PLAN B Natural Heritage

Environmental Impact Study & Management Plan
Palgrave Settlement Area
Town of Caledon
Region of Peel

Prepared for:

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1.0 INTRODUCTION

The following Environmental Impact Study (EIS) and Management Plan (MP) has been prepared in conjunction with a development application for eleven estate residential lots located in the Palgrave Settlement Area of the Town of Caledon. The subject property is located at the southwest corner of Old Church Road and Mount Hope Road (Figure 1).

The subject property is 24 ha in area, and is comprised of cultivated fields, kettle wetlands (swamp, marsh), cultural woodland/thicket, and deciduous forest. A residence with small out buildings is located in the southeast corner of the property, near Mount Hope Road. The property is bounded by existing estate residential development to the north, west and south. An active farm is located to the east.

The subject property is located within the Palgrave Estate Residential Community of the Town of Caledon. Environmental Zone 1 (EZ1) and Environmental Zone 2 (EZ2) features, including minimum vegetation protection zones, are identified on Schedule I of the Town of Caledon Official Plan (2015). The EZ 1 lands coincide with evaluated wetlands (non-provincially significant) and woodland/forest. The EZ2 lands coincide with linkage connections between the EZ1 features, associated with drainage swales and cultural vegetation.

The subject property is located within Policy Area 1 on land use Schedule G. Permitted land uses within Policy Area 1 include estate residential development, which is proposed for the subject property. The subject lands are also part of the Countryside Area (Palgrave Estate Residential Community) of the Oak Ridges Moraine Conservation Plan (ORMCP). The property is located within an area of Low Aquifer Vulnerability (Schedule P-1). Landform Conservation Area Category 1 lands, however, are identified in the northeast corner and north-central portion of the property, in association with rolling/sloping topography (knob-hollow relief).

The Region of Peel Official Plan (2014) designation on the subject property is Palgrave Estate Residential Community. There are no core areas of the regional Greenland System identified on the subject property or adjoining lands.

Due to the presence of wetlands, swales and steep slopes, a large portion of the property is regulated by the TRCA under *Ontario Regulation 166/06 - Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*.

Section 7.1.9 of the Caledon Official Plan provides the environmental policy regime for the Palgrave Estate Residential Community. The key environmental study tasks identified in these policies include the following:

- Stake and survey the limits of the EZ1 and EZ2 features;
- Prepare vegetation and wildlife ecology mapping;
- Identify and map slopes greater than 10%, 15% and 25%;
- Prepare a groundwater map identifying water table levels of 0 m to 0.5 m and 0.5 m to 1.5 m; and,

- Prepare an Environmental Management Plan that identifies the protection measures for EZ1 and EZ2 features, as well as areas and methods of reforestation (e.g. buffers, undeveloped areas).

The purpose of this EIS and MP is to satisfy the applicable environmental policy regime (i.e. Provincial Policy Statement, Region of Peel Official Plan, Town of Caledon Official Plan and TRCA Policies/Guidelines) by providing the following information:

- A description and evaluation of the biophysical resource features within and adjacent to the subject property (vegetation, wildlife) based on in-season field surveys;
- Field confirmation of natural area boundaries, buffers and linkages;
- Staking of environmental features (EZ1, EZ2) with TRCA and MNRF staff;
- Identification of opportunities/constraints to future development;
- A description of the development proposal;
- An evaluation of potential impacts of future development on core natural areas and linkage functions;
- Recommended mitigation/design measures (Management Plan), including buffers/setbacks, to reduce development related impacts, protect sensitive environmental features and achieve habitat enhancement, where feasible; and,
- Documentation of findings in an EIS/MP report that addresses the current environmental policy regime.

2.0 STUDY METHODOLOGY

The following tasks were completed as part of the EIS and MP:

- Review of background reports, mapping and supporting technical studies;
- Review of aerial photography, topographic mapping, soils and physiographic mapping;
- Field investigations to document existing conditions and confirm opportunities/constraints to development;
    - Botanical Survey (3 seasons)
    - Tree Inventory[1]
    - Wildlife Surveys following standard protocol (amphibians, birds)
- Agency consultation
    - Staking of wetland and woodland boundaries with MNRF and TRCA staff (June 4th, 2014)
    - Confirmation of field work program.

3.0 RESULTS

Physical Features

The subject property is located within the Oak Ridges Moraine physiographic region of southern Ontario (Chapman and Putnam 1984). This region is characterized by hummocky, rolling topography with permeable sand and gravel deposits separated by glacial till.

[1] Prepared under separate cover by Bruce Tree Expert Company (2016).

The property exhibits rolling topography with isolated kettle wetlands and upland knolls. The soils are mapped as well drained King clay-loam derived from heavy textured clay till (Hoffman and Richards 1953). Organic muck soils are associated with the large kettle wetland located along the western fringe of the site.

The topography of the subject property is depicted on Figure 2. The ground surface elevation ranges from 278.5 m to 291.3 m.

The hydrogeological conditions on the subject property were investigated by SPL Consultants (2016). Water table levels at the site were reported to range from 0.4 m to 4.1 m below ground surface during measurements taken on November 18th and 19th, 2013 from various borehole locations. SPL Consultants (2016) state that the groundwater flow path across the site is in a southwest direction, towards the main wetland feature.

The subject property is located within the main Humber River watershed. Drainage from the wetlands along the western edge of the property forms part of the headwaters of the Humber River. Drainage from wetlands in the southeast corner of the property is part of the Cold Creek subwatershed, which is a tributary of the Humber River. A small, closed depression with a wetland occurs in the northeast corner of the property. Further details on the pre-development catchment areas and overland flow routes are provided in the Stormwater Management Report prepared by the Urban Watershed Group Ltd. (2016).

Vegetation

Vegetation features on the subject property were classified following the Ecological Land Classification System for Southern Ontario (Lee et al. 1989). Plant species present on the subject property were inventoried on the following dates:

- October 23rd, 2013;
- June 4th, 2014;
- July 9th, 2014;
- September 9th, 2014; and,
- November 12th, 2014.

The vegetation communities are mapped on Figure 3. An overview description of the vegetation features is provided below. A checklist of vascular plant species recorded from the property is found in Appendix A-1.

Overview

The subject property is mainly comprised of cultivated fields. Wetland features occur in the northeast and southeast corners of the property and along the western edge, in association with kettle depressions. The marsh communities (MAM, MAS) are mainly dominated by a mixture of reed canary grass, cattail, bulrush, woolgrass, arrowhead, duckweed, fowl-manna grass, watercress, and sedges, with herbaceous species such as jewelweed and beggars tick, and scattered shrub willows and red-osier dogwood. Reed canary grass is also the dominant species along an ephemeral drainage swale that occurs along the eastern edge of the property (refer to Figure 3).

Two small shrub thicket wetlands (SWT) dominated by willows with speckled alder and red-osier dogwood, occur along the southern edge of the property. The ground layer in these communities is dominated by joe-pye weed, reed canary grass, jewelweed, and beggars tick.

A deciduous swamp (SWD) is associated with the main wetland block located along the western edge of the property. The overstorey is dominated by silver/red maple with occasional green/black ash, white elm, yellow birch, eastern white cedar and balsam poplar. The understorey is comprised of mixed hardwood tree species, white cedar, shrub willow, and red-osier dogwood. Groundcover vegetation is dominated by a mixture of jewelweed, reed canary grass, rice-cut grass, and fowl-manna grass, with cattail, sedges and duckweed predominant in open water areas. Standing dead trees and snags occur throughout the swamp, which appears to be inundated with water for most of the year.

Cultural thicket communities (CUT) on the subject property are comprised of eastern white cedar, green ash, trembling aspen, white elm, Scots pine, hawthorn, brambles, buckthorn and wild plum. These communities occupy the steeper slopes of the site where cultivation has not occurred. Groundcover vegetation is comprised of a mixture of old field meadow herbaceous species (e.g. asters, goldenrods) and perennial forage grasses (e.g. smooth brome, timothy, bluegrass, orchard grass).

Cultural old field meadow (MEF) and inclusions also occur in areas of steep slopes or in conjunction with cultural thicket communities. The groundcover vegetation is dominated by forb species such as hawkweed, heal-all, aster, goldenrod, thistle, knapweed, wild carrot, and perennial forage grasses.

A young mixed woodland community (WO) is located in the northwest section of the property. The successional woodland is dominated by a mixture of trembling aspen, white birch, green/white ash, white cedar, shrub willow, red-osier/grey dogwood, chokecherry, Virginia creeper, and riverbank grape.

A narrow band of mature, deciduous forest (FOD) separates the main wetland along the western edge of the property from the adjacent farm fields. This stand consists primarily of deciduous tree species such as sugar maple, red oak, American beech, basswood, green ash, with occasional eastern hemlock and white pine. The diverse understory consists of standing snags, fallen timber, shrubs (chokecherry), and saplings (maple, ash, cedar). The ground cover vegetation within the forest varied with location. Within the center of the forested strip, helleborine, herb-robert, wood fern, false lily of the valley, and hairy wood sedge were the dominant cover. The transitional areas adjacent to the wetland supported species such as beggars tick, jewelweed, sensitive fern, and bracken fern. The edge of this forest community appears to have been the dumping ground for the farm over many years. Piles of old, rolled up fencing have been dumped in in the woodlot edge in several locations. Scattered groundwater seepage zones were observed along the forested slope that discharge to the wetland.

Along the western fringe of the main wetland is a narrow band of mixed forest (FOM) dominated by eastern white cedar, eastern hemlock, black cherry, green ash and red/sugar maple. Extensive downfall, together with standing dead cedars and scattered shrubs and saplings, form the understory. The ground cover in this community is sparse to absent in areas. Typical species present include common wood fern, jack in the pulpit, zig-zag goldenrod and herb-robert.

The balance of the property is comprised of cultivated fields (OAG) with some ploughed through drainage swales that convey runoff to meadow marsh communities located in small depressions. Ornamental plantings and old field meadow regeneration occur in association with the existing residence and out buildings. A cedar dominated hedgerow is located along the south property line. Hawthorn, buckthorn, Manitoba maple, sugar maple and white ash also occur within this hedgerow. Roadside trees along Old Church Road are comprised of white cedar, trembling aspen, green ash and white birch.

Rare Plant Species

No species considered rare in Ontario (Oldham and Brinker 2009) have been recorded to date on the subject property. The following species were recorded that are considered "Moraine Rare Species" based on the listings in *ORMCP Technical Paper 6 - Identification of Significant Portions of Habitat for Endangered, Rare and Threatened Species*:

- *Aster laevis* Smooth Aster
- *Carex hirtifolia* Hairy Sedge
- *Equisetum sylvaticum* Woodland Horsetail
- *Impatiens pallida* Pale Touch-me-not
- *Juglans nigra* Black Walnut (likely planted and/or adventive at this site)
- *Juniperus virginiana* Red Cedar
- *Pinus resinosa* Red Pine (not natural population; planted at this site)
- *Utricularia vulgaris* Common Bladderwort

The plant communities that these species were located within is described below.

