Greenbelt Planning Area Review for the Bathurst-Green Lane Properties

King, Ontario

Submitted to (Owner):
Bathurst-Green Lane Partnership

Submitted by:
GEI Consultants Ltd.
100-75 Tiverton Court
Markham, ON L3R 4M8

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PREPARED BY:
GEI Consultants

Olivia Robinson
Intermediate Ecologist
647-482-2849
orobinson@geiconsultants.com

Russell Wiginton, P. Eng.
Senior Geotechnical Engineer
613-876-1441
rwiginton@geiconsultants.com

Noel Boucher
Senior Fisheries Biologist
289-929-6951
nboucher@geiconsultants.com

Aaron Pettifer, P. Eng.
Land Development Engineer Manager
905-973-1886
apettifer@geiconsultants.com

CHECKED BY:
GEI Consultants

Scott Cole, P. Eng.
Senior In-House Reviewer /Principal
416-670-4600
scole@geiconsultants.com

Statement of Conditions

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Executive Summary

GEI has been retained by Bathurst Green Lane Limited Partnership (“BGL”) to complete a review of the Greenbelt and Oak Ridges Moraine Planning Areas within the property in King, Ontario. With an increase in housing demand within Southern Ontario, a review of existing Planning Areas was completed to understand whether additional development areas may be present within the Subject Lands while ensuring protection and enhancement of existing natural heritage features. GEI has reviewed secondary source information and completed a site reconnaissance to inform this review to identify opportunities for refinement of the existing planning areas to further optimize developable area within the Subject Lands.

The northern portion of the Subject Lands are located within the Greenbelt Planning Areas and were designated as Protected Countryside and Greenbelt Natural Heritage System (NHS), while the southern portion of the Subject Lands are located within the Oak Ridges Morane Planning Areas and contained Core Areas. The Greenbelt NHS and Oak Ridges Moraine Core Areas designations are reserved for Key Natural Heritage Features (KNHFs), Key Hydrologic Features (KHFs) and Key Hydrologic Areas (KHAs).

Currently the bulk of Subject Lands is agricultural and functioning as active pastureland. Four branches of the West Holland River were identified within the Subject Lands and are likely watercourses. These features were identified as regulated features by the Lake Simcoe Region Conservation Authority (LSRCA). Headwater drainage features (HDFs) are also likely present within the Subject Lands; however, they would not be considered intermittent or permanent streams. Watercourses and HDFs may provide fish habitat within the Subject Lands. Two KHA was identified within the Subject Lands; these KHAs were associated with Highly Vulnerable Aquifers (HVAs) along the north-eastern and south-western watercourses. Several wetland vegetation communities were identified within the Subject Lands, which included two mapped Provincially Significant Wetland (PSW) units. The PSWs were located in the north-central and the south-eastern portion of the Subject Lands. Other unevaluated wetlands that were identified on the site should be considered candidate PSWs given their proximity to the mapped PSW units. Potentially suitable habitat for Species at Risk (SAR) and Significant Wildlife Habitat (SWH) were identified throughout the Subject Lands; however, detailed field investigations will be required to confirm whether the species are present and using the habitats. Significant valleylands may be present along the unnamed tributaries to the West Holland River. Wooded communities were also identified within the Subject Lands; further evaluation is required to determine whether these woodlands would meet the threshold for significance.

Based on existing conditions, refinement to the Greenbelt and Oak Ridges Planning Areas are recommended based on the presence of candidate KNHFs, KHFs and KHAs. The proposed refinements to these planning areas are generally located within active agricultural areas and ensure that a 30 m Vegetation Protection Zone (VPZ) is provided to all natural features. In addition to these refinement areas, potential enhancement areas were also considered to further strengthen and create a more resilient NHS.

Additional ecological, hydrogeological and geotechnical investigations are warranted to further refine the existing constraints within the Subject Lands to determine the available developable footprint and determine design/construction approaches. Several servicing strategies have been explored and determined that servicing from the York-Durham Sewage System (YDSS) and the Upper York Sanitary Solution (UYSS) are feasible.

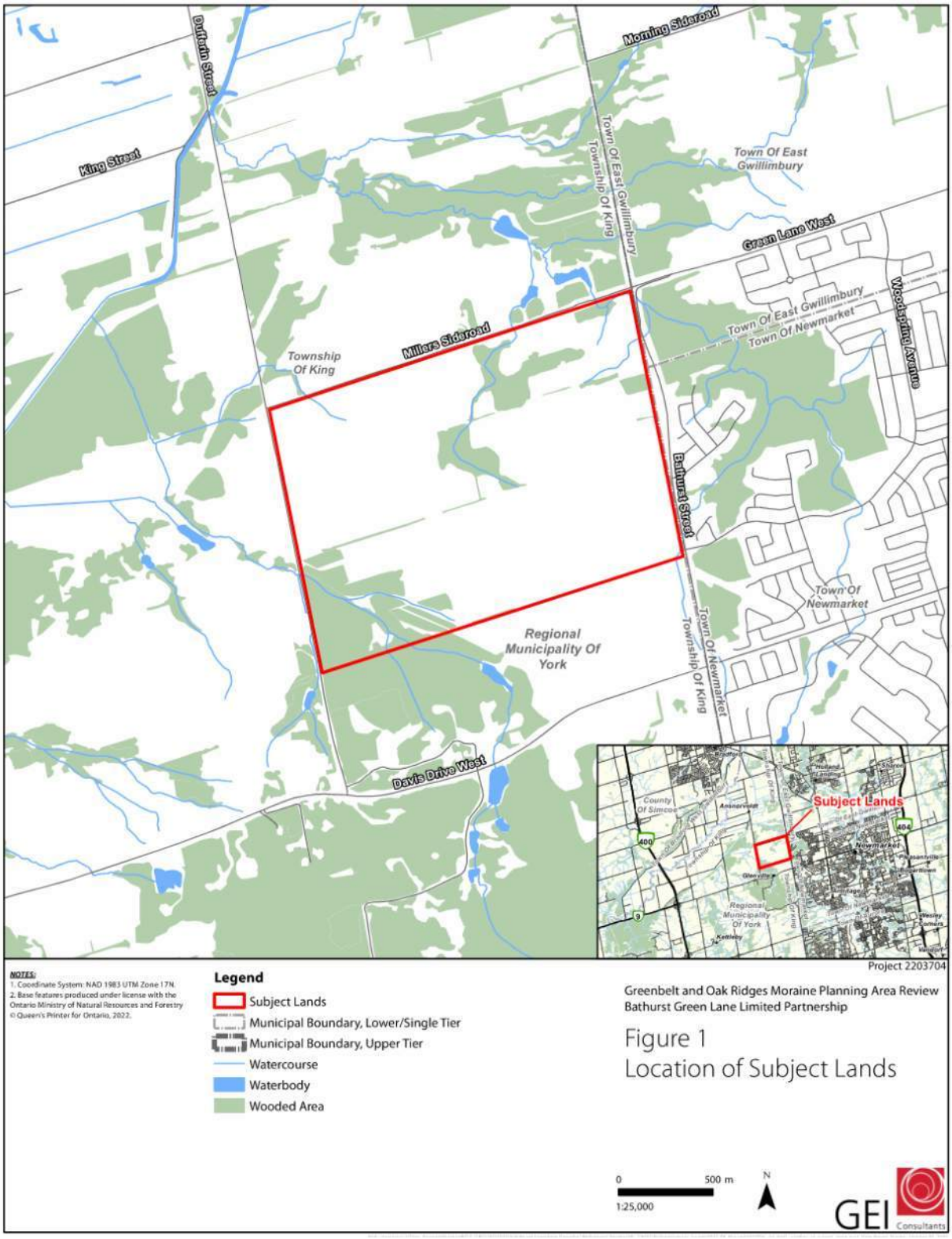
1. Introduction

GEI Consultants Ltd. (GEI) has been retained by Bathurst Green Lane Limited Partnership ("BGL") to complete a review of the Greenbelt Planning Areas and the Oak Ridges Moraine Conservation Plan (ORMCP) Areas within their properties in the Town of King, Ontario. Specifically, a review was completed for BGL's properties located south of Miller's Sideroad, east of Dufferin Street, north of Davis Drive West and west of Bathurst Street, these properties are herein referred to as the Subject Lands (**Figure 1)**.

The northern portion of the Subject Lands is located within the Greenbelt Planning Area (i.e., Greenbelt), while the southern portion of the Subject Lands are located within the Oak Ridges Moraine Conservation Plan Area (i.e., Oak Ridges). Based on the current mapping, the Subject Lands are fully overlapped by these two planning areas.

With the increased housing demand from our population and existing communities, a review of existing areas within the Greenbelt and Oak Ridges must be undertaken to understand whether additional developable areas may be present. This review must also ensure the protection of natural heritage features within the landscape and provide opportunities for adequate servicing solutions to develop the Subject Lands. GEI has undertaken a high-level review to identify areas within the Subject Lands that are currently included within the Greenbelt and Oak Ridges plan areas where opportunities to refine and/or remove existing designations could be considered.

Figure 1: Location of Subject Lands



2. Planning Context in Natural Heritage Systems

An assessment of the quality and extent of natural heritage features found on, and adjacent to, the Subject Lands and an analysis of the potential constraints to development associated with these features was undertaken to comply with requirements of the following regulatory agencies, local municipality, and/or legislation:

- Township of King Official Plan (OP; 2019 Consolidation);
- York Region OP (2022 Consolidation);
- Lake Simcoe Region Conservation Authority (LSRCA) Ontario Regulation (O.Reg) 179/06 and Lake Simcoe Protection Plan (2009);
- Provincial Policy Statement (PPS; MMAH 2020);
- Greenbelt Plan (2017);
- Oak Ridges Moraine Conservation Plan (ORMCP; 2017);
- *Endangered Species Act* (ESA; 2021 Consolidation of S.O. 2007, c. 6); and
- *Fisheries Act* (R.S.C., 1985, c. F-14).

2.1 Township of King Official Plan

As defined in the Township of King OP (2019), the Township's Natural Heritage System (NHS) consists of:

a. The Greenbelt Plan's NHS;
b. The ORMCP's Natural Core Areas and Natural Linkage Areas;
c. The York Region Greenlands System;
d. Key natural heritage features (KNHFs) and key hydrologic features (KHFs) and their minimum vegetation protection zones; and
e. Other natural heritage and hydrologic features and functions as may be identified through the completion of Natural Heritage Evaluations, hydrological evaluation or other studies, such as non-significant woodlands, non-significant valleylands, headwater drainage features, and vernal pools.

KNHFs consist of:

- Habitat of endangered species and threatened species;
- Fish habitat;
- Wetlands;
- Life science ANSIs;
- Environmentally significant areas;
- Significant valleylands;
- Significant woodlands;
- Significant wildlife habitat (SWH; including habitat of species at risk, including special concern species as identified by the Province);

- Sand barrens, savannahs, tallgrass prairies and alvars.

The KHFs consist of:

- Permanent and intermittent streams;
- Lakes, including kettle lakes (and their littoral zones);
- Seepage areas and springs; and
- Wetlands.

The Township of King OP (2019) further indicates that development and site alteration are not permitted within the NHS. Development and site alteration within 120 m of the NHS shall be accompanied by a Natural Heritage Evaluation or hydrological evaluation.

Based on review of the Township of King OP (2019) and its associated Schedule, the following Planning Area designations and Natural Heritage Features are present in or within the vicinity of the Subject Lands.

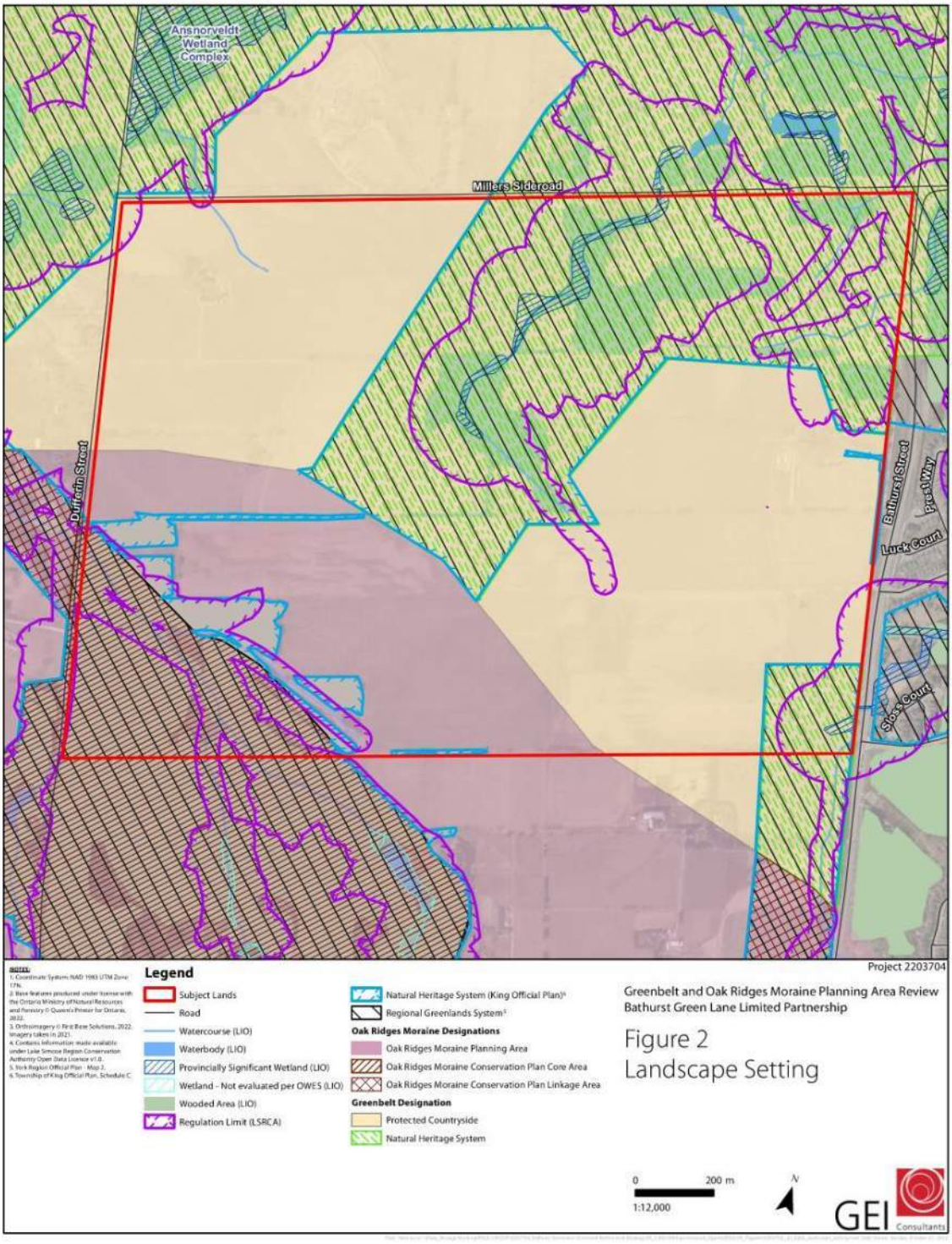
The Subject Lands are designated as part of the Natural Heritage System (NHS) and the Agricultural and Rural Areas under Schedule A ("Township Structure") of the Township of King OP (2019).

The central and northern portions of the Subject Lands are identified within the Greenbelt Plan Area and includes both the NHS and Protected Countryside designations as per Schedule B ("Provincial Plan Areas and Designation"). In addition, the central and southern portions of the Subject Lands are identified as within the ORMCP Area Boundary as per Schedule B ("Provincial Plan Areas and Designation"). Within the ORCMP Area Boundary, the south-western corner of the Subject Lands are designated as a Natural Core Area, while a Countryside Area located towards the center of the Subject Lands. The south-eastern corner of the Subject Lands is designated as a Natural Linkage Area.

The Subject Lands contain several woodlands within the south-western and north-eastern corners as per Schedule C1 ("Woodlands"). Portions of the Ansnorveldt Provincially Significant Wetlands (PSW) complex were identified in the north-central and south-east portions of the Subject Lands. Two Highly Vulnerable Aquifers (HVAs) have also been identified on the Subject Lands (Schedule C4: Key Hydrological Areas), generally in the northeast and south-west corners at the watercourse locations. The Glenville Hills Kame Earth Science Area of Natural and Scientific Interest (ANSI) is present south of the limits of the Subject Lands as per Schedule C2 ("Environmentally Significant Areas and Areas of Natural and Scientific Interest").

Natural heritage features present within the Subject Lands are illustrated on **Figure 2**.

Figure 2: Landscape Setting



2.2 York Region Official Plan

Similar to the Township of King OP, the Region of York OP (2022) designates the Subject Lands as part of the Greenbelt and the ORMCP as per Map 1 ("Regional Structure"). Map 4 ("Key Hydrological Features") and Map 5 ("Woodlands") also identify the wetlands and woodlands discussed in the Township of King OP.

Large portions of the Subject Lands are identified as part of the Regional Greenlands System on Map 2 ("Regional Greenlands") except for the north-western and south-eastern corners. The Regional Greenlands System is comprised of core areas, corridors and linkages. Core areas have high concentrations of significant natural features (including significant woodlands, wetlands, Life Science ANSIs and Environmentally Significant Areas). Corridors include existing significant valleylands and watercourses. Linkages connect core areas together and are identified as restoration areas.

The Region of York OP (2022) indicates that development and site alteration within the Regional Greenlands System are prohibited unless it is demonstrated through a natural heritage evaluation, hydrological evaluation, or environmental impact study that the development or site alteration will not result in a negative impact on the natural feature or its ecological functions.

Natural heritage features present within the Subject Lands are illustrated on **Figure 2**.

2.3 Lake Simcoe Region Conservation Authority

The LSRCA conducts reviews of planning processes associated with development of properties within its jurisdictional boundaries. In addition, LSRCA provides planning and technical advice to planning authorities to assist them in fulfilling their responsibilities regarding natural hazards, natural heritage and other relevant policy areas pursuant to the *Planning Act* (1990).

The LSRCA administers the Regulation of Development, Interference with Wetlands, Alterations to Shorelines and Watercourses, under O.Reg 179/06. Authorizations are required from the LSRCA for any development within their regulated areas which include watercourses, flooding and erosion hazards and wetlands as well as regulated allowances adjacent to these features.

Several regulated areas were identified along the north, southern and central portions of the Subject Lands (**Figure 2**). Portions of these regulated areas are associated with wetland and wooded communities, as well as unnamed tributaries of the Holland River.

2.4 Lake Simcoe Protection Plan

The Subject Lands are located within the Lake Simcoe watershed, and thus, are subject to the Lake Simcoe Protection Plan (2009). This plan has a focus on protecting and restoring the ecological health of the Lake Simcoe watershed by restoring the health of aquatic life, improving water quality and maintaining water quantity, improving the health its ecosystems

by protecting and rehabilitating important areas, as well as addressing impacts associated with invasive species and climate change.

2.5 Provincial Policy Statement

The PPS (MMAH 2020) provides guidance on matters of provincial interest surrounding land-use planning and development. It "supports improved land use planning and management, which contributes to a more effective and efficient land use planning system" (p. 1). The PPS is to be read in its entirety and land-use planners and decision-makers need to consider all relevant policies and how they work together.

Eight types of significant natural heritage features are defined in the PPS, as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- SWH;
- Fish habitat;
- Habitat of endangered and threatened species; and
- ANSIs.

The PPS indicates that development and site alteration shall not be permitted in significant wetlands within EcoRegions 5E, 6E and 7E, or in significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, significant wildlife habitat (SWH) or significant ANSIs, unless it is demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Development and site alteration shall not be permitted in the habitat of endangered and threatened species or in fish habitat, except in accordance with provincial and federal requirements.

Development and site alteration may be permitted on lands adjacent to the above features provided it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.6 Greenbelt Plan

The Greenbelt Plan (2017) works to permanently protect environmentally sensitive areas, due to their ecological value, within the Golden Horseshoe. It is intended to enhance the natural landscapes by working to facilitate the connection of environmentally significant areas and reducing fragmentation of the landscape. Protection is offered also to permanent agricultural areas ensuring the permanency and sustainability of natural resources.

