Environmental Impact Study for 1158 Second Line Road, Ottawa, Ontario

Version 2

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Project Number: Theberge 1554

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List of Acronyms and Abbreviations

EIS – Environmental Impact Statement
KAL – Kilgour & Associates Ltd.
TCR – Tree Conservation Report
M – Meters
PPS – Provincial Policy Statement
MNR – Ministry of Natural Resources
ECCC – Environment and Climate Change Canada
SARA – Species at Risk Act
ESA – Endangered Species Act
MBCA – Migratory Bird Convention Act
FWCA – Fish and Wildlife Conservation Act
SAR – Species at Risk
ELC – Ecological Land Classification
SWH – Significant Wildlife Habitat

1.0 INTRODUCTION

This report is an updated Environmental Impact Study (EIS) prepared by Kilgour & Associates Ltd. (KAL) on behalf of Theberge Homes in support of the updated residential development Site Plan for rezoning approval for 1158 Second Line Road, Ottawa, Ontario, K2K 1X7 (hereafter referred to as "the Site").

In the City of Ottawa, an EIS is required when development or site alternation is proposed within 120 m of a Natural Environment area as mapped on Schedule "C11" of the City of Ottawa Official Plan (2021). The purposes of an EIS are to:

- Identify natural heritage features on or adjacent to the Site;
- Assess potential impacts of the proposed development to existing features; and,
- Recommend mitigation measures to minimize or eliminate identified impacts.

This EIS is required due to the proximity of the Site to the South March Highlands Natural Area, located adjacent to the southwest boundary of the Site, directly across Second Line Road. An EIS and Tree Conservation Report (TCR) were completed in September 2013 by CJB Environment Inc. (Appendix A), and a memo providing supplementary information to the 2013 EIS and TCR was prepared by Holly J. Bickerton, Consulting Ecologist in March 2019 (Appendix B). This (KAL) EIS provides an update to the aforementioned documents and describes current site conditions and provides mitigation measures required to limit impacts of the proposed development and rezoning on ecological functions of identified natural heritage features.

2.0 ENVIRONMENTAL POLICY CONTEXT

Natural heritage policies and legislation relevant to this EIS are outlined below.

2.1 The Provincial Policy Statement, 2020

The Provincial Policy Statement (PPS) was issued under Section 3 of the *Planning Act* (Government of Ontario, 1990a). The current PPS came into effect May 1, 2020 (Government of Ontario, 2020). Natural features are afforded protections under Section 2.1 of the PPS. Protections may include maintenance, restoration, and improved function of diversity, connectivity, ecological function, and biodiversity of natural heritage systems. These protections restrict development and site alteration in significant natural areas (e.g., woodlands, wetlands, wildlife habitat) unless it can be demonstrated that there will be no negative effects on the features and ecological functions of those natural areas. Technical guidance for implementing the natural heritage policies of the PPS is found within the second edition of the *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005* (NHRM: Ministry of Natural Resources (MNR), 2010). This manual recommends the approach and technical criteria for protecting natural heritage features and areas in Ontario.

2.2 City of Ottawa Official Plan

The City of Ottawa Official Plan (2021) provides direction for future growth in the City and is a policy framework to guide physical development to 2031. The Official Plan was developed in accordance with the PPS (and relevant provincial legislation). The City of Ottawa reviews development applications within its boundaries, which must be in accordance with the Official Plan. The Site is designated 'Neighbourhood' in Schedule B5 of the Official Plan. The South March Highlands Natural Area located directly adjacent to the southwest boundary of the Site is included in the Natural Heritage System Core Area and designated 'Natural Environment Area' and 'Significant Wetlands' in Schedule C11-A. The majority of the Site is included in the Natural Heritage Features Overlay in Schedule C11-A. Section 5.6.4.1 of the Official Plan requires that development or site alteration proposed in or adjacent to natural heritage features must be supported by an EIS prepared in accordance with the City's guidelines.

2.3 *Conservation Authorities Act*, 1990

Conservation Authorities were created to address erosion, flooding, and drought concerns regionally by managing at the watershed level. Conservation Authorities were given the ability to regulate under Section 28 of the *Conservation Authorities Act* (Government of Ontario, 1990). The Act provides mechanisms to regulate works and site alterations that have potential to affect erosion, flooding, land conservation, and alterations to waterbodies within their jurisdiction. It is the obligation of all Conservation Authorities to implement Ontario Regulations 42/06 and 146/06 to 182/06 *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* under Section 28 of the Conservation Authorities Act for relevant works.

2.4 Ontario Regulation 174/06

Section 2(1)(b) states no person shall undertake development or permit another person to undertake development in or on areas within the jurisdiction of the Authority, that include river or stream valleys, the limits of which are determined in accordance with the following:

- Where the river or stream valley is apparent and has stable slopes, the valley extends from the stable top of bank, plus 15 meters, to a similar point on the opposite site; and,

- Where the river or stream valley is apparent and has unstable slopes, the valley extends from the predicted long term stable slope projected from the existing stable slope or, If the toe of the slope is unstable, from the predicted location of the toe of the slope as a result of stream erosion over a projected 100-year period, plus 15 meters, to a similar point on the opposite side.

2.5 *Species at Risk Act*, 2002

The federal *Species at Risk Act* (Government of Canada, 2002) is administered by Environment and Climate Change Canada (ECCC) and provides direction to protect and ensure the survival of wildlife species in Canada. The purpose of the SARA is to prevent populations of wildlife from becoming Extirpated, Endangered, or Threatened, provide recovery Endangered or Threatened species, and to manage other species to prevent them from becoming Endangered or Threatened.

All species listed on Schedule 1 of SARA are afforded protection on federal lands. Aquatic species and species of migratory birds protected by the *Migratory Birds Convention Act* (MBCA; 1994) and listed as

Endangered, Threatened, or Extirpated under Schedule 1 of SARA are protected wherever they occur in Canada, regardless of land ownership.

2.6 *Endangered Species Act*, 2007

The provincial *Endangered Species Act* (ESA; Government of Ontario, 2007) is administered by the Ministry of Environment, Conservation, and Parks (MECP) and provides protection for species at risk (SAR) and their habitat. The ESA states that it is illegal to harm the habitat of species listed as Extirpated, Endangered, and Threatened. It is also illegal to kill, harm, harass, possess, transport, buy or sell Extirpated, Endangered, and Threatened species, whether it is living or dead. Species listed as Endangered, Threatened, or Extirpated and their habitats (e.g., areas essential for breeding, rearing, feeding, hibernation, and migration) are automatically afforded legal protection under the ESA.

2.7 *Migratory Birds Convention Act*, 1994

Nesting migratory birds are protected under the MBCA (Government of Canada, 1994). No work is permitted that would result in the destruction of active nests (nests with eggs or young birds) or the wounding or killing of bird species protected under the MBCA and/or associated regulations (e.g., SARA). The "incidental take" of migratory birds and the disturbance, destruction, or taking of the nest of a migratory bird is prohibited. "Incidental take" is the killing or harming of migratory birds due to actions that are not primarily focused on taking migratory birds (e.g., economic development) and no permits exist for the incidental take of migratory birds or their nest/eggs as a result of activities that are not focused on taking migratory birds. These prohibitions apply throughout the year. The Government of Canada has compiled nesting calendars that apply across Canada that can be used to greatly reduce the risk of harming/destroying active nests by ensuring works that may impact nests are performing outside of the nesting period.

Effective July 30, 2022, a list of 18 species of migratory birds identified on Schedule 1 of the MBCA are provided year-round nest protection until they can be deemed abandoned. The Schedule includes this list for birds that re-use their own nest from one year to the next. If the nest of a Schedule 1 species has not been occupied by a migratory bird for the entirety of the waiting time indicated in the MBCA, it is considered to be abandoned, and to no longer have high conservation value for migratory birds.

2.8 *Fish and Wildlife Conservation Act*, 1997

The provincial *Fish and Wildlife Conservation Act* (FWCA; Government of Ontario, 1997) governs the hunting and trapping of a variety of wildlife including mammals, birds, reptiles, amphibians, and fish in Ontario, thereby facilitating the protection of wildlife and their habitat. The FWCA outlines the prohibition of hunting or trapping specially protected species and the requirement for provincially issued licenses for the hunting or trapping of "furbearing" or "game" animals. Examples of specifically protected animals include, for example, Southern Flying Squirrel (*Glaucomys volans*), Northern Harrier (*Circus cyaneus*), American Kestrel (*Falco sparverius*), Blue Jay (*Cyanocitta cristata*), Midland Painted Turtle (*Chrysemus picta marginata*), Northern Watersnake (*Nerodia sipedon*) and Gray Treefrog (*Hyla versicolor*). In particular, raptors that are not protected under the MBCA (including Peregrine Falcon) are protected under the FWCA.

3.0 PROPERTY IDENTIFICATION

The Site is located at 1158 Second Line Road and includes two parcels, legally described as Con 3 Pt Lot 11 (Roll # 06143008161260100000 and Roll # 06143008161260500000). The Site is situated south of Goward Drive, north of Whernside Terrace and east of Second Line Road, and is 1.23 ha in size. The current zoning is Residential Third Density (R3Z(2622) S183). Forest cover previously occurring on the Site was removed between 2019 and 2021 as permitted by the City (Bickerton, 2019); current land use on the Site is primarily a cultural meadow. The Site includes a centrally located detached single-family residence and hedgerows located on the northern and southern boundaries of the property, abutting residential rear yard allowances. A steel hydro tower and cut line are located directly adjacent to the northeast property boundary, where a wildflowers and grasses community grow underneath it (CJB Environment Inc., 2013). The South March Highlands Natural Area is located directly adjacent to the southwest boundary of the Site, which covers an area of approximately 1,479 ha. A significant wildlife corridor connects the South March Highlands with the Carp Hills to the northwest along the Carp Ridge (CJB Environment Inc., 2013).

4.0 METHODOLOGY

4.1 Desktop and Background Data Review

4.1.1 Background Review

Background information was obtained from online databases and geographic information system mapping applications to review relevant information. Aerial imagery was used to identify existing features and confirm information found in the background review. The CJB Environment Inc. EIS and TCR (2013) and Bickerton Memo (2019) were reviewed and provide the basis for this updated EIS. Background information was obtained from available resources, which include:

- Species at Risk in Ontario (SARO; Ministry of Environment, Conservation, and Parks (MECP, 2022);
- Species at Risk Public Registry (Government of Canada, 2022);
- Natural Heritage Information Centre (NHIC; Ministry of Natural Resources, and Forestry (MNRF, 2022a);
- Land Information Ontario (MNRF, 2022b);
- Aquatic Species at Risk Map (DFO, 2022);
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019);
- Ontario Breeding Birds Atlas (Birds Canada et al., 2009);
- Ontario Butterfly Atlas (Toronto Entomologists' Association, 2022);
- eBird (Cornell Lab of Ornithology, 2022a);
- iNaturalist (California Academy of Sciences and National Geographic Society, 2022);

- Bumble Bee Watch (Wildlife Preservation Canada et al., 2022);
- Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Ontario (Humphrey and Fotherby, 2019);
- Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) in Ontario (Humphrey, 2017); and,
- Fish ON-Line (MNRF, 2022c).

4.1.2 Agency Consultation

The review of existing information included a preliminary SAR screening for species listed under the federal SARA and provincial ESA. The screening identified SAR having some potential to occur on or near the Site. The screening was completed following the *Draft Client's Guide to Preliminary Screening for Species at Risk* (MECP, 2019). The results of the screening process inform the initial list of species to be considered in the assessment of the potential for development to impact(s) to SAR or SAR habitat. If it is determined through the EIS process that there is an anticipated impact of the development on SAR, an Information Gathering Form (IGF) will be submitted to MECP for further review.

4.1.3 Ecological Land Classification

A desktop review of current aerial imagery (City of Ottawa, 2023) and of previous field studies (Bickerton, 2019; CJB Environment Inc., 2013) informed the initial (re)delineation of vegetation communities based on variation in land cover, topography, and vegetation structure. Vegetation communities on the Site were confirmed in the field using standard Ecological Land Classification (ELC) methods for Ontario (Lee et al., 1998). This method provides a consistent approach to identify, describe, and map vegetation communities or physiographic features on the landscape based on dominant plant species and soil composition. It results in a standardized description of each vegetation community to capture the natural diversity and variability of communities within a site, and to provide insight into available habitat and the type of species that may be present. More specifically, the classifications from ELC provide a basis for determining whether potential habitat for a given SAR or other ecological value may be present.

During the ELC survey on May 03, 2023, the dominant plant species were recorded within each proposed ecosite in the field to further divide ecosites into vegetation types (the finest resolution in ELC), where possible. Representative photos of each ELC unit on the Site were taken and are included with the community descriptions in this report.

5.0 EXISTING CONDITIONS

5.1 Landforms, Soils, and Geology

The Site is located within the Ottawa Valley Clay Plains physiographic region (Chapman & Putnam, 1984). The surficial geology of the region is composed of clay and silt underlying erosion terraces. The upper part of the soil profile contains marine deposits. Soils on the Site are mapped as Urban (U) in Report No. 58 of the Ontario Institute of Pedology, *The Soils of The Regional Municipality of Ottawa-Carleton* (Schut &

Wilson, 1987). Soils in areas surrounding the Site are mapped as well drained sandy soils, moderately coarse to coarse textured with noncalcareous and acidic parent material (1987). The bedrock of the Site is composed of sandstone and dolomites interbeds (City of Ottawa, 2013). Soil samples taken as part of the 2013 EIS observed a thin organic layer (< 1 cm) overlying a thicker sandy soil horizon (>17 cm). The soil composition combined with the absence of mottling (i.e., rusty brown spots throughout soil horizon) suggests that the Site has relatively good drainage.

5.2 Surface Water

The Site is located within the Ottawa West Watershed (CJB Environment Inc., 2013). No surface water features were observed on the Site during the May 03, 2023, field visit. The nearest surface water feature is the South March Highlands Wetlands complex approximately 100 meters upland west across Second Line Road. According to the topography of the property, rainwater flows towards the northeast limit of the property.

5.3 Vegetation Cover (Ecological Land Classification)

The majority of the Site is characterized by a single ELC unit, Mineral Cultural Meadow (CUM1; Figure 1), and is a highly disturbed, open community primarily comprised of herb, graminoid and forb species. Deciduous sapling and small shrub cover is sparse across the Site. The area is dominated by Orange Daylily (*Hemerocallis fulva*), Common Bird's-Foot Trefoil (*Lotus corniculatus*), Wild Carrot (*Daucus carota*), Catnip (*Nepeta cataria*), Common Yarrow (*Achillea millefolium*), Red Raspberry (*Rubus ideaus*), and Canada Goldenrod (*Solidago canadensis*). Saplings and shrubs on the Site include American Basswood (*Tillia americana*), Ironwood (*Ostrya virginiana*), American Elm (*Ulmus americana*), American Beech (*Fagus grandifolia*), Balsam Poplar (*Populus balsamifera*), and Sugar Maple (*Acer saccharum*). It is unlikely that this community is providing significant habitat for wildlife species.

Two hedgerows are present on the northern and southern boundaries of the Site abutting the adjacent residential rear yards. While the vegetation of the hedgerows differs from the rest of the CUM1 dominated site, these features fall below the size threshold to qualify as a separate ELC ecosites and are therefore not assigned a unique ELC code. The hedgerows are primarily comprised of deciduous sapling and shrub vegetation. A limited number of larger trees are scattered throughout the Site, primarily along the property boundary at Second Line Road and include White Pine (*Pinus strobus*), Sugar Maple (*Acer saccharum*), and White Spruce (*Picea glauca*).

5.4 Species at Risk

The potential for SAR to occur in the broader area of the Site was reviewed, including Extirpated, Endangered, Threatened, and Special Concern species. The potential for SAR and their potential habitat was assessed based on KAL's field visits, ELC results, the CJB Environment Inc. EIS and TCR (2013), Bickerton Memo (2019), and a desktop assessment that considered species range information, other known records, work conducted in the area and current site conditions, historic land use practices, and the preferred habitat requirements of these species. Special attention was given to the Whip-poor-will and Blanding's Turtle based on previous requests by the City of Ottawa's Environmental Data Collection Checklist and Ministry of Natural Resources record of potential SAR occurrences on the Site (CJB Environment Inc., 2013).

Figure 1 Ecological Land Classification (ELC) Mapping for 1158 Second Line Road

The CJB Environment Inc. (2013) field surveys were conducted in an ideal timeframe to observe at risk bird species and at risk plant species growing on the Site. No species at risk were observed No other SAR were observed during the field surveys conducted by KAL in 2023.

Special attention was also given to the Endangered Butternut Tree. Bickerton (2019) noted that:

> *In April 2018, a Tree Conservation Report was completed by IFS Associates and five Butternut trees were identified on the subject property. A Butternut Health Assessment was completed by Andrew Boyd at IFS Associates on 14 June 2018 (see IFS Associates 2018b). Of the five trees, one was dead, and the remaining four were assessed as Category 1 ("non-retainable") under the BHA Tree analysis protocol, meaning that these four were affected by Butternut Canker to such an advanced degree that retaining the tree would not support the protection of the species. The BHA report summarizing this information was submitted by IFS Associates to MNRF on 27 June 2018.*

No Butternut Trees were retained, and no individuals were observed during KAL's 2023 site visit. The IFS Associates TCR is included in Appendix C.

During the CJB Environment Inc. (2013) field visit, no Blanding's Turtles were observed during active searching for reptiles and Site was not considered to correspond to the habitat requirements of this species. Bickerton (2019), however, determined that subsequent updates to MNRF protocols and standards lead to the consideration of the Site as Category 3 Habitat for Blanding's Turtle under the ESA. After submission of appropriate forms submitted to the MNRF by Bickerton, it was agreed upon that proposed mitigation measures to construction works on the Site would prevent all unlikely impact to Blanding's Turtle as a result of proposed development. No Blanding's Turtles were observed on the Site during KAL's 2023 site visit. Current conditions of the Site surrounding area (i.e., a developed neighborhood with no wetland areas beyond) correspond with conditions in 2019. As such, the SAR risk assessment from Bickerton (2019) is still considered relevant and valid.

CJB Environment Inc. completed call playback surveys for Whip-poor-will and no individuals were detected on the Site (2013). Bickerton (2019) completed a structural habitat suitability survey for SAR, including Whip-poor-will habitat. It was determined that no suitable habitat is present due to the closed nature of the canopy, the absence of suitable understory to provide nesting cover, the absence of foraging habitat, and the Site's proximity to dense suburban settlement. The current conditions observed by KAL concur that the Site does not provide suitable habitat for the Whip-poor-will.

5.5 Significant Woodland

Using the City's Significant Woodland evaluation criteria and size thresholds for urban woodlands in this planning area (City of Ottawa, 2019), established significance of the forested area is considered to be 0.8 ha as the minimum size threshold and must be greater than 60 years old, as demonstrated through aerial photography. It is important to note that the forest on the Site prior to clearing would have been considered a Significant Woodland. The Bickerton Memo (2019) states that the wooded area was considered as a Significant Woodland under the draft policy because it lied within the urban boundary, was more than 60 years old, was greater than 0.8 ha in size, and did not fall within an existing Secondary Plan, Community Design Plan, or Plan of Subdivision. Based on the City of Ottawa's analysis included in

the Bickerton Memo (2019), however, City staff concluded that the loss of the wooded area on the Site would result in a small decrease in ecosystem services provided to the local community.

The Site was cleared after 2019. No forest cover is currently present on the Site and is therefore not considered to be a Significant Woodland.

5.6 Significant Wildlife Habitat

Potential for Significant Wildlife Habitat (SWH) was not reviewed by CJB Environment Inc. EIS (2013) nor in the Bickerton Memo (2019). The City of Ottawa's SWH includes seasonal concentration areas for wildlife, rare vegetation communities or specialized wildlife habitat, habitat for species of special concern or other species of conservation concern, and animal movement corridors (City of Ottawa, 2015). Due to the small size of the Site, the urban character and proximity to urban areas, limited natural heritage features, and lack of significant habitat functions, it is not expected that SWH is present on the Site.

6.0 DESCRIPTION OF THE PROJECT

It is our understanding that the proposed development on the Site includes the construction of 100 stacked townhouse units, 140 parking spaces, associated access roads, amenity space and landscaped areas. There are eight (8) townhouse blocks proposed, 3.5 storeys in height ranging from 10-14 units in each block. It is anticipated that approximately 2,732m^2 of the Site will be occupied by townhouse blocks, 968m^2 of shared amenity space, 1,105m^2 of private amenity space, and 3,907m^2 of total landscape area. Additional areas include snow storage space and site servicing areas. A concept site plan is shown in Figure 2.

7.0 IMPACT ASSESSMENT AND MITIGATION

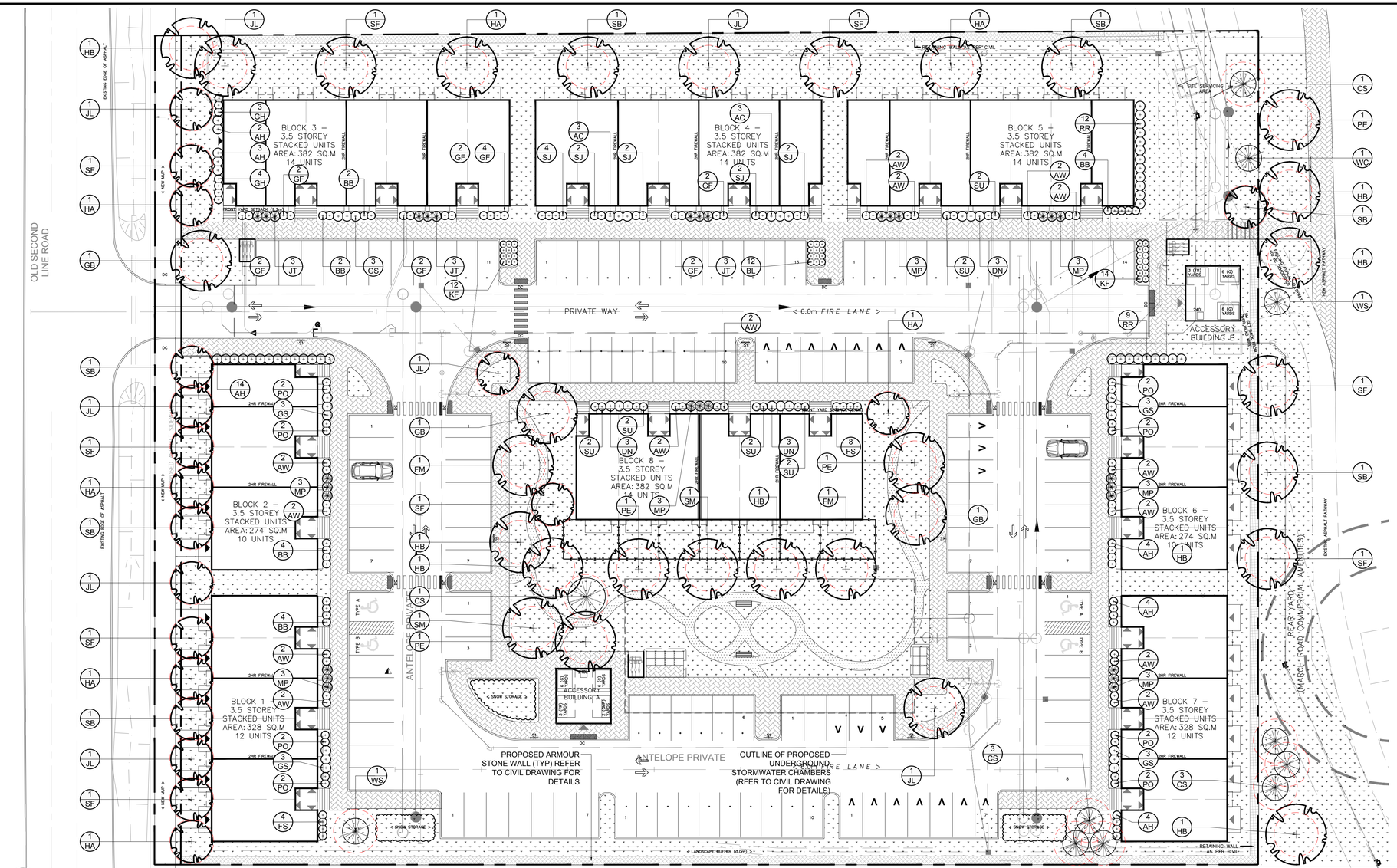
The mitigation measures identified in the CJB Environment Inc. EIS and TCR (2013) and the Bickerton Memo (2019) remain appropriate and applicable unless otherwise stated below.

7.1 Surface Water and Aquatic Habitat

There are no surface water features or wetland areas located on the Site. The South March Highlands Natural Area containing a Significant Wetland is located directly adjacent to the southwest boundary of the Site and within 120m of the proposed development. However, the separation of the Site from the South March Highlands Natural Area by Old Second Line Road, which includes roadside ditching along both sides with no culverted connect between the sides within >600 m of road length, is likely to limit direct hydrological connection. The Site does not contribute aquatic habitat. Considering the existing extent of residential land use adjacent to the Site, no further impacts are anticipated to surface water or aquatic habitat in the surrounding area under future development of the Site as proposed.

7.2 Vegetation

The Site is highly disturbed from site clearing activities that occurred after 2019. The vegetation clearing mitigation measures provided in the CJB Environment Inc. EIS and TCR (2013) are no longer applicable as the forested areas have already been cleared.

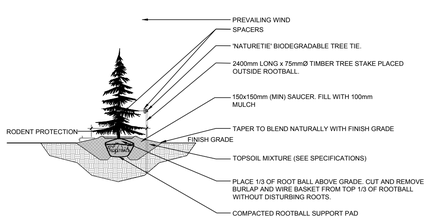


1 L.1 LANDSCAPE PLAN
SCALE 1:250

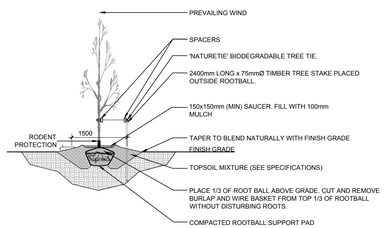
0 2 4 6 8 10m

GENERAL NOTES:

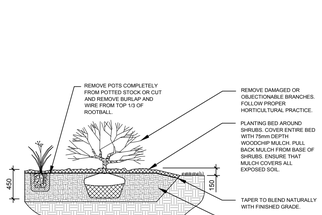
1. IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR OR OFFICIAL TO REPORT ANY ERRORS, OMISSIONS OR DISCREPANCIES ON THIS PLAN WITH ACTUAL SITE CONDITIONS TO THE LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH CONSTRUCTION.
2. THE CONTRACTOR IS TO NOTIFY ALL UTILITY COMPANIES AND AUTHORITIES PRIOR TO ANY EXCAVATION AND ASCERTAIN LOCATIONS OF UNDERGROUND SERVICES.
3. THE CONTRACTOR IS TO REINSTATE ALL AREAS AND ITEMS DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITY.
4. THE CONTRACTOR IS TO COMPLY WITH ALL PERTINENT CODES AND BY-LAWS.
5. THE CONTRACTOR IS TO MAINTAIN A POSITIVE SURFACE RUN-OFF THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD.
6. THE LANDSCAPE ARCHITECT IS NOT RESPONSIBLE FOR SUBSURFACE CONDITIONS.
7. THE CONTRACTOR IS TO IDENTIFY ALL EXISTING TREES TO REMAIN ON SITE WITH THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
8. THE CONTRACTOR IS TO STAKE THE PROPOSED LOCATION OF ALL PLANT MATERIAL IN CONJUNCTION WITH THE LANDSCAPE ARCHITECT PRIOR TO EXCAVATION.
9. MINIMUM DISTANCES FOR SELECTED DECIDUOUS TREES ARE AS FOLLOWS:
   - 9.1. BUILDING FOUNDATIONS - 7.5M
   - 9.2. SIDEWALKS - 1.5M
   - 9.3. PUBLIC STREETS - 2.5M
   - 9.4. UNDERGROUND INFRASTRUCTURE - 2.0M
10. ALL TREES WITHIN 1M OF UNDERGROUND UTILITY TRENCHES ARE TO BE EXCAVATED BY HAND.
11. REMOVE ALL PROTECTIVE WRAPPING FROM TREE TRUNKS AFTER INSTALLATION.
12. STAKING OF TREES SHALL ONLY BE PERFORMED IF NECESSARY.
13. ENSURE THAT MULCH IS PULLED BACK A MINIMUM DISTANCE OF 75MM FROM BASE OF TREE TRUNK.



