





Environmental Screening Report

**Brooks Road Landfill Vertical and
Horizontal Expansion**

2270386 Ontario Limited

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Executive summary

Brooks Road Landfill (the Site) is located at 160 Brooks Road, near Cayuga, Haldimand County, Ontario and is owned and operated by 2270386 Ontario Limited, herein referred to as Brooks Road Environmental (BRE, Owner, Proponent).

The Site, which operates under Environmental Compliance Approval (ECA)¹ No. A110302, has an approved annual fill rate of 250,000 tonnes per year and a total approved capacity of 1,045,065 cubic metres (m³) (including waste and daily/final cover). The Site also operates under an air and noise ECA No. 7323-C6EJUM (Air ECA). The Site has accepted waste (in one form or another) since 1959 and received a Certificate of Approval (C of A, now referred to as an ECA) in 1980, with amendments approved by the Ministry of the Environment (currently the Ministry of Environment, Conservation and Parks (MECP)) in 1980, 2002, 2004, 2005, 2007, 2011, 2012, 2013, 2014, 2017, 2018, 2020, and 2021.

Under the ECA, the Site is licensed to receive post-diversion solid non-hazardous Industrial, Commercial & Institutional (IC&I) waste from across Ontario. The 14.3 hectare (ha) Site contains an approved fill area of 6 ha.

In 2018, BRE completed an Individual Environmental Assessment (EA) to increase the total approved capacity at the Site to allow for the continued receipt of post-diversion IC&I waste over a five-to-seven-year planning period and an amendment to the Site's rate of fill to provide for a maximum of 151,000 tonnes per year (known as the Brooks Road Landfill Vertical Capacity Expansion EA). The Brooks Road Landfill Vertical Capacity Expansion EA was approved by the Minister of Environment, Conservation and Parks on January 15, 2019. The Site ECA was amended in 2021 to increase the annual rate of fill from 151,000 tonnes per year to a maximum of 250,000 tonnes per year, which is proportional to the daily maximum of 1,000 tonnes per day. The 2021 ECA amendment was subject to the Environmental Screening Process, as stated in Section 15 of the Waste Management Projects Regulation (O. Reg. 101/07) of the *EA Act*.

BRE is seeking to increase the capacity of the existing Site by approximately 219,400 m³ (including waste and daily cover) through a combination of vertical and horizontal expansion of the existing landfill. The proposed vertical and horizontal expansion will allow BRE to respond to the growing demands from waste generators and customers who need a safe and reliable waste management facility for disposal of their residual material. Expanding the capacity of the Site by 219,400 m³, as proposed through this Project, will allow operations to continue at the current fill rate and annual waste filling capacity for approximately two additional years once the current approved capacity is reached. There are no changes to the annual fill rate limits nor to the annual waste filling capacity of the Site proposed as part of this Project.

The vertical and horizontal capacity expansion proposed under this Project is subject to the Environmental Screening Process (Screening) in accordance with Section 13 of O. Reg. 101/07 – Waste Management Projects of the *EA Act*. The Environmental Screening Process was conducted in accordance with the Ontario Ministry of Environment, Conservation and Parks (MECP) "Guide to Environmental Assessment Requirements for Waste Management Projects". Through the Environmental Screening Process, the potential for the Project to result in adverse environmental effects was assessed. As there will be changes to the currently approved total landfill volume, footprint, and final site contours, it was concluded in the Screening Criteria Checklist that the Project could have potential environmental effects on the following environmental components:

- Surface Water;
- Geology and Hydrogeology;
- Land Use & Socio-Economic;
- Air Quality and Odour;

¹ The Ontario *Environmental Protection Act* in 2011 the term 'Certificate of Approval' (C of A) was changed to 'Environmental Compliance Approval' (ECA). All previously issued CA's are now referred to as ECAs.

- Noise;
- Natural Environment and,
- Traffic.

To further evaluate the potential effects on the environmental components identified through the initial Screening process, studies were completed to review the existing environmental conditions within the Site Study Area (SSA) and Local Study Area (LSA), identify potential effects, apply appropriate mitigation measures and determine the resultant net effects to the environment. With this in mind, separate stand-alone evaluations were completed for the following environmental components:

1. Surface Water Assessment
2. Geology and Hydrogeology Assessment
3. Land Use and Socio-Economic Assessment
4. Air Quality and Odour Assessment
5. Noise Impact Assessment
6. Natural Environment Assessment
7. Traffic Impact Assessment

Through the assessment of the Project's potential environmental effects of the Project, it was determined that increasing the total waste disposal capacity would result in minor environmental impacts. However, through the application of mitigation measures, the Project is not anticipated to result in any new net negative effects on the environment. As a result, the advantages of the Project outweigh the disadvantages.

Upon completion of the Environmental Screening Process an application will be made to amend the existing ECA No. A110302.

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1. Introduction

Brooks Road Environmental (BRE, Owner, Proponent) has undertaken an Environmental Screening Process (Screening) in accordance with the Waste Management Project Regulation (Ontario Regulation [O. Reg.] 101/07) of the Ontario *Environmental Assessment Act* (EA Act) in order to expand the existing Brooks Road Landfill located at 160 Brooks Road, near Cayuga, Haldimand County, Ontario. This Environmental Screening Report (ESR) documents the Screening carried out and includes a description of the Project, a description of the existing environment, consultation activities, mitigation and monitoring measures, and net effects of the project.

1.1 Project Proponent

BRE is a Canadian operating company in Haldimand County, Ontario, owned and operated by 2270386 Ontario Limited. The BRE contact for this project is as follows:

Tim Danyliw, P.Eng, PMP
Project Manager, Brooks Road Environmental
160 Brooks Road
Cayuga, Ontario, N0A 1E0
Tel: (226) 979-2468
Email: tim@gpnvironmental.ca

1.2 Project Location

The Brooks Road Landfill Site (Site) is located at 160 Brooks Road, near Cayuga, Haldimand County, Ontario. The location of the Site is shown in **Figure 1.1**.

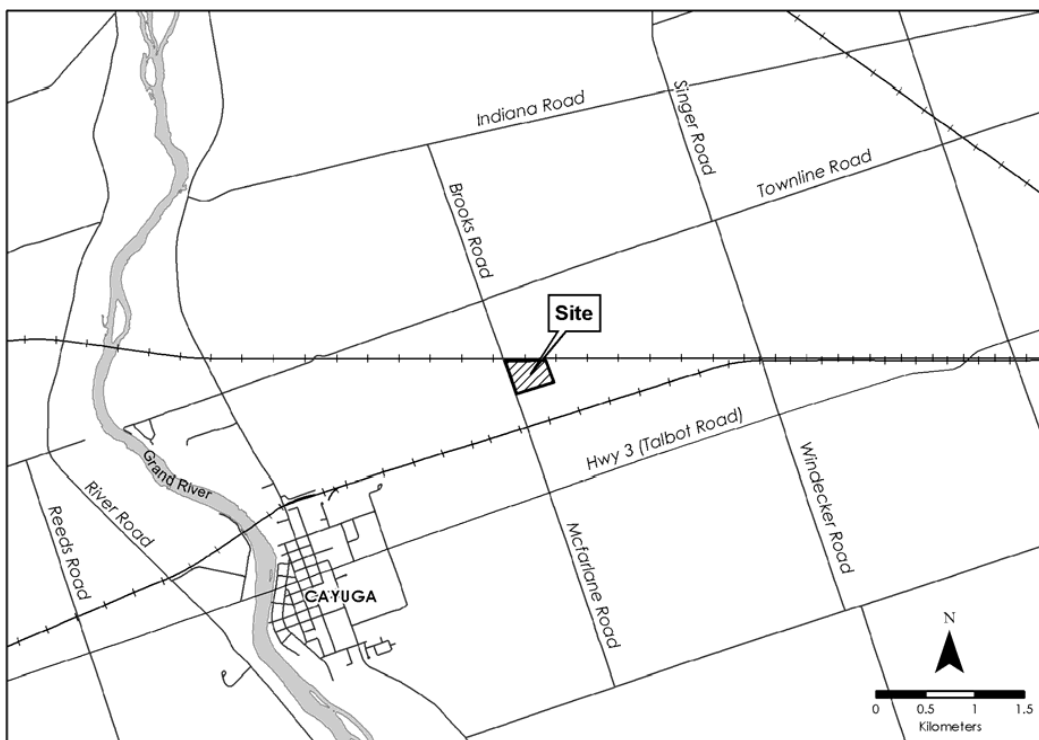


Figure 1.1 Site Location Map

1.3 Project Background

The Site, which operates under Environmental Compliance Approval (ECA)² No. A110302, has an approved annual fill rate of 250,000 tonnes per year and a total approved capacity of 1,045,065 cubic metres (m³) (including waste and daily/final cover). The Site also operates under an air and noise ECA No. 7323-C6EJUM (Air ECA). The Site has accepted waste (in one form or another) since 1959 and received a Certificate of Approval (C of A, now referred to as an ECA) in 1980, with amendments approved by the Ministry of the Environment (currently the Ministry of Environment, Conservation and Parks (MECP)) in 1980, 2002, 2004, 2005, 2007, 2011, 2012, 2013, 2014, 2017, 2018, 2020, and 2021.

Under the ECA, the Site is licensed to receive post-diversion solid non-hazardous Industrial, Commercial & Institutional (IC&I) waste from across Ontario. The 14.3 hectare (ha) Site contains an approved fill area of 6 ha.

In 2018, BRE completed an Individual Environmental Assessment (EA) to increase the total approved capacity at the Site to allow for the continued receipt of post-diversion IC&I waste over a five-to-seven-year planning period and an amendment to the Site's rate of fill to provide for a maximum of 151,000 tonnes per year (known as the Brooks Road Landfill Vertical Capacity Expansion EA). The Brooks Road Landfill Vertical Capacity Expansion EA was approved by the Minister of Environment, Conservation and Parks on January 15, 2019. The Site ECA was amended in 2021 to increase the annual rate of fill from 151,000 tonnes per year to a maximum of 250,000 tonnes per year, which is proportional to the daily maximum of 1,000 tonnes per day. The 2021 ECA amendment was subject to the Environmental Screening Process, as stated in Section 15 of the Waste Management Projects Regulation (O. Reg. 101/07) of the *EA Act*.

BRE is seeking to increase the capacity of the existing Site by approximately 219,400 m³ (including waste and daily cover) through a combination of vertical and horizontal expansion of the existing landfill. The proposed vertical and horizontal expansion will allow BRE to respond to the growing demands from waste generators and customers who need a safe and reliable waste management facility for disposal of their residual material. Expanding the capacity of the Site by 219,400 m³, as proposed through this Project, will allow operations to continue at the current fill rate and annual waste filling capacity for approximately two additional years once the current approved capacity is reached. There are no changes to the annual fill rate limits nor to the annual waste filling capacity of the Site proposed as part of this Project.

The vertical and horizontal capacity expansion proposed under this Project is subject to the Environmental Screening Process (Screening) in accordance with Section 13 of O. Reg. 101/07 – Waste Management Projects of the *EA Act* as follows:

A change to a landfilling site or dump is defined as a major commercial or business enterprise or activity and is designated as an undertaking to which the Act applies, if the changes meet the following criteria:

- 1. The total waste disposal volume of the landfilling site or dump after the change would exceed the total waste disposal volume that the landfilling site or dump was authorized to have under the Environmental Protection Act before the change by more than 100,000 cubic metres but by less than or equal to 375,000 cubic metres.*
- 2. The increase in the total waste disposal volume of the landfilling site or dump would not exceed 25 per cent of the total waste disposal volume that the landfilling site or dump was authorized to have under the Environmental Protection Act before the change.*
- 3. If a notice of completion under the Environmental Screening Process for Waste Management Projects has been submitted to the Ministry in respect of a previous change to the landfilling site or dump that meets the criteria in paragraphs 1 and 2, the day on which the notice of commencement is issued under the Environmental Screening Process for Waste Management Projects in respect of the change is at least 10 years after the day the notice of completion in respect of the previous change was submitted.*

² The Ontario *Environmental Protection Act* in 2011 the term 'Certificate of Approval' (C of A) was changed to 'Environmental Compliance Approval' (ECA). All previously issued CA's are now referred to as ECAs.

Section 13 of O. Reg. 101/07 – Waste Management Projects Regulation exempts this Project from Part II of the *EA Act*, subject to fulfilling the Environmental Screening process. This Screening is being conducted in accordance with the planning and design process outlined in Ontario MECP “Guide to Environmental Assessment Requirements for Waste Management Projects” (Guide)³. A Screening includes identifying and applying screening criteria to determine and describe potential environmental effects, public/external agency consultation, and the development of measures to mitigate identify environmental effects. The results of the Screening are documented within this ESR, which will be released for review by Indigenous communities, the public, and government agencies for a defined comment period. BRE will incorporate feedback received during the comment period, as appropriate and where possible, into a Final ESR to be posted for a 60-day review and comment period. Upon completion of the Environmental Screening Process, an application will be made to amend the existing ECA No. A110302.

1.3.1 History of the Brooks Road Landfill Site

The Site has gone from being a rural ‘dump’ (i.e., non-engineered, unlined, waste disposal pits) to a modern engineered and operated waste management facility/landfill. Due to the nature of some of the waste that was historically disposed at the Site, the Site was remediated to remove previous waste deposited on-Site from the unlined disposal pits, some of which was deemed to be hazardous under Ontario Regulations. Since BRE has taken Ownership, the Site has undergone numerous improvements from an operational and safety standpoint, received approval for a vertical capacity expansion under the *EA Act*, and been granted amendments to its ECA. A short summary of the Site’s history is provided in the subsections below.

Establishment of the Brooks Road Landfill Site

The Site was first established in 1959 as a rural dump for the surrounding area. A lack of provincial environmental protections and waste legislation at the time allowed for the accumulation of hazardous wastes in areas of the Site that gave rise to concerns about toxic contamination. In 1971, provincial legislation was enacted requiring that all waste disposal operators apply for a C of A (now referred to as an ECA), resulting in the renaming of the Site to Edwards Landfill. Edwards Landfill continued to operate and accept IC&I waste from the County between 1971 and 1977.

From 1977 to 2002 waste disposal at Edwards Landfill occurred only on an intermittent basis. The Site was purchased by Haldimand-Norfolk Sanitary Landfill Inc. in 2002, and an application was submitted to reopen the Site. The Ministry of the Environment (now MECP) granted an ECA for Edwards Landfill to reopen, subject to a list of conditions. The main requirement of Haldimand-Norfolk Sanitary Landfill Inc. was to decommission the disposal pits that had historically accepted potentially hazardous wastes.

Haldimand-Norfolk Sanitary Landfill Inc. submitted an application in 2004 to amend the maximum daily fill rate from 10 tonnes per day to 500 tonnes per day. The proposal was granted by the Ministry of the Environment in February 2005; however, an application seeking leave to appeal the decision was filed in June of that same year. A Settlement Agreement was reached between the appellants, Haldimand-Norfolk Sanitary Landfill Inc., and the Ministry of the Environment in November of 2006, and the appeal was withdrawn. A number of important issues and concerns related to the Edwards Landfill and its operation were raised during the appeal and are summarized as follows:

Inexperience of Operator (Haldimand-Norfolk Sanitary Landfill Inc. at the time) – no experience, expertise, or capability to operate a landfill receiving up to 500 tonnes of waste per day, nor to decommission historic waste disposal pits.

Non-compliance – not in compliance with a number of the conditions contained in the existing Site ECA and the County’s Tree Control Bylaw.

Inadequacies of Site Decommissioning Plan – Site Decommissioning Plan at the time of the previous application was inadequate and its implementation could have resulted in significant harm to the environment.

³ Ministry of the Environment, Conservation and Parks. (2007). *Guide to Environmental Assessment Requirements for Waste Management Projects*.

Truck Traffic Impacts – suitability of the Site to sustain the traffic volumes and loads associated with a fill rate of 500 tonnes per day was not assessed, nor was the impact of truck traffic on several other area roads.

Fundamental Unsuitability of Site – the location is fundamentally unsuitable for a landfill, particularly in regard to hydrogeological conditions, including the potential presence of karst topography and abandoned gypsum mines in the Site vicinity and the proximity of Provincially Significant Wetlands (PSW) and a National Historic Site.

Flawed Approvals Process – a proponent wishing to establish a new 600,000 m³ landfill in Ontario will ordinarily be subject to a mandatory public hearing, and the approval process followed by Haldimand-Norfolk Sanitary Landfill Inc. was designed to purposely circumvent that requirement.

Significant management and financing issues led Haldimand-Norfolk Sanitary Landfill Inc. to declare bankruptcy in 2007, leaving no plan in place for cleaning up the areas of concern at the Site. The Site went into receivership in September 2007, with SF Partnership Chartered Accountants as acting receivers. Community members and Indigenous communities expressed concerns over the following years about mismanagement of the Site.

Brooks Road Environmental Purchase of the Site

In May 2012, BRE purchased the Site with a plan for the future of the landfill as a modern facility managed in accordance with MECP requirements. Although the above concerns were raised with a different owner, BRE reviewed these issues as a starting point to address community concerns.