As previously documented, portions of the Subject Lands are identified as Protected Countryside, and Greenbelt NHS (**Figure 2**).

As described within Section 3.2 of the Greenbelt Plan (2017), the Protected Countryside contains a Natural System composed of a NHS and a Water Resource System. The NHS includes core and linkage areas of the Protected Countryside with the highest concentration of sensitive and significant natural features and functions, while the Water Resource System is made up of both ground and surface water features, areas and their associated functions. The Natural System protects natural heritage, hydrologic and/or landform features (key hydrologic areas, key hydrologic features and key natural heritage features) that contribute to conserving Ontario's biodiversity and the ecological integrity of the Greenbelt itself.

Section 4.1.1 of the Greenbelt Plan indicates that proposals for non-agricultural uses must demonstrate the following:

1. The use is appropriate for the location in a rural area;
2. The type of water and sewer servicing proposed is appropriate for the type of use;
3. There are no negative impacts on KNHFs and/or KHFs or their functions; and
4. There are no negative impacts on the biodiversity or connectivity of the NHS.

The Greenbelt Plan (2017) contains policies to protect key hydrologic areas (KHAs), KHFs and KNHFs.

KHAs include the following:

- Significant groundwater recharge areas (SGRAs);
- HVAs; and
- Significant surface water contribution areas.

KHFs include the following:

- Permanent and intermittent streams;
- Lakes (and their littoral zones);
- Seepage areas and springs; and
- Wetlands.

KNHFs include the following:

- Habitat of Endangered and Threatened species;
- Fish habitat;
- Wetlands;
- Life science ANSIs;
- Significant valleylands;
- Significant woodlands;
- SWH (including habitat of special concern species);
- Sand barrens, savannahs and tallgrass prairies; and
- Alvars.

2.7 Oak Ridges Moraine Conservation Plan

The ORMCP (2017) was created to provide land-use and resource management planning to protect the Moraine's ecological and hydrological features and functions. The lands identified as part of the ORMCP and the Niagara Escarpment Plan are also subject to the Greenbelt Plan. The Greenbelt Plan, together with the Growth Plan for the Greater Golden Horseshoe, builds on the PPS to provide a land-use planning framework to protect the environment while supporting the provincial economy.

The following land-use designations are recognized under the ORMCP:

- Natural Core Areas – areas with high concentrations of KNHFs, KHFs, ecological functions or landform conservation areas.
- Natural Linkage Areas – areas that form part of a central corridor that support or have the potential to support movement of plants and animals between Natural Core Areas, Natural Linkage Areas, river valleys and stream corridors.
- Countryside Areas – rural lands.
- Settlement Areas – urban development.

Designated Natural Core Areas and Natural Linkage Areas are present within the south-western portion of the Subject Lands. The core areas were identified in the western portion of the Subject Lands near the wooded communities and the linkage areas were identified along Bathurst Street near a wetland community.

KNHFs include the following:

- Wetlands;
- Habitat of endangered and threatened species;
- Fish habitat;
- ANSIs (Life Science);
- Significant valleylands;
- Significant woodlands;
- SWH (including habitat of special concern species); and
- Sand barrens, savannahs and tallgrass prairies.

KHFs include the following:

- Permanent and intermittent streams;
- Wetlands;
- Kettle lakes; and
- Seepage areas and springs.

2.8 Endangered Species Act

The provincial ESA, 2007 (Consolidation 2021) was developed to:

- Identify species at risk (SAR) based upon best available science;
- Protect SAR and their habitats and to promote the recovery of the SAR; and
- Promote stewardship activities that would support those protection and recovery efforts.

The ESA protects all threatened, endangered and extirpated species listed on the Species at Risk in Ontario (SARO) list (Government of Ontario 2007b). These species are legally protected from harm or harassment, and their associated habitats are legally protected from damage or destruction, as defined under the ESA, unless authorized through a permitting or registration process.

2.9 Fisheries Act

Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act*, 1985, which defines fish habitat as “water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas” (s. 2(1)). The *Fisheries Act* prohibits the death of fish by means other than fishing (s. 34.4(1)), and the harmful alteration, disruption or destruction of habitat (HADD; s. 35(1)), unless permitted under a Fisheries Act Authorization. A HADD is defined as “any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat’s capacity to support one or more life processes” (DFO 2019).

3. Ecological Characterization

3.1 Secondary Source Review

GEI has relied, in part, upon supporting background information to provide insight into the overall character of the Subject Lands. These resources included:

- Land Information Ontario (LIO) Natural Features Mapping (2019);
- Natural Heritage Information Centre (NHIC) database (2022);
- LSRCA Regulation Mapping (2019);
- Provincial wildlife atlases (i.e., Ontario Breeding Bird Atlas, etc.);
- Citizen Science Databases (i.e., iNaturalist and eBird); and,
- DFO Aquatic Species at Risk Distribution Mapping (DFO 2022).

The results of these background reviews are discussed in the following sections.

3.1.1 Land Information Ontario Natural Features

The LIO geographic database (2019) identifies the following features on or within 120 metres (m) of the Subject Lands (**Figure 2**):

Within the Subject Lands:

- Portions of the Ansnorveldt PSW Complex;
- Woodlands;
- Greenbelt areas designated as Protected Countryside; and
- Oak Ridges Moraine Areas designated as Countryside and natural core area.

Within 120 m of the Subject Lands:

- Unevaluated Wetlands;
- Cawthra Mulock Nature Reserve;
- Greenbelt areas designated as Protected Countryside; and,
- Oak Ridges Moraine Areas designated as Countryside, Natural Core Area and Natural Linkage Areas.

No other natural heritage features were identified on or adjacent to the Subject Lands in the MNRF LIO mapping.

3.1.2 Natural Heritage Information Centre

The NHIC database (MNRF 2022) was searched for records of provincially significant plants, vegetation communities and wildlife on and in the vicinity of the Subject Lands. The database provides occurrence data by 1 km^2 area squares, with nine squares containing the Subject

Lands: 17PJ1880, 17PJ1980, 17PJ1978, 17PJ1878, 17PJ1778, 17PJ1979, 17PJ1879, 17PJ1779 and 17PJ1780.
In total, nine species were recorded in the atlas squares that overlap with the Subject Lands.

- Species listed as Threatened or Endangered on the SARO list:
    - Bank Swallow (*Riparia riparia*) – Threatened;
    - Barn Swallow (*Hirundo rustica*) – Threatened;
    - Bobolink (*Dolichonyx oryzivorus*) – Threatened;
    - Eastern Meadowlark (*Sturnella magna*) –Threatened;
    - Black Ash (*Fraxinus nigra*) – Endangered; and
    - Butternut (*Julgans cinerea*) – Endangered.

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species):

    - Wood Thrush (*Hylocichla mustelina*) – Special Concern;
    - Snapping Turtle (*Chelydra serpentina*) – Special Concern; and
    - Swamp Valarian (*Valeriana uliginosa*) – S2 (imperiled).

3.1.3 Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas (OBBA) contains detailed information on the population and distribution status of Ontario birds (Bird Studies Canada et al. 2006). The data are presented on 100 km^2 area squares with two squares overlapping a portion of the Subject Lands (17PJ17 and 17PJ18). It should be noted that the Subject Lands represent only a small component of the overall bird atlas squares. Therefore, it is unlikely that all species noted within these atlas squares are found within the Subject Lands. Habitat type, availability and size are all contributing factors in species presence and use.

In total, 124 species were recorded in the atlas squares that overlap with the Subject Lands, with the following species of interest noted:

- Species listed as Threatened or Endangered on the SARO list:
    - Bank Swallow – Threatened;
    - Barn Swallow – Threatened;
    - Bobolink – Threatened;
    - Chimney Swift (*Chaetura pelagica*) – Threatened;
    - Eastern Meadowlark – Threatened; and
    - Red-headed Woodpecker (*Melanerpes erythrocephalus*) - Endangered.

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species):
    - Black Tern (*Chlidonias niger*) – Special Concern;
    - Blue-winged Teal (*Anas discors*) – S3B (vulnerable), S4M (apparently secure);
    - Canada Warbler (*Cardellina canadensis*) – Special Concern;

- Common Gallinule (*Gallinula galeata*) – S3B;
- Eastern Wood-Pewee (*Contopus virens*)– Special Concern;
- Grasshopper Sparrow (*Ammodramus savannarum*) – Special Concern; and
- Wood Thrush – Special Concern.

3.1.4 Ontario Reptile and Amphibian Atlas

The Ontario Reptile and Amphibian Atlas contains detailed information on the population and distribution status of Ontario herpetofauna (Ontario Nature 2019). The data are presented on 100 km^2 area squares with two squares overlapping a portion of the Subject Lands (17PJ17 and 17PJ18). It should be noted that the Subject Lands represent only a small component of the overall atlas squares. Therefore, it is unlikely that all species noted within these atlas squares are found within the Subject Lands. Habitat type, availability and size are all contributing factors in species presence and use.

In total, 25 species were recorded in the atlas squares that overlap with the Subject Lands, with the following species of interest noted:

- Species listed as Threatened or Endangered on the SARO list:
  - Blanding's Turtle (*Emydoidea blandingi*) – Threatened.

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species):
  - Eastern Ribbonsnake (*Thamnophis sauritus*) – Special Concern;
  - Northern Map Turtle (*Graptemys geographica*) – Special Concern; and
  - Snapping Turtle (*Chelydra serpentina*)– Special Concern.

3.1.5 Ontario Butterfly and Moth Atlases

The Ontario Butterfly and Moth Atlases (Toronto Entomologists' Association 2022a, 2022b) contain detailed information on the population and distribution status of Ontario butterflies and moths. The data are presented on 100 km^2 area squares with two squares overlapping a portion of the Subject Lands (17PJ17 and 17PJ18). It should be noted that the Subject Lands represent only a small component of the overall atlas squares. Therefore, it is unlikely that all species noted within these atlas squares are found within the Subject Lands. Habitat type, availability and size are all contributing factors in species presence and use.

In total, 86 species were recorded in the atlas square that overlaps with the Subject Lands. Of these, one species of interest was noted: Monarch (*Danaus plexippus*), which is listed as Special Concern in Ontario.

3.1.6 Aquatic Species at Risk Distribution Mapping

Aquatic species at risk distribution mapping (DFO 2022) was reviewed to identify any known occurrences of aquatic SAR, including fish and mussels, within the subwatershed where the Subject Lands is located.

No aquatic SAR (i.e., fish or mussels) were identified on or within the general vicinity of the Subject Lands.

3.1.7 eBird Results

The eBird (2022) database is a large citizen science-based project with a goal to gather bird diversity information in the form of checklists of birds, archive it, and share it to power new data-driven approaches to science, conservation and education. As the observations can be submitted by anyone, and the records are not officially vetted, the data obtained from this tool should not be used as a clear indicator of species presence, and species may be filtered out based on habitat and target survey efforts.

This online database was examined to identify observations made within the Subject Lands. However, no species of interest were found on the Subject Lands or within 120 m of its boundaries.

3.1.8 iNaturalist Results

The iNaturalist (2022) database is a large citizen science-based identification and data collection app. It allows any citizen to submit observations to be reviewed and identified by other naturalists and scientists to help provide accurate species observations. As the observations can be submitted by anyone, and the records are not officially vetted, the data obtained from this tool should not be used as a clear indicator of species presence, and species may be filtered out based on habitat and targeted survey efforts.

This online database was examined to identify observations made within the Subject Lands that were research grade. However, no species of interest were found on the Subject Lands or within 120 m of its boundaries.

3.1.9 Landscape Ecology

The Subject Lands are located within Ecoregion 6E (Lake Simcoe - Rideau). From a landscape perspective, the Subject Lands are located within the Lake Simcoe Watershed and West Holland Subwatershed. Two PSW units were identified within the northern and eastern portions of the Subject Lands. Several unevaluated wetlands are also present within the naturalized areas of the Subject Lands. Three unnamed tributaries to the Holland River were identified within the north-eastern portion, with two tributaries being located near the corner of Green Lane and Bathurst Street and one tributary associated with the central wooded area and PSW unit. One additional tributary is identified with the southern portion of the property within the wooded unit. Headwater drainage features (HDFs) may be present within the naturalized and agricultural settings.

The landscape surrounding the Subject Lands is represented by a mixture of industrial, agricultural and residential land uses interspersed with naturalized vegetation communities and natural heritage features.

The Subject Lands themselves are primarily composed of agricultural lands and scattered hedgerows. Some anthropogenic structures (i.e., residences, barns and farm outbuildings) are present within the Subject Lands. Some remnant and fragmented vegetation communities are present in the middle and north-eastern portions of the Subject Lands, while, in the south-western portion, a larger more contiguous woodland feature is present. This feature connects to a larger woodland south of the Subject Lands and eventually to the Glenville Hills Kame ANSI, approximately 1 km south of the Subject Lands.

3.2 Site Reconnaissance Findings

A site reconnaissance was conducted by GEI's Ecology team on October 4, 2022 to generally characterize the Subject Lands. Findings and initial interpretations are provided below.

3.2.1 Aquatic Ecology

Four potential watercourses were identified within the Subject Lands:

- One within the south-western ORMCP Core Area;
- One within the south-eastern PSW unit;
- One within the north-eastern corner of the Subject Lands (i.e., near the intersection of Bathurst Street and Green Lane); and
- One within the central forested and PSW unit.

Of these four drainage features, flow was observed within two of them (north-eastern and south-western). These watercourses were identified as regulated watercourses by the LSRCA (as discussed above within **Section 2.3** and shown on **Figure 2**). Two other regulated watercourses were identified as draining into the north-eastern watercourse. These features were dry during the site reconnaissance, suggesting that they are seasonal features. A review of available topographic information suggested the catchment areas for these two features are approximately 5.3 ha and 21.5 ha; thus, they should be considered headwater drainage features instead of watercourses.

No perched culverts were recorded within the flowing watercourses and no obvious fish migration barriers were identified that would suggest fish were unable to access the features. Within the central forested/PSW watercourse, one existing farm crossing was recorded. The farm crossing had a CSP culvert and appears to be regularly used by cattle as evident by hoof prints within the muddied crossing.

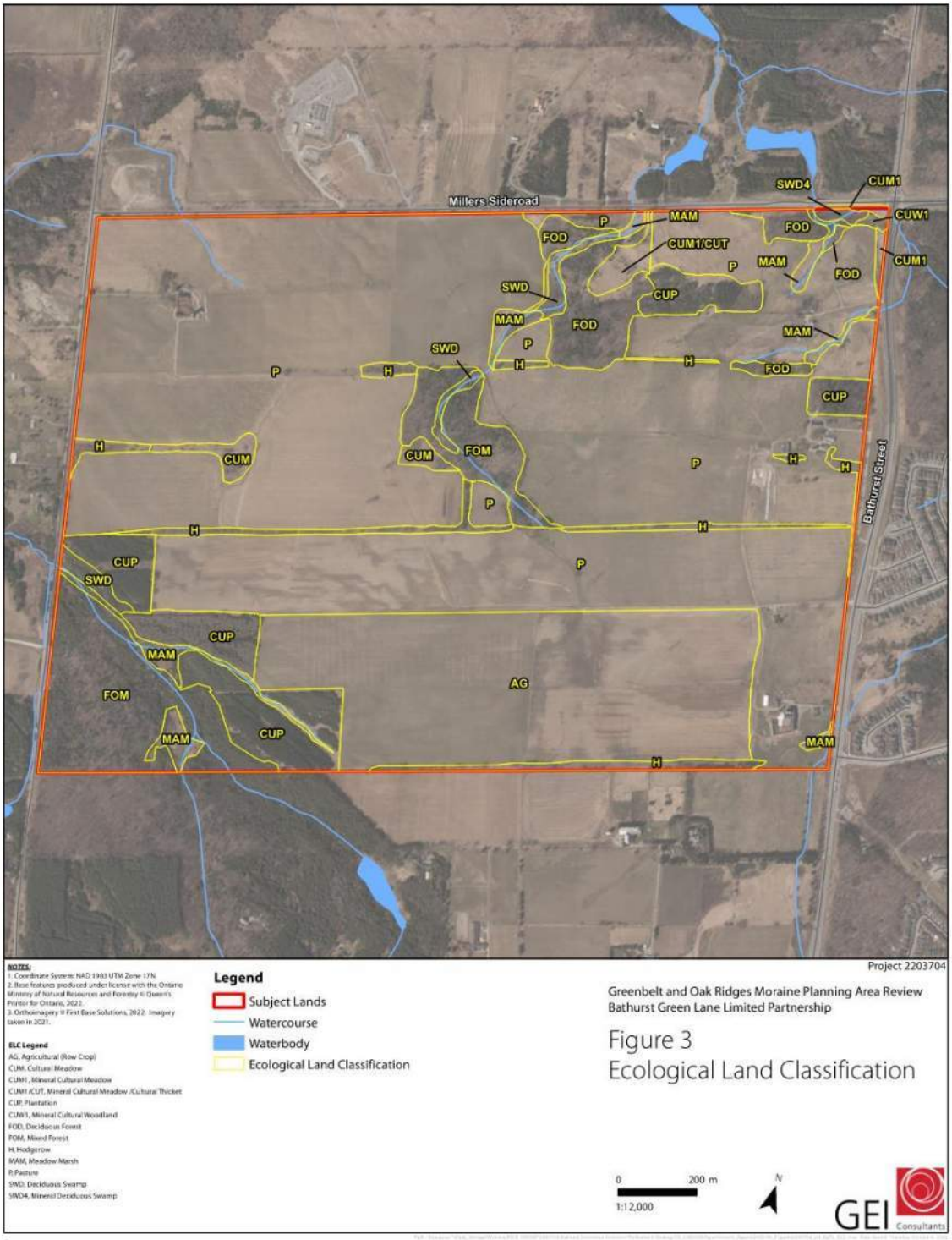
Several potential headwater drainage features were identified within the Subject Lands within topographic lows. Most of these features were associated with active pasturelands and/or cropped agricultural fields. Based on the existing riparian vegetation and dry conditions, it is likely that these features would be assigned a Mitigation management recommendation under the TRCA/CVC's Evaluation, Classification and Management of Headwater Drainage Features Guideline (2014).

No ponds were observed within the Subject Lands.

3.2.2 Vegetation Communities

Ecological Land Classification (ELC) data for portions of the Subject Lands is available through the LSRCA open data portal (LSRCA 2022). This data was used as a basis for analysis of vegetation communities present within the Subject Lands. GEI also undertook preliminary delineation of vegetation communities using aerial imagery interpretation and confirmation of vegetation communities was undertaken during the site reconnaissance visit on October 4, 2022. The preliminary delineation of vegetation communities within the Subject Lands are illustrated on **Figure 3**.

Figure 3: Ecological Land Classification



Much of the Subject Lands are agricultural lands (i.e., pasture lands and row crops) interspersed with hedgerows. The property has been used for cattle and much of the Subject Lands have been converted for cattle grazing, particularly in the northern and middle portions of the Subject Lands. The southern agricultural fields consisted of row crops during the site reconnaissance visit on October 4, 2022. Isolated portions of the Subject Lands still support naturalized vegetation communities, and a description of those features is provided below.

A large woodland is present within the south-western portion of the Subject Lands. This woodland is also located within the portion of the Subject Lands that is designated as ORMCP Core Area. This large feature mainly consists of a Mixed Forest (FOM) and Cultural Plantations (CUP). Small wetlands are also present, including a Deciduous Swamp (SWD) and Meadow Marshes (MAM). These wetlands are associated with the watercourse that bisects the woodland.

Within the portions of the Subject Lands designated as Greenbelt Protected Countryside and NHS, a number of smaller, scattered naturalized vegetation communities are present. A FOM and small Cultural Meadow (CUM1) were identified within the middle of the Subject Lands. This feature has become isolated from the neighboring woodland and Ansnorveldt PSW, located immediately to the northeast. This isolation is assumed to have occurred due to the presence of a hydro corridor and subsequent vegetation management, as well as the installation of a farm crossing. An existing culvert is present to convey flows from the watercourse that bisects the landscape in the generally northeast to south-west direction. This feature was noted to be dry during the time of site reconnaissance.