2 L.1 CONIFEROUS TREE PLANTING
SCALE: NTS



3 L.1 DECIDUOUS TREE PLANTING
SCALE: NTS



4 L.1 SHRUB / PERENNIAL / ORNAMENTAL GRASS PLANTING
SCALE: NTS

PROPOSED PLANT LIST

QTY/KEY — O/C = ON CENTRE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	REMARKS
TREES						
CS	8	*Picea pungens*	Colorado Spruce	2.0m Ht.	B&B	
FM	2	*Acer x freemanii*	Freeman's Maple	50mm CAL.	B&B	
GB	3	*Ginkgo biloba* 'Princeton Sentry'	Maidenhair Tree	50mm CAL.	B&B	Male tree
HA	7	*Crataegus crus-galli var. inermis*	Thornless Cockspur Hawthorn	50mm CAL.	B&B	Single leader
HB	8	*Celtis occidentalis*	Hackberry	50mm CAL.	B&B	
JL	8	*Syringa reticulata*	Japanese Tree Lilac	50mm CAL.	B&B	Single leader
PE	4	*Ulmus wilsoniana* 'Prospector'	Prospector Elm	50mm CAL.	B&B	
SB	7	*Amelanchier canadensis*	Serviceberry	50mm CAL.	B&B	Single leader
SF	9	*Amelanchier laevis 'JFS-ARB'*	Spring Flurry Serviceberry	50mm CAL.	B&B	Single leader
SM	2	*Acer saccharum*	Sugar Maple	50mm CAL.	B&B	
WC	1	*Thuja occidentalis*	White Cedar	2.0m Ht.	B&B	
WS	2	*Picea glauca*	White Spruce	2.0m Ht.	B&B	
SHRUBS						
AC	6	*Ribes alpinum*	Alpine Currant	800mm ht.	POTTED	1000 mm O/C
AH	31	*Hydrangea arborescens* 'Annabelle'	Annabelle Hydrangea	3 GALLON POT	POTTED	1000 mm O/C
AW	28	*Spiraea japonica* 'Anthony Waterer'	Anthony Waterer Spirea	600mm HT.	POTTED	800 mm O/C
BB	16	*Euonymus alatus* 'Compactus'	Dwarf Burning Bush	600mm HT.	POTTED	800 mm O/C
DN	9	*Physocarpos opulifolius*	Ninebark	800mm HT.	POTTED	1000 mm O/C
FS	12	*Sorbaria sorbifolia* 'Sem'	Sem False Spirea	600mm HT.	POTTED	800 mm O/C
GF	16	*Potentilla fruticosa* 'Goldfinger'	Goldfinger Potentilla	600mm HT.	POTTED	800 mm O/C
GS	15	*Spiraea x arguta*	Garland Spirea	800mm HT.	POTTED	800 mm O/C
JT	9	*Juniperus sabina* 'Tamariscifolia'	Tamarix Juniper	600 mm SPR.	POTTED	800 mm O/C
MP	21	Pinus mugo 'Pumilio'	Dwarf Mugo Pine	600mm SPRJ	POTTED	1000mm O/C
PO	16	*Potentilla fruticosa* 'Red Ace'	Red Ace Potentilla	600mm HT.	POTTED	800 mm O/C
RR	21	*Rosa rugosa*	Rugosa Rose	600mm HT.	POTTED	1000 mm O/C
SJ	12	*Hypericum kalmianum*	St. John's Wort	600mm HT.	POTTED	800 mm O/C
SS	12	*Sorbaria sorbifolia*	Ural False Spirea	800mm HT.	POTTED	1000 mm O/C
SU	12	*Rhus aromatica*	Fragrant Sumac	600mm HT.	POTTED	800 mm O/C
PERENNIALS AND ORNAMENTAL GRASSES						
BL	12	*Leymus arenarius* 'Blue Dune'	Blue Dune Grass	250mm POT	POTTED	800 mm O/C
GH	7	*Hosta* 'Guacamole'	Guacamole Hosta	1 gal. POT	POTTED	600 mm O/C
KF	26	*Calamagrostis* 'Karl Foerster'	Karl Foerster Grass	250mm POT	POTTED	800 mm O/C

CLIENT
THEBERGE HOMES

CONSULTANTS

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LEGEND

- PROPOSED DECIDUOUS TREE
  30m3 SOIL VOLUME
- PROPOSED CONIFEROUS TREE
- PROPOSED SHRUBS / PERENNIALS / ORNAMENTAL GRASSES
- PROPOSED SOD
- PROPOSED ASPHALT PATHWAY
- X—X—X PROPOSED FENCE (REFER TO ARCH. DWG FOR DETAILS)

No.	Issue	Date MM/DD/YY	DR	CK
2	REVISED PER CITY COMMENTS	11/15/2023	ML	JL
1	ISSUED FOR SITE PLAN CONTROL	06/13/2023	ML	JL

JAMES B. LENNOX & ASSOCIATES INC.
LANDSCAPE ARCHITECTS
3332 CARLING AVE. OTTAWA, ONTARIO K2H 5A8
Tel. (613) 722-5168 Fax. 1(866) 343-3942

PROJECT
OLD SECOND LINE ROAD DEVELOPMENT
1158 OLD SECOND LINE ROAD, OTTAWA ON

DRAWING
LANDSCAPE PLAN

STAMP
ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
JAMES B. LENNOX
MEMBER

SCALE
AS SHOWN

START DATE
APRIL 2023

PROJECT NO.
23TH2332

PROJECT NORTH

DRAWING NO.
L.1

PLOT SIZE ARCH-D

Vegetation on the Site is limited to a cultural meadow primarily comprised of herb, graminoid and forb species. Deciduous sapling and small shrub cover is sparse across the Site. A limited number of trees are present along the southwestern property boundary at Second Line Road and in the southeast corner of the Site adjacent to the hydro corridor and paved pathway, just outside of the property boundary. Based on the Site plans provided to us, it is expected that these trees will be removed.

It is expected that the removal of the cultural meadow community and associated vegetation on the Site will have a negligible impact on lands surrounding the Site and the City's natural heritage system.

The following mitigation measures should be applied during site preparation and construction. To minimize impacts to remaining trees during development:

- Erect a fence beyond the Critical Root Zone (CRZ; equivalent to 10 x the trunk diameter) of retained trees. The fence should be highly visible (orange construction fence) and paired with erosion and sediment control fencing. Pruning of branches is recommended in areas of potential conflict with construction equipment.

- Do not place any material or equipment within the CRZ of trees unless otherwise approved by the City of Ottawa.

- Do not attach any signs, notices, or posters to any trees unless otherwise approved by the City of Ottawa.

- Do not raise or lower the existing grade within the CRZ of trees unless otherwise approved by the City of Ottawa.

- Do not extend any hard surface or significantly change landscaping within the CRZ of trees unless otherwise approved by the City of Ottawa.

- Do not damage the root system, trunk, or branches of any remaining trees unless otherwise approved by the City of Ottawa.

- Use tunneling or boring when digging within the CRZ of a tree.

- Ensure that exhaust fumes from equipment are not directed towards any tree's canopy.

7.3 Species at Risk and Wildlife Mitigation

The potential for SAR presence on the Site and within the development envelope was considered to be negligible. The species at risk mitigation measures provided in the Bickerton Memo (2019) regarding Blanding's Turtles remain appropriate and are addressed below.

No woodland or forest cover is present on the Site and no negative impacts are anticipated to forest habitat or Significant Woodlands. The Site provides very limited habitat and no occurrences of species at risk were found on the Site.

Butternut Trees previously on the Site were deemed 'non-retainable' in the IFS Butternut Health Assessment (Bickerton, 2019) and all five trees observed have since removed. No individuals were observed during KAL's 2023 site visit.

CJB Environment Inc. (2013) completed call playback surveys for Whip-poor-will and no individuals were detected on the Site. Bickerton (2019) determined that no suitable Whip-poor-will habitat is present due to the closed nature of the canopy, the absence of suitable understory to provide nesting cover, the absence of foraging habitat, and the Site's proximity to dense suburban settlement. The current conditions on the Site do not provide suitable habitat for the Whip-poor-will.

During the CJB Environment Inc. field visit, no Blanding's Turtles were observed during the active searching for reptiles (2013). No Blanding's Turtles were observed on the Site during KAL's 2023 site visit, and the current conditions observed by KAL on the Site do not provide suitable habitat for the Blanding's Turtle. The proximity of the Site in relation to South March Highlands Natural Area (within 120m) creates the potential for wildlife to cross Second Line Road into the Site. In the unlikely event of wildlife species presence during earth alteration works and construction, any turtles or snakes observed in the vicinity of the work areas or that may otherwise be in danger should be encouraged to relocate to the South March Highlands Natural Area. Animals should be moved only far enough to ensure their immediate safety and any handling of SAR during construction for safe relocation purposes should be done by individuals who are properly trained to do so. Any machinery should remain on the east side of Second Line Road to avoid potential disruption to wildlife species occupying the area.

8.0 CONCLUSION

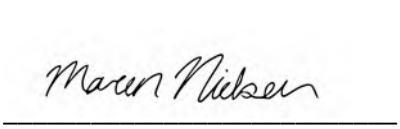
It is our professional opinion that potential future development on the Site is not expected to result in negative impacts to natural features or ecological functions of the Site.

9.0 CLOSURE

This EIS was prepared for exclusive use by Theberge Homes and may be distributed only by Theberge Homes. Questions relating to the data and interpretation can be addressed to the undersigned.

Respectfully submitted,

KILGOUR & ASSOCIATES LTD.



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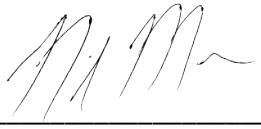

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Appendix A CJB Environment Inc. EIS and TCR (2013)

1158 Second Line Road, Ottawa, Ontario

Environmental Impact Assessment and Tree Conservation Report

Presented to:

Mr. Adel Houssari

September 2013

CJB Environnement inc.

1158 Second Line Road, Ottawa, Ontario

Environmental Impact Assessment and Tree Conservation Report

Presented to:

Mister Adel Houssari

September 30 2013

CJB Environnement inc.

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Quebec City, September 30 2013

Presented to:

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1. PROPERTY INFORMATION

The property under study, owned by Adel Houssari, is found at 1158 Second Line Road, Ottawa, Ontario, Canada, K2K 1X7. The lot, Concession and Township of the property are con 3 pt lot 11 RP 5R-1715; parts 1&2 (PIN: 045260207 Roll#061430081612601) and con 3 pt lot 11 RP 5R-2564 parts 1&2 (PIN: 045261418 Roll# 061430081912605). The name of the councillor for the property is Marianna Wilkinson and the WARD name is Kanata North (number 4). According to Schedule B of the City of Ottawa Official Plan, the land use designation is a General Urban Area. The Zoning By-Law is "Development Reserve Zone", Consolidation, June 25th 2008. The current land use is residential. The property is in the study area of the Kanata North Environmental/Stormwater Management plan (CH2Mhill Canada, 2001).

2. DESCRIPTION OF THE SITE AND THE NATURAL ENVIRONMENT

The study site is found at 1158 Second Line Road (45.349181°N, -75.948673°W). The 1.13 hectare site is forested and located on the northeast side of Second Line Road, between Goward Drive (northwest) and Whernside Terrace (southeast). A steel hydro tower is located along the northeast side of the property (Figure 1).

The site is bordered by two residential developments to the northwest and southeast. To the northeast, the site borders a hydro corridor where a wildflowers and grasses community grow underneath it. Finally, the southwest limit of the property is bordered by the South March Highlands Natural Area.

Covering an area of 1,478 ha, the South March Highlands Natural Area, designated as Natural Environment Area in the City of Ottawa's Official Plan, is a site of Natural and Scientific Interest (Brunton, 2002; Brunton, 2005). A significant wildlife corridor connects the South March Highlands with the Carp Hills to the northwest along the Carp Ridge. Portions of the South March Highlands include provincially significant wetlands.

This Environmental Impact Statement (EIS) is required due to the presence of the South March Highlands Natural Area along the southwest edges of the study site.

2.1 General Map of the Natural Environment

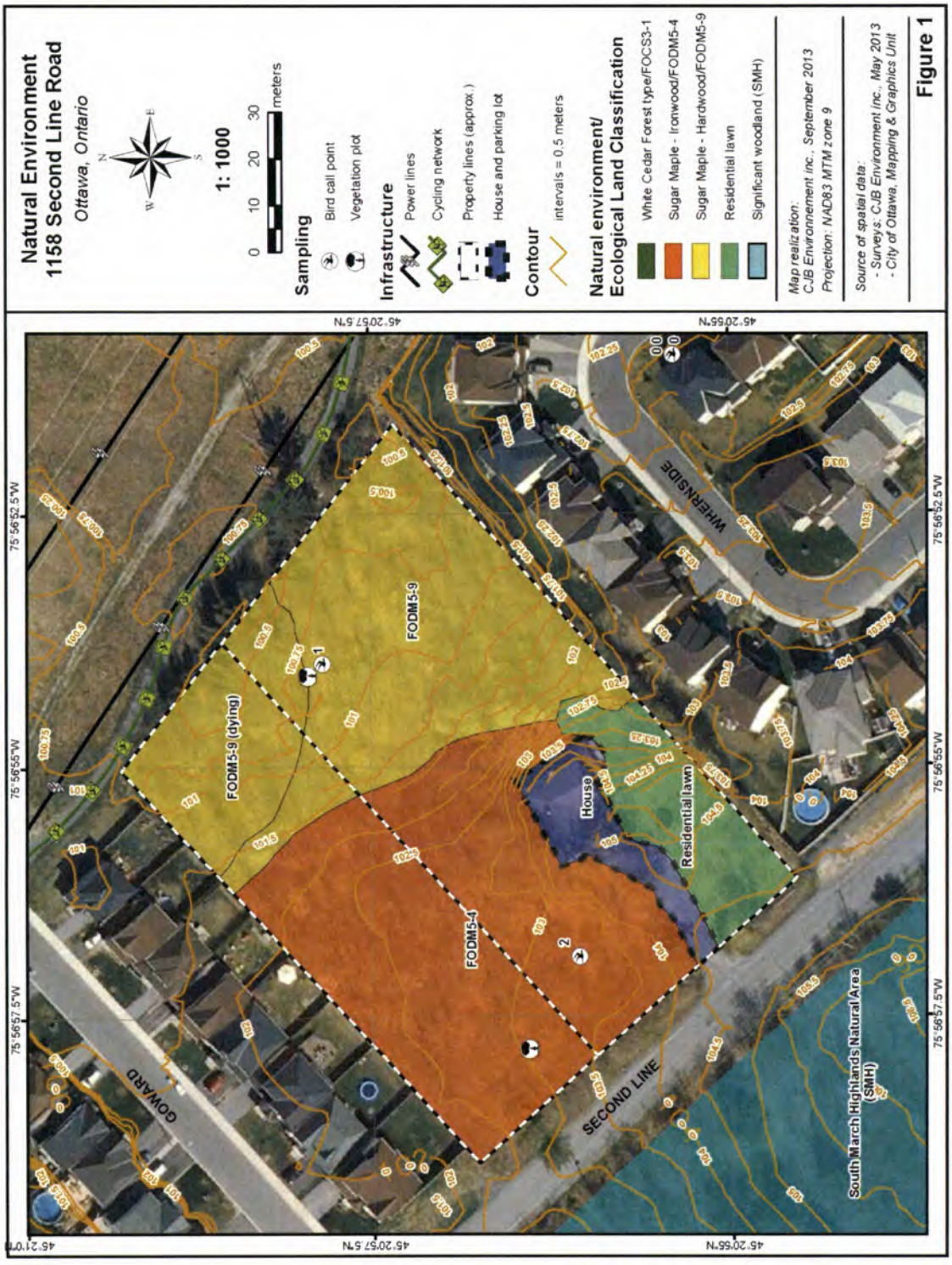

Figure 1. Natural and Man-made elements surrounding the property of 1158 Second Line Road in Ottawa.

2.2 Landforms, Soils and Geology

The surficial geology of the region is composed of clay and silt underlying erosion terraces. These fine materials come from the disappearance of the Champlain Sea which was created from the melting of the glaciers more than 10,000 years ago. Consequently, the upper part of this material contains marine deposits. The bedrock of the site is composed of sandstone with dolomites interbeds (City of Ottawa, 2013a).

Using a soil auger, we executed one soil sampling on the vegetation plot #1 (SMH side, Figure 1). We observed a thin organic soil layer (< 1 cm) overlying a thicker sandy soil horizon (> 17 cm). This soil composition combined with the absence of mottle (i.e. spots of various colors or shades, often rusty brown) suggests that the site has relatively good drainage (Photo 1).

Soil sample (vegetation plot #1, Figure 1)

Photo 1

The finding of a colony of white morels (*Morchella esculenta*) on the site suggests that the soil is slightly alkaline (Photo 2).

White morel (*Morchella esculenta*)

Photo 2

2.3 Surface Water, Groundwater and Fish Habitat

The property of 1158 Second Line Road is in the Ottawa West Watershed (City of Ottawa 2011). No water body (e.g. lakes, ponds, aquifer, springs, streams, etc.) were observed on the property. The nearest water body is the South March Highlands Wetlands complex located 100 meters upland. According to the topology of the property, rain water flows towards the northeast limit of the property (Figure 1). At the regional scale, only 10% of precipitation that falls in the Ottawa area infiltrates into the ground, the rest being lost to evapotranspiration or runoff to rivers and lakes (Natural Resource Canada as cited in City of Ottawa 2011).

2.4 Vegetation Cover

The natural environment of the property at 1158 Second Line Road is described in order to identify vegetation communities and potential environmentally significant urban woodlots and to assess the potential for the occurrence of species at risk at the provincial and federal levels. All vegetation communities identified are classed in accordance with the MNR's Ecological Land Classification (ELC) for Southern Ontario (Lee 2008).

To classify these communities, we sampled two forest plots of 400 m^3 each (Figure 1). For every tree, we measured the diameter at breast height (DBH), which is at approximately 1.20 m from the ground, and the general health condition for each tree. We also measured the height of the forest stand. Finally, we identified and estimated the percentage of cover of shrub and herbaceous understory species. In order identify potential high quality tree specimens or species at risk such as the butternut (*Juglans cinerea*), we walked the entire study site.

According to our results, the field study site has three types of vegetation community. These three vegetation communities are all terrestrial and named as follows: a *Dry Fresh Sugar Maple Ironwood Deciduous Forest type* (FODM5-4), a *Dry Fresh Sugar Maple Hardwood Deciduous Forest type* (FODM5-9), and a residential lawn (Figure 1).

2.4.1 Residential lawn

The first vegetation community is a typical residential lawn (grasses and forbs) of 0.11 ha containing a few isolated trees and shrubs. We observed a few common lilacs (*Syringa vulgaris*) and sugar maples (*Acer saccharum*) (Photo 3).

The edge of the residential lawn (Second Line Road behind)

Photo 3

2.4.2 Dry Fresh Sugar Maple Ironwood Deciduous Forest type (FODM5-4)

As its name suggests, the second vegetation community is a forest stand of 0.485 hectare largely dominated by native species such as the eastern hop-hornbeam (*Ostrya virginiana*) commonly known as Ironwood, and sugar maple (*A. saccharum*). American beech (*Fagus grandifollia*) and northern red oak (*Quercus rubra*) were also observed in this forest plot (Photo 4, 5, 6 and 7). Exploring this forest community, we also observed few individuals of bitternut hickory (*Carya cordiformis*) and white ash (*Fraxinus americana*). The complete statistical details (density and number of stem per hectare) of the forest plot #1 are in Table 1. According to Lee (2008), the abundance of ironwood suggests the presence of a highly managed forest or historically grazed site. Photo 6 suggests a certain level of forest management as brushwood, fallen dead branches and twigs are windrowed. In the North Kanata Environmental Management Plan (CH2Mhill Canada 2001), this forest underwent extensive logging. Consequently, trees are not over the range of 50 to 65 years old. The health condition of this forest stratum is generally good. A few individuals had dead branches or had ecological injuries probably caused by fungi, insect or woodpeckers looking for food (Photo 8 and 9). Some trees reach approximately 20 meters high. Table 1 and Photo 4 to 7 show, however, that the stand has many small trees.

Forest plot #1, southwest view

Photo 4

Forest plot #1, northwest view

Photo 5

Forest plot #1, northeast view

Photo 6

Forest plot #1, southeast view

Photo 7

Sugar maple, injured

Photo 8

Sugar maple, woodpecker injury

Photo 9

The shrub stratum is also largely dominated by a younger stage of the Eastern hop-hornbeam (*O. virginiana*) (55%), and sugar maple (*A. saccharum*) (40%). To a lesser

extent, white spruce (*Picea glauca*) (<5%), white ash (*F. americana*) (<5%), currant (*Ribes spp.*) (<5%), (*Rhamnus cathartica*) (<5%), basswood (*Tilia americana*) (<5%), and the alternate-leaved dogwood (*Cornus alternifolia*) (<5%) are also present in the shrub layer of this forest community. The European buckthorn (*R. cathartica*) is an invasive species in Canada (Environment Canada 2002). Though this species is tolerant of a wide range of moisture and light conditions, at the time of our observations, the population was limited to the edge of the forest (Photo 5).

The forest herbaceous understory stratum is largely dominated by the yellow trout lily (*Erythronium americanum*) (>80%). The remaining 20% of forest herbs observed are the baneberry (*Actaea* spp.), Carex (*Carex* spp.), white trillium (*Trillium grandiflorum*), rattlesnakeroot (*Prenanthes* spp.), large false Solomon's seal (*Maianthemum racemosum*), and Carolina spring beauty (*Claytonia caroliniana*). In addition to the herbaceous species observed in this forest plot, we also identified a few colonies of Canada wild ginger (*Asarum canadense*).

Trees have several ecological functions such as providing shelters and food for wildlife. They also generate oxygen, provide air pollution control, prevent soil from excessive erosion, recycle nutrients, regulate the water table, absorb toxins and control local climate (Beckham 1991). They act, also, as a visual and noise barrier from the traffic on Second Line road and neighbors.

Table 1. Statistic of tree species identified in the forest plot #1.

Species of forest plot #1	Number of stem	%	Density (stem/ha)	Basal area (m^2)	Basal area (%)	Density (m^2/ha)
Eastern hop-hornbeam	30	44.8%	750.0	0.6286	53%	15.72
Sugar maple	25	37.3%	625.0	0.3997	34%	9.99
American beech	11	16.4%	275.0	0.0669	6%	1.67
Northern red oak	1	1.5%	25.0	0.0674	6%	1.68
Total, excluding dead trees	65	97.0%	1625.0	**1.1626**	98%	29.06
Total, dead trees	2	3.0%	50.0	**0.0220**	2%	0.55
Total	**67**	**100**	1675.0	**1.1846**	100%	29.61

According to Muncaster and Brunton (2006), this stand was not evaluated. If we define a continuous forested site as one with a canopy that appears unbroken on an aerial photograph (see Appendix 8: Characteristics of Significant Woodlands in Environmental Impact Statement Guidelines, (City of Ottawa 2013b)), the study area is not continuous since the Second Line Road cuts the study site from the South March Highlands Natural Area. There is no rare vegetation community, or species at risk resent in the study site. While exploring this forest community, a large specimen of sugar maple was identified adjacent to the house (Figure 1).

This forest stand is considered to have moderate ecological value due to many factors including its overall health condition, its species composition (number of species, presence of exotic shrub species), its fragmentation from any natural corridor (road,

house development, power line), and the absence of species at risk and hydrological connection.

2.4.3 Dry Fresh Sugar Maple Hardwood Deciduous Forest type (FODM5-9)

The third vegetation community is a forest stand of 0.467 hectares largely dominated by native sugar maple (*A. saccharum*) followed by secondary species such as the eastern hop-hornbeam (*O. virginiana*), basswood (*T. americana*), burr oak (*Quercus macrocarpa*), white ash, (*F. americana*), bitternut hickory (*Carya cordiformis*) and the northern red oak (*Q. rubra*). American beech (*Fagus grandifollia*), eastern white cedar (*Thuya occidentalis*), and eastern hop-hornbeam (*O. virginiana*) were also found (Photo 10, 11, 12 and 13). Exploring this forest community, we also observed a few white elms (*Ulmus americana*). The complete statistical details (density and number of stem per hectare) of forest plot #2 are given in Table 2. Photo 14 suggests a certain level of forest management in this forest segment as brushwood, fallen dead branches and twigs are windrowed. As mentioned earlier, CH2Mhill Canada (2001) suggests that this forest section underwent extensive logging. Consequently, trees are not over the range of 50 to 65 years old. The health condition of this forest stratum is not as good as the FODM5-9. Half of the individuals in the plot were not in good condition. These individuals were dead or had dead branches or had injuries probably caused by fungi, insects or birds such as woodpeckers (Photo 15). The tallest trees are approximately 18 meters high. Table 2 and Photo 10 to 13 show, however, that the stand has many small trees.

Forest plot #2, northwest view

Photo 10

Forest plot #2, southeast view

Photo 11

Forest plot #2, southwest view

Photo 12

Forest plot #2, northwest view

Photo 13

Windrow

Photo 14

Snag of eastern white cedar

Photo 15

Forest dieback

Photo 16

The shrub stratum is also dominated largely at the young stage of the Eastern hop-hornbeam (*O. virginiana*) (60%), and sugar maple (*A. saccharum*) (30%). To a lesser

extent, white ash (*F. americana*) (<5%), European buckthorn (*R. cathartica*) (<5%), basswood (*Tilia americana*) (<1%), basswood (*T. americana*) (<1%), bitternut hickory (*Carya cordiformis*) (<1%), Northern red oak (*Q. rubra*) (<1%), currant (*Ribes spp.*) (<1%), black cherry (*Prunus* serotina), chokecherry (*P. virginiana*), and eastern poison ivy (*Toxicodendron radicans*) are also found in the shrub layer of this forest community.

The forest herb stratum is largely dominated by the yellow trout lily (*Erythronium americanum*) (>50%) and Carex (*Carex* spp.) (20%). The remaining 30% cover of forest herbs observed are the white trillium (*Trillium grandiflorum*), sharp-lobed hepatica (*Anemone acutiloba*), violet (Viola spp.), partridgeberry (*Mitchella repens*), grasses (*Poa* spp.), aster (*Aster* spp.), and common dandelion (*Taraxacum officinale*).

This community has several ecological functions such as providing shelter and food for wildlife. Forest communities also generate oxygen, provide air pollution control, prevent soil from excessive erosion, recycle nutrients, regulate the water table, absorb toxins and control local climate (Beckham 1991). They act as a visual and noise barrier from the traffic on Second Line road and neighbors.

Table 2. Statistic of tree species identified in the forest plot #2.

Stem number (all conditions):	Number of stem	%	Density (nb stem/ha)	Basal area (m^2)	Basal area (%)	Density (m^2/ha)
Eastern hop-hornbeam	13	28.9%	325	0.0547	4.93%	1.37
Sugar maple	17	37.8%	425	0.3592	32.39%	8.98
American beech	0	0.0%	0	0.0000	0.00%	0.00
Northern red oak	1	2.2%	25	0.0630	5.68%	1.58
Eastern white cedar	2	4.4%	50	0.0379	3.42%	0.95
Glossy buckthorn	4	8.9%	100	0.0034	0.31%	0.08
Burr oak	2	4.4%	50	0.1178	10.62%	2.94
Bitternut hickory	1	2.2%	25	0.0602	5.43%	1.51
Basswood	3	6.7%	75	0.2722	24.54%	6.80
White ash	2	4.4%	50	0.1408	12.69%	3.52
Total, excluding dead trees	**45**	93.8%	1125	**1.1092**		27.73
Total, dead trees	**3**	6.3%	75	**0.0459**		3.52
Total	**48**	100.0%	1200	**1.1551**		31.25

According to Muncaster and Brunton (2006), this stand was not evaluated. If we define a continuous forested site as one with a canopy that appears unbroken on an aerial photograph (see Appendix 8: Characteristics of Significant Woodlands in Environmental Impact Statement Guidelines, (City of Ottawa 2013b)), however, the study area is not continuous since the Second Line Road separates the study site from the South March Highlands Natural Area.

This forest stand is considered to have moderate ecological value due to many factors including its overall health condition, its species composition (number of species, presence of exotic shrub species), its fragmentation from any natural corridor (road,

house development, power line), and the absence of high quality specimen or species at risk and hydrological connection.

A small portion of this vegetation community (0.14 ha) was in very bad condition. This stand is located at the northern section of the study site (Figure 1). Indeed, this forest section has several snags (i.e. standing leafless trees) probably caused by a significant natural stress agent (e.g.: lack of water, insects, fungi, etc.) (Photo 18). We were not able to identify the cause of this forest dieback. We observed, however, dying sugar maple, white ash, and some aspen (*Populus* spp.). The forest regeneration of this section was well established with the Eastern hop-hornbeam (*O. virginiana*) dominating the vegetation cover (60%) followed by the white ash (25%), the European buckthorn (*Rhamnus cathartica*) (5%), and minor species such as the bitternut hickory (*Carya cordiformis*) and the black cherry (*Prunus serotina*).

We also observed isolated non vigorous and snags of white ash on the property. Some of these snags were cut (Photo 17) while others were still standing (Photo 18). The cause of their death is unconfirmed.

Snag of white ash cedar cut down

Photo 17

Snag of white ash standing

Photo 18

2.5 Wildlife

2.5.1 Birds

Two bird call points were done on the property. To conduct the bird call survey, we used the Ontario Breeding bird Atlas protocol (Ontario Breeding Bird Atlas 2001). Weather conditions of this inventory are described below (Table 3).

Table 3. Information on the condition of the bird calls point.

Song bird point count	Date	Starting time	Duration	Cloud condition	Wind condition	Temperature
Station #1	May 18 2013	5:02 AM	15 minutes	Clear	None (0 km/h	8 °C
Station #2	May 18 2013	5:23 AM	15 minutes	Clear	None (0 km/h	8 °C

A total of seventeen birds species were identified by call. Nine species were heard inside the property limits whereas eight species were heard outside the property limits. The complete list of birds species heard from the survey is given in Table 4. Bird calls heard on the go were also noted.

Table 4. Bird species heard at the bird call point 1 and 2 on May 16, 2013.

