46, 47 and 87 Hyland Road, Guelph

Environmental Impact Study

Prepared for:
Dunnink Homes Ltd.
4988 Jones Baseline
RR#2
Guelph, Ontario

Project No. 1400 | December 2015

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

46, 47 and 87 Hyland Road,
Guelph, Ontario
Environmental Impact Study

Project Team:

David Stephenson	Senior Biologist, Project Advisor, Certified Arborist
Ryan Archer	Terrestrial and Wetland Biologist, Project Manager
Jessica Walker	Terrestrial and Wetland Biologist
Andrew Dean	Terrestrial and Wetland Biologist
Jeremy Bannon	Terrestrial and Wetland Biologist, Certified Arborist
Laura Hockley	GIS Analyst

Report submitted on December 22, 2015

Ryan Archer
Project Manager
Terrestrial and Wetland Biologist

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained in August 2013 by Dunnink Homes Ltd. to complete an Environmental Impact Study (EIS) for a proposed residential subdivision at 46, 47, and 87 Hyland Road in the City of Guelph. The subject property consists of two adjacent parcels located north and south of Hyland Road (for the purposes of the EIS, referred to as the north parcel and south parcel, respectively). The landowner is proposing to develop the subject property to accommodate 19 single detached residential lots across both parcels. A cul-de-sac will be constructed within the north parcel, and an extension of Glenburnie Drive into a cul-de-sac will be constructed within the south parcel. A formal pedestrian trail is proposed to traverse the subject property from the south property limit to Hyland Road in accordance with the City of Guelph's Trail Master Plan as mapped in Official Plan Amendment (OPA) 48. In accordance with City requirements, three trail route alternatives were assessed as part of the EIS to identify a preferred alignment that presents the least potential for natural feature impact (see Section 6.0).

The majority of the south parcel is dominated by wetland and woodland features that have been designated as part of the Guelph Northeast Provincially Significant Wetland (PSW) by the Ontario Ministry of Natural Resources and Forestry (MNRF) and as Significant Woodland by the City of Guelph in OPA 42 (City of Guelph 2014). Collectively, these features are considered Significant Natural Areas within the City of Guelph's Natural Heritage System, as described and mapped in OPA 42. The majority of the proposed development is to occur within culturally disturbed meadow and smaller wooded features, located outside of the PSW and Significant Woodlands. Due to the location of the proposed development on lands adjacent to City of Guelph Significant Natural Areas, and within lands regulated by the Grand River Conservation Authority (GRCA), an EIS was required by the City and the GRCA to demonstrate that the proposed development will not negatively impact the adjacent natural features or their ecological functions.

Technical studies relevant to other aspects of the project, such as stormwater management and engineering design, have been completed by Van Harten Survey Inc.

as summarized in the Functional Servicing and Stormwater Management Report (Van Harten 2015). The results of these technical studies were referred to by NRSI to inform the EIS.

This report summarizes background information on natural heritage features, as well as results of original field surveys of breeding birds, mammals, reptiles, amphibians, and vascular flora for the subject property. This report contains the detailed findings of the EIS including the characterization of existing natural features based on the results of background review and original field surveys, the identification of natural feature constraints in association with land use policy designations, and the assessment of potential impacts and mitigation measures associated with details of the proposed development.

1.1 Project Scoping

The Terms of Reference (TOR) for the EIS was prepared and submitted to the City of Guelph and the GRCA on January 3, 2014 for review and comment. The GRCA and Regional staff reviewed the TOR and provided comments to NRSI on the study approach. The City of Guelph's Environmental Advisory Committee (EAC) met on February 12, 2014 and approved the EIS TOR provided that various conditions were met. GRCA comments on the TOR were provided on January 17, 2014, and City of Guelph Parks and Recreation Division comments were provided on February 6, 2014. The TOR was amended based on agency review comments, and is included in Appendix I. The following is a brief overview of the approach to the EIS.

In order to determine a study approach for the EIS, existing natural heritage information was first gathered and reviewed to identify key natural heritage features and species that are known or have potential to occur within the vicinity of the subject property (i.e., within 10km). Background information on the natural heritage features within the subject property vicinity was gathered from the Natural Heritage Information Centre (NHIC) (MNRF 2014) significant species database, the MNRF's Land Information Ontario, and relevant taxa-specific databases, as listed below.

Initial wildlife species lists were compiled to provide information on species reported from the subject property vicinity using various atlases; including the Ontario Mammal Atlas (Dobbyn 1994), the Ontario Reptile and Amphibian Atlas (Ontario Nature 2015), the Ontario Butterfly Atlas (Jones et al. 2013), and the Ontario Odonata Atlas (NHIC 2005). Data on breeding birds in the area was extracted from the Ontario Breeding Bird Atlas (Bird Studies Canada *et al.* 2008). Since this atlas provides data based on 10x10km survey squares, information on breeding birds from the square that overlaps the subject property (17NJ62) was compiled. A list of Species at Risk (SAR) that have occurrence records in Wellington County was also provided by the MNRF Guelph District office. These initial species lists were used to guide the scope and type of wildlife field surveys required for completion of the EIS.

Additional background information sources on the natural features present within the subject property were also reviewed to inform the scope of this study, and included the following:

- Grand River Conservation Authority (GRCA Information Network)
- Ontario Ministry of Natural Resources, Guelph District
- Guelph Natural Heritage System Report (Dougan and Associates 2009)
- City of Guelph OPA 42 (City of Guelph 2014)
- GRCA Wetland Policy and EIS Guidelines (GRCA 2005)
- Clythe Creek Subwatershed Report (Ecologistics 1998)
- Eramosa-Blue Springs Subwatershed Report (Beak International and Aquafor-Beech 1999)

Based on the findings of the background review, screening exercises for SAR and Species of Conservation Concern (SCC), and Significant Wildlife Habitat (SWH) were completed. Refer to Appendix I for the significant species and SWH screening tables completed as part of the EIS scoping exercise, as included in the TOR. Recently updated SWH criteria tables (MNRF 2015) were reviewed and compared to the results of SWH screening that were based on 2012 criteria (OMNR 2012). However, no substantial screening differences resulted based on the review of 2015 criteria.

Among the TOR review comments provided by EAC, it was recommended that the MNRF be consulted to confirm whether any recent Jefferson Salamander (*Ambystoma jeffersonianum*) records exist for the study area vicinity, as the last known record for this species in the area is considered historical (>20 years old) (MNRF 2014). NRSI contacted the MNRF Guelph District office, and received a response on February 18, 2014 in which it was stated that surveys for Jefferson Salamander within the study area are considered unnecessary (G. Buck, MNRF, pers. comm). It was also recommended by EAC that, despite Least Bittern (*Ixobrychus exilis*) habitat being considered absent from the study area (see TOR; Appendix I), surveys for this species should be completed using standard protocols due to the presence of standing water within a thicket community south of the subject property, as observed by an EAC member in 2013.

1.1.1 Study Area

For the purposes of this report, the term 'subject property' collectively refers to the property (comprising north and south parcels) owned by the proponent with the civic addresses 46, 47 and 87 Hyland Road, within which the development is proposed to occur (Map 1).

The term 'development areas' collectively refers to the portions of the subject property, within each of the north and south parcels, that are proposed to be developed by the proponent, which are outside of the significant wetland and woodland features. The proposed development areas on the subject property are shown on Map 1.

Based on the scoping exercise described above, it was determined that the adjacent natural features that are most likely to be potentially impacted by the proposed development are those features that occur within the subject property, adjacent to the development areas. For this reason, the "study area" that was focused on for completion of EIS studies represents the subject property (Map 1). The entirety of natural features within the subject property were investigated and characterized in completion of this study.

Note that herein for the purposes of the report, true northwest is referred to as “north”, true northeast is referred to as “east”, true southeast is referred to as “south”, and true southwest is referred to as “west”.

1.1.2 Relevant Policies, Legislation, and Planning Studies

Table 1 provides an overview of policies, legislation and planning studies that were considered and which informed the field program and analysis. To help inform suitable land-use concepts, guide the layout of development, and identify areas to be protected, inventoried natural features were evaluated against relevant policies, legislation, and planning studies outlined in the following sections. The specific implications of these policies to the study is discussed in further in Section 5.0.

Table 1. Relevant Policies, Legislation and Planning Studies

Policy/Legislation	Description	Project Relevance
Provincial Policy Statement (OMMAH 2014).	• Issued under the authority of Section 3 of the Planning Act and came into effect on April 30, 2014, replacing the 2005 PPS (OMMAH 2005). • Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as 'significant'. • The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000, MNRF 2015) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.	• Natural features that occur within the subject property, and which receive protection under the PPS, include: o Provincially Significant Wetland, o Significant Woodlands, o Potential Significant Wildlife Habitat, and o Potential habitat for Endangered and Threatened species. • Section 2.1.4 of the PPS states that development and site alteration shall not be permitted in significant wetlands in Ecoregions 6E. • Section 2.1.5 of the PPS states that development or site alteration shall not be permitted in Significant Wildlife Habitat or Significant Woodland unless it has been demonstrated that there will be no negative impacts on the features or their ecological functions. • Section 2.1.7 of the PPS states that development or site alteration shall not be permitted in habitat of Endangered or Threatened species except in accordance with provincial or federal requirements.
Endangered Species Act	• The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007. • The ESA prohibits killing, harming, harassing or capturing SAR and protects their habitats from damage and destruction.	• Based on a preliminary analysis, several SAR were identified as having the potential to occur within the subject property based on presence of suitable habitat.
Migratory Birds Convention Act	• Prohibits the disturbance, destruction, or taking of a nest or eggs of migratory birds.	• Any vegetation removal required for construction of the proposed development must have regard for this legislation in the form of timing window restrictions or

Policy/Legislation	Description	Project Relevance
		other suitable mitigation measures.
City of Guelph OPA 42 (2014)	• OPA 42 focuses on defining a Natural Heritage System (NHS) for the City of Guelph. OPA 42 was approved by the Ontario Municipal Board on June 4, 2014, bringing its policies into effect as of that date. Consideration has been made to OPA 42 throughout the report.	• Natural areas situated within the subject property are designated as Significant Natural Area. These areas are further characterized under Schedule 10 – Natural Heritage System to identify which natural heritage features are present. These include: Provincially Significant Wetland, Significant Woodland • These features together comprise what is defined as the Natural Heritage System under Schedule 2 of OPA 42. • Development is not permitted within Significant Natural Areas or their minimum buffers as indicated in Table 6.1 in OPA 42 and shown in Schedule 2 with a few exceptions (i.e. approved stormwater management infrastructure). • Development or site alteration may be permitted within the adjacent lands to Significant Natural Areas and within Natural Areas provided it has been demonstrated through an EIS that there will be no negative impacts on the protected natural heritage features or their associated ecological functions.
City of Guelph OPA 48	• OPA 48 updates the previous 2001 Official Plan and addresses the necessary changes to ensure that the City's policies and mapping are consistent with the 2005 Provincial Policy Statement, conform with the Growth Plan for the Greater Golden Horseshoe, and have regard to matters of provincial interest. • OPA 48 policy and mapping amendments include recommendations made in the City's Trail Master Plan.	• The City's Trail Master Plan identifies a proposed pedestrian trail through the subject property, with a northern terminus at Hyland Road, as mapped in OPA 48.
GRCA Regulation 150/06	• Regulation issued under *Conservation Authorities Act,* R.S.O. 1990.	• The GRCA regulates a portion of the subject property due to the presence of the Guelph North-East PSW

Policy/Legislation	Description	Project Relevance
	• Through this regulation, the GRCA has the responsibility to regulate activities in natural and hazardous areas (i.e., areas in and near rivers, streams, floodplains, wetlands, and slopes). • GRCA requires that an EIS be undertaken in accordance with their *EIS Guidelines and Submission Standards for Wetlands* where development is proposed within 120m of PSW or 30m of non-PSW (GRCA 2005).	complex. • As such, permitting from the GRCA must be obtained for proposed works within their regulation area.
City of Guelph Tree By-Law (2010)	• When applying for a permit to destroy or injure a regulated tree, a Tree Preservation Plan is required to demonstrate how the remaining trees will be protected from injury and outline a replanting and replacement plan. • The City of Guelph's OPA 42 (2014) also requires that a Vegetation Compensation Plan be required for the replacement of all healthy indigenous trees measuring over 10cm Diameter at Breast Height (DBH).	• A detailed Tree Inventory and Preservation Plan (TIPP) for the subject property will be created that identifies opportunities for tree retention in the context of the proposed development layout. • Recommendations to maintain and protect retained trees during- and post-construction, will also be provided.

2.0 Field Methods

Terrestrial field surveys were undertaken within the subject property (within and outside the development areas) to characterize natural features and species. A total of 15 site visits was completed between April 2013 and December 2014 to complete a variety of field surveys which are described in detail within the TOR (Appendix I) and summarized in Table 2.

Table 2. Field Survey Summary

Survey Type	Protocol[1]	Date
Wetland Boundary Flagging	OMNR (2013)	April 3, 2013
GRCA Wetland Boundary Confirmation; Wetland Boundary Surveying (NRSI)	N/A	May 21, 2013
Ecological Land Classification	Lee et al. (1998), Lee (2008)	November 12, 2013; Refined during multiple site visits in 2014
Winter Raptor Survey	Systematic area search of suitable habitats	March 4, 2014
Amphibian Call Surveys	BSC 2009	April 10, 2014; April 30, 2014; May 29, 2014; June 28, 2014
Vegetation Inventories	Systematic search by ELC polygon	May 16, 2014; July 9, 2014; September 5, 2014
Reptile Visual Encounter Surveys and Snake Coverboard Checks	Systematic search by ELC polygon	April 10, 2014 (board placement); May 16, 2014; June 4, 2014; June 25, 2014; July 9, 2014; September 5, 2014
Least Bittern Surveys	Jobin et al. 2009	May 16, 2014; June 4, 2014
Breeding Bird Surveys	BSC 2001	June 4, 2014; June 25, 2014
Tree Inventory and Assessment	N/A	June 4, 2014; October 1, 2014
Bat Cavity Tree Assessments	OMNR 2011a	June 4, 2014; October 1, 2014
Crepuscular Bird Survey (targeting SCC Common Nighthawk)	G. Buck, MNRF, pers. comm., 2012	June 18, 2014
Significant Woodland Dripline Review with City of Guelph	N/A	September 5, 2014
Significant Woodland Dripline Surveying (NRSI)	N/A	October 1, 2014

Turtle Nesting Habitat had been identified as a Candidate SWH type for the subject property based on the presence of potentially suitable habitat. The MNRF Ecoregion Criterion Schedules Addendum for Ecoregion 6E describes Turtle Nesting Habitat as exposed mineral soils (e.g., sand, gravel) within 100m of wetland or aquatic communities, including the Cattail Graminoid Mineral Meadow Marsh located adjacent to the Development Area. NRSI field surveys included an assessment of the presence of suitable mineral soils that may provide nesting habitat, within proximity to the on-site meadow marsh community. Suitable wetland habitats were also investigated for the presence of turtles during all spring and summer-based site visits.

As requested by EAC, NRSI contacted the MNRF to request clarification about accepted survey methods and timing for turtle nesting surveys. A response was provided on June 11, 2014, which included the MNRF's standard methodology and timing to complete turtle nesting surveys. This correspondence and methodology is provided in Appendix II.

Although the Marsh Monitoring Program protocol for amphibian call surveys (BSC 2009) requires three surveys during the breeding season, a total of four surveys were completed. City of Guelph EAC requested that additional amphibian call surveys be completed given the location of the Cattail Graminoid Mineral Meadow Marsh adjacent to a culturally-influenced area (i.e., the Development Area) and questions about its retention.

See Map 2 for the locations of point-based monitoring and snake coverboards within the subject property.

3.0 Existing Conditions

3.1 Soils, Terrain and Drainage

The subject property is located near Eramosa Road and Victoria Road in the northeast section of Guelph. The north parcel of the subject property is characterized by tableland topography, with surface water draining southeast towards the Guelph Northeast PSW complex. Surface drainage from the north parcel drains through an existing 450mm diameter culvert in the southeast corner that conveys water to the adjacent PSW. The south parcel of the subject property is characterized by rolling upland topography, with surface water draining east toward the PSW.

Soils reported in the proposed development areas are predominantly comprised of sandy till (i.e. sandy silt to silty sand) (GRCA 2015). The remaining portions of the subject property are comprised of sandy lacustrine deposits, and organic substrates associated with the extensive wetland areas (GRCA 2015). During ELC investigations conducted by NRSI, the surficial soil composition throughout the subject property was noted to be comprised of loams and organic substrates.

3.2 Vegetation

3.2.1 Vegetation Communities

The majority of the development area consists of cultural meadow features with areas of regenerating woodland communities. The remainder of the subject property, outside of the development area, consists of deciduous and coniferous forest, wetlands, and thicket swamp communities. A summary of ELC communities identified within the subject property is provided in Table 3, divided between “within development area” and “outside development area”. ELC communities are described below in detail and shown on Map 2.

Table 3. Vegetation Communities Identified within the Study Area

WITHIN DEVEOPMENT AREA	
Cultural	
MEMM3	Dry-Fresh Mixed Meadow
THDM2-6	Buckthorn Deciduous Shrub Thicket
Deciduous Forest	
FODM8-1	Fresh-Moist Poplar Deciduous Forest*
OUTSIDE DEVELOPMENT AREA	
Plantation	
FOCM6-3	Dry-Fresh Scotch Pine Naturalized Coniferous Plantation
Coniferous Forest	
FOC4-1	Fresh-Moist White Cedar Coniferous Forest
Deciduous Woodland	
WODM5-3	Fresh-Moist Manitoba Maple Woodland
Wetland	
MAMO1-2	Cattail Graminoid Organic Meadow Marsh
SWDO2-3 /SWTO2-6	Swamp Maple Organic Deciduous Swamp/Mixed Willow Organic Deciduous Thicket Swamp
SWTO2-6	Mixed Willow Organic Deciduous Thicket Swamp

*Community also occurs outside Development Area

Vegetation Communities Within the Development Area

Dry-Fresh Mixed Meadow (MEMM3)

This community exists in three separate locations throughout the subject property, two of which are within the areas proposed for development. It is moderately disturbed, resulting from recreational use (i.e. foot trails, play area for local children), and edge effects from adjacent land uses. The sparsely vegetated canopy and sub-canopy is dominated by Scots Pine (*Pinus sylvestris*), Manitoba Maple (*Acer negundo*), Trembling Aspen (*Populus tremuloides*), and White Ash (*Fraxinus americana*). Understory vegetation consists of Red-osier Dogwood (*Cornus stolonifera*), Common Buckthorn (*Rhamnus cathartica*), Choke Cherry (*Prunus virginiana ssp. virginiana*), and Black Walnut (*Juglans nigra*). The groundcover vegetation is comprised of Canada Goldenrod (*Solidago canadensis*), Orchard Grass (*Dactylis glomerata*), Spotted Knapweed (*Centaurea maculosa*), Wild Strawberry (*Fragaria virginiana*), and Reed-canary Grass (*Phalaris arundinacea*).

Fresh-Moist Poplar Deciduous Forest (FODM8-1)

This community exists in three separate locations within the subject property, one of which is within the development area north parcel. It is moderately disturbed, resulting from recreational use (e.g., foot trails), and edge effects from adjacent land uses. As well, Common Buckthorn was observed to be heavily established within these communities. The canopy is dominated by Trembling Aspen, Manitoba Maple, Green Ash (*Fraxinus pensylvanica*), and Balsam Poplar (*Populus balsamifera ssp. balsamifera*). The sub-canopy is comprised of Trembling Aspen, Common Buckthorn, White Cedar, and White Elm. Understory vegetation is largely dominated by Common Buckthorn, with smaller amounts of Tartarian Honeysuckle (*Lonicera tatarica*), Red-osier Dogwood, and Choke Cherry. The groundcover vegetation is characterized by Yellow Avens (*Geum aleppicum*), Late Goldenrod (*Solidago gigantea*), Heal-all (*Prunella vulgaris ssp. lanceolata*), and Enchanter's Nightshade.

A distinct habitat inclusion exists within this vegetation community within the development area: Buckthorn Deciduous Shrub Thicket (THDM2-6).

Based on the results of ELC classification and description, this feature was determined to have characteristics that approached those that would suggest a wetland community, as determined through ELC, (e.g., soil moisture regime, species composition). In order to confirm the status of this feature as an upland woodland or a wetland, a site visit was completed on September 5, 2014 with staff of the GRCA (R. Messier) and City (A. Labbe) to investigate this feature further. Based on this site investigation, it was determined by the GRCA that this feature is not wetland. As described above, it is considered an upland FODM8-1 community.

Vegetation Communities Outside the Development Area

Fresh-Moist White Cedar Coniferous Forest (FOCM4-1)

This community exists in two separate locations within the northeastern portion of the subject property. It is dominated by White Cedar (*Thuja occidentalis*), Trembling Aspen, and White Birch (*Betula papyrifera*) in the canopy. The sub-canopy consists of White Cedar, White Elm (*Ulmus americana*), Common Buckthorn, and Alternate-leaved Dogwood (*Cornus alternifolia*). A sparse understory is comprised of Choke Cherry,

Common Buckthorn, and Glossy Buckthorn (*Frangula alnus*). Groundcover vegetation was sparse, and consisted of Spinulose Wood Fern (*Dryopteris carthusiana*), Enchanter's Nightshade (*Circaea lutetiana ssp. canadensis*), Rough Goldenrod (*Solidago rugosa ssp. rugosa*), and Graceful Sedge (*Carex gracillima*).

Cattail Graminoid Organic Meadow Marsh (MAMO1-2)

This community exists adjacent to Hyland Road, on the southeast side, and comprises a portion of the Guelph Northeast PSW Complex. It is characterized by White Willow (*Salix alba var. alba*), Crack Willow (*Salix fragilis*), Trembling Aspen, and Freeman's Maple (*Acer X freemanii*) in the sparsely vegetated canopy and sub-canopy. The understory is dominated by Slender Willow (*Salix petiolaris*), Silky Dogwood (*Cornus amomum ssp. obliqua*), and Heart-leaved Willow (*Salix eriocephala*). Groundcover vegetation is comprised of Broad-leaved Cattail (*Typha latifolia*), Narrow-leaved Cattail (*Typha angustifolia*), Reed-canary Grass, Spotted Jewelweed (*Impatiens capensis*), and Lance-leaved Aster (*Symphyotrichum lanceolatum var. lanceolatum*).

Swamp Maple Organic Deciduous Swamp/Mixed Willow Organic Deciduous Thicket Swamp (SWDO2-3 /SWTO2-6)

This extensive wetland community exists within the eastern portion of the subject property, extending off-property to the east, and comprises a portion of the Guelph Northeast PSW Complex. It is characterized by Freeman's Maple, Trembling Aspen, Balsam Poplar, and White Elm in the canopy. The sub-canopy is dominated by Black Ash (*Fraxinus nigra*), White Cedar, White Elm, Glossy Buckthorn, and Balsam Fir (*Abies balsamea*). The understory is comprised of Silky Dogwood, Red-osier Dogwood, Glossy Buckthorn, and Heart-leaved Willow. Groundcover vegetation consists of Sensitive Fern (*Onolcea sensibilis*), several species of sedge (*Carex* spp.), Purple-stemmed Aster (*Symphyotrichum puniceum var. puniceum*), and Reed-canary Grass.

Mixed Willow Organic Deciduous Thicket Swamp (SWTO2-6)

This community exists within the central portion of the subject property, and comprises a portion of the Guelph Northeast PSW Complex. It is characterized by Trembling Aspen, White Cedar, and Balsam Fir in the sparsely vegetated canopy. The sub-canopy and understory layers are largely dominated by willows, including Slender Willow, Bebb's

Willow (*Salix bebbiana*), Heart-leaved Willow, Pussy Willow (*Salix discolor*), with smaller amounts of Silky Dogwood, and Shining Willow (*Salix lucida*). Groundcover vegetation is comprised of Sensitive Fern, Marsh Fern (*Thelypteris palustris* var*. pubescens*), Rice Cut Grass (*Leersia oryzoides*), Northern Water-Horehound (*Lycopus uniflorus*), and several species of sedge (*Carex spp.*).

A distinct habitat inclusion exists within this vegetation community: Fresh-Moist Manitoba Maple Woodland (WODM5-3).

3.2.1.1 Natural Feature Boundary Delineations

The PSW boundary facing the proposed development area was delineated and flagged by NRSI on April 3, 2013. A GRCA review of the PSW boundary was completed on-site on May 21, 2013, after which the confirmed PSW boundary was accurately surveyed by Van Harten Surveying Inc.

A site visit was completed between staff of NRSI and the City of Guelph (A. Labbe) on September 5, 2014 to review and stake the woodland dripline facing the development area, south of Hyland Road. The dripline boundary was used to define the development area-facing sides of the wooded features WODM5-3 and FODM8-1, as shown on Map 2. NRSI subsequently reviewed the confirmed woodland dripline boundary in light of the City's definition of "woodland" as presented in OPA 42. One small area that was originally staked as being within the woodland, adjacent to FODM8-1 within the MEMM3 cultural meadow, was considered to fall well below the tree density requirement to be considered woodland based on the City's definition. These trees are much more sparsely distributed than the adjacent forest communities and represent an area of natural regeneration on previously cleared land. See Map 2 for an illustration of inventoried tree locations and densities. Therefore, this section of the woodland boundary was delineated to align with the ELC community boundary of the FODM8-1 woodland feature as shown on Map 2.

3.2.2 Vascular Flora

Detailed vegetation inventories were conducted during site visits, and 191 species were identified. Approximately 35% of the recorded vascular flora is considered non-native. A complete list of these species is appended to this report (Appendix III).

Background information (MNRF 2014, OMNR 2013b) and SAR screening indicates that a total of six plant SAR and SCC are reported from within 1km of the subject property. Appendix IV provides a summary of these species, their current status ranks, and preferred habitats. Based on field work conducted, none of these species were confirmed within the subject property. A total of four species considered to be regionally significant were observed, including Meadow Horsetail (*Equisetum pratense*), Smooth Gooseberry (*Ribes hirtellum*), Elliptic-leaved St. John's-Wort (*Hypericum ellipticum*), and Hop Sedge (*Carex lupulina*). Of these, Meadow Horsetail and Elliptic-leaved St. John's-Wort were observed within the development area (see Appendix IV).

3.2.3 Tree Inventory

Appendix V includes detailed summary of the findings of the tree inventory. In that appendix and below, tree inventory results are reported separately for the development area and the trail area, as the trail area results were specifically considered in the evaluation of a preferred trail alternative (Section 7.0).

3.2.3.1 Development Area

A total of 296 trees, comprising 21 species, were inventoried within and immediately adjacent to the proposed development areas by an NRSI Certified Arborist. Of the 295 trees inventoried, 271 (91.5%) are native species and 25 (8.5%) are non-native. The Fresh-Moist Poplar Deciduous Forest (FODM8-1) community located north of Hyland Road contains 171 of these trees, and is discussed further below.

The inventory included 23 boundary trees and 1 off-site tree with an overlapping canopy. The majority of these trees are native and are dominated by Trembling Aspen (*Populus tremuloides*), Black Walnut (*Juglans nigra*) and White Cedar (*Thuja occidentalis*). Non-native trees are dominated by Scot's Pine and Norway Maple (*Acer platanoides*). Table

4 provides a list of tree species inventoried within the development area, whether they are native or non-native, and their overall condition.

Table 4. Summary of Trees Inventoried for the Subject Property Development Area

Common Name	Scientific Name	Excellent	Good	Fair	Poor	Very Poor	Snag	Total
Native Species								
Balsam Poplar	*Populus balsamifera*		0	4	3	2	0	9
Black Maple	*Acer nigrum*		0	0	1	0	0	1
Black Walnut	*Juglans nigra*		1	6	3	1	0	11
Freeman's Maple	*Acer x freemanii*		3	4	0	0	0	7
Green Ash	*Fraxinus pennsylvanica*		6	1	0	0	0	7
Manitoba Maple	*Acer negundo*		1	10	13	6	0	30
Trembling Aspen	*Populus tremuloides*		39	74	60	16	0	189
White Birch	*Betula papyrifera*		1	0	0	1	1	3
White Cedar	*Thuja occidentalis*		9	2	0	0	0	11
White Spruce	*Picea glauca*		3	0	0	0	0	3
Total			**63**	**101**	**80**	**26**	**1**	**271**
Non-Native Species								
Apple species	*Malus* sp.	0	0	0	2	1	0	3
Cherry species	*Prunus species*	0	0	0	1	0	0	1
Common Buckthorn	*Rhamnus cathartica*	0	0	0	0	1	0	1
Colorado Spruce	*Picea pungens*	0	2	0	0	0	0	2
Horsechestnut	*Aesculus hippocastanum*	0	0	0	1	0	0	1
Linden species	*Tilia spp*	0	0	1	0	0	0	1
Norway Maple	*Acer platanoides*	0	2	1	2	0	0	5
White Mulberry	*Morus alba*	0	0	0	0	1	0	1
Scots Pine	*Pinus sylvestris*	0	1	3	5	1	0	10
Total		**0**	**5**	**5**	**11**	**4**	**0**	**25**
Overall Total		**0**	**68**	**106**	**91**	**30**	**1**	**296**

Table 5 provides a summary of the overall condition of trees inventoried within the development area, along with their structural failure rating. A majority of the trees inventoried are in fair to poor condition with a low potential for structural failure. A complete list of trees inventoried is provided in Appendix V.

Table 5. Overall Condition of Inventoried Trees for the Development Area

Structural Failure Rating	Overall Condition						Total
	Excellent	Good	Fair	Poor	Very Poor	Snag	
Low	0	67	89	43	4	0	203
Medium	0	1	15	36	10	0	62
High	0	0	0	14	16	0	31
Total	**0**	**68**	**104**	**93**	**30**	**0**	**296**

3.2.3.2 Trail Area

A total of 45 trees, comprising 7 species, was inventoried within 30m the three proposed trail route alternatives. Of the 46 trees inventoried, 43 (95.5%) are native species and 2 (4.5%) are non-native. Table 6 provides a list of tree species inventoried within the trail area, whether they are native or non-native and their overall condition.

Table 6. Summary of Trees Inventoried for the Proposed Trail Route Alternatives

Common Name	Scientific Name	Excellent	Good	Fair	Poor	Very Poor	Snag	Total
Native Species								
Black Cherry	*Prunus serotina*	0	2	1	1	0	1	5
Manitoba maple	*Acer negundo*	0	0	2	12	6	0	20
Peachleaf Willow	*Salix amygdaloides*	0	0	0	3	0	0	3
Trembling Aspen	*Populus tremuloides*	0	0	6	2	0	0	8
White Birch	*Betula papyrifera*	0	0	0	0	0	3	3
White cedar	*Thuja occidentalis*	0	2	2	0	0		4
Total		**0**	**4**	**11**	**18**	**6**	**5**	**44**
Non-Native Species								
Scot's pine	*Pinus sylvestris*	0	1	0	1	0	0	2
Total		**0**	**1**	**0**	**1**	**0**	**0**	**2**
Overall Total		**0**	**5**	**11**	**19**	**6**	**4**	**45**

Table 7 provides a summary of the overall condition of trees inventoried within the trail area, along with their structural failure rating. A majority of the trees inventoried are in fair to poor condition with a high potential for structural failure. A complete list of trees inventoried is provided in Appendix V.

Table 7. Overall Condition of Inventoried Trees for the Proposed Trail Route Alternatives

Structural Failure Rating	Overall Condition						Total
	Excellent	Good	Fair	Poor	Very Poor	Snag	
Low	0	5	6	0	0	0	11
Medium	0	0	5	2	0	0	7
High	0	0	0	17	6	4	27
Total	**0**	**5**	**11**	**19**	**6**	**4**	**45**

3.3 Wildlife

3.3.1 Birds

A total of 112 bird species is reported from the vicinity of the study area based on the OBBA (BSC *et al.* 2008). The data found in the OBBA includes those species that have been observed in the area (10 x 10km range), are known to nest in the area, and/or have exhibited some evidence of breeding in the area. Forty-five of these species were documented within the subject property during the field surveys. Twenty-four of these species exhibited signs of breeding, such as males singing, females carrying food or nest materials, and the presence of fledged young. Of the 45 bird species documented within the subject property, 24 were observed within the development area. Refer to Appendix VI for a list of bird species found in the study area and vicinity.

Appendix IV provides a summary of significant bird species reported to occur in the vicinity, or observed, in the study area, their current status ranks, and preferred habitats. Based on the field work conducted, none of these species were observed within the development areas. Three provincially significant species were confirmed within the subject property outside of the development areas: Bald Eagle (*Haliaeetus leucocephalus*), Wood Thrush (*Hylocichla mustelina*), and Eastern Wood-Pewee (*Contopus virens*). Bald Eagle was observed outside the bird breeding season, flying overhead, and was recorded with no breeding evidence.

Eastern Wood-Pewee and Wood Thrush are both listed as Special Concern provincially and therefore considered SCC. Habitat for these species is considered to be SWH and is afforded legal protection under the PPS (2014) and OPA 42 (City of Guelph 2014). Eastern Wood-Pewee prefers open, deciduous, mixed or coniferous forest. They can often be seen in forest clearings, woodland edges, or farm woodlots and parks (OMNR

2000). One individual singing male was recorded within the woodland outside of the south parcel development area, from station BMB-001, during early morning breeding bird surveys. This observation represents "possible" evidence of breeding within the vicinity based on OBBA breeding evidence classifications (BSC 2001). This species was not recorded during other field surveys completed during the bird breeding season; therefore, the recorded individual may have been travelling through the area.

Wood Thrush inhabits interior and edges of deciduous and mixed forests with trees that are greater than 16m in height (Evans et al. 2011). Singing male Wood Thrushes were recorded during the 2014 breeding bird surveys outside of the development areas, within the Fresh-Moist White Cedar Coniferous Forest (FOCM4-1) and within the woodland/wetland features 75m northeast of crepuscular bird survey station CNH-002. Wood Thrushes are known to maintain territories of up to 4ha in size (Evans et al. 2011). The Wood Thrush observations may therefore represent evidence of a breeding territory, which is considered evidence of "probable" breeding within the subject property (BSC 2001). Following a conservative approach, the PSW and Significant Woodland features as shown on Map 3b are considered SWH for Wood Thrush.

Sixteen bird species were observed that are considered regionally significant (Dougan and Associates 2009, City of Guelph 2012) (see Appendix IV). Seven of these species exhibited signs of breeding within the subject property. Of these, two species showed evidence for probable breeding: Wood Thrush (described above) and Baltimore Oriole (*Icterus galbula*), of which only Baltimore Oriole was observed within the development area. Specifically, a Baltimore Oriole breeding pair was observed within the Dry-Fresh Mixed Meadow (MEMM3) community of the south parcel development area during the June 4, 2014 site visit. This species is known to use a variety of habitats for breeding purposes, including open areas with scattered trees, deciduous woodlands and woodland edges, deciduous and mixed forest, shrub wetlands and orchards (Rising and Flood 1998). Based on observed evidence of probable breeding and the presence of suitable habitat, the MEMM3 community is considered habitat for Baltimore Oriole, although the adjacent woodland communities are also likely used.

No raptors were observed during the winter wildlife survey completed on the subject property. Consequently, Raptor Wintering Area SWH is considered absent from the subject property. No Common Nighthawks were observed during crepuscular bird surveys. Additionally, no Least Bitterns were recorded within the subject property marsh habitat through use of the targeted Least Bittern survey protocol.

3.3.2 Herpetofauna

According to the Ontario Amphibian and Reptile Atlas (Ontario Nature 2015), 27 species of herpetofauna are reported from within 10km of the subject property. NRSI field investigations confirmed the presence of five species within the subject property. Of these, only one species, Eastern Garternsnake (*Thamnophis sirtalis sirtalis*) was observed within either of the development areas. A complete list of herpetofauna reported from the subject property, based on background information and observations made as part of this study, is included in Appendix VII. The results of species-specific surveys are detailed in the following sections.

No herpetofauna SAR or SCC were observed within the development areas or elsewhere within the subject property. Appendix IV provides a summary of significant herpetofauna species known to occur or observed in the subject property vicinity, their current status ranks, and preferred habitats.

3.3.2.1 Anurans (Frogs and Toads)

Five anuran species were recorded during call surveys or observed incidentally within the subject property. None of these were recorded within the development area. Spring Peeper (*Pseudacris crucifer*), Gray Treefrog (*Hyla versicolor*) and Wood Frog (*Lithobates sylvaticus*) were heard calling within both the Silver Maple Organic Deciduous Swamp/Mixed Willow Organic Deciduous Thicket Swamp (SWDO2-3/SWTO2-6) and the Cattail Gramminoid Organic Meadow Marsh (MAMO1-2), while Green Frog (*Lithobates clamitans melanota*) and American Toad (*Anaxyrus americanus*) were only recorded within the MAMO1-2 community. Of these species, Spring Peeper was recorded at full chorus within both SWDO2-3/SWTO2-6 and MAMO1-2 while all other species were recorded at relatively low abundances. Northern Leopard Frog

(*Lithobates pipiens*) was observed incidentally during the September 5, 2014 site visit but was not heard calling during anuran call surveys.

3.3.2.2 Snakes

One species of snake, Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) was observed during area searches, snake coverboard checks, and incidentally during other surveys. Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) was observed at the following snake coverboards (see Map 2):

- SNK-005 (2 juveniles observed on May 11, 2014; 2 juveniles observed on June 4, 2014)
- SNK-008 (3 juveniles observed on June 4, 2014; 1 juvenile observed on June 25, 2014)

3.3.2.3 Turtles

No turtles were observed during any of the site visits. Turtle nesting habitat had been identified as a Candidate SWH type for the subject property as described in the TOR (Appendix I). However, no sandy soils or fine/loose gravel areas that would support potential nesting habitat was observed within the subject property. Furthermore, no egg shells or other evidence of predated nests were observed within the subject property. Turtle nesting SWH was therefore considered absent from the subject property.

3.3.3 Mammals

According to the Mammal Atlas of Ontario (Dobbyn 1994), 38 mammal species are reported from within 10km of the subject property. Ten of these species were recorded through direct observation or by indirect evidence within the subject property: Eastern Cottontail (*Sylvilagus floridanus*), Woodchuck (*Mormota motax*), Eastern Chipmunk (*Tamias striatus*), Northern Raccoon (*Procyon lotor*), White-tailed Deer (*Odocoileus virginianus*), Coyote (*Canis latrans*), Beaver (*Castor canadensis*), mouse (*Peromyscus* sp.), Eastern Gray Squirrel (*Sciurus carolinensis*), and Red Squirrel (*Tamiasciurus hudsonicus*). Appendix VIII provides a complete list of mammal species reported from the study area.

There were no mammal SAR or SCC observed within the study area. Appendix IV provides a summary of significant mammal species known to occur or observed in the study area vicinity, their current status ranks, and preferred habitats.

3.3.3.1 Bat Habitat Assessments

No suitable cavity trees were identified during completion of cavity tree assessments completed on the subject property. The majority of trees within the development area are relatively young (e.g., few trees within the north parcel development area are >15cm DBH) while the majority of trees within immediately adjacent woodlands (e.g., WODM5-3 community) are relatively young and secondary growth. Larger, more mature trees occur around the existing house on the south side of Hyland Road as well as a row along the north subject property boundary. However, these trees were also found to not provide suitable bat habitat cavities according to MNRF guidelines (OMNR 2011a). Suitable habitat for the SAR bats Little Brown Myotis and Northern Myotis are therefore considered absent from the development area and the immediately adjacent woodlands.

3.3.4 Insects and Other Wildlife

According to the Ontario Butterfly Atlas (Jones et al. 2012), 59 butterfly species are known to occur within 10km of the subject property. NRSI biologists observed four species during surveys completed within the study area. No SAR or SCC butterfly species were observed during site visits. No regionally significant butterflies were observed. A complete list of species observed and reported from the subject property and vicinity is provided in Appendix IX.

A total of 56 odonate species are reported from within 10km of the subject property (OMNR 2005). No odonate species were recorded during field investigations. A complete list of species reported from the subject property vicinity is provided in Appendix X.

Field investigations resulted in the observation of terrestrial crayfish chimneys at three distinct locations, two of which occurred within the subject property boundaries. Chimneys were observed immediately adjacent to the existing foot path within the Fresh-

Moist Manitoba Maple Woodland (WODM5-3) as well as within the Silver Maple Organic Deciduous Swamp/Mixed Willow Organic Deciduous Swamp (SWDO2-3/SWTO2-6). A third grouping of crayfish chimneys was observed within the drainage ditch immediately north of Hyland Road within the right-of-way. See Map 3b for crayfish chimney locations.

4.0 Natural Environment Development Constraints

The natural environment constraints analysis is used to identify natural features that are sensitive to disturbance based on the rarity or significance of the feature or the functions/processes and/or policies inhibiting development within them. These areas are identified as "constraints", and are discussed in the context of natural heritage policies governing their protection. Conversely, opportunities for development may occur outside of these natural environment constraints within the subject property. Results of this analysis have been provided as input to the proposed development plan in order to avoid and reduce impacts to natural features and functions. A summary of this analysis for the subject property is discussed below. Natural features identified as constraints to development are shown on Maps 3a and 3b.

4.1 Significant Natural Features and Habitats

As detailed above, several terrestrial and wetland features and functions have been documented within the subject property. These include features considered provincially significant (e.g., PSW) and locally significant (e.g., Significant Woodland). These features occur entirely outside the proposed development area. The following is a summary of the significance and sensitivity of the subject property natural features and how the natural heritage policies and legislation described in Section 1.1.2 inform the identification of constraints for the proposed development.

4.1.1 Provincially Significant Wetland

A portion of the Guelph Northeast PSW Complex is located within subject property, where it dominates the eastern two-thirds of the south parcel, but outside of the development area. The wetland communities that are located on the subject property have been characterized as Swamp Maple Organic Deciduous Swamp (SWDO2-3), Mixed Willow Organic Deciduous Thicket Swamp (SWTO2-6), and Cattail Gramminoid Organic Meadow Marsh (MAMO1-2) (Map 3a). More fulsome descriptions of these communities are provided in Section 3.2.1

The wetland communities present within and adjacent to the subject property have been identified as Significant Natural Area under Schedule 1 of OPA 42 (City of Guelph 2014). Additionally, the wetlands have been identified as PSW in Schedule 10A of OPA 42. As

described in Section 1.1.2, development and site alteration is not permitted in PSWs as described in the PPS (OMMAH 2014) and OPA 42 (as a form of Significant Natural Area) (City of Guelph 2014). Development may be permitted in lands adjacent to a PSW/Significant Natural Area if it can be demonstrated that there will be no negative impacts to the significant natural feature or its ecological functions (OMMAH 2014, City of Guelph 2014). As these lands are regulated under Ontario Regulation 150/06 by the GRCA, a permit will be required from the GRCA to proceed with development within regulated areas.

4.1.2 Significant Woodland

The subject property contains wooded natural features that are mapped as Significant Woodland, comprising part of the Significant Natural Area as mapped in OPA 42 (City of Guelph 2014). Within and adjacent to the subject property, the Significant Woodland is comprised of a mosaic of two forest community types: Fresh-Moist White Cedar Coniferous Forest (FOCM4-1) and Fresh-Moist Poplar Deciduous Forest (FODM8-1). At the subject property these woodland communities exist as two distinct bands that are separated by the wide swath of PSW (Map 3a). All Significant Woodland located on the subject property occurs entirely outside of the proposed development area as discussed further below.

Section 6A.2.6 of OPA 42 describes the criteria that define Significant Woodlands within Guelph's Natural Heritage System. Portions of the subject property woodlands meet the City's criteria of Significant Woodlands due to their size of >1ha and contiguity with a relatively large woodland complex that extends off-property to the northeast and south (Map 3a). Together with the Guelph Northeast PSW this represents a regionally important natural feature at the north extent of Guelph.

As described in Section 1.1.2, development and site alteration is not permitted in Significant Woodland or their minimum buffers as described in OPA 42 (as a form of Significant Natural Area) (City of Guelph 2014).

Certain woodland patches on the subject property were deemed to not fulfill criteria for significance. As a distinct woodland patch, the Fresh-Moist Poplar Deciduous Forest (FODM8-1) community north of Hyland Road measures 0.27ha, which is below the 1ha threshold criterion required for significance (City of Guelph 2014). The Fresh-Moist Manitoba Maple

Woodland (WODM5-3) community south of Hyland Road exists as a relatively narrow (approximate maximum width of 20m), ecologically disturbed (abundant Manitoba Maple, Common Buckthorn) stand of trees that separated from the nearest adjacent woodland community by almost 20m. This small woodland ecosite inclusion likely represents secondary growth of formerly cleared lands and is therefore culturally-influenced. As noted in Section 7.3.2 of the Natural Heritage Reference Manual (OMNR 2010), relatively narrow, linear treed areas with minimum average width of <40m are intended to be excluded from Significant Woodland delineations. For these reasons, the WODM5-3 ecosite inclusion is not considered an extension of the mapped Significant Woodland.

4.1.3 Cultural Woodland

One wooded vegetation community meets the definition of "cultural woodland" as defined in Item 5 of OPA 42: the Fresh-Moist Manitoba Maple Woodland (WODM5-3). The Fresh-Moist Poplar Deciduous Forest (FODM8-1) located north of Hyland Road does not meet City criteria to be considered "cultural woodland" due to its canopy coverage of >60%.

Section 6A.3.3 of OPA 42 lists criteria by which Cultural Woodland is considered a form of Natural Area within the City's Natural Heritage System. Because the WODM5-3 community is <1ha in size, it is not considered a form of Natural Area. Therefore, OPA 42 Natural Area protection policies associated with Cultural Woodland are considered to not apply within the subject property. However, as shown on Map 3a, this feature falls within the recommended 30m wetland buffer.

4.1.4 Species at Risk

The field investigations were scoped to adequately survey for the presence of SAR that have potential to occur within the subject property, which were identified through background information review. No SAR vegetation or wildlife were identified during field investigations. Further, no cavity trees were documented within or adjacent to the development area that provides suitable roosting or maternity colony habitat for bat SAR. Therefore, the proposed development is not anticipated to have implications under the ESA.

4.1.5 Significant Wildlife Habitat

Several SWH types were identified as Candidate SWH for the subject property, based on desktop-level screening as detailed in the TOR (Appendix I). Based on the results of field investigations, the majority of these habitats were identified as not meeting the criteria for SWH. SWH assessment results, including rationale for ruling out a habitat category as significant within the study area, are included in Appendix XI.

Based on the results of field investigations, three SWH categories were confirmed for the subject property, all of which occur in the natural features outside of the development area:

- Amphibian Breeding Habitat (Woodland)
- Wood Thrush Habitat
- Terrestrial Crayfish Habitat

One additional SWH type was maintained as Candidate SWH for the subject property: Bat Maternity Colonies. This Candidate SWH is located within the natural features outside of the development area. Confirmed and candidate SWH types identified for the subject property are described further below.

4.1.5.1 Confirmed Significant Wildlife Habitat

Amphibian Breeding Habitat (Woodland)

Amphibians require aquatic habitats to reproduce, and concentrate in breeding ponds during spring. Suitable aquatic habitats must be unpolluted, shallow, and maintain surface water long enough through the spring for juveniles to mature. Woody debris and vegetation are also important components to provide calling sites and egg-laying structures (OMNR 2011b). Amphibians disperse into adjacent terrestrial areas following breeding. These terrestrial habitats must provide dense canopy coverage, moist conditions and cover habitat. Breeding ponds must be sufficiently close to summer habitats to provide habitat function.

The subject property wetlands are considered to provide excellent amphibian breeding habitat based on NRSI field investigations. Full choruses (>20 individuals) of breeding Spring Peepers were heard calling from the Cattail Graminoid Organic Meadow Marsh (MAMO1-2) and the SWDO2-3/SWTO2-6 swamp community during 2014 field surveys. The abundance of breeding

individuals renders these wetlands and the adjacent forest communities as SWH for woodland amphibian breeding as shown on Map 3b.

As defined in the MNRF Ecoregion Schedules Criterion Addendum for Ecoregion 6E (OMNR 2012), the adjacent deciduous and coniferous forest habitat is also considered SWH to reflect the important function that this upland habitat provides as summer habitat. Although full choruses of anurans were not heard within the Mixed Willow Organic Deciduous Thicket Swamp (SWTO2-6) community, this feature is likely used by anurans as connecting habitat between significant breeding habitat in MAMO1-2 and SWDO2-3/SWTO2-6, and to adjacent upland forest communities and is therefore included in the SWH designation.

Wood Thrush Habitat

The SCC Wood Thrush was observed in suitable habitat within the subject property, outside the development area, during field surveys. Wood Thrush was observed showing evidence of probable breeding (displaying permanent territory) based on observations within the FOCM4-1 community at the east end of the subject property, and within the natural features 75m northeast of CNH-002. By applying a conservative approach, PSW and Significant Woodland features are considered part of a breeding territory and are considered SWH as shown on Map 3b.

Terrestrial Crayfish Habitat

Two species of terrestrial crayfish occur in Ontario that are primary or secondary burrowers. Of these, only one occurs in the subject property vicinity: Chimney Crayfish (*Fallicambarus fodiens*). Chimney Crayfish is considered to be a SCC in Ontario; accordingly, its habitat is considered SWH and is afforded protection under the Provincial Policy Statement (2014). This species maintains colonies of underground tunnels of up to 0.4ha in size, and is usually associated with marshy fields, drainage ditches, marshes and ponds (OMNR 2011b).

Terrestrial crayfish chimneys were observed at two locations within the subject property, with a third observation within the Hyland Road municipal ROW drainage ditch, as shown on Map 3b. Within the subject property, crayfish chimneys were located within the Fresh-Moist Manitoba Maple Woodland (WODM5-3) immediately adjacent to the existing trail, and along the edge of the SWDO2-3/SWTO2-6. These observed chimney locations are considered to be primary habitat for the species, as demarcated chimney point-locations on Map 3b.

Based on the observations by NRSI biologists and an understanding of these species' natural history, chimney crayfish habitat at this site falls into two main strata: primary habitat near wetlands which is utilized for the majority of the year, and secondary habitat beyond this which may be utilized during wetter periods when soils are saturated and the water table is higher than normal. Additional secondary habitat will be protected within a 10m buffer from the observation points. As a conservative approach, the 10m buffer from each terrestrial crayfish observation point inside the natural feature has been connected to protect secondary habitat that may occur for this species between the two observation points, adjacent to the wetland edge (Map 3b). Collectively, these primary and secondary habitat areas are considered to be SWH for terrestrial crayfish. Because the terrestrial crayfish chimneys located within the Hyland Road drainage ditch are not located within a natural feature, SWH has not been identified for this observation point.

