Cardinal Creek Village South Updated Environmental Impact Study

2024-12-19

Final Report

Submitted To:

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Project Number: TAGG 1672.2

Version History

Version	Date	Description of revisions
1	December 19, 2024	Update to Muncaster Environmental Planning Inc. Environmental Impact Statement (December 22, 2021) KAL Final Report

Distribution List

Report Version	Recipient	Date Received	Number and type of copies provided
1	Taggart (Tamarack Developments)	December 19, 2024	1 Digital

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List of Acronyms and Abbreviations

cm – centimetres
e.g. – *exempli gratia*
ECR – Existing Conditions Report
EIS – Environmental Impact Study
ELC – Ecological Land Classification
ESA – *Endangered Species Act*
FWCA – *Fish and Wildlife Conservation Act*
ha – hectare
i.e. – id est
KAL – Kilgour & Associates Ltd.
km – kilometre
m – metre
MBCA – *Migratory Birds Convention Act*
MECP – Ministry of Environment, Conservation and Parks
MNRF – Ministry of Natural Resources and Forestry
NHIC – Natural Heritage Information Centre
PPS – Provincial Policy Statement
SAR – species at risk
SARA – *Species at Risk Act*
SWH – Significant Wildlife Habitat

1.0 INTRODUCTION

This report is an Environmental Impact Study (EIS) prepared by Kilgour & Associates Ltd. (KAL; Appendix A) on behalf of Taggart (Tamarack Developments; "the Proponent") in support of a future residential development known as Cardinal Creek Village South (the "Site"; Figure 1). The Site is located at 1296 and 1400 Old Montreal Road and encompasses the northern portion of each property, from Cardinal Creek northward.

Natural heritage review work in support of development planning began in 2011, with several minor updates taking place over the subsequent years. An Environmental Impact Statement (also an "EIS") was prepared in 2021 by Muncaster Environmental Planning Inc.; however, the City of Ottawa updated its EIS guidelines in 2023 and more recently released comments on the Muncaster (2021) EIS.

This report evaluates the natural heritage conditions on and around the site, reviews the policy context related to development plans and site history, assesses potential impacts of the proposed development on existing features, and recommends mitigation measures to minimize or eliminate these impacts. The content of this EIS was prepared in accordance with the *Environmental Impact Study Guidelines* (City of Ottawa, 2023). It serves to update the Muncaster EIS (2021) and address City of Ottawa comments provided therein.

To assess current site conditions and collect up-to-date field data (partially in response to City comments), an extensive field program was undertaken in 2024, which was detailed in the Existing Conditions Report (ECR) prepared by KAL (2024). The ECR identified natural heritage conditions on the Site based on field studies performed to date, reviews of publicly available records and data for the area, and identified opportunities for consideration in the planning process related to development options for the Site and provides the basis for this EIS.

2.0 ENVIRONMENTAL POLICY CONTEXT

Natural heritage policies and legislation relevant to the development of the Site are outlined below.

2.1 The Provincial Policy Statement, 2020, 2024

The Provincial *Policy* Statement (PPS) was issued under Section 3 of the Planning Act (Government of Ontario, 1990b). The PPS in force for the Muncaster EIS (2021) came into effect May 1, 2020 (Government of Ontario, 2020). Natural features were afforded protections under Section 2.1 of the PPS. Protections included maintenance, restoration, and improved function of diversity, connectivity, ecological function, and biodiversity of natural heritage systems. These protections restricted development and site alteration in significant natural areas (e.g., woodlands, wetlands, wildlife habitat) unless it was demonstrated that there would 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 was found within the second edition of the Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005 (NHRM; MNR, 2010). Importantly, the Province has approved the updated Provincial *Planning* Statement 2024 (i.e. as of

Figure 1 Site Location

Legend

Site Boundary

N

0 200 m

Project: TAGG 1672.1
Map File: TAGG 1672 Map 2410B.map
Universal Transverse Mercator - Zone 18 (N)
Printed on: 2024-10-22

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August 20, 2024); it came into effect on October 20, 2024. The revised PPS is intended to simplify and integrate existing policies to achieve housing objectives while providing tools for municipalities to deliver on housing objectives. While the 2024 edition is formally the planning document in effect at the time of this EIS, other than renumbering the relevant policies, there have been no meaningful changes related to natural heritage considerations between the two versions.

2.2 The City of Ottawa Official Plan (2021)

The current City of Ottawa Official Plan (OP; City of Ottawa, 2021) was updated and approved by the Ministry of Municipal Affairs and Housing as part of a comprehensive review. Pursuant to subsections 17(36.5) and (38.1) of the Planning Act, the decision of the Minister of Municipal Affairs and Housing regarding an official plan adopted in accordance with section 26 of the Planning Act is final and not subject to appeal. Accordingly, the new City of Ottawa Official Plan, as approved with modifications by the Minister, came into effect on November 4, 2022. The OP provides a vision for the future growth of the city and a policy framework to guide the city's physical development. With respect to natural heritage considerations addressed under an EIS, the OP provides a framework through which species at risk and other wildlife (and their habitats), forested areas, wetlands and surface water features must be reviewed. Key portions of the OP to be considered include:

- **The Environmental Impact Study Guidelines** (City of Ottawa, 2023) - which outlines study requirements of the EIS.

- **OP Schedule C11** - which outlines the Natural Heritage System Features overlay and Natural Heritage System Core Areas.

- **OP Section 4.8.1** - under which the City recognizes the following natural heritage features, as defined in Ottawa's Environmental Impact Study Guidelines:

    a) Significant wetlands;
    b) Habitat for endangered and threatened species;
    c) Significant woodlands;
    d) Significant valleylands;
    e) Significant wildlife habitat;
    f) Areas of Natural and Scientific Interest;
    g) Urban Natural Features;
    h) Natural Environment Areas;
    i) Natural linkage features and corridors;
    j) Groundwater features;
    k) Surface water features, including fish habitat;
    l) Landform features; and
    m) Natural features or natural areas having significant cultural, economic, or historical value to the Algonquin Anishinabe Host Nation.

- **Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment** (City of Ottawa, 2022b) - which identifies wooded areas within the urban boundary that are >0.8 ha and have been continuously forested for > 60 years as "Significant Woodland''.

- **OP Section 4.9.3** – which provides guidelines for development and site alteration near surface water features through the provision of minimum setbacks and directives to retain wetland areas and the requirement to complete headwater drainage feature assessments (HDFA) to provide management recommendations for headwater features. Section 4.9.3 states:

    1) The minimum setback from surface water features shall be the development limits as established by a Council-approved watershed, subwatershed or environmental management plan.
    2) Where a Council-approved watershed, subwatershed or environmental management plan does not exist, or provides incomplete recommendations, the minimum setback from surface water features shall be the greater of the following:
        a) Development limits as established by the conservation authority's hazard limit, which includes the regulatory flood line, geotechnical hazard limit and meander belt;
        b) Development limits as established by the geotechnical hazard limit in keeping with Council-approved Slope Stability Guidelines for Development Applications;
        c) 30 metres from the top of bank, or the maximum point to which water can rise within the channel before spilling across the adjacent land; and
        d) 15 metres from the existing stable top of slope, where there is a defined valley slope or ravine.
    3) Lands within the minimum setback shall remain in a naturally vegetated condition to protect the ecological function of surface water features from adjacent land-use impacts, subject to the exceptions in Policies 6) and 7). Any natural vegetation that is disturbed due to development or site alteration activities shall be restored and enhanced, to the greatest extent possible, with native species and shall avoid non-native invasive species. Burial or complete encasement of a surface water feature shall not be allowed.
    4) The setback provided for in Policies 1) and 2) shall be implemented through the Zoning-By-law, and any change in the setback shall require a Zoning By-law amendment or variance that conforms with the policies in this section of this Plan.

    This EIS therefore relies on the setbacks prescribed by the Greater Cardinal Creek Subwatershed Management Plan (City of Ottawa & AECOM, 2014; herein "GCCSMP"). The GCCSMP is detailed further in Section 2.9 below. KAL recognizes that the new OP (City of Ottawa, 2021) provides updated definitions for terms including top of bank, stable top of slope, and normal high water mark. However, as the GCCSMP predominates, the terminology in that document, as associated with the old OP will be applied in this EIS.

- **The Protocol for Wildlife Protection during Construction** (City of Ottawa, 2022a) – which identifies best management practices to be employed through construction to reduce the direct impacts of development on wildlife.

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, 1990a). The Act obliges 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. This project falls under the jurisdiction of the Rideau Valley Conservation Authority (RVCA).

Bill 23, which was passed on November 28th, 2022, and received Royal Assent the same day, introduced a series of legislative and proposed regulatory changes affecting conservation authorities. It is now in effect. Among the changes under Bill 23, the definition of "watercourse" was updated from an identifiable depression to a defined channel having a bed, and banks or sides.

2.4 Species at Risk Act, 2002

The federal Species at Risk Act (SARA; 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; Government of Canada, 1994) and listed as Endangered, Threatened, or Extirpated under Schedule 1 of SARA are protected wherever they occur in Canada, regardless of land ownership. SARA protections for other species do not normally extend to privately owned land. However, the Federal Minister of ECCC can and has imposed SARA protections on private projects where habitat is deemed "…*necessary for the survival or recovery of the species*…" in the area of concern.

2.5 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. 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.

2.6 Fisheries Act, 1985

The federal Fisheries Act (Government of Canada, 1985) is administered by Fisheries and Oceans Canada (DFO) and provides protections to fish, fish habitat, and fisheries. Specifically, the Fisheries Act in its current version provides protection for all fish and fish habitat, and prohibits the harmful alteration, disruption or destruction of fish habitat.

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).

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. It also provides general protections for many species otherwise covered under the MBCA, the ESA and/or SARA.

2.9 Greater Cardinal Creek Subwatershed Management Plan

The GCCSMP (City of Ottawa & AECOM, 2014) is a City of Ottawa document addressing land use planning and environmental issues within the subwatershed, with a specific focus on development pressures, water quality, and slope stability. The plan includes policies for protection and potential habitat restoration opportunities within the subwatershed. The plan was prepared in accordance with the City of Ottawa Official Plan Policy 2.43 – Watershed and Subwatershed Plans. The Plan specifically addresses Cardinal Creek Village (Section 2.6).

The GCCSMP provides for general management recommendations to for protection and improvement of Natural System Heritage Features (i.e. the Significant Woodland) where possible including:

- Preventing any further loss or intrusion into component features;
- Preventing any further fragmentation of linkages;
- Prevent, and/or minimize, road crossings through linkages, particularly where there are watercourses;
- Preserving smaller isolated woodlots where possible; and
- Where natural features abut rear yards, installing appropriate fencing to prevent incremental intrusion. Retaining mature trees or tree clusters.

The GCCSMP provides recommended minimum watercourse setbacks for Cardinal Creek (and its tributary which passes through the Site) as the greater of:

a) Regulatory flood line
b) Geotechnical limit of hazard lands
c) 30 m from normal high-water mark
d) 25 m from top of bank
e) Setback as determined through an Environmental Impact Statement
f) Setback as determined through a Drain Engineer's report.

Regulatory flood lines for this area are determined and set by the RVCA. Geotechnical limits of hazard will be determined through a geotechnical study of the site. The normal high-water mark is the mark made by the

action of water under natural conditions on the shore or bank of a watercourse or waterbody, the action having been so common or usual or so long continued that it has created a distinction in the general terrestrial vegetation, in changes in soil characteristics or by the edge of some embankment particularly scored by the action of water. It is a variable line in characteristic indicators and distinctiveness, and it is identified by the consideration of all visible evidence, not alone by one indicator, as located by an Ontario Land Surveyor.

The term top of bank can refer either to top of a channel bank as in the maximum point to which water can rise within the channel before spilling across the adjacent land, or it can refer to the top of slope of the associated valley, the point up the valley side where the pitch first levels out. This latter definition is (potentially) different again from the stable top of slope referred to in the current City OP. Appendix E of the GCCSMP specifically indicates that the above list of criteria were determined from HDFA setback guidelines including:

> *…the greater of 30 m from the centreline, 30 m from the normal high water mark, 25 m from the top of bank, or 15 m from the top of slope…*

As the identified list of criteria formally selected for inclusion in the GCCSMP is clearly identified as a subset of criteria prescribed to both "top of bank and, independently, to "top of slope", the term top of bank within the context of management plan must be interpreted as referring to top of the channel bank.

Setback requirements for headwater features that would be retained are the same. For smaller headwater channels providing indirect fish habitat, setback requirements from the top of the bank (or the centerline for the smallest headwater features) are reduced to 15 m where they are retained.

Importantly, the preceding applies solely and directly to watercourse features. The GCCSMP separately requires the protection of significant valleylands, even though it does not specifically identify the presence of this class of natural heritage feature on the site. While the GCCSMP does not directly provide a specific setback distance for the protection of valleys per se, it does refer to 15 m setbacks from top of slope per the HDFA guidelines.

3.0 PROPERTY IDENTIFICATION

The Site (Figure 1) currently includes two major parcels (1296 and 1400 Old Montreal Road; 45.499° N, 75.458°W), encompassing the northern portion of each property, from a tributary of Cardinal Creek (herein the "Cardinal Creek Tributary") northward, comprising 56.1 ha. The Site is predominantly agricultural, with scattered tree stands and a forested valley corridor along the tributary on the south edge of the Site. The majority of the Site is zoned Rural (RU), while a portion of the west side of the Site is zoned Rural Institutional (RI) and is currently under development. The lands associated with the Cardinal Creek Tributary are zoned Parks and Open Space (O1).

The Site is bordered by:

- Old Montreal Road, portions of the Cardinal Creek Village development, forested lands and the Ottawa River to the north;

- Agricultural lands, rural residential properties and Cardinal Creek to the west;
- Cox County Road, rural residential properties, and forested lands to the east; and
- Agricultural lands to the south.

4.0 METHODOLOGY

4.1 Desktop and Background Data Review

4.1.1 General Records Review

Background information was obtained from online databases and geographic information system mapping applications to review relevant information. Aerial imagery from Google Earth, the SNC Geoportal and the City's geoOttawa systems was used to identify existing features and confirm information found in the background review.

4.1.2 Species at Risk Screening

The review of existing information included a preliminary SAR screening for species listed under the federal SARA and provincial ESA having some record of occurrence within the broader vicinity of the Site. The screening was completed following the *Draft Client's Guide to Preliminary Screening for Species at Risk*. The results of the screening process informed the list of species that were considered in the assessment of the potential for development impact(s) to SAR or SAR habitat.

Where it is determined through the EIS process that there is an anticipated impact of the development on SAR, an Information Gathering Form (IGF) is typically submitted to MECP for further review. The IGF process, however, is not generally necessary where the SAR management process may be handled through a Notice of Activity process associated with the Ontario Conservation Fund under O.Reg. 829/21.

On-line databases queried for SAR, provincially rare species, and natural heritage features included the following:

- Species at Risk in Ontario (SARO; Ministry of Environment, Conservation, and Parks (MECP, 2024);
- Species at Risk Public Registry (Government of Canada, 2024);
- Natural Heritage Information Centre (NHIC; Ministry of Natural Resources, and Forestry (MNRF, 2024c);
- Land Information Ontario (MNRF, 2024b);
- Aquatic Species at Risk Map (DFO, 2023);
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019);

- Ontario Breeding Birds Atlas (Birds Canada et al., 2009);
- Ontario Butterfly Atlas (Toronto Entomologists' Association, 2024);
- eBird (The Cornell Lab of Ornithology, 2024);
- iNaturalist (California Academy of Sciences and National Geographic Society, 2024);
- Bumble Bee Watch (Wildlife Preservation Canada et al., 2024);
- Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Ontario (Humphrey & Fotherby, 2019);
- Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) in Ontario (Humphrey, 2017); and
- Fish ON-Line (MNRF, 2024a).

4.1.3 Site-Specific Background Data Review

In addition to the general background data outlined above, site-specific background data were obtained through previously prepared reports. The following reports were reviewed:

- Fluvial Geomorphological and Erosion Threshold Assessment, Tributary of Cardinal Creek: 1296 and 1400 Old Montreal Road (GEO Morphix Ltd., 2024);
- Environmental Impact Statement and Tree Conservation Report: Cardinal Creek Village South Portion (Muncaster Environmental Planning Inc., 2021);
- Cardinal Creek Village – South Side: Headwater Drainage Feature Assessment (Bowfin Environmental Consulting Inc., 2021);
- Geotechnical Investigation: Proposed Residential Development – Cardinal Creek Village South (Paterson Group, 2023a);
- Preliminary Geotechnical Review – Proposed SWMP (Paterson Group, 2023d);
- Geotechnical Response to City Comments (Paterson Group, 2023b);
- Site Specific Water Budget Report – Cardinal Creek Village Development (R1) (Palmer Environmental Consulting Group Inc., 2013);
- Cardinal Creek Montioring – Summary of Three Year Baseline Monitoring (J. F. Sabourin and Associates Inc. (JFSA), 2016);
- Slope Stability Assessment of Existing Slope Failure (Paterson Group, 2023e); and

- Geotechnical Response to Third-Party Landslide Risk Assessment Report Review Letter (Paterson Group, 2023c).

4.1.4 Agency Consultation and EIS Scoping

The Site is located within the jurisdictions of the City of Ottawa and RVCA.

City of Ottawa Environmental Planner Mark Elliott was consulted in 2024 to confirm the scope of the updated field program for the ECR.

4.2 Field Surveys

4.2.1 Site Work Summary

Ongoing ecological field reviews were undertaken in 2011, 2012, 2020, and 2021 by Muncaster Environmental Planning Inc., Bowfin Environmental Consulting Inc., and BCH Consulting Inc. (Muncaster Environmental Planning Inc., 2021).

KAL Biologists completed an extensive suite of field studies through the spring and summer of 2024. Table 1 provides a summary of all field visits. Specific details of each program are further described under each study type (e.g. breeding bird surveys) in the relevant sub-sections following through the remainder of Section 4.2. Specific survey stations are shown in Figure 2.

