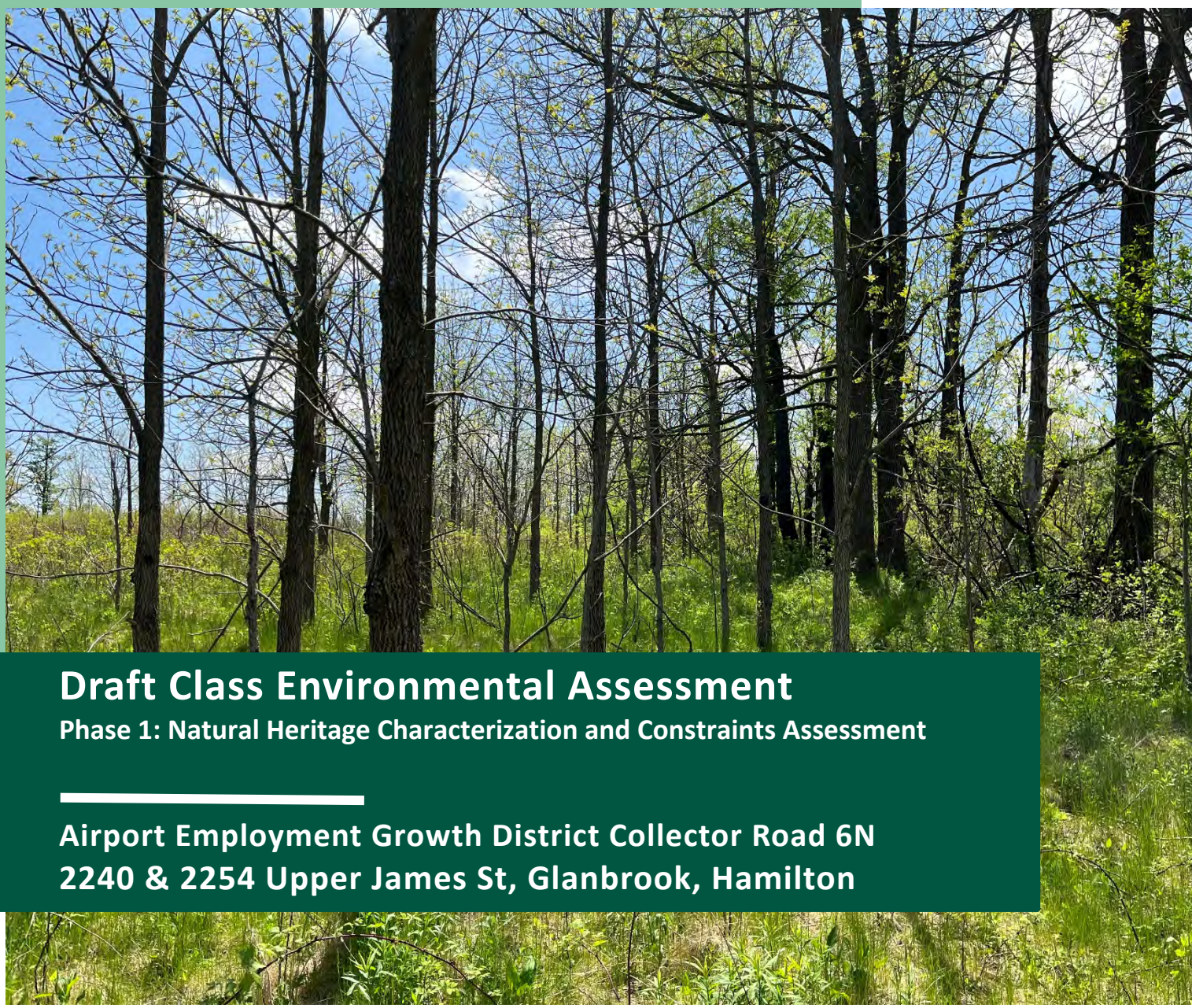

Draft Class Environmental Assessment

Phase 1: Natural Heritage Characterization and Constraints Assessment

Airport Employment Growth District Collector Road 6N
2240 & 2254 Upper James St, Glanbrook, Hamilton

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January 27, 2023

TABLE OF CONTENTS

TABLES

MAPS

FIGURES

APPENDICES

This document, Draft Class Environmental Assessment Characterization and Constraints Report was prepared by Dougan & Associates for Panattoni Capital Inc. on January 27, 2023. The purpose of this document is to provide a preliminary ecological characterization for the Upper James Class EA study area and address preliminary constraints for the proposed road development ahead of the future class EA.

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of ***every place.***

1. INTRODUCTION

1.1 PROPERTY LOCATION

Dougan & Associates (D&A) was retained by Panattoni Capital Inc. to complete the natural heritage assessment as part of the Class Environmental Assessment (EA) for the Airport Employment Growth District Collector Road 6N, located at 2240 & 2254 Upper James St., Glanbrook, Hamilton. Located in the City of Hamilton, the study area is 22.89 acres and includes active agricultural fields, cultural/anthropogenic and natural areas (Map 1).

Most of the site is located west the current Hamilton Street Railway (HSR) Mountain Transit Centre. The site is composed of a mixture of natural and cultural areas including cultural meadows, woodlands, hedgerows, and active agricultural fields.

1.2 STUDY PURPOSE & OBJECTIVES

The Class EA is intended to support the Airport Employment Growth District Transportation Master Plan Update which is being prepared by the City of Hamilton for the creation of a new road (6N Collector) that will connect Dickenson Road with Upper James Street in the vicinity of the Hamilton Street Railway (HSR) Mountain Transit Centre, passing through multiple properties including the Dickenson lands and either the Panattoni Upper James property (options 2 and 3 – the Talbot Lane Extension, both go south of the HSR Mountain Transit Centre) or private lands that are currently used as a garden center (options 1 and 4 both go north of the HSR Mountain Transit Centre). This road will consist of a 36 m wide road corridor and will be a collector level road within the City's road network.

Currently there are four road alignment options being considered that are illustrated on Map 7. The study area for this report includes each of these road options plus 120 metre "adjacent lands" per the Provincial Policy Statement (Government of Ontario, 2020a).

This Phase 1 report characterizes the study area from a natural heritage perspective and identifies key ecological constraints. A forthcoming Phase 2 impact assessment will be completed following the confirmation of a selected road alignment option.

It should be noted that this study includes terrestrial natural heritage data collected between 2019 and 2022 within 9236 and 9322 Dickenson Road and 2210 Upper James, and data collected in 2022 for each of the properties overlapping the study area. Access to 2136 Upper James Street (north of the transit centre) was not granted, so these lands were not surveyed directly. This property was characterized through interpretation of aerial imagery and visual observations from the neighboring property for which access was granted by the City.

Aquatic assessments were completed by Geoprocess Research Associates (GRA) between 2019 and 2022 for each of the watercourses within the study area. Their methods and findings are summarized in this report; a detailed memo titled "*2240 and 2254 Upper James Street, Hamilton, ON Headwater Drainage Feature Assessment*" dated January 17, 2023 was completed by GRA and is provided under separate cover.

1.3 AGENCY LIAISON

Discussions with the City of Hamilton and Niagara Peninsula Conservation Authority (NPCA) were undertaken in Spring of 2022 to determine an appropriate Terms of Reference (ToR) for this study based

on the natural heritage constraints and proposed activities. Comments were received from the City on July 31, 2022 and a revised ToR was submitted to address these comments (Appendix H). This report is intended to satisfy some of the requirements of the ToR, with the full assessment of potential impacts and recommended mitigation measures to be completed following the confirmation of preferred road alignment option, detailed design and activity specifics.

2. METHODS

2.1 BACKGROUND REVIEW

Species at Risk Screening

A desktop screening for Species at Risk (SAR) records within approximately 1km of the subject lands was completed using the online provincial NHIC database and research-grade observations on the citizen science websites: iNaturalist and eBird. Data for the area was also requested from the Ontario Breeding Bird Atlas (2021–2025-point count data) which covers an approximate 10 km area around the subject lands. In addition, species record data for the study area and adjacent lands was requested from the Hamilton Natural Heritage Database through the Hamilton Conservation Authority (HCA).

2.2 FIELD VISITS

Dougan & Associates staff visited the Upper James EA property multiple times in 2019-2022 to confirm and document natural heritage conditions. The purpose of the visits was to verify and record Ecological Land Classification (ELC) conditions, record seasonal plant and wildlife species encountered, conduct targeted Breeding Bird and Breeding Amphibian surveys, and review habitat within and adjacent to the study area for potential Significant Wildlife Habitat (SWH) and SAR (bats, Butternut trees, etc.). A summary of the timing of visits and staff involved is provided in Table 1 below.

Table 1. Site Visit Details

Date	Staff	Purpose of Visit
April 25, 2019	Kristen Beauchamp	Nocturnal Amphibian Call Surveys (NACS)
May 15, 2019	Carl-Adam Wegenschimmel	Active Snake Search
May 21, 2019	Zack Harris	Spring Ecological Land Classification (ELC)
May 24, 2019	Zack Harris	NACS, ELC
June 26, 2019	Heather Schibli	Site Visit
July 18, 2019	Zack Harris	Summer ELC
August 26, 2019	Carl-Adam Wegenschimmel	Site Visit
March 16, 2022	GeoProcess	HDF Visit 1
April 14, 2022	Zack Harris	NACS
May 4, 2022	GeoProcess	HDF Visit 2

Date	Staff	Purpose of Visit
May 15, 2022	Zack Harris	NACS
June 8, 2022	Matthew Iles	Breeding Bird Survey
June 16, 2022	Zack Harris	NACS
June 30, 2022	Matthew Iles	Breeding Bird Survey
	Zack Harris	Feature boundary (woodlands and wetlands) confirmation with City and NPCA
August 3, 2022	Heather Schibli	Tree Survey
	Tess Sprawson	
August 4, 2022	Summer Graham	Tree Survey
	Tess Sprawson	Botanical Inventory
	Zack Harris	
August 5, 2022	GeoProcess	HDF Visit 3
August 5, 2022	Christina Olar	Tree Survey
	Tess Sprawson	
October 12, 2022	Zack Harris	Fall Botanical
December 5, 2022	Tess Sprawson	Tree Survey

2.2.1 VEGETATION

Ecological Land Classification

Vegetation communities within the study area were characterized according to the Ecological Land Classification (ELC) System protocol for Southern Ontario, 1st approximation (Lee et al., 1998). ELC classification and mapping was produced via high quality aerial photo interpretation and confirmation through field surveys. Areas north of the study area (2136 Upper James St) were unable to be accessed due to property ownership. These areas were assessed for ELC classification via air-photo interpretation and surveys from adjacent lands.

All vascular plant species encountered within the canopy, sub-canopy, understory, or ground layer were recorded within each ELC polygon along with relative abundance. Soil texture and moisture regime were also characterized by representative topographic positions (e.g. table lands, valley slope, bottom lands). ELC field data was compiled into an ArcGIS database using Survey 123 and linked to mapped ELC units in an ArcGIS feature class where it could be managed, reviewed, and exported for analysis and reporting.

Botanical Inventory

A botanical survey was carried out simultaneously with the ELC survey. This involved taking an inventory of vascular plant species growing within each ELC polygon. The botanical information was added to the ArcGIS ELC database to facilitate data management, QA/QC, analysis, and mapping. The taxonomy, nomenclature and provincial ranks for each of the species are consistent with the Natural Heritage Information Centre. Plant rarity status will be assessed using COSEWIC rankings for federal status (NHIC, 2021), SARO ranks for Species at Risk in Ontario (NHIC, 2021), and Srank for rarity in Ontario (NHIC, 2021).

Arborist Assessment

An inventory and arborist assessment of all living and dead trees ≥10cm DBH within the subject property was conducted by ISA (International Society of Arboriculture) certified arborists on August 3, 4 and 5, 2022, and December 5, 2022 (Map 3).

Each tree was tagged with a numbered metal forestry tag, its location was mapped using a Trimble Catalyst High Accuracy GPS device, and the following information was recorded for each tree:

- Tag number;
- Species (common name, botanic name);
- DBH, recorded at 1.4m (in cm);
- Canopy diameter (in m);
- Structural condition (high/medium/low);
- Biological health (high/medium/low);
- Preservation priority (high/medium/low);
- Any additional comments.

2.2.2 WILDLIFE

Nocturnal Amphibian Call Surveys (NACS)

Three Nocturnal Amphibian Call Surveys were conducted as per the Marsh Monitoring Protocol (BSC 2009) on April 25, May 24, and June 16, 2019 at stations 1, 2, 3, 4, 5 and 6.

The surveys were completed within MMP recommended breeding windows of April 15- 30, May 15-30 and June 15-30, when the minimum night air temperatures were at least 5°C, 10°C and 17°C respectively. These surveys were completed for an EIS on the adjacent property with an overlapping study area (Map 4). Surveys were repeated in spring 2022 at stations 1, 2, 3, 4 and 5 on April 14, May 15, and June 16, 2022.

Breeding Bird Surveys (BBS)

Two Breeding Bird Surveys were conducted on June 8 and June 30, 2022, by a qualified avian ecologist, as per the Ontario Breeding Bird Atlas (2001) protocol which stipulates that the first survey will take place between May 24 and June 15, and the second survey will take place between June 15 and July 10, and surveys should be carried out at least seven days apart. According to the protocol, surveys should occur between sunrise and approximately 10:00 a.m. and under suitable weather conditions (i.e. light winds, good visibility, and no heavy rain). Species and numbers of individuals were recorded and mapped, along with any breeding evidence exhibited. Different levels of breeding confidence were assigned based on breeding evidence and the OBBA protocol. Regional status will be assessed using COSEWIC rankings for

federal status (NHIC, 2021), SARO ranks for Species at Risk in Ontario (NHIC, 2021), and Srank for rarity in Ontario (NHIC, 2021), along with local significance (HCA, 2014).

Targeted Snake Survey

Snake surveys were undertaken on May 15 and May 29, 2019, to search for any active snakes on site as well as for features that may represent hibernacula. The surveys were conducted during warm (at least 15°C) and sunny conditions with light winds, when snakes would be most likely active in spring. The surveys involved searching all areas of the site and adjacent lands, taking care to look under debris and rotting logs in order to find snakes and other herpetofauna (e.g. salamanders). Suitable locations for reptile basking were also searched repeatedly during each of the other site visits for botanical and ELC. Reptile observations were supplemented by incidental observations throughout all site visits. Targeted reptiles surveys were not undertaken in 2022 but were noted as incidental observations.

Incidental Wildlife

All wildlife encountered incidentally during the completion of other surveys on site were recorded and assessed for significance.

2.2.3 Headwater Drainage Features

Aerial photographs of the study area were reviewed to identify potential locations of headwater drainage features within the subject property prior to conducting fieldwork. Fieldwork for the HDF assessment comprised an early spring field visit to verify the presence/absence of flowing headwater drainage features. Headwater drainage features were assessed following the 2014 HDF Guidelines. A total of three (3) visits were completed by GeoProcess staff between March and August 2022 in order to characterize the features and determine the appropriate management recommendation.

Please refer to GRA's "*2240 and 2254 Upper James Street, Hamilton, ON Headwater Drainage Feature Assessment*" memo for details.

2.3 SIGNIFICANT FEATURES & FUNCTIONS

Species at Risk

The SAR records gathered through background review (2.1) were assessed for their potential to occur within the subject lands based on habitat presence and incidental species observations during field investigations.

Significant Wildlife Habitat

During all field investigations, habitats on site were screened to determine if the study area merits designation as SWH based on the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (OMNRF, 2015).

Significant Woodlands

The boundaries (dripline) of two woodland features within the study area were delineated and confirmed by D&A and City of Hamilton staff on August 9, 2019. These features are shown as wooded areas on Map 2, and are Key Natural Heritage Feature Woodland and Linkage, respectively, on the City's Official Plan Schedule and Airport Employment Growth District Secondary Plan. A significant woodland assessment was completed for all potential significant features (FOD, CUW, SWD, etc) within and adjacent to the Upper James EA study area.

Linkages

Linkages are defined in the Urban Hamilton Official Plan (UHOP) and Rural Hamilton Official Plan (RHOP) as follows:

Natural areas within the landscape that ecologically connect Core Areas. They are avenues along which plants and animals can propagate, genetic interchange can occur, populations can move in response to environmental changes and life cycle requirements and species can be replenished from other natural areas. Conserving Linkages also protects and enhances Core Areas.

(City of Hamilton, 2012)

A linkage assessment was carried out for the site following the City of Hamilton's Linkage Assessment Guidelines (2015) and the Term of Reference for this project (see section 3.3). The linkage assessment was conducted by compiling vegetation and wildlife data collected for the project, and analysis of ELC and wildlife mapping.

Provincially Significant Wetlands

The boundaries of the Twenty Mile Creek Provincially Significant Wetland Complex within the study area were reviewed in spring 2022 during spring botanical and ELC surveys, and updates to the boundary were completed in June 2022. These updates were based on the Ontario Wetland Evaluation System (OMNR, 2013) approach to delineating wetlands based on vegetation and soils characteristics. The revised wetland boundaries were then reviewed and confirmed with NPCA and City staff on June 30, 2022. A memo describing the changes to the wetland boundary was provided to the NPCA and City on December 5, 2022 along with the wetland shapefiles.

3. FINDINGS

Below is a summary of the key findings for the subject property from the background review and site visits.

3.1 BACKGROUND REVIEW

The background queries (iNat, eBird, NHIC, OBBA, HNHD) resulted in a consolidated list of Species at Risk which was used to assess suitable habitat and the potential to occur within the study area or adjacent lands.

The records from the Hamilton Natural Heritage Database (HNHD) were provided in the form of a natural area inventory (NAI) completed in 2016 on the Upper James Complex.

A full list of species reported by iNaturalist, eBird, OBBA, and the HNHD can be found in Appendix C.

Using the Natural Heritage Information Centre (NHIC) make a map feature, it was determined that there are records of Species at Risk within a 1km grid of the subject site indicating there is a potential for these species to occur on or adjacent to the site. The NHIC grid areas included in the search include: 17NH8783, 17NH8883, 17NH8983, 17NH8782, 17NH8882, 17NH8982, 17NH8781, 17NH8881, and 17NH8981.The full list of species reported by the NHIC for the study area and their status ranks is provided in Appendix B.

A summary of SAR detected through background review and their typical habitats is provided in Table 2 below.

Table 2. Species at Risk Desktop Screening Summary

Species Name	Common Name	Typical Habitat	Habitat Present? (on lands or within 120 m)
Chelydra serpentina	**Snapping Turtle**	**streams / ponds / lakes**	**Yes**
Chimaphila maculata	Spotted Wintergreen	Dry oak-pine sandy woodlands	No
Colinus virginianus	**Northern Bobwhite**	**Savannahs / grasslands / abandoned fields**	**Yes**
Contopus virens	**Eastern Wood-Pewee**	**Woodlands / forest edges**	**Yes**
Crotalus horridus	Timber Rattlesnake	N/A – extirpated	N/A – extirpated
Danaus plexippus	**Monarch**	**Abandoned farmland / roadside / open fields**	**Yes**
Esox americanus	Grass Pickerel	Coastal wetlands / lakes / rivers	No
Hirundo rustica	**Barn Swallow**	**Farmland / shorelines / urban areas / Wooded clearings / Buildings**	**Yes – foraging habitat**
Nicrophorus americanus	American Burying Beetle	N/A – extirpated	N/A – extirpated
Sturnella magna	Eastern Meadowlark	Large grasslands / hayfields	No
Uvularia perfoliata	**Perfoliate Bellwort**	**Forests / woodlands**	**Yes - in polygons 7.1, 7.2, 14**

Of the species reported above, the six bolded species have the potential to occur on or adjacent to the subject lands, due to presence of suitable habitat. Of these, Eastern Wood-Pewee, Barn Swallow (no breeding evidence) and Monarch butterfly were detected during field studies. Butternut (*Juglans cinera*) is an additional Species at Risk that was also recorded on site. See section 3.3 and Appendix E for discussion of the significance of these observations.

3.2 FIELD SURVEYS

3.2.1 VEGETATION

Ecological Land Classification

A total of 19 ELC polygons comprised of nine unique vegetation communities were detected within the study area, as summarized in Table 3 and shown on Map 2. The general characteristics of each polygon as well as the most abundant plant species in each community are described in Appendix A.

Table 3. Summary of ELC Community Series within the EA Study area boundary

ELC COMMUNITY SERIES	POLYGON NO.	TOTAL Ha	Ha within Study Area	% EA STUDY AREA
Cultural		56.42	14.80	76.25
Agricultural	1, 21	29.39	1.35	6.96
Anthropogenic	27, 30	16.47	3.75	19.32
Gray Dogwood Cultural Thicket	24.1, 24.2, 24.3	2.95	2.95	15.2
Hedgerow	9.1, 9.2, 15.2, 26	2.78	1.92	9.89
Mineral Cultural Meadow	13	2.99	2.99	15.4
Mineral Cultural Woodland	23.1, 23.2	1.84	1.84	9.48
Forest		4.16	3.86	19.88
Dry-Fresh Sugar Maple-Beech Deciduous Forest	7.1, 7.2	3.11	3.11	16.02
Dry – Fresh Sugar Maple – Basswood Deciduous Forest	14	1.05	0.75	3.86
Wetland		0.75	0.75	3.86
Mineral Deciduous Swamp	19.1, 19.2	0.75	0.75	3.86
TOTAL STUDY AREA		**61.33**	**19.41**	**100%**

Site Physiography and Topography

The site is positioned within the Haldimand Clay Plain region of Ontario, with the property resting fully on the Clay Plains landform (Chapman & Putnam, 2007). The soils in this area are predominantly Fine-textured glaciolacustrine deposits (silt and clay, minor sand and gravel, massive to well laminated) (Ontario Geological Survey, 2010).

Botanical Inventory

During the botanical inventories, a total of 189 vascular plants were observed, including 167 that were identified to species level. A complete list of species observed is provided in Appendix A. Of the 167

plants identified to species level, 122 (73%) are native to Ontario and 45 (27%) are introduced. The remaining 22 species could only be identified to genus level due to immaturity or lack of identifiable features at the time of the survey. A total of one (1) provincially significant and three (3) locally significant species were observed (Table 4).

It should be noted that in previous versions of the Dickenson EIS (D&A, 2021; under review, submitted December 2022), *Crataegus coccinea var. coccinea* and *C. coccinea var. pringlei* were reported. These have been corrected to *Crataegus holmesiana* based on additional fieldwork conducted in 2022 (Photograph 1). Identifications were based on the Flora of North America (Phipps 2007), Phipps and Muniyamma (1980), and Michigan Flora (Voss and Reznicek 2011) and comparison to reference collections from nearby locations in Hamilton to ensure accurate identification.

Photograph 1. *Crataegus holmesiana* in fruit.

Except for Butternut (*Juglans cinera*), all the species observed in the botanical survey on site are federally and provincially secure and are not considered species at risk (Government of Ontario 2022; COSEWIC, 2022).

Table 4. Significant Botanical Species

Scientific Name	Common Name	COSEWIC 2019	SARO 2019	SRank	Hamilton 2014*	Polygons (See Map 2)
Ambrosia trifida	Great Ragweed				Uncommon	4,5,6.3,7,8,9.1,22
Crataegus holmesiana	Holmes' Hawthorn				Uncommon	4,6.3,7.1,9.1,9.2, 14,15.1, 9, 10
Crataegus macracantha	Large-thorned Hawthorn				Uncommon	9.1
Juglans cinera	Butternut	END	END	S2?		9.2,7.1,7.2,14

The Coefficient of Conservatism (CC) metric was calculated based on the plant species observed to assess the overall habitat quality of the study area. The CC is a value (0 to 10) assigned to native species in Ontario based on their degree of fidelity to a specific vegetation community type (Oldham et al., 1995).

The lower this value, the more likely the plant is to be found in a wide variety of plant community types, representing more disturbed sites, while higher values represent least disturbed and more naturalized sites. The average CC for the Upper James EA study area is 2.74, indicating a relatively low quality and highly disturbed site compared to more natural areas.

Tree Inventory and Arborist Assessment

A total of 417 trees were tagged and assessed within the subject property (Map 3). This included hedgerows, woodland edges and isolated trees on anthropogenic lands. The locations of these trees are shown on Map 3, and the data collected for each tree is provided in Appendix J.

Figure 2 shows the species abundance of all 417 trees surveyed. The most frequently encountered species was Basswood (*Tilia americana*) followed by Black Walnut (*Juglans nigra*). Overall, 363 native trees were observed (90%), 10 non-native trees were observed (2%), and 44 were unidentifiable due to being dead (12 trees) or identifiable to genus level only (32 trees) (Figure 3). None of the identified species are Species at Risk or otherwise significant.

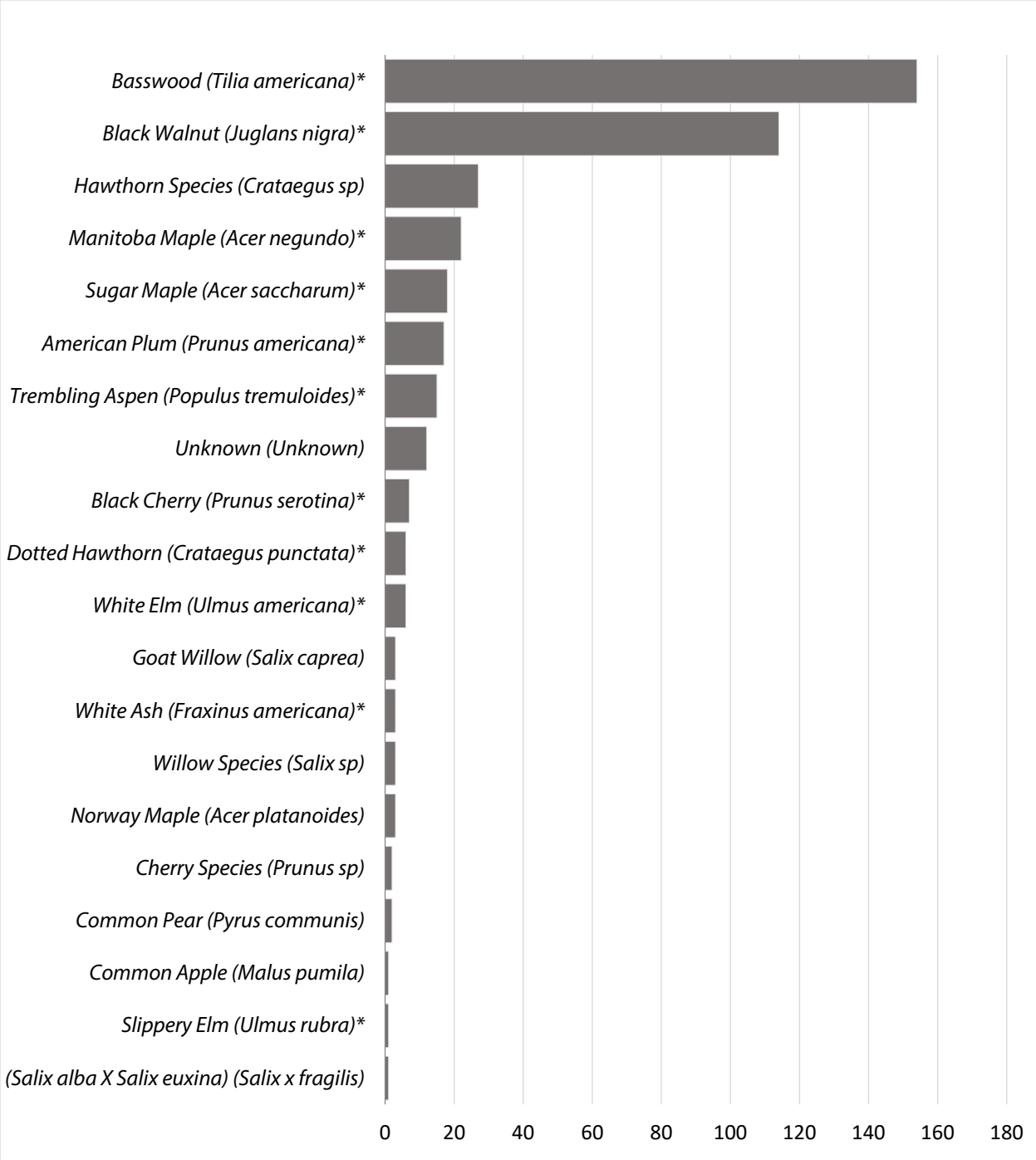

Figure 1. Tree species abundance (* indicates species is native to Ontario)

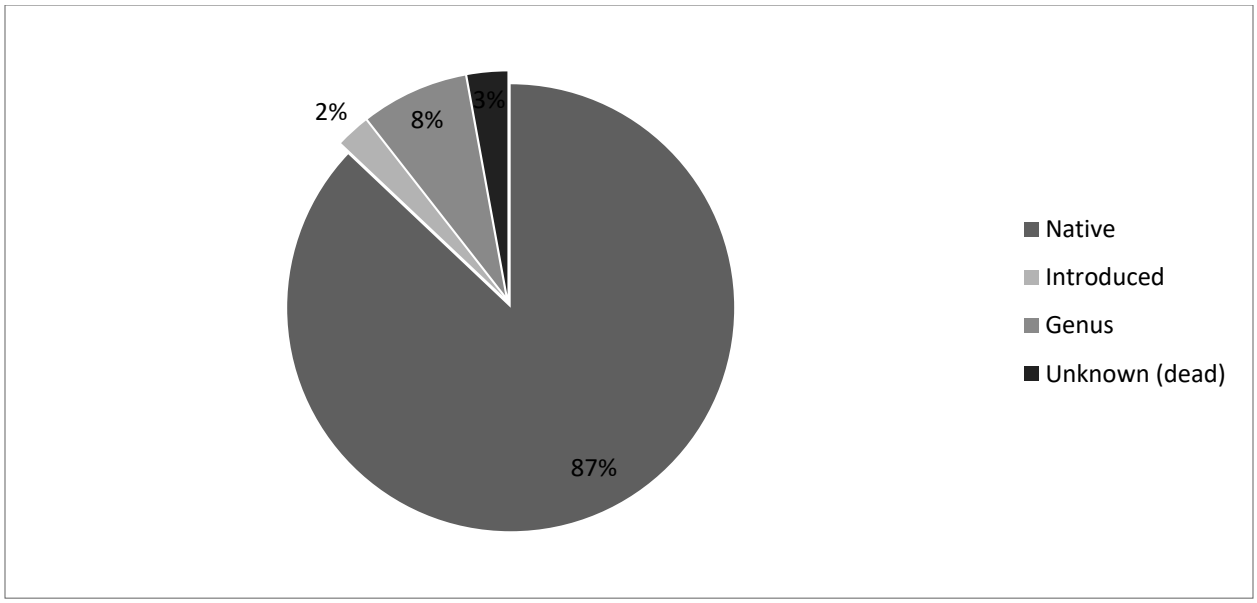

Figure 2. Proportion of native vs. non-native trees.

Trees sizes ranged from 10 cm to 110 cm DBH, with an average size of approximately 26 cm DBH. Most trees were 20-49 cm DBH, with an average of 31 cm (Figure 4). The largest tree (#154) is a Willow species (*Salix sp*) with a DBH of 110 cm. The largest trees overall were comprised of Willow species (*Salix sp*), Black Walnut (*Juglans nigra*), and Basswood (*Tilia americana*).

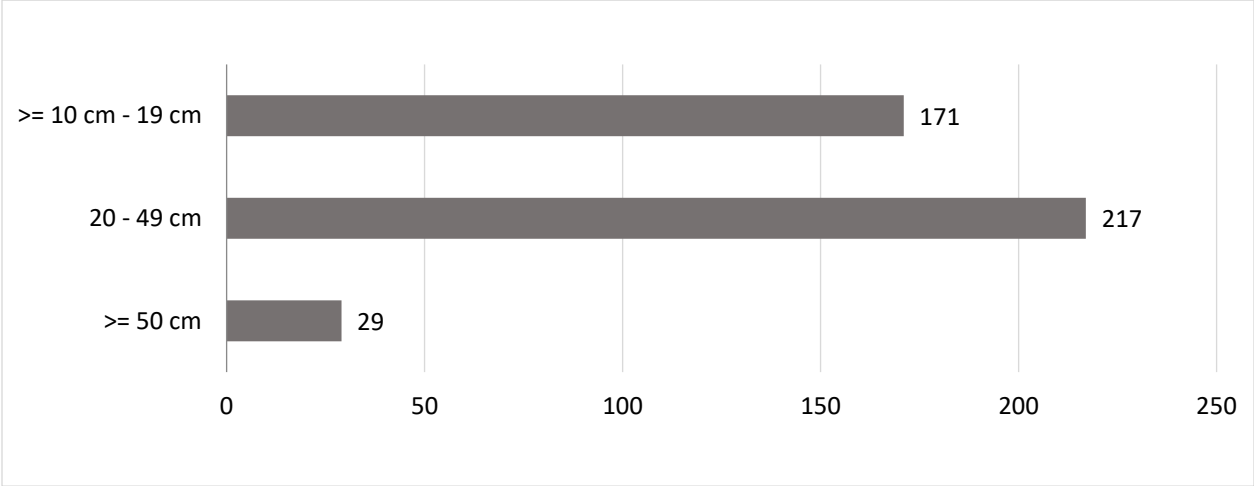

Figure 3. Size (cm DBH) distribution for trees observed within the study area.

Most trees surveyed were in medium structural condition and high biological health (Table 5). Similarly, most trees received a medium rating for structure and high ranking for health. Many of the mature Basswood exhibited structural defects such as included bark, rot or cracks, which placed them in the low structure category. A total of 19 trees were dead.

Table 5. Summary of tree conditions for trees observed within the surveyed areas.

	Structural Condition	Biological Health	Preservation Priority
	(No. of Trees)	(No. of Trees)	(No. of Trees)
High	121	201	269
Medium	204	147	75
Low	71	48	71
Dead	21	21	3
Total	417	417	417

3.2.2 WILDLIFE

Nocturnal Amphibian Call Surveys (NACS)

Six species of amphibians were detected during the surveys in 2019 and 2022: American Toad (*Anaxyrus americanus*), Spring Peeper (*Pseudacris crucifer*), Green Frog (*Lithobates clamitans*), Gray Treefrog (*Hyla versicolor*), Northern Leopard Frog (*Lithobates pipens*) and Wood Frog (*Lithobates sylvaticus*). None of these species are considered significant at the federal, provincial or local level. See Map 4 for the location of the amphibian point count survey stations.

For detailed results of the 2019 and 2022 surveys, please refer to Appendix D.

Breeding Bird Surveys (BBS)

A total of 45 species of birds were detected during the breeding bird surveys and other wildlife surveys; 42 of these species were considered at least possibly breeding on the site. Three species – Tree Swallow (*Tachycineta bicolor*), Northern Rough-winged Swallow (*Stelgidopteryx* serripennis) and Barn Swallow – were observed flying over the site only and were not considered breeding. Note that Barn Swallow is designated as Threatened both federally and provincially but due to being a flyover only (one individual on June 8, two on June 30), this is not considered a significant observation.

Of the 42 species of breeding birds recorded, one of them is introduced (non-native): House Sparrow (*Passer domesticus*). Of the remaining 41 native species, one is SAR: Eastern Wood-pewee, designated Special Concern, at both a federal (COSEWIC 2022) and a provincial level (Government of Ontario 2022). See the "Species at Risk" section for further details.

At a provincial level, all of the 41 native breeding species have been assigned an Srank of either S4 or S5 by the Natural Heritage Information Centre (NHIC 2021), which indicates that their provincial populations are "apparently secure" or "secure", respectively (NHIC 2021). At a local level, 35 of the 42 potentially breeding species are considered common to abundant and widespread in the City of Hamilton (Smith 2014). The six exceptions are Green Heron (*Butorides virescens*), Black-billed Cuckoo (*Coccyzus erythropthalmus*), Cooper's Hawk (*Accipiter cooperi*), Red-bellied Woodpecker (*Melanerpes carolinus*), Alder Flycatcher (*Empidonax alnorum*) and Least Flycatcher (*Empidonax minimus*) which are considered uncommon in Hamilton (Schwetz, 2014).

The Ontario Ministry of Natural Resources and Forestry (OMNR 2000) consider Cooper's Hawk, Least Flycatcher, White-breasted Nuthatch (*Sitta carolinensis*) and Ovenbird (*Seiurus* aurocapilla) to be area sensitive. This indicates that these species require large areas of suitable habitat (i.e. forest) for their long-term survival. All four species were observations/detections of single individuals on one of the breeding bird visits, and as such all were given a "possible" level of breeding evidence (see below).

The highest level of breeding evidence obtained during the surveys was "confirmed breeding" (OBBA 2001); this is determined by locating a nest with eggs (NE), fledglings in a nest (NY), Adults leaving or entering a nest (AE), recently fledged young (FY), adults carrying food (CF), carrying fecal sac (FS), eggs shells in nest (NU) or adult distraction display (DD). Four species were "confirmed", with recently fledged young observed of Black-capped Chickadee (*Poecile atricapillus*), American Robin (*Turdus migratorius*), Red-winged Blackbird (*Agelaius phoeniceus*) and Common Grackle (*Quiscalus quiscula*).

The next highest level of evidence is "probable" which includes observation of pairs of birds (code P) or territorial males (code T), which is defined as a singing male being present at the same location at least seven days apart. This evidence was the highest level obtained for 21 species.

The next highest level of breeding evidence was "possible" breeding (OBBA 2001), as seen with singing males (code S) or birds being present in appropriate breeding habitat during the breeding season (code H); this evidence was the highest breeding level for 17 species.

For a comprehensive list of breeding birds found on the property, along with their level of breeding evidence, see Appendix D.

Incidental Wildlife

Incidental wildlife encountered include White-tailed Deer tracks (*Odocoileus virginianus*), Eastern Gray Squirrel (*Sciurus carolinensis*), Eastern Garter Snake (*Thamnophis sirtalis sirtalis*), Common Green Darner (*Anax junius*), Monarch butterfly , and Least Skipper (*Ancyloxypha numitor*).

Monarch butterfly is considered Special Concern federally and provincially. See section 3.3 for a discussion on SAR. The remaining five incidental species are all federally, provincially, and locally secure and not considered species at risk.

For a comprehensive list of all wildlife found on the property see Appendix D.

3.2.3 Headwater Drainage Features

A total of three (3) HDF reaches were assessed within two (2) drainage features on site (Map 5). Detailed findings can be found in GRA's "*2240 and 2254 Upper James Street, Hamilton, ON Headwater Drainage Feature Assessment*" memo; key findings are summarized as follows:

HDF 1a has a defined channel flowing from the PSW (polygons 5.1-5.4) continuing northeast. It contains sparse wetland vegetation and it is cropped along its entire length. The channel width was 1.6 m at the start and became less defined as it progressed downstream. HDF1a turns into HDF1b when it turns sharply east and follows a dug ditch/swale.

HDF1b is vegetated throughout its riparian zone including few scattered trees and shrubs. Its width was approximately 1.8 m.

Minimal flow was observed in HDFs 1a and 1b during visits 1 and 2, and no flow or standing water was observed during visit 3. Invasive plant species Reed Canary Grass (*Phalaris arundinacea var. arundinacea*) and Purple Loosetrife (*Lythrum salicaria*) were observed during visit 3, along with native American Water Plantain (*Alisma subcordatum*).

HDF2 is a swale that flows northeast across the agricultural field (polygon 21) and exhibited braided and undefined channel characteristics towards the centre of the field and had an average bankfull width of

0.45 m. Vegetation was cropped on both sides of the bank. Minimal flow was observed during visit 1, standing water was observed during visit 2 and no flow or standing water was observed during visit 3.

Based on the 2014 HDF guidelines, Table 6 summarizes the classification for HDFs 1 and 2 (ref. GRA, 2022 Table 1).

Table 6. Headwater Drainage Feature Guidelines Classification System for HDF 1 and HDF 2 (GRA, 2022)

HDF	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat
1a	Contributing Functions-Ephemeral	agricultural practices	Valued Functions	Contributing Functions (no fish habitat)	Valued Functions (wetland habitat upstream)
1b	Valued functions-Intermittent	channelized	Valued Functions	Contributing Functions (no fish habitat)	Limited Functions
2	Contributing Functions-Ephemeral	agricultural practices	Limited Functions	Contributing Functions (no fish habitat)	Limited Functions

Based on the Linking Classification to Management Guidelines (ref. GRA Memo, Figure 2) the recommended management guidelines for HDF-1a/1b and HDF 2 are Mitigation based on valued and contributing hydrology features. Management recommendations for these features will be discussed at the next phase of reporting and are provided in Appendix K.

3.3 SIGNIFICANT FEATURES & FUNCTIONS

Species at Risk

A detailed SAR screening table was completed based on the background review, habitat identified during field surveys, and species records. Desktop results indicate the following species as having the potential to be present on or adjacent to the site:

- Snapping Turtle;
- Barn Swallow;
- Eastern Wood-Pewee;
- Monarch;
- Eastern Small-footed Myotis (*Myotis leibii*);
- Little Brown Myotis (*Myotis lucifugus*);
- Northern Myotis (*Myotis septentrionalis*);
- Tri-colored Bat (*Perimyotis subflavus*)
- Perfoliate Bellwort; and
- Butternut.

Of these species, the following were detected on-site: Barn Swallow, Eastern Wood-Pewee, Monarch, Snapping Turtle and Butternut.

- Barn Swallow (*Hirundo rustica*) is designated Threatened both federally and provincially but were observed flying over study area only (one individual on June 8, two on June 30) and were not considered to be breeding within the study area.
- Eastern Wood-pewee (*Contopus virens*) is designated Special Concern at both a federal (COSEWIC 2022) and provincial level (Government of Ontario, 2022). Two singing males were observed within the study area during the first breeding visit and at least four on the second. At least one individual/territory was within the central deciduous forest woodlot (polygons 7.1 and 7.2), whilst the others were occupying habitat within the associated adjacent deciduous forest communities (polygon 14 and offsite).
- Monarchs were observed in small numbers incidentally during breeding bird surveys. They could likely be found on site during fall migration but in non-significant numbers. This species breeds on Common Milkweed (*Ascelpias syriaca)* which is abundant in polygon 17 (cultural meadow).
- Snapping Turtle is designated Special Concern. One individual was recorded in suitable habitat on the subject lands (Polygons 5.1 - 5.4) in 2015, however no Snapping Turtles were observed during 2019 and 2022 surveys.
- Butternut is Endangered both federally and provincially. Six (6) trees were identified within the study area (Map 2; polygons 7.1, 7.2, 9.2 and 14). The ESA (O.Reg. 242/08 sec. 23.7) provisions for Butternut include a regulated radius of 25 m surrounding the trunk, or 50 m if suitable habitat is present within 25-50 m of the trunk. If site alteration or development Is proposed within the regulated area, further studies including genetic testing and Butternut Health Assessment may be required.

The full SAR screening table can be found in Appendix E.

Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) categories were reviewed on-site during field investigations to confirm habitat (ELC) and/or indicator species presence (OMNRF, 2015). Six candidate and one confirmed SWH category were documented within the study area.

Based on the screening, Candidate SWH with potential to occur within the study area are:

- Bat Maternity Colonies – Large woodlots in northern (polygons 7.1 and 14) portion of study area likely meet snag size/density thresholds, but this has not been calculated. BBBA and SHBA have not been confirmed.
- Turtle Nesting Areas – Turtles are likely present in the central pond (Snapping Turtles were observed in 2015, but not in 2019 – 2022). Therefore, they may be nesting within the study area, most likely along the edges of agricultural fields as there are no other suitable nesting areas (e.g., sand and/or gravel, preferably with a southerly aspect) in the study area.
- Reptile Hibernacula – Snake hibernacula can occur in a variety of landscapes including cultural/disturbed areas. However, no snakes were observed during the active snake search conducted in May 2019. Snakes documented in spring (especially in early spring) can be indicative of nearby hibernacula. Ideal hibernacula habitat (e.g., karsts) are also absent in the

study area. Therefore, although it's possible that snake hibernacula are present, it is unlikely that enough snakes are present to trigger confirmed SWH status.

- Seeps and Springs – Seepage was generally observed in polygons 7.1 and 10. SWH criteria state that two or more seeps/springs are required to confirm SWH. This category is classified as Candidate since two or more seeps were not recorded. Neither polygon 7.1 or 10 will be directly impacted by any of the route options.
- Amphibian Breeding Habitat (Woodland) – 3 indicator species were detected: Spring Peeper, Wood Frog, and Gray Tree Frog. Species thresholds were met at Station 4 (Polygon 5 MAM2-2) with 10+ individuals of each Spring Peeper and Wood Frog. However, MAM2-2 is not a qualifying ELC community for woodland amphibian breeding habitat. Gray Treefrog and Spring Peeper were detected in lower numbers at Stations 1 and 3 but do not meet abundance thresholds.
- Amphibian Breeding Habitat (Wetland) – 3 indicator species were detected: Gray Treefrog, Green Frog and American Toad. Indicator species were detected in low numbers (<10 individuals) and abundance thresholds were not met to confirm SWH
- Special Concern (SC) and Rare Wildlife Species: Snapping Turtle (SC) - species was observed in the man-made pond in 2015 (Polygons 5.1 - 5.4) but was not observed as part of this study between 2019 and 2022. The OMNRF (2015) criteria state that: *"Man-made ponds such as sewage lagoons or storm ponds should not be considered SWH",* however if Snapping Turtles are using it as habitat, it is important to consider it as potential SWH in protecting all life stages of the species.

Based on species records and habitat present within the study area, Confirmed SWH includes:

- Special Concern (SC) and Rare Wildlife Species:
    - Eastern Wood-Pewee (SC) were detected on territory (i.e. breeding) within the woodland (Polygon 10) and likely in the northeast woodlot (Polygon 7.1).
    - Monarch (SC) were detected on site and likely breed on site (Polygons 3, 13, 17). Polygon 17 contained a very high abundance of this species' hostplant, Common Milkweed.

Many the SWH categories for Ecoregion 7E are not represented in the Upper James Class EA lands based on the following:

- Suitable habitat (by ELC category) is not present (e.g. Alvars);
- If suitable ELC habitat is present, it does not meet size thresholds or is not adjacent to other required habitats (e.g. Raptor Wintering Area; Landbird Migratory Stopover Areas);
- Indicator species are not present based on appropriate field investigations (e.g. Waterfowl Nesting Areas; Woodland Area-Sensitive Bird Breeding Habitat);
- If indicator species were present, their numbers and/or diversity do not meet significance thresholds (e.g. Shrub/Early Successional Bird Breeding Habitat);
- The habitat is rare and/or with a long history of use by certain wildlife groups and is known to agencies (e.g. Shorebird Migratory Stopover Area); and
- Confirmed habitat is only identified by MNRF (e.g. Deer Winter Congregation Areas).

The full SWH screening table can be found in Appendix F.

Woodlands

According to the City's Official Plan definitions (Chapter G, Glossary), Significant woodlands are woodland areas that are ecologically important in terms of:

Species composition, age of trees, stand history;

a) Functionally important due to its contribution to the broader landscape because of its location, size, or due to the amount of forest cover in the planning area; and,

b) Economically important due to site quality, species composition or past management history (Government of Ontario, 2020a)

Several woodland features within the study area are shown as Core Areas or Linkages based within the City's natural heritage system (Schedule B). However, these woodland areas are not currently shown as Key Natural Heritage Feature Significant Woodlands on Schedule B-2. According to the City's Official Plan policies and EIS guidelines, woodlands must be evaluated to determine if they meet the Significant Woodland Criteria provided in Chapter G (Glossary).