To the north-east of the FOM, another large area of naturalized vegetation is present. This feature consisted of a Deciduous Forest (FOD) and CUP. The wooded areas were bisected by a creek and portions of the Ansnorveldt PSW. Wetland features include a SWD and MAM. In the field, it was noted that the limits of the Ansnorveldt PSW had been fenced, presumably to limit grazing by cattle.

Near the intersection of Green Lane and Bathurst Street, another portion of naturalized vegetation is present. However, evidence of disturbance, presumably associated with the installation of Bathurst Street, is apparent near the intersection. Close to the intersection, a narrow band of CUM and a small disturbed Cultural Woodland (CUW1) are present. Steep banks, associated with the road right-of-way are present in this location. A narrow band of SWD is present at the bottom of these slopes. This vegetation community is also associated with the creek in this location.

An isolated patch of the FOD is setback slightly from Miller's Sideroad/Green Lane; this forest is bisected by a MAM which appears to convey overland flows from the adjacent fields towards the SWD and its associated watercourse. This feature was dry during the time of site reconnaissance visit on October 4, 2022.

A few additional isolated features are also present along the eastern limit of the Subject Lands. These include a narrow MAM, a narrow band of FOD, and a CUP.

Finally, an isolated unit of the Ansnorveldt PSW is present in the south-eastern corner of the Subject Lands. This feature is characterized as a MAM; however, the community appears to have been disturbed and possibly grazed in the past. In the field, it was noted that the limits of the PSW had been fenced, presumably to limit further grazing by cattle.

These vegetation communities are illustrated on **Figure 3**.

3.2.3 Flora

A dead Butternut (*Juglans cinerea*) was identified near the edge of the FOM in the south-western portion of the Subject Lands. This species is designated as Endangered within Ontario. Additional Butternut may be present elsewhere within the Subject Lands.

Some invasive species noted within the Subject Lands during the site reconnaissance included:

- Common Reed (Phragmites australis);
- European Buckthorn (Rhamnus cathartica);
- Canada Thistle (Cirsium arvense); and
- Purple Loosestrife (Lythrum salicaria).

Of these, Common Reed is considered a highly invasive species and is subject to provincial Best Management Practices for its eradication (Anderson 2012). Common Reed was identified within the road right right-of-way along Bathurst Street; however, it may be elsewhere in the Subject Lands.

3.2.4 Fauna

Habitats for various terrestrial and aquatic species were recorded within the Subject Lands. It is likely that the south-western, north-eastern and north-central watercourse support linkage functions on the landscape; specifically, the south-western and north-eastern watercourse likely provide primary linkages, while the north-central watercourse likely provides a secondary linkage. These linkages would likely support various mammals, amphibians, reptiles, birds and fish, as well as other abiotic and biotic processes.

Several barn and shed structures were recorded within the Subject Lands that could support SAR bats and Barn Swallow. Detailed investigations are required to understand whether these species are present and using these structures.

One Turkey Vulture (*Cathartes aura*) was recorded during the site reconnaissance. No other wildlife were recorded during the site reconnaissance.

3.3 Analysis of Natural Heritage Features

Eight types of natural features are identified in the PPS (MMAH 2020):

- Significant wetlands;

- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- SWH;
- Fish habitat;
- Habitat of endangered and threatened species; and
- Significant areas of natural and scientific interest.

The presence and/or absence of these natural features within the Subject Lands are discussed in the subsequent sections. These characterizations are considered preliminary and should be confirmed with detailed ecological inventories. This section is informed by the Natural Heritage Reference Manual (NHRM; MNR 2010).

3.3.1 Significant Wetlands

Within Ontario, significant wetlands are identified by the MNRF or by their designates. Other evaluated or unevaluated wetlands may be identified for conservation by the municipality or the conservation authority. Two PSWs units were identified within the Subject Lands (Figure 2).

Further to this, a number of additional wetlands were identified within the Subject Lands (**Figure 3**). Previously unevaluated or unidentified wetlands can be classified as provincially significant either by complexing them with a nearby PSW (i.e., within 750 m) or by evaluating the wetland on its own to determine if it meets the test of significance. Given that a confirmed PSW is present within the Subject Lands, it is possible that the LSRCA, the Township and Region may defer to the MNRF to assess whether these wetland units should be complexed in following the Ontario Wetland Evaluation System (OWES).

The LSRCA and/or the MNRF may propose including these unidentified wetlands to the existing PSW complex (as they are within 750 m of an existing PSW) during the review process. As a precautionary approach, these wetlands are considered herein as candidate PSWs.

3.3.2 Significant Coastal Wetlands

Similar to significant wetlands, the MNRF or their designates identify significant coastal wetlands present on the landscape. Coastal wetlands are defined in the NHRM (MNR 2010) as:

a) *"any wetland that is located on one of the Great Lakes or their connecting channels (Lake St. Clair, St. Mary's, St. Clair, Detroit, Niagara and St. Lawrence Rivers); or*

b) *Any other wetland that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located two km upstream of the 1:100-year floodplain (plus wave run-up) of the large water body to which the tributary is connected."*

No significant coastal wetlands are identified in the Subject Lands and would not be expected given the distance of the Subject Lands from the waterbodies noted above.

3.3.3 Significant Woodlands

Significant woodlands are identified by the planning authority in consideration of criteria established by the MNRF. Under the NHRM (2010), woodlands are defined as:

> *...treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels.*

However, both the York Region (2019) and Township of King (2022) Official Plans define Woodlands as:

… An area of land at least 0.2 hectare in area with at least:

a) 1000 trees of any size, per hectare;
b) 750 trees measuring over 5 centimetres diameter at breast height, per hectare;
c) 500 trees measuring over 12 centimetres diameter at breast height, per hectare; or,
d) 250 trees measuring over 20 centimetres diameter at breast height, per hectare…

Similarly, both the York Region (2019) and Township of King (2022) Official Plans state that woodlands within the Greenbelt NHS must be evaluated for significance in accordance with the requirements of the Greenbelt Plan and associated technical papers. The Greenbelt Plan (2017) defines Significant Woodlands as:

… an area which is ecologically important in terms of features such as species composition, age of trees and stand history; 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; or economically important due to site quality, species composition, or past management history…

In accordance with the above-noted definitions, natural treed communities (FOC, FOM, FOD, SWC, SWM, SWD) and cultural forest/plantation communities (CUW, CUP) may be considered woodlands (i.e., meets the *Forestry Act* woodland density requirements). Woodland patches are considered part of the same continuous woodland if they are within 20 m of each other.

Based on the preliminary review, it is likely that any features identified as Forest (FO) or Swamp (SW), or CUP could be considered significant woodlands. Given their proximity to PSW units, prominence on the landscape, size and diversity of vegetation communities, it is likely that these woodlands would be considered significant.

3.3.4 Significant Valleylands

Significant valleylands are defined and designated by the planning authority (per section 8.1.3 of the NHRM; MNR 2010). General guidelines for determining significance of these features are presented in the NHRM (MNR 2010). Recommended criteria for designating significant valleylands includes prominence as distinctive landform, degree of naturalness, and importance of its ecological functions, restoration potential and historical and cultural values. It is recognized that the NHRM doesn't specify the number of criteria that are required to be met for a feature to be significant and recommends that local planning authorities undertake a study that would determine which criteria should be applied for a valleyland to be considered significant; no such study has been undertaken by the planning authorities to date.

It is likely that valleylands are present with the unnamed tributaries of the West Holland River within the Subject Lands. Given the prominence of the features on aerial imagery, there is potential that these features could be considered significant valleylands, and thus will be treated herein as candidate significant valleylands.

Additional studies will be required to confirm the presence of significant valleylands within the Subject Lands.

3.3.5 Significant Wildlife Habitat

SWH is one of the more complex natural heritage features to identify and evaluate. There are several provincial documents that discuss identifying and evaluating SWH including the NHRM (MNR 2010), the Significant Wildlife Habitat Technical Guide (MNR 2000) and the SWH Eco-Region Criterion Schedule (MNRF 2015). The Subject Lands are located in Eco-Region 6E and were therefore assessed using the 6E Criterion Schedule (MNRF 2015).

There are four general types of SWH:

- Seasonal concentration areas;
- Rare or specialized habitats;
- Habitat for species of conservation concern; and
- Animal movement corridors.

General descriptions of these types of SWH are provided in the following sections.

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. Seasonal concentration areas include deer yards, wintering sites for snakes, bats, raptors and turtles, waterfowl staging and molting areas, bird nesting colonies, shorebird staging areas and migratory stopover areas for passerines or butterflies. Only the best examples of these concentration areas are usually designated as SWH.

Rare or Specialized Habitats

Rare and specialized habitat are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the 'state', or in Canada at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the NHIC (2022), could qualify. It is to be assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

Specialized habitats are microhabitats that are critical to some wildlife species. The NHRM (MNR 2010) defines specialized habitats as those that provide for species with highly specific habitat requirements, areas with exceptionally high species diversity or community diversity, and areas that provide habitat that greatly enhances species' survival.

Habitat for Species of Conservation Concern

Species of conservation concern include those that are provincially rare (S1 to S3), provincially historic records) and Special Concern species. Several specialized wildlife habitats are also included in this SWH category, including Terrestrial Crayfish habitat, and significant breeding bird habitats for marsh, open country and early successional bird species.

Habitats of species of conservation concern do not include habitats of endangered or threatened species as identified by the ESA (2021 Consolidation). Endangered and threatened species are discussed in **Section 3.3.7**.

Animal Movement Corridors

Animal movement corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements, including areas used by amphibians between breeding and summer/over-wintering habitats, called amphibian movement corridors.

Table 1 (**Appendix A**) discusses the potential for SWH within the Subject Lands based on the preliminary ELC and site reconnaissance observations. Detailed ecological investigations are required to confirm whether SWH is present within the Subject Lands.

The following candidate SWH types were identified within the Subject Lands:

- Raptor Wintering Areas (FOM community in the South-western portion of the Subject Lands);
- Bat Maternity Colonies (FOD, FOM, SWD, SWM);
- Turtle Wintering Areas (MAM);
- Reptile Hibernacula (All ecosites);
- Colonial Bird Nesting Sites (tree/shrubs; SWD and SWM);
- Waterfowl Nesting Area (MAM, SWD);
- Bald Eagle and Osprey Habitats (FO, SW);
- Woodland Raptor Nesting Habitat (FO, CUP and SW);

- Seeps and Springs (Forested ecosites);
- Woodland Amphibian Breeding Habitat (FO, SW);
- Wetland Amphibian Breeding Habitat (SW, MA);
- Woodland Area-Sensitive Bird Breeding Habitat (FO, SW);
- Marsh Bird Breeding Habitat (MAM);
- Terrestrial Crayfish (MAM);
- Habitats for Special Concern and Rare Wildlife:
    - Canada Warbler
    - Eastern Wood-Pewee
    - Grasshopper Sparrow
    - Wood Thrush
    - Monarch
    - Swamp Valerian
    - Snapping Turtle

All candidate SWH types are associated with the wetland and forested communities found within the Subject Lands, except for candidate Monarch SWH. While unlikely, Monarch SWH may be present within the CUM vegetation communities in the Subject Lands. Large abundances of Common Milkweed (*Asclepias syriaca*), the host plant for Monarch, and evidence of Monarch breeding would be required to be considered SWH for this species.

3.3.6 Fish Habitat

Fish habitat, as defined in the federal *Fisheries Act* (1984), c. F-14, means "spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes." Fish, as defined in S.2 of the *Fisheries Act*, c. F-14, includes "parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals."

Four watercourses were identified within the Subject Lands during the site reconnaissance, of which two (south-western and north-eastern) were flowing during the visit suggesting that they provide permanent, direct fish habitat. The two dry watercourses (north-central and south-eastern) likely provide seasonal fish habitat. Detailed investigations are required to determine whether they support direct or indirect fish habitat.

One watercourse was identified in the north-western corner of the Subject Lands by LIO; however, this feature was not identified as a regulated watercourse on LSRCA mapping. A brief review of Ontario Flow Assessment Tool suggests that this feature is likely a seasonal headwater drainage feature (HDF) instead of a watercourse. This was further confirmed during the site reconnaissance as no obvious flow path was observed within the agricultural field. It is likely that this feature provides indirect fish habitat. Similarly, other HDFs within the Subject Lands likely support seasonal fish habitat and/or indirect fish habitat. HDFs that are dry and/or containing standing water during early spring assessment would not provide fish habitat. To determine the hydrology, functionality and extent of HDFs within the Subject Lands, additional investigations would be required to assess their management

recommendations using the TRCA and CVC's 2014 Headwater Drainage Feature Assessment Guideline, in conjunction with fish community sampling.

3.3.7 Habitat for Endangered and Threatened Species

Table 2 (**Appendix A**) discusses the potential for endangered and threatened SAR and SAR habitat within the Subject Lands. This is based on the species identified through the background wildlife atlas search (**Section 3**).

The following SAR and SAR habitat may be present within the Subject Lands based on preliminary ELC and site reconnaissance findings:

- Black Ash
- Butternut
- Bank Swallow
- Barn Swallow
- Bobolink
- Chimney Swift
- Eastern Meadowlark
- Red-headed Woodpecker
- Bat SAR (Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tri-colored Bat)

Detailed investigations are required to confirm whether these species are present within the Subject Lands.

3.3.8 Significant Areas of Natural and Scientific Interest

No ANSIs were identified on or within 120 m of the Subject Lands (**Figure 2**).

4. Secondary Source Review for Geotechnical & Hydrogeological Conditions

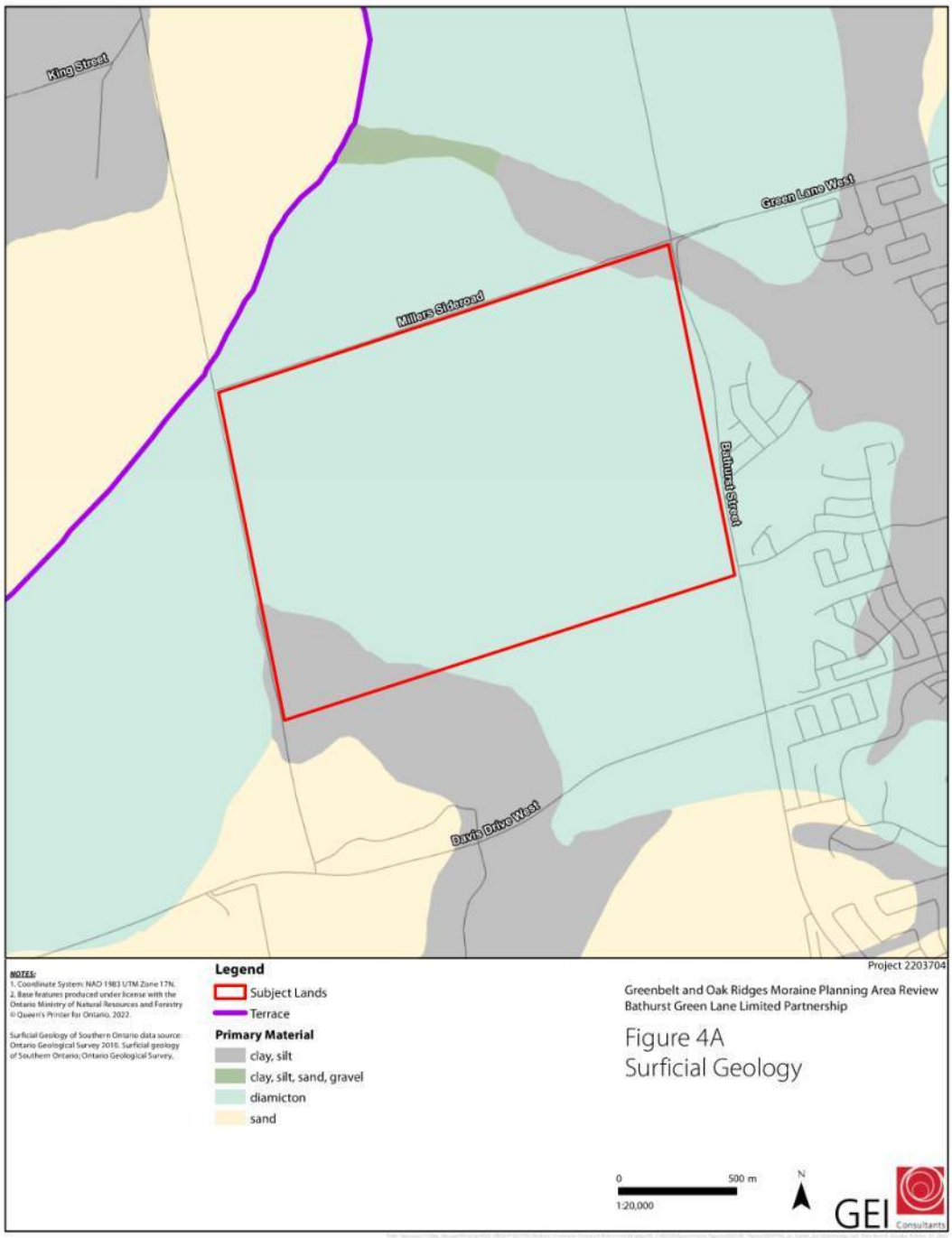
GEI has conducted a desktop background review of the publicly available sources of subsurface information, surficial geology and bedrock mapping, and local experience about nearby soil and groundwater conditions to discuss geotechnical and hydrogeological engineering constraints and considerations for the Subject Lands.

Existing subsurface investigations, geotechnical reports, or hydrogeological reports were not provided by the client for the Subject Lands. An overview of the subsurface conditions expected to be encountered within the Subject Lands were established using a range of publicly available information and previous subsurface investigations completed by GEI nearby, summarized below. The actual subsurface conditions within the Subject Lands may differ once detailed borehole investigations are carried out.

4.1 Physiology and Geology Mapping

Surficial geology mapping from the Ontario Geological Survey (OGS) was reviewed and is provided on **Figure 4A**. The OGS mapping indicates that most of the Subject Lands are dominated by stone-poor sandy silt to silty sand glacial till on Paleozoic terrain (called “diamicton” on **Figure 4A**). The north-eastern corner and south-western corner of the Subject Lands are shown to be underlain by fine textured glaciolacustrine deposits of clays and silts. The Subject Lands are within the Physiographic Region denoted as the Simcoe Lowlands (Chapman and Putnam 1984), with the landform consisting of drumlinized glacial till plains. Mapping indicates that several drumlins are present within the Subject Lands.