4.1.5.2 Candidate Significant Wildlife Habitat

Bat Maternity Colonies

The Fresh-Moist Poplar Deciduous Forest (FODM8-1) communities that comprise the Significant Woodland, east of the development area, represent Candidate SWH for bat maternity colonies as these features were not investigated for the presence of cavity trees. Because Candidate SWH falls entirely outside of the development area and won't be directly impacted by the development, this SWH type was not assessed to confirm its status. For this reason it has been maintained as Candidate SWH for the subject property outside of the development areas, although further survey work is considered unnecessary. Guidance provided by the MNRF does not require analysis of aerial feed habitats for bats.

4.1.6 Regionally Significant Species

A total of 18 locally or regionally significant species was observed during NRSI field surveys (Dougan and Associates 2009). These include four plant species and 14 bird species. See Appendix IV for a full list of locally or regionally significant species observed. Locations of observed significant species, including bird species that displayed at least probable breeding evidence, are shown on Map 3b.

Of the four significant plant species observed, only two are located within the development area (north parcel only). Meadow Horsetail (*Equisetum pratense*) was inventoried within the Fresh-Moist Poplar Deciduous Forest (FODM8-1) while Elliptic-leaved St. John's Wort (*Hypericum ellipticum*) was inventoried within the Dry-Fresh Mixed Meadow (MEMM3).

Two locally significant bird species were observed with evidence of probable breeding within the property: Wood Thrush and Baltimore Oriole. Of these, only Baltimore Oriole was observed within the development area. Wood Thrush, as a SCC, is addressed in the context of Significant Wildlife Habitat above. A breeding pair of Baltimore Orioles was observed in the MEMM3 community south of Hyland Rd. Probable nesting habitat for this species therefore falls within the south parcel development area.

As described in Section 6A.3.4 of OPA 42 (City of Guelph 2014), development and site alteration may be permitted within the habitat of regionally significant species where it can be demonstrated that there will be no negative impacts to the habitat or its ecological functions.

5.0 Impact Analysis and Mitigation Measures

5.1 Description of the Proposed Undertaking

Dunnink Homes proposes to develop the subject property into a residential development consisting of 19 fully-serviced single detached homes. Eleven of these homes will be built along an extension of Hyland Road within the north parcel and an additional 8 homes will be built along an extended Glenburnie Drive with cul-de-sac in the south parcel (Map 4). One existing single detached home and one existing garage structure, at 46 and 47 Hyland Road, will be removed. A new house will be constructed at 47 Hyland Road as part of this development. The proposed lots will be serviced by an extension of existing watermains, and by existing sanitary sewers. An existing 300mm diameter storm sewer will be extended into the newly constructed Glenburnie Drive cul-de-sac. See Appendix XII for the preliminary grading and servicing plan (Van Harten 2015).

The proposed development includes Block 20, which will be maintained in an undeveloped and un-graded natural state with no native vegetation removal proposed. Block 20 is to remain in the ownership of the proponent.

The rear lot boundaries of Lots 11-15 will be lined with a retaining wall to accommodate reasonable slopes for residential lot development. The retaining wall will vary between 1.0-1.8m high. A formal pedestrian trail is proposed immediately east of the development to improve and maintain existing trail connectivity, in accordance with the City's Trail Master Plan as mapped in OPA 48. Details of this proposed trail, including impact assessment of three alternative trail alignments and proposed mitigation measures, are described in Section 6.0.

5.2 Approach to Impact Analysis

The analysis of potential impacts arising from the proposed undertaking was determined by reviewing proposed development plans, including overlaying the plans onto the existing natural features to determine the extent of the disturbance footprint as shown on Map 4. The outcome of this process is based primarily on the resilience of the identified natural features to withstand predicted disturbance caused by design, construction and post-construction use of the development. In this manner, both the significance and sensitivity of the natural features to disturbance will be considered. Buffers necessary to protect natural features including

wetlands, woodlands and the significant wildlife habitats they contain are also discussed below. The following is a description of the types of impacts which will be discussed.

- **Direct impacts** to the natural features on the subject lands associated with disruption or displacement caused by the actual proposed 'footprint' of the undertaking;
- **Indirect impacts** associated with changes in site conditions such as drainage and water quantity/quality;
- **Induced impacts** associated with impacts after the development is constructed such as subsequent demand on the resources created by increased habitation/use of the area and vicinity; and,
- **Cumulative impacts** associated with the spatial and temporal implications of this proposal in conjunction with other undertakings in the area.

This section details the impact assessment related to the proposed residential development (i.e., within the development areas), while Section 6.0 discusses the impacts associated with the proposed trail alternatives. The discussion of cumulative impacts for both the residential development as well as the trails, are discussed together in Section 5.6.

5.3 Recommended Buffers

Buffers are required around natural heritage features such as woodlands and wetlands to protect them from impacts during development. Based on the characterization of the natural features on the subject property, both woodland and wetland buffers should be considered in laying out the proposed development. As described below, confirmed or potential habitats for provincially or locally significant wildlife species and habitats will also be protected within these recommended buffers.

5.3.1 Woodland Buffer

One area of the Significant Woodland occurs immediately adjacent to the south parcel development area, where the Fresh-Moist Poplar Deciduous Forest (FODM8-1) community extends into the south end of the subject property. A development setback from the dripline of this feature is therefore warranted to maintain the condition of edge trees and the function of the woodland from impacts of development.

OPA 42 (2014) requires a minimum setback of 10m from the trees at the woodland edge. A recommended 10m buffer from the woodland edge is shown on Map 4. This buffer area comprises mixed meadow and has experienced historical disturbance through site clearing, but is currently naturalizing with scattered tree growth (e.g. Scot's Pine). By avoiding vegetation removal and other direct impacts within this buffer, and by allowing the existing naturalization process to continue, the buffer lands will ultimately develop into woodland edge habitat that will serve to spatially separate and buffer the more interior areas of woodland habitat from the adjacent residential development. Ongoing passive naturalization of the buffer area should also be actively restored with native vegetation plantings as described further below. The ecological enhancement of the buffer area that will occur by actively supplementing the existing regeneration of this buffer area is expected to provide overall improvement in ecological quality for the adjacent natural features, such as by providing additional wildlife habitat within the buffer and mitigating sensory disturbances to wildlife that occur in more interior areas of woodland from the adjacent development.

The Significant Woodland also provides SWH for Wood Thrush, amphibian breeding, and terrestrial crayfish as shown on Map 3b. This feature has also been determined to represent Candidate SWH for bat maternity colonies. As described above, woodland habitat will be maintained, and the proposed 10m buffer is anticipated to effectively protect the form and function of the SWH types that have been determined to occur within this woodland.

5.3.2 Wetland Buffer

The Guelph Northeast PSW is a constraint to development under the PPS (OMMAH 2014), GRCA Wetland Policy (GRCA 2003) and City of Guelph OPA 42 (City of Guelph 2014), as development within a PSW is prohibited. In addition, buffers are required between the boundaries of these wetland features and the proposed development.

Naturally vegetated buffers are required for natural heritage features such as wetlands to protect their form and ecological function, as well as to mitigate negative effects from a proposed development. A recommended 30m buffer from the surveyed wetland boundary is shown on Map 4. This is consistent with the minimum buffer width presented in Table 6.1 of OPA 42, and is also the standard setback distance required by the GRCA (GRCA 2003).

Much of the lands within this 30m buffer are wooded, comprising all or portions of the Fresh-Moist Manitoba Maple Woodland (WODM5-3) and the Fresh-Moist Poplar Deciduous Forest (FODM8-1). Large portions of the buffer also occur as culturally-influenced Dry-Fresh Mixed Meadow (MEMM3) as well as a portion of the existing residential property fronting the south side of Hyland Road (Map 3a). The buffer lands are re-naturalizing following several years of idle land use, as evidenced by the presence of scattered trees and shrubs within this area. As described above, the WODM5-3 community is of lower ecological quality than nearby woodlands and has experienced historic and ongoing disturbance. An actively used informal trail currently traverses the majority of this buffer, as shown on Map 2.

Wetland buffers provide multiple benefits for the protection of wetland form and function, including the protection of surface water quality through effects of sedimentation, erosion and nutrient loading; protection of existing vegetation and tree root zones; provision of additional habitat such as for amphibian foraging and local movement corridors; reduction of edge effects and wildlife sensory disturbances through the development of more robust edge habitat and spatial separation from development.

Due to the existing and ongoing re-naturalization of these lands, it is recommended that the 30m buffer be allowed to continue to passively regenerate with native vegetation species to ultimately form a more robust woodland edge separating the proposed development from the PSW. This passive regeneration should be augmented with native plantings, selected as appropriate to site conditions, to further restore the edge habitat and provide a more ecologically robust and diverse vegetated transition between the wetland and upland areas. A 30m vegetated buffer from the PSW is considered sufficient to effectively mitigate potential for development impacts on the form and function of the wetland, including SWH functions that it provides (amphibian breeding habitat, terrestrial crayfish habitat, Wood Thrush habitat).

Notwithstanding the recommendation of a 30m wetland buffer described above, reduced wetland buffers are proposed for two areas of the proposed development based on existing and proposed land uses specific to those areas. Proposed lots 19 and 13 both occur on a single existing residential lot (47 Hyland Road) in whole or in part (see Appendix XII and Map 4). Based on pre-consultation discussions held between the proponent and City staff (J. Dunnink, pers. comm.), it is understood that reduced wetland buffers may be permitted within these lots,

as the existing residential land use is to be maintained as part of the proposed development. This is in accordance with OPA 42 policy 6A 1.1.11. Based on the proposed development plan, a wetland buffer with a minimum width of approximately 23m, but primarily >25m, would be accommodated within these two lots. Provided the proposed mitigation and buffer restoration measures described below are incorporated, this proposed buffer width is expected to adequately protect the adjacent wetland form and function from development construction and post-construction use.

The second area of reduced wetland buffer occurs within the proposed Lot 10 immediately north of Hyland Road (see Appendix XII). As shown on Map 4, this lot largely occurs within 30m of the surveyed wetland boundary (MAMO1-2), which is congruent with the south edge of the Hyland Road graded surface. The existing Hyland Road right-of-way (ROW) separates the proposed Lot 10 and the existing wetland. In accordance with OPA 42 Section 6A.1.1.11, due to the presence of an existing land use which will be continued post-development (i.e. municipal road ROW), a reduced wetland buffer may be permitted. Development of the proposed Lot 10 north of Hyland Road is not expected to cause negative impact to the PSW provided that stormwater management considerations and other mitigation measures described in Section 5.0 are addressed and implemented. City Environmental Planner Adele Labbe confirmed that a reduced wetland buffer at this location may be permitted in accordance with OPA 42 Section 6A.1.1.11 due to the existing land use (A. Labbe, pers. comm., November 2014).

5.4 Direct Impacts and Mitigations

The approach to identifying and delineating the subject property natural features was aimed at avoiding direct impacts from development on significant and sensitive natural features. The delineation of the woodland and wetland boundaries, and their associated buffers, were used to guide the layout of the residential development. The development will be maintained outside of the identified natural features that include the PSW and Significant Woodland that comprise Significant Natural Area under OPA 42. Therefore, direct impacts to these natural features have been avoided.

The proposed development plan has been overlain onto mapped existing natural features and development constraints as shown on Map 4.

5.4.1 Vegetation Removal

Direct impacts within the subject property will occur as loss of natural vegetation as a result of clearing, grubbing, and grading where indicated in the proposed development (Map 4). The proposed development would result in the removal of culturally influenced meadow and woodland features that occur outside of boundaries of the Significant Woodland and PSW features (i.e., the Development Area).

The proposed development will require the removal of the FODM8-1 aspen-dominated wooded area located within the north property parcel. As described in Section 5.1.2, this feature is not contiguous with the mapped Significant Woodland, and does not meet City OPA 42 criteria to warrant status as a Significant Natural Area or Natural Area. Tree removals will be compensated for according to City requirements as described in Section 5.3.2.

Two locally significant vegetation species were inventoried within the north parcel development area: Elliptic-leaved St. John's Wort within the Dry-Fresh Mixed Meadow (MEMM3), and Meadow Horsetail within the Fresh-Moist Poplar Deciduous Forest (FODM8-1) community. Individuals of these species will require removal to accommodate proposed site grading. It is recommended that individuals of these species be located and transplanted to adjacent areas of suitable habitat (e.g., buffers) prior to construction. All other inventoried vegetation species within the development areas are considered common and widespread locally and provincially, and their removal is not expected to cause negative impact to local natural features or species.

5.4.2 Tree Removal

Of the 296 trees inventoried, 273 are anticipated to be removed in the development areas, of which 254 (93%) are native and 19 (7%) are non-native. This includes 115 trees that have been identified as being in poor or very poor condition, and/or have a high risk of structural failure, and/or have been identified as snags, as well as an additional 3 fruit trees that are exempt from compensation within the City's tree by-law. The remaining 155 trees identified for removal are based on comparing the extent of the proposed site grading, which is required to effectively service the lands. Most of these 155 trees are in fair condition with low risk of structural failure, and range in size from 10-88cm DBH. The majority of these trees are native and are dominated by Trembling Aspen, Black Walnut and White Cedar. Non-native trees are dominated by Scot's Pine and Norway Maple. Of these 155 trees, 104 are located within the aspen-dominated

FODM8-1 community north of Hyland Road that will require removal to accommodate the proposed development. Of the trees anticipated to be removed for site grading and development, as reported in the EIS and TIPP, the proponent will retain as many as possible during the construction stage where feasible. For more information on tree removal, see the TIPP in Appendix V.

The majority of the trees to be removed represent secondary growth on lands that were historically cleared and have since begun renaturalizing (i.e., the cultural meadow communities and FODM8-1 community within the development areas). The trees of greater ecological significance and functional habitat value (e.g., for Wood Thrush habitat, upland amphibian breeding habitat) are located within the designated Significant Woodland and will be separated from the development by restored vegetated buffers. Existing tree coverage within Block 20 will be retained as part of site development, which is intended to be left in its current, renaturalizing state. The rear of Lot 16 will also be left un-graded, with existing tree cover maintained (see TIPP; Appendix V).

By implementing the recommended protective measures detailed in Section 6.0 of the TIPP (Appendix V), negative impacts to trees to be retained are not anticipated. Tree protection fencing established at least 1m from dripline should also be installed around any additional trees within the development area that are deemed retainable based on the finalized site and grading plans. Any additional trees to be retained within the development should be inspected by a Certified Arborist during the Site Plan stage to re-assess the tree health and structural integrity.

As discussed in Section 5.0 of the TIPP (Appendix V), City of Guelph Tree By-law Number (2010)-19058 requires that native or non-native trees in fair to good condition must be replaced at a compensation ratio of 1:1 or greater. A list of trees exempt from compensation is provided in the same section of the TIPP. Based on City tree by-law requirements, a 1:1 compensation ratio has been applied to non-exempt trees requiring removal to accommodate the development. Based on this compensation ratio, of the 155 trees to be removed requiring compensation, a total of 155 compensation tree plantings will be required. It is recommended that compensation plantings be established within the buffers as part of the proposed restoration and enhancement of these areas. Additional compensation planting requirements should also be established within the proposed development to the extent possible. This can

include Block 20 or the un-graded rear of Lot 16, where there is opportunity to further bulk up the woodland edge and provide additional buffer to more interior areas of Significant Woodland from the adjacent proposed and existing residential developments. The required number of tree compensation plantings will be confirmed during the detailed design stage in conjunction with the City, which may account for planned relocations of existing, good quality trees from the development footprint to the restoration area, on the part of the proponent. It is understood that trees selected for relocation will require inspection by City staff to determine if/how their relocation to the adjacent restoration area may affect overall tree compensation requirements (P. Patel, City of Guelph, pers. comm., November 2015).

5.4.3 Impacts to Wildlife and their Habitats

Provincially significant wildlife species and habitats observed within the subject property (see Sections 5.1.1-5.1.4) are located within the protected Significant Natural Area outside the development area. This includes habitat for the SCC Wood Thrush, confirmed SWH for terrestrial crayfish and amphibian breeding, and candidate SWH for bat maternity colonies. No direct impacts to these significant species or habitats will occur as a result of the proposed development.

Open space areas that are included in the development plan have the potential to provide habitat for a variety of wildlife species that are common and ubiquitous on the surrounding landscape, and which are typically adapted and resilient to human-influenced landscapes. The loss of trees and vegetation within the development areas is not anticipated to have significant impacts on these observed wildlife species. One locally significant bird species, Baltimore Oriole, was observed with evidence of probable breeding within the south parcel development area. This species generally favours habitats such as woodland edge, riparian areas, and open areas with scattered trees (Rising and Flood 1998). The proposed development will require the removal of the majority of the natural habitat used by this species on the subject property. Existing habitat will be retained within the buffers Block 20 and the un-graded rear of Lot 16. One breeding pair was observed using existing habitat within the meadow, indicating a low number of individuals actively using the property. Baltimore Orioles may continue to use the retained areas of habitat on the property, including the restored buffer, Block 20, and rear of Lot 16. Over the longer-term post-construction, Baltimore Orioles may use landscape tree plantings

within the development as this species is known to use human modified environments such as gardens and parks (Rising and Flood 1998).

The Significant Natural Area represents part of a north-south landscape-level ecological linkage that extends for several kilometers to the north. This linkage may provide a locally important wildlife movement corridor, although it does not serve as a provincially significant deer movement corridor. The development area occurs peripherally to this larger regional linkage feature and does not function as part of this important ecological linkage. Therefore, the proposed development will not directly impact wildlife movements on the surrounding landscape.

The FODM8-1 community within the north parcel is relatively disturbed, contains relatively little floral diversity and does not afford significant ecological value to the subject property vicinity in relation to the adjacent Significant Woodland and PSW. No significant species were observed within this feature. Consequently, its removal is not expected to cause significant negative impact to local wildlife populations.

Vegetation clearing has the potential to directly impact bird breeding activity through damage and destruction of nests, eggs and young, or avoidance of the area by breeding adults. Vegetation clearing is therefore recommended to occur outside the core bird nesting season (May 1-July 31) so as to limit disturbances to nesting activities of birds within the meadow habitat and isolated trees, and to avoid destruction of active nests. The destruction of migratory birds and their nests is prohibited under the federal *Migratory Birds Convention Act*, 1994. If vegetation clearing cannot be avoided during the core bird nesting season, a qualified avian biologist must be retained to carry out a nest search ahead of clearing activities within “simple” (i.e., non-forested) habitats.

5.5 Indirect Impacts and Mitigations

Construction of the proposed development has potential to cause indirect impacts on the adjacent natural features and functions if not mitigated appropriately. Recommended mitigation measures are provided for each potential impact.

5.5.1 Encroachment into Recommended Buffers

As shown on Map 4, proposed Lots 14, 15 and 16 are maintained entirely outside of the recommended 30m wetland buffer. Lots 10, 19 and 13, which partially occur within 30m of the PSW boundary, are discussed above in relation to retention of existing land uses and the applicability of OPA 42 Section 6A 1.1.11. The proposed reduced wetland buffer within Lots 13 and 19 will not negatively impact existing wildlife habitats or movement functions since these lands are currently used for residential purposes. The lands proposed for Lot 10 fall within the 30m of the PSW north of Hyland Road. However, the existing functional value of these lands to the PSW, as wildlife habitat, is diminished due to the presence of Hyland Road which bisects these lands from the PSW. Some potential herpetofauna (e.g., snake) foraging habitat may be lost through development of these lands; however, large areas of surrounding upland habitat will be maintained within the protected Significant Natural Feature. Eastern Gartersnake was the only snake species observed on the property. As a habitat generalist, loss of potential foraging habitat within the existing meadow is not expected to negatively impact local populations. As discussed above, the reduction in buffer width adjacent to these lots is not anticipated to cause negative impact to the adjacent natural features or ecological functions provided the recommended mitigation measures are implemented.

Block 20 and a relatively small corner of Lot 16 encroach into the 10m woodland buffer. This comprises up to approximately 8m into the 10m buffer within Block 20. However, as described above, Block 20 and the rear of Lot 16 are to be left undeveloped and will not be graded. The rear limits of Lot 16 will be demarcated by permanent fencing as described below to inhibit uncontrolled post-construction human access to the adjacent woodland. Provided the recommended mitigation measures are implemented, negative impact as a result of this buffer encroachment is not anticipated.

In all locations, the proposed development avoids direct impact to the existing PSW and Significant Woodland.

5.5.2 Disturbance to Protected Natural Features and Wildlife Habitats

Vegetation clearing and other construction activities have the potential to inadvertently destroy, damage and degrade the edges of existing vegetation within buffers unless the boundaries of these buffers are clearly marked. For example, construction activities can cause scarring and decreased health of adjacent trees whose branches or root systems have been damaged by

machinery or affected by construction-related dust and sedimentation. Damage to trees and other vegetation can also be caused by the compaction of soils within tree rooting zones along wetland or woodland edges.

Construction-related vegetation damage and indirect disturbances can cause stresses on the natural features that weaken their ecological integrity. In these states, natural features are more prone to the establishment and proliferation of invasive, non-native species such as Common Buckthorn. Proliferation of invasive, non-native species within natural communities decreases their ecological value by suppressing native species, diminishing biodiversity and reducing habitat suitability. Because the proposed development is separated from existing woodlands, the potential for construction-stage damage to adjacent vegetation is limited.

To limit ecological impacts during construction, efforts should be made to clearly demarcate the limits of the ecological buffers so as to prevent unnecessary encroachment into the surrounding natural features and to avoid damage to retained buffer vegetation. These boundaries should be clearly marked using either brightly coloured snow fencing or silt fencing erected for the purposes of on-site stormwater runoff control. Where trees are located along the buffer edges to be retained, protective tree hoarding should be installed at least 1m from dripline to adequately protect the root zone from soil compaction and other disturbances.

Designated areas for construction lay-down, vehicle access and parking, equipment storage, materials stockpiling, and any on-site construction offices should be located entirely outside of established buffers, and preferably not adjacent to the buffers so as to limit potential to indirectly impact the adjacent natural features.

Potential indirect impacts to natural features and wildlife may also arise from noise, vibrations, human presence, unnatural lighting and dust associated with construction activities.

During construction activities such as vegetation clearing and grubbing, dust can potentially result in the following:

- Changes in vegetation due to increased heat absorption and decreased transpiration,
- Adverse effects to plants and/or wildlife in aquatic or wetland systems that are not adapted to high levels of sedimentation, and

- Immediate visual impacts.

Impacts due to dust should be mitigated for by moistening areas of bare, dry soil with water as needed during construction activities to reduce the amount of dust produced.

Excessive noise, vibrations and human presence as a result of site preparation and construction activities may cause wildlife to temporarily avoid the area. These impacts can be mitigated by restricting the daily timing of construction activities to between 0700hr and 1900hr. This timing restriction should also apply to the use of generators or pumps insofar as possible.

Lighting associated with construction activities should be turned off following daily cessation of activities or directed away from adjacent natural features to reduce the impacts resulting from artificial lighting on natural features and wildlife.

Such impacts resulting from dust, noise, vibrations and artificial light are expected to be temporary, minimal and localized during the construction of the proposed development. Significant effects on wildlife are not anticipated and it is expected that displaced wildlife species will return to the vicinity of the subject property following construction.

5.5.3 Sedimentation and Erosion

During construction, areas of bare soil will be exposed which have the potential to erode during rainfall events and impact adjacent natural features. In the event of a heavy rain, sediment laden runoff can enter adjacent natural areas by way of overland flow. Due to the prominently sloped lands of the south parcel, the adjacent wetlands are particularly susceptible to erosion and sedimentation if on-site surface runoff is not appropriately controlled.

Soil compaction also has potential to occur as a result of heavy machinery and the stockpiling of heavy materials in the area of development. Soil compaction can greatly reduce the permeability of soils and affect their ability to retain water during rain/snow melt events. This will result in an increase in surface water run-off which will ultimately increase the erosion potential and the amount of sediment being transported into adjacent natural features.

In order to protect on-site natural features from potential impacts due to sediment, a Sediment and Erosion Control Plan must be developed prior to any construction activities on-site. The primary principles associated with sedimentation and erosion protection measures are to: (1) minimize the duration of soil exposure, (2) retain existing vegetation, where feasible, (3) encourage re-vegetation, (4) divert runoff away from exposed soils, (5) keep runoff velocities low, and (6) trap sediment as close to the source as possible.

The following actions are recommended to limit potential for erosion and sedimentation from construction areas:

- installation of erosion control silt fencing around the perimeter of any construction or area grading operations;
- inspection and monitoring of all erosion control measures by the contractor, with repairs completed as required;
- operation and storage of all materials and equipment in a manner that prevents any deleterious substance from leaving the site;
- stripping and strategic placement of topsoil stockpiles, and placement of sediment control fencing around all stockpile areas; and,
- re-vegetation of completed areas as soon as possible after construction.

The impact resulting from soil compaction can be mitigated by avoiding use of construction vehicles and equipment within the buffers, and by locating material stockpile and equipment storage locations away from natural features and their buffers.

An environmental monitoring program is recommended to ensure that the sediment and erosion control measures are installed, maintained and functioning as intended.

5.5.4 Changes to Hydrologic Regime

Construction of the proposed development has potential to alter the existing hydrological regime of the adjacent wetlands, such as through changes to existing stormwater drainage patterns and amounts of impervious surface, and changes to shallow groundwater flow. These activities may cause changes to hydrological inputs to the wetlands, ultimately impacting their form and function, if not appropriately mitigated.

As described in the Functional Servicing and Stormwater Management Report (Van Harten 2015), the existing drainage pattern within the north parcel will remain unchanged under the post-construction regime, whereby surface runoff will flow in a southeasterly direction toward the wetland following the proposed site grades. The existing 450mm diameter culvert conveying runoff under Hyland Road will be replaced with a 600mm diameter culvert based on runoff calculations for a 10-year storm event (Van Harten 2015). The majority of the south parcel catchment area will continue to direct rooftop and side and rear yard drainage toward the wetland, while the road ROW, front yards and individual foundation sump pump drains will be directed toward extensions of the existing 300mm diameter Glenburnie Drive storm sewer. Stormwater will then be conveyed into the existing storm sewer system located west of the proposed development.

A summary of the peak flow rates and water balance calculations has been provided in the Functional Servicing and Stormwater Management Report (Van Harten 2015). As described in that report, peak stormwater flow rates to the wetland under post-development conditions will remain similar to pre-development conditions, with slight decreases in flow within the south parcel under the 10-year storm event, and within both property parcels under the 100-year storm event. Minor flow rate increases of 0.042m^3/sec and 0.008m^3/sec under the 2-year storm event for the north and south parcels, respectively, and a minor increase in flow rate of 0.006m^3/sec within the north parcel under the 10-year storm event are expected. However, these minor flow rate increases are not anticipated to cause any negative impact on the adjacent natural features.

Stormwater flow volumes to the wetland under the post-development condition will be relatively similar to volumes derived from the property under existing conditions. As summarized in Section 6.4 of the Functional Servicing and Stormwater Management Report, an effective water balance is achieved with anticipated net increases of only 66.05m^3, 56.46m^3 and 22.76m^3 (runoff from both parcels combined) between post- and pre-development for the 2-year, 10-year and 100-year storm events, respectively. The majority of the net volume increase will be contributed by the north parcel development. For the 2-year storm event, net volume increases are broken down into 56.92m^3 from the north parcel and only 9.13m^3 from the south parcel. For the 10-year and 100-year storm events, the water volume increases of 71.38m^3 and 80.38m^3, respectively, from the north parcel are offset by anticipated input volume reductions

from the south parcel (Van Harten 2015). Altogether, due to the effective water balance that will be achieved, no changes to the hydrological regime of the wetland are anticipated post-construction.

5.5.5 Changes to Water Quality

Decreases in water quality, such as through discharge of deleterious substances in stormwater runoff, can cause both acute and chronic toxicity impacts within biological communities. These impacts include increased mortality rates, impaired health conditions, decreased reproductive productivity and other reproductive impairments. Environmental contaminants are also known to biomagnify 'up the food chain', where higher-level predators are particularly susceptible to impacts. Water quality impairments can also pose health risks to humans wherever there is potential to come into contact with untreated or inadequately treated water discharge.

The proposed development cannot accommodate on-site stormwater storage facilities due to lack of available space (Van Harten 2015); however, water quality improvements are proposed through the use of catch basins with sumps and by directing rooftop runoff into vegetated swales. Within the south parcel, road surface runoff will not be directed to the wetland and will instead be conveyed into storm sewers. Stormwater drainage from the north parcel will drain into an installed ditch inlet at a location immediately upstream of the cross-culvert spanning Hyland Road. The ditch inlet will function similar to a catch basin, whereby sediments will be settled out of the water column prior to release into the wetland south of Hyland Road. Stormwater will be conveyed to this ditch inlet via a grassed swale (Van Harten 2015), which will also function to remove sediments through natural filtration processes. Since stormwater inputs to the wetland will be subject to passive treatment provided by vegetated swales (e.g., surface flow rate reduction and filtration) and the use of a ditch inlet structure to treat drainage from the north property parcel, negative water quality impacts to the wetland and surrounding natural features are not anticipated.

5.6 Induced Impacts and Mitigations

Establishment of the proposed residential subdivision will introduce increased potential for human disturbances within the surrounding natural features, including the PSW and Significant Woodland. In particular, the increase in local residents may result in increased human access to, and activity within, the adjacent woodland and wetland features, with associated potential for

habitat degradation (e.g., vegetation trampling or damage, path creation, litter, garbage or yard waste dumping). Habitat degradation may subsequently facilitate the further establishment of non-native, invasive species such as Common Buckthorn. Increased human population in the immediate vicinity will also increase the potential for domestic animal (e.g., cat (*Felis catus*)) and other development-tolerant predatory mammal (e.g., raccoon (*Procyon lotor*)) access to surrounding natural areas. Easier access provided to these animal groups may impact nesting success and direct mortality among certain small-size wildlife, such as passerine birds.

Provision of a formal recreational trail, as described in Section 6.0, is expected to minimize disturbances caused by uncontrolled access and informal path creation through the natural features from the development. Active planting of the buffers, and in particular dense plantings of woody vegetation species, will further discourage access from adjacent areas. Additionally, a site-specific insert to the City's EnviroGuide brochure should be distributed to homeowners within the new development to inform them of the ecological significance of the adjacent natural features, the importance of limiting impacts to those features, and examples of various activities (e.g., use of motorized off-road vehicles, refuse dumping) that can cause stresses on the ecological systems.

Due to the proposed location of a pedestrian trail immediately behind the south parcel residential lots backing onto the woodland and wetland buffers (see Section 6.0), permanent fencing along the rear lot lines to inhibit natural feature or buffer encroachment by the homeowners is considered unnecessary. Recommended measures to discourage human encroachment into the adjacent natural features from the trail area are further discussed in Section 6.3. The EnviroGuide insert will indicate the importance of not dumping garbage, yard waste, and other refuse behind the rear-lot yards into the buffer and pedestrian trail area. Additionally, a sign should be posted at the Hyland Road trailhead indicating that dumping of refuse within the natural area is prohibited

5.7 Cumulative Impacts

In order to evaluate the potential for cumulative impacts resulting from this proposal, it is necessary to look beyond the boundaries of the development area to the neighbouring lands. This approach looks at the character and potential changes that are occurring or may occur in the future on surrounding lands. Cumulative impacts may arise as a result of impacts from a

number of sources to add up (or combine) if they overlap in space, overlap in time, occur at some receiver spatially removed from the undertaking, or at some future point in time. Cumulative impacts may also arise from more than one development that may not actually overlap in time or space, but affects the same component of the ecosystem.

The proposed development is predominantly located between areas of existing residential development on its north, west, and south sides, and the City-designated Significant Natural Features on the east side. Within the immediate vicinity of the subject property (i.e., between Speedvale Avenue to the north and Eastview Road to the south) there is therefore little to no potential for additional future "greenspace" development of lands located outside of the Significant Natural Features. NRSI is not aware of any proposals for redevelopment of existing residential or commercial land uses in this immediate area.

The Guelph Northeast PSW and Significant Woodland may be vulnerable to cumulative impacts if appropriate protective measures are not taken in development of lands on the south and east sides of these natural features, in combination with the residential development that currently exists and is proposed (at Hyland Road) west of these features. Efforts have been made by the Project Team to avoid or mitigate potential impacts to the natural features arising from the proposed development of the subject property. This has included implementation of development setbacks and restoration/enhancement of buffers to the adjacent natural features. A recently constructed residential development located south of the Significant Natural Features, north of Eastview Road, has also been set-back from the adjacent natural features, such as through the positioning of a stormwater management pond between the residential housing and the natural features. This development design will provide opportunity for natural feature buffering, through restoration of the pond feature, expansion of adjacent wildlife habitat and as a physical separation and/or barrier to the natural features from the adjacent housing. Open lands located east of the significant natural features, which comprise former landfill lands, have been identified on OPA 42 Schedule 10 as Restoration Area, and as such represent part of the City-designated Significant Natural Area contiguous with the PSW and Significant Woodland. It is therefore anticipated that this parcel of land will remain undeveloped.

Therefore, relatively little future development is anticipated that would cause additional potential for cumulative impact to the adjacent natural features, as there is little further opportunity for

future land development that would impact these features. Consequently, no significant cumulative impacts are expected for which the proposed Hyland Road development would contribute.

6.0 Impact Analysis for Pedestrian Trail Alternatives

The City of Guelph Trail Network, as shown in OPA 48 Schedule 8 (City of Guelph 2012) identifies an off-road secondary trail that extends northerly from an existing trail at the municipal Eastview Community Park, south of the subject property, terminating at Hyland Road. The proposed trail is shown to traverse just inside the western edge of the on-site Significant Natural Area before ending at the eastern terminus of Hyland Road. A short side-branch trail extends across the south parcel development area to connect to the eastern end of Glenburnie Drive (see Appendix XIII). As described in the letter from the City's Parks and Recreation Department dated February 6, 2014 (Appendix I), in response to the draft Terms of Reference, it is required that the EIS investigate opportunities to implement the planned trail route based on the conceptual alignment illustrated in OPA 48, and to recommend a trail route location such that the existing natural features will not be negatively impacted. Furthermore, it is understood that multiple trail route alternatives are to be considered in the EIS, whereby each route will be assessed for potential natural feature impact and one route will be recommended.

Map 5 illustrates the location of three trail route alternatives that were field-assessed and GPS-surveyed by NRSI staff to minimize potential for tree and other natural environment impacts (e.g., avoiding or minimizing trail encroachment into tree driplines). All three alternatives enter the subject property at the south boundary at the location of the existing informal trail's access point. The following are general descriptions of each trail route alignment alternative.

> **Trail Option 1:** This route alternative conforms closely to the conceptual alignment that was identified by the proponent independent of this route alternative analysis, and as showing as part of the development CAD overlay on Maps 4 and 5. This alignment is intended to occur immediately below (east of) the proposed retaining wall lining the rear property boundaries. This trail option deviates from the proponent's conceptual alignment in places to minimize tree impact, most prominently at the southern end where the proposed trail avoids a stand of Balsam Poplars and Scot's Pines. This alignment would occur within the woodland/wetland buffer and would avoid direct encroachment into the Significant Woodland or PSW. The trail would run immediately east of the Lot 19 boundary where it would terminate at Hyland Road. This route alternative as shown on Map 5 slightly overlaps the rear lot boundary of the development plan overlay, as this route was GPS-georeferenced in the field prior to finalization of the lot limit details. The

detailed alignment of this route would be revised at the Site Plan stage to conform to the finalized development limits and further assessed as part of a subsequent Environmental Implementation Report.

Trail Option 2: The majority of this trail route is common to Trail Option 3, where it follows the alignment of the existing informal north-south trail through the property. This option deviates from Option 3 by diverting west slightly to avoid direct encroachment into the Cattail Graminoid Organic Meadow Marsh (MAMO1-2) and the Mixed Willow Organic Deciduous Thicket Swamp (SWTO2-6), which are part of the Guelph Northeast PSW Complex. Instead, the northern segment of this trail option traverses a small mixed meadow community before joining Hyland Road.

Trail Option 3: This trail option is entirely consistent with the alignment of the existing informal north-south foot path on the subject property. As with Option 2, this option bisects a small section of Significant Woodland at the south end before traversing a part of the Fresh-Moist Manitoba Maple Woodland (WODM5-3). Unlike Option 2, this alignment crosses a drier west section of the MAMO1-2 PSW community before reaching Hyland Road.

As required by the City (Appendix I), each trail option would include a 2.5m wide graded stone dust trail with 0.6m wide grassed edges and a drainage swale between the development and the trail. The exception to this would be the section of Trail Option 3 that would cross the MAMO1-2 wetland community, which would comprise a raised wooden boardwalk. The boardwalk is anticipated to be 1.5m wide and raised 60cm above the existing grade. This represents a Light-Duty design boardwalk under the City's boardwalk trail design specifications (City of Guelph 2005). In order to accommodate trail construction, it is assumed that an allowance of 3m will be required for graded trail sections while an allowance of 2m will be required for the boardwalk section. Based on the results of the impact assessment, one preferred trail route option will be carried forward as part of the proposed development plan.

The following assessment considers potential direct, indirect and induced impacts associated with each trail route alternative. Grading details of each trail alternative have not been determined; therefore, proposed impacts consider only trees or other features that fall within the

anticipated footprint of the trail allowance. Grading details will be determined for the recommended trail alternative during the Site Plan stage of development.

6.1 Direct Impacts

6.1.1 Vegetation Removal

Trail Options 2 and 3 pass through woodland vegetation communities and would require a greater amount of woody vegetation removal, including a larger number of trees (see below) than Trail Option 1, which is primarily located within an open meadow community and existing residential yard. The southern portion of Trail Options 2/3 pass through the northern extent of Significant Woodland (Fresh-Moist Poplar Deciduous Forest (FODM8-1)) located adjacent to the residential development, and would therefore require some vegetation removal within this significant feature within the grading limits of the 2.5m wide trail. Hazard trees located within 30m of the trail, some of which will occur within the Significant Woodland, may also require removal. Each trail will also traverse a section of the Fresh-Moist Manitoba Maple Woodland (WODM5-3) requiring vegetation removal within the trail grading limits. However, as described above, this community is a low quality secondary growth feature and the species located within it are common on the surrounding landscape.

In addition to the above, Trail Option 3 also passes through a section of wetland that comprises part of the Guelph Northeast PSW Complex. Trail delineations through PSW features should only be considered if other alternative routes are not feasible, due to the requirements for direct vegetation removal and increased potential for indirect and induced impacts to the wetland. Because the other two routes are considered feasible options, Option 3 is not recommended on this basis. However, for the purposes of a full assessment, Option 3 is still considered within the evaluations below.

Trail Option 3 passes through a small section of the Mixed Willow Organic Deciduous Thicket Swamp (SWTO2-6) community (Map 5). The locally significant Hop Sedge was inventoried within this community. Individuals of this species would need to be searched for and accurately mapped/GPS-georeferenced prior to trail construction. Any observed individuals would require re-location to areas of nearby suitable habitat.

By contrast, Trail Option 1 is delineated to remain outside of the Significant Woodland or PSW, although it would entirely occur within the protective buffers for these features. The species that may require removal to accommodate this trail route are common and ubiquitous on the surrounding landscape. No federally, provincially or locally significant plant species will require removal based on the Option 1 trail alignment.

To ensure that impacts of trail construction are confined to a limited space, it is recommended that prior to any site clearing or grading, the limits of construction are identified in the field. This will include the installation of ESC measures and/or construction fencing as appropriate, prior to the commencement of construction as recommended for the development in Section 6.3.1.

6.1.2 Tree Removal

As described above, three alternative trail alignments were GPS-georeferenced on December 22, 2014 with an aim to minimize tree removal requirements for trees that are in fair to good condition and/or are not considered hazard trees. These alignments are shown on Map 5 and are also presented within the TIPP (Appendix V). These trails are shown as 3m wide trail route allowances that are anticipated to be required to construction the 2.5m wide graded crushed stone trail segments. The exception is the wetland trail segment of Trail Option 3, which comprises a 2m wide trail allowance to accommodate a 1.5m wide raised wooden boardwalk.

A greater number of trees will require removal to accommodate Trail Options 2 or 3 than Option 1. Specifically, 7 trees in fair to excellent condition fall within the footprint of Trail Option 2, while an additional 22 potential hazard trees (trees in poor or very poor condition, or at high risk of structural failure) within 30m may require removal. Six trees in fair to excellent condition fall within the footprint of Trail Option 3, while an additional 19 potential hazard trees within 30m may require removal. By contrast, only 2 trees in fair to excellent condition fall within the footprint of Trail Option 1, while an additional 3 potential hazard trees within 30m may require removal.

Further consultation with the City may be required regarding the need for removal of all of the inventoried potential hazard trees along the selected trail alignment, as not all of these trees may present a hazard based on their size and species. Nevertheless, as trees considered to have potential for structural failure and/or being in poor or very poor condition, the hazard trees

are exempt pursuant to Section 4 of the City's tree by-law and do not require compensation. These recommendations are based on the typical approach required by City parks to identify hazard trees that may pose a safety concern. As the overall condition and structural integrity of trees can change relatively quickly over time, it is recommended that a detailed inventory and assessment of all trees in and within 30m of the trail alignment be reassessed by the City when they propose to construct the trail at the Environmental Implementation Report (EIR) stage or Site Plan stage of the project.

The City's tree by-law requires a minimum 1:1 compensation ratio for non-hazard trees in fair to good condition that require removal as part of the proposed trail development. Based on the conceptual alignments illustrated on Map 5 and as described in the TIPP, the following compensation tree plantings would be required for each trail alignment alternative based on a 1:1 compensation ratio:

- Trail Option 1: 2 trees
- Trail Option 2: 7 trees
- Trail Option 3: 6 trees

Installation of the pedestrian trail, regardless of which trail route alignment is selected, will require the construction of a trailhead area at Hyland Road. Details of the trailhead design will be determined at a future date in consultation with the City of Guelph. However, it is expected that the feature will include gates to restrict large motorized vehicle access to the trail from the road, as well as signage to warn pedestrians of the road crossing. It is also expected that some tree removal may be required to construct the trailhead where it meets Hyland Road. Details of the tree removal requirements will be determined at a future date with the City of Guelph. Tree removals necessary for trailhead construction have therefore not been included in the above tree removal assessments.

6.1.3 Wildlife Habitat Alteration/Loss

The majority of wildlife recorded within the woodland habitat on the subject property is common and ubiquitous on the surrounding landscape. Habitat alteration will be largely limited to tree and vegetation removal within the trail grading or boardwalk footprints, which may cause a displacement of wildlife currently using these features as habitat. However, significant impacts to these relatively common species are not anticipated due to the relatively large areas of

equally suitable or superior habitat elsewhere on the surrounding landscape (e.g., elsewhere within the Guelph Northeast PSW and Significant Woodland).

As described in Section 4.0, the woodland and PSW collectively provide confirmed SWH for the SCC Wood Thrush and contain primary and secondary SWH zones for terrestrial crayfish (Map 3b). The common alignment section of Trail Options 2/3 require encroachment into a small part of the Fresh-Moist Poplar Deciduous forest (FOMD8-1) community, which represents part of the Wood Thrush SWH. However, Wood Thrush observations made during NRSI site investigations were from areas further interior to the natural features rather than near the woodland edge. This species is known to be sensitive to habitat fragmentation (Evans *et al.* 2011); however, Trail Options 2/3 are not expected to cause a significant edge effect for the species due to the relatively narrow linear opening that would be created. Nonetheless, trail construction may improve access to Wood Thrush and other bird nests for Brown-headed Cowbird (*Molothrus ater*).

The existing informal north-south pathway occurs immediately adjacent to one of three observed terrestrial crayfish chimney locations. As shown on Map 3b, Trail Options 2/3, which corresponds to the existing informal pathway (entirely for Option 3, mostly for Option 2), may directly impact the chimneys and other primary habitat of terrestrial crayfish due to the wider trail footprint and grading requirements in relation to the existing path. This would cause the physical destruction of burrows and associated tunnels in this area, such as through the soil compaction that would occur from equipment during trail construction. Trail grading immediately adjacent to existing burrows may also cause an increase in stormwater flow into the adjacent burrows, which could cause flooding of the burrows or introduce sediments.

By avoiding encroachment into the significant natural features and primary or secondary terrestrial crayfish habitat, Trail Option 1 avoids direct impact to confirmed SWH. One locally significant bird species, Baltimore Oriole, maintains probable breeding habitat within the Dry-Fresh Mixed Meadow (MEMM3) community that the majority of Trail Option 1 would traverse. Direct habitat impacts caused by trail construction are relatively minor compared to the loss of Baltimore Oriole habitat due to the proposed residential development. Refer to Section 5.3.3 for discussion about direct impact to Baltimore Oriole habitat pertaining to the proposed residential development. Construction of Trail Option 1 is not anticipated to cause any additional

significant direct impact to existing wildlife populations or their habitats beyond what may occur through construction of the proposed residential development.

Vegetation clearing has the potential to directly impact bird breeding activity through damage and destruction of nests, eggs and young, or avoidance of the area by breeding adults. Vegetation clearing is therefore recommended to occur outside the bird nesting season (May 1-July 31) so as to limit disturbances to nesting activities of birds within affected vegetation, and to avoid destruction of active nests. The destruction of migratory birds and their nests is prohibited under the federal *Migratory Birds Convention Act*, 1994 as described in Section 2.3.3.

6.2 Indirect Impacts

6.2.1 Disturbance to Protected Natural Features and Wildlife Habitat

Impacts due to excessive noise, dust, vibrations, lighting, and proximity of human presence during trail construction may cause certain wildlife to abandon or avoid the area for travel, nesting or foraging. This may include construction-stage disturbances to the SCC Wood Thrush, and the locally significant Baltimore Oriole regardless of which trail route option is selected. However, these impacts are anticipated to be minimal, localized and temporary. Expected vegetation removal requirements for the trail will be relatively minor. As the observed wildlife species are generally adaptable and resilient to human disturbances, it is expected that displaced wildlife species will return to the vicinity of the subject property following construction.

Disturbances associated with the construction of Trail Options 2/3 may be more pronounced for terrestrial crayfish that occur next to the trail alignment than would construction of Trail Option 1. Disturbances such as ground vibrations, dust, vegetation removal and proximity of human presence may cause Chimney Crayfish to avoid use of the immediately adjacent habitats. However, evidence for indirect impact to terrestrial crayfish by disturbances such as these has not been found in the existing literature to date.

Trail construction activities completed by the proponent will include vegetation removal and preliminary grading. If possible, these activities should be completed in conjunction with construction of the residential development in order to minimize the temporal periods of disturbance on the adjacent natural features. Vegetation removal and preliminary trail grading

will be completed prior to the installation of restoration plantings within the buffer, in order to minimize the potential for construction damage to restoration plantings.

Additional recommendations including daily timing of construction activities and limitations on noise and lighting for construction of the trail are the same as those outlined for the proposed development in Section 6.4.1 above.

As a general means to limit ecological impacts during construction, efforts should be made to clearly demarcate the limits of trail construction, including vegetation cutting and grading boundaries (for the crushed stone and asphalt surface segments), so as to prevent unnecessary encroachment into the surrounding natural features. These boundaries should be clearly marked using either bright-coloured snow fencing, or silt fencing erected for the purposes of on-site stormwater runoff control.

6.2.2 Erosion and Sedimentation

As described above, Trail Options 1 and 2, and the majority of 3 outside of the wetland are proposed to comprise graded trail beds comprising crushed limestone surfaces. The limits of trail grading would be minimized to the extent feasible to accommodate the 2.5m wide trail surface due to the trail location within either the significant natural features (Options 2 and 3) or their buffer (Option 1).

During rain events, erosion of the exposed soils, and transport of sediment-laden stormwater into the adjacent woodland and wetland has the potential to occur if not appropriately mitigated. Erosion control fencing should be established at the limits of grading prior to any grading activities. The locations and types of the sediment barrier (i.e. silt fence) will be detailed on an ESC Plan for the proposed development.

Soil compaction also has potential to occur as a result of machinery used in the construction of the crushed stone surface pedestrian trail sections. Soil compaction can greatly reduce the permeability of soils and affect their ability to retain water during rain/snow melt events. This will result in an increase in surface water run-off which will ultimately increase the erosion potential and the amount of sediment being transported into adjacent natural areas and features. Due to the occurrence of Trail Option 3 within the wetland features themselves, potential for sediment

and erosion impacts are highest associated with this trail alternative, followed by Trail Option 2 for which a portion traverses the west edge of the MAMO1-2 community.

Construction equipment should be kept outside of the natural features or their buffers except where required to construct the pedestrian trail. Grading and trail construction activities within the features or their buffer should be planned such that disturbances to this zone are minimized to the extent possible (e.g., completing all site grading and construction activities within this zone at once and in conjunction with residential development construction, if feasible, rather than requiring multiple entries into this zone across the construction period).

6.2.3 Water Balance and Drainage Pattern Alterations

The crushed limestone surface of the pedestrian trail segment outside of the woodland dripline will be a pervious surface that is expected to allow some infiltration of stormwater to overland stormwater flow from the adjacent residential rear lots. However, the presence of the trail itself is not expected to cause any notable change to the volume of stormwater that will be directed into the wetland. Construction of any of the three pedestrian trail alternatives themselves is not anticipated to negatively affect the hydrological balance of the adjacent natural features.

The constructed pedestrian trail may cause stormwater runoff to be directed along the trail following the downslope trail gradient. However, it is expected that stormwater will run off the trail at low elevation points and enter the wetland. Presence of the trail is not expected to inhibit the flow of stormwater runoff volume into the natural features, or significantly change their flow patterns or flow rate versus a post-development condition without the trail.

Because the trail segment of Trail Option 3 within the wetland comprises a raised boardwalk on helical piers, this trail segment is not anticipated to inhibit existing surface flow patterns from the development area to the PSW. The boardwalk itself is not expected to significantly alter the estimated post-construction water balance calculated for the development area. No indirect impacts to natural feature water balance and drainage patterns caused by construction of any of the proposed trail route alternatives are therefore anticipated.

6.3 Induced Impacts

As described in Section 5.5, induced impacts are often difficult to control post-development. Construction of the pedestrian trail will result in an increased number of people accessing the natural features immediately adjacent to the proposed development. However, the construction of a formal trail is expected to minimize the potential for ad hoc trail formation that may be formed in the natural areas in the absence of a formal pedestrian trail. The potential for human encroachment into, and disturbances of, the natural features may increase the more interior a formal trail route is located. Trail Option 3 traverses the most sensitive of the natural communities in which the trail alternatives are located, where it crosses within the PSW communities. By contrast, Trail Option 1 is maintained outside of the natural features themselves, and is located within a relatively resilient mixed meadow community.

Existing vegetation and supplemental restoration plantings within the buffer will serve to inhibit public encroachment into the natural features from Trail Option 1. It is recommended that these plantings include dense planting configurations to further limit the potential for off-trail encroachment. In addition, educational signage can be used to educate trail users with respect to the values of the natural features, including the presence of PSW and Significant Woodland, and the importance of environmental stewardship of local natural areas.

