Woodlands

The identification of significant woodlands is the responsibility of local and/or regional planning authorities based on criteria provided by the MNRF (see definitions section of the PPS). However, MNRF have to date not provided such criteria.

Some guidance on significant woodland is provided in the Natural Heritage Reference Manual (MNRF 2010) (NHRM): “Woodlands should be considered significant if a portion of the woodland is located within a specified distance (e.g., 30 m) of a significant natural feature and the entire woodland meets the minimum area threshold (e.g., 0.5–20 ha, depending on circumstance)”. However, this is guidance and the NHRM is not designed to provide specific criteria.

The woodland that mainly occurs on the south of the subject property, encompassing the coniferous forest and treed wetland communities and corresponding to the FOC1-2, FOC2-2, FOD5-6 and SWD3-2 communities, covers approximately 10 ha of lands. Based on its area, the amount of forest cover within the City of Pickering boundaries, its intrinsic quality (e.g., species composition, ecological functions), and the contiguity/overlap with a PSW, we anticipate that this woodland would be considered a significant woodland.

The largest patch (approximately 0.6 ha in area) of Scotch Pine Cultural Plantation (CUP3-3), located south of Kellino Street, might be considered significant given its proximity to the PSW. However, in our opinion, based on: its relative small size, the young age of trees (the main patch was less than 0.2 ha in 2005 based on historical aerial imagery), and perhaps most importantly, that it is primarily non-native invasive Scotch Pine, it is our professional opinion that this cultural and regenerating treed community should not be considered significant woodland. However, although TRCA does not regulate woodlands, it is their policy to seek retention of woodlands that are contiguous with wetlands, as is the case in this instance.

It is also important to note that the Planning Authority (i.e., the City of Pickering) who is charged with the responsibility of identifying significant woodland has not identified these areas as significant. These three patches of Scotch Pine Cultural Plantation have not been identified as Significant Woodlands by the City of Pickering in *Schedule III B - Resource Management: Key Natural Heritage Features*.

Descriptions of the woodland communities specifically related to the significant woodlands are provided in Section 4.3.1.

## 5.3 Significant Valleylands

Significant valleylands are defined by distinctive landforms, degree of naturalness, importance of ecological functions, restoration potential and historical and cultural values.





**Designated Natural Heritage Features**

**Figure 2C**

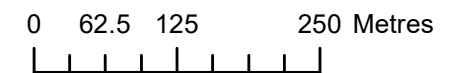
Durham Live - EIS

**Legend**

- Subject Property
  - Provincially Significant Wetland
  - Significant Woodland
  - Other Woodland/Woody Vegetation Contiguous with PSW (TRCA Designation)
- Drainage Channel by Management Recommendation Type:**
- Conservation
  - Mitigation

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The Duffins Creek valley land areas are considered a component of the Natural Heritage System per the City of Pickering Official Plan and would meet any test of a significant valleyland. The extreme north east corner of the subject property lies within the Duffins Creek valleylands.

## 5.4 Significant Wildlife Habitat

The PPS states that the identification of significant wildlife habitat is the responsibility of local and/or regional planning authorities. The assessment of which areas are to be considered significant wildlife habitat is to be based on the existing conditions of all the lands within the jurisdiction of the planning authority. In this case, determination criteria thresholds have not been provided by the municipalities. Additional guidance on wildlife habitat features and functions that could also be considered in the analysis is provided by MNRF in the Significant Wildlife Habitat Technical Guides (MNR 2000, 2010).

Significant wildlife habitat is broadly categorized by MNRF as:

- Seasonal concentration areas;
- Rare vegetation communities or specialized habitats for wildlife;
- Habitats of species of conservation concern (i.e., provincially tracked species, listed as Special Concern or rare, that are declining, or are featured species) excluding species protected in regulation under the *Endangered Species Act*; and
- Animal movement corridors.

Seasonal concentration areas include areas such as heron colonies, waterfowl or shorebird stopover or staging areas and reptile hibernacula. There are none of these types of features on the subject property.

The portions of the PSW featuring Silver Maple Deciduous swamp could be considered to represent SWH as it supports breeding by Wood Frogs. However, the presence of only a few individuals in portions of the PSW situated within the study area, is not considered to constitute a level of function commensurate with the designation of SWH.

No rare vegetation communities or specialized habitats for wildlife are present on the study area.

Regarding habitat for species of conservation concern, based on habitat mapping, potential habitat (e.g., open country breeding bird habitat) is present in the study area. However, field investigations demonstrated that the breeding individuals of listed species (i.e., Savannah Sparrow), were not present in sufficient numbers or diversity to warrant confirmation of SWH.

Nearby Lower Duffins Creek valley is a major wildlife corridor but the functional portions of this system are not represented on the subject property. The rest of the subject property does not support a wildlife corridor at the regional or at the local level. Urban areas are currently located to the north, west and south of the PSW, with busy roads (Hwy. 401 and Bayly Street) on its northern and southern limits which represent formidable barriers for the dispersal of wildlife. Given downstream connections with the presence of major infrastructures preventing fish passage, the headwater drainage features associated with the PSW do not represent an aquatic movement corridor.

## 5.5 Habitat of Endangered or Threatened Species

The MNRF was contacted to obtain existing records for species to which the ESA applies on the subject property. In their response dated February 15, 2019, the MNRF provided a summary of SAR species that have been observed or recorded, or may potentially be present at a geographic township / municipal level, and indicated that it was the proponent’s responsibility to complete a preliminary screening for each project.

Based on these MNRF SAR data for occurrence and general habitat present on or adjacent to the subject lands, several species listed as either endangered or threatened under the ESA were assessed to have the potential to occur and are discussed in the table below : Butternut (*Juglans cinerea*), Barn Swallow (*Hirundo rustica*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*) as well as Endangered Bats: Tricolored Bat (*Perimyotis subflavus*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Eastern Small-footed Myotis (*Myotis leibii*).

Based on the preferred habitat of these species, habitat identified through field investigations, the likelihood of these species occurring within the subject property was assessed in **Table 6**.

**Table 6. Endangered or Threatened Species Identified within the Vicinity of the Subject Property**

| Identified Species at Risk | SARO Status | Preferred Habitat  | Habitat Present in Subject Property                                     | Species Present in Subject Property  |
|----------------------------|-------------|--|---|--|
| Butternut                  | Endangered  | Butternut trees are normally found scattered throughout low density forests deciduous or mixed forests, fence lines or open fields   | Potential habitat present   | Not present  |
| Barn Swallow               | Threatened  | Barn Swallows often live in close association with humans, building their nests almost exclusively on human-made structures such as open barns, under bridges and in culverts                        | Barn Swallow nesting structures are not present on the subject property | Observed foraging on and adjacent to the subject property. Not observed nesting within the subject property. |
| Bobolink                   | Threatened  | Dense grasses, hayfields or meadow communities that are greater than 5 ha in area  | Potential habitat occurs in cultural meadow communities                 | Not present  |
| Eastern Meadowlark         | Threatened  | Moderately tall grasslands, pastures and hayfields, also in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields that are typically greater than 5 ha | Potential habitat occurs in cultural meadow / thicket communities       | Not present  |
| Northern Myotis            | Endangered  | Roosting habitat: under loose bark and in the cavities of trees  | Potential habitat occurs in protected                                   | Potentially present in protected forested  |

| Identified Species at Risk  | SARO Status | Preferred Habitat   | Habitat Present in Subject Property                | Species Present in Subject Property       |
|-----------------------------|-------------|---|--|---|
| Little Brown Myotis         | Endangered  | Roosting habitat: under loose bark and in the cavities of trees. Also buildings and barns   | forested communities south of the subject property | communities south of the subject property |
| Tri-colored Bat             | Endangered  | Roosting habitat: under loose bark, in foliage, in the cavities of trees, preferentially in older forest; occasionally barns and other structures |  |   |
| Eastern Small-footed Myotis | Endangered  | Roosting habitat: under loose bark and in the cavities of trees; also rock outcrops, buildings, bridges, caves, mines                             |  |   |

## 6. Proposed Development

### 6.1 General Description

The proposed development will feature a casino, hotel, performing arts centre and associated parking areas north of the former Kellino Street, and a variety of complementary and supportive uses south of Kellino Street, including various major tourist destination experiences, boutique hotels, restaurants, conference centres, and offices. The proposed development may also include residential uses.

On the western half of the subject property, south of the former Kellino Street, the proposed development will include a film studio, with associated parking areas, on both sides of the wetland.

The general elements of the proposed Durham Live development are presented on **Figure 3**.

### 6.2 Stormwater Management

As detailed in the Functional Servicing Report (SKA 2020), the stormwater management system has been designed to meet specific criteria including quantity control (dictated by receiving existing infrastructures), quality control (Enhanced Protection Level), erosion control (detention and release over 48h of runoff from a 25mm storm), runoff volume control (on-site retention of 5.0 mm of rainfall from impervious areas) and ensure the PSW pre-development hydroperiod (seasonal pattern of water level fluctuation) is maintained. The following summary is excerpted from the Functional Servicing Report (SKA 2020).

Four outlets and associated SWM systems have been proposed throughout the subject property:

- Stormwater runoff from the Phase 2 Film Studio and the Squires Beach Road right-of-way discharges to the PSW, with outfall spillway partially located into the W3 unit (as named in

section 7.1.2), which ultimately outlets to Metrolinx culvert north of the subject property. Quality, erosion and quantity control will be provided through the use of a closed-bottom underground storage facility with a permanent pool;

- Stormwater runoff from the Phase 1 Film Studio and the future Casino parking lot outlets to a Metrolinx culvert north of the subject property. Quality, erosion and quantity control will be provided through the use of a closed-bottom underground storage facility with a permanent pool; and
- On eastern parts of the subject property south of Kellino Street
  - Stormwater runoff from southern portions will discharge to the existing storm sewer network south of Bayly Street and be conveyed to the existing Durham Woods Industrial Lands SWM facility that will provide the required quality, erosion and quantity control; and
  - Stormwater runoff from northern portions will discharge to the existing storm sewer network within the Casino lands north of Kellino Street. The receiving storm sewer was sized to accept the pre-development 100-year flow from 5.0 ha. On-site control in the form of a super pipe system is required to meet the allowable storm sewer allotment.

Within a subcatchment south of Kellino Street outletting into a topographically closed swamp wetland, named W1 in section 7.1.2, it is proposed to distribute the roof runoff to the swamp through a bioretention swale running parallel to the eastern limit of the natural feature. This facility that was designed to maintain the seasonal water balance of the swamp is detailed in section 7.2.3. In spring, during high water periods this treed swamp can spill towards the Bayly Street drainage ditch.

Additional details of the SWM network and facilities are provided in the Functional Servicing Report (SKA 2020).

### **6.3 Public Trail**

At this time establishing a public trail or path system through the PSW eastern edge naturalized buffer has not been addressed. The need and design of trail/path system should be assessed if such a proposal moves forward.

## **7. Impact Assessment and Proposed Mitigation**

The following sections present the key potential negative effects of the proposed residential development and identify mitigation opportunities to be utilized to minimize the adverse effects of the project.



# Proposed Development

# Figure 3

## Durham Live - EIS

### Legend

- Subject Property
  - ELC Communities
  - Drainage Channel/Watercourse (Beacon 2018)
  - Drainage Channel Removed in 2019 to Facilitate Construction of the Casino (Beacon 2019)
  - Constructed Channel (Beacon 2018)
  - Proposed Development
  - Staked Dripline (TRCA April 2014)
  - Dripline + 10 m
  - Staked Top of Bank (TRCA April 2014)
  - Staked Top of Bank + 10 m
  - Lower Duffin Creek PSW, Staked Wetland Boundary (TRCA & MNRF July 2014)
  - Provincially Significant Wetland + 30 m
  - Additional Buffer Areas (4,627.73 m<sup>2</sup>)
- PSW + 30 m Encroachment**
- Development (0.06 ha, 559.01 m<sup>2</sup>)
  - Grading (0.39 ha, 4,857.851 m<sup>2</sup>)
  - SWM Outfall Disturbance Area (0.07 ha, 689.87 m<sup>2</sup>)

| Code    | Community Description                               |
|---------|---|
| FOC1-2  | Dry - Fresh White Pine - Red Pine Coniferous Forest |
| FOC2-2  | Dry - Fresh White Cedar Coniferous Forest           |
| FOD5-6  | Dry - Fresh Sugar Maple - Basswood Deciduous Forest |
| SWD3-2  | Silver Maple Mineral Deciduous Swamp                |
| SWT2-2  | Willow Mineral Thicket Swamp                        |
| SWT2-5  | Red-osier Mineral Thicket Swamp                     |
| MAS2-1  | Cattail Mineral Shallow Marsh                       |
| MAS2-9  | Forb Mineral Shallow Marsh                          |
| MAM2-2  | Reed-canary Grass Mineral Shallow Marsh             |
| MAM2-10 | Forb Mineral Meadow Marsh                           |
| CUP3-3  | Scotch Pine Coniferous Plantation                   |
| CUW1    | Mineral Cultural Woodland                           |
| CUT1-1  | Sumac Mineral Cultural Thicket                      |
| CUT1    | Mineral Cultural Thicket                            |
| CUM1    | Mineral Cultural Meadow                             |
| AG      | Agricultural  |
| ANT     | Anthropogenic                                       |