Figure 4a: Surficial Geology

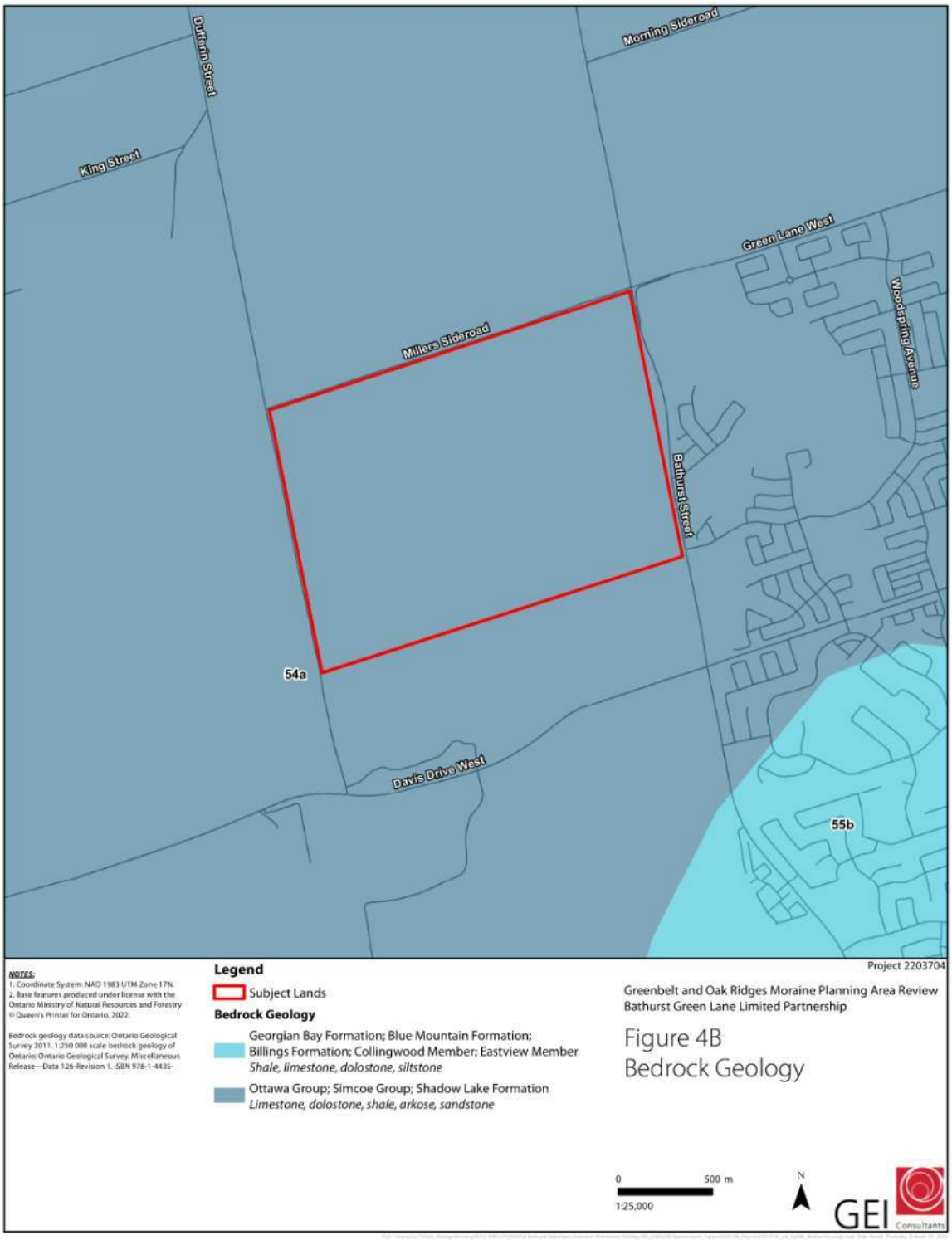


Although not specifically identified on the mapping, there may be local and discontinuous cohesionless alluvial deposits of sands and gravels along the watercourse alignments.

Bedrock geology mapping was reviewed and is provided on provided on **Figure 4B**. At depth, the Subject Lands are underlain by bedrock of the Lindsay Formation (Simcoe Group), which consists primarily of limestone. Bedrock topography mapping from the Ministry of Northern

Development and Mines (Map P.3414, 1993) indicates bedrock is near Elev. 130 m, or about 120 m below grade.

Figure 4b: Bedrock Geology



Geotechnical boreholes available on a database from the Ministry of Energy, Northern Development and Mines (MENDM) were reviewed. No boreholes were found within the Subject Lands. Boreholes in the database located about 750 m north of the Subject Lands typically encountered glacial till with some sandy interbeds, and a borehole located near the north-western corner of the Subject Lands encountered sands.

4.2 Topography and Drainage

Ministry of the Environment, Conservation and Parks (MECP) mapping with 5 m contour intervals shows that the subject Lands have undulating topography with typical elevations ranging from 290 to 250 m. There are some local hills / ridges with higher topographic relief that generally correspond to drumlin locations shown on the surficial geology mapping. The watercourses are depressed areas closer to elevation 250 to 245 m.

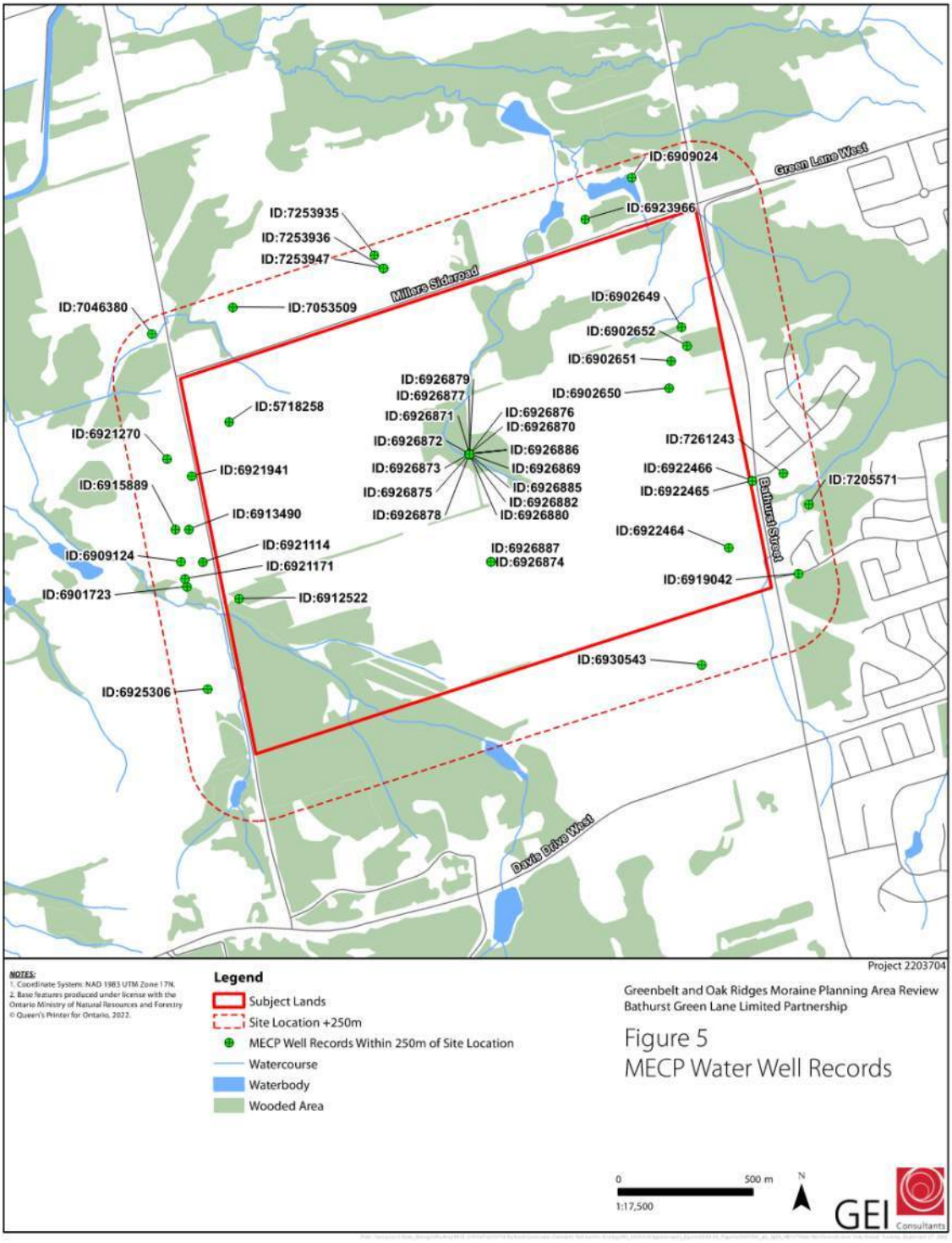
It is expected that overland runoff drains into the tributary watercourses within the Subject Lands. The MECP mapping shows flow directions of these water courses generally to the north and north-western, eventually converging with West Holland River about 6 km north of the Subject Lands. West Holland River outlets into Cook's Bay of Lake Simcoe about 15.5 km north of the Subject Lands.

The Ontario Watershed Information Tool (OWIT) by MNRF was reviewed and similarly shows that the Subject Lands drain north / north-west into West Holland River.

4.3 Ministry of Environment Conservation and Parks Water Well Records and Permit to Take Water Mapping

MECP water well records were reviewed for the Subject Lands and surrounding area. Numerous well records were found in the area, but 12 representative well records were selected and are appended with their locations shown on **Figure 5**. The stratigraphic descriptions within the MECP well records are typically inaccurate due to the methodology in which they are determined (observations of cuttings and no consistency between descriptions of soil between different well drillers). Though this is the case, an overall sense of the stratigraphy can still be determined.

Figure 5: MECP Water Well Records



The well records generally encountered topsoil at grade. The well records typically show layers of clay with stones/gravel below the topsoil, extending to depths of 10 m or more below grade. Based on the surficial geology mapping, the “clay with stones/gravel” may actually

represent cohesive glacial till deposits. The clay layers are typically interbedded with cohesionless deposits of sand and gravel at depth, and some well records indicate local sand deposits could be encountered at grade in some locations. Unstabilized water levels were measured to be 20 to 40 m with one well record indicating a stabilized water level of 6.4 m. These water levels are not considered to fully represent groundwater levels near the ground surface, as the wells are screened within deeper sand aquifers.

The online MECP Permit to Take Water (PTTW) database shows there are no active PTTWs within the Subject Lands. The nearest permit is approximately 900 m northwest of the subject lands for agriculture with a maximum water taking rate of about 5.5 million L/day. Though not necessarily the case, the lack of PTTWs in this area may indicate that there is limited need for active dewatering as the near surface soils are primarily cohesive in nature.

4.4 West Holland River Subwatershed Plan

Figure 2-15 from *"West Holland River Subwatershed Management Plan"* (LSRCA 2010) includes a regional north-south cross section along Yonge Street which is cut just east of the Subject Lands. The cross-section shows that approximately 10 m of Halton Till is expected at grade, underlain by deposits of the Oak Ridges Moraine (ORM). The ORM typically consists of sand and gravel aquifer units.

Halton Till was placed in the last glacial period and consists mainly of a silt to clayey silt matrix. It is an aquitard that overlies the Oak Ridges Moraine Aquifer Complex deeper below the Subject Lands. These expected conditions are consistent with the subsurface findings from the MECP well records and other nearby boreholes.

4.5 Lake Simcoe Region Conservation Authority and Source Protection Plan Mapping

The online Source Protection Information Atlas from the MECP and mapping from LSRCA was reviewed. The Subject Lands are not located within a Wellhead Protection Area (WHPA) Zone A to E, but the entirety of the Subject Lands are located within the York Region WHPA Q2 as shown on **Figure 6A**. Two localized areas along the watercourses are underlain by a HVA as shown on **Figure 6B**. As shown on **Figure 6C**, there are no SGRA's within the Subject Lands. The areas surrounding the watercourses are considered an Intake Protection Zone (IPZ) 3 but are not an IPZ 1 or 2.

Figure 6a: Wellhead Protection Areas

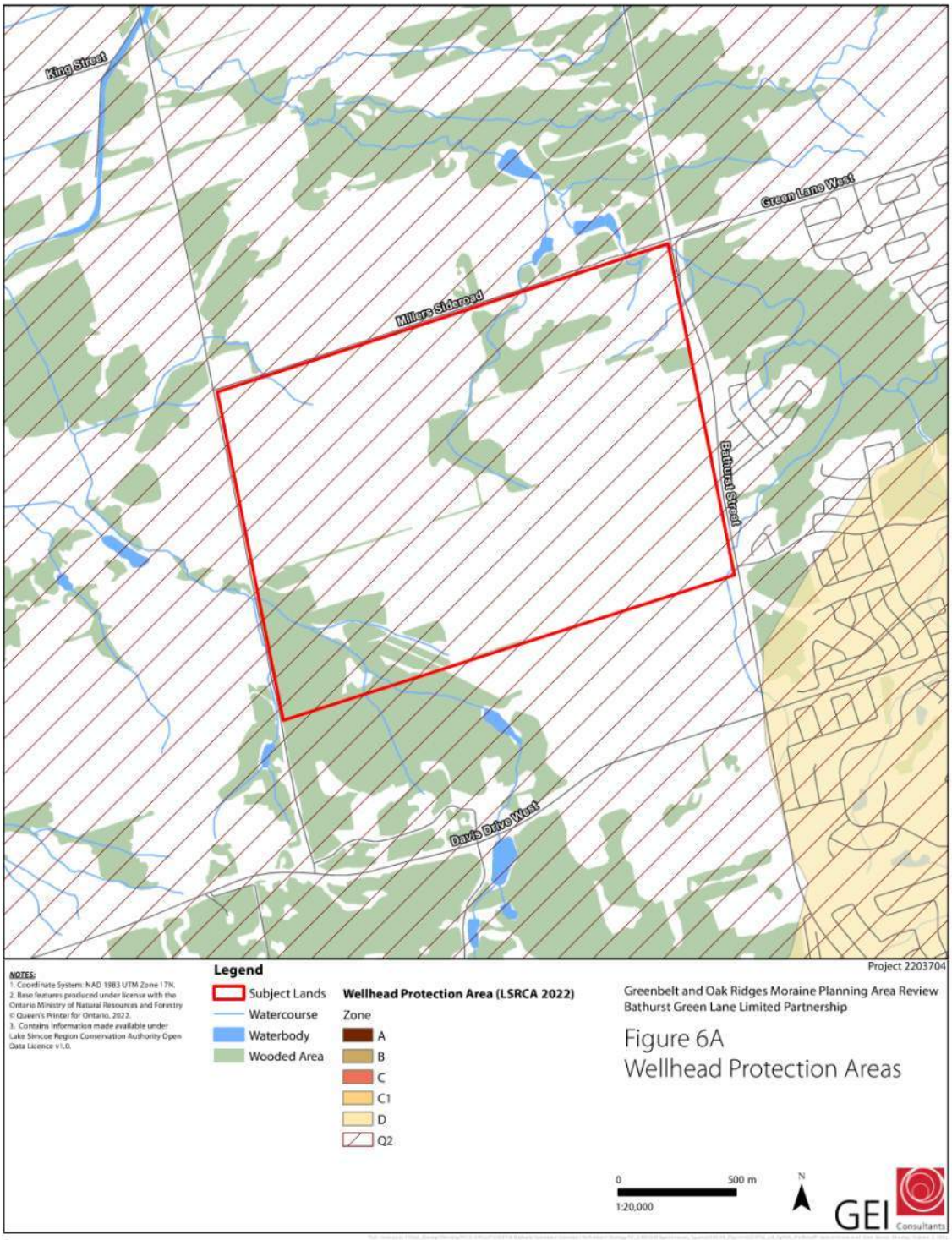


Figure 6b: Highly Vulnerable Aquifers

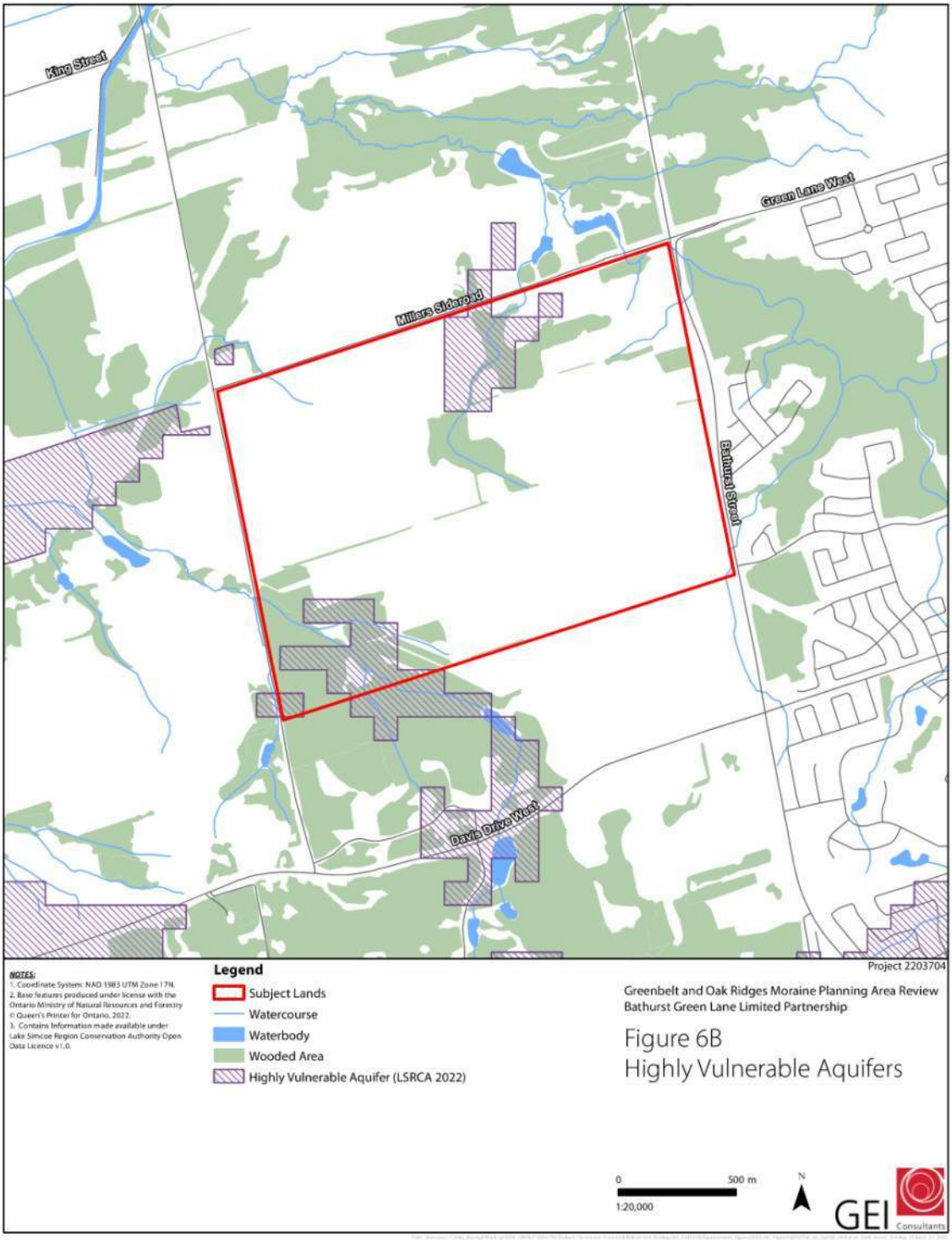
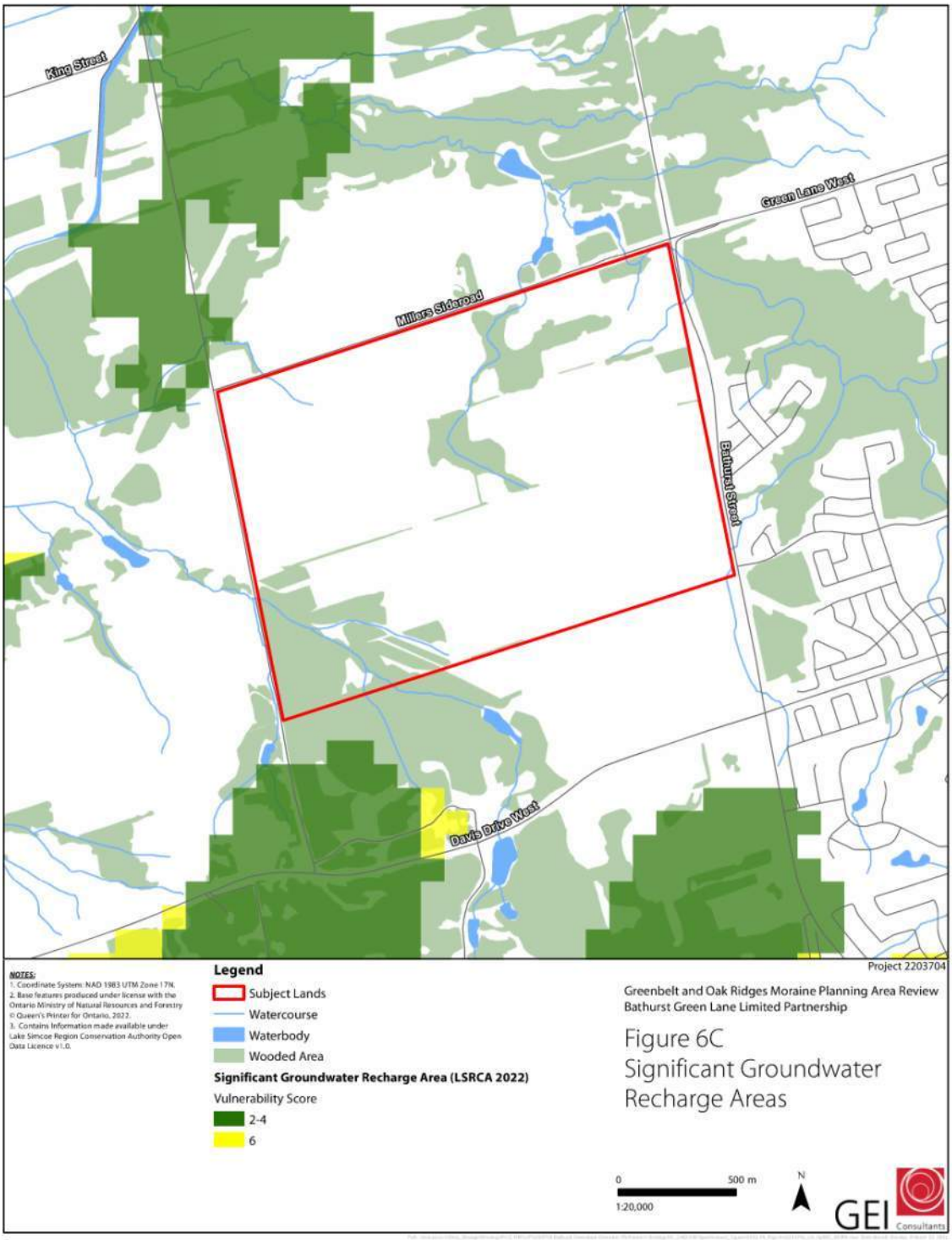


Figure 6c: Significant Groundwater Recharge Areas



The document *"Guidance for the Protection and Restoration of Significant Groundwater Recharge Areas (SGRAs) in the Lake Simcoe Watershed,"* dated February 2014, by LSRCA, provides additional mapping for Ecologically Significant Groundwater Recharge Areas (ESGRAs) which are areas that recharge sensitive surface water features like wetlands or coldwater streams. There are no mapped ESGRAs within the Subject Lands based on this document. LSRCA updates their mapping periodically and conditions could change in the future.