Potential for disturbance to wildlife and their habitats, including the SCC Wood Thrush and terrestrial crayfish, is less for Trail Option 1 than Options 2 or 3. Although Wood Thrush is not expected to be negatively impacted by human use of Trail Options 2 or 3 since this species is not known to be highly sensitive to human presence (Evans *et al.* 2011) and because it was observed further interior to the natural feature, public use of these trails may negatively impact existing adjacent terrestrial crayfish habitat through off-trail trampling of burrows. Public use of Trail Option 1 is not expected to cause disturbance to any significant or sensitive wildlife species or habitats.

It is recommended that garbage receptacles be placed at the pedestrian trailhead at Hyland Road, and be regularly emptied by City parks staff, to minimize the potential for litter and debris along the trail route. It is also recommended that trail signage advise that trail users keep dogs on a leash to minimize disturbance potential to local wildlife, and to keep public use to daylight hours as it is recommended that the trail segment not be lit with light fixtures. Maintaining trail

use to daylight hours will avoid impact to crepuscular or nocturnal wildlife use of the features, such as deer.

6.4 Evaluation of Trail Route Impacts Among Alternatives

The following is a summary of potential impacts associated with the three trail route alternatives. Table 8 presents a summary of impacts described in Section 6.0, associated with anticipated direct, indirect and induced impacts, among the three trail options. A preferred option is identified for each sub-category of impact, which was used to inform an overall preferred trail route alternative from a natural feature perspective.

Table 8. Evaluation of Potential Impacts Among Preliminary Trail Route Alternatives

Evaluation Category	Trail Option 1	Trail Option 2	Trail Option 3	Evaluation
Direct Impacts				
Vegetation Removal (trees <10cm dbh, shrubs, herbaceous species)	• Vegetation removal would primarily occur within an existing residential property and a mixed meadow community historically influenced by anthropogenic disturbance • No significant species anticipated to be impacted • Requires vegetation removal within trail grading footprint	• Vegetation removal is proposed within a feature designated as Significant Woodland (Significant Natural Area) in OPA 42 • No significant species anticipated to be impacted • Requires vegetation removal within trail grading footprint	• Vegetation removal is proposed within a feature designated as Significant Woodland (Significant Natural Area) in OPA 42 • Vegetation removal is proposed within PSW (Significant Natural Area in OPA 42) • The locally significant Hop Sedge may be impacted and would require relocation and transplantation prior to trail construction • Requires vegetation removal within trail grading footprint except where boardwalk is proposed	Trail Option 1 is maintained outside of significant natural features. Vegetation communities in which vegetation removal will occur have more history of anthropogenic disturbance and are less sensitive to ecological impact and degradation than the adjacent woodland and wetland features. ***Option 1 preferred***
Tree Removal	• 2 trees in fair-good condition, plus 3 potential hazard trees, are expected to require removal based on the conceptual trail alignment	• 7 trees in fair-good condition, plus 22 potential hazard trees, are expected to require removal based on the conceptual trail alignment	• 6 trees in fair-good condition, plus 19 potential hazard trees, are expected to require removal based on the conceptual trail alignment	Trail Option 1 requires the fewest number of trees to be removed. ***Option 1 preferred***

Evaluation Category	Trail Option 1	Trail Option 2	Trail Option 3	Evaluation
Wildlife Habitat Alteration/Loss	• Requires minor habitat removal within probable breeding habitat of locally significant Baltimore Oriole. However, trail footprint requirements are minor compared to the adjacent proposed development. • Minor vegetation removal may cause displacement of commonly occurring wildlife that use meadow and woodland edge habitats, but impact anticipated to be negligible with abundant adjacent habitat	• Requires a small encroachment into the edge of confirmed Wood Thrush SWH • Requires encroachment into primary SWH for terrestrial crayfish • Minor vegetation removal may cause displacement of commonly occurring wildlife that use woodland and wetland edge habitats, but impact anticipated to be negligible with abundant adjacent habitat	• Requires a small encroachment into the edge of confirmed Wood Thrush SWH • Requires encroachment into primary SWH for terrestrial crayfish • Minor vegetation removal may cause displacement of commonly occurring wildlife that use woodland and wetland habitats, but impact anticipated to be negligible with abundant adjacent habitat	Trail Option 1 presents less potential for significant negative impact to SWH, particularly by avoiding encroachment into terrestrial crayfish SWH. ***Option 1 preferred***
Indirect Impacts				
Disturbance to Protected Natural Features and Wildlife Habitat	• Sensory disturbances to wildlife due to construction may cause them to temporarily avoid the area during the construction period • Significant impact to nesting birds will be avoided if vegetation removal is completed outside the period May 1-July 31 • Wildlife impacts associated with noise and artificial lighting are not anticipated provided that recommended mitigation measures are followed	• Sensory disturbances to wildlife due to construction may cause them to temporarily avoid the area during the construction period • Trail construction may cause indirect impacts to adjacent terrestrial crayfish habitat • Significant impact to nesting birds will be avoided if vegetation removal is completed outside the period May 1-July 31 • Wildlife impacts associated with noise and artificial lighting are not anticipated provided that recommended mitigation measures are followed	• Sensory disturbances to wildlife due to construction may cause them to temporarily avoid the area during the construction period • Trail construction may cause indirect impacts to adjacent terrestrial crayfish habitat • Significant impact to nesting birds will be avoided if vegetation removal is completed outside the period May 1-July 31 • Wildlife impacts associated with noise and artificial lighting are not anticipated provided that recommended mitigation measures are followed	All three options present similar potential for indirect impact, or lack thereof, and potential impacts are anticipated to be mitigated through implementation of recommended measures. Construction of Trail Options 2 and 3 presents additional potential for indirect impact to adjacent terrestrial crayfish SWH, such as due to soil compaction or increased stormwater surface runoff from the trail surface. ***Option 1 preferred***

Evaluation Category	Trail Option 1	Trail Option 2	Trail Option 3	Evaluation
Erosion and Sedimentation	• Significant erosion and sedimentation impacts are not anticipated provided that appropriate ESC measures are implemented, including the installation of silt fencing along the limits of grading	• Significant erosion and sedimentation impacts are not anticipated provided that appropriate ESC measures are implemented, including the installation of silt fencing along the limits of grading • However, potential for indirect impact is greater than Option 1 due to trail passing near wetland boundary, but not as great as Option 3.	• Construction of the raised wooden boardwalk section will not require grading. • Significant erosion and sedimentation impacts are not anticipated provided that appropriate ESC measures are implemented, including the installation of silt fencing along the limits of grading • However, potential for negative impact is greatest among trail options where trail passes through wetland habitat.	Because Trail Option 1 does not pass through or immediately adjacent to wetland, there is less potential for negative impact caused by erosion and sedimentation. ***Option 1 preferred***
Water Balance and Drainage Pattern Alterations	• Construction of the trail would result in a negligible difference in anticipated water balance and flow estimations relative to the development area as a whole • Construction of the boardwalk trail through the woodland would not significant alter hydrological flows or contribute additional stormwater volume to the PSW	• Construction of the trail would result in a negligible difference in anticipated water balance and flow estimations relative to the development area as a whole.	• Construction of the trail would result in a negligible difference in anticipated water balance and flow estimations relative to the development area as a whole. • Construction of the boardwalk trail through the wetland would not significant alter hydrological flows or contribute additional stormwater volume to the PSW	***No difference***
Induced Impacts				

Evaluation Category	Trail Option 1	Trail Option 2	Trail Option 3	Evaluation
General post-construction induced impacts	• Construction of the trail will result in greater numbers of people accessing the natural features, and may result in additional human encroachment off-trail into the PSW and Significant Woodland unless appropriately mitigated. • Impacts associated with off-trail human encroachment are anticipated to be mitigated through establishment of dense native vegetation plantings along the trail within the buffer and to install educational signage informing the public about the significance and sensitivity of the adjacent natural features • Littering and garbage/yard waste dumping within the woodland/wetland can be be mitigated through placement of garbage receptacles at the Hyland Road trailhead (maintained by City) and signage indicating the sensitivity of the natural features	• Construction of the trail will result in greater numbers of people accessing the natural features, and may result in additional human encroachment off-trail into the PSW and Significant Woodland unless appropriately mitigated. • Potential for induced impact to terrestrial crayfish habitat, is greater for Options 2 and 3 than Option 1. • Significant negative impacts to Wood Thrush habitat are not anticipated if recommended mitigation measures are implemented • Littering and garbage/yard waste dumping within the woodland/wetland can be mitigated through placement of garbage receptacles at the Hyland Road trailhead (maintained by City) and signage indicating the sensitivity of the natural features	• Construction of the trail will result in greater numbers of people accessing the natural features, and may result in additional human encroachment off-trail into the PSW and Significant Woodland unless appropriately mitigated. • Potential for induced impact to terrestrial crayfish habitat, is greater for Options 2 and 3 than Option 1. • Significant negative impacts to Wood Thrush habitat are not anticipated if recommended mitigation measures are implemented • Littering and garbage/yard waste dumping within the woodland/wetland can be mitigated through placement of garbage receptacles at the Hyland Road trailhead (maintained by City) and signage indicating the sensitivity of the natural features	Trail Option 1 presents the least potential for induced impacts caused by off-trail encroachment into PSW and Significant Woodland, and damage/destruction of terrestrial crayfish SWH, versus Options 2 and 3. ***Option 1 preferred***

Based on the assessment of potential impacts summarized in Table 8 for Trail Options 1, 2, and 3, Trail Option 1 is considered the preferred option among all factors considered. Trail Option 1 is maintained within the buffer of the significant natural features rather than traversing through these features. Vegetation removal required for construction of Option 1 will occur within an area that has experienced a greater degree of historical and ongoing disturbance (e.g., use of the existing residential property fronting Hyland Road), and the habitats to be affected are less sensitive and more resilient to disturbance than the woodland and wetland communities that would be affected through construction of Options 2 or 3. The Trail Option 1 route will also occur in buffer areas that are to be ecologically restored, offering opportunity to establish dense and woody plantings between the trail and the adjacent natural features that would further inhibit off-trail encroachment. Trail Options 2 and 3 would require trail construction and operation within confirmed SWH for Wood Thrush and terrestrial crayfish, the latter of which are most susceptible to construction- and post-construction stage impacts. No significant vegetation species will require removal or relocation for construction of Trail Option 1, whereas the locally significant Hop Sedge may potentially occur within or adjacent to the Option 3 trail footprint within the SWTO2-6 community. For these reasons and others as described above, Trail Option 1 is the preferred alternative for pedestrian trail construction within the subject property.

7.0 Restoration and Enhancement of Natural Features

Targeted plantings of native tree species should be established in open meadow areas of the buffer and Block 20 to further enhance and supplement woody vegetation growth within these lands. Restoration plantings should be selected such that they are suitable to the area and reflect the existing complement of native vegetation species in adjacent communities. These restoration plantings will serve to augment existing and ongoing regeneration of native vegetation species within the buffer to ultimately develop a wider, more robust and ecologically diverse woodland edge. This will provide a better buffer to the adjacent PSW and interior areas of Significant Woodland from the proposed residential development than what currently exists within the proposed buffer area.

The locations and densities of restoration plantings within the subject property will be detailed within a future Restoration Planting Plan. Dense plantings of woody species should be established between within the buffer, between the trail and the adjacent PSW and Significant Woodland, to further discourage potential for human encroachment and buffer adjacent impacts.

Restoration tree plantings are expected to comprise the requirements for on-site tree compensation as described in Section 5.3.2 and the TIPP (Appendix V) in accordance with City guidelines. Compensation plantings should also be considered for Block 20 of the proposed development, which will be left vegetated and un-graded, to augment existing passive renaturalization of this area and to further enlarge the area of enhanced woodland edge within the buffer. Trees that the proponent plans to relocate from the development footprint will also be re-planted within these areas. Additionally, any significant vegetation species relocations that are to be completed due to development/grading requirements (i.e., Meadow Horsetail, Elliptic-leaved St. John's-Wort) should be established within these restoration areas, provided that the existing site conditions (e.g., soil moisture, sun exposure) are suitable. Restoration areas will also receive an application of native herbaceous seed mix containing a site-appropriate mix of species beneficial to pollinators.

The services of a certified arborist may be required to assess the health of existing trees to be retained within the buffer to determine which trees recommended for removal, such

as due to declining health or other potential hazard considerations associated with the proposed residential development or pedestrian trail. Protection fencing, in the form of silt fencing or hoarding should be used to prevent unnecessary damage or disturbance to the root systems of retained vegetation.

It is recommended that the existing informal north-south pathway through the edge of the significant natural features (corresponding to Trail Option 3; Map 5) be closed and restored. Closing and restoration of the trail should occur following construction of the recommended trail alignment so that members of the public have an alternate trail route to take and refrain from walking on the closed route. Trail signage installed at Hyland Road will direct pedestrians to the new trail opening. The old trail will be planted with native restoration plantings that are suitable to the site (e.g., soil conditions, sun exposure). This will include dense woody plantings at the old trail entrance at Hyland Road to deter access to this route.

It is recommended that non-native, invasive species (e.g., Common Buckthorn) should be removed as part of buffer restoration efforts, such as within the WODM5-3 community as well as along areas adjacent to the proposed trail route. Other enhancement and restoration measures within the buffer and natural features may be considered including removal of garbage and debris.

Details of proposed on-site and buffer restoration and enhancement measures will be further detailed within the EIR for the subject property.

8.0 Monitoring

A pre-, during, and post-construction monitoring program is recommended. The recommended monitoring program is described in more detail below.

8.1.1 Pre-Construction Monitoring

Prior to any construction activity on-site, including clearing and grubbing, on-site inspections of the following should be undertaken to ensure proper installation:

- sediment and erosion control measures;
- tree and natural area protection measures, such as fences installed beyond dripline, trees to be retained and wetland buffer; and
- in accordance with the City of Guelph tree management policies, trees affected by development have been inventoried and assessed (see Appendix V).

8.1.2 During Construction Monitoring

Construction monitoring is the responsibility of the proponent and is tied to the specific undertaking. Generally, construction monitoring must occur to ensure compliance with the conditions of various permits.

The following measures are recommended during construction:

- pruning of any limbs or roots (of trees to be retained) disrupted during construction;
- maintenance of vegetated setbacks from wetlands and woodlands by clearly demarcating the limits of these setbacks (e.g., brightly coloured snow fencing or silt fencing for the purposes of stormwater management;
- fuelling of machinery to be done at designated locations away from the wetland and woodland boundaries and their buffers (minimum 30m); and,
- storage of machinery and material, fill, etc. to be done in designated areas away from the wetland and woodland buffers.

8.1.3 Post-Construction Monitoring

A two year warranty is recommended for all proposed planting material throughout the subject property (trees and herbaceous vegetation). Planted material will be inspected by a Certified Arborist or biologist at the end of the warranty period. Plants which, at that time, are not in healthy vigorous growing condition, to the inspector's approval, shall be replaced at no extra charge. All tree staking is to be removed just prior to final inspection.

9.0 Summary

NRSI was retained by Dunnink Homes Ltd. to complete an EIS for a proposed residential subdivision at 46, 47, and 87 Hyland Road in the City of Guelph. The landowner is proposing to develop the subject property to accommodate 19 single detached residential lots. This EIS provides a comprehensive characterization of the existing natural features, and identifies development constraints for the protection of significant and sensitive natural features. Potential impacts to natural features were assessed based on development details provided by Van Harten, on behalf of Dunnink Homes.

A portion of the Guelph Northeast PSW Complex, as well as City-designated Significant Woodland, represent the primary natural feature constraints that were considered in development of the subject property design. Collectively, these features are considered Significant Natural Area in OPA 42, and were confirmed to contain SWH for the SCC Wood Thrush, woodland amphibian breeding and terrestrial crayfish within their boundaries. Development setbacks of 10m and 30m have been recommended from the confirmed boundaries of the Significant Woodland and PSW, respectively, which will be actively restored with native plantings to enhance their capacity to buffer the adjacent natural features from potential impacts derived from the proposed development. A small, localized area of woodland buffer encroachment has been identified, which will be left undeveloped. As well, two areas of recommended reduced wetland buffer width were identified based on maintenance of existing land uses under the post-development condition (i.e., re-development of 47 Hyland Road as a residential lot; proposed residential lot within 30m of the PSW but bisected by the existing Hyland Road ROW). Rationale for reduced buffers have been provided for these areas in accordance with OPA 42 policy. These areas of minor buffer encroachment and reduced buffer width were not anticipated to cause any additional potential for negative impact, provided mitigation measures are implemented as recommended.

All tree removal required to accommodate the proposed development, including the proposed trail alignment, will be compensated at a ratio of 1:1 in conformance with the City tree by-law. Compensation plantings should be established on-site to the extent feasible, and prioritized for establishment as part of proposed restoration plantings within

the woodland/wetland buffer as well as in Block 20. The proponent plans to transplant suitable existing trees from within the development footprint to restoration areas. The degree to which this tree transplantation offsets standard tree compensation planting requirements will be determined through further consultation with the City. A refined tree compensation requirement will be determined during the detailed design stage of development.

An impact assessment was completed for three alternative pedestrian trail alignments, in accordance with the conceptual trail network plan mapped in OPA 48. Trail Option 1, which corresponds with an alignment maintained outside of the PSW and Significant Woodland, was selected. This alignment was determined to impose the least potential for impact among all factors evaluated.

Recommendations have been provided to minimize impacts and ensure that mitigation measures are installed and functioning. These include recommendations to mitigate direct, indirect and induced impacts that may arise during the proposed development. Monitoring recommendations have been provided to ensure that construction-stage mitigations are functioning appropriately, restoration plantings are establishing as expected, and established buffer limits are being respected. The proposed development is not anticipated to cause significant negative impacts to the adjacent natural features or their ecological functions provided that recommended mitigation measures are implemented.

9.1 Recommendations for Environmental Implementation Report

The following should be included in the EIR:

- Detailed design of the pedestrian trail and Hyland Road trailhead including locations of signage, gates, and invasive species removal requirements. Specifications for trails and trail features will be compliant with City of Guelph Trail Master Plan (2005) and the Accessibility for Ontarians with Disabilities Act (2005). The pedestrian trail will be located outside of the future subject property boundary, and will be constructed, owned and maintained by the City of Guelph.

- Update of tree removal requirements based on detailed design of the pedestrian trail, and updated assessment of trees that may pose a hazard to the trail or residential development.
- Updated assessment of tree compensation requirements, based on identification of trees to be transplanted from the development footprint to restoration area, in consultation with the City.
- Preparation of Landscape Plans for the subject property including Restoration Planting Plans for the subject property and woodland/wetland buffer.
- Plans for cleanup of debris and waste
- Plans for addressing invasive species management
- Design of educational, interpretive and stewardship materials and appropriate signage
- Re-location and GPS-georeferencing of regionally significant vegetation species, previously inventoried, that may require removal and relocation prior to site grading.
- Updated/finalized Stormwater Management Plan
- Sediment and Erosion Control Plan
- Development of a detailed pre-, during-, and post-construction monitoring plan.

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MAPS

Map 1

46, 47 and 87 Hyland Road EIS

Study Area

561000 561100 561200 561300 561400

4824800 4824700 4824600 4824500

HYLAND RD

Guelph North-East Complex

Legend

- Subject Property
- Development Area
- Significant Woodland
- Provincially Significant Wetland (PSW)

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: December 2, 2015

NAD83 - UTM Zone 17
Size: 11x17"

0 20 40 60 80 Metres

N

Path: X:\1400_HylandRoad\NRSI_1400_Map1_StudyArea_3K_2015_12_02_KEB.mxd

Map 2

46, 47 and 87 Hyland Road EIS

Vegetation Communities and Monitoring Locations

561000 561100 561200 561300

4824800 4824700 4824600 4824500

FODM8-1 FOCM4-1 FODM8-1 FOCM4-1 FODM8-1 FODM8-1

SNK-001 SNK-002 SNK-004 THDM2-6 SNK-003 RWA-001 MEMM3 BMB-002 CNH-001 MEMM3 MBM-001 ANR-002 MAMO1-2 SWTO2-6 SWDO2-3/SWTO2-6 CVR MEMM3 BMB-003 WODM5-3 SWDO2-3/SWTO2-6 CVR SNK-007 SNK-008 MEMM3 ANR-001 SNK-005 CNH-002 SNK-006 BMB-001 FODM8-1 FOCM4-1 MEMM3

ELEANOR CRT HYLAND RD

Legend

- Subject Property
- Snake Board Cover Location (SNK)
- Amphibian Call Survey Location (ANR)
- Breeding Migratory Bird Survey Location (BMB)
- Winter Raptor Survey Station (RWA)
- Crepuscular Bird Survey Station
- Marsh Bird Survey Station (MBB)
- Inventoried Tree
- Existing Informal Trails
- Surveyed Dripline
- Wetland Boundary (Reviewed by GRCA)
- Ecological Land Classification (ELC)

UPLAND:

(CVR) Residential

(FOCM4-1) Fresh-Moist White Cedar Coniferous Forest

(FOCM6-3) Dry-Fresh Scotch Pine Naturalized Coniferous Plantation Type

(FODM4-5) Dry-Fresh Manitoba Maple Deciduous Forest

(FODM8-1) Fresh-Moist Poplar Deciduous Forest

(MEMM3) Dry-fresh Mixed Meadow

(THDM2) Dry-Fresh Deciduous Shrub Thicket

(THDM2-6) Buckthorn Deciduous Shrub Thicket

(WODM5-3) Fresh-Moist Manitoba Maple Woodland

WETLAND:

(MAMO1-2) Cattail Graminoid Organic Meadow Marsh

(SWDO2-3/SWTO2-6) Swamp Maple Organic Deciduous Swamp Type/Mixed Willow Organic Deciduous Thicket Swamp Type

(SWTO2-6) Mixed Willow Organic Deciduous Thicket Swamp

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: December 3, 2015

NAD83 - UTM Zone 17
Size: 11x17"
1:1,500

0 20 40 60 80 Metres

N

Path: X:\1400_HylandRoad\NRSI_1400_Map2_ELC_Monitoring_2K_2015_12_03_KEB.mxd

Map 3a

46, 47 and 87 Hyland Road EIS

Development Constraints

561000 561100 561200 561300

4824800 4824700 4824600 4824500

FODM8-1 FOCM4-1 FODM8-1 FOCM4-1 FODM8-1 FODM8-1 MEMM3 THDM2-6 MEMM3 MAMO1-2 SWTO2-6 SWDO2-3/SWTO2-6 MEMM3 CVR WODM5-3 CVR SWDO2-3/SWTO2-6 MEMM3 FODM8-1 FOCM4-1 ELEANOR CRT HYLAND RD

Legend

- Subject Property
- Wetland Boundary (Reviewed by GRCA)
- Significant Woodland Boundary
- PSW (Guelph North-East Complex)
- Significant Woodland

Locally Significant Plant Species

- E Elliptic-leaved St. John's Wort
- H Hop Sedge
- M Meadow Horsetail
- S Smooth Gooseberry
- Ecological Land Classification (ELC)

UPLAND:

(CVR) Residential

(FOCM4-1) Fresh-Moist White Cedar Coniferous Forest

(FODM4-5) Dry-Fresh Manitoba Maple Deciduous Forest

(FODM8-1) Fresh-Moist Poplar Deciduous Forest

(MEMM3) Dry-fresh Mixed Meadow

(THDM2) Dry-Fresh Deciduous Shrub Thicket

(THDM2-6) Buckthorn Deciduous Shrub Thicket

(WODM5-3) Fresh-Moist Manitoba Maple Woodland

WETLAND:

(MAMO1-2) Cattail Graminoid Organic Meadow Marsh

(SWDO2-3/SWTO2-6) Swamp Maple Organic Deciduous Swamp Type/Mixed Willow Organic Deciduous Thicket Swamp Type

(SWTO2-6) Mixed Willow Organic Deciduous Thicket Swamp

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: December 3, 2015

NAD83 - UTM Zone 17
Size: 11x17"
1:1,500

0 20 40 60 80 Metres

N

Path: X:\1400_HylandRoad\NRSI_1400_Map3a_DevelopmentConstraints_2K_2015_12_03_KEB.mxd

Map 3b

46, 47 and 87 Hyland Road EIS

Development Constraints

561000 561100 561200 561300

4824800 4824700 4824600 4824500

FODM8-1 FOCM4-1 FODM8-1 FOCM4-1 FODM8-1 FODM8-1 THDM2-6 MEMM3 MEMM3 MAMO1-2 SWTO2-6 SWDO2-3/SWTO2-6 CVR MEMM3 WODM5-3 CVR SWDO2-3/SWTO2-6 MEMM3 B FODM8-1 FOCM4-1 MEMM3 ELEANOR CRT HYLAND RD

Legend

- Subject Property
- Chimney Crayfish Location
- Chimney Crayfish Secondary Habitat Boundary
- Wood Thrush SWH
- Amphibian Breeding SWH

Locally Significant Bird Species

- B Baltimore Oriole
- Ecological Land Classification (ELC)

UPLAND:

(CVR) Residential

(FOCM4-1) Fresh-Moist White Cedar Coniferous Forest

(FODM4-5) Dry-Fresh Manitoba Maple Deciduous Forest

(FODM8-1) Fresh-Moist Poplar Deciduous Forest

(MEMM3) Dry-fresh Mixed Meadow

(THDM2) Dry-Fresh Deciduous Shrub Thicket

(THDM2-6) Buckthorn Deciduous Shrub Thicket

(WODM5-3) Fresh-Moist Manitoba Maple Woodland

WETLAND:

(MAMO1-2) Cattail Graminoid Organic Meadow Marsh

(SWDO2-3/SWTO2-6) Swamp Maple Organic Deciduous Swamp Type/Mixed Willow Organic Deciduous Thicket Swamp Type

(SWTO2-6) Mixed Willow Organic Deciduous Thicket

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: December 3, 2015

NAD83 - UTM Zone 17
Size: 11x17"
1:1,500

0 20 40 60 80 Metres

N

Path: X:\1400_HylandRoad\NRSI_1400_Map3b_DevelopmentConstraints_2K_2015_12_03_KEB.mxd

Map 4

46, 47 and 87 Hyland Road EIS

Proposed Development

560950 561000 561050 561100 561150 561200 561250

4824750 4824700 4824650 4824600 4824550 4824500

ELEANOR CRT
HYLAND RD
GLENBURNIE DR

FODM8-1
THDM2-6
MEMM3
CVR
MAMO1-2
SWTO2-6
WODM5-3
SWDO2-3/SWTO2-6
FOCM4-1
FOCM4
FODM8-1

Path: X:\1400_HylandRoad\NRSI_1400_Map4_DevConstraints_2K_2015_12_07_KEB.mxd

Legend

- Subject Property
- Development Plan
- Significant Woodland Buffer (10m)
- Significant Woodland Boundary
- Wetland Boundary (Reviewed by GRCA)
- PSW Buffer (30m)

Trail Route Alternatives

- Option 1
- Option 2
- Option 3
- Ecological Land Classification (ELC)

UPLAND:

(CVR) Residential

(FOCM4-1) Fresh-Moist White Cedar Coniferous Forest

(FODM4-5) Dry-Fresh Manitoba Maple Deciduous Forest

(FODM8-1) Fresh-Moist Poplar Deciduous Forest

(MEMM3) Dry-fresh Mixed Meadow

(THDM2) Dry-Fresh Deciduous Shrub Thicket

(THDM2-6) Buckthorn Deciduous Shrub Thicket

(WODM5-3) Fresh-Moist Manitoba Maple Woodland

WETLAND:

(MAMO1-2) Cattail Graminoid Organic Meadow Marsh

(SWDO2-3/SWTO2-6) Swamp Maple Organic Deciduous Swamp Type/Mixed Willow Organic Deciduous Thicket Swamp

(SWTO2-6) Mixed Willow Organic Deciduous Thicket Swamp

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: December 7, 2015

NAD83 - UTM Zone 17
Size: 11x17"
1:1,200

0 20 40 60 80 Metres

N

561000 561050 561100 561150 561200

4824650 4824600 4824550

FODM8-1 THDM2-6 FODM8-1 FODM8-1 MEMM3 MEMM3 MAMO1-2 SWTO2-6 CVR HYLAND RD MEMM3 SWDO2-3/SWTO2-6 WODM5-3 CVR FODM8-1 FODM8-1 MEMM3 MEMM3

Path: X:\1400_HylandRoad\NRSI_1400_Map5_PedestrianTrailAlternatives_1K_2015_12_03_KEB.mxd

Map 5

46, 47 and 87 Hyland Road EIS

Pedestrian Trail Alternatives

Legend

- Subject Property

Trail Route Alternatives

- Option 1
- Option 2
- Option 3
- Chimney Crayfish Location
- Development Plan
- Chimney Crayfish Secondary Habitat Boundary
- Significant Woodland Buffer (10m)
- Significant Woodland Boundary
- Wetland Boundary (Reviewed by GRCA)
- PSW Buffer (30m)
- Ecological Land Classification (ELC)

UPLAND:

(CVR) Residential

(FOCM4-1) Fresh-Moist White Cedar Coniferous Forest

(FODM4-5) Dry-Fresh Manitoba Maple Deciduous Forest

(FODM8-1) Fresh-Moist Poplar Deciduous Forest

(MEMM3) Dry-fresh Mixed Meadow

(THDM2) Dry-Fresh Deciduous Shrub Thicket

(THDM2-6) Buckthorn Deciduous Shrub Thicket

(WODM5-3) Fresh-Moist Manitoba Maple Woodland

WETLAND:

(MAMO1-2) Cattail Graminoid Organic Meadow Marsh

(SWDO2-3/SWTO2-6) Swamp Maple Organic Deciduous Swamp Type/Mixed Willow Organic Deciduous Thicket Swamp Type

(SWTO2-6) Mixed Willow Organic Deciduous Thicket Swamp

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: December 3, 2015

NAD83 - UTM Zone 17
Size: 11x17"
1:750

0 10 20 30 40 50 Metres

N

APPENDIX I

Terms of Reference and Agency EIS Terms of Reference Review Comments

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

1400

January 3, 2014

Mr. Al Hearne
City of Guelph
1 Carden Street
Guelph, Ontario
N1H 3A1

CC: Nathan Garland, GRCA

Dear Mr. Hearne,

Re: Environmental Impact Study- Hyland Road, Guelph, Ontario
Terms of Reference

On behalf of Natural Resource Solutions Inc. (NRSI), I am pleased to provide the following Terms of Reference (TOR) to prepare an Environmental Impact Study (EIS) for the Hyland Road property in Guelph, Ontario.

The eastern portion of the subject property is located within the Clythe Creek Subwatershed in the City of Guelph. The western portion of the subject property in which the development is proposed is located within the Eramosa River – Blue Springs Subwatershed. The subject lands are characterized as residential in nature and include Deciduous Shrub Thicket, Dry-Fresh Poplar Forest and is situated adjacent to a portion of Provincially Significant Wetland (PSW) known as the Guelph Northeast Wetland Complex. As such, lands regulated under the Grand River Conservation Authority (GRCA) Regulation 150/06 are present within the subject property. Any development within 120m of the wetland boundary requires the preparation of an EIS to demonstrate that no negative impacts to the feature will occur as a result of the proposed undertaking. Similarly, a review of the City of Guelph Official Plan Amendment 42 (Guelph 2010) (hereafter referred to as OPA 42) has identified Significant Natural Areas within the subject property. These natural features include the Guelph Northeast Wetland Complex (PSW), Significant Woodlands as well as potential habitat for locally significant species. These features share the same boundaries and are located on the eastern portion of the subject property. As the development is proposed within adjacent lands, an EIS is required under OPA 42 to demonstrate that there will be no negative impacts from the proposed undertaking to the protected features or their functions.

The following Terms of Reference (TOR) for this EIS outlines the steps required to complete the EIS for the proposed development within the Hyland Road property in accordance with *Grand River Conservation Environmental Impact Study Guidelines and Submission Standards for Wetlands* (GRCA 2005) and the Guelph OPA 42 (City of Guelph 2010). I understand that you will be circulating this TOR to appropriate City staff and the GRCA. Please do not hesitate to contact me if you have any questions or comments on this.

Sincerely,
Natural Resource Solutions Inc.

David E. Stephenson Senior Biologist

Hyland Property Guelph, Ontario
Environmental Impact Study
Terms of Reference
January 3, 2013

Introduction

The subject property is approximately 5.01ha in area and is legally described as Part of Lot 4 and Part of Lot 5, Registered Plan 359 (Geographic Township of Puslinch), City of Guelph, County of Wellington. The property's is located at the end of Hyland Road, which connects the subject property to Eramosa Road to the west.

Although the subject property is large and includes Significant Natural Features including the PSW, Significant Woodlands and potential habitat for locally significant species, the development area is limited to the western portion of the subject property which is proposed outside of the natural features boundaries.

Wetland flagging of the PSW, along with preliminary site characterization was conducted on April 3, 2013. NRSI staff characterized the subject property as Fresh-Moist Poplar Forest, Deciduous Shrub Thicket, Cattail Marsh and Deciduous Swamp (present within the Northeast Wetland Complex). The location of the subject property is shown on Figure 1.

Proposed Undertaking

The landowner is proposing to develop the subject property as a residential neighbourhood. This will include single detached housing, road network, stormwater management facility and open space.

Associated Studies

To meet the requirements set by the City of Guelph's Official Plan (OP)(2001) and OPA 42 (City of Guelph 2010) associated reporting will be completed to provide detailed information on site topography, drainage, hydrology, soils and hydrogeological conditions. This will supplement the natural characterization reporting to be completed by NRSI and will inform the impact assessment for the EIS. Reports to be completed to inform the EIS include:

- Hydrogeology Study,
- Preliminary Servicing and Stormwater Management Report,
- Geotechnical Study,
- Planning,
- Surveying and Topography.

At the request of the City, monthly water balances will be determined as part of the Stormwater Management study.

Figure 1

Hyland Road

Subject Property

Legend

Subject Property

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: January 3, 2014

NAD83 - UTM Zone 17
Size: 8.5 x 11"
1:3,000

0 20 40 60 80 100 Metres

N

Path: X:\1400_HylandRoad\NRSI_1400_Fig1_StudyArea_3K_2014_01_03_GCS.mxd

Environmental Impact Study - Scoping

In order to determine a study approach for the Hyland Road EIS, existing natural heritage information was gathered and reviewed to identify key natural heritage features and species that are known or have the potential to occur in the vicinity of the subject property. Additionally, one pre-consultation meeting with the City of Guelph on March 5, 2012 identified further concerns with respect to the proposed plan. The following is a description of information gathering conducted that has informed the surveys for the subject property.

Collection and Review of Background Information

Existing background information on the biological features within the subject property has been collected and reviewed by NRSI and has assisted in guiding the study approach provided in this draft TOR. Background information sources have included the following:

- Grand River Conservation Authority (GRCA Information Network);
- Natural Heritage Information Centre database;
- Ministry of Natural Resources, Guelph District;
- City of Guelph Official Plan, including OP42;
- Guelph Natural Heritage System Report;
- GRCA Wetland Policy and EIS Guidelines;
- Clythe Creek Subwatershed Report;
- Eramosa – Blue Springs Watershed Report;
- Ontario Breeding Bird Atlas;
- Ontario Herpetofaunal Atlas;
- Mammal Atlas of Ontario; and
- Butterflies of Canada.

This background information will be integrated with original data collected by NRSI during the 2013 and 2014 field surveys to form the characterization component of the EIS. This will allow for the identification of data deficiencies, such as outdated and missing data, data collected at unsuitable scales, etc.

The Natural Heritage Information Centre (NHIC) and GRCA mapping identified a Provincially Significant Wetland (PSW), known as the Guelph Northeast Wetland Complex overlapping with the subject property. Appendix I of the City of Guelph's Official Plan Amendment (OPA) 42 (2010) identifies the PSW as mixed swamp and is located along the eastern boundary of the subject property, south of Hyland Road. NRSI has conducted site investigations and has met with GRCA to delineate the wetland boundary. Confirmation of the wetland boundary with the GRCA was conducted on May 21, 2013. Any development within 120m of the wetland boundary requires the preparation of an EIS to demonstrate that no negative impacts to natural features occur as a result of the proposed undertaking.

Additionally, Significant Woodlands and Potential Habitat for Locally Significant Species within the subject property were identified in Schedules 10C and 10E of OPA 42 (Guelph 2010). These natural features share boundaries with the PSW within the subject property and are located adjacent to the proposed development area.

An associated hydrogeological study, as mentioned below, will be used to assess surface water, groundwater features and hydrologic functions that support ecological

functions for natural features such as the PSW. The EIS will characterize these features and functions and describe all potential direct or indirect negative impacts to the Natural Heritage System.

Significant Species

A review of background information, including the sources mentioned above, was conducted to determine significant species that are known to occur within the vicinity of the subject property and further inform the scope for the terms of reference.

Birds

The collection and review of background information resulted in the identification of 9 significant bird species that have been known to occur within the vicinity of the subject property including: chimney swift (*Chaetura pelagica*), red-headed woodpecker (*Melanerpes erythrocephalus*), eastern wood-pewee (*Contopus virens*), barn swallow (*Hirundo rustica*), wood thrush (*Hylocichla mustelina*), bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*), least bittern (*Ixobrychus exilis*) and bank swallow (*Riparia riparia*). Five of these species, chimney swift, bobolink, barn swallow, least bittern and eastern meadowlark, are considered Endangered or Threatened provincially and are considered Species At Risk (SAR) in Ontario. These species are afforded protection under the Endangered Species Act (ESA).

Chimney swift is listed as Threatened provincially and is therefore afforded protection under the ESA. Habitat for the chimney swift commonly includes urban areas near buildings. They can often be found nesting in hollow trees, crevices of rock cliffs and chimneys (OMNR 2000). There are no structures or chimneys and limited woodland habitat within the development area. It is unlikely that this species is present within the development area.

Red-headed woodpecker is listed as Special Concern provincially and Threatened federally. Habitat for this species is considered Significant Wildlife Habitat (SWH) which is protected under the Provincial Policy Statement (PPS)(2005). Red-headed woodpeckers prefer open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards; small woodlots or forest edges; groves of dead or dying trees (OMNR 2000). Habitat for this species is not present within the development area but may be present within the PSW found within the adjacent lands within the subject property.

Eastern wood pewee is listed as Special Concern federally. Habitat for this species is therefore is considered SWH and is therefore afforded protection under the PPS (2005). Eastern wood pewee is often found in open, deciduous, mixed or coniferous forest that are predominated by oak with little understory. They are also commonly found in forest clearings and edges, farm woodlots and parks (OMNR 2000). Habitat for this species may be present within the small deciduous woodlot located within the development area as well as the adjacent PSW.

Barn swallows are listed as Threatened provincially and are therefore protected under the ESA. Barn Swallows prefer farmlands or rural areas and often nest in buildings or other man-made structures that are in close proximity to a body of water (OMNR 2000). There are no barns or structures for nesting found within the development area. However, foraging habitat may be present within the open meadow habitats.

Wood thrush is listed as Threatened federally. Habitat for this species is therefore considered SWH and is afforded protection under the PPS (2005). Wood thrush can often be found in undisturbed moist mature deciduous or mixed forest with deciduous sapling growth located near a pond or swamp. This species prefers hardwood forest edges with some trees greater than 12m in height (OMNR 2000). Habitat for this species is not present within the development area but may be present within the adjacent PSW.

Bobolink is listed as Threatened provincially and therefore is protected under the ESA. Bobolinks prefer large, open expansive grasslands with dense ground cover as well as hayfields, meadows or fallow fields. This species requires large tracts of grassland habitat >50ha in size (OMNR 2000). Habitat for this species is not present within the development area or subject property.

Eastern meadowlark is listed as Threatened provincially and is therefore is afforded protection under the ESA. Eastern Meadowlarks also prefer open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches. They can be found in cultivated lands and weedy areas with some trees. This species requires at least 10ha of open grassy areas (OMNR 2000). Habitat for this species is not present within the development area or the subject property.

Least Bittern are also listed as Threatened provincially and afforded protection under the ESA. This species prefers deep marshes, swamps, bogs and marshy borders of lakes, ponds, streams or ditches. Least bittern requires dense emergent vegetation including cattails, bulrushes, and sedges. This species is intolerant to loss of habitat and human disturbance (OMNR 2000). There is no suitable habitat for this species within the development area. Habitat for this species may be present within the PSW; however, due to the abundance of human disturbance, it is unlikely that this species is present.

Bank swallow is listed as Threatened nationally. Habitat for this species is therefore considered SWH and is afforded protection under the PPS (2005). Bank swallows prefer sand, clay or gravel river banks or steep riverbank cliffs as well as lakeshore bluffs of easily crumbled sand or gravel, gravel pits, road-cuts, grassland or cultivated fields that are close to water (OMNR 2000). Suitable habitat for this species is not present within the development area and is unlikely to be present within the subject area as there are no river banks.

Breeding bird surveys including crepuscular surveys, as described below, will be conducted to determine the presence of bird species within the development area and adjacent lands.

Herpetofauna

A review of background information identified 4 significant herpetofauna species that occur within the vicinity of the subject property. These species include common snapping turtle (*Chelydra serpentine*), eastern milksnake (*Lampropeltis triangulum*), northern ribbonsnake (*Thamnophis sauritus septentrionalis*) and Jefferson salamander (*Ambystoma jeffersonianum*). The Jefferson salamander record is considered historical as they have not been recorded since 1993. Jefferson salamanders are considered Endangered provincially and therefore are afforded protection under the ESA.

Jefferson salamander prefers damp shady deciduous forest, swamps, moist pasture and lakeshores. They require woodland vernal pools for breeding and can be found hiding under leaf litter, stones or decomposing logs (OMNR 2000). Vernal pooling may be

present within the subject property but is not present within the development area. Therefore there is likely no suitable habitat for Jefferson Salamander within the development area.

The common snapping turtle, eastern milksnake and northern ribbonsnake are listed as Special Concern provincially. Habitat for these three species is therefore considered SWH, and is therefore afforded protection under the PPS (2005). Common snapping turtles can be found in permanent, semi-permanent fresh water including marshes, swamps, bogs, rivers and streams with soft muddy banks or bottoms (OMNR 2000). Habitat for the common snapping turtle is not found within the development area, but may be present within the PSW within the subject property.

Habitat for the eastern milksnake consists of farmlands, meadows, hardwood or aspen stands as well as pine forests with brushy or woody cover (OMNR 2000). The subject property consists of Deciduous Shrub Thicket and Fresh-Moist Poplar Forest. These communities may provide habitat for the eastern milksnake. Northern ribbonsnake prefers sunny grassy areas with low dense vegetation near bodies of shallow, permanent, quiet water. They can often be found in wet meadows, grassy marshes or sphagnum bogs or the borders of ponds, lakes or streams. Habitat for this species may be present within the wetland. Area searches and coverboard surveys as described below will be conducted to determine the potential for habitat use within the subject property.

Mammals
Two mammal SAR, little brown myotis (*Myotis lucifugus*) and tricoloured bat (*Perimyotis subflavus*), were identified during the background review as occurring within the vicinity of the subject property. Little brown myotis has been recently up-listed to Endangered provincially and is therefore provided protection under the ESA. This species uses caves, quarries, tunnels, hollow trees or buildings for roosting. Maternity sites are generally dark, warm areas including attics and barns. Additionally, they are found wintering in humid caves. Tricoloured bat is listed as Endangered federally but is not listed provincially. This species prefers open woods near water and can be found roosting in trees, cliff crevices buildings or caves. Tricoloured bats hibernate in damp, draft-free, warm caves, mines or rock crevices (OMNR 2000). Roosting habitat for this species may be present within the PSW, however, records for this species are historical and therefore, it is unlikely that this species is present within the subject property.

The small stand of trees within the development area generally of small caliper trees. These conditions reduce the potential for cavity roosting within the development area. However, all trees within the development area will be assessed for bat habitat. During the detailed tree inventory, potential bat maternity cavities will be recorded if present. There are no caves for overwintering bat habitat within the subject property.

An additional screening exercise was conducted using the Wellington – Upper Tier list of SAR provided by the City of Guelph and the Natural Heritage Information Center square date. The results of this screening can be viewed in Appendix I of this TOR.

<u>Significant Wildlife Habitat</u>
The collection and review of background information has informed the preliminary screening for SWH within the study area. This review compared site conditions with criteria set in the SWH Ecoregion 6E Criterion Schedule (OMNR 2012) to determine the presence of any candidate SWH. The results of the SWH screening have informed

surveys required to confirm such habitat within or adjacent to the subject property. Table 1 summarizes the SWH types classified as seasonal concentration areas, and their potential for occurrence within the property. Wildlife seasonal concentration areas are defined as areas where animals occur in relatively high densities for all, or portions, or their life cycle (OMNR 2000).

Table 1. Preliminary Screening Assessment Results of Seasonal Concentration Area SWH Types for the Property.

Wildlife Habitat Type	SWH Type Present within the Development Area/Subject Property	Rationale	Field Studies Required
Waterfowl Stopover and Staging Areas (terrestrial)	No	No fields or meadows where flooding occurs are present within the subject property.	**No**
Waterfowl Stopover and Staging Areas (aquatic)	No	Wetland communities are found within and adjacent to the subject property. However, there is no shallow water inundation associated with these wetlands.	**No**
Shorebird Migratory Stopover Area	No	No shoreline of lakes, rivers or wetlands present.	**No**
Raptor Wintering Area	Not within the development area, but Candidate habitat is present within the subject property	The mixed swamp PSW may provide suitable habitat within subject property.	**No, but breeding bird surveys will be completed and all species recorded.**
Bat Hibernacula	No	No caves, abandoned mine shafts, underground foundations or crevices present within 1km of the subject property.	**No**
Bat Maternity Colonies	Not within the development area, but Candidate Habitat is present within the subject property.	Tree cavities and snags may be present within forested areas within the development area and subject property.	**No, however trees within the development area will be assessed for suitable cavities during the tree inventory.**
Bat Migratory Stopover Area	N/A	No criteria available.	**N/A**
Turtle Wintering Areas	No	No large permanent water bodies present within the development area or subject property.	**No**
Reptile Hibernacula (snakes)	Candidate habitat within the development area and subject property.	Fresh-Moist Poplar Forest and Dry-Fresh Meadow may contain areas of burrows or rock crevices that provide access to subterranean sites.	**Yes; area searches will be conducted.**

Wildlife Habitat Type	SWH Type Present within the Development Area/Subject Property	Rationale	Field Studies Required
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	No	No banks, steep hills, pits, steep slopes, rock faces or rock piles in meadows, thickets, savannahs, bluffs or cliffs are present that provide suitable nesting habitat within the development area or subject property.	**No**
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)	Not present within the development area but Candidate habitat may be present within the subject property.	The Northeast Wetland Complex consist of mixed swamp is within the subject property.	**Yes; Breeding bird surveys will be conducted to determine presence of indicator species.**
Colonially - Nesting Bird Breeding Habitat (Ground)	No	No rocky islands, peninsulas (natural or artificial), marshes or pastures present.	**No**
Migratory Butterfly Stopover Areas	No	Subject property is not located within 5km of Lake Ontario.	**No**
Landbird Migratory Stopover Areas	No	Wooded area is less than 10ha and the subject property is not located within 5km of Lake Ontario.	**No**
Deer Yarding Areas	No	OMNR has not identified this property as containing a deer yard.	**No**
Deer Winter Congregation Areas	No	Wooded area is less than 100ha in size and has not been identified as significant by the OMNR. Congregation areas have been identified in southern Guelph, but not within 120m of subject property.	**No**

Table 2 summarizes the SWH types classified as rare vegetation communities and specialized wildlife habitat, and their potential for occurrence within or adjacent to the property. Rare vegetation communities are those considered provincially rare according to the OMNR's Natural Heritage Information Centre, or those considered rare within a planning area. Specialized habitats include those that support wildlife species with highly specific habitat requirements, areas with exceptionally high species diversity, and/or areas that provide habitat that greatly enhances a species' chance of survival (OMNR 2000).

Table 2. Preliminary Screening Assessment Results of Rare Vegetation Community and Specialized Wildlife Habitat SWH Types for the Property.

Wildlife Habitat Type	SWH Type Present within the Subject Property	Rationale	Field Studies Required
Cliffs and Talus Slopes	No	No cliffs or talus slopes are present.	**No**
Sand Barren	No	No sand barrens are present.	**No**
Alvar	No	No alvar communities are present.	**No**
Old Growth Forest	No	No old growth or mature forests present; all forest communities are young or mid-age stands.	**No**
Savannah	No	No savannah communities are present.	**No**
Tall-grass Prairies	No	No tall-grass prairie communities are present.	**No**
Other Rare Vegetation Communities	No	No other rare vegetation communities are present.	**No**
Waterfowl Nesting Area	Not within the development area, but Candidate habitat is present within the subject property	The Northeast Wetland Complex PSW is located on and adjacent to the subject property and therefore may provide habitat for nesting waterfowl.	**No, however breeding bird surveys will be completed and all species recorded.**
Bald Eagle, Osprey Nesting, Foraging, and Perching Habitat	No	No forest or swamp communities within the subject property are immediately adjacent to rivers, lakes, ponds or wetlands.	**No**
Woodland Raptor Nesting Habitat	Not within the development area, but Candidate habitat is present within the subject property.	Forested PSW within the subject property is greater than 30ha and may provide nesting habitat for raptors.	**No, but breeding bird surveys will be completed and all species recorded.**
Turtle Nesting Habitat	Not within the development area, but Candidate habitat is present within the subject property.	Cattail Marsh is present within subject property.	**Yes; Area searches for turtles and nesting sites will be conducted during field investigations.**
Seeps and Springs	No	No seeps of springs were observed during wetland flagging site investigation in May 2013.	**No.**
Amphibian Breeding Habitat (woodland)	Not within the development area, but Candidate habitat present within subject property.	Fresh-Moist Poplar forest is present within the development area. Additionally, the PSW within the subject property may also provide habitat for breeding amphibians.	**Yes; Amphibian call surveys will be completed. Habitat is not suitable for salamander species.**

Wildlife Habitat Type	SWH Type Present within the Subject Property	Rationale	Field Studies Required
Amphibian Breeding Habitat (wetland)	Not within the development area, but Candidate habitat present within the subject property.	Portions of the Northeast Wetland Complex fall outside of the 120m distance from woodlands.	**Yes; Amphibian call surveys will be completed. Habitat is not suitable for salamander species.**

Table 3 summarizes the SWH types related to habitat for species of conservation concern, and their potential for occurrence within or adjacent to the property. Species of conservation concern are species with a provincial S-rank of S1 to S3 or species listed as species of Special Concern provincially. It also includes those species listed as Endangered, Threatened or Special Concern nationally but are not protected by the provincial ESA. Confirmed habitat for species of conservation concern is considered significant wildlife habitat (OMNR 2000).