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Web Mapping Service 2019

UTM Zone 17 N, NAD 83

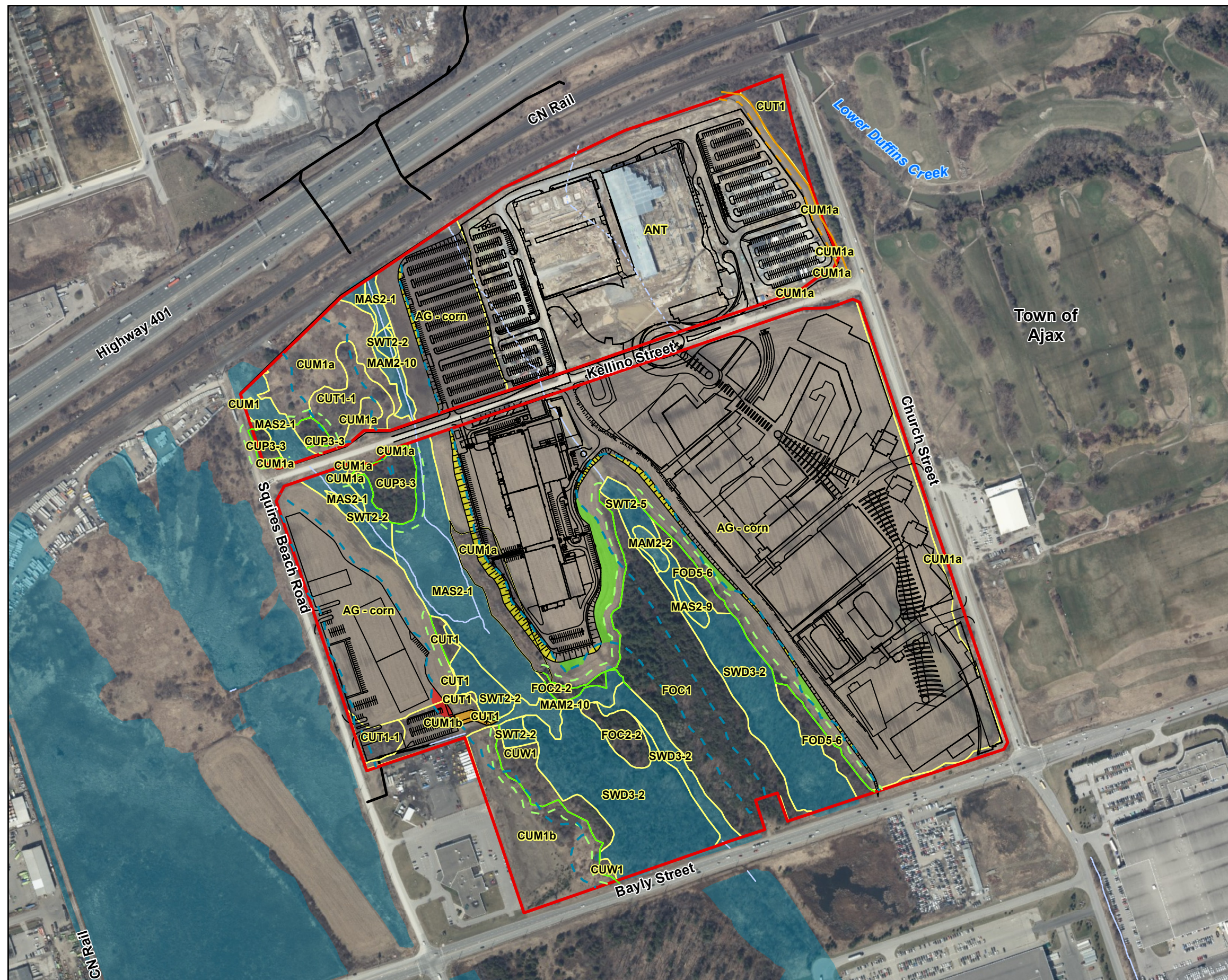
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## 7.1 Potential Negative Impacts

Since avoidance is generally the most effective means of reducing the risk of development impacts on the natural environment development limits of the Durham Live project have been established outside of any significant natural heritage features.

The impact assessment presented in this section includes the site-specific assessment for the subject property and adjacent lands. The impact assessment is based on:

- The most detailed level of information available related to biophysical existing conditions as presented in Section 4; and
- The findings of the constraint analysis as presented in Section 5 to identify significant natural heritage features and ecological functions that require protection to maintain the integrity of the features and functions within the subject property.

### 7.1.1 Vegetation Removal

As noted, although development will primarily occur on agricultural lands outside natural heritage features, it will still require the removal of any existing vegetation including:

- Removal of 0.6 ha of Mineral Cultural Meadow (CUM1);
- Removal of 0.22 ha of Mineral Cultural Thicket (CUT1); and
- Removal of fencerow trees and road allowance trees.

None of these vegetation communities are considered to be ecologically significant as they are dominated by either commonly occurring, readily establishing and disturbance tolerant species, or non-native vegetation. Native plant species identified on the subject property are provincially secure.

The installation of the stormwater outfall discharging drainage of the Film Studio Phase 2 area into the PSW will result in the temporary disturbance of approximately 110 m<sup>2</sup> of wetland SWT2-2 and MAS2-1 vegetation.

### 7.1.2 Post Development Effects on Wetland Water Balance

A feature-based water balance was prepared and reported by SKA (2020) and Palmer (2019). The purpose of the analysis was to determine the potential for the development to impact upon hydrology of the PSW.

In undertaking the analysis, wetland units were identified by Beacon.

#### 7.1.2.1 Wetlands Hydrologic Sensitivity

The PSW was divided into three units to correspond with three existing surface drainage catchments (C2, C4 and C3) on the subject property that contribute runoff to these wetlands. The PSW segment associated with Drainage Feature C and corresponding to the C4 Catchment area was divided into two

sub-units to better consider the differences in vegetation between the southern and northern portions. The numbering system of the pre- and post-development catchment areas is inherited from the Functional Servicing Report (SKA 2020). For more details on contributing surface drainage areas and estimated imperviousness values pre- and post-development in each drainage areas the reader should refer to this report.

The 4 wetland units, W1 (Catchment area C2), W2 (Catchment area C4, upstream portion), W3 (Catchment area C4, downstream portion) and W4 (Catchment area C3) are shown on **Figure 2D**.

Wetlands include marshes and swamps. W1 is a palustrine swamp with no or poorly defined inflow. W2 and W3 are palustrine units associated with Drainage Feature C with inflow from upstream portion of the catchment C2 south of the subject property. W4 is an isolated wetland draining into a ditch north of the subject property.

Monitoring of the surface water flow conditions and groundwater levels have confirmed that seasonal trends in precipitation and surface runoff are the primary controlling factors for wetland water levels (Palmer 2019). W1, W2 and W3 have the potential to be affected by proposed development on the subject property. No development is proposed on the catchment area of W4.


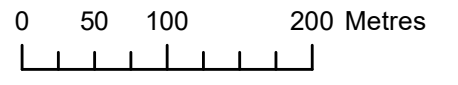

Sensitivity of these wetland units was evaluated based on ecological and hydrological criteria including:

- *Vegetation type sensitivity*: this criterion was assessed based on the presence of vegetation communities and/or flora species sensitive to hydrological change. For instance, treed swamps are usually less able to tolerate prolonged or frequent flooding than are herbaceous wetland communities;
- *Wildlife sensitivity*: this criterion was assessed based on the presence of fauna species and/or significant wildlife habitat sensitive to hydrological change. Surface water supported wetlands with substantial seasonal fluctuation (inundated in spring and summer), such as the wetland complex situated on the subject property, and that support amphibian breeding are highly sensitive to local modifications in the wetland catchment area; and
- *Hydrological classification*: Sensitivity to hydrological change based on hydrogeomorphic setting (Isolated / Palustrine / Riverine / Lacustrine). Riverine wetlands are less likely to be affected by changes to local-scale hydrology whereas palustrine wetlands with no inflow and in particular isolated wetlands are more sensitive to hydrological changes.



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|   |  |   |  |
|---|--|---|--|
| <b>PSW Units</b>  |  | <b>Figure 2D</b>  |  |
| Durham Live - EIS   |  |   |  |
| <b>Legend</b>   |  |   |  |
| — Property Boundary   |  | □ MNRF 2019   |  |
| UTM Zone 17 N, NAD 83   |  |  |  |
| First Base Solutions<br>Web Mapping Service 2019                                      |  | 1:5,200   |  |
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Evaluation of the four wetland units is detailed in **Table 7** below:

**Table 7. Wetland Units Sensitivity Analysis**

| Wetland ID | Dominant Vegetation types *   | Wildlife (Amphibians)              |                                    | Hydrology ***                               | Hydrologic Sensitivity of Wetland Unit |
|------------|-------------------------------|------------------------------------|------------------------------------|---|--|
|            |                               | Present Species (Abundance Code**) | Sensitivity to hydrological change |   |  |
| W1         | SWD3-2 (high sensitivity)     | Wood Frog (3)                      | High                               | Palustrine with no or poorly defined inflow | <b>High</b>                            |
| W2         | SWD3-2 (high sensitivity)     | None heard                         |                                    | Palustrine with inflow                      | <b>Moderate</b>                        |
| W3         | MAS2-1 (moderate sensitivity) | Wood Frog (1)<br>American Toad     | High<br>Moderate                   | Palustrine with inflow                      | <b>Low</b>                             |
| W4         | MAS2-1 (moderate sensitivity) | None heard                         |                                    | Palustrine with no or poorly defined inflow | <b>Low</b>                             |

\* ELC codes of dominant communities

\*\* abundance codes assigned to amphibian abundance according to the provincial Marsh Monitoring Program protocol (BSC 2005)

\*\*\* based on OWES evaluation of Lower Duffins Creek PSW by MNRF (2014)

The Silver Maples swamps (W1 and W2) are the most sensitive units. The eastern unit (W1) has been evaluated as highly sensitive due to its hydrological type (Palustrine with no or poorly defined inflow), the presence of breeding Wood Frog and the dominant treed vegetation.

### 7.1.2.2 Wetland Units Water Balance

A detailed feature-based water balance (FBWB) study has been jointly developed by Palmer and SKA for the wetland communities within the subject property. For more details refer to the Functional Servicing Report (SKA 2020) and Hydrogeological Assessment Report (Palmer 2019).

The overall of purpose a feature-based water balance is to maintain quantity of surface water and groundwater contributions that ensures the pre-development hydroperiod (seasonal pattern of water level fluctuation) of a feature of interest is protected.

The study was performed by utilizing a monthly soil-moisture balance as described in Thornthwaite and Mather (1957). All associated background data, including catchment boundaries and parameters, was provided by SKA (2020). Precipitation and evapotranspiration data were taken from the online TRSPA Water Balance Tool (2019).

In addition to this non-continuous modelling approach used for the four wetland units, due to its high hydrologic sensitivity and the proposed changes in its catchment area, a continuous model has been specifically applied to the W1 unit to calculate the alteration to water balance that would result from the proposed development, with and without implementation of LID measures. The methods and results of this continuous model are presented in the FSR (SKA 2020).

The four identified wetland units within the subject property form part of the Lower Duffins Creek PSW. Figures showing the maps of drainage catchments of these identified wetland features under the pre-development and post-development conditions are included in the Hydrogeological Assessment Report (Palmer 2019).

Pre-development and post-development water budgets were calculated for each catchment. Infiltration was not considered a wetland input as the hydrogeological assessment by Palmer suggests primarily surface water wetland features with limited groundwater contributions. Based on the comparison between the calculated runoff volumes under pre-development and post-development conditions, mitigation measures were applied to bring the post-development water balance back in line with the pre-development conditions.

A summary of the feature-based water balance analysis is provided in Table 8 below.

**Table 8. Summary of Feature Based Water Balance**

| Feature | Catchment # | Pre-Development Runoff (m3/year)    | Post Development Runoff with no LIDs (m3/year) | % Change | Post Development Runoff with LIDs (m3/year) | % Change |
|---------|-------------|-------------------------------------|--|----------|---|----------|
| W1      | C2          | 20,841                              | 25,628   | 23%      | 20,824                                      | 0%       |
| W2      | C4 (SWD3-2) | 148,327                             | 148,327  | 0%       | 148,327                                     | 0%       |
| W3      | C4 (MAS2-1) | 24,206                              | 85,212   | 252%     | 71,161                                      | 194%     |
| W4      | C3          | No proposed changes to Catchment C3 |  |          |   |          |

Refer to the Hydrogeological Assessment report by Palmer (2019) for more details on the average monthly results comparison between pre-development and post-development conditions for the identified four wetland features respectively.

**C2 Catchment – Wetland W1**

The W2 wetland unit is a treed swamp with a small catchment basin and no watercourse inflow which make it highly sensitive to changes occurring within the catchment area. Based on the continuous water level monitoring data collected to date, it is expected that the wetland is generally inundated between approximately March and July (Palmer 2019).

As mentioned above, treed swamps are usually less able to tolerate prolonged or frequent flooding than herbaceous wetland communities. They develop in areas where the soil is saturated or flooded for a period long enough during the growing season to favour wetland plants, but where the water level recedes early enough to allow woody plants to germinate and grow. Permanent standing water in SWD3-2 communities would result in a shift to shallow marsh communities.



Without mitigation there is an anticipated increase of 23% in runoff and a decrease of 31% in infiltration within the C2 catchment. This is primarily due to the increase in hard surfacing along the north south roadway east of the feature (Palmer 2019). By incorporating LID mitigation designed to capture and infiltrate rainfall volumes consistent with pre-development infiltration rates, surface water inputs to the wetland will be maintained. Both the continuous and discontinuous FBWB models have demonstrated that the overall volume and timing of water entering the feature will be maintained post development (Palmer 2019, SKA 2020). It is therefore not anticipated that the changes in runoff contributions will impact on the hydrology and ecological functions of the W1 swamp feature.

The corresponding LID mitigation measures are described in Section 7.2.3.

#### **C4 (SWD3-2) Catchment – Wetland W2**

The W2 wetland unit is also a treed swamp. Based on the continuous data collected to date, periods of inundation are observed starting in the mid-fall and continuing into the spring, with the wetland being dry for much of the summer and early fall (Palmer 2019).

The vast majority of water entering the W2 wetland feature is derived from direct precipitation, from runoff offsite south of Baily Street and from runoff from the C2 catchment through the roadside ditch along Baily Street (Palmer 2019). As it has been demonstrated that the runoff volumes can be maintained in the C2 catchment by incorporating LID mitigation and no changes to the roadside ditching or to lands south of Baily Street are part of the proposed development, no hydrological impacts from the proposed development are therefore anticipated on the W2 swamp feature.