Significant of woodlands are determined based on several qualities: their size, the presence of interior habitat, proximity to other significant features and aquatic/wetland features, the age of the woodland, and the presence of significant of provincially or locally significant species. Each forest and woodland area within the study area is evaluated in Table 6 below.

Polygons 6.1, 6.2, 6.3, 6.4, 7, 14, and 23.1/23.2 all meet two or more of the criteria required to be considered significant woodlands, as illustrated on Map 5.

The cultural woodland polygons 6.2 and 6.3 are adjacent to the study area and are primarily treed areas established on fill from when the pond was dug. While they do meet the proximity/connectivity and proximity to water criteria because they are adjacent to the PSW, they do not meet the minimum patch size criteria of 2 ha based on 5-10% cover within the planning unit. They are also not highly sensitive features in terms of species composition (i.e. low CC values, generalists, abundant exotic species).

As per Table 7, polygons 7 and 14 meet more than two of the criteria listed, and therefore are considered significant woodlands. These are mature woodlands with a highly diverse vegetation community and associated wildlife habitat functions. Polygons 7.1 and 7.2 are both clearly present on the historic 1952 aerial imagery available from the McMaster Historical Hamilton portal (McMaster University, 2022), indicating they are likely over 100 years old.

Polygon 28 is a small remnant wetland found within polygon 14. As a wetland, this feature meets the crietria for proximity to water, but no other criteria are met. For this reason, it does not qualify as a significant woodland.

Cultural woodland polygons 23.1 and 23.2 were also assessed. Both met the criteria for proximity to water, and proximity/connectivity as they are adjacent to a PSW feature. Since these features were not directly surveyed it is not possible to comment on the quality of the habitat or vegetation present, however they do meet the criteria to qualify as significant woodland.

Table 7. Significant Woodland Screening

Criteria	Description	6.1	6.2	6.3	6.4	7.1/ 7.2	14	28	23.1/ 23.2
Size	Minimum patch size of 2 ha, minimum average width of 40m					x			
Interior Forest	Woodlands that contain interior forest habitat. Interior forest habitat is defined as 100 metres from edge.								
Proximity/ Connectivity	Woodlands that are located within 50 metres of a significant natural area (defined as *wetlands* 0.5 hectares or greater in size, ESAs, PSWs, and Life Science ANSIs)	x	x	x	x		x		x
Proximity to Water	Woodlands where any portion is within 30 metres of any hydrological features, including all streams, headwater areas, wetlands, and lakes.	x	x	x	x	x	x	x	x
Age	Woodlands with 10 or more native trees/hectare greater than 100 years old.					x			
Rare Species	Any woodland containing threatened, endangered, special concern, provincially, or locally rare species.					x	x		
	Total Criteria met:	2	2	2	2	4	3	1	2

x – criteria met based on assessment

Linkage Assessment

The Urban Hamilton Official Plan (UHOP) identifies Linkage Areas within the study site. These were later refined within the Airport Employment Growth District Secondary Plan, as shown on Figure 4 and Figure 5.

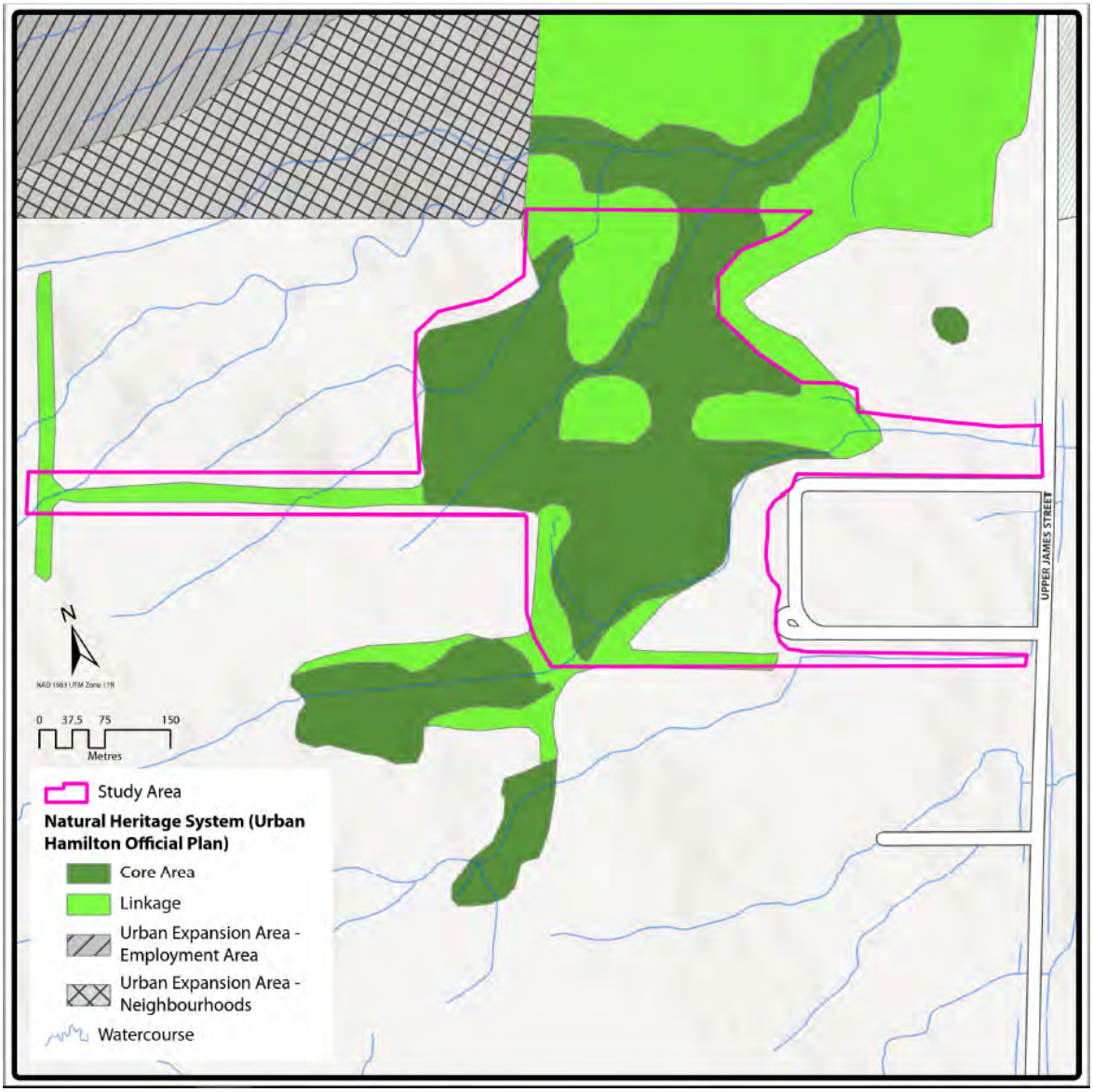

Figure 4. UHOP Linkage mapping

The areas identified on UHOP Schedule B (Natural Heritage System) within the study area include:

- PSW (polygons 3 and 5.1 – 5.4) as a core area and bordering woodlands (polygon 6.1 and 6.4) as linkages
- polygons 7.1, 7.2, 8, 13, 19.1 as core area
- Sections of polygons 19.1, 19.2, 23, 24 and 26 as linkage areas

- Hedgerows extending west from the study area and turning south (polygon 9.2) as linkage.
- Hedgerow polygon 15.2 is mapped as a linkage extending east from the PSW towards Upper James Street

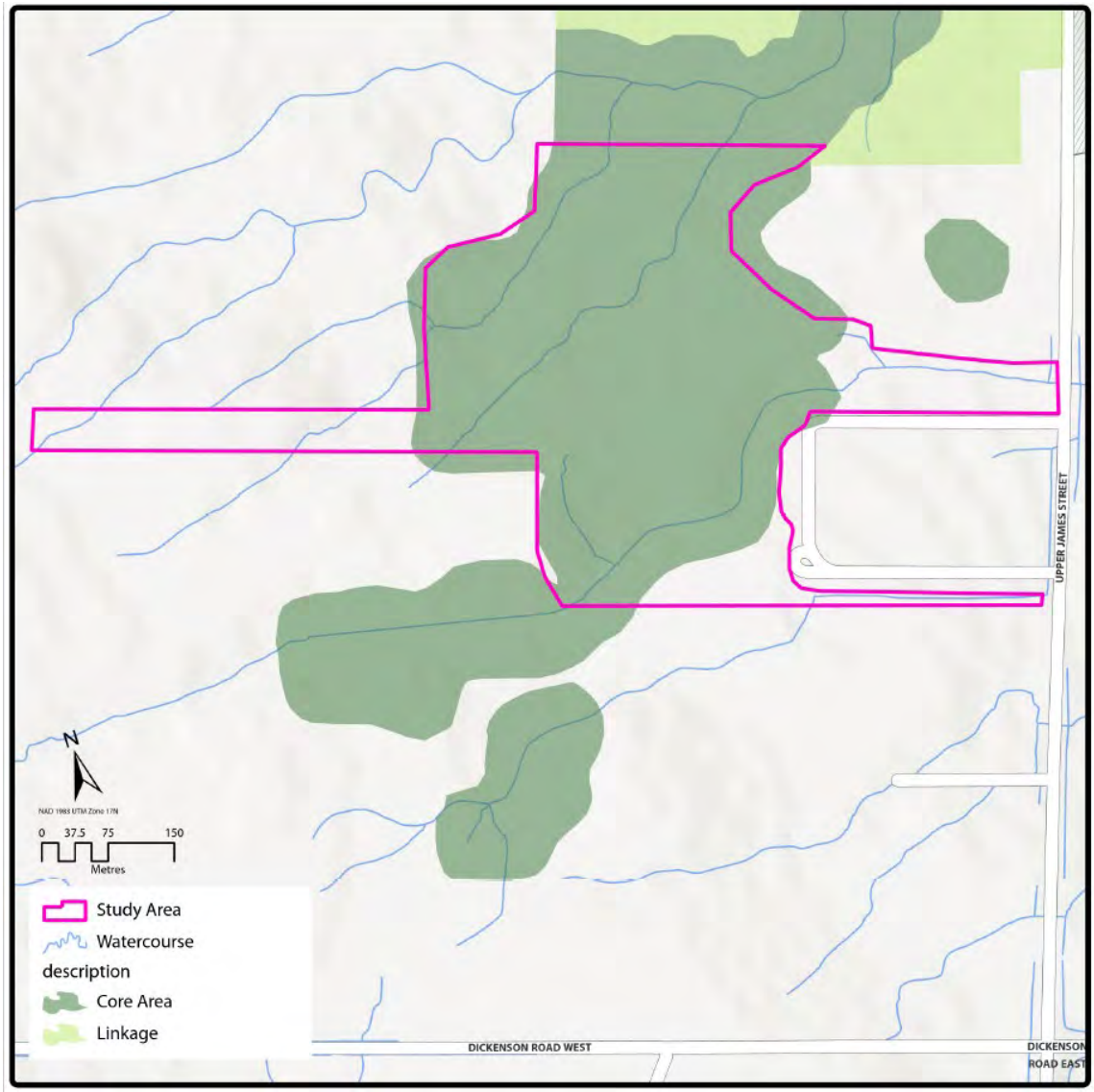

Figure 5. AEGD mapping

In contrast, the AEGD mapping shows the PSW (polygons 3 and 5.1 – 5.4) and bordering woodlands (polygon 6.1 – 6.4), as well as the contiguous woodlands and PSW to the north and east of the subject property (polygons 7.1, 7.2, 8, 13, 14, 19, 23, and 24) as Core Area. The land north of this core area and outside of the EA study area is mapped as linkage area. Hedgerows (eg. Polygons 9.1, 9.2, and 15.2) are mapped as Hedgerows and are not indicated to be linkage features. UHOP and AEGD mapping can also be compared on Map 6.

A linkage assessment needs to assess the ecological functions, condition, viability, and integrity of the linkage features, considering connectivity, scale, size, condition, surrounding land use, and any other relevant information. See Section 3.2.1 for ELC findings and Section 3.2.2 for wildlife findings.

Polygon 9.2 - Hedgerow

This feature is 1.6 ha in size and is in the west of the Upper James EA study area, extending down into the Dickenson EIS study area (Map 2); it is a linear hedgerow ranging in width from approximately 14 to 25m and is approximately 800m in length. As determined through the Dickenson Road EIS (D&A, 2022, in review) this hedgerow provides connectivity between ELC polygon 10, a Dry-Fresh Sugar Maple – Beech Deciduous Forest in the southwest corner of the adjacent Dickenson property to ELC polygon 7.1, a Dry-Fresh Sugar Maple Deciduous Forest in the northeast corner of the study area. Another hedgerow connects to this feature at the north-west corner of the site and extends towards Twenty Road West; this portion was not investigated in detail.

The ecological condition of polygon 9.2 is moderate, with a largely mature native tree canopy including Basswood and Sugar Maple but an understory of non-native invasive shrub species dominated by European Buckthorn. There is one existing gap in the canopy cover approximately 35m wide close to the intersection of this feature with ELC community 10. Two stems of one significant tree species, Butternut, were found within this feature close to ELC community 7.1. Several locally significant plants were also present, including numerous Holmes' Hawthorn (*Crataegus holmesiana*), and Great Ragweed (*Ambrosia trifida*). The Holme's hawthorn that were large enough were included in the tree survey (See Map 3). Eastern Wood-Pewee was observed incidentally within the vicinity of polygon 9.1/9.2 (Map 4). In terms of functions, this feature provides tree cover for movement between the woodland and several HDFs. This feature may also function as breeding habitat for wildlife species tolerant of edge habitat. Due to its role in connecting woodlands and PSW on the landscape, and relatively high ecological value, polygon 9.2 should be considered a Linkage Feature.

Polygon 15.2 – Hedgerow

Polygon 15.2 is a hedgerow running between 2240 and 2254 Upper James Street and the HSR Mountain transit center (Map 2). This hedgerow initiates at the PSW/significant woodland feature in the center of the site, but vegetation cover becomes sparse as it extends east for 150 m before it meets Upper James St., limiting the potential for linking of NH features. On average, this feature is 230 m long and 15 m wide.

This feature also contains a small meadow marsh, polygon 25, which is noted as being highly disturbed and anthropogenic in nature.

As mentioned before, linkage functions of this feature are limited as wildlife would need to cross Upper James Street in order to connect to natural areas on the east side of the road. Although there is potential for this to occur, this linkage is considered broken. For connectivity on the landscape, HR polygon 26 offers similar linkage connections North of the transit center. This hedgerow is not mapped as a linkage in the official plan but may provide connection from the significant woodland feature (polygon 7.1/7.2) to the forested area continuing east of the transit center and Upper James Street.

Polygon 14 – FOD5-6

Polygon 14 runs south from the significant woodland polygon 7.1/7.2 to connect to the woodlands surrounding the PSW. This is a mature woodland with a highly diverse vegetation community and associated wildlife habitat functions. On average, this feature is 377 m long and 31 m wide. This feature is expected to provide a variety of valuable linkage and habitat functions for wildlife and is also considered candidate Significant Wildlife Habitat. Due to its role in connecting woodlands and PSW on the landscape, and relatively high ecological value, polygon 14 should be considered a Linkage Feature.

Polygons 19.1, 19.2, 23, 24 and 26 – CUT/CUW and MAM2-2

These features are present on the north property that was not accessible for detailed surveys. Because of this, an accurate linkage assessment of these features is not currently possible.

Polygons 6.1 and 6.4 – CUW

The cultural woodland polygons are primarily tree areas established on fill from when the pond was dug. These features surround and are adjacent to the PSW formed by polygon 5. They are also not highly sensitive features in terms of species composition (i.e. low CC values, generalists, abundant exotic species). These woodlands do connect to polygon 14 and create a small buffer for the PSW edges, however in general these features provide little or low-quality habitat and function and should not be considered high-quality linkages on the landscape.

Provincially Significant Wetlands

The boundaries of the Twenty Mile Creek Provincially Significant Wetland Complex within the study area were reviewed in spring 2022 during spring botanical and ELC surveys, and updates to the boundary were completed in June 2022. For details on how the extent of wetlands were determined for the study area please refer to the memo in Appendix L.

Aquatic Ecosystems

GeoProcess found that HDFs 1a and 1b are ephemeral and HDF2 is intermittent. HDFs 1a, 1b and 2 contain no fish habitat and were assessed as 'Contributing Functions'. Details can be found in the HDF assessment memo submitted by GeoProcess (GRA, 2023).

4. POLICY FRAMEWORK

The following is an assessment of policies that have implications for development activities of the property. A summary of the relevant portions of the below-mentioned policies is available in Appendix G.

Policies included in this review include:

Federal

- Species at Risk Act (2002)
- Migratory Bird Convention Act (1994)

Provincial

- Provincial Policy Statement (2020)
- Endangered Species Act (2007)
- Conservation Authorities Act / O. Reg. 150/06 (2006) and NPCA policies

Local

- Urban Hamilton Official Plan (2013)
- Airport Employment Growth District (AEGD) Secondary Plan
- City of Hamilton Urban Woodland By-Law (14-212)

4.1 FEDERAL

Species at Risk Act (2002)

Site Implications: Within the EA Study Area, SARA only applies to listed aquatic species and migratory birds that are also listed in the *Migratory Birds Convention Act, 1994* (Government of Canada 1994).

Migratory Bird Convention Act (1994)

Site Implications: Incidental take of migratory birds, nests or eggs must be avoided by limiting activities during sensitive periods and migration measures to ensure appropriate nesting areas are re-established on the site. Tree and vegetation clearing should not take place within the active nesting season between approximately April 1 and August 15. If the areas proposed for removal are thoroughly checked during the active breeding season for bird nests by a qualified biologist during the construction phase, and no nests are found, then construction may be permitted. Although nesting activity outside of this timing window is unlikely, if activities are completed that disturbed or destroyed protected birds, nests, or eggs at any time of year the client, will still be considered to be in contravention with the Migratory Birds Convention Act and may be subject to penalties or fines.

For application of the Migratory Birds Convention Act (MBCA 1994), 34 of the 42 species recorded as at least possibly breeding are protected by the Act. As such, it is illegal to harm or kill these species, or to harm or destroy their nests and nesting habitat. The nine species that are afforded no protection from the Act are Wild Turkey, Cooper's Hawk, American Crow, Blue Jay, House Sparrow, Brown-headed Cowbird, Red-winged Blackbird and Common Grackle. Note that Wild Turkey, Cooper's Hawk and Blue Jay are afforded protection by the provincial fish and wildlife Conservation Act.

4.2 PROVINCIAL

Endangered Species Act (2007)

Site Implications: Six (6) Endangered or Threatened species were identified or have high habitat suitability within the study area. These species are afforded habitat protection under the Endangered Species Act (ESA), including:

- Barn Swallow: Although Barn Swallow were not found to be nesting during the 2022 surveys, there is potential for them to initiate nesting in 2023. The small wooden structures located around the pond immediately west of the study area provide suitable habitat for these species, and if they are to be removed, demolition should take place before May 1, 2023; if the building is to be removed after that date, the building should be tarped (paying close attention to under the eaves where swallows tend to nest) before May 1 to ensure that no birds initiate nesting. Note that if birds do start to nest, that is, they somehow get past the tarp, the building can't be removed until after the birds finish nesting. In this case, the proponent would need to follow the MNRF streamlined approval process to remove the building as it would then be considered SAR habitat.
- Butternut: Four trees were identified within the study area. The trees and a 25 m setback receives protection under the ESA regulation 242/08.
- Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, and Tri-colored Bat: Ontario's four (4) Endangered bat species were not specifically identified in the background SAR screening

or incidentally during field investigations, however targeted bat surveys were not undertaken and suitable habitat for these species exists in the study area in the form of certain isolated trees (snags) and forested/treed swamp habitat (FOD, SWD).

It is recommended that an Information Gathering Form (IGF) be submitted to the MECP at the detailed design phase to ensure compliance with the ESA which may include adherence to timing windows for construction and/or further study such as bat acoustic surveys.

Provincial Policy Statement (2020)

Site Implications: This study is being completed as a requirement for a Class Action Environmental Assessment and must fulfill conservation authority & municipal development approvals in compliance with Section 2.1 of the Provincial Policy Statement (2020), demonstrating how the proposed development will be carried out in a manner that will have no negative impact to natural heritage features and ecological functions.

Natural heritage features protected under the PPS (policy 2.1) identified in the study area include: provincially significant wetlands, significant woodlands, potential habitat of endangered and threatened species, significant wildlife habitat, and fish habitat (indirect) (PPS policy 2.1).

Conservation Authorities Act / O. Reg. 150/06 (2006) and NPCA policies

Site Implications: NPCA regulated watercourses and wetlands are present within the study area. A permit from NPCA will be required prior to initiating development or site alteration on regulated lands.

4.3 LOCAL

Urban Hamilton Official Plan (2013)

Site Implications: The study area includes Core Areas and supporting Linkages as mapped in the UHOP (Urban Hamilton Official Plan) and shown on Map 6.

Core Areas

UHOP policy 2.3.3 states:

"*2.3.3 The natural features and ecological functions of Core Areas shall be protected and where possible and deemed feasible to the satisfaction of the City enhanced. To accomplish this protection and enhancement, vegetation removal and encroachment into Core Areas shall generally not be permitted, and appropriate vegetation protection zones shall be applied to all Core Areas.*"

Further, policies 2.5.2-2.5.4 prohibits development within provincially significant wetlands and significant habitat of threatened and endangered species, and fish habitat (except in accordance with federal and provincial requirements). Development and site alteration is not permitted within significant woodlands or significant wildlife habitat unless it can be demonstrated that there will be no negative impacts to the feature and its ecological function.

Linkages

Linkages are features that connect and enhance the functions of Core Areas. In accordance with UHOP section 7, a Linkage Assessment is required where new development or site alteration is proposed within an identified Linkage (UHOP Schedule B). The Linkage Assessment shall include the following information (UHOP policy 2.7.6 and F3.2.1.11):

> *a) identify and assess the linkage including its vegetative, wildlife, and/or landscape features or functions, including:*
>
> *i) the natural areas and habitats/functions linked (number of sites linked and habitat sizes and condition);*
>
> *ii) linkage type (e.g. anthropogenic railway or utility corridor, hedgerow, plantation, or natural community);*
>
> *iii) vegetation cover type quality (health, condition, maturity, species, and aesthetic value); iv) width;*
>
> *v) length; and,*
>
> *vi) continuity of vegetation (long gaps greater than 100 metres, gaps containing roads or other barriers, or gaps less than 30 metres wide with no barriers);*
>
> *vii) assess the potential impacts on the viability and integrity of the linkage as a result of the development proposal; and,*
>
> *viii) make recommendations on how to protect, enhance or mitigate impacts on the linkage(s) and its functions through planning, design and construction practices.*

A Linkage Assessment has been completed in Section 3.3 in accordance with the above.

Airport Employment Growth District (AEGD) Secondary Plan (City of Hamilton, 2015)

Site Implications: Map B.8-2 of the AEGD shows the following features as present within and adjacent to the study area; Core Areas, Seasonal Habitat (streams), Support/indirect Fish Habitat (streams), Hedgerow Features, Linkages, and Unclassified Streams. The policies of UHOP section C.2.0 – Natural Heritage System apply with regard to natural heritage feature protection. The Unclassified Stream identified on Map B.8-2 was classified as Mitigation HDF 1a/b (GRA, 2022; ref. section 3.2.3).

City of Hamilton Urban Woodland By-Law (14-212)

Site Implications: Woodlands and forests 0.2 ha or larger within the study area are subject to this By-law. This includes polygons 6.1, 7.1/7.2, 14, 23.1, and 23.2 (Map 2). Destruction or injury of trees within these features is not permitted. Features should be protected from development and mitigation measures such as Vegetation Protection Zones (VPZs), buffers, and/or protective fencing may be recommended at detailed design to reduce impacts of development during and after road construction.

5. CONSTRAINT SUMMARY

5.1 EXISTING CONSTRAINTS

Based on a review of the available background information, existing site conditions including species and vegetation communities, and relevant policy applicable to the subject lands, the following sensitive natural heritage features (Table 8) are present and may serve as constraints to the proposed activities.

Table 8: List of Sensitive Natural Heritage Features

SENSITIVE NATURAL HERITAGE FEATURES	PRESENCE WITHIN STUDY AREA (See Map 5)	IMPACTS ANTICIPATED FROM PROPOSED ROAD?	CONSTRAINT IMPLICATIONS	POLICY REFERENCE
Woodland(s)	Present; Woodlands are present in various locations. Woodlands and forests over 0.2 ha include polygons 6.1, 7.1/7.2, 14, 23.1, and 23.2. See below for Significant Woodlands.	Yes, all proposed road alternatives will result in some direct impact to polygon 14. Alignment option 4 will also impact 23.1 and the buffer of 7.1/7.2.	Destruction or injury of trees within woodlands 0.2 ha or larger require a permit under the City's bylaw 14-212.	City of Hamilton Urban Woodland By-law (14-212)
Provinicially Significant Wetland (PSW)	Present; PSW features present in polygons 3, 19.1, and 5.1	No direct impacts anticipated	No development or site alteration is permitted within PSW and their respective buffer/ vegetation protection zone. Permit from NPCA is required within regulated areas (including 120 m adjacency to PSW).	PPS (2020) Urban Hamilton Official Plan (2013) Conservation Authorities Act and O.Reg. 150/06

SENSITIVE NATURAL HERITAGE FEATURES	PRESENCE WITHIN STUDY AREA (See Map 5)	IMPACTS ANTICIPATED FROM PROPOSED ROAD?	CONSTRAINT IMPLICATIONS	POLICY REFERENCE
Significant Woodland(s)	Present; Polygons 7.1/7.2, 14, 23.1 and 23.2 and 6.1-6.4 have been identified as significant woodland features	Yes, all proposed road alternatives will result in some direct impact to Significant Woodland 14. Alignment option 4 will also impact 23.1 the buffer of 7.1/7.2.	Development and site alteration is not permitted within significant woodlands unless it can be demonstrated that there will be no negative impacts to the feature and its ecological function	PPS (2020) Urban Hamilton Official Plan (2013)
Linkage	Present; Polygons 14 and 9.2 have been identified as linkages in this report.	Yes, all proposed road alternatives will result in direct impacts to the linkages present in polygons 9.2 and 14.	Linkages should be carefully assessed through a linkage assessment and avoided where possible with consideration that linkages provide essential connections between core areas.	PPS (2020) Urban Hamilton Official Plan (2013)
Significant Wildlife Habitat	Present; Confirmed SWH is present within polygons 3, 13, 17, 7.1, and 7.2.	Route options 1, 2 and 4 will impact polygon 13. Alignment option 4 will impact the buffer of polygon 7.1.	Development and site alteration is not permitted within significant wildlife habitat unless it can be demonstrated that there will be no negative impacts to the feature and its ecological function	PPS (2020) Urban Hamilton Official Plan (2013)
Species at Risk	Present; Eastern Wood Pewee were recorded in polygons 9.2, 7.1, and 14. Butternut is also present on the property.	Yes, polygons 9.2 and 14 will be impacted by all road options. Road option 4 will also impact the buffer of 7.1. Butternut will be impacted by options 1 and 4.	Development and site alteration is not permitted within significant habitat of threatened and endangered species (except in accordance with federal and provincial requirements).	PPS (2020) Urban Hamilton Official Plan (2013) Endangered Species Act (2007) and O.Reg. 242/08

SENSITIVE NATURAL HERITAGE FEATURES	PRESENCE WITHIN STUDY AREA (See Map 5)	IMPACTS ANTICIPATED FROM PROPOSED ROAD?	CONSTRAINT IMPLICATIONS	POLICY REFERENCE
Hydrological Feature(s)	Present; HDFs 1a, 1b, 2 (Mitigation – Contributing Functions)	Yes, alternative 2 will impact HDFs 1a and 1b; alternative 3 will impact HDF 1a and 2.	HDFs can be removed and replicated subject to management recommendations (ref Appendix K)	HDF Guidelines (TRCA, 2014)
Unevaluated Wetland(s)	Present; Polygon 5.3 (0.72 ha) is adjacent to the study area. Other unevaluated wetlands are present on the landscape but are under 0.5 ha in size: Polygon 5.2 (0.05 ha) Polygon 5.4 (0.11 ha) Polygon 8 (0.26 ha) Polygon 19.2 (0.36 ha) Polygon 25 (0.08 ha) Polygon 22 (0.28 ha) Polygon 28 (0.08 ha) Polygon 29 (0.16 ha)	No direct impacts to unevaluated wetlands over 0.5 ha in size. Alternatives 1 and 4 will impact polygon 19.2 and 28, alternatives 2 and 3 both cross polygon 22.	No development and/or interference is permitted within wetlands greater than 0.5 hectares in size. A permit from NPCA is required within regulated areas (including 30 m adjacency to non-PSW wetlands <2 ha or 120 m for non-PSW wetlands >2 ha).	Conservation Authorities Act and O.Reg. 150/06

5.2 ROAD PLACEMENT OPTIONS, ALTERNATIVES, AND IMPACTS

5.2.1 ROAD OPTIONS AND COMPARISON

A detailed analysis of the 4 proposed road alignment options (Map 7) was completed in January 2023 and provided to the City in the form of a memo (Appendix I). The analysis used a standardized and predefined method of assessing various impacts of the roadways on NH features by ranking anticipated impacts as low, medium, or high. This assessment looked at impacts on NH features such as woodlands, wetlands, and other core areas, Species at Risk, Significant Wildlife Habitat, and general natural vegetation communities. Areas of impact (in hectares) of each route on each vegetation community and natural heritage feature was also provided in the memo to allow for easy comparison of the magnitude of specific impacts.

Based on our assessment of impacts to NH features, the four alignment options all result in impacts to at least some of the sensitive features present on the landscape. Various levels of mitigation and compensation are available to address these impacts, depending on the nature of the feature impacted. A brief summary of these options is provided below, but further discussion involving all involved agencies and experts may be needed to fully weigh the pros and cons of each option to determine the preferred route. A full and detailed impact assessment, including appropriate potential mitigation, can only be completed once a route has been chosen and more details are available.

This discussion briefly highlights the key differences in impacts between routes, with all other impacts being relatively equal. For example, all routes have relatively equal impacts to Significant Woodlands and Linkages, so that is not included in our discussion. Refer to the memo in Appendix I for a comparison of all route impacts.

Route options 1 and 4 avoid headwater drainage features but result in impacts and removal of Butternut trees (Endangered Species at Risk). Although rare on the landscape, Butternut trees can be removed and compensated for through an established provincial permitting process.

Route options 2 and 3 avoid impacts to Butternut trees but involve a crossing of the headwater drainage features (HDF 1 and 2, Map 5). HD1 has a Provincially Significant Wetland (PSW) within its riparian corridor, which will need to be crossed by both options. Additionally, option 2 overprints HDF 1b and will require its realignment. These potential impacts would need to be investigated further in the future based on the final design of these road alignment options.

Routes 1, 2 and 4 impact confirmed SWH for Monarch butterfly (Endangered/Special Concern) as they cross polygon 13, a cultural meadow containing Monarch's hostplant, milkweed. Monarch butterflies exist primarily wherever milkweed and wildflowers exist, such as abandoned farmland, along roadsides, and other open spaces. If this area is impacted, there is potential for mitigation of these impacts through enhancement of habitat and planting of native wildflowers and milkweed in the remaining open old field communities present on the site.

6. CONCLUSION

This Draft Environmental Assessment has:

- Provided a summary of relevant natural heritage policies that apply to the EA Study Area;
- Provided ELC / vegetation and wildlife information for the EA Study Area based on background information collected as part of the field surveys completed for the ongoing Upper James and Dickenson EIS studies;
- Identified Candidate and Confirmed SWH present in the EA Study Area;
- Identified local Core Areas and Linkages present in the EA Study Area;
- Provided an initial summary of the natural heritage constraints present on the landscape, and;
- Provided an initial summary and assessment of the impacts for the four proposed road alignment options for the Collector 6N roadway.

Additional discussions with the study team and Agencies are likely needed to weigh the above-mentioned impacts on the NH constraints identified. This assessment only presents the information available regarding the impacts of the conceptual road alignment options and does not provide a recommendation for any one alignment over the others. Since natural heritage impacts are present and fairly equal across all options, it may be beneficial to view the alignments through a holistic lens and take the overall road configuration into account when comparing options. Features vary in their ability to be properly compensated for or enhanced, and multidisciplinary factors will also need to be considered to determine the preferred alternative. Once the final road alignment is chosen and proceeds to detailed design, a more detailed assessment of impacts and potential mitigation options will be completed as a next phase.

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PROJECT: DA21-104-02

CLIENT: Panattoni Development Company

DATE: 20, January 2023

DRAWN BY: C. White

Map 1
Study Area Boundary
2240 Upper James Class EA

2240 Upper James Street, Hamilton Ontario

- 2240 Upper James Property
- Upper James Class EA Study Area Boundary
- 2240 Upper James EIS Study Area Boundary
- 9236 Dickenson EIS Study Area Boundary

Wetland (MNRF, February 2021)

Significance

- Evaluated - Other
- Evaluated - Provincial
- Not evaluated per OWES

- Watercourse
- Nocturnal Amphibian Call Station
- Butternut Not Assessed
- Butternut Assessed within 50m of Development Envelope
- Butternut 25m Setback

Base Map Source: Esri, CGIAR, USGS, Maxar

0 37.5 75 150

Metres

SCALE: 1:4,500

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NAD 1983 UTM Zone 17N

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PROJECT: DA21-104-01

CLIENT: Panattoni Development Company

DATE: 23, January 2023

DRAWN BY: C. White

The Owner is to be aware of the Migratory Birds Convention Act, 1994. This Act is implemented by Environment Canada and the Owner is to make every effort to avoid the removal of vegetation from the period of March 31st to August 31st.

Woodland/Wetland Delineation

Polygon ID	Date of Delineation
5	09-Aug-19
11	09-Aug-19
3 - West Side	09-Aug-19
3 - East Side	30-Jun-22
22	30-Jun-22
25	30-Jun-22
28	30-Jun-22
29	30-Jun-22
14 - East Side	30-Jun-22
23.1	30-Jun-22

Vegetation Communities

PolyID	ELC Code	Description	Area (ha)
1	AGR	Agricultural	21.19
2	HR	Hedgerow	0.35
3	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.69
4	CUS1	Mineral Cultural Savannah	1.02
5.1	SAF1-3*	Duckweed Floating-leaved Shallow Aquatic	0.96
5.2	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.05
5.3	SWT2-5*	Red-osier Mineral Thicket Swamp	0.72
5.4	MAS2-4*	Broad-leaved Sedge Mineral Shallow Marsh	0.11
6.1	CUW	Cultural Woodland	0.29
6.2	CUW	Cultural Woodland	0.13
6.3	CUW	Cultural Woodland	0.14
6.4	CUW	Cultural Woodland	0.13
7.1	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	2.57
7.2	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	0.54
8	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.26
9.1	HR	Hedgerow	0.14
9.2	HR	Hedgerow	1.6
10	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	1.39
11	MAS2-1	Cattail Mineral Shallow Marsh	0.11
12	ANTH	Anthropogenic	0.93
13	CUM1	Mineral Cultural Meadow	2.99
14	FOD5-6	Dry – Fresh Sugar Maple – Basswood Deciduous Forest	1.05
15.1	HR	Hedgerow	0.49
15.2	HR	Hedgerow	0.55
16.1	CUT1-1	Sumac Cultural Thicket	3.96
16.2	CUT1	Mineral Cultural Thicket	1.63
17	CUM1	Mineral Cultural Meadow	1.62
18	ANTH	Anthropogenic	0.27
19.1	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.39
19.2	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.36
20	AGR	Agricultural	8.34
21	AGR	Agricultural	8.2
22	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.28
23.1	CUW1	Mineral Cultural Woodland	1.28
23.2	CUW1	Mineral Cultural Woodland	0.56
24.1	CUT1-4	Gray Dogwood Cultural Thicket	2.18
24.2	CUT1-4	Gray Dogwood Cultural Thicket	0.11
24.3	CUT1-4	Gray Dogwood Cultural Thicket	0.66
25	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.08
26	HR	Hedgerow	0.49
27	ANTH	Anthropogenic	7.6
28	SWD4*	Mineral Deciduous Swamp	0.08
29	SWT2-5	Red-osier Mineral Thicket Swamp	0.16
30	ANTH	Anthropogenic	8.87
31	ANTH	Anthropogenic	2.26

Boundary was confirmed with City of Hamilton Staff on August 9, 2019

Boundary confirmed with City of Hamilton staff June 21, 2022

Map 2
Vegetation Communities
2240 Upper James Class EA

2240 Upper James Street, Hamilton Ontario

- Subject Property
- Upper James Class EA Study Area Boundary
- 2240 Upper James EIS Study Area Boundary
- 9236 Dickenson EIS Study Area Boundary
- Watercourse
- Contour Line

Wetland

Delineation Date

- 2019
- 2022
- Not Field Verified
- Vegetation Community

Orthoimagery Source: Esri, NASA, NGA, USGS, Maxar

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Metres

SCALE: 1:5,000

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CLIENT: Panattoni Development Company

DATE: 20, January 2023

DRAWN BY: C. White

Map 3
Tree Inventory

2240 Upper James Class EA

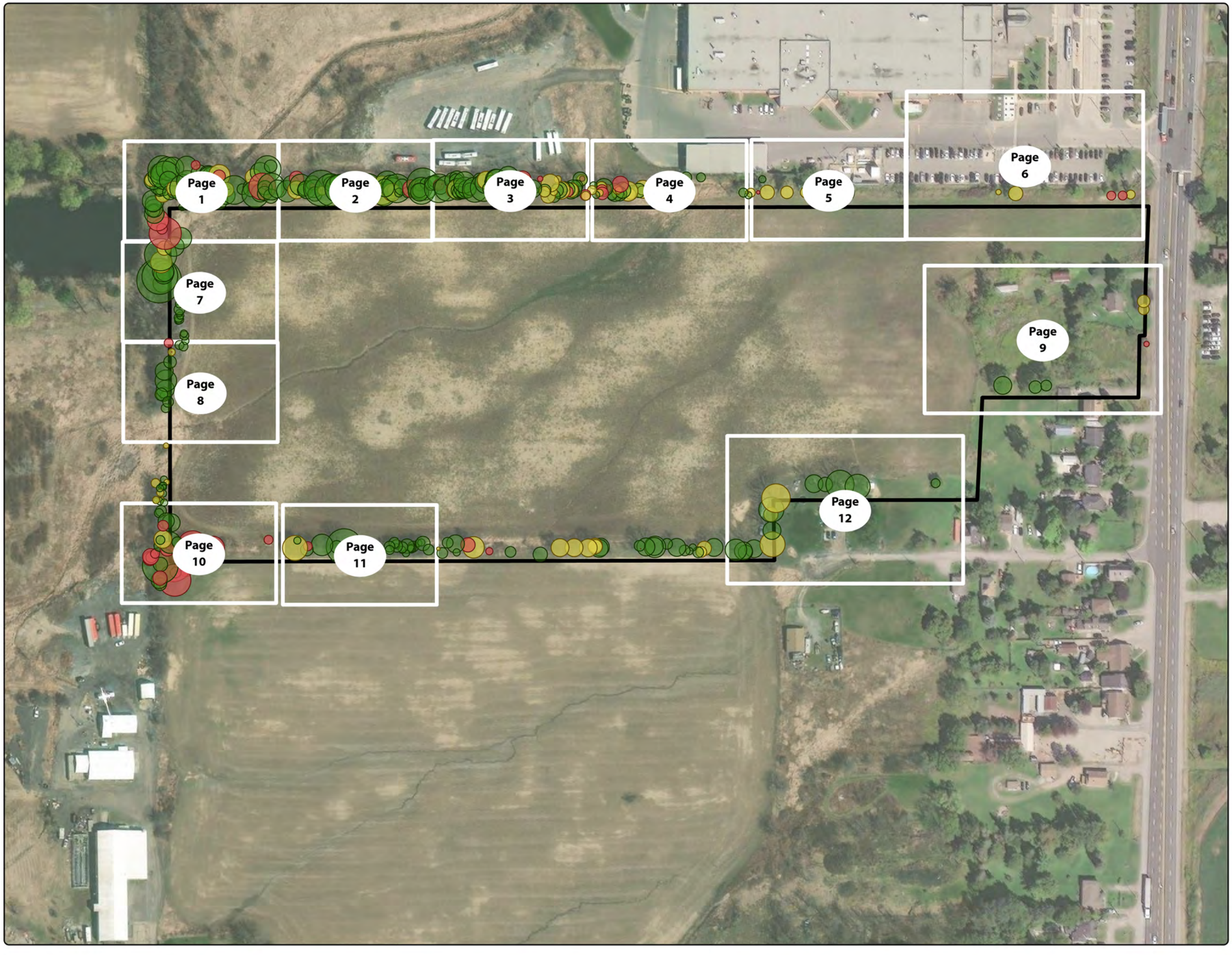
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



Base map source: Maxar, Microsoft, Esri, NASA, NGA, USGS

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DATE: 20, January 2023

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Map 3.1
Tree Inventory
2240 Upper James Class EA

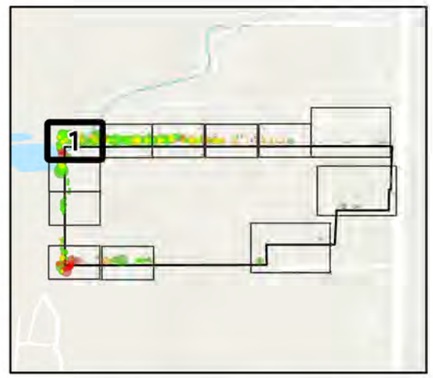
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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Map 3.2
Tree Inventory
2240 Upper James Class EA

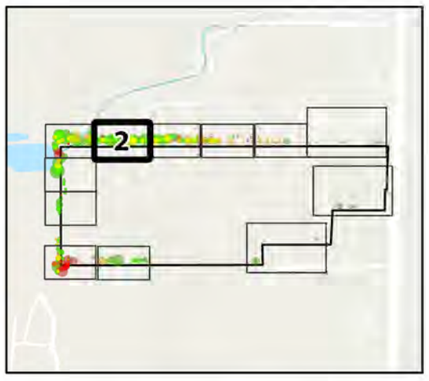
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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Map 3.3
Tree Inventory

2240 Upper James Class EA

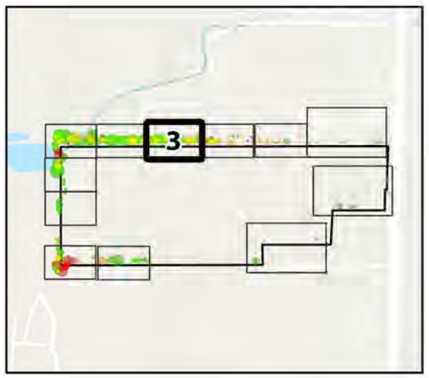
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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Metres

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Map 3.4
Tree Inventory
2240 Upper James Class EA

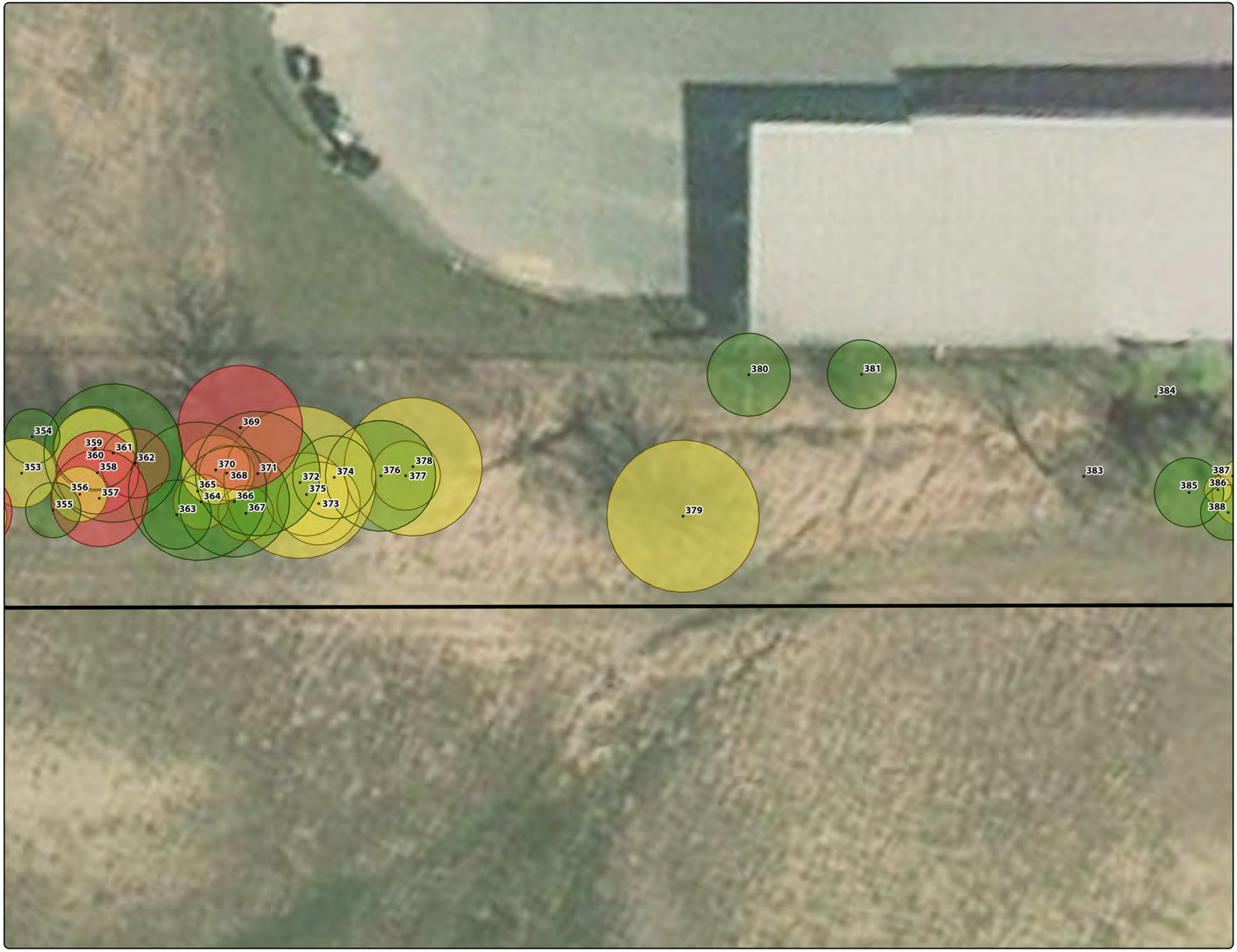
2240 Upper James Street, Hamilton Ontario