As previously described the Subject Lands are noted to be within the ORMCP and Greenbelt Designated Areas. Per the Township of King Official Plan *Schedule J – Oak Ridges Moraine Areas of High Aquifer Vulnerability*, the Subject Lands are shown to only contain Areas of Low Aquifer Vulnerability within the Oak Ridges Moraine.

Online mapping from LSRCA shows that there are mapped watercourses flowing through the north-eastern and south-western quadrants of the Subject Lands. The watercourses and adjacent lands are shown to be Regulated Areas. These watercourses are tributaries to the West Holland River.

4.6 Historic Aerial Photographs

Various aerial images of the Subject Lands from 1954 to 2021 were reviewed online from York Region Maps. The Subject Lands have predominantly been used as farmland with some intermittent farmstead developments (barns, farmhouses, etc.) near the roadways. No obvious signs of infilling or other earthworks were observed, and no obvious signs of erosion along the watercourses were visible. The aerial images are appended.

4.7 Ministry of Transportation Foundation Library

The Ontario Ministry of Transportation (MTO) Foundation Library online database was searched for any MTO geotechnical reports and boreholes near the subject lands. Two reports with boreholes were encountered, both about 800 m south of the Subject Lands along Davis Drive West.

One report included nine borehole logs which encountered hard clayey silt glacial till or hard clayey silt extending to depths of 12 m below grade. The second report included one borehole log which encountered very dense silty sand to a depth of 24 m.

4.8 Other Nearby Boreholes

The nearest boreholes to the Subject Lands previously advanced by GEI were on Woodspring Avenue, about 850 m east of the Subject Lands. The boreholes extended to depths of 6 to 8 m and encountered compact sand and silt glacial till. Groundwater levels were measured at 2 to 4 m below grade and hydraulic conductivity testing showed the soil had a low permeability, precluding the free flow of water.

The Current Planning Applications GIS mapping tool from the Town of Newmarket was reviewed, and the nearest development application is located at the intersection of Bathurst

Street and Davis Drive West (about 500 m southeast of the Subject Lands). Publicly available information was available, including geotechnical and hydrogeological reports with boreholes by other consultants. The boreholes encountered firm to hard clayey silt / clayey silt glacial till deposits to depths of 12 m below grade. A single borehole encountered compact sand and silt at a depth of 14 m. Groundwater was measured about 1 to 2 m below grade and hydraulic conductivity testing indicated low soil permeability within the upper cohesive deposits.

5. Preliminary Hydrologic Constraints Analysis

5.1 Regulatory Requirements

As previously discussed, the Subject Lands are not within a WHPA Zone A to E, but the entirety of the Subject Lands are within the York Region WHPA Q2 as shown on **Figure 6A**. Two localized areas along the watercourses are underlain by a HVA as shown on **Figure 6B**. As shown on Figure 6C, there are no SGRA within the Subject Lands. Additional LSRCA references shows there are no mapped ESGRAs within the Subject Lands. The south-western quadrant of the Subject Lands are noted to be within the Oak Ridges Moraine and the northern part of the Subject Lands are within the Greenbelt.

5.1.1 Source Water Protection

The Subject Lands are located within the West Holland River Watershed, within the jurisdiction of the LSRCA. The following document should be referenced for source water protection within the Subject Lands:

- *"Lake Simcoe Protection Plan"* dated July 2009, by Ministry of the Environment and Climate Change (MOECC), MNR & LSRCA.
- *"Approved South Georgian Bay Lake Simcoe Source Protection Plan"* dated January 26, 2015, by LSRCA.
- *"Lake Simcoe Protection Plan Water Budget Policy for LSPP 4.8-DP and 6.40-DP"* dated November 2018, by LSRCA.

Section 6.0 of the "Lake Simcoe Protection Plan Water Budget Policy for LSPP 4.8-DP and 6.40-DP," (LSRCA 2018) describes the policy hierarchy for water balance required for Lake Simcoe Watershed. The Subject Lands are within the WHPA Q2; therefore, Source Protection Plan Land Use Policy (SPP LUP) 12 applies to the Subject Lands, which is the most stringent policy. A water balance and recommended mitigation measures will be required as part of the detailed hydrogeological study for the Subject Lands. SPP LUP 12 is summarized below.

- Source Protection Plan Land Use Policy (SPP LUP) 12: *"Planning Approval Authorities shall only permit new major development (excluding single detached residential, barns and non-commercial structures that are accessory to an agricultural operation) in a WHPA-Q2 where the activity would be a significant drinking water threat, where it can be demonstrated through the submission of a hydrogeological study that the existing water balance can be maintained through the use of best management practices such as low impact development. Where necessary, implementation and maximization of off-site recharge enhancement within the same WHPA-Q2 to compensate for any predicted loss of recharge from the development."*

Based on Table 2 in *"Lake Simcoe Protection Plan Water Budget Policy for LSPP 4.8-DP and 6.40-DP,"* infiltration-based practices are always permitted from rooftop runoff or vegetated

areas. Infiltration is not permitted from pollution hotspots (gas stations, waste storage areas, etc.). The document shows that infiltration should be permitted for residential developments but there may be restrictions for mixed-use commercial / industrial or strictly industrial developments.

5.1.2 Other Official Plans and Conservation Plans

Section 2 provides a summary of the various other plans that must be followed as part of the development process. This includes the ORMCP (2017), Greenbelt Plan (2017), Township of King Official Plan (2022) and the York Region Official Plan (2019). The hydrogeological considerations from each of these plans is similar, which includes identifying and assessing the KHFs and KHAs on the Subject Lands.

It is the responsibility of planners / others to determine what types of development are feasible based on the land designation and other environmental / planning considerations. Where a major development is proposed, a detailed hydrogeological study must be completed that includes (but is not limited to) the following:

- Identification of the KHFs and KHAs within the Subject Lands and an assessment to verify these features will not be impacted by the proposed development.
- Analysis for maintaining the quantity and quality of groundwater and surface water and maintaining groundwater recharge.
- Groundwater quantity and recharge is assessed with a water balance that:
  - Characterizes groundwater and surface water flow systems by means of modelling.
  - Identifies the availability, quantity, and quality of water sources.
  - Identifies water conservation methods.
- This requires detailed subsurface investigations, field inspections, analysis and reporting.

HVAs are located in the north-eastern and south-western portions of the Subject Lands, along the watercourses. These HVAs may be related to the surrounding wetlands and potential for local sand or gravel deposits which could be surficial aquifers. The aforementioned plans restrict certain land uses within HVAs including generation or storage of hazardous waste, waste disposal, snow storage, underground / above ground storage tanks, stormwater management facilities, etc.

5.1.3 Construction Dewatering

The volume of water entering an excavation during construction will be based on both groundwater seepage and precipitation events. Based on O.Reg. 63/16, the construction dewatering limits and requirements are as follows:

- Construction Dewatering less than 50,000 L/day: The takings of both groundwater and stormwater do not require a hydrogeological report and does not require a Permit to Take Water (PTTW) from the MECP.
- Construction Dewatering greater than 50,000 L/day and less than 400,000 L/day: The taking of groundwater and/or stormwater requires a hydrogeological report and

registration on the Environmental Activity and Sector Registry (EASR) but does not require a PTTW from the MECP.

- Construction Dewatering greater than 400,000 L/day: The taking of groundwater and/or stormwater requires a hydrogeological report and a PTTW from the MECP.

For permanent dewatering, based on Section 34 of O.Reg. 387/04, the dewatering limits and requirements are as follows:

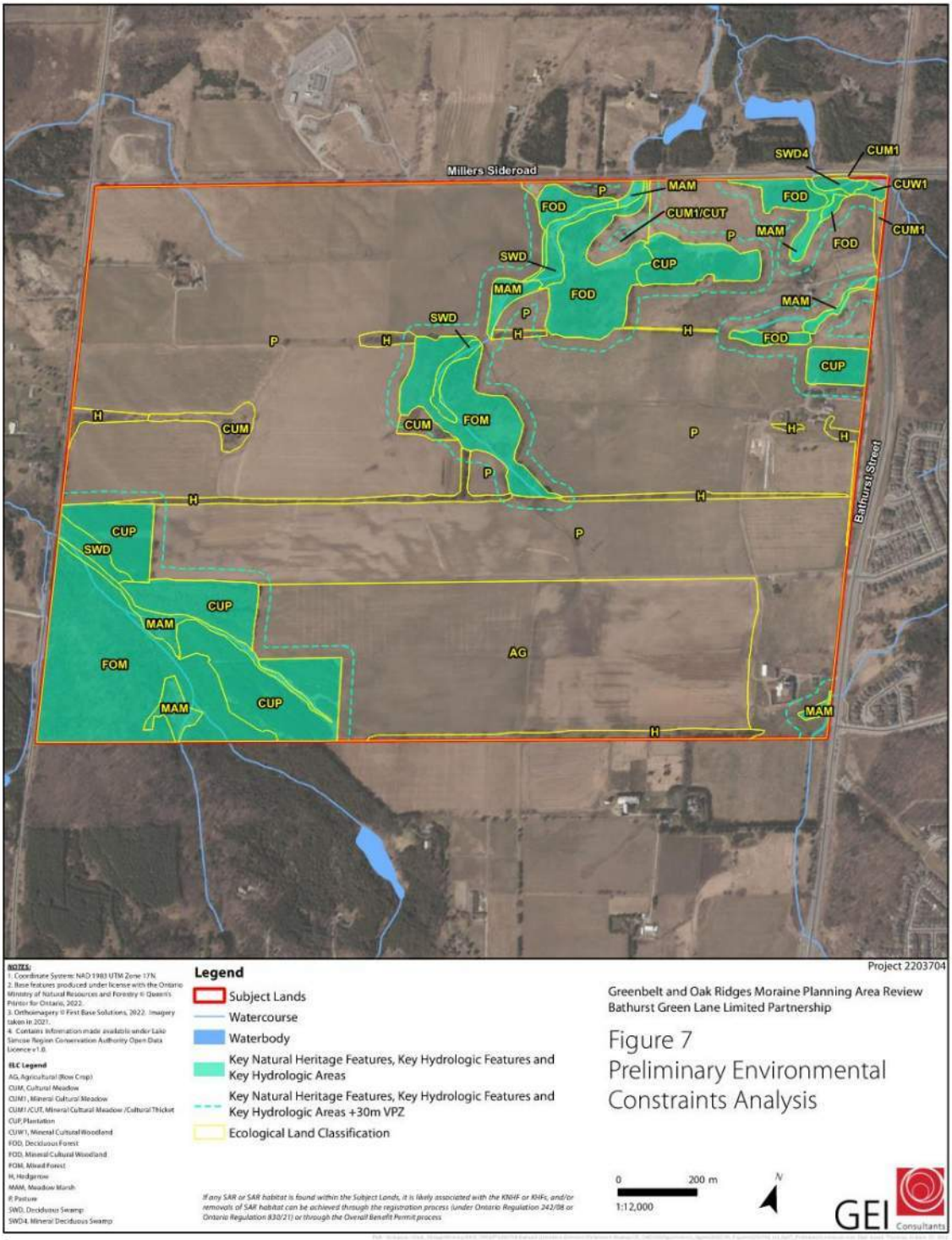
- Water Taking less than 50,000 L/day: A PTTW is not required from the MECP.
- Water Taking greater than 50,000 L/day: A PTTW is required from the MECP.

5.2 Key Hydrologic Features & Areas

For KHFs, permanent and intermittent streams and wetland areas were assessed and are discussed in **Section 3**. The drawing *"Schedule C3, Key Hydrologic Features"* from the Township of King Official Plan (2022) indicates that no kettle lakes are present within the Subject Lands.

Seepage areas and springs are a hydrogeological consideration. Based on the expected soil conditions from the desktop review (glacial till or clayey silt deposits, part of the Halton Till Aquitard) and the Subject Land's topography, seepage areas or springs are not expected across most of the Subject Lands. These soil deposits often have a low permeability which precludes the free flow of water. Our experience on similar sites with rolling topography and cohesive soils indicates that seepage areas are unexpected through the tableland areas. If there are defined slopes and confined valley systems along the watercourses, there is potential for seepage daylighting from the slope face near the bottom of the slope. At a preliminary level, potential seepage locations (if any) are expected to be confined to the watercourse areas already delineated on **Figure 7** as constraint areas where development cannot occur. This assessment must be confirmed through visual inspections on the Subject Lands, boreholes and monitoring well installations.

Figure 7: Preliminary Environmental



The following summarizes KHAs for the Subject Lands:

- No SGRAs or ESGRAs were identified.
- HVAs are located in the north-eastern and south-western portions of the Subject Lands along the watercourses, as shown on **Figure 6B.** These HVAs may be related to the surrounding wetlands and potential for local sand or gravel deposits which could be surficial aquifers. Certain Land Uses that have a higher potential to contaminate the HVAs are not permitted in HVA locations. The desktop review indicates that 10 m or more of glacial till or clayey silt (Halton Till Aquitard) likely overlies the deeper sands and gravels (Oak Ridges Moraine Aquifer Units) used as a local water resource by domestic wells. Impacts to the deep confined aquifers are not expected. The thick aquitard below grade is likely why there are no SGRAs on the Subject Lands, and why the HVAs are only small, localized areas along the watercourses.
- Significant Surface Water Contribution Areas for the Subject Lands are not expected. The anticipated low-permeability soil conditions reduce groundwater flow rates through the soil. Depending on the near-surface groundwater levels, some minor baseflow could be expected to daylight into the watercourses, but the expected volumes are low such that they will not contribute significantly to overall flows in the watercourse or overall watershed.

5.3 Water Balance and Infiltration

One of the critical hydrogeological components for developing the Subject Lands is maintaining the water balance from the pre- to post-construction scenario to the greatest extent possible. A water balance is an accounting of the water resources within a given area. The water balance equates the precipitation over a given area to the summation of the change in groundwater storage, evapotranspiration/evaporation, surface water runoff and infiltration. The difference between the mean precipitation and evapotranspiration/evaporation is referred to as the water surplus. The water surplus is divided into two parts: as surface or overland runoff and the infiltration into the surficial soil. The infiltration is comprised of two end member components: one component that moves vertically downward to underlying aquifers (referred to as percolation, deep infiltration or net recharge) and a second component that moves laterally through the near surface soil profile or shallow soils as interflow that re-emerges locally to surface (i.e., as runoff) at some short distance and time following precipitation.

The amount of impermeable land increases with development (such as roads, buildings, Storm Water Management Ponds, etc.) and an infiltration deficit will occur between the pre- and post-construction scenarios. The increases in surface water runoff that will occur with urban development and mitigation of the potential impacts to the local water table due to reduction of infiltration may be minimized by using appropriate stormwater management and using low impact development (LID) measures to promote infiltration. The following constraints may exist for the Subject Lands that could reduce the ability to implement infiltration-based LID measures to maintain the water balance:

- Thick deposits of low-permeability soils are expected below grade, and SGRAs are not shown to exist on the Subject Lands. Low in-situ infiltration rates should be expected for these soils, which may require larger LIDs or a variety of LID measures to maintain the water balance. Depending on the actual soil types and in-situ infiltration rates, infiltration measures may not be practical or feasible for the Subject Lands. Infiltration rates must be assessed on the Subject Lands through a detailed investigation and testing.
- Infiltration elevations must typically be kept 1 m above the seasonal high groundwater table. Near-surface groundwater levels are currently unknown for the Subject Lands.
- LSRCA permits infiltration of runoff from vegetated areas and rooftops, but there may be restrictions for infiltrating water from roadways and other impermeable surfaces for commercial or industrial developments. Infiltration from pollution hotspots (gas stations, waste storage areas, etc.) is not permitted.

The LSRCA recognizes that the water balance cannot always be maintained on a site, for instance where there is already a high groundwater table or impermeable soils exist near grade. In this case, off-site compensation can be explored to infiltrate water into the same underlying aquifer system but in a location where infiltration is more feasible. If off-site compensation is not available, cash compensation may be possible for the infiltration deficit.

5.4 Construction Dewatering

For typical low-rise land development, excavations for basement levels or site services often extend around 3 m below grade, and footings may extend about 1.2 m below grade. Cohesive, low-permeability soils (Halton Till Aquitard) are expected across most of the Subject Lands, which preclude the free flow of water into excavations. On a preliminary basis, there are fewer concerns for construction dewatering at the Subject Lands. On sites with similar subsurface conditions, construction can often be completed using a methodology that keeps the water taking to less than 50,000 L/day, preventing the need for an EASR posting or PTTW. At the very least, an EASR posting should be expected if larger areas will be dewatered at the same time.

A detailed hydrogeological study must be completed to calculate the water taking rates and provide an impact assessment. The radius of influence to dewater 3-m-deep excavations in low-permeability surficial soils is usually small, limiting potential impacts to nearby domestic wells, environmental / surface water features, settlement of nearby land, or overall groundwater quantity.

If pumping stations with wet wells are required, typical depths may extend around 10 m below grade. Few issues with groundwater control are expected for excavations made entirely within the glacial till or clayey silt soils, but it is noted that confined sands and gravels (part of the Oak Ridges Moraine Aquifer Unit) may be encountered around 10 m below grade. Detailed subsurface investigations are required for any potential pumping stations or deeper excavations to delineate the transition zone between the surficial aquitard and confined ORM aquifer unit. High groundwater inflows should be expected in this case, which would likely require a PTTW from the MECP for short term water taking, and hydrostatic uplift resistance

may be required as part of the wet well design. Another consideration is adequately sealing deeper excavations to prevent a preferential flow path for contaminants from the ground surface into the ORM aquifer unit, which is a critical water-bearing unit for domestic and municipal drinking water. The radius of influence for dewatering the confined aquifer units will much larger and more detailed analysis would be necessary to assess potential short-term impacts to nearby domestic wells or land stability.