It has been demonstrated by Palmer (2019) that, under post-development conditions, due to the proposed SWM outfall location to the existing drainage channel immediately downstream from the W2 swamp unit and an increased runoff contribution from the C4 (MAS2-1) catchment (as detailed in the following paragraph), short duration backwatering effect could occur following large rainfall events and generate additional inundated areas. However, these temporary flooding events are expected to be limited to the W3 unit and the very northern fringes of the W2 swamp unit and not exceed one or two days following a significant storm event. According to Palmer (2019), no impact to the water levels or hydroperiod for the W2 swamp unit are expected from the proposed development scenario.

#### **C4 (MAS2-1) Catchment – Wetland W3**

All land uses changes occurring in the C4 catchment are within the W3 sub-catchment. The W3 wetland unit is dominated by MAS2-1 cattail marshes. Based on the continuous data collected to date, it is expected that the wetland is generally inundated between approximately October and July and water levels do not exceed approximately 0.2 m due to positive drainage to the north within drainage feature C. This drainage mechanism makes the feature less sensitive to increased surface water inflow (Palmer 2019).

Under the proposed development scenario with incorporation of LID mitigation, it has been estimated that runoff volumes to the W3 unit of the PSW will be increased by 188%. The corresponding LID mitigation measures are described in Section 7.2.3.

Due to existing drainage of the wetland to the north, the post-development increased runoff within the C4 (MAS2-1) catchment will only have limited influence on the overall wetland water level which is not expected to exceed 0.2 m and on the extent of seasonally flooded areas that currently represent approximately 1.8 ha as per Figure 22 from the hydrogeological assessment report (Palmer 2019). However, under post-development conditions, the duration of inundation periods within the W3 marsh unit is expected to increase; periods of dry conditions within these seasonally flooded areas are still expected during the late summer and early fall but they would be overall less frequent and of shorter duration.

The W3 unit is dominated by Mineral Cattail Shallow Marsh (MAS2-1) communities. Germination of cattail seeds will likely be impaired overtime by more permanent spring/summer flooding on the deepest portions of the wetland. This hydroperiod shift may actually favour the hybrid cattail, and may also potentially end up fragmenting or reducing cattail species overall cover, leaving more room for other species more adapted to a more permanent water level of around 20 cm. Changes of the type, overall cover and spatial distribution of vegetation communities might therefore occur in the deepest portions of the marsh resulting from the proposed development. However, those modifications would likely have no negative impacts on wetland function and this wetland area might evolve towards a more complex community with increased vegetation diversity and interspersed with open water, a scenario that generally scores more points within the Ontario Wetland Evaluation System.

### **Summary of Potential Hydrological Effects on the PSW units**

The maximum spatial extent of inundated areas within the W3 unit will remain unchanged, as the water level in this wetland unit will continue to be controlled by the existing outlet. The composition of the W3 vegetation will vary naturally according to modified hydroperiod but that shift will not result into a negative effect on this PSW unit.

The W1 and W2 units will not be affected by this increased extent of flooded areas.

The W4 unit will not be affected by the proposed development as no changes within its catchment area will result from the proposed development.

Therefore, water balance mitigation measures will prevent negative impacts on the wetland features as they relate to water balance and hydrological function.

#### ***7.1.3 Removal of Drainage Feature***

The existing drainage features D and E in the northern portion of the subject property have been removed to facilitate the construction of the Casino.

The drainage feature D did not support direct fish habitat and was bordered by actively farmed fields. However, it was providing some hydrologic functions that required replication.

The drainage feature E did not impose environmental constraints.

### **7.1.4 Stormwater Quality Effects on Wetland Features**

The proposed development will result in new impervious areas and an increased car traffic, which can have potential negative effects on receiving wetland features through increased stormwater discharge combined with higher pollutant loads.

### **7.1.5 Other Indirect Impacts**

#### **7.1.5.1 Potential Effects on the Integrity of Natural Features During Construction**

Uncontrolled erosion, sedimentation, and machine use (including potential spills) during construction could result in release of deleterious materials (sediments, fuel, oil, lubricant, etc.) into the drainage features and wetlands, and/or degradation of water quality. There is an increased risk of encroachment into the wetland and woodland buffers during the construction phase including but not limited to spatial extent of development, illegal dumping, fence removal, or presence of illegal structures.

#### **7.1.5.2 Noise and Light Effects**

These effects are very difficult to quantify. The effects of these stressors would be important except that this system is already heavily influenced by the light and noise of the surrounding urban land uses and major transportation corridor. The majority of breeding bird species recorded on the subject property are already urban-tolerant.

#### **7.1.5.3 Waste Dumping**

Generally speaking, and without any mitigative measures, dumping of waste into natural areas could have a negative effect on the natural system. This can smother native species, encourage non-native plants and disturb wildlife habitat.

#### **7.1.5.4 People and their Companion Animals**

Uncontrolled access into natural areas will result in trampling, a proliferation of trails and direct effects on flora and fauna. Non-native invasive plant species are also spread in this manner, and overuse can result in physical damage and degradation of the natural system that is being protected from development.

## **7.2 Proposed Mitigation**

### **7.2.1 Buffers to Natural Features**

The protection of features with buffers follows the natural heritage policies of the Provincial Policy Statement (PPS), Durham Region Official Plan, City of Pickering Official Plan and TRCA's Ontario Regulation 166/06, and TRCA's Living City Policies.



The buffers proposed for this development plan are designed to mitigate a range of potential negative effects described in sections 7.1.2, 7.1.37.1.4 and 7.1.5 including:

- Soil mobilization during site grading and alteration in the conveyance of surface water drainage and stockpiling of material;
- Sediment-laden water runoff from the construction site, or later driveways, parking lots and roads, entering the woodlands, wetlands and drainage features;
- Hydrological effects on wetlands;
- Garbage in natural areas;
- Light and noise effects from adjacent development; and
- Human access to natural features.

#### *7.2.1.1 Buffers to the Provincially Significant Wetland and Significant Woodland*

Buffers are required to limit the spread of any invasive plant species and to protect wetland and woodland wildlife from direct disturbance. Due to the urban environment the wetlands contain relatively modest vertebrate wildlife. For instance, there are no known turtles, a few individuals of amphibians and tolerant wetland bird species, and only one pair of forest-sensitive bird species recorded. It is possible however that bat species use the treed areas.

Many of the stressors associated with adjacent urban and agricultural land uses are already manifest within the woodland and wetland systems. Therefore, it can reasonably be deduced that most are species that can tolerate some measure of disturbance related to the adjacent land uses. This is consistent with the types of relatively non-sensitive species that are found on the subject property. Thus, wider buffers generally would not be needed for sensitive wildlife.

The proposed development may include residential uses. Pets and people often enter nearby natural features from residences once built. A buffer including high density plantings of shrub species as well as fences and other barriers will help to minimize this type of disturbance.

The buffer needs to assist in protecting wetland water quality, by attenuating and transforming nutrients and other contaminants, especially when the buffer area is naturalized. This function is limited by the fact that most water is treated via the storm water management system.

A feature-based water balance has been completed to demonstrate that negative effects on hydrologic conditions associated with the wetland features will be mitigated by a combination of the proposed buffer and complementary Low Impact Development measures (see sections 7.1.2 and 7.2.3).

The buffers will require the preparation of a Planting Plan that will ensure that it is planted with trees and shrubs native to the eco-region with sufficient density (See Section 7.2.2).

Based on these factors the recommended width of buffers (or vegetation protection zones) has been determined to be 30 m from the Provincially Significant Wetland (PSW) staked limit and 10 m from staked dripline of the significant woodland or any woody vegetation associated with the PSW as required by the City of Pickering Official Plan and TRCA policies. These buffers are shown on **Figure 3**.

## **Buffer Encroachment**

A portion of the wetland 30 m buffer of approximately 3,950 m<sup>2</sup> in area will be temporarily disturbed to accommodate grading requirements of the proposed development, as shown on **Figure 3**.

The buffer limit is an irregular line that is difficult to match as a limit of development. The proposed curbs for the adjacent parking lots and roads have been set outside of the buffer. Furthermore, a flat boulevard area has also been set outside of the buffer, adjacent to all curbs (2 m wide for parking lots, 3 m wide for roads) to allow for a transition to the proposed top of slope and some snow storage. Given the irregularity of the buffer line, the distance from the curb and boulevard to the buffer varies. Because of this variance, the 3:1 slope that is required to match existing grade falls within buffer in some locations. The proposed regraded toe of slope is well outside of the 10 m buffer from the woodland dripline in all locations, preventing damage to tree roots. Given that regraded portions will have a relatively moderate slope of 3:1 and will be revegetated, the buffer ecological functions should not be significantly attenuated over the long term. Self-sustaining vegetation within the protective buffers represents an ecological net gain compared to the existing agricultural land use.

The only area of structure encroachment into the 30 m PSW buffer will be located in southern portion of the Film Studio Phase 2 area along Squires Beach Road. This 560 m<sup>2</sup> encroachment area is due to locally enlarged buffer generated by a small protuberance (approximately 100 m<sup>2</sup> in area) of the swamp thicket at this location as shown on **Figure 3**. Although little function is associated with this protruding piece of wetland, appropriate effort should be made during detailed design to enhance protection of the wetland edge at this location, including higher density plantings throughout this reduced width buffer area.

As shown on **Figure 3**, additional lands located between the recommended buffer outer boundary and proposed footprint of finished development and representing 5,200 m<sup>2</sup> in area, will be restored to permanent self-sustaining native vegetation which will result in an overall increase of the Natural Heritage System and will offset the proposed minor encroachment into the PSW 30 m buffers. This restoration area will also significantly enlarge buffers to upland woodland portions that do not benefit from the PSW buffer protective functions.

### *7.2.1.2 Buffer to the Valleyland*

The buffer applied to the northeast valley edge is 10 m.

As construction of the casino is already underway on the northeast parcel, grading works have started with minor encroachment into the 10 m valley buffer to facilitate the construction of parking lots and eliminate the need for a retaining wall. This has been addressed at the site plan application stage.

As this portion of the valley is separated from the rest of the valley by a major road no effects on the valley function are anticipated.

### *7.2.1.3 Temporary Loss of Wetland at SWM Outfall*

The SWM outfall along the southwestern portion of the subject property will result in the temporary disruption of wetland habitat. This will be mitigated by restoration plantings as per section 7.2.2.

### **7.2.2 Restoration Plan**

Potential indirect impacts to woodlands and wetlands can be minimized by the maintenance of a naturalized buffer.

Around woodland features, including swamp communities, plantings with trees and shrubs native to the eco-region will emulate a natural forest edge with smaller sized plant material at the front, and larger sized plant material along the existing forest.

A border of trees and shrubs, including species tolerant of wet soil, are proposed along the edge of the marsh units that will form a living fence to define the wetland edge, provide a buffer to wetland, and limit human disturbance.

Restoration plantings will also be carried out in portions of the SWM outfall disturbance area within the PSW.

Further details of the restoration plantings will be presented at a later stage. It is recommended that the provision of the corresponding restoration plan be a condition of site plan approval.

### **7.2.3 Wetland Water Balance and Low Impact Development Measures (LID)**

Based on findings from the feature-based water balance assessment undertaken by Palmer (2019) and SKA (2020), the incorporation of Low Impact Development measures into the proposed stormwater management strategy has been recommended to promote infiltration and reduction of direct runoff in order to mitigate potential changes to the water balance for wetlands.

For the treed swamps (wetlands W1 and W2), this has been achieved in part by the mitigative measure of diverting “clean” water with a pipe system from roughly 1.6 hectares of roofs to a vegetative swale that is 250 m in length and has been designed to infiltrate a 5 mm storm event with all additional water directed out of the LID into wetland W1, matching both W1 and W2 units’ predevelopment water balance conditions.

For the main marsh unit (wetland W3), runoff from the subcatchment east of the wetland will be collected from the film studio roofs and directed to a 180 m long infiltration trench to also infiltrate a 5 mm storm event. Additional runoff will be directed away from the W3 unit into an underground SWM facility along the northern property boundary. This will contribute to increase the infiltration component for catchment C4 but also limit the runoff volume directed to wetland W3.

With these mitigation measures we conclude that no negative impacts will result to the wetland and woodland complex on the subject property.

### **7.2.4 Replication of Headwater Drainage Features Function**

The Drainage Feature C is embedded within the PSW and will be retained in its current location.

Feature D and Feature E have been removed as part of the proposed Casino development north of Kellino Street.



Feature E does not impose environmental constraints.

As “Mitigation” type, Feature D requires outlet flows at the top end of the system to be replicated through Low Impact Development measures in accordance with the Head Water Drainage Features Guidelines (TRCA and CVC 2014). Further details have been provided during corresponding site plan application.

### **7.2.5 Water Quality Control**

The underground storage cells located on southern portion of the Film Studios Phase 2 area along Squires Beach Road are also designed to include a permanent pool sized to provide enhanced water quality treatment where stormwater drainage is being discharged directly towards the PSW (SKA 2020).

### **7.2.6 Timing of Vegetation Removal**

The federal *Migratory Birds Convention Act* (1994) protects the nests, eggs and young of most bird species from harm or destruction. Environment Canada considers the ‘general nesting period’ of breeding birds in southern Ontario to be between late March and the end of August. This includes times at the beginning and end of the season when only a few species might be nesting. In light of this it is recommended that during the peak period of bird nesting (i.e., between mid-April and mid-July), no vegetation clearing or disturbance to nesting bird habitat should occur.

In the ‘shoulder’ seasons of April 1 to April 15, and July 16 to August 31, vegetation clearing could occur, but only after an ecologist with appropriate avian knowledge has surveyed the area to confirm lack of nesting. For any proposed clearing of vegetation within the breeding bird season an ecologist should undertake detailed nest searches immediately prior to site alteration to ensure that no active nests are present.

If nesting is found, then vegetation clearing in an area around the nest, the size of which depends on the specific circumstances, has to wait until nesting has concluded. The likelihood of nesting birds being present in the ‘shoulder’ seasons also depends on the habitat type.

From September 1 through to March 31, vegetation clearing can occur without nest surveys, but the need to ensure nest protection still applies (i.e., if an active nest is known to be present it must be protected).