By January 2014, the Site had been fully decommissioned, which included excavation and the off-Site disposal of 193.37 tonnes of suspected hazardous waste and impacted soils at Newalta's waste disposal facility at 65 Green Mountain Road in Stoney Creek, Ontario, the excavation and off-Site disposal of five over-packed drums of solid non-hazardous waste to Tervita's waste transfer station at 1650 Upper Ottawa Street in Hamilton, Ontario, the off-Site disposal of 27,680 litres of liquid industrial waste to Newalta's facility at 1131 Snow Valley Road, Barrie, Ontario, and the relocation of 60,204 m³ of non-hazardous solid waste and impacted soil from the unlined disposal pits (referred to as the Original Landfill Area or OLA) to the on-Site engineered landfill cells. Results of the soil sampling program confirmed that all waste and impacted soils had been removed from the OLA and the remaining native soil within the decommissioning area met the applicable Ontario Soil Criteria standards provided in O. Reg. 153/04. All decommissioning activities are documented in the Site Decommissioning Report⁴ submitted to the Ministry of the Environment (now MECP) on January 30, 2014, and BRE provided an irrevocable letter of credit to the Ontario Government to satisfy the Financial Assurance requirements. Further, a renewed Indigenous community, Agency and public consultation/outreach program was put in place upon BRE's purchase of the Site – and continues today – to provide immediate data and to consult on future plans for the Site. In short, a significant improvement to the Site and its operations came about as a result of the new ownership.

Brooks Road Landfill Vertical Capacity Expansion EA 2019 Approval

In 2018, BRE completed an Individual EA (known as the Brooks Road Landfill Vertical Capacity Expansion EA) to increase the total approved capacity at the Site by 421,000 m³ to allow for the continued receipt of post-diversion IC&I waste over a five-to-seven-year planning period. The approved Brooks Road Landfill Vertical Capacity Expansion EA also proposed a change to the rate of waste received on-Site from a daily maximum of 500 tonnes per day to an annual maximum of 151,000 tonnes per year to accommodate busier months of operation in the spring and summer when more construction waste is produced compared to the winter months. Any proposed change in the annual fill rate limits requires a modification to Condition 3(7) of the approved ECA, which specifies that the maximum amount of waste that may be received at the landfill on an annual basis. The approved Brooks Road Landfill Vertical Capacity Expansion EA assessed the effects to the environment based on a maximum daily fill rate of 1,000 tonnes per day to demonstrate that the Site could manage this daily quantity, while maintaining the same annual limits (151,000 tonnes per year). Therefore, the 1,000 tonnes per day was used in the EA as a benchmark for the environmental effects analysis. On January 15, 2019, the MECP approved the Brooks Road Landfill Vertical Capacity Expansion EA. The

⁴ Report was provided by Conestoga-Rivers & Associates. (2014, October 9).

resulting March 27, 2020 amendment to the ECA reflected a daily maximum of 1,000 tonnes per day and annual maximum of 151,000 tonnes per year.

Environmental Compliance Approval Amendment 2021

The Site ECA was recently amended to increase the annual rate of fill from 151,000 tonnes per year to a maximum of 250,000 tonnes per year, which is proportional to the daily maximum of 1,000 tonnes per day. The 2021 ECA amendment was subject to the Environmental Screening Process, as stated in Section 15 of the Waste Management Projects Regulation (O. Reg. 101/07) of the *EA Act*. The Environmental Screening Process to amend the approved ECA that commenced in November 2020 was completed in early 2021. The results of the Screening were documented in an ESR, which was released for a 60-calender day review to government agencies, Indigenous communities, and the public on April 15, 2021.

1.4 Problem, Purpose, and Opportunity

The purpose of the Project is to increase the capacity of the Site by approximately 219,400 m³ (including waste and daily cover). This will be achieved through a combination of re-engineering the Site's final contours to expand the Site vertically, as well as increasing the existing landfill footprint to expand the Site horizontally. The former railway property will continue to provide buffer land for the Site. Additionally, a revision of the final contours proposed under the ESR will require modification to the northern perimeter access road and stormwater drainage ditch.

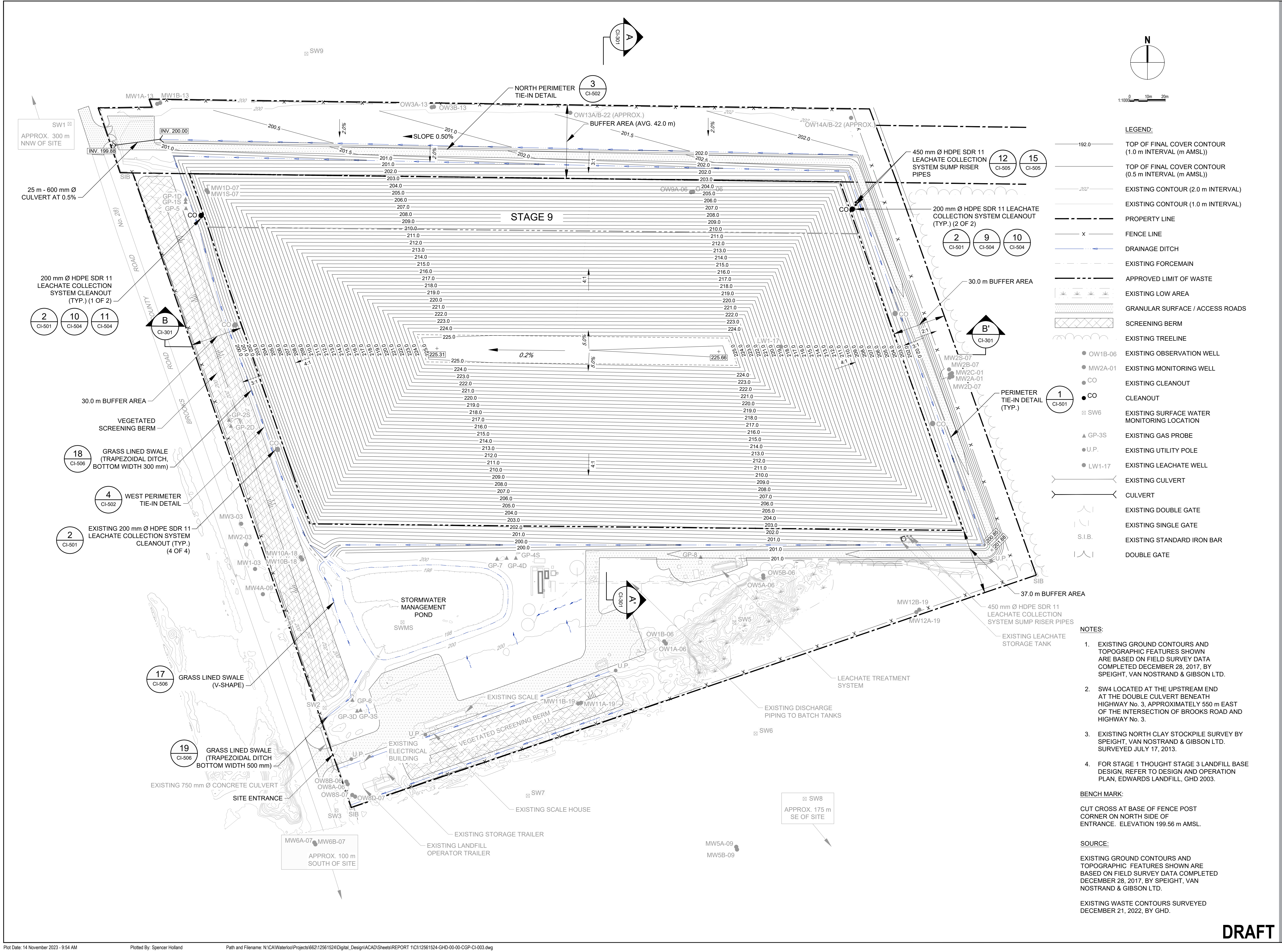
The Site accepts only non-hazardous solid waste, and serves a primarily industrial customer base, who have already extracted the value from their residual material and need a permitted, environmentally secure facility to manage the residual material their operations generate.



BRE intends to continue serving its existing customer base and is responding to the economic opportunity of providing waste management services to address the continued and growing demand from local and regional customers that require a facility that is permitted to manage the residual materials they generate. Extending the life of the Site will provide BRE with increased flexibility in terms of how best to serve its existing waste clients while remaining competitive within the marketplace. As part of its business plan, BRE reviewed the following:

- The current post-diversion solid, non-hazardous industrial residual material generated in Ontario, requiring a local, safe, and secure disposal facility
- Future post-diversion solid, non-hazardous industrial residual material generated in Ontario, requiring a local, safe, and secure disposal facility
- Development and analysis of potential long-term disposal capacity options that BRE could implement in order to continue providing waste management disposal services to their current businesses and customers

1.5 Description of Project Components and Activities

The Project for which the Screening is being undertaken is a proposed capacity expansion of 219,400 m³ and involves a change to the final Site capacity, contours, and footprint. Some level of construction is required to implement the proposal. This will be a combination of re-engineering the Site's final contours to expand the Site vertically in the expansion area (exceeding current approved peak contours), as well as increasing the existing landfill footprint to expand the Site horizontally. Modification to the northern perimeter access road and stormwater drainage ditch will be required to accommodate the proposed changes to the final Site contours. The former railway property will continue to provide buffer land for the Site (see **Figure 1.2**). Brooks Road Landfill will continue to operate within currently approved operating hours and current construction activities and daily operations will continue as usual. There are no changes to the annual fill rate limits (maximum 1,000 tonnes per day and 250,000 tonnes per year) proposed as part of this project.





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Figure 1.2

P03.	ISSUED FOR CLIENT REVIEW	R.L.	D.B.	10-27-2023
P02.	ISSUED FOR CLIENT REVIEW	R.L.	D.B.	04-26-2023
P01.	ISSUED FOR REVIEW	R.L.	D.B.	09-19-2022
No.	Issue	Checked	Approved	Date
Author	S. HOLLAND	Designer	D. BARTON	
Drafting Check	M. WOLFER	Design Check	D. GATRELL	
Project Manager	R. LOVEDAY	Project Director	D. BARTON	
Client	BROOKS ROAD LANDFILL SITE HALDIMAND COUNTY, ONTARIO			
Project	DESIGN AND OPERATIONS REPORT LANDFILL EXPANSION			
Date	OCTOBER 20, 2023	Scale	1:1000	
Project No.	12561524			
Title	FINAL CONTOUR PLAN (TOP OF TOPSOIL)			
Sheet No.	CI-103			

A summary of the key elements of the proposed capacity expansion compared to the existing approved Site is provided in Table 1.1.

Table 1.1 *Summary of Proposed Brooks Road Landfill Capacity Expansion Design vs Existing Landfill*

Design Component	Existing Landfill	Proposed Capacity Expansion
Volume (m ³)	1,045,065	1,264,4651
Footprint Area (ha)	6.07	7.15
Peak Elevation (mAMSL) (top of final cover)	221.50	225.66
Peak Elevation – top of waste (mAMSL)	220.75	224.91
Crest of Slope Elevation (mAMSL)	221.0	225.30
Slopes (Top/Sides)	Top – 20:1 (5%) Sides – 4:1 (25%)	Top – 20:1 (5%) Sides – 4:1 (25%) New stage is 4:1 (25%) north side slope, extends to a new peak elevation (i.e., elevated 20:1 [5%] plateau), and the south side slope (25%) ties-in to existing approved top of waste plateau. All other sides remain the same.
Stormwater Pond	Permanent pool – 1,266 m ³ Total live storage – >5,502 m ³	Pond capacity is sufficient for the proposed expansion based on existing Stormwater Management Plan.
Stormwater Drainage Ditch		Stormwater drainage ditch shifted north by 30 m. East and west ditches will extend north to maintain full perimeter ditch.
Perimeter Roads		Northern perimeter access road shifted by 29 m. East access road extended as appropriate. Access road will extend west, proposed to connect to Brooks Road as a secondary site access (locked during normal operation). A turnaround area will be provided in the northwest corner.
Maximum Daily Truck Traffic	25 to 50	25 to 50
Post-Closure Leachate Generation Rate	33 m ³ /day	39 m ³ /day
Capacity anticipated to be reached (year)	2024	2026

Environmental investigations were carried out as part of the Screening to confirm the potential environmental effects associated with the implementation of the Project; identify mitigation or compensation measures required to address potential adverse environmental effects; and determine the remaining net effects following the application of mitigation and/or compensation measures.

1.6 Approval Requirements

A change in the capacity of the landfill requires a modification to Condition 3(6) of the approved ECA, which specifies the maximum volumetric capacity for the Site including waste and daily cover. This proposed vertical and horizontal capacity expansion is subject to the Environmental Screening Process in accordance with Section 13 of the Waste Management Projects Regulation, (O. Reg. 101/07) of the *EA Act*.

When the Environmental Screening Process has been completed, BRE will prepare and apply to the MECP to amend ECA No. A110302.

2. Environmental Screening Process for Waste Management Projects

As stated above, the Environmental Screening Process under the Waste Management Projects Regulation (O. Reg. 101/07) of the EA Act was followed for the proposed Project. As per Section 13 of O. Reg. 101/07,

A change to a landfilling site or dump is defined as a major commercial or business enterprise or activity and is designated as an undertaking to which the Act applies, if the changes meet the following criteria:

1. *The total waste disposal volume of the landfilling site or dump after the change would exceed the total waste disposal volume that the landfilling site or dump was authorized to have under the Environmental Protection Act before the change by more than 100,000 cubic metres but by less than or equal to 375,000 cubic metres.*
2. *The increase in the total waste disposal volume of the landfilling site or dump would not exceed 25 per cent of the total waste disposal volume that the landfilling site or dump was authorized to have under the Environmental Protection Act before the change.*
3. *If a notice of completion under the Environmental Screening Process for Waste Management Projects has been submitted to the Ministry in respect of a previous change to the landfilling site or dump that meets the criteria in paragraphs 1 and 2, the day on which the notice of commencement is issued under the Environmental Screening Process for Waste Management Projects in respect of the change is at least 10 years after the day the notice of completion in respect of the previous change was submitted.*

In accordance with Section 13 of O. Reg. 101/07, the proposed 219,400 m³ expansion is exempt from Part II of the EA Act, subject to fulfilling the Environmental Screening process. In support of O. Reg. 101/07, the MECP published the *Guide to Environmental Assessment Requirements for Waste Management Project* (Guide), which outlines the planning and design process for the Environmental Screening Process. This Screening was conducted in accordance with the planning and design process outlined in the Guide, following the process as illustrated in **Table 2.1**.

This ESR has been prepared as a part of the Environmental Screening Process, documenting the potential adverse environmental effects of the Project on the environment. Where adverse environmental effects have been identified, mitigation and monitoring measures have been recommended to reduce or eliminate the effects.

Table 2.1 Steps in the Environmental Screening Process

Step 1	Publish Notice of Commencement and Public Open House
Step 2	Identify Problems or Opportunities and Project Description
Step 3	Apply Screening Criteria
Step 4	Describe Potential Environmental Effects, Concerns & Issues
Step 5	Consultation and Public Open House #1
Step 6	Conduct Studies and Assessment of Potential Environmental Effects
Step 7	Develop Impact Management / Mitigation Measures
Step 8	Consultation and Public Open House #2
Step 9	Identify Significant Net Effects and Resolve Concerns (if required)
Step 10	Conduct Additional Studies and Assessments (if required)

Step 11	Prepare Environmental Screening Report
Step 12	Publish Notice of Completion
Step 13	Resolve Elevation Requests (if required)
Step 14	Submit Statement of Completion to MECP

2.1 Amendment to Waste Management Project Regulation

O. Reg. 101/07 came into place in 2007, to ensure that the environmental effects of waste management projects are appropriately reviewed, given their potential significance. On August 8, 2023, the MECP amended the Waste Management Projects regulations (O. Reg. 101/07) in an effort to modernize the almost 50-year-old EA process that is not reflective of best practices, and that places undue burden on proponents that may not lead to environmental benefits and results in unnecessary cost from critical infrastructure projects. As part of modernizing the EA process, the MECP brought in regulatory changes that allow more projects to follow a streamlined EA process (i.e., Screening). The MECP proposed and approved updates to the thresholds for determining EA requirements for certain landfill expansions such that the following projects will be able to use the streamlined EA process for waste management projects:

- Changing a landfill to increase the total waste disposal volume by more than 100,000 m³ and less than or equal to 375,000 m³ if the change will increase the total waste disposal volume by less than or equal to 25%
- The Minister is the decision maker for elevation requests.

The approved revisions also state that proponents are not able to use the streamlined EA process to do a series of expansions over a defined period of time in order to avoid undertaking a Comprehensive (previously known as an Individual) EA. These amendments are captured in O. Reg. 101/07 made under the *EA Act* as well as the Guide.

Based on the approved legislative changes, BRE elected to revise the initially proposed expansion volume from 100,000 m³ (as reported in the June 2022 Notice of Commencement) to approximately 219,400 m³.

2.2 Screening Criteria Checklist

At the beginning of the Environmental Screening Process, the Screening Criteria Checklist (provided as Schedule I, pp 62 – 64, to the Guide) is to be completed based on the information provided in the Project Description. The Screening Criteria reflect the broad definition of “environment” contained in the *EA Act*.