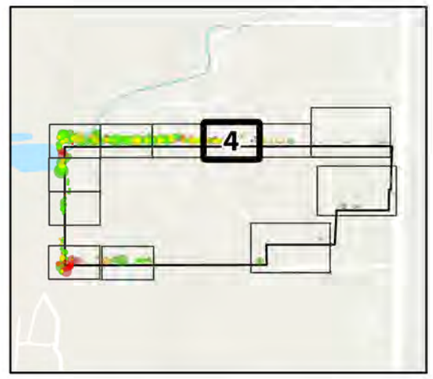
Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low





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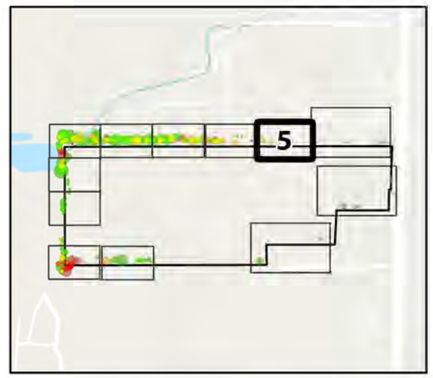
Map 3.5
Tree Inventory
2240 Upper James Class EA
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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Metres
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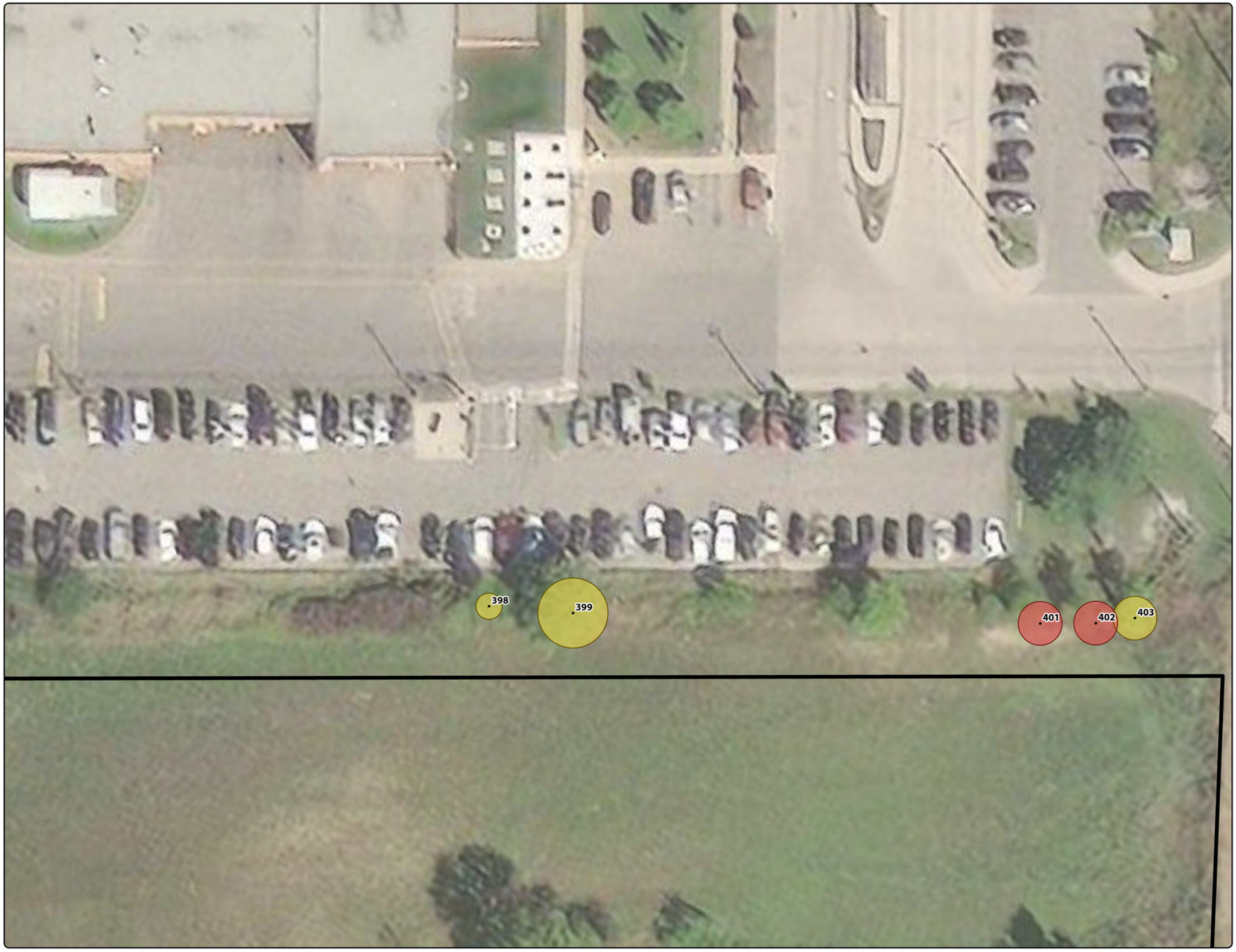


Map 3.6
Tree Inventory
2240 Upper James Class EA

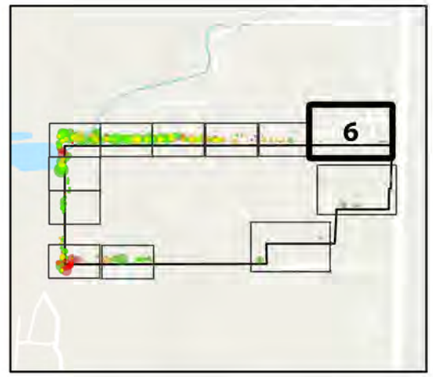
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



Base map source: Esri Community Maps Contributors, City of Hamilton, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada, Maxar, Microsoft, Esri, NASA, NGA, USGS, FEMA

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Metres

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PROJECT: DA21-104-01

CLIENT: Panattoni Development Company

DATE: 20, January 2023

DRAWN BY: C. White

Map 3.7
Tree Inventory
2240 Upper James Class EA

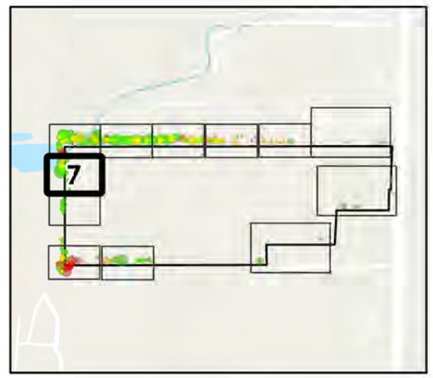
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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N

NAD 1983 UTM Zone 17N

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T 519.822.1609 F 519.822.5389 www.dougan.ca

PROJECT: DA21-104-01

CLIENT: Panattoni Development Company

DATE: 20, January 2023

DRAWN BY: C. White

Map 3.8
Tree Inventory
2240 Upper James Class EA

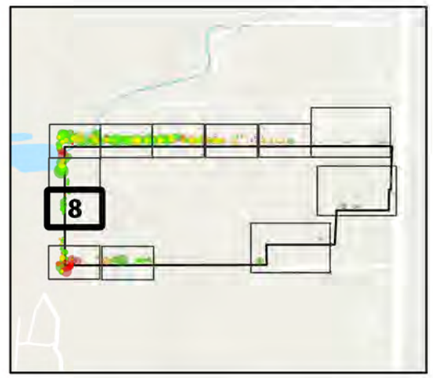
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



Base map source: Esri Community Maps Contributors, City of Hamilton, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada, Maxar, Microsoft, Esri, NASA, NGA, USGS, FEMA

0 2.5 5 10

Metres

1:260

N

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PROJECT: DA21-104-01

CLIENT: Panattoni Development Company

DATE: 20, January 2023

DRAWN BY: C. White

Map 3.9
Tree Inventory
2240 Upper James Class EA

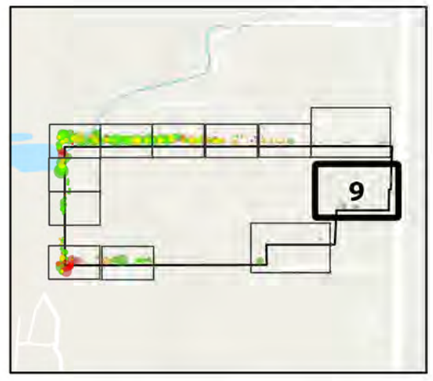
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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0 4 8 16

Metres

1:410

N

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DATE: 20, January 2023

DRAWN BY: C. White

Map 3.10
Tree Inventory
2240 Upper James Class EA

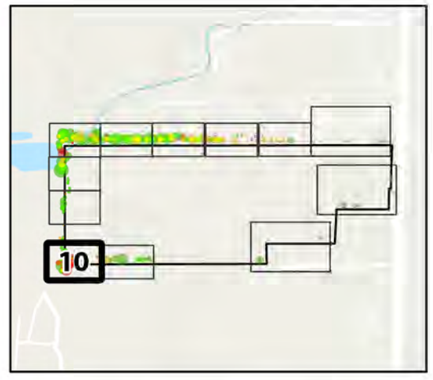
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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0 2.5 5 10

Metres

1:260

N

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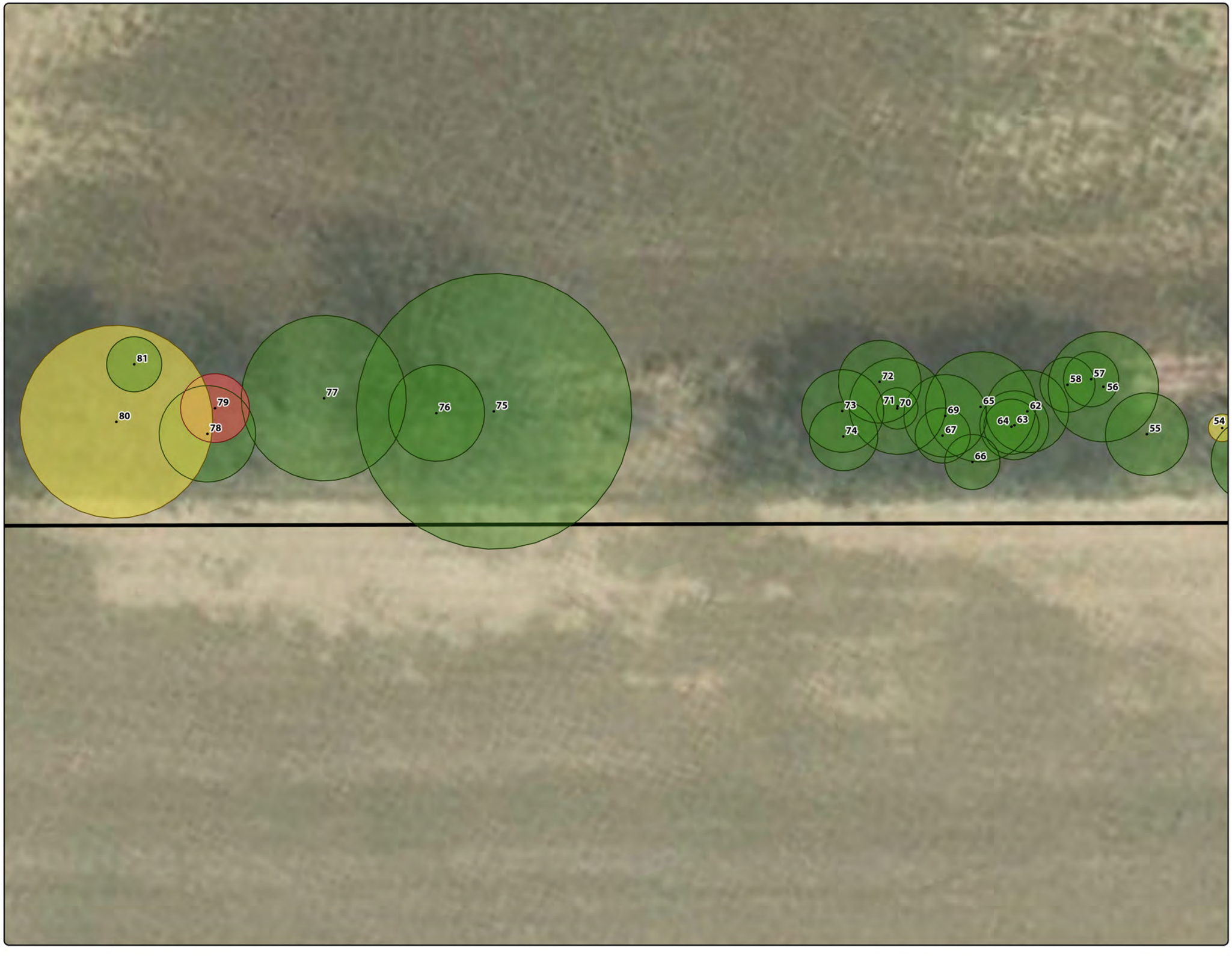
DATE: 20, January 2023

DRAWN BY: C. White

Map 3.11
Tree Inventory
2240 Upper James Class EA

2240 Upper James Street, Hamilton Ontario

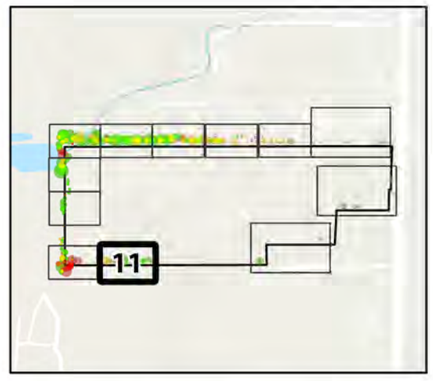


Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



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0 2.5 5 10

Metres

1:260

N

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PROJECT: DA21-104-01

CLIENT: Panattoni Development Company

DATE: 20, January 2023

DRAWN BY: C. White

Map 3.12
Tree Inventory
2240 Upper James Class EA

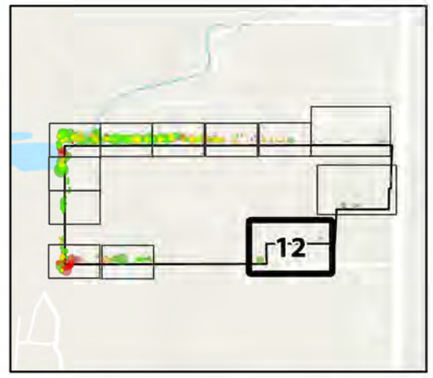
2240 Upper James Street, Hamilton Ontario

Property Boundary

Tree Inventory

Preservation Priority

- High
- Medium
- Low



Base map source: Esri Community Maps Contributors, City of Hamilton, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada, Maxar, Microsoft, Esri, NASA, NGA, USGS, FEMA

0 4 8 16

Metres

1:410

N

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PROJECT: DA21-104-02

CLIENT: Panattoni Development Company

DATE: 20, January 2023

DRAWN BY: C. White

Map 4
Wildlife Survey Locations & Observations

2240 Upper James Class EA

2240 Upper James Street, Hamilton Ontario

- Upper James Class EA Study Area Boundary
- 2240 Upper James EIS Study Area Boundary
- 9236 Dickenson EIS Study Area Boundary
- Nocturnal Amphibian Call Station

Significant Species Observation

- Eastern Wood Pewee
- Watercourse

Base Map Source: Esri, CGIAR, USGS, Maxar

0 37.5 75 150

Metres

SCALE: 1:4,500

NAD 1983 UTM Zone 17N

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PROJECT: DA21-104-01

CLIENT: Panattoni Development Company

DATE: 23, January 2023

DRAWN BY: C. White

Map 5
Preliminary Constraints
2240 Upper James Class EA
2240 Upper James Street, Hamilton Ontario

The Owner is to be aware of the Migratory Birds Convention Act, 1994. This Act is implemented by Environment Canada and the Owner is to make every effort to avoid the removal of vegetation from the period of March 31st to August 31st.

Woodland/Wetland Delineation

Polygon ID	Date of Delineation
5	09-Aug-19
11	09-Aug-19
3 - West Side	09-Aug-19
3 - East Side	30-Jun-22
22	30-Jun-22
25	30-Jun-22
28	30-Jun-22
29	30-Jun-22
14 - East Side	30-Jun-22
23.1	30-Jun-22

Vegetation Communities

PolyID	ELC Code	Description	Area (ha)
1	AGR	Agricultural	21.19
2	HR	Hedgerow	0.35
3	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.69
4	CUS1	Mineral Cultural Savannah	1.02
5.1	SAF1-3*	Duckweed Floating-leaved Shallow Aquatic	0.96
5.2	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.05
5.3	SWT2-5*	Red-osier Mineral Thicket Swamp	0.72
5.4	MAS2-4*	Broad-leaved Sedge Mineral Shallow Marsh	0.11
6.1	CUW	Cultural Woodland	0.29
6.2	CUW	Cultural Woodland	0.13
6.3	CUW	Cultural Woodland	0.14
6.4	CUW	Cultural Woodland	0.13
7.1	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	2.57
7.2	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	0.54
8	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.26
9.1	HR	Hedgerow	0.14
9.2	HR	Hedgerow	1.6
10	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	1.39
11	MAS2-1	Cattail Mineral Shallow Marsh	0.11
12	ANTH	Anthropogenic	0.93
13	CUM1	Mineral Cultural Meadow	2.99
14	FOD5-6	Dry – Fresh Sugar Maple – Basswood Deciduous Forest	1.05
15.1	HR	Hedgerow	0.49
15.2	HR	Hedgerow	0.55
16.1	CUT1-1	Sumac Cultural Thicket	3.96
16.2	CUT1	Mineral Cultural Thicket	1.63
17	CUM1	Mineral Cultural Meadow	1.62
18	ANTH	Anthropogenic	0.27
19.1	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.39
19.2	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.36
20	AGR	Agricultural	8.34
21	AGR	Agricultural	8.2
22	MAM2-2*	Reed-canary Grass Mineral Meadow Marsh	0.28
23.1	CUW1	Mineral Cultural Woodland	1.28
23.2	CUW1	Mineral Cultural Woodland	0.56
24.1	CUT1-4	Gray Dogwood Cultural Thicket	2.18
24.2	CUT1-4	Gray Dogwood Cultural Thicket	0.11
24.3	CUT1-4	Gray Dogwood Cultural Thicket	0.66
25	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.08
26	HR	Hedgerow	0.49
27	ANTH	Anthropogenic	7.6
28	SWD4*	Mineral Deciduous Swamp	0.08
29	SWT2-5	Red-osier Mineral Thicket Swamp	0.16
30	ANTH	Anthropogenic	8.87
31	ANTH	Anthropogenic	2.26

Boundary was confirmed with City of Hamilton Staff on August 9, 2019

Boundary confirmed with City of Hamilton staff June 21, 2022

- Subject Property
- Upper James Class EA Study Area Boundary
- 2240 Upper James EIS Study Area Boundary
- 9236 Dickenson EIS Study Area Boundary
- Approximate Regulation Lands (NPCA, 2022)
- Watercourse
- Contour Line

Constraints

- Butternut - Not Assessed
- Butternut - Assessed
- Butternut 25m Setback

Wetland

Delineation Date

- 2019
- 2022
- Not Field Verified
- Provincially Significant Wetland
- Significant Woodland
- Vegetation Community
- Vegetation Protection Zone
- Core Area

Significant Species Observation

- Eastern Wood Pewee

Orthoimagery Source: Esri, NASA, NGA, USGS, Maxar

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0 37.5 75 150
Metres

SCALE: 1:5,000

NAD 1983 UTM Zone 17N

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PROJECT: DA21-104-01

CLIENT: Panattoni Development Company

DATE: 23, January 2023

DRAWN BY: C. White

Map 6
Local Natural Heritage System Policy Areas
2240 Upper James Class EA

2240 Upper James Street, Hamilton Ontario

- Upper James Class EA Study Area Boundary
- 2240 Upper James EIS Study Area Boundary
- 9236 Dickenson EIS Study Area Boundary
- Subject Property
- Watercourse
- Contour Line

Wetland

Delineation Date

- 2019
- 2022
- Not Field Verified

Natural Heritage System

Urban Hamilton Official Plan

- Core Area
- Linkage

Airport Employment Growth District Secondary Plan, Urban Hamilton Official Plan, Map B.8-2

- Core Area
- Linkage
- Vegetation Community

The Owner is to be aware of the Migratory Birds Convention Act, 1994. This Act is implemented by Environment Canada and the Owner is to make every effort to avoid the removal of vegetation from the period of March 31st to August 31st.

Orthoimagery Source: Esri, NASA, NGA, USGS, Maxar

0 37.5 75 150

Metres

SCALE: 1:4,000

NAD 1983 UTM Zone 17N

Woodland/Wetland Delineation	
Polygon ID	Date of Delineation
5	09-Aug-19
11	09-Aug-19
3 - West Side	09-Aug-19
3 - East Side	30-Jun-22
22	30-Jun-22
25	30-Jun-22
28	30-Jun-22
29	30-Jun-22
14 - East Side	30-Jun-22
23.1	30-Jun-22

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PROJECT: DA21-104-02

CLIENT: Panattoni Development Company

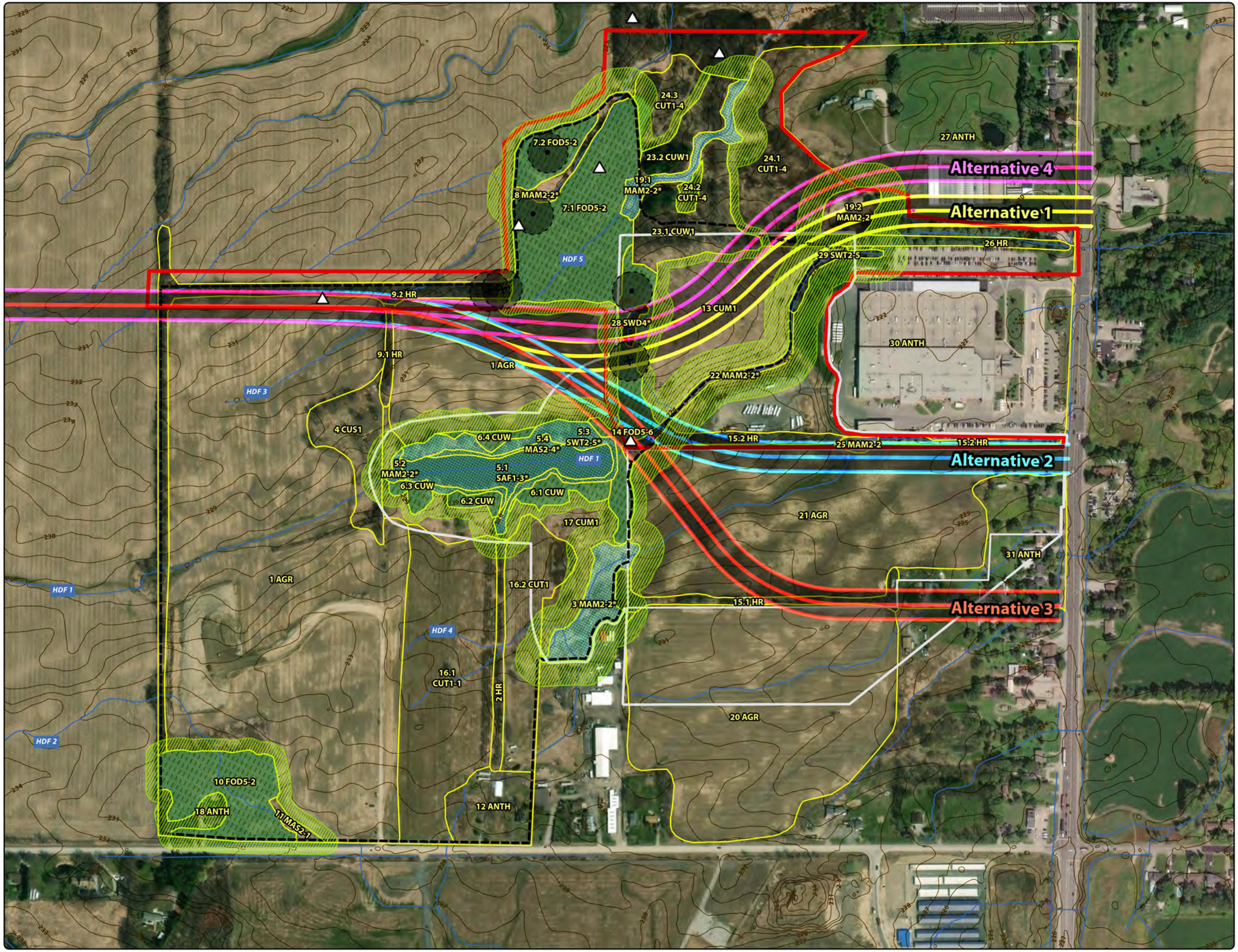
DATE: 23, January 2023

DRAWN BY: C. White

Map 7: Proposed Road Alignment Options

2240 Upper James Class EA

2240 Upper James Street, Hamilton Ontario



- Subject Property
- Upper James Class EA Study Area Boundary
- 2240 Upper James EIS Study Area Boundary
- 9236 Dickenson EIS Study Area Boundary
- Watercourse
- Contour Line
- Vegetation Community

Alignment Option (IBI Group, 2023)

- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4

Constraints

- Butternut - Not Assessed
- Butternut - Assessed
- Butternut 25 Metre Setback
- Eastern Wood Pewee Observation
- Significant Woodland
- Provincially Significant Wetland
- Vegetation Protection Zone

Orthoimagery Source: Esri, CGIAR, USGS, Maxar

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0 37.5 75 150

Metres

SCALE: 1:4,500

N

NAD 1983 UTM Zone 17N

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APPENDIX A – BOTANICAL LIST & ELC COMMUNITY DESCRIPTIONS

Botanical Inventory – Upper James EA Study Area

Scientific Name*	Common Name*	COSEWIC 2022*	SARO Status 2022*	G Rank *	S Rank*	Hamilton NAI (2014)	C C	C W	Native Status	Polygons												
										1	7	9	13	14	15	19	21	23	24	26	27	30
Acer negundo	Manitoba Maple			G5	S5		0	-2	N			x		x								
Acer nigrum	Black Maple			G5	S4?		7	3	N		x											
Acer saccharum	Sugar Maple			G5	S5		4	3	N		x	x	x							X		
Actaea pachypoda	White Baneberry			G5	S5		6	5	N		x											
Actaea sp											x											
Agrimonia gryposepala	Hooked Agrimony			G5	S5		2	2	N		x			x								
Agrostis gigantea	Redtop			G4G5	SNA		0	0	I		x											
Agrostis stolonifera	Creeping Bentgrass			G5	SNA		0	-3	I		x											
Alliaria petiolata	Garlic Mustard			GNR	SNA		0	0	I	x	x	x										
Ambrosia artemisiifolia	Annual Ragweed			G5	S5		0	3	N	x		x										
Ambrosia trifida	Great Ragweed			G5	S5	h	0	-1	N		x	x										
Amelanchier sp											x											
Amphicarpaea bracteata	American Hog-peanut			G5	S5		4	0	N		x											
Anemone acutiloba	Sharp-lobed Hepatica			G5	S5		6	5	N		x											
Arctium sp												x										
Arisaema triphyllum	Jack-in-the-pulpit			G5	S5		5	-2	N		x	x	x									
Asclepias syriaca	Common Milkweed			G5	S5		0	5	N	x	x											
Asparagus officinalis	Garden Asparagus			G5?	SNA		0	3	I			x										
Athyrium filix-femina	Common Lady Fern			G5	S5		4	0	N		x											
Barbarea vulgaris	Bitter Wintercress			GNR	SNA		0	0	I	x							x					
Bidens sp												x										
Bidens vulgata	Tall Beggarticks			G5	S5		5	-3	N				x	x								
Brassica oleracea	Cabbage			GNR	SNA		---	---	I		x											
Bromus inermis	Smooth Brome			G5TNR	SNA		0	5	I			x										
Calystegia sepium	Hedge False Bindweed			G5	S5		2	0	N		x											
Cardamine concatenata	Cut-leaved Toothwort			G5	S5		6	3	N		x											
Cardamine diphylla	Two-leaved Toothwort			G5	S5		7	5	N		x											
Carex albursina	White Bear Sedge			G5	S5		7	5	N		x											
Carex blanda	Woodland Sedge			G5	S5		3	0	N		x											
Carex cephalophora	Oval-leaved Sedge			G5	S5		5	3	N					x								
Carex communis	Fibrous-root Sedge			G5	S5		6	5	N		x											
Carex deweyana	Dewey's Sedge			G5	S5		6	4	N		x											
Carex hitchcockiana	Hitchcock's Sedge			G5	S4S5		6	5	N		x											
Carex pedunculata	Long-stalked Sedge			G5	S5		5	5	N		x											
Carex radiata	Eastern Star Sedge			G5	S5		4	5	N		x											
Carex sp											x											
Carpinus caroliniana	Blue-beech			G5	S5		6	0	N		x											
Carya cordiformis	Bitternut Hickory			G5	S5		6	0	N		x											

Carya sp													x								
Caulophyllum giganteum	Giant Blue Cohosh			G4G5	S4S5		----	---	N		x										
Caulophyllum thalictroides	Blue Cohosh			G5	S5		6	5	N		x										
Cerastium fontanum ssp. vulgare	Common Mouse-ear Chickweed			GNRTNR	SNA		0	3	I	x											
Chenopodium album	White Goosefoot			G5	SNA		0	1	I	x											
Cichorium intybus	Chicory			GNR	SNA		0	5	I			x									
Circaea canadensis	Broad-leaved Enchanter's Nightshade			G5T5	S5		3	3	N		x	x	x	x							
Cornus alternifolia	Alternate-leaved Dogwood			G5	S5		6	5	N		x	x	x								
Cornus racemosa	Gray Dogwood			G5?	S5		2	-2	N	x	x	x	x	x				x	x	X		
Cornus sericea	Red-osier Dogwood			G5	S5		2	-3	N		x	x	x	x		x						
Corylus sp											x										
Crataegus holmesiana	Holmes' Hawthorn			G5	S4S5	h	4	5	N		x	x	x	x			x				
Crataegus macracantha	Large-thorned Hawthorn			GNR	S5	h	4	5	N			x				x					
Crataegus punctata	Dotted Hawthorn			G5	S5		4	5	N			x									
Crataegus sp											x	x	x								
Cyperus esculentus	Perennial Yellow Flatsedge			G5	S5		1	-3	N		x										
Dactylis glomerata	Orchard Grass			GNR	SNA		0	3	I			x									
Daucus carota	Wild Carrot			GNR	SNA		0	5	I	x	x	x									
Dianthus armeria	Deptford Pink			GNR	SNA		0	5	I			x									
Dicentra sp											x										
Dryopteris carthusiana	Spinulose Wood Fern			G5	S5		5	-2	N		x										
Echinochloa crus-galli	Large Barnyard Grass			GNR	SNA		0	-3	I	x	x										
Echinocystis lobata	Wild Mock-cucumber			G5	S5		3	-2	N		x	x	x	x							
Elymus hystrix	Bottlebrush Grass			G5	S5		5	5	N		x										
Epilobium coloratum	Purple-veined Willowherb			G5	S5		3	-5	N			x									
Equisetum arvense	Field Horsetail			G5	S5		0	0	N		x										
Erigeron annuus	Annual Fleabane			G5	S5		0	1	N			x	x								
Erigeron canadensis	Canada Horseweed			G5	S5		0	1	N	x		x									
Erigeron philadelphicus	Philadelphia Fleabane			G5	S5		1	-3	N			x									
Erythronium americanum	Yellow Trout-lily			G5	S5		5	5	N		x		x								
Euonymus obovatus	Running Strawberry Bush			G5	S4		6	5	N		x	x	x								
Eupatorium perfoliatum	Common Boneset			G5	S5		2	-4	N		x	x									
Eurybia macrophylla	Large-leaved Aster			G5	S5		5	5	N		x		x								
Euthamia graminifolia	Grass-leaved Goldenrod			G5	S5		2	-2	N		x										
Fagus grandifolia	American Beech			G5	S4		6	3	N		x	x									
Fragaria sp												x									
Fragaria vesca	Woodland Strawberry			G5	S5		4	4	N		x										
Fragaria virginiana	Wild Strawberry			G5	S5		2	1	N	x	x		x	x							
Fraxinus americana	White Ash			G5	S4		4	3	N			x									
Fraxinus pennsylvanica	Green Ash			G5	S4		3	-3	N			x									

Fraxinus sp											x										
Galium aparine	Cleavers			G5	S5		4	3	N				x								
Galium mollugo	Smooth Bedstraw			GNR	SNA		0	5	I				x								
Geranium robertianum	Herb-Robert			G5	S5		0	5	N		x	x									
Geum canadense	White Avens			G5	S5		3	0	N					x							
Geum sp											x	x	x								
Glechoma hederacea	Ground Ivy			GNR	SNA		0	3	I	x											
Glycine max	Soybean			GNR	SNA		--	5	I								x				
Glyceria striata	Fowl Mannagrass			G5	S5		3	-5	N		x	x									
Hackelia virginiana	Virginia Stickseed			G5	S5		5	1	N		x	x	x								
Hesperis matronalis	Dame's Rocket			G4G5	SNA		0	5	I	x	x	x	x								
Hydrophyllum virginianum	Virginia Waterleaf			G5	S5		6	-2	N	x	x		x								
Hypericum perforatum	Common St. John's-wort			GNR	SNA		0	5	I							x					
Impatiens capensis	Spotted Jewelweed			G5	S5		4	-3	N		x	x	x	x							
Juglans cinerea	Butternut	END	END	G4	S2?		6	2	N		x		x					x	x		
Juglans nigra	Black Walnut			G5	S4?		5	3	N	x		x	x	x						X	
Juncus dudleyi	Dudley's Rush			G5	S5		1	0	N		x										
Leersia virginica	Virginia Cutgrass			G5	S4		6	-3	N			x									
Leonurus cardiaca	Common Motherwort			GNR	SNA		0	5	I	x		x									
Ligustrum vulgare	European Privet			GNR	SNA		0	1	I		x										
Lobelia inflata	Indian-tobacco			G5	S5		3	4	N		x										
Lobelia siphilitica	Great Blue Lobelia			G5	S5		6	-4	N			x									
Lonicera sp													x								
Lonicera tatarica	Tartarian Honeysuckle			GNR	SNA		0	3	I					x							
Lycopodium sp											x										
Lythrum salicaria	Purple Loosestrife			G5	SNA		0	-5	I		x										
Maianthemum canadense	Wild Lily-of-the-valley			G5	S5		5	0	N		x						x				
Malus pumila	Common Apple			G5	SNA		0	5	I			x									
Matteuccia struthiopteris	Ostrich Fern			G5	S5		5	-3	N		x										
Menispermum canadense	Canada Moonseed			G5	S4		7	0	N		x										
Monotropa uniflora	Indian-pipe			G5	S5		6	3	N							x					
Onoclea sensibilis	Sensitive Fern			G5	S5		4	-3	N		x										
Ostrya virginiana	Eastern Hop-hornbeam			G5	S5		4	4	N		x										
Oxalis stricta	Upright Yellow Wood-sorrel			G5	S5		0	3	N			x	x	x							
Panicum capillare	Common Panicgrass			G5	S5		0	0	N	x											
Panicum dichotomiflorum	Fall Panicgrass			G5	SNA		0	-2	I	x											
Panicum sp											x										
Parthenocissus sp																					
Parthenocissus vitacea	Thicket Creeper			G5	S5		3	3	N			x									
Persicaria hydropiper	Marshpepper Smartweed			GNR	SNA		4	-5	I		x										
Persicaria maculosa	Spotted Lady's-thumb			G3G5	SNA		0	-3	I		x					x					

Phalaris arundinacea	Reed Canary Grass			G5	S5		0	-4	N		x	x	x	x			x				
Picris hieracioides	Hawkweed Oxtongue			G5	SNA		0	5	I		x	x									
Pilea pumila	Canada Clearweed			G5	S5		5	-3	N			x									
Pinus strobus	Eastern White Pine			G5	S5		4	3	N		x										
Plantago major	Common Plantain			G5	SNA		0	-1	I	x	x	x									
Plantago rugelii	Rugel's Plantain			G5	S5		1	0	N		x										
Poa nemoralis	Woods Bluegrass			G5	SNA		0	0	I		x										
Poa pratensis	Kentucky Bluegrass			G5	S5		0	1	N	x				x						x	
Podophyllum peltatum	May-apple			G5	S5		5	3	N			x	x								
Populus deltoides	Eastern Cottonwood			G5	S5		4	-1	N				x		x						
Populus tremuloides	Trembling Aspen			G5	S5		2	0	N		x		x								
Potentilla norvegica	Norwegian Cinquefoil			G5	S5		0	0	N	x		x									
Prunella vulgaris	Sweet Cherry			GNR	SNA		0	5	I		x	x	x								
Prunus americana	American Plum			G5	S4		6	5	N		x										
Prunus avium	Black Cherry			G5	S5		3	3	N	x		x									
Prunus serotina	Choke Cherry			G5	S5		2	1	N		x	x	x								
Prunus virginiana	Self-heal			G5	S5		---	---	N				x								
Quercus macrocarpa	Bur Oak			G5	S5		5	1	N		x	x									
Quercus rubra	Northern Red Oak			G5	S5		6	3	N		x	x									
Ranunculus pensylvanicus	Pennsylvania Buttercup			G5	S5		3	-5	N		x										
Ranunculus recurvatus	Hooked Buttercup			G5	S5		4	-3	N		x										
Ranunculus sceleratus	Cursed Buttercup			G5	S5		2	-5	N								X				
Rhamnus cathartica	Common Buckthorn			GNR	SNA		0	3	I	x		x	x								
Rhus typhina	Staghorn Sumac			G5	S5		1	5	N		x	x									
Ribes cynosbati	Prickly Gooseberry			G5	S5		4	5	N		x	x	x								
Ribes triste	Swamp Red Currant			G5	S5		6	-5	N		x	x	x	x							
Robinia pseudoacacia	Black Locust			G5	SNA		0	4	I												
Rosa multiflora	Multiflora Rose			GNR	SNA		0	3	I		x	x									
Rosa sp																					
Rubus allegheniensis	Allegheny Blackberry			G5	S5		2	2	N		x	x									
Rubus idaeus	Common Red Raspberry			G5	S5		---	---	N	x	x	x	x								
Rubus occidentalis	Black Raspberry			G5	S5		2	5	N			x									
Rubus sp												x									
Salix amygdaloides	Peach-leaved Willow			G5	S5		6	-3	N		x		x								
Salix bebbiana	Bebb's Willow			G5	S5		4	-4	N				x	x							
Salix discolor	Pussy Willow			G5	S5		3	-3	N		x										
Salix sp												x			x						
Sambucus canadensis	Common Elderberry			G5T5	S5		5	-2	N		x										
Setaria pumila	Yellow Foxtail			GNR	SNA		0	0	I			x									
Setaria viridis	Green Foxtail			GNR	SNA		0	5	I	x											

Sinapis arvensis	Corn Mustard			GNR	SNA		0	5	I	x											
Solanum dulcamara	Climbing Nightshade			GNR	SNA		0	0	I			x				x					
Solidago canadensis	Canada Goldenrod			G5	S5		1	3	N		x	x	x	x			x				
Solidago sp											x	x									
Sonchus arvensis	Field Sow-thistle			GNR	SNA		---	1	I	x		x									
Symphyotrichum lanceolatum	Panicled Aster			G5	S5		3	-3	N		x	x	x	x							
Symphyotrichum lateriflorum	Calico Aster			G5	S5		3	-2	N		x	x									
Symphyotrichum novae-angliae	New England Aster			G5	S5		2	-3	N	x	x	x									
Symphyotrichum urophyllum	Arrow-leaved Aster			G4G5	S4		6	5	N		x	x	x								
Taraxacum officinale	Common Dandelion			G5	SNA		0	3	I	x	x	x	x	x		x	x				
Tilia americana	American Basswood			G5	S5		4	3	N		x	x	x	x							
Toxicodendron radicans var. rydbergii	Western Poison Ivy			G5	S5		0	0	N		x	x									
Trifolium repens	White Clover			GNR	SNA		0	2	I			x									
Trifolium sp										x											
Trillium erectum	Red Trillium			G5	S5		6	1	N		x										
Trillium grandiflorum	White Trillium			G5	S5		5	5	N		x										
Ulmus americana	American Elm			G5	S5		3	-2	N			x		x							
Ulmus rubra	Slippery Elm			G5	S5		6	0	N		x										
Urtica dioica	Stinging Nettle			G5	S5		---	---	N			x									
Verbena hastata	Blue Vervain			G5	S5		4	-4	N		x										
Verbena urticifolia	White Vervain			G5	S5		4	-1	N		x										
Veronica officinalis	Common Speedwell			G5	SNA		0	5	I		x										
Veronica serpyllifolia	Thyme-leaved Speedwell			G5	SNA		---	-3	I	x											
Veronica sp										x							x				
Viburnum opulus	Cranberry Viburnum			GNR	SNA		0	0	I			x		x							
Vicia cracca	Tufted Vetch			GNR	SNA		0	5	I		x										
Viola cucullata	Marsh Blue Violet			G4G5	S5		5	-5	N		x										
Viola pubescens	Yellow Violet			G5	S5		5	4	N		x										
Viola sororia	Woolly Blue Violet			G5	S5		4	1	N		x										
Vitis riparia	Riverbank Grape			G5	S5		0	-2	N		x	x	x								

COSEWIC (NHIC 2020)

NAR Not At Risk, a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances; SC Special Concern, a wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats; T Threatened, a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction; E Endangered, a wildlife species facing imminent extirpation or extinction; XT Extirpated, a wildlife species that no longer exists in the wild in Canada, but exists elsewhere; X Extinct, a wildlife species that no longer exists.

SARO (NHIC 2020)

NAR Not At Risk; SC Special Concern; THR Threatened; END Endangered; EXP Extirpated; END-R Endangered (Regulated)

GRANK (NHIC 2020)

G1 critically imperiled on a global scale; G2 imperiled on a global scale; G3 vulnerable on a global scale; G4 apparently secure on a global scale; G5 secure on a global scale; GX Presumed Extinct, Not located despite intensive searches and virtually no likelihood of rediscovery; GH Possibly Extinct, Missing; known from only historical occurrences but still some hope of rediscovery; G#G# Range Rank—A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community;

GU Unrankable—-Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. Whenever possible, the most likely rank is assigned and the question mark qualifier is added (e.g., G2?) to express uncertainty, or a range rank (e.g., G2G3) is used to delineate the limits (range) of uncertainty; GNR Unranked—Global rank not yet assessed; GNA Not Applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities; ? Inexact Numeric Rank—Denotes inexact numeric rank (e.g., G2?); Q Questionable taxonomy—Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority; C Captive or Cultivated Only—At present extant only in captivity or cultivation, or as a reintroduced population not yet established; T# Infraspecific Taxon (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T-rank cannot imply the subspecies or variety is more abundant than the species as a whole-for example, a G1T2 cannot occur.

SRANK (NHIC 2020)

SX Presumed Extirpated; SH Possibly Extirpated (Historical); S1 Critically Imperiled; S2Imperiled; S3 Vulnerable; S4 Apparently Secure; S5 Secure; SNR Unranked; SU Unrankable (conflicting information about status or trends); SNA A conservation status rank is not applicable because the species is not a suitable target for conservation activities (e.g. an introduced species, or a species that has been recorded in Ontario but the observations were made at locations far outside the species' usual range); S#S# Range Rank (used to indicate any range of uncertainty about the status of the species or community). S? Not Ranked Yet; or if following a ranking, Rank Uncertain (e.g. S3?).

Hamilton (2014)

h uncommon; H Rare

CC (Oldham et al. 1995)

Coefficient of Conservatism is a value (0 to 10) assigned to native species in Ontario based on its degree of fidelity to a specific vegetation community type. The lower this value, the more likely the plant is to be found in a wide variety of plant community types including disturbed sites. The presence of plants with a coefficient of conservatism of 9 or 10 indicates later-successional native plants that have undergone only minor disturbance.

Native Status (NHIC 2014)

N native; I introduced

References

Goodban, A.G. 2014. The Vascular Plants of Hamilton, Ontario. In Schwetz, N. (ed.). 2014. Hamilton Natural Areas Inventory Project 3rd Edition - Species Checklist Document. Pages 1 to 91.

Oldham, M.J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Natural Heritage Information Centre, Science and Research Branch, Ontario Ministry of Natural Resources and Forestry, 300 Water Street, Peterborough, Ontario.

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NHIC (Natural Heritage Information Centre). 2017. Ontario Vascular Plant Species List. February 2020. Ontario Ministry of Natural Resources. https://www.ontario.ca/page/get-natural-heritage-information.

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ELC Community Descriptions – Upper James EA Study Area

CULTURAL

Agricultural (AG) Polygons 1, 21

The Agriculture category included lands in use for agricultural purposes such as pasture, actively tilled row crops, hay, grain, sod or orchard. These lands are typically quite homogenous and low in species diversity. From a terrestrial resources perspective these lands are generally of low ecological quality due to ongoing human management, however they can provide specialized habitat for grassland birds and other wildlife. The edges of these polygons include species like Black Walnut (*Juglans nigra*), Common Ragweed (*Ambrosia artemisifolia*), Garlic Mustard (*Alliaria petiolata*), Wild Carrot (*Daucus carota*), Kentucky Bluegrass (*Poa pratensis*), and Canada Horseweed (*Erigeron canadensis*).

Anthropogenic (ANTH) Polygon 27, 30

Lands classified as ANTH include areas that have been cleared of natural vegetation and are in use for human activities such as parking lots, lawns, residential dwellings, commercial outlets, and industrial structures. Due to the removal of natural habitats, features, and functions from these areas, all lands categorized as ANTH are considered to be low quality. Polygon 27 was not surveyed due to being present on private property. Polygon 30 is primarily compose of the Mountain transit center and associated parking lots.

Gray-Dogwood Cultural Thicket (CUT1-4) Polygons 24.1, 24.2, 24.3

These communities are often areas of recently abandoned agricultural lands that have begun to succeed towards a naturally vegetated community. Cultural thickets include areas in a somewhat later stage of succession than cultural meadow, where shrub cover is greater than 25% but tree cover remains below 25%. Cultural thicket communities are dominated by woody shrubs and often have an understory of forbs and grasses. These polygons were not directly surveyed due to being located on private property, however the dominant shrub cover present was determined to be Grey Dogwood (*Cornus racemosa*).

Mineral Cultural Meadow (CUM1) Polygon 13

Cultural meadows represent a very early stage of natural succession. They lack woody species and are dominated primarily by opportunistic forbs and grasses. Depending on soil moisture regimes, these communities can vary from dry pasture grasses to the aster/goldenrod assemblages on fresh to moist substrates. Canopy and subcanopy is sparse and contains only Eastern Cottonwood (*Populus deltoides*) and Willow (Salix) species. The understory is also sparse but primarily contains Grey Dogwood (*Cornus racemosa*), as well as some shorter *Salix* shrubs. The ground layer is the most diverse of the categories, with Reed Canary grass (*Phalaris arundinacea),* Kentucky Bluegrass (*Poa pratensis*), Canada Goldenrod

(*Solidago canadensis),* Wild Carrot (*Daucus carota*), Wild Strawberry (*Fragaria virginiana*), White-sweet clover (*Melilotus albus*), and Tufted vetch (*Vicia cracca*) being most abundant.