It is important to note that this timing constraint applies to all habitat types including grasses and shrubs (cultural meadows), not just trees.

### **7.2.7 Erosion and Sediment Control (ESC) during Construction**

Construction works such as grading, grubbing and excavation can cause the movement of sediment into the valley corridor northeast of the subject property and into woodlands, wetlands and drainage features on the western portion of the property.

An erosion and sediment control plan will be prepared and submitted to the City and TRCA for review prior to construction works. Silt fencing with staked straw bales should be installed along the limits of

development so as to filter surface runoff and protect features and function during construction and should be removed when development work is completed and exposed soils stabilized.

### **7.2.8 Lighting**

Lighting along the edge of the proposed development should be directed away from PSWs and Significant Woodlands to minimize the impact on adjacent development on the function of these areas.

### **7.2.9 Fencing at the Edge of Development Limit**

Fencing at the limit of the development will be provided. The specifics of this mitigation measure will be developed during the detailed design stage.

## **8. Monitoring Plan**

To ensure compliance with policies and regulations and also to evaluate the effectiveness of various mitigation and environmental management strategies identified through the EIS (e.g., buffers), it will be necessary to implement an environmental monitoring program. The program will be multidisciplinary and will include monitoring of surface water resources, groundwater resources and natural heritage resources. Here, the natural heritage components are addressed.

The following section outlines, in general terms, the rationale for and type of the various elements of a monitoring program that could be considered appropriate for the subject property. Monitoring is to focus, the effectiveness of the buffers to the features and the detection of any changes in the terrestrial and aquatic environments that might be attributable to the proposed development. The results of the monitoring plan will be analyzed and appropriate measures to resolve observed issues should be identified and implemented.

### **Construction Monitoring**

#### **Erosion and Sediment Control Measures**

All ESC measures will be installed prior to construction and inspected regularly throughout construction phasing. Specifically, to monitor potential changes related to erosion, the following strategy should be set up by the proponent in consultation with TRCA:

1. Identification of the monitoring stations that would be used on an ongoing basis. Photographs will be acquired to document pre-development conditions and be taken during any monitoring inspections as construction proceeds;
2. Identification of the monitoring triggering events (rainfall events, minimum inspection schedule);

3. Provision of a short memorandum to TRCA each season (spring-summer-fall) that will include photographs and a brief description of the stations;
4. If the inspector recognizes an issue with sediment moving into the adjacent wetland communities (soil accumulation or excessive standing water), a notification should be sent to the TRCA within 72 hours of the inspection along with a proposed mitigation plan; and
5. The monitoring program will continue until all soils are stable.

### **Natural Heritage Monitoring**

Three years of inspection/monitoring activities will be undertaken within or adjacent to wetland and woodland features of the subject property. The monitoring results will be summarized in a monitoring report at the end of the three years period with an interim letter summary delivered annually. The proponent will be required to keep this report on file for two years following completion of the monitoring programme should the TRCA request an audit.

#### **Wetlands**

Monitoring of PSW units will examine any changes to the physical extent of the feature (boundary changes), integrity of its physical and biological attributes, invasive species, encroachments (e.g., debris, dumping of fill or garbage, cutting), etc. The wetlands will be examined to determine if post construction hydrology may be having detrimental effects on its quality and function. This will include identification and documentation of areas where:

- Silt accumulation is evident;
- Canopy species are declining within swamp units with aggressive herbaceous species becoming dominant (e.g., cattail, reed canary grass) which are indicative of impaired water quantity/quality; and
- Native wetland species are being displaced within marsh units by extremely invasive species (e.g., Common Reed, Purple Loosestrife).

Additionally, hydrological monitoring will continue.

#### **Woodlands**

The edge of significant woodlands will be periodically inspected, and any observed impacts documented with photographic records. At least one monitoring cycle must be undertaken prior to the commencement of construction to establish baseline reference conditions. Monitoring should document the following:

- Encroachments (e.g., informal trails, yard waste disposal, vegetation removal, gates in fences);
- Tree canopy health and condition; and
- Presence of invasive species where they represent a significant portion of cover.



### Buffer Integrity and Buffer Planting Assessment

The condition of the buffer areas will be inspected and evaluated through field reconnaissance. Buffers will be inspected post development:

- To ensure that any area of encroachment (including but not limited to illegal dumping, fence removal, or presence of illegal structures) is documented, and subsequently reported to the City or TRCA; and
- To assess the condition of restoration plantings using standard vegetation plots.

Monitoring activities in buffers will be conducted during the growing season (mid-May to mid-October) for three years following planting.

### Wildlife

Breeding birds are a useful indicator of ecosystem health and function because they are relatively easy to monitor, are present in all habitats, respond quickly to changes in the landscape. Breeding bird roving surveys will be conducted for three years in woodlands and wetlands features of the subject property.

Amphibians are also relatively easy to monitor in the breeding season and they often respond rapidly to habitat improvement or degradation. Breeding amphibian surveys will be conducted for three years within all suitable areas of the PSW, including previous amphibian monitoring locations.

## **9. Policy Conformity**

### **9.1 Provincial Policy Statement**

Within the Provincial Policy Statement (PPS), natural heritage features listed include significant wetlands, significant woodlands and significant valleylands.

No development is being proposed within these significant features. Appropriate buffers and mitigation measures have been applied to ensure there will be no negative impacts on the natural features or their ecological functions.

### **9.2 Durham Region Official Plan**

Requirements of the Durham Region Official Plan revolve around the protection of key natural heritage features and key hydrologic features.

Key Natural Heritage and Hydrologic Features are identified on the subject property on Schedule B, 'Map B-1d' Greenbelt Natural Heritage System & Key Natural Heritage and Hydrologic Features. The proposed development is outside of the limits of these natural features including woodland, wetland valleyland as staked by MNR and TRCA in 2014.

This EIS recommends appropriate buffers to protect the features and outlines mitigation measures to limit the potential impacts on the adjacent natural features, including Low Impact Development and buffer planting.

### 9.3 City of Pickering Official Plan

Schedule IIIA identifies portions of the subject property as Natural Heritage System, locally comprised of Significant Woodlands, Wetlands and Stream Corridor on the western half and Significant Valleylands on the northeast corner as per Schedule IIIB and Schedule IIIC.

The limits of the Provincially Significant Wetland (PSW), the Significant Woodland and the Duffins Creek valley corridor have been staked and surveyed with MNRF and TRCA in 2014.

These PSW has been provided a 30 m buffer, a portion of which will be temporarily disturbed to achieve overall grading requirements for the proposed development. A buffer planting plan will be proposed to ensure slope stabilization and revegetation of the disturbed areas.

The significant woodland features have been provided a buffer that is greater in area than that which would be provided by a continual 10 m buffer from the dripline as required by the City Official Plan.

Table 18 prescribes a minimum protection zone of 30 m from the stable top of bank for significant valleylands. As stated in section 16.51, smaller vegetation protection zones will be considered in the South Pickering urban area where:

*“the conservation authority determined it to be appropriate, and where it can be demonstrated that there is no increase in risk to life or property; no impact to the control of flooding, erosion, dynamic beach, or pollution; and where a net environmental benefit can be established on the property.”*

A 10 m buffer from the stable top of bank has been provided to the valleylands to the satisfaction of the TRCA.

Provided recommended mitigation is implemented, no adverse effects from the proposed development are anticipated on the key natural heritage features and their ecological functions.

### 9.4 Toronto and Region Conservation Authority

TRCA regulates watercourses, valleylands, shorelines and wetlands under O. Reg. 166/06. It also makes recommendations on the protection of other natural features through review on behalf of municipalities. TRCA prescribes buffers both through regulation and through recommendation.

All of the watercourses, valleylands, wetlands and woodlands on the subject property will be protected. TRCA recommended buffers of 30 m on PSWs, 10 m on valleylands or top of bank, and 10 m on woodland driplines will be followed under the proposed development plan. A portion of the wetland 30 m buffer will be temporarily disturbed to accommodate grading requirements of the proposed development. Restoration of these areas will reestablish the long-term functions of the protective buffer.

Restoration of the storm outfall disturbance area within the cattail marsh unit of the PSW will be integrated into the design to avoid long term impact on the wetland feature.

Incorporation of Low Impact Development (LID) measures into the stormwater management strategy has been recommended to promote infiltration and reduce runoff, and ultimately mitigate potential changes to the PSW water balance.

The proposed development is located within the TRCA regulatory limit, as being situated within 120 m of a Provincially Significant Wetland. It is therefore understood that a permit will be required from the TRCA in order to undertake development in this area.

## 10. Summary of Impacts and Recommendations

An integrated multi-disciplinary approach has been applied to assess the potential impacts of developing the subject property and propose mitigation as detailed in the preceding sections. **Table 5** provides a summary matrix of potential impacts and recommendations from this EIS. It is structured to identify:

- The potential effects on environmental receptors (features and functions); and
- And the corresponding recommended mitigation and monitoring measures.

| Potential Impacts  |             | Corresponding Recommendations   |             |
|--|-------------|---|-------------|
| Description  | EIS section | Description   | EIS section |
| Removal of cultural and anthropogenic vegetation   | 7.1.1       | Timing of vegetation removal  | 7.2.6       |
| Temporary loss of wetland at SWM outfall   | 7.2.1.3     | Restoration plantings   | 7.2.2       |
| Removal of Ephemeral Drainage Features   | 7.1.3       | Replication of headwater drainage features function   | 7.2.4       |
| Effects on wetland water balance   | 7.1.2       | Low Impact Development measures   | 7.2.3       |
|  |             | 30 m buffer from PSW  | 7.2.1.1     |
|  |             | Buffer restoration plantings  | 7.2.2       |
|  |             | Wildlife monitoring (breeding amphibians)   | 8           |
|  |             | Monitoring of buffer integrity and plantings  | 8           |
| Potential effects of construction on natural features integrity during construction  | 7.1.5.1     | Erosion and Sediment Control  | 7.2.7       |
|  |             | Monitoring during construction  | 8           |
| Stormwater quality effects on wetland and woodland features  | 7.1.4       | Enhanced water quality treatment  | 7.2.5       |
|  |             | 30 m buffer from PSW and 10 m buffer from Significant Woodland  | 7.2.1.1     |
|  |             | Buffer restoration plantings  | 7.2.2       |
|  |             | Monitoring of buffer integrity and plantings  | 8           |
| Other potential effects: <ul style="list-style-type: none"> <li>• Noise and light effects on wetland and woodland wildlife</li> <li>• Waste dumping</li> </ul> | 7.1.5.2     | 30 m buffer from PSW, 10 m buffer from Significant Woodland and 10 m buffer from Significant Valleyland | 7.2.1.1     |
|  | 7.1.5.3     | Significant Valleyland  | 7.2.1.2     |
|  |             | Buffer restoration plantings  | 7.2.2       |



|  |         |  |       |
|--|---------|--|-------|
| <ul style="list-style-type: none"> <li>• People and their companion animals</li> </ul> | 7.1.5.4 | Lighting mitigation                          | 7.2.8 |
|  |         | Fencing at the edge of development           | 7.2.9 |
|  |         | Monitoring of buffer integrity and plantings | 8     |
|  |         | Wildlife monitoring (breeding birds)         | 8     |

## 11. Conclusion

Beacon has reviewed the existing natural heritage policies as they pertain to the subject property. A field program was developed to understand the site conditions, context and function with respect to natural heritage features. These data were integrated with information from surface and groundwater teams to understand the function of the features.

As demonstrated through this report, no negative impacts on the Provincially Significant Wetland, habitat for endangered or threatened species, fish habitat, significant woodland and significant valleyland or their ecological functions will result from the proposed development provided the proposed mitigation measures are implemented. These mainly include:

- Protection of features from development.
- 30 m and 10 m buffers to wetlands and woodlands respectively;
- Low Impact Development strategy to ensure ensures the pre-development hydrological function and hydroperiod of the wetlands is protected;
- Restoration planting in buffer areas around natural heritage features; and
- Implementation of a monitoring plan.

Report prepared by:  
**Beacon Environmental**



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Ecologist

Report reviewed by:  
**Beacon Environmental**



Brian E. Henshaw  
CEO, Senior Ecologist

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# Appendix A

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## Terms of Reference and TRCA correspondence

**From:** [Kyle Larmour](#)  
**To:** ["Steve Heuchert"](#)  
**Cc:** ["Krista Boyce"](#); ["Jason Cole"](#); [Brian Henshaw](#); [Don Given](#); [Lincoln Lo](#); ["Steve Apostolopoulos"](#); [Thomas Melymuk \(tmelymuk@bell.net\)](#)  
**Subject:** Durham Live - Terms of Reference  
**Attachments:** [2018 03 19 Durham Live Amalgamated ToR.PDF](#)

---

Good morning Steve,

The combined Terms of Reference for the environmental and servicing works related to the Durham Live project are attached here for your review.

Please let us know if you have any questions or concerns.

Thanks,

Kyle Larmour, BES  
Planner/Urban Designer

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**From:** [Steve Heuchert](#)  
**To:** [Kyle Larmour](#)  
**Cc:** [Ross Pym \(rpym@pickering.ca\)](#); [Gadzovski, Marilee \(mgadzovski@pickering.ca\)](#)  
**Subject:** Durham Live - Terms of Reference - TRCA Ref # CFN 50331.02  
**Date:** April 10, 2018 10:55:57 AM

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Hello Kyle

We only have minor comments on the Terms of Reference, as follows:

1. Task 3 in Section 3.2 includes a Wetland Water Balance Risk Assessment. The results of this assessment should inform the level of analysis required to complete the rest of the Wetland Water Balance. TRCA staff have reviewed the tasks included by SKA's scope of work; however, we cannot fully comment on the suitability of these tasks until the risk assessment is complete and until a conceptual model of the wetland is presented. Nevertheless, here are some items that may be required based on our general water balance requirements:
  - The pre-development model should be calibrated / validated based on the monitoring data.
  - TRCA requires the pre-development and post-development models be run based on long-term analysis from a nearby climate station, and using a 30-year climate record is preferred.
  - Daily water balance analysis should be used to generate weekly results, and results should be assessed based on the wetland's hydroperiod and the sensitivity of the wetland.
  - A sensitivity analysis may be required to determine if the mitigation measures are optimized.
2. Under Task 1, Item 7 in the Beacon section, please remove the words "If required..." as we would like to see this Interim Statement.
3. Under Task 5, Item 3.2, this includes infiltration testing with a Guelph Permeameter (GP). We recommend additional single well response tests in the existing monitoring wells and wetland mini-piezometers to supplement the GP data, since the GP only tests a very localized horizon.
4. Under Task 8, Item 3.2 provides an estimated timeline for the long-term monitoring. Please extend the period to at least 1 year post-construction, since any hydrogeologic effects are likely to be realized after construction.
5. Under Task 3, Item 3.3, this suggests that a long-term pumping test MAY be required if highly permeable sediments are encountered. We recommend that a long term pumping test WILL be required in this situation, if an underpass is proposed.
6. Page 8, word "expended" should be "expanded".
7. The headers and footers appear to be incorrect.