Species	Location
Aster laevis	Edge of deciduous forest (FOD) and mixed thicket (THM).
Carex hirtifolia	Edge of deciduous forest (FOD).
Equisetum sylvaticum	Wetland-forest interface (FOD/SWD).
Impatiens pallida	Wetland-forest interface (FOD/SWD), meadow marsh (MAM).
Juglans nigra	Cultural thickets, woodland.
Juniperus virginiana	Cultural thickets, woodland.
Pinus resinosa	Cultural thickets,
Utricularia vulgaris	Thicket swamp (SWT), shallow marsh (MAS).

Wildlife

An initial reconnaissance of the subject property was completed on October 23rd and November 5th, 2013 to document the presence of wildlife and migrant birds.

Tracks of three species of mammals were observed during the surveys, namely, raccoon, striped skunk, and white-tailed deer. Deer appeared to travel primarily in an east-west direction, widely throughout the property, towards the main wetland/forest block located along the western edge of the property.

A total of 26 species of bird were recorded during the site visits. The *Second Ontario Breeding Bird Atlas* (Cadman et al. 2007) recorded 131 species in the 10x10 km square that the property is located within. Of the species observed below, 22 have been previously recorded to breed locally, with the rest being migrants.

Bird species observed during the 2013 fall surveys included:

Common Name	Scientific Name
Canada Goose	*Branta canadensis*
Turkey Vulture	*Cathartes aura*
Red-tailed Hawk	*Buteo jamaicensis*
Ring-billed Gull	*Larus delawarensis*
Mourning Dove	*Zenaida macroura*
Northern Flicker	*Colaptes auratus*
Eastern Phoebe	*Sayornis phoebe*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Horned Lark	*Eremophila alpestris*
Black-capped Chickadee	*Poecile atricapillus*
White-breasted Nuthatch	*Sitta carolinensis*
Golden-crowned Kinglet	*Regulus satrapa*
Ruby-crowned Kinglet	*Regulus calendula*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*
European Starling	*Sturnus vulgaris*
American Pipit	*Anthus rubescens*
Yellow-rumped Warbler	*Setophaga coronata*
Song Sparrow	*Melospiza melodia*
White-throated Sparrow	*Zonotrichia albicollis*

Dark-eyed Junco	*Junco hyemalis*
Northern Cardinal	*Cardinalis cardinalis*
Red-winged Blackbird	*Agelaius phoeniceus*
American Goldfinch	*Spinus tristis*

Amphibians

Monitoring of amphibians was completed on April 21st, May 28th, and June 12th, 2014. Frog calls were recorded following the Marsh Monitoring Program protocol (Bird Studies Canada 2004). The highest concentration of frogs was recorded from the following three wetland areas (refer to Figure 4):

- large wetland area located along the western edge of the property;
- small wetland parcels in the southeast corner of the property; and,
- small wetland on an adjacent property (north-central location).

Species recorded included spring peeper, wood frog, western chorus frog, American toad, grey tree frog, green frog, and American bullfrog.

The point-count observations of amphibians are provided in Appendix A-2.

Reptiles

Reptile observations were limited to eastern garter snake and midland painted turtle (Figure 4). The garter snake was observed in the southwest corner of the property, hunting along the edge of the wetland. Midland painted turtle was recorded from a wetland on the adjacent north-central property.

Breeding Birds

Seven point count stations were selected in representative habitats within the study area. The point counts followed the Second Ontario Breeding Bird Atlas methodology (Cadman et al. 2007). All species and daily numbers of individuals were recorded during each of the site visits. The level of breeding (possible, probable or confirmed) was recorded following the Second Ontario Breeding Bird Atlas methodology (Cadman et al. 2007). The surveys were conducted between 5 am and 10 am on June 16th and July 9th, 2014. Species numbers and diversity was also casually recorded on site visits during October 23rd, 2013, and April 21st, June 12th, 20th, and September 9th, 2014. Point-count locations are provided in Figure 4. The results of the surveys are presented in Appendix A-3 (point-count) and A-4 (species list).

The avifauna diversity of the site reflects the diverse habitat conditions present, including active croplands, wetlands, and mature forest. A total of 65 species of birds were observed during the site visits, of which 37 species showed signs of breeding on the subject property.

The avian community within the study area is comprised primarily of successional habitat and habitat generalist species. Dominant species present included Red-winged Blackbird, American Robin, American Goldfinch, Song Sparrow and Yellow Warbler. Grassland bird species were absent due to the lack of

suitable habitat, and the presence of actively farmed fields. Given the presence of wetlands on the property and in the surrounding landscape, several species of waterfowl and waders were observed flying over the property, including Trumpeter Swan, Wood Duck and Great Blue Heron.

Mammals

Mammals recorded from the subject property consisted of common species, typical for the range of habitat conditions present within the landscape. Species recorded are listed below:

- Red Squirrel *Tamiasciurus hudsonicus*
- Eastern Chipmunk *Tamias striatus*
- Eastern Gray Squirrel *Sciurus carolinensis*
- Deer Mouse *Eromyscus maniculatus*
- Woodchuck *Marmota monax*
- White-tailed Deer *Odocoileus virginianus*
- Coyote *Canis latrans*
- Eastern Cottontail *Sylvilagus floridanus*

Species at Risk

Barn Swallow (Federally and Provincially Threatened)

Barn Swallows were observed nesting within the old barn located in the southeast corner of the property. A total of five active nests were located in the barn. The nests were either on the center beam or the inner beam furthest from the barn entrance. This species appeared to prefer to forage with Tree Swallows, primarily over the adjacent properties to the south and east of the site.

Wood Thrush (Federally Threatened, Provincially Special Concern)

One singing individual was recorded at point count station 1. During both breeding bird census visits, an individual singing male was recorded from the forested area along the edge of the wetland in the northwest corner of the property.

A complete list of avian species observed in study area and their breeding status is located in Appendix A-3.

Staking of Environmental Features

In order to provide an environmental framework for the proposed development, the boundaries of the wetlands and woodlands on the subject property were staked on June 4th, 2014 with representatives of the TRCA and MNRF. The surveyed boundaries are shown on Figure 5. A 30 m buffer was applied to the greater of the wetland or woodland boundary. This information was used as a framework for various development options for the property.

4.0 OPPORTUNITIES AND CONSTRAINTS TO DEVELOPMENT

The environmental framework for the proposed development was developed in consultation with TRCA and MNRF. The initial task was to stake and survey the wetland boundaries and the limit of woodlands, as shown on Figure 5. The proposed environmental framework for the site is comprised of the following features:

- All wetland features;
- The main forest/wetland block in the northwest corner, including an area of cultural old field meadow and thicket;
- Ephemeral drainage swales;
- A 10 m linkage connection along the south property line; and,
- A 30 m buffer from the greater of surveyed woodland or wetland boundary.

The environmental constraint framework for the proposed development is shown on Figure 5.

Areas of steep slopes were also considered in establishing the framework for locating house and septic tile beds. An analysis of the slopes on the subject property is provided under separate cover. An Environmental Summary Map, which identifies the EZ1 and EZ2 lands, as well as slope classes (i.e. 10-15%, 16-25% and >25%) and areas of high water table (i.e. 0-0.5 m, 0.5-1.5 m) is provided in the Appendix.

5.0 PROPOSED DEVELOPMENT

Eleven estate residential lots are proposed for the subject property. Six of the lots will have access to Mount Hope Road via three paired driveways. The remaining lots will have access to Old Church Road via a single entry point with a cul-de-sac. Existing municipal services (water, gas, hydro, bell, cable) will be extended from Old Church Road and Mount Hope Road to serve the individual residential lots. Sewage treatment will be addressed through the provision of individual septic tile beds. The proposed building envelopes and tile beds maintain a minimum 30 m buffer to the wetlands. For the most part, areas with steep sloping topography have been avoided. A 10 m wide linkage connection has been provide along the south property line to provide a corridor between the wetlands located in the southwest and southeast corners of the property. The 10 m linkage connection will function in combination with the linkage provided by the existing development to the south (i.e. along the common lot line).

The proposed draft plan and environmental framework overlay is provided in Figure 6.

6.0 POTENTIAL IMPACTS AND MITIGATING MEASURES

For the most part, the proposed development respects the surveyed wetland and woodland boundaries previously established with TRCA and MNRF. Minor removal of vegetation, however, is proposed in the following locations:

- An area of eastern white cedar regeneration located near Old Church Road (north-central); and,
- A reed canary grass dominated drainage swale in the southeast corner of the site.

To accommodate the driveway access to Old Church Road and a proposed lot, partial removal of regenerating white cedar is required. The balance of the vegetation will be retained as part of the 30 m buffer to an adjacent (off-property) wetland.

The proposed driveway access in the southeast corner of the property is located along the alignment of the current driveway access. An undersized culvert conveys flow from an ephemeral swale under the driveway, south towards a wetland feature and a dug pond. The swale is dominated by reed canary grass. To accommodate the new driveway access, it will be necessary to upgrade the culvert and widen the driveway footprint. This will result in the partial removal of wetland vegetation associated with the swale. The proposed culvert upgrade will eliminate the current backwater effect and will provide positive drainage towards the down-gradient wetlands. Flow contribution to the swale from up-gradient lands will continue. A permit from the TRCA will be required for the proposed culvert crossing.

To compensate for the minor removal of regenerating white cedar (woodland) and reed canary grass (wetland, swale), naturalization of the 30 m wetland/woodland buffer strip is proposed. In our opinion, the long-term naturalization of the undeveloped portions of the property, which includes the 30 m buffer, should provide for a substantial net environmental gain over the current (farmed) condition, and compensate for the minor loss of habitat. Naturalization of the undeveloped portions of the property is discussed in Section 7.0 below.

Water Balance

SPL Consultants (2016) predict a 7% reduction in infiltration across the site and an increase in post-development runoff of 8%. With mitigation measures, SPL predict a 0.2% decrease in recharge across the site and no increase in runoff. Measures to address the infiltration deficit include:

- Directing roof runoff to grassed areas and soak-away pits;
- Installation of buried infiltration galleries; and,
- Roadside ditches.

Given the above, it is our recommendation that appropriate measures be implemented to maintain the pre-development pattern/volume of groundwater recharge across the site. Low impact development stormwater management measures should be implemented to achieve this objective and to control post-development runoff to pre-development levels.

Sewage Treatment

A combination of conventional on-site sewage systems and tertiary treatment systems are proposed to maintain nitrate levels below the 10 mg/l threshold level, as per the provincial water quality criteria. Based on SPL's calculations, the subject property can support 16 residential lots, which would result in nitrate levels of 7.74 mg/l, which is an increase of 7.461 mg/l over the background levels (i.e. 0.279 mg/l). Given the above calculations, the post-development nitrate levels (including the background level) are predicted to be less for the proposed 11 lot subdivision.

SPL consultants recommend that a lot-level groundwater monitoring program is required to confirm the type of sewage treatment system to be used on an individual lot basis. They also recommend quarterly groundwater monitoring to establish baseline conditions for the site in terms of groundwater quality, elevations and flow path. Combined, this information would be used to finalize the sewage treatment system requirements for the development, confirm post-development nitrate levels, and confirm the measures necessary for maintaining the pre-development volume and pattern of groundwater recharge and ultimate discharge to wetlands or watercourses.