Mineral Cultural Woodland (CUW1) Polygons 23.1, 23.2

Cultural woodlands are treed areas characterized by canopy coverage between 35 – 60%. These communities often represent the stage of natural succession between cultural thicket and forest but may also represent a highly disturbed or fragmented forest. Of all the cultural vegetation community types, cultural woodlands generally have the greatest ecological function due to their similarity to natural forest communities. Polygons 23.1 and 23.2 were not surveyed for vegetation as they are present on private property. Based on surveys conducted from adjacent lands, tree cover is abundant enough to qualify as cultural woodland.

Hedgerow (HR) Polygons 9.1, 9.2, 15.2, 26

Hedgerows are narrow strips of vegetation that typically occur along the edges of agricultural fields. Vegetation in these areas has been planted, or may have been retained by farmers as windbreaks along field edges. The most domain trees in these polygons are Sugar Maple (*Acer saccharum*) and Basswood (*Tilia americana*). The understory is primarily young *A. saccharum* along with Chokecherry (*Prunus virginiana*), Grey Dogwood (*Cornus racemosa*) and Wild Grape (*Vitis riparia*). The ground layer is composed of Canada goldenrod (*Solidago canadensis*), *A. saccharum* seedlings, Smooth Brome (*Bromus inermis*), Virginia waterleaf (*Hydrophyllum virginianum*), and Kentucky Bluegrass (*Poa pratensis*).

FOREST

Dry-Fresh Sugar Maple-Beech Deciduous Forest (FOD5-2) Polygons 7.1, 7.2

Deciduous forests are characterized by their canopy layer, which is dominated by deciduous species and has greater than 60% canopy cover. Dry-fresh sites have well-drained soils and the community on the Upper James site is dominated by Sugar Maple (*Acer saccharum*) with American Beech (*Fagus grandifolia*) as a primary associate. Black Maple (*Acer nigrum*) and Black Cherry (*Prunus serotina*) are also present in lower numbers. Alternate leaved dogwood (*Cornus alternifolia*), Red-osier Dogwood (*Cornus sericea*), and Alleghany Blackberry *(Rubus allegheniensi*s) are all present in the understory. The ground lady is primarily Canada goldenrod (*Solidago canadensis*), Broad-leaved Enchanter's nightshade (*Circaea canadensis*), and Two-leaved Toothwort (*Cardamine diphylla*).

Dry-Fresh Sugar Maple-Basswood Deciduous Forest (FOD5-6) Polygon 14

Deciduous forests are characterized by their canopy layer, which is dominated by deciduous species and has greater than 60% canopy cover. Dry-fresh sites have well-drained soils and the community on the Upper James site is dominated by Sugar Maple (*Acer saccharum*) with Basswood (*Tilia americana*) as a primary associate. Young Basswood are abundant in the canopy as well as Red-osier dogwood (*Cornus sericea*) and Red

raspberry (*Rubus idaeus*). Virginia waterleaf (*Hydrophyllum virginianum*), New England aster (*Symphyotrichum novae-angliae*), and Broad-leaved Enchanter's nightshade (*Circaea canadensis*) are all abundant in the ground layer.

WETLAND

Mineral Deciduous Swamp (SWD4) Polygon 19.1, 19.2

Wetland and aquatic communities include areas primarily influenced by site hydrology. Wetlands are typically low-lying areas dominated by hydrophytic vegetation. They may have standing water part or all of the year. Deciduous swamps are characterized by their canopy layer, which contain at least 75% hydrophytic deciduous species and often exhibit standing water or vernal pooling. Species present include Red-osier Dogwood (*Cornus sericea*), Large-thorned Hawthorn (*Crataegus macracantha*), Common St. John's wort (*Hypericum perforatum*), and Spotted ladies thumb (*Persicaria maculosa*).

APPENDIX B – NHIC SPECIES

NHIC Screening List – Upper James EA

Scientific Name	Common Name	COSEWIC	SARO	Srank
Chelydra serpentina	Snapping Turtle	SC	SC	S3
Chimaphila maculata	Spotted Wintergreen	THR	THR	S2
Chrysemys picta marginata	Midland Painted Turtle	SC	---	S4
Colinus virginianus	Northern Bobwhite	END	END	S1
Crotalus horridus	Timber Rattlesnake	EXP	EXP	SX
Esox americanus	Grass Pickerel	SC	SC	---
Nicrophorus americanus	American Burying Beetle	EXP	EXP	SH
Sturnella magna	Eastern Meadowlark	THR	THR	S4B
Uvularia perfoliata	Perfoliate Bellwort			S1S2

COSEWIC/SARO Status: SC = Special Concern, THR = Threatened, END = Endangered

S Rank: SX Presumed Extirpated; SH Possibly Extirpated (Historical); S1 Critically Imperiled; S2Imperiled; S3 Vulnerable; S4 Apparently Secure; S5 Secure; SNR Unranked; SU Unrankable (conflicting information about status or trends); SNA A conservation status rank is not applicable because the species is not a suitable target for conservation activities (e.g. an introduced species, or a species that has been recorded in Ontario but the observations were made at locations far outside the species' usual range); S#S# Range Rank (used to indicate any range of uncertainty about the status of the species or community). S? Not Ranked Yet; or if following a ranking, Rank Uncertain (e.g. S3?)

APPENDIX C – INAT, EBIRD, OBBA, AND HNHD SPECIES

Background Review Species List

Scientific Name	Common Name	SAR or significant? (Y/N)	Record Date	Source
Corvus brachyrhynchos	American Crow	N	2017-06-16T00:00:00	OBBA
Spinus tristis	American Goldfinch	N	2017-06-16T00:00:00	OBBA
Turdus migratorius	American Robin	N	2017-06-16T00:00:00	OBBA
Hirundo rustica	**Barn Swallow**	**Y (SC/THR)***	**2017-06-16T00:00:00**	**OBBA**
Molothrus ater	Brown-headed Cowbird	N	2017-06-16T00:00:00	OBBA
Contopus virens	**Eastern Wood-Pewee**	**Y (SC/SC)**	**2016-07-04/05**	**HNHD**
Caulophyllum giganteum	Giant Blue Cohosh	N	2021-04-15T14:01:09	iNaturalist research-grade observations
Passer domesticus	House Sparrow	N	2017-06-16T00:00:00	OBBA
Danaus plexippus	**Monarch**	**Y (END/SC)***	**2017-06-16T00:00:00**	**eButterfly**
Symphyotrichum novae-angliae	New-England Aster	N	2019-09-19T13:41:20	iNaturalist research-grade observations
Cardinalis cardinalis	Northern Cardinal	N	2017-06-16T00:00:00	OBBA
Agelaius phoeniceus	Red-winged Blackbird	N	2017-06-16T00:00:00	OBBA
Passerculus sandwichensis	Savannah Sparrow	N	2017-06-16T00:00:00	OBBA
Melospiza melodia	Song Sparrow	N	2017-06-16T00:00:00	OBBA
Malus coronaria	Sweet Crabapple	N	2022-05-05T08:03:00	iNaturalist research-grade observations

Scientific Name	Common Name	SAR or significant? (Y/N)	Record Date	Source
Dipsacus fullonum	Wild Teasel	N	2019-09-19T13:41:45	iNaturalist research-grade observations
Setophaga petechia	Yellow Warbler	N	2017-06-16T00:00:00	OBBA

***Status (COSEWIC/SARA)**: SC = Special Concern, THR = Threatened, END = Endangered

APPENDIX D – FAUNA OBSERVATIONS

BREEDING BIRD SURVEY RESULTS

Scientific Name	Common Name	COSEWIC (1)	ESA (Gov. Ont. 2019)	S Rank (3)	City of Hamilton (Smith 2014)	AS (6)	Protected by MBCA (2)	Breeding Evidence (5)	Comments
Wild Turkey	*Meleagris gallopavo*	---	---	S5	common - widespread; extirpated, re-introduced	---	N	PROBABLE	
Killdeer	*Charadrius vociferus*	---	---	S5	abundant - ubiquitous	---	Y	POSSIBLE	
Green Heron	*Butorides virescens*	---	---	S4	uncommon – widespread	---	Y	POSSIBLE	Only seen on second visit
Yellow-billed Cuckoo	*Coccyzus americanus*	---	---	S4	rare - scattered	---	Y	POSSIBLE	Heard only
Black-billed Cuckoo	*Coccyzus erythropthalmus*	---	---	S5	uncommon – very widespread	---	Y	POSSIBLE	Heard only
Cooper's Hawk	*Accipiter cooperi*	NAR	NAR	S4	uncommon - scattered	AS	N	POSSIBLE	
Red-tailed Hawk	*Buteo jamaicensis*	NAR	NAR	S5	common - ubiquitous	---	N	POSSIBLE	
Red-bellied Woodpecker	*Melanerpes carolinus*	---	---	S4	uncommon - very widespread	---	Y	PROBABLE	Observed on both visits, Pair observed Jun 30
Downy Woodpecker	*Dryobates pubescens*	---	---	S5	common - ubiquitous	---	Y	POSSIBLE	
Northern Flicker	*Colaptes auratus*	---	---	S4	common - ubiquitous	---	Y	POSSIBLE	

Scientific Name	Common Name	COSEWIC (1)	ESA (Gov. Ont. 2019)	S Rank (3)	City of Hamilton (Smith 2014)	AS (6)	Protected by MBCA (2)	Breeding Evidence (5)	Comments
Great Crested Flycatcher	*Myiarchus crinitus*	---	---	S4	common - very widespread	---	Y	PROBABLE	
Eastern Kingbird	*Tyrannus tyrannus*	---	---	S4	abundant – ubiquitous	---	Y	POSSIBLE	
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4	common - very widespread	---	Y	PROBABLE	At least 3 were detected on June 8; 2 individuals on June 30, one singing from same location as first visit = Presumed Territory; see report for details.
Alder Flycatcher	*Empidonax alnorum*	---	---	S5	uncommon – widespread	---	Y	POSSIBLE	Two singing males observed on June 8
Willow Flycatcher	*Empidonax traillii*	---	---	S5	common - very widespread	---	Y	PROBABLE	
Least Flycatcher	*Empidonax minimus*	---	---	S4	uncommon - widespread	AS	Y	POSSIBLE	
Red-eyed Vireo	*Vireo olivaceous*	---	---	S5	common - very widespread	---	Y	PROBABLE	
Warbling Vireo	*Vireo gilvus*	---	---	S5	common - very widespread	---	Y	POSSIBLE	
Blue Jay	*Cyanocitta cristata*	---	---	S5	abundant - ubiquitous	---	N	PROBABLE	

Scientific Name	Common Name	COSEWIC (1)	ESA (Gov. Ont. 2019)	S Rank (3)	City of Hamilton (Smith 2014)	AS (6)	Protected by MBCA (2)	Breeding Evidence (5)	Comments
American Crow	*Corvus brachyrhynchos*	---	---	S5	common - ubiquitous	---	N	PROBABLE	
Black-capped Chickadee	*Poecile atricapillus*	---	---	S5	abundant – ubiquitous	---	Y	CONFIRMED	
Tree Swallow	*Tachycineta bicolor*	---	---	S4	abundant – very widespread	---	Y	X	Observed flying over study area only; not considered breeding.
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	---	---	S4	common - very widespread	---	Y	X	Observed flying over study area only; not considered breeding.
Barn Swallow	*Hirundo rustica*	THR	THR	S4	common - ubiquitous	---	Y	X	Observed flying over study area only; not considered breeding.
White-breasted Nuthatch	*Sitta carolinensis*	---	---	S5	common - very widespread	AS	Y	POSSIBLE	
House Wren	*Troglodytes aedon*	---	---	S5	common - ubiquitous	---	Y	POSSIBLE	
American Robin	*Turdus migratorius*	---	---	S5	abundant - ubiquitous	---	Y	CONFIRMED	
Gray Catbird	*Dumetella carolinensis*	---	---	S4	abundant - ubiquitous	---	Y	PROBABLE	
Cedar Waxwing	*Bombycilla cedrorum*	---	---	S5	common - ubiquitous	---	Y	PROBABLE	

Scientific Name	Common Name	COSEWIC (1)	ESA (Gov. Ont. 2019)	S Rank (3)	City of Hamilton (Smith 2014)	AS (6)	Protected by MBCA (2)	Breeding Evidence (5)	Comments
House Sparrow	*Passer domesticus*	---	---	SNA	abundant - ubiquitous; exotic, introduced	---	N	PROBABLE	
American Goldfinch	*Spinus tristis*	---	---	S5	abundant - ubiquitous	---	Y	PROBABLE	
Chipping Sparrow	*Spizella passerina*	---	---	S5	abundant - ubiquitous	---	Y	PROBABLE	
Field Sparrow	*Spizella pusilla*	---	---	S5	common - widespread	---	Y	POSSIBLE	
Song Sparrow	*Melospiza melodia*	---	---	S5	abundant - ubiquitous	---	Y	PROBABLE	
Swamp Sparrow	*Melospiza georgiana*	---	---	S5	common – widespread	---	Y	PROBABLE	
Baltimore Oriole	*Icterus galbula*	---	---	S4	common - ubiquitous	---	Y	PROBABLE	
Red-winged Blackbird	*Agelaius phoeniceus*	---	---	S4	abundant - ubiquitous	---	N	CONFIRMED	
Brown-headed Cowbird	*Molothrus ater*	---	---	S4	abundant - ubiquitous	---	N	PROBABLE	
Common Grackle	*Quiscalus quiscula*	---	---	S5	abundant - ubiquitous	---	N	CONFIRMED	
Ovenbird	*Seiurus aurocapilla*	---	---	S4	common – widespread	AS	Y	POSSIBLE	
Common Yellowthroat	*Geothlypis trichas*	---	---	S5	common - ubiquitous	---	Y	PROBABLE	

Scientific Name	Common Name	COSEWIC (1)	ESA (Gov. Ont. 2019)	S Rank (3)	City of Hamilton (Smith 2014)	AS (6)	Protected by MBCA (2)	Breeding Evidence (5)	Comments
Yellow Warbler	*Setophaga petechia*	---	---	S5	abundant - ubiquitous	---	Y	PROBABLE	
Chestnut-sided Warbler	*Setophaga pensylvanica*	---	---	S5	common – widespread	---	Y	POSSIBLE	
Northern Cardinal	*Cardinalis cardinalis*	---	---	S5	abundant - ubiquitous	---	Y	PROBABLE	
Indigo Bunting	*Passerina cyanea*	---	---	S4	common - ubiquitous	---	Y	PROBABLE	

WEATHER AND SURVEY TIMES:

Breeding bird survey (BBS) 1 – June 8, 2022; calm, partial cloudy, 12°C

Breeding bird survey (BBS) 2 - June 30, 2022; calm, cloudy, 16°C

LEGEND:

COSEWIC: SC - Special Concern; **THR** - Threatened; **END** - Endangered **NAR** - assessed and deemed to be not at risk; --- = not assessed as population secure

OMNRF: SC - Special Concern; **THR** - Threatened; **END** – Endangered; **NAR** - assessed and deemed to be not at risk; --- = not assessed as population secure

Provincial Sranks: SX presumed extinct; **SH** possibly extirpated (historical) **S1** critically imperiled**; S2** imperiled; **S3** vulnerable; **S4** - apparently secure; **S5** - secure; **SNA** - non-native exotic

Area Sensitivity: AS - Area Sensitive species

MBCA: Y - Yes; N - No

OBBA: X - species observed but not considered a potential breeder

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2. **MBCA (Migratory Birds Convention Act). 1994.** Available at: http://laws-lois.justice.gc.ca/eng/acts/M-7.01/
3. **NHIC (Natural Heritage Information Centre). 2019.** Srank Definition. http://nhic.mnr.gov.on.ca/MNR/nhic/glossary/srank.cfm
4. **NHIC (Ontario Natural Heritage Information Centre). 2019. NHIC List of Ontario Birds. Ontario Natural Heritage Information Centre Home Page.Available at: http://nhic.mnr.gov.on.ca/MNR/nhic/ species/listout.cfm?el=ab**
5. **OBBA (Ontario Breeding Bird Atlas). 2001**. Guide for Participants. Atlas Management Board, Federation of Ontario Naturalists, Don Mills. 34pp.
6. **OMNR (Ontario Ministry of Natural Resources). 2000.** Significant Wildlife Habitat Technical Guide. 151 pp.
7. **OMNRF (Ontario Ministry of Natural Resources and Forestry). 2019. Species** at Risk in Ontario (SARO) List. Updated January 2019. Available at: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list

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NOCTURNAL AMPHIBIAN CALL SURVEY DATA

SUMMARY OF NOCTURNAL AMPHIBIAN CALL SURVEY RESULTS (2019 AND 2022)

Species	Visit	Station # 1	2	3	4	5	6
American Toad	*April 2019*			L2(3)			
	May 2019					L1(3)*	
	June 2019						
	April 2022		L1(1)		L2(3)	L2(5)	
	May 2022						
	June 2022						
Spring Peeper	*April 2019*	L3	L2(2)	L3	L3		
	May 2019						
	June 2019						
	April 2022	L1(3)		L1(1)	L3		
	May 2022				L2(4)		
	June 2022						
Green Frog	*April 2019*						
	May 2019					L1(2)*	
	June 2019	L1(3)	L1(2)	L1(3)		L1(1)	L2(2)
	April 2022				L3		
	May 2022				L1(1)		
	June 2022				L3		
Gray Treefrog	*April 2019*						
	May 2019	L1(3)	L1(2)		L1(1)		
	June 2019	L1(2)	L1(1)	L1(2)		L1(1)	
	April 2022						
	May 2022			L1(1)			
	June 2022			L1(1)			

Northern Leopard Frog	*April 2019*	L1(2)	L1(1)			L2(4)
	May 2019					
	June 2019					
	April 2022					
	May 2022					
	June 2022					
Wood Frog	*April 2019*					
	May 2019					
	June 2019					
	April 2022			L3		
	May 2022					
	June 2022					

L# = Calling Code
(#) = Number of Individuals
* = calling from >120m from site
Calling codes based on the Marsh Monitoring Program (MMP) (Bird Studies Canada, 2009)
L1 = Individual calls do not overlap and calling individuals can be counted.
L2 = Individual calls sometimes overlap, but numbers of individuals can still be estimated.
L3 = Overlap among calls seems continuous (full chorus); a count estimate is impossible.
( ) = Estimated number of individuals present

SUMMARY OF AMPHIBIAN SPECIES STATUS

Scientific Name	Common Name	COSEWIC	ESA	S Rank	City of Hamilton	Comments
Anaxyrus americanus	American Toad	---	---	S5	Abundant	
Hyla versicolor	Gray Treefrog	---	---	S5	Abundant	
Pseudacris crucifer	Spring Peeper	---	---	S5	Abundant	
Lithobates clamitans	Green Frog	---	---	S5	Abundant	

Scientific Name	Common Name	COSEWIC	ESA	S Rank	City of Hamilton	Comments
Lithobates pipiens	Northern Leopard Frog	NAR	NAR	S5	Abundant	
Lithobates sylvaticus	Wood Frog	---	---	S5	Abundant	

INCIDENTAL WILDLIFE

Scientific Name	Common Name	COSEWIC	ESA	S Rank	City of Hamilton	Comments
Mammals						
Odocoileus virginianus	White-tailed Deer	---	---	S5	Common	Tracks
Sciurus carolinensis	Eastern Gray Squirrel	---	---	S5	Common	
Reptiles						
Thamnophis sirtalis sirtalis	Eastern Garter Snake	---	---	S5	Abundant	
Insects						
Anax junius	Common Green Darner	---	---	S5	Common permanent resident and breeding immigrant	Dragonfly
Danaus plexippus	Monarch	END	SC	S2N, S4B	Common breeding immigrant	Butterfly
Ancyloxypha numitor	Least Skipper	---	---	S5	Common permanent resident	Butterfly

APPENDIX E – SAR SCREENING

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
AMPHIBIANS				
Jefferson Salamander (*Ambystoma jeffersonianum*)	Endangered	Southern Ontario, mainly along the Niagara Escarpment	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	**Potential habitat in woodlot at northeast (in adjacent lands) and southwest woodlots, as well as breeding habitat is the central pond. However, this species is found mainly along Niagara Escarpment; the NHIC and MECP databases do not have records from this area (most populations in Ontario have been identified). Given the isolated nature of these habitats, with surrounding urban and agricultural habitats, it is highly unlikely that this species is present.**
Unisexual Ambystoma - Jefferson-dominated (*Ambystoma laterale-jeffersonianum*)	Endangered	Southern Ontario, mainly along the Niagara Escarpment	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	**See Jefferson Salamander.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
Acadian Flycatcher (*Empidonax virescens*)	Endangered	Carolinian Region (as far north as Toronto)	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Bald Eagle (*Haliaeetus leucocephalus*)	Special Concern (provincial only)	Widespread in southern Ontario	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers; they roost in super canopy trees such as pine.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Bank Swallow (*Riparia riparia*)	Threatened	Widespread in southern Ontario	Low areas along rivers, streams, coasts or reservoirs; nest in natural bluffs and eroding streamside banks, also sand and gravel quarries and road cuts	**No suitable breeding habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Barn Owl (*Tyto alba*)	Endangered	Extreme southwestern Ontario only	Generally prefers low-elevation, open country; often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs.	**No suitable nesting structures found in study area or adjacent lands. Open agricultural areas represent low quality foraging habitat. This species is very rare in the region and absent most years.**
Barn Swallow (*Hirundo rustica*)	Threatened	Widespread in southern Ontario	Prefers farmland, lake/river shorelines, wooded clearings, urban populated areas, rocky cliffs, and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves, etc.	**Single birds were seen foraging over open habitats during both 2019 and 2022 breeding bird surveys. There was no evidence of breeding on site in 2019 or 2022, but a nest was found under the rear porch of the old homestead in 2015.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
Black Tern (*Childonias niger*)	Special Concern (provincial only)	Scattered in southern Ontario; breed mainly along edges of the Great Lakes	Generally prefers freshwater marshes and wetlands; nests either on floating material in a marsh or on the ground very close to water.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Bobolink (*Dolichonyx oryzivorus*)	Threatened	Widespread in southern Ontario	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Canada Warbler (*Wilsonia canadensis*)	Threatened / Special Concern	Absent in southwestern Ontario; primarily breeds in Southern Shield	Generally prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Cerulean Warbler (*Dendroica cerulea*)	Endangered / Threatened	Widespread but local in southern Ontario	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Chimney Swift (*Chaetura pelagica*)	Threatened	Widespread in southern Ontario	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys.	**No birds were observed in 2019 or 2022, but GeoProcess observed four birds foraging in 2015. There are no suitable structures for nesting on the property but there may be suitable habitat in adjacent lands in the form of tree snags or old buildings (with chimneys).**
Common Nighthawk (*Chordeiles minor*)	Threatened / Special Concern	Widespread in southern Ontario	Generally prefers open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
			be found in urban areas (nests on flat roof-tops).	
Eastern Meadowlark (*Sturnella Magna*)	Threatened	Widespread in southern Ontario	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	**One bird was heard singing (May 29, 2019 only) at least 100 meters south of Dickenson Road and therefore well outside the study area.**
Eastern Whip-poor-will *(Caprimlugus vociferus)*	Threatened	Scattered in southwestern Ontario; primarily north of Toronto	Generally prefers semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred. In winter they occupy primarily mixed woods near open areas.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Eastern Wood-Pewee (*Contopus virens*)	Special Concern	Widespread in southern Ontario	Found in deciduous, mixed woods, or pine plantations; also found in mature woodlands, urban shade trees, roadsides, and orchards; usually found in clearings and forest edges.	**NHIC record (undated). One heard on June 25 only in 2019; In 2022 at least 3 were detected on June 8, 2 individuals on June 30, Territory presumed (Probable breeding) in northeast woodlot (Polygon 7); see report for details.**
Golden-winged Warbler (*Vermivora chrysoptera*)	Threatened / Special Concern	Local; primarily central-eastern Ontario	Generally prefers areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Henslow's Sparrow *(Ammodramus henslowii)*	Endangered	Extremely rare; may be extirpated	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material.	**No suitable habitat found on site or in adjacent lands. This species is locally extirpated and may be extirpated from the entire province. None detected during breeding bird surveys.**
King Rail (*Rallus elegans*)	Endangered	Majority found at Lake St. Clair; remainder at key coastal marshes along lakes Erie and Ontario	Freshwater and brackish marshes and rice fields.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
Least Bittern *(Ixobrychus exilis)*	Threatened	Widespread in southern Ontario	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Louisiana Waterthrush *(Seiurus motacilla)*	Special Concern	Widespread but local in southern Ontario	Ggenerally inhabits mature forests along steeply sloped ravines adjacent to running water. Prefers clear, cold streams and densely wooded swamps.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Peregrine Falcon (*Falco peregrinus*)	Special Concern	Nests in large cities in southern Ontario; primarily found in northwestern Ontario	Mountain ranges, coastlines, river valleys, and increasingly in cities.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Prothonotary Warbler (*Protonotaria citrea*)	Endangered	Primarily along north shore of Lake Erie; very local	Generally found in the dead trees of flooded woodlands or deciduous swamp forests; Carolinian Zone	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	Threatened / Special Concern	Widespread but rare in southern Ontario	Generally prefers open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks.	**No birds were detected in 2019 or 2022. However, A bird was observed in 2015 by GeoProcess but no breeding activity was evident. There are suitable snag tree present in the study area**
Short-eared Owl *(Asio flammeus)*	Special Concern	Very local in southern Ontario	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields.	**No suitable habitat found on site or in adjacent lands. None detected during breeding bird surveys.**
Wood Thrush (*Hylocichla mustelina*)	Threatened / Special Concern	Widespread in southern Ontario	Breeds in mature deciduous and mixed forests, most commonly those with American beech, sweet gum, red maple, black gum, eastern hemlock, flowering dogwood, American hornbeam, oaks, or pines; nests less	**Potential habitat found on site and in adjacent lands. None were detected during 2019 or 2022 breeding bird surveys. However, a single bird was detected in 2015 by GeoProcess.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
			successfully in fragmented forests and suburban parks with enough large trees for a territory; ideal habitat includes trees over 50 feet tall, a moderate understory of saplings/shrubs, an open floor with moist soil and decaying leaf litter, and water nearby.	
Yellow-breasted Chat ***(Icteria virens)***	Endangered	Breeds mainly Point Pelee and Pelee Island	Generally prefers dense thickets around wood edges, riparian areas, and in overgrown clearings.	**No suitable breeding habitat found on site or in adjacent lands. Not detected during breeding bird surveys.**
INSECTS				
Monarch ***(Danaus plexippus)***	Endangered / Special Concern	Widespread in southern Ontario	Exist primarily wherever milkweed and wildflowers exist, such as abandoned farmland, along roadsides, and other open spaces.	**Small numbers detected in 2019 and 2022 field studies. Likely found on site during fall migration but in non-significant numbers. Likely breeds on Common Milkweed in CUM (polygon 13) and adjacent MAM (polygons 22 and 19.2) habitat. Polygon 13 will be impacted by Road Alignment options 1, 2 and 4.**
Mottled Duskywing (*Erynnis martialis*)	Endangered (federal only)	Scattered locations throughout southern Ontario	Open woodland, barrens, prairie hills, open brushy fields, chaparral; larvae feed on New Jersey tea (*Ceanothus americanus*) and redroot (*Ceanothus herbaceus*)	**No suitable habitat found on site or in adjacent lands.**
West Virginia White (*Pieris virginiensis*)	Special Concern (provincial only)	50 sites in south and central Ontario; primarily western Lake Ontario region	Generally prefer moist, deciduous woodlands; the larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	**No suitable habitat found on site or in adjacent lands. No NHIC or MECP records from area; most sites in southern Ontario are generally known.**
MAMMALS				

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
American Badger (*Taxidea taxus*)	Endangered (SW Ontario); Special Concern (provincial only; NW Ontario)	Southwestern Ontario, primarily Norfolk and Middlesex (close to Lake Erie); also northwestern Ontario pop.	Occurs primarily in grasslands and open areas with grasslands, which can include parklands, farms, and treeless areas; also found in forest glades and meadows, marshes, brushy areas, hot deserts, and mountain meadows	**May occur in general area but no records on file with NHIC, MECP, or HCA. No burrows or other evidence of presence found during field investigations.**
Eastern Small-footed Myotis (*Myotis leibii*)	Endangered (provincial only)	Widespread in southern Ontario	Overwintering habitat: caves and mines that remain above 0 degrees Celsius; Maternal roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses, and under tree bark.	**Maternity roosts may occur in woodlots in northeast and southwest corners of study area; may form temporary roosts in woodlot during migration (April and May; August to October). Any snag trees slated for removal will be done so outside of April 1 to October 31. Proposed development will not adversely impact this species or its habitat.**
Little Brown Myotis (*Myotis lucifugus*)	Endangered	Widespread in southern Ontario	Overwintering habitat: caves and mines that remain above 0 C; Maternal roosts: Often associated with buildings (attics, barns, etc.). Occasionally found in trees (25-44 cm dbh).	**See Eastern Small-footed Myotis.**
Northern Myotis (*Myotis septentrionalis)*	Endangered	Widespread in southern Ontario	Overwintering habitat: caves and mines that remain above 0 C; Maternal roosts: often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns, etc.)	**See Eastern Small-footed Myotis.**
Tri-colored Bat (*Perimyotis subflavus*)	Endangered	Very rare; widespread but scattered in southern Ontario	Overwintering habitat: caves and mines that remain above 0 degrees Celsius; Maternal roosts: can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	**See Eastern Small-footed Myotis.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
Woodland Vole (*Microtus pinetorum*)	Special Concern	Carolinian Region only	Occurs in deciduous forests, dry fields, and apple orchards, preferring wooded areas with high vertical vegetative stratification, also evergreen shrubs, ground cover, and old fallen logs. Voles are most abundant in deciduous forests with moist, friable soils suitable for burrowing.	**Potential habitat found in woodlot at northeast and southwest corners of study area, although status in area is unknown. If present, proposed development will not adversely impact this species or its habitat.**
REPTILES				
Blanding's Turtle *(Emydonidea blandingii)*	Threatened	Widespread in south, central, and eastern Ontario	Generally occurs in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. Prefers shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	**Potential habitat found in central pond. No NHIC or MECP records from area (the locations of most populations in this region of Ontario are known). Given the isolated nature of this site, surrounded by anthropogenic and agriculatural habitats, it is highly unlikely that a population of this species persists in the area.**
Eastern Hog-nosed Snake (*Heterodon platirhinos*)	Threatened	Two populations: East of Georgian Bay and southwestern Ontario (primarily Grand River sand plain)	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	**Potential habitat found on site or in adjacent lands. However, soils are not sandy in nature so not suitable for egg-laying or overwintering. No NHIC or MECP records from area.**
Eastern Musk Turtle (Stinkpot)	Special Concern	Mostly southern edge of Canadian Shield; scattered	Occurs in rivers, lakes and ponds with a slow-moving current, soft bottom, and shallow water	**No suitable habitat found on site or in adjacent lands. No NHIC or MECP records from area.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
(***Sternotherus odoratus***)		locations in southwestern Ontario		
Northern Ribbonsnake *(Thamnophis sauritus septentrionalis)*	Special Concern	Widespread in southern and eastern Ontario	Generally occurs along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	**Potential habitat found in and around central pond. However this species is regarded as unusual in the Hamilton area. If present, the proposed development will not adversely impact this species as mitigation measures will be in place; see report for details.**
Midland Painted Turtle (Chrysemys picta marginata)	Special Concern (federal only)	Very widespread and common in southern Ontario	Painted turtles inhabit waterbodies, such as ponds, marshes, lakes and slow-moving creeks, that have a soft bottom and provide abundant basking sites and aquatic vegetation. These turtles often bask on shorelines or on logs and rocks that protrude from the water. The midland painted turtle hibernates on the bottom of waterbodies.	**Potential habitat found on site (Polygon 5.1) and adjacent lands. If present, the proposed development will not directly impact this habitat; see report for details.**
Northern Map Turtle (*Graptemys geographica*)	Special Concern	Widespread along shores of Georgian Bay and lakes Erie, Ontario, and St. Clair	Found in large rivers and lakes with slow-moving currents and soft bottoms	**See Blanding's Turtle.**
Snapping Turtle *(Chelydra serpentina)*	Special Concern	Very widespread and common in southern Ontario	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	**Likely found in central pond and general area as this species can utilize habitats such as ditches and small watercourses and wetlands. No records for area in the NHIC and MECP databases. However an individual was observed in 2015 by GeoProcess. If present, the habitat for this species will be preserved and no adverse impacts are anticipated. See report for mitigation measures.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
Spiny Softshell (*Apalone spinifera*)	Threatened	Lakes St. Clair and Erie and western L. Ontario watersheds. Majority are found in the Thames and Sydenham rivers and at two sites in Lake Erie.	Found in rivers with soft bottoms, aquatic vegetation and sandbars or mudflats; occasionally found in lakes or impoundments.	**No suitable habitat found on site or in adjacent lands. No NHIC or MECP records from area.**
FISH				
American Eel (*Anguilla rostrata*)	Endangered	12-mile Creek watershed and Lake Ontario.	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean.	**No suitable habitat found on site or in adjacent lands.**
Grass Pickerel (*Esox americanus vermiculatus*)	Special Concern	Occur in the St. Lawrence River, and lakes Ontario, Erie, and Huron	Generally occur in wetlands with warm, shallow water and an abundance of aquatic plants.	**NHIC record (undated). Potential suitable habitat exists in the central pond (polygon 5.1).**
Nothern Sunfish (Great Lakes - upper St. Lawrence pop.) (*Lepomis peltastes*)	Special Concern	Throughout southern Ontario including Great Lakes and rivers and small lakes in eastern Ontario.	Shallow, vegetated and slow flowing waters as well as warm lakes and ponds with sandy banks or rocky bottoms. Preferred habitats have aquatic vegetation to avoid strong currents.	**No suitable habitat found on site or in adjacent lands.**
Redside Dace *(Clinostomus elongatus)*	Endangered	Found in a few tributaries of Lake Huron, in streams flowing into western Lake Ontario, the Holland River (flows into Lake Simcoe), and Irvine Creek of	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient.	**No suitable habitat found on site or in adjacent lands.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
		the Grand River system.		
Silver Shiner (*Notropis photogenis*)	Threatened	Found in the Thames and Grand Rivers, and in Bronte and Sixteen Mile Creeks.	Generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients.	**No suitable habitat found on site or in adjacent lands.**
MOLLUSCS (FRESHWATER MUSSELS)				
Eastern Pondmussel (*Ligumia nasuta*)	Special Concern / Endangered	Lake St. Clair River delta; Lyn Creek (small tributary in upper St. Lawrence River); found at 17 new sites	Generally inhabit sheltered areas of lakes or slow streams in substrates of fine sand and mud	**No suitable habitat found on site or in adjacent lands.**
Lilliput *(Taxolasma parvum*)	Threatened (provincial only)	Southwest Ontario	Found in a variety of habitats including small to large rivers, wetlands, shallows of lakes, ponds and reservoirs. They are common in soft substrates with over 50% of the substrate type comprised of sand and a mud/muck/silt combination. Typically occur with or near Green Sunfish, Bluegill, White Crappie, and Johnny Darter	**No suitable habitat found on site or in adjacent lands.**
Rainbow Mussel (*Villosa iris*)	Special Concern	Ausable, Bayfield, Detroit, Grand, Maitland, Moira, Niagara, Salmon, Saugeen, Sydenham, Thames, & Trent Rivers; Lake St. Clair;	Most abundant in shallow, well oxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel,sand and occasionally mud.	**No suitable habitat found on site or in adjacent lands.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
		may no longer be in L. Erie & St. Clair, Detroit & Niagara R.		
VASCULAR PLANTS				
American Chestnut (*Castanea dentata*)	Endangered	Found in the Carolinian Zone between Lake Erie and Lake Huron.	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA databases. Not observed during botanical surveys.**
American Columbo (*Frasera caroliniensis*)	Endangered	Only found in the Carolinian forest region; 22 populations recorded. Based on field surveys in 2004/2005, 13 populations are currently believed to exist.	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils.	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA databases. Not observed during botanical surveys.**
American Ginseng (*Panax quinquefolius*)	Endangered	Southern Ontario	Grows in rich, moist, undisturbed and relatively mature deciduous woods (dominated by Sugar Maple, White Ash, and American Basswood) in areas of neutral soil (such as over limestone or marble bedrock).	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA databases. Not observed during botanical surveys.**
Broad Beech Fern (*Phegopteris hexagonoptera*)	Special Concern	Found in forest remnants in southern Muskoka, along Lake Erie, and in the eastern Lake Ontario-St.	Generally inhabits shady areas of beech and maple forests where the soil is moist or wet.	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA databases. Not observed during botanical surveys.**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
		Lawrence River region.		
Butternut (*Juglans cinerea*)	Endangered	Found throughout the southwest, north to the Bruce Peninsula, and south of the Canadian Shield.	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows.	**Six trees were identified in the main northern woodlot (polygon 7.1), adjacent hedgerow and wooded areas; all within the Class EA Study Area. Two trees will be impacted by Road Alignment Options 1 and 4, and potentially minor indirect impacts by options 2 and 3. see report for details.**
Cherry Birch (*Betula lenta*)	Endangered	Two sites on the Niagara peninsula. A survey of these sites in 2010 found only 17 trees (of 50 trees identified in 1967).	Found on moist, well-drained clay loam soil over limestone bedrock with White Oak, Red Oak, Eastern Hemlock, Sugar Maple and other deciduous trees.	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA databases. Not observed during botanical surveys.**
Eastern Flowering Dogwood (*Cornus florida*)	Endangered	Only in the Carolinian Zone (southwest of Toronto to Sarnia down to the shores of Lake Erie).	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; also grows around edges and hedgerows.	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA databases. Not observed during botanical surveys.**
Few-flowered Club-rush (*Trichophorum planifolium*)	Endangered	Two sites: Royal Botanical Gardens (Hamilton) and Rouge Park (Toronto).	Generally found on steep slopes of Dry Fresh Oak deciduous forests and Dry Fresh Oak-Maple-Hickory deciduous forests.	**No suitable habitat found on site or in adjacent lands. Only location in Hamilton area is at Royal Botanical Gardens.**
Green Dragon (*Arisaema dracontium*)	Special Concern	Believed to still occur at about 30 to 35 sites in the	Generally grows in damp deciduous forests, particularly maple forest and forest dominated	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA**

SPECIES LIST	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Upper James EA Site (and within 120 metres)
		southwestern Ontario.	by Red Ash and White Elm trees, and along streams.	**databases. Not observed during botanical surveys.**
Hoary Mountain-mint (*Pycnanthemum incanum*)	Endangered	Only in Hamilton - north shore of harbour	Oak savannas and prairies, dry sites; occurs on steep, warmer-than-normal slopes.	**No suitable habitat found on site or in adjacent lands.**
Red Mulberry (*Morus rubra*)	Endangered	Found in the Carolinian Zone, especially the shores of Lake Erie and the slopes of the Niagara Escarpment.	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; can grow in open areas such as hydro corridors.	**No suitable habitat found on site or in adjacent lands.**
White Wood Aster (*Eurybia divaricata*)	Threatened	Restricted to a relatively small number of sites in the Niagara region	Generally grows in open, dry, deciduous forests that are dominated by Sugar Maple and American Beech. May benefit from some disturbance as it often grows along trails. Often found mixed in with other asters.	**No suitable habitat found on site or in adjacent lands. Not detected during botanical surveys.**
LICHENS AND MOSSES				
Spoon-leaved Moss (*Bryoandersonia illecebra*)	Endangered	Restricted to a few sites in southern Ontario – Elgin, Essex and Welland counties, and the Niagara Region.	Generally found in deciduous forests; found on soil that is in or near flat, low-lying, seasonally wet areas.	**Potential habitat in deciduous forest at northeast and southwest portions of study area. No records in NHIC, MECP, or HCA databases. Not observed during field investigations. If present, woodlot is being preserved as part of proposed development and this species will not be adversely impacted.**

APPENDIX F – SWH SCREENING

Screening for Known/Candidate SWH at Upper James EA site, Hamilton - using Ecoregion 7E Criteria Schedule (Final version: OMNRF, January 2015)

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
Seasonal Concentration Areas of Animals				
Waterfowl Stopover and Staging Areas (Terrestrial)	CUM1; CUT1; plus evidence of spring flooding (Mar–May); does not include agricultural fields. Any mixed species groups of 100+ birds. Eight qualifying spp.: AMBD, AMWI, BWTE, GADW, GWTE, NOPI, NSHO & TUSW.	Air photo interpretation, ELC confirmation and spring breeding bird surveys.	Candidate. CUM1 and CUT1 communities are present in the Study Area. Habitat use to be determined during field investigations.	SWH Absent. No flooded fields were observed during spring (March – May) field investigations. No concentrations of waterfowl were observed.
Waterfowl Stopover and Staging Areas (Aquatic)	MAS1; MAS2; MAS3; SAS1; SAM1; SAF1; SWD1; SWD2; SWD3; SWD4; SWD5; SWD6; SWD7. 27 qualifying species; 100+ of listed species for 7 days; areas with annual staging of Canvasback, Redhead, and Ruddy Duck.	Air photo interpretation, possibly followed by ELC confirmation and spring bird survey(s).	Candidate. Qualifying wetland habitats appear to be present in the Study Area. Habitat use to be determined during field investigations.	SWH Absent. Wetland habitats were too small to meet aggregation thresholds for qualifying species.
Shorebird Migratory Stopover Area	BB01; BB02; BBS1; BBS3; BBT1; BBT2; SDO1; SDS2; SDT1; MAM1–MAM5. Habitat extremely rare, long history of use. Does not include SWM ponds. Presence of 3+ (of 22) qualifying spp. and 1000+ "shorebird use days".	Air photo interpretation, possibly followed by ELC confirmation and migratory bird survey(s).	SWH Absent. Natural unvegetated shoreline habitat is absent from the Study Area.	SWH Absent. n/a
Raptor Wintering Area	Candidate sites are > 20 ha and include one of FOD, FOM, FOC and one of CUM, CUT, CUS, CUW; least disturbed sites are idle/fallow or lightly grazed field/meadow	Air photo interpretation, possibly followed by ELC confirmation and winter bird survey(s).	SWH Absent. Qualifying upland habitat in the Study Area was of insufficient size	SWH Absent. n/a

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
	(>15 ha) with adjacent woodlands; Fields need to be wind swept; Bald Eagle: FOD, FOM, FOC, SWD or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water. Qualifying spp. = AMKE, NOHA, RLHA, RTHA, SNOW + BAEA & SEOW. Confirmed sites require 1+ SEOW or BAEA, or 10+ of 2+ qualifying spp. for at least 20 days.		to support concentrations of wintering raptors.	
Bat Hibernacula	Big Brown Bat/Tri-colored Bat only; CCR1; CCR2; CCA1; CCA2; does not include buildings. All sites with confirmed bats are SWH. Note: buildings are not considered to be SWH.	Air photo interpretation, followed by ELC survey and wildlife habitat assessment.	SWH Absent. A review of available aerial photographic and topographic mapping suggests there are no areas of exposed bedrock suitable for hibernation.	SWH Absent. No crevices, caves, karsts or abandoned mines were observed on the Subject Property or adjacent lands.
Bat Maternity Colonies	Big Brown Bat/Silver-Haired Bat only; all FOD, FOM, SWD, SWM; does not include buildings. 10+ large diameter (25+ cm dbh) snag trees per hectare. Requires: 10+ Big Brown Bats or 5+ Silver-haired Bats.	Air photo interpretation of vegetation communities. ELC confirmation and specialized bat habitat survey(s) (i.e., following Maternity Roost Survey for Treed Habitats protocol)	Candidate SWH present. Qualifying forested ELC communities are present in the Study Area. Habitat use to be determined during field investigations.	Candidate SWH present. Large woodlots in northern portion of study area (polygons 7.1 and 14) likely meet snag size/density thresholds. Snag inventory and/or acoustic surveys within suitable habitat have not been undertaken to confirm SWH. Habitat remains candidate within these polygons.
Turtle Wintering Areas	Snapping/Midland Painted Turtles: SW, MA, OA, SA; FEO and BOO; Northern Map Turtle: open water areas (e.g., deeper rivers, streams) and lakes with current can be used. Must be permanent water. Does not include	Air photo interpretation, to help guide early spring and/or late autumn basking turtle surveys.	Candidate SWH present. Suitable wetland communities are present based on a review of aerial photography. To be	SWH Absent. No turtles were observed in wetland communities during spring field investigations, however targeted turtle

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
	man-made ponds such as sewage lagoons or stormwater ponds. Requires: 5+ 'Painted' or 1+ Snapping/Northern Map Turtles.		determined during field investigations. Snapping Turtle was observed in 2014 (background record).	basking surveys were not undertaken. Based on site investigations, Polygon 5.1 represents potential habitat. This pond was reportedly dug /human-made and therefore is not considered SWH.
Reptile Hibernaculum	Snakes: any ecosite except very wet ones; talus, rock barren, crevice, cave, & alvar site may be directly related. Qualifying species = E. Gartersnake, N. Watersnake, N. Red-bellied Snake, N. Brownsnake, Smooth Greensnake, N. Ring-necked Snake, Milksnake, & E. Ribbonsnake. Requires of 5+ individuals or 2+ species, or 1+ E. Ribbonsnake.	Air photo interpretation, to help guide spring and/or autumn visual encounter surveys.	Candidate SWH present. A mix of natural and cultural habitats are present, including forest/agricultural edge. To be determined during dedicated surveys.	Candidate SWH Present. No snakes were observed during the active snake search conducted in May 2019. Snakes documented in spring (especially in early spring) can be indicative of nearby hibernacula. Ideal hibernacula habitat (e.g., karsts) are also absent in the study area. Therefore, although it's possible that snake hibernacula are present, it is unlikely that enough snakes are present to trigger confirmed SWH status.
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	CUM1, CUS1, BLS1, CLO1, CLT1; CUT1; BLO1; BLT1; CLS1. Qualifying spp. include Cliff and N. Rough-winged Swallow. Does not include berms, soil piles, bridges, aggregate pits, etc. Requires 8+ pairs of either or combined.	Air photo interpretation, ELC surveys, breeding bird surveys and wildlife habitat assessments.	Candidate SWH present. CUM1 habitat exists within the Study Area. To be determined during field investigations.	SWH Absent. No eroding features, or exposed slopes were observed during field investigations. Neither indicator species was documented during