As noted in the Guide:

“The Screening Criteria are presented in the form of a checklist with the option of a “Yes” or “No” response. Mitigation measures are not to be considered in concluding whether there is “No” potential environmental effect. That is, the proponent is required to answer “Yes” even if the proponent believes that a potential environmental effect could likely be mitigated. The reason for requiring a “Yes” is to ensure that mitigation measures are open to discussion and review. Another reason for this approach is that further discussion and review of a potential effect may reveal that there is no actual effect, in which case no mitigation is required. Where a “Yes” has been identified, the proponent is to provide additional information in the ESR, explaining the potential effect(s), methods to mitigate or address the effect(s), any net effects that are anticipated and if so, their significance. Even where the proponent indicates that “No” environmental effects are anticipated, it is recommended that additional information be provided in the ESR in order to support the “no effects” conclusion.”

Each criterion is based on a question which is prefaced with the phrase, “Might the Project...”. The result of the screening level analysis is provided in Table 2.2.

Table 2.2 Screening Criteria Checklist

	Criterion	YES	NO	Additional Information
	Might the project...			
Surface and Groundwater				
1.1	Cause negative effects on surface water quality, quantities, or flow?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause potential negative effects on surface water quality, quantities, or flows.
1.2	Cause negative effects on groundwater quality, quantity, or movement?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects on groundwater quality, quantity, or movement.
1.3	Cause significant sedimentation or soil erosion or shoreline or riverbank erosion on or off site?		X	The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause some sedimentation on- or off-Site; however, it is not anticipated to be significant.
1.4	Cause negative effects on surface or groundwater from accidental spills or releases (e.g., leachate) to the environment?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects on surface or groundwater from accidental spills or releases (e.g., leachate) to the environment.
Land				
2.1	Cause negative effects on residential, commercial, institutional, or other sensitive land uses within 500 metres from the site boundary?		X	The proposed undertaking is a continuation of the existing operation through an expansion within the existing site. No change to land use is being proposed. As such, no negative effects are anticipated on the lands or land uses within 500m the Site as a result of the Project.
2.2	Not be consistent with the Provincial Policy Statement, provincial land use or resource management plans?		X	The proposed landfill expansion will continue to be consistent with the Provincial Policy Statement, provincial land use and/or resource management plans.
2.3	Be inconsistent with municipal land use policies, plans and zoning bylaws (including municipal setbacks)?		X	The proposed landfill expansion will continue to be consistent with municipal land use policies, plans and zoning bylaws (including municipal setbacks). No new lands are required and no changes to existing zoning are required.
2.4	Use lands not zoned as industrial, heavy industrial or waste disposal?		X	The proposed landfill expansion will not require new lands or changes to existing zoning.
2.5	Use hazard lands or unstable lands subject to erosion?	X		The proposed landfill expansion may require the use of hazard lands or GRCA regulated lands.
2.6	Cause negative effects related to the remediation of contaminated land?		X	The proposed landfill expansion will not cause negative effects related to the remediation of contaminated land.
Air and Noise				
3.1	Cause negative effects on air quality due to emissions (for parameters such	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final

	Criterion	YES	NO	Additional Information
	Might the project...			
	as temperature, thermal treatment exhaust flue gas volume, nitrogen dioxide, sulphur dioxide, residual oxygen, opacity, hydrogen chloride, suspended particulates, or other contaminants)?			contours, and on-Site operations and may cause negative effects on air quality due to emissions.
3.2	Cause negative effects from the emission of greenhouse gases (e.g., carbon dioxide, carbon monoxide, methane)?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may result in a potential increase in emission of greenhouse gases associated with continued operation of the Site.
3.3	Cause negative effects from the emission of dust or odour?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may result in a potential increase in dust and odour emissions associated with continued operation of the Site.
3.4	Cause negative effects from the emission of noise?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may result in a potential increase in noise emissions associated with continued operation of the Site.
3.5	Cause light pollution from trucks or other operational activities at the site?		X	The proposed landfill expansion will not cause negative effects from light pollution.
Natural Environment				
4.1	Cause negative effects on rare (vulnerable), threatened or endangered species of flora or fauna or their habitat?	X		The provincial Species at Risk Ontario (SARO) and federal <i>Species at Risk Act</i> (SARA) list numerous endangered, threatened, and special concern species of flora or fauna within the Study Areas. Some of these species (e.g., barn swallow [<i>Hirundo rustica</i>]) have been observed within the Site.
4.2	Cause negative effects on protected natural areas such as, ANSIs, ESAs, or other significant natural areas?		X	As there are no ANSIs, Environmentally Sensitive Areas, or other significant natural areas within the Site, the proposed expansion is not expected to cause a negative effect.
4.3	Cause negative effects on designated wetlands?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects on designated wetlands. PSWs are present within the southern boundary of the Site and throughout the adjacent lands.
4.4	Cause negative effects on wildlife habitat, populations, corridors, or movement?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects on wildlife habitats, populations, corridors, or movements. It should be noted Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR) have identified Wildlife Activity Area (white-tailed deer wintering area) as being present within the Study Areas.

	Criterion	YES	NO	Additional Information
	Might the project...			
4.5	Cause negative effects on fish or their habitat, spawning, movement, or environmental conditions (e.g., water temperature, turbidity, etc.)?		X	The proposed landfill expansion will not result in negative effects on fish or their habitat, spawning, movement, or environmental conditions (e.g., water temperature, turbidity, etc.) due to lack of presence within the Site.
4.6	Cause negative effects on locally important or valued ecosystems or vegetation?		X	The proposed landfill expansion will not result in negative effects on locally important or valued ecosystems or vegetation.
4.7	Increase bird hazards within the area that could impact surrounding land uses (e.g., airports)?		X	The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations. This is unlikely to cause an increase in bird hazards.
Resources				
5.1	Result in practices inconsistent with waste studies and/or waste diversion targets (e.g., result in final disposal of materials subject to diversion programs)?		X	The proposed landfill expansion will be consistent with diversion targets.
5.2	Result in generation of energy that cannot be captured and utilized?		X	No energy recovery/ utilization is proposed.
5.3	Be located a distance from required infrastructure (such as availability to customers, markets, and other factors)?		X	The proposed landfill expansion will not change the existing landfill location.
5.4	Cause negative effects on the use of Canada Land Inventory Class 1-3, specialty crop or locally significant agricultural lands?		X	According to the Canada Land Inventory, ⁵ lands within the Local Study Area (LSA) are comprised of Class 2 soils (generally north and west of the Site) and Class 3 soils (generally east and south of the Site). The proposed landfill expansion will not result in any loss of soil with agricultural capability, nor would the current expansion cause negative effects on Canada Land Inventory Class 2-3 soils within the LSA. All lands on the Site are considered to be disturbed and are not rated under the Canada Land Inventory.
5.5	Cause negative effects on existing agricultural production?		X	The proposed landfill expansion will not cause negative effects on agricultural production.
Socio-Economic				
6.1	Cause negative effects on neighbourhood or community character?		X	The proposed undertaking is an expansion to an already approved and existing landfill within the existing site. As such, no negative effects on the neighbourhood or community character are anticipated on as a result of the Project.
6.2	Result in aesthetics impacts (e.g., visual and litter impacts)?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause aesthetic impacts due the increase in landfill height
6.3	Cause negative effects on local businesses, institutions, or public facilities?		X	The proposed undertaking is a continuation of the existing operation through an expansion within the existing site. No change to land use is being

	Criterion	YES	NO	Additional Information
	Might the project...			
				proposed. As such, no negative effects are anticipated to local businesses, institutions, or public facilities.
6.4	Cause negative effects on recreation, cottaging or tourism?		X	The proposed landfill expansion will not result in negative effects on recreation, cottaging or tourism as none of the above-mentioned uses have been identified within the Study Areas..
6.5	Cause negative effects related to increases in the demands on community services and infrastructure?		X	The proposed landfill expansion will not cause negative effects related to increases in the demands on community services and infrastructure.
6.6	Cause negative effects on the economic base of a municipality or community?		X	The proposed landfill expansion will not cause negative effects on the economic base of a municipality or community.
6.7	Cause negative effects on local employment and labour supply?		X	The proposed landfill expansion will not cause negative effects on local employment and labour supply. The continued use of the landfill will provide economic benefits to the local community in the form of new employment opportunities in both the construction and day-to-day operation. There is also the potential for increased employment opportunities in local firms.
6.8	Cause negative effects related to traffic?	X		The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects related to traffic through prolonging the life of the Site.
6.9	Be located within 8 km of an aerodrome/airport reference point?	X		Three aerodromes have been identified within 8km of the Site: Cayuga (Bruce Field), approximately 1.3 km south of the Site Cayuga East, approximately 3 km southeast of the Site Grand River Executive, approximately 7.5 km north of the Site
6.10	Interfere with flight paths due to the construction of facilities with height (i.e., stacks)?		X	The proposed landfill expansion will not interfere with flight paths.
6.11	Cause negative effects on public health and safety?		X	The proposed landfill expansion would not cause any negative effects on public health and safety.
Heritage and Culture				
7.1	Cause negative effects on heritage buildings, structures or sites, archaeological sites or areas of archaeological importance, or cultural heritage landscapes?		X	The entire Site has been subjected to recent, extensive and intensive disturbance and it is therefore considered that the Site does not have any heritage, cultural and archaeological potential that will be negatively affected by the expansion. While there are areas within the Local Study Area (LSA) that may have heritage, cultural archaeological potential, these areas will not be disturbed by the proposed expansion.

	Criterion	YES	NO	Additional Information
	Might the project...			
7.2	Cause negative effects on scenic or aesthetically pleasing landscapes or views?	X		The proposed vertical and horizontal landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects on scenic or aesthetically pleasing landscapes or views.
Aboriginal				
8.1	Cause negative effects on land, resources, traditional activities, or other interests of Aboriginal communities?		X	Consultation with Indigenous communities will take place throughout the Environmental Screening Process.
Other				
9.1	Result in the creation of non-hazardous waste materials requiring disposal?		X	The proposed landfill expansion will not change the types of wastes the facility is permitted to receive and will not result in the creation of non-hazardous waste materials requiring disposal (the landfill currently <u>receives</u> non-hazardous wastes as permitted by the existing Environmental Compliance Approval).
9.2	Result in the creation of hazardous waste materials requiring disposal?		X	The proposed landfill expansion will not change the types of wastes the facility is permitted to receive and will not result in the creation of hazardous waste materials requiring disposal (the landfill currently <u>receives</u> non-hazardous wastes as permitted by the existing Environmental Compliance Approval).
9.3	Cause any other negative environmental effects not covered by the criteria outlined above?		X	The proposed landfill expansion will not cause any other negative environmental effects not covered by the criteria outlined above.

3. Description of the Existing Environment

This section documents the existing conditions (i.e., what exists in absence of the proposed Project) in the context of the discipline-specific criteria included in the Screening Criteria Checklist (see Table 2.2, above) within the Study Areas defined for each discipline.

3.1 Surface Water Existing Conditions

3.1.1 Study Area

The Surface Water Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **Site Study Area (SSA):** Including all lands (i.e., 14.3 ha)) within the existing, approved boundaries of the Site as defined by ECA No. A110302, as amended
- **Local Study Area (LSA):** Including all lands and waters within a 1 kilometre (km) radius of the SSA boundaries including agricultural, residential, and municipal properties



3.1.2 Methodology

3.1.2.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Surface Water Study Team to determine existing surface water conditions within the Study Areas. The following sources of secondary information were collected and reviewed:

- MECP Stormwater Management Planning and Design Manual (MECP, March 2003)
- Stormwater Management (SWM) Plan (Conestoga-Rovers & Associates (CRA), September 2013)
- Surface Water (SW) Resources Assessment Report for the Brooks Road Landfill Site, Vertical Capacity Expansion Environmental Assessment (GHD, July 2016)
- Design and Operation (D & O) Report Landfill Expansion Report 81 Revision 1 (GHD, June 2021)
- 2021 Operations and Monitoring (O & M) Report, Brooks Road Landfill Site (GHD, March 2022)

3.1.3 Process Undertaken

The process undertaken for the Surface Water Assessment on the Site includes the following:

- Background Review
- Existing Site Conditions Review
- Field Investigation Review (based on the current surface water monitoring program)
- Proposed Expansion Assessment
- Potential effects, mitigation measures and net effect analysis

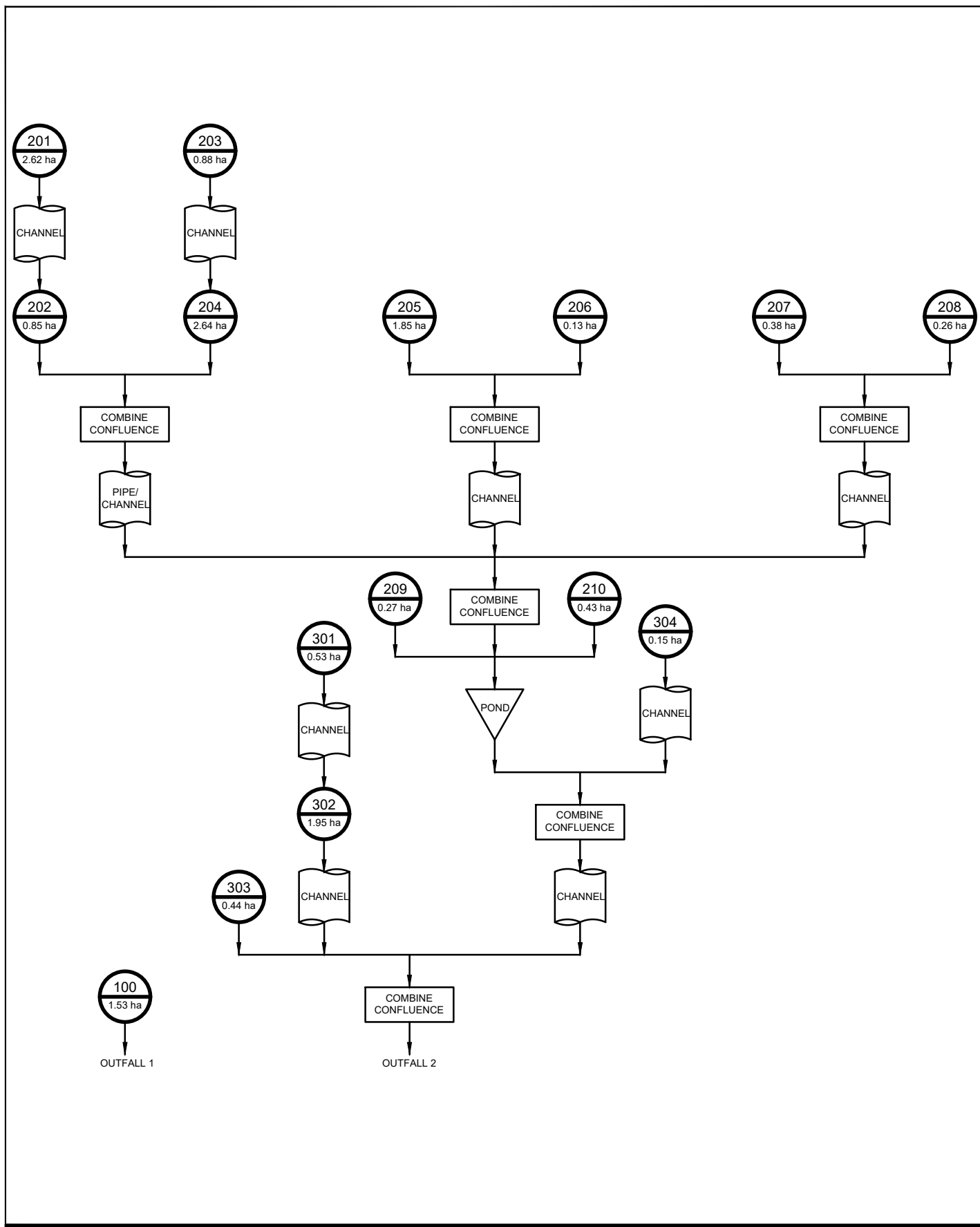
3.1.4 Description of Surface Water Existing Conditions

The on-Site drainage patterns are similar to those described in the SWM Plan (2013) and SW Resources Assessment Report (2016). The Site stormwater management practices currently operate under Amended ECA Nos. 1122- BKUPSM, issued in February 2020. The Site drainage network is being configured to the Post Closure Condition, illustrated on Figure 5 of the 2013 SWM Plan. The SWM Plan and SW Resources Assessment are provided in the Surface Water Assessment Report (see **Appendix A**).

The LSA includes slough forest, woodlot, agricultural, residential, and municipal properties. The on-Site topography is very flat with a slight 0.003 metre/metre (m/m) horizontal gradient to the south. The topography across the LSA from north to south ranges from approximately 202 m above mean seal level (AMSL) to approximately 196 m AMSL.

The existing SWM measures within the Site, as described in the SWM Plan and D&O report, include the following:

- Site stormwater runoff is discharged from two outfalls. Runoff from the undeveloped area of land located at the south-east corner of the Site (catchment 100) discharges through Outfall 1. The remainder of the Site discharges through Outfall 2. The existing flow schematic is presented on **Figure 3.2**.
- The majority of the Site areas discharge to the existing SWM pond through perimeter ditches including final cover areas (Catchments 201-204), areas between the landfill perimeter access road and the visual screening berms to the north and west (Catchments 205-206), segregated recyclable material storage areas, Site trailers, scales (Catchments 207-208) and areas that encompass the pond (Catchments 209-210).
- The rest of the Site areas, which are largely undeveloped (Catchments 301-303), discharge towards Outfall 2.