Table 3. Preliminary Screening Assessment Results of Species of Conservation Concern SWH Types for the Property

Wildlife Habitat Type	SWH Type Present within the Subject Property	Rationale	Field Studies Required
Marsh Bird Breeding Habitat	No	The Northeast Wetland Complex does not contain open water. Suitable habitat is not present within the development area or subject property.	**No, however breeding bird surveys will be completed and all species observed recorded**
Woodland Area Sensitive Breeding Birds	Not within the development area, but Candidate habitat is present within the subject property.	Interior forest habitat is not present within the development area. The Northeast Wetland Complex may provide interior habitat within the subject property.	**No, however breeding bird surveys will be completed and all species observed recorded**
Open Country Breeding Bird Habitat	No	Suitable habitat for open country bird breeding habitat is not present within the subject property.	**No, however breeding bird surveys will be completed and all species observed recorded**
Shrub/Early Successional Bird Breeding Habitat	No	Suitable habitat for shrub/early successional bird breeding habitat is not present within the subject property.	**No, however breeding bird surveys will be completed and all species observed recorded**

Terrestrial Crayfish	Candidate Habitat within the development area and subject property.	Cattail Marsh and adjacent lands may provide habitat for Terrestrial Crayfish.	**Yes; area searches for chimneys will be conducted during site visits.**
Special Concern and Rare Wildlife	Candidate Habitat within the development area and subject property.	There are a number of species of conservation concern reported in the vicinity of the subject property including common snapping turtle, eastern milksnake, northern ribbonsnake, red-headed woodpecker, eastern wood-pewee, wood thrush and bank, wood thrush.	**Yes (Area surveys, breeding bird surveys and amphibian call surveys will be conducted)**

Table 4 summarizes the SWH types classified as animal movement corridors, and their potential for occurrence within the property. Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (OMNR 2000). They can include natural landscapes such as shorelines as well as anthropogenic features such as trails and hydro corridors. The potential for animal movement corridors to occur in the study area is contingent on confirming significant amphibian breeding ponds, cervid concentration areas, or furbearer denning sites (OMNR 2012).

Table 4. Preliminary Screening Assessment Results of Animal Movement Corridor SWH Types for the Property

Wildlife Habitat Type	SWH Type Present within the Subject Property	Rationale	Field Studies Required
Amphibian Movement Corridor	No	Amphibian habitat within the subject property is separated from surrounding areas by roads.	**No; however amphibian call surveys will be conducted to determine the presence of habitat.**
Deer Movement Corridor	No	OPA 42 did not identify any wildlife movement linkage for deer.	**No; however all evidence of mammal species during field investigations will be recorded.**

Environmental Impact Study - Field Surveys

Field surveys of the project area will be undertaken in fall 2013 and spring and summer of 2014, building on the background information collected and site surveys conducted in spring 2013. The following is a description of the surveys that have been, or will be conducted:

Vegetation Community Mapping

Vegetation communities on the site have been characterized and mapped in the fall of 2013 using the Ecological Land Classification for Southern Ontario (Lee et al. 2008). Details on the vegetation communities will be recorded including species composition, dominance, uncommon species or features and evidence of human impact. Wetland boundaries were staked and reviewed by GRCA (Rob Messier) staff on May 21, 2013 and subsequently surveyed.

Vascular Flora Inventories

Spring, summer and fall surveys will be conducted to record all species of vascular flora on the subject lands. Fall vegetation will be conducted in 2013 and spring and summer surveys will be conducted in 2014. During these site investigations the subject lands will be systematically searched for plant species and any rare species or vegetation communities and their location(s) will be recorded with a handheld GPS unit.

Tree Inventory

Trees on and within 5m of, the development area will be inventoried by a Certified Arborist according to the City of Guelph's Tree Protection Policies and Guidelines, Tree By-law. This included recording the following for each tree ≥10cm diameter at breast height (DBH):

- Species common and scientific name,
- DBH,
- Crown radius (metres),
- General condition/health (excellent, good, fair, poor, very poor), including characteristics of any cavities from bat maternity perspective;
- Tree identification number,
- Potential for structural failure (low, medium, high),
- Tree location (lot or block number), and
- General comments (i.e. disease, aesthetic quality, development constraints, sensitivity to development)

Herpetofauna Surveys

Evening surveys for calling frogs and toads will be completed once in each of late April, May, and June 2014 using methods based on the Marsh Monitoring Program (Bird Studies Canada 2003). This will involve point counts during peak breeding periods to record species calling and their abundance. Point count locations will be adjacent to suitable habitat within the PSW.

Habitat, including reptile hibernacula, within the subject property may provide habitat for several snake species, particularly in the thicket communities adjacent to the PSW. Area searches and coverboard surveys will be conducted during field visits to record the presence of snake species within the subject property.

Breeding Bird Surveys

Two detailed breeding bird surveys will be conducted in June 2014 in accordance with Ontario Breeding Bird Atlas methodology. Point counts and area surveys will be conducted within all on-site and wetland/woodland areas within 120m of the subject property. Standard breeding evidence will be recorded during both early morning surveys in June. These surveys, along with habitat

characterization, will allow of the identification of any Significant Wildlife Habitat present within or adjacent to the subject property.

Additionally, two crepuscular surveys will be conducted (once in May and June 2014) in conjunction with other field surveys.

Odonata and Lepidoptera Surveys
Odonata (dragonflies and damselflies), as well as Lepidoptera (butterflies and moths), observed will be recorded during all field surveys.

Mammal Surveys
Trees and snags within the subject property will be assessed for potential maternity colonies. Evaluation methods for maternity colonies will be conducted following methods outlined in the Guideline for Wind Power Projects Potential Impacts to Bats and Bat Habitats (2011). This assessment will identify any snags or trees greater than 25cm DBH with cavities and loose bark.

In the event that other structures which may provide maternity roosts are proposed for removal, bat exit surveys will be conducted following the *Use of Buildings by Little Brown Myotis and Northern Myotis guidance* (MNR Guelph District 2013).

All mammal species will be recorded during field surveys. Direct observations of mammals, as well as signs such as dens, tracks, scats, etc. will be used to record mammal species in the study area.

Other Wildlife
Habitat for Terrestrial Crayfish has been identified as potentially occurring within and adjacent to the subject property. Area searches within the subject property, including riparian areas have been conducted to determine the presence of crayfish chimneys within these suitable habitats.

Environmental Impact Study - Data Analysis

Identification of Opportunities and Constraints
Significant biological features will be identified based on current species and habitat status listings. This will include national, provincial and regional rarity. As well, the sensitivity of species and habitats will be documented based on current ecological trends, research and professional experience and input from local agency staff. These features will be identified as 'constraints' to the development.

Identified constraints will be mapped on a digital base map. These maps will include: vegetation communities, designated natural features, wetland boundaries and significant species. Current and potential linkages will be identified and will include the recommended buffers from natural features, etc.

Implications of development within or adjacent to the identified natural features based on current policies and regulations will be identified, including the GRCA Wetlands Policy, the City of Guelph OP and OPA 42, City of Guelph Tree Bylaw, and PPS.

Environmental Impact Study - Impact Analysis
The details of the proposed undertaking, including the proposed draft plan, stormwater management strategy, and grading plans will be reviewed and compared to the existing conditions on the subject property. Any areas of conflict between significant natural features, buffers, etc. and the development will be discussed with the client and options for minimizing impacts will be recommended. Impacts will be determined based on the direct, indirect, induced and cumulative effects of the proposal.

The analysis of impacts will be divided into:

- Direct impacts associated with disruption or displacement caused by the actual proposed 'footprint' of the undertaking, such as tree removal.

- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality.

- Induced impacts associated with impacts after the development is constructed such as subsequent demand on the resources created by habitation/use of the area and vicinity.

- Cumulative impacts associated with surrounding activities over time and space.

Each of these impact types are described further below.

Direct Impacts
The approach to identifying and delineating constraint areas, discussed above, will be used to avoid direct impacts from the development on important natural features. The delineation of natural features with buffers will be provided to the study team to guide the proposed development layout. Any overlaps will be identified and addressed.

Indirect Impacts
Indirect impacts are described as those associated with changes in site conditions such as drainage and water quantity/quality. The approach to assessing the potential for indirect impacts will include an integrated analysis of proposed management of the natural features on the subject lands in conjunction with neighbouring lands.

Induced Impacts
Induced impacts are described as those that are not directly related to the construction of the undertaking, but rather arise as a result of the use of the natural areas as a result of the development. In this case, potential induced impacts could include increased use of natural areas by residents, feral domestic wildlife, and unauthorized trail/pathway construction.

Cumulative Impacts
This approach looks at the character and potential changes that are occurring or may occur in the future on surrounding lands within the neighbouring property. Cumulative impacts include spatial crowding, temporal crowding, spatial lags and temporal lags.

Environmental Impact Study – Recommendations & Monitoring
Recommendations with regard to mitigation of residual impacts will also be made and opportunities for enhancement will be highlighted. A Tree Preservation Plan outlining

which trees are recommended to be retained or removed or transplanted will be prepared by a Certified Arborist. Details about tree protection, mitigation and recommendations will be included. Recommendations for monitoring the success of mitigation measures will also be provided.

References

City of Guelph. 2010. The Official Plan of The City of Guelph By-law Number (2010)-19058.

City of Guelph. 2010. The Official Plan of The City of Guelph Amendment 42 (2010)

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Ontario Ministry of Natural Resources (OMNR). 2000. Addendum to Significant Wildlife Habitat Technical Guide: Appendix G. http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@fw/documents/document/mnr_e001287.pdf (April 24, 2013).

Ontario Ministry of Natural Resources (OMNR). 2011. Bats and Bat Habitats: Guidelines for Wind Power Projects. July 2011. 24p.

Ontario Ministry of Natural Resources (OMNR). 2013. Use of Buildings by Little Brown Myotis and Northern Myotis.

400 Clyde Road, P.O. Box 729, Cambridge, ON N1R 5W6
Phone: 519-621-2761 Toll free: 866-900-4722 www.grandriver.ca

January 17th, 2014

Dave Stephenson
Natural Resource Solutions Inc.
225 Labrador Drive, Unit 1
Waterloo, Ontario
N2K 4M8

Attn: Dave Stephenson, Senior Biologist

Dear Mr. Stephenson,

RE: Terms of Reference – Hyland Road Environmental Impact Study
47 and 87 Hyland Road and 46 Hyland Road (Part of Lot 12 and Part of Lot 5, RP 359 and and Part of Lot 4 and Part of Lot 5, RP 359 (Geographic Township of Puslinch)
City of Guelph

We have now had an opportunity to review the Terms of Reference for the Environmental Impact Study (dated November 13th, 2013) for 47 and 87 Hyland Road and 46 Hyland Road, in the City of Guelph. We find the Terms of Reference satisfactory.

Additionally, a portion of the wetland boundary has been confirmed on site (Messier-Stephenson) on May 21st, 2013. Therefore please provide the updated line as part of the update to the wetland mapping.

Should you have any further questions or comments, please do not hesitate to contact me at 519-621-2763 x2236.

Yours truly,

Nathan Garland
Resource Planner
Grand River Conservation Authority

cc. Adèle Labbé, City of Guelph
Al Hearne, City of Guelph

.docx

February 12, 2014
Environmental Advisory Committee

Item 1 **46, 47 & 87 Hyland Road**
File #: tbd

46, 47 & 87 Hyland Road – Proposed residential subdivision
Terms of Reference for an Environmental Impact Study

Proposal An Environmental Impact Study Terms of Reference is proposed to define the terms of study for an Environmental Impact Study which will be undertaken to support a proposed Draft Plan of Subdivision. A complete application has not yet been received by the City.

Total area of the site is 6.28 hectares.

Location The subject properties are located north and south of Hyland Road (see location map on page 4). The subject property currently consists of old field, thicket, mowed lawn and portions of the Guelph Northeast Provincially Significant Wetland Complex.

Background

- Portions of the lands fall within the Clythe Creek and Eramosa-Blue Springs Subwatersheds.
- In the Official Plan, portions of the lands are designated as Core Greenlands and Non-Core Greenlands overlay as well as General Residential on Schedule 1.
- In the Official Plan, Schedule 2 identifies portions of the property as Provincially Significant Wetlands & Other Natural Heritage Features. The Core Greenlands attributes on and adjacent to the site include: Provincially Significant Wetlands, potential Habitat for Endangered and Threatened Species, and Natural Hazard areas. The Non-Core Greenlands attributes include: Significant Woodlands, Fish Habitat, candidate Significant Wildlife Habitat and Environmental Corridors and Ecological Linkages.
- Under Official Plan Amendment 42 (OPA 42), portions of the site are identified as Significant Natural Area due to presence of PSW, Fish Habitat and Significant Woodlands. There is also potential for Habitat for Provincially Endangered and Threatened Species and candidate SWH. An area to the east of the property is identified as Restoration Area. Furthermore, there are undesignated woodlands on the subject property which need to be examined to determine whether they meet the cultural woodland designation, are included within the significant woodland or neither.
- The site is currently zoned Urban Reserve (UR) with an overlay identifying lands adjacent to PSW and lands within significant woodlands and/or ecological linkages.
- GRCA confirmed by letter on January 17th, 2014 that the Terms of Reference for the EIS are satisfactory.
- Parks Planning comments are not yet available, however, it is noted that there is a trail network anticipated in this area.

Comments City staff reviewed the proposed EIS Terms of Reference (EIS ToR) dated May

<u>Introduction</u>

- At the bottom of page 2, it would be beneficial to clarify the purpose of a monthly water balance, to avoid confusion. The water balance exercise is specifically a natural feature water balance and monthly data is being used in the analysis to inform potential impacts to the wetland functions.
- The ToR refers to the subject property as having a future "development area" which is distinguished from the Core natural heritage feature. Please provide an updated figure that depicts the "proposed future development area" for clarity. As well, include on the figure the proposed survey locations for the field program.
- The City will verify the boundary of Significant Woodlands by means of a site visit with NRSI, preferably in advance of submitting the EIS.
- Include a Policy Framework to inform the Policy Analysis.

Significant Species and Significant Wildlife Habitat:

- Least Bittern has been identified as occurring in the vicinity of the site. The EIS ToR indicates that the Northeast PSW does not contain open water, however species assemblages continue to indicate a degree of function that is associated with open water and there appear to be some smaller marsh communities in the general area. During a site reconnaissance in the fall 2013, City staff noted the PSW had 0.5 m of standing water in the SWT community to the south of the subject property. It is acknowledged that swamp thicket habitat type isn't suitable, however effort should be made to determine presence/absence of the species on adjacent lands where marsh communities exist, using marsh monitoring protocols.
- City staff acknowledge the historical (record >20 years old) Jefferson Salamander occurrence on site. The terms of work should include communication with the MNR to confirm we have all data records available, because it is often the case that NHIC is outdated.
- Complete the detailed tree inventory within 10 m of the proposed development area.
- Clarify that timing of surveys (season and time of day) to investigate for presence/absence of snake hibernacula and turtle nesting sites.
- The terms of reference indicates there is low potential for bat maternity roosts or hibernacula to be present within the proposed development area and indicates that all trees will be assessed for bat habitat during the detailed tree inventory. Staff agree that the potential within the proposed development area is low, however, ensure the assessment methodology meets the SWH criterion schedule and MNR direction (guideline for wind power projects) as applicable (i.e., height of cavity is a factor for example). Also, note page 4 of 6 in Appendix 1 seems to include misinformation as it relates to bats (i.e., there is no barn on site).

Data Analysis

- Note that the data analysis should confirm whether there are any features present that are not mapped. Of particular interest for this subject property is confirmation of presence/absence of wetland communities

and/or cultural woodlands for the piece of property northeast of Hyland Road, in consultation with appropriate agencies.

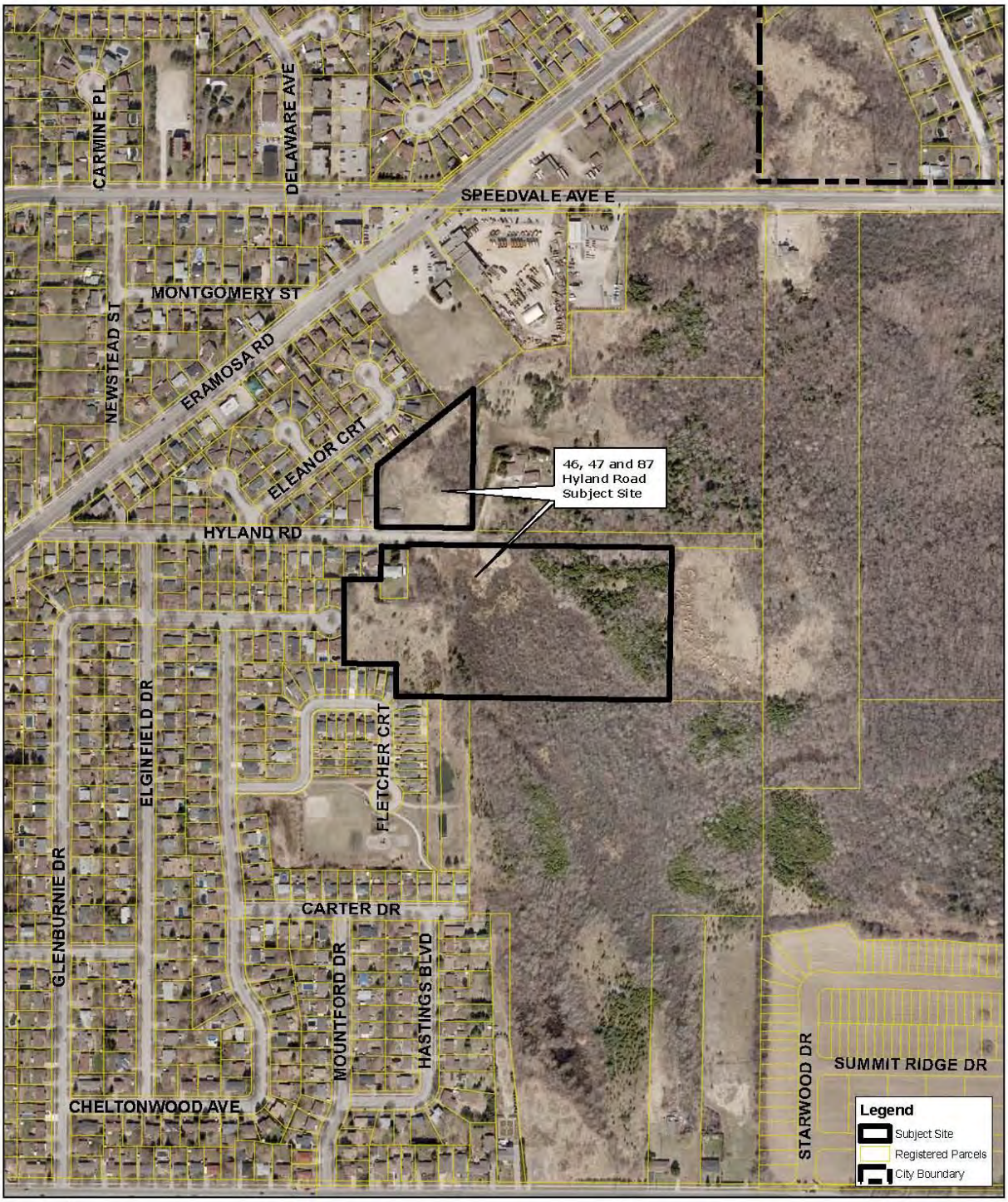
- Include a column for Regional Rarity (Wellington County) and Local Species (City Natural Heritage Strategy list) in the species list and consider this in the analysis.
- Report flora and fauna species by ELC community in species lists.
- A complete policy analysis is to be included in the section including the City's current consolidated OP and with respect to OPA 42.
- The EIS should be supported by figures including the proposed development concept on an aerial photograph.
- Schedule 7 of OPA 42 includes the City of Guelph's Trail Network, which indicates proposed City trails within the subject property. The EIS must include the proposed trail and an impact analysis in this respect. Please contact, Jyoti Pathak (Parks Planner) to obtain detailed information regarding the proposed trail network, to be incorporated into the proposal and EIS.

Suggested Motion

Staff recommends that the Environmental Advisory Committee conditionally support the proposed Terms of Reference for an Environmental Impact Study at 46,47 and 87 Hyland Road prepared by Natural Resource Solutions Inc., with the following conditions:

THAT the Terms of Reference for the EIS:

- Include a revised Figure detailing the proposed development area and field survey locations;
- Clarify the purpose of a natural heritage feature water balance and that it will be analyzed suing monthly data;
- Include staff confirmation of the Significant Woodland boundary on site;
- Include field surveys for Least Bittern, communication with MNR to confirm Jefferson Salamander occurrences are all historical and clarification of snake and/or bat hibernacula and turtle nesting site survey methods/timing;
- Ensure the analysis identifies any features that may be present but not mapped, in consultation with appropriate agencies (ex., wetlands or cultural woodlands);
- Include analysis in consideration of Regional and Local Significance and report flora and fauna by ELC community;
- Include a complete policy analysis including the current OP and OPA 42; and
- Include the City's proposed trail alignment and an impact analysis to address it.



100 50 0 100 m

Produced by the City of Guelph
Planning & Building, Engineering and Environment
January 2014
Data Sources: Dougan and Associates (2009), City of Guelph (2009)

Location Map

46, 47 and 87 Hyland Road

Spring 2012 Aerial Photography

INTERNAL MEMO

DATE	February 6, 2014
TO	Adele Labbe, Al Hearne, Mary Angelo
FROM	Jyoti Pathak
DIVISION	Parks and Recreation
DEPARTMENT	Community and Social Services
SUBJECT	**Hyland Road**
	Scoped Environmental Impact Study- Terms of Reference

Park Planning & Development has reviewed the Terms of Reference (November 2013) for the Scoped Environmental Impact Study (EIS) to be prepared in support of zoning bylaw amendment application for Hyland Road Property and offers the following comments:

Trail Network:
Guelph Trail Network identifies an off-road secondary route trail connection from Hyland Road through the subject property to provide a neighbourhood link to Primary Trail Loop at Eastview Community Park. There is an opportunity to create a connecting off road route from Hyland Road further north to Speedvale Avenue East for users wanting to access the primary trail system at Speedvale Avenues East.

The trail route has been proposed on the edge of the natural heritage features to route people away from environmentally sensitive features. Installation of a formal trail is essential to protect the environmentally sensitive features from any further damage due to new ad-hoc trails through these protected areas in absence of a formal trail. Please refer to the conceptual trail alignment **(Appendix 1)**.

The trail is proposed to be a 2.5 metre wide stone-dust trail with 0.6 m wide grass edges and a drainage swale in between the development and the trail within the open space.

Parks Planning recommends that the following aspects be included in the scoped EIS:

- Identification of existing foot trails and potential ad-hoc trails
- Refinement of the Conceptual trail alignment, as shown on the appendix 1, in consultation with Parks Planning and Environmental Planning Staff
- Recommendations on the closure of existing foot trails, if any, and potential ad-hoc trails, if not part of the proposed conceptual trail alignment
- Assessment of the environmental impact of development of the proposed trail and recommendations on measures to mitigate impacts be included in EIS; the design of trail and mitigation measures to be addressed and detailed out through Environmental Implementation Report (EIR);
- Recommendations for the management of the natural open space, along the trail route including removal of hazard trees and invasive species and restoration of the disturbed areas within the natural feature and its buffer.

- Recommendations on the installation of educational interpretive signage along the trail route adjacent to protected features be included in EIS and be detailed out through EIR.

- Recommendations on the timing of site preparation and grading for trail construction within the open space. Based on the location of the trails within natural open space it would be beneficial to implement the trails at the same time as other area features (planting, demarcation, etc). This would consolidate timing of construction activity close to sensitive habitats and avoid re-disturbance of regenerating buffer areas. It would also avoid home buyer concerns and related further delay in trail installation typically associated with later trail development.

The conceptual trail alignment through the existing natural open space will be refined and detailed design in accordance with the City standards through completion of an Environmental Implementation Report.

Please contact me if you have any questions.

Regards,

Jyoti Pathak
Park Planner

Parks and Recreation
Community and Social Services
Location: City Hall

T 519-822-1260 x 2431
E Jyoti.pathak@guelph.ca

Appendix 1 Hyland Road Conceptual Trail Alignment

HYLAND ROAD CONCEPTUAL TRAIL ALIGNMENT

APPENDIX II

Ontario Ministry of Natural Resources and Forestry (MNRF) Comment on Standard Survey Methodologies

Subject: FW: RE: Hyland Rd. Guelph- SAR Survey Guidance (proj1400)
From: "Timmerman, Art (MNR)" <art.timmerman@ontario.ca>
Date: 11/06/2014 9:36 AM
To: "rarcher@nrsi.on.ca" <rarcher@nrsi.on.ca>

FYI Ryan.

Art Timmerman
Management Biologist
Guelph District

519-826-4935

From: Buck, Graham (MNR)
Sent: Wednesday, June 11, 2014 9:21 AM
To: Timmerman, Art (MNR)
Subject: RE: RE: Hyland Rd. Guelph- SAR Survey Guidance (proj1400)

See attached.

Graham Buck
Management Biologist
Ministry of Natural Resources
1 Stone Road West
Guelph ON
N1G 4Y2
519 826 4505
graham.buck@ontario.ca

From: Timmerman, Art (MNR)
Sent: June-10-14 5:57 PM
To: Buck, Graham (MNR)
Subject: FW: RE: Hyland Rd. Guelph- SAR Survey Guidance (proj1400)

Do you know of any Graham - I don't.

Art

From: Ryan Archer [rarcher@nrsi.on.ca]
Sent: Tuesday, June 10, 2014 7:51 AM
To: Timmerman, Art (MNR)
Subject: Fwd: RE: Hyland Rd. Guelph- SAR Survey Guidance (proj1400)

Hi Art,

I'm working with David Stephenson at Natural Resource Solutions Inc. on the completion of an EIS for a property on Hyland Road in Guelph (see below). One study consideration that was raised by the City's Environmental Advisory Committee was the potential for turtle nesting on this property. Our field crews regularly search for and record observations of turtles while completing scheduled field surveys within the property. However, I was wondering if MNR has a standard survey methodology and timing that they

recommend to adequately survey for the presence of turtle nesting.

Thanks,
Ryan

-------- Original Message --------
Subject:RE: Hyland Rd. Guelph- SAR Survey Guidance (proj1400)
Date: Tue, 18 Feb 2014 20:59:20 +0000
From: Buck, Graham (MNR) <Graham.Buck@ontario.ca>
To: Nathan Miller <nmiller@nrsi.on.ca>

Hi Nathan,

MNR does not have a survey protocol for Least Bittern. MNR recommends you follow the EC survey protocol.
I do not see the need for a Jefferson Salamander survey. However the property has the potential to be significant wildlife habitat for at risk snake and turtle so I recommend that effort go towards surveys for snakes and turtles.
I forwarded your question about winter raptor surveys to Art Timmerman.

Graham Buck
Species at Risk Biologist
Ministry of Natural Resources
1 Stone Road West
Guelph ON
N1G 4Y2
519 826 4505
graham.buck@ontario.ca

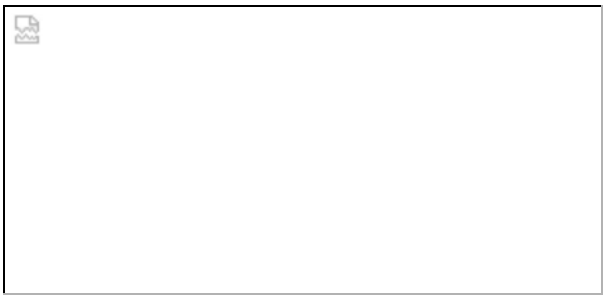
From: Nathan Miller [mailto:nmiller@nrsi.on.ca]
Sent: February-13-14 12:14 PM
To: Buck, Graham (MNR)
Cc: Jessica Walker
Subject: Re: Hyland Rd. Guelph- SAR Survey Guidance (proj1400)

Hi Graham,

One more item. It was mentioned by EAC that least bittern does not respond very well to call playbacks. Does the OMNR have a recommended survey protocol that is different from the National Least Bittern Survey Protocol outlined by CWS?

Thanks,

Nathan



On 2/13/2014 11:59 AM, Nathan Miller wrote:

> Hi Graham,
>
> NRSI is currently carrying out an EIS on Hyland Rd within Guelph, and historical records of Jefferson Salamander from 1993 have been identified within the study area. NRSI would like some guidance on whether salamander surveys are required, as well as the appropriate level of effort. A map identifying the habitat and study area has been attached. Vernal pools have been identified within the study area but not within the proposed development area.
>
> I also called and left a message on your answering machine regarding winter raptor surveys which are required based on the criteria outlined in the ecoregion criterion schedule.
> It is NRSI's understanding that the MNR may have recently changed their survey protocol regarding the level of effort. Currently NRSI has been carrying out 3 surveys at each site, spaced widely throughout the winter from December to March. These surveys have primarily involved walking transects along the edge of the woodland and suitable open country habitat as well as point counts where necessary. If you could respond either by email or phone regarding this it would be much appreciated.
>
> Thanks,
> Nathan
> --

Attachments:

Turtle Nesting Surveys.docx	14.2 KB

Turtle Nesting Surveys

Nesting surveys with positive results can be helpful in identifying the occurrence of the species in a particular area, particularly for species which nest in close proximity to their aquatic habitat.

Survey Technique:

Visually inspect suitable nesting areas from a distance. If females are startled, they will likely abandon nesting activity for the evening and this could constitute harassment for a species protected under the ESA. As such, appropriate precautions should be taken to avoid startling nesting females: stay as far away from the nesting site as possible while maintaining a good line of sight, use binoculars when possible, try to remain inconspicuous and do not make any noise. If no turtles are detected during surveys, cautiously approach the site and search for (and photograph) any potential turtle tracks. To maximize detection probability, it is recommended that suitable nesting habitat is surveyed at least twice per evening and that surveys are separated by two hours.

Search suitable nesting habitat for evidence of depredated nests and hatched nests immediately after the nesting and hatching periods, respectively (see section 2.3 for timing of these periods). It can be difficult to identify the species from evidence of a depredated or successful nest. However, evidence of nests can be used to identify potential nesting habitat and inform future surveys.

Survey Period:

The nesting period lasts about three weeks but varies between years and regions. It usually occurs between late May and early July. Although nesting activity can last a few weeks, peak activity can occur over just a few nights. Observations of turtles (any species) nesting along roads can be a useful indicator of the onset of nesting activity in a particular area. Discussions with local experts can also be helpful in identifying the beginning of the nesting period. Potential nest sites should be surveyed between 7 pm and 10 pm.

Survey Conditions:

Nesting activity can take place in most weather conditions but may peak after rainfall or during periods of light rain.

particular area. Discussions with local experts can also be helpful in identifying the beginning of the nesting period. Potential nest sites should be surveyed between 7 pm and 10 pm.

Survey Conditions:

Nesting activity can take place in most weather conditions but may peak after rainfall or during periods of light rain. The presence of other nesting turtles is an indication of good nesting conditions for Blanding's Turtle.

APPENDIX III

Vegetation Species Inventoried Within the Subject Property

Vascular Flora Observed within the Subject Property

BOTANICAL NAME	COMMON NAME	PROVINCIAL STATUS[1]	OMNR STATUS[2]	COSEWIC STATUS[3]	SARA Schedule[4]	Wellington County Status[5]	City of Guelph Status[7]	NHIC Data[8]	NRSI Observed								
									FODM8-1	MEMM3	SWTO2-6	MAMO1-2	FOCM4-1	THDM2-6	SWDO2-3/SWTO2-6	WODM5-3	Combined Polygons
PTERIDOPHYTES	**FERNS & ALLIES**																
Dryopteridaceae	**Wood Fern Family**																
Dryopteris carthusiana	Spinulose Wood Fern	S5											X				X
Dryopteris cristata	Crested Wood Fern	S5									X				X		X
Onoclea sensibilis	Sensitive Fern	S5							X		X		X		X		X
Equisetaceae	**Horsetail Family**																
Equisetum arvense	Field Horsetail	S5								X			X			X	X
Equisetum pratense	Meadow Horsetail	S5				R	S		X		X				X		X
Thelypteridaceae	**Beech Fern Family**																
Thelypteris palustris var. pubescens	Marsh Fern	S5									X				X		X
GYMNOSPERMS	**CONIFERS**																
Cupressaceae	**Cypress Family**																
Thuja occidentalis	White Cedar	S5							X	X	X	X	X		X		X
Pinaceae	**Pine Family**																
Abies balsamea	Balsam Fir	S5							X		X				X		X
Picea glauca	White Spruce	S5								X							X
Picea mariana	Black Spruce	S5													X		X
Pinus strobus	Eastern White Pine	S5							X								X
Pinus sylvestris	Scot's Pine	SE5							X	X							X
DICOTYLEDONS	**DICOTS**																
Aceraceae	**Maple Family**																
Acer negundo	Manitoba Maple	S5							x	X	X	X	X	X		X	X
Acer saccharum ssp. saccharum	Sugar Maple	S5							X	X							X
Acer X freemanii	Freeman's Maple											X			X		X
Anacardiaceae	**Sumac or Cashew Family**																
Toxicodendron rydbergii	Poison-ivy	S5															X
Apiaceae	**Carrot or Parsley Family**																
Aegopodium podagraria	Goutweed	SE5										X					X
Cicuta bulbifera	Bulb-bearing Water-hemlock	S5							X		X				X		X
Daucus carota	Wild Carrot	SE5							X	X				X			X
Sium suave	Hemlock Water-parsnip	S5									X				X		X
Apocynaceae	**Dogbane Family**																
Apocynum androsaemifolium ssp. androsaemifolium	Spreading Dogbane	S5								X							X
Araliaceae	**Ginseng Family**																
Aralia elata	Sarsaparilla	SE1									X						X

Vascular Flora Observed within the Subject Property

BOTANICAL NAME	COMMON NAME	PROVINCIAL STATUS[1]	OMNR STATUS[2]	COSEWIC STATUS[3]	SARA Schedule[4]	Wellington County Status[5]	City of Guelph Status[7]	NHIC Data[8]	NRSI Observed								
									FODM8-1	MEMM3	SWTO2-6	MAMO1-2	FOCM4-1	THDM2-6	SWDO2-3/SWTO2-6	WODM5-3	Combined Polygons
Asclepiadaceae	**Milkweed Family**																
Asclepias incarnata ssp. incarnata	Swamp Milkweed	S5									X	X			X		X
Asclepias syriaca	Common Milkweed	S5								X						X	X
Asteraceae	**Composite or Aster Family**																
Achillea millefolium ssp. millefolium	Common Yarrow	SE?								X			X				X
Ambrosia artemisiifolia	Common Ragweed	S5								X							X
Arctium minus ssp. minus	Common Burdock	SE5							X	X				X		X	X
Arnoglossum plantagineum	Tuberous Indian-plantain	S3	SC	SC	Schedule 1			X									
Bidens frondosa	Devil's Beggar-ticks	S5							X			X					X
Centaurea sp.	Knapweed									X							
Centaurea maculosa	Spotted Knapweed	SE5								X			X				X
Cichorium intybus	Chicory	SE5								X							X
Cirsium arvense	Canada Thistle	SE5							X	X				X			X
Cirsium vulgare	Bull Thistle	SE5								X							X
Erigeron philadelphicus ssp. philadelphicus	Philadelphia Fleabane	S5								X			X			X	X
Erigeron pulchellus	Robin's Plantain	S5											X				X
Verbascum blattaria	Moth Mullein	SE5								X							X
Eupatorium maculatum ssp. maculatum	Spotted Joe-pye-weed	S5									X	X					X
Euthamia graminifolia	Flat-topped Bushy Goldenrod	S5								X		X	X				X
Leucanthemum vulgare	Ox-eye Daisy	SE5								X							X
Conyza canadensis	Canada Horsetail	S5								X							X
Rudbeckia hirta	Black-eyed Susan	S5								X							X
Solidago sp.	Goldenrod												X		X		X
Solidago altissima var. altissima	Tall Goldenrod	S5							X	X						X	X
Solidago canadensis	Canada Goldenrod	S5							X	X				X		X	X
Solidago gigantea	Giant Goldenrod	S5							X	X	X	X				X	X
Solidago nemoralis ssp. nemoralis	Gray Goldenrod	S5								X			X				X
Solidago rugosa ssp. rugosa	Rough Goldenrod	S5							X	X	X		X				X
Sonchus arvensis ssp. arvensis	Field Sow-thistle	SE5								X							X
Symphyotrichum ericoides var. ericoides	White Heath Aster	S5											X				
Symphyotrichum lanceolatum var. lanceolatum	Tall White Aster	S5															X
Symphyotrichum lanceolatum var. hesperium	Panicled Aster	S5								X		X					X
Symphyotrichum lateriflorum var. lateriflorum	Calico Aster	S5							X		X						X
Symphyotrichum novae-angliae	New England Aster	S5							X	X			X			X	X
Symphyotrichum puniceum var. puniceum	Purple-stemmed Aster	S5							X		X	X			X		X
Balsaminaceae	**Touch-me-not Family**																
Impatiens capensis	Spotted Touch-me-not	S5									X	X					X
Impatiens glandulifera	Glandular Touch-me-not	SE4								X							X
Betulaceae	**Birch Family**																
Betula papyrifera	White Birch	S5											X		X		X
Boraginaceae	**Borage Family**																
Echium vulgare	Blueweed	SE5								X							X
Brassicaceae	**Mustard Family**																
Alliaria petiolata	Garlic Mustard	SE5								X							X
Hesperis matronalis	Dame's Rocket	SE5								X				X			X
Campanulaceae	**Bellflower Family**																
Campanula rapunculoides	Creeping Bellflower	SE5								X							X
Caprifoliaceae	**Honeysuckle Family**																
Lonicera tatarica	Tartarian Honeysuckle	SE5							X	X			X			X	X
Viburnum lentago	Nannyberry	S5							X		X			X			X
Viburnum opulus	Guelder Rose	SE4							X		X		X	X		X	X

Vascular Flora Observed within the Subject Property

BOTANICAL NAME	COMMON NAME	PROVINCIAL STATUS[1]	OMNR STATUS[2]	COSEWIC STATUS[3]	SARA Schedule[4]	Wellington County Status[5]	City of Guelph Status[7]	NHIC Data[8]	NRSI Observed								
									FODM8-1	MEMM3	SWTO2-6	MAMO1-2	FOCM4-1	THDM2-6	SWDO2-3/SWTO2-6	WODM5-3	Combined Polygons
Caryophyllaceae	**Pink Family**																
Saponaria officinalis	Bouncing-bet	SE5								X							X
Silene latifolia	Bladder Campion	SE5								X							X
Celastraceae	**Staff-tree Family**																
Euonymus europaea	Spindle Tree	SE2								X							X
Convolvulaceae	**Morning-glory Family**																
Convolvulus arvensis	Field Bindweed	SE5								X							X
Cornaceae	**Dogwood Family**																
Cornus alternifolia	Alternate-leaved Dogwood	S5											X				X
Cornus amomum ssp. obliqua	Silky Dogwood	S5							X	X	X	X			X		X
Cornus stolonifera	Red-osier Dogwood	S5							X	X	X	X	X	X	X	X	X
Cornus foemina ssp. racemosa	Red Panicled Dogwood	S5													X		
Euphorbiaceae	**Spurge Family**																
Euphorbia cyparissias	Cypress Spurge	SE5								X				X			X
Euphorbia esula	Leafy Spurge	SE5												X			X
Fabaceae	**Pea Family**																
Coronilla varia	Variable Crown-vetch	SE5								X				X			X
Lotus corniculatus	Bird's-foot Trefoil	SE5								X							X
Medicago lupulina	Black Medick	SE5								X				X			X
Melilotus alba	White Sweet-clover	SE5								X							X
Trifolium pratense	Red Clover	SE5											X				X
Vicia cracca	Tufted Vetch	SE5								X						X	X
Geraniaceae	**Geranium Family**																
Geranium robertianum	Herb Robert	SE5							X								X
Grossulariaceae	**Currant Family**																
Ribes americanum	Wild Black Currant	S5															X
Ribes hirtellum	Smooth Gooseberry	S5				R	S				X						X
Ribes rubrum	Red Currant	SE5							X								X
Guttiferae	**St. John's-wort Family**																
Hypericum ellipticum	Elliptic-leaved St. John's-wort	S5				R	SG							X			X
Hypericum perforatum	Common St. John's-wort	SE5								X							X
Hypericum punctatum	Corymbed St. John's-wort	S5															X
Juglandaceae	**Walnut Family**																
Juglans nigra	Black Walnut	S4							X	X						X	X
Lamiaceae	**Mint Family**																
Clinopodium vulgare	Wild Basil	S5							X						X		X
Glechoma hederacea	Creeping Charlie	SE5								X							X
Leonurus cardiaca ssp. cardiaca	Common Motherwort	SE5														X	X
Lycopus americanus	Cut-leaved Water-horehound	S5										X					X
Lycopus uniflorus	Northern Water-horehound	S5							X		X	X			X		X
Mentha canadensis	American Wild Mint	S5										X					X
Prunella vulgaris ssp. vulgaris	Common Heal-all	SE3							X	X			X	X		X	X

Vascular Flora Observed within the Subject Property

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									FODM8-1	MEMM3	SWTO2-6	MAMO1-2	FOCM4-1	THDM2-6	SWDO2-3/SWTO2-6	WODM5-3	Combined Polygons
Oleaceae	**Olive Family**																
Fraxinus americana	White Ash	S5							X	X							X
Fraxinus nigra	Black Ash	S5													X		X
Fraxinus pennsylvanica	Green Ash	S5							X	X							X
Ligustrum vulgare	Common Privet	SE5							X	X	X		X				X
Onagraceae	**Evening-primrose Family**																
Circaea lutetiana ssp. canadensis	Yellowish Enchanter's Nightshade	S5							X	X						X	X
Epilobium hirsutum	Great Hairy Willow-herb	SE5															X
Epilobium parviflorum	Sparse-flowered Willow-herb	SE4							X			X					X
Oenothera biennis	Common Evening-primrose	S5							X	X						X	X
Oxalidaceae	**Wood Sorrel Family**																
Oxalis stricta	Upright Yellow Wood-sorrel	S5							X	X							X
Papaveraceae	**Poppy Family**																
Chelidonium majus	Celandine	SE5								X							X
Plantaginaceae	**Plantain Family**																
Plantago lanceolata	Ribgrass	SE5								X							X
Plantago major	Common Plantain	SE5							X	X							X
Plantago rugelii	Rugel's Plantain	S5							X								X
Polygonaceae	**Smartweed Family**																
Rumex crispus	Curly-leaf Dock	SE5								X	X						X
Primulaceae	**Primrose Family**																
Lysimachia nummularia	Moneywort	SE5														X	X
Ranunculaceae	**Buttercup Family**																
Anemone cylindrica	Thimbleweed	S4								X							X
Clematis virginiana	Virgin's-bower	S5							X								X
Ranunculus acris	Tall Buttercup	SE5							X	X	X				X	X	X
Ranunculus hispidus var. caricetorum	Swamp Buttercup	S5									X						X
Rhamnaceae	**Buckthorn Family**																
Rhamnus cathartica	Common Buckthorn	SE5							X	X	X		X	X	X	X	X
Frangula alnus	Glossy Buckthorn	SE5							X	X	X	X	X		X		X
Rosaceae	**Rose Family**																
Agrimonia gryposepala	Tall Hairy Agrimony	S5							X	X			X	X			X
Agrimonia striata	Grooved Agrimony	S4?											X				X
Amelanchier arborea	Downy Juneberry	S5															X
Fragaria virginiana	Wild Strawberry	S5							X	X			X	X			X
Geum sp.	Avens								X				X	X			
Geum aleppicum	Yellow Avens	S5							X	X						X	X
Geum canadense	White Avens	S5								X							X

Vascular Flora Observed within the Subject Property

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									FODM8-1	MEMM3	SWTO2-6	MAMO1-2	FOCM4-1	THDM2-6	SWDO2-3/SWTO2-6	WODM5-3	Combined Polygons
Malus pumila	Common Crabapple	SE5															X
Malus domestica	Apple								X								X
Physocarpus opulifolius	Ninebark	S5								X							X
Potentilla norvegica	Rough Cinquefoil	S5								X							X
Potentilla recta	Rough-fruited Cinquefoil	SE5								X				X			X
Prunus sp.	Plum or cherry									X							X
Prunus avium	Cherry Plum	SE4															X
Prunus pensylvanica	Pin Cherry	S5								X							X
Prunus serotina	Black Cherry	S5								X			X		X	X	X
Prunus virginiana ssp. virginiana	Choke Cherry	S5							X	X			X			X	X
Rosa multiflora	Multiflora Rose	SE4														X	X
Rubus idaeus ssp. idaeus	Red Raspberry	SE1								X				X		X	X
Rubus occidentalis	Thimble-berry	S5															X
Rubus pubescens	Dwarf Raspberry	S5									X		X		X		X
Sorbus aucuparia	European Mountain-ash	SE4							X								X
Rubiaceae	**Madder Family**																
Galium mollugo	White Bedstraw	SE5															X
Galium palustre	Marsh Bedstraw	S5									X	X			X		X
Salicaceae	**Willow Family**																
Populus balsamifera ssp. balsamifera	Balsam Poplar	S5							X			X	X	X	X		X
Populus tremuloides	Trembling Aspen	S5							X	X	X	X	X	X	X		X
Salix sp.	Willow									X	X	X		X			X
Salix alba var. alba	White Willow	SE4										X					X
Salix bebbiana	Long-beaked Willow	S5									X	X					X
Salix discolor	Pussy Willow	S5									X	X					X
Salix eriocephala	Heart-leaved Willow	S5							X		X	X			X		X
Salix fragilis	Crack Willow	SE5										X					X
Salix lucida	Shining Willow	S5									X	X			X		X
Salix petiolaris	Slender Willow	S5									X	X		X	X		X
Salix purpurea	Basket Willow	SE4							X	X	X					X	X
Scrophulariaceae	**Figwort Family**																
Linaria vulgaris	Butter-and-eggs	SE5								X							X
Veronica officinalis	Common Speedwell	SE5								X			X				X
Solanaceae	**Nightshade Family**																
Solanum dulcamara	Bitter Nightshade	SE5							X		X	X					X
Tiliaceae	**Linden Family**																
Tilia americana	American Basswood	S5								X							X
Ulmaceae	**Elm Family**																
Ulmus americana	White Elm	S5							X				X		X		X
Urticaceae	**Nettle Family**																
Boehmeria cylindrica	False Nettle	S5													X		X
Urtica dioica ssp. gracilis	American Stinging Nettle	S5															X

Vascular Flora Observed within the Subject Property

BOTANICAL NAME	COMMON NAME	PROVINCIAL STATUS[1]	OMNR STATUS[2]	COSEWIC STATUS[3]	SARA Schedule[4]	Wellington County Status[5]	City of Guelph Status[7]	NHIC Data[8]	NRSI Observed								
									FODM8-1	MEMM3	SWTO2-6	MAMO1-2	FOCM4-1	THDM2-6	SWDO2-3/SWTO2-6	WODM5-3	Combined Polygons
Violaceae	**Violet Family**																
Viola sororia	Woolly Blue Violet	S5									X						X
Vitaceae	**Grape Family**																
Parthenocissus vitacea	Woodbine	S5								X			X		X		X
Vitis riparia	Riverbank Grape	S5							X	X			X	X	X	X	X
MONOCOTYLEDONS	**MONOCOTS**																
Araceae	**Arum Family**																
Arisaema triphyllum	Jack-in-the-pulpit	S5								X							X
Cyperaceae	**Sedge Family**																
Carex sp.	Sedge										X						X
Carex blanda	Woodland Sedge	S5							X				X				
Carex bebbii	Bebb's Sedge	S5									X	X			X		X
Carex careyana	Carey's Sedge	S2				R		X									
Carex comosa	Bristly Sedge	S5										X					X
Carex cristatella	Crested Sedge	S5							X						X		X
Carex flava	Yellow Sedge	S5									X						X
Carex gracillima	Graceful Sedge	S5							X	X	X					X	X
Carex hystericina	Porcupine Sedge	S5										X					X
Carex interior	Inland Sedge	S5									X				X		X
Carex intumescens	Bladder Sedge	S5							X		X						X
Carex lupulina	Hop Sedge	S5				R					X				X		X
Carex projecta	Necklace Sedge	S5													X		X
Carex pseudocyperus	Cypress-like Sedge	S5										X			X		X
Carex rosea	Stellate Sedge	S5							X								X
Carex stipata	Awl-fruited Sedge	S5									X	X			X		X
Carex vulpinoidea	Fox Sedge	S5							X								X
Carex granularis	Meadow Sedge	S5								X							
Scirpus atrovirens	Dark-green Bulrush	S5									X				X		X
Scirpus cyperinus var. cyperinus	Wool-grass	S5										X			X		X
Scirpus pendulus	Lined Bulrush	S5							X	X							X
Juncaceae	**Rush Family**																
Juncus articulatus	Jointed Rush	S5										X					X
Juncus effusus var. solutus	Soft Rush	S5									X	X			X		X
Juncus tenuis	Path Rush	S5							X	X						X	X
									X	X							
Lemnaceae	**Duckweed Family**																
Spirodela polyrhiza	Greater Duckweed	S5										X					X

Vascular Flora Observed within the Subject Property

BOTANICAL NAME	COMMON NAME	PROVINCIAL STATUS[1]	OMNR STATUS[2]	COSEWIC STATUS[3]	SARA Schedule[4]	Wellington County Status[5]	City of Guelph Status[7]	NHIC Data[8]	NRSI Observed								
									FODM8-1	MEMM3	SWTO2-6	MAMO1-2	FOCM4-1	THDM2-6	SWDO2-3/SWTO2-6	WODM5-3	Combined Polygons
Liliaceae	**Lily Family**																
Convallaria majalis	Lily-of-the-valley	SE5									X						X
Hemerocallis fulva	Orange Day-lily	SE5								X						X	X
Maianthemum canadense	Wild Lily-of-the-valley	S5									X				X		X
Maianthemum racemosum ssp. racemosum	False Solomon's Seal	S5									X						X
Maianthemum stellatum	Star-flowered Solomon's Seal	S5														X	X
Orchidaceae	**Orchid Family**																
Cypripedium calceolus var. pubescens	Large Yellow Lady's Slipper	S5									X				X		X
Epipactis helleborine	Common Helleborine	SE5							X				X				X
Poaceae	**Grass Family**																
Agrostis gigantea	Redtop	SE5								X							X
Bromus inermis ssp. inermis	Awnless Brome	SE5								X							X
Calamagrostis canadensis	Blue-joint Grass	S5										X					X
Dactylis glomerata	Orchard Grass	SE5							X	X						X	X
Elymus repens	Quack Grass	SE5								X							X
Glyceria canadensis	Rattlesnake Manna Grass	S4S5							X								X
Glyceria grandis	Tall Manna Grass	S4S5										X			X		X
Glyceria striata	Fowl Meadow Grass	S5							X		X					X	X
Festuca pratensis	Meadow Fescue	SE5								X							X
Panicum capillare	Witch Grass	S5								X							X
Leersia oryzoides	Rice Cut Grass	S5									X	X			X		X
Muhlenbergia mexicana	Mexican Satin Grass											X					X
Phalaris arundinacea	Reed Canary Grass	S5								X	X	X		X	X	X	X
Phleum pratense	Timothy	SE5								X							X
Poa compressa	Canada Blue Grass	S5								X							X
Poa palustris	Fowl Meadow Grass	S5							X						X		X
Poa pratensis ssp. pratensis	Kentucky Bluegrass	S5								X							X
Typhaceae	**Cattail Family**																
Typha angustifolia	Narrow-leaved Cattail	S5									X	X					X
Typha latifolia	Broad-leaved Cattail	S5									X	X					X

[1]MNRF2014, [2]MNRF 2015, [3]COSEWIC 2015, [4]Government of Canada 2015, [5]Dougan 2009, [6]Riley 1989, 7City of Guelph, 2012, [8]MNRF 2014

Legend:

Co-efficient of Conservatism (CC): This value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific habitat integrity.