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
				targeted breeding bird surveys in 2022.
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)	SWM2; SWM3; SWM5; SWM6; SWD1; SWD2; SWD3; SWD4; SWD5; SWD6; SWD7; FET1. Qualifying spp. include Black-crowned Night-Heron, Great Blue Heron, Green Heron, & Great Egret. 2+ active nests of listed species.	Air photo interpretation, ELC surveys, breeding bird surveys and wildlife habitat assessments.	Candidate SWH present. Qualifying ELC vegetation communities appear to be present. To be determined during field investigations.	SWH Absent. Only one qualifying species (Green Heron) was documented during the second breeding bird survey in 2022. One (1) pair exhibited possible breeding evidence, however no nests were observed.
Colonially - Nesting Bird Breeding Habitat (Ground)	MAM1 – 6; MAS1 – 3; CUM; CUS; CUT. Qualifying spp. = BRBL, CATE, COTE, HERG, GBBG, LIGI, & RBGU. Nest threshold = 25+ HERG & RBGU; 1+ GBBG & LIGU; 5+ COTE; 2+ CATE; and 5+ BRBL.	Air photo interpretation, ELC surveys, breeding bird surveys and wildlife habitat assessments.	Candidate SWH present. Rocky islands or peninsulas in large lakes or rivers are absent. However, open fields and pastures with scattered trees and shrubs near water are present. To be determined during field investigations.	SWH Absent. Indicator species thresholds were not met during breeding bird surveys.
Migratory Butterfly Stopover Areas	Field (CUM, CUS, CUT) & forest (FOC, FOD, FOM, CUP) 10+ ha, ≤ 5 km of Lake Ontario/Erie. Qualifying spp. = Monarch, Painted Lady & Red Admiral; 5000+ "Monarch Use Days" or 3000+ 'days' for Painted Lady/Red Admiral.	GIS analysis to measure distance from the Lake Ontario/Erie shoreline and if applicable, size of qualifying ELC communities.	SWH Absent. The Study Area is > 5 km from the Lake Ontario/Erie shoreline.	SWH Absent. n/a
Landbird Migratory Stopover Areas	FOC, FOM, FOD, SWC, SWM, SWD; 5+ ha, within 5 km of Lake Ontario/Erie. If woodlots are rare, then 2–5 ha should be considered. Sites have a variety of habitats, and larger sites are more significant. All migratory	GIS analysis to measure distance from the Lake Ontario shoreline and if	SWH Absent. The Study Area is > 5 km from the Lake Ontario/Erie shoreline.	SWH Absent. n/a

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
	songbirds & raptors qualify. >200 birds/day with >35 spp., and 10+ spp. on 5+ survey visits.	applicable, size of woodlots.		
Deer Winter Congregation Areas	FOC; FOM; FOD; SWC; SWM; SWD; typically 100+ ha or 50+ if woodlots rare; conifer plantations less than 50 ha may be used. Identified by MNRF.	Land Information Ontario (LIO) database query and consultation with MNDMNRF District office. Use of the woodlot by White-tailed Deer is determined by MNDMNRF. Woodlots that exceed the area criteria are significant unless determined not to be significant by MNDMNRF.	SWH Absent. The qualifying ELC communities do not meet the size threshold, nor are any Deer Wintering Areas identified by NDMNRF within the study area.	SWH Absent. n/a
Rare Vegetation Communities				
Cliffs and Talus Slopes	TAO; TAS; TAT; CLO; CLS; CLT. Vertical cliff 3+ metres in height.	Air photo interpretation and ELC surveys.	SWH Absent. The terrain within the Study Area is flat to gently undulating, precluding the possibility of any cliffs or talus slopes. No qualifying ELC communities identified within the Study Area.	SWH Absent. n/a
Sand Barren	SBO1; SBS1; SBT1. Vegetation cover < 60%; Must be ≥ 0.5 ha in size.	Air photo interpretation and ELC surveys.	SWH Absent. No areas of exposed sand with sparsely vegetated cover were observed on available aerial photography. No qualifying ELC communities identified within the Study Area	SWH Absent. n/a

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
Alvar	ALO1; ALS1; ALT1; FOC1; FOC2; CUM2; CUS2; CUT2-1; CUW2; Must be ≥ 0.5 ha in size and with 4 of 5 indicator species present (i.e., *Carex craei*, *Eleocharis compressa*, *Panicum philadelphicum*, *Scutellaria parvula*, & *Trichostema brachiatum*).	Air photo interpretation and ELC surveys.	**SWH Absent.** No areas of shallow, exposed limestone bedrock were visible on available aerial photography or are likely to be present. Site is not in western islands of Lake Erie.	**SWH Absent.** n/a
Old Growth Forest	FOD; FOC; FOM; SWD; SWC; SWM; Must be ≥ 0.5 ha in size. Rare in 7E. Dominant tree species are > 140 years old.	Air photo interpretation and ELC surveys.	**Candidate SWH present.** Forested communities within the Study Area likely meet size criteria. To be confirmed during field investigations.	**SWH Absent.** Old growth characteristics were not observed within woodlands in the Study Area.
Savannah	TPS1; TPS2; TPW1; TPW2; CUS2. Tallgrass prairie habitat has tree cover 25–60%. No min. size; does not include remnant sites. Requires 1+ indicator sp. listed in Appendix N.	Air photo interpretation, ELC and botanical surveys.	**SWH Absent.** Qualifying ELC communities were not observed on available aerial photography.	**SWH Absent.** Qualifying ELC communities and indicator species not observed during field investigations.
Tallgrass Prairie	TPO1; TPO2. Tallgrass prairie has tree cover < 25%. No min. size; does not include remnant sites. Requires 1+ indicator sp. listed in Appendix N. Prairie plant spp. list from Ecoregion 7E should be used.	Air photo interpretation, ELC and botanical surveys.	**SWH Absent.** Qualifying ELC communities were not observed on available aerial photography.	**SWH Absent.** Qualifying ELC communities and indicator species not observed during field investigations.
Other Rare Vegetation Communities	S1, S2, or S3 vegetation communities. May include beaches, fens, forest, marsh, barrens, dunes and swamps.	Air photo interpretation and ELC surveys.	**Candidate SWH present.** A variety of natural vegetation communities are present within the Study Area. To be confirmed during field investigations.	**SWH Absent.** No rare vegetation communities were observed in the Study Area.
Specialized Habitat for Wildlife				

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
Waterfowl Nesting Area	All upland habitats next to wetlands > 0.5 ha (i.e., MAM1–MAM6; MAS1–MAS3; SAF1; SAM1; SAS1; SWD1–SWD4; SWT1; SWT2). Nesting area extends 120 m from wetland(s). Qualifying spp. = ABDU, BWTE, GADW, GWTE, HOME, MALL, NSHO, NOPI, WODU. Studies must confirm 3+ nesting pairs (excl. MALL) or 10+ (incl. MALL). Any AMDU nest is significant.	Air photo interpretation, ELC surveys, and breeding bird surveys.	Candidate SWH present. Qualifying wetlands >0.5 ha appear to be present within the Study Area, adjacent to upland habitats. To be confirmed during field investigations.	SWH Absent. Wetland communities were confirmed to be small, and no breeding waterfowl were observed during field investigations.
Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat	FOD; FOM; FOC; SWD; SWM; SWC; adjacent to riparian areas (rivers, lakes, ponds and wetlands). Requires 1+ active nests; includes 300 m radius for OSPR, 400 – 800 m for BAEA.	Air photo interpretation, ELC surveys, and breeding bird surveys.	Candidate SWH present. Forested habitats on the Study Area appear to be contiguous with wetland communities and a small (<0.5 ha) pond. To be confirmed during field investigations.	SWH Absent. Pond and wetland communities are relatively small. No large trees or stick nests were observed during field investigations. No Bald Eagles or Osprey were documented during breeding bird surveys.
Woodland Raptor Nesting Habitat	All forested ELC ecosites; also SWC, SWM, SWD, CUP3; 30+ ha with > 4 ha Interior Forest Habitat (determined using 200 m buffer). Indicator spp. = BADO, BWHA, COHA, NOGO, RSHA, & SSHA; Requires 1+ active nests; specific radius around nest for each species.	Air photo interpretation, GIS analysis, ELC surveys, and breeding bird surveys.	SWH Absent. Forested vegetation communities within the Study Area are less than 30 ha in size.	SWH Absent. n/a
Turtle Nesting Areas	MAS1; MAS2; MAS3; SAS1; SAM1; SAF1; BOO1; FEO1. Midland Painted, Snapping, and Northern Map turtles only. Requires presence of 5+ Midland Painted, 1+ Snapping/Northern Map.	Air photo interpretation, ELC surveys, and dedicated turtle nesting activity surveys/turtle nest search surveys conducted	Candidate SWH present. Open habitats (cultural meadow and agricultural lands) with potentially suitable nesting soils are present within 100 m of	Candidate SWH Present. Turtles are likely present in the central pond (Snapping Turtles were observed in 2015, but not in 2019 – 2022). Therefore, they may

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
		between the last week of May and first week of July.	wetlands. To be confirmed during field investigations.	be nesting within the study area, most likely along the edges of agricultural fields as there are no other suitable nesting areas (e.g., sand and/or gravel, preferably with a southerly aspect) in the study area. Targeted turtle nesting surveys were not undertaken as part of this study. Habitat category remains candidate.
Seeps and Springs	Any forested ecosite (with <25% meadow/field/pasture) within headwater area of stream. Indicator spp. = WITU, RUGR, SPGR, deer, salamander spp.; Ecosites or ecoelements with 2+ seeps or springs are significant.	Air photo interpretation, ELC surveys and wildlife habitat assessment. Review of site-specific hydrogeologic information.	Candidate SWH present. A series of headwater drainage features appear to bisect forested communities within the Study Area. Seeps and springs may be present. To be confirmed during field investigations.	Candidate SWH present. Seepage was observed in forested polygons 7.1 and 10. Confirming criteria (i.e. 2+ seeps) were not recorded, nor were any of the indicator species. Habitat category remains candidate.
Amphibian Breeding Habitat (Woodland)	FOC; FOM; FOD; SWC; SWM; SWD. 500+ m^2 wetland, pool or woodland (incl. vernal) pool within or ≤ 120 m from woodland (any size). Qualifying spp. = Eastern Newt, Blue-spotted & Spotted Salamander, Gray Treefrog, Spring Peeper, Western Chorus Frog & Wood Frog. Must include 1+ listed salamanders or 2+ listed frogs (with ≥ 20 adults/egg masses or full chorus).	Air photo interpretation and GIS analysis of wetland size. Nocturnal amphibian call surveys and visual encounter surveys as per Marsh Monitoring Program.	Candidate SWH present. Forested wetland communities appear to be present within the Study Area. To be confirmed during field investigations.	Candidate SWH present. 3 indicator species were detected: Spring Peeper, Wood Frog, and Gray Tree Frog. Species thresholds were met at Station 4 (Polygon 5: MAM2-2) with 10+ individuals of each Spring Peeper and Wood

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
				Frog. However, MAM2-2 is not a qualifying ELC community for woodland amphibian breeding habitat. Gray Treefrog and Spring Peeper were detected in lower numbers at Stations 1 and 3 but do not meet abundance thresholds. Due to the presence of indicator species this habitat type remains candidate.
Amphibian Breeding Habitat (Wetlands)	SW, MA, FE, BO, OA, SA; 500+ m^2; typically, ≥ 120 m from woodlands, but larger wetlands containing mostly aquatic species may be considered; Qualifying spp. = Eastern Newt, Blue-spotted, Spotted & Four-toed Salamander, American Toad, Gray Treefrog, Western Chorus Frog, Northern Leopard Frog, Pickerel Frog, Green Frog, Mink Frog & Bullfrog. Must include 1+ listed salamanders, or 2+ listed frogs (with ≥ 20 adults/egg masses or full chorus), or breeding Bullfrogs	Air photo interpretation, as well as GIS analysis of wetland size and proximity to woodland ecosites. Nocturnal amphibian call surveys and visual encounter surveys as per Marsh Monitoring Program.	Candidate SWH present. Several wetland features appear to be present in the Study Area. To be confirmed during field investigations.	Candidate SWH Present. Qualifying ELC communities are present within the Study Area. 3 indicator species were detected: Gray Treefrog, Green Frog and American Toad; species were detected in low numbers (<6 individuals each) not meeting abundance thresholds to confirm SWH. Due to annual species variation and only one year of data (2022), this habitat type remains candidate.

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
Woodland Area-Sensitive Bird Breeding Habitat	Interior habitats (i.e., FOC, FOM, FOD, SWC, SWM, SWD) where 3+ listed species are breeding (i.e., typically, large mature (60+ years) forests, or woodlots >30 ha). Also, any site with CAWA or CERW is SWH. Interior habitat = 200+ m from forest edge. Qualifying spp. = BHVI, BLBW, BTBW, BTNW, NOPA, OVEN, PIWO, RBNU, SCTA, VEER, WIWR, YBSA.	GIS analysis of size of woodlot/forest, as well as interior forest habitat. ELC survey confirmation and breeding bird surveys.	SWH Absent. Woodland communities do not contain interior habitat defined as 200m+ from the edge.	SWH Absent. Woodlands do not meet size criteria and no indicator species were detected during 2019 or 2022 breeding bird surveys.
Habitats for Species of Conservation Concern (not including END or THR species)				
Marsh Breeding Bird Habitat	MAM1–MAM6; SAS1; SAM1; SAF1; FEO1; BOO1. Also, SW, MA, CUM1 for GRHE. Requires 5+ pairs of MAWR/SEWR, or 4+ listed spp., or any nesting BLTE, GRHE, TRUS, YERA. Qualifying spp. = AMBI, AMCO, COGA, COLO, GRHE, MAWR, PBGR, SEWR, SORA, TRUS, VIRA + BLTE & YERA.	Air photo interpretation, ELC surveys and breeding bird surveys.	Candidate SWH present. Although possibly too small to support species thresholds, qualifying wetland communities appear to be present. To be confirmed during field investigations.	SWH Absent. Qualifying wetland communities (MAM, SAF1, SW and CUM1) are present within the Study Area. Indicator species thresholds were not met during breeding bird surveys.
Open Country Bird Breeding Habitat	Candidate SWH requires large grassland areas (i.e., natural fields & CUM1, CUM2) 30+ ha; not Class 1 or 2 agricultural lands or actively used for farming in last 5 years. Confirmed SWH requires nesting by SEOW or 2+ indicator species (i.e., GRSP, NOHA, SAVS, UPSA, VESP).	Air photo interpretation, ELC, as well as GIS analysis of the size of natural & cultural fields & meadows.	SWH Absent. Qualifying ELC communities may be present but do not meet size threshold >30 ha.	SWH Absent. n/a
Shrub/Early Successional Bird Breeding Habitat	Candidate SWH = CUT1; CUT2; CUS1; CUS2; CUW1; CUW2; > 10 ha; not Class 1 or 2 agricultural lands or actively used for farming in last 5 years. Confirmed SWH requires 1 "Indicator" spp. and 2+	Air photo interpretation, ELC, as well as GIS analysis of the size of the qualifying cultural communities.	SWH Absent. Shrub/early successional communities may be present but do not meet > 10 ha size threshold.	SWH Absent. n/a

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
	"Common" spp., or any nesting GWWA/YBCH. Indicator spp. = BRTH & CCSP; Common spp. = BBCU, EATO, FISP & WIFL.	Review of agricultural land classification mapping.		
Terrestrial Crayfish	Candidate SWH = MAM1–MAM6; MAS1–MAS3; SWT; SWD; SWM; CUM1 with inclusions of above MAM or swamp ecosites. No minimum size. Confirmed SWH = presence of Chimney (Digger) Crayfish (*Fallicambrarus fodiens*) or Devil (Meadow) Crayfish (*Cambarus diogenes*) or their burrows.	Air photo interpretation, ELC surveys and searches for crayfish chimneys in spring, during other field investigations.	Candidate SWH present. Qualifying wetland communities appear to be present. To be confirmed during field investigations.	SWH Absent. Qualifying wetland communities are present. No crayfish chimneys were observed incidentally during field investigations.
Special Concern and Rare Wildlife Species	All SC and S1, S2, S3, and SH species	Review of aerial photography and background information sources (e.g., NHIC Make-a-Map rare species query results). ELC surveys, botanical surveys, breeding bird surveys and other wildlife habitat assessments.	Candidate SWH present. A mix of natural vegetation communities that could support Special Concern and Rare Species are present. Desktop SC and Rare species records that have potentially suitable habitat within the Study Area include: -Snapping Turtle (SC) -Eastern Wood-Pewee (SC) -Monarch (SC) -Perfoliate Bellwort (S1S2) Habitat suitability and species presence to be confirmed during field investigations.	Candidate SWH Present: -Snapping Turtle was observed in the man-made pond in 2015 but was not observed as part of this study between 2019 and 2022 (Polygons 5.1 - 5.4). The OMNRF (2015) criteria state that: "Man-made ponds such as sewage lagoons or storm ponds should not be considered SWH", however if Snapping Turtles are using it as habitat, it is important to consider it as potential SWH in protecting all life stages of the species.

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
				SWH Confirmed. The following SC and Rare wildlife were observed within suitable habitat in the Study Area: -Eastern Wood-Pewee (polygons 7.1 and 10) -Monarch (polygons 3, 13, 17) SWH Absent. Perfoliate Bellwort was not recorded during botanical inventories.
Animal Movement Corridors				
Amphibian Movement Corridors	Corridors may be in all ecosites associated with water. However, corridors must first be IDed as Candidate or Confirmed SWH by MNDMNRF or planning authority to be considered. Qualifying species the same as those for "Amphibian Breeding Habitat (Wetland)" SWH. No thresholds for numbers/diversity.	Air photo interpretation and ELC when nocturnal amphibian call surveys confirm SWH for Amphibian Breeding Habitat (Wetlands) is present.	Candidate SWH present. Candidate amphibian breeding habitat (wetland and woodland) is present within the Study Area. To be confirmed during field investigations.	SWH Absent. No suitable corridors on site or in adjacent lands. Any watercourses are small with little native vegetation, narrow (< 15 m) riparian zones, and broken up by roadways. No wetlands within 500 metres of site in any direction for amphibians to be moving to or from.
Bat Migratory Stopover Area	No Specific ELC types. The only known bat migratory stopover habitat based on information at the time of publication is Long Point.	If site is along the Lake Ontario, Lake Erie or Lake St. Clair shoreline, check	SWH Absent. The site is not situated along the Long Point peninsula, Lake	SWH Absent. n/a

SWH Type (OMNRF, 2015)	Qualifying ELC codes/species + other criteria & thresholds	Methods used to assess SWH	Results of Desktop Habitat Assessment	Results of Field Investigations
		with local MNDMNRF office.	Ontario, Lake Erie or Lake St. Clair shoreline.	

References:

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2014. Significant Wildlife Habitat Mitigation Support Tool. Version 2014. 533 pp. Available at: https://www.ontario.ca/document/significant-wildlife-habitat-mitigation-support-tool

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E, January, 2015. 41 pp. Available at: https://www.ontario.ca/document/significant-wildlife-habitat-ecoregional-criteria-schedules-ecoregion-7e

APPENDIX G – POLICY SUMMARIES

FEDERAL LEGISLATION

Species at Risk (2002)

Enacted in 2002, the Species at Risk Act (SARA) provides legal protection for species at risk. This act also helps to protect species identified as sensitive from becoming extinct and secure the actions for their recovery. This may include protecting critical habitat, and rehabilitation of impacted critical habitat.

Migratory Birds Convention Act (1994)

This federal legislation protects the nests, eggs and offspring of listed migratory bird species from destruction or disturbance. In its application, it requires best management practices to detect and avoid disturbance to active nests during development activities.

PROVINCIAL LEGISLATION

Endangered Species Act (2007)

This legislation provides the provincial mandate for the protection of species identified as Endangered or Threatened at the provincial level. Significant habitats of provincially Endangered and Threatened species are specifically protected from development in the PPS, and habitats of provincial Special Concern species are recognized under the Province's Significant Wildlife Habitat categories.

Provincial Policy Statement (2020)

The Provincial Policy Statement (PPS) is issued under the authority of Section 3 of the Planning Act. Note that the current PPS (2020) came into effect on May 1, 2020, and replaced the PPS issued on April 30, 2014. Section 3 requires that decisions affecting planning matters "shall be consistent with" policy statements under the Act. Section 2.1 of the PPS (2020), which relates specifically to natural heritage, establishes clear direction on the adoption of an ecosystem approach, and the protection of resources that have been identified: significant wetlands, significant woodlands, significant valleylands, significant wildlife habitat (SWH), significant areas of natural and scientific interest, habitat(s) of endangered or threatened species, and fish habitat. PPS Section 2.1.1 states that "natural features and areas shall be protected for the long term". Additionally, Section 2.2 includes policies for planning authorities to protect, improve or restore the quality and quantity of water.

In general, the PPS states that development and site alteration in Significant Natural Heritage features or on adjacent lands is not permitted unless it can be demonstrated that there will be no negative impacts on the features or their functions (OMMAH, 2020). The PPS states in section 2.1.2 that "The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features".

Portions of Section 2.1 specifically relevant to natural heritage systems protection include:

> *2.1.3 Natural heritage systems shall be identified in Ecoregions 6E & 7E1, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.*
>
> *2.1.5 Development and site alteration shall not be permitted in:*
>
> *a) Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E1;*
>
> *b) Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);*
>
> *c) Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);*
>
> *d) Significant wildlife habitat;*
>
> *e) Significant areas of natural and scientific interest; and*
>
> *f) Coastal wetlands in Ecoregions 5E, 6E and 7E1 that are not subject to policy 2.1.4(b)*
>
> *unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.*
>
> *2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.*
>
> *2.1.7 Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.*
>
> *2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.*

In March 2010, the Province released the Second Edition of the Natural Heritage Reference Manual (NHRM), which is intended to guide the implementation of the PPS. This document is also useful for other approval processes such as Class Environmental Assessments.

The Planning Act and PPS form the basis of Official Plans and Secondary Plans that are prepared and updated by municipalities. An Environmental Impact Statement (EIS) is required by the City of Hamilton for new developments that may negatively affect features and ecological functions that

are considered as significant under the PPS. An Environmental Assessment is considered to meet the requirements for an EIS under Urban Hamilton Official Plan policy 3.2.1.8.

Conservation Authorities Act / O. Reg. 150/06 (2006) and NPCA policies

The Niagara Peninsula Conservation Authority (NPCA) is authorized under Section 28 of the Conservation Authorities Act to implement and enforce the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 155/06). Permits are required to identify potential interference in areas within the 100-year floodline, 15 metres of the shoreline, 15 metres within a valley's top of bank, hazard lands, and 120 metres around all PSWs and ELC wetlands greater than 2 ha, and 30 metres around all ELC wetlands greater than 0.5 ha.

Under Ontario Regulation 150/06, the NPCA regulates development or site alteration within river or stream valleys, wetlands, Lake Erie shorelines, inland lakes, and hazardous lands within the Grand River watershed. The NPCA also has authority to regulate alterations to existing creek channels, or changes to wetlands. Modifications to the extent of the Regulated Areas may be made where more detailed studies, such as an EIS, determine a more precise boundary.

LOCAL POLICY

Urban Hamilton Official Plan (2013)

The study area is within the City of Hamilton's urban area and thus subject to policies of the Urban Hamilton Official Plan (UHOP, 2013). The Urban Hamilton Official Plan provides long-term direction and guidance over planning matters, such as land use and development, within the amalgamated communities within the City of Hamilton. This includes the development of a natural heritage system to protect natural areas and features within the Greenbelt Plan, the Niagara Escarpment Plan, and additional locally and provincially significant natural areas within the City that are beyond these planning areas.

The City's Natural Heritage System is provided in Schedule B of the OP consists of the Niagara Escarpment Plan area, Core Areas and supporting Linkages identified by the City, based on requirements of the Provincial Policy Statement (2020). Core Areas include key natural heritage features (e.g. significant woodland), key hydrological features (e.g. wetlands), provincially significant natural areas , and locally significant natural areas (e.g. Environmentally Sensitive Areas).

With the respect to the zoning of natural heritage features, the general policies (Section 2.2) state:

> *2.2.8 All natural features, required vegetation protection zones, and enhancement or restoration areas on a property shall be placed under appropriate zoning in the zoning by-law and/or protected through a conservation easement to the satisfaction of the City or the relevant*

Conservation Authority, or deeded to a public authority. Acquisition by a public body may also be considered as an option for protecting natural features and functions.

General policies pertaining to Core Areas within the Natural Heritage System include:

2.3 Natural Heritage System - Core Areas

It is the intent of this policy to preserve and enhance Core Areas and to ensure that any development or site alteration within or adjacent to them shall not negatively impact their natural features or their ecological functions.

2.3.1 In accordance with the policies of this Plan, Schedule B – Natural Heritage System, identifies Core Areas to include key natural heritage features and key hydrological features. Core Areas of the City's Natural Heritage System also include other locally and provincially significant natural areas. Schedule B – Natural Heritage System shall be amended when new Core Areas are identified.

2.3.2 Core Areas include key natural heritage features, key hydrological features and provincially significant and local natural areas that are more specifically identified by Schedule B-1-8 – Detailed Natural Heritage Features. Core Areas are the most important components in terms of biodiversity, productivity, and ecological and hydrological functions.

2.3.3 The natural features and ecological functions of Core Areas shall be protected and where possible and deemed feasible to the satisfaction of the City enhanced. To accomplish this protection and enhancement, vegetation removal and encroachment into Core Areas shall generally not be permitted, and appropriate vegetation protection zones shall be applied to all Core Areas.

Relevant policies specific to the natural heritage system outside the Greenbelt Plan Area, include:

2.5.2 New development and site alteration shall not be permitted within provincially significant wetlands, significant coastal wetlands or significant habitat of threatened and endangered species.

2.5.3 New development and site alteration shall not be permitted within fish habitat, except in accordance with provincial and federal requirements.

2.5.4 New development and site alteration shall not be permitted within significant woodlands, significant valleylands, significant wildlife habitat and significant areas of natural and scientific interest unless it has been demonstrated that there shall be no negative impacts on the natural features or on their ecological functions.

2.5.5 New development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in Section C.2.5.2 to C.2.5.4 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there shall be no negative impacts on the natural features or on their ecological functions.

New development or site alterations within or adjacent to Core Areas shall require the approval of an EIS which demonstrates the following (as per section C.2.5.8, City of Hamilton, 2013):

There shall be no negative impacts on the Core Area's natural features or their ecological functions;

Connectivity between Core Areas shall be maintained, or where possible, enhanced for the movement of surface and ground water, plants and wildlife across the landscape;

The removal of other natural features shall be avoided or minimized by the planning and design of the proposed use or site alteration wherever possible.

According to section 2.5.9 of the OP, the EIS should also propose a vegetation protection zone of sufficient width to protect the Core Area and its ecological functions during and after construction, where VPZs are to be maintained as natural, self-sustaining vegetation.

Section 2.5.10 states that the following VPZs are to be evaluated for features relevant to the study area:

Warmwater Watercourse and Important and Marginal Habitat – 15 metre vegetation protection zone on each side of the watercourse, measured from the bankfull channel.

Provincially Significant Wetlands – 30-metre vegetation protection zone, measured from the boundary of the wetland, as approved by the Conservation Authority or Ministry of Natural Resources.

Unevaluated wetlands – Unevaluated wetlands and locally significant wetlands require a 15 metre vegetation protection zone, measured from the boundary of the wetland, as approved by the Conservation Authority or Ministry of Natural Resources, unless an Environmental Impact Statement recommends a more appropriate vegetation protection zone.

Woodlands – 10-metre vegetation protection zone, measured from the edge (drip line) of the woodland.

Significant woodlands – 15-metre vegetation protection zone, measured from the edge (drip line) of the significant woodland.

Significant Habitat of Threatened or Endangered Species and Significant Wildlife Habitat: the minimum vegetation protection zone shall be determined through Environmental Impact Statements, dependent on the sensitivity of the feature.

Specific VPZ widths may be more or less than specified above, and are to be determine on a site-specific basis, as stated within Section 2.5.11:

2.5.11 Vegetation protection zone widths greater or less than those specified in a) to i) above may be required if ecological features and functions warrant it, as determined through an approved Environmental Impact Statement. Widths shall be determined ona site-specific basis, by considering factors such as the sensitivity of the habitat, the potential impacts of the proposed land use, the intended function of the vegetation protection zone, and the physiography of the site.

Permitted uses within VPZs are specified in Section 2.5.12:

2.5.12 Permitted uses within a vegetation protection zone shall be dependent on the sensitivity of the feature, and determined through approved studies. Generally, permitted uses within a vegetation protection zone shall be limited to low impact uses, such as vegetation

restoration, resource management, and open space. Permitted uses within the vegetation protection zone shall be the same uses as those within the Core Area in Policy C.2.5.1 and the vegetation protection zone should remain in or be returned to a natural state.

2.5.13 All plantings within vegetation protection zones shall use only non-invasive plant species native to Hamilton. The City may require that applicants for development or site alteration develop a restoration or management plan for the vegetation protection zone as a condition of approval.

Linkages are features within the City's Natural Heritage System that connect Core Areas to allow for the movement of species across the landscape and serve to enhance the functions of Core Areas. Relevant policies specific to Linkages are described in Section 7:

2.7.1 The City shall encourage the connection of Core Areas within the municipality and adjacent to its municipal boundaries through the identification of Linkages in Environmental Impact Statements, Secondary Plans, watershed plans, and other studies.

2.7.3 The City shall require the incorporation of Linkages into a design of new development requiring approval by this Plan to retain and enhance the cultural, aesthetic, and environmental qualities of the landscape, wherever possible and deemed feasible to the satisfaction of the City.

2.7.4 Since linkages are best enhanced and protected through larger-scale planning processes, Secondary Plans shall identify and evaluate Linkages in greater detail, including Linkages currently identified in Schedule B – Natural Heritage System and those that may be newly identified through the planning process. Linkages shall be mapped in Secondary Plans and policies for their protection and enhancement included.

2.7.5 Where new development or site alteration is proposed within a Linkage in the Natural Heritage System as identified in Schedule B – Natural Heritage System, the applicant shall prepare a Linkage Assessment. On sites where an Environmental Impact Statement (EIS) is being prepared, the Linkage Assessment can be included as part of the EIS report. Any required Linkage Assessment shall be completed in accordance with Policy F.3.2.1.11 – Linkage Assessments.

2.7.6 Linkage Assessments shall include the following information:

a) identify and assess the Linkage including its vegetative, wildlife, and/or landscape features or functions;

b) assess the potential impacts on the viability and integrity of the Linkage as a result of the development proposal; and,

c) make recommendations on how to protect, enhance or mitigate impacts on the Linkage(s) and its functions through planning, design and construction practices.

2.7.7 In addition to the Linkages identified on Schedule B – Natural Heritage System, there may be Hedgerows that are worthy of protection, especially where:

a) they are composed of mature, healthy trees and generally provide a wide, unbroken linkage between Core Areas;

b) there is evidence that wildlife regularly use them as movement corridors or habitat;

c) they contain tree species which are threatened, endangered, special concern, provincially or locally rare; or,

d) groupings of trees which are greater than 100 years old.

Lastly, Section 3.2.1.11 within Chapter F of the Official Plan (Implementation) outlines the requirements for linkage assessments within Environmental Impact Statements:

3.2.1.11 Linkage assessments shall consider both the linkage within the site and connections with other sites and shall evaluate the following:

a) identify and assess the linkage including its vegetative, wildlife, and/or landscape features or functions, including:

i) the natural areas and habitats/functions linked (number of sites linked and habitat sizes and condition);

ii) linkage type (e.g. anthropogenic railway or utility corridor, hedgerow, plantation, or natural community);

iii) vegetation cover type quality (health, condition, maturity, species, and aesthetic value); iv) width;

v) length; and,

vi) continuity of vegetation (long gaps greater than 100 metres, gaps containing roads or other barriers, or gaps less than 30 metres wide with no barriers);

vii) assess the potential impacts on the viability and integrity of the linkage as a result of the development proposal; and,

viii) make recommendations on how to protect, enhance or mitigate impacts on the linkage(s) and its functions through planning, design and construction practices.

UHOP Policy 2.2.4 e) iii) requires a Class Environmental Assessment for major urban servicing infrastructure that is essential for commencement or completion of development of all or part of the lands. An EIS is required by the City of Hamilton for new developments that may negatively affect features and ecological functions that are considered as significant under the PPS. Although an Environmental Assessment is considered to meet the requirements for an EIS under UHOP Policy 3.2.1.8, City planning staff specifically required that the EA follow the City's EIS standards for assessment of impacts to natural heritage features and ecological functions.

Airport Employment Growth District (AEGD) Secondary Plan (2015)

The Airport Employment Growth District (AEGD) Secondary Plan applies to 1, 204 hectares of land between Garner Road/Twenty Road West to the north, Upper James Street in the east, and Highway 6 as both the south and west boundary in some areas. This plan establishes development standards, design principles, and infrastructure requirements to guide business park development of lands within the area surrounding the John C.

Munro Hamilton International Airport. The natural heritage principles of the AEGD include developing in a manner that is sensitive to the natural environment; the use of innovative, sustainable storm and wastewater infrastructure to protect water quality and source water; protection and integration of provincially and municipally significant natural features, such as streams, valley lands, wetlands, mature trees and forests into the employment district's development, implement provincial policy and meet municipal policy; use of sustainable design to limit the emissions, water and energy consumption of buildings within the employment district; and connecting the employment district's open space system to surrounding natural areas to allow employees to enjoy and explore the region's natural heritage.

Policies relevant to natural heritage within the AEGD Secondary Plan include:

8.2.1 Natural Heritage System principles:

Through sustainable design and appropriate development the employment district protects and enhances the natural environment. The intent is to: a) Develop in a manner that is sensitive to the natural environment; b) Use innovative, sustainable storm and wastewater infrastructure to protect water quality and source water; c) Protect and integrate provincially and municipally significant natural features, such as streams, valley lands, wetlands, mature trees and forests into the employment district's development, implement provincial policy and meet municipal policy; d) Use sustainable design to limit the emissions, water and energy consumption of buildings within the employment district; and, e) Connect the employment district's open space system to surrounding natural areas to allow employees to enjoy and explore the region's natural heritage.

8.5 Natural Open Space:

8.5.1 Lands designated Natural Open Space on Map B.8-1 – Airport Employment Growth District Land Use Plan shall comply with Section B.3.5.3 – Parkland Policies, Section C.2 – Natural Heritage System and Section C.3.3 – Open Space Designations of Volume 1.

8.5.2 Minor refinements to boundaries of the Natural Open Space designation may be permitted without amendment to this Secondary Plan provided the change is justified by an Environmental Impact Statement to the satisfaction of the City.

8.12 Natural Heritage System:

8.12.1 Within the Airport Employment Growth District, there are wetlands, streams, woodlands, meadows, successional areas and hedgerows which are identified as Core Areas, Linkages, and Hedgerows in Map B.8-2 – Airport Employment Growth District Natural Heritage System. The policies of Volume 1 Section C.2.0 – Natural Heritage System apply, with the exception of Section C.2.4 (Core Areas within the Greenbelt Plan Area in Rural Hamilton Official Plan).

8.12.2 Streams are identified in Map B.8-2 – Airport Employment Growth District Natural Heritage System. If the stream has not been classified as part of an Environmental Impact Study, subwatershed study, or other study, a scoped Environmental Impact Study is required to determine the classification.

City of Hamilton Urban Woodland Conservation By-Law (14-212)

The City's Urban Woodland By-law aims to promote the conservation and sustainable use of woodlands on private property within the Urban Boundary. This by-law prohibits the injury or destruction of privately-owned trees in woodlands 0.2 hectares or larger within the Urban Boundary. Section 11 a) and b) of this By-law, Sensitive Natural Areas, such as Core Areas, must be adequately protected preserved, along with steam and wetland functions. In order to injure or destroy a tree within a woodland, a permit must be issued by the City which may include conditions of approval, and expires 1 year after issuance.

APPENDIX H – Terms of Reference

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Terms of Reference

For Class Environmental Assessment

Airport Employment Growth District Collector Road 6N

1.PURPOSE AND SCOPE

The purpose of this field program is to provide natural heritage data collection and characterization in support of a Phase 3 Environmental Assessment for a future road connection between 9236 Dickenson Road and Upper James Street in the vicinity of the Hamilton Street Railway (HSR) Mountain Centre (Collector 6N). This area contains the Twenty Mile Creek Provincially Significant Wetland Complex, woodlands, linkages, and watercourses, which are part of the City's Natural Heritage System. These features will be delineated and characterized, and constraints and opportunities for potential road options will be identified for the purpose of evaluating road alignment options for collector 6N. Figure 1 shows the proposed study area.

2.BACKGROUND REVIEW

The EA will include review of background data, documents, plans, and legislation relevant to the subject property. Key background sources will include:

- Natural Heritage Information Centre (NHIC) Biodiversity Atlas;
- Ontario Ministry of Natural Resources and Forestry wetland mapping;
- Niagara Peninsula Conservation Authority mapping and data request;
- Hamilton Natural Areas Inventory (NAI) site summaries, mapping and data;
- Hamilton Natural Heritage Database;
- Hamilton Urban Official Plan and Schedules and relevant zoning by-laws;
- Other data or mapping from City Natural Heritage Planners;
- Twenty Mile Creek Provincially Significant Wetland Evaluation Record;
- SAR data request to Ministry of Environment, Conservation, and Parks (MECP);
- AEGD Subwatershed Study & Stormwater Master plan (SWMP) and implementation report;
- Review of online citizen science databases (e.g. eBird, iNaturalist, etc);
- Department of Fisheries and Oceans Canada (DFO) Aquatic Species at Risk (SAR) MAP (2020);
- Twenty Mile Creek Watershed Plan; and,
- Any other relevant background documents.

This background information will provide a preliminary understanding of the natural heritage features and functions present on the subject lands.

3. POLICY CONTEXT

The policy context will be reviewed and relevant designations and regulations will be summarized (e.g. Ontario Endangered Species Act and Regulations, Provincial Policy Statement, Urban Hamilton Official Plan Policies and zoning by-laws, AEGD Subwatershed Study & Stormwater Master plan (SWMP) and implementation report, NPCA Policies).

4. FIELD STUDIES

The scope of field studies for this EA is based on the known habitats present on the property and presence of documented constraint features (wetlands, watercourses, linkages, and significant woodland) or anticipated constraints. The proposed study area boundary is shown on Figure 1. This study area is based on several preliminary road alignment options (not shown) and includes all lands within 120m of these alignments and extends around contiguous natural heritage features where they extend beyond 120m. The proposed EA study area also overlaps the study area boundaries for two the Environmental Impact Studies being undertaken simultaneously within the adjoining properties, 9236 Dickenson Road and 2240/2254 Upper James Street. Data collection within the 9236 Dickenson Road Property began in the spring of 2019, and data collection within the 2240/2254 Upper James Street study area will begin in spring 2022. The data collected for these studies will be incorporated into the dataset for the EA and used when evaluating road alignment options.

The following field studies and analysis are proposed:

1. **Vegetation community delineation** to Vegetation Type level based on the Ecological Land Classification System (ELC) for Southern Ontario, 1st approximation (Lee et. al, 1998) (throughout).
2. **Botanical inventory:** 3 visits to inventory vascular plant species within the study area (1 each in May, July, and September).
3. **Delineation of wetland features** according to the Ontario Wetland Evaluation System (MNRF, 2013). Provincially Significant Wetlands are found within and adjacent to the study area. The wetland boundaries will be GPSed using a Trimble GeoXH high-accuracy GPS unit. (June).
4. **Delineation of woodland features** will be completed in consultation with City staff and will be surveyed (June).
5. **Breeding Bird Surveys** (2 visits) as per the Ontario Breeding Bird Atlas (2007). The 1st survey will take place between May 24 and June 15, the 2nd between June 15 and July 10 July 10, at least seven days apart. They will occur between sunrise and approximately 10:00 a.m. and under suitable weather conditions (i.e. light winds, good visibility, and no heavy rain.
6. **Nocturnal Amphibian Call Surveys** as per the Marsh Monitoring Protocol (BSC, 2009). Three surveys will be completed within MMP windows when the minimum night air temperatures are 5 degrees C, 10 degrees C and 17 degrees C (April, May, and June).
7. **Reptile Surveys (4 visits total)** will be completed in spring (May - June) and fall (September – October), 2022, using the Visual Encounter Survey Protocol in (OMNRF 2016). Open meadows, woodland edges, and hedgerows throughout the study area will be targeted specifically. Incidental observations of Reptiles will also be made during other field studies when they are encountered.
8. **Incidental wildlife** observations of during all field visits.
9. **Headwater Drainage Feature Classification and Aquatic Habitat Characterization** will be completed as per Evaluation, Classification and Management of Headwater Drainage Features

Guidelines (CVC, TRCA January 2014) (March, Late April/Early May, August (if required). To be completed by GeoProcess.

10. **Linkage Assessment** will be completed for the study area using the City of Hamilton Linkage Assessment Guidelines (City of Hamilton 2015). The linkage assessment will include the following:
    - Assessment of the ecological features and functions of the Linkages, including vegetative, wildlife, and/or landscape features or functions;
    - Identification of the Linkage boundaries based on these features and functions;
    - Description of the ecological functions, condition, and integrity;
    - Identification of how the function(s) will be maintained or enhanced within the development proposal;
    - assessment of potential impacts as a result of the proposed development or site alteration; and,
    - Recommendations on how to protect and enhance the Linkage, and/or avoid, minimize, or mitigate impacts on the Linkage and its ecological functions.

11. **Screening for Significant Wildlife Habitat (SWH)** will be conducted based the SWH Criteria Schedule for Ecoregion 7E (January 2015) using available background information (See list under Section 2) and data from field studies. The SWH screening table to be used is provided in Appendix 2.
12. **Screening for Species at Risk (SAR)** will be conducted based on available background information (See List under Section 2) and data from field studies. The SWH screening table to be used is provided in Appendix 3.
13. **Wetland Water Balance Risk Evaluation** will be completed according to the methods provided in the TRCA's Wetland Water Balance Risk Evaluation (2017).
14. **Site visit** with City and NPCA staff to verify woodland and wetland boundaries (June 2022).

5.REPORTING AND MAPPING

The findings of the background review and field studies will be used to complete a characterization report for the study area that will be integrated in the Class EA report to be prepared by the City's consultant. This report will characterize natural heritage features and functions and summarize identified constraints and opportunities. This information will provide input to the evaluation of road alternatives to be completed by the City's consultant. The following is a summary of the proposed Table of Contents for the scoped EIS.

Anticipated Maps:

Map 1: Study Area Landscape Context
Map 2: ELC Vegetation Communities
Map 3: Tree Inventory and Arborist Assessment
Map 4: Wildlife Survey Locations and Observations
Map 5: Constraints and Opportunities

Flora and fauna species lists and ELC data will be included within the appendix of the report, including federal, provincial, and local rankings according to the Hamilton Natural Areas Inventory Project 3rd Edition (2014) species checklist.

REFERENCES

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NPCA (Niagara Peninsula Conservation Authority). 2013. Regulation of Development, Interference with Wetlands and Alterations to shorelines and Watercourses. February 8, 2013.

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OMNR (Ontario Ministry of Natural Resources). 2013b. Ontario Wetland Evaluation System, Southern Manual, 3rd Edition, Version 3.2. 293 pages.

TRCA/CVC. 2014. Evaluation, Classification and Management of Headwater Drainage Features Guideline. Toronto and Region Conservation Authority and Credit Valley Conservation, TRCA Approval July 2013 (Finalized January 2014).

Appendix 1. Tree Inventory and Arborist Assessment Data to be collected

The Tree Inventory and Arborist Assessment will be completed as per the City of Hamilton's Tree Protection Guidelines (October 2010). The following information will be collected for each tree within the study area:

1. **Tree tag number**
2. **Tree species** (Scientific and Common Names as per NHIC (2017))
3. **Diameter at Breast height (DBH)**: Measure in centimetres at 1.4 m above ground
4. **Structural Condition**: Related to defects in a tree's structure, (i.e., lean, codominant trunks).
   High - No structural defects, well-developed crown.
   Medium - Presence of minor structural defects.
   Low - Presence of major structural defects including drastic leans and imminent branch and/or trunk failure.
5. **Biological Health**: Related to presence and extent of disease/disease symptoms and the vigour of the tree.
   High - No diseases/disease symptoms present, and moderate to high vigour.
   Medium - Presence of minor diseases/disease symptoms, and/or moderate vigour.
   Low - Presence of major diseases/disease symptoms, (i.e., extensive crown dieback), and/or severely poor vigour.
6. **Tree Condition**:
   Good - Dead branches less than 10%; signs of good compartmentalization on any wounds; no structural defects
   Fair - 10-30% dead branches; size or occurrence of wounds present; some concerns, minor structural defects
   Poor - more than 30% dead branches, weak compartmentalization, early leaf drop, presence of insects or disease, major structural defects
   Dead - the tree shows no signs of life
7. **Recommended Action**: Retain, remove, or transplant
8. **Native Status:**
   Native – Native to Ontario
   Introduced – Not native to Ontario

References:

City of Hamilton. October 2010. Tree Protection Guidelines – City Wide. 26 pp.

NHIC (Natural Heritage Information Centre). 2021. Ontario Vascular Plant Species List. Biodiversity Explorer Online Database. Ontario Ministry of Natural Resources.

Appendix 2. Table to be used for screening known and candidate Significant Wildlife Habitat for AEGD Collector Road 6N.