Table 1 Field Study Dates

Date	Purpose	Conditions	Personnel
March 28, 2024	• HDFA #1	• +8°C • Overcast • Wind 15 km/h SW	• Jenni Velichka • Kesia Miyashita
May 28, 2024	• HDFA #2 • Electrofishing	• 19°C • Partly cloudy • Wind 25 km/h W	• Jenni Velichka • Kurtis Westbury
June 14, 2024	• Breeding bird survey #1	• 17°C • Sunny • Wind 10 km/h NW	• Maren Nielsen
June 20, 2024	• Breeding bird survey #2 • Acoustic bat monitor deployment	• 28°C • Sunny • Wind 14 km/h W	• Maren Nielsen
July 4, 2024	• Breeding bird survey #3 • Acoustic bat monitor pickup • HDFA #3 • Ecological Land Classification • Black Ash Assessment	• 27°C • Sunny • Wind 10 km/h SW	• Robert Hallett • Nicholas Schulz

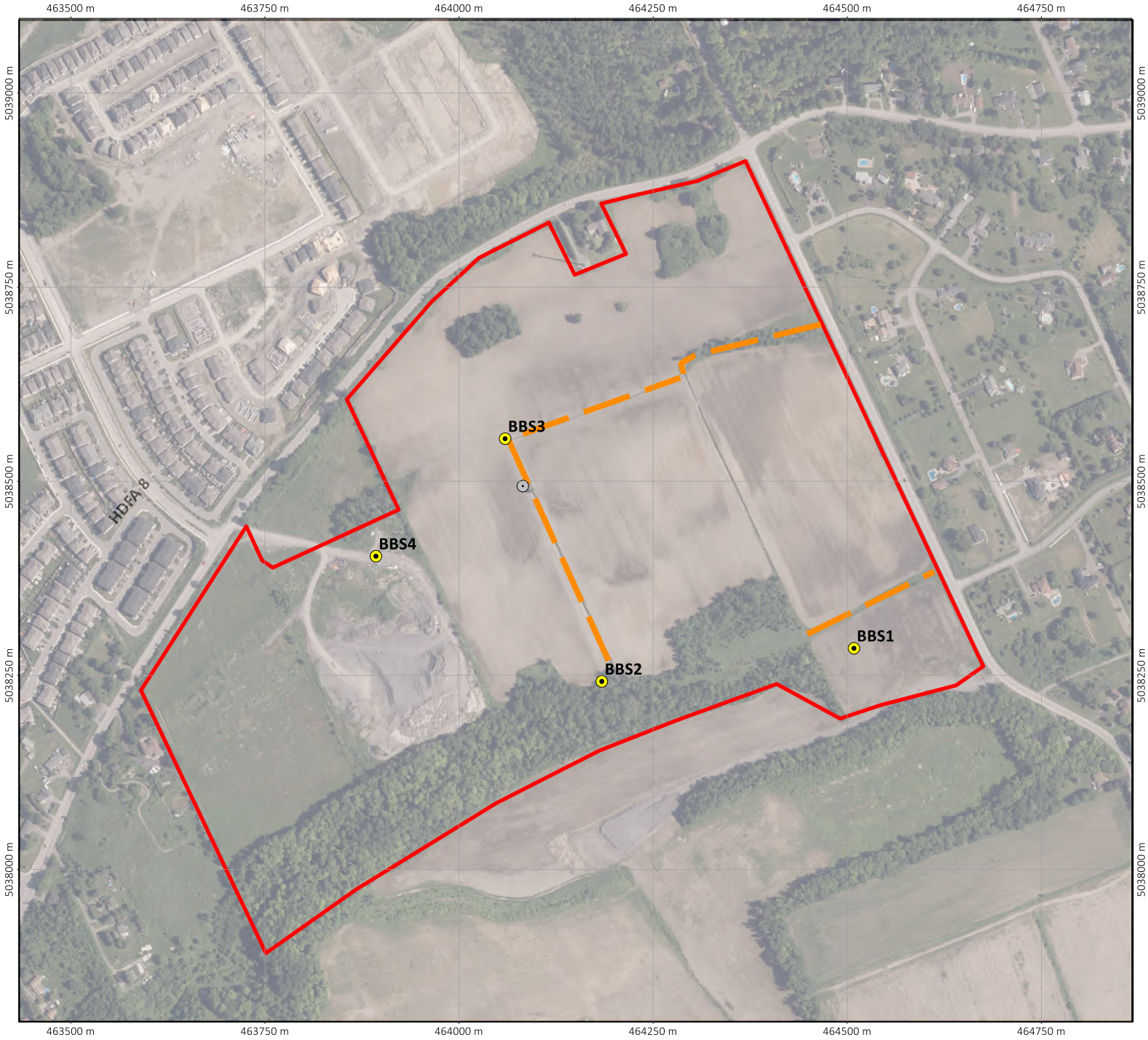

Figure 2 Field Study Locations

Legend

- Site Boundary
- Acoustic Bat Monitor
- Breeding Bird Survey Station
- HDFs Electrofished

N

0 200 m

Project: TAGG 1672.1
Map File: TAGG 1672 Map 2410B.map
Universal Transverse Mercator - Zone 18 (N)
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4.2.2 Surface Water Characterization

Aerial imagery and public databases were reviewed to determine wetland areas and watercourses (City of Ottawa, 2024; MNRF, 2024c; Rideau Valley Conservation Authority, 2023). Any wetlands on the Site were delineated and characterized in the field as part of the Ecological Land Classification (ELC) exercise (see Section 4.2.3 below). A Headwater Drainage Feature Assessment (HDFA) was conducted for the Site following the methods per the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (Toronto and Region Conservation Authority & Credit Valley Conservation, 2013).

The HDFA protocol requires up to three surveys of HDFs on a site. The first is conducted near the spring freshet to identify channel and wetted dimensions at peak water levels. Fish communities and habitats are assessed later in the spring for those HDFs hydrologically capable of supporting fish. Water levels of features not found to be dry during the second visit are checked once more in mid to late summer to assess their status as permanent watercourses. HDFA surveys were completed on March 28, May 28, and July 4, 2024.

The Standard level of assessment follows Ontario Stream Assessment Protocol (OSAP) methodologies for descriptions of flow conditions, riparian vegetation and site features that are important components of habitat (headwater sampling protocol OSAP S4.M10) and includes an electrofishing survey to describe fish and fish habitat (OSAP S4.M10). Additionally, the Ecological Land Classification for Southern Ontario (ELC) was applied to the Site (Lee et al., 1998), with specific focus on the riparian zone of each segment and determined habitat community types present on the Site.

4.2.3 Ecological Land Classification

Vegetation communities on the Site were identified and mapped in the field on July 4, 2024, 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. This method 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.

A desktop review of available aerial imagery and preliminary field visits informed how the Site generally divides into vegetation communities based on variation in land cover, topography, and vegetation structure. 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. Soil samples were taken using a 120 centimeter (cm) long soil auger to characterize community substrates. Representative photos of each ELC unit on the Site were taken and are included with the community descriptions in this report.

4.2.4 Tree Inventory, Butternut and Black Ash

A detailed tree survey was performed for the Site on July 4, 2024, following the City of Ottawa TCR guidelines. Forest groupings and notable trees to be retained on and adjacent to the Site were documented, characterized and mapped. Butternut (*Juglans cinerea*) and Black Ash (*Fraxinus nigra*) trees (both Endangered

under the ESA) were specifically searched for. Any individuals of those species encountered were fully characterized to meet provincial requirements, and formal Black Ash Assessments were undertaken for any Black Ash trees onsite.

4.2.5 Breeding Birds

Morning breeding bird surveys were performed using point counts following the Ontario Breeding Bird Atlas Guide for Participants (Ontario Breeding Bird Atlas, 2001). Breeding bird surveys are to be completed from survey stations that, combined, provide suitable viewing of all habitats on a site on calm weather days with light wind (less than 3 on the Beaufort Scale) and no precipitation. As per the Ontario Breeding Bird Atlas, three rounds of surveys must take place between sunrise and five hours after sunrise between May 24 and July 10. Surveys took place during the mornings of June 14, June 20, and July 4, 2024.

A total of four (4) breeding bird survey stations were established in representative habitats on the Site (Figure 2). All incidental observations were recorded while moving between survey points as well as during other visits to the Site. Birds were identified by song and/or direct visual observation.

Bird species were classed as regionally rare based on an analysis of data from the Atlas of Breeding Birds of Ontario (2009) based on Hill's Site Regions, now Ecoregions. The federal and provincial significance of bird species were classed based on species' listings under Schedule 1 of SARA and the ESA, and species tracked by NHIC (MNRF, 2023c; for non-SAR species considered provincially significant).

4.2.6 Bats and Other Mammals

Bat monitoring was completed following acoustic surveys under the MNRF's Survey Protocol for Species at Risk Bats within Treed Habitats (2017). This is currently the recommended protocol for confirming the presence/absence of Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-coloured Bat (*Perimyotis subflavus*), where it is determined that potentially suitable habitat for the establishment of maternity roosts is present. Wooded areas on the Site were deemed potentially suitable habitat for the establishment of maternity roosts during KAL's preliminary desktop review and initial field visits. Trees with characteristics suitable for bat roosting were observed in the area.

All species of bats in a given area are detectable under this protocol if ultrasonic acoustic monitors are used and the signal-to-noise ratio can be analyzed from sonogram displays to identify bat calls to species level. Under the protocol, acoustic monitors are to be installed for a minimum of 10 nights between June 1 and June 30, with recordings commencing after dusk and continuing for five hours. KAL installed one acoustic monitor on the Site (Figure 2). The acoustic monitor was placed in this location to capture the best potential bat habitat on the Site (potential roosting habitat in wooded areas and potential foraging habitat over adjacent open areas) and to increase the likelihood of detecting bats based on their echolocating behaviour. Bats use echolocation more frequently in cluttered environments (Falk et al., 2014), so installing monitors along the edges of wooded areas rather than in the middle of open foraging areas likely increases bat detectability. The monitor was installed on June 20, and removed on July 4, 2024 (14 nights of data collection).

Incidental observations of other mammals present in the Study Area were collected during all field visits. Mammal observations were limited to sightings of scat, tracks, and in some cases, direct observations.

5.0 RESULTS

Site existing conditions are mapped and shown in Figure 3.

5.1 General Natural Heritage Context

The nearest lands zoned EP-Environmental Protection surrounding the Site are approximately 750 m west of the west edge of the Site (the Cardinal Creek valley) and approximately 650 m north of the north edge of the Site (forest adjacent to Cardinal Creek Village Phase 7). The closest provincially significant wetland is the Petrie Island Wetland, located approximately 1.9 km to the northwest of the Site. The nearest Life Science Area of Natural and Scientific Interest (ANSI) is also associated with Petrie Island. An Earth Science Area of Natural and Scientific Interest is located along Cardinal Creek, comprising limestone karst formations conveying the creek flow underground for approximately 250 m. This feature is approximately 1.1 km south of the southwest corner of the Site.

Significant valleylands and significant woodlands are associated with the south tributary, along the south edge of the Site. Significant natural heritage features are discussed further in Section 5.7 below.

5.2 Landforms, Soils, and Geology

The Site topography is characterized as gently sloping from east to west. Soils were characterized as topsoil over stiff silty clay and glacial till. Areas of fill were documented on the north edge of the Site along Old Montreal Road. Relatively steep slopes occurred along the tributary to Cardinal Creek at the south edge of the Site; the slopes ranged from 3 to 15 m high and were generally 5H:1V, with localized sections of 1H:1V. The slopes comprised stiff, brown silty clay. Some toe erosion was observed along the valley wall adjacent to the tributary.

Regionally, soils in the vicinity of the Site are characterized as a mosaic comprising the Rideau, Grenville and Farmington soil associations. Soils were characterized as gently sloping to nearly level with good to imperfect drainage. Portions of Cardinal Creek and the south tributary on site were characterized as Eroded Channels, with narrow creek beds and steep valley walls with slopes greater than 15%.

5.3 Surface Water, Groundwater and Fish Habitat

5.3.1 General Context

The Site is located within the Cardinal Creek subwatershed (City of Ottawa & AECOM, 2014). Cardinal Creek is located approximately 600 m from the west of the Site; a tributary to Cardinal Creek is located along the south edge of the Site. The tributary traverses the Site from east to west.

Farm ditches (Reaches 1-4 and 6-7) function within an agricultural context that would change substantially with urban development. These features were not noted within the GCCSMP and would be either removed

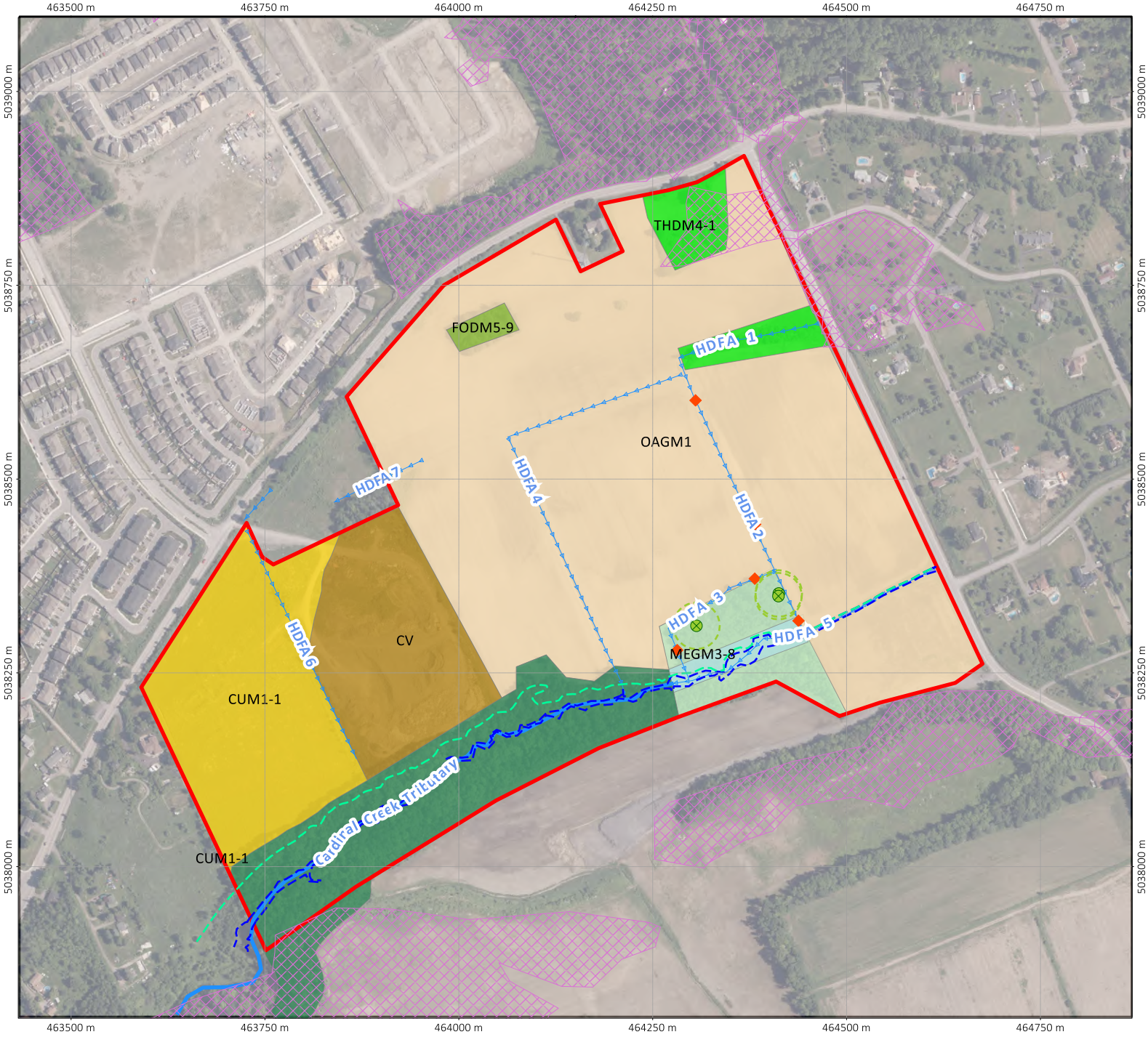

Figure 3 Existing Conditions

Legend

ELC Ecosites

- CUM1-1
- CV
- FODM5-9
- FODM6-5
- MEGM3-8
- OAGM1
- THDM4-1
- WODM4

- Black Ash
- Protected Habitat (30 m buffer)

Surface Water Features

- Cardinal Creek Tributary
- HDFA
- Fish Barrier

Setback Considerations

- TOB/NHWM
- TOS

- Important Recharge Areas

N

0 200 m

Project: TAGG 1672.1
Map File: TAGG 1672 Map 2412b.map
Universal Transverse Mercator - Zone 18 (N)
Printed on: 2024-12-19

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or subject to significant alteration/realignment as part of community design. Setback requirements are thus not identified in this EIS for small farm ditches.

For Reach 5 (identified for "Protection" per the GCCSWS) and its downstream continuation as the Cardinal Creek Tributary, setback considerations as indicated in the GCCSWS (per Section 2.9 above) are the same and consider both the normal high water mark and top of bank. For these reaches, however, the normal high water mark and top of bank (i.e. of the channel) are effectively equivalent. The setback to the Reach 5 watercourse is thus the greater of the geotechnical limit of hazard lands or 30 m from the normal high water mark. The geotechnical limit of hazard lands was determined through appropriate geotechnical studies (Paterson Group, 2023a). Setbacks from the Cardinal Creek tributary valley are discussed separately below (Section 5.7.2).

Per the GCCSMP, no sensitive groundwater recharge areas extend onto the Site. "Watercourse 76" as indicated in Figure 2.3 of the GCCSMP was not observed to exist as a permanent watercourse crossing the entire central portion of the Site from east to west. While parts of Reaches 1, 4 and 7 align disjointedly with portions of Watercourse 76 as mapped, the mapping of Watercourse 76 as a contiguous permanent stream in the GCCSMP must be considered outdated and no longer relevant to future Site development.

5.3.2 Groundwater, Springs and Seeps

The Cardinal Creek Tributary baseflow was determined to be primarily derived from groundwater discharge from karst springs, which are fed by the exposed Bobcaygeon Formation bedrock located south of the Site, along with rapid rainfall infiltration and discrete springs in the middle reaches of the tributary (Palmer Environmental Consulting Group Inc., 2013). Local seepage from the upper weathered overburden contributes to stream flow after precipitation events and during wet seasons, however the recharge area that supports the springs on the Site are located outside of the Site boundary and will this not be affected by the proposed development (Palmer Environmental Consulting Group Inc., 2013). According to Palmer (2013), most infiltration through the fractured Bobcaygeon Formation bedrock becomes deep groundwater recharge, discharging into the lower reaches of Cardinal Creek and the Ottawa River. Based on the Site Specific Water Budget Model results (Palmer Environmental Consulting Group Inc., 2013), areas within the Site where infiltration was 129 mm or greater were identified as Important Recharge Areas (IRA's). One IRA was identified on the Site, in the northeast corner, south of Old Montreal Road (Figure 3). This is a small area of shallow Bobcaygeon Formation bedrock identified through test pit data, where infiltration from this bedrock feature was interpreted to contribute only to flow into the lower reaches of Cardinal Creek and the Ottawa River, and not contribute to stream flow in the tributaries on the Site (Palmer Environmental Consulting Group Inc., 2013).

Three years of surface water monitoring was recommended and stipulated by the documents listed in the Cardinal Creek Montioring – Summary of Three Year Baseline Monitoring (J. F. Sabourin and Associates Inc. (JFSA), 2016). Monitoring was completed in 2012, 2013, and 2014 and identified groundwater/surface water interactions on the Site, identifications of flow sources, groundwater recharge areas, streamflow/baseflow measurements, shallow groundwater studies, rainfall measurements, air temperature data, stream temperature, and surface water quality. The conclusions of the JFSA (2016) surface water monitoring program reiterated the need for standard mitigation measures related to development associated with Cardinal Creek tributaries including:

1. *The Contractor shall not discharge turbid water to any watercourse. Turbid water shall be defined as any discharge water from the excavation or diverted water with a maximum increase of 5 NTUs above the receiving stream's background levels*

2. *SWM Pond monitoring as required for commissioning*

3. *Construction and lifecycle monitoring - Monitoring of the natural thermal regime in the South Tributary, to inform detailed design of stormwater facilities*

It did not otherwise amend the assessment that the IRA on site did not support baseflows in either upper Cardinal Creek or its tributaries.