Species	Point #1 (Power line side)	Point #2 (SMH side)	Heard on the go	Inside the property	Outside the property
American crow	X		X		X
American goldfinch		X		X	
American robin	X	X	X	X	
Black-capped chickadee	X	X			X
Blue jay		X			X
Brown thrasher			X	X	
Canada Goose	X	X			X
Chipping sparrow	X			X	
Eastern phoebe	X	X	X	X	
Great crested flycatcher			X	X	
Killdeer			X		X
Mourning dove		X			X
Northern cardinal			X	X	
Northern flicker		X		X	
Red-winged blackbird	X	X			X
Song sparrow	X				X
White-breasted nuthatch			X	X	

2.5.2 Amphibians

For the amphibian survey, we used the protocol defined in the Marsh Monitoring Program (Konze *et al.* 1997). We modified some aspects of the program. For example, we performed the amphibian call survey even if open water was mandatory to undertake the survey. We used, therefore, the exact same location as for the bird call survey in order to hear potential amphibians inside the property or outside the property limits (e.g.: Power line side #1 or the South March Highlands Natural Area side #2). According to the Konze

et al. (1997) guidelines, we did Survey 2 that, depending of the spring conditions, should be performed between May 15th and May 30th. We performed the survey half an hour after sunset. The weather conditions were excellent for the survey (e.g.: no wind, temperature 15°C, etc.).

The only amphibians noted were Spring peepers heard at the point located on the side of the South March Highlands Natural Area. The location of these calls is estimated to be in the South March Highlands Natural Area. Accord to the Konze *et al.* (1997), the level of calling was 2 meaning that the number of some individuals can be estimated or counted, others overlapping. At the second survey point (the side of the power lines), no amphibian was heard outside or inside the property limit.

2.5.3 Mammals and reptiles

Active searching was performed for mammals and reptiles. No individuals were observed during the field visits. We did observe the entrances of a few groundhog burrows within the property limits. According to the landowners, white-tailed deer visit the study site occasionally.

2.6 Habitat for Species at Risk

The timing of our surveys concorded with the presence of spring ephemerals (early to mid-May) and woodland sedges (mid-May to early June). Consequently, we were in a good position to observe plant species at risk growing in the forested study site. No species at risk were observed.

According to Erin Thompson, a biologist at the Ministry of Natural Resources Kemptville District, a few species are documented in proximity of the site. These species are butternut (endangered), Blanding's turtle (threatened), whip-poor-will (threatened), milksnake (special concern), and the snapping turtle (special concern) (Appendix 1). None of these species was observed.

The study site can still have potential for some species at risk. The potential, however, is greatly reduced due to the regular use of the site by the landowner and his family. As discussed earlier, we observed a few windrows of dead branches, many trails and one small cabin in the trees.

As mentioned in the Environmental Data Collection Checklist given by the City of Ottawa for this project, special attention was given to the Whip-poor-will and the Blanding's turtle.

2.6.1 Whip-poor-will

Using the whip-poor-will pilot project participant's guide (Ontario Whip-poor-will Project 2012), we set up a whip-poor-will survey in order to detect the presence of this species at risk (threatened in Ontario and in Canada). The call of the whip-poor-will was played after the sunset at the birds call station 1 and 2 for 2 x 3 minutes. Bird call station 1 is in the

FODM5-9 type of forest whereas bird station 2 is in the FODM5-4 type of vegetation (Figure 1). After played the call, we listened for approximately ten minutes. Every individual heard was noted in the field book. The distance (m) and direction (bearing, °) of the call heard were estimated.

Table 5. Information on the condition of the whip-poor-will survey.

Song bird point count	Date	Starting time	Duration	Cloud condition	Wind condition	Temperature
Station #1	May 17 2013	20:45 PM	16 minutes	Clear	None (0 km/h	13-15 °C
Station #2	May 17 2013	21:11 PM	16 minutes	Clear	None (0 km/h	13-15 °C

No whip-poor-wills were heard during the survey. For short periods of time, noisy cars driving on Second Line Road disturbed the survey.

2.6.2 Blanding's turtle

As it was mentioned in the Environmental Data Collection Checklist for this project, special attention was given to the Blanding's turtle. During the field visit, no Blanding's turtles were observed during the active searching for reptiles. Moreover, the study site does not correspond to the habitat requirements of this species.

3. DESCRIPTION OF THE PROPOSED PROJECT

CJB Environmental was contracted to conduct an Environmental Impact Statement (EIS) for a residential development to be located on 1158 Second Line Road, con 3 pt lot 11 RP 5R-1715; parts 1&2 (PIN: 045260207 Roll#061430081612601) and con 3 pt lot 11 RP 5R-2564 parts 1&2 (PIN: 045261418 Roll# 061430081912605), Geographic Township of March, Ottawa, Ontario, Canada. The proposed project is a residential development of single houses/semi detached or town units. No development plans are currently available. Property lines in Figure 1 demonstrate the potential extent of the project. The proponent of the project is seeking both a rezoning and site approval from the City of Ottawa. The EIS was undertaken in advance of the rezoning application and is required as part of the application process.

3.1 Constraints

3.1.1 South March Highlands Natural Area

As described previously, located a few hundred meters south of the 1158 Second Line Road, the South March Highlands Natural Area is designated as a Natural Environmental Area in the Schedule A of the Official Plan. The forest is located immediately adjacent to and within the urban and developing area in Kanata. According to the City of Ottawa's website, the Forest is an ecologically significant and diverse area in the City of Ottawa, and is also an important environment for outdoor recreation such as biking, hiking, birding, etc.

3.1.2 Others

The North Kanata Environmental Management Plan (CH2Mhill Canada 2001) identified two environmental features in and around the property. First, the property would have a Sugar Maple Forest and Small Red Ash Swamp of "medium" quality. After characterising the site, our data suggest that the forest is composed essentially of a Dry Fresh Sugar Maple Ironwood Deciduous Forest type (FODM5-4) and a Dry Fresh Sugar Maple Hardwood Deciduous Forest type. No wetland/swamp was observed on the site. Second, the report mentioned that a wetland and an osprey nest are located east of the study site. At the time of our visit, no wetland and osprey nest were observed. Moreover, during the amphibian surveys, no amphibian was heard on the property. The land is now dominated by wildflowers and grasses that grow underneath a power line.

An old landfill of 2.1 ha is located at 0.5 km south southeast of the study site. The landfill operated from 1963 to 1974. According to the Memo of the City of Ottawa (2002), "there continues to be no evidence of a related public health risk" regarding the old landfill. Moreover, a letter from AMEC (2013) confirms that the area of influence is not impacting the property and satisfies Section 3.8 of the Official Plan (Appendix 2). Therefore, no additional investigation (Risk Assessment) is required.

3.2 Plans and Drawings

The EIS was undertaken in advance of rezoning application and is required as part of the application process. No Plans and Drawings were available at the time the EIS was undertaken.

4. IMPACT ASSESSMENT

4.1 General

The South March Highlands Natural Area is the major natural heritage feature in the immediate area and is a significant attribute of the regional landscape. However, the study site does not contribute to the features and functions of the adjacent South March Highlands Natural Area. There are no environmental features of note present on the forested study site. There is no hydrological connection (water course) between the site and the natural area as the contouring of the land would cause rain water to exclusively flow from South March Highlands onto the site and from the site to the east (power lines), away from South March Highlands. Furthermore, the Second Line Road separates the South March Highlands from the study site. Two road ditches are located at each side of the street which capture this rain water from the South March Highlands Natural Area and drain this water away from the study site due to a slope in elevation. Therefore, the site does not contribute to the hydrology regime of South March Highlands. Any increases in impervious rain water will not impact the moisture regime of the South March Highlands.

4.2 Impact assessment matrix

The environmental assessment of the project primarily aims to identify, describe and assess the negative effects and propose mitigation measures on the receiving environment. For the purposes of the analysis, the project is designed in four phases: site preparation, construction, operation, and decommissioning. To facilitate the descriptions of negative effects and mitigation measures, the project components are grouped by themes, as presented in Table 6. The components of the project are facing the elements of the environment in a double-entry table, which identifies all interrelationships between the project and the elements of the receiving environment (Table 6). In this table, an interrelationship is indicated (X) whenever a part of the project is likely to have an effect on one of the elements of the environment.

Table 6. Matrix to identify environmental effects

DIMENSIONS	PHYSICAL							BIOLOGICAL						
	AIR		SOL			Water		Habitat		Fauna		Veg.		
						Ground	Surface							
	Quality	Sound env.	Quality	Drainage	Erosion	Quality	Quality	Terrestrial	Aquatic	Terrestrial	Aquatic	Terrestrial	Aquatic	Landscape
SITE PREPARATION														
1. Delineating protective zones			X											
2. Vegetation clearing										X		X		
3. Demolition of the existing house		X	X											
CONSTRUCTION														
4. Soil excavation	X	X	X			X	X							
5. Street and buildings construction	X	X	X				X							
6. Waste management and residual material			X				X							
7. Machinery	X	X	X				X							
OPERATION														
8. Traffic	X	X												
9. Residential development								X		X				X

Table 7. Impacts and Mitigations Summary Table

Activity	Natural Feature/Function	Potential Effect (may be positive or negative)	Proposed Mitigation	Residual Effect (may be positive or negative)
Site preparation				
1. Delineating protective zones	Soil quality	Delineating protective zones (South March Highlands Natural Area and residual trees on the site) will prevent the passage of machinery in the Natural Area and will circumscribe the passage of the machinery on study site. This action will prevent soil erosion as well as the compaction of soil around trees.	- Mark the excavation site using visible markers (ribbon, rope, paint, etc.) and inform workers of the precautions to be taken.	The negative residual impact is deemed negligible.
2. Vegetation clearing	Vegetation	Loss of trees on the site	- Immediately cut all ash species found on the site. - Only remove trees that cannot be conserved. - Special attention must be given to residual trees in order to avoid injuries to trunks, branches or roots.	Removal of invasive, trees severely infected by pathogens. If necessary, replace cut tree by native species as recommended in the EMP. Positive effect to neighbours is expected as dangerous tree will be eliminated. See Tree Conservation Report section 5.1
	Breeding birds	Destruction of the nests of breeding birds.	- No tree removal will take place between April 15th and July 31th to minimize the impact on breeding birds. - A pre-clearing survey for active stick nests and cavity nests must also be conducted between April 1st and April 15th, in order to identify early-nesting owls and raptors.	Residual effect should be minimized as birds may breed on trees in surrounding area (e.g. SMH).
3. Demolition of the existing house	Soil quality	Waste material resulting from demolition activities may cause contaminants to disperse in the soil and surrounding environment. Impact from this work is possible with respects to potential contamination.	- The work must be performed by a qualified contractor. - Once the house is demolished, appropriate waste management procedures will be taken so that the materials do not contaminate the environment. The material will be placed in containers.	Taking into account the mitigation measures, the residual impact is deemed negligible.

		Given the relatively small size of the structures, the impact is considered negligible.	- All waste will be disposed of in accordance with regulations and cannot be incinerated or buried on site. - Following excavation, clean soil will be used to backfill and rehabilitate the area.	
	Soil quality	The movements of trucks and heavy equipment present a risk of accidental spills and therefore a risk of soil contamination. Given the relatively small size of the site, the impact is considered negligible.	- Provide the necessary equipment to prevent dispersion of wastes into the environment. - See section 8. Machinery	Taking into account the mitigation measures, the residual impact is deemed negligible.
	Sound environment	The demolition activities will be a source of noise.	- The usual working hours (7AM-7PM) will be respected.	Taking into account the mitigation measures, the residual impact is deemed negligible.
Construction				
4. **Soil excavation**	Air quality	Excavation could give rise to airborne dust that may affect air quality, especially in dry weather. However, these will be negligible.	- Limit the time periods in which fine materials that may be a source of dust are exposed. - Adopt working methods that minimize the emission of fine particles. The use of water as a dust suppressant should be done with great care, including the recovery and proper management any runoff. - Minimize the duration of these operations.	Taking into account the mitigation measures, the residual impact is deemed negligible.
	Sound environment	The excavation work will be a source of noise.	- The usual working hours (7AM-7PM) will be respected.	Taking into account the mitigation measures, the residual impact is deemed negligible.
	Soil quality, surface water and groundwater	The project will require soil excavation for the implementation of a street and various infrastructure such foundations, drainage, separator, pipes, piles, concrete slab, and installation of public and private utilities (sewage and aqueduct).	- The work must be performed by a qualified contractor. - If soil contamination is detected, once excavated, appropriate soil management is essential to avoid contamination of the environment. Place in airtight containers or shelter from the elements by covering with traps. Complete characterization of the	Considering the application of mitigation, the residual impact is negligible.

		Impact from this work is possible with respects to potential contamination.	excavated soil at the bottom and sides of trenches to determine their appropriate destination. Redirect to an authorized site, in accordance with the standards. Following excavation, clean soil will be used to backfill and rehabilitate the area.	
	Surface water quality	Water can accumulate in excavations during construction. The impact is negligible.	- Water in the excavations will be pumped and directed to a water treatment system or to an authorized site.	Considering the application of mitigation, the residual impact is negligible.
5. Street and building construction	Air quality	Construction of the street and the wood and metal structures for the buildings involves activities that may affect air quality through the emission of fine particles. Painting can also temporarily affect air quality in the immediate vicinity of the site. Given the relatively small size of the buildings, the impact is considered negligible.	- Adopt good working practices to minimize emissions and volatilization of solvents and paints.	Considering the application of mitigation, the residual impact is negligible.
	Sound environment	A variety of activities such as assembly work and welding may cause noise. Two small residential areas adjacent to the study site may be affected by these noisy activities.	- The usual working hours (7AM-7PM) will be respected.	Considering the application of mitigation, the residual impact is negligible.
	Soil quality and surface water	Impacts on soil quality and surface water from spills are possible. Contaminants that may be discharged include welding debris, paint and solvents. Accidental spills of dirty water during cleaning activities could also cause contamination of soil and surface water. The magnitude of the impact depends on the number of incidences and the amount of material discharged. Taking into account the measures proposed by the proponent, the risk is very low.	The following measures must be taken to minimize the risk of spills: - Set up the working areas to reduce the risk of soil contamination. - Minimize the amount of solvents used. - Handle paint and solvents containers in places where it is possible to recover spills. - Keep containers that are not in use closed. - Prohibit the disposal of paints, solvents and wastewater on the ground or in ditches. - Quickly recover any spilled hazardous material, even small quantities, and dispose of them in compliance with applicable regulations. - Continuous care is essential to avoid accidents that can cause a spill.	Considering the strict application of mitigation, the residual impact is negligible.

6. Waste management and residual material	Soil quality and surface water	Waste management, including management of hazardous waste, can affect soil and surface water quality. In this case, the waste produced on site will include construction and demolition debris from the existing house and parking lot. Considering the nature and magnitude of the work, the impact is considered minor. Inadequate soil and debris management could result in impacts to soil and surface water. The magnitude of this impact varies according to the volumes involved, the nature of the soils and their dryness, as well as weather conditions.	- Comply with the applicable rules and regulations for waste management. Manage in accordance with the principle of 4Rs: reduction, reuse, recycling and recovery. - Manage soils in accordance with the results of the characterization. If contaminated soil is detected, it must be managed in accordance with the appropriate regulations and disposed of at an authorized site. - Pay attention to waste likely to be carried by the wind (paper, plastic bags, etc.). At the end of the work, collect all waste, including empty containers and packaging. - Waste must be transported by a qualified contractor holding the licenses and permits required, particularly for the transport of hazardous waste. - Care should be taken to prevent accidental spills during handling, packaging and transport of debris and contaminated soils. - The contractor must provide an emergency plan to recover the contaminated soil or toxic and dangerous debris that could accidentally fall from the trucks. - Fallen debris will be collected and managed according to current environmental regulations.	Considering that contaminated soils, if any, will be disposed of in an authorized site and considering the rigorous application of the mitigation measures, the residual impact is considered negligible.
	Fauna	Disturbance, displacement, injury or death of wildlife as a result of vegetation clearing and other activities associated with site alteration or development.	- Contractors and other on-site workers should be briefed on appropriate measures to reduce human-wildlife conflict during the work *(e.g.* waste management, no feeding of wildlife, no deliberate harm to wildlife). If necessary, provide contact numbers for large animal removal, rehabilitation of injured wildlife, and species at risk reporting.	Considering the application of the mitigation measured, the residual impact is negligible.

7. Machinery	Air quality	The use of machinery is likely to affect air quality. The movements of the machinery and the repeated passage of trucks may cause degradation of air quality through the emission of fine particles. Given the amount of work, the impact is considered minor. In addition, considering the small number of trucks involved and the easy access via the Second Line Road, this impact is considered negligible.	- Use of equipment in good operating condition and in compliance with emission regulations. - Turn off the engines when machinery is not on operation. - As needed, clean circulation areas to minimize dust lift. - When transporting soils or materials that can be carried by the wind, make sure to cover the loads with tarps to prevent any loss, as required by the road safety code.	Considering the application of mitigation, the residual impact is negligible.
	Sound environment	The machinery and trucks have a negative impact on the sound environment. Transportation activities will affect the noise environment along the routes used by trucks. Two small residential areas may be affected by these noisy activities. Given the amount of work and the machinery used, the impact is considered minor.	- Use equipment in good operating condition and equipped with an adequate muffler. - Turn off the engines when machinery is not on operation. - The usual working hours (7AM-7PM) will be respected.	Considering the application of mitigation, the residual impact is negligible.
	Soil quality and surface water	The presence of machinery on the site could be the source of leakage of oil or grease, which may cause soil and surface water contamination.	Take measures to reduce the risk of leaks and spills: - Use clean equipment in good operating condition to minimize leakage and potential breakage and spills. - Do not perform maintenance of equipment on the site. - ,If possible place the machinery on paved or nonporous surfaces When the machinery is put away for the night or for short periods of time. A possible spill would then be easy to recover. - Remove from the site any vehicle that is no longer required. - If they are required on site, handle and store petroleum products carefully (at least 30 m from any ditch).	Considering the application of the mitigation measures, the residual impact is negligible.

			- Provide permanent presence on site of equipment to deal with a spill (absorbent, waterproof containers, etc.). - Collect any spill, even of small amounts. - If a spill occurs, apply emergency measures to control the spill and fix the problem that caused the spill (breakage, mishandling, etc.). Contain the contaminated area clean and remove contaminated material and send it to an authorized site. Report the accident by contacting the appropriate authorities. - Use watertight dump trucks for the transportation of soils. - The drivers of all trucks and other vehicles will take the necessary precautions to minimize the risk of leaks or spills during transport such as defensive driving, following speed limits, etc. - At the end of the work, clean the site of any material that falls off the trucks.	
Operation				
8. **Traffic**	Air quality	Traffic is likely to affect air quality. The movements of vehicles may cause degradation of air quality by the emission of fine particles.	- Turn off truck engines when they are not in operation. - As needed, clean traffic areas to minimize dust lift.	Considering the application of mitigation, the residual impact is negligible.
	Sound environment	Machinery and trucks have a negative impact on the sound environment. Considering that the work involves small machinery, the impact is negligible. Two small residential areas, however, may be affected by these noisy activities.	- Use equipment in good operating condition and equipped with an adequate muffler. - Turn off the engines with machinery is not on operation.	Considering the application of the mitigation, the residual impact is negligible.

9. Residential development	Landscape	The new residential development will replace a house. It may affect the visual environment of the neighbourhood; however, given the presence of two other residential developments adjacent to the site, the effect is negligible.	- If necessary, trees and shrubs will be planted all along the site. This will integrate the new residential development into its surroundings.	Considering the application of the mitigation, the residual impact is negligible. Greening the site is a positive effect through which the wildlife corridor of the Shirley's Brook North Branch will be improved.
	Vegetation	Loss of native biodiversity due to increased presence of non-native invasive species after development.	- Use only locally appropriate native species for landscaping adjacent to the South March Highlands. - Re-establish native vegetation along new or disturbed edges of natural features by seeding or transplanting locally appropriate native species (except all ash species).Provide new homeowners with a list of locally appropriate native species for use in landscaping, along with information on the negative impacts of non-native invasive species such as the Norway maple, Amur maple, periwinkle and other commonly cultivated species.	Considering the application of the mitigation, the residual impact is negligible.
	Fauna	Ongoing conflicts between wildlife and humans or domestic pets following development of new homes in or adjacent to the South March Highlands.	- Provide *Owner Awareness Package* to all new residents, including information on avoiding and resolving human-wildlife conflicts, with references for more information. - Include information on potential consequences of allowing pets to roam unattended, including o Impacts of pets on wildlife o Impacts of wildlife on pets o Legal restrictions on uncontrolled pets	Considering the application of mitigation, the residual impact is negligible.

5. MITIGATION

This section highlights recommendations to minimize potential impacts to the natural environment and presents a Tree Conservation Report.

5.1 Tree Conservation Report

The field surveys and this report were completed by Dominic Chambers, who has a Master's of Science in Biology/Forestry and over 8 years of experience as a biologist in completing field surveys and natural environment assessments. Chantale Caux, who has over 8 years of experience as a Biologist, accompanied Mr. Chambers during the field surveys. Bruno Dupré, with over twelve years of experience in environmental assessment, supervises the current project.

The objectives of this section were to determine the measures of protection for retained trees (if applicable), make recommendations for the removal of particular tree species, and finally suggest appropriate tree species for landscaping. Despite the absence of development plans, this Tree Conservation Report was prepared in order to outline the protective measures that must be taken with respect to retained trees. According to the proponent of the development project, a maximum of trees will be protected to provide an added value to the residential development.

A small portion of the site (21.5%) is adjacent to a South March Highlands Natural Area. The majority of the site is bordered by other residential developments (56.6%) or power lines (21.8%) beneath which wildflowers and grasses grow. The Second Line Road separates the study site from the South March Highlands forest (Figure 1). The study site is mainly forested. A complete description of the forest stands is given in section 2.4.2 and 2.4.3 of the EIS.

If there is retained trees, prior to the works, the sections of the property with these trees will be protected by placing a fence at least 1.5 metres high. The fence will be placed outside the root critical zone (RCZ). According to the City of Ottawa's website, the RCZ is established as being 10 centimetres from the trunk of a tree for every centimetre of trunk diameter. The trunk diameter is measured at a height of 1.2 metres for trees of 15 centimetres diameter and greater and at a height of 0.3 metres for trees of less than 15 centimetres diameter.

As discussed in the impact assessment matrix, no grading or activities that may cause soil compaction such as the passage of heavy machinery and stockpiling of construction material are allowed within the RCZ of retained trees (if applicable). The root system, trunk or branches of the trees to be retained must not be damaged. For example, no signs, notices or posters are allowed to be attached to a tree. Avoid directing the exhaust fumes from any equipment towards the canopy of trees to be retained. Any branches of a retained tree that interfere with any stage of the residential development are to be

removed by a qualified arborist. Pruning trees without using proper techniques could create entrances for pathogens.

As mentioned in the matrix, some species of trees are recommended in the residential development landscaping plan. It will be important to priorities *Upland Dry Forest* species such as the sugar maple, basswood, red oak, etc. It is important to avoid any non-native species such as the Norway maple, buckthorn shrubs and the recently popular Japanese knotweed. Some native species must be avoided. All ash species are now vulnerable to the emerald ash borer. This insect is a highly destructive wood-boring beetle that feeds under the bark of all ash trees even individuals having a DBH < 2cm (Natural Resources Canada, 2012). Silver maple and willows must be avoided because of their very intrusive root systems that could damage house foundations, water lines and sewers. Finally, shade intolerant species such as poplars and birches are undesirable next to a house because of the softness of their wood. The branches and trunk of these species are more likely to break during strong winds.

To protect breeding birds, no tree or shrub larger than 1 cm (DBH) should be removed between April 15th and July 31st.

6. MONITORING

As suggested in the Contents of the Environmental Impact Statement Report (City of Ottawa, 2012), a monitoring program in EIS using basic and/or conventional mitigation measures to avoid or minimize potential impacts is not needed. The mitigation measures suggested in the impact matrix (section 4.2) are conventional.

7. SUMMARY AND RECOMMANDATIONS

The site is mostly forested with a small portion of disturbed land occupied by the house and a driveway. The forested portion contains three different terrestrial vegetation communities: a *Dry Fresh Sugar Maple Ironwood Deciduous Forest type* (FODM5-4), a *Dry Fresh Sugar Maple Hardwood Deciduous Forest type* (FODM5-9), and a residential lawn.

The residential development of the site will not have any negative impacts on the natural features and functions of the South March Highlands Natural Area if existing woody vegetation along the boundary of this natural area is preserved and the mitigation measures identified in this section 4.2 are followed. This conclusion is also based on the following points:

- First, there is no hydrological connection (water course) between the site and the natural area. The topography of the land would cause rain water to flow exclusively from the South March Highlands onto the site and from the site to the east (towards the power lines), away from South March Highlands. Furthermore, the Second Line Road separates the South March Highlands from the study site. Two ditches are located on each side of the road. These capture the rain water from the South March Highlands Natural Area and drain it away of the study site.

- Second, no natural features of note on the site itself.

- Third, no species at risk were observed on the site despite the fact that we covered the entire study site during their growing season. Moreover, no Whip-poor-will, Blanding's turtle and butternut were observed despite the fact that they were specifically targeted by different surveys.

This EIS identifies mitigation measures for the woody vegetation to be retained. The EIS concludes that the residential development will not have a significant impact on the adjacent Natural Area if the proposed mitigation measures are fully respected.

Here are some general recommendations regarding the residential development:

1. All ash species found on the site should be cut immediately in order to avoid the study site becoming a possible source of infestation by the emerald ash borer;

2. Woody vegetation inside the study site is to be removed outside of the bird breeding period from April 15th to July 31st;

3. Landscaping must priorities *Upland Dry Forest* species such as the sugar maple, basswood, red oak, etc. Silver maple, willows, and shade intolerant species should be avoided.

8. REFERENCES

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Appendix 1

MINISTRY of NATURAL RESOURCES COORESPONDENCE

Good morning Mr. Chambers,

I took a look at the property you outlined in your email and screened it for species at risk (SAR). The following species are documented in proximity to the site:

Butternut (endangered –END)
Blanding's turtle (threatened- THR)
Whip-poor-will (THR)
Milksnake (special concern- SC)
Snapping turtle (SC)

Endangered and threatened species have species protection and Whip-poor-will has general habitat protection and species protection.

Little brown bat has been recently listed as endangered and has both species and habitat protection. Though not documented here, there is the potential for the species to occur. Chimney Swift (THR) is also afforded the same type of protection and may occur on the site should any old cavity trees or chimneys be present.

Please note that general habitat protection for all endangered and threatened species comes into effect June 30th of this year. Also, information regarding species at risk is based on documented occurrences only and does not include an interpretation of potential habitat within or in proximity to the site in question. Although this data represents the MNR's best current available information, it is important to note that a lack of information for a site does not mean that additional features and values are not present. i.e.: Species at Risk (SAR) or their habitat could still be present at the location or in the immediate area. It is the responsibility of the proponent to ensure that species at risk are not killed, harmed, or harassed; or their habitat is not damaged or destroyed through the activities carried out on the site. The MNR continues to strongly encourage ecological site assessments to determine the potential for SAR habitat and occurrences. When a SAR or potential habitat for a SAR does occur on a site, it is recommended that the proponent contact the MNR for technical advice and to discuss what activities can occur without contravention of the Act. If an activity is proposed that will contravene the Act (such as Section 9 or 10), the proponent must contact the MNR to discuss the potential for a permit (Section 17). For specific questions regarding the Endangered Species Act (2007) or SAR, please contact a district Species at Risk Biologist at sar.kemptville@ontario.ca.

Please note: The advice in this letter may become invalid if:

- The Committee on the Status of Species at Risk in Ontario (COSSARO) re-assesses the status of the above-named species OR adds a species to the SARO List such that the section 9 and/or 10 protection provisions apply to those species.
- Additional occurrences of species are discovered.
- Habitat protection comes into force for one of the above-mentioned species through the creation of a habitat regulation.

For future information requests, please review and fill out the attached application and send to Kemptville.inforequest@ontario.ca.

Regards,

Erin Thompson

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Appendix 2

Letter from AMEC, April 15 2013

April 15, 2013

VIA EMAIL

TZ13009

Adel Houssari and Nada Harb
1158 Second Line Road
Kanata, Ontario
K2K 1X7

Dear Mr. Houssari and Ms. Harb:

**RE: Former Township of March Closed Landfill
Development Property 1158 Second Line Road**

AMEC Environment & Infrastructure, a Division of AMEC Americas Limited ("AMEC") was retained by Adel Houssari and Nada Hard to provide an assessment of the potential environmental concerns that the Former Township of March Closed Landfill ("March Landfill") may present with respect to a proposed development property located at 1158 Second Line Road in Ottawa (Kanata), Ontario (the "Development Property"). The proposed Development Property is located within 500 metres of the March Landfill. The location of the Development Property and the March Landfill are shown on Figure 1 attached. This letter addresses the potential environmental concerns and is intended to provide the necessary clearance for the Development Property with respect to March Landfill to satisfy the City of Ottawa's Planning and Approval requirements with respect to old closed landfills.

Development Property

The proposed development property consists of two contiguous parcels of located on the east side of Second Line Road between Goward Drive and Klondike Road in the suburban area of Morgan's Grant. The parcels have a combined area of 1.23 hectares and are located just inside the City of Ottawa rural-urban boundary. The Development Property has a frontage of approximately 96 metres along Second Line Road and an average lot depth of 127.7 metres. The Development Property is bound to the north and south by private residential properties and by a Hydro high tension power line right-of-way to the east. Lands opposite the Development Property on the west side of Second Line Road consist of undeveloped rural lands designated as a Natural Environment Area (NEA). The topography across the Development Property is moderately sloped to the northeast with overall relief in the order of 4 metres.