6. Review Of KNHF, KHF And KHA Per The Greenbelt Plan And Oak Ridges Moraine Conservation Plan

A review of the presence of KNHF, KHF and KHAs in accordance with the Greenbelt Plan (2017) and ORMCP (2017) is provided below based on the preliminary data that was collected during the background review and site reconnaissance. This interpretation should be considered preliminary and should be refined through detailed site investigations to confirm the presence, extent and functionality of features within the Subject Lands.

Based upon the background information review, KHAs for the Subject Lands are summarized below:

- No SGRAs or ESGRAs were identified.
- HVAs are located in the north-eastern and south-western portions of the Subject Lands along the watercourses, as shown on **Figure 6B.**
- Significant Surface Water Contribution Areas for the Subject Lands are not expected.

Based on the background information review and site reconnaissance, the following KHFs may be present within the Subject Lands:

- Permanent and intermittent streams;
  - The LIO database identified a number of watercourses within the Subject Lands. Four branches of the West Holland River are present within the Subject Lands and are likely watercourses. Other aquatic features identified by LIO are likely HDFs. HDFs would not qualify as a permanent or intermittent stream.
- Lakes (and their littoral zones);
  - No Lakes or their littoral zones are present within the Subject Lands.
- Kettle lakes:
  - No kettle lakes have been identified within the Subject Lands.
- Seepage areas and springs;
  - Seepage areas and/or springs are not expected across most of the Subject Lands. At a preliminary level, potential seepage locations (if any) are expected to be confined to the watercourse areas already delineated on Figure 7 as constraint areas where development cannot occur.
- Wetlands
  - Wetland vegetation communities have been identified within the Subject Lands. Two PSW units were identified within the north-central portion of the Subject Lands and the south-eastern corner. Other unevaluated wetlands are considered candidate PSWs given their proximity to the PSW units.

Based on the background information review and site reconnaissance, the following KNHFs may be present within the Subject Land

- Habitat of Endangered and Threatened species;
  - Potentially suitable habitat for species designated as Endangered or Threatened on the SARO list is present within the Subject Lands.
- Fish habitat;
  - Fish habitat may be present within the Subject Lands. It is likely that the watercourses within the Subject Lands support seasonal or permanent, direct fish habitat. HDFs may provide seasonal direct fish habitat, indirect fish habitat and/or no fish habitat.
- Wetlands;
  - PSW units and unevaluated wetlands were identified within the Subject Lands.
- Life Science ANSIs;
  - No ANSIs are present within the Subject Lands.
- Significant valleylands;
  - Significant valleylands may be present within the Subject Lands. These significant valleylands would be associated with the unnamed tributaries to the West Holland River.
- Significant woodlands;
  - Significant woodlands may be present within the Subject Lands.
- SWH (including habitat of special concern species);
  - Candidate SWH types were identified within the Subject Lands. All SWH types were associated with the forested or wetland communities, except for the Monarch SWH type, which was identified within the CUM vegetation communities.
- Sand barrens, savannahs and tallgrass prairies; and
  - No sand barrens, savannahs or tall grass prairies were identified within the Subject Lands.
- Alvars.
  - No alvars were identified within the Subject Lands.

7. Preliminary Constraints Analysis Summary

Several candidate KNHF and KHF were identified as potentially present within the Subject Lands. The location of these candidate KNHF, KHF and KHAs are illustrated on **Figure 7**.

A policy review of the required setbacks for each KNHF, KHF and KHA was undertaken to understand the minimum vegetated setbacks (or vegetation protection zones; VPZs).

In accordance with Section 3.2.5 of the Greenbelt Plan (2017), development and site alteration are not permitted within KNHF and KHFs and their associated VPZs within the Greenbelt Plan area. The prescribed VPZ for these features is a minimum of 30 m, measured from the outside boundary of the KNHF and KHF.

Development and site alteration is also prohibited within KNHFs and their associated minimum VPZs in accordance with Section 22(2) of the ORMCP (2017). The KNHFs, KHFs, and ANSI Table within the Oak Ridges Moraine Conservation Plan (2017) outlines the minimum VPZs. A minimum of a 30 m VPZ is required for all KNHF and KHFs, except for habitat for endangered and threatened species, ANSIs or SWH, as these are determined during detailed evaluations. No minimum VPZ are prescribed for KHAs.

Section 23 of the ORMCP states that a Natural Heritage Evaluation (NHE) is required to ensure that development or site alteration will not cause adverse effects to KNHF and their associated functions.

The Lake Simcoe Protection Plan (2009) provides guidance on the protection of KNHF and KHF that are outside of the Greenbelt and Oak Ridges Moraine Planning Areas. Given that the Subject Lands are currently located within these planning areas, the Greenbelt and Oak Ridges planning policies take precedence. If the Greenbelt and Oak Ridges planning policies were not applied to the Subject Lands, the Lake Simcoe Protection Plan would apply a minimum of a 30 m VPZ (in accordance with Section 6.24-DP of the Plan). This is consistent with the VPZs prescribed under the Greenbelt and Oak Ridges planning policies.

The York Region OP reinforces the VPZs outlined within the Greenbelt Plan, ORMCP and the Lake Simcoe Protection Plan. The Town of King also reinforces the VPZs outlined within these plans, stating that “minimum vegetation protection zone requirements of the Greenbelt Plan, ORMCP and Lake Simcoe Protection Plan will be achieved or exceeded”.

Regardless of the policies applied to the candidate features within the Subject Lands, provincial and local policies dictate that a minimum of a 30 m VPZ is required from the boundary of all KNHF and KHFs. No alteration or development is permitted within the features and their associated VPZs, with some exceptions (e.g., infrastructure in accordance with Section 4 of the Greenbelt Plan). A 30 m VPZ has been applied to all candidate KNHF and KHFs shown on **Figure 4**.

8. Proposed Refinements

Several local refinements to the Greenbelt and ORMCP boundaries are recommended within the Subject Lands to better reflect the existing conditions. These refinements have been informed by the desktop review and site reconnaissance that is presented within the sections above. These limits should be confirmed and further refined following detailed site investigations and feature staking exercises.

Figure 4 illustrates a 30 m VPZ around all candidate KNHF and KHFs, as required by the provincial and local planning documents (as discussed above within **Section 7.0**).

Currently the northern portion of the Subject Lands is designated as Protected Countryside or Greenbelt NHS under the Greenbelt and the southern portion as Core Areas under the ORMCP. The below refinements to this land-use designation are recommended to protect and enhance the existing KNHFs and KHFs. It is recognized that Protected Countryside also includes Prime Agricultural Areas. The proposed loss in agricultural lands should be evaluated by a qualified professional.

Some proposed refinements to the Greenbelt and Oak Ridges Planning Areas include:

- All candidate KNHF and KHF will be retained in place and further enhanced through the establishment of a 30 m VPZ within existing agricultural lands;
- KHAs will be retained in place within candidate KNHF and KHFs; and
- The exclusion of actively managed agricultural fields and small, disturbed CUM vegetation communities is warranted given that they are assumed to provide limited ecological function and are not afforded protection under provincial or local planning guidelines.

In addition, several enhancement areas have been identified outside of the Greenbelt and Oak Ridges Planning Areas based on their existing functions within the landscape. The intent of the enhancement areas is to provide opportunities to connect existing KNHFs, KHFs and KHAs between the two planning areas where existing connections may not be present and/or to strengthen connections where they may be limited. These opportunities will be explored following detailed investigations. These enhancement areas may support infrastructure such as roadways, SWM facilities, recreational trails, or native vegetative plantings. These enhancements would strengthen and create a more resilient and connected systems. Potential enhancement areas are shown on **Figure 8**. Discussion on each enhancement area is provided below:

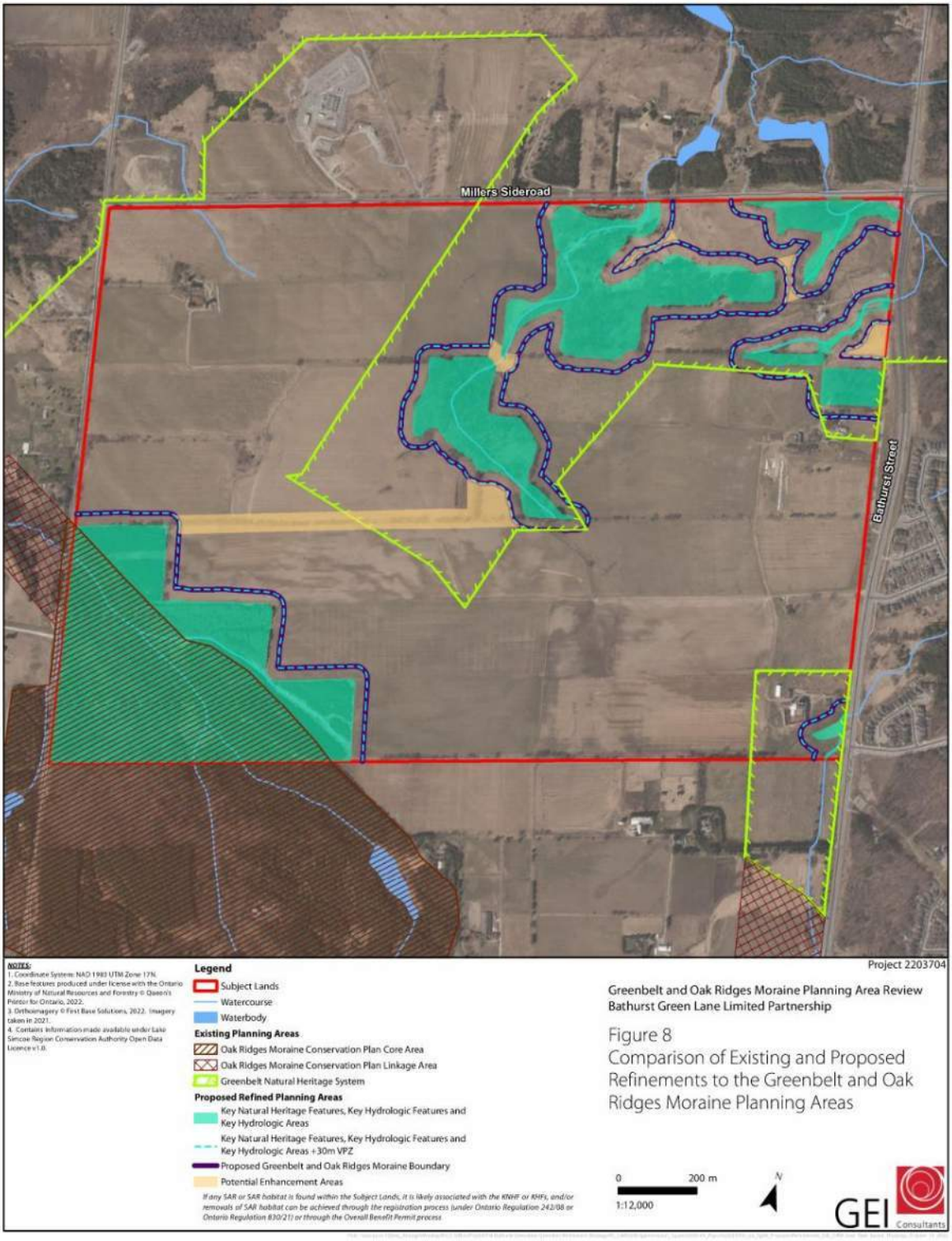
- The intent of the Greenbelt and Oak Ridges planning documents within this Subject Lands appears to be encourage a connection between the two planning areas, which could encourage and strengthen biophysical linkages at a landscape scale. While the Greenbelt and Oak Ridges planning areas are not currently physically connected by a natural feature (e.g., woodland, wetlands, watercourse) and instead are separated by actively managed agricultural fields, some biotic movement could still be supported through this porous

landscape. In a developed landscape without an established natural connection between the two planning areas, movement of biotic and abiotic materials would be limited within the Subject Lands. In order to maintain this connection, a 50 m wide enhancement area will be considered between the two planning areas to establish a natural connection. A 50 m linkage width was recommended as this is the minimum corridor width in Section 3 (NHS) of the NHRM (2010). This corridor will provide a functional connection between the two planning areas and will support generalist species. This width is further supported as there are other offsite linkages that are present within the landscape that can encourage abiotic and biotic movement. This linkage will occur along an existing hedgerow community to retain any existing functions that the hedgerow may provide. It is recognized that there are several primary linkages within the adjacent landscape that will promote connection between the two planning areas and their KNHF/KHF/KHAs; therefore, this was identified as a potential linkage within the Subject Lands;

- The north-eastern corner of the Subject Lands is topographically diverse with several different KNHFs, KHFs and LSRCA regulated features. The concentration of features within this area limits the potential for site servicing and development; therefore, several enhancement areas are identified to better connect features and their associated VPZs; and
- An existing farm crossing is present within the north-central unit. Opportunities for enhancement within this location could strengthen and enhance existing features by restoring the ecological connectivity in this location.

The proposed refinements discussed above are presented on **Figure 8**. This Figure also provides an overlay of the existing and proposed Greenbelt and ORMCP boundaries, for comparative purposes.

Figure 8: Comparison of Existing and Proposed Refinements to the Greenbelt and Oak Ridges Moraine Planning Areas



While it is recognized that the northern half of the Subject Lands are designated as Protected Countryside within the Greenbelt, a smaller central portion was identified as part of the Greenbelt NHS. The NHS is where the concentration of the KNHF, KHF and KHAs were located. Based on the aerial interpretation and background review, the footprint of these existing features appears to be smaller in size (including their minimum VPZs) than the designated Greenbelt NHS area. A refinement of this area may be considered to better represent existing conditions.

The southern portion of the Subject Lands was identified as part of the Oak Ridges planning area, with a Core Area identified in the south-western corner. The Core Area is where the concentrations of KNHF and KHFs are present; however, based on existing conditions this appears to be larger than the existing Core Area footprint that is currently shown within the ORMCP. As a result, an expansion of this Core Area is recommended to include these candidate KNHF and KHFs. In addition, the south-eastern corner of the Subject Lands hosts a PSW; this unit should be designated as a Core Area under the ORMCP.

9. Geotechnical Engineering Commentary

The commentary provided below is based on the desktop review and high-level background information available for the Subject Lands. The commentary may change once a site-specific investigation is carried out (including boreholes and monitoring wells), which are required to provide preliminary or detailed geotechnical engineering recommendations.

The subsurface conditions are summarized in **Section 4**. Overall, cohesive deposits of glacial till or clayey silt to clay are expected beneath the Subject Lands (Halton Till Aquitard). Some localized deposits of sands and gravels could be encountered closer to the watercourses, and local fill may be encountered near the farmsteads. It is common to encounter thicker topsoil layers in farm fields (on the order of 0.5 to 1 m could be encountered), and the upper 1 to 2 m of in-situ soil is often disturbed from farming activities or weathered from frost penetration. Otherwise, glacial till or clayey silt deposits are generally considered favourable for low-rise land development, as discussed below.

9.1 Site Grading

The Subject Lands have a rolling topography, therefore, a cut and fill balance may be considered for the site grading strategy. The topsoil layer and any vegetation or existing pavements will need to be removed and typical recommendations for proof-rolling and/or subgrade inspections prior to fill placement, will likely apply. Depending on the presence, consistency, and thickness of potential weathered / disturbed zones near the ground surface, some further sub-excavation can be expected for settlement-sensitive areas or locations of engineered fill.

Depending on the extent of cut and fill across the Subject Land, it may be most practical to raise grades beneath building footprints using engineered fill. GEI defines “engineered fill” as material that will support foundations, and which is placed and compacted in a specified and controlled manner under full-time supervision of geotechnical engineering staff. A benefit of constructing an engineered fill pad beneath buildings is to provide uniform support and reduce the total bearing depth of foundations that would otherwise need to extend to the underlying native soils.

For soils containing a higher clay content, it can be difficult or impractical to increase or decrease moisture content to reach the optimum moisture content for soil compaction. In-situ moisture content must be tested during a future borehole program to determine any moisture conditioning requirements or potential constraints related to soil re-use on site, where higher compaction specifications are needed (e.g. for engineered fill).

9.2 Foundations and Slabs

It is expected that conventional shallow spread and strip footing foundations made at frost depth on the undisturbed native soils should be suitable for the support of typical low-rise residential, commercial and / or industrial buildings. The firm to hard soil consistency

encountered in nearby boreholes indicates that longer-term consolidation settlement will likely not be a concern and typical bearing resistance values can be expected for design.

Conventional spread and strip footing foundations can also be made on engineered fill where grades are raised beneath building locations.

Unreinforced concrete slabs can typically be set on weathered native soils, undisturbed native soils, or new compacted fill based on our experience on similar sites. Standard sub-slab drainage layers are expected. Cohesive soil deposits can be more susceptible to disturbance from the weather or construction traffic, so additional considerations for construction access lanes may be warranted.

9.3 Site Servicing

The type of material and depth of granular bedding below the pipe will, to some extent, depend on the method of construction used by the contractor. Pipe bedding for flexible and rigid pipes normally follow the requirements set out in Ontario Provincial Standard Drawings (OPSDs). Based on the anticipated soil subgrade conditions, typical OPSD bedding requirements are likely sufficient.

9.4 Pavements

Topsoil and vegetation are not suitable subgrade material for pavement structures, but native soils or proof-rolled and inspected weathered / disturbed soils are likely suitable. Some local sub-excavation and replacement of weak or organic zones should be expected. The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures must be maintained to ensure that uniform subgrade moisture and density conditions are achieved as much as possible when fill is placed, and the natural subgrade is not disturbed or weakened after it is exposed.

Typical drainage provisions are expected, such as sloped subgrades towards roadside ditches or to subdrains that drain into catch basins and storm sewers.

The subgrade conditions are likely suitable to support a flexible asphaltic pavement structure (asphalt and granular courses) for a typical 15-to-20-year design life. A site-specific pavement design should be provided following a borehole investigation, but the minimum Township of King pavement design standards should be suitable.

A close control on the pavement construction process will be required to obtain the desired pavement life. Regular inspection and testing should be conducted during the pavement construction to confirm material quality, thickness, and to ensure adequate compaction.

9.5 Excavations and Groundwater Control

Where workers must enter a trench or excavation the soil must be suitably sloped and/or braced in accordance with the OHSA. These regulations designate four (4) broad classifications of soils to stipulate appropriate measures for excavation safety. If firm to hard

cohesive glacial till or clays are encountered on site, excavation slopes for Type 2 or 3 Soils could be expected. Cobbles and boulders embedded within glacial till deposits should be expected in construction excavations.

Glacial till deposits are typically well graded and laboratory testing from the nearby GEI boreholes indicate a relatively high percentage of fines. Hydraulic conductivity testing from nearby sites indicates the potential glacial till or clayey silt deposits have a low permeability which typically precludes the free flow of water into excavations. This can significantly reduce groundwater taking rates and potential complications during construction dewatering. More details for groundwater control are discussed in the Hydrogeology Commentary.

9.6 Erosion and Slope Stability Hazards

The watercourses are Regulated Areas by the LSRCA and are therefore subject to policies related to slope instability and erosion hazards. Where the watercourse consists of a confined valley system (including the river / creek, floodplain, slope, and tableland with a defined crest), the slope and erosion hazards and setback limits for development are calculated combining a toe erosion allowance, stable slope allowance, and erosion access allowance. A geotechnical investigation and slope stability study are typically recommended to determine the setback limits. In lieu of a detailed study, conservative setbacks can be applied but this potentially reduces the amount of developable space.

For unconfined systems, the development setbacks are calculated by meander belt analysis, carried out by a fluvial geomorphologist.

Based on the topography and assumed soil conditions, it is estimated that the development setbacks related to slope instability and erosion hazards are within the existing environmental constraints shown on Figure 7. This must be confirmed through slope inspections and additional detailed studies.