5.3.3 Headwater Drainage Features

A Headwater Drainage Feature Assessment (HDFA) was completed in 2021 (Bowfin Environmental Consulting Inc., 2021). KAL completed a field review and update in spring and summer of 2024. The HDFA identified eight (8) HDFs located on the Site, the majority of which were characterized as farm drains (Figure 3). The results of the HDFA are described below.

5.3.3.1 General Reach Descriptions

Reach 1

Reach 1 is a channelized/constrained swale feature located in the eastern portion of the Site, flowing from east to west originating at Cox Country Road. Reach 1 was observed to have minimal flow during the spring freshet, with narrow-leaved emergent and shrub in-stream vegetation and a silty organic substrate.

Reach 2

Reach 2 is a channelized/constrained feature and farm drain flowing southward from Reach 1. This reach was observed to have minimal flow during spring freshet, and contain shrub and narrow-leaved emergent in-stream vegetation, with a silty clay substrate.

Reach 3

Reach 3 is a channelized/constrained feature that flows westward from Reach 2, following the boundary of the WODM4 vegetation community, and turning southward flowing into the Cardinal Creek Tributary (Reach 5). Reach 3 had minimal flow during spring freshet, contained shrub and narrow-leaved emergent in-stream vegetation, and has a clay organic substrate.

Reach 4

Reach 4 originates from the upper portion of Reach 2, and traverses westward, turning southward and flowing into the Cardinal Creek Tributary (Reach 5). Reach 4 was observed to have minimal flow during spring freshet, with predominantly narrow-leaved emergent in-stream vegetation, with some shrubs present. Reach 4 has a silty clay substrate.

Reach 5

Reach 5 constitutes the upper reach of the tributary to Cardinal Creek. Combined, they traverse the Site from east to west, originating near Cox Country Road and Jonquille Way. As the watercourse descends into the valley, it is considered a permanent stream per the GCCSWS. Reach 5 is a defined natural channel with substantial baseflow observed. Robust emergent, shrub, narrow and broad-leaved emergent, trees, and herbaceous in-stream vegetation were observed throughout the reach. Clay, silt, and cobble substrates were observed.

Reach 6

Reach 6 is a swale feature that flows southward, that was found to be dry during spring freshet. Tree and shrub vegetation were observed within this reach. A few isolated wetland pockets of standing water were observed, with silty organic substrate.

Reach 7

Reach 7 is a swale feature that flows east to west originating in the open agricultural area (OAGM1) in the northern portion of the Site, outletting to the meadow in the northwest site corner. Reach 7 was observed to have standing water during spring freshet, and have robust and narrow-leaved emergent vegetation, shrubs, and trees in-stream. Organic clay substrates are present within this reach.

Reach 8

Reach 8 is a roadside ditch feature along Old Montreal Road in the northwestern site corner, east of the construction access gate. It was observed to have standing water during the spring freshet, with silty organic substrate and broad-leaved emergent, robust emergent, narrow-leaved emergent, shrub and tree in-stream vegetation.

5.3.3.2 Component Classifications

Tables 2-5 below summarize the functions provided by the eight (8) drainage features.

Table 2 Hydrology Classifications for HDFs

Drainage Feature	Hydrology Classification					
	Assessment Period	Flow Conditions		Flow Classification	Modifiers	Hydrological Function
		Description	(OSAP Code)			
1	March 28, 2024 May 28, 2024	Minimal Surface flow Minimal Surface flow	4 4	Ephemeral	No source other than spring run-off and after heavy rain	**Contributing Functions**
2	March 28, 2024 May 28, 2024	Minimal Surface flow Minimal Surface flow	4 4	Ephemeral/Intermittent	No source other than spring run-off and after heavy rain	**Contributing Functions**
3	March 28, 2024 May 28, 2024	Minimal Surface Flow Minimal Surface flow	4 4	Ephemeral	No source other than spring run-off and after heavy rain	**Contributing Functions**
4	March 28, 2024 May 28, 2024	Minimal Surface flow Minimal Surface flow	4 4	Intermittent	No source other than spring run-off and after heavy rain	**Valued Functions**
5	March 28, 2024 May 28, 2024	Substantial Flow Substantial Flow	5 5	Perennial	Water is present throughout the year. Upstream minimal flow significant flow downstream in valley	**Important Functions**
6	March 28, 2024 May 28, 2024	Minimal Surface flow Dry	4 1	Ephemeral	No source other than spring run-off and after heavy rain	**Contributing Functions**
7	March 28, 2024 May 28, 2024	Dry Dry	1 1	Dry or Standing Water	No source other than spring run-off and after heavy rain	**Limited Functions**
8	March 28, 2024 May 28, 2024	Standing Water Dry	2 1	Ephemeral	No source other than spring run-off and after heavy rain	**Contributing Functions**

Table 3 Riparian Classifications

Drainage Feature	Riparian Classification			
	OSAP Descriptions	OSAP Riparian Codes	ELC Codes	Riparian Conditions
1	RUB - Scrubland	RUB - 5	THDM4-1, OAGM1	**Important/Valued Functions**
	LUB - Meadow	LUB - 4		
2	RUB - Cropped	RUB - 3	OAGM1	**Limited Functions**
	LUB - Cropped	LUB - 3		
3	RUB - Forest	RUB - 7	WODM4, OAGM1	**Important Functions**
	LUB - Cropped	LUB - 3		
4	RUB - Cropped	RUB - 3	OAGM1	**Limited Functions**
	LUB - Cropped	LUB - 3		
5	RUB - Forest	RUB - 7	FODM6-5	**Important Functions**
	LUB - Forest	LUB - 7		
6	RUB - None	RUB - 1	CV	**Limited Functions**
	LUB - Meadow	LUB - 4		
7	RUB - Cropped	RUB - 3	OAGM1, CUT1-1	**Limited Functions**
	LUB - Cropped	LUB - 3		
8	RUB - Meadow	RUB - 4	CUT1-1	**Valued Functions**
	LUB - Meadow	LUB - 4		

Table 4 Fish and Fish Habitat Classification

Drainage Feature	Fish Habitat Classification		
	Fish Observation	Fish & Fish Habitat Designation*	Modifiers/Notes
	Fishing effort		
1	No fish present; 195 S	Contributing Functions	
2	Dry	Contributing Functions	
3	Dry	Contributing Functions	
4	No fish present; 710.8 S	Contributing Functions	
5	No fish present (upper reach); 526.6 S	Valued Functions	Upper reach electrofished; no fish present. Lower reach in the valley was not electrofished as fish habitat is assumed present
6	Dry	Contributing Functions	
7	Dry	Contributing Functions	
8	Dry	Contributing Functions	

Table 5 Terrestrial Classifications

Drainage Feature	Terrestrial Classification		
	Description	Amphibians	Terrestrial Classification
1	This reach is a swale that is heavily vegetated and holds water for much of the summer. There is no wetland habitat present.	No frogs were observed within the vicinity of this feature	Limited Functions
2	This reach is a channelized feature that conveys flow into Reach 5. There is no wetland habitat present.	No frogs were observed within the vicinity of this feature	Limited Functions
3	This reach is a channelized feature that conveys flow into Reach 5. There is no wetland habitat present.	No frogs were observed within the vicinity of this feature	Limited Functions
4	This reach is a channelized farm drain holds water for much of the summer and conveys flow to Reach 5.	No frogs were observed within the vicinity of this feature	Limited Functions
5	This is a permanent stream feature and tributary to Cardinal Creek. Forest provides important riparian habitat connecting the Site with downstream features. No wetland habitat is present.	No frogs were observed within the vicinity of this feature	Contributing Functions
6	This reach is a swale that is dry for most of the year. There is no wetland habitat present.	No frogs were observed within the vicinity of this feature	Limited Functions
7	This reach is a swale that is dry for most of the year. There is no wetland habitat present.	No frogs were observed within the vicinity of this feature	Limited Functions
8	This reach is a roadside ditch that is dry for most of the year. There is no wetland habitat present.	No frogs were observed within the vicinity of this feature	Limited Functions

5.3.4 Reptile and Amphibian Habitat

The Site lacks suitable wetland habitat, and there is minimal flow present in the channels and low flow in the Cardinal Creek Tributary. No suitable turtle habitat is considered to be present on or directly adjacent to any portion of the Site that would be subject to development. While targeted anuran (frog and toad) surveys were not completed as part of the 2024 field program, no frogs were observed or noted incidentally on the Site during any other field studies, including studies directly within the site HDFs. Any potential (limited) anuran presence would be restricted directly to the Cardinal Creek Tributary and associated riparian areas, which could support limited woodland amphibian breeding opportunity (FODM6-5, WODM4, MEGM3-8).

5.4 Ecological Land Classification

A total of eight (8) distinct landcovers or ELC units were delineated on the Site (Figure 3). The majority of the Site is dominated by an Open Agriculture – Annual Row Crops (OAG) ecosite. The valleylands associated with the Cardinal Creek Tributary are characterized by a Fresh – Moist Sugar Maple – Hardwood Deciduous Forest Type (FODM6-5), a Dry - Fresh Deciduous Woodland Ecosite (WODM4), and a Reed Canary Grass Graminoid Meadow Type (MEGM3-8). Three isolated vegetated areas within the OAG ecosite are characterized by a Native Deciduous Regeneration Thicket Type (THDM4-1) adjacent to the eastern Site boundary and within the northeastern corner adjacent to Old Montreal Road and Cox Country Road, and a Dry – Fresh Sugar Maple – Hardwood Deciduous Forest Type (FODM5-9) ecosite in an isolated forest stand in the northern portion of the Site. The western portion of the Site is characterized by a Cultural Thicket (CUT1-1) ecosite and a large area of fill piles and construction material (Constructed - CV).

5.4.1 Open Agriculture – Annual Row Crops (OAGM1)

The Open Agriculture – Annual Row Crops is planted with corn crops. Based on a review of historic aerial imagery, this area has been actively farmed since at least 1976 (City of Ottawa, 2024).

5.4.2 Fresh – Moist Sugar Maple – Hardwood Deciduous Forest Type (FODM6-5)

The valleylands, riparian area, and upland areas associated with the Cardinal Creek Tributary is dominated by a Fresh – Moist Sugar Maple – Hardwood Deciduous Forest Type (FODM6-5). The tree canopy is dominated by Sugar Maple (*Acer saccharum*), with American Beech (*Fagus grandifolia*), Trembling Aspen (*Populus tremuloides*), White Birch (*Betula papyrifera*) and Eastern Hemlock (*Tsuga canadensis*) within the shady valley bottom adjacent to the tributary. No Black Ash (*Fraxinus nigra*) or Butternut (*Juglans cinerea*) trees were observed within this ecosite (Figure 3). Little to no understory and groundcover vegetation is present within this ecosite. The dominant tree species size ranged from 30-40 DBH, and 11-20 m in height, on average.

Soils within the FODM6-5 community were found to be mineral material, with a loamy A horizon extending from 0-20 cm in depth, with a sandy loam B horizon extending to a depth of 75 cm, and clay soils with a blocky structure within the C horizon (75+ cm). The exposed soil profile is shown in Figure 5 below.

Figure 4 Fresh – Moist Sugar Maple – Hardwood Deciduous Forest Type (FODM6-5)

Figure 5 FODM6-5 Soil Core

5.4.3 Dry – Fresh Deciduous Woodland Ecosite (WODM4)

East of the tributary valleylands, adjacent to the tributary and MEGM3-8 community (described below), transitioning to the OAGM1 area is characterized by a Dry – Fresh Woodland Ecosite (WODM4) vegetation community. The upper canopy of the woodland is dominated by Bur Oak (*Quercus macrocarpa*) and Red Maple (*Acer rubrum*). The subcanopy is dominated by Green Ash (*Fraxinus pennsylvanica*), Eastern Black Walnut (*Juglans nigra*), Basswood (*Tilia americana*), and Hawthorn (*Crataegus spp.*). Groundcover species include Red Raspberry (*Rubus idaeus*), Jewelweed (*Impatiens capensis*), and Poison Ivy (*Rhus radicans*). Many dead fallen trees and open groundcover (bare soil) was observed within this community. Dominant tree species ranged from 35-50 DBH in size, and 11-20 m in height, on average. Subdominant tree species ranged from <10-15 DBH on average. Three Black Ash trees were observed within this community, and are addressed further is Section 5.6.2 of this EIS.

Soils within this community were found to be moist mineral clay loam soils. Undecomposed organic material was present within the A horizon (0-5 cm), and light mottling was encountered around a depth of 30 cm within the B horizon (5 – 60 cm). A heavy clay layer was encountered around a depth of 80 cm within the C horizon (60+ cm). Soil core within the WODM4 in Figure 7.

Figure 6 Dry – Fresh Woodland Ecosite (WODM4)

Figure 7 Soil Core in WODM4

5.4.4 Reed Canary Grass Graminoid Meadow Type (MEGM3-8)

A Reed Canary Grass Graminoid Meadow Type (MEGM3-8) is associated with the upper reach of the tributary to Cardinal Creek. It is bordered by the WODM4 vegetation community to the north and south. The MEGM3-8 community is dominated entirely by Reed Canary Grass (*Phalaris arundinacea*). No trees, shrubs, or other groundcover vegetation species are present within the community.

Soils within this community were found to be mineral material, with a clay loam texture throughout all exposed horizons. Light mottling and gleying was encountered around a depth of 40 cm (Figure 9).

Figure 8 Reed Canary Grass Graminoid Meadow Type (MEGM3-8)

Figure 9 MEGM3-8 Soil Core

5.4.5 Native Deciduous Regeneration Thicket Type (THDM4-1)

A Native Deciduous Regeneration Thicket Type (THDM4-1) community is located within the eastern and northeastern portions of the Site, associated with HDF 1 (Figure 3), and at the corner of Old Montreal Road and Cox Country Road. This community is dominated by Manitoba Maple with Trembling Aspen (*Populus tremuloides*), Staghorn Sumac (*Rhus typhina*), Glossy Buckthorn (*Rhamnus frangula*), and American Plum (*Prunus spp.*). Large dead Ash trees were observed.

Figure 10 Native Deciduous Regeneration Thicket Type (THDM4-1)

5.4.6 Dry – Fresh Sugar Maple – Hardwood Deciduous Forest Type (FODM5-9)

A Dry – Fresh Sugar Maple – Hardwood Deciduous Forest Type (FODM5-9) characterizes an isolated forest stand within the northern portion of the Site, southwest of the existing home along Old Montreal Road. The upper canopy is dominated by American Elm (), Sugar Maple, Green Ash, and Basswood trees. Canopy trees ranged from 30-40 DBH on average and 11-20 m in height. The subcanopy of the FODM5-9 community was composed primarily of saplings of the same canopy species.

Soils within this community were composed mineral material, with loamy A horizon extending from 0 cm tp a depth of 15 cm, and a clay loam B horizon from 15-40 cm, and a heavy silty clay C horizon (40+ cm). The exposed soil profile is shown in Figure 12.

Figure 11 Dry – Fresh Sugar Maple – Hardwood Deciduous Forest Type (FODM5-9)

Figure 12 FODM5-9 Soil Core

5.4.7 Cultural Meadow Ecosite (CUM1-1)

A Cultural Meadow Ecosite (CUM1-1) is located on the western side of the Site, south of Old Montreal Road. This area consisted of active agricultural fields until 2017. Beginning in 2018, most of the ecosite was subject to various ground works with fill piles moved around the area. The ecosite is currently dominated by Kentucky Bluegrass (*Poa pratensis*) with Canada Goldenrod (*Solidago canadensis*), Common Dandelion (*Taraxacum officinale*), and Virginia Creeper (*Parthenocissus quinquefolia*). Scattered young Manitoba Maple and Staghorn Sumac saplings have begun sprouting randomly across the area.

Figure 13 Cultural Meadow (CUM1-1) adjacent to Open Agriculture (OAGM1-1)

5.4.8 Constructed (CV)

A large area of gravel fill, construction materials and fill piles is located in the western portion of the Site (Figure 14).

Figure 14 Constructed (CV)

5.5 Wildlife Surveys

5.5.1 Breeding Birds

Breeding bird surveys were completed via three rounds of surveys on June 14, June 20, and July 4, 2024. Species observed, the station observed, and breeding evidence is shown in Table 2 below. 27 bird species were observed, belonging to common, widespread species. One at-risk bird was observed, the Eastern Wood-Pewee (Special Concern).

Table 6 Breeding Bird Survey Data

Species Observed	Station	Highest Breeding Evidence	Species Observed	Station	Highest Breeding Evidence
American Crow (*Corvus brachyrhynchos*)	BBS1, BBS 2, BBS3	Possible	Indigo Bunting (*Passerina cyanea*)	BBS1	Probable
American Goldfinch (*Spinus tristis*)	BBS1, BBS 2, BBS3	Observed	Killdeer (*Charadrius vociferus*)	BBS1	Possible
American Redstart (*Setophaga ruticilla*)	BBS3	Possible	Mallard (*Anas platyrhynchos*)	BBS2	Transient
American Robin (*Turdus migratorius*)	BBS1, BBS 2, BBS3	Probable	Northern Cardinal (*Cardinalis cardinalis*)	BBS2	Possible
Black-and-white Warbler (*Mniotilta varia*)	BBS1	Possible	Northern Flicker (*Colaptes auratus*)	BBS2, BBS3	Probable
Black-capped Chickadee (*Poecile atricapillus*)	BBS1, BBS2	Probable	Red-eyed Vireo (*Vireo olivaceus*)	BBS1, BBS3	Possible
Blue Jay (*Cyanocitta cristata*)	BBS1	Probable	Red-tailed Hawk (*Buteo jamaicensis*)	BBS2	Possible
Cedar Waxwing (*Bombycilla cedrorum*)	BBS1, BBS2	Possible	Red-winged Blackbird (*Agelaius phoeniceus*)	BBS1, BBS2, BBS3, BBS4	Observed
Chestnut-sided Warbler (*Setophaga pensylvanica*)	BBS2	Possible	Song Sparrow (*Melospiza melodia*)	BBS1, BBS2, BBS3, BBS5	Probable
Chipping Sparrow (*Spizella passerina*)	BBS4	Possible	Swamp Sparrow (*Melospiza georgiana*)	BBS4	Probable
Common Grackle (*Quiscalus quiscula*)	BBS1, BBS4	Observed	Turkey Vulture (*Cathartes aura*)	BBS1, BBS3	Transient
Common Yellowthroat (*Geothlypis trichas*)	BBS1	Probable	Wild Turkey (*Meleagris gallopavo*)	BBS2, BBS3	Probable
Eastern Wood-Pewee (*Contopus virens*)*	BBS2	Probable	Yellow Warbler (*Setophaga petechia*)	BBS2, BBS3	Probable
Great Crested Flycatcher (*Myiarchus crinitus*)	BBS1, BBS2	Probable			

* Species listed as-risk in Ontario

5.5.2 Bats

One acoustic bat monitor was installed for 14 nights and placed facing an open agricultural community (OAGM1), just north of the FODM6-5 community, where the greatest likelihood for bat activity would occur on the Site. Conditions were ideal with mainly clear or cloudy nights and warm temperatures (≥15°C). Bat species identified within the Site include Big Brown Bat (*Eptesicus fuscus*), Hoary bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), Tri-colored Bat (*Perimyotis subflavus*), Eastern Red Bat (*Lasiurus borealis*), and Little Brown Bat (*Myotis lucifugus*). Bat monitor location is shown in Figure 2.