In light of the above, further analysis will be required, as a condition of approval, to quantify the potential impacts of sewage effluent on the environment, and to determine appropriate treatment and mitigation measures.

Stormwater Management

The proposed grading plan maintains the pre-development overland flow contributions to the isolated, closed depressions that support wetland features. A minimum 30 m vegetated buffer strip will be maintained between the wetlands and the proposed lots. The buffer strip will provide for infiltration and polishing of surface water runoff. Roadside ditches and swales (on lots) are proposed to polish, filter and recharge runoff across the site. The pre-development contribution of existing swales to the on-site wetlands will be maintained. Given the porosity of the on-site soil conditions, a permanent storm detention pond will not be required. Runoff from the site will be recharged at source (lot level) and via swales and the roadside ditch system.

Based on water balance calculations completed by the Urban Watershed Group Ltd. (2016), a 9% reduction in recharge and a 3.9% increase in surface runoff is predicted post-development. With the provision of soak-away pits and infiltration galleries[2], Urban Watershed Group predict a 41% increase in post-development infiltration across the site. A combination of at-source and conveyance "low impact development" measures are proposed to recharge the runoff to the groundwater system. These measures are intended to maintain the pre-development overland surface flow and recharge contributions to the on-site wetlands. Further details on the proposed stormwater management plan for the site are provided under separate cover by Urban Watershed Group Ltd. (2016).

Given that the pre-development pattern and volume of recharge can be maintained across the site, negative impacts to wetland hydrology are not anticipated. The provision of soak-away pits, infiltration galleries, grassed swales and roadside ditches (i.e. treatment train) will also assist in maintaining water quality in the receiving wetlands. The 30 m buffer strips and restoration areas will provide additional attenuation, polishing and infiltration of runoff.

Species at Risk

Species at risk recorded from the subject property included wood thrush and barn swallow. Wood thrush was recorded from the forest/wetland block in the northwest corner of the property. The habitat for this

[2] Volume based on 25mm rainfall event.

species will be protected with a minimum 30 m buffer. Restoration of the adjacent farm fields will provide additional habitat for this species over the long term.

Barn swallows were recorded from a barn located in the southeast corner of the property. It is our understanding that the barn will be removed as part of the future development. To address the *Endangered Species Act* regulations for this species, it will be necessary for the landowner to undertake the following steps:

- § register the work and the affected species with the Ministry of Natural Resources and Forestry (before work begins);
- § minimize the effects of the development activity on barn swallow (maintain structure until new one is in place);
- § create and maintain new habitat for barn swallow (nesting structure with nest cups);
- § report sightings of rare species (and update registration documentation, if needed);
- § monitor the habitat created and report on certain key observations; and,
- § prepare and maintain records that relate to the activity and the habitat.

The buffer areas in the southeast corner of the site provide a good location to create a new nesting structure, as it is close to the current barn and the wetlands/ponds that the species prefers to forage over with other swallow species.

The barn should be re-surveyed at the time of site development to confirm the number of active nests. During the 2014 survey, five active nests were recorded.

Rare Plant Species

Several plant species considered to be rare within the Oak Ridges Moraine planning jurisdiction were recorded on the subject property. The species occur in areas of the property that will be retained and protected (with buffers). The cultivated portions of the property that will be converted to a 30 m buffer and/or restoration area, will provide additional habitat for some of the species in question.

Erosion & Siltation Control

Erosion and siltation control measures, in accordance with Town of Caledon and TRCA standards, should be properly installed prior to development and properly maintained over the full course of construction. The fencing should be installed at the limits of grading to protect those areas identified for naturalization. Erosion and siltation control measures are described in further detail in the Stormwater Management Report (Urban Watershed Group Ltd. 2016).

Tree Saving Plan

A Tree Saving Plan has been prepared under separate cover by Bruce Tree Expert Company Ltd. (2016). The report provides a detailed assessment of tree removals associated with driveway access and house construction. Measures to protect trees during the site grading and house construction phase have been provided. Approximately 66 trees of varying health and condition, ranging in size from 5 cm to 60 cm in diameter, will be removed to accommodate the proposed development. With the exception of 50 cedar

stems to be removed from a small cultural woodland community, the remaining trees to be removed occur as hedgerows or tree groupings.

7.0 ENVIRONMENTAL MANAGEMENT PLAN

The proposed development provides an opportunity for significant environmental restoration and enhancement to the core natural features of the property (wetlands, woodland). Due to the steep, sloping topography of the site, additional land beyond the 30 m buffer requirements is available for restoration. Figure 7 shows the areas of the property that can be considered for restoration.

Given the extent of forest cover that exists on the subject property and adjacent lands, we recommend the following restoration approach:

- Allow undeveloped lands to succeed to old field meadow groundcover vegetation. This approach will create a sequence of meadow, shrub thicket, woodland and forest cover over an extended period of time. Native woody tree and shrub species would colonize the open meadow areas over a period of time creating a mosaic of habitat conditions.

- An alternative approach to the above would be to seed the restoration areas with an old field meadow seed mix with an emphasis on aster, goldenrod and perennial grass species. This approach would reduce the amount of weedy plant species cover that could establish on the former agricultural lands, and would provide important habitat for pollinating species that is in short supply.

The overall intent of the restoration plan is to provide for the typical successional sequence of plant communities that establish on former agricultural land and, over time, increase the forest cover on the property and in the larger landscape setting. Given the diversity of native woody species that exist in the surrounding forested areas, we anticipate that site will regenerate at a fairly rapid pace. An example of this can be seen in the northwest corner of the site where maple and ash regeneration has expanded outwards from the edge of the deciduous forest. The succession of the buffer areas to forest cover over time will more than compensate for the removal of trees for the proposed development.

Further details regarding the environmental management plan can be provided as a condition of draft plan approval.

As noted above, the areas of the property to be restored (i.e. former cultivated fields) should be protected with erosion/siltation control fencing (as per Town/TRCA standards). The fencing should be installed at the limits of grading and maintained over the duration of site development.

The natural heritage features on the subject property are intact and do not exhibit signs of major disturbance or weedy plant invasion. Additional environmental management measures include the following:

- cleaning up debris from the edges of the woodland/wetland along west edge of property; and,

- § prepare and distribute an information handout to the homeowners advising them of the significance/sensitivity of the natural environment features on the property and appropriate stewardship behavior.

8.0 SUMMARY AND CONCLUSIONS

This EIS and MP has been prepared in conjunction with an application for an 11 lot estate residential development located in the Palgrave Settlement Area of the Town of Caledon. The natural heritage framework for the property was developed in consultation with TRCA and MNRF. A minimum 30 m buffer has been provided from the greater of surveyed wetland or woodland boundary. Passive restoration (i.e. natural plant succession) of the buffer and non-developable portions of the property are recommended as the preferred method for addressing the environmental management plan requirements for the site.

Low impact development (LID) stormwater management measures are proposed to maintain the overall pattern, volume and quality of recharge to the groundwater system at pre-development levels and protect wetland hydrology. A combination of conventional and tertiary sewage treatment systems are recommended to meet the provincial water quality criteria for nitrate loading (i.e. <10mg/l). Nitrate levels below the 10 mg/l threshold can be achieved with the proposed 11 lot development. Groundwater monitoring on a lot level basis, however, is recommended by SPL Consultants (2016) to determine the most appropriate type of sewage treatment facility and confirm nitrate loading.

In conclusion, a high level of protection has been provided to the natural environmental features on and adjacent to the subject property, in accordance with the policy requirements for development within the Palgrave Settlement Area of the Oak Ridges Moraine. Provided that the recommended mitigation and environmental management measures described herein are properly implemented, no adverse impacts to the natural heritage system are anticipated as a result of the future development of the property.

Respectfully submitted by,

PLAN B Natural Heritage



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APPENDICES

A1 – Vascular Plant Checklist

A2 – Amphibian Point Count Survey Results

A3 – Breeding Bird Point Count Survey Results

A4 – Breeding Bird Checklist

FIGURES

Figures 1 to 7

Environmental Summary Map (UWG)

Large-format Figures

APPENDIX A-1: VASCULAR PLANT CHECKLIST
MOUNT HOPE, PALGRAVE, ONTARIO

Field reconnaissance of the subject property was undertaken in 2014. Two hundred and thirty-nine (239) vascular plant taxa were recorded to date in 2014. Seventy-six (76) taxa, or 31.8% of the recorded flora, are considered non-native and introduced to southern Ontario. Introduced taxa are denoted with the letter "I" in the Int (Introduced) column in the checklist below.

Provincial ranks are provided in the "S-rank" column. Coefficients of conservatism (CC) and wetness (CW) are also provided (from Oldham et al. 1995).

No species considered rare in Ontario (Oldham and Brinker 2009) have been recorded to date. The following species were recorded that are considered "Moraine Rare Species" based on the listings in *ORMCP Technical Paper 6 - Identification of Significant Portions of Habitat for Endangered, Rare and Threatened Species*:

Aster laevis	Smooth Aster
Carex hirtifolia	Hairy Sedge
Equisetum sylvaticum	Woodland Horsetail
Impatiens pallida	Pale Touch-me-not
Juglans nigra	Black Walnut (likely planted and/or adventive at this site)
Juniperus virginiana	Red Cedar
Pinus resinosa	Red Pine (not natural population; planted at this site)
Utricularia vulgaris	Common Bladderwort

VASCULAR PLANT CHECKLIST

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Acer negundo	Manitoba Maple		S5	0	-2
Acer platanoides	Norway Maple	I	SE5	*	5
Acer rubrum	Red Maple		S5	4	0
Acer saccharinum	Silver Maple		S5	5	-3
Acer saccharum saccharum	Sugar Maple		S5	4	3
Acer spicatum	Mountain Maple		S5	6	3
Acer x freemanii	Swamp Maple		S5	5	-3
Achillea millefolium	Yarrow	I	SE5	*	3
Actaea rubra	Red Baneberry		S5	5	5
Agrostis gigantea	Redtop	I	SE5	*	0
Agrostis stolonifera	Creeping Bent Grass		S5	0	-3

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Alisma plantago-aquatica	Water-plantain		S5	3	-5
Alliaria petiolata	Garlic Mustard	I	SE5	*	0
Allium tricoccum	Wild Leek		S5	7	2
Alnus glutinosa	Black Alder	I	SE5	*	-2
Ambrosia artemisiifolia	Common Ragweed		S5	0	3
Amelanchier laevis	Smooth Juneberry		S5	5	5
Anemone canadensis	Canada Anemone		S5	3	-3
Apocynum androsaemifolium androsaemifolium	Spreading Dogbane		S5	3	5
Arctium minus	Common Burdock	I	SE5	*	5
Arisaema triphyllum triphyllum	Jack-in-the-pulpit		S5	5	-2
Asclepias incarnata incarnata	Swamp Milkweed		S5	6	-5
Asclepias syriaca	Common Milkweed		S5	0	5
Aster ericoides	Heath Aster		S5	4	4
Aster laevis	Smooth Aster		S5	7	5
Aster lanceolatus	Tall White Aster		S5	3	-3
Aster lateriflorus	One-sided Aster		S5	3	-2
Aster macrophyllus	Large-leaved Aster		S5	5	5
Aster novae-angliae	New England Aster		S5	2	-3
Aster puniceus	Purple-stemmed Aster		S5	6	-5
Aster urophyllus	Arrow-leaved Aster		S4	6	5
Athyrium filix-femina angustum	Northeastern Lady Fern		S5	4	0
Berberis thunbergii	Japanese Barberry	I	SE5	*	4
Betula alleghaniensis	Yellow Birch		S5	6	0
Betula papyrifera	White Birch		S5	2	2
Betula pendula	European White Birch	I	SE4	*	-4
Bidens cernua	Nodding Beggar-ticks		S5	2	-5
Bidens frondosa	Devil's Beggar-ticks		S5	3	-3