Wetness Index: This value, ranging from -5 (obligate wetland) to 5 (upland) provides the probability of a species occurring in wetland or upland habitats.

Weediness Index: This value, ranging from -1 (low) to -3 (high) quantifies the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, it can be used as an indicator of disturbance.

Provincial Status: Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario. The ranks are:

S1: Critically Imperiled in Ontario; 5 or fewer occurrences; especially vulnerable to extirpation

S2: Imperiled in Ontario; usually between 5-20 occurrences or with many individuals in fewer occurrences; often susceptible to extirpation.

S3: Vulnerable in Ontario due to a restricted range; relatively few populations ,usually between 20-80 occurrences;recent and widespread declines, or other factors making it vulnerable to extirpation

S4: Apparantly Secure; uncommon but not rare; some cause for long-term concern due to decline or other factors; usually more than 100 occurrences.

S5: Secure in Ontario; common, widespread and abundant in the province

COSEWIC

SC: Special Concern

SARA Schedule

Schedule 1: Officially Protected under SARA

County Status

X: Native, Present and all Introduced Species

R: Native, Present, and Provincially or Otherwise Rare

City Status

SG: Significant to the City of Guelph (On the city of Guelph NHS Significant Species List, but not on the Frank & Anderson's Wellington Flora Rare Plant List 2009)

S: Locally significant as per Significant Plant Lists (not meeting: Prov. Threatened or Endangered status, NHIC SRank, Globally Significant, and Federally or Provincial Species of Concern

APPENDIX IV

Federally, Provincially and Locally Significant Species Known From or Observed Within the Subject Property and Vicinity

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Vascular Flora												
Arnoglossum plantagineum	Tuberous Indian-plantain	S3	SC	SC	Schedule 1	--	--	Wet, calcium rich meadows or shoreline fens.	MNRF 2014, OMNR 2013	No	No	No
Carex careyana	Carey's Sedge	S2	--	--	--	--	R	Mesic to dry-mesic hardwood forests, floodplain woods.	MNRF 2014, OMNR 2013	Yes	No	No
Carex lupulina	Hop Sedge	S5	--	--	--	S	R	Swamps (usually deciduous, rarely cedar or tamarack), floodplains, marshes and thickets along rivers, lakes, and ponds, mucky hollows and depressions in forests, occasionally in moist fields and ditches adjacent to swamps.	NRSI Observation	Yes	No	Yes
Castanea dentata	American Chestnut	S2	E	END	Schedule 1	--	R	Moist to well drained forests on sand, occasionally heavy soils.	OMNR 2013	No	No	No
Equisetum pratense	Meadow Horsetail	S5	--	--	--	S	R	Moist to wet deciduous or mixed conifer-hardwood forests, springy or seepy sites or along streams, conifer swamps.	NRSI Observation	Yes	Yes	Yes
Hypericum ellipticum	Elliptic-leaved St. John's-wort	S5	--	--	--	SG	R	Moist sandy shores and clearings, open moist thickets, marshy beach flats, borders of rivers, bogs.	NRSI Observation	Yes	Yes	Yes
Juglans cinerea	Butternut	S3?	E	END	Schedule 1	SG	R	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also infrequently found on dry, rocky and shallow soils.	OMNR 2013	Yes	Yes	No
Panax quinquefolius	American Ginseng	S3	E	END	Schedule 1	--	R	Deep leaf litter in rich, moist deciduous woods, especially on rocky, shaded cool slopes in sweet soil.	OMNR 2013	Yes	No	No
Potamogeton hillii	Hill's Pondweed	S2	SC	SC	Schedule 1	--	R	Highly alkaline waters of ditches, beaver ponds and slow-moving cold waters.	OMNR 2013	No	No	No
Ribes hirtellum	Smooth Gooseberry	S5	--	--	--	S	R	Cedar and tamarack swamps, fens and sedge meadows, rocky openings in mixed forests, gravelly shores and edges of forests, shrubby thickets along streams and lakes.	NRSI Observation	Yes	No	Yes
Birds												
Accipiter striatus	Sharp-shinned Hawk	S5	NAR	--	--	X	√*	Dense, coniferous or mixed forests; usually near a lake or river; sometimes wet forest; uses more open areas like forest edges or forest clearings for hunting; requires minimum of 4 ha of dense (>80%) canopy closure for nesting; forests >30 ha appear to be preferred.	NRSI Observation	Yes	No	Yes
Ammodramus henslowii	Henslow's Sparrow	SHB	END	E	Schedule 1	--	√	Large, fallow, grassy area with ground mat of dead vegetation, dense herbaceous vegetation, ground litter and some song perches; neglected weedy fields; wet meadows; cultivated uplands; a moderate amount of moisture needed; requires a minimum tract of grassland of 40 ha, but usually in areas >100 ha.	OMNR 2013	No	No	No

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Ardea herodias	Great Blue Heron	S4B	--	--	--	X	**	Wetlands, shores of ponds and lakes, marshes, standing trees in open water, swamps, including woodlots; require tall trees for nesting	NRSI Observation	Yes	No	Yes
Asio flammeus	Short-eared Owl	S2N, S4B	SC	SC	Schedule 3	--	√	Grasslands, open areas or meadows that are grassy or bushy; marshes, bogs or tundra; both diurnal and nocturnal habits; ground nester; destruction of wetlands by drainage for agriculture is an important factor in the decline of this species; home range 25 - 125 ha; requires 75-100 ha of contiguous open habitat.	OMNR 2013	No	No	No
Caprimulgus vociferus	Eastern Whip-poor-will	S4B	THR	T	Schedule 1	--	√	Dry, open, deciduous woodlands of small to medium trees; oak or beech with lots of clearings and shaded leaflitter; wooded edges, forest clearings with little herbaceous growth; pine plantations; associated with >100ha forests.	OMNR 2013	No	No	No
Cardellina canadensis	Canada Warbler	S4B	SC	T	Schedule 1	--	√	Interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat; usually requires at least 30ha.	OMNR 2013	Yes	No	No
Cathartes aura	Turkey Vulture	S5B	--	--	--	--	√	Bottomland hardwood forests and thickets, rocky cliffs, various habitats, except heavy unbroken forest; roost in tall woods of live or dead trees with limbs >18 inches diameter; feeds on carrion.	NRSI Observation	Yes	No	Yes
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1	--	√	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water.	OMNR 2013; BSC et al. 2008	No	No	No
Childonias niger	Black Tern	S3B	SC	NAR	--	--	**	Wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands.	OMNR 2013	No	No	No
Chordeiles minor	Common Nighthawk	S4B	SC	T	Schedule 1	--	√	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	OMNR 2013	No	No	No

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Colaptes auratus	Northern Flicker	S4B	--	--	--	X	√*	Open deciduous, coniferous or mixed woodlands; forest edges; suburbs, farm woodlots; wetlands; uses dead or dying trees with dbh >30 cm; very adaptable species; not dependent on forest size.	NRSI Observation	Yes	No	Yes
Colinus virginianus	Northern Bobwhite	S1	END	E	Schedule 1	--	√	Grassland, prairie or hay fields with woody cover in form of thickets, tangles of vines, shrubs; fence rows or woodland edges; cropland growing corn, soybeans or small grains and clover or grass; well-drained sandy or loamy soil; pond edges.	OMNR 2013	No	No	No
Contopus cooperi	Olive-sided Flycatcher	S4B	SC	T	Schedule 1	--	√	Semi-open conifer forest, prefers spruce; near pond, lake or river; treed wetlands for nesting; burns with dead trees for perching.	OMNR 2013	Yes	No	No
Contopus virens	Eastern Wood-pewee	S4B	SC	SC	--	X	√	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks.	BSC et al. 2008; NRSI Observation	Yes	No	Yes
Dolichonyx oryzivorus	Bobolink	S4B	THR	T	--	--	√*	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	OMNR 2013; BSC et al. 2008	No	No	No
Empidonax virescens	Acadian Flycatcher	S2S3B	END	E	Schedule 1	--	√	Mature, shady, deciduous forests; heavily wooded ravines; creek bottoms or river swamps; availability of good quality habitat is limiting factor; needs at least 30 ha of forest.	OMNR 2013	No	No	No
Haliaeetus leucocephalus	Bald Eagle	S2N, S4B	SC	NAR	--	--	√	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200m from shore; require tall, dead, partially dead trees within 400 m of nest for perching.	OMNR 2013; NRSI Observation	No	No	Yes
Hirundo rustica	Barn Swallow	S4B	THR	T	--	--	--	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	OMNR 2013; BSC et al. 2008	Yes	Yes	No
Hylocichla mustelina	Wood Thrush	S4B	SC	T	--	X	√*	Undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12m.	BSC etal. 2008; NRSI Observation	Yes	No	Yes
Icteria virens	Yellow-breasted Chat	S2B	END	E	Schedule 1	--	√	Thickets, tall tangles of shrubbery beside streams, ponds; requires tracts of grassland >50 ha overgrown bushy clearings with deciduous thickets; nests above ground in bush, vines etc.	OMNR 2013	No	No	No
Icterus galbula	Baltimore Oriole	S4B	--	--	--	X	√*	Deciduous, wooded areas with natural openings; hedgerows, deciduous groves, orchards, shade trees in parks, gardens, backyards; woodland edges; along streams and lakes.	NRSI Observation	Yes	Yes	Yes

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Ixobrychus exilis	Least Bittern	S4B	THR	T	Schedule 1	--	√	Deep marshes, swamps, bogs; marshy borders of lakes, ponds, streams, ditches; dense emergent vegetation of cattail, bulrush, sedge; nests in cattails; intolerant of loss of habitat and human disturbance.	OMNR 2013; BSC et al. 2008	Yes	No	No
Junco hyemalis	Dark-eyed Junco	S5B	--	--	--	X	√	Coniferous woodlands with aspen, birch and clearings; young jack pine stands; burned areas; forest edges; borders of streams or clearings; nests in depression on ground, under roots, rocks or logs; winters in conifers, hedgerows or brushy field borders.	NRSI Observation	No	No	Yes
Lanius ludovicianus	Loggerhead Shrike	S2B	END	E	Schedule 1	--	√	Grazed pasture, marginal farmland with scattered hawthorn shrubs, hedgerows; fence posts, wires and associated low-lying wetland; located on core areas of limestone plain adjacent to Canadian Shield; greatest threat is fragmentation of suitable habitat due to natural succession; probably needs at least 25 ha of suitable habitat.	OMNR 2013	No	No	No
Larus delawarensis	Ring-billed Gull	S5B, S4N	--	--	--	X	**	Small, partly vegetated islands, dykes, breakwaters, sewage lagoons, garbage dumps, lakes, rivers, open beaches, mudflats, harbours; nests in colonies on islands in lakes, rivers	NRSI Observation	No	No	Yes
Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	SC	T	Schedule 1	--	√	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40 cm dbh; require about 4 ha for a territory.	OMNR 2013; BSC et al. 2008	Yes	No	No
Parkesia motacilla	Louisiana Waterthrush	S3B	SC	SC	Schedule 1	--	√	Prefers wooded ravines with running streams; also woodlands swamps; large tracts of mature deciduous or mixed forests; canopy cover is essential; has strong affinity to nest sites; nests on ground.	OMNR 2013	No	No	No
Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B	--	--	--	X	√*	Immature and mature broad-leaved deciduous forests; swamp borders; thickets, old orchards; suburban trees, shrubs.	NRSI Observation	Yes	Yes	Yes
Picoides villosus	Hairy Woodpecker	S5	--	--	--	X	√*	Mixed or deciduous forests; prefer mature trees, but does range in size and canopy cover; forest edges; requires a number of tall trees and snags; requires trees >25 cm dbh; territories cover 4-8 ha.	NRSI Observation	Yes	No	Yes

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Regulus satrapa	Golden-crowned Kinglet	S5B	--	--	--	--	√	Closed, mature coniferous forest; preferably spruce, fir, hemlock, pines; mature spruce and pine plantations with average dbh >15 cm and a closed canopy; cedar bogs.	NRSI Observation	Yes	No	Yes
Riparia riparia	Bank Swallow	S4B	THR	T	--	--	√* (only significant in nesting colonies >100)	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water.	BSC et al. 2008	No	No	No
Setophaga citrina	Hooded Warbler	S3B	SC	NAR	Schedule 1	--	√	Favours mature, deciduous forest (Carolinian), particularly along stream bottoms, ravine edges and where saplings and shrubbery grow; nests above ground in small shrubs; feeds on or near ground.	OMNR 2013	No	No	No
Setophaga magnolia	Magnolia Warbler	S5B	--	--	--	X	√	Mainly mixed and coniferous forests; may be mature trees but require dense shrubs; in mature forests, prefer open areas, edges; disturbed woodland; appears to require about 30 ha in the south.	NRSI Observation	Yes	No	Yes
Setophaga ruticilla	American Redstart	S5B	--	--	--	X	√*	Deciduous or mixed woods with closed canopy of either tall shrubs or dense young trees or mature trees; woodland edges; upland or lowland; requires >100 ha of forest habitat.	NRSI Observation	Yes	No	Yes
Sturnella magna	Eastern Meadowlark	S4B	THR	T	--	--	√*	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	OMNR 2013; BSC et al. 2008	No	No	No
Toxostoma rufum	Brown Thrasher	S4B	--	--	--	X	√	Open pastures, hedgerows or woodland edges with bushes, low trees or tangles of vines; areas of low, dense woody vegetation; early successional habitat; overgrown hawthorn pasture or marginal farmland.	NRSI Observation	Yes	Yes	Yes
Tyto alba	Barn Owl	S1	END	E	Schedule 1	--	√	Open areas such as fields, agricultural lands with scattered woodlots, buildings and/or orchards; grasslands, sedge meadows, marshes; snow-cover limits ability to catch prey; species has intolerance to severe cold; nests in hollow trees and live trees >46 cm dbh; also nests in barns, abandoned buildings.	OMNR 2013	No	No	No
Vermivora chrysoptera	Golden-winged Warbler	S4B	SC	T	Schedule 1	--	√	Early successional habitat; shrubby, grassy abandoned fields with small deciduous trees bordered by low woodland and wooded swamps; alder bogs; deciduous, damp woods; shrubbery clearings in deciduous woods with saplings and grasses; brier-woodland edges; requires >10 ha of habitat.	OMNR 2013	No	No	No
Herpetofauna												

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	E	Schedule 1	--	R	Damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs.	Ontario Nature 2015; OMNR 2013	No	No	No
Chelydra serpentina serpentina	Snapping Turtle	S3	SC	SC	Schedule 1	--	R	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites.	Ontario Nature 2015, OMNR 2013	Yes	No	No
Clemmys guttata	Spotted Turtle	S3	END	E	Schedule 1	--	R	Unpolluted, shallow bodies of water such as streams, ponds, wet meadows, marshes or swamps with aquatic vegetation, logs or clumps of vegetation for basking. nest is dug near water in fine-textured soil (e.g. sand) or moss. Vulnerable to factors affecting water quality, vegetation composition and structure. Average home range size 3.7 ha	OMNR 2013	No	No	No
Emydoidea blandingii	Blanding's Turtle (*Great Lakes/St Lawrence pop.*)	S3	THR	T	Schedule 1	--	R	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps, or banks.	Ontario Nature 2015; OMNR 2013, MNRF 2014	Yes	No	No
Graptemys geographica	Northern Map Turtle	S3	SC	SC	Schedule 1	--	R	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger for females (about 70ha) than males (about 30ha) and includes hibernation, basking, nesting and feeding areas; aquatic corridors (e.g. stream) are required for movement.	Ontario Nature 2015; MNRF 2014	No	No	No
Lampropeltis taylori triangulum	Eastern Milksnake	S3	SC	SC	Schedule 1	--	R	Farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms or bog woods; hides under logs, stones, or boards or in outbuildings.	Ontario Nature 2015, OMNR 2013	Yes	Yes	No
Pseudacris triseriata pop. 2	Western Chorus Frog *(Great Lakes/St. Lawrence - Canadian Shield Pop.)*	S3	NAR	T	Schedule 1	--	R	Roadside ditches or temporary ponds in fields; swamps or wet meadows; woodland or open country with cover and moisture; small ponds and temporary pools.	Ontario Nature 2015	Yes	No	No

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Sistrurus catenatus	Massasauga Rattlesnake	--	END	E	--	--	R	use upland, old field in summer; marsh, shrub swamp or bog; rivers and streams that provide sedge or low vegetative growth; in fall and winter; hibernate underground in mammal burrows, under rotting stumps,in rock crevices	OMNR 2013	No	No	No
Thamnophis butleri	Butler's Gartersnake	S2	END	E	Schedule 1	--	R	wet meadows, pastures, margins of marshes and streams, and open country	OMNR 2013	No	No	No
Thamnophis sauritus septentrionalis	Eastern Ribbonsnake	S3	SC	SC	Schedule 1	--	R	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams.	Ontario Nature 2015; OMNR 2013, MNRF 2014	Yes	No	No
Mammals												
Myotis lucifuga	Little Brown Myotis	S4	END	E	Schedule 1	--	--	use caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges	Dobbyn 1994, OMNR 2013	Yes	No	No
Myotis septentrionalis	Northern Myotis	S3	END	E	Schedule 1	--	--	hibernates during winter in mines or caves; roosts in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy	Dobbyn 1994, OMNR 2013	Yes	No	No
Perimyotis subflavus	Tricoloured Bat	S3	--	E	Schedule 1	--	--	Open woods near water; roosts in trees, cliff crevices, buildings or caves; hibernates in damp, draft-free, warm caves, mines or rock crevices.	Dobbyn 1994	Yes	No	No
Urocyon cineroargenteus	Grey Fox	S1	THR	T	Schedule 1	--	--	Hardwood forests with a mix of fields and woods; swamps; wooded, brushy or rocky habitats; woodland farmland edge; old fields with thickets. Dens in hollow log or tree. Individual has numerous winter dens throughout its range which is > 40 ha.	OMNR 2013	No	No	No
Insects												
Aeshna clepsydra	Mottled Darner	S3	--	--	--	--	X	Small lakes or calm bays of large lakes.	OMNR 2005	No	No	No
Danaus plexippus	Monarch	S2N, S4B	SC	SC	Schedule 1	VC	X	Host plant is Milkweed (*Asclepias* spp.)	OMNR 2013, Jones et al. 2013	Yes	No	No
Bombus affinis	Rusty-patched Bumblebee	S1	END	E	Schedule 1	--	--	can be found in open habitat such as mixed farmland, urban settings, savannah, open woods and sand dunes	OMNR 2013	Yes	No	No
Gomphus descriptus	Harpoon Clubtail	S3	--	--	--	--	X	Clear rapid streams with pools.	OMNR 2005	No	No	No
Libellula semifasciata	Painted Skimmer	S2	--	--	--	--	X	Ponds and wetlands	OMNR 2005	Yes	No	No
Papilio cresphontes	Giant Swallowtail	S3	--	--	--	--	X	Open areas in forest and woodlands, as well as fields and gardens.	Jones et al. 2013	Yes	Yes	No
Pieris virginiensis	West Virginia White	S3	--	SC	--	--	X	Host plant is Toothwort (*Cardamine* spp)	OMNR 2013, Jones et al. 2013	No	No	No
Somatochlora tenebrosa	Clamp-tipped Emerald	S2S3	--	--	--	--	X	Shady forest streams with intermittent rapids and pools.	OMNR 2005	No	No	No
Fish												

Federally, Provincially and Regionally Significant Species Known from the Study Area and Vicinity

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	City of Guelph Status[5]	County of Wellington Status[6]	Habitat Preference[8,9,10,11]	Background Source	Suitable Habitats within Subject Property	Suitable Habitats within Development Area	Observed by NRSI
Clinostomus elongatus	Redside Dace	S2	END	E	Schedule 3	--	--	Prefers small, quite pools in coolwater streams	OMNR 2013	No	No	No
Moxostoma duquesnei	Black Redhorse	S2	THR	T	--	--	--	lives in pools and riffle areas of medium-sized rivers and streams that are usually less than two metres deep	OMNR 2013	No	No	No
Notropis photogenis	Silver Shiner	S2S3	THR	T	Schedule 3	--	--	prefer moderate to large size streams with swift currents that are free of weeds and have clean gravel or boulder bottoms	OMNR 2013	No	No	No
Molluscs												
Villosa iris	Rainbow Mussel	S2S3	THR	E	Schedule 1	--	--	clean, well-oxygenated waters at depths of less than one metre	OMNR 2013	No	No	No
Lampsilis fasciola	Wavy-rayed Lampmussel	S1	THR	SC	Schedule 1	--	--	small to medium rivers with clear water; shallow riffle areas with clean gravel or sand bottoms	OMNR 2013	No	No	No

[1]MNRF 2014; [2]MNRF 2015; [3]COSEWIC 2015; [4]Government of Canada 2015; [5]Dougan and Associates 2009, [6]Guelph Natural Heritage Strategy 2009, [8]OMNR 2000; [9]MNRF 2014; [10]Michigan Flora Online 2011

[11] Jones et. al 2008

**Specimens observed within Study Area are believed to be anthropogenic occurrences.*

LEGEND
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA Unranked
B Breeding
N Non-breeding
S#? Rank Uncertain
COSSARO/COSEWIC
END/E Endangered
THR/T Threatened
SC/SC Special Concern
NAR Not at Risk
SARA Schedule
Schedule 1 Officially Protected under SARA
Schedule 3 Special concern; may be reassessed for consideration for inclusion to Schedule 1
County of Wellington Status
X: Significant
R: Native, Present, and Provincially or Otherwise Rare
√ Significant and rare
√* Significant but not rare
** Only habitats that support or have recently supported active nests should be considered signficant
City of Guelph Status
SG: Significant to the City of Guelph (On the city of Guelph NHS Significant Species List, but not on the Frank & Anderson's Wellington Flora Rare Plant List 2009)
S: Locally significant as per Significant Plant Lists (not meeting: Prov. Threatened or Endangered status, NHIC SRank, Globally Significant, and Federally or Provincial Species of Concern
X: Significant

APPENDIX V

Tree Inventory and Preservation Plan

46, 47 and 87 Hyland Road, Guelph

Tree Inventory & Preservation Plan

Prepared for:

Dunnink Homes Ltd.
4988 Jones Baseline
RR#2
Guelph, Ontario

Project No. 1400 | December 2015

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

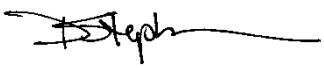
46, 47 and 87 Hyland Road, Guelph

Tree Inventory & Preservation Plan

Project Team:

David Stephenson	Senior Biologist, Certified Arborist, Project Advisor
Ryan Archer	Terrestrial & Wetland Biologist, Project Manager
Jeremy Bannon	Terrestrial & Wetland Biologist, Certified Arborist
Pamela Hammer	Terrestrial & Wetland Biologist, Certified Arborist
Gerry Schaus	GIS Analyst

Report submitted on December 22, 2015



Dave Stephenson, Certified Arborist
Senior Biologist

225 Labrador Drive, Unit 1, Waterloo, Ontario, N2K 4M8 **Tel:** (519) 725-2227 **Web:** www.nrsi.on.ca **Email:** info@nrsi.on.ca

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by Dunnink Homes to undertake a Tree Inventory and Preservation Plan (TIPP) as part of the Environmental Impact Study (EIS) for a proposed residential development at 46, 47 and 87 Hyland Road in the City of Guelph.

1.1 Subject Property

The subject property comprises two parcels located north and south of Hyland Road, which are 1.08 and 5.01ha respectively, totalling 6.09ha in size. The subject property has the physical address of 46, 47, and 87 Hyland Road.

The reader is referred to the EIS completed by NRSI for a fulsome discussion of existing conditions, analysis of potential impacts as a result of the development and recommended mitigation measures.

1.2 Proposed Undertaking

The landowner is proposing to develop the subject property as a residential subdivision with associated servicing, and cul-de-sac extensions of Hyland Road and Glenburnie Drive. A pedestrian trail is proposed along the east side of the subject property south of Hyland Road. The location of this trail is discussed below.

This TIPP was conducted in accordance with City of Guelph By-law (2010)-19058. The by-law states that if an owner wishes to destroy or injure a tree and if none of the exemptions set out in this by-law are applicable, then the owner shall submit the information required in Part 5 of the by-law. Within the By-law, a regulated tree is defined as:

> "*a specimen of any species including deciduous or coniferous growing woody perennial plant, supported by a single root system, which has reached, or could have reached a height at least 4.5m from the ground at physiological maturity, is located on a lot that is greater than 0.2 hectares (0.5 acres) in size and has a DBH of 10cm".*

The City of Guelph's Official Plan Amendment (OPA) Number 42: Natural Heritage System also requires that a Tree Inventory and Preservation Plan be required for all healthy indigenous trees measuring over 10cm diameter at breast height (DBH). The tree inventory was conducted to satisfy the relevant policies.

Section 6.2.5 Tree Inventory and Tree Preservation Plan within OPA 42 notes:

1. *"Tree Inventory and Tree Preservation Plans shall as a minimum include:*
   - *i) A Tree Inventory measuring all trees over 10cm diameter at breast height (dbh), including the size, species composition and health, and indigenous shrubs in accordance with the City's tree inventory guidelines,*
   - *ii) A Tree Preservation Plan identifying healthy indigenous and non-invasive trees to be protected, including those that may be transplanted (e.g. small specimens),*
   - *iii) The protective measures required for tree protection during construction, and*
   - *iv) Measures for avoiding disturbance to any breeding birds during construction"*

This report provides the findings of the tree inventory, analysis of existing health and/or structural integrity of trees, protection measures for trees to be retained, and recommended mitigation and compensation measures. The tree data and mapping has been compared to the Site Plan layout prepared by Van Harten Surveying Inc. (July 3, 2014), as well as the grading plan prepared by Van Harten Surveying Inc. (May 21, 2015). Maps 1a and b show the tree inventory data overlaying the proposed development plan. This plan shows the proposed grading, limit of disturbance, development layout, as well as the location of inventoried trees.

Map 1c shows the area of proposed alternative locations for the pedestrian trail. A separate assessment of tree removal and compensation requirements associated with each of three trail alternatives is discussed below. The trail route alternatives are described in more detail within the EIS. Note that Map 1c displays the conceptual

alignment of a pedestrian trail as identified by the proponent (labelled “Proposed Walk”). Trail Option 1 represents a trail route alternative that seeks to reflect the proponent-identified conceptual alignment while avoiding or minimizing tree removal requirements. The proponent-identified conceptual alignment shown on Map 1c is for informational purposes only and was not included in tree removal and compensation assessments for the alternatives described below.

The health and structural condition of the inventoried trees were compared to the layout and grading to determine whether existing trees would be impacted by the proposed undertaking. Avoidance, mitigation, and protection measures for trees were examined to determine which trees would be impacted and which could be retained. In the case of trees requiring removal, compensation for removal is discussed.

This report summarizes the following:

- findings of the tree inventory,
- assessment of existing health and/or structural integrity of inventoried trees,
- tree retention analysis based on details of the proposed development,
- tree retention analysis for each of the three proposed pedestrian trail route alternatives,
- protection measures for trees to be retained, and,
- recommended mitigation and compensation measures.

2.0 Tree Inventory and Methodology

A comprehensive inventory of trees ≥10cm DBH on the subject property was completed by NRSI Certified Arborists in September and October of 2014. Trees inventoried within and immediately adjacent to the proposed residential development, as shown on Maps 1a and 1b, are listed in Appendix I. Additional trees inventoried for the purposes of assessing alternative trail route impacts, as shown on Map 1c, are listed in Appendix II.

All assessed trees were tagged with a pre-numbered aluminum forestry tag. On-site tree inventory work focused on areas within and adjacent to the proposed Development Area of the subject property (see EIS Map 1), with the exception of additional trees inventoried for trail route alternative assessment. The northern property parcel contains a Fresh-Moist Poplar Deciduous Forest (FODM8-1; see EIS Map 2) that was discussed on-site with City of Guelph staff during a site meeting on September 5, 2014. It was agreed that the FODM8-1 feature will require complete removal to accommodate the proposed development. As discussed and agreed to with the City, all trees ≥10cm DBH in this forest were inventoried, but were not tagged, as none had the potential to be retained due to site grading. The following information was recorded for all other individual on-site trees:

- species,
- DBH,
- crown radius (metres),
- general health (excellent, good, fair, poor, very poor, snag),
- potential for structural failure (low, medium, high),
- tree location (lot or block number), and,
- general comments (i.e. disease, aesthetic quality, development constraints, sensitivity to development).

The general health and potential for structural failure of each tree was assessed based on the criteria outlined in Table 1.

Table 1. Tree Assessment Criteria

Assessment Criteria	Definition[1]
Health Rating*	
Excellent	Represents a tree in near perfect form, health, and vigor. This tree would exhibit no deadwood, no decline, and no visible defects.
Good	Represents a tree ranging from a generally healthy tree to a near perfect tree in terms of health, vigor and structure. This tree exhibits a complete, balanced crown structure with little to no deadwood and minimal defects as well as a properly formed root flare.
Fair	Represents a tree with minor health, balance or structural issues with minimal to moderate deadwood. Branching structure shows signs of included bark or minor rot within the branch connections or trunk wood. The root flare shows minimal signs of mechanical injury, decay, poor callusing, or girdling roots. Trees in the category require minor remedial actions to improve the vigor and structure of the tree.
Poor	Represents a tree that exhibits a poor vigor, reduced crown size (<30% of crown typical of species caused by overcrowding or decline), extreme crown unbalance, or extensive rot in the branching and trunk wood. Fungus could be seen from these rotting areas, suggesting further decay. These trees have extensive crown die back with a large amount of deadwood, and possibly dead sections. These weakened areas can lead to a potential failure of tree sections. Rooting zones show signs of extensive root decay or damage (fruiting bodies or mechanical damage) or girdling roots. Trees in this category require more extensive actions to prevent failure. A tree identified as poor would be a candidate for removal in the near future.
Very Poor	Represents a tree that exhibits major health and structural defects. Quite often the defects or diseases affecting this tree will be fatal. Large quantities of fungus, large dead sections with possible cavities and bark falling off all are signs that a tree is in a major state of decline and would be identified as very poor. These trees have a high potential for structural failure. These trees should be identified for removal.
Potential for Structural Failure Rating*	
Low	Trees that show good vigor and structure and show little to no signs of decline or structural issues.
Medium	Trees with some structural issues that are forming which could lead to failure if not addressed and properly treated (i.e. pruned). Symptoms of these structural issues include cavity openings/stem damage <30% of the circumference of the tree, poor branching union within the scaffold branches (signs of canker or decay within branch union), signs of historic branch failure throughout the crown, or advanced signs of included bark within the branch unions throughout the tree (water staining, tight angled branch unions, noticeable gap in branch union).
High	Trees with a large number of structural issues (i.e. poor branch union, decay) which could lead to the failure of large scaffold branches or major sections. Major defects include: large cavities within stem or branch wood, historic crown damage of the majority of the canopy, extensive lean due to recent or historic root damage/decay, or large dead crown limbs with fruiting bodies present. If trees identified as a High Potential for Structural Failure are located within striking distance of a target (high traffic place, person, or high value thing), the tree should be identified for removal as soon as possible.
* Trees which are located within dense groupings are evaluated as individual specimens. Trees within these stands quite often have a reduced crown size (<30% of crown typical of species), off balanced crowns, and prioritized upward growth (i.e. low trunk taper and few lateral branches). As such, these trees would be considered to have poor vigour. As well, these trees pose a high potential for structural failure when newly exposed edges or individual trees are isolated through removal of surrounding trees. This is often the case with overstocked plantations. Individual trees which meet the above criteria will be identified as poor or high potential for structural failure.	

[1]Dunster 2009

3.0 Summary of Tree Inventory

The following summarizes the results of the tree inventory, separated into the proposed residential development area and the area encompassing the proposed alternative trail routes.

3.1 Development Area

In total, 296 trees, comprising 21 species, were inventoried with regard to the proposed development area of subject property. Of the 296 trees inventoried, 271 (91.5%) are native species and 25 (8.5%) are non-native. Polygon FODM8-1 contains 171 of these trees, and is discussed further below. This inventory included 23 boundary trees and 1 off-site tree with an overlapping canopy. A complete list of trees inventoried for the development area is provided in Appendix I and tree locations within the subject property are shown on Maps 1a-b.

Table 2 provides a list of tree species inventoried within the subject property's development area, whether they are native or non-native and their overall condition.

Table 2. Summary of Trees Inventoried for the Subject Property Development Area

Common Name	Scientific Name	Excellent	Good	Fair	Poor	Very Poor	Snag	Total
Native Species								
Balsam Poplar	*Populus balsamifera*			4	3	2		9
Black Maple	*Acer nigrum*				1			1
Black Walnut	*Juglans nigra*		1	6	3	1		11
Freeman's Maple	*Acer x freemanii*		3	4				7
Green Ash	*Fraxinus pennsylvanica*		6	1				7
Manitoba Maple	*Acer negundo*		1	10	13	6		30
Trembling Aspen	*Populus tremuloides*		39	74	60	16		189
White Birch	*Betula papyrifera*		1			1	1	3
White Cedar	*Thuja occidentalis*		9	2				11
White Spruce	*Picea glauca*		3					3
Total			**63**	**101**	**80**	**26**	**1**	**271**
Non-Native Species								
Apple species	*Malus* sp.				2	1		3
Cherry species	*Prunus species*				1			1
Common Buckthorn	*Rhamnus cathartica*					1		1
Colorado Spruce	*Picea pungens*		2					2
Horsechestnut	*Aesculus hippocastanum*				1			1
Linden species	*Tilia spp*			1				1
Norway Maple	*Acer platanoides*		2	1	2			5
White Mulberry	*Morus alba*					1		1
Scots Pine	*Pinus sylvestris*		1	3	5	1		10
Total			**5**	**5**	**11**	**4**	**0**	**25**
Overall Total		**0**	**68**	**106**	**91**	**30**	**1**	**296**

Table 3 provides a summary of the overall condition of trees inventoried within the development area, along with their structural failure rating. A large proportion of trees were found to be in fair to poor condition.

Table 3. Overall Condition of Inventoried Trees for the Development Area

Structural Failure Rating	Overall Condition					Total
	Good	Fair	Poor	Very Poor	Snag	
Low	67	89	43	4		203
Medium	1	15	36	10		62
High		0	14	16	1	31
Total	**68**	**104**	**93**	**30**	**1**	**296**

3.2 Trail Options

In total, 45 trees, comprising 7 species, were inventoried within 30m the 3 proposed trails. Of the 46 trees inventoried, 43 (95.5%) are native species and 2 (4.5%) are non-native. A complete list of trees inventoried for the trail area is provided in Appendix II and tree locations within 30m of the proposed trail route alternatives are shown on Map 1c. These also include trees inventoried for the residential development that are nearby or affected by a proposed trail alternative.

Table 4 provides a list of tree species inventoried within the subject property specifically for the trail area, whether they are native or non-native and their overall condition.

Table 4. Summary of Trees Inventoried for the Proposed Trail Route Alternatives

Common Name	Scientific Name	Excellent	Good	Fair	Poor	Very Poor	Snag	Total
Native Species								
Black Cherry	*Prunus serotina*		2	1	1		1	5
Manitoba maple	*Acer negundo*			2	12	6		20
Peachleaf Willow	*Salix amygdaloides*				3			3
Trembling Aspen	*Populus tremuloides*			6	2			8
White Birch	*Betula papyrifera*						3	3
White cedar	*Thuja occidentalis*		2	2				4
Total			**4**	**11**	**18**	**6**	**4**	**43**
Non-Native Species								
Scots pine	*Pinus sylvestris*		1		1			2
Total			**1**		**1**			**2**
Overall Total		**0**	**5**	**11**	**19**	**6**	**4**	**45**

Table 5 provides a summary of the overall condition of trees inventoried specifically for the trail area, along with their structural failure rating. A large proportion of trees were found to be in fair to poor condition.

Table 5. Overall Condition of Inventoried Trees for the Proposed Trail Route Alternatives

Structural Failure Rating	Overall Condition					
	Good	Fair	Poor	Very Poor	Snag	Total
Low	5	6				11
Medium		5	2			7
High			17	6	4	27
Total	**5**	**11**	**19**	**6**	**4**	**45**

4.0 Tree Removal and Retention Analysis

Tree removal and retention was based on two considerations:

1) Trees identified as having a high potential for structural failure or poor condition. The removal of these trees would be recommended for safety etc., especially if they are located within striking distance of a component of the proposed development, or existing off-site sidewalks, roads or buildings. They would be given a rating of high potential for structural failure. For the purpose of this report, trees which fall into this category are identified for removal.
2) Trees that require removal based on the extent of proposed site grading. This was determined by comparing the location of the trees to the location of the components of the development proposal as shown on Map 1a-c.

4.1 Development Area

Of the 296 trees inventoried, 273 are anticipated to be removed, of which 254 (93%) are native and 19 (7%) are non-native. This includes 115 trees that have been identified as being in poor or very poor condition, and/or have a high risk of structural failure, and/or have been identified as snags, as well as an additional 3 fruit trees that are exempt from compensation within the City's tree by-law. The remaining 155 trees identified for removal are based on comparing the extent of the proposed site grading, which is required to effectively service the lands. This includes trees situated along the grading limit/limit of distubrance or in close proximity (i.e. <5m and/or >30% of canopy radius overlapping development limit) that may incur root damage as a result of grading. A total of 23 boundary trees will require removal. The removal of the boundary trees will require the permission of the adjacent property landowners prior to Site Plan approval. If it is determined that these trees can be retained through the Site Plan Stage of either property, the location of tree protection fencing and revisions to tree compensation measures will need to be discussed and reviewed by the City of Guelph. Most of these 155 trees are in fair condition with low risk of structural failure, and range in size from 10-88cm DBH. The majority of these trees are native and are dominated by Trembling Aspen, Black Walnut and White Cedar . Non-native trees are dominated by Scots Pine and Norway Maple.

4.2 Pedestrian Trail Alternatives

Refer to Map 1c for the specific locations of the following three trail route alternatives, referred to as Trail Options 1-3. It should be noted that a segment of Trail Options 2 and 3 is common between both route options, as shown on Map 1c. Tree inventory and removal requirements for Options 2 and 3 each independently include the trees located along this common trail segment.

4.2.1 Trail Option 1

Trail Option 1 requires the removal of 2 trees that are in fair to excellent condition and are not at a high risk for structural failure. This option also requires the removal of 3 potential hazard trees (trees in poor or very poor condition, or at a high risk for structural failure, or that are dead) that are located within 30m of the trail route option.

4.2.2 Trail Option 2

Trail Option 2 requires the removal of 7 trees that are in fair to excellent condition and are not at a high risk for structural failure. This option also requires the removal of 22 potential hazard trees (trees in poor or very poor condition, or at a high risk for structural failure, or that are dead) that are located within 30m of the trail route option.

4.2.3 Trail Option 3

Trail Option 3 requires the removal of 6 trees that are in fair to excellent condition and are not at a high risk for structural failure. This option also requires the removal of 19 potential hazard trees (trees in poor or very poor condition, or at a high risk for structural failure, or that are dead) that are located within 30m of the trail route option.

5.0 Tree Compensation Plan

Section 5 (h) in the City's tree by-law (2010)-19058 states that *"where three or more trees are proposed for Destruction or Injuring, and where the Inspector so requires, a Landscaping, Replanting and Replacement Plan"* is required. Overall compensation for tree loss is a requirement of the City's by-law, which notes that *"each tree Destroyed or Injured be replaced with one or more replacement trees to be planted and maintained to the satisfaction of the Inspector in accordance with the Landscaping, Replanting and Replacement Plans approved by the Inspector"* [Section 7 (b)].

OPA 42 states that all trees removed in excellent to fair condition require compensation at at least a 1:1 ratio. Trees located in FODM8-1 are in a location with relatively poor biodiversity, and could pose a risk if individuals were left standing, as these trees have not grown to withstand open winds. It is proposed that these trees are compensated for at a 1:1 ratio.

According to City of Guelph Tree By-law Number (2010)-19058, trees exempt from compensation must have the following site specific criteria:

- "*A tree having no living tissue, having 70% or more of its crown dead, or being infected by a lethal pathogen, fungus or insect (including the Emerald Ash Borer or the Asian Longhorned Beetle), and where required, a certificate issued by an Arborist, confirming this justification for Destruction or Injuring, has been submitted to an Inspector" [Part 4, section (a)],*
- *"A tree which is Hazardous, and where required, a certificate issued by an Arborist, confirming this justification for Destruction or Injuring, has been submitted to an Inspector" [Part 4, section (b)]*
- *"A specimen of Rhamnus cathartica (common buckthorn), Rhamnus frangula (European or glossy buckthorn), Alnus glutinosa (black alder), Elaeagnus umbellate (autumn olive), or Morus alba (white mulberry)" [Part 4, section (g)],*
- *"A fruit tree that is capable of producing fruit for human consumption" [Part 4, section (h)].*

The tree compensation plan analysis has been conducted separately for trees located within the development area and those located in and within 30m of the 3 trail route options. The analysis is summarized in the sections below.

5.1 Development Area

As discussed above, approximately 273 trees have been identified for removal due to the proposed grading for installation of roads, services and residential development blocks. Of these, 155 native and non-native trees requiring removal are in fair or good condition and are therefore subject to compensation. 104 of these trees are within the poplar stand (FODM8-1). It is understood that tree removal requirements will be refined upon finalization of the grading plans and tree inventory during the detailed design stage of development.

A minimum 1:1 compensation is required for all native and non-native trees that are in excellent to fair condition under the City's tree by-law. This excludes fruit trees which are exempt from compensation within the City's by-law. A 1:1 compensation ratio has been applied to trees requiring removal as a result of the proposed development. Therefore, a total of 155 trees are required in compensation.

Table 6 provides a summary of the trees inventoried throughout the property, total number proposed for removal and the proposed compensation plan.

Table 6. Summary of Trees to be Removed and Recommended Compensation Plan for Development Area

Tree Inventory	**Total**
Total number of trees inventoried	296
Total number of trees to be removed	273
→Non-native trees to be removed (including fruit trees)	19
→Native trees to be removed	254
Tree Compensation	
Native/Non-native trees in poor to very poor condition and/or high structural failure (excluding fruit trees) – exempt from compensation	115
Fruit trees - exempt from compensation	3
1:1 Compensation Trees Recommended (to be refined at Site Plan Stage)	**155**

The required number of tree compensation plantings will be confirmed during the detailed design stage in conjunction with the City, which may account for planned relocations of existing, good quality trees from the development footprint to the

restoration area, on the part of the proponent. It is understood that trees selected for relocation will require inspection by City staff to determine if/how their relocation to the adjacent restoration area may affect overall tree compensation requirements (P. Patel, City of Guelph, pers. comm., November 2015).

5.2 Trail Alternatives

5.2.1 Trail Option 1

As described in Section 4.2.1, 2 trees in fair to excellent condition may require removal for Trail Option 2. Of these, 1 is in good condition (Tree #749) and the other is in fair condition (Tree #744). At a compensation ratio of 1:1, a total of 2 trees are therefore required in compensation. An additional 3 potential hazard trees may require removal for this option as well (trees in poor or very poor condition, or at a high risk for structural failure, or that are dead). These trees are therefore not subject to compensation requirements. Four additional trees may also require removal to accommodate this trail route option; however, they already require removal as part of the residential development and so have not been included in compensation or removal calculations for this trail route option.

5.2.2 Trail Option 2

As described in Section 4.2.2, 7 trees in fair to excellent condition may require removal for Trail Option 2. Of these, 4 are in good condition (trees 730, 737, 738, and 1461) and 3 are in fair condition (trees 733, 734, and 741). At a compensation ratio of 1:1, a total of 7 trees are therefore required in compensation. An additional 22 potential hazard trees may require removal for this option as well (trees in poor or very poor condition, or at a high risk for structural failure, or that are dead). These trees are therefore not subject to compensation requirements.

5.2.3 Trail Option 3

As described in Section 4.2.3, 6 trees in fair to excellent condition may require removal for Trail Option 3. Of these, 3 are in good condition (trees 730, 737, 738) and 4 are in fair condition (trees 733, 734, 741 and 886). At a compensation ratio of 1:1, a total of 6

trees are therefore required in compensation. An additional 19 potential hazard trees may require removal for this option as well (trees in poor or very poor condition, or at a high risk for structural failure, or that are dead). These trees are therefore not subject to compensation requirements.

5.3 Summary of Tree Compensation Requirements

In summary, based on the tree removal/retention analyses summarized in Section 4.0, the requirements under the City's tree by-law (2010)-19058, the following tree compensation amounts are required for the following:

Development Area

- 155 trees requiring compensation at a 1:1 ratio

Trail Option 1

- 2 trees in requiring compensation at a 1:1 ratio

Trail Option 2

- 7 trees requiring compensation at a 1:1 ratio

Trail Option 3

- 6 trees requiring compensation at a 1:1 ratio

Therefore, between the proposed residential development and one of the three selected trail route options, a total of between 157 and 162 tree plantings will be required. Compensation trees plantings will be planted within the subject property, and in particular within recommended buffer restoration areas, to the extent feasible as described in the EIS. Compensation tree plantings will be provided by the landowner/developer.

6.0 Tree Protection Measures and Recommended Mitigation

6.1 Prior to Construction

Temporary tree protection fencing will be situated where trees are adjacent to the limit of disturbance/grading as Maps 1a-b demonstrate. A detailed sediment and erosion control plan will be prepared at the Site Plan Stage; however, it is recommended that a combined sediment and erosion control fencing (i.e. silt fence) and tree protection fence be situated where trees are adjacent to the limit of disturbance. This tree protection fencing is to take the form of 1200mm high heavy-duty paige-wire fencing.

The temporary tree protection fencing will be installed and maintained by the Developer and/or their agents. Prior to any construction activities (rough grading, vegetation and tree removal), the tree protection fencing, in the form of 1200mm high heavy-duty paige-wire fencing, will be installed at a minimum of 1m from the dripline of trees to be retained in order to protect the root systems. Prior to works commencing on-site, fence installation and location is to be inspected by a Certified Arborist and/or the on-site Environmental Inspector. Signage indicating the purpose of protection fencing will be attached to the paige-wire fencing every 100-150m. Recommended fencing locations are shown on Maps 1a-b.

As recommended above, a number of trees are recommended for removal due to their high potential for structural failure, that are located in areas that also contain trees to be retained. As such, prior to installation of the tree protection fence, these trees will need to be clearly marked for removal by a Certified Arborist and then properly felled and removed with minimal disturbance to neighbouring trees by a Certified Arborist or qualified tree professional.

The Tree Preservation Plan is to be reviewed and approved by the City of Guelph. Upon approval of the Tree Preservation Plan, and prior to any on-site works (i.e. rough grading, tree removal), a qualified environmental consultant is to submit written verification to the City that all of the recommended tree protection measures have been installed in accordance with the Tree Preservation Plan.

6.2 During Construction

Temporary tree protection fencing is to be maintained by the Developer and/or their agents during the entire construction period to ensure that trees being retained and their root systems are protected. Any minimal damage (i.e. damage to limbs or roots) to trees to be retained during construction must be pruned using proper arboricultural techniques. Should any of the trees intended to be retained be seriously damaged or die as a result of construction activities, the City will be consulted and presented with a proposed plan of action (i.e. treatment or compensation). Replacement species are to be reviewed by a Certified Ontario Landscape Architect (OLA) or Certified Arborist. Watering and pruning of newly planted trees will be carried out by the owner/contractor as required during the warranty period (approximately 2 years).

6.3 Post-Construction

It is recommended that the temporary tree protection fencing be removed upon completion of construction activities and that adjacent areas be stabilized with a native vegetative cover to the satisfaction of the Environmental Inspector or qualified biologist.

6.4 Mitigation

The recommendations provided below are aimed at protecting retained trees and associated natural features. Species used for replacement/enhancement plantings, with the exception of street trees, should be native to Wellington County and not include any species that are listed as introduced, or locally, provincially or federally significant. The use of hardy species will ensure successful early establishment and minimize the potential for invasive species proliferation. For street tree plantings, the use of non-native species that are sometimes more tolerant of urban conditions (i.e. salt and drought tolerant) may be suitable as long as they do not include invasive species such as Norway maple (*Acer platanoides*).

At the detailed design stage, it is recommended that the following criteria be followed during the development of proposed planting plans:

- plantings within open space block be limited to native, non-invasive tree and shrub species indigenous to Wellington County that complement the surrounding natural features,
- tree species to be situated in close proximity to roads should be salt tolerant,
- avoid ash species due to the risk of the Emerald Ash Borer (*Agrilus planipennis*),
- avoid 'messy trees', such as fruiting trees or poplars (*Populus* spp.) where plantings occur in close proximity to driveways and roadways,
- all plant material is to conform to the latest edition of the *Canadian Nursery Trades Association Specifications and Standards*,
- plantings installed as per specifications outlined in planting plans to be prepared by an OLA or Certified Arborist (e.g. place a minimum of 10cm of shredded pine-bark mulch or equivalent around all planted material),
- spacing of plant material should account for the ultimate size and form of the selected species and also the purpose of the planting, whether it be for screening, shade, naturalizing, rehabilitation, etc.,
- special attention to location and height of trees in proximity to utilities, and,
- ensure that there is sufficient soil volume for all plantings.

7.0 References

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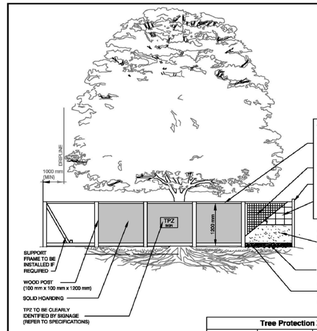
Ontario Ministry of Natural Resources (OMNR). 2011. Bats and Bat Habitats: Guidelines for Wind Power Projects. First edition. July, 2011.