Table 7 Acoustic Bat Survey Data

Survey Station	Survey Dates	Habitat Description	Big Brown Bat	Eastern Red Bat	Hoary Bat	Eastern Small-footed Bat	Little Brown Bat	Silver-haired Bat	Tri-Colored Bat	Northern Long-eared Bat	Mean Number of Calls per Night
AM-1	2023-06-20 to 2023-07-04	Open agricultural field adjacent to FODM6-5 ecosite	57	2	288	0	1	362	7	0	9

5.6 Species at Risk

An assessment of species listed under SARA and ESA was completed to identify species having some potential to occur on or near the Site, including Extirpated, Endangered, Threatened, and Special Concern species. Species listed as Extirpated, Endangered, and Threatened are afforded species and habitat protection under the ESA. Federal protections under SARA are always in force for listed species of fish and migratory birds. For species of other groups, SARA normally only applies on federal lands or on projects having some level of participation with or oversight by the federal government. However, SARA-based protections can be imposed by ministerial order on a case-by-case basis in situations where provincial-level protections are deemed inadequate to otherwise protect a species. Such protections are not expected to apply to the Site.

The SAR assessment evaluated whether the Site may provide suitable habitat for SAR (i.e. considering species known to occur in the Ottawa area; Appendix B) and whether they have potential to interact with future development of the Site. An assessment of the potential for SAR and their potential habitat was completed based on the results of the field surveys, ELC (i.e., habitat availability), and a desktop review that considered known species ranges, historic observation records, and preferred habitat requirements of these species (Appendix B). A total of 16 species subject to protections as SAR under the ESA and/or SARA were initially considered to have a moderate to high potential to occur on the Site and/or interact with the project (Table 8). Of those 16 species, three were observed to occur on the Site. Those species are discussed below.

Table 8 Species at risk with moderate or high potential to interact with the project

Species Name (*Taxonomic name)*	Status under Endangered Species Act	Status under Species at Risk Act (Schedule 1)	Potential to Interact with Development of the Site
Birds			
Bank Swallow (*Riparia riparia*)	Threatened	Threatened	Not detected on the Site
Bobolink (*Dolichonyx oryzivorus*)	Threatened	Threatened	Not detected on the Site
Canada Warbler (*Cardellina canadensis*)	Special Concern	Threatened	Not detected on the Site
Eastern Meadowlark (*Sturnella magna*)	Threatened	Threatened	Not detected on the Site
Eastern Wood-Pewee (*Contopus virens*)	Special Concern	Special Concern	High – detected onsite
Olive-sided Flycatcher (*Contopus cooperi*)	Special Concern	Threatened	Not detected on the Site
Wood Thrush (*Hylocichla mustelina*)	Special Concern	Threatened	Not detected on the Site
Mammals			
Eastern Red Bat (*Lariurus borealis*)	Endangered (January 2025)	No Status	Limited/transient presence only – low probability of negative interactions if tree clearing occurs outside of the active season
Eastern Small-footed Myotis (*Myotis leibii*)	Endangered	No Status	Not detected on the Site
Hoary Bat (*Lasiurus cinereus*)	Endangered (January 2025)	No Status	Detected on the Site – migratory species, low probability of negative interactions if tree clearing occurs outside of the active season
Little Brown Myotis (*Myotis lucifugus*)	Endangered	Endangered	Limited/transient presence only – low probability of negative interactions if tree clearing occurs outside of the active season
Northern Myotis / Northern Long-eared Bat (*Myotis septentrionalis*)	Endangered	Endangered	Not detected on the Site
Silver-haired Bat (*Lasionycteris noctivagans*)	Endangered (January 2025)	No Status	Detected on the Site – migratory species, low probability of negative interactions if tree clearing occurs outside of the active season
Tri-colored Bat / Eastern Pipistrelle (*Perimyotis subflavus*)	Endangered	Endangered	Limited/transient presence only – low probability of negative interactions if tree clearing occurs outside of the active season
Vascular Plants			
Black Ash (*Fraxinus nigra*)	Endangered	No Status	High – present on the Site
Butternut (*Juglans cinerea*)	Endangered	Endangered	Low - Not observed on the Site

SAR presented in Table 8 do not include listed species that are not directly protected as SAR under the ESA or SARA (e.g. listed only as Special Concern, or are protected only federally and are not birds or fish). However, individuals of these species are protected under other regulations addressing wildlife conservation generally, such as the FWCA, the MBCA, and the PPS. In addition, species listed as Special Concern under the ESA may receive habitat protection if they are observed in habitats that meet the criteria for designation as SWH for Special Concern Species (MNRF, 2015). Species of Species Concern will be discussed with SWH in Section 5.8.

5.6.1 SAR Bats

The Committee on the Status of Species at Risk in Ontario (COSSARO) has updated the provincial status for the Hoary Bat, Silver-haired Bat, and Eastern Red Bat to Endangered. These species will receive general habitat protection on or prior to January 31, 2025. Although these species are not officially listed at the time of this EIS, it is anticipated that protections will apply throughout the development application timeline, and during future community build-out. As such, these species are considered and assessed as Endangered species in this EIS.

The Hoary Bat and Silver-haired Bat were detected in high numbers at the monitoring stations on the Site, indicating potential roosting habitat. The Eastern Red Bat, Little Brown Myotis, and Tri-colored Bat were detected at the monitoring stations on the Site and therefore likely forage and/or roost in proximity to the Site. The numbers of detections, however, were very low, suggesting only a limited transient presence over most of the Site, with little evidence of maternal roosting activity or habitat. As Endangered species, Hoary Bat, Silver-haired Bat, Eastern Red Bat, Little Brown Myotis and Tri-colored Bat receive "general habitat protection" under the ESA. However, vegetation removal on the Site would not result in a loss of maternal roosting habitat for the Hoary Bat, Little Brown Myotis and Tri-colored Bat given the protection of the Cardinal Creek Tributary lands.

Regardless, individuals of listed bat species may periodically roost diurnally in trees on the site during the active season (April 1 to September 30 inclusive; MNRF, 2017), i.e., bats could briefly use any site tree or structure as a rest stop, but only opportunistically (not as a required habitat element). Potential impacts to individual at-risk bats directly would be mitigated by clearing trees, removing structures (or commencing construction works on them) outside of the roosting season. Following this tree-clearing window would also avoid potential interactions with birds and bird nests protected under the Migratory Birds Convention Act (MBCA; Government of Canada, 1994). As such, the Hoary Bat, Silver-haired Bat, Eastern Red Bat, Little Brown Myotis and Tri-colored Bat are generally considered unlikely to be impacted by future site development.

5.6.2 Black Ash

Black Ash (*Fraxinus nigra*), endangered under the ESA and with no status under the SARA, are a medium sized shade-intolerant hardwood tree primarily found in wetland environments like swamps, floodplains and fens. Black Ash can also occur in moist upland forests (COSEWIC, 2018). Black Ash received protection under the ESA on January 24, 2024. O.Reg 6/24 and O.Reg 7/24 set out individual and habitat protection. Black Ash habitat is defined as a radial distance of 30 m from the stem of every Black Ash that are over 8 cm at 1.37 m.

A total of three Black Ash >8 DBH were observed on the Site (Figure 3). Black Ash were located predominantly east of the tributary valleylands, within a Dry – Fresh Woodland Ecosite (WODM4) vegetation community. All three trees were determined to be healthy (Appendix C). Healthy trees have a canopy condition rating of 1, 2 or 3, and mortality is unlikely within five years based on severity of stressors. Unhealthy trees have a canopy condition rating on 3, 4 or 5, and mortality is expected within five years based on the severity of stressors. No Black Ash saplings were observed on the Site.

Development within any portion of this ecosite would lead to the impact or removal of healthy Black Ash protected under the ESA. Future site development that impacts healthy Black Ash will require the submission

of a *Black Ash Assessment Report* to the MECP and an *Information Gathering Form* (IGF) to support a Net Benefit Permit under the ESA.

5.7 Significant Natural Heritage Features

5.7.1 Significant Woodlands and Canopy Cover

The City of Ottawa's (2022b) Significant Woodland Policy, defines Significant Woodlands within the urban boundary as any area 0.8 hectares in size or larger, supporting woodland 60 years of age and older at the time of evaluation. Significant Woodland on the Site was thus demarcated by delineating the boundaries of wooded areas on and adjacent to the property based on aerial imagery from 1976 (City of Ottawa, 2024). Portions of the demarcated areas that were noted as subsequently deforested in historical aerial imagery between 1976 and 2023 within the geoOttawa system were removed. Remaining areas greater than 0.8 ha in size were deemed to constitute Significant Woodland. A total of 8.2 ha of the wooded areas on the Site thus constitute Significant Woodland.

A portion of the Significant Woodlands on the Site are mapped as an Urban Natural Feature (UNF) on Schedule C12 of the City's OP (Figure 15; City of Ottawa, 2021).

Significant Woodland features on the site are characterized according to screening criteria per the City's Significant Woodlands policy (2022; Table 9).

Table 9 Characterization of Significant Woodland Areas

Social Values	
Unusual recreational, educational or cultural opportunities	None. The Site consists of private property with no public use supported.
Qualifying Cultural, Heritage, or Historical Features	None. There are no existing designations within the OP.
Indigenous values established through consultation	None. No values are identified in the Greater Cardinal Creek Subwatershed Management Plan.
Hazard lands	
Constrained areas	Subject area is associated with hazards (steep or unstable slopes).
Habitat and Landscape Connectivity	
Adjacency and connectivity	Includes areas indicated in the Natural Heritage Features Overlay with portions designated as a UNF, but not part of Natural Heritage System Core Area. Forested areas on the Site extend west to join Cardinal Creek and its associated forests and riparian areas.
Specialized habitat	Limited. There are no uncommon community types or rare species within the wooded areas. The current forest mix consists of trees neither especially large nor uncharacteristically old for the broader area. Three Black Ash (Endangered) were identified.

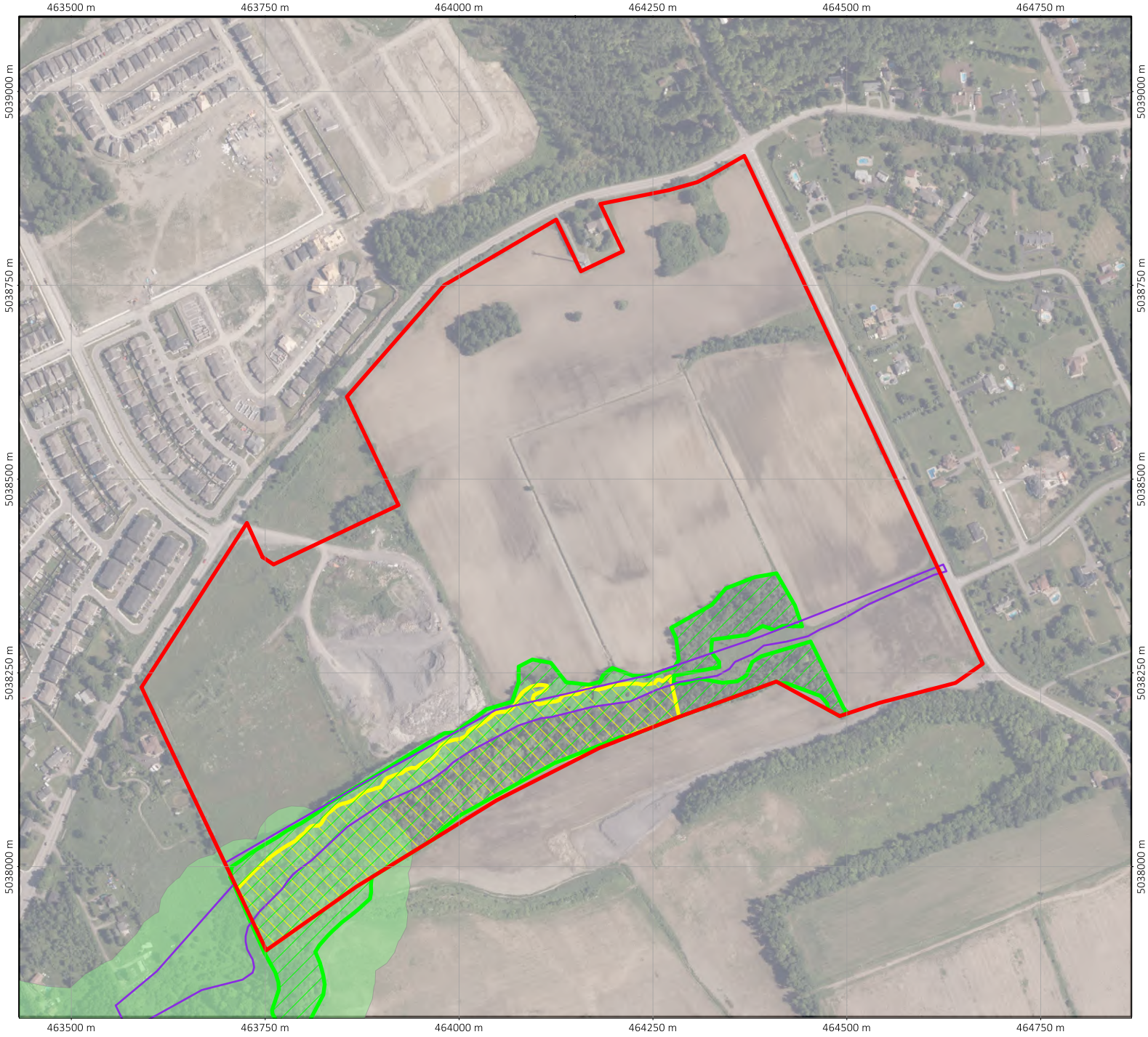

Figure 15 Significant Natural Heritage Features

Legend

- Site Boundary
- Significant Woodland
- Significant Valleylands
- Natural Heritage Features Overlay (OP Schedule C11)
- Urban Natural Features (OP Schedule C12)

N

0 250 m

Project: TAGG 1672.1
Map File: TAGG 1672 Map 2412b.map
Universal Transverse Mercator - Zone 18 (N)
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5.7.1.1 iTree Canopy Assessment

An iTree Canopy assessment of the Site compares the canopy services across the Site generally. The assessment was based on distributions of 100 random sample points across the entire Site. Existing canopy cover across the Site was calculated to be 23%. The existing canopy cover is almost entirely associated with the forested Cardinal Creek tributary valley. Outside of the Cardinal Creek Tributary valley, with its extensive agricultural usage (present and historical), is almost entirely devoid of trees.

The detailed iTree Assessment of canopy tree benefits for the Site in its existing condition is provided in Appendix D.

5.7.2 Significant Valleylands

Significant Valleylands are defined as *"*valleylands with slopes greater than 15 percent and a length of more than 50 metres, with water present for some period of the year, excluding manmade features such as pits and quarries" (City of Ottawa, 2023). The Cardinal Creek Tributary and associated ELC ecosites, FODM6-5 and portions of WODM4 meet the criteria to be considered significant valleylands, and constitute 3.5 ha of the Site (Figure 15). Valleylands were identified based on field observations and available LiDAR data for the Site, and delineated based on top of slope as defined in geotechnical studies (Paterson Group, 2023a).

The GCCSMP does not provide a specific setback distance for the protection of Significant Valleylands. The GCCSMP, however, indicates HDFA Guidelines as the source for watercourse setback considerations, noting their identification of a general 15 m setback from the top of slope. Setbacks along Significant Valleylands should also consider geotechnical issues and wildlife habitat functions.

A 15 m setback from the existing top of slope would sit within agricultural areas that currently do not otherwise provide wildlife habitat functions. As such, to protect the Significant Valley, the recommended setback to feature (i.e. independent of watercourse setbacks otherwise provided within the GCCSMP) is the greater of:

a) a 15 m setback from the existing top of slope of the valley; and
b) the geotechnical setback to the valley as determined by a geotechnical study.

The geotechnical limit of hazard lands was determined by Paterson (Paterson Group, 2023a) and includes a 6 m erosion access allowance and a 5m toe erosion allowance from the stable slope .

5.8 Significant Wildlife Habitat

The Significant Wildlife Habitat (SWH) Criteria Schedule for Ecoregion 6E (MNRF, 2015) identifies four main types of significant wildlife habitat: seasonal concentration areas, rare vegetation communities, specialized habitat for wildlife and habitats of Species of Conservation Concern.

5.8.1 Seasonal Concentration Areas

Seasonal concentration areas include terrestrial and aquatic waterfowl stopover and staging areas, shorebird migratory stopover areas, raptor wintering areas, bat hibernacula, maternity colonies, and migratory

stopover areas, turtle wintering areas, reptile hibernaculum, colonially nesting bird breeding habitat (bank and cliff; tree/shrub; ground), migratory butterfly stopover area, landbird migratory stopover areas, and deer yarding and winter congregation areas.

The background information reviewed for the Site did not identify any seasonal concentration areas for animals. No obvious signs or evidence of use as a seasonal concentration area were observed and none are likely to occur on the Site.

5.8.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare Vegetation Communities

Rare vegetation communities typically include those that have developed on cliff and talus slopes, sand barrens, shallow soils over limestone bedrock (alvar), old growth forests, savannahs, and tallgrass prairies. No rare vegetation communities were observed on the Site.

Specialized Wildlife Habitat

Specialized Wildlife Habitat includes waterfowl nesting areas, Bald Eagle and Osprey nesting, foraging and perching habitat, woodland raptor nesting habitat, turtle nesting areas, seeps and springs, woodland amphibian breeding habitat, wetland breeding habitat, and woodland area-sensitive bird breeding habitat.

The Red-tailed Hawk (*Buteo jamaicensis*) was observed adjacent to FODM6-5 ecosite. However, the Red-tailed Hawk is not listed as a species considered as candidate SWH for woodland raptor nesting habitat and the Site does therefore not qualify as SWH for this category. No other specialized wildlife habitat is present on the Site.

Habitats of Species of Conservation Concern

Habitats of Species of Conservation Concern include marsh bird breeding habitat, open country bird habitat, shrub/early successional bird breeding habitat, terrestrial crayfish and special concern and rare wildlife species. Habitats of Species of Conservation Concern do not include habitats of Endangered or Threatened species as identified by the ESA. Our background review identified the potential presence of three Special Concern species, including Canada Warbler, Eastern Wood-Pewee, and Olive-sided Flycatcher. Eastern Wood-Pewee was observed on the Site during breeding bird surveys. Therefore, the Site qualifies as SWH for special concern and rare wildlife species.

5.9 Other Natural Heritage Features

No Provincially Significant Wetlands (PSW) and/or Areas of Natural and Scientific Interest (ANSI) are located on or adjacent to the Site. The Site does not contain greenspace linkages. No other significant natural heritage features are located within 120 m of the Site.

6.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed project would see the development of a residential community. The new community would be comprised of a mix of single homes (333), townhomes/semi detached (261), gallery towns/back-to-back units (1152), mixed-use and park blocks (1 each), two schools, and a stormwater management pond (Figure 16). The development will be primarily located within the OAGM1, CV, CUM1-1, THDM4-1, and FODM5-9 vegetation communities. Vegetation clearing on the Site would be limited to the isolated FODM5-9 pocket, a small portion of the WODM4 woodland, the thicket (THDM4-1) vegetation associated with HDF 1 and in the northeast corner, as well as limited scattered vegetation across the Site.