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Bidens tripartita	Beggar-ticks		S5	4	-3
Boehmeria cylindrica	False Nettle		S5	4	-5
Bromus inermis inermis	Smooth Brome Grass	I	SE5	*	5
Caltha palustris palustris	Marsh-marigold		S5	5	-5
Cardamine concatenata	Cut-leaved Toothwort		S5	6	3
Carex bebbii	Bebb's Sedge		S5	3	-5
Carex blanda	Smooth Sedge		S5	3	0
Carex eburnea	Ivory Sedge		S5	6	4
Carex gracillima	Filiform Sedge		S5	4	3
Carex hirtifolia	Hairy Sedge		S5	5	5
Carex intumescens	Bladder Sedge		S5	6	-4
Carex lupulina	Hop Sedge		S5	6	-5
Carex pedunculata	Peduncled Sedge		S5	5	5
Carex pseudo-cyperus	Cyperus-like Sedge		S5	6	-5
Carex vulpinoidea	Fox Sedge		S5	3	-5
Caulophyllum thalictroides	Blue Cohosh		S5	6	5
Chelidonium majus	Celandine		SE5	*	5
Chenopodium album	Lamb's-quarters	I	SE5	*	1
Chenopodium simplex	Maple-leaved Goosefoot		S5	0	5
Chrysanthemum leucanthemum	Ox-eye Daisy	I	SE5	*	5
Cichorium intybus	Chicory	I	SE5	*	5
Cirsium arvense	Canada Thistle	I	SE5	*	3
Cirsium vulgare	Bull Thistle	I	SE5	*	4
Claytonia virginica	Narrow-leaved Spring Beauty		S5	7	3
Clinopodium vulgare	Wild Basil		S5	4	5
Convolvulus arvensis	Field Bindweed	I	SE5	*	5
Conyza canadensis	Horseweed		S5	0	1

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Cornus alternifolia	Alternate-leaved Dogwood		S5	6	5
Cornus foemina racemosa	Grey Dogwood		S5	2	-2
Cornus stolonifera	Red-osier Dogwood		S5	2	-3
Coronilla varia	Crown-vetch	I	SE5	*	5
Crataegus monogyna	English Hawthorn	I	SE5	*	5
Crataegus punctata	Dotted Hawthorn		S5	4	5
Dactylis glomerata	Orchard Grass	I	SE5	*	3
Daucus carota	Queen Anne's Lace	I	SE5	*	5
Digitaria sanguinalis	Large Crab Grass	I	SE5	*	3
Dipsacus fullonum sylvestris	Teasel	I	SE5	*	5
Dryopteris carthusiana	Spinulose Wood Fern		S5	5	-2
Dryopteris marginalis	Marginal Wood Fern		S5	5	3
Echinochloa crusgalli	Barnyard Grass	I	SE5	*	-3
Echinocystis lobata	Wild Cucumber		S5	3	-2
Echium vulgare	Blueweed	I	SE5	*	5
Elaeagnus angustifolia	Russian-olive	I	SE3	*	4
Eleocharis obtusa	Blunt Spike-rush		S5	5	-5
Eleocharis smallii	Small's Spike-rush		S5	6	-5
Epilobium hirsutum	Great Hairy Willow-herb	I	SE5	*	-4
Epilobium parviflorum	Small-flowered Willow-herb	I	SE4	*	3
Epipactis helleborine	Helleborine	I	SE5	*	5
Equisetum arvense	Field Horsetail		S5	0	0
Equisetum sylvaticum	Woodland Horsetail		S5	7	-3
Erigeron philadelphicus philadelphicus	Philadelphia Fleabane		S5	1	-3
Erythronium americanum	Yellow Trout-lily		S5	5	5
Eupatorium maculatum	Spotted Joe-Pye-weed		S5	3	-5
Eupatorium perfoliatum	Boneset		S5	2	-4

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Euphorbia esula	Leafy Spurge	I	SE5	*	5
Euthamia graminifolia	Grass-leaved Goldenrod		S5	2	-2
Fagus grandifolia	American Beech		S5	6	3
Fragaria vesca americana	Woodland Strawberry		S5	4	4
Fragaria virginiana	Field Strawberry		S5	2	1
Fraxinus americana	White Ash		S5	4	3
Fraxinus pennsylvanica	Green Ash		S5	3	-3
Galeopsis tetrahit	Hemp-nettle	I	SE5	*	5
Galium palustre	Marsh Bedstraw		S5	5	-5
Galium triflorum	Sweet-scented Bedstraw		S5	4	2
Geranium maculatum	Wild Geranium		S5	6	3
Geranium robertianum	Herb Robert	I	SE5	*	5
Geum canadense	White Avens		S5	3	0
Glyceria striata	Fowl Manna Grass		S5	3	-5
Hesperis matronalis	Dame's Rocket	I	SE5	*	5
Hieracium aurantiacum	Orange Hawkweed	I	SE5	*	5
Hordeum jubatum jubatum	Foxtail Barley	I	SE5	*	-1
Hystrix patula	Bottle-brush Grass		S5	5	5
Impatiens capensis	Spotted Touch-me-not		S5	4	-3
Impatiens pallida	Pale Touch-me-not		S5	7	-3
Inula helenium	Elecampane	I	SE5	*	5
Iris pseudacorus	Yellow Flag	I	SE3	*	-5
Juncus dudleyi	Dudley's Rush		S5	1	0
Juncus effusus solutus	Soft Rush		S5	4	-3
Juglans nigra	Black Walnut		S4	5	3
Juniperus virginiana	Red Cedar		S5	4	3
Lactuca serriola	Prickly Lettuce	I	SE5	*	0
Lamium amplexicaule	Henbit	I	SE3	*	5

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Laportea canadensis	Wood Nettle		S5	6	-3
Leersia oryzoides	Rice Cut Grass		S5	3	-5
Lemna minor	Common Duckweed		S5	2	-5
Lemna trisulca	Star Duckweed		S5	4	-5
Lepidium campestre	Field Pepper-grass	I	SE5	*	5
Linaria vulgaris	Butter-and-eggs	I	SE5	*	5
Lonicera tatarica	Tartarian Honeysuckle	I	SE5	*	3
Lotus corniculatus	Birdfoot Trefoil	I	SE5	*	1
Lycopus americanus	American Water-horehound		S5	4	-5
Lycopus uniflorus	Water-horehound		S5	5	-5
Lythrum salicaria	Purple Loosestrife	I	SE5	*	-5
Maianthemum canadense	Wild Lily-of-the-valley		S5	5	0
Maianthemum racemosum racemosum	Tall False Solomon's-seal		S5	4	3
Malus pumila	Apple	I	SE5	*	5
Matteuccia struthiopteris	American Ostrich Fern		S5	5	-3
Medicago lupulina	Black Medick	I	SE5	*	1
Medicago sativa	Alfalfa	I	SE5	*	5
Melilotus alba	White Sweet-clover	I	SE5	*	3
Melilotus officinalis	Yellow Sweet-clover	I	SE5	*	3
Mentha arvensis borealis	Common Mint		S5	3	-3
Muhlenbergia mexicana var. mexicana	Muhly Grass		S5	1	-3
Nasturtium microphyllum	Water Cress	I	SE5	*	-5
Nepeta cataria	Catnip	I	SE5	*	1
Onoclea sensibilis	Sensitive Fern		S5	4	-3
Ostrya virginiana	Ironwood		S5	4	4
Panicum implicatum var. lanuginosum	Panic Grass		S5	2	0

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Parthenocissus inserta	Virginia Creeper		S5	3	3
Phalaris arundinacea	Reed Canary Grass		S5	0	-4
Phleum pratense	Timothy Grass	I	SE5	*	3
Phragmites australis australis	European Common Reed	I	SE5	*	-3
Picea abies	Norway Spruce	I	SE3	*	5
Picea glauca	White Spruce		S5	6	3
Pinus resinosa	Red Pine		S5	8	3
Pinus strobus	White Pine		S5	4	3
Plantago lanceolata	English Plantain	I	SE5	*	0
Plantago major	Broad-leaved Plantain	I	SE5	*	-1
Poa annua	Annual Blue Grass	I	SE5	*	1
Poa compressa	Canada Blue Grass		S5	0	2
Poa pratensis	Kentucky Blue Grass		S5	0	1
Podophyllum peltatum	May-apple		S5	5	3
Polygonum amphibium	Water Smartweed		S5	5	-5
Populus balsamifera	Balsam Poplar		S5	4	-3
Populus grandidentata	Large-toothed Aspen		S5	5	3
Populus tremuloides	Trembling Aspen		S5	2	0
Potentilla norvegica	Rough Cinquefoil		S5	0	0
Prunella vulgaris	Heal-all		S5	5	5
Prunus nigra	Canada Plum		S4	4	4
Prunus pensylvanica	Pin Cherry		S5	3	4
Prunus serotina	Wild Black Cherry		S5	3	3
Prunus virginiana virginiana	Chokecherry		S5	2	1
Pteridium aquilinum	Eastern Bracken Fern		S5	2	3
Pyrus communis	Pear	I	SE4	*	5
Quercus rubra	Red Oak		S5	6	3
Ranunculus acris	Tall Buttercup	I	SE5	*	-2

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Ranunculus hispidus var. caricetorum	Swamp Buttercup		S5	5	-5
Ranunculus sceleratus	Cursed Crowfoot		S5	2	-5
Rhamnus cathartica	Common Buckthorn	I	SE5	*	3
Rhus radicans rydbergii	Poison-ivy		S5	0	0
Rhus typhina	Staghorn Sumac		S5	1	5
Rosa blanda	Smooth Rose		S5	3	3
Rosa multiflora	Multiflora Rose	I	SE4	*	3
Rubus allegheniensis	Common Blackberry		S5	2	2
Rubus idaeus melanolasius	Wild Red Raspberry		S5	0	-2
Rubus occidentalis	Black Raspberry		S5	2	5
Rudbeckia hirta	Black-eyed Susan		S5	0	3
Rumex crispus	Curly Dock	I	SE5	*	-1
Sagittaria latifolia	Common Arrowhead		S5	4	-5
Salix alba	White Willow	I	SE4	*	-3
Salix amygdaloides	Peach-leaved Willow		S5	6	-3
Salix bebbiana	Bebb's Willow		S5	4	-4
Salix discolor	Pussy Willow		S5	3	-3
Salix eriocephala	Heart-leaved Willow		S5	4	-3
Salix lucida	Shining Willow		S5	5	-4
Salix petiolaris	Slender Willow		S5	3	-4
Salix x rubens	Crack Willow	I	SE4	*	-4
Scirpus atrovirens	Black Bulrush		S5	3	-5
Scirpus cyperinus	Wool-grass		S5	4	-5
Scirpus validus	Softstem Bulrush		S5	5	-5
Senecio viscosus	Sticky Groundsel	I	SE3	*	5
Sinapsis arvensis	Charlock	I	SE5	*	3
Sium suave	Water-parsnip		S5	4	-5