Thanks.

**Steven H. Heuchert**, MCIP, RPP, MRTPI | Associate Director, Development Planning and Regulation | Toronto and Region Conservation for the Living City | 📞 416 661-6600 ext. 5311 | 📠 416-661-6898 | 🌐 <https://trca.ca>

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**TERMS OF REFERENCE  
DURHAM LIVE TOURIST DESTINATION  
CITY OF PICKERING**

Prepared By: Beacon Environmental  
Palmer Environmental Consulting Group Inc.  
Sabourin Kimble & Associates Ltd.

Prepared For: Triple Properties Inc.

Date: February 15, 2018

## **SUMMARY**

These Terms of Reference were prepared in support of the Durham Live Tourist Destination development proposed by Triple Properties Inc. in the City of Pickering. The Terms cover the works that will be completed by Beacon Environmental for studies and reports pertaining to natural environmental features, Palmer Environmental Consulting Group Inc. for hydrogeology and wetland water level monitoring, and Sabourin Kimble & Associates Ltd. for functional servicing and stormwater management studies.

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### **Terms of Reference**

#### **Durham Live Tourist Destination**



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## A. BEACON ENVIRONMENTAL

Beacon Environmental Limited (Beacon) is pleased to present for consideration and discussion this Terms of Reference for natural environment work required to address each of the following:

1. Lifting the H-1 designation to within 120 m on Triple Properties land (the subject property) in the City of Pickering;
2. Conducting an Environmental Impact Study for proposed development on the eastern Triple Properties lands to support re-zoning of the UR Lands; and
3. Contribute to a Municipal Class EA (Schedule C) for a new Highway 401 Road Crossing connecting Notion Road, including road upgrades between Bayly and Hwy. 2 to lift the H-2 hold designation.

To the extent possible these tasks will utilize findings of environmental investigations previously undertaken on Triple Properties lands by Beacon, specifically:

- 1) 2014 investigations (ecological land classification, plant inventory, breeding amphibians and breeding birds), and
- 2) 2014 staking of wetland boundaries, woodland driplines and top-of-bank.

### **Task 1. Lift the H-1 designation to within 120 m of western feature limits**

The City of Pickering applied an H-1 designation to lands owned by Triple Properties within the City of Pickering. The H-1 designation does not allow development on lands so designated. Lands within the H-1 designation are bounded by Highway 401 and CN and GO rail to the north, Church Street South to the east and Bayly Street to the south. The western boundary of H-1 designated land is 120 meters east of a Provincially Significant Wetland (PSW). Lands within the H-1 designation consist largely of agricultural fields and have very limited environmental features and functions. A small portion of the Holding lands in the northeastern corner are within the Lower Duffins Creek valley and this area supports cultural vegetation.

To lift the H-1 designation, Section 7 (2) of By-law 7404-15 identifies seven requirements. One requirement is a Tree Preservation, Compensation and Enhancement Plan.

Beacon will produce a Tree Preservation, Compensation and Enhancement Plan for the affected area. Given that H-1 designated land is currently farmed, the number of trees which will be assessed will be relatively low and the requirement for compensatory tree plantings will be relatively small.

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### *Draft Terms of Reference*

- 1) A Tree Preservation, Compensation and Enhancement Plan for the H-1 designated lands will be prepared to map each tree within the H-1 designated lands.
- 2) The Plan will identify each to species, size (dbh), condition and whether it is to be retained or must be removed.
- 3) The Plan will also map areas where compensatory tree plantings will occur, identify tree species, numbers and size of plantings.
- 4) This Plan will adhere to City and TRCA requirements for tree preservation and compensation.
- 5) This Plan will not address UR zoned land on the west side of Church Street south of the rail lines as the UR zoned land is not proposed for development or tree removals.
- 6) Beacon will review hydrological data to ensure that the development within the released area will not affect downstream features.
- 7) If required Beacon will prepare an interim statement related to the Site Plan application for the Casino lands only. This will be primarily based on the findings of hydrology, hydrogeology and the tree preservation plan, integrating existing ecological information that has been gathered for these lands. This interim statement will address matters related to the proposed casino (i.e., north of Kellino) and will focus on synthesizing data related to the potential for hydrological effects downstream of the casino lands (i.e., north and west).

### *Timing*

No seasonal timing or permitting restrictions are known for this task. Beacon can complete its contribution in draft two weeks after receiving draft reports from the related disciplines.

## **Task 2. Environmental Impact Study to support re-zoning of the UR Lands**

Development proposed by Triple Properties in the City of Pickering is within 120 m of a PSW. The Pickering Official Plan identifies that an Environmental Impact Study be submitted in this case. Lands to be assessed by the EIS are bounded by Highway 401 and CN and GO rail to the north, Church Street South to the east, Bayly Street to the south and Squires Beach Road to the west.

### *Draft Terms of Reference*

- 8) The primary EIS report will characterize the existing environmental features within the EIS study area using existing data. The existing conditions aspect of the report will integrate other information particularly hydrology and hydrogeology to form a fulsome understanding of how the natural system functions.

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- 9) Integration of other disciplines will be facilitated by two technical meetings. One will address existing conditions and one will address potential impacts, once the development plan is known.
- 10) If the proposed development plan changes could affect potential habitat of species protected by the *Endangered Species Act*, additional field work may be required in June. If this occurs a scope change will be provided for approval.
- 11) Assess impacts to environmental features on the subject property and adjacent lands.
- 12) A report will be prepared that addresses design alternatives, mitigation and where necessary compensation. It is proposed that compensation be finalized as part of a comprehensive approach addressing both the EIS and the EA. However, agreement in principle may be required prior to completion of the EA process to ensure that project timelines are maintained.
- 13) Mitigation will include a vegetation protection zone around the PSW. The width of the vegetation protection zone will be a minimum of 30 m wide as required by the Durham Region Official Plan (Section 2.3.17) and TRCA's Living City Policies. Beacon will determine if 30 m is sufficient based on sensitivities and functions.
- 14) Prior to finalization of the draft report a meeting will be held with the City of Pickering and agency staff to ensure that solutions being contemplated meet their expectations. In addition, we anticipate four internal team meetings at the call of the project coordinator.
- 15) A post-development monitoring plan will be developed to test the assumptions of the EIS.

### *Timing*

Beacon will be in a position to integrate other data by mid-August. The draft report can then be prepared. Beacon can complete its contribution in draft two week after reviewing draft reports from the related disciplines.

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#### Terms of Reference

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### Task 3. Class Environmental Assessment for a new Highway 401 road crossing

An Environmental Assessment is required in support of proposed road improvements in the City of Pickering. We have assumed that the study area for the EA is:

- Squires Beach Road from Bayly Street northerly to 401, extending north under 401 to Hwy 2. plus 50 m on each side of ROW;
- Kellino Street from Squires Beach Road easterly to point 50 m east of where PSW crosses Kellino Street plus 50 m on each side of ROW; and
- Intersections at
  - Church St. and Kellino St.
  - Church St. and Bayly St.
  - Kellino St. and Squires Beach Rd. and
  - Squires Beach Rd. and Bayly St.

The EA investigations will characterize the existing environmental features within the EA study area using existing data and new data provided by additional investigations conducted from May 1<sup>st</sup> to July 31<sup>st</sup>, 2018. New data are required as the study area extends beyond the subject property and because removal of wetlands are likely to be contemplated and detailed information is required to determine impacts. These additional investigations will confirm vegetation communities and species and assess breeding birds within the EA study area, and assess amphibian numbers and species within the PSW adjacent to Squires Beach and Kellino.

Beacon will provide text and materials for presentations and the EA reports as requested by the EA lead consultant and consistent with this scope of work.

#### *Draft Terms of Reference*

- 1) The EA investigations will characterize the existing environmental features within the EA study area using existing data and new data provided by additional investigations to be conducted from May 1<sup>st</sup> to July 31<sup>st</sup>, 2018. Additional investigations will confirm vegetation communities and species and assess breeding birds within the EA study area and assess amphibian numbers and species within or adjacent the study area.
- 2) Beacon will communicate with agency staff as required, including MNRF regards species at risk.
- 3) Analysis of effects will occur using the existing conditions information, information from other and disciplines. This will be facilitated by two internal technical meetings and one external technical meeting with City and agency staff.
- 4) Beacon will assess various options that are being initially considered (at a high level of detail) and carried forward (at a greater level of detail).
- 5) The Tree Preservation plan work will be extended to include the EA study area.

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#### Terms of Reference

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- 6) Beacon will provide materials for the public consultation process and attend five additional external projects meetings, including the PICs, and six internal team meetings.
- 7) Beacon will provide text and other materials as a contribution to the Environmental Study Report including measures to mitigate or compensate impacts to the PSW and other natural features from proposed project. It is anticipated that if timing allows and compensation is required that this could be addressed in one compensation package for the EA and EIS should timing permit.
- 8) Comments on a draft of the Beacon contributions will be received and addressed.

It may be necessary to address potential habitat for species subject to the *Endangered Species Act*. If this becomes necessary a scope of work change will be prepared.

### *Timing*

Beacon will follow the timing lead of the prime EA consultant.

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## **B. PALMER ENVIRONMENTAL CONSULTING GROUP INC.**

### **1.0 Introduction**

Palmer Environmental Consulting Group Inc. (PECG) is pleased to provide this proposed Terms of Reference (ToR) for completion of a series of hydrogeological investigations to support development approvals for the Durham Live project. The hydrogeological investigations will be conducted as part of an integrated environmental team including Beacon Environmental (natural environment) and Sabourin Kimble and Associates (stormwater engineering and servicing), to provide a detailed characterization of groundwater and surface water conditions to ultimately support completion of EIS and FSR reports.

We understand that there are a series of holding provisions and provincial approvals that are required for the project to proceed. These can be described as part of the three project phases, which include:

1. Lifting the H-1 designation to within 120 m on Triple Properties land (the subject property) in the City of Pickering;
2. Providing a Hydrogeology and Water Balance Report to support Rezoning of the UR Lands and completion of an Environmental Impact Study by Beacon for proposed development on the eastern Triple Properties lands; and
3. Municipal Class EA (Schedule C) for a new Highway 401 Road Crossing connecting Notion Road to Squires Beach Road as part of lifting the H-2 Designation.

Each of the specific phases requires a different focus for the hydrogeological investigations that will be clearly outlined in this letter. In addition, the timing for completion for the hydrogeology study to support each phase will be outlined to provide clarity on the overall project schedule.

### **2.0 Background**

PECG staff have been involved with the Durham Live project since 2014. In September 2014, PECG completed a preliminary hydrogeological investigation at the site, with a specific focus on characterizing groundwater and surface water levels within the PSW wetland communities present on the site (**Figure 1**). The intent of this study was to determine the hydroperiod for representative wetland communities and to characterize each as groundwater supported, surface water supported, or a combination of both.

Nine (9) boreholes were drilled at the site and seven (7) were completed as 2" diameter monitoring wells. The location of the monitoring wells were focused on the PSWs and surface water features at the site. Six (6) wetland mini-piezometers (MP) were installed in the PSW focused on different wetland community types. Surface water and groundwater levels at each MP were monitored monthly over a period of 1-year, between September 2014 and September 2015. The results indicate that the majority of the PSW wetlands, particularly the swamp communities, are supported by surface water

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runoff and direct precipitation, and not by groundwater discharge. The wetlands are essentially acting as recharge areas, albeit, limited by the low permeability of the underlying glaciolacustrine clay and till soils. Localized areas of marsh wetland communities appear to be seasonally groundwater supported or at equilibrium with the water table.

In August 2017, the wetland monitoring program was resumed and expended upon to meet the criteria of the TRCA Wetland Water Balance Monitoring Protocol (2016) and the Wetland Water Balance Risk Evaluation (2017). Two (2) additional MP locations were added, and dataloggers were added to each of the existing MP locations to collect continuous water level data (**Figure 1**). Two (2) staff gauges, with dataloggers, were added at the outlet and inlet of the PSW wetlands along Bayly Street to determine the spill over/ spill in water level elevations.

These data are intended to support a Feature Based Water Balance (FBWB) Assessment for the wetland communities located on the site, and recommendations for Low Impact Development (LID) measures to maintain the existing site infiltration rates and wetland hydroperiods.

### **3.0 Proposed Scope of Work**

#### **3.1 Lifting the H1 Designation**

The H1 hold designation lands are located north of Kellino Road and setback 120 m from the nearest watercourse or PSW. Based on discussions with TRCA staff at a project team meeting on November 14, 2017, we understand that TRCA would accept a scoped impact assessment for these lands, assuming it was demonstrated that surface water flow from this area did not enter the PSW. Based on our preliminary assessment of site grading and surface water drainage, we believe this to be the case.

#### **Task 1 – Scoped Hydrogeological Assessment**

PECG staff will utilize existing site data from the 2014-2015 study to complete a scoped hydrogeological assessment report. This report will include information on site physiography, quaternary geology, bedrock geology, groundwater level and flow, hydraulic properties of the soil, and groundwater chemistry. The report will be scoped to focus on the lands north of Kellino where the extent of the PSW wetlands is limited. MP3 is located in this area in the tributary to East Duffins Creek and will be discussed as part of reporting.