The southern two-thirds of the Development Property is currently improved with one (1) single family home while the northern third is currently vacant. The residence is currently supplied with on-site servicing including domestic water by an on-site water well while sanitary wastes management by way of an on-site septic system. The owners are proposing to redevelop the property to residential use. The proposed development will include typical municipal servicing including water, sewer, Hydro, telephone cable and natural gas.

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The March Landfill is located approximately 370 metres south of the Development Property and approximately 210 metres southwest of the intersection of Klondike Road and Second Line Road. The March Landfill was operated by the former Township of March as a municipal waste disposal site between 1963 and 1974 under Provisional Certificate of Approval (C of A) number A461101 issued by the Ontario Ministry of the Environment (MOE). The March Landfill was officially closed in 1974.

The March Landfill is located in an open water marsh and comprises approximately 2 hectares (4.94 acres) with dimensions measuring approximately 175 metres (east-west) by 160 metres (north-south). The Site is characterized by two distinct areas; 1) an upper road allowance, which serves as the western extension of un-opened Klondike Road right-of-way; and 2) the lower waste disposal area to the south of and flanking the road allowance. The surface of the lower waste disposal area lies approximately 2 to 3 metres below the road allowance and is currently surrounded by open water to the east, south, and west.

The March Landfill and surrounding lands lie within a physiographic region known as the March Highlands, an area characterized by a gently rolling bedrock terrain. The highlands are flanked to the east and northeast by lowlands of the Ottawa Area Clay Flats, an area typified by flat-lying lands and abundant marshes. The geology of the March Landfill and surrounding area is characterized by thin overburden deposits and abundant bedrock outcrops. The bedrock geology is comprised of a relatively flat-lying Palaeozoic sedimentary sequence that unconformably overlies Precambrian crystalline basement rocks (Williams, 1991). The March Landfill and host wetland lie within a linear depression or graben-like structure. This structure appears to have formed due to faulting on either side of the wetland, as inferred by vertical offsets observed in the bedrock stratigraphy beneath the landfill, subsequently modified by glaciation.

In October 2000 the City of Ottawa (then as the Region of Ottawa-Carleton) initiated environmental investigations at the property located at the 78.5 hectare parcel located at the southwest corner of the intersection of Klondike Road and Second Line Road in support of its acquisition for preservation as a NEA. The March Landfill was identified as an area of potential environmental concern with respect to the acquisition of the property. Subsequent investigations carried out at and in the immediate vicinity of the March Landfill identified soil and/or groundwater impacts by several contaminants including volatile organic compounds (VOC), petroleum hydrocarbons (PHC), polynuclear aromatic hydrocarbons (PAH) and metals.

Extensive hydrogeological investigations carried out at the March Landfill and surrounding lands by AMEC on behalf of the City of Ottawa between January 2001 and July 2002 delineated a groundwater contaminant plume migrating in the bedrock beneath the March Landfill and downgradient lands beneath the Morgan's Grant subdivision to the east-northeast. The groundwater contaminant plume is characterized by elevated concentrations of trichloroethylene (TCE) and its degradation products including isomers of dichloroethylene (DCE) and vinyl chloride (VC). These compounds together have been collectively referred to as the "TCE plume". TCE, cis-1,2-DCE, and VC continue to persist in the bedrock groundwater at concentrations exceeding drinking water and/or potable groundwater use standards as provided in the Ontario Drinking Water Standards, Objectives and Guidelines (MOE, revised 2006) and Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental

Protection Act (MOE, 2004, amended 2011). An outline of the TCE plume showing its migration relative to the March Landfill and the Development Property is provided on Figure 1.

A Human Health Risk Assessment (HHRA) was completed by AMEC on behalf of the City (AMEC 2003) to identify potential exposure pathways and human receptor groups in order to assess the potential risk to the residential community downgradient of the landfill associated with the presence of TCE plume in groundwater. A Risk Management Plan (RMP), including the implementation of a multi-component annual monitoring program, was developed for the March Landfill to provide an overall long-term environmental management strategy to prevent unacceptable risks to human health associated with the TCE plume. The HHRA and RMP were acknowledged by the Ontario Ministry of the Environment (MOE) in July 2007. The RMP, including groundwater, surface water and private water well monitoring programs currently remains in effect. The data acquired since 2000 has resulted in a comprehensive understanding of the migration of the March Landfill TCE plume and associated environmental concerns.

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Groundwater Contamination

Groundwater in the vicinity of March Landfill has been impacted by PHC, PAH and VOC, the latter consisting primarily of TCE and related degradation products. Impacts by PHC and PAH are confined to the immediate area of the landfill. TCE groundwater impacts extend beyond the landfill and have been delineated over a distance of 1.5 kilometres and a maximum with of approximately 350 metres migrating in the sandstone bedrock. The TCE plume has been the subject of continuous monitoring since 2000. The migration of the TCE plume has been well documented in annual reports prepared by AMEC on behalf of the City of Ottawa. These data indicate the TCE plume to be migrating to the east-northeast.

One of the primary human exposure concerns associated with the March Landfill TCE plume is the intrusion of TCE vapours into homes and/or buildings constructed on top of the TCE Plume. The migration of subsurface vapour typically occurs through cracks and seams in the building foundation and/or floor due to differential pressure between the interior and exterior of the structure. Given the TCE plume migration away from the Development Property and the intention to service the Property with municipal water, the TCE plume is not considered to pose any environmental concern with respect to the Development Property.

Surface Water Contamination

Surface water in the vicinity of March Landfill has been monitored periodically by AMEC on behalf of the City to assess potential impacts resulting from the March Landfill. The monitoring data indicates that the surface water in water body hosting the March Landfill is impacted by metals and PAH. Other waster bodies in the area exhibit similar impacts thus it remains uncertain if these impacts are directly attributable to the March Landfill or other anthropogenic activities in the general area.

Surface runoff in the vicinity of the March Landfill is directed to the open water marsh in which the landfill in located. This marsh is drained to the north by a series of un-named tributaries of Shirley's Brook. Surface water at March Landfill is thus not considered to pose any environmental concern with respect to the Development Property.

Landfill Generated Gases

Landfill gases have not been assessed at March Landfill. Wastes at the landfill were placed in a open water marsh underlain by relatively impermeable native clay silt / silty clay deposits. These impermeable deposits extend across the base of the landfill to the edge of the marsh. The landfill was closed by capping the wastes with permeability silty sands. These features serve to promote direct venting of any landfill gases, if present, with little to no potential of lateral migration beyond the landfill footprint. As such, the March Landfill is not considered to pose any concerns with respect to the Development Property.

Landfill Odours

The March Landfill was closed in 1974. The landfill is covered with 0.6 to 1.2 metres of silty sand and is well vegetated blending in with the surrounding terrain. No noxious or other odours originating at or attributable to the landfill have been identified.

Landfill Litter

The March Landfill has been closed in 1974. Landfilled waste disposed at the site has been covered with a suitable material that is continuous across the waste disposal area with no obvious gaps, breaches or large areas of exposed waste. Penetration of the cover by waste material is relatively minor and is generally limited to re-bar and wire. The cover fill is well vegetated with actively growing grasses, shrubs and trees rendering the Site relatively inconspicuous and aesthetically benign.

Visual Impact;

The March Landfill is separated from the Property by a distance of 370 metres. The landfill lies in an open water marsh reaching a peak elevation of approximately 108 metres. Intervening lands between the Development Property and March Landfill reach a peak elevation of 110.5 m. Although this elevation change is minimal, the intervening lands are well vegetated with grasses, shrubs and mature trees thus obscuring the sight lines from the Property.

As noted above the landfill is well vegetated with actively growing grasses, shrubs and trees rendering the Site relatively inconspicuous and aesthetically benign allowing it to blend naturally with its surroundings. The March Landfill is thus not considered to pose any concerns with respect to visual impact.

Dust and Noise

The March Landfill has been closed in 1974. As such, no issues concerning noise or dust emissions typically associated with an operating landfill exist at the March Landfill.

Fires;

The March Landfill has been closed in 1974. These are no fire-related concerns regarding the March Landfill beyond those commonly associated with vacant forested lands (i.e., grass and/or forest fires).

Vectors and Vermin

The closed March Landfill is located in rural marsh setting surrounded by vacant forested lands which serve as home to a variety of fauna, including the landfill itself.

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The March Landfill was operated by the former Township of March as a municipal waste disposal site between 1963 and 1974. The March Landfill was officially closed in 1974. The City of Ottawa has been engaged in monitoring and management of potential environmental concerns associated with the March Landfill since October 2000. The data acquired from these studies has shown that the former Township of March Landfill poses no potential environmental concern with respect to the Development Property.

We trust the above information is satisfactory. If you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

AMEC E□□□r□□□ □□□□ I□□r□□□r□□□□r□
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Kevin D. Hicks, M.Sc., P.Geo., QP_{ESA}
Senior Associate Hydrogeologist

KDH/kdh

Attachment (1)
Figure 1 – Site Plan

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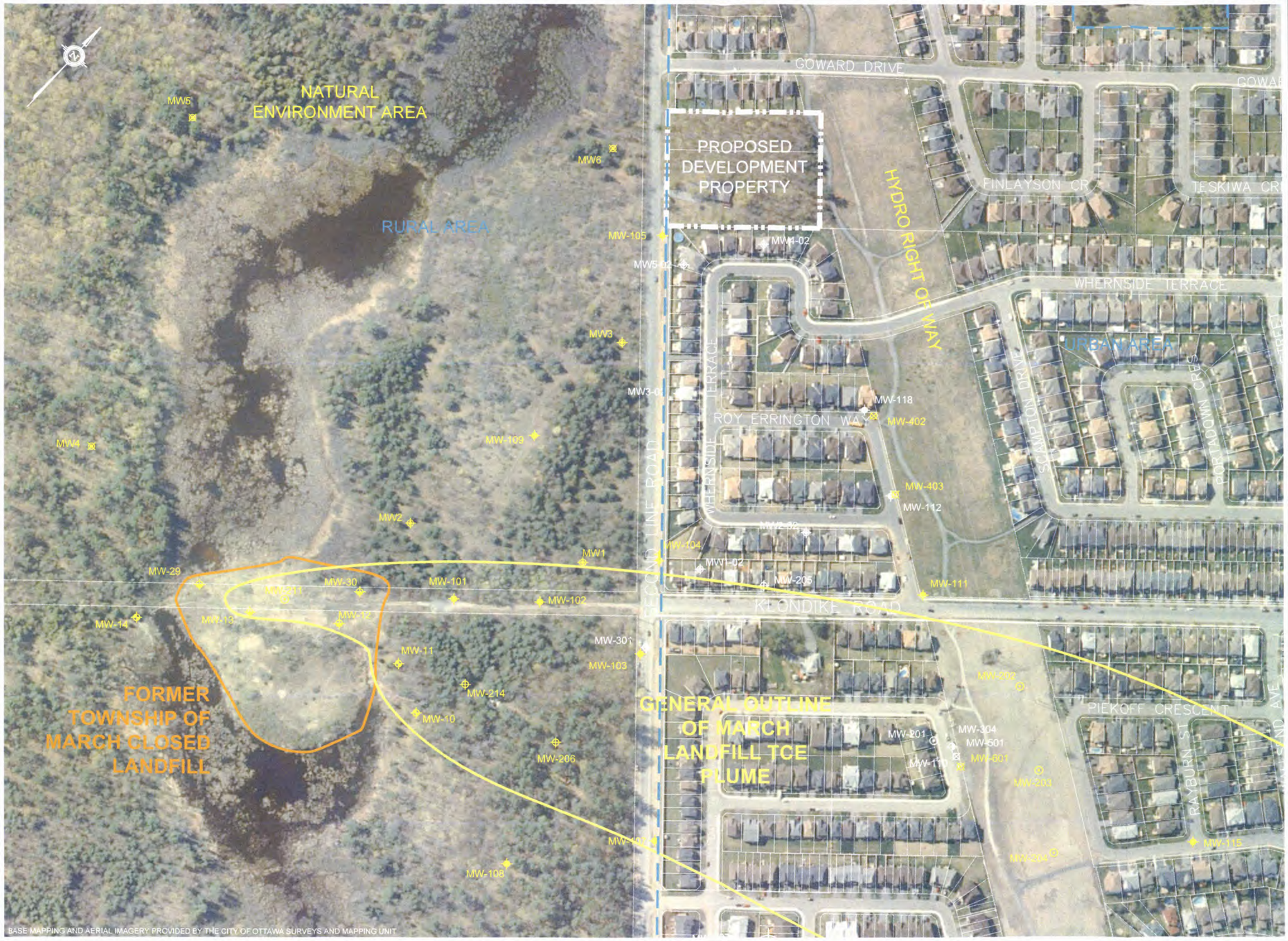


BASE MAPPING AND AERIAL IMAGERY PROVIDED BY THE CITY OF OTTAWA SURVEYS AND MAPPING UNIT

LEGEND

- MW-14D — SHALLOW BEDROCK MULTI-LEVEL MONITORING WELL (2000)
- MW-12D — SHALLOW OVERBURDEN / BEDROCK MULTI-LEVEL MONITORING WELL (2000)
- MW-101 — DEEP BEDROCK MULTI-LEVEL MONITORING WELL (2001)
- MW-210 — DEEP BEDROCK MULTI-LEVEL MONITORING WELL (2002)
- MW-201 — SHALLOW BEDROCK MULTI-LEVEL MONITORING WELL (2002)
- MW-301 — BEDROCK COREHOLE WITH SINGLE OR MULTI-LEVEL MONITORING WELL (2002)
- MW3-02 — SHALLOW BEDROCK MONITOR (J.D. PATERSON 2002)
- MW4 — MULTI-LEVEL BEDROCK MONITOR (J.D. PATERSON 2004)
- MW-401 — DEEP BEDROCK MULTI-LEVEL MONITORING WELL (2006 - 2008)
- PROPOSED DEVELOPMENT PROPERTY
- MARCH LANDFILL TCE PLUME
- RURAL - URBAN BOUNDARY
- MARCH LANDFILL PROPERTY LINE

DECOMMISSIONED MONITORING WELLS SHOWN IN WHITE

amec

TITLE:	**SITE PLAN**
PROJECT:	**1158 SECOND LINE ROAD**
CLIENT:	**ADEL HOUSSARI AND NADA HARB**
DESIGNED BY:	KDH
DRAWN BY:	JFT
CHECKED BY:	KDH
DATE:	APRIL 2013
SCALE:	1 : 3,000
PROJECT No.:	TZ13009
FIGURE No:	**1**

P:\PROJECTS IN PROGRESS\1 ENVIRONMENTAL\2013\TZ13009 - HOUSSARI MARCH\FIGURE 1.DWG

Appendix B Bickerton Memo (2019)

Holly J. Bickerton
Consulting Ecologist

143 Aylmer Ave. Ottawa, K1S 2Y1
(613) 730-7725
holly.bickerton@rogers.com

MEMORANDUM

To: Matthew Hayley, City of Ottawa
Laurel McCreight, City of Ottawa
cc: Joey Theberge, Theberge Homes Ltd.
Bill Holzman, Holzman Consulting
RE: 1158 Old Second Line Road, Addendum to 2013 Environmental Impact Assessment and Tree Conservation Report , File D07-16-18-0008

Date 4 March 2019

This memo provides supplementary information to an EIS and Tree Conservation Report developed in September 2013 by CJB Environnement toward a proposed subdivision development at 1158 Old Second Line Road, Ottawa, Ontario.

Background

The subject property in Kanata, Ontario, consists of two lots (Con 3 Part Lot 11 RP 5R-1715, parts 1& 2 and Con 3 Part Lot 11 RP 5R-2564 Parts 1& 2) that are under contract with Theberge Homes Ltd. The site is zoned General Urban - Development Reserve (DR) in current zoning bylaws. The mostly wooded property has not been included as Open Space or linkages within any existing Community Design Plans.

An EIS was completed in 2013 by CJB Environnement. This memo should be read in conjunction with the 2013 report. The 2013 EIS thoroughly described the existing conditions on the site including Vegetation cover, Ecological Land Classification, Surface Water and Fish Habitat, Wildlife Habitat and Species at Risk, as well as the proposed development, impacts, and mitigations.

Since the submission of the 2013 EIS, changes in policy and in the proposed project have led to a need for supplementary information and updates to the previous EIS. This memo provides information to be considered together with existing information in the 2013 CJB Environnement document, using the same organizational structure as the previous report:

- Vegetation Cover (2.4, p. 6-12)
- Habitat for Species at Risk (2.6, p. 15-17)
- Description of the Proposed Project (3.0, p. 17-18)
- Impact Assessment (4.1, p. 19)
- Mitigation (5.0, p 28)
- Monitoring (6.0, p, 30).

The following recent documents, referenced throughout, also support the original EIS and this Memo:

- Tree Conservation Report completed by IFS Associates (April 19, 2018), see File.
- i-Tree Ecosystem Analysis: 1158 Old Second Line Road, Urban Forest Effects and Values, February 2019, Appendix 1.
- Memo, Nick Stow (Senior Planner, City of Ottawa, 21 Feb 2019) re: 1158 Old Second Line Road, File No. D07016-18-0008, Appendix 2.
- Avoidance Alternatives Form (AAF) for activities that may require an overall benefit permit under clause 17(2)(c) of the *Endangered Species Act* (dated 30 Jan 2019), Appendix 3.
- Email from Aaron Foss (Kemptville MNRF, 5 Feb 2019) re: 1158 Old Second Line Road, File No. D07016-18-0008, Appendix 4.
- Information Gathering Form (IGF) for activities that may affect species or habitat protected under the *Endangered Species Act* (dated 10 Dec 2018), available via email.

2.0 Description of the Site and the Natural Environment

While the site itself is virtually unchanged since 2013, several changes to policies and procedures have led to the identification of additional impacts, as well as proposals for mitigation.

2.4 Vegetation Cover and Significant Woodlands

Within the 2013 EIS, the current vegetation cover is clearly described (2.4.1 to 2.4.3). Vegetation cover is unchanged since 2013. However, new policies around Significant Woodlands have resulted in the addition of the sections below to the EIS.

2.4.4. Tree Conservation Report (2018)

In April 2018, an updated Tree Conservation Report was completed in support of the EIS process (IFS Associates 2018a). In addition to the identification of five Butternut trees (see Section 2.6 below), the TCR provided additional information on the tree species, condition, size and status on the site. In response to a 2018 site plan proposal, IFS Associates recommended a 2m wide linear area to be protected adjacent to all property lines to allow for the retention of small trees (<10 cm diameter). The TCR also outlines tree preservation and protection measures to be undertaken during construction, outlined under 5.0 Mitigation (below).

2.4.5. Significant Woodlands: New 2019 Policy Context

Since 2013, a draft Significant Woodlands policy has been developed (City of Ottawa 2019), to provide consistency with Ontario's Provincial Policy Statement and supporting Natural Heritage Reference Manual (OMNR 2010).

In the draft 2019 policy, there are specific requirements to address Significant Woodlands that impact the proposed subdivision development at 1158 Old Second Line Road. Specifically, the EIS for the subject property must consider Significant Woodlands within the EIS because it is not within the urban boundary expansion area, it is not in a rural area, and it is not within an Urban Expansion Study Area or Developing Community (City of Ottawa Official Plan, Appendix A, p. 31). The property has not been identified as part of any existing natural heritage system, plan of subdivision, or community design plan. It was not included or assessed as an Urban Natural Feature (UNA) in Ottawa's Urban Natural Areas Study (Muncaster Environmental Planning and Brunton Consulting Services 2005).

However, the wooded area is considered as a Significant Woodland under the draft policy because it lies within the urban boundary, is more than 60 years old, is greater than 0.8 ha in size, and does not fall within an existing Secondary Plan, Community Design Plan, or Plan of Subdivision.

2.4.6. Significant Woodlands Screening Criteria

According to the draft Significant Woodlands policy (City of Ottawa 2019), areas of woodland that meet any of the criteria below should be screened out from development or negative impact (Table 2a (*new*)). As indicated below in the right column, the woodland at 1158 Old Second Line Road does not meet any of the Screening Criteria in the draft policy.

Table 2a Screening Criteria for Woodland at 1158 Old Second Line Road

Social Values	
Unusual recreational, educational or cultural opportunities	**None.** The subject area is private property with no public use supported.
Qualifying Cultural, Heritage, or Historical Features	**None.** No existing designations.
Indigenous values established through consultation	**None**. No values identified through CDP or other process.
Hazard lands	
Constrained areas	**None**. Subject area has no hazards (e.g. floodplain, meander belts, steep or unstable slopes, restrictive soils or karst).
Habitat and Landscape Connectivity	

Adjacency and connectivity	**None**. Not part of Natural Heritage System or identified greenspace. Although it is a woodland adjacent to the South March Highlands (an NEA), the intervening area is not natural landcover or greenspace, but a suburban road (see Draft guidelines, p . 37). To date, the property has not been identified in any natural heritage network.
Specialized habitat	**None.** There are no uncommon characteristics in the woodland (see OMNR 2010, Natural Heritage Reference Manual, Table 7.2: e.g. uncommon community types, important habitat of restricted species or woodlands dominated by large or old trees). The woodlands are not considered to provide habitat for an endangered or threatened species under the ESA 2007 (see below).

The screening criteria confirm that avoidance ("screening out") of the proposed development is not appropriate for this area under the draft Significant Woodlands policy.

2.4.7. Significant Woodlands Comparative Criteria

Comparative criteria identified in the draft policy identify attributes that can be replaced, substituted or adequately mitigated. The draft policy acknowledges that negative impacts on these functions and services of significant urban woodland may be necessary in order to achieve other policies and objectives of the Official Plan and PPS (City of Ottawa 2019).

Because 1158 Old Second Line Road represents the first proposal under the draft Significant Woodlands guidelines, City of Ottawa staff has evaluated the property with respect to the comparative criteria. This evaluation is appended (Memo dated 21 Feb, N. Stow, Senior Planner). It confirms that the woodland is subject to the following evaluation:

- Total canopy cover
- Social value
- iTree analysis
- Accessibility and Equity
- Low impact development

The following analyses were carried out by the City of Ottawa (2019b) for this evaluation:

- An iTree Canopy analysis of the urban tree canopy in Morgan's Grant (the community), based upon 100 sample points.
- An iTree Eco analysis of the woodland, based upon two sample plots, projecting 40 years into the future. The analysis used the default settings and assumed a natural regeneration of 15 trees per year. Note that the recommendations of the TCR (2 m buffer at north and south) and the landscaped trees were not accounted for in this analysis. For rationale, please see accompanying Memo.
- A GIS analysis of total, accessible greenspace and the percentage of the community with easy access to greenspace (defined as 250 m straight-line distance).

The modelling program iTree was developed by the USDA Forest Service. Ecosystem services offered by woodlands include removal of air pollution, reduction in surface run-off, carbon storage and sequestration, as well as structural value.

Note that a modest natural regeneration of 15 trees per year was assumed for the iTree analysis of 1158 Old Second Line Road. The planned retention of a 2 m treed buffer along north and south property lines, a wider area of tree retention along the hydro corridor, and trees proposed for planting in the landscaping plan were not included in the analysis. In the case of the latter, this is because the City determined that the soil volumes provided for the landscaped trees would be insufficient to allow for their long-term growth and development.

2.4.8. Results of City of Ottawa Assessment of Significant Woodlands Criteria

Results of the City's evaluation of the subject property with respect to Significant Woodlands are found in Table 2b (*new*, Memo from Nick Stow, 21 Feb 2019).

Table 1b Summary of Significant Woodlands Assessment (City of Ottawa)

Ecosystem Service	Change in local community (Morgan's Grant) as a result of proposed development	Comment
Total Canopy Cover	-1.7%	
Social Value	None known	
Accessible Greenspace	31 ha (15% of the community area)	No history of public access at 1158 Old Second Line Rd. (private)
Percent of the community within 250 m of accessible	95%	No history of public access at 1158 Old Second Line Rd. (private)

greenspace		
Percent of multi-unit housing within 250 m of accessible greenspace	100%	No history of public access at 1158 Old Second Line Rd. (private)
Carbon Storage	-0.26% (69 metric tons)	
Carbon Sequestration (net change)	-2%	
CO (kg)	-1.2%	
NO2 (kg)	-3.4%	
Ozone	-3.6%	
SO2 (kg)	-0.11%	
PM 2.5 (kg)	-2%	
Additional Runoff	184 m^3/a	

2.4.10. Significant Woodlands Conclusion

Based on the above analysis (Table 2b), City staff have concluded that the loss the wooded area on the subject property would result in a small decrease in ecosystem services provided to the local community. However the loss is considered limited in scope and magnitude when compared to the full community of Morgan's Grant.

The City of Ottawa acknowledges that the Significant Woodlands policy has not yet been approved by City Council and that the City "cannot reasonably ask the proponent to provide compensation in this case." The City Memo concluded that the negative impacts of the proposed development on the significant woodland should not prevent it from proceeding as planned. The proposed site plan is presented in Section 3.0 below, and impacts and proposed mitigations are discussed in Sections 4.0 and 5.0 respectively.

It should be noted that the proposed project is consistent with a variety of other policies with Ottawa's current Official Plan which affect natural systems planning for the City. For example:

- 2.1: Patterns of Growth: The proposed project is consistent with intensification targets in that population density is within an urban area and is directed towards key existing locations that are accessible to transit, walking, and cycling, and compact and efficient from a servicing point of view.

- 2.2: Managing Growth: The proposed project lies within Schedule B [Official Plan 2.2.1] where the City of Ottawa aims to accommodate approximately 90% of its growth. The project consists of a new development on … "land in designated growth areas that contributes to the completion of an existing community or builds a new community(ies)."

The ecological benefits of policies of growth and intensification in existing communities are well understood and include reduction in fossil fuel use due to reduced car travel, increased efficiency of land use, and protection of significant natural features in rural settings.

2.6 Habitat for Species at Risk

Since 2013, there has also been significant change to policies and procedures surrounding the identification of Species at Risk habitat, and mitigation. The information below is in addition to section 2.6, Habitat for Species at Risk (CJB Environnement 2013, p. 15-16). In 2013, CJB Environnement identified five potential SAR occurring on the subject property: Butternut (END), Blanding's Turtle (THR), Whip-poor-will (THR), Milksnake (SC at the time), and Snapping Turtle (SC). Since 2013, the Milksnake has been delisted as a Species at Risk under the provincial ESA.

2.6.1 Eastern Whip-poor-will

On 17 May 2013, CJB Environnement completed call playback surveys for Whip-poor-will on the subject property. No Whip-poor-wills were heard during the surveys, although again the surveys were completed prior to provision of a standard MNRF survey protocol. The property was visited by Holly Bickerton on November 22, 2018, to observe the structural habitat suitability for SAR, including Whip-poor-will. As summarized in documents to MNRF (appended), the site is not considered to provide suitable habitat for Whip-poor-will due to the closed nature of the canopy, the absence of suitable understory to provide nesting cover, the absence of foraging habitat, and the site's proximity to dense suburban settlement. A lack of documented observations in the nearby vicinity supports this assessment. In a January 2019 reply to the IGF, the MNRF concurred that although 2013 surveys did not follow the currently required survey protocol, "the rationale explaining the poor suitability of the site for species provides good support that no additional surveys are needed."

2.6.2 Blanding's Turtle

Between 16-18 May 2013, CJB Environnement completed active surveys for reptiles. Surveys were completed prior to a 2014 MNRF publication to standardize survey methods for Blanding's Turtles. No Blanding's Turtles were observed, and it was concluded that the site did not correspond to the habitat requirements of this species (p. 16). The site contains no wetland habitat, and there is also no wetland habitat or suitable nesting habitat in the adjacent hydro corridor.

Since 2013, MNRF has significantly altered the screening process for the identification of SAR habitat under the Ontario ESA 2007. In 2018 through communication with consultants at GHD and Holly Bickerton, MNRF identified the subject property as Category 3 Habitat for Blanding's Turtle as identified under the ESA, due to its proximity

to known sites and recent observations of roadkill in the area (J. Devlin, pers. comm. 2018).

An Information Gathering Form (IGF, 11 Dec 2018) and Avoidance Alternative Form (AAF, 30 January 2019) were subsequently submitted to MNRF by Holly Bickerton on behalf of Theberge Homes (Bickerton 2019a and 2019b). In summary, the forms described the subject property and the surrounding area, and indicated several reasons why the area is unlikely to be used as Category 3 habitat of value to support Blanding's Turtle. In the AAF, activities were proposed during construction that would prevent all unlikely impact to Blanding's Turtle as a result of the proposed development. MNRF subsequently concurred via email that "the works, as proposed will not likely contravene the ESA with the mitigation described in the AAF." All agreed upon mitigations identified in the AAF are summarized in Table 1 (see Proposed Mitigation, below).

2.6.3 Butternut (NEW)

In April 2018, a Tree Conservation Report was completed by IFS Associates and five Butternut trees were identified on the subject property (Figure 2). A Butternut Health Assessment was completed by Andrew Boyd at IFS Associates on 14 June 2018 (see IFS Associates 2018b). Of the five trees, one was dead, and the remaining four were assessed as Category 1 ("non-retainable") under the BHA Tree analysis protocol, meaning that these four were affected by Butternut Canker to such an advanced degree that retaining the tree would not support the protection of the species. The BHA report summarizing this information was submitted by IFS Associates to MNRF on 27 June 2018.