BROOKS ROAD LANDFILL
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SURFACE WATER RESOURCES
ASSESSMENT REPORT
POST CLOSURE CONDITIONS
FLOW SCHEMATIC

Project No. 12561524
 Date October 2022

FIGURE 3.2

A summary of the existing subcatchment parameters for contributing drainage areas to the SWM pond is presented in **Table 3.1**.

Table 3.1 Existing Subcatchment Parameters for Contributing Drainage Areas to SWM Pond

Catchment ID*	Area (ha)	Slope (%)	Imperviousness Area (%)	Imperviousness Area (ha)	SCS Curve Number
201	2.62	25	5	0.13	73
202	0.85	25	7	0.06	73
203	0.88	25	5	0.04	72
204	2.64	25	8	0.21	73
205	1.85	50	0	0.00	74
206	0.13	2	5	0.01	72
207	0.38	2	95	0.36	98
208	0.26	2	95	0.25	98
209	0.27	2	5	0.01	72
210	0.43	10	100	0.43	98
Total	10.31				

Source*: Stormwater Management Plan 2013 (Table 3)

The existing stormwater controls on Site include drainage ditches and the SWM Pond, which are summarized in subsequent sections.

Although the Site is on the boundary of two watersheds and the conditions are primarily ephemeral, the surface water drainage pattern meanders through road-side ditches, farmland, and Norton's Creek to the Grand River, located approximately 7 km from the Site.

3.1.4.1 Monitoring Program

As specified in the Landfill ECA, a surface water monitoring program was developed to assess the surface water quality within the Site and downstream of the Site to ensure compliance with the ECA requirements, Water Management Policies, Guidelines, Provincial Water Quality Objectives (PWQO), published by the MECP in July 1994, and reprinted February 1999. The current surface water monitoring program includes monitoring of surface water quality and quantity, through water sampling and flow rate measurements, respectively.

The surface water monitoring network is currently comprised of nine monitoring locations (see **Figure 3.3**) which includes the following:

- Three off-Site background locations: SW1, SW8, and SW9. All three have been established to document the background water quality in the local ditches and ponds. SW9 is located immediately north of the Site, north of OW3A/B-13 monitoring well.
- Two on-Site surface water monitoring locations: include one pond (SW5) located in the southern portion of the Site and one on-Site surface water ditch (SW2) located at the discharge from the surface water management system (SWMS).
- Four off-Site surface water monitoring locations: include two ponds (SW6 and SW7) located to the south of the Site; one drainage ditch located immediately downstream of the Site discharge point (SW3), and one drainage ditch (SW4) situated approximately 1 km south and downstream of the Site along Highway No. 3.

Water quality monitoring and surface water flow measurements at all surface water stations is scheduled to take place on a quarterly basis in March, May, August, and November. An attempt is made to correlate the surface water

monitoring with rainfall events. As such, the John C. Munro Hamilton International Airport in Mount Hope, ON Hamilton Airport), located approximately 24 km to the north, is often used to schedule surface water monitoring events.

The comprehensive list of specific surface water parameters analyzed during the monitoring program includes:

- General parameters: Alkalinity, conductivity, chloride, ammonia, nitrate, nitrite, TKN, total phosphorus, TDS, pH, TSS, sulphate, BOD5, COD, phenol, pH
- Metals: arsenic, barium, boron, cadmium, chromium, iron, lead, mercury, copper, zinc
- Organics: ethylbenzene, benzo(a)pyrene, naphthalene
- Field parameters: conductivity, pH, temperature, and dissolved oxygen

The parameter list for the current monitoring period (2021) is provided in Table 5.7 of the 2021 O&M report.



SOURCE: MICROSOFT PRODUCT SCREEN SHOT REPRINTED WITH PERMISSION FROM MICROSOFT CORPORATION, ACQUISITION DATE 2020, ACCESSED MARCH, 2020

LEGEND

- PROPERTY LINE
- ⊗ SW5 SURFACE WATER MONITORING LOCATION
- TEMPORARY DEWATERING SEDIMENTATION POND



BROOKS ROAD LANDFILL SITE
SURFACE WATER RESOURCES ASSESSMENT
REPORT

Project No. 12561524
Date October, 2022

SURFACE WATER MONITORING LOCATIONS

Figure 3.3

3.2 Geology & Hydrogeology Existing Conditions



3.2.1 Study Area

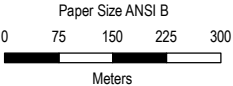
The Geology and Hydrogeology Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **SSA:** Including all lands (i.e., 14.3 ha) within the existing, approved boundaries of the Site as defined by ECA No. A110302, as amended
- **LSA:** Including all lands and waters within a 1 km radius of the SSA boundaries including agricultural, residential, and municipal properties



Legend

-  Site Study Area
-  Local Study Area (1km Radius)



Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 17N



BROOKS ROAD LANDFILL
160 BROOKS ROAD, CAYUGA, ONTARIO
GEOLOGY AND HYDROGEOLOGY
ASSESSMENT REPORT

Project No. **12561524**
Revision No. **-**
Date **Oct 21, 2022**

STUDY AREAS

FIGURE 3.4

3.2.2 Methodology

3.2.2.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Geology and Hydrogeology Study Team to determine existing geology and hydrogeology conditions within the Study Areas. The following sources of secondary information were collected and reviewed:

Site-Specific Reports

- GHD Limited. (April 2022). 2021 Annual Operations and Monitoring Report, Brooks Road Landfill Site, Haldimand County, Ontario.
- Conestoga-Rovers and Associates. (October 2002, Amended November 2003). Design and Operations Report, Edwards Landfill Site, Haldimand County, Ontario.
- Conestoga-Rovers and Associates. (October 2002). Hydrogeologic Performance Assessment - Updated Design, Edwards Landfill Site, Haldimand County, Ontario.
- Conestoga-Rovers and Associates. (July 2010). Updated Site Decommissioning Plan, Edwards Landfill Site, Haldimand County, Ontario.
- Conestoga-Rovers and Associates. (July 2004). Well Survey and Limited Hydrogeological Assessment, Edwards Landfill Site, Haldimand County, Ontario.
- Conestoga-Rovers and Associates. (January 2014). Site Decommissioning Report, Brooks Road Landfill Site, Haldimand County, Ontario.
- GHD Ltd. (May 2016). Gypsum Mine Investigation Report, Haldimand County, Ontario.

Government Information Available in the Public Domain

- Physiography mapping (classified as the Haldimand Clay Plain)
 - Chapman, L.S. and Putnam, D.F., 1984: The Physiography of Southern Ontario; Ontario Geological Survey, Special Volume 2, Ontario Ministry of Natural Resources, Third addition
- Topography Mapping (regional topography and slope, and approximate site topography of 200 m above mean sea level (AMSL))
 - National Topographic System, 1983: Dunnville, Ontario; Canada Centre for Mapping, Department of Energy, Mines & Resources, Information Current as of 1980, Map Sheet 30 L/13, Edition 6, scale 1:50,000
- Soils mapping (classified as lacustrine silty clay)
 - Ontario Institute of Pedology, 1983: Soils of Haldimand-Norfolk Regional Municipality; Cartography Section, Land Resource Research Institute, Research Branch, Agriculture Canada, Soil Survey Report No. 57, Sheet 6, scale 1:25,000
- Quaternary geology mapping (classified as glaciolacustrine clay and silt)
 - Feenstra, B.H., 1974: Quaternary Geology of the Dunnville Area, Southern Ontario; Ontario Division of Mines, Preliminary Map P.981, Geological Series, scale 1:50,000. Geology 1973
- Bedrock topography mapping (bedrock topography approx. 182.5 m AMSL)
 - Feenstra, B.H., 1981: Bedrock Topography of the Dunnville Area, Southern Ontario; Ontario Geological Survey, Preliminary Map P.2412, scale 1:50,000
- Bedrock geology mapping (bedrock geology is comprised of argillaceous dolostone and evaporites of the Salina Formation)
 - Telford, P.G., and Tarrant, G.A., 1975: Paleozoic Geology of the Dunnville Area, Southern Ontario; Ontario Division of Mines, Preliminary Map P.988, Geological Series, scale 1:50,000. Geology 1974

- Karst geology report/mapping
 - Brunton, F.R. and Dodge, J.E.P. 2008: Karst of Southern Ontario and Manitoulin Island; Ontario Geological Survey, Groundwater Resources Study 5. ISBN 978-1-4249-8376-6 (ZIP FILE)
- Active and abandoned gas wells in proximity to the Site were also reviewed (source: Oil, Gas & Salt Resources Library, London, ON)

3.2.3 Description of Geology & Hydrogeology Existing Conditions

The Site is situated on the Haldimand Clay Plain⁶ approximately 2 km northeast of the Town of Cayuga. The Site is relatively flat. The regional topography is generally flat with a gentle slope to the south towards Lake Erie. The elevation of the Site is approximately 200 m AMSL⁷. A Site location map, which includes regional elevations, is included as **Figure 3.5**.

A review of soil surveys indicates that the surficial soils in the LSA are classified as mainly lacustrine silty clay⁸. A review of the quaternary geology in the LSA indicates that the area is generally underlain by glaciolacustrine clay and silt⁹. Published bedrock topography mapping indicates a bedrock elevation of approximately 182.5 m AMSL in the vicinity of the Site¹⁰. The bedrock geology in the LSA and underlying the Site is comprised of argillaceous dolostone, shale, and evaporites of the Salina Formation¹¹.

⁶ Chapman, L.S. and Putnam, D.F., 1984: The Physiography of Southern Ontario; Ontario Geological Survey, Special Volume 2, Ontario Ministry of Natural Resources., Third addition.

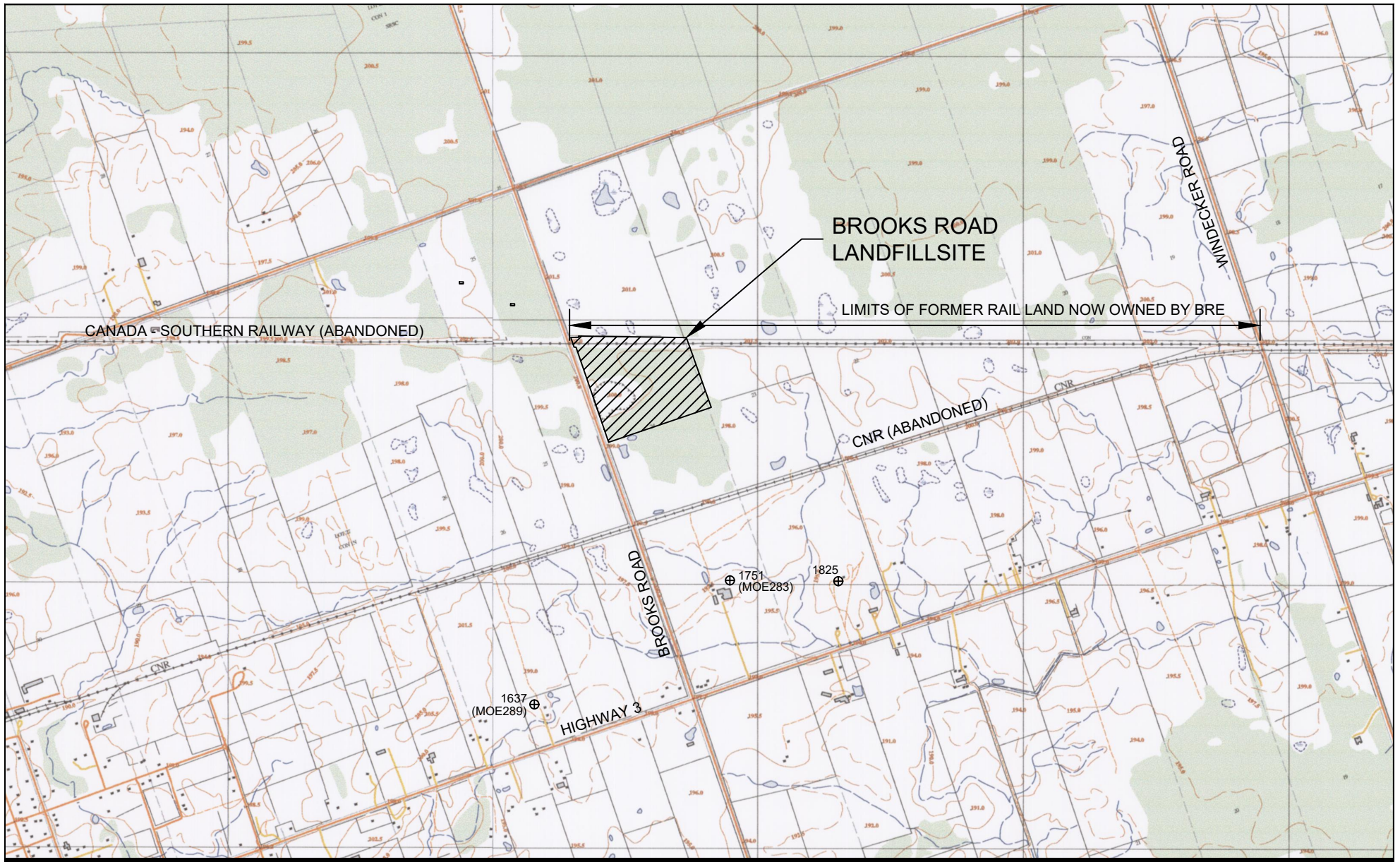
⁷ National Topographic System, 1983: Dunnville, Ontario; Canada Centre for Mapping, Department of Energy, Mines & Resources, Information Current as of 1980, Map Sheet 30 L/13, Edition 6, scale 1:50,000.

⁸ Ontario Institute of Pedology, 1983: Soils of Haldimand-Norfolk Regional Municipality; Cartography Section, Land Resource Research Institute, Research Branch, Agriculture Canada, Soil Survey Report No. 57, Sheet 6, scale 1:25,000.

⁹ Feenstra, B.H., 1974: Quaternary Geology of the Dunnville Area, Southern Ontario; Ontario Division of Mines, Preliminary Map P.981, Geological Series, scale 1:50,000. Geology 1973.

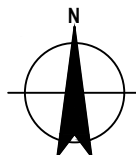
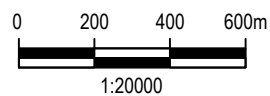
¹⁰ Feenstra, B.H., 1981: Bedrock Topography of the Dunnville Area, Southern Ontario; Ontario Geological Survey, Preliminary Map P.2412, scale 1:50,000.

¹¹ Telford, P.G., and Tarrant, G.A., 1975: Paleozoic Geology of the Dunnville Area, Southern Ontario; Ontario Division of Mines, Preliminary Map P.988, Geological Series, scale 1:50,000. Geology 1974.



LEGEND

1637
(MOE289) ⊕ RESIDENTIAL WELL LOCATION



**BROOKS ROAD LANDFILL SITE HYDROGEOLOGIC
PERFORMANCE ASSESSMENT REPORT**

**SITE LOCATION MAP WITH REGIONAL
ELEVATION**

Project No. 12561524
Date June 2022

FIGURE 3.5

3.2.3.1 Site Geology

The overburden geology is relatively uniform beneath the Site. In general, the Site is characterized by a thick (14 to 18 m) glaciolacustrine layer of stratified silty clay, silty clay till and varved clays, underlain by a thin (1 to 3 m) discontinuous layer of silty sand till with varying proportions of gravel and clay. The bedrock has been encountered at depths varying from 15.2 to 20.2 m below ground surface (BGS). A thin surficial deposit of topsoil is generally observed at the surface of the Site, with the exception of the southwestern portion.

The silty clay deposits are described as being locally fractured (weathered) from the surface down to depths varying from 3 to 5 m BGS and are characterized as a very stiff to hard with low plasticity. At depths more than 5 m, the silty clay deposits have little to no fracturing and the consistency of the units increase from stiff to very stiff.

Underlying the silty clay deposits, a thin discontinuous silty sand till with varying proportions of clay and gravel is encountered across the Site. The silty sand till ranges in thickness from 1 to 3 m and often contains cobbles and/or broken angular bedrock fragments. This deposit is usually well graded with fine to medium grained sand, minor silt and trace clay, and is described as dense to compact, grey, and saturated. The silty sand till rests directly over the bedrock.

Bedrock underlying the Site has been described as a fractured shale, dolostone and gypsum of the Salina Formation. The top of bedrock elevation ranges from 180.8 to 187.0 m AMSL and forms a small bedrock valley from northwest to southeast across the Site. The valley is characterized by a thicker silty sand till deposit. Regionally, the bedrock topography dips to the south.

3.2.3.2 Site Hydrogeology

In general, the geologic units identified at the Site may be grouped into two main hydrogeologic units separated by the thick silty clay aquitard unit, as follows:

- i) An unconfined water table (shallow overburden) unit within shallow fractured silty clay (weathered) unit
- ii) Silty clay aquitard
- iii) A confined basal till overburden/shallow bedrock aquifer

These two hydrogeological units are separated by a thick (between 9 and 12 m) layer of stratified silty clay, silty clay till, and varved clays which form a continuous aquitard of very low hydraulic conductivity. Groundwater level data historically gathered from the shallow overburden unit and basal overburden/shallow bedrock aquifer indicate that the clay aquitard provides hydraulic separation between the two units. Differences in hydraulic head between the two units have varied between 9.5 to 15 m as historically measured at the location of nested wells. The vertical hydraulic gradient between the two hydrogeologic units is downward.