10. Geoenvironmental Considerations

A preliminary geoenvironmental review for Potentially Contaminating Activities (PCAs) was completed for the Subject Lands using aerial images only. Additional detailed studies must be conducted to further assess and confirm the PCAs.

Aerial photographs were obtained in order to review the development and land use history of the Subject Lands, as well as to the land in the immediate vicinity of the Subject Lands. Aerial photographs dated 1954, 1970, 1978, 1988, 1995, 1999, 2022, 2005, 2007, 2009, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 were obtained from York Region Interactive Maps. The aerial photographs were collected based on availability from the archives at available intervals to best capture the changes to the Subject Lands. GEI notes that at the time of this review, the 1954 aerial photograph was the earliest available photograph for the Subject Lands and surrounding area.

The development and land use history of the Subject Lands and adjacent properties as depicted on the reviewed aerial photography is summarized in the table below.

Table 1: Aerial Photograph Observations

Aerial Photograph Year	Observations
1954	a. The Subject Lands appears to be developed for agricultural use with fifteen (15) residential dwellings developed throughout the Site. b. The land appears disturbed at the north-eastern corner of Dufferin Street and Miller's Sideroad, at the western portion of the Site. c. The land appears disturbed at the at the south-western corner of Dufferin Street and Miller's Sideroad, at the western portion of the Site.
1970	a. The Subject Lands and surrounding area remain unchanged since the 1954 aerial photograph.
1978	a. The Subject Lands and surrounding area remain unchanged since the 1954 aerial photograph.
1988	a. Multiple residential properties appear to have been developed at the northern portion of the Subject Lands, north of Miller's Sideroad. b. The surrounding area remains unchanged since the 1954 aerial photograph.
1995	a. Multiple residential properties appear to have been developed at the northern portion of the Subject Lands, west of Dufferin Street. b. The surrounding area remains unchanged since the 1954 aerial photograph.
1999	a. The Subject Lands and surrounding area remain unchanged since the 1995 aerial photograph.
2002	a. The Subject Lands and surrounding area remain unchanged since the 1995 aerial photograph.

2005	a. The Subject Lands and surrounding area remain unchanged since the 1995 aerial photograph.
2007	a. The Subject Lands and surrounding area remain unchanged since the 1995 aerial photograph.
2009	a. A power station appears to have been developed north of Miller's Sideroad, at the northern portion of the Subject Lands. b. Multiple residential dwellings appear to be developed east adjacent of the Subject Lands.
2011	a. The Subject Lands and surrounding area remain unchanged since the 2009 aerial photograph.
2012	a. The Subject Lands and surrounding area remain unchanged since the 2009 aerial photograph.
2013	a. The Subject Lands and surrounding area remain unchanged since the 2009 aerial photograph.
2014	a. The Subject Lands and surrounding area remain unchanged since the 2009 aerial photograph.
2015	a. The Subject Lands and surrounding area remain unchanged since the 2009 aerial photograph.
2016	a. The Subject Lands remains unchanged since the 2009 aerial photograph. b. Multiple residential dwellings appear to be developed east adjacent of the Subject Lands.
2017	a. The power station north of Miller's Sideroad appears to have been expanded to the north. b. The surrounding area remains unchanged since the 2016 aerial photograph.
2018	a. The Subject Lands and surrounding area remain unchanged since the 2017 aerial photograph.
2019	a. The Subject Lands and surrounding area remain unchanged since the 2017 aerial photograph.
2020	a. The Subject Lands and surrounding area remain unchanged since the 2017 aerial photograph.
2021	a. The Subject Lands and surrounding area remain unchanged since the 2017 aerial photograph.

Based on the review of the aerial photographs the following PCAs were identified:

- The Subject Lands were historically used for agricultural purposes from prior to 1954 to 2021. The Subject Lands are associated with PCA#40 – Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications.
- The land appeared to be disturbed at the western portion of the Subject Lands, at the south-western corner of Dufferin Street and Miller's Sideroad between 1954 and 1985, and at the north-eastern corner of Dufferin Street and Miller's Sideroad between 1954 and 2021. Multiple residential dwellings appeared to have been developed at the northern portion of the Subject Lands, north of Miller's Sideroad in 1988 and west of Dufferin Street

in 1995. Fill material may have been brought to the Site. The Subject Lands are associated with PCA#30 – Importation of Fill Material of Unknown Quality.

- The Subject Lands appears to have been developed with a power station at the northern portion of the Subject Lands, north of Miller's Sideroad, in 2009. The Subject Lands are associated with PCA#18 – Electricity Generation, Transformation and Power Stations.

Based on the review of the aerial photographs only, no additional PCAs as per Table 2, Schedule D of O.Reg.153/04, as amended, were identified.

11. Site Serviceability Strategy

The site serviceability strategy has been considered primarily for external sanitary and water linear infrastructure projects to ultimately connect the subject lands to treatment facilities in **Section 11.1** and **Section 11.2**, respectively. A roadmap for additional SWM studies and conceptual facility locations within the subject lands are discussed in **Section 11.3**.

11.1 Sanitary Servicing

The Subject Lands have the opportunity to be serviced either through the York-Durham Sewage System (YDSS) or the Upper York Sanitary Solution (UYSS) for a total of three options illustrated on **Figures 9a – 9c.** These options provide flexibility to the ultimate servicing solution and illustrates that the subject lands are not solely dependent on the UYSS.

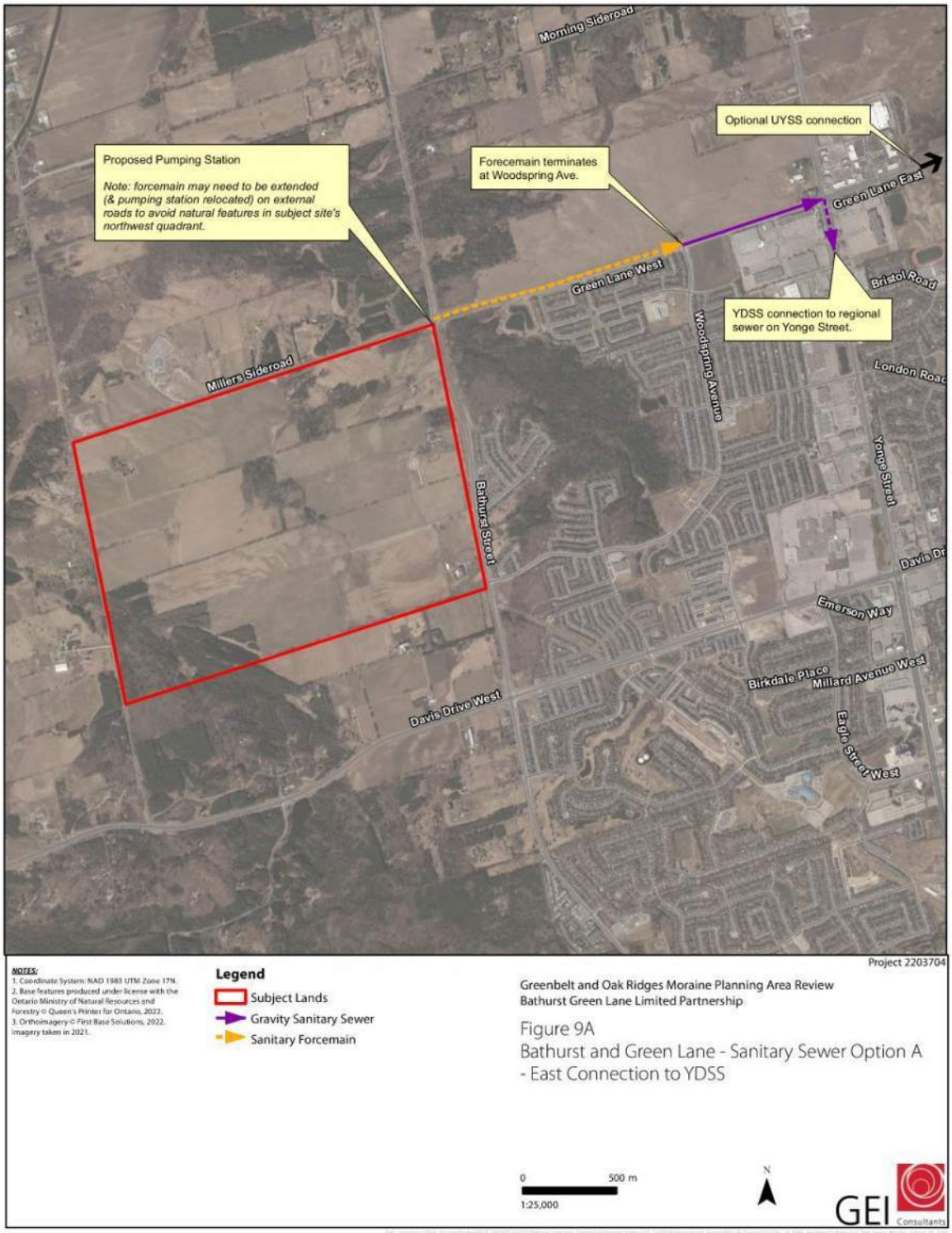
Sanitary Sewer Option A: East Connection to YDSS, illustrated in **Figure 9a** directs the Subject Lands sanitary flows to an existing sewer on Green Lane which ultimately discharges to a Regional sewer on Yonge Street. This option proposes:

- An internal SPS nearest to the intersection of Bathurst Street & Green Lane West;
- 1.38 km of forcemain and 0.78 km of gravity sewer.

The exact location of the proposed internal SPS within the Subject Lands north-east quadrant will need further refinement due to a concentration of candidate KNHF, KHF and LSRCA regulated features. As such, relocating this internal SPS introduces the possibility of extending sanitary forcemain on either Miller's Sideroad or Bathurst Street.

Further, the connection to the regional sewer may also exist ultimately to the UYSS via the Water & Wastewater Bayview Operation Centre located south of the East Gwillimbury GO Station nearest to Main Street North & Green Lane East intersection. This connection would be facilitated by the existing sanitary sewer on Green Lane east of Yonge Street.

Figure 9a: Sanitary Sewer Option A

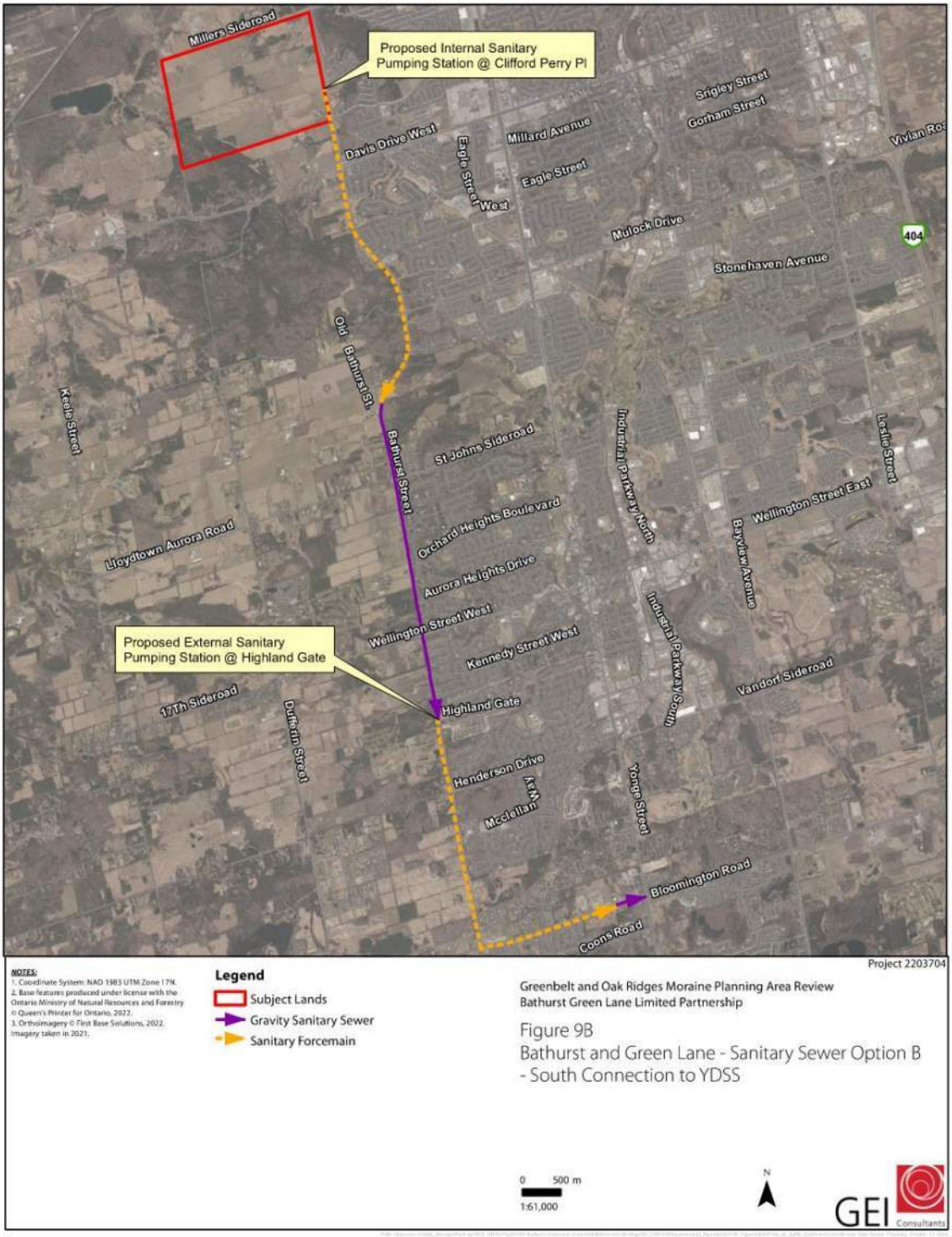


Sanitary Sewer Option B: South Connection to YDSS illustrated in **Figure 9b** directs the Subject Lands sanitary flows to a YDSS shaft located near the intersection of Yonge Street and Bloomington Road to eliminate system constraints through Aurora and Newmarket. The option proposes:

- An internal SPS located at Bathurst Street & Clifford Perry Place;
- External SPS at the intersection of Bathurst Street & Highland Gate; and
- 9.34km of forcemain and 4.59km of gravity sewer.

Although this option introduces the most amount of infrastructure by linear meter, its proposal relies on a preferred location for the internal SPS.

Figure 9b: Sanitary Sewer Option B



Sanitary Sewer Option C: North Connection to UYSS illustrated in **Figure 9c** directs the Subject Lands sanitary flows to the existing Holland Landing Sanitary Pumping Station (SPS) located at 44 Bradford Street. This option proposes:

- An internal SPS nearest to the intersection of Bathurst Street & Green Lane West;
- External SPS at the intersection of Bathurst Street & Highway 11;
- A gravity manhole structure 450m north of Morning Sideroad; and
- 3.76 km of forcemain and 3.68 km of gravity sewer.

As Bill 306, York Region Wastewater Act (2021) is currently in its first reading with Legislative Assembly of Ontario as of June 3, 2021, the approval of UYSS remains in question and not currently considered as viable for an end of sanitary treatment solution for the subject lands. Further, the proposed internal SPS location is not ideal as above mentioned in Option 1.

A number of planned wastewater projects as part of York Region's Water & Wastewater Master Plan (August 2022) will be reviewed to further inform the above proposed works:

- Increase capacity of Holland Landing SPS to service growth with upgrades expected to be accommodated within original building footprint (Project #WW18, expected 2032-2041; Schedule A+)
- Holland Landing Lagoon decommissioning and commissioning new Water Reclamation Centre (Project #WW19, expected 2022-2031; Schedule A+)

Figure 9c: Sanitary Sewer Option C

11.2 Water Servicing

The water servicing strategy for the subject lands is illustrated in **Figure 10** and proposes two (2) connections to the Newmarket West Pressure District (WPD):

- Connect from Bathurst Street & Woodspring Avenue to existing Kirby Crescent Booster Pumping Station and Existing Glenway Reservoir
    - Potential connection or upsizing of existing York Region owned watermain from Woodspring Avenue to Davis Drive West along Bathurst Street
- Connect from Bathurst St. & Green Lane West to Town of Newmarket owned watermain on Yonge Street
    - This connection to existing Town owned services will be analyzed in conjunction with planned Region watermain works along Yonge Street to connect Newmarket Central & Holland Landing Pressure Districts via the Newmarket London Elevated Tank located approximately 175m north of the intersection of Yonge Street & London Road

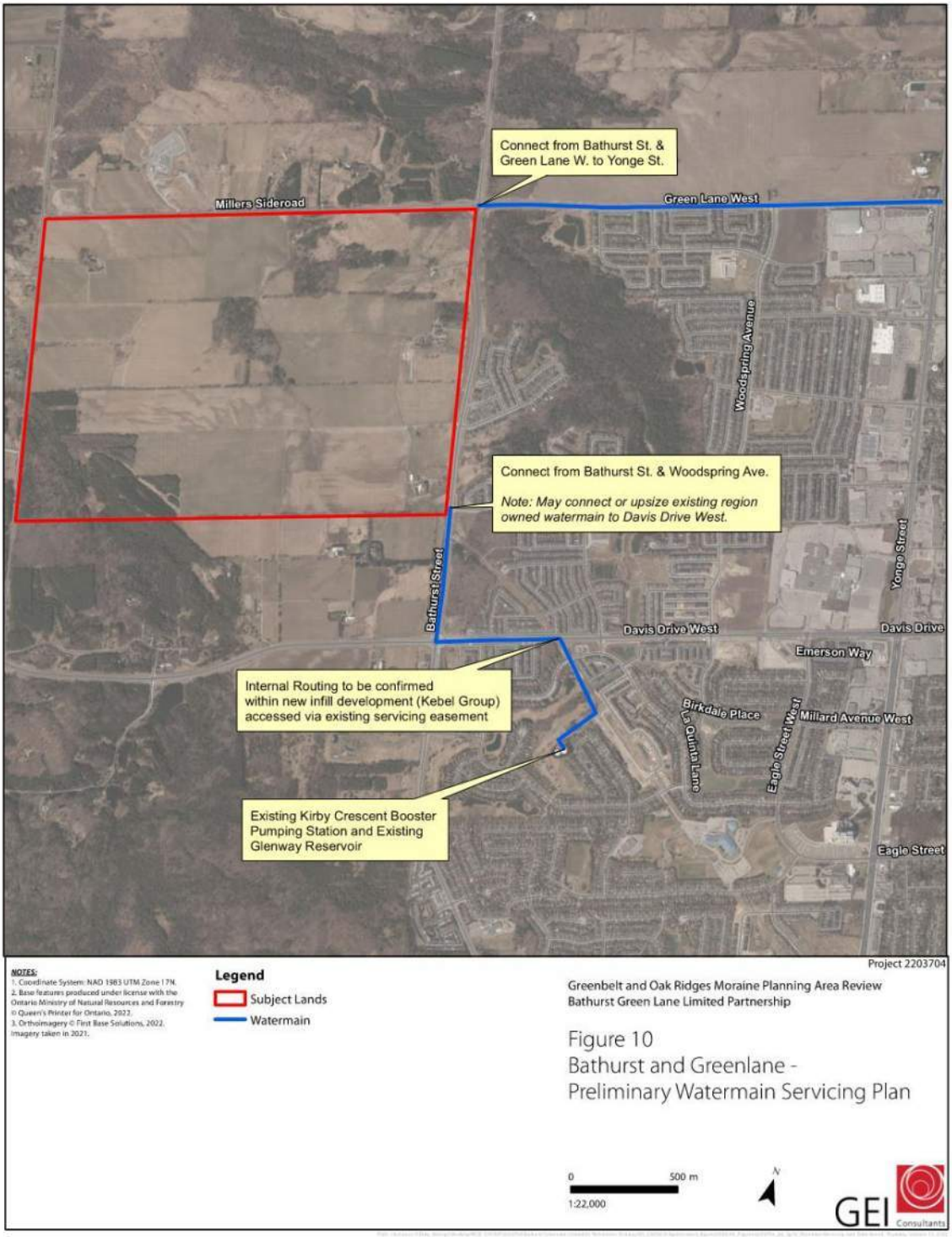
A number of planned water projects as part of York Region's Water & Wastewater Master Plan (August 2022) will be reviewed to further inform the above proposed works:

- Construct new watermain along Yonge Street from Gladman Road to Green Lane (Project #W19; expected 2042-2051; EA Schedule A+)
    - Connects the Newmarket Central & Holland Landing Pressure Districts
- Expand the existing Kirby Crescent Booster Pumping Station (BPS) & construct a new elevated tank (i.e., expand existing Glenway Reservoir) to service Newmarket West Pressure District (Project #W18, expected 2032-2041, EA Schedule B).
    - Includes upgrading existing watermain services from the intersection of Bathurst St. & Woodspring Avenue to the Kirby Crescent BPS.