Significant Wildlife Habitat (SWH) Type	ELC Categories indicated for SWH Type	SWH present on site or within 120 m?	Rationale (Habitat Presence or Absence)	Additional field studies required?
	Seasonal Concentration Areas of Animals			
Waterfowl Stopover and Staging Areas (Terrestrial)	CUM1; CUT1; plus evidence of spring (Mar – May) flooding; does not include AGR			
Waterfowl Stopover and Staging Areas (Aquatic)	MAS1; MAS2; MAS3; SAS1; SAM1; SAF1; SWD1; SWD2; SWD3; SWD4; SWD5; SWD6; SWD7			
Shorebird Migratory Stopover Area	BB01; BB02; BBS1; BBS3; BBT1; BBT2; SDO1; SDS2; SDT1; MAM1; MAM2; MAM3; MAM4; MAM5			
Raptor Wintering Area	One of FOD, FOM, FOC and one of CUM, CUT, CUS, CUW (20+ ha); least disturbed sites 15+ ha with adjacent woodlands; BAEA: FOD, FOM, FOC, SWD or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water			
Bat Hibernacula	BBBA/TRBA only; CCR1; CCR2; CCA1; CCA2; does not include buildings			
Bat Maternity Colonies	BBBA/SHBA only; all FOD, FOM, SWD, SWM; 10+ ha AND 25+ cm dbh			
Bat Migratory Stopover Area	No specific ELC types			
Turtle Wintering Areas	SNTU/PATU: SW, MA, OA, SA; FEO and BOO; NMTU: open water areas (e.g. deeper rivers, streams) and lakes with current can also be used as over-wintering habitat.			
Reptile Hibernaculum	Snakes: any ecosite except very wet ones; talus, rock barren, crevice, cave, and alvar site may be directly related; FLSK: FOD, FOM and FOC1/FOC3			
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	CUM1, CUS1, BLS1, CLO1, CLT1; CUT1; BLO1; BLT1; CLS1			
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)	SWM2; SWM3; SWM5; SWM6; SWD1; SWD2; SWD3; SWD4; SWD5; SWD6; SWD7; FET1			
Colonially - Nesting Bird Breeding Habitat (Ground)	MAM1 – 6; MAS1 – 3; CUM; CUS; CUT			
Migratory Butterfly Stopover Areas	Field: CUM, CUS, CUT; Forest: FOC, FOD, FOM, CUT; 10+ ha, within 5 km of Lake Ontario			

Significant Wildlife Habitat (SWH) Type	ELC Categories indicated for SWH Type	SWH present on site or within 120 m?	Rationale (Habitat Presence or Absence)	Additional field studies required?
Landbird Migratory Stopover Areas	FOC, FOM, FOD, SWC, SWM, SWD; 10+ ha, within 5 km of Lake Ontario			
Deer Yarding Areas	FOM, FOC, SWM, SWC; CUP2, CUP3, FOD3, CUT; identified by MNRF			
Deer Winter Congregation Areas	FOC; FOM; FOD; SWC; SWM; SWD; typically 100+ ha; identified by MNRF			
Cliffs and Talus Slopes	TAO; TAS; TAT; CLO; CLS; CLT			
Sand Barren	SBO1; SBS1; SBT1			
Alvar	ALO1; ALS1; ALT1; FOC1; FOC2; CUM2; CUS2; CUT2-1; CUW2; 0.5+ ha			
Old Growth Forest	FOD; FOC; FOM; SWC; SWD; SWM; 30+ ha with 10+ ha IF (100m buffer)			
Savannah	TPS1; TPS2; TPW1; TPW2; CUS2			
Tallgrass Prairie	TPO1; TPO2			
Other Rare Vegetation Communities	S1, S2, or S3 vegetation communities			
Waterfowl Nesting Area	MAS1; MAS2; MAS3; SAS1; SAM1; SAF1; MAM1; MAM2; MAM3; MAM4; MAM5; MAM6; SWT1; SWT2; SWD1; SWD2; SWD3; SWD4			
Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat	FOD; FOM; FOC; SWD; SWM; SWC; adjacent to riparian areas (rivers, lakes, ponds and wetlands)			
Woodland Raptor Nesting Habitat	All forested ELC ecosites; also SWC, SWM, SWD, CUP3; 30+ ha with 10+ ha IF (200m buffer)			
Turtle Nesting Areas	MAM1; MAM2; MAM3; MAM4; MAM5; MAM6; SAS1; SAM1; SAF1; BOO1; FEO1			
Seeps and Springs	Any forested ecosite within headwater area of stream			
Amphibian Breeding Habitat (Woodland)	FOC; FOM; FOD; SWC; SWM; SWD			
Amphibian Breeding Habitat (Wetlands)	SW, MA, FE, BO, OA, SA; typically 120+ from woodlands (except AMBU)			
Woodland Area-Sensitive Bird Breeding Habitat	FOC, FOM, FOD, SWC, SWM, SWD; mature (60+ years), 30+ ha; IF 200+ m from edge			
Marsh Breeding Bird Habitat	MAM1; MAM2; MAM3; MAM4; MAM5; MAM6; SAS1; SAM1; SAF1; FEO1; BOO1; GRHE – all SW, MA, CUM1 sites			

Significant Wildlife Habitat (SWH) Type	ELC Categories indicated for SWH Type	SWH present on site or within 120 m?	Rationale (Habitat Presence or Absence)	Additional field studies required?
Open Country Bird Breeding Habitat	CUM1; CUM2; 30+ ha; not Class 1 or 2 AGR or actively used for farming in last 5 years			
Shrub/Early Successional Bird Breeding Habitat	CUT1; CUT2; CUS1; CUS2; CUW1; CUW2; 10+ ha; not Class 1 or 2 AGR or actively used for farming in last 5 years			
Terrestrial Crayfish	MAM1; MAM2; MAM3; MAM4; MAM5; MAM6; MAS1; MAS2; MAS3; SWT; SWD; SWM; CUM1 with inclusions of above MAM or swamp ecosites can be used by crayfish			
Special Concern and Rare Wildlife Species	SC and S1, S2, S3, and SH species			
Amphibian Movement Corridors	All ecosites associated with water			
Deer Movement Corridors	All forested ecosites; Stratum II Deer Wintering Areas have potential to contain corridors.			

Appendix 3. Table to be used for Species at Risk Screening AEGD Collector Road 6N.

SPECIES LIST (For City of Hamilton; MNRF, November 2018)	SAR Designation (if different = federal / provincial)	Status in Ontario	Key Habitats Used By Species	Status at Dickenson Road EIS site and adjacent lands (within 120 metres)
AMPHIBIANS				
Jefferson Salamander (*Ambystoma jeffersonianum*)	Endangered	Southern Ontario, mainly along the Niagara Escarpment	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	
Unisexual Ambystoma - Jefferson-dominated (*Ambystoma laterale-jeffersonianum*)	Endangered	Southern Ontario, mainly along the Niagara Escarpment	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	
Acadian Flycatcher (*Empidonax virescens*)	Endangered	Carolinian Region (as far north as Toronto)	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	
Bald Eagle (*Haliaeetus leucocephalus*)	Special Concern (provincial only)	Widespread in southern Ontario	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers; they roost in super canopy trees such as pine.	
Bank Swallow (*Riparia riparia*)	Threatened	Widespread in southern Ontario	Low areas along rivers, streams, coasts or reservoirs; nest in natural bluffs and eroding streamside banks, also sand and gravel quarries and road cuts	

Barn Owl (*Tyto alba*)	Endangered	Extreme southwestern Ontario only	Generally prefers low-elevation, open country; often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs.	
Barn Swallow (*Hirundo rustica*)	Threatened	Widespread in southern Ontario	Prefers farmland, lake/river shorelines, wooded clearings, urban populated areas, rocky cliffs, and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves, etc.	
Black Tern (*Childonias niger*)	Special Concern (provincial only)	Scattered in southern Ontario; breed mainly along edges of the Great Lakes	Generally prefers freshwater marshes and wetlands; nests either on floating material in a marsh or on the ground very close to water.	
Bobolink (*Dolichonyx oryzivorus*)	Threatened	Widespread in southern Ontario	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands.	
Canada Warbler (*Wilsonia canadensis*)	Threatened / Special Concern	Absent in southwestern Ontario; primarily breeds in Southern Shield	Generally prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	
Cerulean Warbler (*Dendroica cerulea*)	Endangered / Threatened	Widespread but local in southern Ontario	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	
Chimney Swift (*Chaetura pelagica*)	Threatened	Widespread in southern Ontario	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys.	

Common Nighthawk (*Chordeiles minor*)	Threatened / Special Concern	Widespread in southern Ontario	Generally prefers open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nests on flat roof-tops).	
Eastern Meadowlark (*Sturnella Magna*)	Threatened	Widespread in southern Ontario	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	
Eastern Whip-poor-will *(Caprimlugus vociferus)*	Threatened	Scattered in southwestern Ontario; primarily north of Toronto	Generally prefers semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred. In winter they occupy primarily mixed woods near open areas.	
Eastern Wood-Pewee (*Contopus virens*)	Special Concern	Widespread in southern Ontario	Found in deciduous, mixed woods, or pine plantations; also found in mature woodlands, urban shade trees, roadsides, and orchards; usually found in clearings and forest edges.	
Golden-winged Warbler (*Vermivora chrysoptera*)	Threatened / Special Concern	Local; primarily central-eastern Ontario	Generally prefers areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	
Henslow's Sparrow *(Ammodramus henslowii)*	Endangered	Extremely rare; may be extirpated	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material.	
King Rail (*Rallus elegans*)	Endangered	Majority found at Lake St. Clair; remainder at key coastal marshes	Freshwater and brackish marshes and rice fields.	

		along lakes Erie and Ontario		
Least Bittern *(Ixobrychus exilis)*	Threatened	Widespread in southern Ontario	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants.	
Louisiana Waterthrush *(Seiurus motacilla)*	Special Concern	Widespread but local in southern Ontario	Ggenerally inhabits mature forests along steeply sloped ravines adjacent to running water. Prefers clear, cold streams and densely wooded swamps.	
Peregrine Falcon (*Falco peregrinus*)	Special Concern	Nests in large cities in southern Ontario; primarily found in northwester n Ontario	Mountain ranges, coastlines, river valleys, and increasingly in cities.	
Prothonotary Warbler (*Protonotaria citrea*)	Endangered	Primarily along north shore of Lake Erie; very local	Generally found in the dead trees of flooded woodlands or deciduous swamp forests; Carolinian Zone	
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	Threatened / Special Concern	Widespread but rare in southern Ontario	Generally prefers open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks.	
Short-eared Owl *(Asio flammeus)*	Special Concern	Very local in southern Ontario	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields.	
Wood Thrush (*Hylocichla mustelina*)	Threatened / Special Concern	Widespread in southern Ontario	Breeds in mature deciduous and mixed forests, most commonly those with American beech, sweet gum, red maple, black gum, eastern hemlock, flowering dogwood, American hornbeam, oaks, or pines; nests less successfully in	

			fragmented forests and suburban parks with enough large trees for a territory; ideal habitat includes trees over 50 feet tall, a moderate understory of saplings/shrubs, an open floor with moist soil and decaying leaf litter, and water nearby.	
Yellow-breasted Chat *(Icteria virens)*	Endangered	Breeds mainly Point Pelee and Pelee Island	Generally prefers dense thickets around wood edges, riparian areas, and in overgrown clearings.	
Monarch *(Danaus plexippus)*	Endangered / Special Concern	Widespread in southern Ontario	Exist primarily wherever milkweed and wildflowers exist, such as abandoned farmland, along roadsides, and other open spaces.	
Mottled Duskywing (*Erynnis martialis*)	Endangered (federal only)	Scattered locations throughout southern Ontario	Open woodland, barrens, prairie hills, open brushy fields, chaparral; larvae feed on New Jersey tea (*Ceanothus americanus*) and redroot (*Ceanothus herbaceus*)	
West Virginia White (*Pieris virginiensis*)	Special Concern (provincial only)	50 sites in south and central Ontario; primarily western Lake Ontario region	Generally prefer moist, deciduous woodlands; the larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	
American Badger (*Taxidea taxus*)	Endangered (SW Ontario); Special Concern (provincial only; NW Ontario)	Southwestern Ontario, primarily Norfolk and Middlesex (close to Lake Erie); also northwestern Ontario pop.	Occurs primarily in grasslands and open areas with grasslands, which can include parklands, farms, and treeless areas; also found in forest glades and meadows, marshes, brushy areas, hot deserts, and mountain meadows	

Eastern Small-footed Myotis (*Myotis leibii*)	Endangered (provincial only)	Widespread in southern Ontario	Overwintering habitat: caves and mines that remain above 0 degrees Celsius; Maternal roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses, and under tree bark.	
Little Brown Myotis (*Myotis lucifugus*)	Endangered	Widespread in southern Ontario	Overwintering habitat: caves and mines that remain above 0 C; Maternal roosts: Often associated with buildings (attics, barns, etc.). Occasionally found in trees (25-44 cm dbh).	
Northern Myotis (*Myotis septentrionalis)*	Endangered	Widespread in southern Ontario	Overwintering habitat: caves and mines that remain above 0 C; Maternal roosts: often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns, etc.)	
Tri-colored Bat (*Perimyotis subflavus*)	Endangered	Very rare; widespread but scattered in southern Ontario	Overwintering habitat: caves and mines that remain above 0 degrees Celsius; Maternal roosts: can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	
Woodland Vole (*Microtus pinetorum*)	Special Concern	Carolinian Region only	Occurs in deciduous forests, dry fields, and apple orchards, preferring wooded areas with high vertical vegetative stratification, also evergreen shrubs, ground cover, and old fallen logs. Voles are most abundant in deciduous forests with moist, friable soils suitable for burrowing.	

Blanding's Turtle *(Emydonidea blandingii)*	Threatened	Widespread in south, central, and eastern Ontario	Generally occurs in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. Prefers shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	
Eastern Hog-nosed Snake (*Heterodon platirhinos*)	Threatened	Two populations: East of Georgian Bay and southwestern Ontario (primarily Grand River sand plain)	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	
Eastern Musk Turtle (Stinkpot) (*Sternotherus odoratus*)	Special Concern	Mostly southern edge of Canadian Shield; scattered locations in southwestern Ontario	Occurs in rivers, lakes and ponds with a slow-moving current, soft bottom, and shallow water	
Eastern Ribbonsnake *(Thamnophis sauritus)*	Special Concern	Widespread in southern and eastern Ontario	Generally occurs along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	

Northern Map Turtle (*Graptemys geographica*)	Special Concern	Widespread along shores of Georgian Bay and lakes Erie, Ontario, and St. Clair	Found in large rivers and lakes with slow-moving currents and soft bottoms	
Snapping Turtle *(Chelydra serpentina)*	Special Concern	Very widespread and common in southern Ontario	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	
Spiny Softshell (*Apalone spinifera*)	Threatened	Lakes St. Clair and Erie and western L. Ontario watersheds. Majority are found in the Thames and Sydenham rivers and at two sites in Lake Erie.	Found in rivers with soft bottoms, aquatic vegetation and sandbars or mudflats; occasionally found in lakes or impoundments.	
American Eel (*Anguilla rostrata*)	Endangered	12-mile Creek watershed and Lake Ontario.	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean.	
Grass Pickerel (*Esox americanus vermiculatus*)	Special Concern	Occur in the St. Lawrence River, and lakes Ontario, Erie, and Huron	Generally occur in wetlands with warm, shallow water and an abundance of aquatic plants.	
Nothern Sunfish (Great Lakes - upper St. Lawrence pop.) (*Lepomis peltastes*)	Special Concern	Throughout southern Ontario including Great Lakes	Shallow, vegetated and slow flowing waters as well as warm lakes and ponds with sandy banks or rocky bottoms. Preferred habitats	

		and rivers and small lakes in eastern Ontario.	have aquatic vegetation to avoid strong currents.	
Redside Dace *(Clinostomus elongatus)*	Endangered	Found in a few tributaries of Lake Huron, in streams flowing into western Lake Ontario, the Holland River (flows into Lake Simcoe), and Irvine Creek of the Grand River system.	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient.	
Silver Shiner (*Notropis photogenis*)	Threatened	Found in the Thames and Grand Rivers, and in Bronte and Sixteen Mile Creeks.	Generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients.	
Eastern Pondmussel (*Ligumia nasuta*)	Special Concern / Endangered	Lake St. Clair River delta; Lyn Creek (small tributary in upper St. Lawrence River); found at 17 new sites	Generally inhabit sheltered areas of lakes or slow streams in substrates of fine sand and mud	
Lilliput *(Taxolasma parvum*)	Threatened (provincial only)	Southwest Ontario	Found in a variety of habitats including small to large rivers, wetlands, shallows of lakes, ponds and reservoirs. They are common in soft substrates with over 50% of the substrate type comprised of sand and a mud/muck/silt combination. Typically occur	

			with or near Green Sunfish, Bluegill, White Crappie, and Johnny Darter	
Rainbow Mussel (*Villosa iris*)	Special Concern	Ausable, Bayfield, Detroit, Grand, Maitland, Moira, Niagara, Salmon, Saugeen, Sydenham, Thames, & Trent Rivers; Lake St. Clair; may no longer be in L. Erie & St. Clair, Detroit & Niagara R.	Most abundant in shallow, well oxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel,sand and occasionally mud.	
American Chestnut (*Castanea dentata*)	Endangered	Found in the Carolinian Zone between Lake Erie and Lake Huron.	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	
American Columbo (*Frasera caroliniensis*)	Endangered	Only found in the Carolinian forest region; 22 populations recorded. Based on field surveys in 2004/2005, 13 populations are currently believed to exist.	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils.	

American Ginseng (*Panax quinquefolius*)	Endangered	Southern Ontario	Grows in rich, moist, undisturbed and relatively mature deciduous woods (dominated by Sugar Maple, White Ash, and American Basswood) in areas of neutral soil (such as over limestone or marble bedrock).	
Broad Beech Fern (*Phegopteris hexagonoptera*)	Special Concern	Found in forest remnants in southern Muskoka, along Lake Erie, and in the eastern Lake Ontario-St. Lawrence River region.	Generally inhabits shady areas of beech and maple forests where the soil is moist or wet.	
Butternut (*Juglans cinerea*)	Endangered	Found throughout the southwest, north to the Bruce Peninsula, and south of the Canadian Shield.	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows.	
Cherry Birch (*Betula lenta*)	Endangered	Two sites on the Niagara peninsula. A survey of these sites in 2010 found only 17 trees (of 50 trees identified in 1967).	Found on moist, well-drained clay loam soil over limestone bedrock with White Oak, Red Oak, Eastern Hemlock, Sugar Maple and other deciduous trees.	
Eastern Flowering Dogwood (*Cornus florida*)	Endangered	Only in the Carolinian Zone (southwest of Toronto to Sarnia	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; also	

		down to the shores of Lake Erie).	grows around edges and hedgerows.	
Few-flowered Club-rush (*Trichophorum planifolium*)	Endangered	Two sites: Royal Botanical Gardens (Hamilton) and Rouge Park (Toronto).	Generally found on steep slopes of Dry Fresh Oak deciduous forests and Dry Fresh Oak-Maple-Hickory deciduous forests.	
Green Dragon (*Arisaema dracontium*)	Special Concern	Believed to still occur at about 30 to 35 sites in the southwestern Ontario.	Generally grows in damp deciduous forests, particularly maple forest and forest dominated by Red Ash and White Elm trees, and along streams.	
Hoary Mountain-mint (*Pycnanthemum incanum*)	Endangered	Only in Hamilton - north shore of harbour	Oak savannas and prairies, dry sites; occurs on steep, warmer-than-normal slopes.	
Red Mulberry (*Morus rubra*)	Endangered	Found in the Carolinian Zone, especially the shores of Lake Erie and the slopes of the Niagara Escarpment.	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; can grow in open areas such as hydro corridors.	
White Wood Aster (*Eurybia divaricata*)	Threatened	Restricted to a relatively small number of sites in the Niagara region	Generally grows in open, dry, deciduous forests that are dominated by Sugar Maple and American Beech. May benefit from some disturbance as it often grows along trails. Often found mixed in with other asters.	
Spoon-leaved Moss (*Bryoandersonia illecebra*)	Endangered	Restricted to a few sites in southern Ontario – Elgin, Essex and	Generally found in deciduous forests; found on soil that is in or near flat, low-lying, seasonally wet areas.	

		Welland counties, and the Niagara Region.		

APPENDIX I – Road Alignment Memo (D&A, Jan. 2023)

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City of Hamilton Class EA to Address Route Options for Collector 6N, Upper James Lands
-- Terrestrial and Watercourse/Aquatic Environments --

January 20, 2023

Introduction

Dougan & Associates, Ecological Consulting and Design (D&A) has coordinated the following terrestrial ecology review and assessment of the four road options being considered, based on a review of available field data from the area. This field data was collected by D&A in 2015 and 2019 - 2022 as part of terrestrial ecological studies for the properties at 9236 & 9322 Dickenson Road and 2240 & 2254 Upper James St (Panattoni lands) and 2210 Upper James Street (Hamilton Street Railway Mountain Transit Centre lands) in Mount Hope, Hamilton.

Discussions with the City of Hamilton and Niagara Peninsula Conservation Authority (NPCA) were undertaken in Spring of 2022 to develop appropriate Terms of Reference (ToR) for this study based on the natural heritage constraints and proposed activities. Based on this ToR, data collected includes Ecological Land Classification (ELC), spring and summer botanical inventory, breeding bird surveys, nocturnal amphibian call surveys, snake surveys, feature boundary delineation of woodlands and wetlands, and headwater drainage feature and aquatic habitat assessment. A tree inventory and arborist assessment and headwater drainage feature assessment were also completed for the 2240 & 2254 Upper James St property. Screenings and habitat assessments were also undertaken for Species at Risk (SAR) and Significant Wildlife Habitat (SWH). The characterization information for the 2240 & 2254 Upper James St property will be submitted in full as part of the Upper James Class EA report (to be submitted, est. January 2023).

Background Information Received and Reviewed to Date

- Natural Heritage Information Centre (NHIC) database query for records of Species at Risk (SAR) and species of conservation concern (provincial Sranks of S1 to S3) (NHIC, 2022).
- Ministry of Natural Resources and Forestry (MNRF) LIO mapping, which includes Wetlands, Waterbodies, Areas of Natural and Scientific Interest (ANSI), Land Management units, Greenbelt, Natural Areas, etc.
- MNRF Significant Wildlife Habitat (SWH) documents (OMNR 2000; OMNRF 2015).
- MNRF Species at Risk list (MNRF 2016) for the City of Hamilton as well as a list of species known from the area, or with the potential to occur.
- Species inventory data from the following sources:
    - *9236 & 9322 Dickenson Road West EIS* (Dougan & Associates, 2022)
    - Species observations from the community science sites iNaturalist and eBird

- Hamilton Natural Heritage Database records requested from the Hamilton Conservation Authority (HCA)

Criteria Applied for Ranking of Impacts

Terrestrial Habitat Features

Where the future road options directly impact terrestrial resources, the following criteria have been applied to distinguish between options:

- Low impacts – no direct impacts to terrestrial habitat features anticipated.

- Medium impacts – direct impacts likely to terrestrial habitat features. Mitigation and/or compensation possible through enhancements to areas that will be protected within the Natural Heritage System, including Linkages, Vegetation Protection Zones (VPZ), and Restoration Areas (RA).

- High impacts – direct impacts likely to significant Natural Heritage System resources such as ESAs, ANSIs, or Core Areas (e.g. Significant Woodlands, Provincially Significant Wetlands). Mitigation possible through enhancements to areas that will be protected within the Natural Heritage System, including Linkages, Vegetation Protection Zones (VPZs) and Restoration Areas (RAs).

The criteria are applied based on the impacts of the road alignment options and with the understanding that the future proposed Panattoni development will largely be located within the agricultural lands outside of identified significant features. The proposed Panattoni development will likely result in additional indirect impacts related to the change in land use to commercial such as noise and light pollution, changes to surface water runoff patterns, and potential human encroachment issues. These issues will be addressed in detail through the Upper James EIS to be completed once the road alignment is finalized.

Species at Risk protected under the Endangered Species Act (ESA; 2007)

Species at Risk (SAR) protected under the ESA include species designated Endangered or Threatened. Special Concern species are addressed through the Province's Significant Wildlife Habitat (SWH) provisions and are described. Impacts are ranked as low (L), medium (M), or high (H) for species found within the Upper James lands, as follows.

Butternut

Six (6) Butternut (*Juglans cinerea*) individuals have been found within the study area, 4 of which have potential to be impacted by the various road alignment options. Only 3 of the 6 Butternuts have been assessed for genetic purity (Map 1). For the purposes of this assessment, all Butternuts will be assumed to be pure and have protections under the Species at Risk Act. This protection includes requirements for compensation in the case of removal, and a 25 m no-development setback buffer which is intended to protect any seedlings of Butternut individuals if they are retained on the landscape.

- Low impact – road alignment will not impact Butternut or its 25 m setback area

- Medium impact – road alignment will impact the 25 m setback area
- High impact – road alignment results in the removal of the tree

If multiple Butternut trees are impacted by an alignment, the highest applicable impact ranking will be used (e.g. if Road Option 1 impacts the buffer of one tree and results in the removal of another, the ranking is High).

Unevaluated Wetlands

The categorization of impacts to unevaluated wetlands less than 0.5 ha fits within the Medium impact category (see *Terrestrial Habitat Features*) and it is assumed that wetland loss could be mitigated/compensated through wetland recreation and/or enhancement in linkage areas, Restoration Areas, VPZs, etc. High impacts pertain to Core Areas only, which include Provincially Significant Wetlands (PSWs) and unevaluated wetlands greater than 0.5 hectares. Note that none of the proposed road alignment alternatives directly impact PSWs or unevaluated wetlands >0.5 ha. Direct medium impacts to unevaluated wetlands <0.5 ha range from 0.07 ha (Route 3) to 0.21 ha (Route 1).

Provincially Significant Wetlands

Impacts to Provincially Significant Wetlands (i.e. Core Areas) fit within the High impact category (see *Terrestrial Habitat Features).* No direct impacts to PSWs on the landscape are anticipated from the proposed road alternatives.

Significant Woodlands

Impacts to Significant Woodlands (i.e. Core Areas) fit within the High impact category (see *Terrestrial Habitat Features)*, and it is assumed that woodland loss could be mitigated/compensated in linkage areas, Restoration Areas, VPZs, etc. Impacts to Significant Woodlands range from 0.08 ha (Routes 3 and 4) to 0.18 ha (Route 2).

Linkages

A detailed linkage assessment completed for the Dickenson EIS (submitted December 2022) confirmed that polygon 9.2 (HR, Map 1) should be considered a linkage as indicated in the City of Hamilton NH mapping. Due to the proposed location of the road, all four road alignment options will impact this linkage feature in a similar manner, however mitigation options are present that will be explored further in the full EA report.

Hedgerows and Thickets

The categorization of impacts to hedgerows and thickets follows that of "Terrestrial Habitat Features". Note that the amount of hedgerow impacted varies from 0.18 (Route 3) to 0.46 ha (Route 2). Thicket habitat is impacted by Routes 1 (0.03 ha) and 4 (0.44 ha). Regarding mitigation/compensation, thicket habitat could be created in future linkages, RAs, and VPZs.

Significant Wildlife Habitat

Using the MNRF's *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015), the site was screened for potential SWH based on the habitats and species verified on site between 2019 and

2022. Note that many of the SWH categories can only be flagged as Candidate; for confirmation, further studies may be required, and any Candidate areas would need to be confirmed by the City of Hamilton.

Most of the SWH categories for Ecoregion 7E are not represented in the Upper James Class EA lands based on the following:

- Suitable habitat (by ELC category) is not present (e.g. Alvars);
- If suitable ELC habitat is present, it does not meet size thresholds or is not adjacent to other required habitats (e.g. Raptor Wintering Area; Landbird Migratory Stopover Areas);
- Indicator species are not present based on appropriate field investigations (e.g. Waterfowl Nesting Areas; Woodland Area-Sensitive Bird Breeding Habitat);
- If indicator species were present, their numbers and/or diversity do not meet significance thresholds (e.g. Shrub/Early Successional Bird Breeding Habitat);
- The habitat is rare and/or with a long history of use by certain wildlife groups and is known to agencies (e.g. Shorebird Migratory Stopover Area); and
- Confirmed habitat is only identified by MNRF (e.g. Deer Winter Congregation Areas).

Based on the screening, Candidate SWH with potential to occur within the study area are:

- Bat Maternity Colonies – Large woodlots in northern (polygons 7.1 and 14) portion of study area likely meet snag size/density thresholds, but this has not been calculated. BBBA and SHBA have not been confirmed.
- Turtle Nesting Areas – Turtles are likely present in the central pond (Snapping Turtles were observed in 2015, but not in 2019 – 2022). Therefore, they may be nesting within the study area, most likely along the edges of agricultural fields as there are no other suitable nesting areas (e.g., sand and/or gravel, preferably with a southerly aspect) in the study area.
- Reptile Hibernacula – Snake hibernacula can occur in a variety of landscapes including cultural/disturbed areas. However, no snakes were observed during the active snake search conducted in May 2019. Snakes documented in spring (especially in early spring) can be indicative of nearby hibernacula. Ideal hibernacula habitat (e.g., karsts) are also absent in the study area. Therefore, although it's possible that snake hibernacula are present, it is unlikely that enough snakes are present to trigger confirmed SWH status.
- Seeps and Springs – Seepage was generally observed in polygons 7.1 and 10. SWH criteria state that two or more seeps/springs are required to confirm SWH. This category is classified as Candidate since two or more seeps were not recorded. Neither polygon 7.1 or 10 will be directly impacted by any of the route options.
- Amphibian Breeding Habitat (Woodland) – 3 indicator species were detected: Spring Peeper, Wood Frog, and Gray Tree Frog. Species thresholds were met at Station 4 (Polygon 5 MAM2-2) with 10+ individuals of each Spring Peeper and Wood Frog. However, MAM2-2 is not a qualifying ELC community for woodland amphibian breeding habitat. Gray Treefrog and Spring Peeper were detected in lower numbers at Stations 1 and 3 but do not meet abundance thresholds.
- Amphibian Breeding Habitat (Wetland) – 3 indicator species were detected: Gray Treefrog, Green Frog and American Toad. Indicator species were detected in low numbers (<10 individuals) and abundance thresholds were not met to confirm SWH.
- Special Concern (SC) and Rare Wildlife Species: Snapping Turtle (SC) - species was observed in the man-made pond in 2015 but was not observed as part of this study between 2019 and 2022 (Polygons 5.1 - 5.4). The OMNRF (2015) criteria state that: *"Man-made ponds such as sewage lagoons or storm ponds should not be considered SWH",* however if Snapping Turtles are using it

as habitat, it is important to consider it as potential SWH in protecting all life stages of the species.

Based on species records and habitat present within the study area, Confirmed SWH categories include:

- Special Concern (SC) and Rare Wildlife Species:
    - Eastern Wood-Pewee (SC) were detected on territory (i.e. breeding) within the woodland (Polygon 10) and likely in the northeast woodlot (Polygon 7.1).
    - Monarch (SC) were detected on site and likely breed on site (Polygons 3, 13, 17). Polygon 17 contained a very high abundance of this species' hostplant, Common Milkweed.

For the SWH categories, polygon 14 (candidate Bat Maternity Colony SWH) will be directly impacted by the road alignment options. Due to its location and extent on the landscape, this SWH will essentially be impacted similarly by all four alternatives (with a range of 0.08 – 0.18 ha impacted), with similar opportunities for mitigation and compensation elsewhere on the landscape. Polygon 13 (confirmed SWH for SC and Rare wildlife) will be impacted by routes 1, 2, and 4 with impacts ranging from 0.02 ha to 0.87 ha).

Watercourses and Aquatic Environments

Three headwater drainage features (HDF) fall within the proposed road alignments. HDF 5 (identified on the 9322 Dickenson Road property) is a very small feature that is impacted by all four alignments. As the impact is similar in all four road alignments scenarios, it is not considered further in this analysis. Two drainage features are considered in this analysis, both of which are considered regulated features by the NPCA. HDF 1 drains the pond/PSW and is the most prominent channel within the study area. It is a well defined feature within a realigned channel corridor traversing the HSR lands to Upper James. The riparian corridor of this feature is identified as PSW. HDF 2 is smaller, lacking a riparian corridor as it crosses a farm field at 2240 Upper James before transitioning to a grassed swale along the HSR property and Upper James.

Alternatives 2 and 3 both cross HDF 1, overprint (Alternative 2) approximately 250 m of HDF 2, or will require a crossing of HDF 2 (Alternative 3). Alternatives 1 and 4 avoid HDF 1 and HDF 2. As per previous discussions, both HDF 1 and HDF 2 are to be retained on the landscape, while both features have the potential to be realigned, it will be more difficult to realign HDF 1 due to the PSW along its riparian corridor. Alternative 2 would require the realignment of HDF 2, while Alternative 3 would need a crossing of HDF 2 and would also conflict with any proposed realignment of HDF 2 as part of the site development. In general, Alternative 1 and 4 avoids impacts to the watercourse features, while Alternative 2 and 3 impact two watercourse features.

The impacts were defined as follows:

- Low impacts – the watercourse is not crossed or realigned, and no impacts are anticipated.
- Medium impacts – the watercourse is realigned, altered, or reconfigured using natural channel design with a minimum floodplain and culvert sizing; enhancement opportunities are available (e.g. better connectivity for fish habitat and terrestrial movement).
- Medium-High – crossing of the feature with a bridge type structure. Permanent loss of riparian habitat, and/or impacts to multiple watercourse features.

- High impacts – the watercourse is heavily altered or eliminated (e.g. buried), with no mitigation or compensation.

Summary of Known Resources and Option Ranking

Appendix 1 provides the Terrestrial and Watercourse/Aquatic Environments ranking of options based on known resources. Overall, Appendix 1 results in the following ranking:

Lower impact (1): Route 3
Moderate impact (2) – Routes 1, 2 and 4

Route 3 is ranked as slightly lower impact as it is the only route not impacting polygon 13, which is confirmed SWH. It should also be noted that impacts to Butternut and watercourses are they key determining factors for the rankings of these alignment options.

Routes 2 and 3 result in medium-high impacts to watercourses while routes 1 and 4 have low impacts on watercourses.

Route 4 impacts the 25 m buffer around Butternut trees and Route 1 results in the removal of a Butternut tree. Although rare on the landscape, Butternut trees can be removed and compensated for if appropriate permits are applied for and granted.

Excluding impacts to Butternut and watercourses, all four road alignment options have a similar magnitude of impact on various features based on the assessment in Appendix 1.

Appendix 2 contains the area calculations for all Ecological Land Classification (ELC) habitats impacted for all polygons (Table 1), by ELC community types (Table 2) by ELC categories for natural habitats only (Table 3), and by area of significant/core NH feature impacted (Table 4). This information is also summarized below.

Table 1. Comparison of impacted areas by hectare – all routes

Impacted area	Road Alignment Option			
	1	2	3	4
Total impacted area - all ELC community types	4.32 ha	4.22 ha	4.24 ha	4.36 ha
Natural ELC Communities only	0.30 ha	0.26 ha	0.21 ha	0.18 ha
NH features only (woodlands, wetlands, and significant core features)	1.10 ha	0.88 ha	0.50 ha	1.45 ha

Refer to Map 1 for the location of the four road alternatives shown with the ELC/NH mapping for the Upper James lands. Note that the ELC mapping is current as of January 2023.

References

NHIC (Natural Heritage Information Centre). 2022. Make a Natural Heritage Map. https://www.ontario.ca/page/make-natural-heritage-area-map

OMNR (Ontario Ministry of Natural Resources). 2000. Significant Wildlife Habitat Technical Guide. 151 pp

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. January 2015. 42 pp

OMNRF (Ontario Ministry of Natural Resources and Forestry). 2022. Species at Risk in Ontario (SARO) List. Updated April 2022. Available at: https://www.ontario.ca/page/species-risk-ontario

Attachments

Map 1. Road Alternative Options 1-4 with ELC and significant features/species for Upper James EA Lands

Appendix 1. Terrestrial and Watercourse/Aquatic Environments Ranking of Upper James Collector 6 N Corridor Options

Appendix 2. Habitat Impacts by Area

PROJECT: DA21-104-02

CLIENT: Panattoni Development Company

DATE: 13, January 2023

DRAWN BY: C. White

Map 1: Proposed Road Alignment Options

2240 Upper James EA

2240 Upper James Street, Hamilton Ontario

- Subject Property
- 2240 Upper James EIS Study Area Boundary (proposed)
- Upper James Class EA Study Area Boundary (proposed)
- 9236 Dickenson EIS Study Area Boundary
- Watercourse
- Contour Line
- Vegetation Community

Alignment Option (IBI Group, 2023)

- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4

Constraints

- Butternut - Not Assessed
- Butternut - Assessed
- Butternut 25 Metre Setback
- Eastern Wood Pewee Observation
- Significant Woodland
- Provincially Significant Wetland
- Vegetation Protection Zone

Orthoimagery Source: Esri, CGIAR, USGS, Maxar

The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations, features, or roads, nor as a guide to navigation. MNRF data provided by King's Printer of Ontario. Use of the data in any derivative product does not constitute an endorsement by the MNRF or the Ontario Government of such products.

0 37.5 75 150

Metres

SCALE: 1:4,500

N

NAD 1983 UTM Zone 17N

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Appendix 1. Terrestrial and Watercourse/Aquatic Environments Ranking of Upper James Collector 6 N Corridor Options

CATEGORY	INDICATORS	Route 1	Route 2	Route 3	Route 4
TERRESTRIAL ENVIRONMENTS					
Natural Heritage System (NHS)	Impacts to NHS: Core Areas, including Significant Woodlands, PSWs (see text for definition of L, M, and H)	H	H	H	H
	Impacts to NHS: Linkages, Restoration Areas, and Vegetation Protection Zones (see text for definition of L, M, and H)	M	M	M	M
Species at Risk: Butternut	L – not impacted; M – 25 m buffer impacted; H – Butternut tree removed (if multiple trees impacted, choose highest ranking)	H	L	L	M
Unevaluated Wetlands <0.5 ha	L – None impacted; M – Impacted but not within Core Areas; H – Core Areas impacted (e.g. PSW)	M	M	M	M
Provincially Significant Wetlands or Unevaluated Wetlands >0.5 ha	L – None impacted; M – Impacted but not within Core Areas; H – Core Areas impacted (e.g. PSW)	L	L	L	L
Significant Woodlands	L – None impacted; M – Impacted but not within Core Areas; H – Core Areas impacted	H	H	H	H
Linkages	L – None impacted; M – direct impacts, mitigation and/or compensation possible; H – direct impacts, few mitigation and/or compensation opportunities	M	M	M	M
Non-Core Area Woodlands	L – None impacted; M – direct impacts, mitigation and/or compensation possible; H – direct impacts, few mitigation and/or compensation opportunities	L	L	L	L
Hedgerows and Thickets	L – None impacted; M – direct impacts, mitigation and/or compensation possible; H – direct impacts, few mitigation and/or compensation opportunities	M	M	M	M
Candidate Significant Wildlife Habitat (SWH)	L – None impacted; M – minimal impacts, readily replicated, mitigation opportunities within final NHS; H – permanent removal and/or few or no mitigation opportunities	M	M	M	M
Confirmed Significant Wildlife Habitat (SWH)	L – None impacted; M – minimal impacts, readily replicated, mitigation opportunities within final NHS; H – permanent removal and/or few or no mitigation opportunities	M	M	L	M
WATERCOURSES AND AQUATIC ENVIRONMENTS					
Watercourses	L – remaining, not crossed and/or no impacts; M – moved, altered, reconfigured, enhanced; M/H – bridge crossing; H – eliminated, few mitigation opportunities	L	M-H	M-H	L
OVERALL RANKING		2	2	1	2

Impacts: L – Low; M – Medium; H – High
PSW – Provincially Significant Wetland

Table 1. Habitat Loss by Polygon

Polygon ID	ELC Code	Description	Impact (hectares) Proposed Road Alignment Option 1	2	3	4
1	AGR	Agricultural	1.85	1.91	1.94	1.86
2	HR	Hedgerow				
3	MAM2-2	Reed-canary Grass Mineral Meadow Marsh				
4	CUS1	Mineral Cultural Savannah				
5.1	SAF1-3	Duckweed Floating-leaved Shallow Aquatic				
5.2	MAM2-2	Reed-canary Grass Mineral Meadow Marsh				
5.3	SWT2-5	Red-osier Mineral Thicket Swamp				
5.4	MAS2-4	Broad-leaved Sedge Mineral Shallow Marsh				
6.1	CUW	Cultural Woodland				
6.2	CUW	Cultural Woodland				
6.3	CUW	Cultural Woodland				
6.4	CUW	Cultural Woodland				
7.1	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest				
7.2	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest				
8	MAM2-2	Reed-canary Grass Mineral Meadow Marsh				
9.1	HR	Hedgerow	0.02	0.02	0.02	0.03
9.2	HR	Hedgerow	0.22	0.23	0.22	0.19
10	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest				
11	MAS2-1	Cattail Mineral Shallow Marsh				
12	ANTH	Anthropogenic				
13	CUM1	Mineral Cultural Meadow	0.87	0.02		0.52
14	FOD5-6	Dry – Fresh Sugar Maple – Beech Deciduous Forest	0.09	0.18	0.13	0.08
15.1	HR	Hedgerow			0.17	
15.2	HR	Hedgerow		0.21		
16.1	CUT1-1	Sumac Cultural Thicket				
16.2	CUT1	Mineral Cultural Thicket				
17	CUM1	Mineral Cultural Meadow				
18	ANTH	Anthropogenic				
19.1	MAM2-2	Reed-canary Grass Mineral Meadow Marsh				
19.2	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.2			0.04
20	AGR	Agricultural			0.22	
21	AGR	Agricultural		1.52	1.02	
22	MAM2-2	Reed-canary Grass Mineral Meadow Marsh		0.04	0.07	
23.1	CUW1	Mineral Cultural Woodland				0.08
23.2	CUW1	Mineral Cultural Woodland				
24.1	CUT1-4	Gray Dogwood Cultural Thicket	0.03			0.44
24.2	CUT1-4	Gray Dogwood Cultural Thicket				
24.3	CUT1-4	Gray Dogwood Cultural Thicket				
25	MAM2-2	Reed-canary Grass Mineral Meadow Marsh		0.05		
26	HR	Hedgerow	0.12			0.02
27	ANTH	Anthropogenic	0.91			1.03
28	SWD4	Mineral Deciduous Swamp	0.01			0.07
29	SWT2-5	Red-osier Mineral Thicket Swamp				
30	ANTH	Anthropogenic		0.04		
31	ANTH	Anthropogenic			0.44	
		Total	**4.32**	**4.22**	**4.23**	**4.36**

Table 2. Habitat Loss by ELC Community

ELC Code	Description	Impact (hectares) Proposed Road Alignment Option 1	2	3	4
AGR	Agricultural	1.85	3.44	3.17	1.86
ANTH	Anthropogenic	0.91	0.04	0.44	1.03
CUM1	Mineral Cultural Meadow	0.87	0.02		0.52
CUS1	Mineral Cultural Savannah				
CUT1	Mineral Cultural Thicket				
CUT1-1	Sumac Cultural Thicket				
CUT1-4	Gray Dogwood Cultural Thicket	0.03			0.44
CUW	Cultural Woodland				
CUW1	Mineral Cultural Woodland				0.08
FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest				
FOD5-6	Dry – Fresh Sugar Maple – Beech Deciduous Forest	0.09	0.18	0.13	0.08
HR	Hedgerow	0.36	0.46	0.42	0.24
MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.20	0.08	0.07	0.04
MAS2-1	Cattail Mineral Shallow Marsh				
MAS2-4	Broad-leaved Sedge Mineral Shallow Marsh				
SAF1-3	Duckweed Floating-leaved Shallow Aquatic				
SWD4	Mineral Deciduous Swamp	0.01			0.07
SWT2-5	Red-osier Mineral Thicket Swamp			0.00	
	Total	**4.33**	**4.22**	**4.24**	**4.35**

Table 3. Habitat loss by Natural ELC Communities

ELC Code	Description	Impact (hectares) Proposed Road Alignment Option 1	2	3	4
FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest				
FOD5-6	Dry – Fresh Sugar Maple – Beech Deciduous Forest	0.0877	0.1758	0.1335	0.0797
MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.2006	0.0835	0.0713	0.0358
MAS2-1	Cattail Mineral Shallow Marsh				
MAS2-4	Broad-leaved Sedge Mineral Shallow Marsh				
SAF1-3	Duckweed Floating-leaved Shallow Aquatic				
SWD4	Mineral Deciduous Swamp	0.0137			0.0672
SWT2-5	Red-osier Mineral Thicket Swamp			0.0005	
	Total	**0.30**	**0.26**	**0.21**	**0.18**

Table 4. Habitat Loss by NH Features

Feature	Impact (hectares) Proposed Road Alignment Option 1	2	3	4
Significant Woodlands	0.09	0.18	0.08	0.08
Woodlands				
Thicket	0.03			0.44
Hedgerow	0.36	0.46	0.18	0.24
Linkage	0.22	0.23	0.22	0.19
PSWs				
Unevaluated Wetland	0.21	0.08	0.07	0.10
Core Areas	0.82	0.44	0.33	1.00
VPZ	0.52	0.23	0.18	0.74
Total Area of Impact (excluding areas of feature overlap)	**1.10**	**0.88**	**0.50**	**1.45**