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Solanum dulcamara	Climbing Nightshade	I	SE5	*	0
Solanum ptycanthum	Eastern Black Nightshade	I	SE4	*	5
Solidago altissima	Tall Goldenrod		S5	1	3
Solidago caesia	Blue-stem Goldenrod		S5	5	3
Solidago canadensis	Canada Goldenrod		S5	1	3
Solidago flexicaulis	Zig-zag Goldenrod		S5	6	3
Solidago nemoralis nemoralis	Gray Goldenrod		S5	2	5
Solidago rugosa rugosa	Rough Goldenrod		S5	4	-1
Sonchus arvensis	Perennial Sow-thistle		SE5	*	1
Sorghum halepense	Johnson Grass	I	SE2	*	3
Sporobolus neglectus	Overlooked Dropseed		S4	1	5
Syringa vulgaris	Common Lilac	I	SE5	*	5
Tanacetum vulgare	Tansy	I	SE5	*	5
Taraxacum officinale	Common Dandelion	I	SE5	*	3
Thalictrum dioicum	Early Meadow-rue		S5	5	2
Thelypteris palustris	Marsh Fern		S5	5	-4
Thuja occidentalis	White Cedar		S5	4	-3
Tilia americana	American Basswood		S5	4	3
Tragopogon pratensis pratensis	Meadow Goat's-beard	I	SE5	*	5
Trifolium hybridum elegans	Alsike Clover	I	SE5	*	1
Trifolium pratense	Red Clover	I	SE5	*	2
Trillium grandiflorum	White Trillium		S5	5	5
Tsuga canadensis	Eastern Hemlock		S5	7	3
Tussilago farfara	Coltsfoot		SE5	*	3
Typha angustifolia	Narrow-leaved Cattail		S5	3	-5
Typha latifolia	Common Cattail		S5	3	-5
Ulmus americana	White Elm		S5	3	-2
Urtica dioica gracilis	American Stinging Nettle		S5	2	-1

Scientific Name	**Common Name**	**Int.**	**S-Rank**	**CC**	**CW**
Utricularia vulgaris	Common Bladderwort		S5	4	-5
Verbascum thapsus	Common Mullein	I	SE5	*	5
Viburnum lentago	Nannyberry		S5	4	-1
Viburnum trilobum	Highbush-cranberry		S5	5	-3
Viola canadensis	Canada Violet		S5	6	5
Viola conspersa	Dog Violet		S5	4	-2
Viola cucullata	Marsh Violet		S5	5	-5
Viola pubescens	Downy Yellow Violet		S5	5	4
Viola sororia	Common Blue Violet		S5	4	1
Vitis riparia	Riverbank Grape		S5	0	-2

Appendix A-2 Amphibian Point-Count Survey Results (2014)

Visit	Date	Start	Finish	Start Temp	Finish Temp	Wind
1	21-Apr-14	23:30	0:31	11	10	1
2	28-May-14	23:35	0:35	13	13	2
3	12-Jun-14	23:38	0:43	18	18	2

Point Count	Visit	SPPE		AMTO		GRTF		GRFR		BULL		WOFR		CHFR	
		<100M	>100M	<100M	>100M	<100M	>100M	<100M	>100M	<100M	>100M	<100M	>100M	<100M	>100M
A	1	3	3	1_1								3	3	1_1	
	2		2_4		2_5	1_2		1_1							
	3					1_1	1_3	1_2	1_3						
B	1	3	3									3	3		
	2					2_4	2_6	2_3	2_5						
	3						1_2	1_2	2_5	1_1					
C	1	3	3	1_2											
	2			3				1_2							
	3							1_4							
D	1	3	3	1_3								2_3	2_7		
	2	1_1		2_5	3										
	3							1_1	1_3						

Codes: Code 1: Individual calls do not overlap and calling individuals can be discretely counted (1_4).
Code 2: Calls of individuals sometimes overlap, but numbers of individuals can still be estimated (2_4).
Code 3: Overlap among calls seems continuous (full chorus), and a count estimate is impossible.

Species Codes: SPPE (Spring Peeper), AMTO (American Toad), GRTF (Grey Tree Frog), GRFR (Green Frog), BULL (Bull Frog), WOFR (Wood Frog), CHFR (Chorus Frog)

Appendix A-3 Breeding Bird Point-Count Survey Results (2014)

June 16th, 2014	Start	End
Temperature (Celsius)	14	15
Wind Speed (Beaufort)	2	2

Station 1	Time:	6:00
Species	<100m	>100m
Warbling Vireo	2	
Wood Thrush		1
Red-winged Blackbird	1	1
Great-crested Flycatcher		1
American Robin		1
Gray Catbird	1	
Song Sparrow	1	

Station 2	Time:	6:12
Species	<100m	>100m
Yellow Warbler		2
Tree Swallow	1	
Cedar Waxwing	2	
American Goldfinch	1	2
Chipping Sparrow		1
Common Yellowthroat		1
Swamp Sparrow		1
Killdeer		1

Station 3	Time:	6:30
Species	<100m	>100m
Warbling Vireo		1
Yellow Warbler		1
Red-winged Blackbird	2	
Common Grackle		1

Station 4	Time:	6:50
Species	<100m	>100m
Red-eyed Vireo		2
Chipping Sparrow	1	
American Goldfinch	2	1
Cedar Waxwing	2	
Great Blue Heron	3	
Eastern Kingbird	1	

July 9th, 2014	Start	End
Temperature (Celsius)	15	17
Wind Speed (Beaufort)	2	3

Station 1	Time:	5:20
Species	<100m	>100m
Wood Thrush		1
American Robin	1	1
Red-eyed Vireo	1	
Warbling Vireo	1	1
Red-winged Blackbird		1
Common Grackle	2	1
Great Crested Flycatcher	1	1
Swamp Sparrow	1	
Song Sparrow		1
Common Yellowthroat	1	
Yellow Warbler		1
Baltimore Oriole	1	
Cedar Waxwing		2

Station 2	Time:	5:38
Species	<100m	>100m
Yellow Warbler	1	1
Common Yellowthroat	1	
Mallard		1
Song Sparrow	1	1
Swamp Sparrow	1	
American Robin		1
Mourning Dove	1	

Station 3	Time:	5:55
Species	<100m	>100m
Warbling Vireo	1	
Baltimore Oriole	1	
Yellow Warbler	1	1
Common Yellowthroat	1	
Common Grackle	1	
Red-winged Blackbird	2	1
Song Sparrow	1	1
Savannah Sparrow		1

Station 5	Time:	7:15
Species	<100m	>100m
Red-winged Blackbird	3	3
Song Sparrow		1
Swamp Sparrow	1	
American Robin		1
Great-crested Flycatcher		1
Chipping Sparrow		1

Station 6	Time:	7:30
Species	<100m	>100m
Song Sparrow	2	2
Red-eyed Vireo		2
American Goldfinch	1	1
American Robin		1
Red-winged Blackbird		3
Gray Catbird		1
European Starling		1

Station 7	Time:	7:50
Species	<100m	>100m
Song Sparrow	2	2
Yellow Warbler	1	1
Baltimore Oriole	1	1
American Robin	1	2
American Redstart		1
American Goldfinch		2
Cedar Waxwing		1
Northern Cardinal		1

Station 4	Time:	6:12
Species	<100m	>100m
Eastern Kingbird	1	
European Starling	3	
Common Raven		1
American Crow		2
American Goldfinch	1	
Savannah Sparrow	1	
Song Sparrow	1	
Red-eyed Vireo		1
American Robin		2

Station 5	Time:	6:35
Species	<100m	>100m
Barn Swallow	2	7
Tree Swallow	3	8
Song Sparrow	1	
Swamp Sparrow	1	1
Red-winged Blackbird	2	1
Chipping Sparrow	1	
Trail's Flycatcher	1	
European Starling	4	
House Sparrow		3
Ring-billed Gull		2

Station 6	Time:	6:52
Species	<100m	>100m
Red-tailed Hawk		1
Song Sparrow	2	1
Savannah Sparrow		1
Gray Catbird	1	1
Common Grackle		1
Red-eyed Vireo		1
Red-winged Blackbird		2
American Goldfinch	1	1
Warbling Vireo		1

Station 7	Time:	7:17

Appendix A-3 Breeding Bird Point-Count Survey Results (2014)

Species	<100m	>100m
Song Sparrow	2	1
Yellow Warbler		1
Common Yellowthroat	1	1
Baltimore Oriole	1	1
Gray Catbird	1	
American Redstart		1
American Robin	2	2
Red-eyed Vireo		2
Red-winged Blackbird		1
House Wren	1	

Appendix A-4 Breeding Bird Observations (2014)

Species		Breeding Evidence
Common Name	**Scientific Name**	
Canada Goose	*Branta canadensis*	Flyover
Trumpeter Swan	*Cygnus buccinator*	Flyover
Wood Duck	*Aix sponsa*	Possible
Mallard	*Anas platyrhynchos*	Possible
Great Blue Heron	*Ardea herodias*	Flyover
Green Heron	*Butorides virescens*	Flyover
Turkey Vulture	*Cathartes aura*	Flyover
Sharp-shinned Hawk	*Accipiter striatus*	Flyover
Red-shouldered Hawk	*Buteo lineatus*	Flyover
Red-tailed Hawk	*Buteo jamaicensis*	Flyover
Killdeer	*Charadrius vociferus*	Possible
Spotted Sandpiper	*Actitis macularius*	Possible
Solitary Sandpiper	*Tringa solitaria*	Migrant
American Woodcock	*Scolopax minor*	Possible
Ring-billed Gull	*Larus delawarensis*	Flyover
Herring Gull	*Larus argentatus*	Flyover
Rock Pigeon	*Columba livia*	Flyover
Mourning Dove	*Zenaida macroura*	Possible
Downy Woodpecker	*Picoides pubescens*	Possible
Northern Flicker	*Colaptes auratus*	Possible
American Kestrel	*Falco sparverius*	Flyover
Trail's Flycatcher (willow/alder)	*Empidonax sp.*	Possible
Eastern Phoebe	*Sayornis phoebe*	Migrant
Great Crested Flycatcher	*Myiarchus crinitus*	Probable
Eastern Kingbird	*Tyrannus tyrannus*	Probable
Warbling Vireo	*Vireo gilvus*	Probable
Red-eyed Vireo	*Vireo olivaceus*	Probable
Blue Jay	*Cyanocitta cristata*	Flyover
American Crow	*Corvus brachyrhynchos*	Flyover
Common Raven	*Corvus corax*	Flyover
Horned Lark	*Eremophila alpestris*	Migrant
Tree Swallow	*Tachycineta bicolor*	Possible
Barn Swallow	*Hirundo rustica*	confirmed
Black-capped Chickadee	*Poecile atricapillus*	Possible
White-breasted Nuthatch	*Sitta carolinensis*	Possible
House Wren	*Troglodytes aedon*	Possible
Golden-crowned Kinglet	*Regulus satrapa*	Migrant
Swainson's Thrush	*Catharus ustulatus*	Migrant
Hermit Thrush	*Catharus guttatus*	Migrant
Wood Thrush	*Hylocichla mustelina*	Probable
American Robin	*Turdus migratorius*	Confirmed
Gray Catbird	*Dumetella carolinensis*	Probable
Brown Thrasher	*Toxostoma rufum*	Migrant
European Starling	*Sturnus vulgaris*	Flyover
American Pipit	*Anthus rubescens*	Migrant
Cedar Waxwing	*Bombycilla cedrorum*	Probable