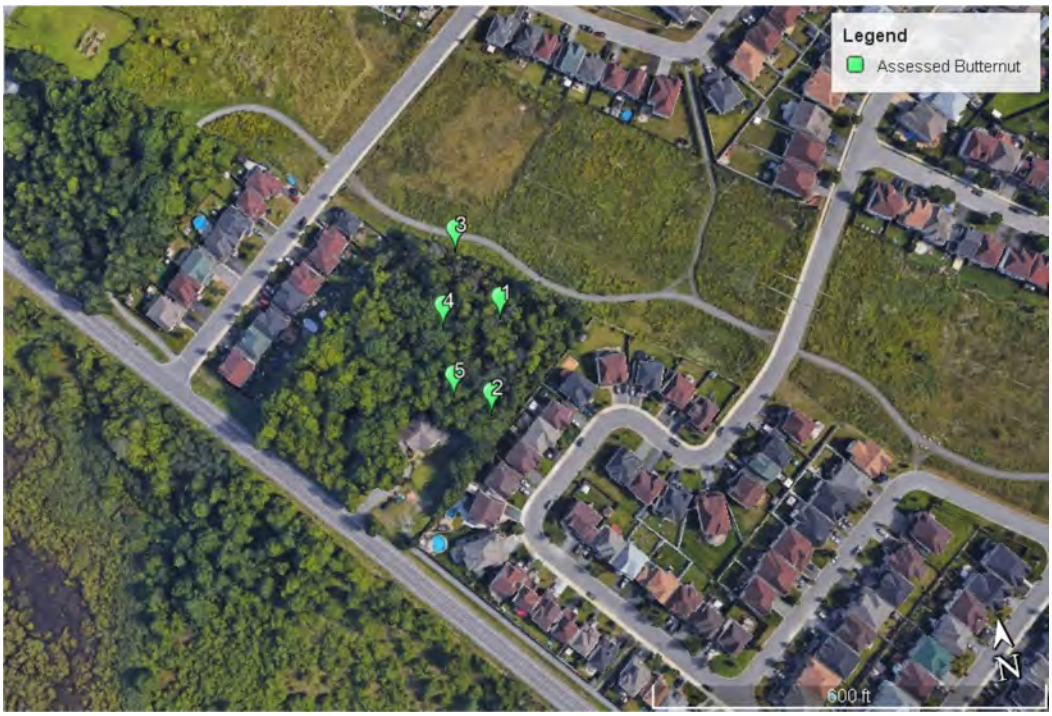


Figure 2 Location of 5 assessed Butternut trees. 1=Dead, 2-5=Category 1 (non-retainable).

3.0 Description of the Proposed Project

At the time of the 2013 EIS, no development plans were available. The former proponent was seeking rezoning and site approval.

Theberge Homes and Holzman Consultants Inc. have developed site plans for the subject property and have submitted an application for a Plan of Subdivision and Zoning Bylaw Amendment based on a detailed Site Plan, Landscape Plan, Site Servicing and Grading Plans, and other supporting materials. A residential development of 47 units is planned, arranged in townhouse blocks (see Site Plan for reference in Figure 3; note that the most recent full site plan is included in Dec 28 submission). Each has an internal single car garage and additional legal parking space in the driveway, with 18 visitor parking spaces. Urban infrastructure servicing is proposed along with a stormwater management facility (dry pond) adjacent to the hydro line, to control the quality and quantity of the stormwater runoff.

A Landscape Plan completed by G.J. Aiello Associates is similarly presented for reference in Figure 4; note that the full Landscape plan is included in Dec 28 submission.

4.0 Impact Assessment

Given that a detailed site plan for the proposed subdivision has been developed, impacts to the woodland can be more clearly identified than in 2013.

4.1 General

The 2013 EIS states that there are no environmental features of note present on the site. However, five Endangered Butternut trees have been identified on the site since that time, and consultation with the MNRF identified that Category 3 Blanding's Turtle habitat is present (see 2.6.2 above). Additionally, the City of Ottawa has identified that the proposed project will result in decreases in ecosystem services provided to the local community.

4.2 Impact Assessment Matrix

Additional impacts described above are now included in the updated Table 6a (below, based on Table 6 completed by CJB Environnement in 2013).

Figure 3 Site Plan, 1158 Old Second Line Road (Partial for reference only; for full plan please see 21 December 2018 SP-1, Rev. 3)

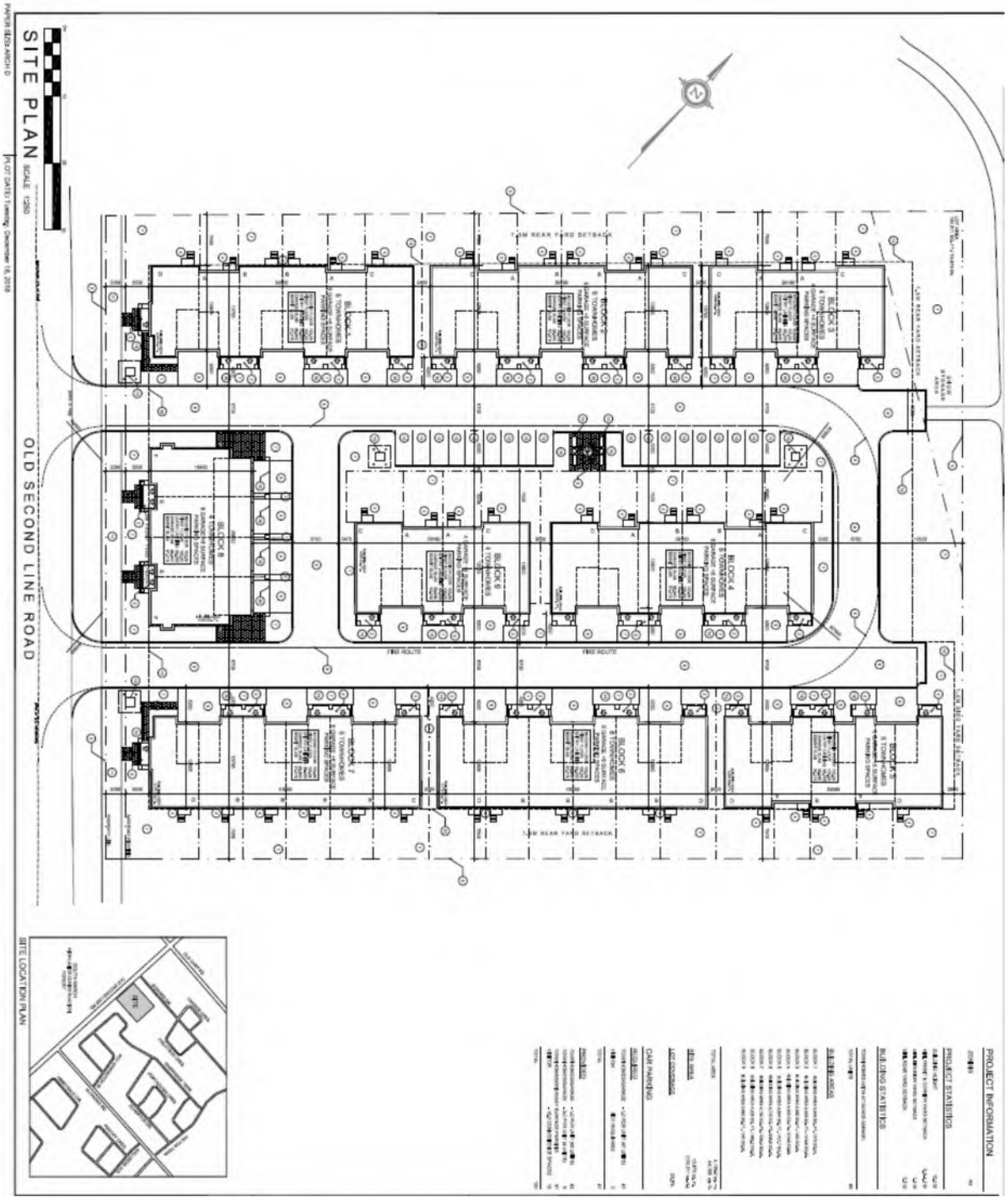


Figure 4 Landscape Plan, 1158 Old Second Line Road (Partial for reference only; for full plan please see 18 December 2018 L-1, Rev. 3)

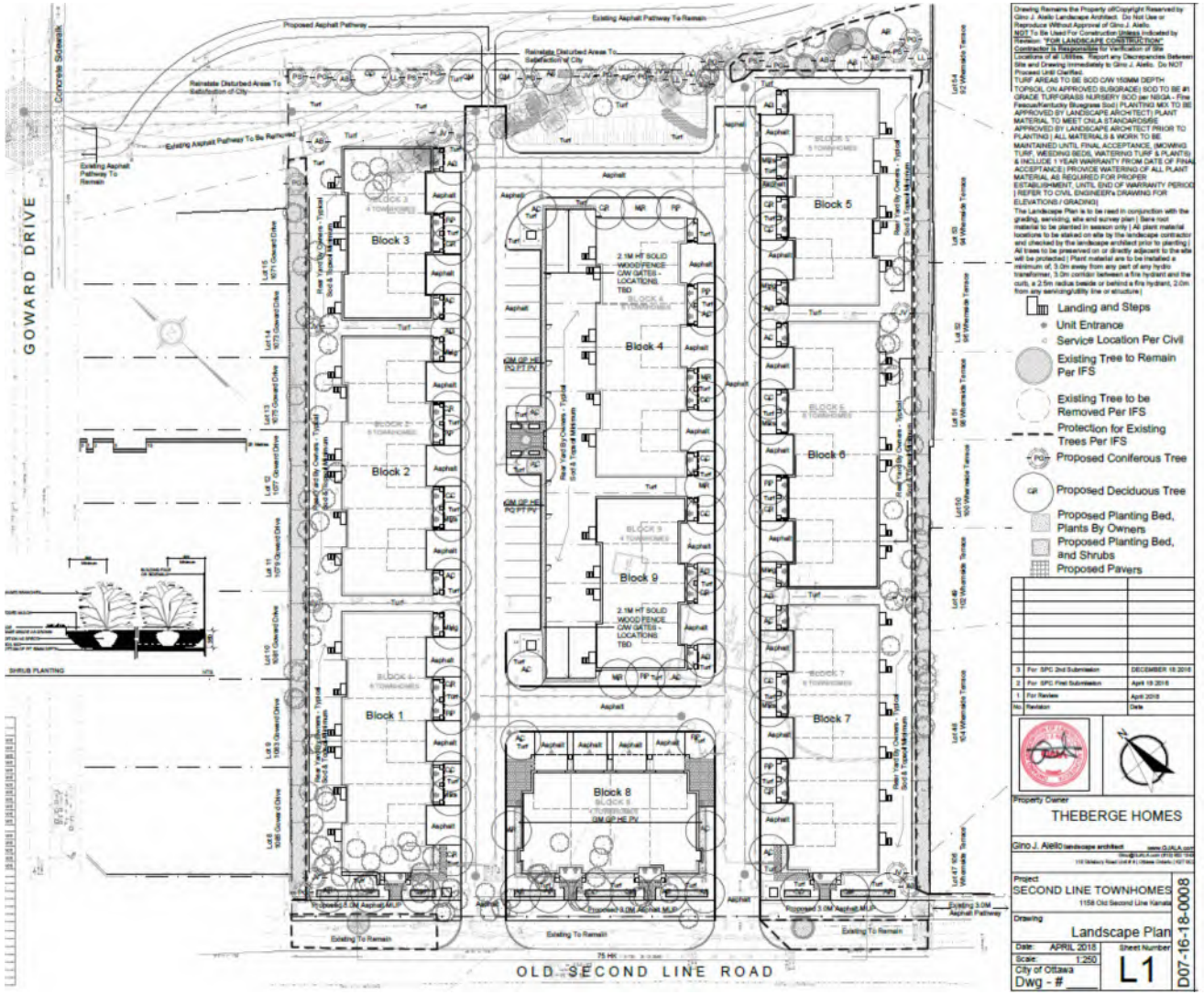


Table 6a Matrix to identify environmental impacts (revised)

DIMENSIONS	PHYSICAL							BIOLOGICAL						
	AIR		SOL			Water		Habitat		Fauna		Veg.		
						Ground	Surface							
	Quality	Sound env.	Quality	Drainage	Erosion	Quality	Quality	Terrestrial	Aquatic	Terrestrial	Aquatic	Terrestrial	Aquatic	Landscape
SITE PREPARATION														
1. Delineating protective zones			X											
2. Vegetation clearing	X		X	X			X	X		X		X		X
3. Demolition of the existing house		X	X											
CONSTRUCTION														
4. Soil excavation	X	X	X			X	X							
5. Street and buildings construction	X	X	X				X							
6. Waste management and residual material			X				X							
7. Machinery	X	X	X				X							
OPERATION														
8. Traffic	X	X												
9. Residential development								X		X		X		X

A combined impacts and mitigation summary table is presented in Table 7 of the 2013 EIS (CJB Environnement 2013). Additions to this table, including all mitigations developed as a result of discussions with MNRF and the City of Ottawa, are included as agreed through consultation, below in Table 7a.

Table 7a. Impacts and Mitigations Summary Table

Activity	Natural Feature/Function	Potential Effect	Proposed Mitigation	Residual Effect
1. Delineating protective zones	SAR habitat (Blanding's Turtle)	Turtles from South March Highlands may risk harm wandering through site in search of unsuitable nesting habitat in hydro corridor (potential habitat sink).	Temporary exclusion fencing installed around the perimeter of the property before April 1, 2019 and maintained and monitored until construction is complete.	Fencing before and during construction will prevent Blanding's Turtles from accessing the construction site. Turtle movement will be excluded well in advance of the start of the active season.
2. Vegetation Clearing	SAR habitat (Butternut)	Five non-retainable Endangered Butternut to be removed (killed).	None. Permit in place (IFS Associates BHA, June 2018).	Non-retainable Butternut trees removed as per permit.
	Soil Quality, Air Quality, Surface Water	Small decreases in stored carbon, long-term carbon sequestration, air quality, urban heat island, and increase in storm water runoff.	As per 2018 TCR: Retention of 2 m linear buffer at north and south boundaries of property, with retention of small-diameter (<10 cm) trees to maximize survivorship (see Figure 4, Landscape Plan). Erosion & Sediment Control Plan will be prepared requiring excavated water to be directed east toward the Hydro Easement, where sediment controls will be installed. Prior to site clearing, a fence will be erected as close as possible to the Critical Root Zone (CRZ) of trees to be retained, with appropriate signage as per TCR.	Modest mitigation of soil quality, air quality and surface water within the existing planning context. Small potential for carbon sequestration as retained trees, providing small offset of woodland loss. Erosion and sediment runoff will be mitigated during vegetation clearance with standard controls.

			No material or equipment is to be placed within CRZ.	
3. Demolition of the existing house	Soil Quality, Air Quality, Surface Water	Possible loss of retained trees if soils are compacted within CRZ.	No material or equipment is to be placed within CRZ.	Appropriate measures will be taken to prevent accidental loss of or damage to trees to be retained.
4. Soil excavation	SAR habitat (Blanding's Turtle)	Turtles from South March Highlands may cross Old Second Line Road and attempt to nest in loose fill on site during excavation.	No loose fill to be stockpiled on site. Site monitored regularly during key times of turtle movement (late May-late June) by a qualified professional Construction workers instructed to identify Blanding's Turtles and to contact a qualified professional immediately if one is identified on or near the site.	Preventing loose fill at site will eliminate any potential nesting opportunities for Blanding's and other turtles. Monitoring and awareness will ensure any turtles near the site will not be harmed. Erosion and sediment runoff will be mitigated during soil excavation.
	Soil Quality, Air Quality, Surface Water	Possible loss of retained trees if soils are compacted within CRZ.	No material or equipment is to be placed within CRZ. Tunnelling or boring is to be used instead of digging or trenching, as per TCR.	Appropriate measures will be taken to prevent accidental loss of or damage to trees to be retained.
5. Street and building construction	SAR habitat (Blanding's Turtle)	Surface water within SMH may be negatively impacted if overland flows are directed to the west.	Overland flow will be directed to a dry basin catchment at the east boundary of the site, and directed via storm sewer to an existing municipal drain to the north along Goward Rd (See AAF for additional information).	Any overland flow that may contain sediment, nutrients, and/or pollutants will be directed to municipal stormwater drains. All adverse impacts on known Blanding's Turtle habitat in SMH will be avoided in that the water chemistry of

				adjacent wetland and local natural areas will remain intact.
6. Waste management and residual material	No change			
7. Machinery	No change			
8. Traffic	No change			
9. Residential development	No change			

5.0 Mitigation

Proposed mitigation was summarized in 2013 in Table 7 and remains in place. Additional mitigation is proposed within Table 7a above.

5.1 Tree Conservation Report

As described above, a 2018 Tree Conservation Report (IFS Associates) replaces the TCR included in Section 5.1 of the 2013 EIS by CJB Environnement. Mitigations recommended in this report are incorporated into Table 7a and also into the most recent (December 2018) proposed Site Plan. These mitigations take precedence over those described in the 2013 EIS.

6.0 Monitoring

As identified in Table 7a, monitoring is required to ensure the effectiveness of mitigation measures. Below is a summary of proposed monitoring, timing, and responsibility (Table 8). Contingency discussions are embedded in Tables 7 and 7a.

Table 8 Proposed monitoring schedule for 1158 Old Second Line Road

Monitoring activity	Duration	Frequency	Responsibility
Check for Blanding's Turtle, ensure fencing is intact and other mitigation measures in place	April 1-late June	Weekly	Environmental consultant
Monitor for turtle activity on or near site	Throughout construction	Daily	Construction staff

7.0 Summary and Recommendations

Since 2013, the site conditions on the subject property are unchanged. However, plans for a 47 dwelling unit residential development have been identified that will require the removal of most of the vegetation on the site. In this Memo, the impacts of the proposed development have been identified in light of changes to the site plan as well as policy changes since 2013.

In summary:

- The wooded area of the site is considered a Significant Woodland under a draft City policy on Significant Woodlands, due to its age, size and location within the urban boundary. No other criteria for Significant Woodlands are met, and identified impacts under City policy and the PPS are limited to ecosystem services.
- The loss of approximately 1.0 ha of wooded area will result in a small loss to the local community of a number of ecosystem services, including air quality, heat

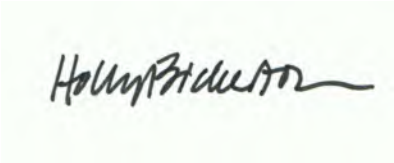
island benefits, carbon sequestration, releases in stored carbon and increases in stormwater run-off.

- To reduce loss of tree cover, a 2 m vegetated buffer (trees <10 cm diameter) will be retained on the north and south boundaries, and a small area of trees adjacent the hydro line, as per a 2018 Tree Conservation Report. Street tree plantings are also identified in a Landscape Plan.
- Overall, losses in ecosystem services are considered limited in scope and magnitude when compared to the full community of Morgan's Grant, and the proposed development is consistent with other environmental policies on infill and densification in existing development areas.
- Five Endangered Butternut trees on the property have been assessed via a Butternut Health Assessment (2018) as non-retainable (Category 1) and will be removed subject to a permit under the Ontario ESA 2007.
- Current procedures to identify potential impacts to Species at Risk have been completed for the subject property, and a low potential for impact to Blanding's Turtle was identified.
- Avoidance activities including fencing of the property and regular monitoring will be undertaken to eliminate any risk to Blanding's Turtles.

A monitoring plan has been developed to ensure that proposed mitigation is both timely and effective.

Please feel free to contact me for further information or clarification.

Kind regards



Holly J. Bickerton
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Consulting Ecologist

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Bickerton, H. 2018a. Information Gathering Form (IGF) for activities that may affect species or habitat protected under the *Endangered Species Act* (dated 10 Dec 2018).

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Appendix 1: iTree Ecosystem Analysis

i-Tree
Ecosystem Analysis

1158 Old Second Line

Urban Forest Effects and Values
February 2019

Summary

Understanding an urban forest's structure, function and value can promote management decisions that will improve human health and environmental quality. An assessment of the vegetation structure, function, and value of the 1158 Old Second Line urban forest was conducted during 2019. Data from 2 field plots located throughout 1158 Old Second Line were analyzed using the i-Tree Eco model developed by the U.S. Forest Service, Northern Research Station.

- Number of trees: 1,292
- Tree Cover: 100.0 %
- Most common species of trees: Sugar maple, Eastern hophornbeam, American beech
- Percentage of trees less than 6" (15.2 cm) diameter: 62.8 %
- Pollution Removal: 36.87 kilograms/year (Can$147/year)
- Carbon Storage: 82.52 metric tons (Can$9.48 thousand)
- Carbon Sequestration: 3.331 metric tons (Can$383/year)
- Oxygen Production: 6.794 metric tons/year
- Avoided Runoff: 183.5 cubic meters/year (Can$427/year)
- Building energy savings: N/A – data not collected
- Avoided carbon emissions: N/A – data not collected
- Structural values: Can$611 thousand

Tonne: 1000 kilograms
Monetary values Can$ are reported in Canadian Dollars throughout the report except where noted.
Ecosystem service estimates are reported for trees.

For an overview of i-Tree Eco methodology, see Appendix I. Data collection quality is determined by the local data collectors, over which i-Tree has no control. Additionally, some of the plot and tree information may not have been collected, so not all of the analyses may have been conducted for this report.

Table of Contents

I. Tree Characteristics of the Urban Forest

The urban forest of 1158 Old Second Line has an estimated 1,292 trees with a tree cover of 100.0 percent. The three most common species are Sugar maple (38.2 percent), Eastern hophornbeam (34.6 percent), and American beech (10.0 percent).

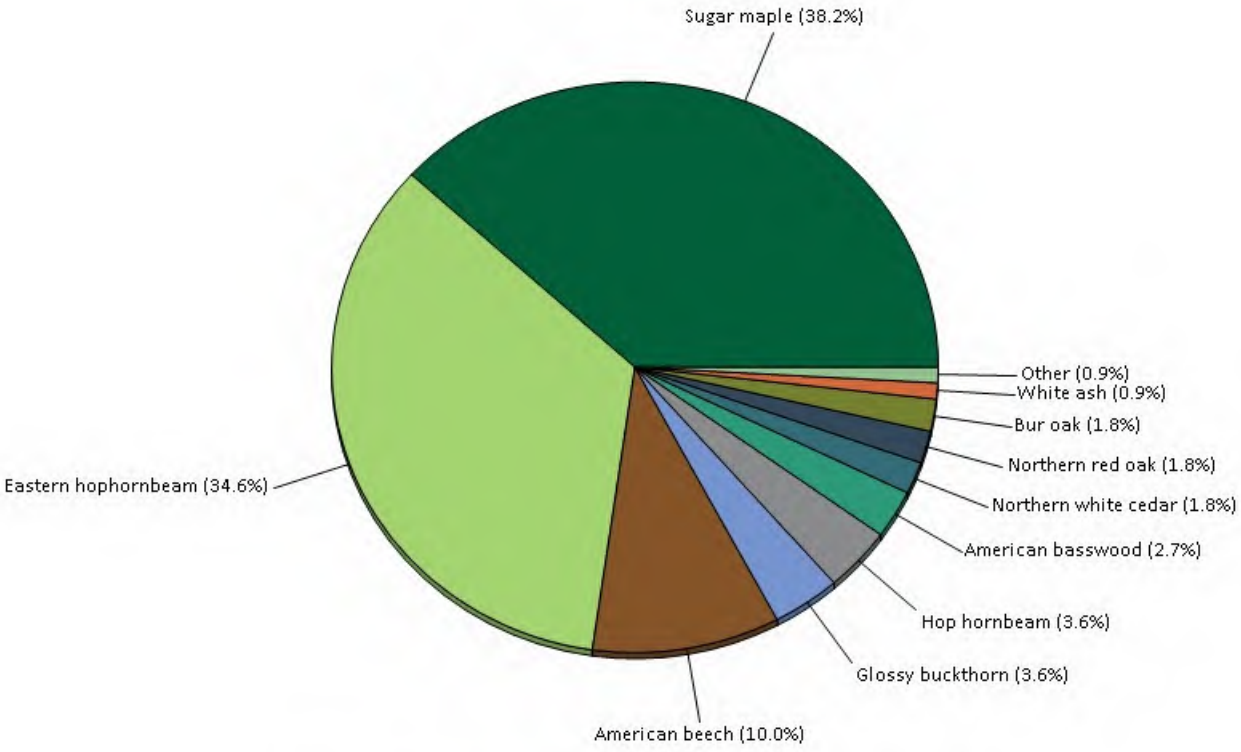

Figure 1. Tree species composition in 1158 Old Second Line

The overall tree density in 1158 Old Second Line is 1,359 trees/hectare (see Appendix III for comparable values from other cities).

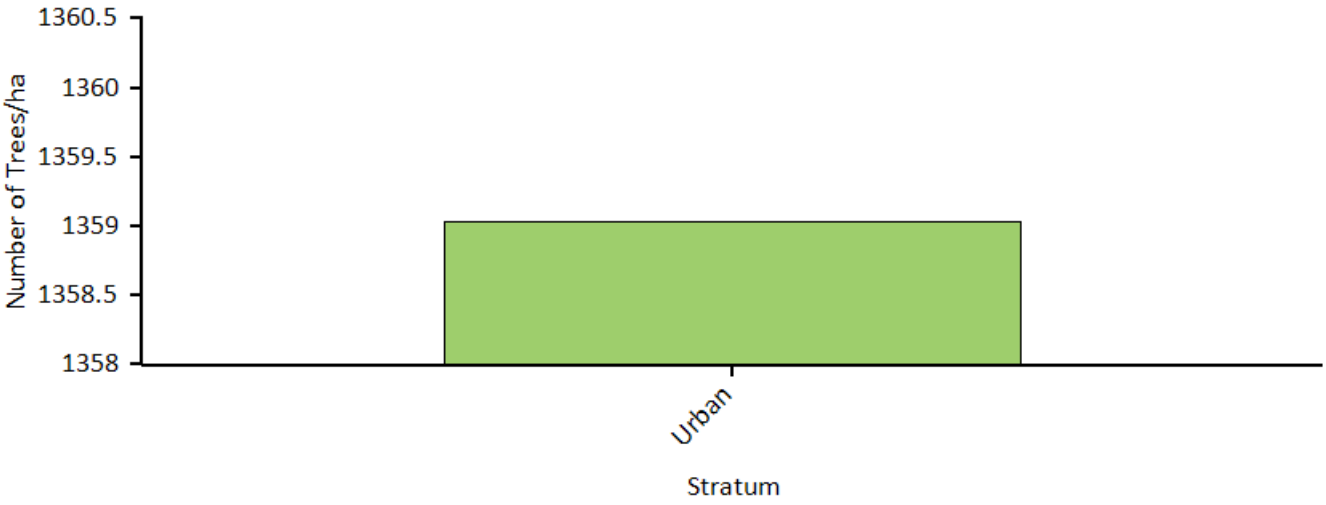

Figure 2. Number of trees/ha in 1158 Old Second Line by stratum

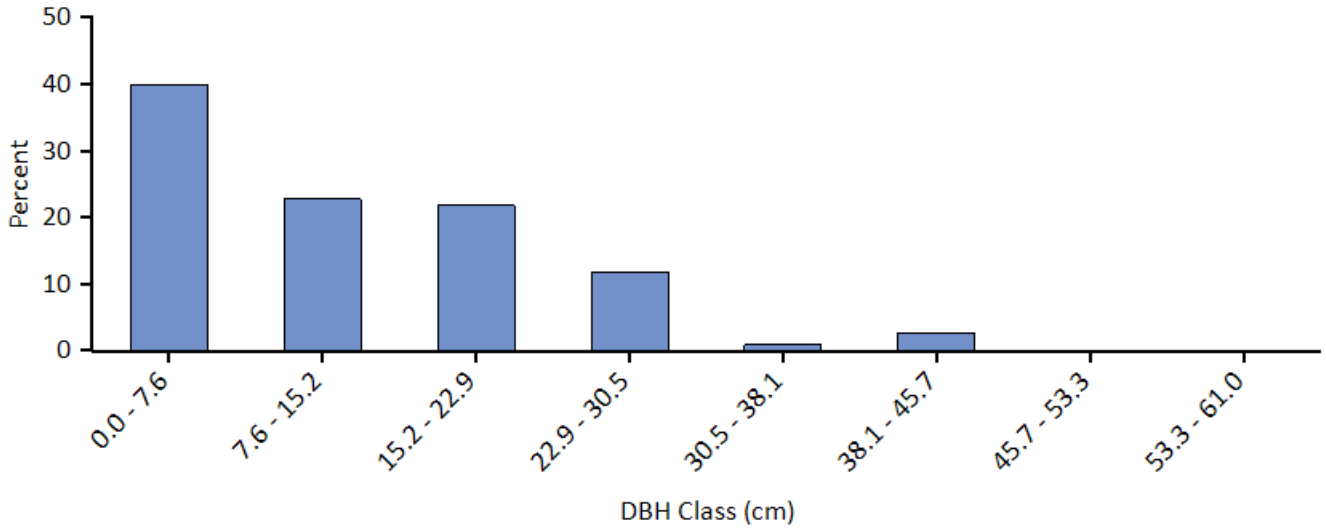

Figure 3. Percent of tree population by diameter class (DBH - stem diameter at 1.37 meters)

Urban forests are composed of a mix of native and exotic tree species. Thus, urban forests often have a tree diversity that is higher than surrounding native landscapes. Increased tree diversity can minimize the overall impact or destruction by a species-specific insect or disease, but it can also pose a risk to native plants if some of the exotic species are invasive plants that can potentially out-compete and displace native species. In 1158 Old Second Line, about 93 percent of the trees are species native to North America. Most trees have an origin from Europe & Asia (4 percent of the trees).