The final natural heritage setback for the new community is the greatest of watercourse setbacks (the regulatory flood line, geotechnical limit of hazard lands, 30 m from normal high-water mark, 25 m from the top of bank), and valley setbacks (15 m from the top of slope of the valley). Currently, the lands along the Carndinal Creek Tributary valley (i.e. that would be protected within the 15 m top of slope setback) are mostly subject to active farming. The edges of the retained buffer will renaturalized, where applicable. A portion of the WODM4 vegetation community associated with the Significant Woodlands (totalling 0.7 ha in size and constituting 8.7% of Significant Woodlands on the Site) does extend beyond the setback and will require removal to accommodate the proposed development. The majority of existing forest cover, Significant Woodlands, and all portions of Significant Valleylands on the Site associated with the Cardinal Creek Tributary would be retained and protected within a 15 m setback from the existing top of slope of the valley (Section 5.7.2 above; Figure 16).

As stated in Section 5.3.2, the upper reach of the Cardinal Creek Tributary, Reach 5, is a defined natural channel with substantial baseflow observed that feeds the Cardinal Creek Tributary. As such, it will be retained and a 30 m setback from the normal high water mark will be applied. This setback is the greatest of the regulatory flood line, geotechnical limit of hazard lands, 30 m from normal high-water mark, and 25 m from top of bank. Reach 5 does not have a defined valley (Figure 15).

For stormwater considerations, one SWM pond (Block 8, 2.0 ha) is proposed to be located in the southwest corner of the Site, at, but outside of, the existing top of slope of the valley setback line, on relatively flat lands. The SWM pond is proposed to include an emergency spillway, a concrete outlet structure, and outlet drop, a concrete headwall with chute blocks, and an armour stone spillway (Paterson Group, 2023d). Paterson (2023d) recommends that the reconstructed sidewalls of the SWMP and immediately following excavation of the side slopes, native vegetation is established to stabilize the Site and reduce erosion potential.

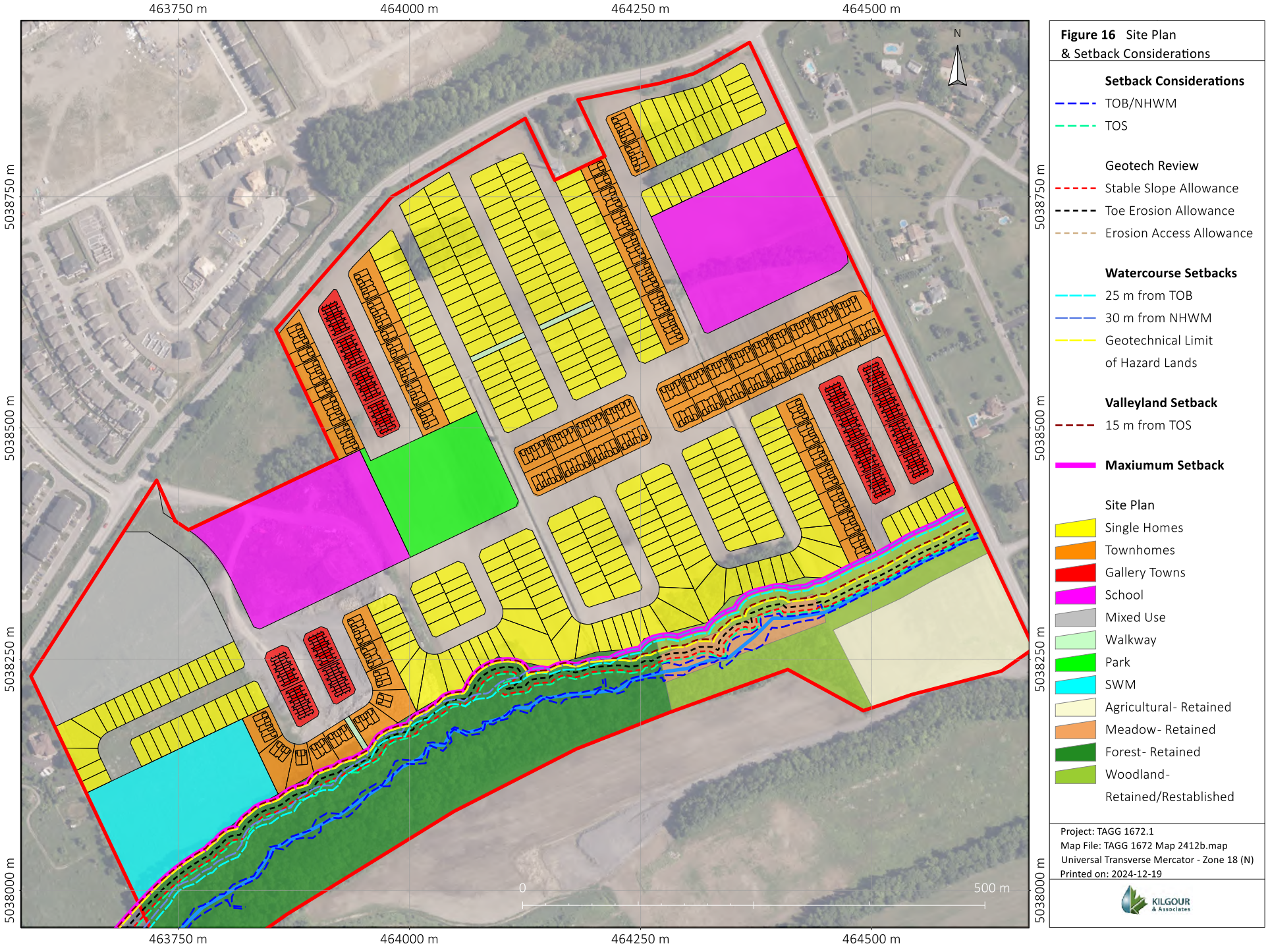

Figure 16 Site Plan & Setback Considerations

Setback Considerations
- TOB/NHWM
- TOS

Geotech Review
- Stable Slope Allowance
- Toe Erosion Allowance
- Erosion Access Allowance

Watercourse Setbacks
- 25 m from TOB
- 30 m from NHWM
- Geotechnical Limit of Hazard Lands

Valleyland Setback
- 15 m from TOS

Maxiumum Setback

Site Plan
- Single Homes
- Townhomes
- Gallery Towns
- School
- Mixed Use
- Walkway
- Park
- SWM
- Agricultural- Retained
- Meadow- Retained
- Forest- Retained
- Woodland- Retained/Restablished

Project: TAGG 1672.1
Map File: TAGG 1672 Map 2412b.map
Universal Transverse Mercator - Zone 18 (N)
Printed on: 2024-12-19

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7.0 IMPACT ASSESSMENT

The potential area of impact associated with the proposed development includes the lands associated with the Cardinal Creek Tributary, the headwater drainage features, and isolated pockets of forested and naturalized lands and their associated natural heritage features. The cleared and active agricultural portions of the Site are not anticipated to have significant impacts on the ecological function of the Site. The assessment of impacts is based on the proposed development compared to previous EIS and HDFA data (Bowfin Environmental Consulting Inc., 2021; Muncaster Environmental Planning Inc., 2021) and existing site conditions observed in 2024 (Kilgour & Associates Ltd., 2024). Previously identified impacts (Muncaster Environmental Planning Inc., 2021) that are considered to remain relevant to the existing condition of the Site are included below, as well as additional updated impacts as identified in this EIS.

7.1 Impacts to Surface Water Features

Farm ditches (HDFs/Reaches 1-4 and 6-7) function within an agricultural context, are are channelized/constrained, swale, or roadside ditch features with minimal flow during spring freshet, and are dry for much of the summer. No fish habitat was identified or found to be present within Reaches 1-4 and 6-7. These features will be removed to accommodate the proposed development. HDFs to be removed will require permission under Section 28.1 of the CA Act (Government of Ontario, 1990a) and O.Reg 41/24 (an "RVCA Permit"). As no fish habitat is present within these reaches, no *Request for Review* (RFR) to Fisheries and Oceans Canada (DFO) is required to remove these tributaries.

No development would be permitted to occur within 30 m from the normal high water mark of Reach 5. The lands associated with the 30 m setback from Reach 5 would thus be planted with suitable native vegetation, consistent with the retained portions of the WODM4 vegetation community, with a target of 50% woodland canopy cover to create a naturalized buffer. Enhancement along Reach 5 through extensive planting effors aim to provide shading, allochthonous inputs, improved filtration, and through engineered drainage controls can be implemented to replicate the function of these removed tributaries/HDFs on the Site.

No development is permitted within 15 m from the existing top of slope of the valley of the Cardinal Creek Tributary. All riparian areas and forested lands associated with these lands and the Significant Valleylands will be retained and enhanced where possible and to the highest extent feasible.

No wetland habitat or other surface water features were identified on the Site.

Based on the results of the Site Specific Water Budget prepared by Palmer (2013), recharge areas supporting stream baseflow (i.e. off-site; Figure 3) will be maintained post-development, and the proposed development is not anticipated to negatively impact the groundwater-supported stream baseflow.

7.2 Impacts to Vegetation, Significant Woodland, Canopy Cover

The Significant Woodland Policy (City of Ottawa, 2022b) provides that the forest attributes of woodland features qualified as "significant" can be replaced, substituted, or otherwise adequately mitigated. The policy acknowledges that negative impacts on the functions and services of significant woodlands within the urban area may be necessary in order to achieve the policies and objectives of the OP and PPS. In evaluating how

the proposed development can be expected to impact Significant Woodland on the Site, this EIS considers changes in:

- Total canopy cover and tree "benefits" as measured using iTree Canopy; and
- Social value, accessibility and equity considering the percentage of the community with easy access to greenspace.

As discussed in Sections 5.4 and 6.0 above, in its existing condition, the distribution of forest coverage on the Site is limited to the Cardinal Creek Tributary corridor which includes Significant Woodlands and Significant Valleylands on the Site (inclusive of FODM6-5, WODM4 and MEGM3-8 ecosites), as well as an isolated woodland pocket (FODM5-9) in the northern portion of the Site. The thicket vegetation communities on the Site (THDM4-1) also offer some limited canopy cover in their existing condition. The Site currently has 23% canopy cover. The proposed development removes 0.7 ha (8.7%) of Significant Woodland and thus retains 91.3% of the Significant Woodlands on the Site.

The central strip of Significant Woodland directly associate with the valley walls (and extending to include the banks of Reach 5) is designated a UNF (Figure 15). The relatively narrow UNF portion, however, is fully within the setback limits and is not included within the forest area subject to alteration.

Enhancement opportunities and an increased protection buffer within the Cardinal Creek Tributary and Reach 5 setback lands are anticipated to establish 1.01 ha of wooded natural heritage lands in an otherwise currently unvegetated area. Given the cleared nature across the majority of the Site and lack of natural heritage features and functions, the proposed development is anticipated to increase canopy cover across the Site.

The assessment of existing conditions (Section 5.7) considered tree functions both within the Significant Woodland and Cardinal Creek Tributary corridor and across the Site generally. Given the anticipated establishment of canopy cover across the Site, the iTree Canopy assessment of the Site post-development employs the same 100 sample points used for the initial assessment (Section 5.7; Appendix D). The estimated values of canopy cover for each land use type were determined using the City of Ottawa standards, as informed by the *Tree Canopy Assessment, Canada's Capital Region* (City of Ottawa et al., 2019) and KAL's experience determining realistic canopy cover results at maturity (i.e., $\geq$40 y/o) based on standard residential cross-sections. Mature tree canopy percentages by land use/zone for the iTree analysis considered:

Residential: 32%
Walkways: 20%
Parks and SWM Blocks: 20%
Mixed Use: 20%
Institutional (School): 20%
Forest: 95%
Woodland: 50%
Natural Meadow: 5%

The estimated canopy cover for the Site at maturity, post-development is 44%. This represents a canopy cover increase of 21% from the existing canopy cover condition. The comparative iTree analysis table including the existing and post-development conditions is included in Appendix D.

7.3 Impacts to Species at Risk

A total of 16 species subject to protections as SAR under the ESA and/or SARA were initially considered to have a moderate to high potential to occur on the Site and/or interact with the project (Table 8). Of those 16 species, three were observed to occur on the Site, and one is considered likely to be negatively impacted by the project. Black Ash is detailed below.

The general wildlife mitigations provided in Sections 8.3 and 8.4, respectively, are anticipated to protect SAR that may potentially occur on the Site.

7.3.1 Black Ash

Black Ash over 8 cm at 1.37 m and their habitat (≤30 m from a healthy stem) are regulated under the ESA (Government of Ontario, 2007). A total of three Black Ash >8 DBH were observed on the Site (Figure 3), located northeast of the Cardinal Creek Tributary valleylands, within the Dry – Fresh Woodland Ecosite (WODM4) vegetation community. All three trees were determined to be healthy. The portion of the WODM4 community containing the Black Ash will be removed to accommodate the proposed development.

A *Black Ash Health Assessment Report Worksheet* will be required for submission to the MECP alongside an *Information Gathering Form* (IGF) to inform the MECP of development works that have potential to impact healthy Black Ash habitat. Appropriate mitigation measures and compensation approaches satisfactory to the MECP, City of Ottawa, and the Proponent will be determined at the appropriate planning stage and will require a Net Benefit Permit. Implemetation of all elements stipulated within the Net Benefit Permit would lead to a net benefit for Black Ash, i.e., would ensure no net negative impacts for the species.

7.4 Impacts to Wildlife

Migratory birds have potential to occur and nest on the Site. The implementation of suitable mitigation measures (per Section 8.4) would minimize the risk resulting in no impacts to migratory birds.

7.5 Impacts to Significant Wildlife Habitat

Our background review identified the potential presence of three Special Concern species, including Canada Warbler, Eastern Wood-Pewee, and Olive-sided Flycatcher. Eastern Wood-Pewee was observed on the Site during breeding bird surveys. Therefore, the Site qualifies as SWH for special concern and rare wildlife species.

The proposed development will result in the loss of one isolated pocket of forest (FODM5-9) and a portion of the WODM4 community that have potential to support Eastern Wood-Pewee. No demonstrated, direct threats to Eastern Wood-Pewee population sizes are known, and loss of habitat is not documented as a significant impact to this species (COSSARO, 2013). The Eastern Wood-Pewee is a small flycatcher that feeds on small insects from a perch in the subcanopy of the forest. The retention of the Cardinal Creek Tributary

forested corridor and recommended planting of the Reach 5 setback lands is anticipated to continue to support this species, and no significant impact is anticipated.

Mitigation measures to eliminate or minimize impact to confirmed SWH are included in Section 8.5 below (OMNRF, 2014).

8.0 MITIGATION MEASURES AND RECOMMENDATIONS

8.1 Mitigation for Surface Water Features

The following mitigation measures are recommended to be implemented to minimize or eliminate impacts to surface water features:

- It is recommended that outlet channels for SWM ponds have accounted for and ensure that stormwater discharge to the Cardinal Creek Tributary are of sufficient water quality and quantity, to ensure no contaminants are introduced to the tributary and no additional sedimentation occurs;

- The landscape plan for the Site, with particular attention to the Reach 5 setback lands and Cardinal Creek Tributary, is recommended to generally include a variety of native tree, shrub, grass, and forb species to provide allochthonous inputs, maximize shading, limit solar heating, provide erosion and sediment control, and contaminant filtration;

- No fish were found to be present within the HDFs (channels in the cultivated fields). However, if water is present in the channels at the time of filling/removal, the channels are to be de-fished with proper permits in place, and moved to the south tributary (Muncaster Environmental Planning Inc., 2021);

The potential for construction-related impacts to surface water features can be managed with the implementation of appropriate mitigation measures, such as:

- Implementation of natural channel design principles in the design process;

- Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed souls and migration of sediment;

- An Erosion and Sediment Control Plan outlining mitigation measures to limit the potential for sediment and erosion to enter these watercourses. The ESC Plan must be developed to the satisfaction of RVCA. The ESC Plan should include:

    - A multi-faceted approach to provide ESC;

    - Regularly inspecting and maintaining the ESC measures during all phases of the project;

    - Retention of existing vegetation and stabilization of exposed soils with native vegetation where possible;

- Keeping the ESC measures in place until all disturbed ground has been permanently stabilized;
- Using biodegradable ESC materials where possible and removing all exposed non-biodegradable ESC materials once the Site is stabilized;
- Limiting the duration of soil exposure and phasing project works;
- Limiting the size of disturbed areas by minimizing nonessential clearing and grading;
- Minimizing the total slope length and the gradient of disturbed areas;
- Refueling of machinery should occur >30 m from surface water features and all machinery will remain on the project-side of silt and construction fence;
- Maintaining overland sheet flow and avoiding concentrated flows;
- Storing/stockpiling materials >30 m away from the Faulkner Drain, SWM pond, and other surface water features;
- Fencing or tarping all stockpiled material (<150-millimeter gravel) during the turtle nesting period (late May to early July) (MECP, 2021b) to prevent turtles from nesting in stockpiles. If the stockpile is within a properly fenced area (i.e., the project footprint) additional fencing is not necessary for turtle management, but is recommended for ESC if piles will be left unused for extended periods;
- Regularly inspecting the Site for signs of sedimentation during all phases of work and taking corrective action if required;
- Developing a response plan to be implemented immediately in the event of a spill of a deleterious substance;
- Keeping an emergency spill kit on the Site;
- Stopping work and containing deleterious substances to prevent dispersal; and
- Reporting any spills of sewage, oil, fuel, or other deleterious material whether near or directly into a surface water feature.

- The following ESC details are outlined in the Functional Servicing and Stormwater Management Report (DSEL, 2021) and detailed in the Muncaster EIS (2021):
  - Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction;

- Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated;

- Mud mats will be installed at the construction accesses to prevent mud tracking onto adjacent roads;

- Construction of the southwest stormwater management facility will precede general construction. Should construction commence prior to the completion of the storm sewer network and stormwater management pond, groundwater will be pumped into a proper filter mechanism such as a sediment trap or filter bag prior to release to the environment. Following their construction, dewatering will be routed to the nearest storm sewer;

- Catch basins will have catch basin inserts installed during construction to protect from silt entering the storm sewer system;

- Extent of exposed soils will be limited at any given time, and exposed areas will be re-vegetated as soon as possible;

- Bulkhead barriers will be installed over the lower half of the outletting sewers to reduce sediment loadings during construction. The barriers will captured sediment laden flows;

- Exposed slopes will be protected with plastic or synthetic mulches;

- Stockpiles of cleared materials as well as equipment fuelling and maintenance areas will be located away from swales and other conveyance routes;

- Seepage barriers such as silt fencing, straw bale check dams and other sediment and erosion control measures will be installed in any temporary drainage ditches and around disturbed areas during construction and stockpiles of fine material. The control measures must be properly maintained to maximize their function during construction; and,

- The above measures will remain in place until streets are asphalted and curbed and the surrounding landscape is stabilized.

As a general surface water protection measure post-development, residents should be made aware of the importance of minimizing or avoiding the use of fertilizers, herbicides, and pesticides and should consider using surface materials that allow for rainwater infiltration (Muncaster Environmental Planning Inc., 2021).