Common Yellowthroat	*Geothlypis trichas*	Probable
American Redstart	*Setophaga ruticilla*	Probable
Yellow Warbler	*Setophaga petechia*	Probable
Chestnut-sided Warbler	*Setophaga pensylvanica*	Migrant
Black-throated Green Warbler	*Setophaga virens*	Migrant
Chipping Sparrow	*Spizella passerina*	Probable
Savannah Sparrow	*Passerculus sandwichensis*	Probable
Song Sparrow	*Melospiza melodia*	Confirmed
Swamp Sparrow	*Melospiza georgiana*	Probable
White-throated Sparrow	*Zonotrichia albicollis*	Migrant
White-crowned Sparrow	*Zonotrichia leucophrys*	Migrant
Northern Cardinal	*Cardinalis cardinalis*	Possible
Red-winged Blackbird	*Agelaius phoeniceus*	Confirmed
Common Grackle	*Quiscalus quiscula*	Confirmed
Brown-headed Cowbird	*Molothrus ater*	Possible
Baltimore Oriole	*Icterus galbula*	Probable
House Finch	*Haemorhous mexicanus*	Probable
American Goldfinch	*Spinus tristis*	Probable
House Sparrow	*Passer domesticus*	Possible



Legend

Study Area

0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Study Area

Project #	2013-75	**Figure #** 1
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	



Legend

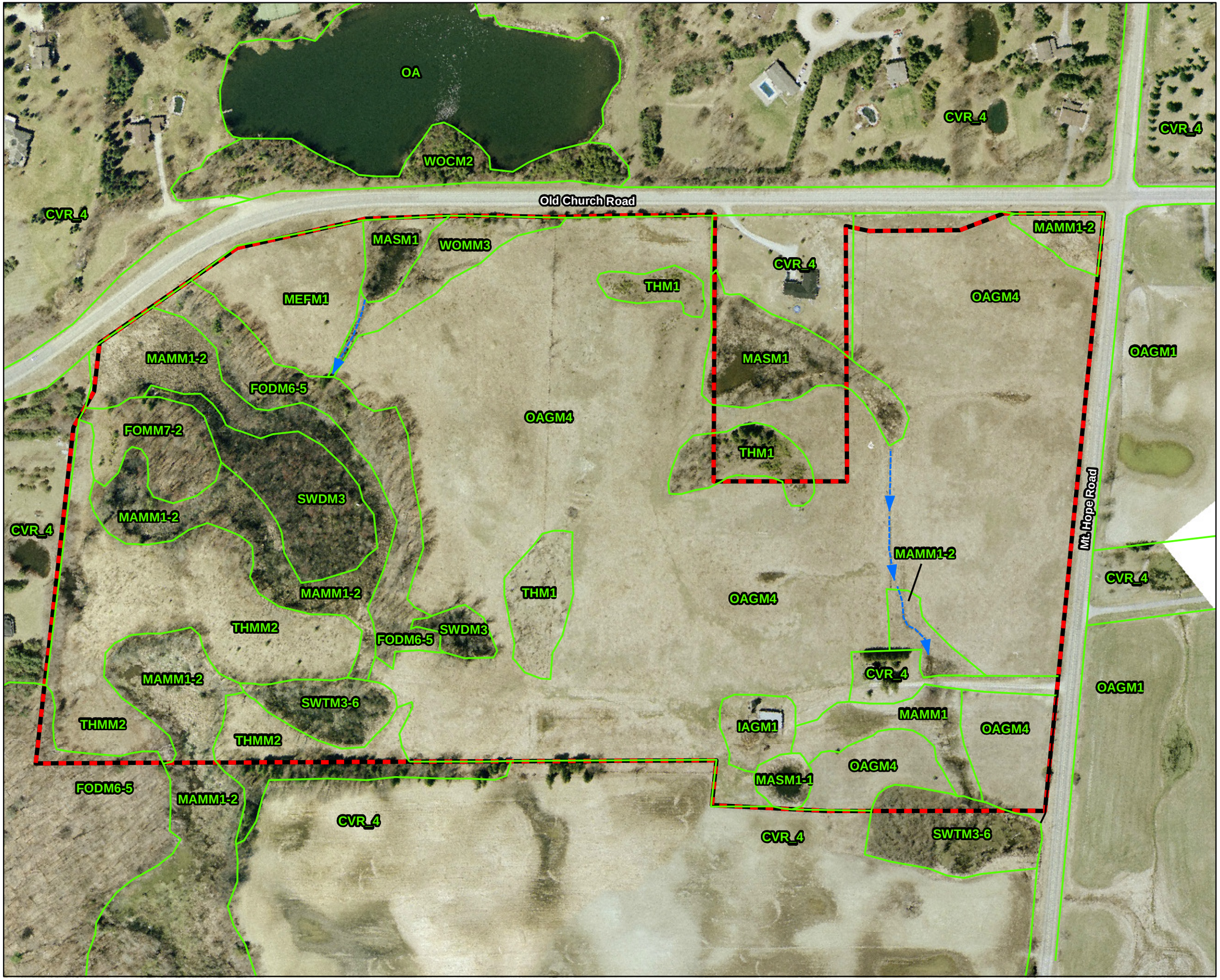
- Study Area
- 1 m Contour Line
- Intermittent Surface Drainage

Meters
0 12.5 25 50 75 100

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Topography

Project #	2013-75	**Figure #** 2
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	



Legend

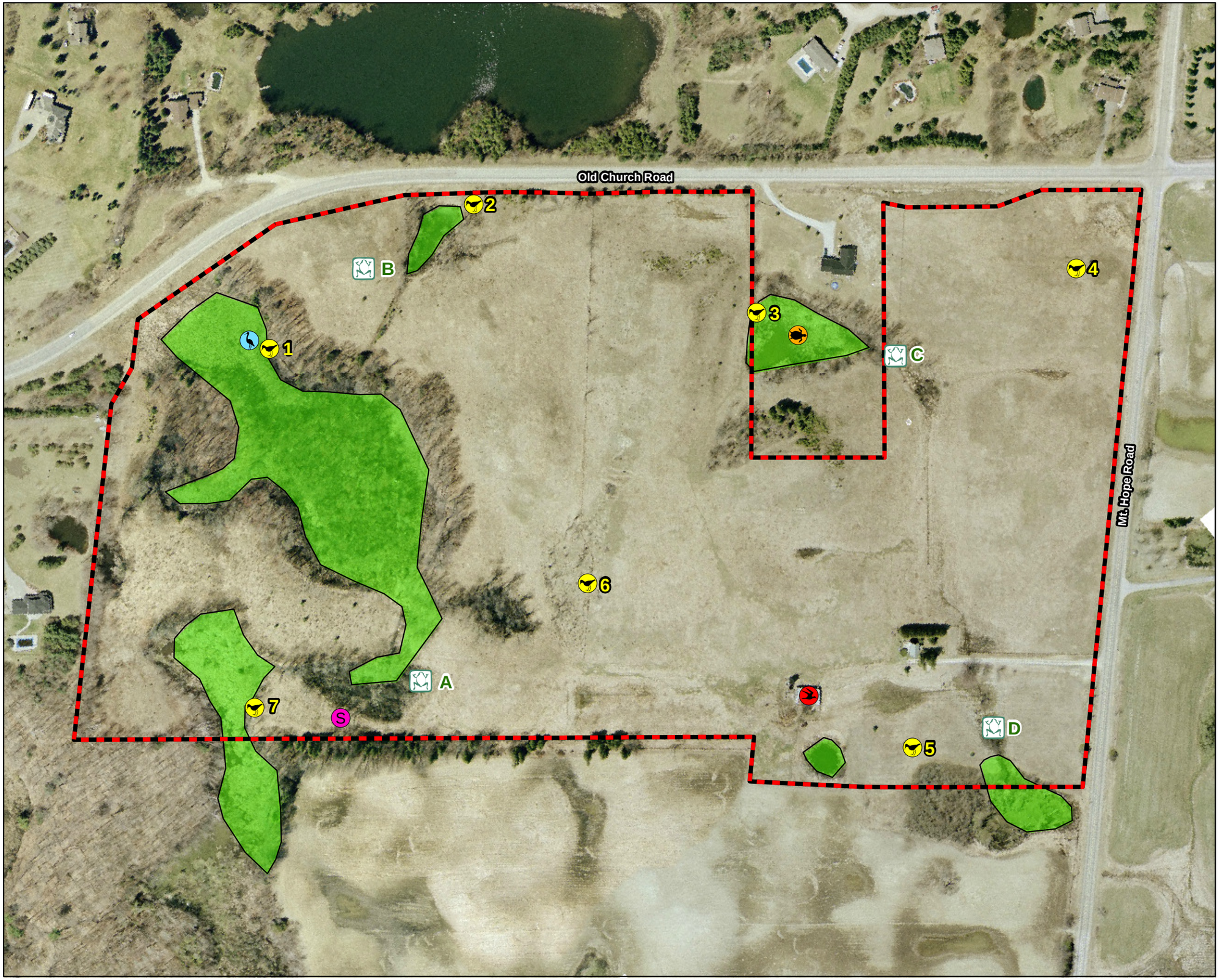
	Study Area
	Intermittent Surface Drainage
	Vegetation Community Boundary
CVR_4	Rural Property
FODM6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type
FOMM7-2	Fresh-Moist Whie Cedar- Hardwood Mixed Forest Type
IAGM1	Agricultural Building
MAMM1	Graminoid Mineral Meadow Marsh
MAMM1-2	Cattail Graminoid Mineral Meadow Marsh
MASM1	Graminoid Mineral Shallow Marsh
MASM1-1	Cattail Mineral Shallow Marsh
MEFM1	Dry-Fresh Forb MeadowType
OA	Open Water
OAGM1	Open Agriculture Annual Row Crops
OAGM4	Open Pasture
SWDM3	Maple Mineral Swamp
SWTM3-6	Mixed Willow Mineral Deciduous Thicket Swamp
THM1	Dry-Fresh Mixed Regeneration Thicket Type
THMM2	Fresh-Moist Mixed Thicket Type
WOCM2	Fresh-Moist Coniferous Woodland
WOMM3	Dry-Fresh Mixed Woodland Type