Maps

Tree Tag #	Common Name	Scientific Name	Native/Non-Native	DBH	Stem Count	Crown Radius (m)	Potential for Structural Failure	Overall Condition	Proposed Action	Compensation Required
5	Colorado Spruce	*Picea pungens*	Non-Native	39.5	1	2.5	Low	Good	Remove	Yes
6	White Spruce	*Picea glauca*	Native	30.5	1	3.5	Low	Good	Remove	Yes
869	Black Walnut	*Juglans nigra*	Native	20.5	1	2.5	Low	Fair	Remove	Yes
870	Manitoba Maple	*Acer negundo*	Native	20	3	4	Medium	Poor	Remove	No
871	Manitoba Maple	*Acer negundo*	Native	10.9	1	1.5	Low	Fair	Remove	Yes
872A	Manitoba Maple	*Acer negundo*	Native	37.5	2	6	High	Very Poor	Remove	No
872B	Black Walnut	*Juglans nigra*	Native	65	1	10	Low	Good	Remove	Yes
872C	White Cedar	*Thuja occidentalis*	Native	25	2	2	Medium	Fair	Remove	Yes
872D	Linden	*Tilia* spp.	Non-Native	30	1	3.5	Low	Fair	Remove	Yes
872E	Black Walnut	*Juglans nigra*	Native	20	1	5	Low	Fair	Remove	Yes
872F	Black Walnut	*Juglans nigra*	Native	50	1	8	Medium	Fair	Remove	Yes
872G	Black Walnut	*Juglans nigra*	Native	50	1	8	Medium	Fair	Remove	Yes
873	Manitoba Maple	*Acer negundo*	Native	30	5	5	High	Poor	Remove	No
874	Black Walnut	*Juglans nigra*	Native	16.6	1	2	High	Poor	Remove	No
875	Scots Pine	*Pinus sylvestris*	Non-Native	15	1	1.5	Low	Poor	Remove	No
876	Black Walnut	*Juglans nigra*	Native	15	1	1.5	High	Very Poor	Remove	No
877	Manitoba Maple	*Acer negundo*	Native	10.7	1	1	Medium	Poor	Remove	No
878	Black Walnut	*Juglans nigra*	Native	11	1	1.5	Medium	Poor	Remove	No
879	Trembling Aspen	*Populus tremuloides*	Native	13.5	1	1.5	Low	Poor	Remove	No
880	Manitoba Maple	*Acer negundo*	Native	12	1	1.5	Low	Fair	Remove	Yes
881	Manitoba Maple	*Acer negundo*	Native	38	2	5	High	Poor	Remove	No
882	Manitoba Maple	*Acer negundo*	Native	25	3	3	Medium	Poor	Remove	No
883	Manitoba Maple	*Acer negundo*	Native	15.5	1	1.5	Low	Poor	Remove	No
884	Manitoba Maple	*Acer negundo*	Native	15	2	2.5	Low	Fair	Remove	Yes
1476	Black Walnut	*Juglans nigra*	Native	16.9	1	4	Low	Fair	Remove	Yes
1477	Black Maple	*Acer nigrum*	Native	36.5	1	7	High	Poor	Remove	No
1478	Norway Maple	*Acer platanoides*	Non-Native	55	1	10	Low	Good	Remove	Yes
1479	Manitoba Maple	*Acer negundo*	Native	14.9	1	2.5	Low	Poor	Remove	No
1480	Manitoba Maple	*Acer negundo*	Native	20.5	1	3	High	Poor	Remove	No
1481	Trembling Aspen	*Populus tremuloides*	Native	34.8	1	2	High	Very Poor	Remove	No
1482	Norway Maple	*Acer platanoides*	Non-Native	13.8	1	2	Medium	Poor	Remove	No
1483	Trembling Aspen	*Populus tremuloides*	Native	10.5	1	1	Medium	Poor	Remove	No
1484	Trembling Aspen	*Populus tremuloides*	Native	17.5	1	2	Medium	Fair	Remove	Yes
1485	Trembling Aspen	*Populus tremuloides*	Native	12.8	1	2.5	Medium	Fair	Remove	Yes
1486	Trembling Aspen	*Populus tremuloides*	Native	30.8	1	4.5	Medium	Fair	Remove	Yes
1487	Trembling Aspen	*Populus tremuloides*	Native	12.2	2	3.5	High	Poor	Remove	No
1488	Trembling Aspen	*Populus tremuloides*	Native	28.2	2	4.5	Medium	Poor	Remove	No
1489	Trembling Aspen	*Populus tremuloides*	Native	23.8	1	2.5	Low	Poor	Remove	No
1490	Trembling Aspen	*Populus tremuloides*	Native	11.5	1	1.5	Low	Poor	Remove	No
1491	Trembling Aspen	*Populus tremuloides*	Native	15.3	1	2	Medium	Poor	Remove	No
1492	Trembling Aspen	*Populus tremuloides*	Native	19	1	1.5	Medium	Poor	Remove	No
1493	Trembling Aspen	*Populus tremuloides*	Native	14.7	1	2	Low	Good	Remove	Yes
1494	Trembling Aspen	*Populus tremuloides*	Native	12.2	1	2	Low	Good	Remove	Yes
1495	Trembling Aspen	*Populus tremuloides*	Native	16.2	1	2.5	Low	Good	Remove	Yes
1496	Trembling Aspen	*Populus tremuloides*	Native	11.5	1	2	Low	Fair	Remove	Yes
1497	Black Walnut	*Juglans nigra*	Native	13.5	1	3.5	Low	Fair	Remove	Yes
1498	Trembling Aspen	*Populus tremuloides*	Native	16	1	2.5	Low	Fair	Remove	Yes
1499	Norway Maple	*Acer platanoides*	Non-Native	13	1	2.5	Medium	Poor	Remove	No
1500	Apple	*Malus* spp.	Non-Native	25.2	1	3.5	High	Poor	Remove	No
1501	Trembling Aspen	*Populus tremuloides*	Native	33.2	1	3.5	Medium	Poor	Remove	No
1502	Manitoba Maple	*Acer negundo*	Native	50.8	1	3	High	Very Poor	Remove	No
1503	Manitoba Maple	*Acer negundo*	Native	26.3	1	3	High	Very Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.90	1	1.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.50	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	3.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.50	1	2.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	2.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Balsam Poplar	*Populus balsamifera*	Native	16.00	1	2.50	Medium	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	3.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	1.50	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	24.00	1	3.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	25.00	1	4.00	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	1.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	34.00	1	5.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Medium	Poor	Remove	No
FCM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	1	3.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	2.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.00	Low	Fair	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	4.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	3.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	1.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	3.00	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	1.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Medium	Very Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	2.00	Low	Very Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.50	Low	Very Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Manitoba Maple	*Acer negundo*	Native	20.00	1	2.50	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	1.50	Medium	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	3.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	4.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	3.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.90	1	1.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	33.00	1	5.00	Medium	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	28.00	1	5.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	3.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	3.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	32.00	1	6.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	1.50	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	2	4.00	High	Very Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	31.00	1	5.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	1.50	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	4.00	Medium	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	30.00	2	6.00	Medium	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	5.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	3.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	2.50	Medium	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.00	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	25.00	1	4.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.00	Medium	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	4.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	4.00	Low	Good	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	2.00	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	6.00	1	2.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	2.50	High	Very Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	32.00	1	6.00	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	32.00	1	4.00	Low	Poor	Remove	No
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	4.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	30.00	1	4.50	Low	Fair	Remove	Yes
FCM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Medium	Poor	Remove	No



TREE PROTECTION BARRIER NOTES:

1. HOARDING TYPE SHOULD BE DETERMINED IN CONSULTATION WITH THE CITY.
2. ALL TREE PROTECTION HOARDING SHALL BE IN PLACE AND MUST BE INSPECTED AND APPROVED BY THE CITY PRIOR TO ANY CONSTRUCTION ACTIVITIES.
3. ALL ARBORICULTURE WORK SUCH AS PRUNING OF BRANCHES AND ROOTS SHALL BE CONDUCTED BY A CERTIFIED ARBORIST.
4. CONSTRUCTION ACTIVITIES, GRADE CHANGES, AND STORAGE OF EQUIPMENT AND MATERIALS ARE NOT ALLOWED WITHIN THE TREE PROTECTION ZONE.
5. THIS DRAWING TO BE USED IN CONJUNCTION WITH "CITY OF GUELPH TREE TECHNICAL MANUAL".

Tree Protection Zones

Diameter of Trunk Centimetres at 1.4 m above-grade (DBH)	Minimum Tree Protection Zone (TPZ) Distance from trunk, measured in metres.	Potential Rooting Area (PRA) for all trees and TPZ for trees in fields, parks, open spaces and other significant natural heritage areas.
<10	1.2	2.4
10-20	1.8	3.3
20-40	2.4	4.8
41-50	3.0	6.0
51-60	3.6	7.2
61-70	4.2	8.4
71-80	4.8	9.6
81-90	5.4	10.8
91-100	6.0	12.0
>100	6 cm per 1 cm DBH	12 cm per 1 cm DBH

Notes:
1- On dripline plus 1 metre, whichever is greater.
2- Works in PRA are subject to specifications outlined in Subsection 4.4.4. of "City of Guelph Tree Technical Manual".

CITY OF GUELPH STANDARD DRAWING

TREE PROTECTION ZONE FENCE DETAIL

DATE DRAWN: JAN/11 | REV. No.:
DESCRIPTION:
REV. DATE: | REV. BY: G.F./ C.M.C.
APPROVED BY:
CITY ENGINEER

ENGINEERING

SD - 90a

Schedule A: Tree Protection Zone (TPZ) Information Signage

TREE PROTECTION ZONE (TPZ)

NO GRADE CHANGE
DUMPING
STORAGE OF MATERIALS
STORAGE OF EQUIPMENT
UNAUTHORIZED ENTRY
TREE INJURY OR REMOVAL
DISTURBANCE OF ANY KIND

THIS FENCING MUST NOT BE DAMAGED OR MOVED

CONTACT: name and telephone number of contact
name and telephone number of contact

City of Guelph - Planning, Building, Engineering & Environmental Services
(519) 837-5616

40 CM MIN.

60 CM MIN.

TPZ FENCE OPTIONS:
WOOD FRAME (50 mm x 100 mm) WITH BOTTOM AND SUHORIZONTAL
ORANGE CONSTRUCTION FENCE SECURED TO WOOD FRAME
IRON 'T' POST
PAGE WIRE FENCE #9/#6 6 STRAND, LEGGED WITH IRON "T" POSTS LOCATED 2400 mm O.C.
GEOTEXTILE TO BE ATTACHED TO POST WITH #12 WIRE A MINIMUM OF 600 mm ABOVE GRADE (IF REQUIRED FOR SILTATION CONTROL)
CLEAR STONE FOR USE IN CONJUNCTION WITH GEOTEXTILE
UNDISTURBED ROOT ZONE: ALL EXPOSED ROOTS MUST BE PROPERLY PRUNED AND BACKFILLED.

Sign Design, Installation and Maintenance: TPZ information signs shall be constructed from metal, corrugated plastic, Gatorboard or wood, and shall be installed in an appropriate manner such that it will be able to withstand inclement weather conditions. Signage shall be maintained in good condition and in the original location throughout the duration of site development works. Signage shall be clearly legible, with black text on a white background being the preferred design.

Sign Content: The TPZ information sign shall, at minimum, provide a list of activities prohibited within the TPZ. Such activities shall include, but not be limited to: grade change, dumping, storage of equipment and materials, unauthorized entry by personnel, tree injury or removal, or other disturbance of any kind. The signage shall also note that TPZ fencing shall not be damaged or removed. The signage shall also provide the contact information for the City of Guelph Planning, Building, Engineering and Environmental Services Department. A City of Guelph corporate logo shall be displayed on the TPZ information sign.

Sign Placement: TPZ information signs shall be affixed no more than 20 m apart on each side of tree protection fencing, at a height of no less than 100 cm.

Sign Size: TPZ information signs shall be a minimum of 40 cm x 60 cm in size

CITY OF GUELPH STANDARD DRAWING

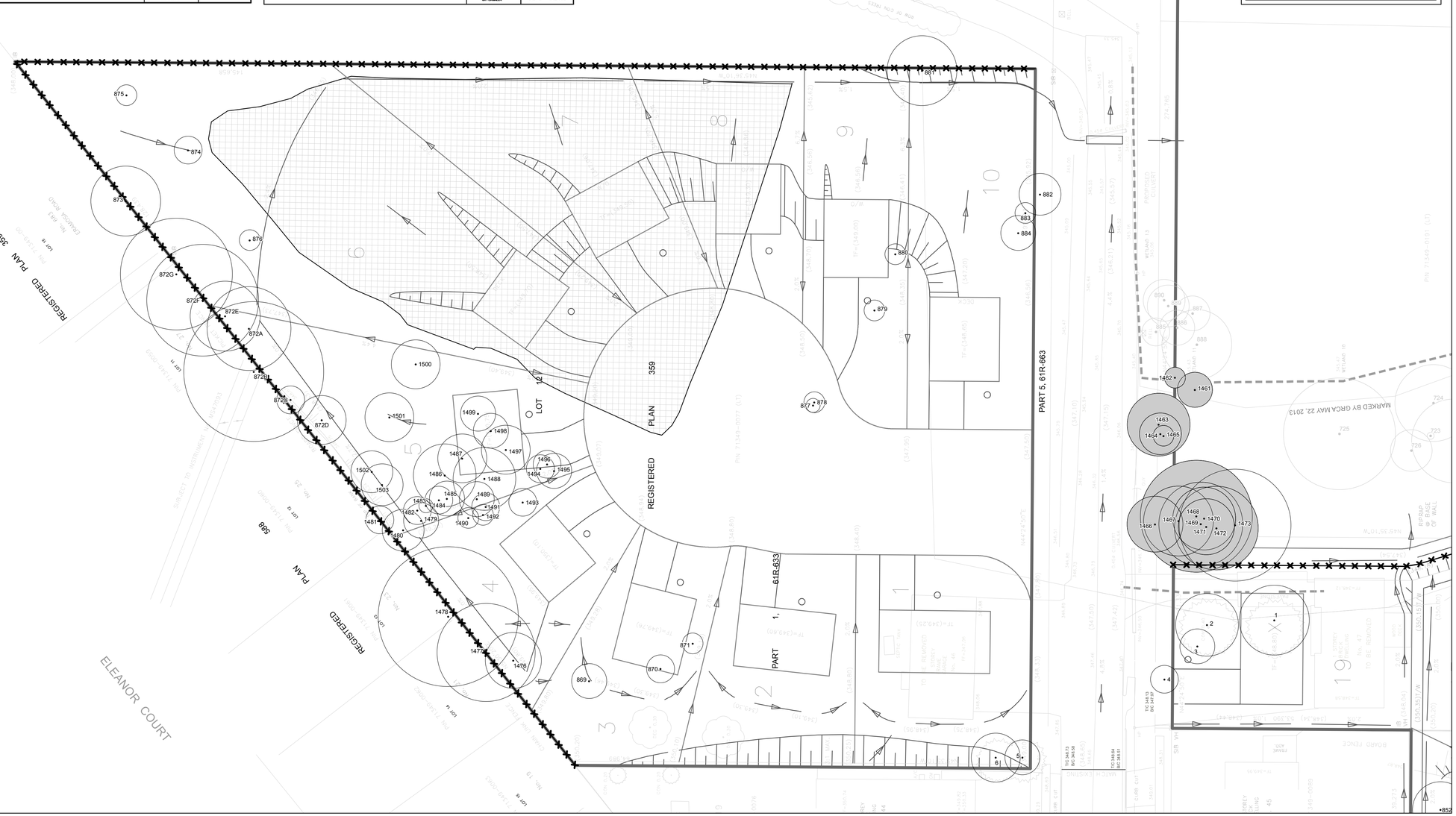
TREE PROTECTION ZONE INFORMATION SIGNAGE DETAIL

DATE DRAWN: JAN/11 | REV. No.:
DESCRIPTION:
REV. DATE: | REV. BY: G.F./ C.M.C.
APPROVED BY:
CITY ENGINEER

ENGINEERING

SD - 90c

Key Map



Map 1a

Hyland Road

Tree Inventory and Preservation Plan and Tree Protection Fencing Plan

Legend

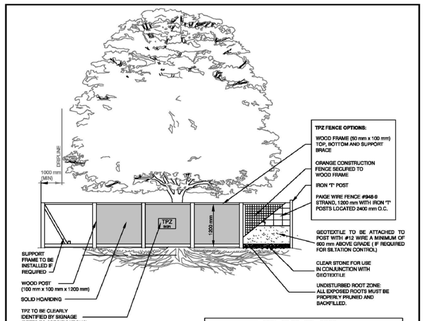
- Subject Property
- Tree Inventoried for Development to be Retained (crown to scale)
- Tree Inventoried for Development to be Removed (crown to scale)
- Tree Inventoried for Trail (crown to scale)
- (FODM8-1) Fresh-Moist Poplar Deciduous Forest - To Be Removed
- Tree Protection Fencing
- Existing Conditions
- Proposed Grading
- Proposed Development
- NRSI Surveyed Wetland Boundary

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400 Date: December 4, 2015	NAD83 - UTM Zone 17 Size: 24x36" 1:300

0 5 10 15 20 Metres

Tree Tag #	Common Name	Scientific Name	Native/Non-Native	DBH	Stem Count	Crown Radius (m)	Potential for Structural Failure	Overall Condition	Proposed Action	Compensation Required
1	White Spruce	*Picea glauca*	Native	58.2	1	5	Low	Good	Remove	Yes
2	White Spruce	*Picea glauca*	Native	49.3	1	4.5	Low	Good	Remove	Yes
3	Horsechestnut	*Aesculus hippocastanum*	Non-Native	18.8	1	2.5	High	Poor	Remove	No
4	Norway Maple	*Acer platanoides*	Non-Native	25.3	1	2	Low	Good	Remove	Yes
824	Manitoba Maple	*Acer negundo*	Native	14.2	3	3	Medium	Poor	Remove	No
825	Manitoba Maple	*Acer negundo*	Native	27.5	2	3	High	Very Poor	Remove	No
826	Green Ash	*Fraxinus pennsylvanica*	Native	15	2	2	Low	Fair	Remove	Yes
827	Green Ash	*Fraxinus pennsylvanica*	Native	10.7	1	1	Low	Good	Remove	Yes
828	Green Ash	*Fraxinus pennsylvanica*	Native	10.5	1	1.5	Low	Good	Remove	Yes
829	Green Ash	*Fraxinus pennsylvanica*	Native	16	1	2.5	Low	Good	Remove	Yes
830	Green Ash	*Fraxinus pennsylvanica*	Native	18	1	3	Low	Good	Remove	Yes
831A	Green Ash	*Fraxinus pennsylvanica*	Native	24.5	1	4	Low	Good	Remove	Yes
831B	White Cedar	*Thuja occidentalis*	Native	15	1	1.5	Low	Good	Remove	Yes
831C	White Cedar	*Thuja occidentalis*	Native	15	1	2	Low	Good	Remove	Yes
831D	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Remove	Yes
831E	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Remove	Yes
831F	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Remove	Yes
831G	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Remove	Yes
831H	Blue Spruce	*Picea pungens*	Non-Native	15	1	1.5	Low	Good	Remove	Yes
831I	Trembling Aspen	*Populus tremuloides*	Native	18	1	2	Low	Good	Remove	Yes
832	Scots Pine	*Pinus sylvestris*	Non-Native	24.8	1	4	Low	Good	Retain	No
833	White Cedar	*Thuja occidentalis*	Native	15.8	1	2	Low	Good	Retain	No
834	Scots Pine	*Pinus sylvestris*	Non-Native	14.5	1	2	Low	Poor	Retain	No
835	Scots Pine	*Pinus sylvestris*	Non-Native	24.5	1	4	Low	Fair	Retain	No
836	Scots Pine	*Pinus sylvestris*	Non-Native	24.1	1	2.5	Low	Poor	Retain	No
837	Cherry sp	*Prunus* spp.	Non-Native	18.2	1	2.5	Medium	Poor	Retain	No
838	White Birch	*Betula papyfera*	Native	14	1	1.5	Low	Good	Retain	No
839	White Cedar	*Thuja occidentalis*	Native	11.5	1	1	Low	Good	Retain	No
840	Scots Pine	*Pinus sylvestris*	Non-Native	18.5	1	2.5	Low	Poor	Retain	No
841	Trembling Aspen	*Populus tremuloides*	Native	15	1	1.5	Low	Fair	Retain	No
842	Scots Pine	*Pinus sylvestris*	Non-Native	23	1	2.5	Low	Poor	Remove	No
843	Scots Pine	*Pinus sylvestris*	Non-Native	18	1	2	Low	Fair	Remove	Yes
844	Apple	*Malus* spp.	Non-Native	22	4	4	High	Very Poor	Remove	No
845	Apple	*Malus* spp.	Non-Native	28	6	4	Medium	Poor	Remove	No
846	Green Ash	*Fraxinus pennsylvanica*	Native	11.5	1	1.5	Low	Good	Remove	Yes
847	Manitoba Maple	*Acer negundo*	Native	38	2	3.5	High	Very Poor	Remove	No
848	Manitoba Maple	*Acer negundo*	Native	24.8	3	3.5	High	Poor	Remove	No
849	Manitoba Maple	*Acer negundo*	Native	47.1	4	5	High	Poor	Remove	No
850	Buckthorn sp.	*Rhamnus* spp.	Non-Native	18.4	4	2	Medium	Very Poor	Remove	No
851	Black Walnut	*Juglans nigra*	Native	22	1	4	Low	Poor	Remove	No
852	Norway Maple	*Acer platanoides*	Non-Native	18.8	1	4	Low	Fair	Remove	Yes
853	Balsam Poplar	*Populus balsamifera*	Native	26.5	1	3	Low	Fair	Remove	Yes
854	Balsam Poplar	*Populus balsamifera*	Native	15.2	1	2.5	High	Fair	Remove	No
855	Balsam Poplar	*Populus balsamifera*	Native	20.7	1	2.5	Low	Fair	Remove	Yes
856	White Birch	*Betula papyfera*	Native	13	1	1.5	Medium	Very Poor	Remove	No
857	White Cedar	*Thuja occidentalis*	Native	14	1	1	Low	Good	Remove	Yes
858	White Cedar	*Thuja occidentalis*	Native	13	1	1	Low	Fair	Remove	Yes
859	Trembling Aspen	*Populus tremuloides*	Native	28.6	1	4	Medium	Fair	Remove	Yes
860	Trembling Aspen	*Populus tremuloides*	Native	29.5	1	4	Medium	Fair	Remove	Yes
861	Trembling Aspen	*Populus tremuloides*	Native	10.5	1	1.5	Medium	Poor	Remove	No
862	Manitoba Maple	*Acer negundo*	Native	45	1	8	Medium	Fair	Remove	Yes
863	Trembling Aspen	*Populus tremuloides*	Native	11	1	1.5	Low	Fair	Remove	No
864	Trembling Aspen	*Populus tremuloides*	Native	13	1	1.5	Medium	Very Poor	Remove	No
865	Manitoba Maple	*Acer negundo*	Native	45	2	6	High	Very Poor	Remove	No
866	Mulberry	*Morus* spp.	Non-Native	13	2	2	Medium	Very Poor	Remove	No
867	Scots Pine	*Pinus sylvestris*	Non-Native	18	1	2.5	Low	Fair	Remove	Yes
868	Scots Pine	*Pinus sylvestris*	Non-Native	13	1	2	High	Very Poor	Remove	No
1461	Trembling Aspen	*Populus tremuloides*	Native	16.8	1	2.5	Low	Good	Retain	No
1462	Trembling Aspen	*Populus tremuloides*	Native	11.8	1	1.5	Low	Fair	Retain	No
1463	Manitoba Maple	*Acer negundo*	Native	49.2	1	4.5	Medium	Poor	Retain	No
1464	Trembling Aspen	*Populus tremuloides*	Native	21.4	1	3	Low	Fair	Retain	No
1465	Trembling Aspen	*Populus tremuloides*	Native	19	1	1.5	High	Very Poor	Retain	No
1466	Manitoba Maple	*Acer negundo*	Native	35.5	2	4	Medium	Fair	Retain	No
1467	Freeman's Maple	*Acer freemanii*	Native	28.5	2	5	Medium	Fair	Retain	No
1468	Freeman's Maple	*Acer freemanii*	Native	29.9	2	8	Medium	Fair	Retain	No
1469	Freeman's Maple	*Acer freemanii*	Native	30.9	1	6	Low	Fair	Retain	No
1470	Freeman's Maple	*Acer freemanii*	Native	32.5	1	4.5	Low	Good	Retain	No
1471	Freeman's Maple	*Acer freemanii*	Native	29.8	1	4	Low	Good	Retain	No
1472	Freeman's Maple	*Acer freemanii*	Native	38.5	1	6	Low	Good	Retain	No
1473	Freeman's Maple	*Acer freemanii*	Native	88	1	8	High	Fair	Remove	No
1474	Trembling Aspen	*Populus tremuloides*	Native	24.1	1	3.5	Medium	Good	Remove	Yes
1475	Trembling Aspen	*Populus tremuloides*	Native	35.1	1	4	Low	Poor	Remove	No



TREE PROTECTION BARRIER NOTES:

1. HOARDING TYPE SHOULD BE DETERMINED IN CONSULTATION WITH THE CITY.
2. ALL TREE PROTECTION HOARDING SHALL BE IN PLACE AND MUST BE INSPECTED AND APPROVED BY THE CITY PRIOR TO ANY CONSTRUCTION ACTIVITIES.
3. ALL ARBORICULTURE WORK SUCH AS PRUNING OF BRANCHES AND ROOTS SHALL BE CONDUCTED BY A CERTIFIED ARBORIST.
4. CONSTRUCTION ACTIVITIES, GRADE CHANGES, AND STORAGE OF EQUIPMENT AND MATERIALS ARE NOT ALLOWED WITHIN THE TREE PROTECTION ZONE.
5. THIS DRAWING TO BE USED IN CONJUNCTION WITH "CITY OF GUELPH TREE TECHNICAL MANUAL".

Tree Protection Zones

Diameter of Trunk Cm/Inches at 1.4 m above grade (DBH)	Minimum Tree Protection Zone (TPZ) Distance from trunk, measured in metres.	Potential Rooting Area (PRA) for all trees and TPZ for trees in fields, parks, open spaces and other significant nature heritage areas.
<10	1.2	2.4
10-20	1.8	3.6
20-40	2.4	4.8
41-50	3.0	6.0
51-60	3.6	7.2
61-70	4.2	8.4
71-80	4.8	9.6
81-90	5.4	10.8
91-100	6.0	12.0
>100	6 cm per 1 cm DBH	12 cm per 1 cm DBH

Notes:
1- Or dripline plus 1 metre, whichever is greater.
2- Works in PRA are subject to specifications outlined in Subsection 4.4.4. of "City of Guelph Tree Technical Manual".

CITY OF GUELPH STANDARD DRAWING

TREE PROTECTION ZONE FENCE DETAIL

DATE DRAWN: JAN/11	REV. No.:
DESCRIPTION:	
REV. DATE:	REV. BY: G.F./C.M.C.
APPROVED BY:	
CITY ENGINEER	

ENGINEERING

SD - 90a

Schedule A: Tree Protection Zone (TPZ) Information Signage

TREE PROTECTION ZONE (TPZ)

NO GRADE CHANGE
DUMPING
STORAGE OF MATERIALS
STORAGE OF EQUIPMENT
UNAUTHORIZED ENTRY
TREE INJURY OR REMOVAL
DISTURBANCE OF ANY KIND

THIS FENCING MUST NOT BE DAMAGED OR MOVED

CONTACT: name and telephone number of contact
name and telephone number of contact

City of Guelph - Planning, Building, Engineering & Environmental Services
(519) 837-5616

40 CM MIN.

60 CM MIN.

Sign Design, Installation and Maintenance: TPZ information signs shall be constructed from metal, corrugated plastic, Gatorboard or wood, and shall be installed in an appropriate manner such that it will be able to withstand inclement weather conditions. Signage shall be maintained in good condition and in the original location throughout the duration of site development works. Signage shall be clearly legible, with black text on a white background being the preferred design.

Sign Content: The TPZ information sign shall, at minimum, provide a list of activities prohibited within the TPZ. Such activities shall include, but not be limited to: grade change, dumping, storage of equipment and materials, unauthorized entry by personnel, tree injury or removal, or other disturbance of any kind. The signage shall also note that TPZ fencing shall not be damaged or removed. The signage shall also provide the contact information for the City of Guelph Planning, Building, Engineering and Environmental Services Department. A City of Guelph corporate logo shall be displayed on the TPZ information sign.

Sign Placement: TPZ information signs shall be affixed no more than 20 m apart on each side of tree protection fencing, at a height of no less than 100 cm.

Sign Size: TPZ information signs shall be a minimum of 40 cm × 60 cm in size

CITY OF GUELPH STANDARD DRAWING

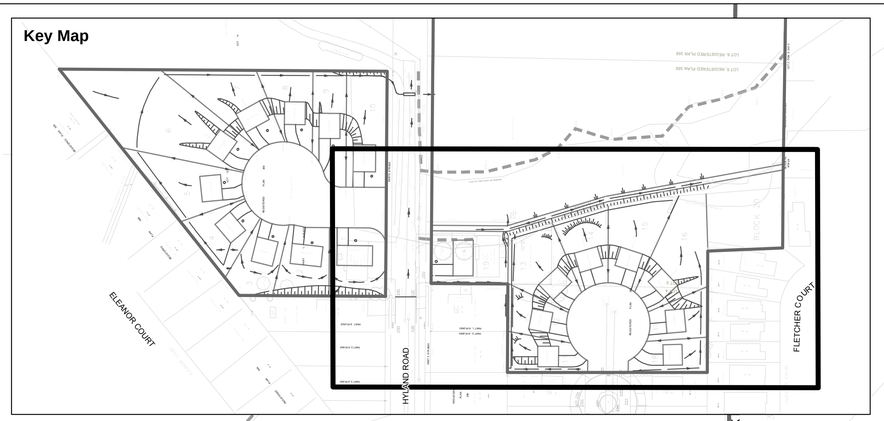
TREE PROTECTION ZONE INFORMATION SIGNAGE DETAIL

DATE DRAWN: JAN/11	REV. No.:
DESCRIPTION:	
REV. DATE:	REV. BY: G.F./C.M.C.
APPROVED BY:	
CITY ENGINEER	

ENGINEERING

SD - 90c

Key Map



Map 1b

Hyland Road

Tree Inventory and Preservation Plan and Tree Protection Fencing Plan

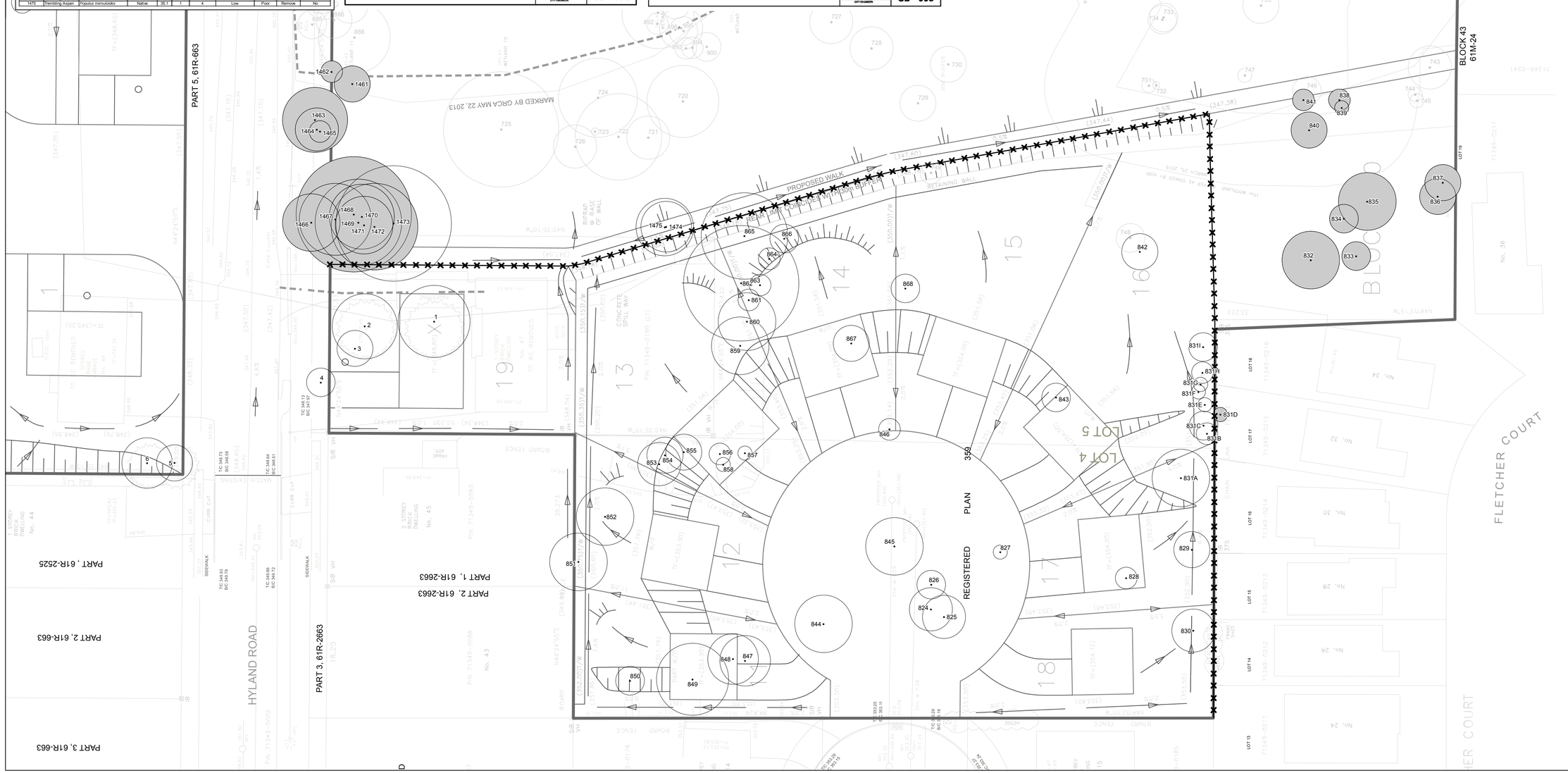
Legend

- Subject Property
- Tree Inventoried for Development to be Retained (crown to scale)
- Tree Inventoried for Development to be Removed (crown to scale)
- Tree Inventoried for Trail (crown to scale)
- Tree Protection Fencing
- Existing Conditions
- Proposed Grading
- Proposed Development
- NRSI Surveyed Wetland Boundary

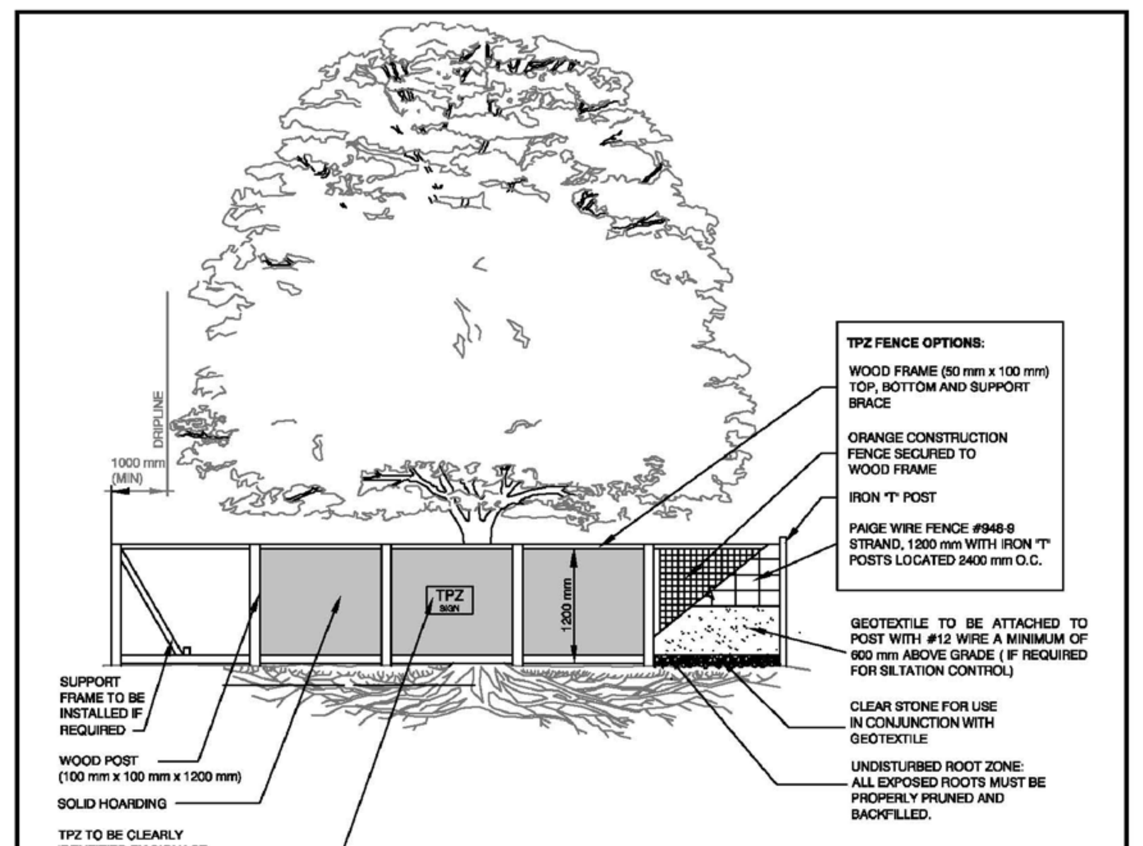
NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400 Date: December 4, 2015	NAD83 - UTM Zone 17 Size: 24x36" 1:275

0 5 10 15 20 Metres



Tree Tag #	Trail/ Development	Common Name	Scientific Name	Stem Count	Native/ Non-Native	DBH (cm)	Crown Radius	Potential for Structural Failure
885	Trail	Manitoba Maple	*Acer negundo*	1	Native	12.4	2.0	Medium
886	Trail	Manitoba Maple	*Acer negundo*	3	Native	15.4	2.5	Medium
887	Trail	Manitoba Maple	*Acer negundo*	1	Native	11.3	2.5	High
888	Trail	Peachleaf Willow	*Salix amygdaloides*	11	Native	18.0	5.0	Medium
889	Trail	Manitoba Maple	*Acer negundo*	2	Native	11.2	3.0	High
890	Trail	Manitoba Maple	*Acer negundo*	2	Native	12.3	3.0	High
891	Trail	Peachleaf Willow	*Salix amygdaloides*	10	Native	22.0	5.0	High
892	Trail	Peachleaf Willow	*Salix amygdaloides*	1	Native	11.5	1.5	High
893	Trail	Manitoba Maple	*Acer negundo*	1	Native	18.4	1.5	High
894	Trail	Manitoba Maple	*Acer negundo*	3	Native	16.2	1.5	High
895	Trail	Manitoba Maple	*Acer negundo*	1	Native	14.1	2.0	High
896	Trail	Manitoba Maple	*Acer negundo*	2	Native	15.6	3.0	High
897	Trail	Manitoba Maple	*Acer negundo*	1	Native	16.2	2.0	High
898	Trail	Manitoba Maple	*Acer negundo*	1	Native	14.6	2.0	High
899	Trail	Manitoba Maple	*Acer negundo*	1	Native	11.7	1.5	High
900	Trail	Manitoba Maple	*Acer negundo*	1	Native	13.2	2.0	High
720	Trail	Manitoba Maple	*Acer negundo*	1	Native	44.3	5.0	High
721	Trail	Manitoba Maple	*Acer negundo*	1	Native	30.0	3.0	High
722	Trail	Black Cherry	*Prunus serotina*	1	Native	51.5	6.0	High
723	Trail	Black Cherry	*Prunus serotina*	3	Native	32.0	0.5	High
724	Trail	Manitoba Maple	*Acer negundo*	1	Native	53.9	5.5	High
725	Trail	Manitoba Maple	*Acer negundo*	3	Native	56.0	8.0	High
726	Trail	Manitoba Maple	*Acer negundo*	1	Native	42.6	3.0	High
727	Trail	Manitoba Maple	*Acer negundo*	2	Native	12.2	3.0	High
728	Trail	Manitoba Maple	*Acer negundo*	2	Native	14.4	3.0	Low
729	Trail	Black Cherry	*Prunus serotina*	1	Native	13.8	2.5	Low
730	Trail	Black Cherry	*Prunus serotina*	1	Native	18.9	2.5	Low
731	Trail	White Birch	*Betula papyfera*	1	Native	13.0	1.0	High
732	Trail	White Birch	*Betula papyfera*	1	Native	11.7	0.5	High
733	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	12.0	2.0	Medium
734	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	12.7	2.0	Low
735	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	22.2	2.5	Medium
736	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	13.8	1.5	Medium
737	Trail	White Cedar	*Thuja occidentalis*	1	Native	10.6	1.5	Low
738	Trail	White Cedar	*Thuja occidentalis*	1	Native	12.6	1.5	Low
739	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	10.0	2.0	Low
740	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	10.1	1.5	Low
741	Trail	Black Cherry	*Prunus serotina*	1	Native	11.7	2.5	Medium
742	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	14.5	3.0	High
743	Trail	Scots Pine	*Pinus sylvestris*	1	Non-Native	21.0	3.0	High
744	Trail	White Cedar	*Thuja occidentalis*	1	Native	11.4	1.0	Low
745	Trail	White Cedar	*Thuja occidentalis*	1	Native	13.4	1.0	Low
746	Trail	Trembling Aspen	*Populus tremuloides*	1	Native	13.5	2.0	High
747	Trail	White Birch	*Betula papyfera*	1	Native	13.4	1.0	High
748	Trail	White Birch	*Betula papyfera*	1	Native	20.0	2.0	High
749	Trail	Scots Pine	*Pinus sylvestris*	1	Non-Native	11.0	1.5	Low
1461	Development	Trembling Aspen	*Populus tremuloides*		Native	16.8	2.5	Low
1462	Development	Trembling Aspen	*Populus tremuloides*		Native	11.8	1.5	Low
1463	Development	Manitoba Maple	*Acer negundo*		Native	49.2	4.5	Medium
1464	Development	Trembling Aspen	*Populus tremuloides*		Native	21.4	3	Medium
1465	Development	Trembling Aspen	*Populus tremuloides*		Native	19	1.5	High
1466	Development	Manitoba Maple	*Acer negundo*		Native	35.5	4	Medium
1467	Development	Freeman's Maple	*Acer freemanii*		Native	28.5	5	Medium
1468	Development	Freeman's Maple	*Acer freemanii*		Native	29.9	8	Medium
1469	Development	Freeman's Maple	*Acer freemanii*		Native	30.9	6	Low
1470	Development	Freeman's Maple	*Acer freemanii*		Native	32.8	4.5	Low
1471	Development	Freeman's Maple	*Acer freemanii*		Native	29.8	4	Low
1472	Development	Freeman's Maple	*Acer freemanii*		Native	38.8	6	Low
1473	Development	Freeman's Maple	*Acer freemanii*		Native	88	8	High
1474	Development	Trembling Aspen	*Populus tremuloides*		Native	24.1	3.5	Medium
1475	Development	Trembling Aspen	*Populus tremuloides*		Native	35.1	4	Low
841	Development	Trembling Aspen	*Populus tremuloides*		Native	15	1.5	Low
865	Development	Manitoba Maple	*Acer negundo*		Native	45	6	High
840	Development	Scots Pine	*Pinus sylvestris*		Non-Native	18.5	2.5	Low



TREE PROTECTION BARRIER NOTES:

1. HOARDING TYPE SHOULD BE DETERMINED IN CONSULTATION WITH THE CITY.
2. ALL TREE PROTECTION HOARDING SHALL BE IN PLACE AND MUST BE INSPECTED AND APPROVED BY THE CITY PRIOR TO ANY CONSTRUCTION ACTIVITIES.
3. ALL ARBORICULTURE WORK SUCH AS PRUNING OF BRANCHES AND ROOTS SHALL BE CONDUCTED BY A CERTIFIED ARBORIST.
4. CONSTRUCTION ACTIVITIES, GRADE CHANGES, AND STORAGE OF EQUIPMENT AND MATERIALS ARE NOT ALLOWED WITHIN THE TREE PROTECTION ZONE.
5. THIS DRAWING TO BE USED IN CONJUNCTION WITH "CITY OF GUELPH TREE TECHNICAL MANUAL".

Tree Protection Zones

Diameter of Trunk Centimetres at 1.4 m above grade (DBH)	Minimum Tree Protection Zone (TPZ) Distance from trunk, measured in metres[1]	Potential Rooting Area (PRA) for all trees and TPZ for trees in NHS, parks, open spaces and other significant natural heritage areas[1,2]
<10	1.2	2.4
10-29	1.8	3.6
30-40	2.4	4.8
41-50	3.0	6.0
51-60	3.6	7.2
61-70	4.2	8.4
71-80	4.8	9.6
81-90	5.4	10.8
91-100	6.0	12.0
>100	6 cm per 1 cm DBH	12 cm per 1 cm DBH

Notes:
1- Or dripline plus 1 metre, whichever is greater.
2- Works in PRA are subject to specifications outlined in Subsection 4.4.4. of "City of Guelph Tree Technical Manual".

CITY OF GUELPH STANDARD DRAWING

TREE PROTECTION ZONE FENCE DETAIL

DATE DRAWN : JAN/11 | REV. No. : | DESCRIPTION : | REV. DATE : | REV. BY. : G.F./ C.M.C. | APPROVED BY: | CITY ENGINEER | ENGINEERING | **SD - 90a**

Schedule A: Tree Protection Zone (TPZ) Information Signage

TREE PROTECTION ZONE (TPZ)

NO GRADE CHANGE
DUMPING
STORAGE OF MATERIALS
STORAGE OF EQUIPMENT
UNAUTHORIZED ENTRY
TREE INJURY OR REMOVAL
DISTURBANCE OF ANY KIND

THIS FENCING MUST NOT BE DAMAGED OR MOVED

CONTACT: name and telephone number of contact
name and telephone number of contact

City of Guelph - Planning, Building, Engineering & Environmental Services
(519) 837-5616

40 CM MIN.
60 CM MIN.

Sign Design, Installation and Maintenance: TPZ information signs shall be constructed from metal, corrugated plastic, Gatorboard or wood, and shall be installed in an appropriate manner such that it will be able to withstand inclement weather conditions. Signage shall be maintained in good condition and in the original location throughout the duration of site development works. Signage shall be clearly legible, with black text on a white background being the preferred design.

Sign Content: The TPZ information sign shall, at minimum, provide a list of activities prohibited within the TPZ. Such activities shall include, but not be limited to: grade change, dumping, storage of equipment and materials, unauthorized entry by personnel, tree injury or removal, or other disturbance of any kind. The signage shall also note that TPZ fencing shall not be damaged or removed. The signage shall also provide the contact information for the City of Guelph Planning, Building, Engineering and Environmental Services Department. A City of Guelph corporate logo shall be displayed on the TPZ information sign.

Sign Placement: TPZ information signs shall be affixed no more than 20 m apart on each side of tree protection fencing, at a height of no less than 100 cm.