8.2 Mitigation for Vegetation

The following mitigation measures are recommended to minimize impacts on trees and forested areas being retained on the Site:

- Erect a fence beyond the critical root zone (CRZ; i.e., 10 x the trunk diameter) of trees. The fence is recommended to be highly visible (e.g., orange construction fence) and paired with erosion control

fencing. Pruning of branches is recommended in areas of potential conflict with construction equipment;

- Permanent fencing is recommended to be installed at rear of lots backing onto the Reach 5 setback lands and Cardinal Creek Tributary;
- Signage attached to the CRZ fence every 5.0 m indicating:
    a) the fencing is to protect the tree's CRZ; and
    b) that the fence must not be moved.
- Do not place any material or equipment within the CRZ of the tree;
- Do not attach any signs, notices, or posters to any tree;
- Do not raise or lower the existing grade within the CRZ without approval;
- Tunnel or bore when digging within the CRZ of a tree;
- Do not damage the root system, trunk or branches of any tree; and
- Ensure that exhaust fumes from all equipment are not directed toward any trees canopy.

Tree planting plans will be created as part of the landscape plan for the development. The tree planting plan for the retained forest areas, riparian areas, Reach 5 setback lands, and residential areas of the Site are to include directives that will contribute to the City's 40% canopy cover target at maturity. Trees and other plants identified in landscape plans are recommended to be non-invasive and locally appropriate native species suitable for sensitive marine clay soils. Based on the *City of Ottawa's Clay Soils Policy* (City of Ottawa, 2017), the following species are recommended for planting:

White Pine (*Pinus strobus*), Norway Spruce (*Picea abies*), White Cedar (*Thuja occidentalis*), Green Ash (*Fraxinus pennsylvanica*), White Spruce (*Picea glauca*), Red Maple (*Acer rubrum*), Sugar Maple (*Acer saccharum*), American Beech (*Fagus grandifolia*), Trembling Aspen (*Populus tremuloides*), White Birch (*Betula papyrifera*) and Eastern Hemlock (*Tsuga canadensis*).

Tree plantings are recommended to be monitored in the spring and summer for five years to ensure the viability and success of the plantings.

The following general protection measures are recommended during site preparation and construction to limit impacts to vegetation:

- Limit tree removal onsite to the highest extent possible and only remove trees necessary to accommodate construction and development; and
- Ensure equipment is clean prior to vegetation removal to avoid introducing invasive species to the Site, and clean equipment prior to leaving the Site to avoid spreading invasive species elsewhere.

8.3 Mitigation for Species at Risk

Impacts to Black Ash is mitigated through the completion of an IGF and subsequently a Net Benefit Permit from MECP. The MECP permitting process would permit the development within the habitat of a healthy Black Ash stem, ensuring an overall net benefit for the species and proceeding in compliance with provincial SAR regulations.

Impacts to other SAR can be managed with the implementation of appropriate mitigation measures, such as:

- All on-site staff are recommended to undergo environmental awareness training to be able to identify the potential SAR that may be encountered;
- Removal of vegetation suitable as nesting habitat should occur outside of the breeding bird season, and outside of the bat roosting season (April 1 to September 30 inclusive; MNRF, 2017) . This will ensure no impact to SAR birds and bats utilizing the Site; and
- Perform daily pre-work searches of the construction area to ensure no wildlife has entered the work area overnight.

8.4 Mitigation for Wildlife

The following mitigation measures are recommended to be implemented during future construction to generally protect wildlife:

- Areas are not recommended to be altered or cleared during sensitive times of year for wildlife unless mitigation measures are implemented and/or the habitat has been inspected by a qualified Biologist;
    - Clearing of trees and/or vegetation should not take place April 1 to September 30 inclusive unless a qualified Biologist has determined that no birds are nesting or suitable bat roosting trees are present. The bird nest sweep would be valid for five days:
        - The MBCA protects the nests and young of migratory breeding birds in Canada. The timing of nesting for birds in the area spans April 1 to August 31 (Government of Canada, 1994);
- Ensure that a qualified biologist develops a wildlife management plan for the construction process and delivers environmental compliance and biodiversity training to all site workers to implement the plan. The plan is recommended include (but not be limited to) requirements to:
    - Utilize silt fence paired with sturdy construction fence along the project perimeter and around soil stockpiles to serve as a wildlife exclusion measure to prevent smaller animals from accessing/utilizing temporary habitats on the Site;
    - Check the entire work site for wildlife prior to beginning work each day;
    - Do not harm, feed, or unnecessarily harass wildlife;

- Manage waste to prevent attracting wildlife to the work site. Effective mitigation measures include litter prevention and keeping all trash secured in wildlife-proof containers and promptly removing it from the work site, especially during warm weather;

- A recommended a speed limit of 20 km/h during the active season (April 1 to September 30) to reduce wildlife mortality; and

- Manage stockpiles and equipment at the work site to prevent wildlife from being attracted to artificial habitat. Cover and contain any piles of soil, fill, brush, rocks, and other loose materials and cap ends of pipes where necessary to keep wildlife out. Ensure that trailers, bins, boxes, and vacant buildings are secured at the end of each workday to prevent access by wildlife.

Once construction is complete and the residences are occupied, KAL recommends that new residents are encouraged through signage and public education to keep pets on leash and keep cats indoors during breeding bird season (April 1 to August 31). It is recommended that landowners be provided with educational resources about keeping cats on a leash or indoors, as cats are one of the largest threats to bird populations (Blancher, 2013).

8.5 Mitigation for Significant Wildlife Habitat

Impacts to special concern and rare wildlife species SWH for Eastern Wood-Pewee is recommended to be mitigated by implementing the following mitigation measures (OMNRF, 2014):

- Enhancing remaining forest and significant woodland with plantings, protecting the structure and moisture regime of the forest and Significant Valleylands;

- Improving canopy cover and shading along Reach 5, resulting in higher quality habitat; and

- Fencing areas around retained forested lands to reduce long-term disturbance and predation by pets due to the adjacent residential community.

9.0 REVIEW AND CONCLUSIONS

The intent of this report is to consider potential impacts to natural heritage system features associated with the Site under future residential development, based on its existing condition. The content of this EIS was prepared in accordance with the *Environmental Impact Study Guidelines* (City of Ottawa, 2023). It serves to update the Muncaster EIS (2021) and address City of Ottawa comments provided therein. This report identifies likely mitigation measures that would be employed under future development and/or imposed on future development as part of a planning application.

Reviewing natural heritage system elements addressed within the PPS and the City's OP (and in consideration of relevant federal and/or provincial legislation per Section 2.0 above):

a) Significant Wetlands (provincial or local)

- No significant wetlands are present on the Site.

b) Habitat for SAR (and SAR directly)

- For SAR identified on the Site, the ESA provides mechanisms that permit the removal of those SAR species and/or their habitat from the Site – with the implementation of offsetting measures to ensure a net benefit for those species – such that future site development can be permitted in full compliance with that legislation.

c) Significant Woodlands

- The total area of Significant Woodland would be reduced from 8.2 ha to 7.4 ha (8.7% reduction), but total canopy cover across the Site would be increased by 21%.

d) Significant Valleylands

- The Significant Valleylands associated with the Cardinal Creek Tributary on the Site are fully retained and protected with required setbacks prescribed in the Council-approved GCCSMP.

e) Significant Wildlife Habitat

- Significant Wildlife Habitat on the Site is limited to supporting Eastern Wood-Pewee. This habitat can be maintained along the Cardinal Creek Triburary corridor and re-established in Reach 5 setback lands.

f) Areas of Natural and Scientific Interest

- There are no ANSIs associated with the Site.

g) Urban Natural Features

- A portion of the Significant Woodlands on the Site are mapped as a UNF on Schedule C12 of the City's OP (Figure 15; City of Ottawa, 2021).

h) Natural linkage features and corridors

- The Site provides Natural linkage features and corridors associated with the Cardinal Creek Tributary corridor. These lands are fully retained and protected.

i) Groundwater features

- There are no significant groundwater features associated with the Site. One IRA is located in the northeast portion of the Site.

j) Surface water features, including fish habitat

- Farm drain headwater channels would be removed from the Site, but Reach 5, the upper reach of the Cardinal Creek Tributary will be fully retained and protected. The functionality of the removed features, however, can be replicated through engineered drainage and SWM features on the future Site.

k) Landform features

- There are no significant landform features associated with the Site.

It is the opinion of the undersigned that residential development could be sufficiently mitigated to limit net negative impacts to significant natural features or ecological functions of the Site.

10.0 CLOSURE

This report was prepared for exclusive use by Tamarack Developments and may be distributed only by Tamarack Developments. Questions relating to the data and interpretation can be addressed to the undersigned.

Respectfully submitted,

KILGOUR & ASSOCIATES LTD.

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Appendix A Qualifications of Report Authors

Maren Nielsen, BES, EMA

Maren is a Biologist with a background in terrestrial ecology. She has over eight years of comprehensive field, laboratory, and consulting experience through a combination of graduate and undergraduate studies and work experience. Maren assists clients to navigate the land development, ecological restoration, species at risk and fisheries permitting and approvals processes. She carries out field programs for the collection, analysis, and monitoring of soils, water, sediment, fish, and benthos, as well as a variety of vegetation and wildlife surveys and construction monitoring. Maren leads numerous studies including Environmental Assessments (EA), Environmental Impact Studies (EIS), Environmental Constraints Analysis, Headwater Drainage Feature Assessments (HDFA), Existing Conditions Reports, and SAR assessments. Since joining Kilgour & Associates Ltd. in 2023, Maren has worked on a variety of land development and environmental monitoring projects. Maren is a certified wetland evaluator under the Ontario Wetland Evaluation System (OWES).

Anthony Francis, PhD

Dr. Francis is a Senior Ecologist with 20 years' consulting experience to both government agencies and private industry. He has worked on a diversity of projects relating to species at risk (SAR), invasive species, terrestrial and aquatic habitat, environmental effects monitoring and mitigation, and fate/effects of contaminants. Within each of these subject areas, Dr. Francis has completed projects addressing specific site concerns and broader policy initiatives. Dr. Francis' academic background is in spatial ecology with a focus on tree species diversity. As a Senior Ecologist at KAL, he regularly completes TCRs, Environmental Impact Statements, and Integrated Environmental Reviews for land development projects throughout Ottawa and eastern Ontario. He is also a certified Butternut Health Assessor (BHA #104).

Appendix B Species at Risk Screening

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Birds								
Bald Eagle (*Haliaeetus leucocephalus*)	**Special Concern**	**Not at Risk**	Reported on-site (Cornell Lab of Ornithology, 2024)	Nest in mature forests near open water. In large trees such as pine and poplar.	Forested areas along the south tributary on-Site may provide suitable habitat.	Low	Low	Low
Bank Swallow (*Riparia riparia*)	**Threatened**	**Threatened**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	Colonial nester; burrows in eroding silt or sand banks, sand pit walls, and human-made sand piles. Often found on banks of rivers and lakes.	The fill piles and banks along the south tributary on-Site may provide suitable habitat.	Moderate	Moderate	Moderate
Barn Swallow (*Hirundo rustica*)	**Special Concern**	**Threatened**	Approximately 130 m from Site (Cornell Lab of Ornithology, 2024)	Nests on barns and other structures. Forages in open areas for flying insects. Lives in close association with humans and prefers to nest on structures such as open barns, under bridges, and in culverts.	Open areas on-Site may provide suitable foraging habitat. The Site does not contain suitable nesting habitat.	Negligible	Negligible	Negligible
Black Tern (*Chlidonias niger*)	**Special Concern**	**Not at Risk**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	Build floating nests in loose colonies in shallow marshes with abundant emergent vegetation, especially in cattails.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Bobolink (*Dolichonyx oryzivorus*)	**Threatened**	**Threatened**	Approximately 1.1 km from Site (Cornell Lab of Ornithology, 2024)	Breeds in hayfields, pastures, agricultural fields, and abandoned fields with tall grass that are ≥5 ha, and preferably >30 ha.	Agricultural fields on-Site may provide suitable habitat.	Moderate	Moderate	Moderate
Canada Warbler (*Cardellina canadensis*)	**Special Concern**	**Threatened**	Approximately 400 m from Site (Cornell Lab of Ornithology, 2024)	Prefers moist forests with dense shrub layers. Nests located on or near the ground on mossy logs or roots, along stream banks or on hummocks. Area-sensitive species that usually require a minimum of 30 ha of continuous forest for breeding habitat (OMNR, 2000).	Forested areas along the south tributary on-Site may provide suitable habitat.	Moderate	Moderate	Moderate
Chimney Swift (*Chaetura pelagica*)	**Threatened**	**Threatened**	Approximately 4 km from site (Cornell Lab of Ornithology, 2024)	Nests in traditional-style open brick chimneys (and rarely in hollow trees). Tends to stay close to water.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Common Nighthawk (*Chordeiles minor*)	**Special Concern**	**Threatened**	Approximately 2 km from Site (Cornell Lab of Ornithology, 2024)	Nests in a wide variety of open sites, including beaches, fields, and gravel rooftops with little to no ground vegetation. They also nest in cultivated fields, orchards, urban parks, mine tailings and along gravel roads/railways but tend to occupy more natural sites.	Open, agricultural areas on-Site may provide suitable habitat.	Low	Low	Low
Eastern Meadowlark (*Sturnella magna*)	**Threatened**	**Threatened**	Approximately 130 m from Site (Cornell Lab of Ornithology, 2024)	Breeds in hayfields, pastures, agricultural fields, and abandoned fields with tall grass that are ≥5 ha, and preferably >30 ha.	Agricultural fields on-Site may provide suitable habitat.	Moderate	Moderate	Moderate
Eastern Whip-poor-will (*Antrostomus vociferus*)	**Threatened**	**Threatened**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	Suitable breeding habitats generally include open and half treed areas and often exhibit a scattered distribution of treed and open space. Lays eggs directly on the forest floor. Roosts are typically located in forest habitat on a low branch or directly on the ground. Home range size varies from 20 to 500 ha (mean 136 ha) (ECCC, 2018a).	Open areas and forested patches along the south tributary on-Site may provide suitable habitat	Low	Low	Low
Eastern Wood-Pewee (*Contopus virens*)	**Special Concern**	**Special Concern**	Approximately 1.5 km from Site (Cornell Lab of Ornithology, 2024)	Woodland species often found in the mid-canopy layer near clearings and edges of intermediate age and mature deciduous and mixed forests with little understory.	Forested areas along the south tributary on-Site may provide suitable habitat.	Moderate	Moderate	High Detected onsite
Evening Grosbeak (*Coccothraustes vespertinus*)	**Special Concern**	**Special Concern**	Approximately 1.8 km from Site (Cornell Lab of Ornithology, 2024)	Nests in trees or large shrubs. Prefers mature coniferous forests (fir and/or spruce dominated), but will also use deciduous forests, parklands, and orchards. Its abundance is strongly linked to the cycle of Spruce Budworm.	Forested areas along the south tributary on-Site may provide suitable habitat.	Low	Low	Low

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Golden Eagle (*Aquila chrysaetos*)	**Endangered**	**Not at Risk**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	Nests in remote, undisturbed areas, usually building their nests on ledges on a steep cliff/riverbank or large trees if needed. Most hunting is done near open areas such as large bogs or tundra. Migration only; no reported nests in Ottawa.	Steep riverbanks along the south tributary may provide suitable habitat.	Low	Low	Low
Hudsonian Godwit (*Limosa haemastica*)	**Threatened**	**No Status**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	They use a wide variety of habitats during migration, such as freshwater marshes, saline lakes, flooded fields, shallow ponds, coastal wetlands, and mudflats. Migrant only; breeds in far north.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Least Bittern (*Ixobrychus exilis*)	**Threatened**	**Threatened**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	Found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels. They prefer larger marshes >5 ha in size and are intolerant of loss of habitat and human disturbance (OMNR, 2000).	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Lesser Yellowlegs (*Tringa flavipes*)	**Threatened**	**No Status**	Approximately 1.8 km from Site (Cornell Lab of Ornithology, 2024)	Breeds in boreal wetlands. Nests on dry ground or forest openings near peatlands, marshes, and ponds in the boreal forest and taiga (Government of Canada, 2021). Migrant only; nests in far north.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Olive-sided Flycatcher (*Contopus cooperi*)	**Special Concern**	**Threatened**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	Found along coniferous or mixed forest edges and openings. Will use forests that have been logged or burned if there are ample tall snags and trees to use for foraging perches.	The forested areas along the south tributary on-Site may contain suitable habitat.	Moderate	Moderate	Moderate
Peregrine Falcon (*Falco peregrinus*)	**Special Concern**	**Special Concern**	Approximately 2 km from Site (Cornell Lab of Ornithology, 2024)	Nests on tall, steep cliff ledges close to large bodies of water. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Red Knot (*Calidris canutus rufa*)	**Endangered**	**Endangered**	Approximately 1.8 km from Site (Cornell Lab of Ornithology, 2024)	Prefer open beaches, mudflats, and coastal lagoons where they feast on molluscs, crustaceans, and other invertebrates. Migrant only; nests in far north.	The Site does not appear to contain suitable habitat.	None	None	None

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Rusty Blackbird (*Euphagus carolinus*)	**Special Concern**	**Special Concern**	Approximately 1.7 km from Site (Cornell Lab of Ornithology, 2024)	Prefers wet wooded or shrubby areas. Nests at edges of boreal wetlands and coniferous forests. These areas include bogs, marshes, and beaver ponds.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Short-eared Owl (*Asio flammeus*)	**Threatened**	**Special Concern**	Within 5 km of Site (MNRF, 2024a)	Prefer a mosaic of grasslands and wetlands. Lives in open areas such as grasslands, marshes, and tundra where it nests on the ground and hunts for small mammals (Environment Canada, 2016c).	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Wood Thrush (*Hylocichla mustelina*)	**Special Concern**	**Threatened**	Within 10 km of Site (Birds Canada et al., 2009)	Lives in mature deciduous and mixed forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing and perching. Prefers nesting in large forest mosaics, but will also use fragmented forests. Usually build nests in Sugar Maple or American Beech.	Forested areas along the south tributary on-Site may provide suitable habitat.	Moderate	Moderate	Moderate
Mammals								
Eastern Small-footed Myotis (*Myotis leibii*)	**Endangered**	**Not Listed**	Humphrey (2017) – in region	In the spring and summer, Eastern Small-footed Myotis will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. Overwinters in caves and abandoned mines.	Forested areas along the south tributary on-Site may provide suitable roosting habitat.	Moderate	Moderate	Moderate
Little Brown Myotis (*Myotis lucifugus*)	**Endangered**	**Endangered**	Humphrey and Fotherby (2019) – in region	During the day they roost in trees and buildings. They often select attics, abandoned buildings, and barns for summer colonies where they can raise their young. They can squeeze through very tiny spaces (as small as six millimetres across) allowing them access to many different roosting areas.	Forested areas along the south tributary on-Site may provide suitable roosting habitat.	Moderate	Moderate	Moderate