#### **Task 2 – Water budget for area North of Kellino**

A pre- and post-development water budget will be completed for these lands to quantify changes to infiltration as a result of increased imperviousness. Recommendations for LID measures to help balance the pre-to post-development water budget will be completed. It should be recognized that many of the mitigation measures may be added to the property as part of later development phases as the hold provisions are lifted. Interim measures, if required, will be discussed.

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Figure 1. Wetland and Groundwater Monitoring Locations

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### **Timing**

No seasonal timing or permitting restrictions are known for the H1 lands. PECG currently has sufficient data to complete this study. The scoped hydrogeology study for H1 can be completed within 4 weeks of project approval.

### **3.2 Hydrogeology and Water Balance Study for Rezoning the UR Lands**

To rezone the Urban Reserve (UR) lands, an Environmental Impact Statement (EIS) is required. A key element of the EIS is an impact assessment on the changes to the groundwater and surface water entering the PSW wetlands due to the proposed development. One year of manual water level monitoring was completed in 2014-2015, and continuous water level monitoring was initiated in August 2017. The workplan tasks for this study are summarized below.

#### **Task 1 – Wetland Water Level Monitoring**

PECG staff will continue the wetland water level monitoring program. All locations are instrumented with dataloggers reading at 1-hour intervals. Manual water level measurements will be collected every 2 months to confirm datalogger readings and to collect hydraulic gradient information.

In August 2017, the wetland water level monitoring program was expanded to include continuous data collection. This timing was optimal, as the summer low water levels for 2017 were captured. It is expected that this monitoring will continue through future development and construction stages of the project, however, we plan to complete reporting as part of the UR Lands rezoning in June 2018. At this time, we will have 1-year of manual water level monitoring data, and an additional 11 months of continuous water level data. This represents nearly 2-years of monitoring data and will be representative to characterize groundwater/ surface water input to each wetland feature, and to support a continuous hydrological model for the wetlands.

#### **Task 2 – Groundwater Level Monitoring**

PECG staff are continuing to measure groundwater levels at the same frequency as the wetland water levels. MW1, MW2, MW3, and TH1 have dataloggers installed collecting continuous water level data on an hourly basis.

#### **Task 3 – Wetland Water Balance Risk Assessment**

In collaboration with the stormwater engineering and ecology teams, PECG will complete the wetland water balance risk assessment (TRCA, 2017) to determine the risk to each PSW wetland community and to determine the appropriate data analysis requirements for the project. Sabourin Kimble and Associates will complete the feature based water budget modelling analysis based on the outcome of this assessment.

#### **Task 4 – Water Budget**

PECG will calculate the pre and post-development water budget for the site to quantify changes to infiltration. The long-term climate average from the nearest meteorological

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station will be used and the Thornthwaite and Mather methodology from the SWM Manual will be used for data analysis. Targets for maintaining the pre-development infiltration rates will be provided and PEGC will work with Sabourin Kimble staff to develop LID measures to mitigate potential impacts.

#### **Task 5 – Infiltration Testing**

To support LID design, PEGC proposes to conduct infiltration testing at the site. A guelph permeameter will be used to calculate percolation rates (in mm/hr) at nine (9) locations across the site. The exact position of the infiltration testing sites will be determined based on preliminary SWM planning and site servicing locations, but are expected to be focused on the lands adjacent to the PSW and watercourses. Testing will be completed at depths ranging from 0.5 to 1.5 m below ground surface.

#### **Task 6 – Reporting**

PEGC will prepare a Hydrogeological Investigation Report for the project. This report will take into account all previously collected data, as well as the continuous wetland water level/ hydroperiod data. This report will contain field and laboratory data, a groundwater contour map, site geological cross-sections, water budget summary, and demonstrate compliance with TRCA and City requirements. A draft report will be prepared by July 30, 2018, and will form the basis for client and agency comments. The final hydrogeological report will be prepared following client and agency comments.

#### **Task 7 – Agency Consultation**

Following completion of the draft report, a meeting will be scheduled with TRCA to discuss the results from the site investigations and to address comments they may have about the draft report. A final meeting will be scheduled in early summer 2018 to discuss the final report.

#### **Task 8 – Long-Term Monitoring**

All water level monitoring equipment will remain in place following completion of the Hydrogeological Investigation to support rezoning of the UR Lands. It is recommended that monitoring continue through the construction phase of the Casino or until September 2019, whichever is earlier.

#### **Timing**

Continuous wetland water level data from spring 2018 is required to complete this assessment. Depending upon weather conditions, sufficient hydroperiod data should be collected by July 1, 2018. Therefore, a Hydrogeological Investigation Report can be completed by *July 30, 2018*.

### **3.3 Environmental Assessment**

To lift the H2 designation, road improvements are required to serve the Subject Property. A north-south connection of Notion Road and Squires Beach Road has been proposed to accommodate the additional traffic. This will require a crossing of Highway 401 and twin Metrolinx train tracks with either an overpass bridge or an underpass

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tunnel. In addition, intersection and roadway improvements are likely to be required for Kellino Road, Squires Beach Road, Notion Road and Pickering Parkway. Due to the proximity of the PSW wetlands to the road right-of-way, it is likely that removal of PSW wetlands will be required.

From a hydrogeological perspective, the key issues for the EA to support an assessment of alternatives are:

1. Soil and groundwater conditions below Hwy 401;
2. Short-term and long-term dewatering requirements;
3. The need for a Permit to Take Water (PTTW) for long-term drainage;
4. Changes to groundwater flow and hydraulic gradients within the PSW and watercourse features; and,
5. Hydrogeological input into road design and servicing.

The hydrogeological investigations will be completed in tandem with the geotechnical investigations to share resources and expertise. PECG is RAQS certified with MTO for Hydrogeological Foundations Engineering.

### **Task 1 – Borehole Drilling and Groundwater Monitoring Well Installations**

Based on MOECC well records and experience drilling in the area, it is expected that bedrock is located at approximately 40 ft below ground at the site (12 m). As a key component is determining the feasibility of the underpass vs. an overpass as part of the EA alternatives, borehole drilling will focus on providing sufficient information to support Preliminary Design and meet the strict MTO hydrogeological requirements.

Twelve (12) deep boreholes to 15 m are proposed along the Notion Road/ Squires Beach Road alignment, including within the MTO right-of-way. Drilling through overburden soils will be completed using hollow stem augers, and we expected to core 3 m into the bedrock. These are focused on the MTO crossing and the potential creek crossing as part of a Kellino Road realignment option. Six (6) of the deep boreholes will be completed as monitoring wells with 2" diameter PVC. Nine (9) shallow boreholes are proposed to provide input on road improvements to Notion Road, Squires Beach Road, Pickering Parkway, and Kellino Road. These will be drilled to between 3 and 6 m in depth with hollow stem augers. Five (5) of the shallow boreholes will be completed as 2" diameter monitoring wells. Shallow wells will be installed near the PSW to assess groundwater conditions at these features.

### **Task 2 – Hydraulic Testing**

Each of the monitoring wells will be developed to ensure a good connection with the aquifer material, and a single well response test will be completed. This test will determine the hydraulic conductivity of the soil to estimate dewatering requirements, and groundwater ingress during operation of a potential underpass. *A long-term pumping test is not included in the scope of work, but may be required should high permeability materials be found near the Hwy 401 crossing.*

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### **Task 3 – Groundwater Quality Sampling**

PECG will collect three (3) groundwater quality samples focused on metal, nutrients, and general groundwater parameters. This sampling is not intended to support an Environmental Site Assessment or RSC. The intention is to characterize chemistry of different hydrostratigraphic units to assess their interconnectedness.

### **Task 4 – Wetland Piezometers**

Due to the proximity of the proposed crossing structure and roadway improvements to the PSW wetlands along Squires Beach Road, PECG will instrument these features with drivepoint piezometers and dataloggers to assess groundwater/ surface water interactions as part of the effects assessment. PECG will instrument three (3) additional PSW wetland locations near the intersection of Squires Beach Road and Killino Road. These data will support the ecology assessment being completed by Beacon and the compensation/ offset requirements, should they be required.

### **Task 5 – Factual Hydrogeological Reporting**

Consistent with MTO requirements, PECG will produce a factual hydrogeological foundation investigation report that can be relied upon as part of a project tender. This report will include all factual information related to geological and hydrogeological conditions, borehole logs, hydraulic conductivity values, groundwater chemistry and hydrostratigraphy.

### **Task 6 – Hydrogeological Investigation Design Report**

As part of the final hydrogeological investigation design report, PECG will assess constructability, dewatering and permitting requirements associated with the alternative designs. This will include a characterization of aquifers and aquitard at the site, and along the MTO crossing alignment, dewatering rate calculations for short-term (construction phase) and long-term (permanent seepage) crossing alternatives, and determine if a future PTTW or EASR registration will be required for the project.

### ***Timing***

A permit from MTO is required to complete borehole drilling within the MTO right-of-way. It is our experience that this can take between 1-2 months to obtain. Utility clearances can take an additional 2-4 weeks to complete. Therefore, drilling investigations for the EA will occur between 6 and 12 weeks from workplan approval, and would be expected to take up to 4 months to complete. Piezometers have already been installed as of December 2017 to capture the winter and spring 2018 water level data.

A draft factual hydrogeological report and hydrogeological investigation design report can be completed within 8 weeks of borehole drilling for review. These reports can be finalized within 2 weeks of receiving comments from the project team, MTO, and TRCA.

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#### 4.0 Closure

Thank you for the opportunity to provide this proposed ToR for you review. Please feel free to contact me 416-605-5797 or [jason@pecq.ca](mailto:jason@pecq.ca) if you have any questions regarding this submission.

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## **C. SABOURIN KIMBLE & ASSOCIATES LTD.**

We are pleased to provide the enclosed draft terms of reference in support of the municipal servicing and stormwater management studies required on the above noted lands. The terms of reference work program is separated into the following three sections:

1. Services required to support the lifting of the H1 Holding Designation to within 120 m on Triple Properties land (the subject property) in the City of Pickering;
2. Functional Servicing and Stormwater Management to support the re-zoning of the Urban Reserve (UR) lands; and
3. Services Required in support of the Class Environmental Assessment for Transportation Improvements to lift the H2 Designation.

A detailed outline of the activities required in support of each section is provided below.

### **1. Lifting the H1 Designation**

The lands within the H1 designation extend from the railway corridor in the north, south to Bayly Street and west from Church Street to a line that runs parallel to the Provincially Significant Wetland limit at a distance of 120 metres. South of Kellino Street the Holding limit is located approximately along a high point ridge which separates overland storm drainage from flowing directly to the PSW. North of Kellino Street, the Holding limit covers lands which flow directly north toward the railway corridor and ultimately discharge to the Duffins Creek. Accordingly, the grading and servicing investigation to support lifting of the H1 Designation will not focus on the provision of any drainage works contributing to the PSW. In support of lifting the H1 designation, the following activities will be carried out:

- Complete a preliminary grading plan for the site roadways and development blocks to determine general grading characteristics, overland drainage outlets, interface with surrounding roads and features,
- Coordinate the grading concept with the casino consultant team to ensure that the proposed casino siting will match into the grading design for the remainder of the development lands (south of Kellino),
- Develop an overall storm drainage design to determine preliminary storm sewer alignments and sizes, outfall locations and connections,
- In cooperation with the casino consultants, develop a storm drainage strategy which adequately services the casino site,
- Develop an overall sanitary drainage design to determine the sanitary sewer alignment which will service the H1 lands plus the casino site,
- Design a water distribution system to provide for adequate supply to the casino plus each of the anticipated building locations south of Kellino and identify connection locations to external existing watermains,

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- Develop a stormwater management strategy which addresses the needs of the casino site plus provides direction for the remainder of the H1 lands,
- Prepare a brief which summarizes the grading, servicing and stormwater management works required to service those lands within the H1 Designation.

## **2. Functional Servicing and Stormwater Management to support re-zoning of the UR Lands**

### **General**

- Carry out a detailed site investigation and inventory to determine site drainage characteristics and existing outlet locations and geometries,
- Provide project coordination with all members of the study team throughout the entire process,
- Liaise with and attend meetings with the review agencies as necessary throughout the study duration,
- Throughout the Master Servicing Plan process liaise and coordinate with the casino consulting team to ensure provision of services that are in keeping with the overall servicing plan,

### **Municipal Servicing**

- Complete a preliminary grading plan for the site roadways and development blocks to determine general grading characteristics, overland drainage outlets, interface with surrounding roads and features,
- Develop an overall storm drainage design to determine storm sewer alignments and preliminary sizes, outfall locations and connections, general stormwater management facility locations,
- Develop an overall sanitary drainage design to determine sanitary sewer alignments and outlet locations,
- Design an overall water distribution system to provide for adequate supply to each anticipated building location and identify connection locations to external existing watermains,

### **Stormwater Management**

- Liaise with the TRCA and City of Pickering to determine the exact stormwater management criteria (quality, quantity and erosion control) for the site,
- Through the storm sewer design process determine the proposed outlet locations for storm drainage from the development lands,
- In conjunction with the storm sewer and grading design, determine the exact drainage area contributing to the existing stormwater management facility to the south of the site,
- Provide a detailed review of the existing stormwater management facility to determine if any additional stormwater controls are required,

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#### **Terms of Reference**

#### **Durham Live Tourist Destination**



- Develop an overall stormwater management design for the proposed master plan which satisfies the control criteria for the site and determines the storage characteristics and facility area required to provide the storage,
- Prepare preliminary designs of all facilities to adequately demonstrate how they will be incorporated into the overall storm drainage system,
- Identify the stormwater management facilities and associated storage characteristics required to service the casino site

### **Feature Based Water Balance and LID Design**

- Through liaison with the hydrogeologist and environmental consultant determine the hydrologic sensitivities and contributing groundwater drainage characteristics to each feature,
- Develop an overall continuous pre-development hydrology model for each feature which reflects the contributing drainage area and the internal storage characteristics,
- Run the model for a minimum of 5 years of continuous rainfall data to reflect a “wet” year, a “dry” year and at least 3 “normal years” to establish the base line existing surface drainage characteristics,
- Develop a post development surface water model that will determine the amount of storm runoff that must be directed to the features to maintain (as much as possible) existing storage and discharge characteristics, environmental sensitivities and surface water responses,
- Determine the extent of water quality treatment required for the contributing area prior to discharge to the features,
- Based on input from the hydrogeologist, determine the extent of groundwater impact on the feature as a result of the proposed development plan and the proposed surface water mitigation works,
- In cooperation with the hydrogeologist, develop an overall LID plan which provides a groundwater balance contributing to the features,
- Prepare preliminary design details of the proposed LID works based on the current overall proposed development plan,
- Identify any LID works required to support the proposed casino site,

### **Reporting**

- Prepare a comprehensive report outlining the complete servicing, stormwater management and LID system designs for the complete development of the site for submission to approval agencies,
- Within the overall report, identify those works that are required to service the casino lands in advance of development of the remainder of the site,
- Based on comments from each agency revise and resubmit our report to receive approval.