0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Vegetation Communities

Project #	2013-75	Figure # 3
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	



Legend

- Study Area
- Breeding Bird Point Count Station
- Anuran Survey Station
- Reptile Observation
  - Eastern Garter Snake
- Turtle Observation
  - Midland Painted Turtle
- Bird Observation
  - Barn Swallow (Threatened Species)
- Bird Observation
  - Wood Thrush (Special Concern)
- Amphibian Concentration Area

0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Wildlife Monitoring

Project #	2013-75	Figure # 4
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	



Legend

- Study Area
- Surveyed Wetland Boundary (TRCA)
- Surveyed Woodland Boundary (MNRF)
- 30 m Buffer (greater of 30 m wetland or woodland setback)
- Intermittent Surface Drainage

N

0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Constraints

Project #	2013-75	**Figure #** 5
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	



Legend

Study Area

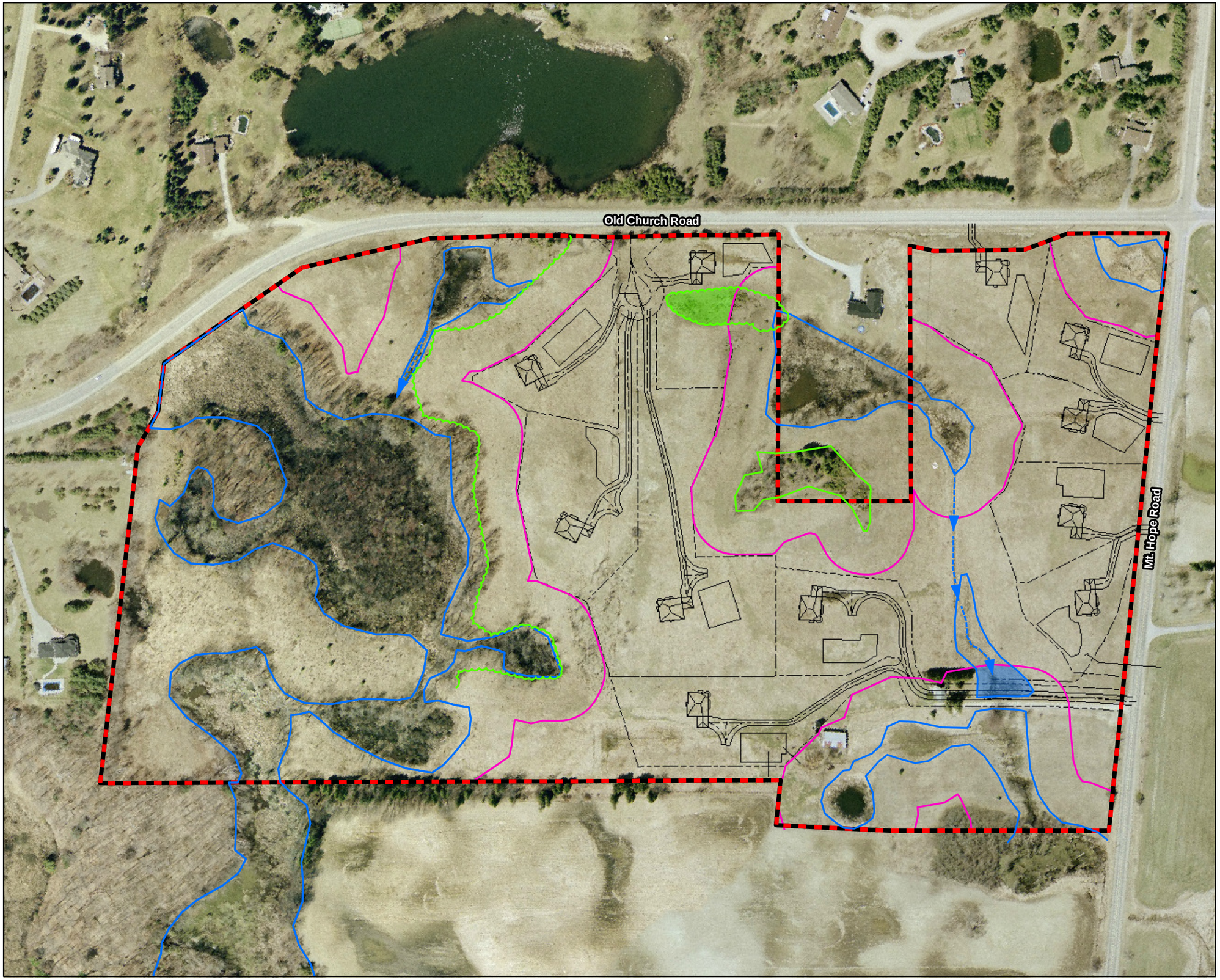
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0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Proposed Development

Project #	2013-75	**Figure #** 6a
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	



Legend

- Study Area
- Surveyed Wetland Boundary (TRCA)
- Surveyed Woodland Boundary (MNRF)
- 30 m Buffer (greater of 30 m wetland or woodland setback)
- Intermittent Surface Drainage
- Proposed Woodland Removal
- Proposed Wetland Removal

N

0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Proposed Development/Constraint Overlay

Project #	2013-75	**Figure #** 6b
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	



Legend

- Study Area
- Intermittent Surface Drainage
- Surveyed Wetland Boundary (TRCA)
- Surveyed Woodland Boundary (MNRF)
- Restoration Areas

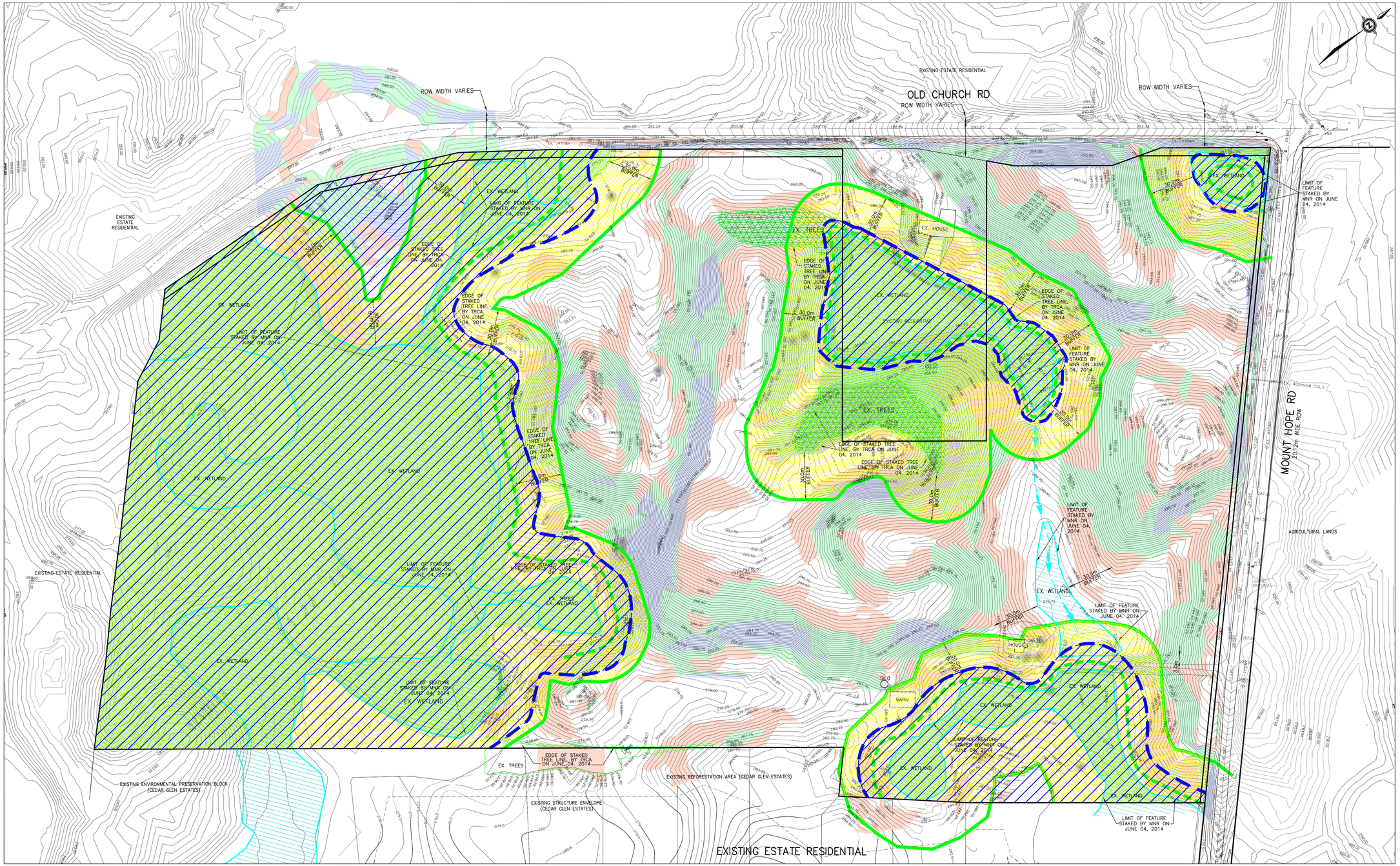
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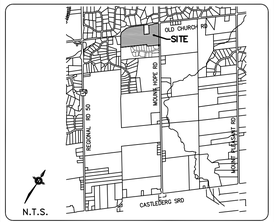
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PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Environmental Management Plan

Project #	2013-75	**Figure #** 7
Date	May 2016	
Scale	1 : 2,500	
Prepared By: JJJ	Verified By: BDB	





DRAFT PLAN OF SUBDIVISION

PART OF EAST HALF
LOT 20
Concession 7
Albion PIN 14333-0051(LT)
Geographic Township of Albion
TOWN OF CALEDON
Regional Municipality of Peel

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR ELEVATION
- EXISTING DRAINAGE SWALE
- EXISTING INTERMITTENT DRAINAGE SWALE
- LIMIT OF FEATURE STAKED BY MNR ON JUNE 04, 2014
- EXISTING TREE
- EXISTING EDGE OF STAKED TREE LINE, BY TRCA ON JUNE 04, 2014
- EXISTING DRY SWALE
- KNHF BUFFER SETBACK
- 11%–15% SLOPE RANGE
- 15%–25% SLOPE RANGE
- GREATER THAN 25% SLOPE RANGE
- SEASONAL WATER TABLE AT 0.50m DEEP
- SEASONAL WATER TABLE FROM 0.50m TO 1.5m DEEP
- ORM KNHF – EZ 1
- ORM MVPZ – EZ 1
- HIGH GROUND WATER TABLE – EZ2

BENCHMARK: USED: MTO#00819758063
TOPOGRAPHIC INFORMATION SHOWN IS BASED ON A SURVEY PREPARED BY: B.M.C. CONSTRUCTION LAYOUT SERVICES LTD.
LOCATION: MT.HOPE & OLD CHURCH
GROUND SURVEY DATE: JUL–AUG 2013.
ELEVATION: 272.961m

No.	By	Date	Revision	Chk'd
1	B.K.	MAY 2016	DRAFT PLAN SUBMISSION	

PLANNER:
Robert Russell Planning Consultants Inc.