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Northern Myotis / Northern Long-eared Bat (*Myotis septentrionalis*)	**Endangered**	**Endangered**	Humphrey and Fotherby (2019) – in region	Associated with deciduous and mixed forests, choosing to roost under loose bark and in the cavities of trees. They forage along and within forests as well as in hayfields and pastures adjacent to mixed forests.	Forested areas along the south tributary on-Site may provide suitable roosting habitat.	Moderate	Moderate	Moderate
Tri-colored Bat / Eastern Pipistrelle (*Perimyotis subflavus*)	**Endangered**	**Endangered**	Humphrey and Fotherby (2019) – in region	Roosts mainly in trees during summer; overwinters in caves and mines along with other species, but often uses deeper parts of the hibernaculum. Foraging occurs in forested riparian areas, over water, and within gaps in forest canopies.	Forested areas along the south tributary on-Site may provide suitable roosting habitat.	Moderate	Moderate	Moderate
Hoary Bat (*Lasiurus cinereus*)	**Endangered (January 2025)**	**No Status**	n/a	Roosts in both deciduous and coniferous forests of any age, among canopy foliage with open flight space below. Maternity roosts are often in large diameter, tall trees. Foraging occurs in open areas, wetlands, grasslands and open fields, with sparse trees.	Habitat on site is generally suitable.	Moderate	Moderate	Moderate
Silver-haired Bat (*Lasionycteris noctivagans*)	**Endangered (January 2025)**	**No Status**	n/a	Roosts under bark and in large decaying deciduous and coniferous tree cavities. Foraging occurs in young and mature forest openings and along forest edges.	Habitat on site is generally suitable.	Moderate	Moderate	Moderate
Eastern Red Bat (*Lariurus borealis*)	**Endangered (January 2025)**	**No Status**	n/a	Roosts in both deciduous and coniferous forests of any age, among canopy foliage with open flight space below. Maternity roosts are often in large diameter, tall trees. Foraging occurs in forested and non-forested areas, above and below forest canopies.	Habitat on site is generally suitable.	Moderate	Moderate	Moderate
Amphibians								
Western Chorus Frog (*Pseudacris triseriata*)	**Not Listed**	Great Lakes/ St. Lawrence population: **Threatened**	Within 5 km of Site (MNRF, 2024a)	Inhabits forest openings around woodland ponds but can also be found in or near damp meadows, marshes, bottomland	Wetland area near the south edge of the Site and associated forested areas may provide suitable habitat.	Low	Low	Low

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
				swamps, and temporary ponds in open country, or even urban areas.				
Reptiles								
Blanding's Turtle (*Emydoidea blandingii*)	**Threatened**	**Endangered**	Within 5 km of Site (MNRF, 2024a)	Quiet lakes, streams, and wetlands with abundant emergent vegetation. Also frequently occurs in adjacent upland forests.	The Site does not appear to contain suitable habitat.	Low	Low	Low
Eastern Milksnake (*Lampropeltis triangulum*)	**Not Listed**	**Special Concern**	Within 10 km of Site (Ontario Nature, 2019)	Found in a variety of open and edge habitats, including meadows, rocky outcrops, and forest edges. They can also inhabit forests. Further, they are often associated with human-made structures such as barns (Environment Canada, 2015b).	Forest edges and open areas on-Site may provide suitable habitat.	Low	Low	Low
Eastern Musk Turtle / Stinkpot (*Sternotherus odoratus*)	**Special Concern**	**Special Concern**	Within 10 km of Site (Ontario Nature, 2019)	Found in lakes, ponds, marshes, and rivers that are generally slow-moving, have abundant emergent vegetation, and muddy bottoms that they burrow into for winter hibernation.	The Site does not appear to contain suitable habitat.	Low	Low	Low
Midland Painted Turtle (*Chrysemys picta marginata*)	**Not Listed**	**Special Concern**	Within 5 km of Site (MNRF, 2024a)	Inhabits waterbodies, such as ponds, marshes, lakes, and slow-moving creeks that have a soft bottom and provide abundant basking sites and aquatic vegetation. Often bask on shorelines or on logs and rocks that protrude from the water.	The south tributary on-Site may provide suitable habitat.	Low	Low	Low
Northern Map Turtle (*Graptemys geographica*)	**Special Concern**	**Special Concern**	Within 5 km of Site (MNRF, 2024a)	Lives in rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, they hibernate on the bottom of deep, slow-moving sections of river.	The Site does not appear to contain suitable habitat.	Low	Low	Low
Snapping Turtle (*Chelydra serpentina*)	**Special Concern**	**Special Concern**	Within 5 km of Site (MNRF, 2024a)	Spend most of their lives in the water. Prefer shallow waters so they can hide under the soft mud and leaf litter with only their noses exposed to the surface to breathe.	The Site does not appear to contain suitable habitat.	Low	Low	Low
Arthropods								

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Monarch (*Danaus plexippus*)	**Special Concern**	**Special Concern**	Within 10 km of Site (Toronto Entomologists' Association, 2024)	Milkweeds are the sole food plant for Monarch caterpillars. These plants predominantly grow in open and periodically disturbed habitats such as roadsides, fields, wetlands, prairies, and open forests.	Open meadows and forest edges may provide suitable habitat.	Negligible	Negligible	Negligible
Yellow-banded Bumble Bee (*Bombus terricola*)	**Special Concern**	**Special Concern**	Within 5 km of Site (MNRF, 2024a)	This species is a forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions. Can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands, and urban areas.	Forested areas along the south tributary on-Site may provide suitable habitat.	Low	Low	Low
Vascular Plants								
Black Ash (*Fraxinus nigra*)	**Endangered**	**No Status**	Onsite (KAL, 2024)	Predominantly a wetland species found in swamps, floodplains, and fens.	The Site does not appear to contain suitable habitat.	High	High	High
Butternut (*Juglans cinerea*)	**Endangered**	**Endangered**	Within 5 km of Site (MNRF, 2024a)	Commonly found in riparian habitats but is also found on rich, moist, well-drained loams and well-drained gravels, especially those of limestone origin.	Riparian forests along the south tributary may provide suitable habitat.	Moderate	Moderate	Low Not observed on the Site

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1 The potential for occurrence of protected habitats and individuals within the project area is estimated based on the following considerations:

	Habitat	Individuals
None	It is not possible for the habitat of the species to occur in proximity to the project site	The species is documented as no longer occurring in the ecoregion or could not occur in proximity to the project area.
Negligible	The usage of the project site as habitat is possible but would be highly unlikely/unusual.	Transient occurrence near the project area is possible but is very unlikely.
Low	The project site includes areas that could be used by the species as habitat, but such usage is considered unlikely given the quality of the feature, a lack of individuals in the broader area, or other (relative) site considerations.	Transient occurrence near the project area possible, but the species would be unlikely to use or require the area.
Moderate	The project site includes areas that could reasonably be expected to provide confirmed or defined habitat within a time frame relevant to the project.	The species occurs in the vicinity and could actively use the site, or transient occurrence should be anticipated.
High	The project site includes areas confirmed to actively provide habitat or to constitute habitat based on official habitat description guidance documents.	The species is confirmed as present on, and actively using the site.

2 The potential for negative project interaction with species and/or their habitat is estimated considering both the likelihood of presence and the general details of the project (e.g., timing, extent), and following the definitions below. If the potential differs for habitat and individuals, the higher value is reported, unless otherwise justified

	Habitat	Individuals
None	It is not possible for the species to occupy the site area due to access barriers.	The species is documented as no longer occurring in the ecoregion
Negligible	Negligible habitat potential, or low habitat potential and the project would not be anticipated to alter the habitat.	Negligible occurrence potential for presence, or absence during the entire span of the project.
Low	Low habitat potential, or medium habitat potential and the project would not be anticipated to alter the habitat.	Low occurrence potential for presence, or the project design excludes individuals in a non-harassing manner by default.
Moderate	Medium habitat potential, or high habitat potential and the project would not be anticipated to alter the habitat (as expressed by MECP).	Medium occurrence potential for presence, or the project design excludes individuals in accordance with agency guidelines/directives by default (i.e., outside of mitigation measures prescribed in this report).
High	The project area will alter identified habitat.	The project will interact with individuals.

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Appendix C Black Ash Health Assessment

Black Ash Health Assessment Report Worksheet

To meet requirements of O. Reg 6/24, a report must be submitted to the Ministry of the Environment, Conservation and Parks at SARontario@ontario.ca prior to undertaking an activity that will harm, harass, kill, capture or take unhealthy Black Ash with DBH ≥ 8 cm in the areas of the province where Endangered Species Act, 2007 prohibitions 9(1)(a) apply.

Report Details	
Name of qualified professional preparing the report	Maren Nielsen, BES, EMA
Description of qualifications of qualified professional Supporting documentation attached ☑	Robert Hallett, Dipl.T Maren Nielsen, BES, EMA See attached
Description of the activity that may impact Black Ash, including if the activity is part of a larger activity (e.g., development)	Residential Development
Site name (if applicable) and address	Cardinal Creek Village South, 1296 & 1400 Old Montreal Road, Ottawa, Ontario
Assessment date(s)	July 4, 2024

Number of Black Ash Count of individual Black Ash trees that may be impacted by the activity.	
Count of Black Ash less than 1.37 m in height and/or less than 8 cm DBH	0
Count of Black Ash with a Diameter at Breast Height (DBH) of 8 cm or greater	3

Health Assessment Results

Complete the table below, adding rows as necessary, for each Black Ash assessed that has a DBH of 8 cm or greater.

#	Date of assessment *(yyyy/mm/dd)*	Geographic coordinates *(e.g., UTM or lat/long)*	DBH *(cm)*	Canopy condition rating *(1 to 5)*	Signs of past or present EAB infestation *(y, n)*	Severity of EAB infestation *(low, med, high, n/a)*	Other factors contributing to condition of tree	Severity of other factors *(low, med, high, n/a)*	Determination of health condition *(healthy, unhealthy)*	Detailed description of evidence of health status	File name(s)/ photo identifier(s)
1	2024/07/04	45.49779507°, -75.45549103°	10	1	Yes	Low	None	N/A	Healthy	Healthy: Canopy condition rating of 1 or 2	BA1, BA1-2
2	2024/07/04	45.49776413°, -75.45549596°	8	1	Yes	Low	None	N/A	Healthy	Healthy: Canopy condition rating of 1 or 2	BA2, BA2-2
3	2024/07/04	45.49741428°, -75.45684647°	10	1	Yes	Low	None	N/A	Healthy	Healthy: Canopy condition rating of 1 or 2	BA3, BA3-2

Statement of health determination: By signing below, I attest to the health condition determinations that I have made as a qualified professional in this Black Ash Health Assessment Report.

Signature: _____

BA1-1

BA1-2

BA2-1

BA2-2

BA3-1

BA3-2

Maren Nielsen, BES, EMA

Maren is a Biologist with a background in terrestrial ecology. She has over eight years of comprehensive field, laboratory, and consulting experience through a combination of graduate and undergraduate studies and work experience. Maren assists clients to navigate the land development, ecological restoration, species at risk and fisheries permitting and approvals processes. She carries out field programs for the collection, analysis, and monitoring of soils, water, sediment, fish, and benthos, as well as a variety of vegetation and wildlife surveys and construction monitoring. Maren leads numerous studies including Environmental Assessments (EA), Environmental Impact Studies (EIS), Environmental Constraints Analysis, Headwater Drainage Feature Assessments (HDFA), Existing Conditions Reports, and SAR assessments. Since joining Kilgour & Associates Ltd. in 2023, Maren has worked on a variety of land development and environmental monitoring projects. Maren is a certified wetland evaluator under the Ontario Wetland Evaluation System (OWES).

EDUCATION

Graduate Certificate, Environmental Management & Assessment, Niagara College Canada, 2021

B.E.S Honours Environmental Studies, Environmental Management & Science, York University, 2020

Cert., Sustainable Energy, York University, 2020

PROFESSIONAL QUALIFICATIONS

Qualified Ontario Wetland Evaluator (OWES), 2023

WHMIS, 2023

Standard First Aid and CPR C, 2022

Environmental Professional in-training, ECO Canada, 2021

EMPLOYMENT HISTORY

Kilgour & Associates, Ottawa, ON, Biologist, (May 2023 to present)

Colville Consulting Inc., Niagara, ON, Ecologist & Agrologist, (January 2021 - January 2023)

SAMPLE PROJECT EXPERIENCE

Environmental Impact Studies (EIS) (2021 - Present) Project Manager, Biologist, Ecologist – Field programs and reporting for commercial, industrial, residential, and urban expansion development projects. Field studies such as Headwater Drainage Feature Assessments (HDFA), Species at Risk (SAR) surveys, flora and fauna surveys, and delineation of natural heritage features to determine potential impacts and recommend mitigation measures to minimize/eliminate impacts.

Wildlife Surveys (2021-Present) Project Manager, Biologist, Ecologist – Conducted numerous wildlife surveys including: Breeding Bird Surveys, bird nest sweeps, SAR surveys, Anuran (frog and toad) Surveys, fish habitat assessments, fish removals, and Nightjar Surveys following industry protocol and legislative requirements.

Vegetation Surveys (2021-Present) Project Manager, Biologist – Conducted numerous vegetation surveys following industry protocol and legislative requirements including: Ecological Land Classification (ELC), wetland delineation, Butternut Health Assessments (BHA), Black Ash Assessments (BAA), and tree surveys.

Headwater Drainage Feature / Fish Habitat Risk Assessments (2023-Present) Project Manager, Biologist - An HDFA evaluates surface-water features and watercourses according to hydrology, riparian condition, fish and amphibian populations and habitat, and terrestrial habitat. The protocol identifies the overall functionality of the feature to the watershed and major hydrologic features.

Stittsville South Urban Expansion Environmental Management Plan, Impact Study, HDFA, Tree Conservation Report (2023, 2024) Project Manager, Senior Biologist – Conducted vegetation, surface and

groundwater features and wildlife field studies. Reporting on existing ecological conditions, impacts assessment and recommendation of mitigation measures for a large-scale residential development in the City of Ottawa.

Iqaluit Metals Dump Fisheries and Terrestrial Habitat Assessment (2024) Biologist – Collection of fish and benthos tissue for the measurement of metals and polychlorinated biphenyls (PCBs) in sampling ponds. Terrestrial habitat assessment of metals dump impacts on vegetation and suitability for avian species use.

Ottawa International Airport (YOW) Species at Risk Assessment (2023, 2024) Project Manager, Biologist – Conducted breeding bird surveys, SAR surveys, acoustic bat surveys, and tree inventory. Produced a Species at Risk Assessment Report and Tree Conservation Report.

Camp Fortune Environmental Characterization Report and Environmental Restoration Plan (2023, 2024) Project Manager, Biologist – Completed Ecological Land Classification and botanical inventory, wetland delineation, SAR survey, collected baseline data and prepared associated technical reporting in support of a federal development application.

Rideau Canoe Club Environmental Permitting (2024) Project Manager, Biologist – Obtained necessary permitting from Parks Canada, NCC, RVCA, Transport Canada, and the City of Ottawa in support of new dock construction in Ottawa, ON.

Martindale (J.R. Stork) Bridge Replacement Project (2022) Project Manager, Ecologist – Conduct field studies in support of an Environmental Impact Statement (EIS) to determine the ecological impacts of bridge reconstruction and recommendation of mitigation measures for the construction and post-construction phases in St. Catharines, ON.

Sarah Properties Ltd. Shoreline Residential Development (2022) Project Manager, Ecologist - Collecting baseline data, ecological inventories, breeding bird surveys and bat acoustic monitoring in support of an Environmental Assessment (EA) in Goderich, ON.

Fort Erie Racetrack Redevelopment Project (2021) Ecologist – Collecting baseline data, ecological inventories, and wetland delineation in support of an Environmental Assessment in Fort Erie, ON.

Agricultural Impact Assessments (AIA) and Alternative Site Studies (2021 - 2023) Project Manager, Agrologist – Field programs and reporting conducted for aggregate resource extraction, commercial, residential, urban expansion, recreational, industrial and institutional development projects. Field programs include soil surveys, soil resource evaluations, soil mapping exercises, and assessment of soil productivity for common field crops based on the Canada Land Inventory (CLI) Soil Capability Classification for Agriculture. Studies include the interpretation of agricultural land use policy, inventory and assessment of agricultural resources, land use, identification of prime agricultural lands and areas, and interpretation of agricultural priority of lands.

Minimum Distance Separation (MDS) I & II Formulae Requirements (2021 - 2023) Project Manager, Agrologist – Data collection and evaluation of agricultural operations in relation to proposed development lands to determine appropriate setbacks.

Land Evaluation and Area Review (LEAR) Studies (2021 – 2023) Project Manager, Agrologist – Identification of prime agricultural areas and applied LEAR methodologies in alternative site selection process and the identification of low priority agricultural lands for future development.

Kleinburg Recreational Complex Project (2021 - 2022) Ecologist & Agrologist – Collecting baseline data, ecological inventories, breeding bird surveys and bat acoustic monitoring and technical reporting in support of an Environmental Impact Study (EIS). Collecting agricultural resource data, soil survey, LEAR Study, and determination of agricultural character and priority in

support of an Agricultural Impact Assessment (AIA), City of Vaughan, ON.

CBM St. Mary's Cement Caledon Quarry Project (2022) Project Manager, Agrologist – Completion of soil surveys, agricultural rehabilitation plans, assessment of agricultural capability, and determination of impacts of short and long-term aggregate resource operations on the agricultural system in support of an Agricultural Impact Assessment (AIA) in the Town of Caledon, ON.

Post-Construction Avian and Bat Mortality Monitoring for Pattern Energy and Samsung Renewable Energy (2021) Biologist – Bird and bat mortality surveys and data collection at an onshore wind power project in Chatham-Kent, Ontario, in support of mitigation measures and significant wildlife habitat indicators for future project location selection.

Post-Construction Avian and Bat Mortality Monitoring for Pattern Energy (2021) Biologist – Bird and bat mortality surveys and data collection at an onshore wind power project in Grand Valley, Ontario.

Foley Residential Development Environmental Impact Study (2021) Project Manager, Ecologist - Collecting baseline data, ecological inventories, Ecological Land Classification (ELC) and wetland delineation in support of an Environmental Impact Study in Mulmur, ON.

City of Pickering Urban Boundary Expansion Study (2022) Project Manager, Agrologist – Agricultural Impact Assessment (AIA) study to determine agricultural character, resources, and capability of lands and evaluate impacts of urban expansion on agricultural system in support of land selection process.

Mayfield West Phase 2 Secondary Plan Update, Town of Caledon (2021 - 2022) Agrologist – Soil surveys to determine agricultural capability and value of proposed urban expansion lands in support of an Agricultural Impact Assessment (AIA) study.

Cavanagh Developments Agricultural Characterization Studies (2022) Project Manager, Agrologist – Soil Surveys and assessment of agricultural resources to determine agricultural character in support of Agricultural Characterization Reports and Minimum Distance Separation (MDS) requirements in Ottawa, ON.

Two Sisters Vineyards Expansion Project (2021) Project Manager, Agrologist – Determine impacts on neighbouring proposed residential community from vineyard operations using edge planning techniques in support of an Assessment of Agricultural-Urban Interface, Niagara-on-the-Lake, ON.

Wellington Secondary Plan Urban Boundary Expansion, Prince Edward County (2022) Project Manager, Ecologist & Agrologist - Natural Heritage Study (NHS) collecting baseline data, ecological inventories to determine natural heritage features and habitat present on proposed lands. Agricultural Impact Assessment (AIA) study to determine agricultural character, resources, and capability of lands and evaluate impacts of urban expansion on agricultural system in support of land selection process.