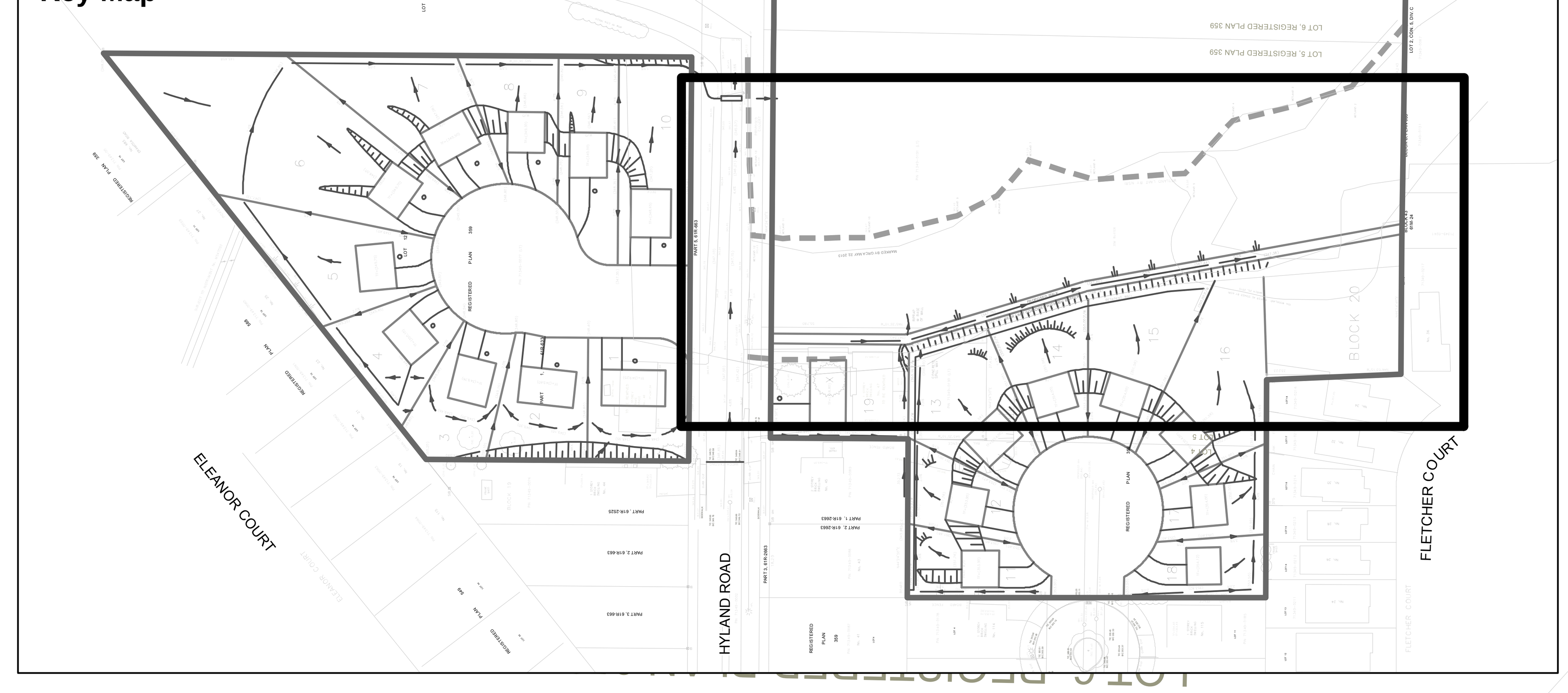
Sign Size: TPZ information signs shall be a minimum of 40 cm × 60 cm in size

CITY OF GUELPH STANDARD DRAWING

TREE PROTECTION ZONE INFORMATION SIGNAGE DETAIL

DATE DRAWN : JAN/11 | REV. No. : | DESCRIPTION : | REV. DATE : | REV. BY. : G.F./ C.M.C. | APPROVED BY: | CITY ENGINEER | ENGINEERING | **SD - 90c**

Key Map



Map 1c

Hyland Road

Tree Inventory and Preservation Plan and Tree Protection Fencing Plan - Trail Area

Legend
- Subject Property
- Tree Inventoried for Trail to be Retained (crown to scale)
- Tree Inventoried for Trail to be Removed (crown to scale)
- Tree Inventoried for Development (crown to scale)
- Existing Conditions
- Proposed Grading
- Proposed Development
- NRSI Surveyed Wetland Boundary
- Tree Protection Fencing
- Boardwalk
- Gravel Trail

Trail Route Alternatives
- Option 1
- Option 2
- Option 3

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1400
Date: December 4, 2015

NAD83 - UTM Zone 17
Size: 24x36"
1:225

0 5 10 15 Metres

APPENDIX I

Proposed Development Area – Tree Inventory Data

Tree Tag #	Common Name	Scientific Name	Native/Non-Native	DBH	Stem Count	Crown Radius (m)	Potential for Structural Failure	Overall Condition	Proposed Action	Compensation Required	Comments
1	White Spruce	*Picea glauca*	Native	58.2	1	5	Low	Good	Remove	Yes	er, op, wound
2	White Spruce	*Picea glauca*	Native	49.3	1	4.5	Low	Good	Remove	Yes	er, wounds
3	Horsechestnut	*hippocastanum*	Non-Native	18.8	1	2.5	High	Poor	Remove	No	large wound at base, br, lean
4	Norway Maple	*Acer platanoides*	Non-Native	25.3	1	2	Low	Good	Remove	Yes	lcs
5	Colorado Spruce	*Picea pungens*	Non-Native	39.5	1	2.5	Low	Good	Remove	Yes	er with wound, op
6	White Spruce	*Picea glauca*	Native	30.5	1	3.5	Low	Good	Remove	Yes	
748	White Birch	*Betula papyrifera*	Native	20.0	1.0	2.0	High	Dead	Remove	No	snag, hazard trail tree
824	Manitoba Maple	*Acer negundo*	Native	14.2	3	3	Medium	Poor	Remove	No	wd
825	Manitoba Maple	*Acer negundo*	Native	27.5	2	3	High	Very Poor	Remove	No	wd
826	Green Ash	*Fraxinus pennsylvanica*	Native	15	2	2	Low	Fair	Remove	Yes	
827	Green Ash	*Fraxinus pennsylvanica*	Native	10.7	1	1	Low	Good	Remove	Yes	
828	Green Ash	*Fraxinus pennsylvanica*	Native	10.5	1	1.5	Low	Good	Remove	Yes	
829	Green Ash	*Fraxinus pennsylvanica*	Native	16	1	2.5	Low	Good	Remove	Yes	
830	Green Ash	*Fraxinus pennsylvanica*	Native	18	1	3	Low	Good	Remove	Yes	
832	Scots Pine	*Pinus sylvestris*	Non-Native	24.8	1	4	Low	Good	Retain	No	
833	White Cedar	*Thuja occidentalis*	Native	15.8	1	2	Low	Good	Retain	No	
834	Scots Pine	*Pinus sylvestris*	Non-Native	14.5	1	2	Low	Poor	Retain	No	
835	Scots Pine	*Pinus sylvestris*	Non-Native	24.5	1	4	Low	Fair	Retain	No	
836	Scots Pine	*Pinus sylvestris*	Non-Native	24.7	1	2.5	Low	Poor	Retain	No	cankers
837	Cherry sp	*Prunus spp.*	Non-Native	18.2	1	2.5	Medium	Poor	Retain	No	
838	White Birch	*Betula papyrifera*	Native	14	1	1.5	Low	Good	Retain	No	
839	White Cedar	*Thuja occidentalis*	Native	11.5	1	1	Low	Good	Retain	No	
840	Scots Pine	*Pinus sylvestris*	Non-Native	18.5	1	2.5	Low	Poor	Retain	No	
841	Trembling Aspen	*Populus tremuloides*	Native	15	1	1.5	Low	Fair	Retain	No	wd
842	Scots Pine	*Pinus sylvestris*	Non-Native	23	1	2.5	Low	Poor	Remove	No	woodpecker
843	Scots Pine	*Pinus sylvestris*	Non-Native	18	1	2	Low	Fair	Remove	Yes	sap suckers
844	Apple	*Malus spp.*	Non-Native	22	4	4	High	Very Poor	Remove	No	wd wf
845	Apple	*Malus spp.*	Non-Native	26	6	4	Medium	Poor	Remove	No	
846	Green Ash	*Fraxinus pennsylvanica*	Native	11.5	1	1.5	Low	Good	Remove	Yes	
847	Manitoba Maple	*Acer negundo*	Native	38	2	3.5	High	Very Poor	Remove	No	
848	Manitoba Maple	*Acer negundo*	Native	24.8	3	3.5	High	Poor	Remove	No	
849	Manitoba Maple	*Acer negundo*	Native	47.1	6	5	High	Poor	Remove	No	
850	Buckthorn sp.	*Rhamnus spp.*	Non-Native	18.4	4	2	Medium	Very Poor	Remove	No	
851	Black Walnut	*Juglans nigra*	Native	22	1	4	Low	Poor	Remove	No	growing into fence
852	Norway Maple	*Acer platanoides*	Non-Native	18.8	1	4	Low	Fair	Remove	Yes	broken top
853	Balsam Poplar	*Populus balsamifera*	Native	26.8	1	3	Low	Fair	Remove	Yes	
854	Balsam Poplar	*Populus balsamifera*	Native	15.2	1	2.5	High	Poor	Remove	No	lean
855	Balsam Poplar	*Populus balsamifera*	Native	20.7	1	2.5	Low	Fair	Remove	Yes	
856	White Birch	*Betula papyrifera*	Native	13	1	1.5	Medium	Very Poor	Remove	No	wd wounds
857	White Cedar	*Thuja occidentalis*	Native	14	1	1	Low	Good	Remove	Yes	in hedge
858	White Cedar	*Thuja occidentalis*	Native	13	1	1	Low	Fair	Remove	Yes	
859	Trembling Aspen	*Populus tremuloides*	Native	28.6	1	4	Medium	Fair	Remove	Yes	lop sided
860	Trembling Aspen	*Populus tremuloides*	Native	29.5	1	4	Medium	Fair	Remove	Yes	lean

861	Trembling Aspen	*Populus tremuloides*	Native	10.5	1	1.5	Medium	Poor	Remove	No	lean
862	Manitoba Maple	*Acer negundo*	Native	45	1	8	Medium	Fair	Remove	Yes	
863	Trembling Aspen	*Populus tremuloides*	Native	11	1	1.5	Low	Poor	Remove	No	lopsided
864	Trembling Aspen	*Populus tremuloides*	Native	13	1	1.5	Medium	Very Poor	Remove	No	alost dead
865	Manitoba Maple	*Acer negundo*	Native	45	2	6	High	Very Poor	Remove	No	rot
866	Mullberry	*Morus spp.*	Non-Native	13	2	2	Medium	Very Poor	Remove	No	not rare thin canopy
867	Scots Pine	*Pinus sylvestris*	Non-Native	18	1	2.5	Low	Fair	Remove	Yes	
868	Scots Pine	*Pinus sylvestris*	Non-Native	13	1	2	High	Very Poor	Remove	No	major trunk rot
869	Black Walnut	*Juglans nigra*	Native	20.8	1	2.5	Low	Fair	Remove	Yes	
870	Manitoba Maple	*Acer negundo*	Native	20	3	2	Medium	Poor	Remove	No	several branches removed
871	Manitoba Maple	*Acer negundo*	Native	10.9	1	1.5	Low	Fair	Remove	Yes	
873	Manitoba Maple	*Acer negundo*	Native	30	6	5	High	Poor	Remove	No	db no top
874	Black Walnut	*Juglans nigra*	Native	16.6	1	2	High	Poor	Remove	No	lean
875	Scots Pine	*Pinus sylvestris*	Non-Native	15	1	1.5	Low	Poor	Remove	No	
876	Black Walnut	*Juglans nigra*	Native	15	1	1.5	High	Very Poor	Remove	No	giant trunk wound
877	Manitoba Maple	*Acer negundo*	Native	10.7	1	1	Medium	Poor	Remove	No	
878	Black Walnut	*Juglans nigra*	Native	11	1	1.5	Medium	Poor	Remove	No	
879	Trembling Aspen	*Populus tremuloides*	Native	13.5	1	1.5	Low	Poor	Remove	No	wd
880	Manitoba Maple	*Acer negundo*	Native	12	1	1.5	Low	Fair	Remove	Yes	
881	Manitoba Maple	*Acer negundo*	Native	38	2	5	High	Poor	Remove	No	
882	Manitoba Maple	*Acer negundo*	Native	25	3	3	Medium	Poor	Remove	No	
883	Manitoba Maple	*Acer negundo*	Native	15.5	1	1.5	Low	Poor	Remove	No	
884	Manitoba Maple	*Acer negundo*	Native	15	2	2.5	Low	Fair	Remove	Yes	
1461	Trembling Aspen	*Populus tremuloides*	Native	16.8	1	2.5	Low	Good	Retain	No	
1462	Trembling Aspen	*Populus tremuloides*	Native	11.8	1	1.5	Low	Fair	Retain	No	s
1463	Manitoba Maple	*Acer negundo*	Native	49.2	1	4.5	Medium	Poor	Retain	No	wf, db, wound
1464	Trembling Aspen	*Populus tremuloides*	Native	21.4	1	3	Medium	Fair	Retain	No	db
1465	Trembling Aspen	*Populus tremuloides*	Native	19	1	1.5	High	Very Poor	Retain	No	large trunk wound, broken top, lean
1466	Manitoba Maple	*Acer negundo*	Native	35.5	2	4	Medium	Fair	Retain	No	wf, db, lean
1467	Freeman's Maple	*Acer freemanii*	Native	28.5	2	5	Medium	Fair	Retain	No	wf, wounds
1468	Freeman's Maple	*Acer freemanii*	Native	29.9	4	8	Medium	Fair	Retain	No	weak forks, trunk wounds
1469	Freeman's Maple	*Acer freemanii*	Native	30.9	1	6	Low	Fair	Retain	No	lopsided crown, er, rw
1470	Freeman's Maple	*Acer freemanii*	Native	32.8	1	4.5	Low	Good	Retain	No	lopsided
1471	Freeman's Maple	*Acer freemanii*	Native	29.8	1	4	Low	Good	Retain	No	op, er
1472	Freeman's Maple	*Acer freemanii*	Native	38.8	1	6	Low	Good	Retain	No	wh, er
1473	Freeman's Maple	*Acer freemanii*	Native	88	1	8	High	Poor	Remove	No	lots of wf
1474	Trembling Aspen	*Populus tremuloides*	Native	24.1	1	3.5	Medium	Good	Remove	Yes	lean
1475	Trembling Aspen	*Populus tremuloides*	Native	35.1	1	4	Low	Poor	Remove	No	trunk wounds, rot
1476	Black Walnut	*Juglans nigra*	Native	16.9	1	4	Low	Fair	Remove	Yes	lean
1477	Black Maple	*Acer nigrum*	Native	36.5	1	7	High	Poor	Remove	No	wf, db, wounds
1478	Norway Maple	*Acer platanoides*	Non-Native	55	1	10	Low	Good	Remove	Yes	close to shed, offsite?
1479	Manitoba Maple	*Acer negundo*	Native	14.9	1	2.5	Low	Poor	Remove	No	large trunk wounds
1480	Manitoba Maple	*Acer negundo*	Native	20.5	1	3	High	Poor	Remove	No	br, 45 degree lean
1481	Trembling Aspen	*Populus tremuloides*	Native	34.8	1	2	High	Very Poor	Remove	No	db
1482	Norway Maple	*Acer platanoides*	Non-Native	13.8	1	2	Medium	Poor	Remove	No	lean, lopsided
1483	Trembling Aspen	*Populus tremuloides*	Native	10.5	1	1	Medium	Poor	Remove	No	lean, db
1484	Trembling Aspen	*Populus tremuloides*	Native	17.8	2	2	Medium	Fair	Remove	Yes	wf, lean

1485	Trembling Aspen	*Populus tremuloides*	Native	12.8	1	2.5	Medium	Fair	Remove	Yes	lean
1486	Trembling Aspen	*Populus tremuloides*	Native	30.8	3	4.5	Medium	Fair	Remove	Yes	wf
1487	Trembling Aspen	*Populus tremuloides*	Native	12.2	2	3.5	High	Poor	Remove	No	wf, lean
1488	Trembling Aspen	*Populus tremuloides*	Native	28.2	2	4.5	Medium	Poor	Remove	No	wf, gv, db
1489	Trembling Aspen	*Populus tremuloides*	Native	23.8	1	2.5	Low	Poor	Remove	No	small crown, gv
1490	Trembling Aspen	*Populus tremuloides*	Native	11.5	1	1.5	Medium	Poor	Remove	No	tw, sc, gv
1491	Trembling Aspen	*Populus tremuloides*	Native	15.3	1	2	Medium	Poor	Remove	No	sc, lean, gv
1492	Trembling Aspen	*Populus tremuloides*	Native	16	1	1.5	Medium	Poor	Remove	No	lean, broken top, gv
1493	Trembling Aspen	*Populus tremuloides*	Native	14.7	1	2	Low	Good	Remove	Yes	
1494	Trembling Aspen	*Populus tremuloides*	Native	12.2	1	2	Low	Good	Remove	Yes	
1495	Trembling Aspen	*Populus tremuloides*	Native	16.2	1	2.5	Low	Good	Remove	Yes	
1496	Trembling Aspen	*Populus tremuloides*	Native	11.5	1	2	Low	Fair	Remove	Yes	old wound
1497	Black Walnut	*Juglans nigra*	Native	13.5	1	3.5	Low	Fair	Remove	Yes	db
1498	Trembling Aspen	*Populus tremuloides*	Native	16	1	2.5	Low	Fair	Remove	Yes	
1499	Norway Maple	*Acer platanoides*	Non-Native	13	1	2.5	Medium	Poor	Remove	No	lean, wounds, db
1500	Apple	*Malus spp.*	Non-Native	25.2	3	3.5	High	Poor	Remove	No	wf, db
1501	Trembling Aspen	*Populus tremuloides*	Native	33.2	1	3.5	Medium	Poor	Remove	No	lots of db, lean, wounds, er
1502	Manitoba Maple	*Acer negundo*	Native	50.8	1	3	High	Very Poor	Remove	No	horizontal, large ow with rot, db
1503	Manitoba Maple	*Acer negundo*	Native	26.3	1	3	High	Very Poor	Remove	No	db, horizontal , suckers
831A	Green Ash	*Fraxinus pennsylvanica*	Native	24.9	1	4	Low	Good	Remove	Yes	
831B	White Cedar	*Thuja occidentalis*	Native	15	1	1.5	Low	Good	Remove	Yes	off site
831C	White Cedar	*Thuja occidentalis*	Native	15	1	2	Low	Good	Remove	Yes	off site
831D	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Retain	No	off site
831E	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Remove	Yes	off site
831F	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Remove	Yes	offf site
831G	White Cedar	*Thuja occidentalis*	Native	15	1	1	Low	Good	Remove	Yes	0.6 meters from fence
831H	Blue Spruce	*Picea pungens*	Non-Native	15	1	1.5	Low	Good	Remove	Yes	0.6 m off site
831I	Trembling Aspen	*Populus tremuloides*	Native	18	1	2	Low	Good	Remove	Yes	0.8m from fence
872A	Manitoba Maple	*Acer negundo*	Native	37.5	2	6	High	Very Poor	Remove	No	rot and wounds
872B	Black Walnut	*Juglans nigra*	Native	65	1	10	Low	Good	Remove	Yes	off site
872C	White Cedar	*Thuja occidentalis*	Native	25	2	2	Medium	Fair	Remove	Yes	right on fence
872D	Linden	*Tilia* spp.	Non-Native	30	1	3.5	Low	Fair	Remove	Yes	1m off site
872E	Black Walnut	*Juglans nigra*	Native	25	1	5	Low	Fair	Remove	Yes	on fence
872F	Black Walnut	*Juglans nigra*	Native	50	1	8	Medium	Fair	Remove	Yes	on fence
872G	Black Walnut	*Juglans nigra*	Native	50	1	8	Medium	Fair	Remove	Yes	on fence
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	1.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	broken top
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	3.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	1.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	2.50	Low	Good	Remove	Yes	lean, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	exposed roots,grape vine
FODM8-1	Balsam Poplar	*Populus balsamifera*	Native	16.00	1	2.50	Medium	Fair	Remove	Yes	exposed roots, lean, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	3.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	1.50	Low	Poor	Remove	No	dead branches, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	24.00	1	3.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	25.00	1	4.00	Low	Poor	Remove	No	trunk wound, dead branches, grape vine

FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	1.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	2.00	Low	Fair	Remove	Yes	lopsided, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	34.00	1	5.00	Low	Good	Remove	Yes	grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Medium	Poor	Remove	No	lean, dead branches, grape vine
FODM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes	
FODM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes	
FODM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes	
FODM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes	
FODM8-1	Manitoba Maple	*Acer negundo*	Native	12.00	1	2.50	Low	Fair	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	1	3.00	Low	Good	Remove	Yes	grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Fair	Remove	Yes	lopsided
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Fair	Remove	Yes	dead branches, small crown, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Fair	Remove	Yes	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Poor	Remove	No	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Good	Remove	Yes	dead branches, thin crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	2.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Fair	Remove	Yes	lopsided crown, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	small crown, exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.00	Low	Poor	Remove	No	dead top, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	4.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	3.50	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Balsam Poplar	*Populus balsamifera*	Native	12.00	2	1.50	Medium	Poor	Remove	No	half dead
FODM8-1	Balsam Poplar	*Populus balsamifera*	Native	11.00	1	1.50	Medium	Poor	Remove	No	lean, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Poor	Remove	No	lean, lopsided, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	3.50	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	24.00	1	2.00	Low	Poor	Remove	No	large wound
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	1.50	Low	Poor	Remove	No	dead branches, small crown, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.00	Medium	Poor	Remove	No	large wound, dead branches, grape vine, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	4.00	Medium	Very Poor	Remove	No	butt rot, wounds, dead branches, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	35.00	1	4.00	Medium	Poor	Remove	No	weak fork, dead branches, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	4.50	Low	Good	Remove	Yes	
FODM8-1	Manitoba Maple	*Acer negundo*	Native	11.00	1	2.00	Low	Good	Remove	Yes	suckers
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.50	Low	Fair	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Medium	Poor	Remove	No	lopsided, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	3	4.00	Medium	Poor	Remove	No	weak fork, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	3.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	3.00	Low	Fair	Remove	Yes	dead branches

FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	3.50	Low	Good	Remove	Yes	lopsided
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	2.00	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	1.50	Low	Fair	Remove	Yes	small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Fair	Remove	Yes	small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Low	Fair	Remove	Yes	lopsided, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	2.50	Low	Fair	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	3.00	Low	Poor	Remove	No	dead branches, small crown, exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	1.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	3.00	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	1.50	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Medium	Very Poor	Remove	No	very small crown, almost dead
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	2.00	Low	Very Poor	Remove	No	thin crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.50	Low	Very Poor	Remove	No	very small crown, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Manitoba Maple	*Acer negundo*	Native	20.00	1	2.50	Low	Poor	Remove	No	dead branches, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Fair	Remove	Yes	grape vine, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	1.50	Medium	Poor	Remove	No	dead branches, exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	3.00	Low	Fair	Remove	Yes	dead branches, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	3.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	1.50	Low	Poor	Remove	No	dead branches, small crown, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	1.50	Low	Poor	Remove	No	dead branches, small crown, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	1.50	Medium	Very Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	11.00	1	1.50	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.00	Low	Fair	Remove	Yes	small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	4.00	Medium	Poor	Remove	No	dead branches,
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	33.00	1	4.00	High	Poor	Remove	No	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Medium	Poor	Remove	No	dead branches, small crown, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	1.50	High	Poor	Remove	No	very small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	2.50	Medium	Very Poor	Remove	No	dead branches, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	3.00	Medium	Poor	Remove	No	thin crown, dead branches, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	30.00	1	3.00	Low	Poor	Remove	No	dead branches, lean, old seam
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	24.00	2	3.00	Low	Very Poor	Remove	No	half dead, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	3.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	25.00	1	4.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	24.00	1	4.00	Low	Poor	Remove	No	dead branches, exposed roots, root wound, butt rot
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	3.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	1.50	Low	Poor	Remove	No	very small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.50	Low	Poor	Remove	No	small crown, dead branches

FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Medium	Very Poor	Remove	No	extremely small crown, barely alive
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	1.50	Medium	Poor	Remove	No	large wound, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Medium	Poor	Remove	No	dead branches, lean, exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.00	Low	Fair	Remove	Yes	exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	1	2.50	Low	Fair	Remove	Yes	dead branches, exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	2.50	Low	Fair	Remove	Yes	dead branches, exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	4.00	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	25.00	1	1.00	High	Very Poor	Remove	No	almost dead, broken top
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	4.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	20.00	1	2.00	High	Very Poor	Remove	No	broken top, dead branches, small crown
FODM8-1	Balsam Poplar	*Populus balsamifera*	Native	20.00	1	3.00	High	Very Poor	Remove	No	dead branches, massive trunk wound
FODM8-1	Balsam Poplar	*Populus balsamifera*	Native	22.00	2	4.00	Low	Very Poor	Remove	No	dead branches, thin crown, root wond, large seam
FODM8-1	Balsam Poplar	*Populus balsamifera*	Native	12.00	1	1.50	Low	Poor	Remove	No	thin crown, dead branches, trunk wound
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	2.50	Medium	Very Poor	Remove	No	dead branches, thin crown, trunk wound
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	1.00	Low	Poor	Remove	No	thin crown, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	4.00	Low	Poor	Remove	No	dead branches, trunk wound, exposed roots
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	1.50	Low	Fair	Remove	Yes	lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	24.00	1	2.00	Medium	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	27.00	1	4.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	3.00	Low	Poor	Remove	No	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	1.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	10.00	1	1.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	33.00	1	5.00	Medium	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	28.00	1	5.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Low	Fair	Remove	Yes	lean, exposed roots, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	3.00	Low	Fair	Remove	Yes	exposed roots, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	3.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	32.00	1	6.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	1.50	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	2	4.00	High	Very Poor	Remove	No	half dead
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	31.00	1	5.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.00	Low	Fair	Remove	Yes	small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	2.00	Low	Fair	Remove	Yes	lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	18.00	1	2.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	14.00	1	1.50	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	4.00	Medium	Poor	Remove	No	trunk woumd, dead branches, grape vine
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	30.00	2	6.00	Medium	Poor	Remove	No	weak fork, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	30.00	1	5.00	Low	Fair	Remove	Yes	small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	21.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	3.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	2.50	Medium	Poor	Remove	No	dead branches, lean

FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.00	Low	Poor	Remove	No	small crown, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	19.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	15.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	25.00	1	4.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	13.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	17.00	1	2.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	16.00	1	2.00	Medium	Poor	Remove	No	butt rot, exposed roots, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	4.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	26.00	1	4.00	Low	Good	Remove	Yes	
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	2.00	Low	Poor	Remove	No	dead branches, lean
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	6.00	1	2.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	23.00	1	2.50	High	Very Poor	Remove	No	large trunk wound, grape vine, dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	32.00	1	6.00	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	32.00	1	4.00	Low	Poor	Remove	No	dead branches, small crown
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	22.00	1	4.50	Low	Fair	Remove	Yes	lopsided
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	30.00	1	4.50	Low	Fair	Remove	Yes	dead branches
FODM8-1	Trembling Aspen	*Populus tremuloides*	Native	12.00	1	1.50	Medium	Poor	Remove	No	lean, small crown

APPENDIX II

Proposed Trail Area – Tree Inventory Data

Tree Tag #	Trail/ Development	Common Name	Scientific Name	Native/ Non-Native	DBH (cm)	Crown Radius	Potential for Structural Failure	Overall Condition	Comments
885	Trail	Manitoba Maple	*Acer negundo*	Native	12.4	2.0	Medium	Poor	w frass
886	Trail	Manitoba Maple	*Acer negundo*	Native	15.4	2.5	Medium	Fair	snapped& hanging
887	Trail	Manitoba Maple	*Acer negundo*	Native	11.3	2.5	High	Very Poor	stem, crown <1m
888	Trail	Peachleaf Willow	*Salix amygdaloides*	Native	18.0	5.0	Medium	Poor	dead/decayed branc
889	Trail	Manitoba Maple	*Acer negundo*	Native	11.2	3.0	High	Very Poor	hazard trail tree
890	Trail	Manitoba Maple	*Acer negundo*	Native	12.3	3.0	High	Poor	hazard trail tree, dieback throughout, damage & decay @rf
891	Trail	Peachleaf Willow	*Salix amygdaloides*	Native	22.0	5.0	High	Poor	rf
892	Trail	Peachleaf Willow	*Salix amygdaloides*	Native	11.5	1.5	High	Poor	overhanging trail, several splits in stem w decay, dieback , epicormic
893	Trail	Manitoba Maple	*Acer negundo*	Native	18.4	1.5	High	Poor	dieback throughout, damage & small opening rf w frass
894	Trail	Manitoba Maple	*Acer negundo*	Native	16.2	1.5	High	Poor	dieback throughout, hobf throughout, damage to rf, peeling bark
895	Trail	Manitoba Maple	*Acer negundo*	Native	14.1	2.0	High	Very Poor	top snapped ~2m from base, tree mostly dead
896	Trail	Manitoba Maple	*Acer negundo*	Native	15.6	3.0	High	Poor	hazard trail tree, dieback &hobf throughout
897	Trail	Manitoba Maple	*Acer negundo*	Native	16.2	2.0	High	Poor	hazard trail tree, hobf inc scaff & leader dieback , lean
898	Trail	Manitoba Maple	*Acer negundo*	Native	14.6	2.0	High	Very Poor	hoscaff & leadr bf, dieback throughout
899	Trail	Manitoba Maple	*Acer negundo*	Native	11.7	1.5	High	Poor	throughout
900	Trail	Manitoba Maple	*Acer negundo*	Native	13.2	2.0	High	Very Poor	top of tree snapped & hanging, in trail footprint
720	Trail	Manitoba Maple	*Acer negundo*	Native	44.3	5.0	High	Poor	throughout, unbal
721	Trail	Manitoba Maple	*Acer negundo*	Native	30.0	3.0	High	Poor	dieback,
722	Trail	Black Cherry	*Prunus serotina*	Native	51.5	6.0	High	Poor	excessively
723	Trail	Black Cherry	*Prunus serotina*	Native	32.0	0.5	High	Dead	snag, hazard trail tree
724	Trail	Manitoba Maple	*Acer negundo*	Native	53.9	5.5	High	Poor	trail 2 footprint, hobf throughout incl lrg codom branch split & scaffs
725	Trail	Manitoba Maple	*Acer negundo*	Native	56.0	8.0	High	Poor	growth only, lrg
726	Trail	Manitoba Maple	*Acer negundo*	Native	42.6	3.0	High	Poor	epi at rf
727	Trail	Manitoba Maple	*Acer negundo*	Native	12.2	3.0	High	Very Poor	tree mostly dead with dieback & decay throughout
728	Trail	Manitoba Maple	*Acer negundo*	Native	14.4	3.0	Low	Fair	trail 2/3 under dripline, will require pruning back
729	Trail	Black Cherry	*Prunus serotina*	Native	13.8	2.5	Low	Good	trail 2/3 within dripline,
730	Trail	Black Cherry	*Prunus serotina*	Native	18.9	2.5	Low	Good	trail 1/2 within dripline, grapevine in canopy
731	Trail	White Birch	*Betula papyrifera*	Native	13.0	1.0	High	Dead	hazard trail tree
732	Trail	White Birch	*Betula papyrifera*	Native	11.7	0.5	High	Dead	hazard trail tree
733	Trail	Trembling Aspen	*tremuloides*	Native	12.0	2.0	Medium	Fair	ubc,calloused wound w frass, sapsucker & borer galleries
734	Trail	Trembling Aspen	*tremuloides*	Native	12.7	2.0	Low	Fair	calloused wound, some dieback, trail 1/2 footprint
735	Trail	Trembling Aspen	*tremuloides*	Native	22.2	2.5	Medium	Fair	trail 1/2 under dripline
736	Trail	Trembling Aspen	*tremuloides*	Native	13.8	1.5	Medium	Fair	grapevine in canopy w some dieback
737	Trail	White Cedar	*Thuja occidentalis*	Native	10.6	1.5	Low	Good	slight thinned crown due to nearby trees closeby
738	Trail	White Cedar	*Thuja occidentalis*	Native	12.6	1.5	Low	Good	minimal browning
739	Trail	Trembling Aspen	*tremuloides*	Native	10.0	2.0	Low	Fair	dripline under trail 1/2 footprint
740	Trail	Trembling Aspen	*tremuloides*	Native	10.1	1.5	Low	Fair	some dieback, dripline close to trail 1/2 footprint
741	Trail	Black Cherry	*Prunus serotina*	Native	11.7	2.5	Medium	Fair	overhanging trail &stem very close to footprint
742	Trail	Trembling Aspen	*tremuloides*	Native	14.5	3.0	High	Poor	single leader decay & snapped off, hanging, dieback
743	Trail	Scots Pine	*Pinus sylvestris*	Non-Native	21.0	3.0	High	Poor	prev topped, dieback &grapevine in canopy throughout
744	Trail	White Cedar	*Thuja occidentalis*	Native	11.4	1.0	Low	Fair	reduced crown as near clump of trees, otherwise good
745	Trail	White Cedar	*Thuja occidentalis*	Native	13.4	1.0	Low	Fair	reduced crown as near clump of trees, slightly thinning
746	Trail	Trembling Aspen	*tremuloides*	Native	13.5	2.0	High	Poor	extensive decay on stem and on wound, poor callous, dieback
747	Trail	White Birch	*Betula papyrifera*	Native	13.4	1.0	High	Dead	snag

749	Trail	Scots Pine	*Pinus sylvestris*	Non-Native	11.0	1.5	Low	Good	slight unbalanced crown otherwise good
1461	Development	Trembling Aspen	*tremuloides*	Native	16.8	2.5	Low	Good	
1462	Development	Trembling Aspen	*tremuloides*	Native	11.8	1.5	Low	Fair	s
1463	Development	Manitoba Maple	*Acer negundo*	Native	49.2	4.5	Medium	Poor	wf, db, wound
1464	Development	Trembling Aspen	*tremuloides*	Native	21.4	3	Medium	Fair	db
1465	Development	Trembling Aspen	*tremuloides*	Native	19	1.5	High	Very Poor	large trunk wound, broken top, lean
1466	Development	Manitoba Maple	*Acer negundo*	Native	35.5	4	Medium	Fair	wf, db, lean
1467	Development	Freeman's Maple	*Acer freemanii*	Native	28.5	5	Medium	Fair	wf, wounds
1468	Development	Freeman's Maple	*Acer freemanii*	Native	29.9	8	Medium	Fair	weak forks, trunk wounds
1469	Development	Freeman's Maple	*Acer freemanii*	Native	30.9	6	Low	Fair	lopsided crown, er, rw
1470	Development	Freeman's Maple	*Acer freemanii*	Native	32.8	4.5	Low	Good	lopsided
1471	Development	Freeman's Maple	*Acer freemanii*	Native	29.8	4	Low	Good	op, er
1472	Development	Freeman's Maple	*Acer freemanii*	Native	38.8	6	Low	Good	wh, er
1473	Development	Freeman's Maple	*Acer freemanii*	Native	88	8	High	Fair	lots of wf
1474	Development	Trembling Aspen	*tremuloides*	Native	24.1	3.5	Medium	Good	lean
1475	Development	Trembling Aspen	*tremuloides*	Native	35.1	4	Low	Poor	trunk wounds, rot
841	Development	Trembling Aspen	*tremuloides*	Native	15	1.5	Low	Fair	wd
865	Development	Manitoba Maple	*Acer negundo*	Native	45	6	High	Very Poor	rot

APPENDIX VI

Bird Species Known From or Observed Within the Subject Property and Vicinity

Bird Species Recorded From the Study Area

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	County of Wellington Status[5]	City of Guelph Status[7]	OBBA[6]	NRSI Observed		
								17NJ62	Development Area	Significant Natural Area	Subject Property
	DUCKS, GEESE & SWANS										
Branta canadensis	Canada Goose	S5						AE	X		X
Aix sponsa	Wood Duck	S5						FY			
Anas platyrhynchos	Mallard	S5						FY			X
Mergus merganser	Common Merganser	S5B, S5N				√	X	FY			
	PARTRIDGES, GROUSE & TURKEYS										
Bonasa umbellus	Ruffed Grouse	S4						T			X
Meleagris gallopavo	Wild Turkey	S5						H			
	LOONS										
Gavia immer	Common Loon	S5B, S5N	NAR	NAR		√	X	H			
	GREBES										
Podilymbus podiceps	Pied-billed Grebe	S4B, S4N				√		CF			
	HERONS & BITTERNS										
Ixobrychus exilis	Least Bittern	S4B	THR	T	Schedule 1	√		S			
Ardea herodias	Great Blue Heron	S4B				**	X	V		X	X
Butorides virescens	Green Heron	S4B				**	X	FY			
	VULTURES										
Cathartes aura	Turkey Vulture	S5B				√		H	X		X
	HAWKS, KITES & EAGLES										
Pandion haliaetus	Osprey	S5B				√		NY			
Haliaeetus leucocephalus	Bald Eagle	S2N, S4B	SC	NAR		√			X		X
Circus cyaneus	Northern Harrier	S4B	NAR	NAR		√*	X	H			
Accipiter striatus	Sharp-shinned Hawk	S5	NAR			√*	X	A	X		X
Accipiter cooperii	Cooper's Hawk	S4	NAR	NAR		√*	X	CF			
Buteo platypterus	Broad-winged Hawk	S5B				√	X	H			
Buteo jamaicensis	Red-tailed Hawk	S5	NAR	NAR				AE			
	RAILS, GALLINULES & COOTS										
Rallus limicola	Virginia Rail	S5B						A			
Porzana carolina	Sora	S4B				√		T			
	PLOVERS										
Charadrius vociferus	Killdeer	S5B, S5N						FY			

Bird Species Recorded From the Study Area

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	County of Wellington Status[5]	City of Guelph Status[7]	OBBA[6]	NRSI Observed		
								17NJ62	Development Area	Significant Natural Area	Subject Property
	SANDPIPERS & PHALAROPES										
Actitis macularia	Spotted Sandpiper	S5						FY			
Gallingo delicata	Wilson's Snipe	S5B						S			
Scolopax minor	American Woodcock	S4B						D		X	X
	GULLS, TERNS & SKIMMERS										
Larus delawarensis	Ring-billed Gull	S5B, S4N				**	X		X		X
	PIGEONS & DOVES										
Columba livia	Rock Pigeon	SNA						NY			X
Zenaida macroura	Mourning Dove	S5						FY	T	S	T
	CUCKOOS & ANIS										
Coccyzus erythropthalmus	Black-billed Cuckoo	S5B				√*	X	H			
	TYPICAL OWLS										
Megascops asio	Eastern Screech-Owl	S4	NAR	NAR				FY			
Bubo virgianus	Great Horned Owl	S4						NY			
Asio otus	Long-eared Owl	S4				√		FY			
	SWIFTS										
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1	√		T			
	HUMMINGBIRDS										
Archilochus colubris	Ruby-throated Hummingbird	S5B						D			
	KINGFISHERS										
Megaceryle alcyon	Belted Kingfisher	S4B				√	X	CF			
	WOODPECKERS										
Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	SC	T	Schedule 1	√		H			
Picoides pubescens	Downy Woodpecker	S5						FY		H	H
Picoides villosus	Hairy Woodpecker	S5				√*	X	FY			X
Colaptes auratus	Northern Flicker	S4B				√*	X	NY	S	H	S/H
Dryocopus pileatus	Pileated Woodpecker	S5				√*	X	N			
	CARACARAS & FALCONS										
Falco sparverius	American Kestrel	S4				√*	X	H			

Bird Species Recorded From the Study Area

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	County of Wellington Status[5]	City of Guelph Status[7]	OBBA[6]	NRSI Observed		
								17NJ62	Development Area	Significant Natural Area	Subject Property
	TYRANT FLYCATCHERS										
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC		√	X	T		S	S
Empidonax alnorum	Alder Flycatcher	S5B						T			
Empidonax traillii	Willow Flycatcher	S5B				√	X	S			
Empidonax minimus	Least Flycatcher	S4B				√	X	T			
Sayornis phoebe	Eastern Phoebe	S5B						NE			
Myiarchus crinitus	Great Crested Flycatcher	S4B						CF			
Tyrannus tyrannus	Eastern Kingbird	S4B				√*	X	FY			
	VIREOS										
Vireo gilvis	Warbling Vireo	S5B						FY			
Vireo olivaceus	Red-eyed Vireo	S5B						CF	S		S
	CROWS & JAYS										
Cyanocitta cristata	Blue Jay	S5						FY	S	S	S
Corvus brachyrhynchos	American Crow	S5B						CF	H	S	S/H
Corvus corax	Common Raven	S5				√	X	H			
	LARKS										
Eremophila alpestris	Horned Lark	S5B						T			
	SWALLOWS										
Tachycineta bicolor	Tree Swallow	S4B						NY			X
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B						NY			
Riparia riparia	Bank Swallow	S4B	THR	T	√* (only significant in nesting c		X	NY			
Petrochelidon pyrrhonota	Cliff Swallow	S4B			** (only significant in nesting		X	NE			
Hirundo rustica	Barn Swallow	S4B	THR	T				FY			
	CHICKADEES & TITMICE										
Poecile atricapillus	Black-capped Chickadee	S5						NE	T	S	T
	NUTHATCHES										
Sitta canadensis	Red-breasted Nuthatch	S5				√*	X	FY			
Sitta carolinensis	White-breasted Nuthatch	S5						AE			X
	CREEPERS										
Certhia americana	Brown Creeper	S5B				√*	X	CF			
	WRENS										
Thryothorus ludovicianus	Carolina Wren	S4					X	NY			

Bird Species Recorded From the Study Area

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	County of Wellington Status[5]	City of Guelph Status[7]	OBBA[6]	NRSI Observed		
								17NJ62	Development Area	Significant Natural Area	Subject Property
Troglodytes aedon	House Wren	S5B						AE		S/H	S/H
Troglodytes hiemalis	Winter Wren	S5B				√*	X	T			
Cistothorus palustris	Marsh Wren	S4B				√		S			
	KINGLETS										
Regulus satrapa	Golden-crowned Kinglet	S5B				√					X
	THRUSHES										
Sialia sialis	Eastern Bluebird	S5B	NAR	NAR				NY			
Catharus fuscescens	Veery	S4B				√*	X	T			
Hylocichla mustelina	Wood Thrush	S4B	SC	T		√*	X	T		S	S
Turdus migratorius	American Robin	S5B						NY	T	S/H	T
	MOCKINGBIRDS & THRASHERS										
Dumetella carolinensis	Gray Catbird	S4B						A	T	S/H	T
Toxostoma rufum	Brown Thrasher	S4B				√	X	CF		S	S
	STARLINGS										
Sturnus vulgaris	European Starling	SNA						NY	X		X
	WAXWINGS										
Bombycilla cedrorum	Cedar Waxwing	S5B						NB	T		T
	WOOD-WARBLERS										
Seiurus aurocapillus	Ovenbird	S4B				√*	X	CF			
Parkesia noveboracensis	Northern Waterthrush	S5B						CF			
Vermivora cyanoptera	Blue-winged Warbler	S4B				√	X	S			
Mniotilta varia	Black-and-white Warbler	S5B				√*	X	NY			
Oreothlypis ruficapilla	Nashville Warbler	S5B						T			
Geothylpis philadelphia	Mourning Warbler	S4B						T			
Geothylpis trichas	Common Yellowthroat	S5B						AE	T	T	T
Setophaga ruticilla	American Redstart	S5B				√*	X	T		S	S
Setophaga magnolia	Magnolia Warbler	S5B				√	X	S			X
Setophaga fusca	Blackburnian Warbler	S5B				√	X	S			

Bird Species Recorded From the Study Area

Scientific Name	Common Name	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	County of Wellington Status[5]	City of Guelph Status[7]	OBBA[6]	NRSI Observed		
								17NJ62	Development Area	Significant Natural Area	Subject Property
Setophaga petechia	Yellow Warbler	S5B						CF		S	S
Setophaga pensylvanica	Chestnut-sided Warbler	S5B						S			X
Setophaga pinus	Pine Warbler	S5B				√*	X	T			
Setophaga coronata	Yellow-rumped Warbler	S5B						T			
Setophaga virens	Black-throated Green Warbler	S5B				√	X	T			
	SPARROWS										
Pipilo erythrophthalmus	Eastern Towhee	S4B				√*	X	NB			
Spizella arborea	American Tree Sparrow	S4B									X
Spizella passerina	Chipping Sparrow	S5B						FY	X		X
Spizella pallida	Clay-colored Sparrow	S4B				√		CF			
Spizella pusilla	Field Sparrow	S4B				√*	X	FY			
Passerculus sandwichensis	Savannah Sparrow	S4B					X	NE			
Ammodramus savannarum	Grasshopper Sparrow	S4B				√	X	P			
Melospiza melodia	Song Sparrow	S5B						NY	T	T	T
Melospiza georgiana	Swamp Sparrow	S5B						CF			
Zonotrichia albicollis	White-throated Sparrow	S5B						T			
Junco hyemalis	Dark-eyed Junco	S5B				√	X		X		X
	CARDINALS & ALLIES										
Piranga olivacea	Scarlet Tanager	S4B				√	X	S			
Cardinalis cardinalis	Northern Cardinal	S5						FY	T	T	T
Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B				√*	X	T		S/H	S/H
Passerina cyanea	Indigo Bunting	S4B						T			
	BLACKBIRDS										
Dolichonyx oryzivorus	Bobolink	S4B	THR	T	No Schedule	√*		T			
Agelaius phoeniceus	Red-winged Blackbird	S4						NY	T	N	N
Sturnella magna	Eastern Meadowlark	S4B	THR	T		√*		T			
Quiscalus quiscula	Common Grackle	S5B						CF	S	S	S
Molothrus ater	Brown-headed Cowbird	S4B						NY			
Icterus galbula	Baltimore Oriole	S4B				√*	X	FY	P		P
	FINCHES										
Carpodacus mexicanus	House Finch	SNA						FY			X
Carpodacus purpureus	Purple Finch	S4B						FY			
Spinus pinus	Pine Siskin	S4B					X	T			
Spinus tristis	American Goldfinch	S5B						FY	T	P	T
	OLD WORLD SPARROWS										
Passer domesticus	House Sparrow	SNA						T			

[1]MNRF 2014, [2]MNRF 2015, [3]COSEWIC 2015, [4]Government of Canada 2015, [5]Guelph Natural Heritage Strategy 2009, [6]BSC et al. 2008, [7]City of Guelp 2012

LEGEND
SRANK
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SU Unrankable
SNA Unranked
COSSARO
THR Threatened
SC Special Concern
NAR Not at Risk
COSEWIC
T Threatened
SC Special Concern
NAR Not at Risk
SARA Schedule
Schedule 1 Officially Protected under SARA
County Status
√ Significant and rare
√* Significant but not rare
** Only habitats that support or have recently supported active nests should be consi
City Status
X: Significant
OBBA Breeding Evidence Codes
Observed
X Species observed in its breeding season with no evidence of breeding
Possible
H Species observed in its breeding season in suitable nesting habitat
S Singing male present of breeding calls heard in breeding season in suitable nestin
Probable
P Pair observed in their breeding season in suitable nesting habitat
T Permanent territory presumed through registration of territorial song on at least 2
D Courtship or display between a male and female or 2 males including courtship fe
V Visiting probable nest site
A Agitated behaviour or anxiety calls of an adult
B Brood patch on adult female or cloacal protuberance on adult male
N Nest building or excavation of nest site
Confirmed
DD Distraction display or injury feigning
NU Used nest or egg shell found (occupied/laid this season)
FY Recently fledged young or downy young
AE Adults leaving or entering nest site in circumstances indicating occupied nest
FS Adult carrying faecal sac
CF Adult carrying food for young
NE Nest containing eggs
NY Nest with young seen or heard

APPENDIX VII

Herpetofauna Species Known From or Observed Within the Subject Property and Vicinity

Herpetofauna Reported From the Study Area

SCIENTIFIC NAME	COMMON NAME	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	Ontario Reptile and Amphibian Atlas[5]	City of Guelph Status[7]	County of Wellington Status[8]	NHIC Data[6]	NRSI Observed		
										Development Area	Significant Natural Area	Subject Property
Turtles												
Chelydra serpentina serpentina	Snapping Turtle	S3	SC	SC	Schedule 1	X		R				
Chrysemys picta marginata	Midland Painted Turtle	S5				X		X				
Emydoidea blandingii	Blanding's Turtle (*Great Lakes/St Lawrence population*)	S3	THR	T	Schedule 1	X		R	X			
Graptemys geographica	Northern Map Turtle	S3	SC	SC	Schedule 1	X		R	X			
Snakes												
Lampropeltis taylori triangulum	Eastern Milksnake	S3	SC	SC	Schedule 1	X		R				
Opheodrys vernalis	Smooth Greensnake	S4				X	X	R				
Nerodia sipedon sipedon	Common Watersnake	S5	NAR	NAR		X	X	R				
Storeria dekayi dekayi	Northern Brownsnake	S5	NAR	NAR		X	X	R				
Storeria occipitomaculata occipitomaculata	Northern Red-bellied Snake	S5				X	X	R				
Thamnophis sauritus septentrionalis	Northern Ribbonsnake	S3	SC	SC	Schedule 1	X		R	X			
Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5				X		X		X	X	X
Salamanders												
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	E	Schedule 1	X		R				
Ambystoma laterale	Blue-spotted Salamander	S4				X	X	R				
Ambystoma maculatum	Spotted Salamander	S4				X	X	R				
Hemidactylium scutatum	Four-toed Salamander	S4	NAR	NAR		X	X	R				
Necturus maculosus	Mudpuppy	S4	NAR	NAR		X	X	R				
Notophthalmus viridescens viridescens	Red-spotted Newt	S5				X	X	R				
Plethodon cinereus	Eastern Red-backed Salamander	S5				X		X				
Toads and Frogs												
Anaxyrus americanus	American Toad	S5				X		X			X	X
Hyla versicolor	Tetraploid Gray Treefrog	S5				X		X			X	X
Pseudacris triseriata pop. 2	Western Chorus Frog *(Gr. Lakes/St. Lawrence - Canadian Shield Population)*	S3	NAR	T	Schedule 1	X		R				
Pseudacris crucifer	Spring Peeper	S5				X		X			X	X
Lithobates catesbeiana	American Bullfrog	S4				X	X	R				
Lithobates clamitans melanota	Northern Green Frog	S5				X		X			X	X
Lithobates palustris	Pickerel Frog	S4	NAR	NAR		X	X	R				
Lithobates pipiens	Northern Leopard Frog	S5	NAR	NAR		X		X				X
Lithobates sylvatica	Wood Frog	S5				X		X			X	X

[1]MNRF 2015, [2]MNRF 2015, [3]COSEWIC 2015, [4]Government of Canada 2015, [5]Ontario Nature 2015, [6]MNRF 2014, [7]City of Guelph 2012, [8]Dougan & Associates 2009

Herpetofauna Reported From the Study Area

Legend
SRANK
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
COSSARO
END Endangered
THR Threatened
SC Special Concern
NAR Not at Risk
COSEWIC
E Endangered
T Threatened
SC Special Concern
NAR Not at Risk
SARA Schedule
Schedule 1 Officially Protected under SARA
County Status
X Present
R Rare
City Status
X Significant

APPENDIX VIII

Mammal Species Known From or Observed Within the Subject Property and Vicinity

Mammals Recorded From the Study Area

Scientific Name	Common Name	SRANK	OMNR[1]	COSEWIC[2]	SARA Schedule[3]	Ontario Mammal Atlas[4]	City of Guelph Status[5]	County of Wellington Status[6]	NHIC Data[7]	NRSI Observed		
										Development Area	Significant Natural Area	Subject Property
Blarina brevicauda	Northern Short-tailed Shrew	S5				X		X				
Canis latrans	Coyote	S5				X		X				X
Castor canadensis	Beaver	S5				X		X				X
Condylura cristata	Star-nosed Mole	S5				X		X				
Didelphis virginiana	Virginia Opossum	S4				X		X				
Eptesicus fuscus	Big Brown Bat	S5				X		X				
Erethizon dorsatum	Porcupine	S5				X		X				
Glaucomys sabrinus	Northern Flying Squirrel	S5				X	X	R				
Lasionycteris noctivagans	Silver-haired Bat	S4				X		X				
Lasiurus borealis	Red Bat	S4				X		X				
Lasiurus cinereus	Hoary Bat	S4				X		X				
Lepus americanus	Snowshoe Hare	S5				X	X	R				
Lepus europaeus	European Hare	SE				X		X				
Marmota monax	Woodchuck	S5				X		X				X
Mephitis mephitis	Striped Skunk	S5				X		X				
Microtus pennsylvanicus	Meadow Vole	S5				X		X				
Mus musculus	House Mouse	SE				X		X				
Mustela erminea	Ermine	S5				X		X				
Mustela frenata	Long-tailed Weasel	S4				X	X	R				
Mustela vison	Mink	S5				X		X				
Myotis lucifugus	Little Brown Myotis	S4	END	E		X		R				
Napeozapus insignis	Woodland Jumping Mouse	S5				X		R				
Odocoileus virginianus	White-tailed Deer	S5				X		X		X	X	X
Ondatra zibethicus	Muskrat	S5				X		X				
Parascalops breweri	Hairy-tailed Mole	S4				X	X	R				
Perimyotis subflavus	Tricoloured Bat	S3?		E		X		R	X			
Peromyscus leucopus	White-footed Mouse	S5				X		X				
Peromyscus maniculatus	Deer Mouse	S5				X		X				
Peromyscus sp.	Mouse sp.											X
Procyon lotor	Raccoon	S5				X		X			X	X
Rattus norvegicus	Norway Rat	SE				X		X				
Sciurus carolinensis	Gray Squirrel	S5				X		X		X		X
Sorex cinereus	Masked (Common) Shrew	S5				X		X				
Sorex fumeus	Smokey Shrew	S5				X		X				
Sylvilagus floridanus	Eastern Cottontail	S5				X		X		X	X	X
Tamias striatus	Eastern Chipmunk	S5				X		X				X