APPENDIX J – Tree Inventory Data

Appendix J. Tree Data Table
Upper James EA

Tree Tag #	Tree Status	Common Name	Scientific Name	DBH1 [1] (cm)	DBH2 (cm)	DBH3 (cm)	DBH4 (cm)	DBH5 (cm)	DBH6 (cm)	Crown Reserve [2] (m)	Height [3] (m)	Structural Condition[4]	Biological Health[5]	Preservation Priority[6]	Native Status [7]
12	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	6	05-10 m	High	High	High	N
18	Alive	Black Walnut	*Juglans nigra*	47	42	0	0	0	0	10	10-15 m	Medium	Medium	High	N
19	Alive	Black Walnut	*Juglans nigra*	26	10	0	0	0	0	8	10-15 m	Medium	High	High	N
20	Alive	Black Walnut	*Juglans nigra*	34	0	0	0	0	0	10	10-15 m	High	High	High	N
21	Alive	Black Walnut	*Juglans nigra*	44	40	0	0	0	0	12	10-15 m	Medium	High	High	N
22	Alive	Black Walnut	*Juglans nigra*	60	0	0	0	0	0	10	10-15 m	Medium	High	High	N
23	Alive	Black Walnut	*Juglans nigra*	13	0	0	0	0	0	8	05-10 m	Medium	Medium	Medium	N
24	Alive	White Elm	*Ulmus americana*	20	8	0	0	0	0	6	05-10 m	Medium	Medium	Medium	N
26	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	4	05-10 m	Medium	Medium	High	N
27	Alive	Black Walnut	*Juglans nigra*	10	0	0	0	0	0	4	05-10 m	Medium	High	High	N
28	Alive	Black Walnut	*Juglans nigra*	15	0	0	0	0	0	6	05-10 m	High	High	High	N
29	Alive	Black Walnut	*Juglans nigra*	41	0	0	0	0	0	10	10-15 m	Medium	High	High	N
30	Alive	Black Walnut	*Juglans nigra*	15	0	0	0	0	0	6	05-10 m	High	High	High	N
31	Alive	Black Walnut	*Juglans nigra*	40	0	0	0	0	0	12	10-15 m	Medium	High	High	N
32	Alive	Black Walnut	*Juglans nigra*	37	0	0	0	0	0	10	10-15 m	High	Medium	High	N
33	Alive	Black Walnut	*Juglans nigra*	47	0	0	0	0	0	10	10-15 m	High	High	High	N
34	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	6	05-10 m	High	High	High	N
35	Dead	Black Walnut	*Juglans nigra*	19	0	0	0	0	0	0	00-01 m	Dead	Dead	Low	N
37	Alive	Norway Maple	*Acer platanoides*	37	0	0	0	0	0	6	10-15 m	Medium	Medium	Medium	I
39	Alive	Basswood	*Tilia americana*	40	21	16	12	0	0	10	10-15 m	Low	Medium	High	N
40	Alive	Basswood	*Tilia americana*	35	34	28	24	20	0	10	10-15 m	Medium	Medium	High	N
41	Alive	Basswood	*Tilia americana*	32	17	0	0	0	0	8	10-15 m	Medium	Medium	Medium	N
42	Alive	Basswood	*Tilia americana*	27	0	0	0	0	0	8	10-15 m	Medium	Medium	Medium	N
43	Alive	Basswood	*Tilia americana*	48	33	24	15	0	0	10	10-15 m	Medium	Medium	Medium	N
44	Alive	Basswood	*Tilia americana*	45	39	12	4	0	0	10	10-15 m	Low	Medium	Medium	N
45	Alive	Basswood	*Tilia americana*	56	50	40	35	28	21	10	10-15 m	Low	Low	Medium	N
46	Alive	Black Walnut	*Juglans nigra*	38	0	0	0	0	0	8	05-10 m	Medium	Medium	High	N
47	Alive	Black Walnut	*Juglans nigra*	14	0	0	0	0	0	6	05-10 m	High	High	High	N
48	Alive	White Elm	*Ulmus americana*	17	0	0	0	0	0	4	05-10 m	Low	Low	Low	N
49	Alive	Basswood	*Tilia americana*	52	42	24	22	19	19	12	10-15 m	Low	Low	Medium	N
50	Alive	Manitoba Maple	*Acer negundo*	24	17	0	0	0	0	8	05-10 m	Medium	Medium	Low	N
51	Alive	Basswood	*Tilia americana*	43	7	0	0	0	0	10	05-10 m	High	High	High	N
52	Alive	Basswood	*Tilia americana*	12	7	0	0	0	0	4	03-05 m	Medium	High	High	N
53	Alive	Black Walnut	*Juglans nigra*	35	0	0	0	0	0	6	05-10 m	High	High	High	N
54	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	2	05-10 m	High	Medium	Medium	N
55	Alive	American Plum	*Prunus americana*	17	0	0	0	0	0	6	15-20 m	High	High	High	N
56	Alive	American Plum	*Prunus americana*	14	10	6	5	0	0	8	05-10 m	Medium	Medium	High	N
57	Alive	American Plum	*Prunus americana*	12	10	0	0	0	0	4	05-10 m	Medium	Medium	High	N
58	Alive	American Plum	*Prunus americana*	13	0	0	0	0	0	4	05-10 m	Medium	Medium	High	N
62	Alive	American Plum	*Prunus americana*	18	10	8	0	0	0	6	05-10 m	Medium	Medium	High	N
63	Alive	American Plum	*Prunus americana*	14	0	0	0	0	0	5	05-10 m	Medium	Medium	High	N
64	Alive	American Plum	*Prunus americana*	12	0	0	0	0	0	4	05-10 m	Medium	Medium	High	N
65	Alive	American Plum	*Prunus americana*	13	13	12	10	0	0	8	05-10 m	Medium	Medium	High	N
66	Alive	American Plum	*Prunus americana*	14	0	0	0	0	0	4	05-10 m	Medium	Medium	High	N
67	Alive	White Elm	*Ulmus americana*	13	0	0	0	0	0	4	10-15 m	Medium	Medium	High	N
68	Alive	White Elm	*Ulmus americana*	22	0	0	0	0	0	6	05-10 m	Medium	Medium	High	N
69	Alive	American Plum	*Prunus americana*	10	10	10	9	0	0	6	05-10 m	Medium	Medium	High	N
70	Alive	American Plum	*Prunus americana*	11	9	0	0	0	0	3	05-10 m	Medium	Medium	High	N
71	Alive	American Plum	*Prunus americana*	18	15	0	0	0	0	7	05-10 m	Medium	Medium	High	N
72	Alive	American Plum	*Prunus americana*	15	0	0	0	0	0	6	05-10 m	Medium	Medium	High	N
73	Alive	American Plum	*Prunus americana*	16	16	10	9	7	0	6	05-10 m	Medium	Medium	High	N
74	Alive	American Plum	*Prunus americana*	17	0	0	0	0	0	5	05-10 m	Medium	Medium	High	N
75	Alive	Black Walnut	*Juglans nigra*	79	0	0	0	0	0	20	20-25 m	Medium	High	High	N
76	Alive	American Plum	*Prunus americana*	24	0	0	0	0	0	7	05-10 m	Medium	Medium	High	N
77	Alive	Black Walnut	*Juglans nigra*	34	0	0	0	0	0	12	15-20 m	Medium	High	High	N
78	Alive	Black Walnut	*Juglans nigra*	18	0	0	0	0	0	7	15-20 m	High	Medium	High	N
79	Dead	American Plum	*Prunus americana*	14	11	8	0	0	0	5	05-10 m	Dead	Dead	Low	N
80	Alive	Common Pear	*Pyrus communis*	54	46	0	0	0	0	14	10-15 m	Low	Medium	Medium	I
81	Alive	Common Pear	*Pyrus communis*	21	0	0	0	0	0	4	05-10 m	Medium	Medium	High	I
82	Alive	Manitoba Maple	*Acer negundo*	12	0	0	0	0	0	5	05-10 m	High	High	Low	N
83	Alive	Manitoba Maple	*Acer negundo*	35	29	0	0	0	0	13	15-20 m	Medium	High	Low	N
84	Alive	Manitoba Maple	*Acer negundo*	24	0	0	0	0	0	7	15-20 m	Medium	High	Low	N
86	Alive	Manitoba Maple	*Acer negundo*	21	0	0	0	0	0	6	15-20 m	Medium	Medium	Low	N
87	Alive	White Elm	*Ulmus americana*	11	0	0	0	0	0	5	10-15 m	Medium	Low	High	N
88	Alive	Manitoba Maple	*Acer negundo*	23	0	0	0	0	0	7	15-20 m	Medium	Medium	Low	N
89	Alive	Manitoba Maple	*Acer negundo*	24	0	0	0	0	0	17	10-15 m	Medium	Medium	Low	N
91	Alive	Black Walnut	*Juglans nigra*	18	0	0	0	0	0	7	10-15 m	Medium	High	High	N
92	Dead	Cherry Species	*Prunus sp*	15	15	8	0	0	0	5	05-10 m	Dead	Dead	Medium	G
93	Alive	Manitoba Maple	*Acer negundo*	27	27	0	0	0	0	8	10-15 m	Medium	Medium	Low	N
94	Alive	Manitoba Maple	*Acer negundo*	20	0	0	0	0	0	8	05-10 m	Low	Low	Low	N
95	Alive	Manitoba Maple	*Acer negundo*	20	0	0	0	0	0	8	10-15 m	Low	Medium	Low	N
96	Alive	Manitoba Maple	*Acer negundo*	26	18	0	0	0	0	12	15-20 m	Medium	Medium	Low	N
97	Alive	Manitoba Maple	*Acer negundo*	30	26	0	0	0	0	9	10-15 m	Medium	Medium	Low	N
98	Alive	Manitoba Maple	*Acer negundo*	60	0	0	0	0	0	20	10-15 m	Low	Low	Low	N
99	Alive	Manitoba Maple	*Acer negundo*	20	15	0	0	0	0	5	15-20 m	Low	Medium	Low	N
100	Alive	Manitoba Maple	*Acer negundo*	24	0	0	0	0	0	6	10-15 m	Medium	Medium	Low	N
101	Alive	Manitoba Maple	*Acer negundo*	32	31	0	0	0	0	18	15-20 m	Medium	Medium	Low	N
102	Alive	Hawthorn Species	*Crataegus sp*	12	0	0	0	0	0	5	03-05 m	Low	Medium	High	G
103	Alive	Hawthorn Species	*Crataegus sp*	23	0	0	0	0	0	6	05-10 m	High	High	High	G
104	Alive	Hawthorn Species	*Crataegus sp*	14	12	0	0	0	0	7	05-10 m	Medium	High	High	G
105	Alive	Hawthorn Species	*Crataegus sp*	19	13	0	0	0	0	9	05-10 m	Medium	Medium	High	G
106	Dead	Unknown	*Unknown*	30	0	0	0	0	0	8	15-20 m	Dead	Dead	Low	Unknown (dead)
107	Alive	Manitoba Maple	*Acer negundo*	39	31	0	0	0	0	20	20-25 m	Medium	Medium	High	N
108	Alive	Hawthorn Species	*Crataegus sp*	18	18	16	15	14	10	8	05-10 m	Medium	Medium	High	G
109	Alive	Manitoba Maple	*Acer negundo*	20	19	12	10	8	0	8	05-10 m	Low	Low	Low	N
110	Alive	Manitoba Maple	*Acer negundo*	19	0	0	0	0	0	6	05-10 m	Medium	Medium	Low	N
111	Alive	Manitoba Maple	*Acer negundo*	33	12	0	0	0	0	9	10-15 m	Medium	Medium	Low	N
112	Alive	Manitoba Maple	*Acer negundo*	12	0	0	0	0	0	5	05-10 m	Medium	Medium	Low	N
113	Alive	Black Walnut	*Juglans nigra*	13	0	0	0	0	0	6	10-15 m	High	High	High	N
114	Alive	Manitoba Maple	*Acer negundo*	16	8	5	0	0	0	8	10-15 m	Low	Low	Low	N
115	Alive	Black Walnut	*Juglans nigra*	30	0	0	0	0	0	12	15-20 m	High	High	High	N
116	Alive	Black Walnut	*Juglans nigra*	22	0	0	0	0	0	10	15-20 m	High	High	High	N
117	Alive	Black Walnut	*Juglans nigra*	18	0	0	0	0	0	5	15-20 m	Medium	High	High	N
118.1	Alive	Hawthorn Species	*Crataegus sp*	12	0	0	0	0	0	8	03-05 m	Medium	Medium	High	G
118.2	Alive	Black Walnut	*Juglans nigra*	16	0	0	0	0	0	6	10-15 m	High	High	High	N
119	Alive	Basswood	*Tilia americana*	10	5	5	5	3	1	5	05-10 m	Medium	Medium	High	N
120	Alive	Hawthorn Species	*Crataegus sp*	12	0	0	0	0	0	7	05-10 m	High	High	High	G
121	Alive	Basswood	*Tilia americana*	34	18	0	0	0	0	10	15-20 m	Medium	Medium	High	N
122	Alive	Basswood	*Tilia americana*	67	18	0	0	0	0	12	15-20 m	Low	Medium	High	N
123	Alive	Basswood	*Tilia americana*	36	34	33	26	17	0	10	15-20 m	Medium	High	High	N
124	Alive	Black Walnut	*Juglans nigra*	31	0	0	0	0	0	7	15-20 m	Medium	High	High	N
125	Dead	Unknown	*Unknown*	11	0	0	0	0	0	0	03-05 m	Dead	Dead	Low	Unknown (dead)
126	Alive	Trembling Aspen	*Populus tremuloides*	21	0	0	0	0	0	4	10-15 m	Low	Low	Medium	N
127	Alive	Trembling Aspen	*Populus tremuloides*	18	0	0	0	0	0	5	01-03 m	Low	Low	Low	N
128	Alive	Trembling Aspen	*Populus tremuloides*	12	0	0	0	0	0	5	10-15 m	Medium	High	High	N
129	Alive	Trembling Aspen	*Populus tremuloides*	10	10	0	0	0	0	5	10-15 m	Medium	High	High	N

Appendix J. Tree Data Table
Upper James EA

Tree Tag #	Tree Status	Common Name	Scientific Name	DBH1 [1] (cm)	DBH2 (cm)	DBH3 (cm)	DBH4 (cm)	DBH5 (cm)	DBH6 (cm)	Crown Reserve [2] (m)	Height [3] (m)	Structural Condition[4]	Biological Health[5]	Preservation Priority[6]	Native Status [7]
130	Alive	Trembling Aspen	*Populus tremuloides*	10	0	0	0	0	0	4	05-10 m	Medium	Medium	High	N
131	Alive	Trembling Aspen	*Populus tremuloides*	10	0	0	0	0	0	5	05-10 m	High	High	High	N
132	Alive	Trembling Aspen	*Populus tremuloides*	13	0	0	0	0	0	4	10-15 m	High	Medium	High	N
133	Alive	Trembling Aspen	*Populus tremuloides*	12	0	0	0	0	0	4	05-10 m	High	Medium	High	N
134	Alive	Trembling Aspen	*Populus tremuloides*	12	0	0	0	0	0	5	10-15 m	High	High	High	N
135	Alive	Trembling Aspen	*Populus tremuloides*	11	0	0	0	0	0	5	15-20 m	High	High	High	N
136	Alive	Trembling Aspen	*Populus tremuloides*	17	0	0	0	0	0	4	05-10 m	High	High	High	N
137	Alive	Trembling Aspen	*Populus tremuloides*	11	0	0	0	0	0	4	10-15 m	High	High	High	N
138	Alive	Trembling Aspen	*Populus tremuloides*	13	0	0	0	0	0	6	05-10 m	High	High	High	N
139	Alive	Trembling Aspen	*Populus tremuloides*	11	4	0	0	0	0	4	10-15 m	High	High	High	N
140	Alive	Sugar Maple	*Acer saccharum*	28	0	0	0	0	0	10	15-20 m	High	High	High	N
141	Alive	Basswood	*Tilia americana*	36	0	0	0	0	0	11	15-20 m	High	High	High	N
142	Alive	Black Walnut	*Juglans nigra*	54	0	0	0	0	0	25	20-25 m	High	High	High	N
143	Alive	Sugar Maple	*Acer saccharum*	47	0	0	0	0	0	20	20-25 m	High	High	High	N
144	Alive	Basswood	*Tilia americana*	22	0	0	0	0	0	10	15-20 m	High	Medium	High	N
145	Alive	Basswood	*Tilia americana*	28	15	0	0	0	0	12	20-25 m	High	High	High	N
146	Alive	Basswood	*Tilia americana*	37	32	30	27	22	0	12	15-20 m	Low	Low	Medium	N
147	Alive	Basswood	*Tilia americana*	52	49	16	0	0	0	18	20-25 m	Medium	High	High	N
148	Alive	Sugar Maple	*Acer saccharum*	33	28	0	0	0	0	8	20-25 m	Low	Low	Medium	N
150	Alive	Black Walnut	*Juglans nigra*	36	0	0	0	0	0	11	20-25 m	High	High	High	N
151	Alive	Black Walnut	*Juglans nigra*	29	0	0	0	0	0	12	15-20 m	High	High	High	N
152	Alive	Willow Species	*Salix sp*	48	0	0	0	0	0	18	20-25 m	Medium	Medium	Low	G
153	Alive	Willow Species	*Salix sp*	85	0	0	0	0	0	6	05-10 m	Low	Low	Low	G
154	Alive	Willow Species	*Salix sp*	110	0	0	0	0	0	12	20-25 m	Medium	High	Low	G
155	Alive	Basswood	*Tilia americana*	21	20	0	0	0	0	11	15-20 m	Medium	High	High	N
156	Alive	Basswood	*Tilia americana*	15	12	6	0	0	0	7	15-20 m	Medium	High	High	N
157	Alive	Basswood	*Tilia americana*	20	7	0	0	0	0	10	15-20 m	High	High	High	N
158	Alive	Basswood	*Tilia americana*	25	0	0	0	0	0	9	15-20 m	High	Medium	High	N
159	Alive	Basswood	*Tilia americana*	25	22	20	10	0	0	12	15-20 m	Medium	Medium	High	N
160	Alive	Basswood	*Tilia americana*	10	9	3	0	0	0	4	05-10 m	Medium	Medium	High	N
161	Alive	Basswood	*Tilia americana*	22	20	0	0	0	0	5	15-20 m	Medium	Medium	High	N
162	Alive	Basswood	*Tilia americana*	37	0	0	0	0	0	8	15-20 m	High	High	High	N
163	Alive	Basswood	*Tilia americana*	20	0	0	0	0	0	8	10-15 m	Low	Medium	Medium	N
164	Alive	Sugar Maple	*Acer saccharum*	14	0	0	0	0	0	7	15-20 m	Medium	High	High	N
165	Alive	Basswood	*Tilia americana*	71	17	0	0	0	0	9	15-20 m	Low	Low	High	N
166	Alive	Sugar Maple	*Acer saccharum*	30	0	0	0	0	0	10	15-20 m	High	High	High	N
167	Alive	Basswood	*Tilia americana*	29	0	0	0	0	0	10	15-20 m	High	High	High	N
168	Alive	Basswood	*Tilia americana*	23	0	0	0	0	0	7	05-10 m	Low	Low	Medium	N
169	Alive	Sugar Maple	*Acer saccharum*	44	0	0	0	0	0	12	15-20 m	High	High	High	N
170	Alive	Sugar Maple	*Acer saccharum*	15	0	0	0	0	0	8	10-15 m	High	High	High	N
171	Alive	Sugar Maple	*Acer saccharum*	19	0	0	0	0	0	9	15-20 m	High	Medium	High	N
172	Alive	Sugar Maple	*Acer saccharum*	46	0	0	0	0	0	16	20-25 m	Medium	Medium	High	N
173	Alive	Basswood	*Tilia americana*	35	21	10	10	0	0	13	15-20 m	Medium	Medium	High	N
174	Alive	Black Walnut	*Juglans nigra*	32	0	0	0	0	0	12	20-25 m	High	High	High	N
175	Alive	Sugar Maple	*Acer saccharum*	34	0	0	0	0	0	16	20-25 m	High	High	High	N
176	Alive	Basswood	*Tilia americana*	33	0	0	0	0	0	10	15-20 m	High	High	High	N
177	Alive	Sugar Maple	*Acer saccharum*	11	0	0	0	0	0	8	05-10 m	High	High	High	N
178	Alive	Sugar Maple	*Acer saccharum*	17	0	0	0	0	0	7	10-15 m	High	High	High	N
179	Alive	Basswood	*Tilia americana*	38	30	12	12	0	0	8	15-20 m	Medium	Medium	Medium	N
180	Alive	Basswood	*Tilia americana*	35	35	33	24	10	0	15	20-25 m	Medium	High	High	N
181	Alive	Black Walnut	*Juglans nigra*	27	0	0	0	0	0	12	15-20 m	High	High	High	N
182	Alive	Black Walnut	*Juglans nigra*	34	0	0	0	0	0	12	15-20 m	High	High	High	N
183	Alive	Black Walnut	*Juglans nigra*	24	0	0	0	0	0	9	15-20 m	Medium	High	High	N
184	Alive	Black Walnut	*Juglans nigra*	25	0	0	0	0	0	10	15-20 m	Medium	Medium	Medium	N
185	Alive	Black Walnut	*Juglans nigra*	26	0	0	0	0	0	10	15-20 m	Medium	High	High	N
186	Alive	Basswood	*Tilia americana*	26	0	0	0	0	0	10	15-20 m	Medium	Medium	High	N
187	Dead	Unknown	*Unknown*	15	0	0	0	0	0	5	03-05 m	Dead	Dead	Low	Unknown (dead)
188	Dead	Unknown	*Unknown*	24	0	0	0	0	0	6	10-15 m	Dead	Dead	Low	Unknown (dead)
189	Dead	Unknown	*Unknown*	25	22	17	0	0	0	5	15-20 m	Dead	Dead	Low	Unknown (dead)
190	Alive	Black Walnut	*Juglans nigra*	30	0	0	0	0	0	10	15-20 m	High	High	High	N
191	Alive	Black Walnut	*Juglans nigra*	28	0	0	0	0	0	10	15-20 m	Medium	Medium	High	N
192	Alive	Black Walnut	*Juglans nigra*	14	0	0	0	0	0	5	15-20 m	Medium	Medium	High	N
193	Alive	Black Walnut	*Juglans nigra*	35	0	0	0	0	0	15	15-20 m	Medium	High	High	N
194	Alive	Basswood	*Tilia americana*	28	20	20	8	0	0	12	10-15 m	Medium	Medium	Medium	N
195	Alive	Basswood	*Tilia americana*	22	14	0	0	0	0	10	15-20 m	Medium	Medium	High	N
196	Dead	Basswood	*Tilia americana*	26	0	0	0	0	0	8	10-15 m	Dead	Dead	Low	N
197	Alive	Basswood	*Tilia americana*	31	30	21	17	10	10	12	15-20 m	Low	Low	Medium	N
198	Alive	Basswood	*Tilia americana*	16	0	0	0	0	0	7	10-15 m	Low	Low	Low	N
199	Alive	Black Walnut	*Juglans nigra*	28	0	0	0	0	0	10	15-20 m	Medium	High	High	N
200	Alive	Basswood	*Tilia americana*	40	0	0	0	0	0	10	15-20 m	High	High	High	N
201	Alive	Basswood	*Tilia americana*	12	0	0	0	0	0	6	10-15 m	Medium	Medium	High	N
202	Alive	Basswood	*Tilia americana*	20	18	6	0	0	0	8	15-20 m	Medium	Medium	Medium	N
203	Dead	Unknown	*Unknown*	19	0	0	0	0	0	0	10-15 m	Dead	Dead	Low	Unknown (dead)
204	Alive	Basswood	*Tilia americana*	50	20	19	19	18	17	16	15-20 m	Medium	High	High	N
205	Alive	Black Walnut	*Juglans nigra*	17	0	0	0	0	0	6	10-15 m	High	High	High	N
206	Alive	Basswood	*Tilia americana*	17	15	15	8	5	5	10	10-15 m	Medium	Medium	High	N
207	Alive	Black Walnut	*Juglans nigra*	49	0	0	0	0	0	15	20-25 m	High	High	High	N
208	Alive	Basswood	*Tilia americana*	29	0	0	0	0	0	10	15-20 m	High	High	High	N
209	Alive	Basswood	*Tilia americana*	23	20	19	7	0	0	9	10-15 m	Medium	Medium	Medium	N
210	Alive	Black Walnut	*Juglans nigra*	25	0	0	0	0	0	11	15-20 m	Medium	High	High	N
211	Alive	Black Walnut	*Juglans nigra*	35	0	0	0	0	0	15	15-20 m	Medium	High	High	N
212	Alive	Black Walnut	*Juglans nigra*	16	0	0	0	0	0	7	10-15 m	High	High	High	N
213	Alive	Basswood	*Tilia americana*	45	32	20	15	5	0	15	15-20 m	Low	Low	Low	N
214	Alive	White Ash	*Fraxinus americana*	14	0	0	0	0	0	3	10-15 m	Low	Low	Low	N
215	Alive	Basswood	*Tilia americana*	19	0	0	0	0	0	8	10-15 m	Medium	Medium	High	N
216	Dead	Unknown	*Unknown*	21	0	0	0	0	0	0	05-10 m	Dead	Dead	Low	Unknown (dead)
217	Alive	Basswood	*Tilia americana*	21	0	0	0	0	0	8	10-15 m	High	High	High	N
218	Alive	Basswood	*Tilia americana*	25	8	7	0	0	0	8	15-20 m	High	High	High	N
219	Alive	Black Walnut	*Juglans nigra*	37	0	0	0	0	0	15	20-25 m	High	High	High	N
220	Dead	Unknown	*Unknown*	17	0	0	0	0	0	0	05-10 m	Dead	Dead	Low	Unknown (dead)
221	Alive	Basswood	*Tilia americana*	32	20	7	0	0	0	10	10-15 m	Medium	High	High	N
222	Alive	Black Cherry	*Prunus serotina*	25	0	0	0	0	0	0	10-15 m	Low	Low	Low	N
223	Alive	Basswood	*Tilia americana*	37	35	15	13	13	10	12	15-20 m	Medium	High	High	N
224	Dead	Cherry Species	*Prunus sp*	19	0	0	0	0	0	0	03-05 m	Dead	Dead	Low	G
225	Alive	Black Walnut	*Juglans nigra*	30	0	0	0	0	0	9	15-20 m	High	High	High	N
226	Alive	White Ash	*Fraxinus americana*	16	0	0	0	0	0	8	10-15 m	Medium	Low	Low	N
227	Alive	Hawthorn Species	*Crataegus sp*	20	10	5	0	0	0	6	05-10 m	Low	Low	High	G
228	Alive	Basswood	*Tilia americana*	43	23	17	15	8	5	10	15-20 m	Low	Medium	Medium	N
229	Alive	Black Walnut	*Juglans nigra*	34	0	0	0	0	0	12	15-20 m	High	High	High	N
230	Alive	Hawthorn Species	*Crataegus sp*	16	8	0	0	0	0	7	05-10 m	Medium	Medium	High	G
231	Alive	Basswood	*Tilia americana*	11	0	0	0	0	0	8	10-15 m	High	High	High	N
232	Alive	Basswood	*Tilia americana*	26	17	10	10	0	0	10	10-15 m	Medium	Medium	High	N
233	Alive	White Ash	*Fraxinus americana*	14	0	0	0	0	0	3	10-15 m	Low	Low	Low	N
234	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	8	10-15 m	High	High	High	N
235	Alive	Basswood	*Tilia americana*	17	12	0	0	0	0	10	15-20 m	Medium	High	High	N
236	Dead	Black Cherry	*Prunus serotina*	70	0	0	0	0	0	0	25+ m	Dead	Dead	High	N

Appendix J. Tree Data Table
Upper James EA

Tree Tag #	Tree Status	Common Name	Scientific Name	DBH1 [1] (cm)	DBH2 (cm)	DBH3 (cm)	DBH4 (cm)	DBH5 (cm)	DBH6 (cm)	Crown Reserve [2] (m)	Height [3] (m)	Structural Condition[4]	Biological Health[5]	Preservation Priority[6]	Native Status [7]
237	Alive	Basswood	*Tilia americana*	22	18	0	0	0	0	8	10-15 m	Medium	High	High	N
238	Alive	Basswood	*Tilia americana*	16	12	0	0	0	0	5	05-10 m	Medium	Medium	Medium	N
239	Alive	Sugar Maple	*Acer saccharum*	41	0	0	0	0	0	20	20-25 m	High	High	High	N
240	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	7	10-15 m	High	High	High	N
241	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	5	10-15 m	High	Medium	High	N
242	Alive	Black Walnut	*Juglans nigra*	22	0	0	0	0	0	8	15-20 m	High	High	High	N
243	Alive	Basswood	*Tilia americana*	80	40	32	30	0	0	18	15-20 m	Medium	Medium	High	N
244	Alive	Basswood	*Tilia americana*	11	5	0	0	0	0	7	10-15 m	High	High	High	N
245	Alive	Basswood	*Tilia americana*	52	40	21	10	0	0	16	15-20 m	Medium	Medium	High	N
246	Alive	Black Cherry	*Prunus serotina*	15	0	0	0	0	0	6	10-15 m	High	Low	High	N
247	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	6	10-15 m	High	High	High	N
248	Alive	Basswood	*Tilia americana*	13	0	0	0	0	0	8	10-15 m	High	High	High	N
249	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	6	10-15 m	High	High	High	N
250	Alive	Black Walnut	*Juglans nigra*	32	0	0	0	0	0	10	20-25 m	High	High	High	N
251	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	7	10-15 m	Medium	High	High	N
252	Alive	Basswood	*Tilia americana*	11	0	0	0	0	0	6	10-15 m	High	High	High	N
253	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	6	10-15 m	High	High	High	N
254	Alive	Basswood	*Tilia americana*	24	8	0	0	0	0	8	10-15 m	High	Medium	High	N
255	Alive	Basswood	*Tilia americana*	22	7	6	0	0	0	8	15-20 m	High	High	High	N
256	Alive	Basswood	*Tilia americana*	32	10	0	0	0	0	8	15-20 m	High	High	High	N
257	Alive	Basswood	*Tilia americana*	19	0	0	0	0	0	8	15-20 m	High	High	High	N
258	Alive	Basswood	*Tilia americana*	48	11	0	0	0	0	9	15-20 m	Medium	High	High	N
259	Alive	Basswood	*Tilia americana*	15	0	0	0	0	0	7	10-15 m	High	High	High	N
260	Alive	Basswood	*Tilia americana*	41	40	35	19	15	8	18	10-15 m	Low	High	High	N
261	Alive	Basswood	*Tilia americana*	43	31	0	0	0	0	16	15-20 m	Low	Low	Medium	N
262	Alive	Basswood	*Tilia americana*	32	28	0	0	0	0	13	15-20 m	Low	High	High	N
263	Alive	Black Walnut	*Juglans nigra*	34	0	0	0	0	0	13	15-20 m	High	Medium	High	N
264	Alive	Black Walnut	*Juglans nigra*	20	0	0	0	0	0	10	15-20 m	Medium	High	High	N
265	Alive	Black Walnut	*Juglans nigra*	21	0	0	0	0	0	6	15-20 m	Medium	High	High	N
266	Alive	Basswood	*Tilia americana*	43	23	0	0	0	0	12	15-20 m	High	High	High	N
267	Alive	White Elm	*Ulmus americana*	13	0	0	0	0	0	6	10-15 m	Medium	Low	Medium	N
268	Alive	Basswood	*Tilia americana*	42	0	0	0	0	0	10	15-20 m	Low	Medium	Medium	N
269	Alive	Basswood	*Tilia americana*	40	28	24	8	8	0	16	15-20 m	Medium	High	High	N
270	Alive	Hawthorn Species	*Crataegus sp*	18	0	0	0	0	0	5	05-10 m	High	Medium	High	G
271	Alive	Basswood	*Tilia americana*	32	0	0	0	0	0	9	10-15 m	Medium	Medium	High	N
272	Alive	Basswood	*Tilia americana*	14	14	13	11	0	0	6	10-15 m	Medium	High	High	N
273	Alive	Basswood	*Tilia americana*	47	17	0	0	0	0	10	10-15 m	Low	Low	Low	N
274	Alive	Basswood	*Tilia americana*	20	0	0	0	0	0	8	15-20 m	High	High	High	N
275	Alive	Basswood	*Tilia americana*	30	0	0	0	0	0	12	15-20 m	High	High	High	N
276	Dead	Unknown	*Unknown*	39	0	0	0	0	0	0	15-20 m	Dead	Dead	Low	Unknown (dead)
277	Alive	Basswood	*Tilia americana*	20	8	0	0	0	0	6	10-15 m	Medium	High	High	N
278	Alive	Black Walnut	*Juglans nigra*	56	0	0	0	0	0	18	20-25 m	Medium	High	High	N
279	Alive	Basswood	*Tilia americana*	37	0	0	0	0	0	15	15-20 m	Low	Medium	High	N
280	Alive	Basswood	*Tilia americana*	11	6	5	0	0	0	8	10-15 m	High	High	High	N
281	Alive	Basswood	*Tilia americana*	16	11	9	9	0	0	10	15-20 m	Medium	High	High	N
282	Alive	Basswood	*Tilia americana*	12	5	0	0	0	0	6	05-10 m	Medium	Medium	High	N
283	Alive	Basswood	*Tilia americana*	11	0	0	0	0	0	8	05-10 m	High	High	High	N
284	Alive	Black Walnut	*Juglans nigra*	15	0	0	0	0	0	6	15-20 m	High	High	High	N
285	Alive	Basswood	*Tilia americana*	16	0	0	0	0	0	8	15-20 m	High	High	High	N
286	Alive	Black Cherry	*Prunus serotina*	22	0	0	0	0	0	6	15-20 m	Low	Low	Low	N
287	Alive	Basswood	*Tilia americana*	40	34	26	17	9	0	16	15-20 m	Medium	High	High	N
288	Alive	Hawthorn Species	*Crataegus sp*	11	5	3	3	0	0	8	05-10 m	High	High	High	G
289	Dead	Black Cherry	*Prunus serotina*	25	7	0	0	0	0	0	05-10 m	Dead	Dead	Low	N
290	Alive	Basswood	*Tilia americana*	39	32	18	15	7	7	14	15-20 m	Low	Medium	High	N
291	Alive	Basswood	*Tilia americana*	12	3	0	0	0	0	9	10-15 m	High	High	High	N
292	Alive	Black Walnut	*Juglans nigra*	13	0	0	0	0	0	8	10-15 m	Medium	High	High	N
293	Alive	Black Walnut	*Juglans nigra*	18	0	0	0	0	0	8	10-15 m	Medium	High	High	N
294	Alive	Black Walnut	*Juglans nigra*	25	0	0	0	0	0	8	15-20 m	Medium	Medium	High	N
295	Alive	Basswood	*Tilia americana*	14	7	6	0	0	0	10	10-15 m	Low	Medium	Medium	N
296	Alive	Basswood	*Tilia americana*	27	0	0	0	0	0	12	15-20 m	Medium	Medium	High	N
297	Alive	Basswood	*Tilia americana*	13	13	0	0	0	0	8	10-15 m	High	High	High	N
298	Dead	Unknown	*Unknown*	26	0	0	0	0	0	0	10-15 m	Dead	Dead	Low	Unknown (dead)
299	Alive	Basswood	*Tilia americana*	20	3	3	0	0	0	7	10-15 m	High	Medium	High	N
300	Alive	Dotted Hawthorn	*Crataegus punctata*	19	0	0	0	0	0	7	10-15 m	High	High	High	N
301.1	Alive	Basswood	*Tilia americana*	45	22	14	12	8	0	12	15-20 m	Low	High	High	N
301.2	Alive	Goat Willow	*Salix caprea*	14	0	0	0	0	0	3	03-05	Low	Medium	Medium	I
302.1	Alive	Basswood	*Tilia americana*	13	7	0	0	0	0	10	10-15 m	High	High	High	N
302.2	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	4	03-05	Medium	High	High	N
303.1	Alive	Black Walnut	*Juglans nigra*	24	0	0	0	0	0	12	15-20 m	High	High	High	N
303.2	Alive	Goat Willow	*Salix caprea*	20	12	9	8	7	0	5	05-10	Low	High	Medium	I
304.1	Alive	Dotted Hawthorn	*Crataegus punctata*	22	0	0	0	0	0	7	10-15 m	Low	High	High	N
304.2	Alive	Hawthorn Species	*Crataegus sp*	11	5	0	0	0	0	3	03-05	Low	Medium	Medium	G
305.1	Alive	Basswood	*Tilia americana*	39	23	17	14	13	13	14	10-15 m	Medium	High	High	N
305.2	Alive	Hawthorn Species	*Crataegus sp*	13	9	4	0	0	0	4	05-10	Medium	Medium	High	G
306.1	Alive	Black Walnut	*Juglans nigra*	30	0	0	0	0	0	8	15-20 m	Medium	High	High	N
306.2	Alive	Hawthorn Species	*Crataegus sp*	17	15	0	0	0	0	4	05-10	Medium	High	High	G
307.1	Alive	Basswood	*Tilia americana*	38	32	14	4	0	0	15	15-20 m	Medium	High	High	N
307.2	Alive	Hawthorn Species	*Crataegus sp*	24	18	0	0	0	0	3	05-10	Medium	High	High	G
308	Alive	Black Walnut	*Juglans nigra*	38	0	0	0	0	0	12	15-20 m	Medium	Medium	High	N
309.1	Alive	Basswood	*Tilia americana*	26	3	0	0	0	0	10	05-10 m	Low	Medium	Medium	N
309.2	Alive	Hawthorn Species	*Crataegus sp*	17	0	0	0	0	0	4	05-10	Medium	High	High	G
310.1	Alive	Dotted Hawthorn	*Crataegus punctata*	23	20	0	0	0	0	7	10-15 m	Low	Low	High	N
310.2	Alive	Hawthorn Species	*Crataegus sp*	17	0	0	0	0	0	4	05-10	High	Medium	Medium	G
311.1	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	8	15-20 m	Medium	Medium	High	N
311.2	Alive	Hawthorn Species	*Crataegus sp*	22	0	0	0	0	0	3	05-10	Medium	High	High	G
312.1	Dead	Hawthorn Species	*Crataegus sp*	13	10	0	0	0	0	0	05-10 m	Dead	Dead	Low	G
312.2	Alive	Hawthorn Species	*Crataegus sp*	22	0	0	0	0	0	4	10-15	Medium	High	High	G
313.1	Alive	Basswood	*Tilia americana*	36	14	0	0	0	0	10	10-15 m	Low	Medium	Medium	N
313.2	Alive	Hawthorn Species	*Crataegus sp*	12	0	0	0	0	0	3	05-10	Medium	Medium	Medium	G
314.1	Alive	Black Walnut	*Juglans nigra*	23	0	0	0	0	0	12	15-20 m	High	High	High	N
314.2	Alive	Hawthorn Species	*Crataegus sp*	14	0	0	0	0	0	4	05-10	Medium	High	High	G
315.1	Alive	Black Walnut	*Juglans nigra*	35	0	0	0	0	0	12	15-20 m	High	High	High	N
315.2	Alive	Hawthorn Species	*Crataegus sp*	13	0	0	0	0	0	3	05-10	Medium	High	High	G
316.1	Dead	Unknown	*Unknown*	29	19	0	0	0	0	0	05-10 m	Dead	Dead	Low	Unknown (dead)
316.2	Alive	Hawthorn Species	*Crataegus sp*	17	4	0	0	0	0	4	05-10	Medium	Medium	Medium	G
317.1	Alive	Basswood	*Tilia americana*	30	26	23	0	0	0	5	05-10 m	Low	Low	Low	N
317.2	Alive	Hawthorn Species	*Crataegus sp*	18	5	4	0	0	0	4	05-10	Medium	High	High	G
318.1	Alive	Black Walnut	*Juglans nigra*	20	0	0	0	0	0	5	10-15 m	High	High	High	N
318.2	Alive	Hawthorn Species	*Crataegus sp*	36	10	21	19	0	0	6	10-15	Medium	High	High	G
319.1	Alive	Black Walnut	*Juglans nigra*	33	0	0	0	0	0	12	10-15 m	High	High	High	N
319.2	Alive	Hawthorn Species	*Crataegus sp*	15	17	8	0	0	0	5	05-10	Medium	High	High	G
320.1	Alive	Basswood	*Tilia americana*	14	0	0	0	0	0	3	03-05 m	Low	Low	Low	N
320.2	Alive	Dotted Hawthorn	*Crataegus punctata*	28	35	27	34	27	14	9	10-15	Medium	High	High	N
321.1	Alive	Trembling Aspen	*Populus tremuloides*	23	0	0	0	0	0	5	10-15 m	High	High	High	N
321.2	Alive	Goat Willow	*Salix caprea*	15	15	10	8	8	10	6	05-10	Low	Medium	Low	I
322.1	Alive	Black Walnut	*Juglans nigra*	43	0	0	0	0	0	9	10-15 m	Low	Low	Low	N

Appendix J. Tree Data Table
Upper James EA

Tree Tag #	Tree Status	Common Name	Scientific Name	DBH1 [1] (cm)	DBH2 (cm)	DBH3 (cm)	DBH4 (cm)	DBH5 (cm)	DBH6 (cm)	Crown Reserve [2] (m)	Height [3] (m)	Structural Condition[4]	Biological Health[5]	Preservation Priority[6]	Native Status [7]
322.2	Alive	Dotted Hawthorn	*Crataegus punctata*	21	10	11	10	0	0	5	05-10	Medium	High	High	N
323.1	Alive	Basswood	*Tilia americana*	38	26	8	0	0	0	8	05-10 m	Low	Medium	Low	N
323.2	Alive	Black Cherry	*Prunus serotina*	30	32	0	0	0	0	10	05-10 m	Low	Low	Medium	N
324.1	Alive	Basswood	*Tilia americana*	37	0	0	0	0	0	8	10-15 m	Medium	Medium	Medium	N
324.2	Alive	Black Walnut	*Juglans nigra*	23	0	0	0	0	0	6	10-15	High	High	High	N
325	Alive	Basswood	*Tilia americana*	54	25	0	0	0	0	8	10-15 m	High	High	High	N
326	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	4	03-05 m	Medium	Medium	Medium	N
327	Alive	Basswood	*Tilia americana*	40	39	34	0	0	0	10	10-15 m	High	High	High	N
328	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	3	03-05 m	Medium	High	High	N
329	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	3	05-10 m	Low	Medium	Low	N
330	Alive	Basswood	*Tilia americana*	17	13	0	0	0	0	6	05-10 m	Low	Medium	Medium	N
331	Alive	Basswood	*Tilia americana*	25	18	0	0	0	0	7	10-15 m	Medium	High	High	N
332	Alive	Basswood	*Tilia americana*	31	14	12	12	9	7	8	05-10 m	Medium	Medium	Medium	N
333	Alive	Basswood	*Tilia americana*	28	17	14	6	0	0	7	05-10 m	Medium	High	High	N
334	Alive	Basswood	*Tilia americana*	14	9	7	0	0	0	4	05-10 m	Medium	Medium	Medium	N
335	Alive	Black Walnut	*Juglans nigra*	40	0	0	0	0	0	10	10-15 m	Medium	Medium	Medium	N
336	Dead	Basswood	*Tilia americana*	13	12	9	0	0	0	0	03-05 m	Dead	Dead	Low	N
337	Alive	Dotted Hawthorn	*Crataegus punctata*	10	0	0	0	0	0	4	05-10 m	Medium	Medium	Medium	N
338	Alive	Black Walnut	*Juglans nigra*	17	0	0	0	0	0	7	10-15 m	High	High	High	N
339	Alive	Basswood	*Tilia americana*	35	14	0	0	0	0	9	10-15 m	Medium	High	High	N
340	Alive	Basswood	*Tilia americana*	43	18	0	0	0	0	10	10-15 m	Medium	Medium	Medium	N
341	Alive	Basswood	*Tilia americana*	17	17	0	0	0	0	6	10-15 m	Medium	High	High	N
342	Alive	Basswood	*Tilia americana*	18	0	0	0	0	0	6	05-10 m	Low	Medium	Low	N
343	Alive	Basswood	*Tilia americana*	29	0	0	0	0	0	8	10-15 m	Medium	High	High	N
344	Alive	Basswood	*Tilia americana*	24	13	9	0	0	0	9	10-15 m	Medium	High	High	N
345	Alive	Basswood	*Tilia americana*	24	21	20	16	0	0	10	10-15 m	Medium	High	High	N
346	Alive	Basswood	*Tilia americana*	41	14	7	6	0	0	8	10-15 m	Medium	Medium	Medium	N
347	Alive	Black Walnut	*Juglans nigra*	24	0	0	0	0	0	7	10-15 m	Medium	High	High	N
348	Alive	Black Walnut	*Juglans nigra*	26	0	0	0	0	0	8	10-15 m	High	High	High	N
349	Alive	Black Walnut	*Juglans nigra*	11	0	0	0	0	0	3	05-10 m	Low	Low	Low	N
350	Alive	Black Walnut	*Juglans nigra*	22	0	0	0	0	0	6	10-15 m	Medium	Medium	Medium	N
351	Alive	Black Walnut	*Juglans nigra*	20	0	0	0	0	0	6	05-10 m	Medium	Low	Low	N
352	Alive	Basswood	*Tilia americana*	14	12	11	10	0	0	5	05-10 m	Medium	Medium	Medium	N
353	Alive	Basswood	*Tilia americana*	20	20	19	18	11	0	5	05-10 m	Low	Medium	Medium	N
354	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	4	05-10 m	Medium	High	High	N
355	Alive	Basswood	*Tilia americana*	20	4	3	0	0	0	4	05-10 m	Medium	High	High	N
356	Alive	Basswood	*Tilia americana*	14	0	0	0	0	0	4	05-10 m	Medium	Medium	Medium	N
357	Alive	Basswood	*Tilia americana*	21	16	12	6	0	0	7	10-15 m	Medium	Medium	Low	N
358	Alive	Basswood	*Tilia americana*	11	8	4	0	0	0	6	05-10 m	Low	Low	Low	N
359	Alive	Black Walnut	*Juglans nigra*	16	0	0	0	0	0	6	10-15 m	Medium	High	Medium	N
360	Alive	Basswood	*Tilia americana*	17	8	0	0	0	0	6	05-10 m	Medium	High	High	N
361	Alive	Basswood	*Tilia americana*	60	0	0	0	0	0	10	10-15 m	High	High	High	N
362	Alive	Basswood	*Tilia americana*	10	9	8	6	0	0	5	05-10 m	Low	Low	Low	N
363	Alive	Black Walnut	*Juglans nigra*	11	0	0	0	0	0	5	05-10 m	Medium	High	High	N
364	Alive	Basswood	*Tilia americana*	11	10	8	0	0	0	4	03-05 m	Low	Medium	Medium	N
365	Alive	Basswood	*Tilia americana*	30	9	7	5	0	0	10	10-15 m	Medium	High	High	N
366	Alive	Basswood	*Tilia americana*	32	18	8	8	6	6	8	10-15 m	Medium	High	High	N
367	Alive	Basswood	*Tilia americana*	10	7	6	0	0	0	4	05-10 m	Low	Medium	Medium	N
368	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	4	05-10 m	Medium	Medium	Medium	N
369	Alive	Basswood	*Tilia americana*	24	0	0	0	0	0	9	05-10 m	Low	Medium	Low	N
370	Alive	Basswood	*Tilia americana*	11	0	0	0	0	0	5	05-10 m	Medium	Medium	Medium	N
371	Alive	Basswood	*Tilia americana*	25	0	0	0	0	0	9	05-10 m	Medium	High	High	N
372	Alive	Black Walnut	*Juglans nigra*	85	0	0	0	0	0	11	10-15 m	Medium	Medium	Medium	N
373	Alive	Basswood	*Tilia americana*	10	0	0	0	0	0	6	05-10 m	Medium	Medium	Medium	N
374	Alive	Basswood	*Tilia americana*	19	0	0	0	0	0	6	10-15 m	High	High	High	N
375	Alive	Basswood	*Tilia americana*	11	6	4	4	3	0	6	05-10 m	Medium	Medium	Medium	N
376	Alive	Basswood	*Tilia americana*	16	15	14	0	0	0	8	05-10 m	Medium	High	High	N
377	Alive	Basswood	*Tilia americana*	20	9	0	0	0	0	5	10-15 m	Medium	Medium	Medium	N
378	Alive	Basswood	*Tilia americana*	35	34	11	9	0	0	10	10-15 m	Low	Medium	Medium	N
379	Alive	(Salix alba X Salix euxina)	*Salix x fragilis*	56	56	45	33	22	20	11	10-15 m	Medium	Medium	Medium	I
380	Alive	Black Walnut	*Juglans nigra*	22	0	0	0	0	0	6	05-10 m	High	High	High	N
381	Alive	Black Walnut	*Juglans nigra*	13	0	0	0	0	0	5	05-10 m	High	High	High	N
383	Alive	Black Walnut	*Juglans nigra*	39	0	0	0	0	0	5	05-10 m	Low	Low	TBD	N
384	Alive	Black Walnut	*Juglans nigra*	12	4	0	0	0	0	5	05-10 m	High	High	TBD	N
385	Alive	Black Walnut	*Juglans nigra*	16	0	0	0	0	0	5	05-10 m	High	High	High	N
386	Alive	Slippery Elm	*Ulmus rubra*	22	0	0	0	0	0	2	05-10 m	Medium	High	Medium	N
387	Alive	Black Cherry	*Prunus serotina*	21	12	7	0	0	0	0	05-10 m	Low	Low	TBD	N
388	Alive	Black Walnut	*Juglans nigra*	12	0	0	0	0	0	4	05-10 m	High	High	High	N
389	Alive	Black Walnut	*Juglans nigra*	15	10	0	0	0	0	5	05-10 m	Low	Medium	Medium	N
390	Alive	Sugar Maple	*Acer saccharum*	37	0	0	0	0	0	2	05-10 m	Low	Low	Low	N
391	Alive	Black Walnut	*Juglans nigra*	20	0	0	0	0	0	4	05-10 m	High	High	High	N
392	Alive	Sugar Maple	*Acer saccharum*	61	0	0	0	0	0	8	10-15 m	Medium	Low	Medium	N
393	Alive	Sugar Maple	*Acer saccharum*	45	0	0	0	0	0	7	10-15 m	Medium	Low	Medium	N
394	Alive	Sugar Maple	*Acer saccharum*	37	0	0	0	0	0	6	10-15 m	Medium	Low	Medium	N
395	Alive	Common Apple	*Malus pumila*	10	10	7	4	0	0	5	03-05 m	Medium	Medium	Low	I
396	Alive	Sugar Maple	*Acer saccharum*	50	0	0	0	0	0	6	05-10 m	Medium	Low	Medium	N
397	Alive	Black Walnut	*Juglans nigra*	36	26	0	0	0	0	10	05-10 m	Medium	High	High	N
398	Alive	Black Walnut	*Juglans nigra*	17	0	0	0	0	0	3	05-10 m	Low	Medium	Medium	N
399	Alive	Black Walnut	*Juglans nigra*	40	0	0	0	0	0	8	10-15 m	Medium	Medium	Medium	N
401	Alive	Black Walnut	*Juglans nigra*	16	0	0	0	0	0	5	05-10 m	Medium	Low	Low	N
402	Alive	Black Walnut	*Juglans nigra*	19	0	0	0	0	0	5	05-10 m	Medium	Low	Low	N
403	Alive	Black Walnut	*Juglans nigra*	22	6	0	0	0	0	5	05-10 m	Low	Medium	Medium	N
404	Alive	Norway Maple	*Acer platanoides*	46	0	0	0	0	0	7	10-15 m	Medium	Medium	Medium	I
406	Alive	Norway Maple	*Acer platanoides*	19	0	0	0	0	0	3	05-10 m	Low	Low	Low	I
407	Alive	Black Walnut	*Juglans nigra*	46	0	0	0	0	0	6	10-15 m	Medium	High	High	N
408	Alive	Black Walnut	*Juglans nigra*	42	31	25	0	0	0	7	10-15 m	Medium	High	High	N
409	Alive	Black Walnut	*Juglans nigra*	46	41	0	0	0	0	10	10-15 m	Medium	High	High	N
410	Alive	Black Walnut	*Juglans nigra*	24	0	0	0	0	0	5	05-10 m	Medium	High	High	N
411	Dead	Unknown	*Unknown*	13	5	5	0	0	0	0	03-05 m	Dead	Dead	Low	Unknown (dead)
412	Alive	Basswood	*Tilia americana*	23	0	0	0	0	0	10	05-10 m	Medium	High	High	N
992	Alive	Black Walnut	*Juglans nigra*	75	0	0	0	0	0	14	15-20 m	High	High	High	N
993	Alive	Black Walnut	*Juglans nigra*	62	61	54	0	0	0	16	15-20 m	Medium	High	High	N
994	Alive	Black Walnut	*Juglans nigra*	26	0	0	0	0	0	8	10-15 m	High	High	High	N
995	Alive	Black Walnut	*Juglans nigra*	45	0	0	0	0	0	10	10-15 m	High	High	High	N
996	Alive	Black Walnut	*Juglans nigra*	82	21	0	0	0	0	16	15-20 m	Medium	Low	Medium	N
997	Alive	Black Walnut	*Juglans nigra*	67	0	0	0	0	0	14	15-20 m	High	High	High	N
998	Alive	Black Walnut	*Juglans nigra*	28	0	0	0	0	0	8	05-10 m	Medium	Medium	Medium	N
999	Alive	Black Walnut	*Juglans nigra*	86	0	0	0	0	0	10	15-20 m	Medium	High	High	N
1000	Alive	Black Walnut	*Juglans nigra*	71	0	0	0	0	0	14	15-20 m	Medium	Medium	Medium	N

Tree Assessment Criteria

1. DBH (cm): Diameter at breast height, 1.4 m above ground, measured in centimetres.

2. Crown Reserve (m): Crown diameter (tree's canopy) measured at intervals of 1, 3, 5, 7.5, 10, 15 metres

3. Height (m): Height of tree from ground to top of crown.

Tree Tag #	Tree Status	Common Name	Scientific Name	DBH1 [1] (cm)	DBH2 (cm)	DBH3 (cm)	DBH4 (cm)	DBH5 (cm)	DBH6 (cm)	Crown Reserve [2] (m)	Height [3] (m)	Structural Condition[4]	Biological Health[5]	Preservation Priority[6]	Native Status [7]

4. Structural Condition: Related to defects in a tree's structure, (i.e., lean, codominant trunks).
   High - No structural defects, well-developed crown.
   Medium - Presence of minor structural defects.
   Low - Presence of major structural defects including drastic leans and imminent branch and/or trunk failure.