PLANNER:
PAUL A. KING
16 Willett Crescent
Caledon East, ON, Ontario
L4K 1W8
Phone: 905 770x0232
Fax: 905 727-6415
Email: paking@pathcom.com

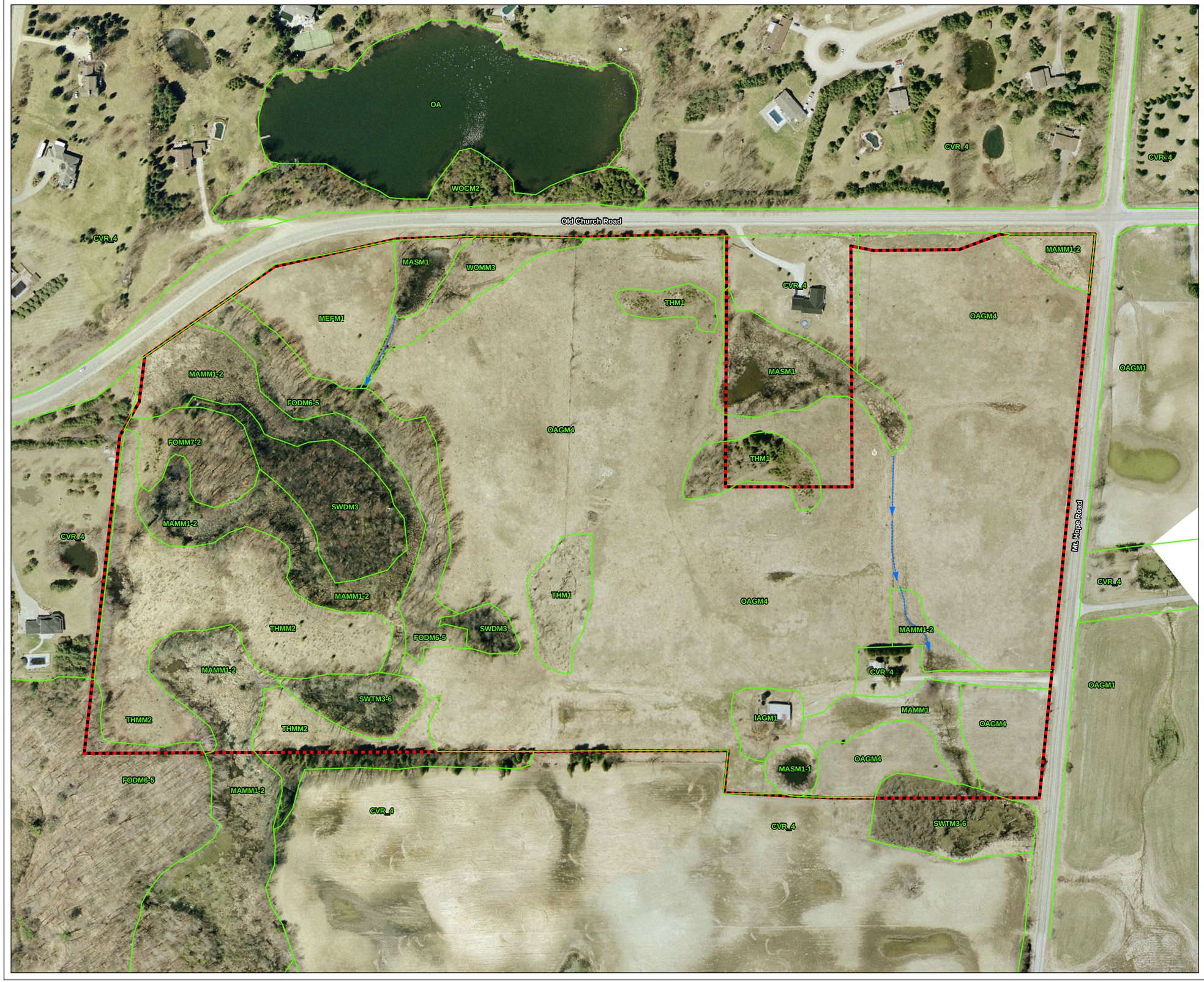
ENGINEER:
15955 AIRPORT ROAD, SUITE 304
CALEDON EAST, ONTARIO, L7C 1H9
PHONE: (905) 584-1458 FAX: (905) 584-1461
rban Watershed Group Ltd.
A Member of the GEOFLAND Group of Companies
urbanwater@rogers.com

CLIENT:
1693388 ONT INC.

MUNICIPALITY:
TOWN OF CALEDON

TITLE:
Mount Hope Estates
Old Church Road & Mount Hope Road
Environmental Summary Map

Surveyed by:				File: 13029	
Drawn by:	B.K.	Chk'd by:	B.K.	Drawing No.	Sheet No.
Designed by:	P.E.	Chk'd by:	B.K.	13029-7	7
Scale: 1 : 1000		Date:	JAN 06, 2014		



Legend

- Study Area
- Intermittent Surface Drainage
- Vegetation Community Boundary
- CVR_4 — Rural Property
- FODM6-5 — Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type
- FOMM7-2 — Fresh-Moist Whie Cedar- Hardwood Mixed Forest Type
- IAGM1 — Agricultural Building
- MAMM1 — Graminoid Mineral Meadow Marsh
- MAMM1-2 — Cattail Graminoid Mineral Meadow Marsh
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- MEFM1 — Dry-Fresh Forb MeadowType
- OA — Open Water
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- OAGM4 — Open Pasture
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- SWTM3-6 — Mixed Willow Mineral Deciduous Thicket Swamp
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- THMM2 — Fresh-Moist Mixed Thicket Type
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- WOMM3 — Dry-Fresh Mixed Woodland Type

N

0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Vegetation Communities

Project #	2013-75	Figure # 3
Date	May 2016	
Scale	1 : 1,250	
Prepared By: JJJ	Verified By: BDB	



Legend

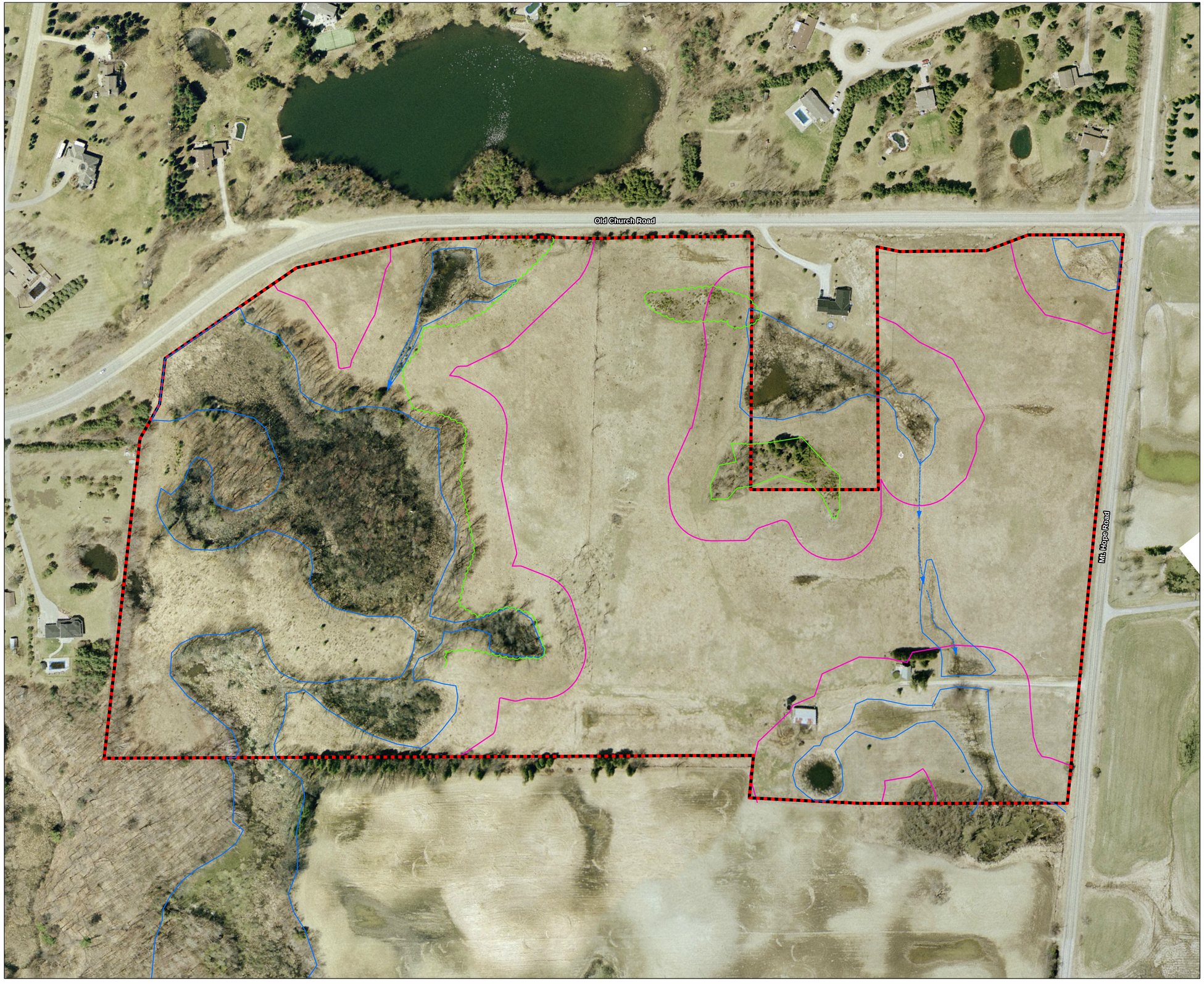
- Study Area
- Breeding Bird Point Count Station
- Anuran Survey Station
- Reptile Observation
  - Eastern Garter Snake
- Turtle Observation
  - Midland Painted Turtle
- Bird Observation
  - Barn Swallow (Threatened Species)
- Bird Observation
  - Wood Thrush (Special Concern)
- Amphibian Concentration Area

0 12.525 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Wildlife Monitoring

Project #	2013-75	**Figure #** 4
Date	May 2016	
Scale	1 : 1,250	
Prepared By: JJJ	Verified By: BDB	



Legend

- Study Area
- Surveyed Wetland Boundary (TRCA)
- Surveyed Woodland Boundary (MNRF)
- 30 m Buffer (greater of 30 m wetland or woodland setback)
- Intermittent Surface Drainage

N

0 12.5 25 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Constraints

Project #	2013-75	**Figure #** 5
Date	May 2016	
Scale	1 : 1,250	
Prepared By: JJJ	Verified By: BDB	



Legend

- Study Area
- Surveyed Wetland Boundary (TRCA)
- Surveyed Woodland Boundary (MNRF)
- Intermittent Surface Drainage
- Restoration Areas

N

0 12.525 50 75 100 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning
176 Fellowes Crescent
Waterdown, ON
L0R 2H3

Mount Hope Estates
Palgrave Settlement Area
Town of Caledon
Environmental Management Plan

Project #	2013-75	**Figure #** 7
Date	May 2016	
Scale	1 : 1,250	
Prepared By: JJJ	Verified By: BDB	