Based on historical groundwater level data, the shallow overburden unit is generally encountered at depths varying from 0.5 to 4 m BGS across the Site. The shallow overburden unit is an unconfined water table unit, which overlies the impermeable un-weathered silty clay unit. Based on the shallow overburden monitoring wells monitored in 2021, groundwater flow in this unit is generally towards the south towards Lake Erie.

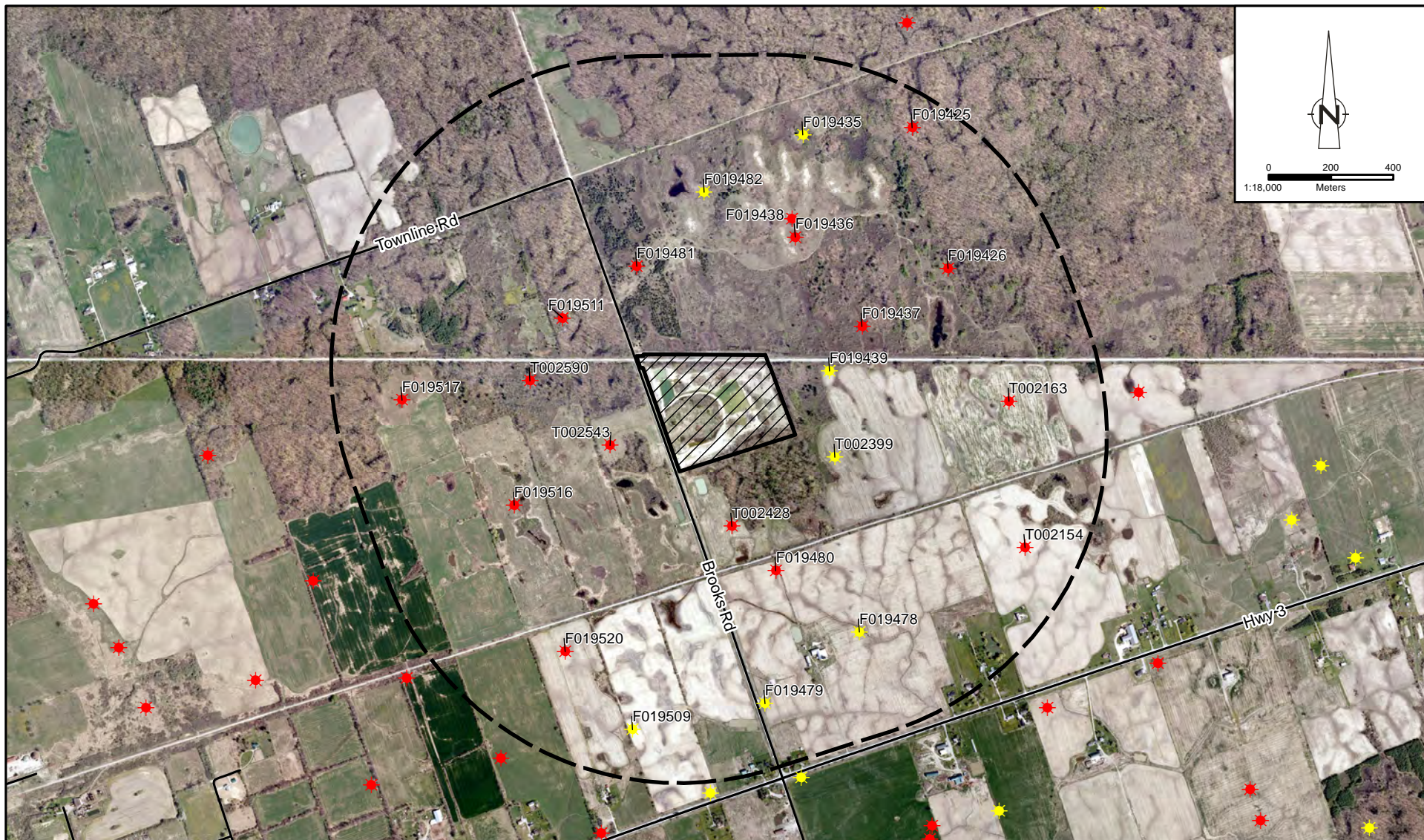
Underlying the silty clay aquitard, a confined basal overburden/shallow bedrock aquifer has been observed within the lower portion of the silty sand till unit and the shallow fractured bedrock. Groundwater quality and water level data indicate that the lower silty sand till unit and the shallow fractured portion of the bedrock are hydraulically connected and geochemically similar. Therefore, these two geological units have been considered to form one aquifer.

Based on the groundwater data obtained to date, the basal overburden/shallow bedrock aquifer is generally encountered at depths varying from 14 to 17 m BGS. The groundwater flow pattern in this aquifer is in a south to southwest direction with a relatively flat horizontal hydraulic gradient.

3.2.3.3 Natural Gas Deposits and Natural Gas Wells

A review of oil, gas and salt resource mapping in Ontario indicates that several active and plugged gas wells are located within the LSA. No active/plugged gas wells were identified on the Site, however, research indicates that 23 current and former gas wells are located within the LSA. A total of 16 gas wells have been identified as abandoned, of which 15 have been identified as plugged, and a total of seven gas wells that may be active, suspended, or abandoned are found within the LSA. The gas wells all targeted the Haldimand Pool within the Clinton Group and were drilled to a total depth (true vertical depth) ranging from 207.6 to 229.5 m BGS at approximately the top of the Queenston Formation. A natural gas pipeline is also located approximately 400 m south of the Site. A list of the Ontario Oil and Gas Wells located within the LSA is itemized in Table 3.1 of the Geology and Hydrogeology Assessment Report (see **Appendix B**) and a reference Figure is attached as **Figure 3.6**.

Due to the depths of the natural gas wells, it is not anticipated that there will be any influence from the landfill on the natural gas wells.



Source: MNRF NRVIS, 2014. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2016; Haldimand County Official Plan
 Aerial: 2006 Grand River Conservation Authority
 Coordinate System: NAD 1983 UTM Zone 17N

Legend





-  Site Location
-  Local Study Area (1km Radius)
-  Abandoned Gas Well
-  Status Unknown



Figure 3.6

OIL AND GAS WELL LOCATIONS
GEOLOGY & HYDROGEOLOGY ASSESSMENT REPORT
BROOKS ROAD LANDFILL
 160 Brooks Road, Cayuga, Ontario

3.2.3.4 Mining Claims and Abandoned Mines

A review of the Ministry of Northern Development, Mines, Natural Resources and Forestry information for abandoned mines and mining claims was completed. No mining claims were identified within the SSA, however one abandoned mine was identified within the LSA to the northwest of the Site (AMIS File # 04888 / MDI # MDI30L13NW00003). The mine was reviewed in a CRA report entitled Well Survey and Limited Hydrogeological Assessment, dated July 2004 (2004 Report). The 2004 Report indicates two documents were reviewed: Gypsum in Ontario, C.R. Guillet, dated 1964, and Abandoned Mines Hazard Abatement Program, London District Site Examinations, prepared by Patrick Chance & Associates Consulting Geologists, dated 1994 (1994 Inspection). The information presented below was gathered from the above-referenced reports and has been revised with the most current information available including information from the Gypsum Mine Investigation Report prepared by GHD that provides an assessment of potential influences of the former Cayuga Gypsum Mine on groundwater at the landfill Site.

The former gypsum mine was operated by the Cayuga Gypsum Company Limited between 1942 and 1949. Gypsum was mined from a 0.9 m thick bed at a depth of 25.9 m BGS.

Mining operations were accomplished via two mine shafts. The first shaft was located approximately 112 m south of Townline Road and 350 m west of Brooks Road. The former shaft can reportedly be located by a 2.4 m deep depression, with a footprint of 3 by 4.6 m. The shaft was a vertical prospect shaft of unknown support and was back-filled with unknown materials. The 1994 Inspection did not document any evidence of subsidence, however the report recommended that a 50 m radius area of caution be observed in the vicinity of this shaft.

Based on the available historical documentation, approximately 10,300 tonnes of gypsum were reportedly removed from this prospect shaft during the operation of the mine. With a density of 2.3 tonnes/m³ and a thickness of 1 m, this would correspond to lateral workings with an aerial footprint of approximately 4,356 square metres (m²). In order to access the gypsum in the 1 m seam, it is likely that approximately 1 to 2 m of the overlying shale bedrock would also have been removed.

The second shaft was located approximately 305 m south of the first shaft. The 1994 inspection was reportedly unable to locate the second shaft. The second shaft was also a vertical prospect shaft of unknown support and it is unknown if the shaft has been back-filled. It is not known how much gypsum was removed from this shaft.

Due to property access restrictions, an inspection of the former Cayuga Gypsum Mine could not be conducted.

During the operation of the mine from 1942 to 1949, dewatering operations would likely have been conducted to keep the mine shafts and associated galleries dry. As such, during the operation of the mine the local groundwater flow would have been influenced by mine dewatering activities. Active removal of large quantities of groundwater from the bedrock would have resulted in inward hydraulic gradients. As such, the bedrock groundwater flow in the vicinity of the former mine would have been directed towards the active galleries during operation of the mine.

Upon closure of the mine in 1949, the dewatering activities at the mine would have ceased and the associated mine shafts and galleries would have flooded within the first year of closure. The mine has now been abandoned for 67 years. Since the former galleries and shafts are flooded, no water deficit should be present between these former underground structures and the surrounding bedrock. Thus, essentially steady state conditions should exist and the former underground structures will no longer have a hydraulic influence on the local bedrock aquifer.

In the unlikely event that the former mine shafts would not have been properly sealed following closure of the mine, there could exist the potential for surface water and groundwater in the shallow overburden to enter the mine shafts and migrate to the underlying bedrock aquifer. If infiltration were occurring, the shafts would be acting as a sink to the overburden groundwater and a source of recharge to the local bedrock groundwater. This would result in a cone of depression in the overburden groundwater towards the former mine shafts and radial flow from the galleries in the bedrock groundwater. Under this scenario there could be a potential for bedrock groundwater flow being diverted away from the former galleries. However, based on the relatively small dimension of the former galleries (areal extent of approximately 4,356 m²) it is expected that any influence of these galleries on the bedrock aquifer would be localized to the immediate vicinity of the former galleries. Bedrock aquifer influence beyond the limits of the former Cayuga Gypsum Mine property is anticipated to be negligible.

The Gypsum Mine Investigation Report reviewed information related to historical mining operations including location and extent of mining activities, review of physical Site conditions for evidence of historical mining operations, and an evaluation of hydraulic gradients within the available monitoring network to identify potential evidence of a hydraulic influence on horizontal or vertical gradients in the vicinity of the Site. The report concluded that there is no evidence of an influence related to the former Cayuga Gypsum Mine on the bedrock aquifer at the Landfill Site.

3.2.3.5 Other Data Sources

A review of the Ontario Geological Survey Karst of Southern Ontario and Manitoulin Island report indicates that no potentially karst, inferred karst, or known karst bedrock has been identified within the Study Areas¹². Furthermore, the groundwater conditions are unfavourable for the dissolution of the bedrock and the Upper Silurian bedrock consists of generally argillaceous dolostone, shale, and evaporites (primarily gypsum), the latter of which precludes the formation of large-scale karst features. Furthermore, no sink holes or caving features have been identified in the study area.

3.3 Land Use & Socio-Economic Existing Conditions

3.3.1 Study Area

The Land Use and Socio-Economic Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **SSA** – the 14.3 ha area within the existing, approved boundaries of the Site, as defined by ECA No. A110302, as amended
- **Site-Vicinity Study Area** – the area within the vicinity of the Site extending approximately 500 m in all directions
- **LSA** – the area within the vicinity of the Site extending approximately 1 km in all directions from the SSA boundaries

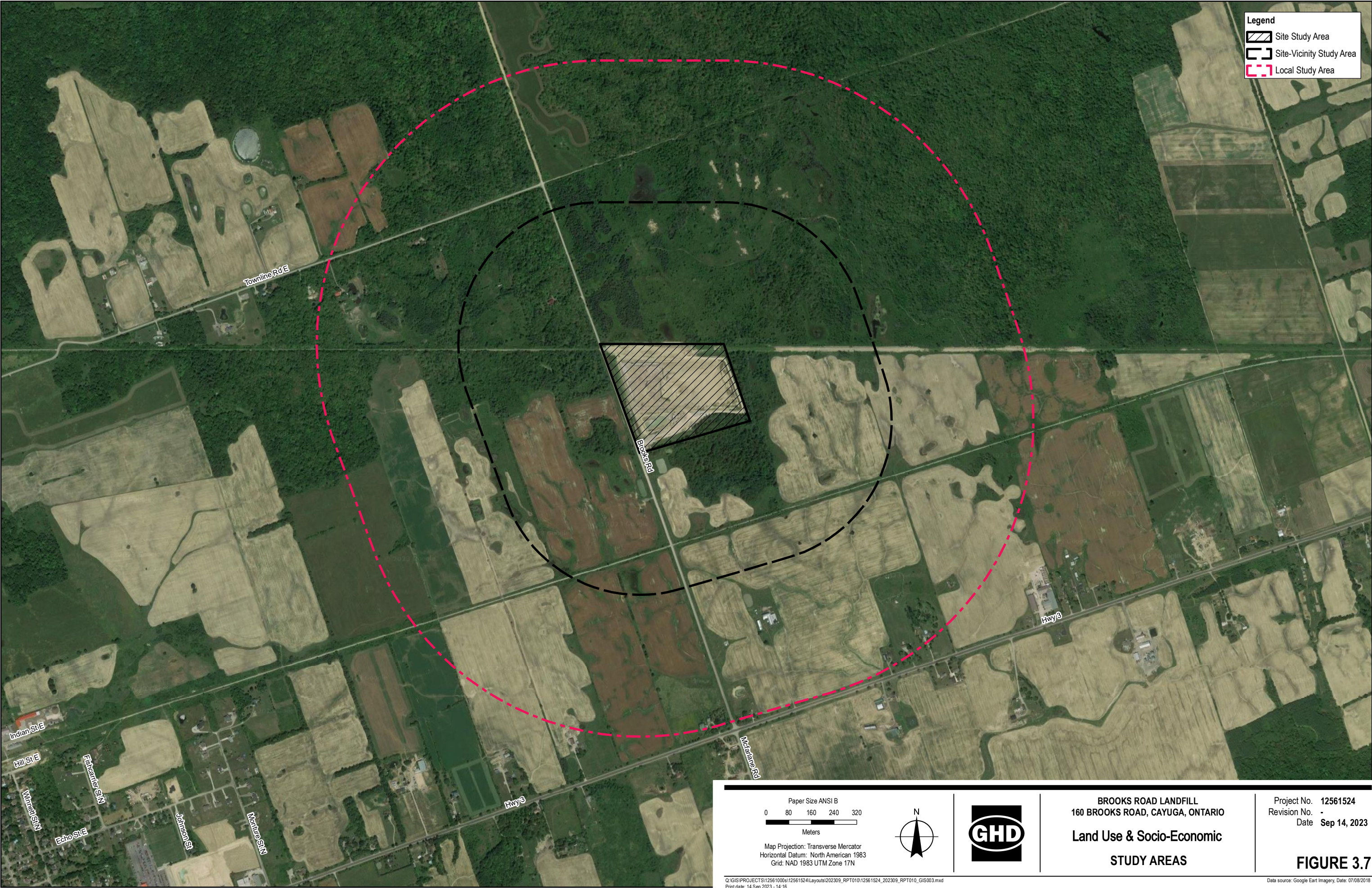
3.3.2 Methodology

3.3.2.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Land Use Study Team to determine existing Land Use conditions within the study area(s). The following sources of secondary information were collected and reviewed:

- Review of current zoning plans, definitions, and land use designations
- Ontario Planning Act
- Provincial Policy Statement (2020)
- Provincial Guidelines D-1: Land Use Compatibility
- Haldimand County Official Plan (2019)
- Haldimand County Zoning By-Law HC 1-2020
- Grand River Conservation Authority
- Statistics Canada (2021 Census Data)
- Land Use Assessment Report for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment report prepared by GHD in December 2016

¹² Brunton, F.R. and Dodge, J.E.P. 2008: Karst of Southern Ontario and Manitoulin Island; Ontario Geological Survey, Groundwater Resources Study 5. ISBN 978-1-4249-8376-6 (ZIP FILE).



3.3.3 Description of Land Use & Socio-Economic Existing Conditions

The existing land uses around the Site are primarily agricultural and wetlands. The Site is bordered by Brooks Road to the west, and agricultural and wetland areas to the other three sides. There is an abandoned railway corridor that runs east-west to the north of the Site.

3.3.3.1 Sensitive Uses Within 500 Metres

Sensitive land uses are defined in the Provincial Policy Statement (PPS), 2020 as *“buildings, amenity areas, or outdoor spaces where routine or normal activities occurring at reasonably expected times would experience one or more adverse effects from contaminant discharges generated by a nearby major facility. Sensitive land uses may be a part of the natural or built environment. Examples may include, but are not limited to residences, day care centers, and educational and health facilities.”*

The existing Site is located at 160 Brooks Road, in Cayuga, Haldimand County, Ontario. The proposed expansion will take place within the Site boundaries and will not require use of any new lands. There are two identified residential properties located within the Site Vicinity Study Area, the closest is approximately 223 m northwest of the site. There are no identified institutional or recreational land uses in a 500 meters radius of the Site boundary.