Water Quality Assessment of 6 Mile Creek (2021) Graduate Student – Determine total wetted width and stream flow conditions of 6 Mile Creek in Niagara ON. Data collection of field parameters included pH, temperature conductivity, and Dissolved Oxygen as well as chloride, nitrate, total phosphorus and E. coli.

Robert Hallett, Dipl.

Robert is a biologist with a background in monitoring terrestrial and aquatic environments, with specific experience related to construction monitoring, regulatory compliance, and fisheries mitigations. Robert has worked on a wide variety of projects including fisheries assessments, permitting, fish habitat mapping, species at risk monitoring as well as general environmental monitoring of water quality, sediment quality, fish community, and benthic invertebrate community. With Kilgour & Associates Robert has participated in and led numerous environmental monitoring programs in the greater Ottawa area, Sudbury, Timmins, Thunder Bay, Northern Saskatchewan, and Greater Toronto Area.

Robert has led numerous fish salvage programs in support of various in water works projects including infrastructure projects, land development, stormwater management, as well as habitat construction and restoration. Robert has led species specific monitoring for Cutlip Minnow, River Redhorse, and American Eel. Rob has also participated in large scale radio telemetry and habitat mapping for Lake Sturgeon in Ontario.

Robert has led and participated in broad scale environmental monitoring including wildlife and erosion and sediment control monitoring for large scale construction projects within the Ottawa area. Robert has also participated in the permitting and regulatory compliance monitoring related to the demolition and construction of the old Highway 17 bridge over the Mississippi River, a project that interacted with River Redhorse. Robert is a CAN-CISEC certified inspector of erosion and sediment controls as well as registered Erosion and Sediment Control Practitioner (ESCP-1) and Erosion and Sediment Control Designer (ESCD).

Robert has worked on a wide variety of projects related to fish and fish habitat monitoring for the great lakes and their tributaries. Robert participated in the collection of bathymetric data, fish community and habitat data in support of Wabagishik and Nairn Generating station environmental assessments. Robert has led and participated in the collection of ecological data in support of environmental assessments at the federal, provincial, and municipal level.

EDUCATION

Dipl. Ecosystem Management Technician, Fleming College, Lindsay, Ontario 2011

RECENT TRAINING AND COURSES

Erosion and Sediment Control – Planning and Design, 2022

Erosion and Sediment Control Practitioner 2021

Formal Workplace Inspections, 2020

Workplace Incident Investigations Training, 2020

Workplace Hazards Training, 2020

Due Diligence Training, 2020

Certified Inspector of Erosion and Sediment Controls, 2019

Class I Boat Electrofishing Certificate, 2017

Class II Backpack Electrofishing, 2017

Ontario Butternut Health Assessor, 2014

Standard First Aid, 2020

WHMIS, 2022

Marine Emergency Duties A3, 2010

Pleasure Craft Operators Certification, 2002

EMPLOYMENT HISTORY

Kilgour & Associates, Ottawa, ON, Biologist (2011 to Present)

Mississippi Valley Conservation, Lanark, ON, Watershed Monitoring Technician (Summers 2007 to 2011)

RELEVANT PROJECT EXPERIENCE

Agnico Eagle – Meliadine Waterline and All-Weather Access Road Fisheries and Wildlife Mitigations (2023) Biologist – Implement Department of Fisheries and Oceans best management practices for the protection of fish and fish habitats. Monitored project impacts on the natural environment near Rankin Inlet, NU.

Caivan Communities – Tewin Lands Expansion (2022) Biologist – Led and collected species at

risk surveys and biodiversity inventories for a large land development project within the City of Ottawa. Surveys related to specific species at risk included Eastern Whip-poor-will, SAR bat acoustic monitoring, Eastern Meadowlark and Bobolink.

Cavanagh Construction – Highway 417 Culvert Erosion and Sediment Control inspections (2022) Biologist – Managed and conducted erosion and sediment control inspections related to the rehabilitation and reconstruction of 49 culverts along Highway 417 near Ottawa. Worked closely with contractors and MTO to facilitate the implementation of sediment and erosion control measures for each project site.

Glencore Canada – Acid Neutralization Plant SAR inventories and wildlife mitigation plan (2022) Biologist – Assessed site infrastructure for potential interactions with Species at Risk during construction. Developed a wildlife mitigation plan for the project.

Pearson Developments – Manitoulin Island Development Inventories (2022) Biologist – Conducted species at risk inventories related to the development of a site on Manitoulin Island. Inventories included Eastern Whip-poor-will, Eastern Meadowlark and Bobolink.

City of Sudbury – Species at Risk assessment tool (2022) Biologist – Developed a geo-tool for assessing individual properties for the potential of species at risk based on known species occurrence data and habitat requirements. Species assessed included Blanding's Turtle, Eastern Meadowlark, Bobolink, and Eastern Whip-poor-will.

City of Sudbury – Urban Forest Master Plan (2022-present) Biologist – Assessed the urban forest condition of the city of Sudbury using geospatial and planning data. Helped develop an Urban Forest Master Plan.

EVB Engineering, John Chase subdivision Fisheries Authorization and Butternut Survey (2021) Biologist – Collected baseline data related the DFO Fisheries Authorization and Request for Review. Completed Butternut Health Assessments for the development property.

Kemptville Creek Tributary Habitat Compensation (2015, 2018, 2021) Biologist – Collected data in support of a habitat compensation feature created to support a Fisheries Authorization.

Beckwith Creek Fisheries Authorization Monitoring (2021) Biologist – Completed and collected data in support of a DFO Fisheries Authorization to realign Beckwith Drain.

Cobden Land Development / Environmental Impact Statement, (2021) Biologist – Collected and analyzed data related to an application for site development and DFO Request For Review in Cobden, Ontario.

Canadian Nuclear Laboratory Chalk River Infrastructure Improvements. (2020) Biologist – Monitored and reviewed environmental mitigations related to infrastructure improvements at the Chalk River Nuclear facility.

Strathcona Mill Environmental Effects Monitoring (Spring 2019) Project Biologist – responsible for the collection of fish, benthos, sediment, and water quality related to the Mill EEM program.

Moose Creek Landfill (2019 – 2021)– Project Biologist – completed surveys for species at risk (Eastern Whip-poor-will, Blanding's Turtles, Barn Swallow, Bank Swallow). Conducted an Ecological Land Classification with supporting surveys of woody and non-woody vegetation. Conducted surveys of fish, benthic invertebrates and water quality in adjacent watercourses. All in support of large site developments and a Federal Environmental Assessment.

Barrhaven Conservancy Development monitoring (2020 – ongoing) – Project Biologist – monitoring erosion and sediment controls (ESC) for expansive cut-fill adjacent to the Jock River. Recommended mitigations for managing risks associated with species at risk, and fisheries.

Abandoned Gould Mine Bat Monitoring (Late Summer 2019) Project Biologist – Conducted surveys in support of Species at risk bats and potential hibernacula in northern Ontario.

Timmins West Mine Environmental Effects Monitoring Program (2018 & 2021) – Project Biologist responsible for the collection of data in support of the Timmins West EEM

Umbatta Falls Generating Station Fish Health Assessment (2018 & 2021) Project Biologist responsible for the collection of data and tissue samples for mercury concentrations in fish related to permitting from MECP.

Seabee Gold Mine EEM (2018 & 2021) Project Biologist Assisted with data collection (fish, sediment, water quality, benthos).

Shebandowan Closure Plan Monitoring (Fall 2018) Project Biologist Assisted with data collection (fish, sediment, water quality, benthos)

SFD Bin Building Species at Risk Monitoring – (April 2018 – 2021) – Project Biologist – complete inventories for Species At Risk.

Victoria Project Species at Risk Inventories – (2016 – Present) – Project Biologist/Project Manager, Lead Species at Risk Inventories for Eastern Whip-poor-will and Blanding's Turtle at both the Victoria project site and the Loughborough Lake Benefit Property

Whitson River Fish Habitat Assessment – Project Biologist– (August 2017) – Assess fish habitat in a stretch of the Whitson River for presence of Brook Trout.

Whitewater Lake Subwatershed Study – (April 2017 to 2018t) – Project Biologist – Ensure water sample collection and analysis is conducted on schedule.

Wabagishik Generating Station Fisheries Assessment – (2018 to Present) – Project Biologist– Completed collection of fish and bathymetric data. Conducted Species at Risk inventories for bats, Barn Swallow, Eastern Whip-poor-will and Common Nighthawk..

Nairn Generating Station Studies – (2017 to Present) - Project Biologist–collected data in support of large generating station infrastructure improvements. Surveyed species at risk including bats, Eastern whip-poor-will and Barn Swallow.

Sudbury Smelter Investigation of Cause EEM – (April 2017 to Present) Project Biologist – Assisted with data collection (temperature and periphyton) for the Smelter's IOC EEM.

Totten Mine Investigation of Cause EEM – (April 2017-Present) – Project Biologist – Assisted with installation of temperatures, depth and dissolved oxygen for the Totten Mine IOC EEM.

Whistle Mine Closure Study – (Summer 2016 to June 2017) – Project Biologist – Conduct aquatic assessment (benthic collection, water sampling and fisheries) work related to mine closure plan and responsible for reporting.

KGHM Baseline Aquatic Assessment – (November 2015 – June 2017) – Project Biologist – Responsible for data collection carrying out field work in Fall of 2016.

Nolin Wastewater Treatment Plant Environmental Monitoring Program – (Fall 2016 to June 2017) – Project Biologist – Responsible for benthic and fish collection in fall.

Deepwater Sculpin Lake Sampling – (September 2016) – Project Biologist –Carried out

sampling for deepwater sculpin in five lakes north of Ottawa under contract with DFO.

Monahan Drain (Creek) Rehabilitation – (January 2016 to August 2016) – Project Biologist– Coordinate environmental work (regarding turtle/fish and other wildlife mitigation) with contractor for life of project.

KGHM Northern Pike and water sampling – (Winter 2016) – Project Biologist – Responsible for organizing the collection of Northern Pike tissue samples and water samples for mercury analysis from waterbodies near Worthington Ontario.

Monahan Stormwater Pond Wetland Retrofit – (Summer 2015) – Project Biologist – Coordinate environmental work (fish/turtle protection, goose mitigation etc.) with contractor and City of Ottawa throughout life of project.

Crean Hill and Totten Mine EEM programs – (2015,2018, 2021) – Project Biologist – Responsible for fish collection activities related to the Crean Hill and Totten Mine EEMs conducted in the Spring of 2015, 2018, 2021.

Aquatic Baseline Assessment of Red Pine Lake (Project Biologist - Fall and Winter 2014) - Take sediment and benthic samples from the lake, conduct a fish community assessment of the lake, assist with reporting and data analysis.

Whistle Mine Biodiversity Study, Capreol, ON – (Summer 2014 – Project Biologist) – Design and report on biodiversity study on the Whistle Mine pit cover, Capreol, ON.

Fish and Fish Habitat Assessment of the Kingsview Park Shoreline, Ottawa, ON – (Summer 2014 – Project Biologist) – Conducted fish and fish habitat assessment conducted on Rideau River shoreline near Kingsview Park, Ottawa.

Baseline Aquatic Environmental Assessment, Victoria Creek, ON – (Project Biologist – Fall 2013)Take sediment benthic and fish community samples for the Victoria Advanced Exploration Project..

Earl Armstrong Drive EIS (2014) -Species at risk inventories were undertaken in support of an EIS completed for Morguard property management in Ottawa, Ontario. Bobolink and Butternut were surveyed for using Ministry protocols.

Mahogany Woods Bio-Inventory (2013 and 2014) - Rob inventoried woody and non-woody plants, in addition to birds in the Mahogany Woods natural area, outside Manotick, Ontario, as part of an evaluation of the sensitivity of the woodland feature Inventories included surveys for species at risk including Blanding's turtles, amphibians, and whip-poor-will, following Ministry protocols .

Rockland Marina Pre-Feasibility Studies (2013 and 2014) Rob inventoried woody and non-woody plants, in addition to birds in the surrounding habitats outside Rockland, Ontario. Inventories included surveys for species at risk including, Blanding's turtles, amphibians and whip-poor-will.

Routine Water Quality Monitoring, Stormwater Management Ponds (2012, 2013, and 2014) Rob has been monitoring the quality of water from stormwater management ponds operated by Mattamy Homes in new subdivisions in the City of Ottawa. Water samples are collected using composite samplers, or as grabs, and submitted to analytical laboratories for analysis of total suspended solids and total phosphorus. Sediment and erosion controls are also inspected at the time water samples are collected.

Ottawa Airport Storm Water Pond Outlet Channel Realignment (2013 and 2014) - Rob helped monitor for species at risk before construction of an outlet channel began. Rob searched for Blanding's turtles, and amphibians following ministry protocol.

Arcadia Development Species at Risk Inventories (2012 and 2013) - Rob inventoried

birds, wood and non-woody plants, and species at risk on Arcadia lands as part of an EIS in support of development outside of Kanata, Ontario.

Peterborough Municipal Airport Environmental Assessment (2013) - Inventories for species at risk were undertaken to support an extension to the runway of Peterborough municipal airport.

Mattamy Richmond Species at Risk Inventories (2013) Rob completed multiple inventories for species at risk in support of proposed development outside of Richmond, Ontario. Species included Bobolink, and Amphibians. Ministry protocols were followed.

Carp River Restoration Survey for Species at Risk (2013) The Carp River between Hazeldean Road and Richardson Side Road is about to undergo significant restoration. Rob has been involved in surveys for species at risk including for Blanding's turtles, Least Bittern, and Barn Swallow, following Ministry standard protocols.

Ontario Stream Assessment Protocol (OSAP), (MVC), 2007 to 2011 Ontario Stream Assessment Protocol was completed yearly throughout the Mississippi Valley Conservation watershed.

Watershed Watch, (MVC), 2007 to 2011 Watershed Watch encompassed water quality, baitfish community, sport fish community, and benthos sampling. Total phosphorus samples, turbidity readings, dissolved oxygen and temperature profiles were completed for water quality sampling. Baitfish community sampling consisted of shoreline seine netting. Sport fish community sampling included gill netting in likely spots throughout various lakes. Benthos sampling included shoreline kick and grab samples. Lakes within the MVC watershed were monitored on a five year cycle.

Brook Trout Index Netting, (MVC), 2007 & 2008 Brook Trout were gill netted in the MVC watershed lakes to test for the health of the population. Seine netting was also completed in an effort to classify the baitfish community in various lakes.

Ontario Benthos Biomonitoring Network, (MVC) 2007 to 2011 OBBN Protocol was completed yearly throughout the MVC watershed.

Ottawa River Muskellunge Spawning Netting (MVC), 2008 to 2011 Seine netting was completed in likely spawning areas in search of young of the year Muskellunge in the Ottawa River.

Municipal Drains Classification Project (MVC), 2010 & 2011 Backpack electrofishing was completed in municipal drains throughout the MVC watershed.

Cold Water Stream Characterization (MVC), 2007 to 2011 Stream morphology and electrofishing were completed yearly in cold water streams throughout the MVC watershed in an attempt to classify various cold water streams.

Provincial Water Quality Monitoring Network (MVC), 2007 to 2011 Provincial Water Quality Monitoring Network collection protocol was completed within the MVC watershed yearly. Water samples were taken in various rivers throughout the MVC watershed

Provincial Groundwater Monitoring Network (MVC), 2007 to 2011 Depth and temperature readings were taken year- round at various monitoring stations throughout the MVC watershed.

Biocriteria Project for Eastern Ontario (MVC), 2010 & 2011 OBBN and aspects of OSAP combined as a bio-criteria monitoring effort. Stream morphology and electrofishing from OSAP and benthic community sampling following OBBN protocol comprised the bulk of the monitoring effort. SAR sampling for Eastern Pond Mussel, Rainbow Mussel, Bridle Shiner, Pugnose Shiner, and Rapids Clubtail, was completed.

Appendix D iTree Canopy Assessment

iTree Canopy Analysis

based on 100 points distributed randomly across the Site

Land Cover Distribution				
Land Cover Type	Full Site (Existing)		Full Site (Post-Development)	
	Area (ha)	Area (%)	Area (ha)	Area (%)
Tree	12.74 ± 2.33	23.00 ± 4.21	24.38 ± 2.75	44.00 ± 4.96
Non-Tree (All other surfaces)	42.67 ± 2.33	77.00 ± 4.21	31.03 ± 2.72	56.00 ± 4.96
Total	**55.41**	**100%**	**55.41**	**100%**

Tree Benefit Estimates: Carbon						
Sequestration	Full Site (Existing)			Full Site (Post-Development)		
	Carbon (t) ± SE	CO2 Equiv. (t) ± SE	Value (CAD) ± SE	Carbon (t) ± SE	CO2 Equiv. (t) ± SE	Value (CAD) ± SE
Sequestered annually in trees	39.00 ± 7.14	142.99 ± 26.16	$10,442 ± 1,911	74.61 ± 8.42	273.55 ± 30.86	$19,4976 ± 2,254
Total stored in trees (Note: this benefit is not an annual rate)	979.39 ± 179.20	3,591.10 ± 657.07	$262,235 ± 47,981	1,873.62 ± 211.37	6,869.93 ± 775.03	$501,667 ± 56,596

Tree Benefit Estimates: Air Pollution				
Pollutant Removed Annually	Full Site (Existing)		Full Site (Post-Development)	
	Amount (kg) ± SE	Value (CAD) ± SE	Amount (kg) ± SE	Value (CAD) ± SE
CO - Carbon Monoxide	12.90 ± 2.36	$8 ± 1	24.68 ± 2.78	$15 ± 2
NO_2 - Nitrogen Dioxide	64.54 ± 11.81	$2 ± 0	123.47 ± 13.93	$5 ± 1
O_3 - Ozone	686.19 ± 125.55	$125 ± 23	1312.7 ± 148.09	$239 ± 27
SO_2 – Sulfur Dioxide	64.46 ± 11.79	$0 ± 0	123.31 ± 13.91	$1 ± 0
PM2.5 - Particulate Matter <2.5 µm	33.91 ± 6.20	$261 ± 48	64.87 ± 7.32	$500 ± 56
PM10 - Particulate Matter 2.5 – 10 µm	243.84 ± 44.61	$750 ± 137	466.47 ± 52.62	$1435 ± 162

Tree Benefit Estimates: Hydrological				
Benefit	Full Site (Existing)		Full Site (Post-Development)	
	Amount (l) ±SE	Value (CAD) ± SE		
Avoided Runoff	107.04 ± 19.58	$360 ± 66	204.76 ± 23.10	$688 ± 78
Evaporation	8,831.45 ± 1,615.90	N/A	16,894.94 ± 1,906.01	N/A
Interception	8,875.52 ± 1,623.96	N/A	16,979.26 ± 1,915.52	N/A
Transpiration	13,685.05 ± 2,503.96	N/A	26,180.09 ± 2,953.51	N/A
Potential Evaporation	67,148.77 ± 12,286.25	N/A	128,458.52 ± 14,492.08	N/A
Potential Evapotranspiration	67,148.77 ± 12,286.25	N/A	128,458.52 ± 14,492.08	N/A