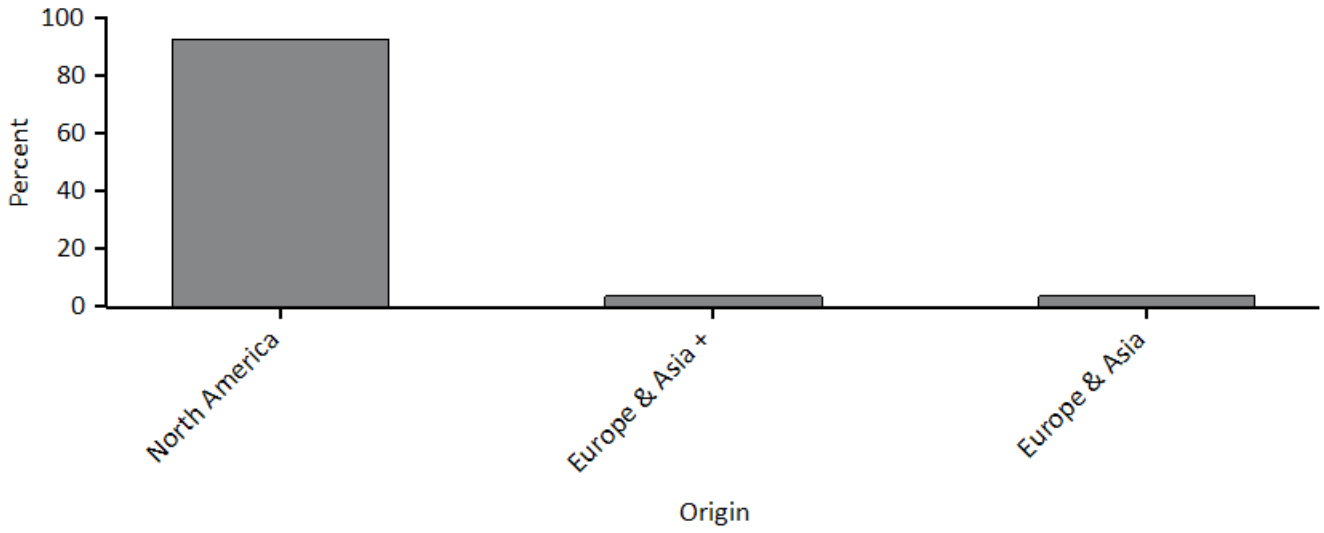

Figure 4. Percent of live tree population by area of native origin, 1158 Old Second Line

The plus sign (+) indicates the tree species is native to another continent other than the ones listed in the grouping.

Invasive plant species are often characterized by their vigor, ability to adapt, reproductive capacity, and general lack of natural enemies. These abilities enable them to displace native plants and make them a threat to natural areas.

II. Urban Forest Cover and Leaf Area

Many tree benefits equate directly to the amount of healthy leaf surface area of the plant. Trees cover about 100 percent of 1158 Old Second Line and provide 9.89 hectares of leaf area. Total leaf area is greatest in Urban.

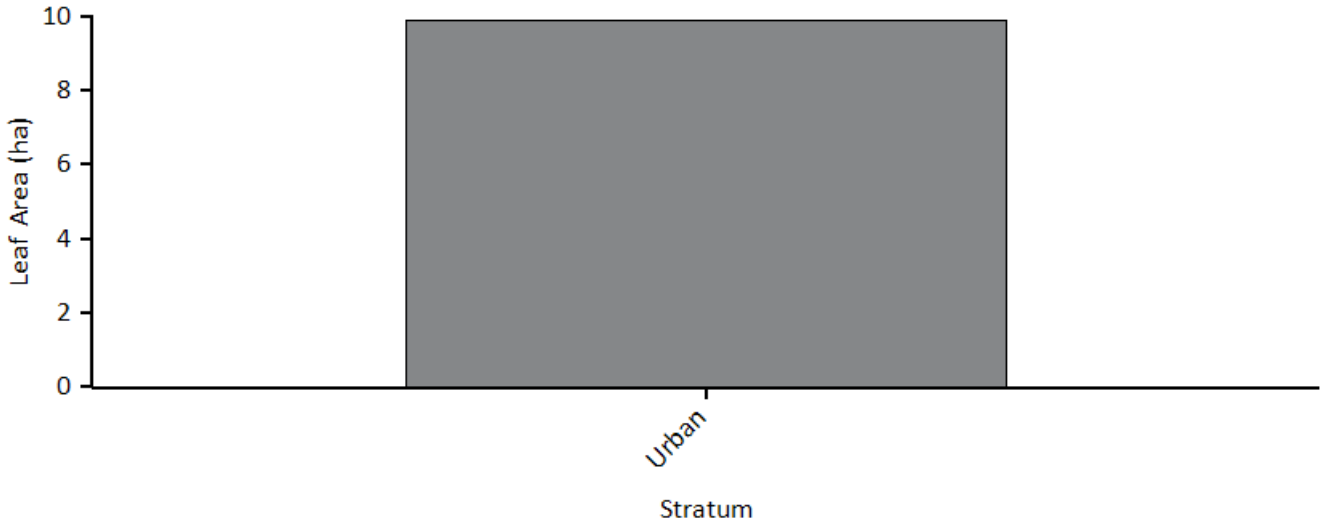

Figure 5. Leaf area by stratum, 1158 Old Second Line

In 1158 Old Second Line, the most dominant species in terms of leaf area are Sugar maple, Eastern hophornbeam, and American beech. The 10 species with the greatest importance values are listed in Table 1. Importance values (IV) are calculated as the sum of percent population and percent leaf area. High importance values do not mean that these trees should necessarily be encouraged in the future; rather these species currently dominate the urban forest structure.

Table 1. Most important species in 1158 Old Second Line

Species Name	*Percent Population*	*Percent Leaf Area*	*IV*
Sugar maple	38.2	39.3	77.5
Eastern hophornbeam	34.5	27.4	61.9
American beech	10.0	10.3	20.3
American basswood	2.7	7.9	10.6
Northern red oak	1.8	4.0	5.8
Hop hornbeam	3.6	1.4	5.0
Bur oak	1.8	3.2	5.0
White ash	0.9	3.5	4.4
Glossy buckthorn	3.6	0.3	3.9
Bitternut hickory	0.9	1.8	2.7

Common ground cover classes (including cover types beneath trees and shrubs) in 1158 Old Second Line are not available since they are configured not to be collected.

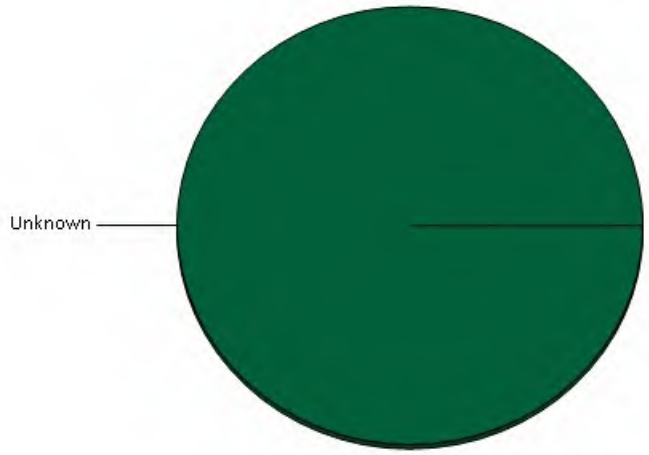

Figure 6. Percent of land by ground cover classes, 1158 Old Second Line

III. Air Pollution Removal by Urban Trees

Poor air quality is a common problem in many urban areas. It can lead to decreased human health, damage to landscape materials and ecosystem processes, and reduced visibility. The urban forest can help improve air quality by reducing air temperature, directly removing pollutants from the air, and reducing energy consumption in buildings, which consequently reduces air pollutant emissions from the power sources. Trees also emit volatile organic compounds that can contribute to ozone formation. However, integrative studies have revealed that an increase in tree cover leads to reduced ozone formation (Nowak and Dwyer 2000).

Pollution removal[1] by trees in 1158 Old Second Line was estimated using field data and recent available pollution and weather data available. Pollution removal was greatest for ozone (Figure 7). It is estimated that trees remove 36.87 kilograms of air pollution (ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), particulate matter less than 2.5 microns (PM2.5)[2], and sulfur dioxide (SO2)) per year with an associated value of Can$147 (see Appendix I for more details).

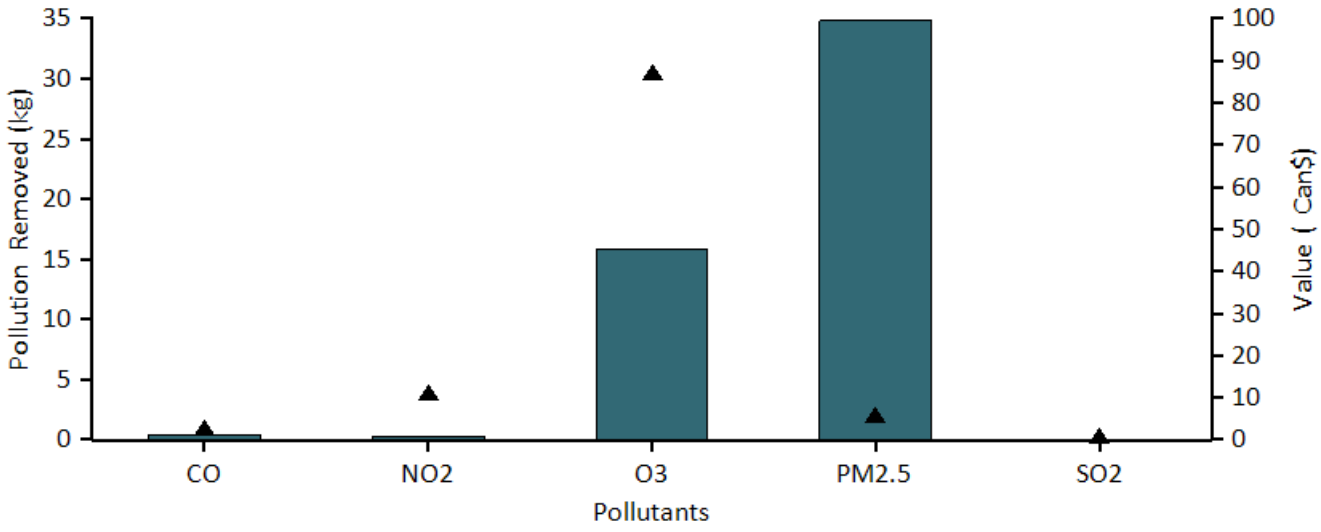

Figure 7. Annual pollution removal (points) and value (bars) by urban trees, 1158 Old Second Line

[1] Particulate matter less than 10 microns is a significant air pollutant. Given that i-Tree Eco analyzes particulate matter less than 2.5 microns (PM2.5) which is a subset of PM10, PM10 has not been included in this analysis. PM2.5 is generally more relevant in discussions concerning air pollution effects on human health.

[2] Trees remove PM2.5 when particulate matter is deposited on leaf surfaces. This deposited PM2.5 can be resuspended to the atmosphere or removed during rain events and dissolved or transferred to the soil. This combination of events can lead to positive or negative pollution removal and value depending on various atmospheric factors (see Appendix I for more details).

In 2019, trees in 1158 Old Second Line emitted an estimated 13.71 kilograms of volatile organic compounds (VOCs) (6.522 kilograms of isoprene and 7.184 kilograms of monoterpenes). Emissions vary among species based on species characteristics (e.g. some genera such as oaks are high isoprene emitters) and amount of leaf biomass. Sixty- eight percent of the urban forest's VOC emissions were from Sugar maple and Northern red oak. These VOCs are precursor chemicals to ozone formation.[3]

General recommendations for improving air quality with trees are given in Appendix VIII.

[3] Some economic studies have estimated VOC emission costs. These costs are not included here as there is a tendency to add positive dollar estimates of ozone removal effects with negative dollar values of VOC emission effects to determine whether tree effects are positive or negative in relation to ozone. This combining of dollar values to determine tree effects should not be done, rather estimates of VOC effects on ozone formation (e.g., via photochemical models) should be conducted and directly contrasted with ozone removal by trees (i.e., ozone effects should be directly compared, not dollar estimates). In addition, air temperature reductions by trees have been shown to significantly reduce ozone concentrations (Cardelino and Chameides 1990; Nowak et al 2000), but are not considered in this analysis. Photochemical modeling that integrates tree effects on air temperature, pollution removal, VOC emissions, and emissions from power plants can be used to determine the overall effect of trees on ozone concentrations.

IV. Carbon Storage and Sequestration

Climate change is an issue of global concern. Urban trees can help mitigate climate change by sequestering atmospheric carbon (from carbon dioxide) in tissue and by altering energy use in buildings, and consequently altering carbon dioxide emissions from fossil-fuel based power sources (Abdollahi et al 2000).

Trees reduce the amount of carbon in the atmosphere by sequestering carbon in new growth every year. The amount of carbon annually sequestered is increased with the size and health of the trees. The gross sequestration of 1158 Old Second Line trees is about 3.331 metric tons of carbon per year with an associated value of Can$383. Net carbon sequestration in the urban forest is about 2.548 metric tons. See Appendix I for more details on methods.

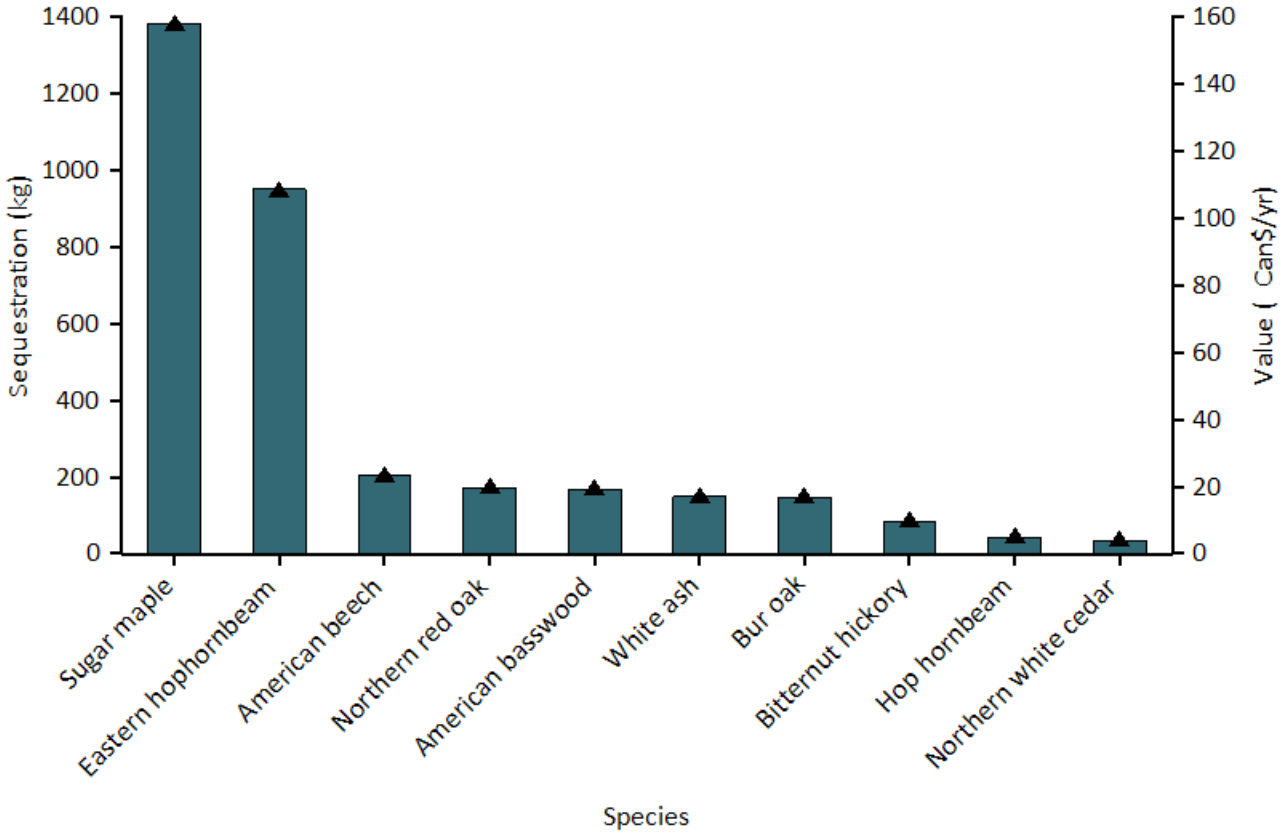

Figure 8. Estimated annual gross carbon sequestration (points) and value (bars) for urban tree species with the greatest sequestration, 1158 Old Second Line

Carbon storage is another way trees can influence global climate change. As a tree grows, it stores more carbon by holding it in its accumulated tissue. As a tree dies and decays, it releases much of the stored carbon back into the atmosphere. Thus, carbon storage is an indication of the amount of carbon that can be released if trees are allowed to die and decompose. Maintaining healthy trees will keep the carbon stored in trees, but tree maintenance can contribute to carbon emissions (Nowak et al 2002c). When a tree dies, using the wood in long-term wood products, to heat buildings, or to produce energy will help reduce carbon emissions from wood decomposition or from fossil-fuel or wood-based power plants.

Trees in 1158 Old Second Line are estimated to store 82.5 metric tons of carbon (Can$9.48 thousand). Of the species

sampled, Sugar maple stores and sequesters the most carbon (approximately 38.3% of the total carbon stored and 41.4% of all sequestered carbon.)

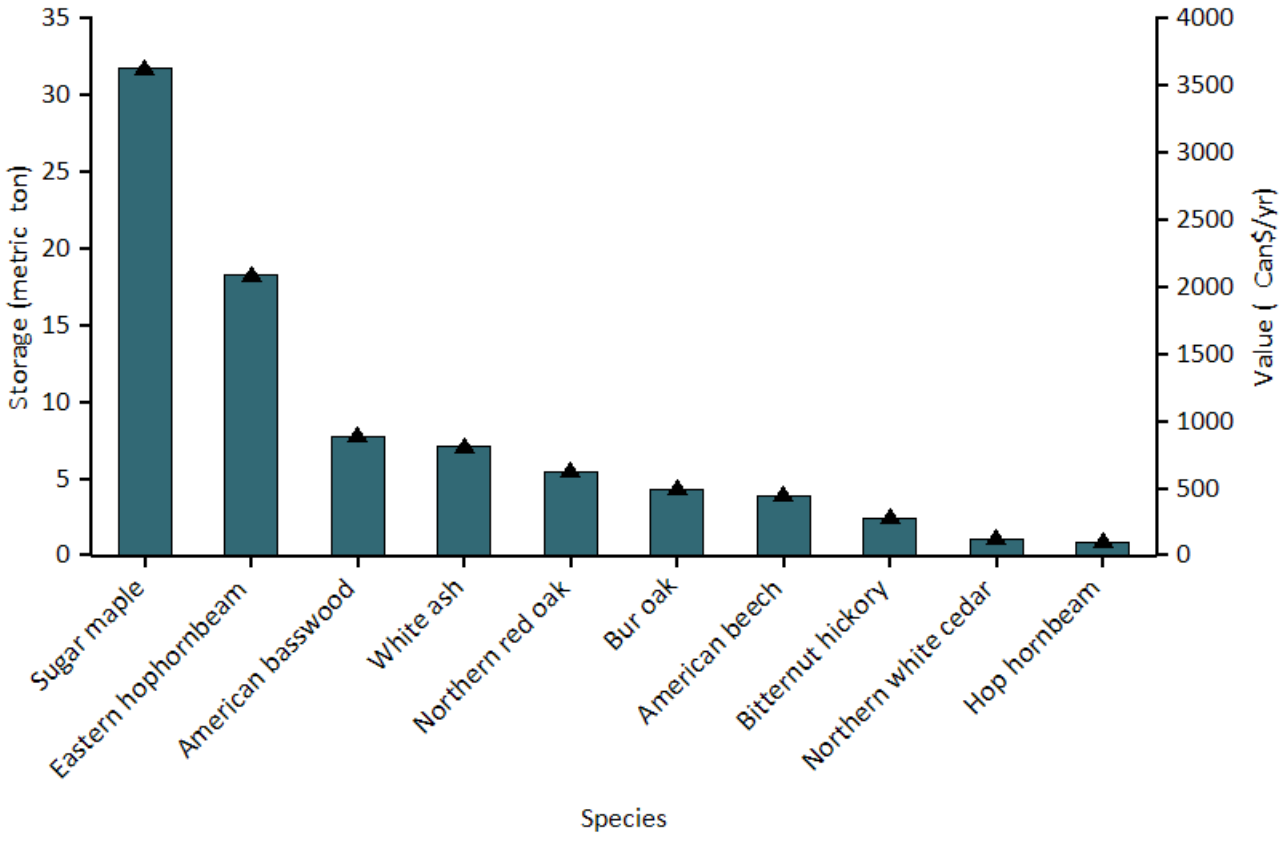

Figure 9. Estimated carbon storage (points) and values (bars) for urban tree species with the greatest storage, 1158 Old Second Line

V. Oxygen Production

Oxygen production is one of the most commonly cited benefits of urban trees. The net annual oxygen production of a tree is directly related to the amount of carbon sequestered by the tree, which is tied to the accumulation of tree biomass.

Trees in 1158 Old Second Line are estimated to produce 6.794 metric tons of oxygen per year.[4] However, this tree benefit is relatively insignificant because of the large and relatively stable amount of oxygen in the atmosphere and extensive production by aquatic systems. Our atmosphere has an enormous reserve of oxygen. If all fossil fuel reserves, all trees, and all organic matter in soils were burned, atmospheric oxygen would only drop a few percent (Broecker 1970).

Table 2. The top 20 oxygen production species.

Species	*Oxygen (kilogram)*	*Net Carbon Sequestration (kilogram/yr)*	*Number of Trees*	*Leaf Area (hectare)*
Sugar maple	2,871.22	1,076.71	493	3.89
Eastern hophornbeam	2,057.26	771.47	446	2.71
American beech	439.54	164.83	129	1.02
Northern red oak	320.45	120.17	23	0.39
Bur oak	279.57	104.84	23	0.32
American basswood	252.94	94.85	35	0.78
White ash	219.15	82.18	12	0.34
Bitternut hickory	162.26	60.85	12	0.18
Hop hornbeam	89.91	33.72	47	0.14
Northern white cedar	62.40	23.40	23	0.08
Glossy buckthorn	38.92	14.59	47	0.03

[4] A negative estimate, or oxygen deficit, indicates that trees are decomposing faster than they are producing oxygen. This would be the case in an area that has a large proportion of dead trees.

VI. Avoided Runoff

Surface runoff can be a cause for concern in many urban areas as it can contribute pollution to streams, wetlands, rivers, lakes, and oceans. During precipitation events, some portion of the precipitation is intercepted by vegetation (trees and shrubs) while the other portion reaches the ground. The portion of the precipitation that reaches the ground and does not infiltrate into the soil becomes surface runoff (Hirabayashi 2012). In urban areas, the large extent of impervious surfaces increases the amount of surface runoff.

Urban trees and shrubs, however, are beneficial in reducing surface runoff. Trees and shrubs intercept precipitation, while their root systems promote infiltration and storage in the soil. The trees and shrubs of 1158 Old Second Line help to reduce runoff by an estimated 183 cubic meters a year with an associated value of Can$430 (see Appendix I for more details). Avoided runoff is estimated based on local weather from the user-designated weather station. In 1158 Old Second Line, the total annual precipitation in 2010 was 92.1 centimeters.

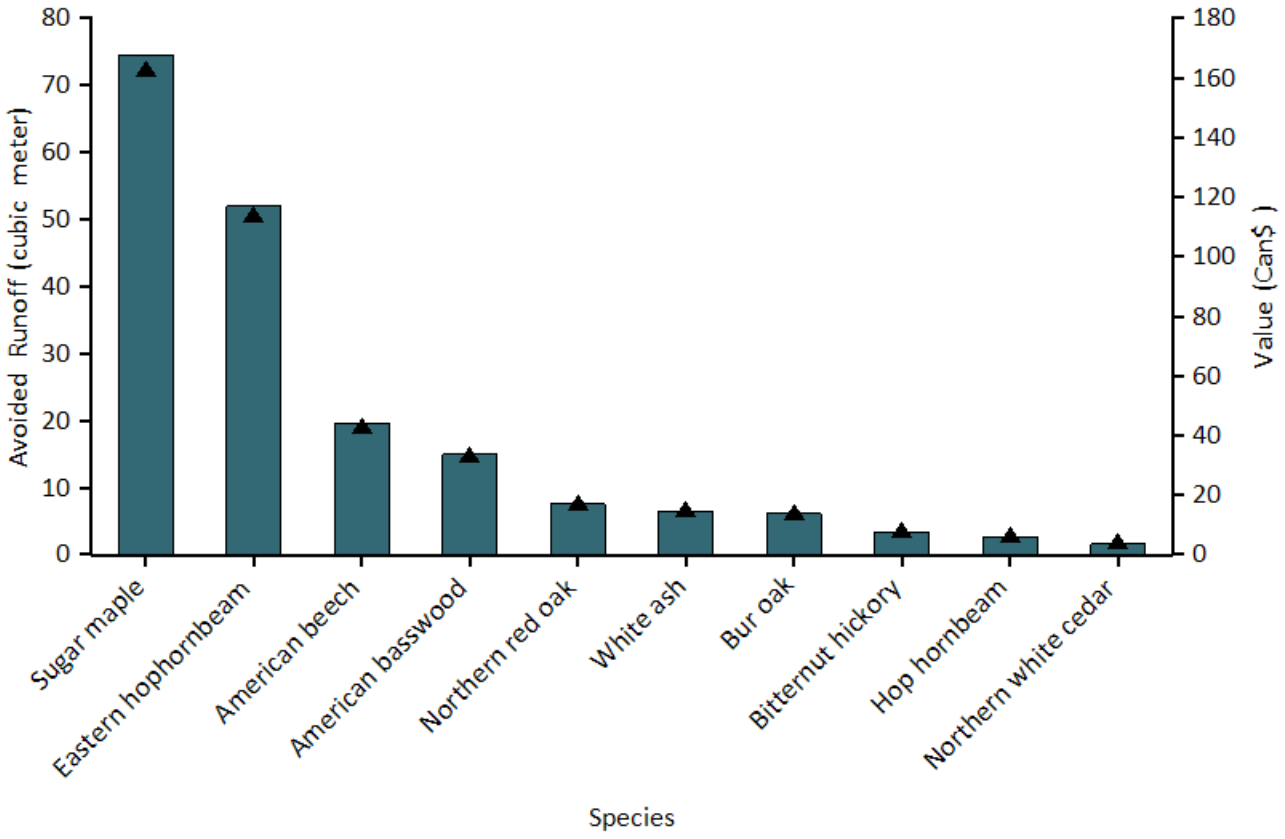

Figure 10. Avoided runoff (points) and value (bars) for species with greatest overall impact on runoff, 1158 Old Second Line

VII. Trees and Building Energy Use

Trees affect energy consumption by shading buildings, providing evaporative cooling, and blocking winter winds. Trees tend to reduce building energy consumption in the summer months and can either increase or decrease building energy use in the winter months, depending on the location of trees around the building. Estimates of tree effects on energy use are based on field measurements of tree distance and direction to space conditioned residential buildings (McPherson and Simpson 1999).

Because energy-related data were not collected, energy savings and carbon avoided cannot be calculated.

Table 3. Annual energy savings due to trees near residential buildings, 1158 Old Second Line

	Heating	*Cooling*	*Total*
MBTU[a]	0	N/A	0
MWH[b]	0	0	0
Carbon Avoided (kilograms)	0	0	0

[a]MBTU - one million British Thermal Units

[b]MWH - megawatt-hour

Table 4. Annual savings [a](Can$) in residential energy expenditure during heating and cooling seasons, 1158 Old Second Line

	Heating	*Cooling*	*Total*
MBTU[b]	0	N/A	0
MWH[c]	0	0	0
Carbon Avoided	0	0	0

[b]Based on the prices of Can$75 per MWH and Can$10.4544285106757 per MBTU (see Appendix I for more details)

[c]MBTU - one million British Thermal Units

[c]MWH - megawatt-hour

[5] Trees modify climate, produce shade, and reduce wind speeds. Increased energy use or costs are likely due to these tree-building interactions creating a cooling effect during the winter season. For example, a tree (particularly evergreen species) located on the southern side of a residential building may produce a shading effect that causes increases in heating requirements.

VIII. Structural and Functional Values

Urban forests have a structural value based on the trees themselves (e.g., the cost of having to replace a tree with a similar tree); they also have functional values (either positive or negative) based on the functions the trees perform.

The structural value of an urban forest tends to increase with a rise in the number and size of healthy trees (Nowak et al 2002a). Annual functional values also tend to increase with increased number and size of healthy trees. Through proper management, urban forest values can be increased; however, the values and benefits also can decrease as the amount of healthy tree cover declines.