3.3.3.2 Provincial Policy Statement

The PPS, 2020¹³ provides clear policy direction on land use planning to promote strong communities, a strong economy, and a clean and healthy environment¹⁴. In terms of land use compatibility, the PPS 2020 (Section 1.2.6.1) states that *“Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term operational and economic viability of major facilities in accordance with provincial guidelines, standards and procedures”*.

The PPS 2020 defines ‘major facilities’ as facilities which may require separation from sensitive land uses (as defined in Section 3.1.2.1, above), including but not limited to airports, manufacturing uses, transportation infrastructure and corridors, rail facilities, marine facilities, sewage treatment facilities, waste management systems, oil and gas pipelines, industries, energy generation facilities and transmission systems, and resource extraction activities.

Section 1.6.10.1 of the PPS 2020 notes that *“waste management systems need to be provided that are of an appropriate size and type to accommodate present and future requirements, and facilitate, encourage and promote reduction, reuse and recycling objectives... [and that] waste management systems shall be located and designed in accordance with provincial legislation and standards.”*

The on-Site, Site-Vicinity, and Local Study Areas are currently in compliance with the policies contained in the PPS 2020.

3.3.3.3 Grand River Conservation Authority (GRCA) Regulation

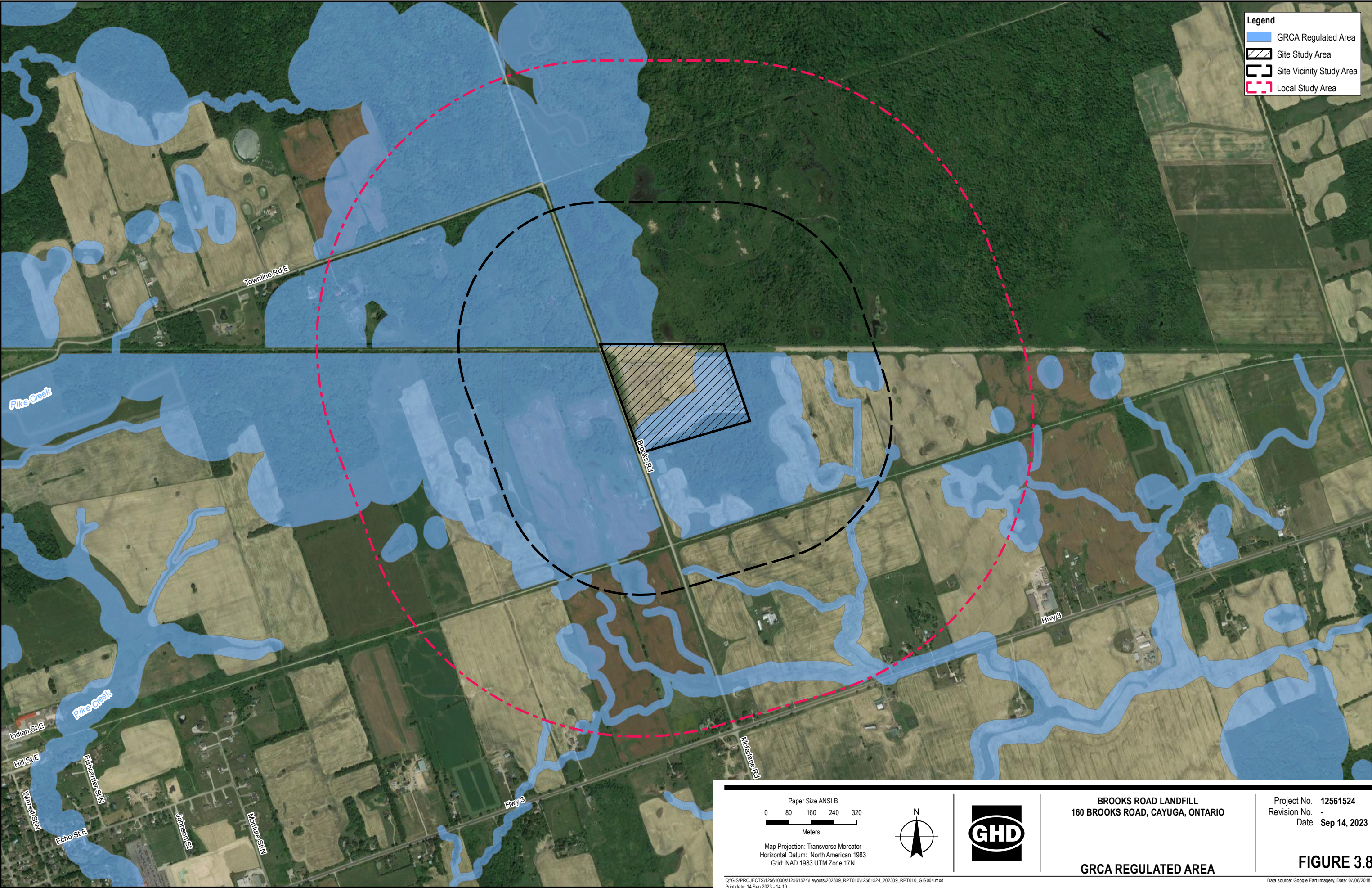
In accordance with O. Reg. 150/06, GRCA regulates areas where development could be subject to flooding, erosion or dynamic beaches, and where interference with wetlands and alterations to shorelines and watercourses might adversely affect those environmental features. Any of these activities within the Regulated Area may require a permit from the GRCA¹⁵.

A portion of the Site area falls within the GRCA regulated area (**Figure 3.8**) and may require a permit.

¹³ [Provincial Policy Statement, 2020 - Under the Planning Act \(ontario.ca\)](#)

¹⁴ It should be noted that the PPS was recently updated, and the proposed changes (PPS, 2023) were out for public consultation until August 4, 2023. The proposed changes do not impact the PPS analysis.

¹⁵ [Map Your Property - Grand River Conservation Authority](#)



3.3.3.4 Planned Developments

There are currently no planned or proposed developments surrounding the Site¹⁶.

3.3.3.5 Municipal Land Use Policies, Plans, Zoning Bylaws

The Study Areas are situated within the unincorporated community of Cayuga in Haldimand County. The County's Official Plan and Zoning By-Laws were reviewed to determine how the land in the Study Areas may be used in the future based on municipal planning policy.

The predominance of agriculture as the primary designated land use in the Study Areas is expected to remain for the foreseeable future with very little change based on the current municipal planning policy espoused by the County of Haldimand.

Haldimand County Official Plan (HCOP)

The SSA is designated as Active Waste Landfill Site and surrounding is PSWs and Agriculture.

Provincially Significant Wetlands – There are delineated PSWs within the SSA, Site-Vicinity Study Area, and LSA. As per Section 2. A. 1) of the HCOP, certain compatible uses may be permitted through an appropriately scoped Environmental Impact Study resulting in no negative impact on the natural features or ecological functions of wetland or wetland complex.

Agriculture – Majority of the Site-Vicinity Study Area is designated agricultural. As per Section 3. A. 1) of the HCOP, the predominant use of lands within the agriculture designation shall be agriculture. Other uses compatible with agriculture such as animal kennels, forestry uses, and conservation related uses may be permitted.

HCOP 34 (Specific policies in Haldimand County) – The abandoned railway, located north of the existing landfill is under the HCOP 34 policy area. A waste disposal site is permitted in addition to the uses permitted in the agricultural designation. The permitted uses under waste disposal site are limited to stockpiling of clean clay, location of ground waste monitoring wells, and a general naturalized buffer area. Waste disposal or landfilling is not permitted in this designation.

Hal 36 (Policies in the former town of Haldimand) – As per Hal 36, policies in the Official Plan relating to PSWs (Section 2. A. 1)), and Natural Environment Areas (Section 2. A. 3)) will not apply to the Brooks Road Landfill (formerly known as Edwards Landfill Site).

Haldimand County Zoning By-Law HC 1-2020

Haldimand County zones the subject site as Disposal Industrial (MD) and Wetland (W). The land in the LSA is zoned as Agricultural (A) and Wetland (W). (see **Figure 3.9**).

Disposal Industrial

The SSA is zoned as Disposal Industrial. The permitted uses include waste disposal site, waste transfer site, and waste processing facility along with other compatible uses.

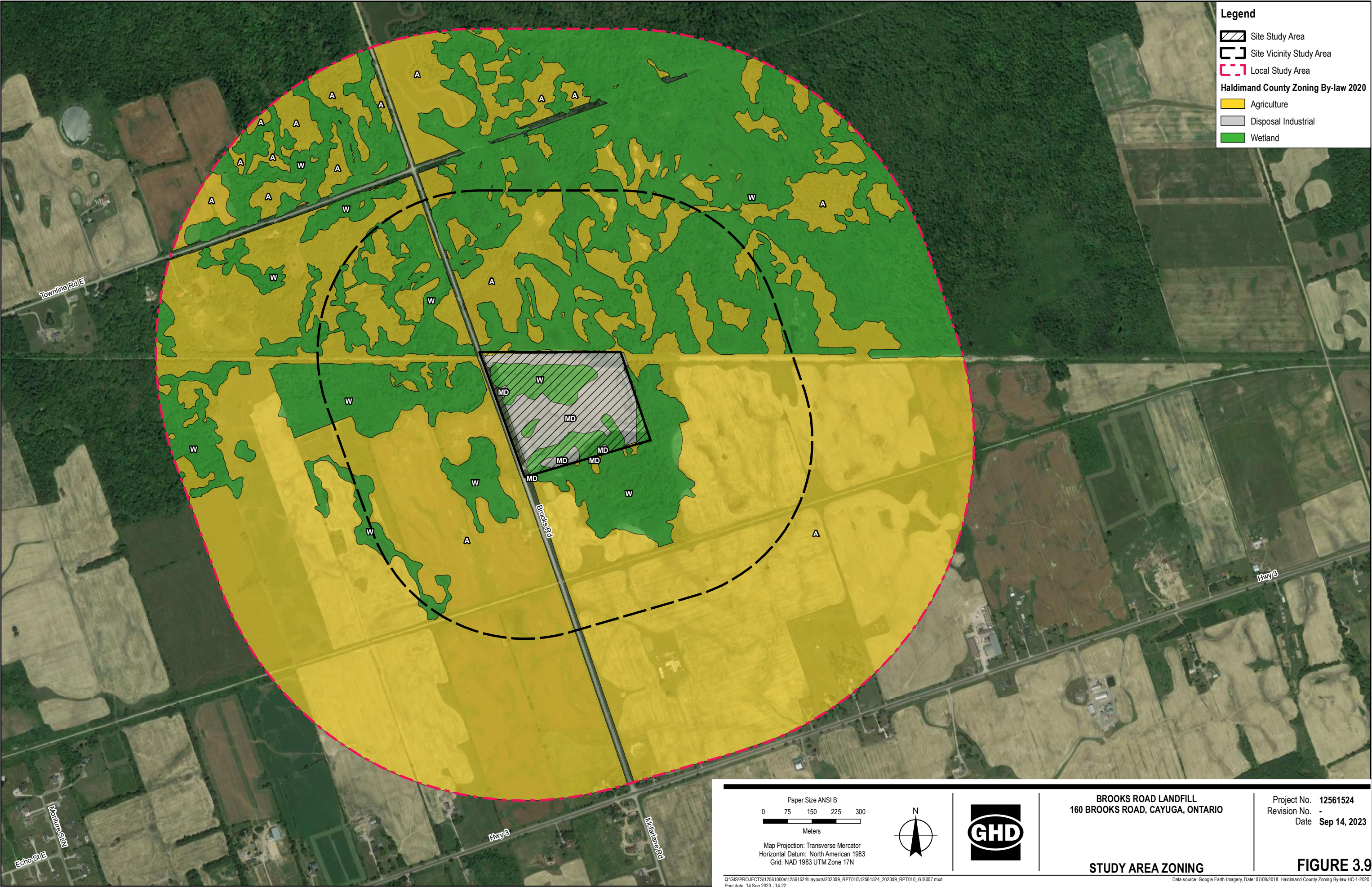
Wetland

A portion of the SSA and majority of the Site-Vicinity Study Area and LSA is zoned as Wetland (W). The permitted uses include parks, woodlot management, conservation area, and tent and trailer park. Under section 12.2, Hal 36.325 (Zone Exceptions) of the zoning by-law, the minimum setbacks from the wetland Zone shall not apply to the commercial buildings existing on the date of passing of the by-law.

¹⁶ Haldimand County Planning Applications. Available at:
<https://haldimand.maps.arcgis.com/apps/dashboards/945e90b55d484fd0a01253953129dc0f>

Agricultural

A larger portion of the Site-Vicinity Study Area and the LSA is zoned as agricultural. Permitted uses in the Agricultural Zone include residential (bed and breakfast establishments, single detached dwellings, and several accessory uses), agricultural, and commercial (animal hospital, animal kennel, commercial greenhouse) uses.



3.3.3.6 Neighbourhood & Community Character

The Site is located within the community of Cayuga in Haldimand County and is designated as an Active Waste Disposal Site within the Haldimand County Official Plan and zoned Disposal Industrial (MD) and Wetlands (W) in the Haldimand County Zoning By-law.

Haldimand County is situated within the Golden Horseshoe region of Ontario. The community is comprised of 1,251 km² of rural landscape, including 83 km of shoreline along Lake Erie.

According to the 2021 Census¹⁷, the County recorded a population of 49,216 in 2021, which is projected to increase to between 67,000 and 68,000 by 2041¹⁸. The age groups with the largest representation are the 55-59 and 60-64 cohorts. There is an equal distribution of males and females throughout the age groups and a greater part of the households fall within the income bracket of \$150k and above. About 4% of total population is Indigenous, largely First Nations and Métis, and 3% are visible minorities, with South Asian and Black visible minority groups more represented than other groups.

Almost half of the total population has completed high school and college education. Common fields of study include engineering, business management, and health related fields. A major portion of the labour force is in the manufacturing, health care, and construction industries. The employment rate was about 56% in 2021 with an unemployment rate of 8.3% in the same year.

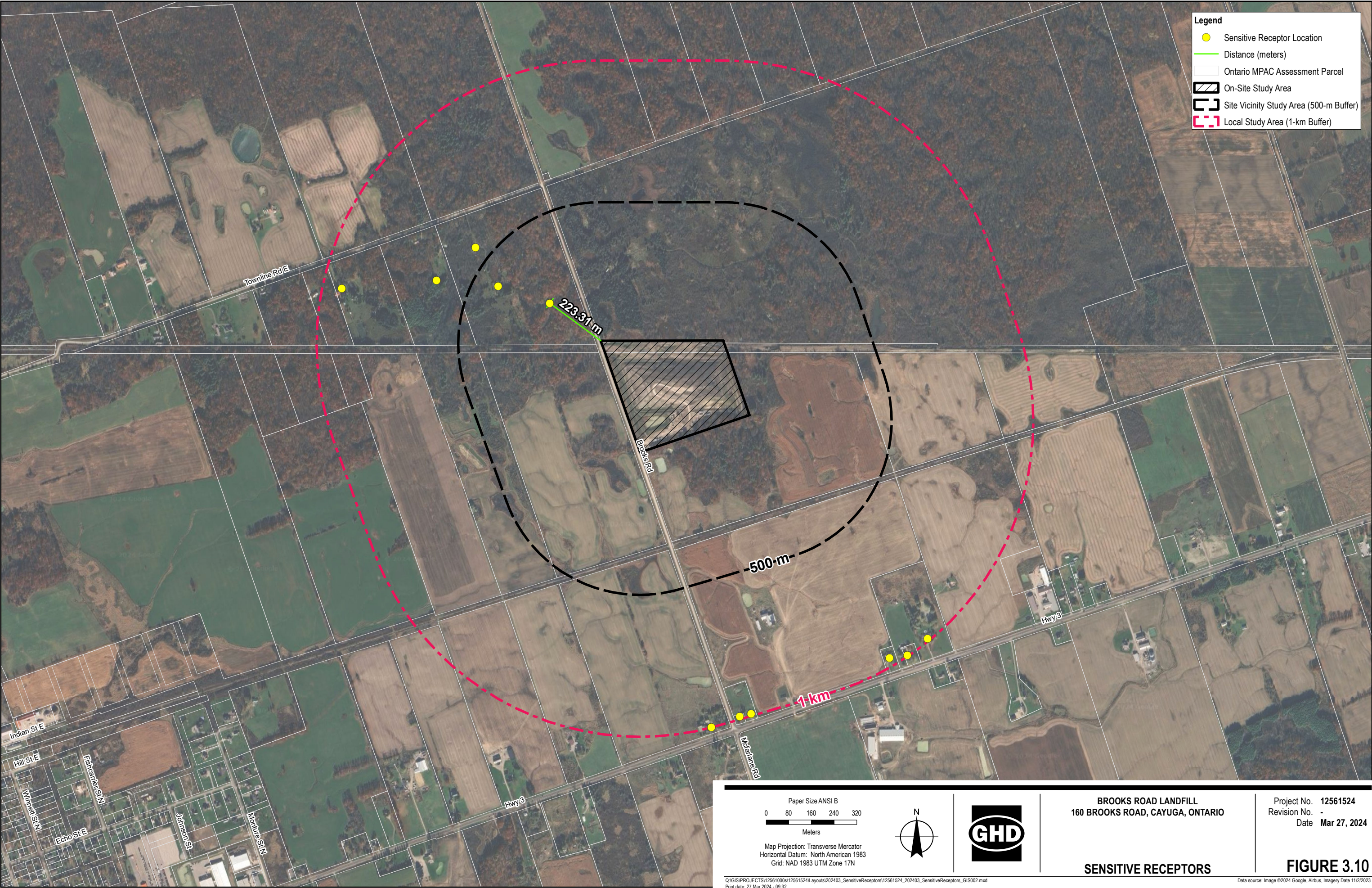
Eighty-five percent of residents own their home and 15% are renters. The new housing construction projects has increased from 2020¹⁹. Forty-nine projects under construction and 101 completed projects were reported in the fourth quarter of 2022.