5. Biological Health: Related to presence and extent of disease/disease symptoms and the vigour of the tree.
   High - No diseases/disease symptoms present, and moderate to high vigour.
   Medium - Presence of minor diseases/disease symptoms, and/or moderate vigour.
   Low - Presence of major diseases/disease symptoms, (i.e., extensive crown dieback), and/or severely poor vigour.

6. Preservation Priority: A rating of each tree's projected survival related to existing conditions.
   High - High to moderate biological health, and well developed crown. Well suited as a shade tree or screen planting. Will survive existing conditions indefinitely.
   Medium - One or more moderate to severe defects in biological health and/or structural condition. Marginally suited as a shade tree or screen planting. Can survive at least 3 - 5 years under existing conditions.
   This category also includes stock planted within past 2 years that is not yet established.
   Low - Low biological health and/or severely damaged/defective structural condition, and/or unsuitable for urban uses. If biologically defective, survival for more than 1-3 years under existing conditions is unlikely.

7. Native Status:
   Native – Native to Ontario
   Introduced – Not native to Ontario
   Genus - Unable to identify species level due to lack of key characteristics at the time of survey.
   Source: NHIC (Natural Heritage Information Centre). 2009. Ontario Vascular Plant Species List. Biodiversity Explorer Online Database. Ontario Ministry of Natural Resources.
   Unkown (Dead) - tree dead; species unknown.

APPENDIX K – HDF Memo (Geoprocess)

MEMO

January 17, 2023

GeoProcess RESEARCH ASSOCIATES
Knowledge Research Consulting

Panattoni Development Company
185 The West Mall, Suite 860
Toronto, ON
M9C 5L5

Re: 2240 and 2254 Upper James Street, Hamilton, ON
Headwater Drainage Feature Assessment

GeoProcess Research Associates Inc. (GeoProcess) is pleased to present the following Headwater Drainage Feature (HDF) assessment for the "study area" located at 2240 and 2254 Upper James Street, Hamilton, Ontario (Map 1). It is GeoProcess' understanding that the study area is the proposed site for a warehouse development.

1. Headwater Drainage Features Guidelines (2014)

In response to development occurring throughout the Greater Toronto Area (GTA) within the headwaters of many watersheds, the Toronto Region Conservation Authority and Credit Valley Conservation developed assessment guideline for headwater drainage features (HDF). These guidelines are captured in a document known as, *The Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (hereafter referred to as the 2014 HDF Guidelines) finalized by CVC and TRCA in 2014.

The 2014 HDF Guidelines were developed to: "*provide direction to practitioners for those features that are not clearly covered by existing policy and legislation as being important eco-hydrological features … but may contribute to the overall health of a watershed"* primarily because they provide "*sources of food, sediment, water, nutrients, and organic matter for downstream reaches*". The guidelines were developed to help standardize data collection with regards to these minor features and how they are managed across the landscape.

1.1. Value of Headwater Drainage Features

The overall form of a headwater drainage network influences the form and function of the downstream larger riverine systems. The stability of the headwater drainage network helps to dictate the level of sediment, nutrients and organic matter which is transported downstream. As described in the River Continuum Theory, this transfer of energy downstream is critical to maintaining downstream aquatic systems. HDFs are shallow depressions, poorly defined or vegetated and generally can be expected to only transport limited sediment downstream. Well defined HDFs or those lacking vegetation will generally provide greater supplies of sediment downstream. Although each headwater channel provides only a small amount of sediment and water to the overall basin, the relatively high proportion of HDFs means that their cumulative contributions (of both water and sediment) are felt throughout the watershed. Recognizing and understanding this overall

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basin contribution has led to a greater awareness of maintaining HDF functions within a developing landscape.

2. Methodology

Aerial photographs of the study area were reviewed to identify potential locations of headwater drainage features within the subject property prior to conducting fieldwork. Fieldwork for the HDF assessment comprised an early spring field visit to verify the presence/absence of flowing headwater drainage features. Headwater drainage features were assessed following the 2014 HDF Guidelines.

Visit 1 is conducted during a window of approximately 2 weeks, during spring freshet. The survey window is typically during late March or early April but is subject to variation depending on the weather in any given year. During the first site visit, the identified drainage lines are examined for both the flow condition and feature type. The first visit determines if a second HDF evaluation is necessary. If the feature is dry or standing water, or if there is no defined feature present, it is likely that the feature would be considered as "limited functions" and no additional data is required; therefore, no further field visits are required. If the feature exhibits functions beyond the "limited functions" criteria, such as a defined flow path and active flow, further data collection is then required to define those functions more fully.

Visit 2 is conducted after the freshet has ended when the melt/thaw related interflow has ceased and, preferably, after a few days with no precipitation. Timing of this visit should occur before spring plant growth is very far advanced to permit unobstructed examination of features and is typically from late April through mid-May. During this site visit, flow condition and fish presence are assessed.

Visit 3 is conducted if water was present in the feature during Site Visit 2. The timing of the third visit is from July to mid-September, preferably after several days without a significant (i.e., flow generating) amount of rain. During this site visit, flow condition and fish presence are assessed. The presence of flow during this visit automatically results in classification as an "important" feature, so fish presence has no effect on management recommendations. Where isolated standing pools exist, sampling should be conducted, as described for site visit 2 (above), to determine the upstream limit of year-round fish utilization.

The data and observations collected from site visits are used to inform a series of classifications of the feature in relation to its function regarding hydrology, riparian character, fish and fish habitat, and terrestrial habitat. These classifications are then used to navigate a flow chart (Figure 1) that determines the most appropriate management approach for the feature. Management approaches can range from protection in situ to "no management" requirements (i.e., removal is possible), with interim management approaches that include replication of form and function or replication of function alone.

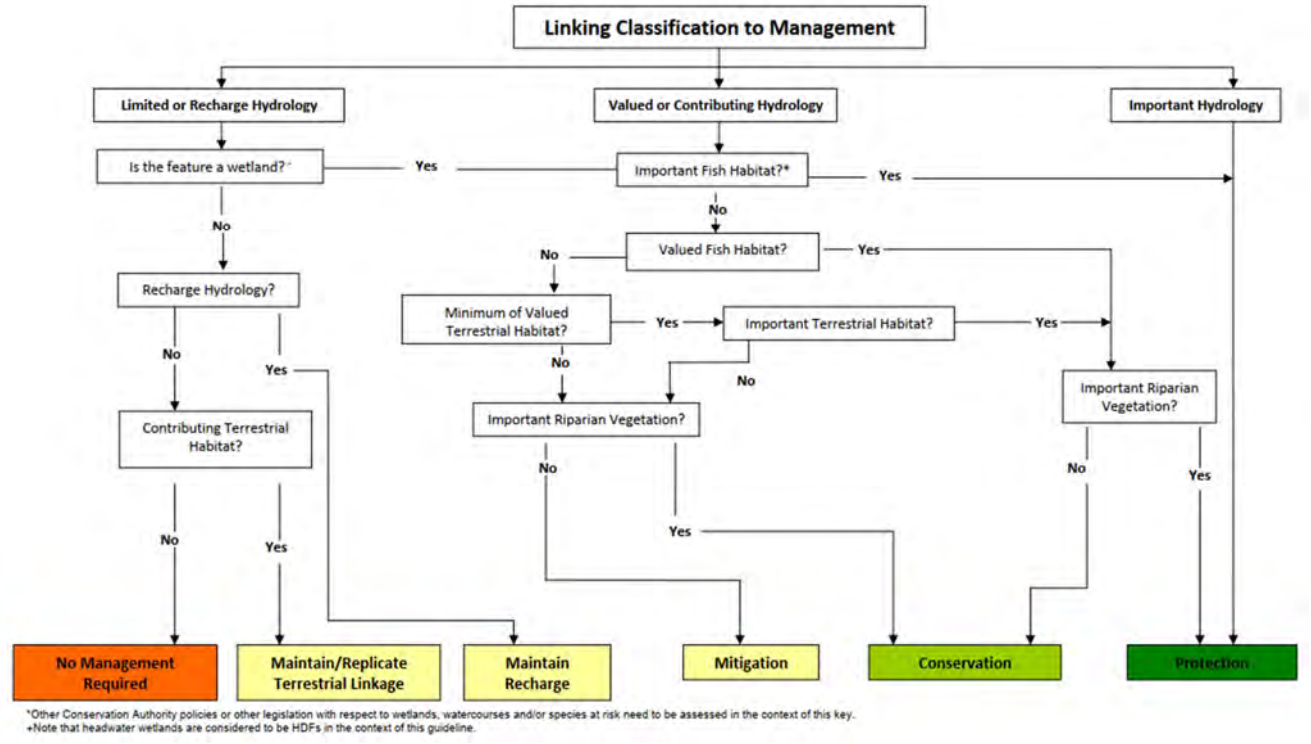


Figure 1. Flow chart providing direction on management options.

The HDF assessment required three field visits. Visit one occurred on March 16, 2022, visit 2 occurred on May 4, 2022 and visit 3 occurred on August 5, 2022. The primary focus of the second and third visits is to confirm the flow regime. Water was present in all three features during visit 2, therefore a third visit was required.

3. Results

3.1. HDF Conditions

In total, three HDF reaches were assessed, within two drainage features. Map 2 provides the locations of the HDFs and the assessment reaches. Refer to Appendix A for the photoplate.

HDF 1a and 1b

HDF 1a (Photo 1) has a defined channel where it outflows from a wetland feature west of the subject property (Photo 7) and flows northeast through an agricultural field. Within the agricultural field, the channel becomes less defined two-thirds of the way across (Photo 2 and 5). When the HDF reached the property limit adjacent of the HSR property, it turns sharply to the east and follows a defined dug ditch/swale and is identified as HDF 1b (Photo 3).

HDF 1a contains sparse wetland riparian vegetation within the feature and is "cropped" along its entire length. HDF 1b is vegetated throughout the feature with a few scattered trees and shrubs within its narrow vegetated riparia zone. The channel is bounded by the HSR yard (asphalt surfaces) to the north and the cropped farm field to the south.

Minimal flow was observed during visit 1 and visit 2, while no flow or standing water was observed during visit 3 (Photo 7, 8 and 9). The growth of Reed Canary Grass (*Phalaris arundinacea var. arundinacea),* Purple Loosetrife (*Lythrum salicaria)* and American Water Plantain (*Alisma subcordatum*) was observed when channel conditions were drier (visit 3). In reach 1a, the channel width was approximately 1.6m at the start and became less defined as it progressed (Map 2). The channel width of HDF 1b was 1.8m. The bankful depth for both reaches ranged from 0.34 m to 0.40 m.

HDF 2

HDF 2 is located centrally within the study area and is a swale that flows northeast across the agricultural field. HDF 2 exhibited braided and undefined channel characteristics towards the centre of the field. HDF 2 had an average bankfull width of 0.45 m, and a bankfull depth range of 0.04 to 0.09 m. Minimal flow was observed during visit 1 (Photo 10), standing water was observed during visit 2 (Photo 11) and no flow/water was observed during visit 3 (Photo 12). Vegetation was cropped on both the right and left banks.

3.2. HDF Classification

The 2014 HDF Guidelines provide a classification system for the HDF features based on the field data collected. The classification involves a four-step process which considers hydrology, riparian vegetation, fish habitat, and terrestrial habitat. These four classification steps are then used to assign a recommended management approach. Table 1 below summarizes the classification for each of the HDFs found in the study area.

Table 1. Headwater Drainage Feature Guidelines Classification System for HDF 1 and HDF 2.

HDF #	STEP 1		STEP 2	STEP 3	STEP 4
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat
1a	Contributing Functions-Ephemeral	agricultural practices	Valued Functions	Contributing Functions (no fish habitat)	Valued Functions (wetland habitat upstream)
1b	Valued functions-Intermittent	channelized	Valued Functions	Contributing Functions (no fish habitat)	Limited Functions
2	Contributing Functions-Ephemeral	agricultural practices	Limited Functions	Contributing Functions (no fish habitat)	Limited Functions

3.3. Management Recommendations and Direction

The 2014 HDF Guidelines provide management recommendations related to HDF's, which are to be considered with other assessment tools. As stated in the guidelines: "*The outcome of applying this guideline should be integrated with the results of other studies … and relevant information should be used to tie back to aquatic functions, and vice versa*". In addition, the 2014 HDF Guidelines recognize that: "*[o]ther Conservation Authority policies or other legislation with respect to wetlands, watercourses and/or species at risk need to be assessed in the context of [the management options] key*" (ref. p. 20).

Based on the Linking Classification to Management Guidelines (Figure 2) the recommended management guidelines for HDF-1a/1b and HDF 2 are Mitigation based on valued and contributing hydrology features.

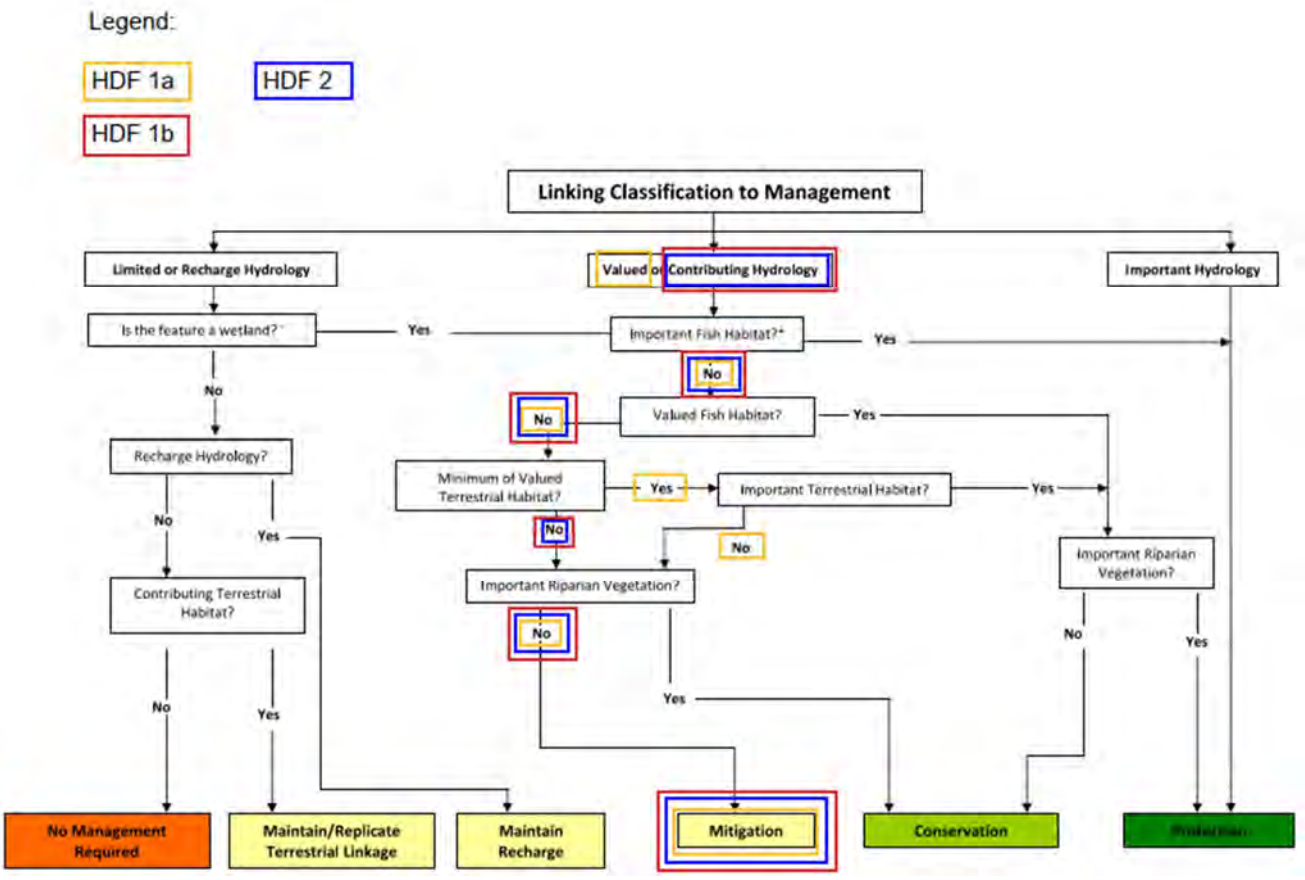


Figure 2. Management recommendation results for HDF 1a and 1 b (blue) and HDF 2 (yellow)

The 2014 HDF Guidelines provide the following direction:

Mitigation – Contributing Functions:

- Replicate or enhance functions through enhanced lot level conveyance measures, such as well vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets or replicate through constructed wetland features connected to downstream.
- Replicate on-site flow and outlet flows at the top end of the system to maintain feature functions with vegetated swales, bioswales, etc. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage).
- Replicate functions by lot level conveyance measures (e.g. vegetated swales) connected to the natural heritage system (refer to Conservation Authority Water Management Guidelines for details).

4. Conclusions

In conclusion, three HDF reaches were assessed within the study area. The management recommendations for all three reaches are mitigation.

If you have any questions regarding this HDF assessment, do not hesitate to contact us.

Regards,

GEOPROCESS RESEARCH ASSOCIATES INC

Ken Glasbergen, MSc., ERPG
Senior Ecologist, Principal

Legend

Study Area

N

2000 m

Prepared using QGIS and Google Satellite Imagery

GeoProcess RESEARCH ASSOCIATES

CREATED BY:	MD	PROJECT NO.:	P2022-609
CHECKED BY:	KG	DATE:	Jan 09, 2023

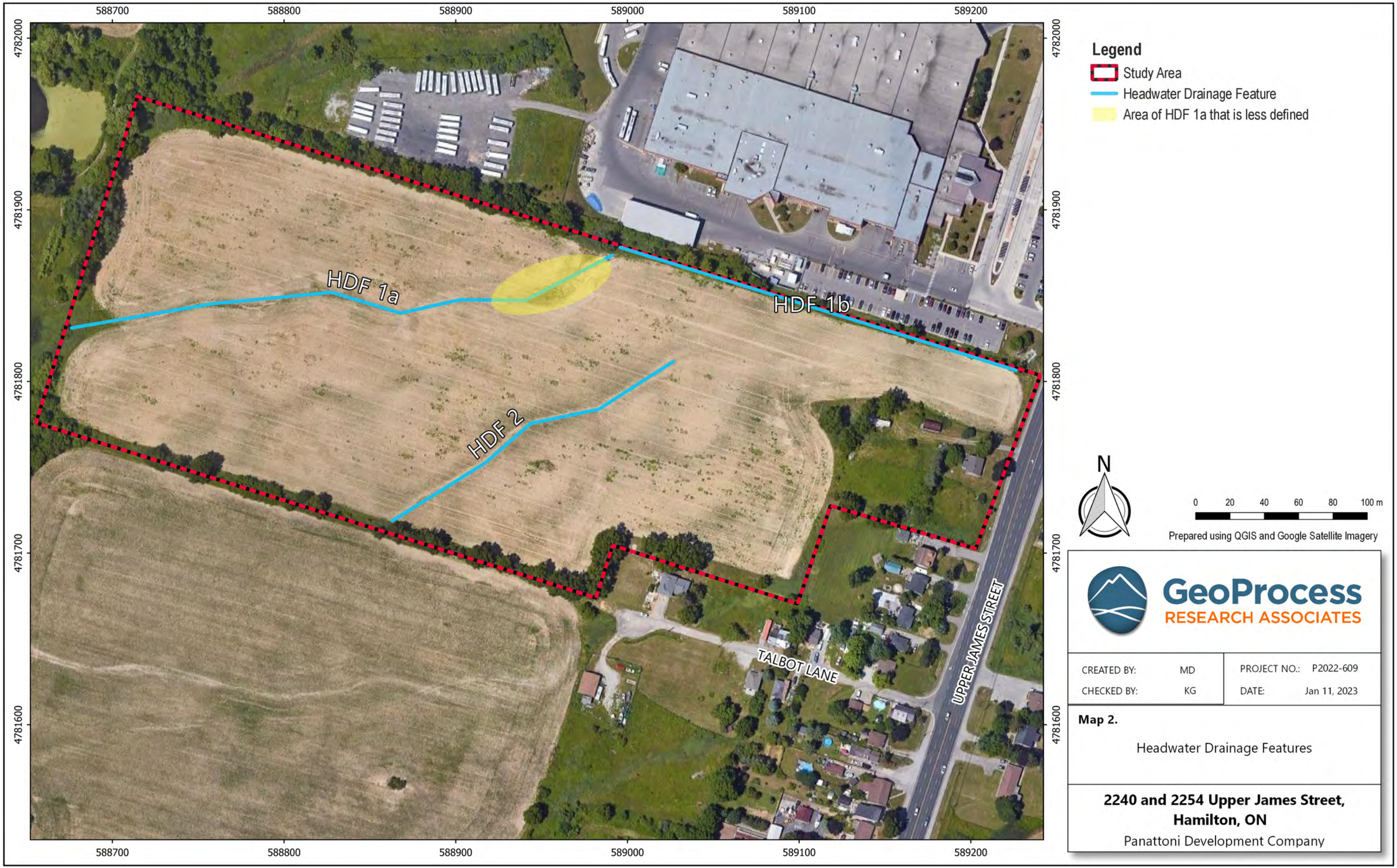
Map 1.

Key Map

2240 and 2254 Upper James Street, Hamilton, ON

Panattoni Development Company

G:\Shared drives\Projects-2022\P2022-609 2240 and 2254 Upper James EIS\GIS\Projects\MXD\F Basemap.qgz



GeoProcess RESEARCH ASSOCIATES

CREATED BY:	MD	PROJECT NO.:	P2022-609
CHECKED BY:	KG	DATE:	Jan 11, 2023

Map 2.

Headwater Drainage Features

2240 and 2254 Upper James Street, Hamilton, ON

Panattoni Development Company

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Appendix A

Photoplate

Photoplate of HDF 1a and HDF 1b

Visit 1- March 16, 2022

Photo 1. Defined swale of HDF 1a

Photo 2. Section of HDF 1a that loses forms and contains standing water

Photo 3. Defined dug/ditch adjacent to the HSR property

Visit 2- May 4, 2022

Photo 4. Upstream view of HDF 1a (wetland habitat)

Photo 5. Downstream section of HDF 1a

Photo 6. Downstream view of HDF 1b

Visit 3- August 5, 2022

Photo 7. Downstream view of HDF 1a

Photo 8. Undefined downstream section of HDF 1a

Photo 9. Photo indicating dry channel (HDF 1b) and increased growth of plants

Photoplate of HDF 2

Visit 1- March 16, 2022

Photo 10. Minimal flow was observed during visit 1

Visit 2- May 4, 2022

Photo 11. Standing water was observed during visit 2

Visit 3- August 5, 2022

Photo 12. Vegetation was cropped on both the right and left banks

APPENDIX L – Wetland Memo (D&A, Dec. 2022)

12/5/2022

Nikolas Wensing, Watershed Planner
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor,
Welland, ON, L3C 3W2

Re: Wetland Boundary Delineation for Upper Twenty Mile Creek Wetland Complex, 2240 Upper James Street, Glanbrook, City of Hamilton L0R 1W0

Dear Mr. Wensing,

As requested by NPCA and City of Hamilton, Dougan & Associates completed a wetland boundary delineation for the portions of the Upper Twenty Mile Creek Wetland Complex within and adjacent to 2240 Upper James Street. This task was part of the scope of work for a feasibility study for updates to the City of Hamilton's AEGD Transportation Master Plan. This letter provides a summary of the wetland characteristics and rational for the updated PSW boundary. The boundaries were reviewed and confirmed with the NPCA on June 30th, 2022.

Methodology

Ecological land classification and three-season botanical inventories were completed within the subject properties on numerous dates between 2019 and 2022. Each wetland polygon was delineated using the Ontario Wetland Evaluation System (OWES) and classified according to ELC (Lee et al. 1998). Wetlands in Ontario are defined by the presence of seasonal or permanent flooding, hydric soils, and the relative abundance of wetland indicator species (MNRF 2014). Soil samples were taken at representative locations along the wetland gradients to characterize the texture and moisture regime of the soils, and the vegetation was assessed to determine where wetland indicator species had a combined relative cover of at least 50%. The wetland boundaries were staked or flagged and GPSed using a Trimble Catalyst high-accuracy GPS unit. The boundaries of polygons 5.1 – 5.4 were delineated in August 2019 and did not require updating in 2022. Polygon 8 was well beyond the property boundaries and limit of disturbance, so was also not delineated in 2022. Permission to enter 2136 Upper James Street was not granted so the wetlands within this property were not directly investigated. These boundaries were approximated using satellite imagery to evaluate the vegetation community boundaries, as well as topographic contours.

Results

Figure 1 shows the wetland boundaries following the August 2019 delineation (MNRF 2021), and Figure 2 shows the updated wetland boundaries agreed-upon during the site visit with the NPCA and City on June 30th, 2022. Defining characteristics of each wetland polygon are summarized in Table 1, along with the average CW values based on the Floristic Quality Assessment System for Southern Ontario (Oldham 1994).

The wetlands within 2240 Upper James Street and 9236 Dickenson Road are primarily associated with watercourses flowing in an east-northeast direction across the properties. The watercourse flowing out of the pond (polygon 5.1 flows through a constructed ditch lined with riprap for most of its length. The riparian wetland bordering the watercourse (polygon 22; Reed-Canary Grass Mineral Meadow Marsh (MAM2-2)) contains some flowing water for most of the year and is defined by a dominance of Reed Canary Grass (*Phalaris arundinacea*) with Narrow-leaved Cattail (*Typha angustifolia*), and occasional bulrushes (*Scirpus sp*) and Spotted Jewelweed (*Impatiens capensis*). The most diverse portion of this wetland is immediately downstream from the pond and includes Wild Blueflag (*Iris versicolor*) and Canada Elderberry (*Sambucus canadensis*). Downstream from polygon 22, the watercourse flows through a shrub-dominant riparian area (polygon 29; STW2-5) dominated by Sandbar Willow (*Salix interior*) and Red-osier Dogwood (*Cornus sericea*) with a sparse canopy of Peach-leaved Willow (*Salix amygdaloides)* and Black Willow (*Salix nigra*). Herbaceous vegetation along this reach is similar to polygon 22. These two wetland polygons were split from polygon 13 based on vegetation community composition, hydrology, and soils characteristics. Polygon 13, formerly classified as a Reed-Canary Grass Mineral Meadow Marsh, is approximately 2-3m above polygons 22 and 29 on tablelands and contains moist but not hydric wetland soils. The soils within polygon 13 consist of silty clay with mottles at depths consistently deeper than 32cm. The tableland areas and slopes bordering the watercourse are dominated by Reed Canary Grass (*Phalaris arundinacea*), which often occurs in meadow marshes, but is not a wetland indicator species (MNRF 2014). Co-dominants included Canada Goldenrod (*Solidago canadensis)*, White Sweet Clover (*Melilotus alba*), Common Milkweed (*Asclepias syriaca*) and Kentucky Bluegrass (*Poa pratensis)*, all species considered to be facultative to obligate upland species (Oldham t al. 1994). Wetland indicator species were only encountered along the lower elevation of the slopes and the seasonally flooded bottom of the watercourse. The transition from polygon 13 to polygon 22 was defined by a transition from the upland meadow species to Spotted Jewelweed (*Impatiens capensis*), Narrow-leaved Cattail (*Typha angustifolia*), Dark-green Bulrush (*Scirpus atrovirens*), and the occasional wetland sedge (*Carex sp*).

Polygon 28 is a depressional area nested within polygon 14 from which it was split. This feature floods seasonally, but outlets through a dug ditch to the watercourse within polygon 22. Historically it may have contained water for a longer duration. The wetland characteristics of this feature include hydric soils and a willow-dominant canopy. Understory vegetation included Red-Osier Dogwood and Holmes' Hawthorn (*Crataegus holmesiana*) around the perimeter, and ground cover was sparse within the depression due to extensive shading from the willow canopy and seasonal flooding.

The eastern-most boundary of polygon 3 was updated to reflect a small portion of wetland that extends along into 2240 Upper James Street. Previously this polygon was truncated at property boundary.

Polygon 25 was not previously mapped as a wetland. This feature is associated with the downstream portion of HDF 4 within the subject property and occurs within a seasonally flooded area. The southern-most edge of this feature was farmed previously based on the presence of deep plough ruts. The community is dominated by Reed Canary Grass, which is not a wetland indicator species. However, it is seasonally flooded in the spring, and contains hydric soils (Mottles ~ 20cm depth).

Table 1. Summary of wetland communities within study area

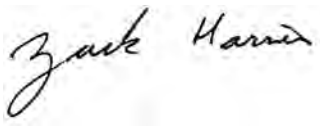
ELC Polygon	ELC Pre-Delineation	ELC Post-Delineation	Wetland Indicators	Comments
3	MAM2-2	MAM2-2	Wetland indicator species (e.g. Typha) and seasonal flooding. Hydric soils (Silty Loam with mottling @ 18-22cm along east edge, 10 cm along west edge) Average CW = -1.95	Associated with watercourse.
5.1 – 5.4	SAF1-3 MAM2-2 SWT2-5 MAS2-4	SAF1-3 MAM2-2 SWT2-5 MAS2-4	Wetland indicator species (e.g. *Typha; Salix spp, Cornus sericea, Lemna*) as well as seasonal flooding. Hydric soils (Silty Clay Loam, surface water in 5.1 and seasonally in 5.2- 5.4) Average CW = - 2.46	Boundary updated in 2019; no change in 2022. Transitions from upland/AGR to shallow aquatic.
8	MAM2-2	MAM2-2	Wetland indicator species (e.g. *Typha, Lycopus*) and seasonal flooding. Average CW = -2.11	No development proposed within 120m. Boundary was not updated in 2019 or 2022.
13	MAM2-2	CUM1	All wetland indicators species <50% relative cover; soils Average CW = 1.53	Polygons 22 and 29 split from 13.
19.1	MAM2-2	MAM2-2	Seasonally flooded from watercourse and seepage from within woodland (polygon 7.1). Dominated by Reed-canary grass with wetland forbs.	Areas outside study area not surveyed directly – no property access.
19.2	NA	MAM2-2	Appears to be consistent with polygon 19.1.	Not surveyed directly – no property access.
22	MAM2-2	MAM2-2	Seasonally flooded with flow in watercourse for most of year. No soils assessment due to riprap. Dominated by Reed-canary grass with wetland indicator associates (e.g. *Scirpus atrovirens, Impatiens capensis*). Average CW = -1.44	Split from polygon 13. Associated with watercourse.
25	NA	MAM2-2	Dominated by Reed-canary grass, which is not a wetland indicator species, but seasonally flooded with hydric soils.	Southern edge was historically ploughed. Very low diversity, high-disturbance community.
28	FOD5-2	SWD4	Seasonally flooded with hydric soils. Wetland community defined by canopy of exotic willows with border of Red-osier dogwood and hawthorns (*Crataegus holmesiana*).	Depressional area previously included within polygon 14 (FOD5-2). Very little ground cover. Outlet to from is dug ditch that connects to polygon 22. Likely did not have an outlet historically.
29	MAM2-2	SWT2-5	Seasonally flooded with flow in watercourse for most of year. No soils assessment due to riprap. Dominated by Red-osier Dogwood and Willow Species. Average CW = -2	Split from polygon 13.

Conclusions

In summary, portions of the Upper Twenty Mile Creek Wetland Complex was delineated in June 2022 and confirmed with the City of Hamilton and NPCA on June 30th, 2022, resulting in revisions to several of the wetland communities within 2240 and 2200 Upper James Street.

I trust that this memo has been completed to your satisfaction and welcome any questions or concerns.

Sincerely,



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Adam Lambros, Panattoni Capital Inc
James Webb, Webb Planning Consultants
Omar Shams, City of Hamilton
Margaret Fazio, City of Hamilton
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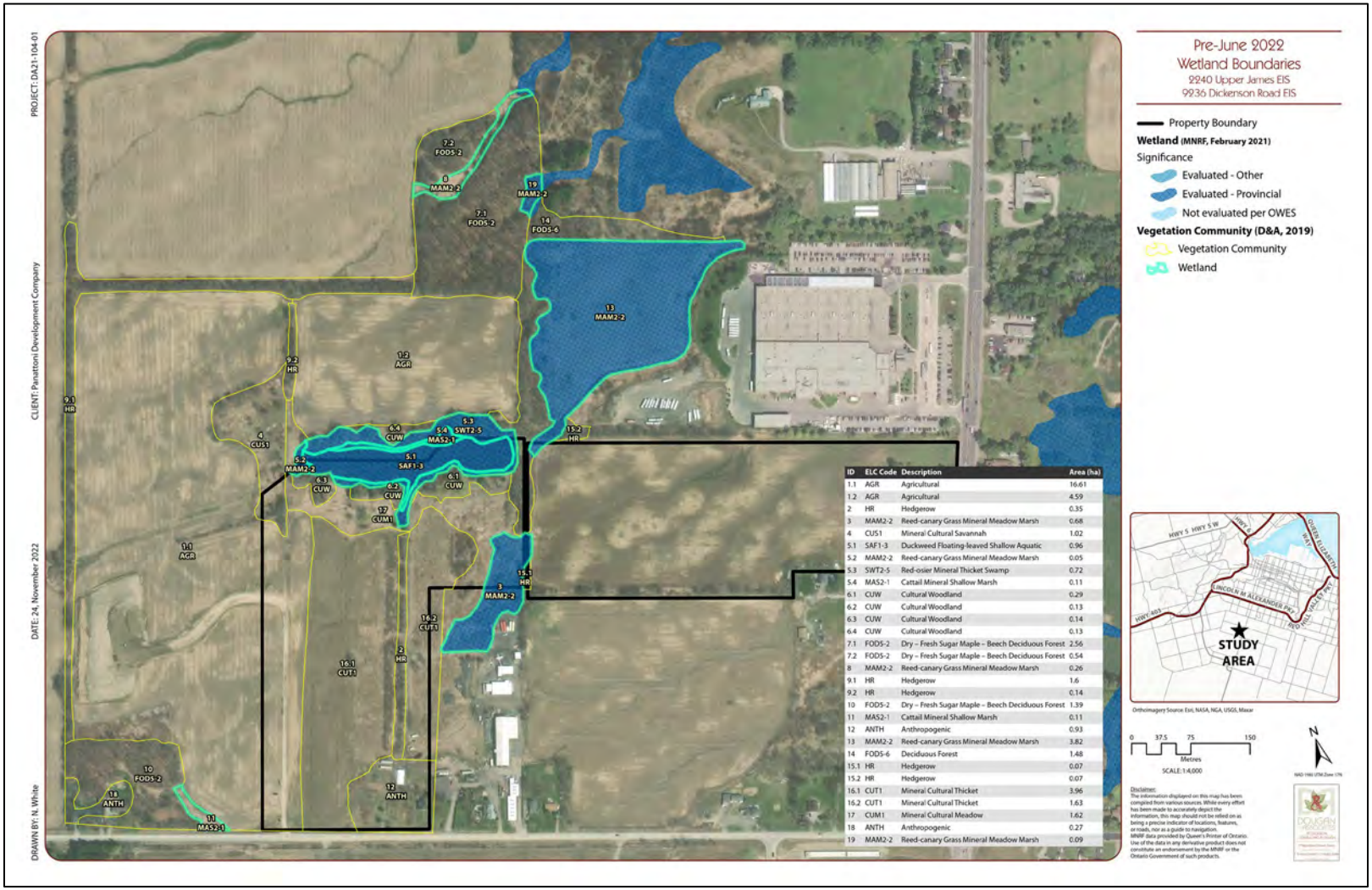
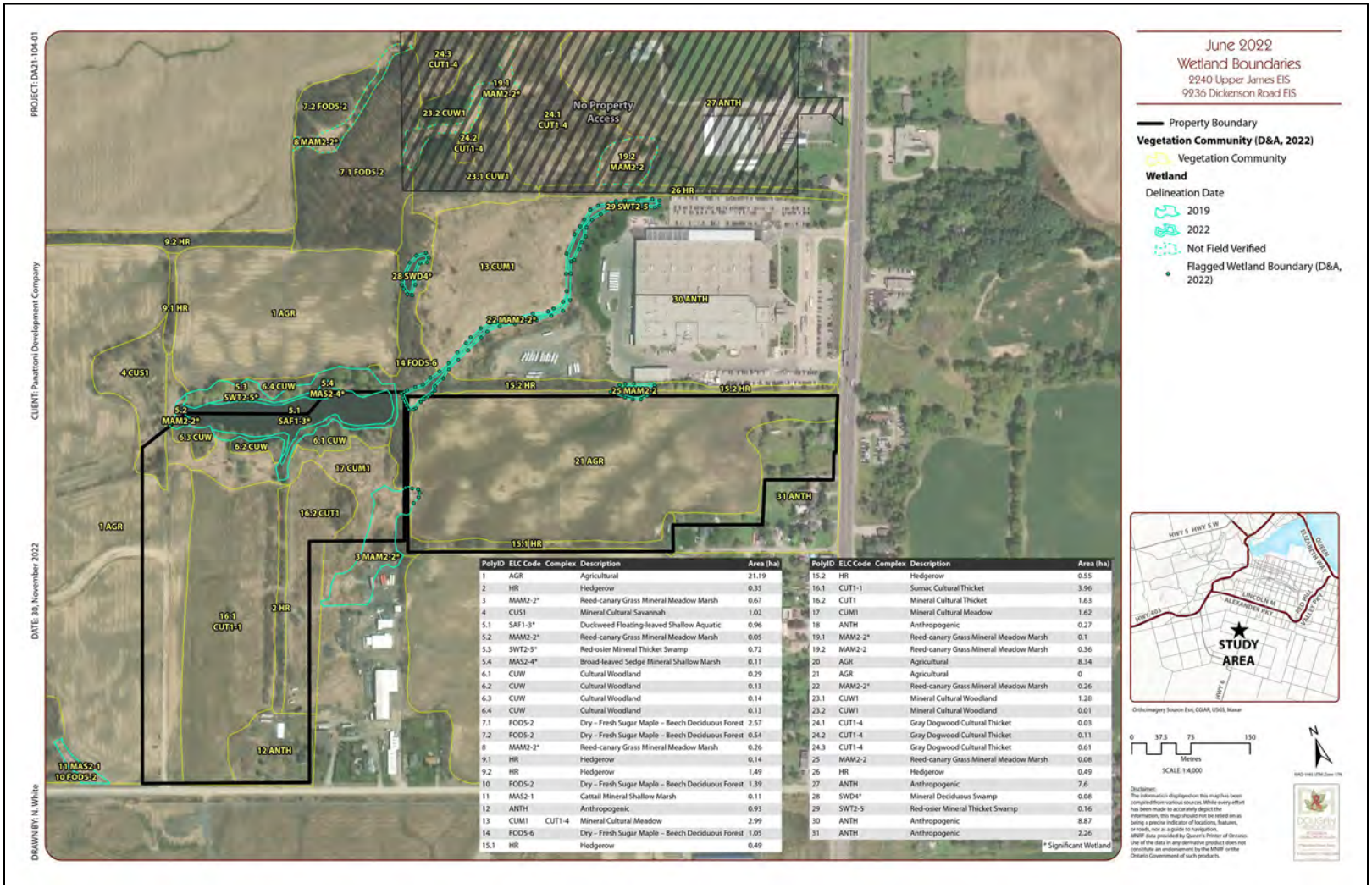
Theresa Bukovics, NPCA
Melissa Kiddie, City of Hamilton

Figure 1. Wetland boundaries prior to updates in June 2022.



ID	ELC Code	Description	Area (ha)
1.1	AGR	Agricultural	16.61
1.2	AGR	Agricultural	4.59
2	HR	Hedgerow	0.35
3	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.68
4	CUS1	Mineral Cultural Savannah	1.02
5.1	SAF1-3	Duckweed Floating-leaved Shallow Aquatic	0.96
5.2	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.05
5.3	SWT2-5	Red-osier Mineral Thicket Swamp	0.72
5.4	MAS2-1	Cattail Mineral Shallow Marsh	0.11
6.1	CUW	Cultural Woodland	0.29
6.2	CUW	Cultural Woodland	0.13
6.3	CUW	Cultural Woodland	0.14
6.4	CUW	Cultural Woodland	0.13
7.1	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	2.56
7.2	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	0.54
8	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.26
9.1	HR	Hedgerow	1.6
9.2	HR	Hedgerow	0.14
10	FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest	1.39
11	MAS2-1	Cattail Mineral Shallow Marsh	0.11
12	ANTH	Anthropogenic	0.93
13	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	3.82
14	FOD5-6	Deciduous Forest	1.48
15.1	HR	Hedgerow	0.07
15.2	HR	Hedgerow	0.07
16.1	CUT1	Mineral Cultural Thicket	3.96
16.2	CUT1	Mineral Cultural Thicket	1.63
17	CUM1	Mineral Cultural Meadow	1.62
18	ANTH	Anthropogenic	0.27
19	MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.09

Figure 2. Updates wetland boundaries (June 2022).



PolyID	ELC Code	Complex	Description	Area (ha)
1	AGR		Agricultural	21.19
2	HR		Hedgerow	0.35
3	MAM2-2*		Reed-canary Grass Mineral Meadow Marsh	0.67
4	CUS1		Mineral Cultural Savannah	1.02
5.1	SAF1-3*		Duckweed Floating-leaved Shallow Aquatic	0.96
5.2	MAM2-2*		Reed-canary Grass Mineral Meadow Marsh	0.05
5.3	SWT2-5*		Red-osier Mineral Thicket Swamp	0.72
5.4	MAS2-4*		Broad-leaved Sedge Mineral Shallow Marsh	0.11
6.1	CUW		Cultural Woodland	0.29
6.2	CUW		Cultural Woodland	0.13
6.3	CUW		Cultural Woodland	0.14
6.4	CUW		Cultural Woodland	0.13
7.1	FOD5-2		Dry – Fresh Sugar Maple – Beech Deciduous Forest	2.57
7.2	FOD5-2		Dry – Fresh Sugar Maple – Beech Deciduous Forest	0.54
8	MAM2-2*		Reed-canary Grass Mineral Meadow Marsh	0.26
9.1	HR		Hedgerow	0.14
9.2	HR		Hedgerow	1.49
10	FOD5-2		Dry – Fresh Sugar Maple – Beech Deciduous Forest	1.39
11	MAS2-1		Cattail Mineral Shallow Marsh	0.11
12	ANTH		Anthropogenic	0.93
13	CUM1	CUT1-4	Mineral Cultural Meadow	2.99
14	FOD5-6		Dry – Fresh Sugar Maple – Beech Deciduous Forest	1.05
15.1	HR		Hedgerow	0.49

PolyID	ELC Code	Complex	Description	Area (ha)
15.2	HR		Hedgerow	0.55
16.1	CUT1-1		Sumac Cultural Thicket	3.96
16.2	CUT1		Mineral Cultural Thicket	1.63
17	CUM1		Mineral Cultural Meadow	1.62
18	ANTH		Anthropogenic	0.27
19.1	MAM2-2*		Reed-canary Grass Mineral Meadow Marsh	0.1
19.2	MAM2-2		Reed-canary Grass Mineral Meadow Marsh	0.36
20	AGR		Agricultural	8.34
21	AGR		Agricultural	0
22	MAM2-2*		Reed-canary Grass Mineral Meadow Marsh	0.26
23.1	CUW1		Mineral Cultural Woodland	1.28
23.2	CUW1		Mineral Cultural Woodland	0.01
24.1	CUT1-4		Gray Dogwood Cultural Thicket	0.03
24.2	CUT1-4		Gray Dogwood Cultural Thicket	0.11
24.3	CUT1-4		Gray Dogwood Cultural Thicket	0.61
25	MAM2-2		Reed-canary Grass Mineral Meadow Marsh	0.08
26	HR		Hedgerow	0.49
27	ANTH		Anthropogenic	7.6
28	SWD4*		Mineral Deciduous Swamp	0.08
29	SWT2-5		Red-osier Mineral Thicket Swamp	0.16
30	ANTH		Anthropogenic	8.87
31	ANTH		Anthropogenic	2.26