Urban trees in 1158 Old Second Line have the following structural values:

- Structural value: Can$611 thousand
- Carbon storage: Can$9.48 thousand

Urban trees in 1158 Old Second Line have the following annual functional values:

- Carbon sequestration: Can$383
- Avoided runoff: Can$427
- Pollution removal: Can$147
- Energy costs and carbon emission values: Can$0

(Note: negative value indicates increased energy cost and carbon emission value)

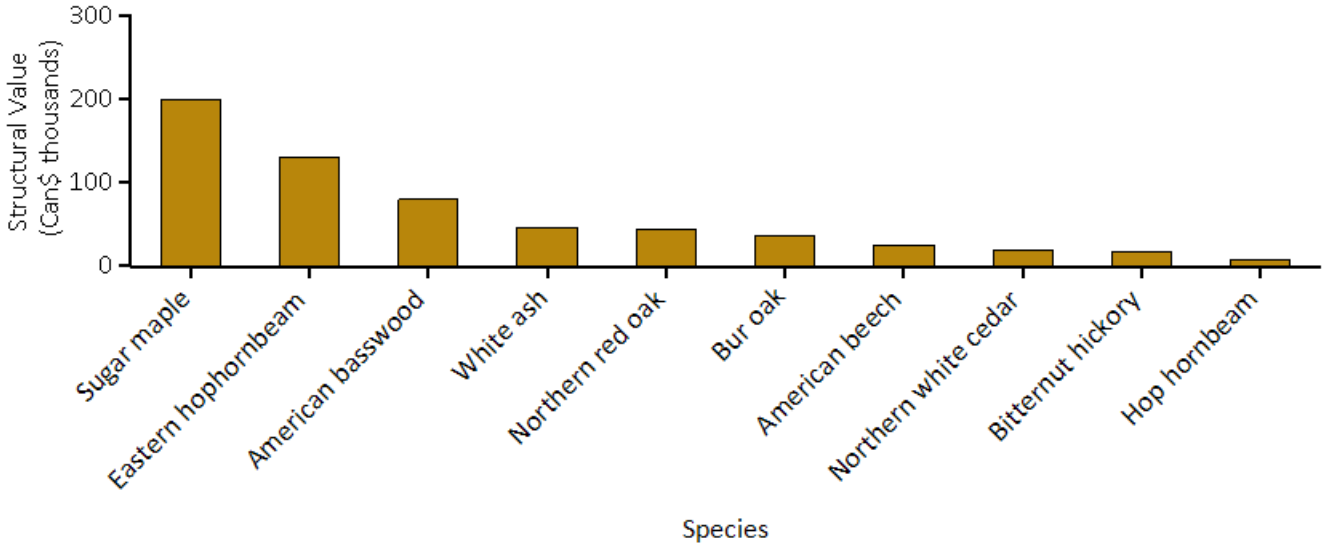

Figure 11. Tree species with the greatest structural value, 1158 Old Second Line

[1] Structural value in Canada is calculated using the same procedure as the U.S. (Nowak et al 2002a). Base costs and species values are derived from the International Society of Arboriculture Ontario Chapter and applied to all Canadian provinces and territories.

IX. Potential Pest Impacts

Various insects and diseases can infest urban forests, potentially killing trees and reducing the health, structural value and sustainability of the urban forest. As pests tend to have differing tree hosts, the potential damage or risk of each pest will differ among cities.Thirty-six pests were analyzed for their potential impact.

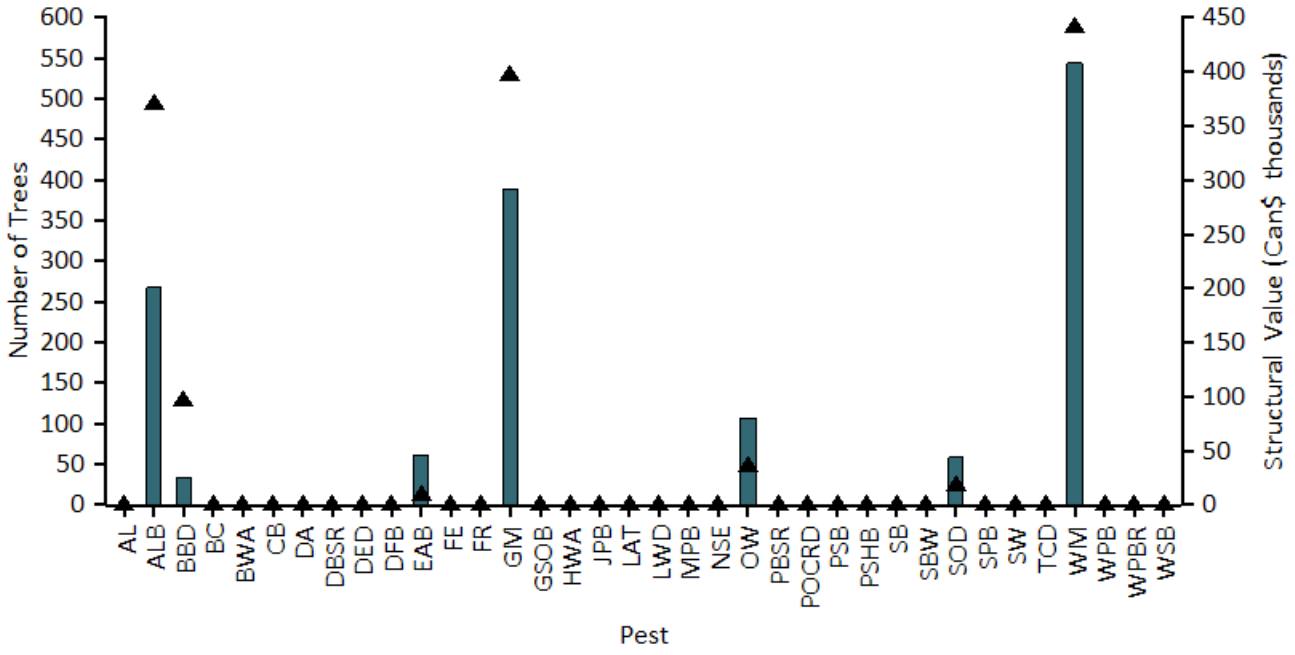

Figure 12. Number of trees at risk (points) and associated compensatory value (bars) by potential pests, 1158 Old Second Line

Aspen leafminer (AL) (Kruse et al 2007) is an insect that causes damage primarily to trembling or small tooth aspen by larval feeding of leaf tissue. AL has the potential to affect 0.0 percent of the population (Can$0 in structural value).

Asian longhorned beetle (ALB) (Animal and Plant Health Inspection Service 2010) is an insect that bores into and kills a wide range of hardwood species. ALB poses a threat to 38.2 percent of the 1158 Old Second Line urban forest, which represents a potential loss of Can$201 thousand in structural value.

Beech bark disease (BBD) (Houston and O'Brien 1983) is an insect-disease complex that primarily impacts American beech. This disease threatens 10.0 percent of the population, which represents a potential loss of Can$25.1 thousand in structural value.

Butternut canker (BC) (Ostry et al 1996) is caused by a fungus that infects butternut trees. The disease has since caused significant declines in butternut populations in the United States. Potential loss of trees from BC is 0.0 percent (Can$0 in structural value).

Balsam woolly adelgid (BWA) (Ragenovich and Mitchell 2006) is an insect that has caused significant damage to the true firs of North America. 1158 Old Second Line could possibly lose 0.0 percent of its trees to this pest (Can$0 in structural value).

The most common hosts of the fungus that cause chestnut blight (CB) (Diller 1965) are American and European chestnut. CB has the potential to affect 0.0 percent of the population (Can$0 in structural value).

Dogwood anthracnose (DA) (Mielke and Daughtrey) is a disease that affects dogwood species, specifically flowering and Pacific dogwood. This disease threatens 0.0 percent of the population, which represents a potential loss of Can$0 in structural value.

Douglas-fir black stain root disease (DBSR) (Hessburg et al 1995) is a variety of the black stain fungus that attacks Douglas-firs. 1158 Old Second Line could possibly lose 0.0 percent of its trees to this pest (Can$0 in structural value).

American elm, one of the most important street trees in the twentieth century, has been devastated by the Dutch elm disease (DED) (Northeastern Area State and Private Forestry 1998). Since first reported in the 1930s, it has killed over 50 percent of the native elm population in the United States. Although some elm species have shown varying degrees of resistance, 1158 Old Second Line could possibly lose 0.0 percent of its trees to this pest (Can$0 in structural value).

Douglas-fir beetle (DFB) (Schmitz and Gibson 1996) is a bark beetle that infests Douglas-fir trees throughout the western United States, British Columbia, and Mexico. Potential loss of trees from DFB is 0.0 percent (Can$0 in structural value).

Emerald ash borer (EAB) (Michigan State University 2010) has killed thousands of ash trees in parts of the United States. EAB has the potential to affect 0.9 percent of the population (Can$46.5 thousand in structural value).

One common pest of white fir, grand fir, and red fir trees is the fir engraver (FE) (Ferrell 1986). FE poses a threat to 0.0 percent of the 1158 Old Second Line urban forest, which represents a potential loss of Can$0 in structural value.

Fusiform rust (FR) (Phelps and Czabator 1978) is a fungal disease that is distributed in the southern United States. It is particularly damaging to slash pine and loblolly pine. FR has the potential to affect 0.0 percent of the population (Can$0 in structural value).

The gypsy moth (GM) (Northeastern Area State and Private Forestry 2005) is a defoliator that feeds on many species causing widespread defoliation and tree death if outbreak conditions last several years. This pest threatens 40.9 percent of the population, which represents a potential loss of Can$292 thousand in structural value.

Infestations of the goldspotted oak borer (GSOB) (Society of American Foresters 2011) have been a growing problem in southern California. Potential loss of trees from GSOB is 0.0 percent (Can$0 in structural value).

As one of the most damaging pests to eastern hemlock and Carolina hemlock, hemlock woolly adelgid (HWA) (U.S. Forest Service 2005) has played a large role in hemlock mortality in the United States. HWA has the potential to affect 0.0 percent of the population (Can$0 in structural value).

The Jeffrey pine beetle (JPB) (Smith et al 2009) is native to North America and is distributed across California, Nevada, and Oregon where its only host, Jeffrey pine, also occurs. This pest threatens 0.0 percent of the population, which represents a potential loss of Can$0 in structural value.

Quaking aspen is a principal host for the defoliator, large aspen tortrix (LAT) (Ciesla and Kruse 2009). LAT poses a threat to 0.0 percent of the 1158 Old Second Line urban forest, which represents a potential loss of Can$0 in structural value.

Laurel wilt (LWD) (U.S. Forest Service 2011) is a fungal disease that is introduced to host trees by the redbay ambrosia beetle. This pest threatens 0.0 percent of the population, which represents a potential loss of Can$0 in structural value.

Mountain pine beetle (MPB) (Gibson et al 2009) is a bark beetle that primarily attacks pine species in the western United States. MPB has the potential to affect 0.0 percent of the population (Can$0 in structural value).

The northern spruce engraver (NSE) (Burnside et al 2011) has had a significant impact on the boreal and sub-boreal forests of North America where the pest's distribution overlaps with the range of its major hosts. Potential loss of trees from NSE is 0.0 percent (Can$0 in structural value).

Oak wilt (OW) (Rexrode and Brown 1983), which is caused by a fungus, is a prominent disease among oak trees. OW poses a threat to 3.6 percent of the 1158 Old Second Line urban forest, which represents a potential loss of Can$80.4 thousand in structural value.

Pine black stain root disease (PBSR) (Hessburg et al 1995) is a variety of the black stain fungus that attacks hard pines, including lodgepole pine, Jeffrey pine, and ponderosa pine. 1158 Old Second Line could possibly lose 0.0 percent of its trees to this pest (Can$0 in structural value).

Port-Orford-cedar root disease (POCRD) (Liebhold 2010) is a root disease that is caused by a fungus. POCRD threatens 0.0 percent of the population, which represents a potential loss of Can$0 in structural value.

The pine shoot beetle (PSB) (Ciesla 2001) is a wood borer that attacks various pine species, though Scotch pine is the preferred host in North America. PSB has the potential to affect 0.0 percent of the population (Can$0 in structural value).

Polyphagous shot hole borer (PSHB) (University of California 2014) is a boring beetle that was first detected in California. 1158 Old Second Line could possibly lose 0.0 percent of its trees to this pest (Can$0 in structural value).

Spruce beetle (SB) (Holsten et al 1999) is a bark beetle that causes significant mortality to spruce species within its range. Potential loss of trees from SB is 0.0 percent (Can$0 in structural value).

Spruce budworm (SBW) (Kucera and Orr 1981) is an insect that causes severe damage to balsam fir. SBW poses a threat to 0.0 percent of the 1158 Old Second Line urban forest, which represents a potential loss of Can$0 in structural value.

Sudden oak death (SOD) (Kliejunas 2005) is a disease that is caused by a fungus. Potential loss of trees from SOD is 1.8 percent (Can$43.9 thousand in structural value).

Although the southern pine beetle (SPB) (Clarke and Nowak 2009) will attack most pine species, its preferred hosts are loblolly, Virginia, pond, spruce, shortleaf, and sand pines. This pest threatens 0.0 percent of the population, which represents a potential loss of Can$0 in structural value.

The sirex woodwasp (SW) (Haugen and Hoebeke 2005) is a wood borer that primarily attacks pine species. SW poses a threat to 0.0 percent of the 1158 Old Second Line urban forest, which represents a potential loss of Can$0 in structural value.

Thousand canker disease (TCD) (Cranshaw and Tisserat 2009; Seybold et al 2010) is an insect-disease complex that kills several species of walnuts, including black walnut. Potential loss of trees from TCD is 0.0 percent (Can$0 in structural value).

Winter moth (WM) (Childs 2011) is a pest with a wide range of host species. WM causes the highest levels of injury to its hosts when it is in its caterpillar stage. 1158 Old Second Line could possibly lose 45.5 percent of its trees to this pest (Can$408 thousand in structural value).

The western pine beetle (WPB) (DeMars and Roettgering 1982) is a bark beetle and aggressive attacker of ponderosa and Coulter pines. This pest threatens 0.0 percent of the population, which represents a potential loss of Can$0 in structural value.

Since its introduction to the United States in 1900, white pine blister rust (Eastern U.S.) (WPBR) (Nicholls and Anderson 1977) has had a detrimental effect on white pines, particularly in the Lake States. WPBR has the potential to affect 0.0

percent of the population (Can$0 in structural value).

Western spruce budworm (WSB) (Fellin and Dewey 1986) is an insect that causes defoliation in western conifers. This pest threatens 0.0 percent of the population, which represents a potential loss of Can$0 in structural value.

Appendix I. i-Tree Eco Model and Field Measurements

i-Tree Eco is designed to use standardized field data from randomly located plots and local hourly air pollution and meteorological data to quantify urban forest structure and its numerous effects (Nowak and Crane 2000), including:

- Urban forest structure (e.g., species composition, tree health, leaf area, etc.).
- Amount of pollution removed hourly by the urban forest, and its associated percent air quality improvement throughout a year.
- Total carbon stored and net carbon annually sequestered by the urban forest.
- Effects of trees on building energy use and consequent effects on carbon dioxide emissions from power sources.
- Structural value of the forest, as well as the value for air pollution removal and carbon storage and sequestration.
- Potential impact of infestations by pests, such as Asian longhorned beetle, emerald ash borer, gypsy moth, and Dutch elm disease.

Typically, all field data are collected during the leaf-on season to properly assess tree canopies. Typical data collection (actual data collection may vary depending upon the user) includes land use, ground and tree cover, individual tree attributes of species, stem diameter, height, crown width, crown canopy missing and dieback, and distance and direction to residential buildings (Nowak et al 2005; Nowak et al 2008).

During data collection, trees are identified to the most specific taxonomic classification possible. Trees that are not classified to the species level may be classified by genus (e.g., ash) or species groups (e.g., hardwood). In this report, tree species, genera, or species groups are collectively referred to as tree species.

Tree Characteristics:

Leaf area of trees was assessed using measurements of crown dimensions and percentage of crown canopy missing. In the event that these data variables were not collected, they are estimated by the model.

An analysis of invasive species is not available for studies outside of the United States. For the U.S., invasive species are identified using an invasive species list for the state in which the urban forest is located. These lists are not exhaustive and they cover invasive species of varying degrees of invasiveness and distribution. In instances where a state did not have an invasive species list, a list was created based on the lists of the adjacent states. Tree species that are identified as invasive by the state invasive species list are cross-referenced with native range data. This helps eliminate species that are on the state invasive species list, but are native to the study area.

Air Pollution Removal:

Pollution removal is calculated for ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide and particulate matter less than 2.5 microns. Particulate matter less than 10 microns (PM10) is another significant air pollutant. Given that i-Tree Eco analyzes particulate matter less than 2.5 microns (PM2.5) which is a subset of PM10, PM10 has not been included in this analysis. PM2.5 is generally more relevant in discussions concerning air pollution effects on human health.

Air pollution removal estimates are derived from calculated hourly tree-canopy resistances for ozone, and sulfur and nitrogen dioxides based on a hybrid of big-leaf and multi-layer canopy deposition models (Baldocchi 1988; Baldocchi et al 1987). As the removal of carbon monoxide and particulate matter by vegetation is not directly related to transpiration, removal rates (deposition velocities) for these pollutants were based on average measured values from the literature (Bidwell and Fraser 1972; Lovett 1994) that were adjusted depending on leaf phenology and leaf area. Particulate removal incorporated a 50 percent resuspension rate of particles back to the atmosphere (Zinke 1967). Recent updates (2011) to air quality modeling are based on improved leaf area index simulations, weather and pollution processing and interpolation, and updated pollutant monetary values (Hirabayashi et al 2011; Hirabayashi et al 2012; Hirabayashi 2011).

Trees remove PM2.5 when particulate matter is deposited on leaf surfaces (Nowak et al 2013). This deposited PM2.5 can be resuspended to the atmosphere or removed during rain events and dissolved or transferred to the soil. This

combination of events can lead to positive or negative pollution removal and value depending on various atmospheric factors. Generally, PM2.5 removal is positive with positive benefits. However, there are some cases when net removal is negative or resuspended particles lead to increased pollution concentrations and negative values. During some months (e.g., with no rain), trees resuspend more particles than they remove. Resuspension can also lead to increased overall PM2.5 concentrations if the boundary layer conditions are lower during net resuspension periods than during net removal periods. Since the pollution removal value is based on the change in pollution concentration, it is possible to have situations when trees remove PM2.5 but increase concentrations and thus have negative values during periods of positive overall removal. These events are not common, but can happen.

For reports in the United States, default air pollution removal value is calculated based on local incidence of adverse health effects and national median externality costs. The number of adverse health effects and associated economic value is calculated for ozone, sulfur dioxide, nitrogen dioxide, and particulate matter less than 2.5 microns using data from the U.S. Environmental Protection Agency's Environmental Benefits Mapping and Analysis Program (BenMAP) (Nowak et al 2014). The model uses a damage-function approach that is based on the local change in pollution concentration and population. National median externality costs were used to calculate the value of carbon monoxide removal (Murray et al 1994).

For international reports, user-defined local pollution values are used. For international reports that do not have local values, estimates are based on either European median externality values (van Essen et al 2011) or BenMAP regression equations (Nowak et al 2014) that incorporate user-defined population estimates. Values are then converted to local currency with user-defined exchange rates.

For this analysis, pollution removal value is calculated based on the prices of Can$1,486 per metric ton (carbon monoxide), Can$1,490 per metric ton (ozone), Can$222 per metric ton (nitrogen dioxide), Can$81 per metric ton (sulfur dioxide), Can$51,860 per metric ton (particulate matter less than 2.5 microns).

Carbon Storage and Sequestration:

Carbon storage is the amount of carbon bound up in the above-ground and below-ground parts of woody vegetation. To calculate current carbon storage, biomass for each tree was calculated using equations from the literature and measured tree data. Open-grown, maintained trees tend to have less biomass than predicted by forest-derived biomass equations (Nowak 1994). To adjust for this difference, biomass results for open-grown urban trees were multiplied by 0.8. No adjustment was made for trees found in natural stand conditions. Tree dry-weight biomass was converted to stored carbon by multiplying by 0.5.

Carbon sequestration is the removal of carbon dioxide from the air by plants. To estimate the gross amount of carbon sequestered annually, average diameter growth from the appropriate genera and diameter class and tree condition was added to the existing tree diameter (year x) to estimate tree diameter and carbon storage in year x+1.

Carbon storage and carbon sequestration values are based on estimated or customized local carbon values. For international reports that do not have local values, estimates are based on the carbon value for the United States (U.S. Environmental Protection Agency 2015, Interagency Working Group on Social Cost of Carbon 2015) and converted to local currency with user-defined exchange rates.

For this analysis, carbon storage and carbon sequestration values are calculated based on Can$115 per metric ton.

Oxygen Production:

The amount of oxygen produced is estimated from carbon sequestration based on atomic weights: net O2 release (kg/yr) = net C sequestration (kg/yr) × 32/12. To estimate the net carbon sequestration rate, the amount of carbon sequestered as a result of tree growth is reduced by the amount lost resulting from tree mortality. Thus, net carbon sequestration and net annual oxygen production of the urban forest account for decomposition (Nowak et al 2007). For complete inventory projects, oxygen production is estimated from gross carbon sequestration and does not account for decomposition.

Avoided Runoff:

Annual avoided surface runoff is calculated based on rainfall interception by vegetation, specifically the difference between annual runoff with and without vegetation. Although tree leaves, branches, and bark may intercept precipitation and thus mitigate surface runoff, only the precipitation intercepted by leaves is accounted for in this analysis.

The value of avoided runoff is based on estimated or user-defined local values. For international reports that do not have local values, the national average value for the United States is utilized and converted to local currency with user-defined exchange rates. The U.S. value of avoided runoff is based on the U.S. Forest Service's Community Tree Guide Series (McPherson et al 1999; 2000; 2001; 2002; 2003; 2004; 2006a; 2006b; 2006c; 2007; 2010; Peper et al 2009; 2010; Vargas et al 2007a; 2007b; 2008).

For this analysis, avoided runoff value is calculated based on the price of Can$2.32 per m^3.

Building Energy Use:

If appropriate field data were collected, seasonal effects of trees on residential building energy use were calculated based on procedures described in the literature (McPherson and Simpson 1999) using distance and direction of trees from residential structures, tree height and tree condition data. To calculate the monetary value of energy savings, local or custom prices per MWH or MBTU are utilized.

For this analysis, energy saving value is calculated based on the prices of Can$75.00 per MWH and Can$10.45 per MBTU.

Structural Values:

Structural value is the value of a tree based on the physical resource itself (e.g., the cost of having to replace a tree with a similar tree). Structural values were based on valuation procedures of the Council of Tree and Landscape Appraisers, which uses tree species, diameter, condition, and location information (Nowak et al 2002a; 2002b). Structural value may not be included for international projects if there is insufficient local data to complete the valuation procedures.

Potential Pest Impacts:

The complete potential pest risk analysis is not available for studies outside of the United States. The number of trees at risk to the pests analyzed is reported, though the list of pests is based on known insects and disease in the United States.

For the U.S., potential pest risk is based on pest range maps and the known pest host species that are likely to experience mortality. Pest range maps for 2012 from the Forest Health Technology Enterprise Team (FHTET) (Forest Health Technology Enterprise Team 2014) were used to determine the proximity of each pest to the county in which the urban forest is located. For the county, it was established whether the insect/disease occurs within the county, is within 400 kilometers of the county edge, is between 400 and 1210 kilometers away, or is greater than 1210 kilometers away. FHTET did not have pest range maps for Dutch elm disease and chestnut blight. The range of these pests was based on known occurrence and the host range, respectively (Eastern Forest Environmental Threat Assessment Center; Worrall 2007).

Relative Tree Effects:

The relative value of tree benefits reported in Appendix II is calculated to show what carbon storage and sequestration, and air pollutant removal equate to in amounts of municipal carbon emissions, passenger automobile emissions, and house emissions.

Municipal carbon emissions are based on 2010 U.S. per capita carbon emissions (Carbon Dioxide Information Analysis Center 2010). Per capita emissions were multiplied by city population to estimate total city carbon emissions.

Light duty vehicle emission rates (g/mi) for CO, NOx, VOCs, PM10, SO2 for 2010 (Bureau of Transportation Statistics 2010; Heirigs et al 2004), PM2.5 for 2011-2015 (California Air Resources Board 2013), and CO2 for 2011 (U.S. Environmental Protection Agency 2010) were multiplied by average miles driven per vehicle in 2011 (Federal Highway Administration 2013) to determine average emissions per vehicle.

Household emissions are based on average electricity kWh usage, natural gas Btu usage, fuel oil Btu usage, kerosene Btu usage, LPG Btu usage, and wood Btu usage per household in 2009 (Energy Information Administration 2013; Energy Information Administration 2014)

- CO2, SO2, and NOx power plant emission per KWh are from Leonardo Academy 2011. CO emission per kWh assumes 1/3 of one percent of C emissions is CO based on Energy Information Administration 1994. PM10 emission per kWh from Layton 2004.
- CO2, NOx, SO2, and CO emission per Btu for natural gas, propane and butane (average used to represent LPG), Fuel #4 and #6 (average used to represent fuel oil and kerosene) from Leonardo Academy 2011.
- CO2 emissions per Btu of wood from Energy Information Administration 2014.
- CO, NOx and SOx emission per Btu based on total emissions and wood burning (tons) from (British Columbia Ministry 2005; Georgia Forestry Commission 2009).

Appendix II. Relative Tree Effects

The urban forest in 1158 Old Second Line provides benefits that include carbon storage and sequestration, and air pollutant removal. To estimate the relative value of these benefits, tree benefits were compared to estimates of average municipal carbon emissions, average passenger automobile emissions, and average household emissions. See Appendix I for methodology.

Carbon storage is equivalent to:

- Amount of carbon emitted in 1158 Old Second Line in 0 days
- Annual carbon (C) emissions from 64 automobiles
- Annual C emissions from 26 single-family houses

Carbon monoxide removal is equivalent to:

- Annual carbon monoxide emissions from 0 automobiles
- Annual carbon monoxide emissions from 0 single-family houses

Nitrogen dioxide removal is equivalent to:

- Annual nitrogen dioxide emissions from 1 automobiles
- Annual nitrogen dioxide emissions from 0 single-family houses

Sulfur dioxide removal is equivalent to:

- Annual sulfur dioxide emissions from 2 automobiles
- Annual sulfur dioxide emissions from 0 single-family houses

Annual carbon sequestration is equivalent to:

- Amount of carbon emitted in 1158 Old Second Line in 0.0 days
- Annual C emissions from 0 automobiles
- Annual C emissions from 0 single-family houses

Appendix III. Comparison of Urban Forests

A common question asked is, "How does this city compare to other cities?" Although comparison among cities should be made with caution as there are many attributes of a city that affect urban forest structure and functions, summary data are provided from other cities analyzed using the i-Tree Eco model.

I. City totals for trees

City	*% Tree Cover*	*Number of Trees*	*Carbon Storage (metric tons)*	*Carbon Sequestration (metric tons/yr)*	*Pollution Removal (metric tons/yr)*
Toronto, ON, Canada	26.6	10,220,000	1,108,000	46,700	1,905
Atlanta, GA	36.7	9,415,000	1,220,000	42,100	1,509
Los Angeles, CA	11.1	5,993,000	1,151,000	69,800	1,792
New York, NY	20.9	5,212,000	1,225,000	38,400	1,521
London, ON, Canada	24.7	4,376,000	360,000	12,500	370
Chicago, IL	17.2	3,585,000	649,000	22,800	806
Baltimore, MD	21.0	2,479,000	517,000	16,700	390
Philadelphia, PA	15.7	2,113,000	481,000	14,600	522
Washington, DC	28.6	1,928,000	477,000	14,700	379
Oakville, ON , Canada	29.1	1,908,000	133,000	6,000	172
Boston, MA	22.3	1,183,000	290,000	9,500	257
Syracuse, NY	26.9	1,088,000	166,000	5,300	99
Woodbridge, NJ	29.5	986,000	145,000	5,000	191
Minneapolis, MN	26.4	979,000	227,000	8,100	277
San Francisco, CA	11.9	668,000	176,000	4,600	128
Morgantown, WV	35.5	658,000	84,000	2,600	65
Moorestown, NJ	28.0	583,000	106,000	3,400	107
Hartford, CT	25.9	568,000	130,000	3,900	52
Jersey City, NJ	11.5	136,000	19,000	800	37
Casper, WY	8.9	123,000	34,000	1,100	34
Freehold, NJ	34.4	48,000	18,000	500	20

II. Totals per hectare of land area

City	*Number of Trees/ha*	*Carbon Storage (metric tons/ha)*	*Carbon Sequestration (metric tons/ha/yr)*	*Pollution Removal (kg/ha/yr)*
Toronto, ON, Canada	160.4	17.4	0.73	29.9
Atlanta, GA	275.8	35.7	1.23	44.2
Los Angeles, CA	48.4	9.4	0.36	14.7
New York, NY	65.2	15.3	0.48	19.0
London, ON, Canada	185.5	15.3	0.53	15.7
Chicago, IL	59.9	10.9	0.38	13.5
Baltimore, MD	118.5	25.0	0.80	18.6
Philadelphia, PA	61.9	14.1	0.43	15.3
Washington, DC	121.1	29.8	0.92	23.8
Oakville, ON , Canada	192.9	13.4	0.61	12.4
Boston, MA	82.9	20.3	0.67	18.0
Syracuse, NY	167.4	23.1	0.77	15.2
Woodbridge, NJ	164.4	24.2	0.84	31.9
Minneapolis, MN	64.8	15.0	0.53	18.3
San Francisco, CA	55.7	14.7	0.39	10.7
Morgantown, WV	294.5	37.7	1.17	29.2
Moorestown, NJ	153.4	27.9	0.90	28.1
Hartford, CT	124.6	28.5	0.86	11.5
Jersey City, NJ	35.5	5.0	0.21	9.6

City	*Number of Trees/ha*	*Carbon Storage (metric tons/ha)*	*Carbon Sequestration (metric tons/ha/yr)*	*Pollution Removal (kg/ha/yr)*
Casper, WY	22.5	6.2	0.20	6.2
Freehold, NJ	94.6	35.9	0.98	39.6

Appendix IV. General Recommendations for Air Quality Improvement

Urban vegetation can directly and indirectly affect local and regional air quality by altering the urban atmosphere environment. Four main ways that urban trees affect air quality are (Nowak 1995):

- Temperature reduction and other microclimate effects
- Removal of air pollutants
- Emission of volatile organic compounds (VOC) and tree maintenance emissions
- Energy effects on buildings

The cumulative and interactive effects of trees on climate, pollution removal, and VOC and power plant emissions determine the impact of trees on air pollution. Cumulative studies involving urban tree impacts on ozone have revealed that increased urban canopy cover, particularly with low VOC emitting species, leads to reduced ozone concentrations in cities (Nowak 2000). Local urban management decisions also can help improve air quality.