Additionally, the Town of Newmarket Water & Wastewater Master Plan prepared by WSP in 2017 will be reviewed in detail to follow-up on project recommendations to satisfy both existing and future fire flows for overall system security.

Further analysis will be required to analyze that the subject domestic water demand and fire flow requirements are satisfied by currently planned system upgrades for the Newmarket WPD.

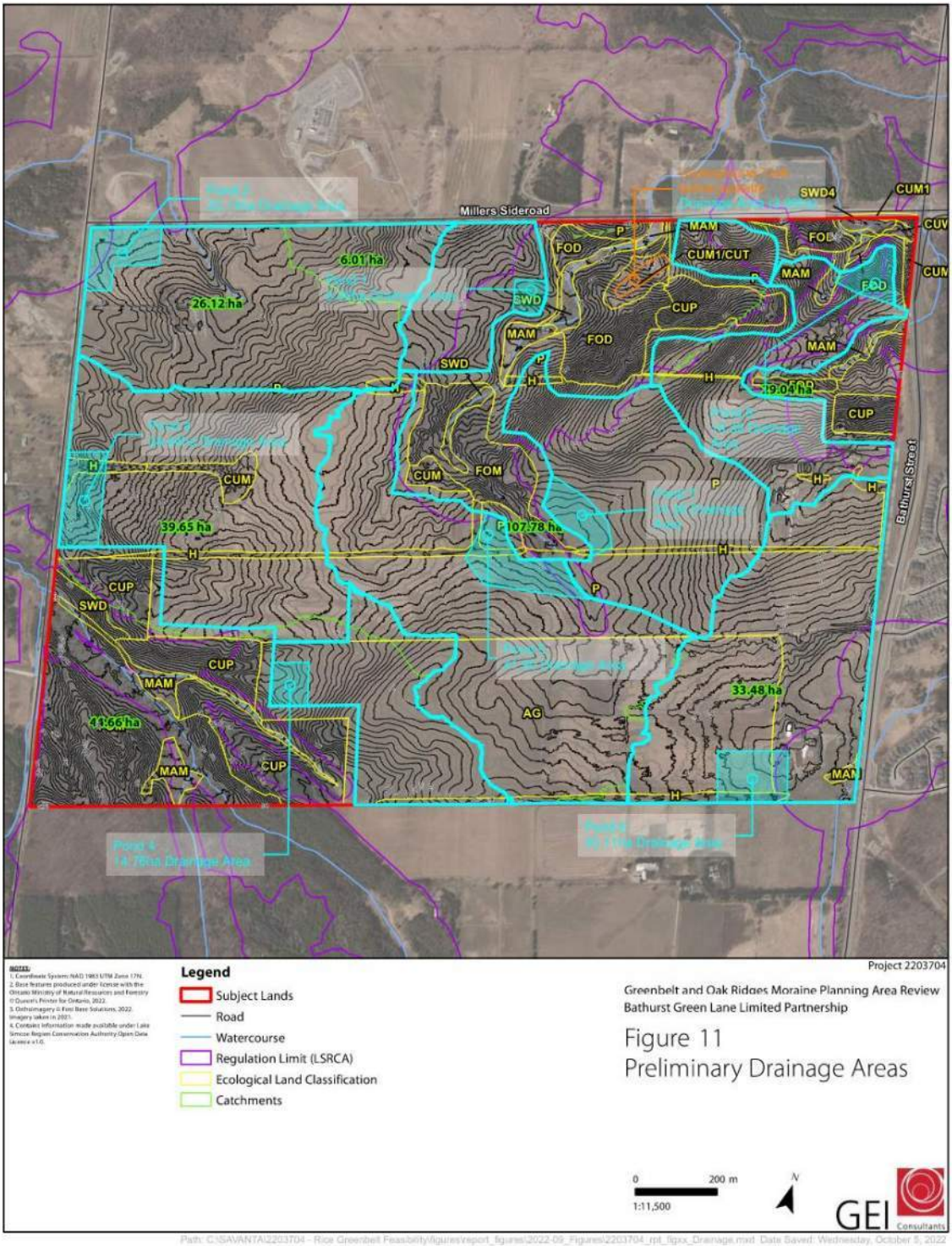
Figure 10: Preliminary Watermain Servicing Plan



11.3 SWM Servicing

A Drainage Management Plan will be prepared as part of future study programs to both size and locate all end of pipe facilities for the proposed development within the Subject Lands. These future study programs will include determining the Subject Lands applicable SWM control criteria as it is overlapped with LSRCA regulated area and fully within the Holland River subwatershed. Proposed end-of-pipe facility locations have been conceptually located based on drainage areas delineated by available topography obtained under LSRCA Open Data License v1.0 as illustrated in **Figure 11**. The overall configuration and location of these facilities were considered to avoid any material drainage area local exchanges within the Holland River subwatershed.

Figure 11: Preliminary Drainage Areas



12. Conclusion

This Greenbelt and Oak Ridges Moraine Planning Area review was completed for the Subject Lands to inform whether any refinements may be warranted given the existing conditions on site. These refinements were recommended based on background reviews and observations from the site reconnaissance; however, further refinements may be feasible following detailed investigations to confirm whether candidate features are present within the Subject Lands.

Several candidate KNHF, KHF and KHAs were identified within the Subject Lands, including:

- Permanent and intermittent streams;
- Seepage areas and springs;
- HVAs;
- Wetlands (PSW and unevaluated);
- Habitat for Endangered and Threatened species;
- Fish habitat;
- Significant valleylands;
- Significant woodlands; and
- SWH.

It is our opinion based our desktop review that refinements of the Greenbelt and Oak Ridges may be considered based on its existing footprint of candidate KNHFs and KHFs. Proposed refinements to the Greenbelt and Oak Ridges NHS are generally limited to active agricultural areas, managed open spaces and cultural meadows that are not known to meet any of the criteria to qualify as a KNHFs or KHFs. Potential enhancement areas are proposed, will better connect the two planning areas and create a more resilient system. Confirmatory investigations are required to:

(1) Determine whether the candidate KNHF and KHFs are present within the Subject Lands; and,
(2) Confirm their form and functionality within the landscape.

Feature staking exercises are required to determine the exact boundaries for woodland, wetland and valleyland features. These investigations would be undertaken in Spring, Summer and Fall 2023.

The commentary for geotechnical, hydrogeological, and geoenvironmental conditions was based on the desktop review and high-level background information available for the Subject Lands. The commentary may change once detailed site-specific investigations and reports are carried out. Overall, there were no geotechnical, hydrogeological, or geoenvironmental constraints identified that should significantly inhibit design and construction above or beyond typical approaches for similar sites.

Servicing strategies proposed within this study are an extension of existing municipal infrastructure within the area. These strategies provide flexibility with multiple sanitary options to confirm servicing functionality of the subject lands in both the UYSS and YDSS Regional servicing plans. Overall, the site is functionally serviceable by sanitary, water distribution, and stormwater based on the strategies presented.

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Appendix A

Tables

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
1. SEASONAL CONCENTRATION AREAS				
Waterfowl Stopover and Staging Areas (terrestrial)	No – the CUM /CUT vegetation communities are too small to support sufficient numbers of species.	No – The topography of the Subject Lands is rolling and hilly, as such, these features are not expected to collect sheet water.	No	No – SWH type is not present
Waterfowl Stopover and Staging Areas (aquatic)	Yes – SWD vegetation communities are present within the Subject Lands.	No – The SWD features are generally small in size and appear to lack open or shallow water. These features are not likely suitable to attract or support significant numbers of waterfowl.	No	No – SWH type is not present
Shorebird Migratory Stopover Areas	Yes – MAM vegetation communities are present within the Subject Lands.	No – Muddy, unvegetated shorelines not present.	No	No – SWH type is not present
Raptor Wintering Areas	Yes – Forested and upland vegetation communities are present within the Subject Lands.	Yes – The forested communities in the Southwest portion of the Subject Lands meet the minimum combined site criteria (>20 ha).	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
Bat Hibernacula	No – Vegetation communities are absent from the Subject Lands.	N/A	No	No – SWH type is not present

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Bat Maternity Colonies	Yes – Forested (FOD, FOM) and swamp (SWD, SWM) vegetation communities are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes	Yes – SWH type may be present
Turtle Wintering Areas	Yes – MAM and SW vegetation communities are present within the Subject Lands. Watercourses contain pool habitats.	Additional studies will be required to confirm if habitat conditions are met.	Yes- surveys targeting reptiles and their habitat are recommended.	Yes – SWH type may be present
Reptile Hibernacula	Yes – ecosites are present on the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes- surveys targeting reptiles and their habitat are recommended.	Yes – SWH type may be present
Colonial Bird Nesting Sites (bank/cliff)	Yes – CUM and CUT vegetation communities are present on the Subject Lands.	No – Presence of exposed or eroding banks, hills, steep slopes and sand piles were not observed.	No	No – SWH type is not present
Colonial Bird Nesting Sites (tree/shrubs)	Yes – SWD and SWM vegetation communities are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met. No colonies are known within the area.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
Colonial Bird Nesting Sites (ground)	No – No rocky islands or peninsulas are present on the Subject Lands.	N/A	No	No – SWH type is not present

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Migratory Butterfly Stopover Areas	Yes – CUM and CUT vegetation communities are identified within the Subject Lands.	No – The Subject Lands are located greater than 5 km away from Lake Ontario.	No	No – SWH type is not present
Migratory Landbird Stopover Areas	Yes – FO and SW vegetation communities are identified within the Subject Lands.	No – The Subject Lands are located greater than 5 km away from Lake Ontario.	No	No – SWH type is not present
Deer Yarding Areas	No – Mapping from the MNRF LIO database did not depict any deer yarding areas on or adjacent to the Subject Lands.	N/A	No	No – SWH type is not present
Deer Winter Congregation Areas	No – Mapping from the MNRF LIO database did not depict any deer wintering areas on or adjacent to the Subject Lands.	N/A	No	No – SWH type is not present
2. RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT FOR WILDLIFE				
2a. Rare Vegetation Communities				
Rare Vegetation Types (cliffs, talus slopes, sand barrens, alvars, old-growth forests, savannahs, and tallgrass prairies)	No – None identified through the background information review.	N/A	No	No – SWH type is not present

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Other Rare Vegetation Types (S1 to S3 communities)	No – None identified thought the background information review.	N/A	No	No – SWH type is not present
2b. Specialized Wildlife Habitat				
Waterfowl Nesting Area	Yes – MAM and SWD vegetation communities are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
Bald Eagle and Osprey Habitats	Yes – FO and SW ecosites are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met. Permanent watercourses are present within the forested communities.	Yes – Breeding bird surveys and searches for large stick nests are recommended.	Yes – SWH type may be present
Woodland Raptor Nesting Habitat	Yes – FO, CUP and SW ecosites are present within the Subject Lands.	Possibly – The forested communities in the southwest portion of the Subject Lands may meet the minimum size criteria, if contiguous woodlands beyond the Subject Lands are considered. Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
Turtle Nesting Areas	No – Suitable ecosites are not present within the Subject Lands.	N/A	No	No – SWH type is not present

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Seeps and Springs	Yes – Forested ecosites are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes	Yes – SWH type may be present
Woodland Amphibian Breeding Habitats (within or < 120m from woodland)	Yes – FO and SW ecosites are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes – Amphibian call surveys are recommended.	Yes – SWH type may be present
Wetland Amphibian Breeding Habitats (wetland >120m from woodland)	Yes – SW and MA ecosites are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes – Amphibian call count surveys should be conducted.	Yes – SWH type may be present
Woodland Area-Sensitive Bird Breeding Habitat	Yes – FO and SW ecosites are present within the Subject Lands.	Possibly – The forested communities in the Southwest portion of the Subject Lands may meet the minimum size criteria, if contiguous woodlands beyond the Subject Lands are considered. Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
3. SPECIES OF CONSERVATION CONCERN				
Marsh Bird Breeding Habitat	Yes – MAM ecosites are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Open Country Bird Breeding Habitat	Yes – CUM vegetation communities are present on the Subject Lands.	No – Minimum size criteria is not met (>30 ha).	No	No – SWH type is not present
Shrub/Early Successional Bird Breeding Habitat	Yes – CUW and CUT vegetation communities are present within the Subject Lands.	No – Minimum size criteria is not met (>10 ha).	No	No – SWH type is not present
Terrestrial Crayfish	Yes – MAM ecosites are present within the Subject Lands.	Additional studies will be required to confirm if habitat conditions are met.	Yes – Terrestrial crayfish surveys are recommended	Yes – SWH type may be present
Special Concern and Rare Wildlife Species (based on Background Review – Section 2.1)				
(i) Black Tern	N/A	No – Shallow marshes are not present within the Subject Lands.	No	No – SWH type is not present
(ii) Blue-winged Teal	N/A	No – Open water marshes are not present within the Subject Lands.	No	No – SWH type is not present
(iii) Canada Warbler	N/A	Possibly – Forested ecosites are present within the Subject Lands. Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
(iv) Common Gallinule	N/A	No – Open water marshes are not present within the Subject Lands.	No	No – SWH type is not present
(v) Eastern Wood-Pewee	N/A	Possibly – Forested ecosites are present within the Subject Lands. Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
(vi) Grasshopper Sparrow	N/A	Possibly – Cultural meadow ecosites are present within the Subject Lands. Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
(vii) Wood Thrush	N/A	Possibly – Forested ecosites are present within the Subject Lands. Additional studies will be required to confirm if habitat conditions are met.	Yes – Breeding bird surveys are recommended.	Yes – SWH type may be present
(viii) Monarch	N/A	Possibly – Cultural meadow ecosites are present within the Subject Lands; however, they are located adjacent to agricultural	Yes – observation of Monarch or their foodplants should be recorded.	Yes – SWH type may be present

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
		lands and are likely disturbed. Additional studies will be required to confirm if habitat conditions are met.		
(ix) Swamp Valerian	N/A	Possibly – Wetland and swamp ecosites are present within the Subject Lands. Additional studies will be required to confirm if habitat conditions are met.	Yes – botanical surveys should be recorded.	Yes – SWH type may be present
(x) Eastern Ribbonsnake	N/A	No – Open water marshes are not present within the Subject Lands.	No	No – SWH type is not present
(xi) Northern Map Turtle	N/A	No – open water marshes are not present within the Subject Lands.	No	No – SWH type is not present
(xii) Snapping Turtle	N/A	Possibly – MAM wetlands and watercourses may provide suitable habitat. Additional studies will be required to confirm if habitat conditions are met.	Yes –surveys targeting reptiles and their habitats are recommended.	Yes – SWH type may be present
4. ANIMAL MOVEMENT CORRIDORS				

Table 1: Significant Wildlife Habitat Assessment (6E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Amphibian Movement Corridors	N/A	Potentially – should amphibian breeding SWH be identified, opportunities for movement corridors will need to be explored.	Yes – Amphibian call count surveys should be conducted.	Yes – SWH type may be present

Species Common Name	Species Scientific Name	Provincial Status (ESA)	S-Rank	Federal Status (SARA Sched. 1)	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
VASCULAR PLANTS							
Black Ash	*Fraxinus nigra*	END	S4	-	Black Ash occurs throughout most of Ontario, except the Far North, ranging from southern Ontario east to the Quebec border, west to the Manitoba border and north to approximately 51° latitude. Approximately 25% of the global range of Black Ash occurs in Ontario (MECP 2022).	Black Ash is predominantly a wetland species found in swamps, floodplains and fens (MECP 2022).	**Yes** - potentially suitable swamps are present within the Subject Lands.
Butternut	*Juglans cinerea*	END	S2?	END	The range of butternut extends through most of the southern and eastern mixed deciduous forests in Ontario except the Bruce Peninsula and Manitoulin Island (MECP 2022)	Found in well-drained, rich soils in valleys or on slopes. Prefers full sun and moist to moderately dry conditions (MECP 2022)	**Yes** - potentially suitable riparian areas, valley and slopes and woodlands edges are present within the Subject Lands.
REPTILES							
Blanding's Turtle	*Emydoidea blandingii*	THR	S3	THR	Blanding's Turtles can be found throughout southern, central and eastern Ontario (MECP 2022).	Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of water plants. Blanding's Turtles hibernate in the mud at the bottom of permanent water bodies from late October until the end of April (MECP 2022).	**No** - The Subject Lands appear to lack large open wetlands. The species is not considered likely to be present within the Subject Lands.
BIRDS							
Bank Swallow	*Riparia riparia*	THR	S4B	THR	Found across southern Ontario, with sparcer populations scattered across northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (MECP 2022)	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable (MECP 2022)	**Yes** - potentially suitable river bank may present within the Subject Lands.
Barn Swallow	*Hirundo rustica*	THR	S4B	THR	The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist (MECP 2022).	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces (MECP 2022).	**Yes** - potentially suitable anthropogenic structures (residential dwellings, barns, sheds) are present within the Subject Lands.
Bobolink	*Dolichonyx oryzivorus*	THR	S4B	THR	Bobolink is widespread in Ontario and is found throughout the province, generally south of the boreal forest (MECP 2022).	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping (MECP 2022).	**Yes** - potentially suitable grasslands may present within the Subject Lands.
Chimney Swift	*Chaetura pelagica*	THR	S4B,S4N	THR	In Ontario, the species is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel (MECP 2022).	They are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate (MECP 2022).	**Yes** - potentially suitable anthropogenic structures which may contain chimneys are present within the Subject Lands.
Eastern Meadowlark	*Sturnella magna*	THR	S4B	THR	Eastern Meadowlark is widespread in Ontario and found mostly south of the Canadian Shield (MECP 2022).	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches (MECP	**Yes** - potentially suitable grasslands may present within the Subject Lands.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	SC	S4B	THR	The Red-headed Woodpecker is found across southern Ontario, where it is widespread but rare (MECP 2022).	The Red-headed Woodpecker lives in open woodland and woodland edges and is often found in parks, golf courses and cemeteries that contain many dead trees, which the bird uses for nesting and perching (MECP 2022).	**Yes** - potentially suitable woodlands may present within the Subject Lands.

Species Common Name	Species Scientific Name	Provincial Status (ESA)	S-Rank	Federal Status (SARA Sched. 1)	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
MAMMALS							
Eastern Small-footed Myotis	*Myotis leibii*	END	S2S3	-	The eastern small-footed bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park (MECP 2022)	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year (MECP 2022)	**Yes** - potentially suitable woodlands may present within the Subject Lands.
Little Brown Myotis	*Myotis lucifugus*	END	S4	END	Widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake (MECP 2022)	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing (MECP 2022).	**Yes** - potentially suitable woodlands may present within the Subject Lands.
Northern Myotis	*Myotis septentrionalis*	END	S3	END	The northern long-eared bat is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon (MECP 2022)	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines (MECP 2022).	**Yes** - potentially suitable woodlands may present within the Subject Lands.
Tri-colored Bat	*Perimyotis subflavus*	END	S2S3	END	This bat is found in southern Ontario and as far north as Espanola near Sudbury. Because it is very rare, it has a scattered distribution (MECP 2022).	During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They overwinter in caves where they typically roost by themselves rather than part of a group (MECP 2022).	**Yes** - potentially suitable woodlands may present within the Subject Lands.