The closest residential dwelling is located approximately 223 m northwest of the Site (see Figure 3.10).

¹⁷ **Community Profile - Haldimand County**

¹⁸ Haldimand County Revised Growth Analysis to 2051 Memo prepared by Watson & Associates Economists Ltd. Available at: <https://www.haldimandcounty.ca/wp-content/uploads/2021/01/Revised-Watson-forecasts-2020-VERSION-2.pdf>

¹⁹ Canada Mortgage and Housing Corporation Website. Last accessed November 12, 2023. Available here: <https://www03.cmhc-schl.gc.ca/hmip-pimh/en/TableMapChart/#Profile/6175/3/Haldimand%20County%20CY%20>



3.3.3.7 Visual

The existing visual landscape within the SSA, Site-Vicinity Study Area, and LSA can be described as rural, agricultural, and includes regional roads. There is a wire fence around the perimeter of the site. The western part of the existing Site located on Books Road has a visual berm which includes a chain link fence with visual screen as mitigation to visual impact, providing a visual barrier to passersby.

3.3.3.8 Local Businesses, Institutions or Public Facilities

In addition to farming, the only other business operating within the LSA is the Brooks Road Landfill Site, which employs six full-time and one part-time staff. There are no other businesses, institutions or public facilities located within the LSA.

3.3.3.9 Local Employment & Labor Supply

According to the 2021 Census²⁰, there are total 24,335 residents in the labour force, of which 20,645 are employees and 3,675 are self-employed. Majority of the employed are in trade and transport occupations (26%); sales and services (22%); business and finance (14%); education, law, and government (10%); and healthcare (8%). The employment rate in 2021 was 56.6% and the participation rate was 61.8%. The unemployment rate was recorded to be 8.3% in the same year.

A major part of the labour force is into manufacturing, health care, and construction industry. The employment rate was about 56% in 2021 with 8.3% of unemployment rate in the same year.

The Brooks Road Landfill Site employs six full-time and one part-time staff.

3.3.3.10 Traffic

Highway 3 and Brooks Road are the two major roads providing access to the existing Brooks Landfill. Traffic on Brooks Road is predominantly truck traffic specific to the landfill operation. Traffic on Highway 3 is a mix of both commuter and truck traffic. The capacity analysis under peak operations confirms no current capacity constraints in the LSA road network. Further details on traffic (existing conditions and potential effects) are included in the Transportation Assessment Report, prepared concurrently with this report by GHD (see **Appendix H**).

3.3.3.11 Social

The LSA is located within the boundaries of Haldimand County, Ontario, approximately 2 km northeast the Village of Cayuga. There are 39 property parcels within the LSA (not including the Site) and 11 residential dwellings. Of these 39 properties, 19 were Farm Tax Rated for the 2022 tax year²¹. The closest residential dwelling is located approximately 223 m northwest of the Site.

No static recreational resources (e.g., picnic areas, trailer parks), churches, or cemeteries are located within the LSA; however, Brooks Road as well as the abandoned railway to south of the Site (parallel to Highway 3) are identified in the Official Plan as trail locations and in the Haldimand County Trails Master Plan 2009 as “Proposed Special Use Routes” (Brooks Road as a “Proposed Signed Route” and the abandoned railway as a Proposed Multi-Use Trail”) for implementation in the short-term (0 to 5 years from the publication date). There is presently no indication of the implementation of the proposed trails along either of these routes.

The topography across the LSA from north to south ranges from approximately 202 m AMSL to approximately 196 m AMSL. As such, the land within the LSA can be considered to be relatively flat. The majority of the lands within the LSA immediately adjacent to the Site are forested, thus obscuring the view of the Site. The exception is the parcel of land immediately west of the Site, which includes an open field, from which the Site is visible; however, the existing berm along the western perimeter of the Site obscures most views of the landfilling operations from this parcel. The

²⁰ [Census of Population \(statcan.gc.ca\)](https://www150.statcan.gc.ca/n1/pub/92-62-001-x/2021001/article/00001-eng.htm)

²¹ Government of Ontario. (2022). *AgMaps – Agricultural Information Atlas*. Source: [AgMaps \(gov.on.ca\)](https://www.agmaps.on.ca/)

existing visual berm includes a chain link fence with visual screen as mitigation to visual impact, providing a visual barrier to passersby from Brooks Road.

3.3.3.12 Airport

There are three private airfields within the 8 km radius of the Site: the Cayuga (Bruce Field) Airport, approximately 1.5 km south; the Cayuga East Airport, approximately 3 km southeast; and the Grand River Executive Airport (also referred to as the York Airport) approximately 7.5 km north of the Site.

See **Appendix C** for a detailed Land Use and Socio-Economic Assessment Report.

3.4 Air Quality Existing Conditions

3.4.1 Study Area

The Air Quality Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **SSA** – the 14.3 ha area within the existing, approved boundaries of the Site, as defined by ECA No. A110302, as amended
- **LSA** – the area within the vicinity of the Site extending approximately 1 km in all directions from the SSA boundaries



3.4.2 Methodology

3.4.2.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Air Quality and Odour Study Team to determine existing Air Quality and Odour conditions within the Study Areas. The following sources of secondary information were collected and reviewed:

- Environment Canada Climate data (2017 to 2021).
- Ambient air quality data obtained from the Hamilton Air Monitoring Network (HAMN) (2019 to 2021). Note that the PM_{2.5} data available from the closest monitoring station #29102 at Hamilton was used in the net effects assessment for a cumulative particulate evaluation.
- Existing Facility Emission Summary and Dispersion Modelling Report, prepared for BRE by CRA (September 14, 2015 and updated September 2022).
- Odour Monitoring Program, prepared for BRE by CRA (July 28, 2014).
- Odour Monitoring Program, prepared for BRE by CRA (November 3, 2014).
- Odour Monitoring Program, prepared for BRE by GHD (2016, 2017, 2019 and 2022).

3.4.2.2 Process Undertaken

On-Site and off-Site odour investigations were completed by GHD in 2014, 2016, 2017, 2019 and 2022. These studies indicated that there was no measurable odour off-Site. GHD completed odour measurements during daytime and night-time periods to try and observe odours in the surrounding community. During all the odour monitoring events, no odours that could be attributed to the Site were detected off-site.

The GHD Team completed a walk-through of the Site, with focused observations at the location of the proposed horizontal expansion to the north and the leachate system. GHD did not identify any fugitive emissions during the walkthrough other than minor particulate emissions generated by small vehicles moving throughout the landfill. The GHD Team also observed the area surrounding the Site to confirm the locations of the nearest sensitive receptors to the Brooks Road Landfill.

3.4.3 Description of Air Quality Existing Conditions

The following conditions are currently present at the Site, as described in **Table 3.2**.

Table 3.2 Existing Conditions Relevant to Air Quality and Odour

Attribute	Existing Landfill
General Description	Expanding the current capacity by 219,400 m ³
Footprint Area (ha)	6.07
Peak Elevation – top of waste (mAMSL)	220.75
Maximum Daily Truck Traffic	25 to 50
Post-Closure Leachate Generation Rate	33 m ³ /day

3.4.4 Hamilton Climate Station

The Hamilton Climate Station is a weather station located at Hamilton's John C. Munro International Airport (43.1N, 79.5W, elevation 237.7 m). The station has been operating since January 15, 1970 under World Meteorological Organization (WMO) ID 71263. The Hamilton Climate Station was selected as it is the closest representative station to the Site that has hourly documented climate data since 2010. Data from this station is published online at Environment

and Climate Change Canada's National Climate Data and Information Archive. Hourly data from the station was analyzed to determine prevalent atmospheric conditions that are considered representative of the Site.

Figure 3.12 presents a five-year wind rose for the Hamilton Climate Station for the period between 2017 and 2021 and **Figure 3.13** presents the wind class frequency distribution. The dominant wind directions, as shown on **Figure 3.12**, are from the southwest, and northeast.

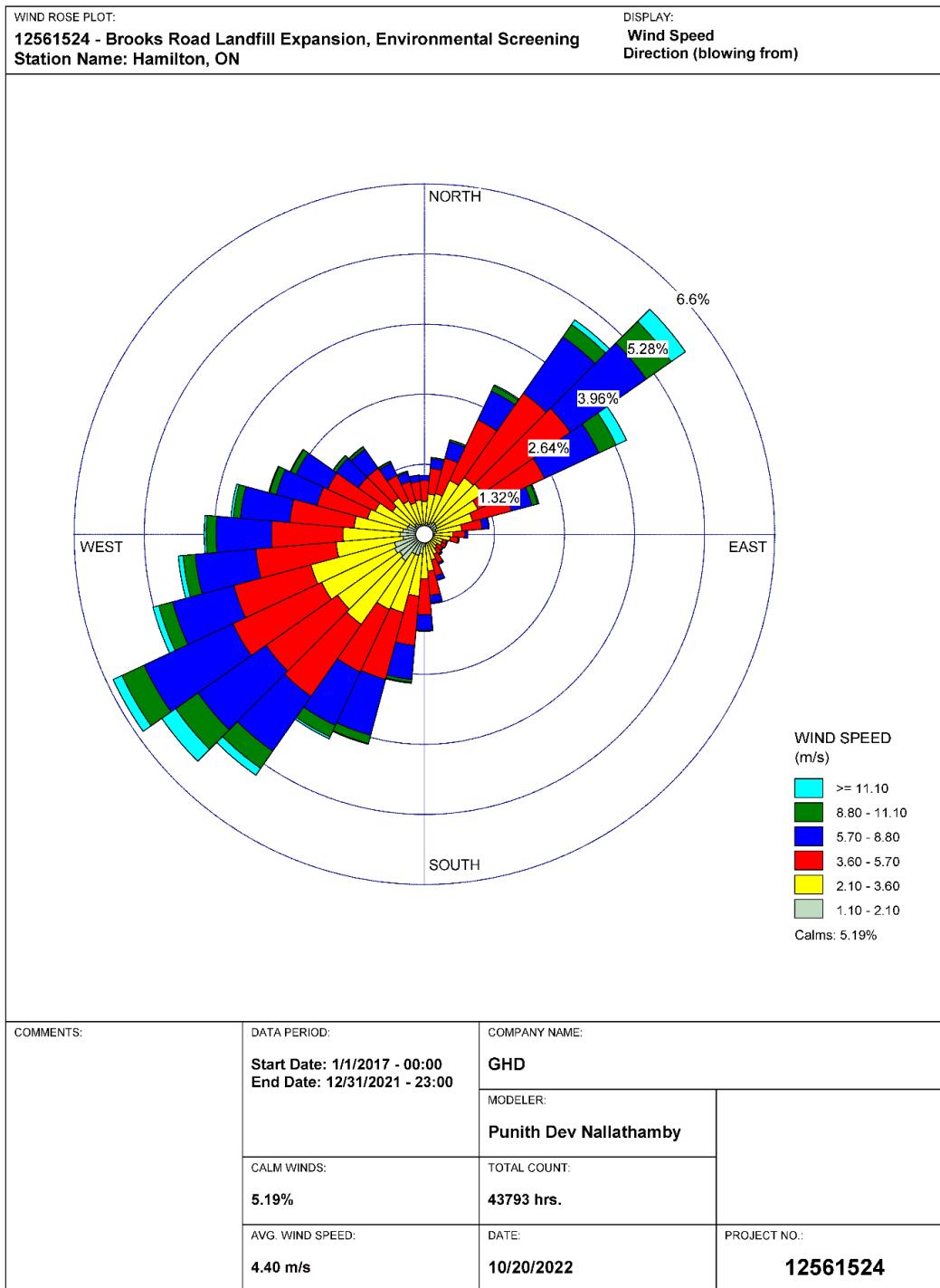


Figure 3.12 *Wind Rose, Hamilton AP (2017 – 2021)*

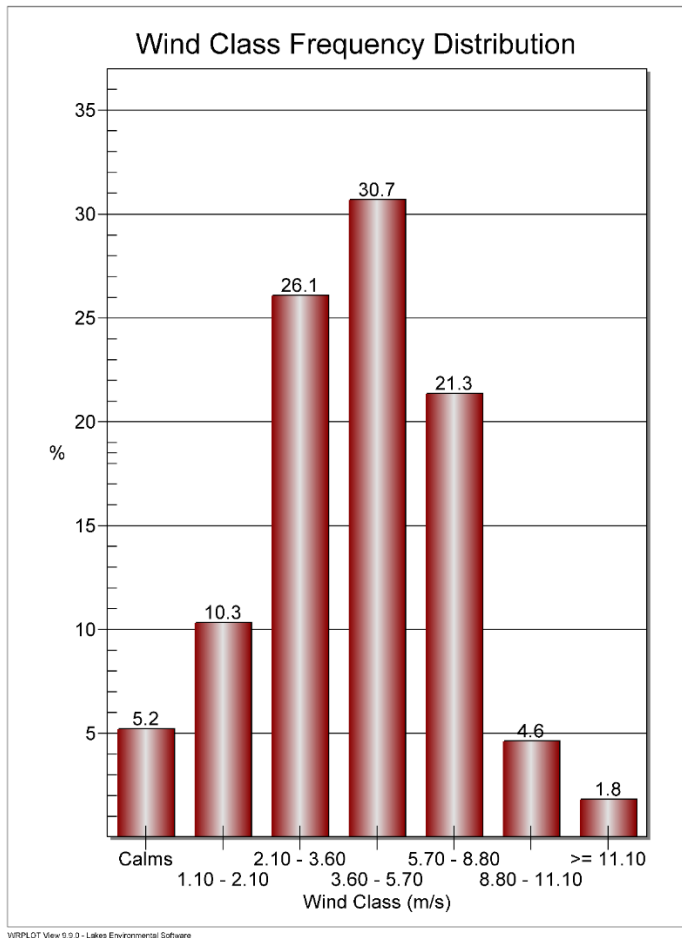


Figure 3.13 Wind Class Frequency Distribution

3.4.4.1 Air Quality

The Site is located approximately 2.8 km northeast of Cayuga and 25 km south of Hamilton and is surrounded by agricultural land. The closest receptor (as per the August 2022 Odour Management Plan) is approximately 223 m from the Site and there are no major industrial sources within the Study Areas. The Site has a berm that runs along the west side of the Site and a clay stockpile located along the north side that reduces the line of sight and fugitive particulate matter emissions when the Site is in operation.

3.4.4.2 Vehicle Emissions

Particulate emissions related to vehicles operating at the landfill are the primary emissions of concern at the Site. Particulate may be defined in various particle size categories; including total suspended particulate (TSP), particulate less than 10 microns (PM_{10}) and particulate less than 2.5 microns ($PM_{2.5}$). All fractions of particulate were previously assessed for the potential landfill emissions. There is no change in the TSP, PM_{10} , or $PM_{2.5}$ emissions from the previous assessment as the proposed operations were assessed and fugitive dust management plans implemented.

3.4.4.3 Indicator Compounds

As identified above, TSP, PM_{10} , and $PM_{2.5}$ were previously included in the assessment as they are the primary emissions of concern at the landfill. Potential TSP, PM_{10} , and $PM_{2.5}$ emissions from vehicle exhaust and break and tire wear for the on-Site vehicles was concluded to be insignificant based on results from previous assessments and were not included in this assessment.

Other tailpipe/combustion emissions, such as nitrogen oxides (NO_x) and carbon monoxide (CO), can also be concluded to be insignificant based on the small volume of daily traffic at the landfill, and the significant distances to sensitive receptors. The potential concentrations of NO_x and CO that a person might be expected to be exposed to near a municipal road will far exceed the concentrations of these compounds at the landfill boundary. Therefore, it may be concluded that NO_x and CO emissions from the vehicles at the landfill continue to be insignificant contributors to the background concentrations of these compounds as the traffic volumes have remained the same.

Landfill gases, such as hydrogen sulfide (H₂S) and vinyl chloride, can also be concluded to be insignificant based on the operations at the landfill. GHD completed a theoretical landfill gas generation rate for the Site. Based on the existing and proposed waste to be disposed at the Site, it is estimated that the maximum amount of landfill gas that will be generated is less than approximately 175 cubic feet (ft³)/minute (in 2025). This will be distributed over an area of approximately 7.09 ha or 70,900 m², resulting in a landfill gas exit velocity of only 0.00007 m/second. This amount of landfill gas generation is anticipated to be insignificant from an overall Site profile and therefore landfill gases are not included in any further assessment.