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#### **Terms of Reference**

#### **Durham Live Tourist Destination**



### **3. Class Environmental Assessment**

Sabourin Kimble & Associates will provide servicing and stormwater management input to all road options provided as part of the Class EA process.

- All road improvement options will be evaluated with input provided on the works required to incorporate the road works into the overall servicing and stormwater management plan,
- Coordination with the environmental, transportation and hydrogeologic consultants with respect to these works,
- Prepare and provide all necessary plans and details for inclusion in all PICs,
- Attendance at all PICs as necessary to support the proposed works,
- Attendance at all meetings with the study team and review agencies as required,
- Provide written input to the Environmental Study Report summarizing the proposed municipal and stormwater management works required in support of the Class Environmental Assessment work.

#### **Timing**

The work program supporting the lifting of the H1 Designation has been initiated and will be completed in keeping with the schedule required to meet the obligations of our client to the operator of the casino lands. The remaining activities will be initiated and in completed in parallel with the overall works being carried out by the Planning, Environmental and Hydrogeologic consultant teams.

We trust that the work program outlined above is clear concise and adequate to address all of the servicing and stormwater management needs to advance this project to completion. If you should have any questions with respect to the enclosed information, please feel free to contact either Alan Kimble or Krista Boyce at your convenience.

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#### **Terms of Reference**

#### **Durham Live Tourist Destination**



# Appendix B

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## Plant List



# Appendix B

## Plant List

| Family Name    | New Scientific Name (FOIBIS 2008)                 | Common Name (FOIBIS)      | COSEWIC (Sep 2007) | COSSARO (Sep 2009) | S-RANK (200_) | DURHAM (Varga 2005) | GTA (Varga 2005) | TRCA RANKS (20_) |
|----------------|---|---------------------------|--------------------|--------------------|---------------|---------------------|------------------|------------------|
| Poaceae        | <i>Poa compressa</i>                              | Canada Bluegrass          |                    |                    | S5            |                     |                  | L+               |
| Typhaceae      | <i>Typha angustifolia</i>                         | Narrow-leaved Cattail     |                    |                    | S5            |                     |                  | L+               |
| Caprifoliaceae | <i>Viburnum opulus</i>                            | Guelder-rose Viburnum     |                    |                    | SNA           |                     |                  | L+               |
| Asteraceae     | <i>Cirsium arvense</i>                            | Creeping Thistle          |                    |                    | SNA           |                     |                  | L+               |
| Asteraceae     | <i>Cirsium vulgare</i>                            | Bull Thistle              |                    |                    | SNA           |                     |                  | L+               |
| Asteraceae     | <i>Tanacetum vulgare</i>                          | Common Tansy              |                    |                    | SNA           |                     |                  | L+               |
| Asteraceae     | <i>Tragopogon dubius</i>                          | Meadow Goat's-beard       |                    |                    | SNA           |                     |                  | L+               |
| Fabaceae       | <i>Lotus corniculatus</i>                         | Bird's-foot Trefoil       |                    |                    | SNA           |                     |                  | L+               |
| Fabaceae       | <i>Melilotus alba</i>                             | White Sweet Clover        |                    |                    | SNA           |                     |                  | L+               |
| Fabaceae       | <i>Melilotus officinalis</i>                      | Yellow Sweet Clover       |                    |                    | SNA           |                     |                  | L+               |
| Plantaginaceae | <i>Plantago lanceolata</i>                        | English Plantain          |                    |                    | SNA           |                     |                  | L+               |
| Plantaginaceae | <i>Plantago major</i>                             | Nipple-seed Plantain      |                    |                    | SNA           |                     |                  | L+               |
| Poaceae        | <i>Agrostis gigantea</i>                          | Redtop                    |                    |                    | SNA           |                     |                  | L+               |
| Poaceae        | <i>Bromus inermis</i> ssp. <i>inermis</i>         | Smooth Brome              |                    |                    | SNA           |                     |                  | L+               |
| Asteraceae     | <i>Tussilago farfara</i>                          | Colt's Foot               |                    |                    | SNA           |                     |                  | L+               |
| Boraginaceae   | <i>Echium vulgare</i>                             | Common Viper's-bugloss    |                    |                    | SNA           |                     |                  | L+               |
| Brassicaceae   | <i>Alliaria petiolata</i>                         | Garlic Mustard            |                    |                    | SNA           |                     |                  | L+               |
| Caprifoliaceae | <i>Lonicera tatarica</i>                          | Tartarian Honeysuckle     |                    |                    | SNA           |                     |                  | L+               |
| Elaeagnaceae   | <i>Elaeagnus angustifolia</i>                     | Russian Olive             |                    |                    | SNA           |                     |                  | L+               |
| Elaeagnaceae   | <i>Elaeagnus umbellata</i>                        | Autum Olive               |                    |                    | SNA           |                     |                  | L+               |
| Lamiaceae      | <i>Glechoma hederacea</i>                         | Ground Ivy                |                    |                    | SNA           |                     |                  | L+               |
| Lythraceae     | <i>Lythrum salicaria</i>                          | Slender-spike Loosestrife |                    |                    | SNA           |                     |                  | L+               |
| Pinaceae       | <i>Pinus sylvestris</i>                           | Scotch Pine               |                    |                    | SNA           |                     |                  | L+               |
| Poaceae        | <i>Dactylis glomerata</i>                         | Orchard Grass             |                    |                    | SNA           |                     |                  | L+               |
| Poaceae        | <i>Phragmites australis</i> ssp. <i>australis</i> | European Common Reed      |                    |                    | SNA           |                     |                  | L+               |
| Rhamnaceae     | <i>Rhamnus cathartica</i>                         | Buckthorn                 |                    |                    | SNA           |                     |                  | L+               |
| Rosaceae       | <i>Malus pumila</i>                               | Common Apple              |                    |                    | SNA           |                     |                  | L+               |
| Salicaceae     | <i>Salix purpurea</i>                             | Basket Willow             |                    |                    | SNA           |                     |                  | L+               |
| Sapindaceae    | <i>Aesculus hippocastanum</i>                     | Horse Chestnut            |                    |                    | SNA           |                     |                  | L+               |
| Brassicaceae   | <i>Capsella bursa-pastoris</i>                    | Common Shepherd's Purse   |                    |                    | SNA           |                     |                  | L+               |
| Fabaceae       | <i>Medicago lupulina</i>                          | Black Medic               |                    |                    | SNA           |                     |                  | L+               |
| Fabaceae       | <i>Vicia cracca</i>                               | Tufted Vetch              |                    |                    | SNA           |                     |                  | L+               |
| Poaceae        | <i>Setaria viridis</i>                            | Green Bristle Grass       |                    |                    | SNA           |                     |                  | L+               |
| Boraginaceae   | <i>Lithospermum officinale</i>                    | European Gromwell         |                    |                    | SNA           |                     |                  | L+               |

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|-----------------|---|----------------------------|--------------------|--------------------|---------------|---------------------|------------------|------------------|
| Caryophyllaceae | <i>Silene vulgaris</i>  | Maiden's Tears             |                    |                    | SNA           |                     |                  | L+               |
| Clusiaceae      | <i>Hypericum perforatum</i>                                   | St. John's-wort            |                    |                    | SNA           |                     |                  | L+               |
| Fabaceae        | <i>Robinia pseudo-acacia</i>                                  | Black Locust               |                    |                    | SNA           |                     |                  | L+               |
| Liliaceae       | <i>Hemerocallis fulva</i>                                     | Orange Daylily             |                    |                    | SNA           |                     |                  | L+               |
| Pinaceae        | <i>Picea abies</i>  | Norway Spruce              |                    |                    | SNA           |                     |                  | L+               |
| Polygonaceae    | <i>Rumex crispus</i>  | Curly Dock                 |                    |                    | SNA           |                     |                  | L+               |
| Rosaceae        | <i>Crataegus monogyna</i>                                     | English Hawthorn           |                    |                    | SNA           |                     |                  | L+               |
| Tiliaceae       | <i>Tilia cordata</i>  | Small leaf Linden          |                    |                    | SNA           |                     |                  | L+               |
| Valerianaceae   | <i>Valeriana officinalis</i>                                  | Common Valerian            |                    |                    | SNA           |                     |                  | L+               |
| Brassicaceae    | <i>Hesperis matronalis</i>                                    | Dame's Rocket              |                    |                    | SNA           |                     |                  | L+               |
| Liliaceae       | <i>Asparagus officinalis</i>                                  | Asparagus                  |                    |                    | SNA           |                     |                  | L+               |
| Asteraceae      | <i>Leucanthemum vulgare</i>                                   | Oxeye Daisy                |                    |                    | SNA           |                     |                  | L+               |
| Rosaceae        | <i>Geum urbanum</i>   | Clover-root                |                    |                    | SNA           |                     |                  | L+               |
| Solanaceae      | <i>Solanum dulcamara</i>                                      | Climbing Nightshade        |                    |                    | SNA           |                     |                  | L+               |
| Asteraceae      | <i>Achillea millefolium</i> var. <i>millefolium</i>           | Common Yarrow              |                    |                    | SNA           |                     |                  | L+               |
| Poaceae         | <i>Elymus repens</i>  | Quack Grass                |                    |                    | SNA           |                     |                  | L+               |
| Polygonaceae    | <i>Persicaria maculosa</i>                                    | Lady's Thumb               |                    |                    | SNA           |                     |                  | L+               |
| Sapindaceae     | <i>Acer negundo</i>   | Manitoba Maple             |                    |                    | S5            |                     |                  | L+?              |
| Poaceae         | <i>Agrostis perennans</i>                                     | Autumn Bentgrass           |                    |                    | S5            | R                   | R                | L3               |
| Iridaceae       | <i>Sisyrinchium montanum</i>                                  | Strict Blue-eyed-grass     |                    |                    | S5            |                     |                  | L3               |
| Asteraceae      | <i>Solidago juncea</i>  | Early Goldenrod            |                    |                    | S5            | U                   | U                | L4               |
| Apocynaceae     | <i>Apocynum androsaemifolium</i> ssp. <i>androsaemifolium</i> | Spreading Dogbane          |                    |                    | S5            |                     |                  | L4               |
| Cyperaceae      | <i>Carex aurea</i>  | Golden-fruited Sedge       |                    |                    | S5            |                     |                  | L4               |
| Equisetaceae    | <i>Equisetum variegatum</i> ssp. <i>variegatum</i>            | Variiegated Horsetail      |                    |                    | S5            |                     | U                | L4               |
| Apiaceae        | <i>Cicuta bulbifera</i>                                       | Bulb-bearing Water-hemlock |                    |                    | S5            |                     |                  | L4               |
| Asclepiadaceae  | <i>Asclepias incarnata</i> ssp. <i>incarnata</i>              | Swamp Milkweed             |                    |                    | S5            |                     |                  | L4               |
| Betulaceae      | <i>Betula papyrifera</i>                                      | Paper Birch                |                    |                    | S5            |                     |                  | L4               |
| Cupressaceae    | <i>Thuja occidentalis</i>                                     | Northern White Cedar       |                    |                    | S5            |                     |                  | L4               |
| Cyperaceae      | <i>Carex intumescens</i>                                      | Bladder Sedge              |                    |                    | S5            |                     |                  | L4               |
| Lamiaceae       | <i>Lycopus uniflorus</i>                                      | Northern Bugleweed         |                    |                    | S5            |                     |                  | L4               |
| Oleaceae        | <i>Fraxinus nigra</i>   | Black Ash                  |                    |                    | S5            |                     |                  | L4               |
| Pinaceae        | <i>Pinus strobus</i>  | Eastern White Pine         |                    |                    | S5            |                     |                  | L4               |
| Salicaceae      | <i>Salix discolor</i>   | Pussy Willow               |                    |                    | S5            |                     |                  | L4               |
| Salicaceae      | <i>Salix petiolaris</i>                                       | Meadow Willow              |                    |                    | S5            |                     |                  | L4               |
| Sapindaceae     | <i>Acer x freemanii</i>                                       | Freeman's Maple            |                    |                    | S5            |                     |                  | L4               |
| Sapindaceae     | <i>Acer rubrum</i>  | Red Maple                  |                    |                    | S5            |                     |                  | L4               |
| Sapindaceae     | <i>Acer saccharinum</i>                                       | Silver Maple               |                    |                    | S5            |                     |                  | L4               |
| Typhaceae       | <i>Typha latifolia</i>  | Broad-leaf Cattail         |                    |                    | S5            |                     |                  | L4               |
| Lamiaceae       | <i>Lycopus americanus</i>                                     | American Bugleweed         |                    |                    | S5            |                     |                  | L4               |