Mammals Recorded From the Study Area

Scientific Name	Common Name	SRANK	OMNR[1]	COSEWIC[2]	SARA Schedule[3]	Ontario Mammal Atlas[4]	City of Guelph Status[5]	County of Wellington Status[6]	NHIC Data[7]	NRSI Observed		
										Development Area	Significant Natural Area	Subject Property
Tamiasciurus hudsonicus	Red Squirrel	S5				X		X				X
Vulpes vulpes	Red Fox	S5				X		X				
Zapus hudsonius	Meadow Jumping Mouse	S5				X		X				

[1]MNRF 2015, [2]COSEWIC 2015, [3]Government of Canada 2015, [4]Dobbyn 1994, [5]City of Guelph 2012, [6]Dougan & Associates 2009, [7]MNRF 2014

Legend
SRANK
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SU Unrankable
SNA Unranked
COSSARO
END Endangered
COSEWIC
E Endangered
Wellington County Status
X Present
R Rare
City of Guelph Status
X Significant

APPENDIX IX

Butterfly Species Known From or Observed Within the Subject Property and Vicinity

Butterfly Species Reported From the Study Area

									NRSI Observed		
SCIENTIFIC NAME	COMMON NAME	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Butterfly Atlas[5]	City of Guelph Status[6]	County of Wellington Status[7]	Development Area	Significant Natural Area	Subject Property
Vanessa virginiensis	American Lady	S5				X					
Speyeria aphrodite	Aphrodite Fritillary	S5				X					
Carterocephalus palaemon	Arctic Skipper	S5				X					
Euphydryas phaeton	Baltimore Checkerspot	S4				X					
Satyrium calanus	Banded Hairstreak	S4				X					
Papilio polyxenes	Black Swallowtail	S5				X					
Poanes viator	Broad-winged Skipper	S4				X					
Lycaena hyllus	Bronze Copper	S5				X					
Junonia coenia	Common Buckeye	SNA				X					
Pieris rapae	Cabbage White	SNA				X					X
Pyrgus communis	Common Checkered Skipper	SNA				X					
Colias philodice	Clouded Sulphur	S5				X					
Coenonympha tullia	Common Ringlet	S5				X			X		X
Cercyonis pegala	Common Wood-Nymph	S5				X					
Satyrium titus	Coral Hairstreak	S5				X					
Anatrytone logan	Delaware Skipper	S4				X		X			
Erynnis icelus	Dreamy Duskywing	S5				X					
Euphyes vestris	Dun Skipper	S5				X					
Callophrys niphon	Eastern Pine Elfin	S5				X					
Cupido comyntas	Eastern Tailed Blue	S5				X					
Papilio glaucus	Eastern Tiger Swallowtail	S5				X					
Thymelicus lineola	European Skipper	SNA				X					
Lethe eurydice	Eyed Brown / Northern Eyed Brown	S5				X					
Hylephila phyleus	Fiery Skipper	SNA				X					
Papilio cresphontes	Giant Swallowtail	S3				X		X			
Speyeria cybele	Great Spangled Fritillary	S5				X					
Poanes hobomok	Hobomok Skipper	S5				X					
Erynnis juvenalis	Juvenal's Duskywing	S5				X					
Ancyloxypha numitor	Least Skipper	S5				X					
Pompeius verna	Little Glassywing	S4				X	X	X			
Megisto cymela	Little Wood-Satyr	S5				X			X		X
Boloria bellona	Meadow Fritillary	S5				X					

Butterfly Species Reported From the Study Area

SCIENTIFIC NAME	COMMON NAME	SRANK[1]	COSSARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Butterfly Atlas[5]	City of Guelph Status[6]	County of Wellington Status[7]	NRSI Observed		
									Development Area	Significant Natural Area	Subject Property
Danaus plexippus	Monarch	S2N, S4B	SC	SC	Schedule 1	X		X			
Nymphalis antiopa	Mourning Cloak	S5				X					
Pieris oleracea	Mustard White	S4				X					
Wallengrenia egeremet	Northern Broken Dash	S5				X					
Thorybes pylades	Northern Cloudywing	S5				X					
Phyciodes cocyta	Northern Crescent	S5				X					
Enodia anthedon	Northern Pearly-Eye	S5				X					
Colias eurytheme	Orange Sulphur	S5				X					
Vanessa cardui	Painted Lady	S5				X					
Phyciodes sp.	Crescent sp.								X		X
Phyciodes tharos	Pearl Crescent	S4				X					
Polites peckius	Peck's Skipper	S5				X					
Colias interior	Pink-edged Sulphur	S5				X					
Polygonia interrogationis	Question Mark	S5				X					
Vanessa atalanta	Red Admiral	S5				X					
Limentis arthemis astyanax	Red-spotted Purple	S5				X					
Polygonia satyrus	Satyr Comma	S4				X					
Epargyreus clarus	Silver-spotted Skipper	S4				X					
Celastrina ladon	Spring Azure	S5				X					
Satyrium liparops	Striped Hairstreak	S5				X					
Celastrina neglecta	Summer Azure	S5				X					
Polites themistocles	Tawny-edged Skipper	S5				X					
Limenitis archippus	Viceroy	S5				X					
Euptoieta claudia	Variegated Fritillary	SNA				X					
Pieris virginiensis	West Virginia White	S3		SC		X		X			
Pontia protodice	Checkered White	SNA				X					
Limenitis arthemis arthemis	White Admiral/Banded Purple	S5				X					
Erynnis baptisiae	Wild Indigo Duskywing	S4				X	X	X			

[1]MNRF 2014, [2]OMNR 2015, [3]COSEWIC 2015, [4]Government of Canada 2015, [5]Jones et al. 2013, [6]City of Guelph 2012, [7]Dougan & Associates 2009

LEGEND	
SRANK	**COSSARO**
S2 Imperiled	SC Special Concern
S3 Vulnerable	**COSEWIC**
S4 Apparently Secure	SC Special Concern
S5 Secure	**SARA Schedule**
SNA Unranked	Schedule 1 Officially Protected under SARA
City and County Status	
X Significant	

APPENDIX X

Odonata Species Known From or Observed Within the Subject Property and Vicinity

Dragonfly and Damselfly Species Reported From the Study Area

									NRSI Observed		
Scientific Name	**Common Name**	**SRANK[1]**	**OMNR[2]**	**COSEWIC[3]**	**SARA Schedule[4]**	**Ontario Odonata Atlas[5]**	**City of Guelph[6]**	**County of Wellington Status[7]**	**Development Area**	**Significant Natural Area**	**Subject Property**
Calopterygidae	**Broadwinged Damselflies**										
Calopteryx aequabilis	River Jewelwing	S5				X					
Calopteryx maculata	Ebony Jewelwing	S5				X					
Hetaerina americana	American Rubyspot	S4				X					
Lestidae	**Spreadwings**										
Lestes congener	Spotted Spreadwing	S5				X					
Lestes disjunctus	Common Spreadwing	S5				X					
Lestes dryas	Emerald Spreadwing	S5				X					
Lestes rectangularis	Slender Spreadwing	S5				X					
Lestes unguiculatus	Lyre-tipped Spreadwing	S5				X					
Coenagrionidae	**Narrow-winged Damselflies**										
Amphiagrion saucium	Eastern Red Damsel	S4				X		X			
Argia fumipennis violacea	Violet Dancer	S5				X					
Argia moesta	Powdered Dancer	S5				X					
Coenagrion resolutum	Taiga Bluet	S5				X		X			
Enallagma boreale	Boreal Bluet	S5				X					
Enallagma carunculatum	Tule Bluet	S5				X					
Enallagma civile	Familiar Bluet	S5				X					
Enallagma ebrium	Marsh Bluet	S5				X					
Enallagma exsulans	Stream Bluet	S5				X					
Enallagma vernale	Spring Northern Bluet	S4				X					
Ischnura verticalis	Eastern Forktail	S5				X					
Nehalennia irene	Sedge Sprite	S5				X					
Aeshnidae	**Darners**										
Aeshna canadensis	Canada Darner	S5				X					
Aeshna clepsydra	Mottled Darner	S3				X		X			
Aeshna constricta	Lance-tipped Darner	S5				X					
Aeshna interrupta	Variable Darner	S5				X		X			
Aeshna umbrosa	Shadow Darner	S5				X					
Anax junius	Common Green Darner	S5				X					
Basiaeschna janata	Springtime Darner	S5				X		X			
Boyeria vinosa	Fawn Darner	S5				X					

Dragonfly and Damselfly Species Reported From the Study Area

									NRSI Observed		
Scientific Name	**Common Name**	**SRANK[1]**	**OMNR[2]**	**COSEWIC[3]**	**SARA Schedule[4]**	**Ontario Odonata Atlas[5]**	**City of Guelph[6]**	**County of Wellington Status[7]**	**Development Area**	**Significant Natural Area**	**Subject Property**
Gomphidae	**Clubtails**										
Dromogomphus spinosus	Black-shouldered Spinyleg	S5				X		X			
Gomphus descriptus	Harpoon Clubtail	S3				X		X			
Gomphus lividus	Ashy Clubtail	S4				X		X			
Hagenius brevistylus	Dragonhunter	S5				X		X			
Ophiogomphus rupinsulensis	Rusty Snaketail	S4				X		X			
Stylogomphus albistylus	Least Clubtail	S4				X		P			
Corduliidae	**Emeralds**										
Epitheca canis	Beaverpond Baskettail	S5				X					
Somatochlora tenebrosa	Clamp-tipped Emerald	S2S3				X		X			
Somatochlora walshii	Brush-tipped Emerald	S4				X	X	X			
Somatochlora williamsoni	Williamson's Emerald	S4				X	X	X			
Libellulidae	**Skimmers**										
Celithemis elisa	Calico Pennant	S5				X					
Celithemis eponina	Halloween Pennant	S4				X	X	X			
Ladona julia	Chalk-fronted Corporal	S5				X	X	X			
Leucorrhinia intacta	Dot-tailed Whiteface	S5				X					
Libellula luctuosa	Widow Skimmer	S5				X					
Libellula pulchella	Twelve-spotted Skimmer	S5				X					
Libellula quadrimaculata	Four-spotted Skimmer	S5				X					
Libellula semifasciata	Painted Skimmer	S2				X		X			
Pachydiplax longipennis	Blue Dasher	S5				X					
Pantala flavescens	Wandering Glider	S4				X					
Perithemis tenera	Eastern Amberwing	S4				X	X	X			
Plathemis lydia	Common Whitetail	S5				X					
Sympetrum internum	Cherry-faced Meadowhawk	S5				X					
Sympetrum obtrusum	White-faced Meadowhawk	S5				X					
Sympetrum rubicundulum	Ruby Meadowhawk	S5				X					
Sympetrum semicinctum	Band-winged Meadowhawk	S4				X					
Sympetrum vicinum	Yellow-legged (Banded) Meadowhawk	S5				X					
Tramea lacerata	Black Saddlebags	S4				X					
					Total	**56**					

[1]MNRF 2014; [2]MNRF 2015; [3]COSEWIC 2015; [4]Government of Canada 2015; [5]OMNR 2005, [6]City of Guelph 2012, [7]Dougan & Associates 2009

LEGEND
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
County and City Status
X: Significant

APPENDIX XI

Significant Wildlife Habitat Assessment

Appendix. Significant Wildlife Habitat Screening Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)				
American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH. <u>Information Sources</u> • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • Any mixed species aggregations of 100Í or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependant on local site conditions and adjacent land use is the significant wildlife habitat [cxlviii]. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHDSS[cxlix] Index #7 provides development effects and mitigation measures.	Dry-Fresh Meadow is present within the subject property. However there is no evidence of annual spring flooding. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)				
Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water); • <u>Information Sources</u> • Canadian Wildlife Service staff know the larger, most significant sites. Check website: http://wildspace.ec.gc.ca • Naturalist clubs often are aware of staging/stopover areas. • OMNR Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • NHIC Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100Í or more of listed species for 7 daysÍ, results in > 700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH [cxlix] • The combined area of the ELC ecosites and a 100m radius area is the SWH [cxlviii] • Wetland area and shorelines associated with sites identified within the SWHTG [cxlviii] Appendix K [cxlix] are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHDSS[cxlix] Index #7 provides development effects and mitigation measures.	Cattail Marsh is present within the PSW (120m from the subject property) however, there is no shallow water inundation associated with these wetlands. Species congregations not observed during field investigations **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Shorebird Migratory Stopover Area				
Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • NHIC Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000Í shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100Í Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area [cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS[cxlix] Index #8 provides development effects and mitigation measures.	Suitable habitat not present within the subject property **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Raptor Wintering Area				
Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl **<u>Special Concern:</u>** Short-eared Owl	Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW.	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering sites need to be > 20 ha [cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi]. Least disturbed sites, idle/fallow or lightly grazed field/meadow with adjacent woodlands [cxlix] <u>Information Sources</u>: • OMNR Ecologist or Biologist may be aware of locations of wintering raptors. In addition, these staff may know local naturalists that may be aware of the locations of raptor wintering habitats. • NHIC Raptor Winter Concentration Area • Data from Bird Studies Canada, most notably for Short-eared Owls. • Reports and other information available from CAs.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; • At least 10 individuals and two listed spp[i]. • To be significant a site must be used regularly (3 in 5 years) [cxlix] for a minimum of 20 days by the above number of birds[i]. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS[cxlix] Index #10 provides development effects and mitigation measures.	Fresh-Moist Poplar Forest and Dry-Fresh Meadow are present within the subject property and adjacent lands. Forested ecosites within the subject property do not meet size requirements. However, the North-East Wetland Complex is large and within 120m of the subject property. Raptor winter survey completed – no target species observed **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Bat Hibernacula				
Big Brown Bat Little Brown Myotis Eastern Pipistrelle/Tri-coloured Bat Northern Myotis Eastern Small-footed Myotis	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> • OMNR for possible locations and contact for local experts • NHIC Bat Hibernaculum/Nursery • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (eg. Sierra Club) • University Biology Departments with bat experts.	• All sites with confirmed hibernating bats are SWH Í. • The area includes 1000m radius around the entrance of the hibernaculum [cxlviii, ccvii, Í]. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Guideline for Wind Power Projects Potential Impacts to Bats and Bat Habitats"[ccv]. • SWHDSS[cxlix] Index #1 provides development effects and mitigation measures.	There are no caves present within the subject property. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Bat Maternity Colonies				

Big Brown Bat
Little Brown Myotis
Silver-haired Bat
Northern Myotis
	Maternity colonies considered SWH are found in forested Ecosites.
	
	All ELC Ecosites in ELC Community Series:
	FOD
	FOM
		Maternity colonies can be found in tree cavities, vegetation and often in buildlings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). Maternity roosts are not found in caves and mines in Ontario[xxii].
		• Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii]
		• Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 [ccxiv] or class 1 or 2 [ccxii] .
		• Northern Myotis prefer contiguous tracts of older forest cover for foraging and roosting in snags and trees[ccix]
		• Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx]
		
		<u>Information Sources</u>
		• OMNR for possible locations and contact for local experts
		• University Biology Departments with bat experts.
			• Maternity Colonies with confirmed use by;
			  • >20 Northern Myotis[cxlix]
			  • >10 Big Brown Bats[Í]
			  • >20 Little Brown Myotis[Í]
			  • >5 Adult Female Silver-haired Bats[Í]
			• The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies[Í].
			• Evaluation methods for maternity colonies should be conducted following methods outlined in the "Guideline for Wind Power Projects Potential Impacts to Bats and Bat Habitats"[ccv].
			• SWHDSS[cxlix] Index #1 provides development effects and mitigation measures.
				Fresh-Moist Poplar Forest is found within and adjacent to the subject property.
				
				Significant Woodland located outside the development area may contain suitable habitat
				
				Candidate SWH
				(outside development area)

Wildlife Species[1]	Candidate SWH		Confirmed SWH	Grand Valley Gravel Pit
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Bat Migratory Stopover Area				
Hoary Bat Eastern Red Bat Silver-haired Bat	No specific ELC types.	Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migrations concentrate these species of bats at stopover areas. The location and characteristics of stopover habitats are generally unknown. <u>Information Sources</u> • OMNR for possible locations and contact for local experts • University of Waterloo, Biology Department	Long Point (42°35'N, 80°30'E, to 42°33'N, 80°03'E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration [ccxv]. • The confirmation criteria and habitat areas for this SWH are still being determined. • SWHDSS [cxlix] Index #38 provides development effects and mitigation measures	Not located near Long Point **Not SWH**

Wildlife Habitat: Turtle Wintering Areas				
Midland Painted Turtle **<u>Special Concern:</u>** Northern Map Turtle Snapping Turtle	Snapping and Midland Painted turtles, ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. [cix], [cx], [cxi], [cxviii] <u>Information Sources</u> • EIS studies carried out by Conservation Authorities. • Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNR ecologist or biologist may be aware of locations of wintering turtles • NHIC	• Presence of 5 over-wintering Midland Painted Turtles is significant[i]. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[i]. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) [cvii]. Congregation of turtles is more common where wintering areas are limited and therefore significant [cix, cx, cxi, cxii]. • SWHDSS[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	There are no deep, permanent water bodies within the subject proptery or 120m adjacent lands**.** **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Snake Hibernaculum				
Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake **Special Concern:** Milksnake Eastern Ribbonsnake Lizard: **Special Concern (Southern Shield population):** Five-lined Skink	For all snakes, habitat may be found in any ecosite in central Ontario other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. The existence of rock piles or slopes, stone fences, and crumbling foundations assist in identifying candidate SWH. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line[xliv, l, li, lii, cxii]. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g.old dug wells). • Reports and other information available from CAs. • Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • NHIC Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures [cciii]. Information Sources • Reports and other information available from CAs. • Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNR ecologist or biologist may be aware of locations of wintering skinks • NHIC	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)Í . • Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity.]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The the feature in which the hibernacula is located plus a 30 m buffer is the SWHÍ • SWHDSS[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHDSS[cxlix] Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.	Fresh-Moist Poplar Forest and Dry-Fresh Meadow may contain areas of burrows or rock crevices that provide access to subterranean sites. Field investigations did not result in the observation of potential hibernaculum habitat within the property **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Colonially – Nesting Bird Breeding Habitat (Bank and Cliff)				
Bank Swallow Cliff Swallow Northern Rough-winged Swallow	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles (Bank Swallow and N. Rough-winged Swallow). Cliff faces, bridge abutments, silos, barns (Cliff Swallows). Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> • Reports and other information available from CAs • Ontario Breeding Bird Atlas [ccv]. • Bird Studies Canada; *NatureCounts* http://www.birdscanada.org/birdmon/ • Naturalist clubs.	Studies confirming: • Presence of 1 or more nesting sites with 8[cxlvix] or more cliff swallow pairs or 50[Í] bank swallow and rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[ccvii] • Field surveys to observe and count swallow nests are to be completed during the breeding season (May-June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS[cxlix] Index #4 provides development effects and mitigation measures	Suitable habitat for Colonially – Nesting Bird Breeding is not present within the subject property or adjacent lands. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Colonially – Nesting Bird Breeding Habitat (Tree/Shrubs)				
Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> • Ontario Breeding Bird Atlas [ccv], colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR). • NHIC Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from CAs. • MNR District Offices. • Local naturalist clubs.	Studies confirming: • Presence of 5[i] or more active nests of Great Blue Heron. • The edge of the colony and a minimum 300m area of habitat or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH [cc, ccvii] • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWHDSS[cxlix] Index #5 provides development effects and mitigation measures.	Suitable habitat is not present within the subject property. Suitable habitat may be present within the adjacent lands (within the PSW). No heron nests were observed within the property; no heron observations with evidence of breeding **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Colonially – Nesting Bird Breeding Habitat (Ground)				
Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6; MAS1 – 3; CUM CUT CUS	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> • Ontario Breeding Bird Atlas [ccv], rare/colonial species records. • Canadian Wildlife Service • Reports and other information available from CAs. • NHIC Colonial Waterbird Nesting Area • MNR District Offices. • Local naturalist clubs.	Studies confirming: • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern[Í]. • Presence of 5 or more pairs for Brewer's Blackbird[Í]. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant[Í]. • The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH [cc, ccvii] • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS[cxlix] Index #6 provides development effects and mitigation measures.	Suitable habitat for Colonially Nesting Bird Breeding was not found within the subject property or the adjacent lands. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Migratory Butterfly Stopover Areas				
Painted Lady White Admiral <u>Special Concern</u> Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: <u>Field</u>: CUM CUT CUS <u>Forest</u>: FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario [cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south [xxxii, xxxiii, xxxiv, xxxv, xxxvi]. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat [cxlviii, cxlix]. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes [xxxvii, xxxviii, xxxix, xl, xli]. <u>Information Sources</u> • OMNR (NHIC) • Agriculture Canada in Ottawa may have list of butterfly experts. • Naturalist Clubs • Toronto Entomologists Association • Conservation Authorities	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur [xl, xlii]. • MUD of >5000 **or** >3000 with the presence of Painted Ladies or White Admiral's is to be considered significant.Í • SWHDSS [cxlix] Index #16 provides development effects and mitigation measures.	The subject property is not within 5 km of Lake Ontario. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Landbird Migratory Stopover Areas				
All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	Woodlots need to be >10 ha[Í] in size and within 5 km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario. • Woodlands <2km from Lake Ontario are more significant [cxlix] • Sites have a variety of habitats; forest, grassland and wetland complexes [cxlix]. • The largest sites are more significant [cxlix] • Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located along the shore and located within 5km of Lake Ontario are Candidate SWH [cxlviii]. Information Sources • Bird Studies Canada • Ontario Nature • Local birders and naturalist club • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey dates[Í]. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr./May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS [cxlix] Index #9 provides development effects and mitigation measures.	The subject property is not within 5 km of Lake Ontario. **Not SWH**

Wildlife Habitat: Deer Yarding Areas				
White-tailed Deer	Note: OMNR to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include; FOM, FOC, SWM and SWC. Or these ELC Ecosites; CUP2 CUP3 FOD3 CUT	• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%[cxciv]. • OMNR determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual" [cxcv] • Woodlots with high densities of deer due to artificial feeding are not significant[í].	No Studies Required: • Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH. [lvi, lvii, lviii, lix, lx, í] • Deer Yards are mapped by OMNR District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNR will be available at local MNR offices or via Land Information Ontario (LIO). • Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNR will complete these field investigations. [cxcv] • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHDSS[cxlix] Index #2 provides development effects and mitigation measures.	No Deer yarding areas have been mapped by the MNRF within or adjacent to the subject property. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Deer Winter Congregation Areas				
White-tailed Deer	All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots will typically be >100 ha in size[í]. Woodlots <100ha may be considered as significant based on MNR studies or assessment. • Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands [cxlviii]. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha [ccxxiv]. • Woodlots with high densities of deer due to artificial feeding are not significant[í]. <u>Information Sources</u> • MNR District Offices. • LIO/NRVIS	Studies confirm: • Deer management is an MNR responsibility, deer winter congregation areas considered significant will be mapped by MNR [cxlviii]. • Use of the woodlot by white-tailed deer will be determined by MNR, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNR [í].. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv] , ground or road surveys. or a pellet count deer density survey[ccxxv]. • SWHDSS [cxlix] Index #2 provides development effects and mitigation measures.	No Deer yarding areas have been mapped by the MNRF within or adjacent to the subject property. **Not SWH**

Table 2: Characteristics of Rare Vegetation Communities in Ecoregion 6E

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	
	ELC Ecosite Code[1]	Habitat Description[1]	Detailed Information and Sources	Defining Criteria[1]	Assessment Details
Cliffs and Talus Slopes **Rationale:** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	Most cliff and talus slopes occur along the Niagara Escarpment. Information Sources • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNR Planner, Forester, Ecologist or Biologist • NHIC has location information on some cliff and talus occurrences, this information is available on their website (Biodiversity Explorer). • Local naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes [lxxviii] • SWHDSS[cxlix] Index #21 provides development effects and mitigation measures.	Vegetation community not present within the subject property or adajacent lands. **Not SWH**

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	
	ELC Ecosite Code[1]	Habitat Description[1]	Detailed Information and Sources	Defining Criteria[1]	Assessment Details
Sand Barren **<u>Rationale;</u>** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <u>≤</u> 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	No minimum size for sand barren area. • Sand Barrens support rare species such as provincially Endangered Forked Three-awned Grass and American Badger [lxxxv, lxxxvi]. By extension, sand barren sites that could support these rare species (close proximity to other populations), historically or currently should be considered for higher priority conservation. <u>Information Sources</u> • OMNR Planner, Forester, Ecologist or Biologist • NHIC has location information on some sand barren occurrences, this information is available on their website (Biodiversity Explorer). • Local naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens [lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[Í]. • SWHDSS[cxlix] Index #20 provides development effects and mitigation measures.	Vegetation community not present within the subject property or adajacent lands. **Not SWH**

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	
	ELC Ecosite Code[1]	Habitat Description[1]	Detailed Information and Sources	Defining Criteria[1]	Assessment Details
Alvar **Rationale;** Alvars are extremely rare habitats in Ontario.	ALO1 ALS1 ALT1	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover [lxxviii].	An Alvar site > 0.5 ha in size [lxxv]. Alvar is particularly rare in ecoregion 7E where the only known sites are found in the western islands of Lake Erie.[cxcix] Information Sources • Alvars of Ontario (2000), Federation of Ontario Naturalists [lxxvi]. • Ontario Nature – Conserving Great Lakes Alvars[ccviii]. • NHIC has location information on many alvar occurrences, this information is available on their website (Biodiversity Explorer). • OMNR Ecologists or Biologists. • Local Naturalist clubs. • Conservation Authorities.	Field studies identify three or more of the Alvar indicator species [lxxv] listed in OMNR (2000b) [cxlix] Appendix N should be present. Note: Alvar plant spp. list from Eco-region 7E should be used. • Confirm and map ELC Vegetation Type polygons for Alvars lxxviii • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses [lxxv]. • SWHDSS[cxlix] Index #17 provides development effects and mitigation measures.	Vegetation community not present within the subject property or adajacent lands. **Not SWH**

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	
	ELC Ecosite Code[1]	Habitat Description[1]	Detailed Information and Sources	Defining Criteria[1]	Assessment Details
Old Growth Forest **Rationale;** Old Growth forest stands are rare in S. Ontario	Forest Community Series: FOD FOC FOM	Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species.	• No minimum size to site[f]. Information Sources • OMNR Forest Resource Inventory mapping • OMNR Forester, Ecologist or Biologist. • Local naturalist clubs • Conservation Authorities • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat [cxlviii]. • The stand will have experienced no recognizable forestry activities [cxlviii] • Determine ELC Vegetation Type for forest stand [lxxviii]. • SWHDSS[cxlix] Index #23 provides development effects and mitigation measures.	Vegetation community not present within the subject property or adajacent lands. **Not SWH**

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	
	ELC Ecosite Code[1]	Habitat Description[1]	Detailed Information and Sources	Defining Criteria[1]	Assessment Details
Savannah **Rationale:** Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. Tallgrass Prairie (TGP) and savannah were historically common in the near-shore areas of the Great Lakes. In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). cc	No minimum size to site Í Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNR Forester, Ecologist or Biologist. • NHIC has location information on many savannah occurrences, this information is available on their website (Biodiversity Explorer). • Local naturalists clubs. • Conservation Authorities.	Field studies confirm one or more of the Savannah indicator species listed in [lxxv] Appendix N should be present Í. Note: Savannah plant spp. list from Ecoregion 7E should be used • Area of the ELC Vegetaion type is the SWH [lxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHDSS[cxlix] Index #18 provides development effects and mitigation measures.	Vegetation community not present within the subject property or adajacent lands. **Not SWH**

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	
	ELC Ecosite Code[1]	Habitat Description[1]	Detailed Information and Sources	Defining Criteria[1]	Assessment Details
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. Tallgrass Prairie (TGP) and savannah were historically common in the near-shore areas of the Great Lakes In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).[cc]	No minimum size to site [í]. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • NHIC has location information on some tallgrass prairie occurrences, this information is available on their website (Biodiversity Explorer). • OMNR Ecologists and Biologists. • Local naturalists clubs. • Conservation Authorities.	Field studies confirm one or more of the Prairie indicator species listed in [lxxv] Appendix N should be present [í]. Note: Prairie plant spp. list from Ecoregion 7E should be used • Area of the ELC Vegetation Type is the SWH [lxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHDSS[cxlix] Index #19 provides development effects and mitigation measures.	Vegetation community not present within the subject property or adajacent lands. **Not SWH**

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	
	ELC Ecosite Code[1]	**Habitat Description[1]**	**Detailed Information and Sources**	**Defining Criteria[1]**	**Assessment Details**
Other Rare Vegetation Communities **<u>Rationale:</u>** Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii] . Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M [cxlviii] The OMNR/NHIC will have up to date listing for rare vegetation communities. <u>Information Sources</u> • NHIC has location information on other rare vegetation types, this information is available on their website (Biodiversity Explorer) • OMNR Ecologists and Biologists. • Local naturalists clubs. • Conservation Authorities.	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii] . • Area of the ELC Vegetation Type polygon is the SWH. • SWHDSS [cxlix] Index #37 provides development effects and mitigation measures.	Other rare vegetation communities not present within the subject property or adjacent lands. **Not SWH**

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Waterfowl Nesting Area				
American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 **Note: includes adjacency to Provincially Significant Wetlands**	A waterfowl nesting area extends 120 m [cxlix] from a wetland (> 0.5 ha) or a wetland (>0.5 ha) with small wetlands (<0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur [cxlix]. • Upland areas should be at least 120m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. <u>Information Sources</u> • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNR Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards[í], or; • Presence of 10 or more nesting pairs for listed species including Mallards[í]. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m [cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHDSS[cxlix] Index #25 provides development effects and mitigation measures.	Cattail Marsh is present within the PSW (120m from the subject property) Target species not observed during the nesting season **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Bald Eagle and Osprey Nesting Habitat				
Osprey **Special Concern** Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). <u>Information Sources</u> • NHIC compiles all known nesting sites for Bald Eagles in Ontario. • MNR values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNR Ecologist or Biologist may be aware of locations of nesting raptors. In addition, these staff may know local naturalists that may be aware of the locations of raptor nests. • Sustainable Forestry Licence (SFL) companies will identify additional nesting locations through field operations. • Check the Ontario Breeding Bird Atlas [ccv] or Rare Breeding Birds in Ontario for species documented • Reports and other information available from CAs.	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area[cxlviii] . • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH [ccvii], maintaining undisturbed shorelines with large trees within this area is important [cxlviii]. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. [cvi, ccvii] Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat [cvi] • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for <u>></u> 3 years or suspected of not being used for >5 years before being considered not significant. [ccvii]	Suitable habitat for Bald Eagle and Osprey Nesting is not present within the subject property or adjacent lands. A Bald Eagle was observed flying over the property; however, not recorded with any breeding evidence. No eagle or Osprey nests observed within the property **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
		• Local naturalists may know of other locations. • Use maps and aerial photographs to identify forests with few roads that tend to have less human disturbance.	• Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid-March to mid-August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS[cxlix] Index #26 provides development effects and mitigation measures	
Wildlife Habitat: Woodland Raptor Nesting Habitat				
Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat [lxxxviiii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii] • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNR Ecologist or Biologist may be aware of locations of nesting raptors. • Sustainable Forestry Licence (SFL) companies will identify additional nesting locations through field operations.	Studies confirm: • Presence of 1 or more active nests from species list is considered significant[cxlviii]. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha of suitable habitat is the SWH [ccvii]. • Barred Owl – A 200m radius around the nest is the SWH [ccvii]. • Broad-winged Hawk and Coopers Hawk,– A 100m radius around the nest is the SWH[ccvii]. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH[ccvii]. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial	Fresh-Moist Poplar Forest is present within the subject but does not meet the size requirements for significance. Of target species, only Sharp-shinned Hawk observed but not during the breeding season; no stick nests observed. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
		• Check the Ontario Breeding Bird Atlas [ccv] or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from CAs. • Use maps and aerial photographs to identify forests with few roads that tend to have less human disturbance.	(courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHDSS [cxlix] Index #27 provides development effects and mitigation measures.	
Wildlife Habitat: Turtle Nesting Areas				
Midland Painted Turtle <u>Special Concern Species</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) [cxlviii] or within the following ELC Ecosites: MAM2 MAM3 MAM4 MAM5 MAM6 MAM1 MAM2 MAM3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles[í] • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[í]. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH.[cxlviii] • Travel routes from wetland to nesting area are to be considered within the SWH.[cxlix] • Field investigations should be conducted in prime nesting season typically late spring to early summer. • SWHDSS [cxlix] Index #28	Cattail Marsh is present within and adjacent to the subject property. No turtles observed within the property during field surveys. No appropriate turtle nesting habitat observed. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
		help to find potential nesting habitat for them. • NHIC • Use aerial photographs and maps to narrow the search for prime nesting areas including shoreline beaches located near weedy areas of wetlands, lake and river shorelines, road embankments near turtle habitat, and stream crossings/culverts. • Skinks will nest under logs, in stumps or under loose rock in partially wooded areas • Reports and other information available from CAs. • Sightings by local Naturalist groups	provides development effects and mitigation measures for turtle nesting habitat.	

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Seeps and Springs				
Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system [cxvii, cxlix]. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species [cxix, cxx, cxxi, cxxii, cxiii, cxiv]. <u>Information Sources</u> • Topographical Map. • Thermography. • Hydrological surveys conducted by CAs and MOE. • Local naturalists and landowners may know some locations. • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.	Field Studies confirm: • Presence of a site with 2 or more[Í] seeps/springs should be considered SWH. • The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat [cxlviii]. • SWHDSS [cxlix] Index #30 provides development effects and mitigation measures	Seeps and Springs were not identified within the subject property. **Not SWH**

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Woodland)				
Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	• Presence of a wetland, lake, or pond within or adjacent (within 120m) to a woodland (no minimum size).[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx] Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat [cxlviii] <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • Local OMNR Ecologist • OMNR wetland evaluations • Local field naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm; • Presence of breeding population of 1 or more of the listed species with at least 20 individuals (adults, juveniles, eggs/larval masses) [lxxi]. • An observational study to determine breeding/larval stages will be required during the spring (Apr-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland. • The habitat is the woodland (ELC polygons) and wetland (ELC polygons) combined. A travel corridor connecting the woodland and wetland polygons is to be included within the habitat. • SWHDSS [cxlix] Index #14 provides development effects and mitigation measures.	Fresh-Moist Poplar forest and deciduous swamp communities are present within the subject property. Spring Peeper recorded at full chorus within both the MAMO1-2 and the SWDO2-2/SWTO2-6 wetland communities. These communities therefore meet the criteria of habitat significance **Confirmed SWH** (*outside development area)*

Wildlife Species[1]	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Wetlands)				
Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA.	• Wetlands and pools (including vernal pools) >500m^2 (about 25m diameter) [ccvii] isolated from woodlands (>120m), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats [clxxxiv]. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation. <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNR Ecologist or Biologist may know of populations, wetland evaluations may be a good source of information.. • Use maps or aerial photography to locate marsh habitat. • Reports and other information available from CAs.	Studies confirm: • Presence of breeding population of 1or more of the listed salamander species or 3 or more of the listed frog or toad species and with at least 20 breeding individuals (adults, juveniles, eggs/larval masses) [lxxi, lxxiii] **or;** • Wetland with confirmed breeding Bullfrogs are significant[í]. • The ELC ecosite wetland area and the shoreline are the SWH. • Surveys to confirm breeding to be completed during spring (Apr to June) when amphibians are migrating, calling and breeding within the wetland habitats. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHDSS [cxlix] Index #15 provides development effects and mitigation measures.	Suitable habitat not present within the subject property. **Not SWH**

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E

Wildlife Species	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Wildlife Habitat: Marsh Bird Breeding Habitat				
American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan **Special Concern:** Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present [cxxiv]. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <u>Information Sources</u> • Contact OMNR, wetland evaluations are a good source of information. • Local naturalist clubs • NHIC Records. • Reports and other information available from CAs. • Ontario Breeding Bird Atlas [ccv].	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or **or** 1 pair of Sandhill Cranes; **or** breeding by any combination of 5 or more of the listed species Í. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH Í. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS [cxlix] Index #35 provides development effects and mitigation measures	Cattail Marsh is present within the PSW (as well as 120m from the subject property) but does not provide open water habitat. Marsh bird surveys completed; no target species recorded. **Not SWH**

Wildlife Species	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Wildlife Habitat: Woodland Area-Sensitive Bird Breeding Habitat Wildlife				
Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren <u>Special Concern:</u> Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. [cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix,] • Interior forest habitat is at least 200 m from forest edge habitat. [clxiv] <u>Information Sources</u> • Ask local birders for local forests that support abundant and species-rich populations of area-sensitive species. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring sites and names of volunteers who might assist the planning authority in locating important areas. • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species • Reports and other information available from CAs.	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. [Í] • <u>Note:</u> any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.[Í] • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHDSS [cxlix] Index #34 provides development effects and mitigation measures.	Interior forest habitat is not present within the subject property. The North-East Wetland Complex may provide interior habitat within the adjacent lands. Target species not recorded during breeding bird surveys **Not SWH**

Wildlife Species	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Wildlife Habitat: Open Country Bird Breeding Habitat				
Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow **Special Concern** Short-eared Owl	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30 ha [clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) Í. Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. <u>Information Sources</u> • Use Agricultural land classification maps with aerial photographs to determine the potential grasslands that might be candidate sites. • Ask local birders for location of grasslands that support abundant and species rich populations of area-sensitive species. • Ontario Breeding Bird Atlas [ccv] • Reports and other information available from CAs.	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species.Í • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHDSS [cxlix] Index #32 provides development effects and mitigation measures	Suitable habitat for Open Country Bird breeding is not present within the subject property. **Not SWH**

Wildlife Species	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat				
Indicator Spp: Brown Thrasher Clay-coloured Sparrow Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher **Special Concern:** Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	Large field areas succeeding to shrub and thicket habitats>10ha[clxiv] in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years) Í. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species [clxxiii]. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Use agricultural land classification maps and recent aerial photographs to determine the amount of potential shrub and thicket habitats. • Ask local birders for location of shrub and thicket habitats that support abundant and species rich populations of area-sensitive species. • Ontario Breeding Bird Atlas [ccv] • Reports and other information available from CAs.	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species.Í • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. Í • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHDSS [cxlix] Index #33 provides development effects and mitigation measures.	Suitable habitat for Shrub/Early Successional Bird Breeding is not present within the subject property or adjacent lands. **Not SWH**

Wildlife Species	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Wildlife Habitat: Terrestrial Crayfish				
Chimney or Digger Crayfish; (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish; (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3	Meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites [cci] • Area of ELC Ecosite polygon is the SWH • Surveys should be done during adult breeding season (April to late June) and in late summer-early August in nearby temporary or permanent water for juveniles. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult [cci] SWHDSS [cxlix] Index #36 provides development effects and mitigation measures.	Cattail Marsh and adjacent lands may provide habitat for Terrestrial Crayfish. Terrestrial crayfish chimneys observed at two locations within the subject property boundaries, outside the development area. **Confirmed SWH** *(outside development area)*

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E

Wildlife Species	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Wildlife Habitat: Amphibian Movement Corridors				
Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	Movement corridors between breeding habitat and summer habitat [clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi]. Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (**Amphibian Breeding Habitat –Wetland)** of this Schedule Í. <u>Information Sources</u> • MNR District Office. • NHIC. • Reports and other information available from CAs. • Naturalist Clubs.	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, roadless area, no gaps such as fields, waterways or bodies, and undeveloped areas are most significant[cxlix] • Corridors should be at least 200m wide[cxlix] with gaps <20m[cxlix] and if following riparian area with at least 15m of vegetation on both sides of waterway[cxlix]. Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix]. • SWHDSS [cxlix] Index #40 provides development effects and mitigation measures	Natural corridors are confined to within the existing natural woodland/wetland features; no distinct corridors within the area proposed for development **Not SWH**

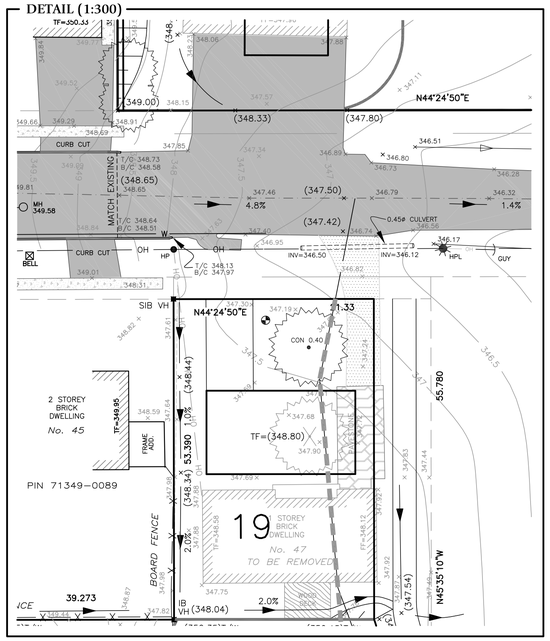
Wildlife Species	Candidate SWH		Confirmed SWH	
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Wildlife Habitat: Deer Movement Corridors				
White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when **Deer Wintering Habitat** is confirmed as SWH from Table 1.1 from Table 1.2.2 of this schedule. Í • A deer wintering habitat identified by the OMNR as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion [clxxxii, clxxxiii, cxlix, cxciv]. • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). <u>Information Sources</u> • MNR District Office. • NHIC. • Reports and other information available from CAs. • Naturalist Clubs.	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas . • Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas. • Corridors should be at least 200m wide[cxlix] with gaps <20m[cxlix] and if following riparian area with at least 15m of vegetation on both sides of waterway[cxlix] . Shorter corridors are more significant than longer corridors, [cxlix]. • SWHDSS [cxlix] Index #39 provides development effects and mitigation measures	Deer yarding and overwintering areas have not been identified within the subject property. **Not SWH**

[1]OMNR 2012, [2]OMNR 2000.

APPENDIX XII

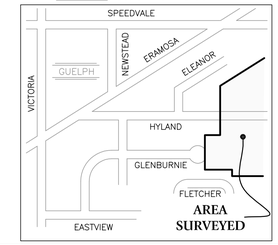
Site Servicing and Grading Plan (Van Harten 2015)

DETAIL (1:300)



KEY PLAN Scale : NOT TO SCALE

SHEET No.



LEGEND:

DECIDUOUS TREE
CONIFEROUS TREE
EXISTING ELEVATION +347.69
EXSTING CONTOUR 328
PROPOSED ELEVATION + (350.20)
PROPOSED TOP OF WALL + (350.00)T/W
PROPERTY BOUNDARY
BELL PEDESTAL BELL
TV PEDESTAL CATV
FIRE HYDRANT FH
TRANSFORMER PAD T
DITCH INLET CATCHBASIN DICB
CATCHBASIN CB
MANHOLE MH
STREET LIGHT SL
SANITARY SEWER — SAN —
WATERMAIN — W — W — W —
STORM SEWER — STM —
FENCELINE — x — x — x — x —
TOP OF BANK
E/ONE SEWAGE EJECTOR
RETAINING WALL

THE POSITION OF POLES, LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	DATE	DESCRIPTION	BY:	CHKD.

ISSUES/REVISIONS

Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS

423 WOOLWICH STREET
GUELPH – ONTARIO, N1H 3X3
PHONE: (519) 821 – 2763
FAX: 821 – 2770
www.vanharten.com

660 RIDDELL ROAD, UNIT 1
ORANGEVILLE – ONTARIO, L9W 5G5
PHONE: (519) 940 – 4110
FAX: 519 – 940 – 4113
www.vanharten.com

CITY OF Guelph
ENGINEERING SERVICES

HYLAND ROAD EXTENSION
CITY OF GUELPH
COUNTY OF WELLINGTON

PRELIMINARY GRADING & SERVICING PLAN

LICENSED PROFESSIONAL ENGINEER
J. M. DUFFY
Dec 21-15
PROVINCE OF ONTARIO

SCALE: 1:300	CONSULTANT DRAWING No. _ OF __
DATE DRAWN: DECEMBER, 2015	CITY CONTRACT No. _-___
DRAWN BY: JLW / CHECKED BY: JMD	CITY REFERENCE No. / REV. —

CITY FILE NO.

Dec 21,2015 - 2:53pm
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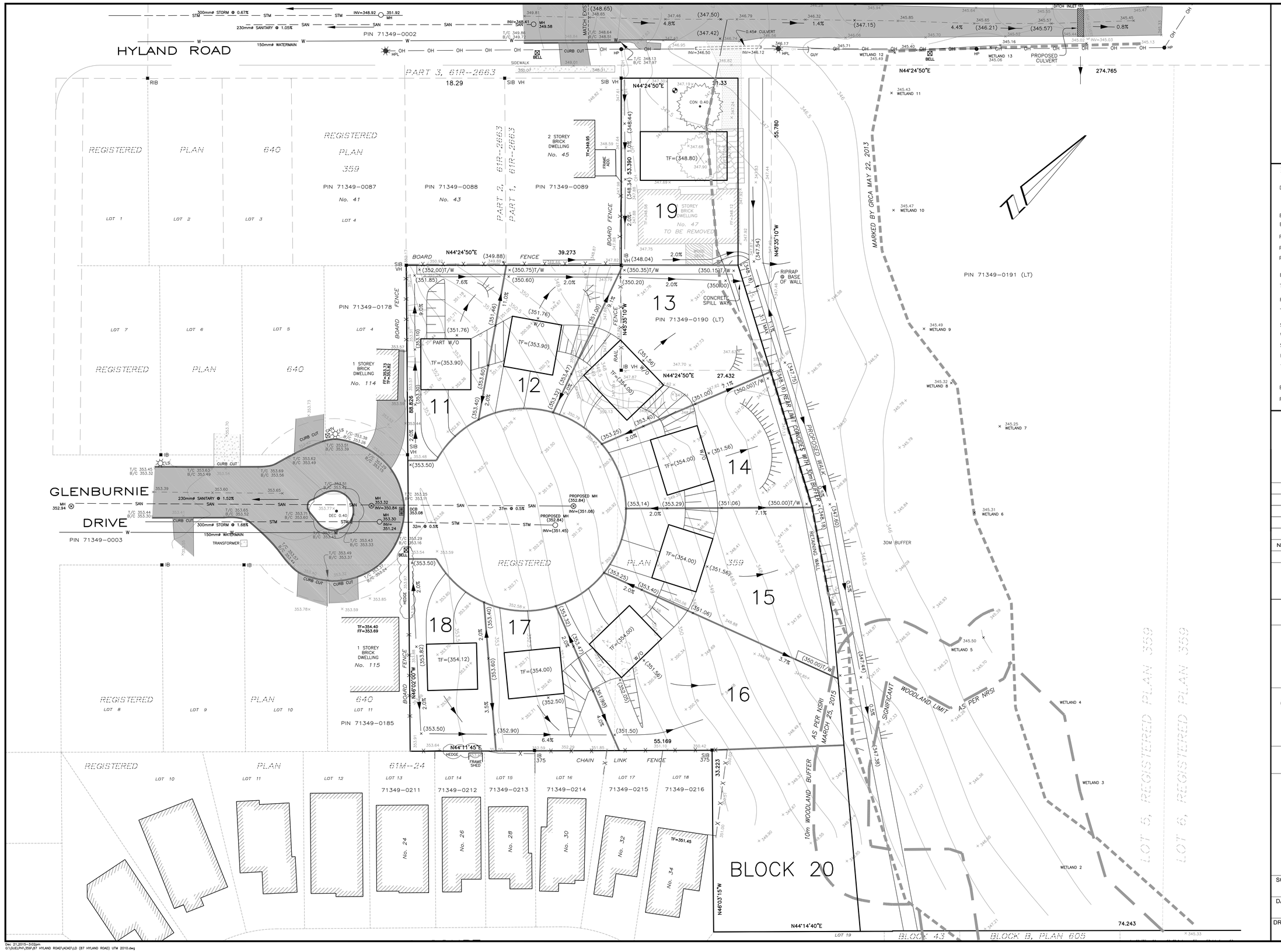
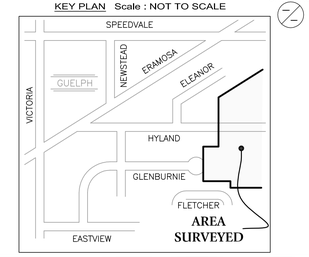


KEY PLAN Scale : NOT TO SCALE

SHEET No. 1/1



LEGEND:

DECIDUOUS TREE — CONIFEROUS TREE

EXISTING ELEVATION +347.69
EXSTING CONTOUR 328
PROPOSED ELEVATION + (350.20)
PROPOSED TOP OF WALL + (350.00)T/W
PROPERTY BOUNDARY

BELL PEDESTAL — BELL
TV PEDESTAL — CATV
FIRE HYDRANT — FH
TRANSFORMER PAD — T
DITCH INLET CATCHBASIN — DICB
CATCHBASIN — CB
MANHOLE — MH
STREET LIGHT — SL

SANITARY SEWER — SAN
WATERMAIN — W
STORM SEWER — STM
FENCELINE — x x x x
TOP OF BANK

E/ONE SEWAGE EJECTOR
RETAINING WALL

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DRAWN BY: JLW / CHECKED BY: JMD	CITY REFERENCE No. / REV. —

CITY FILE NO.

Dec 21,2015–3:02pm
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APPENDIX XIII

City of Guelph Official Plan Amendment 48 Schedule 8

DRAFT

This Schedule is to be read in conjunction with the other Schedules and the text of The Official Plan

TransCanada Trail to Elora (North) and Elmira (Northwest via Kissing Bridge Trail)

GORBA Trails developed and maintained under special agreement with the Grand River Conservation Authority.

GUELPH LAKE CONSERVATION AREA

Refer to the GORBA Trail Club for trails in the area.

Refer to the Downtown Secondary Plan

Refer to the University of Guelph Arboretum Trails

Continue to explore trail connections with the University of Guelph

Potential Connection to Guelph Radial Line Trail and Starkey Hill Trail

Trail routing in the new section of the Hanlon Business Park is based on the Draft Plan of Subdivision.

POTENTIAL TRAIL GATEWAY TO BE LOCATED AT CITY BOUNDARY WHEN AREA PLANS ARE DEVELOPED.

Legend

- City Streets
- Future City Streets
- County Roads
- Railways
- Watercourses
- Waterbodies
- Natural Heritage System & Open Space
- Corporate Boundary

Trail Network

- Existing City Trails
- Proposed City Trails
- Structure Required
- Staging Area
- Canoe Launch & Node
- Trail Gateway

General note for all future development areas: It is imperative that the City Wide Trail Master Plan be referenced in conjuction with this schedule as supporting documentation. Trail routing is to be provided as part of the development planning process and will be consistent with the goals, objectives and guiding principles of the GTMP.

This schedule is intended to be used for planning purposes only.

1 0.5 0 1 KM

Projection: UTM 17N NAD83
Produced by the City of Guelph
Planning Services
January 30, 2012

CITY OF GUELPH OFFICIAL PLAN

DRAFT SCHEDULE 8: TRAIL NETWORK

Making a Difference

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