Urban forest management strategies to help improve air quality include (Nowak 2000):

Strategy	*Result*
Increase the number of healthy trees	Increase pollution removal
Sustain existing tree cover	Maintain pollution removal levels
Maximize use of low VOC-emitting trees	Reduces ozone and carbon monoxide formation
Sustain large, healthy trees	Large trees have greatest per-tree effects
Use long-lived trees	Reduce long-term pollutant emissions from planting and removal
Use low maintenance trees	Reduce pollutants emissions from maintenance activities
Reduce fossil fuel use in maintaining vegetation	Reduce pollutant emissions
Plant trees in energy conserving locations	Reduce pollutant emissions from power plants
Plant trees to shade parked cars	Reduce vehicular VOC emissions
Supply ample water to vegetation	Enhance pollution removal and temperature reduction
Plant trees in polluted or heavily populated areas	Maximizes tree air quality benefits
Avoid pollutant-sensitive species	Improve tree health
Utilize evergreen trees for particulate matter	Year-round removal of particles

Appendix V. Invasive Species of the Urban Forest

Invasive species data is only available for the United States. This analysis cannot be completed for international studies because of a lack of necessary data.

Appendix VI. Potential Risk of Pests

Pest range data is only available for the United States. This analysis cannot be completed for international studies because of a lack of necessary data.

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Appendix 2: Memo, Nick Stow (Senior Planner, City of Ottawa, 21 Feb 2019) re: 1158 Old Second Line Road, File No. D07016-18-0008, Appendix 2.

MEMO / NOTE DE SERVICE

To / Destinataire	Holly Bickerton Laurel McCreight Matthew Hayley	File/N° de fichier: D07-16-18-0008
From / Expéditeur	Nick Stow Senior Planner Planning Services	
Subject / Objet	1158 Old Second Line Road : Significant Woodland Evaluation	Date: 21 February 2019

Background

The proposed subdivision development at 1158 Old Second Line Road would require the removal of a forested area meeting the City of Ottawa definition of a significant woodland. Consequently, the Environmental Impact Statement for the development requires an evaluation of the impacts upon the woodland.

This proposal provides the first case of development of a significant woodland in the established urban area under the City's new significant woodland policies. It is also the first development subject to the draft Significant Woodlands Guidelines (scheduled for consideration by City Council on March 6, 2019). In this instance, City staff from the Natural Systems and Rural Affairs Unit have carried out the analysis of the proposal under the Significant Woodlands Guidelines, as a practical test of the utility and practicality of those guidelines. On future development applications affecting significant woodlands, proponents will be responsible for carrying out the analysis as part of their Environmental Impact Statement requirements.

Mitigation Hierarchy

Based upon past planning decisions, the proponent appears to have a reasonable expectation of development of 1158 Old Second Line Road for residential use. Neither the property nor the surrounding community (Morgan's Grant) is governed by an existing secondary plan or community design plan. However, the land uses within the Morgan's Grant community have been well-established, including the locations of park and open space blocks. For example, the similar woodlot at 1190 Old Second Line Road has been acquired by the City and preserved as an open space block. In contrast, 1158 Old Second Line Road has been zoned DR – Development Reserve. The purpose of the DR zone is to, "recognize lands intended for future urban development", and to, "limit the range of permitted uses to those which will not preclude

future development options". In this case, the planning context clearly establishes an intent by the City to see residential development of the property.

Preservation of the forest cover on site is not consistent with the designation and intended use of the land in the Official Plan and Zoning By-law. Consequently, avoidance and mitigation are not viable options for this significant woodland. Compensation for the loss of the ecosystem services provided by the woodland is the preferred option, if feasible.

Evaluation

According to the information provided by the proponent's consultants, the woodland meets the Official Plan definition of a significant woodland in the urban area: *i.e.* it is older than 60 years, and it is larger than 0.8 hectares. Accordingly, it is considered significant within the urban area for its social, economic, and cultural values. It does not appear significant with respect to any other of the criteria in the Province's Natural Heritage Reference Manual. Based upon Table 4 of the draft Significant Woodlands Guidelines, the woodland is subject to the following evaluation measures and indicators:

- Total canopy cover;
- Social value: unusual recreational, education or cultural opportunities; cultural, heritage, or historical features; Indigenous values; existing public use;
- iTree analysis: removal of pollutants; run-off averted; carbon sequestration; structural value;
- Accessibility and Equity: residents within 250 m by housing type and quality of access, total accessible greenspace, sensitive populations within 250 m;
- Low-impact development: run-off captured.

The planning area chosen for the analysis is the community of Morgan's Grant, lying within the boundaries of March Road, Terry Fox Drive, Old Second Line Road, and Old Carp Road. This community has an approximate area of 210 hectares. Residential development in the community consists predominantly of street-oriented housing, with some small areas of multi-unit housing.

The woodlot does not currently provide public access. Consequently, an analysis of change in greenspace access for the community is not necessary. However, a summary of accessible greenspace within the surrounding community has been provided.

An evaluation should consider the net change in ecosystem services resulting from development of the woodland. It should identify:

- The ecosystem services provided by the urban forest within the community;
- The loss of ecosystem services through impacts on the woodland;
- The gain in ecosystem services through compensation within the development, especially the planting of trees.

The following analyses were carried out for this evaluation:

- An iTree Canopy analysis of the urban tree canopy in Morgan's Grant (the community), based upon 100 sample points.
- An iTree Eco analysis of the woodland, based upon two sample plots, projecting 40 years into the future. The analysis used the default settings and assumed a natural regeneration of 15 trees per year.
- A GIS analysis of total, accessible greenspace and the percentage of the community with easy access to greenspace (defined as 250 m straight-line distance).

Ideally, iTree Eco would have been used instead of iTree Canopy for the analysis of the full urban tree canopy, using City of Ottawa inventory data. However, due to time constraints, staff employed the simpler and quicker iTree Canopy analysis. In addition, due to time constraints, staff limited the iTree Canopy analysis to 100 samples points, resulting in a relatively high standard error in the tree cover estimate.

Staff did not credit the development plan for any compensation through tree planting. A review of the landscaping plan and tree planting details suggests that most trees proposed for planting on site would lack sufficient soil volume for healthy growth. The City's draft Street Tree Manual recommends 20 cubic meters of native or good quality topsoil for a single small tree or 12 cubic meters of soil for a small tree planted in a shared space. The landscaping plan suggests that most of the trees proposed on site would have less than half these soil volumes. Consequently, healthy growth appears unlikely, especially for medium or large tree species.

Results

Total Canopy Cover

Morgan's Grant: 59 hectares (27.3% +/- 4.5)
Woodlot at 1158 Old Second Line: 1 hectare.

Change in urban tree cover: -1.7%.

Social Value

There are no known social values on the site.

Accessible Greenspace

Total accessible greenspace: 31 hectares (15% of the community area).
Percent of the community within 250 of accessible greenspace: 95%
Percent of multi-unit housing within 250 m of accessible greenspace: 100%

Change in accessible greenspace: not applicable.

iTree Analysis – Air Quality and Climate Change

Carbon released through tree removal: 83 metric tons

Net Air Quality and Climate Benefit (Forty Years)

	Carbon	Pollutants Removed				
	Carbon Sequestration (metric tons)	CO (kg)	NO_2 (kg)	Ozone (kg)	SO_2 (kg)	PM 2.5 (kg)
Morgan's Grant	26460	2222	3940	28732	3452	3624
1158 Old Second Line Road (loss)	69	26	136	1050	4	73
Net Change in Community Ecosystem Services	-0.26%	-1.2%	-3.4%	-3.6%	-0.11%	-2%

iTree Analysis - Stormwater

Additional run-off due to loss of trees: 184 cubic meters *per* year.

Low impact development: no LID measures appear planned for the site.

Conclusions

The proposed development would result in a small decrease in ecosystem services provided to the community, primarily as a direct result of tree cover loss. These losses are:

- A small release of stored carbon;
- A small decline in long-term carbon sequestration;
- Small declines in long-term air quality benefits;
- A small decline in urban heat island benefit;
- A small increase in stormwater run-off.

The development plan provides few compensating benefits on site, because of inadequate soil volumes for planted trees and lack of LID measures.

There is no change in accessibility to greenspace for the community. Community greenspace is currently below the Official Plan target of 16 – 20% of gross area. However, access to greenspace remains high and equitable in the community, in part because of the presence of a large City-owned Hydro corridor through the community.

Recommendations

The negative impacts of the project on the significant woodland should not prevent it from proceeding as planned.

If this proposal had been submitted after approval of the Significant Woodlands Guidelines by City Council, then Natural Systems and Rural Affairs would recommend against its approval. The Landscaping and Tree Conservation Plan does not appear to provide the necessary volumes of quality soil for the growth of healthy, mature trees. Additional soil volume could be provided using Silva cells or their equivalent under driveways. Although this would add to the cost of the development, the City would be justified in asking for their use as compensation for loss of the woodland.

However, given that the Significant Woodlands Guidelines have not yet been approved by City Council, it follows that Council has not yet endorsed the principle of compensation for loss of ecosystem services that they propose. Consequently, the City cannot reasonably ask the proponent to provide that compensation in this case.

Overall, removal of the significant woodland will result in a small decrease in ecosystem services provided to the community. However, the limited scope and magnitude of these services appears small in the context of the full community of Morgan's Grant. Given previous planning decisions by City Council, the reasonable expectation of development by the proponent, and the lack of approved Significant Woodlands Guidelines, this negative impact appears defensible under the Official Plan and the Provincial Policy Statement.

Nick Stow
NS / NS

cc: Geraldine Wildman
Mark Richardson

Appendix 3: Avoidance Alternatives Form (AAF) for activities that may require an overall benefit permit under clause 17(2)(c) of the *Endangered Species Act* (dated 30 Jan 2019),

Ontario

Ministry of
Natural Resources

Avoidance Alternatives Form for activities that may require an overall benefit permit under clause 17(2)(c) of the *Endangered Species Act*

For Internal Use Only

Tracking Number	Lead District

Note: It is anticipated that the completion of this form will take multiple extended sessions. It is recommended that proponents download and save the form and the associated guide to their local hard drive in order to more easily facilitate this task. Adobe Reader 10 is required to save, view and add data to the form. If you require this version of Adobe, select download to download it for free. To review the entire form, select view. It is strongly recommended that while completing the form, proponents read all associated tabs and help buttons to ensure the information requirements are clearly understood.

Personal information in this form is collected under the authority of Section 53 of the *Endangered Species Act*, *2007*. The information provided will be used for the purposes of administering the Act and its Regulations. Questions about the use of this information should be directed to the species at risk representative at the local MNR office (http://www.mnr. gov.on.ca/en/ContactUs/2ColumnSubPage/STEL02_179002.html) for the location where the proposed activity will take place.

Fields marked with an asterisk (*) are mandatory.

1. Contact Information

Proponent Contact Information ☐ check this box if the proponent is a private individual

Legal Last Name*	Legal First Name*	Legal Middle Initial(s)
Theberge Homes Ltd.	None	

Full Mailing Address

Unit No.	Street No.*	Street Name*	P.O. Box
	904	Lady Ellen Place	

Rural Route	Postal Station	Lot No.	Concession

City/Town*	Province*	Postal Code*
Ottawa	Ontario	K1X 5L5

Telephone No.*	Fax No.	Email (if available)
613 421-1515 ext.		joeytheberge@thebergehomes.com

Primary Contact for Proponent

Is the proponent the primary contact for this form?*

☐ Yes ☑ No

Last Name*	First Name*	Middle Initial(s)
Bickerton	Holly	

Position/Title
Consulting Ecologist

Legal Name of Organization/Company
Holly Bickerton

Full Business Mailing Address

Unit No.	Street No.*	Street Name*	P.O. Box
	143	Aylmer Ave	

Rural Route	Postal Station	Lot No.	Concession

City/Town*	Province*	Postal Code*
Ottawa	ON	K1S 2Y1

Business Telephone No.*	Business Fax No.	Business Email (if available)
613 730-7725 ext.		holly.bickerton@rogers.com

Authorization*

☑ I, Joey Theberge (Theberge Homes Ltd.) (proponent's name), authorize

Holly Bickerton (primary contact's name)

to disclose information required by the Ministry of Natural Resources for the purpose of administering the *Endangered Species Act*, *2007* and its Regulations in accordance with the *Freedom of Information and Protection of Privacy Act*, *1990*.

2. Consideration of reasonable alternatives that would not adversely affect protected species at risk or habitat (i.e., avoidance alternatives)

In Table 1, please describe the alternative approaches to the activity that would not adversely affect the protected species at risk or habitat(s) for MNR's consideration. For multiple species, add additional rows. For each alternative listed, provide the rationale for how it would completely avoid adverse effects on 1) the protected species (**avoidance of all adverse effects on species**) or 2) the protected habitat (**avoidance of all adverse effects on protected habitat**).

Note: MNR will consider the information provided and assess whether or not the activity avoidance alternatives completely avoid adverse effects on protected species and habitat.

If proponents do not elect to proceed with avoidance alternatives that completely avoid adverse effects to species at risk or their habitat, then they will be advised to complete the Application for an overall benefit permit under clause 17(2)(c) of the *Endangered Species Act*, and the information presented in this form will be used to assist MNR to assess the permit application and determine whether it meets the legislated requirements of clause 17(2)(c) of the ESA.

2. Consideration of reasonable alternatives that would not adversely affect protected species at risk or habitat (i.e., avoidance alternatives)

Table 1. Alternative approaches considered to avoid potential adverse effects on protected species or habitat (e.g., alternative locations) and any contravention of subsection 9(1) or 10(1) of the ESA**.** If this information is available in an existing report, proponents can copy and paste the relevant information into the appropriate spaces below and reference the title, author and date of the report(s) from which the copy and paste sections originate.

Description of Avoidance Alternative	Explanation of how all adverse effects on species will be avoided	Explanation of how all adverse effects on habitat will be avoided	Effectiveness in meeting the main purpose of the activity	Potential limitations (e.g., biological, technical and economic feasibility)
1. Project does not proceed at 1158 Old Second Line Road. No development will occur.	All potential adverse effects on Blanding's Turtles will be avoided because the project would not occur.	All potential adverse effects on habitat will be avoided because the project would not occur.	Completely ineffective. The fundamental objects of the proposed projects would not be met.	This alternative is economically infeasible. It is also infeasible on a policy basis, in that the area would no longer contribute to the City of Ottawa's stated goal of increasing density within appropriate zoning within the urban boundary.
2. Project proceeds with an altered site plan and potentially reduced footprint, e.g. by designing a "travel corridor" for Blanding's Turtle through the subject property to the Hydro Line	Adverse impacts to Blanding's Turtles are unlikely to be avoided. Potential impacts may increase. The identification of the subject property by MNRF as Category 3 habitat is entirely based on proximity to known Blanding's Turtle habitat, and does not consider other factors. The property at 1158 Old Second Line Road does not represent Category 3 habitat of any value to Blanding's Turtles. On the contrary, it may function as a habitat sink, as turtles in the South March Highlands may potentially be drawn across busy Old Second Line Road (risking mortality), through a	Adverse effects on habitat may not be avoided. Subject property does not provide habitat of value and may be habitat sink. Addition of corridor is unlikely to provide effective habitat, but if effective, it could increase function as a habitat sink by drawing turtles across the road	Ineffective. The project may not proceed due to economic in-feasibility of reduced footprint. It is unlikely there would be any benefit to Blanding's Turtle.	Biologically ineffective. Encouraging wildlife to undertake this behavior via a travel corridor to a habitat sink may increase mortality. Technically limiting and possibly infeasible because there are many inflexible planning and engineering-related factors influencing the site plan, including grading and tree retention requirements.

Description of Avoidance Alternative	Explanation of how all adverse effects on species will be avoided	Explanation of how all adverse effects on habitat will be avoided	Effectiveness in meeting the main purpose of the activity	Potential limitations (e.g., biological, technical and economic feasibility)
	high density housing development, into a meadow corridor where no nesting habitat exists. To survive, they would then need to return through the subject property and across the road once more to return safely to nesting habitat. Encouraging wildlife to travel to a habitat sink may increase mortality. There is also little research to suggest this type of corridor would be effective.	to an area where no nesting habitat exists.		Economically infeasible because significantly altering the site plan may result in the project not being economically viable.
3. Project proceeds with permanent exclusion fencing according to MNRF guidelines (July 2013 and April 2016) was considered along the west of Old Second Line Road as suggested in MNRF's reply to the IGF	Reduced road mortality to individual turtles could result as turtles would prevented from accessing Old Second Line Road, and therefore both the subject property and the Hydro Line. It is unlikely there will be any change in direct mortality of Blanding's Turtles on the subject property itself, because although this area has been identified as Category 3 habitat, it is of very low value to Blanding's Turtle, which are probably not present on the site.	All potential adverse effects on habitat would be avoided. Blanding's Turtles will be prevented from low likelihood of entering property, which may function as a habitat sink.	Effective in that development could as planned, while avoiding some road mortality impacts to Blanding's Turtles (ie. Impacts not related to the proposed project itself). It is unlikely there will be any change in adverse effects on Blanding's Turtle on the subject property because it is unlikely any are present in this area with no observed habitat value, but decreases in road mortality may result.	May be technically infeasible. The west side of Old Second Line road is private property. Permanent fencing may not be supported by the City of Ottawa because it restricts access to a privately owned lot (M. Hayley, pers.comm. approve this could involve significant delay, meaning this option may also not be economically feasible.

4. Project proceeds with permanent exclusion fencing according to MNRF guidelines (July 2013 and April 2016) along the east side of Old Second Line Road as suggested in MNRF's reply to the IGF, or along the Hydro Line.	Fencing along the frontage of 1158 Old Second Line Road (east side) has been considered but offers no substantial conservation gains because it does not prevent Blanding's Turtles from crossing Old Second Line Road (the primary threat, which is not a result of the proposed project). Based on the Site Plan, the lot frontage will be interrupted by two new streets in order to provide access to residents so fencing would be interrupted.. Fencing at the rear of the property adjacent to the hydro line was also considered but has limited conservation value, in that turtles are not anticipated in this area, and iIt offers no nesting habitat and is surrounded by high-density residential neighbourhoods.If turtles are there, it would not be desirable to create more barriers to escape. Potential fencing along the Hydro Line would also be interrupted by two pedestrian access points to the recreational path on the Hydro Line, and therefore would probably be an ineffective barrier.	All potential adverse effects on habitat will be avoided. Blanding's Turtles will be prevented from low likelihood of entering property, which may function as a habitat sink.	Moderately effective in that development could proceed as planned with existing site plan.	Biologically not feasible - ineffective. Benefits to Blanding's Turtles are low to nil, because road mortality is not reduced and fencing would not prevent Blanding's Turtle from habitat sink. Hydro Line fencing may be technically infeasible because it may limit HydroOne access, contrary to easement requirements (B. Holzman, pers. comm. 28 Jan 2019). The process to negotiate this could involve significant delay, making the project not economically feasible.

5. Project proceeds as proposed, with the following activities: -Temporary exclusion fencing installed around the perimeter of the property before April 1, 2019 and maintained and regularly monitored until construction is complete. -No loose fill to be stockpiled on site. -Site monitored regularly during key times of turtle movement (late May-late June) by a qualified professional - Construction workers instructed to identify Blanding's Turtles and to contact a qualified professional immediately if one is identified on or near the site. -Erosion & Sediment Control Plan will be prepared requiring excavated water to be directed east toward the Hydro Easement, where sediment controls will be installed. - Post-development, overland flow will be directed to a dry basin catchment at the east boundary of the site, and directed via storm sewer to an existing municipal drain to the north along Goward Rd. See attached Figure.	Fencing before and during construction will prevent Blanding's Turtles from accessing the construction site. Turtle movement will be excluded well in advance of the start of the active season. Preventing loose fill at site will eliminate any potential nesting opportunities. Site will be regularly monitored to ensure harm and staff trained. Should a turtle (Blanding's or otherwise) be identified on or near the site, a qualified professional will ensure all adverse impacts are avoided. No water or sediment will reach Blanding's Turtles or cause direct impact, either during construction or in future.	Adverse potential effects of the habitat sink (Hydro line) will be avoided with exclusion fencing to ensure that Blanding's Turtles do not access any areas likely to function as a habitat sink. Any overland flow that may contain sediment, nutrients, and/ or pollutants will be directed to municipal stormwater drains. All adverse impacts on known Blanding's Turtle habitat in SMH will be avoided in that the water chemistry of adjacent wetland and local natural areas will remain intact.	Fully effective in that this alternative allows development to proceed, while protecting Blanding's Turtle and habitat.	No potential limitations. All activities occur on property owned and managed by proponent and within management purview.

3. Expression of Interest to Apply for a Permit

Does the proponent elect to proceed with the avoidance alternative(s) that MNR has determined to be sufficient to avoid contravention of subsection 9(1) or 10(1) of the ESA?

☑ **Yes**. The proponent wishes to apply the fifth avoidance alternative described in Table 1 alternative(s) as identified by MNR to avoid contravention of the ESA and will NOT be proceeding with a 17(2)(c) overall benefit permit application at this time.

☐ **No**. The proponent wishes to proceed with the application for an overall benefit permit under clause 17(2)(c) of the ESA.

4. Submission Information

Date this form was submitted to the local MNR office (yyyy-mm-dd)*

2019-01-30

Please note: the email function will not work if you do not have your automatic email settings established. In these cases, please save a copy of your form, access your email account and attach a copy of the form for email submission to your local MNR. The list of MNR office email addresses is below for your reference.

Email Client Option *

☑ Default Email Application (e.g., MS Outlook)

☐ Internet Email (e.g., Yahoo or Hotmail. Save the form and send it manually to the MNR office by using internet email service.)

Local MNR office this form is being submitted to*	MNR Email Address for reference
Kemptville	sar.kemptville@ontario.ca

Proposal title (same as title used in the Information Gathering Form (IGF))*

1158 Old Second Line Road, Ottawa

Authorization*

☑ I, Joey Theberge (Theberge Homes Ltd.), (insert "proponent" name) confirm that the information provided in this form is accurate and complete to the best of my knowledge. I grant permission for a summary of my proposed activity to be posted on the Ministry of Natural Resources Species at Risk website and the Environmental Registry for the purpose of administering the *Endangered Species Act, 2007* and its Regulations and in accordance with the *Freedom of Information and Protection of Privacy Act, 1990*.

Appendix 4: Email from Aaron Foss (Kemptville MNRF, 5 Feb 2019) re: 1158 Old Second Line Road, File No. D07016-18-0008

Holly Bickerton

From: Foss, Aaron (MNRF) <Aaron.Foss@ontario.ca>
Sent: Tuesday, February 5, 2019 12:25 PM
To: Holly Bickerton
Subject: RE: AAF - 1158 Old Second Line Rd.

Good morning Holly,
Thanks for completing the AAF for works related to 1158 Second Line Rd and providing it for review.
The MNRF is of the opinion that the works, as proposed, will likely not contravene the ESA with the mitigation described in the AAF
If details of the proposal change, I would advise further review by the Ministry.

Any questions, please let me know

Aaron Foss

Sr. Fish and Wildlife Technical Specialist
Ministry of Natural Resources and Forestry
Kemptville District
10-1 Campus Drive
Kemptville, ON K0G 1J0
Ph: 613-258-8386

From: Holly Bickerton <holly.bickerton@rogers.com>
Sent: January 30, 2019 3:05 PM
To: SAR Kemptville District (MNRF) <sar.kemptville@ontario.ca>
Cc: joeytheberge@thebergehomes.com
Subject: AAF - 1158 Old Second Line Rd.

Hi Aaron,
Attached is a revised AAF for the above property.
Many thanks for your help with guiding this application quickly through the process – it is much appreciated.

Please feel free to contact me if you need any additional information.

Holly

Holly Bickerton
B.A.Sc., MES
Consulting Ecologist
143 Aylmer Ave.
Ottawa, Ontario K1S 2Y1
Tel: 613 730 7725
Cell: 613 720 7725

Appendix C IFS Associates TCR (2018)

P.O. BOX 13593, OTTAWA, ON K2K 1X6
TELEPHONE: (613) 839-0101
WEBSITE: WWW.IFSASSOCIATES.CA
URBAN FORESTRY & FOREST MANAGEMENT CONSULTING

April 19, 2018

Joey Theberge
Theberge Developments Land Holding Limited
904 Lady Ellen Place
Ottawa, ON
K1Z 5L5

RE: ENVIRONMENTAL IMPACT STATEMENT AND TREE CONSERVATION REPORT – 1158 OLD SECOND LINE ROAD, OTTAWA

Dear Joey,

This report details a pre-construction update to the combined Environmental Impact Statement and Tree Conservation Report (EIS/TCR) for the above-noted property in Ottawa. The original EIS/TCR was prepared by CJB Environnement Inc. in September 2013 and should be read in conjunction with this report. At the time of the original report the layout of the development slated for the property was unknown.

The need for this updated EIS/TCR is related to the development now proposed for the subject property by Theberge Developments Land Holding Limited. Currently a single-family house occupies the site. The only areas not substantially occupied by vegetation are within the footprint of the house, the front and back yards and driveway leading from Old Second Line Road. The rest of the property is well stocked with trees of varying species and ages. The development proposed for the site includes 10 townhouse blocks holding a total of 49 townhouses, each with associated garages and individual surface parking spaces.

Combined EIS/TCR reports are required for properties under site plan control applications which are greater than one hectare in area, are located within the urban boundary and on which there are trees 10 centimetres in diameter or greater. The approval of this EIS/TCR by the City of Ottawa and the issuing of a permit by them authorize the removal of approved trees. **Importantly, although this report may be used to support the application for a City tree removal permit, it does not by itself constitute permission to remove trees or begin site clearing activities. No such work should occur before a tree removal permit is issued by the City of Ottawa.**

UPDATED TREE SPECIES, CONDITION, SIZE AND STATUS

A survey of the vegetation on site found little has changed since the 2013 combined EIS/TCR. In particular, the impact assessment is still relevant. However, missed in the 2013 report were several butternut *(Juglans cinerea)*. This species of tree is listed as endangered under the Province of Ontario's Endangered Species Act (ESA, 2007) and so is protected from harm.

A review of historic aerial photographs of the property confirms it has remained in a forested condition for many decades, save for the house which was built in the early 2000s. This and the presence of very mature butternuts confirms these trees are all naturally occurring. Because of this butternut health assessments (BHA) for each tree will be completed in early May 2018 and submitted to the Ministry of Natural Resources and Forestry shortly thereafter. Compensation for any retainable butternuts will be arranged through a third party.

TREE CONSERVATION

Given the density of proposed development, the relatively small area of the subject property and intensity of servicing requirements, there are very limited opportunities for the conservation of existing trees. The perimeter of the six outside townhouse blocks presents the only realistic opportunity for tree conservation. Even with a 7.5 meter setback from the property lines, the necessary increases to grade within these future backyards will preclude the retention of existing mature trees (please site servicing and grading plans prepared by EXP Services Inc.).

In this particular situation site clearing and servicing work will have a disproportionate impact on mature trees. In dense groupings mature trees develop far spreading root systems and living crowns held high proportionate to their total height. This is due to intense intercompetition between trees for sunlight, moisture and nutrients. These characteristics leave mature trees prone to root loss and 'edge effect' (sunscald, wind throw, etc.) on development sites. Consequently, smaller trees, especially those under 10cm, will have a greater chance of survival following development. In this instance, a 2m-wide linear area will be protected adjacent to all property lines to allow for the retention of existing smaller diameter trees. Grade changes within these areas will be minimal. Trees within this protected area and those on adjacent public and private property (including those straddling property lines) will be preserved using the following measures.

TREE PRESERVATION AND PROTECTION

Preservation and protection measures intended to mitigate damage during construction will be applied to the trees to be retained on City of Ottawa and private property directly adjacent to the subject property. The following measures are the minimum recommended to ensure tree survival during and following construction:

1. Erect a fence (snow or metal) as close as possible to the critical root zone (CRZ[1]) of trees;
2. Attach signs to the fence indicating the area within is a protected space (do not attach any signs, notices or posters to any tree);
3. Do not place any material or equipment within the CRZ of trees;
4. When possible do not raise or lower the existing grade within the CRZ;
5. Tunnel or bore instead of digging or trenching within the CRZ of trees;
6. Do not damage the root system, trunk or branches of any tree – if damage does occur cut the wound cleanly and, especially in the case of roots, seal the wound with beeswax;

7. Ensure that exhaust fumes from all equipment are not directed towards any tree's crown.

[1] The critical root zone (CRZ) is established as being 10 centimetres from the trunk of a tree for every centimetre of trunk diameter at breast height (DBH). The CRZ is calculated as DBH x 10 cm.

Please do not hesitate to contact me with any questions concerning this updated Environmental Impact Statement and Tree Conservation Report.

Yours,

Andrew Boyd

Andrew K. Boyd, B.Sc.F, R.P.F. (#1828)
Certified Arborist #ON-0496A and TRAQualified
Butternut Health Assessor #513
Consulting Urban Forester

IFS ASSOCIATES