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|-----------------|---|----------------------------|--------------------|--------------------|---------------|---------------------|------------------|------------------|
| Cyperaceae      | <i>Carex pseudo-cyperus</i>                               | Cyperus-like Sedge         |                    |                    | S5            |                     |                  | L4               |
| Cyperaceae      | <i>Carex gracillima</i>                                   | Graceful Sedge             |                    |                    | S5            |                     |                  | L4               |
| Pinaceae        | <i>Tsuga canadensis</i>                                   | Eastern Hemlock            |                    |                    | S5            |                     |                  | L4               |
| Rosaceae        | <i>Spiraea alba</i>                                       | Narrow-leaved Meadow-sweet |                    |                    | S5            |                     |                  | L4               |
| Poaceae         | <i>Danthonia spicata</i>                                  | Poverty Oat-grass          |                    |                    | S5            |                     |                  | L4               |
| Apiaceae        | <i>Cicuta maculata</i>                                    | Spotted Water-hemlock      |                    |                    | S5            | U                   |                  | L5               |
| Juncaceae       | <i>Juncus articulatus</i>                                 | Jointed Rush               |                    |                    | S5            |                     |                  | L5               |
| Asclepiadaceae  | <i>Asclepias syriaca</i>                                  | Common Milkweed            |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Solidago altissima</i> var. <i>altissima</i>           | Tall Goldenrod             |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Symphyotrichum novae-angliae</i>                       | New England Aster          |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Symphyotrichum ericoides</i> var. <i>ericoides</i>     | Heath Aster                |                    |                    | S5            |                     |                  | L5               |
| Equisetaceae    | <i>Equisetum arvense</i>                                  | Field Horsetail            |                    |                    | S5            |                     |                  | L5               |
| Onagraceae      | <i>Oenothera biennis</i>                                  | Common Evening-primrose    |                    |                    | S5            |                     | U                | L5               |
| Poaceae         | <i>Panicum capillare</i>                                  | Old Panic Grass            |                    |                    | S5            |                     |                  | L5               |
| Anacardiaceae   | <i>Rhus typhina</i>                                       | Staghorn Sumac             |                    |                    | S5            |                     |                  | L5               |
| Anacardiaceae   | <i>Toxicodendron radicans</i> ssp. <i>negundo</i>         | Poison Ivy                 |                    |                    | S5            |                     |                  | L5               |
| Araceae         | <i>Arisaema triphyllum</i> ssp. <i>triphyllum</i>         | Jack-in-the-pulpit         |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Bidens frondosa</i>                                    | Devil's Beggar's Ticks     |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Symphyotrichum lanceolatum</i> ssp. <i>lanceolatum</i> | Panicled Aster             |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Eutrochium maculatum</i> var. <i>maculatum</i>         | Spotted Joe-pye Weed       |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Solidago flexicaulis</i>                               | Broad-leaved Goldenrod     |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Symphyotrichum puniceum</i> var. <i>puniceum</i>       | Purple-stemmed Aster       |                    |                    | S5            |                     |                  | L5               |
| Balsaminaceae   | <i>Impatiens capensis</i>                                 | Spotted Jewel-weed         |                    |                    | S5            |                     |                  | L5               |
| Berberidaceae   | <i>Podophyllum peltatum</i>                               | May Apple                  |                    |                    | S5            |                     |                  | L5               |
| Cyperaceae      | <i>Scirpus atrovirens</i>                                 | Woolgrass Bulrush          |                    |                    | S5            |                     |                  | L5               |
| Dryopteridaceae | <i>Onoclea sensibilis</i>                                 | Sensitive Fern             |                    |                    | S5            |                     |                  | L5               |
| Hydrophyllaceae | <i>Hydrophyllum virginianum</i>                           | Virginia Waterleaf         |                    |                    | S5            |                     |                  | L5               |
| Oleaceae        | <i>Fraxinus americana</i>                                 | White Ash                  |                    |                    | S5            |                     |                  | L5               |
| Poaceae         | <i>Leersia oryzoides</i>                                  | Rice Cutgrass              |                    |                    | S5            |                     |                  | L5               |
| Rosaceae        | <i>Prunus virginiana</i> var. <i>virginiana</i>           | Choke Cherry               |                    |                    | S5            |                     |                  | L5               |
| Rosaceae        | <i>Geum aleppicum</i>                                     | Yellow Avens               |                    |                    | S5            |                     |                  | L5               |
| Rosaceae        | <i>Prunus serotina</i>                                    | Wild Black Cherry          |                    |                    | S5            |                     |                  | L5               |
| Tiliaceae       | <i>Tilia americana</i>                                    | American Basswood          |                    |                    | S5            |                     |                  | L5               |
| Ulmaceae        | <i>Ulmus americana</i>                                    | American Elm               |                    |                    | S5            |                     |                  | L5               |
| Cyperaceae      | <i>Carex radiata</i>                                      | Stellate Sedge             |                    |                    | S5            |                     |                  | L5               |
| Lamiaceae       | <i>Scutellaria galericulata</i>                           | Hooded Skullcap            |                    |                    | S5            |                     |                  | L5               |
| Vitaceae        | <i>Parthenocissus vitacea</i>                             | Thicket Creeper            |                    |                    | S5            |                     |                  | L5               |
| Vitaceae        | <i>Vitis riparia</i>                                      | Riverbank Grape            |                    |                    | S5            |                     |                  | L5               |
| Asteraceae      | <i>Erigeron strigosus</i>                                 | Daisy Fleabane             |                    |                    | S5            |                     |                  | L5               |

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|------------------|---|------------------------|--------------------|--------------------|---------------|---------------------|------------------|------------------|
| Asteraceae       | <i>Euthamia graminifolia</i>                | Grass-leaved Goldenrod |                    |                    | S5            |                     |                  | L5               |
| Cyperaceae       | <i>Carex stipata</i>                        | Stalk-grain Sedge      |                    |                    | S5            |                     |                  | L5               |
| Juncaceae        | <i>Juncus tenuis</i>                        | Slender Rush           |                    |                    | S5            |                     |                  | L5               |
| Oleaceae         | <i>Fraxinus pennsylvanica</i>               | Green Ash              |                    |                    | S5            |                     |                  | L5               |
| Ranunculaceae    | <i>Actaea rubra</i>                         | Red Baneberry          |                    |                    | S5            |                     |                  | L5               |
| Ranunculaceae    | <i>Clematis virginiana</i>                  | Virginia Virgin-bower  |                    |                    | S5            |                     |                  | L5               |
| Rosaceae         | <i>Fragaria vesca ssp. americana</i>        | Woodland Strawberry    |                    |                    | S5            |                     |                  | L5               |
| Salicaceae       | <i>Populus balsamifera ssp. balsamifera</i> | Balsam Poplar          |                    |                    | S5            |                     |                  | L5               |
| Poaceae          | <i>Phragmites australis ssp. australis</i>  | Common Reed            |                    |                    | SNA           |                     |                  | LX               |
| Rosaceae         | <i>Malus sp.</i>                            | Apple Species          |                    |                    |               |                     |                  |                  |
| Rosaceae         | <i>Crataegus sp.</i>                        | Hawthorn Species       |                    |                    |               |                     |                  |                  |
| Cyperaceae       | <i>Carex vulpinoidea</i>                    | Fox Sedge              |                    |                    | S5            |                     |                  | L5               |
| Rosaceae         | <i>Rosa multiflora</i>                      | Rambler Rose           |                    |                    | SNA           |                     |                  | L+               |
| Juncaceae        | <i>Juncus torreyi</i>                       | Torrey's Rush          |                    |                    | S5            |                     |                  | L4               |
| Scrophulariaceae | <i>Agalinis tenuifolia var. tenuifolia</i>  | Slender False Foxglove |                    |                    | S4S5          |                     |                  | L3               |
| Orchidaceae      | <i>Liparis loeselii</i>                     | Loesel's Twayblade     |                    |                    | S4S5          |                     |                  | L3               |
|                  |   |                        |                    |                    |               |                     |                  |                  |



# Appendix C

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## Breeding Birds

# Appendix C

## Breeding Birds

| Common Name              | Scientific Name                   | Status                            |                                      |                                    |               |                 |                        | Number of Territories or Pairs |
|--------------------------|-----------------------------------|-----------------------------------|--------------------------------------|------------------------------------|---------------|-----------------|------------------------|--------------------------------|
|                          |                                   | National Species at Risk COSEWICa | Species at Risk in Ontario Listing a | Provincial breeding season SRANK b | TRCA Status d | Regional Status | Area-sensitive (OMNR)c |                                |
| Canada Goose             | <i>Branta canadensis</i>          |                                   |                                      | S5                                 | L5            |                 |                        | F                              |
| Mallard                  | <i>Anas platyrhynchos</i>         |                                   |                                      | S5                                 | L5            |                 |                        | 1                              |
| Red-tailed Hawk          | <i>Buteo jamaicensis</i>          |                                   |                                      | S5                                 | L5            |                 |                        | 1                              |
| Killdeer                 | <i>Charadrius vociferus</i>       |                                   |                                      | S5                                 | L4            |                 |                        | 3                              |
| Ring-billed Gull         | <i>Larus delawarensis</i>         |                                   |                                      | S5                                 | L4            |                 |                        | F                              |
| Rock Pigeon              | <i>Columba livia</i>              |                                   |                                      | SNA                                | L+            |                 |                        | F                              |
| Mourning Dove            | <i>Zenaida macroura</i>           |                                   |                                      | S5                                 | L5            |                 |                        | 2                              |
| Red-bellied Woodpecker   | <i>Melanerpes carolinus</i>       |                                   |                                      | S4                                 | L4            |                 |                        | 1                              |
| Northern Flicker         | <i>Colaptes auratus</i>           |                                   |                                      | S4                                 | L4            |                 |                        | 2                              |
| Willow Flycatcher        | <i>Empidonax traillii</i>         |                                   |                                      | S5                                 | L4            |                 |                        | 1                              |
| Great Crested Flycatcher | <i>Myiarchus crinitus</i>         |                                   |                                      | S4                                 | L4            |                 |                        | 1                              |
| Eastern Kingbird         | <i>Tyrannus tyrannus</i>          |                                   |                                      | S4                                 | L4            |                 |                        | 2                              |
| N. Rough-winged Swallow  | <i>Stelgidopteryx serripennis</i> |                                   |                                      | S4                                 | L4            |                 |                        | F                              |
| Barn Swallow             | <i>Hirundo rustica</i>            | THR                               | THR                                  | S4                                 | L4            |                 |                        | F                              |
| Black-capped Chickadee   | <i>Poecile atricapillus</i>       |                                   |                                      | S5                                 | L5            |                 |                        | 2                              |
| American Robin           | <i>Turdus migratorius</i>         |                                   |                                      | S5                                 | L5            |                 |                        | 5                              |
| Gray Catbird             | <i>Dumetella carolinensis</i>     |                                   |                                      | S4                                 | L4            |                 |                        | 4                              |
| Cedar Waxwing            | <i>Bombycilla cedrorum</i>        |                                   |                                      | S5                                 | L5            |                 |                        | 2                              |
| European Starling        | <i>Sturnus vulgaris</i>           |                                   |                                      | SE                                 | L+            |                 |                        | 3                              |
| Warbling Vireo           | <i>Vireo gilvus</i>               |                                   |                                      | S5                                 | L5            |                 |                        | 4                              |
| Red-eyed Vireo           | <i>Vireo olivaceus</i>            |                                   |                                      | S5                                 | L4            |                 |                        | 2                              |
| Yellow Warbler           | <i>Setophaga petechia</i>         |                                   |                                      | S5                                 | L5            |                 |                        | 6                              |

|                        |                                  | Status                            |                                      |   |               |                 |                        | Number of Territories or Pairs |
|------------------------|----------------------------------|-----------------------------------|--------------------------------------|---|---------------|-----------------|------------------------|--------------------------------|
|                        |                                  | National Species at Risk COSEWICa | Species at Risk in Ontario Listing a | Provincial breeding season SRANK <sup>b</sup> | TRCA Status d | Regional Status | Area-sensitive (OMNR)c |                                |
| Common Name            | Scientific Name                  |                                   |                                      |   |               |                 |                        |                                |
| Chestnut-sided Warbler | <i>Setophaga pensylvanica</i>    |                                   |                                      | S5  | L3            |                 |                        | 1                              |
| American Redstart      | <i>Setophaga ruticilla</i>       |                                   |                                      | S5  | L3            |                 | A                      | 1                              |
| Common Yellowthroat    | <i>Geothlypis trichas</i>        |                                   |                                      | S5  | L4            |                 |                        | 3                              |
| Northern Cardinal      | <i>Cardinalis cardinalis</i>     |                                   |                                      | S5  | L5            |                 |                        | 5                              |
| Indigo Bunting         | <i>Passerina cyanea</i>          |                                   |                                      | S4  | L4            |                 |                        | 1                              |
| Chipping Sparrow       | <i>Spizella passerina</i>        |                                   |                                      | S5  | L5            |                 |                        | 1                              |
| Savannah Sparrow       | <i>Passerculus sandwichensis</i> |                                   |                                      | S4  | L4            |                 | A                      | 2                              |
| Song Sparrow           | <i>Melospiza melodia</i>         |                                   |                                      | S5  | L5            |                 |                        | 10                             |
| Swamp Sparrow          | <i>Melospiza georgiana</i>       |                                   |                                      | S5  | L4            |                 |                        | 5                              |
| Red-winged Blackbird   | <i>Agelaius phoeniceus</i>       |                                   |                                      | S4  | L5            |                 |                        | 18                             |
| Common Grackle         | <i>Quiscalus quiscula</i>        |                                   |                                      | S5  | L5            |                 |                        | 3                              |
| Brown-headed Cowbird   | <i>Molothrus ater</i>            |                                   |                                      | S4  | L5            |                 |                        | 3                              |
| Baltimore Oriole       | <i>Icterus galbula</i>           |                                   |                                      | S4  | L5            |                 |                        | 1                              |
| House Finch            | <i>Haemorhous mexicanus</i>      |                                   |                                      | SNA   | L+            |                 |                        | 1                              |
| American Goldfinch     | <i>Spinus tristis</i>            |                                   |                                      | S5  | L5            |                 |                        | 2                              |
| House Sparrow          | <i>Passer domesticus</i>         |                                   |                                      | SNA   | L+            |                 |                        | F                              |