Odours from the operations have not been further assessed. Due to the nature of the material being landfilled and the previous assessment that evaluated the proposed conditions there is no change in the odour profile for the Site.

3.4.4.4 MECP Air Monitoring Data

The MECP has ambient air monitoring stations across Ontario that measure a variety of pollutant concentrations. Typically, the stations monitor criteria air contaminants, such as nitrogen oxides, carbon monoxide, sulphur dioxide, and particulate matter, with the exception of some specialized monitors that measure speciated volatile organic compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAH). There are no active monitoring stations within the Study Area, therefore, the monitor located in Hamilton (29102), Ontario was chosen as the closest monitor to the Site.

The Hamilton station monitors nitrogen oxides, ground-level ozone, and PM_{2.5}. The Hamilton station is located towards the north in Hamilton and is expected to be influenced by the industry within the City of Hamilton. The focus of this assessment is on the various size fractions of particulate matter. Although the Hamilton Station is not representative of the Site, the data from this location has been included for completeness. The focus of this assessment is on the TSP, PM₁₀, and PM_{2.5}. These fractions of particulate matter are the main containments that will be released at the Site.

Hourly readings and 24-hour average values are provided as part of the Hamilton air monitoring data set for PM_{2.5}. The Hamilton monitor is located in a predominantly urban area. Therefore, the PM_{2.5} concentrations around the Site are expected to be much lower compared to the monitoring station.

As shown in **Table 3.3**, the concentration for PM_{2.5} for the 24-hour averaging period is below its respective Canada Ambient Air Quality Standard (CAAQS). The Annual average of the monitoring data indicates PM_{2.5} levels are slowly increasing over time. However, this is a result of an increase in industry in the vicinity of the Hamilton monitoring station and is not expected to be the trend for the Site and its surrounding area. Based on the monitored data, the PM_{2.5} background concentrations in the vicinity of the Site are expected to be well below the CAAQS. It is expected that the levels at the Site are significantly lower as they are not influenced by the industrial and populated areas of Hamilton.

As part of BRE's continuing commitment to ensuring that particulate matter emissions from the Site are minimized from amended operations the standard operating procedure (SOP) will continue to be deployed. The purpose of the SOP is to ensure Best Management Practices (BPMs) are implemented at the Site to reduce the potential generation of particulate matter results. This includes, but is not limited to, the watering and sweeping of roads that equipment uses to travel the Site.

Table 3.3 *PM_{2.5} Concentration (µg/m³) reported from the Hamilton Monitoring Station (STN29102)*

Averaging Time	Monitoring Period			Average	CAAQS	Statistical Form
	2019	2020	2021			
24 hour	22.0	22.4	27.5	23.9	27	The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations
Annual	9.1	10.1	10.7	10.0	8.8	The 3-year average of the annual average of the daily 24-hour average concentrations

3.4.4.5 Odour Quality

The Site has a functional leachate treatment facility to minimize the generation of odours at the Site. The most recent odour monitoring completed by GHD at the Site in 2022, also confirmed that the leachate treatment system has reduced the potential for odour impacts. Faint odours were detected throughout the Site during the most recent odour monitoring, however, no odour that would be attributed to the Site was detected at any off-Site monitoring locations.

In addition to the on-Site and off-Site odour monitoring that was completed by BRE, GHD completed a theoretical landfill gas generation rate for the Site. Based on the existing and proposed waste to be disposed at the Site, it was determined that the maximum amount of landfill gas that will be generated is less than 297 m³/hours) [175 cubic feet per minute (cfm)] (in 2025). This will be distributed over an area of approximately 7.09 ha or 70,900 m², resulting in a landfill gas exit velocity of only 0.00007 m/second. This amount of landfill gas generation is anticipated to be insignificant from an overall odour Site profile.

As part of BRE's commitment to ensuring that odour complaints are minimized from the existing and proposed operations a SOP was developed. The purpose of the SOP is to include odour mitigation measures that would be implemented to ensure that odour complaints are investigated and the condition that resulted in the odour complaint is mitigated.

See **Appendix D** for a detailed Air Quality Assessment Report.

3.5 Noise Existing Conditions

3.5.1 Study Area

The Noise Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **SSA** – the 14.3 ha area within the existing, approved boundaries of the Site, as defined by ECA No. A110302, as amended
- **LSA** – the area within the vicinity of the Site extending approximately 1 km in all directions from the SSA boundaries



3.5.2 Methodology

3.5.2.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Noise Study Team to determine existing Noise conditions within the Study Areas. The following sources of secondary information were collected and reviewed:

- Historic Noise Complaints
- Current zoning plans, definitions and land use designations
- Field Observations and Investigations
- Local traffic data
- MECP technical guidelines and standards
- March 27, 2020 Amended ECA #A110302
- D&O Report Vertical Expansion – Rev. 1, Brooks Road Landfill Site, 2270386 Ontario Inc., Prepared by GHD, June 15, 2021
- Noise Assessment Report (AAR) and BMP Plan for the Brooks Road Landfill Site Vertical Capacity Expansion EA, Prepared by GHD, June 14, 2021

3.5.3 Process Undertaken

GHD has describe the processes and steps taken in chronological order as required to best describe the methodology used for this assessment.

3.5.3.1 Historic Noise Complaints

Brooks Road Landfill has not received any formal noise complaints for the previous operations on-Site after a review of all formal complaint records provided since September 2015 which is based on the records provided by BRE Site operators. During a recent open house event in June of 2022 one written comment from a local resident was received indicating that there was a concern with the noise from tracked vehicles.

3.5.3.2 Review of Zoning

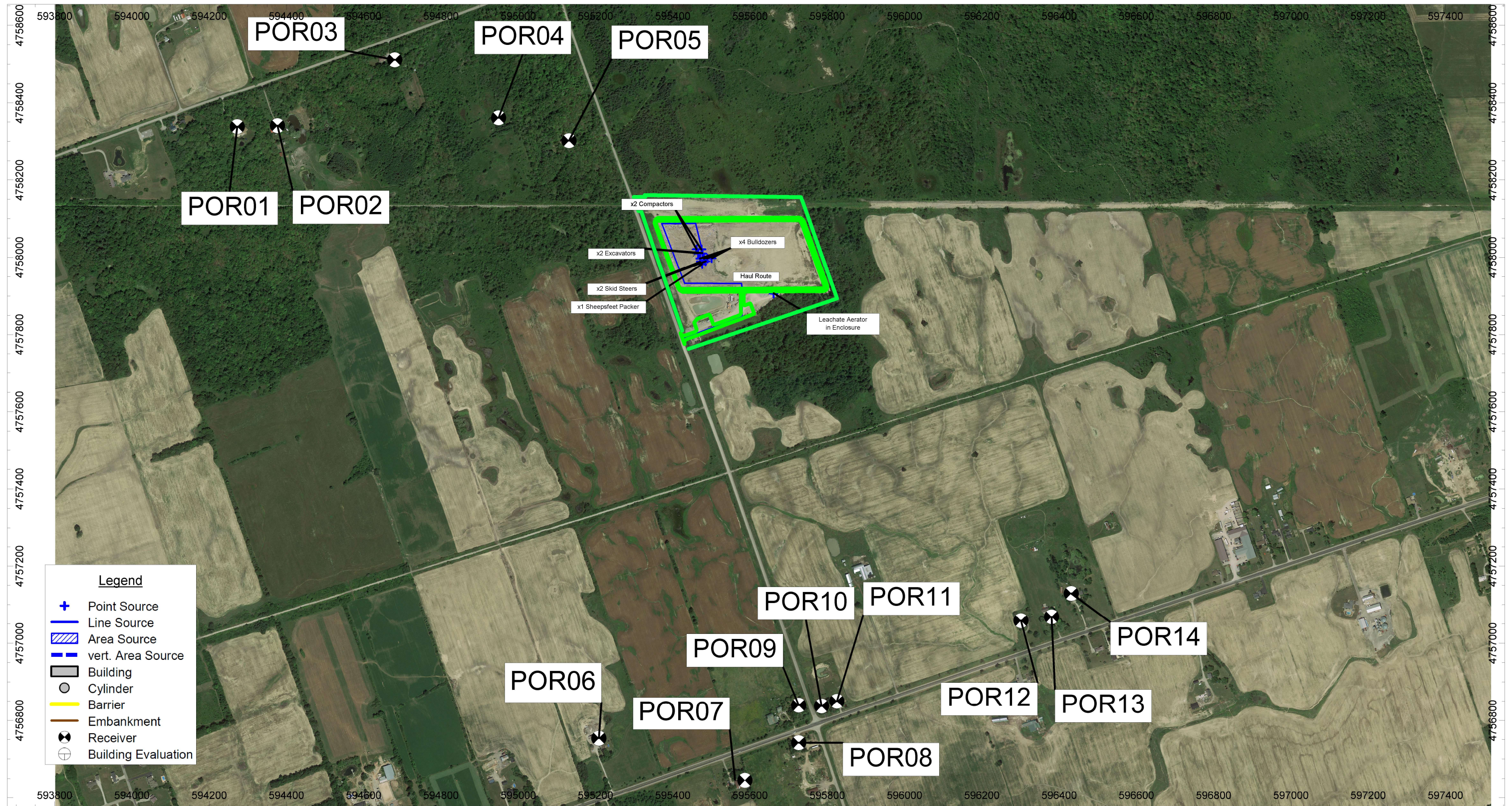
The Comprehensive Zoning By-Law for Haldimand County identifies the Site as “MD – Disposal Industrial Zone,” which is suitable for a municipal sanitary landfill site. The surrounding land uses are zoned Agricultural use.

3.5.3.3 Site Review

Previous data collected during the 2021 Environmental Screening was reviewed. The SSA is rural in character and surrounded by agricultural fields. There are no existing industries within the Study Areas other than the Facility that may contribute to the background noise levels.

During the Vertical Capacity Expansion EA, a Site visit was conducted for the purpose of determining noise impact exposure off-Site. Off-Site residential dwelling locations were reviewed and the height of structures for noise impact exposure analysis was determined.

The nearest residential dwelling is approximately 232 m northwest of the existing property boundary. There are approximately 14 existing one-storey (1.5 m above grade) and two-storey (4.5 m above grade) residential dwellings within the LSA as identified on **Figure 3.15**.



ACOUSTIC ASSESSMENT REPORT
BROOKS ROAD ENVIRONMENTAL
160 BROOKS ROAD, CAGUYA, ONTARIO

POINT OF RECEPTION LOCATION PLAN

12561524
12.10.2022

FIGURE 3.15

3.5.4 Description of Noise Existing Conditions

3.5.4.1 Local Traffic Data

There are three roads located within the Study Areas including:

1. Townline Road – is a two-lane dirt rural road with minimal local traffic only
2. Brooks Road – is a two-lane road with minimal local traffic and primarily used by Brooks Road Landfill
3. Highway 3 – is a two-lane road with significant 24-hour road traffic

Traffic data was obtained from the local traffic authority and the Ministry of Transportation (MTO). Townline Road and Brooks Road experience low traffic volumes based on Site observations and also confirmed by the traffic authority. Highway 3 traffic volumes are elevated and subject of analysis.

MECP's Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) software is the approved road traffic model that is currently used in the province of Ontario to evaluate noise generated from road traffic. However, the model does not graphically generate contours and cannot be used to evaluate large areas and multiple road corridors simultaneously. ORNAMENT modeling predictions are also limited to noise predictions less than 500 m from the source and a minimum traffic volume of 40 vehicles per hour is required to evaluate an individual roadway.

Due to these model limitations, Computer Aided Noise Abatement Acoustical Modeling Software (CADNA A) was selected for the purposes of this Study as the preferred modeling software for analysis of road traffic generated background noise existing conditions. In addition, the CADNA A modeling software is better suited to handle multiple noise sources and can generate contour plots with imported base maps.

Annual Average Daily Traffic (AADT) values are the only reported data for less travelled roads, which presents a problem when estimating daytime and nighttime background noise levels as the values do not provide a distribution for the two time periods. GHD used recommendations for traffic breakdown for provincial highways and regional roads as outlined in the ORNAMENT guidance document to address this issue. The most current road traffic volumes were obtained from Haldimand County and the MTO. The following AADT values were available for road segments within the Study Area:

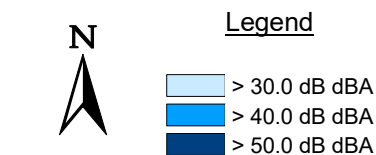
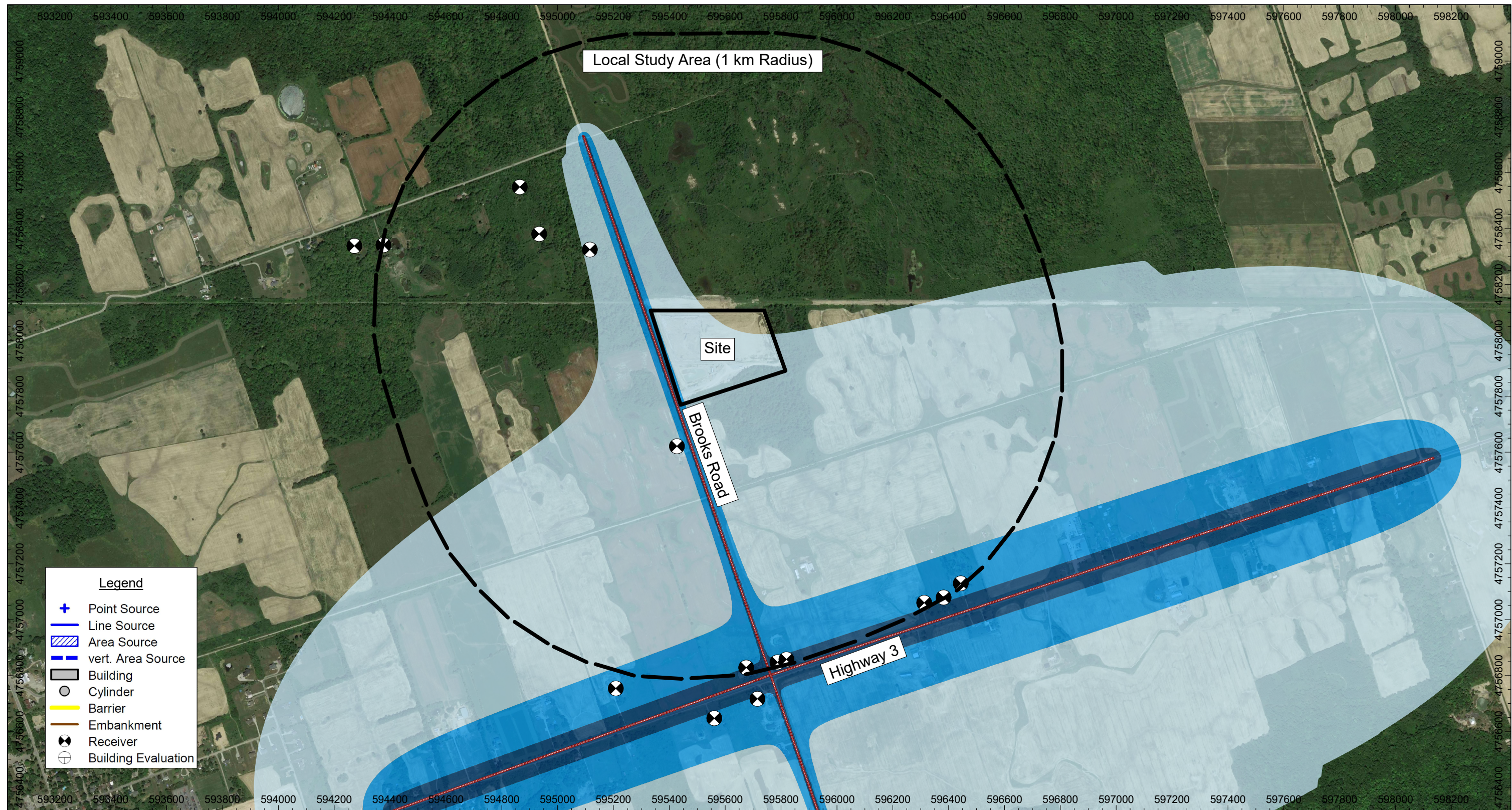
- Highway 3 (MTO, 2016) – 3,250 vehicles / day
- Brooks Road (Haldimand County, 2019) – 131 vehicles / day

The existing noise conditions within the Study Areas were quantified using the industry standard CADNA A software and the road traffic data provided by the regulatory authorities. The US Department of Transportation Federal Highway Administration Traffic Noise Model (TNM) calculation standard was used in CADNA A to quantify the noise levels.

Vehicular road traffic generates noise that consists of mechanical noise from the engine and brakes, friction noise created from wheel contacting the road surface, and aerodynamic wind noise. Traffic volume, speed, road composition, gradient and surface type will affect the overall traffic noise that can be generated. Proximity and line-of-sight to the road corridor are most consequential for quantifying the off-Site noise exposure conditions.

The model calculates the predicted equivalent sound level (Leq) respective of the defined daytime (7 a.m. to 11 p.m.) and nighttime (11 p.m. to 7 a.m.) periods.

Figure 3.16 and **Figure 3.17** present the road traffic sound level contours within the Study Areas for the daytime and nighttime periods, respectively.



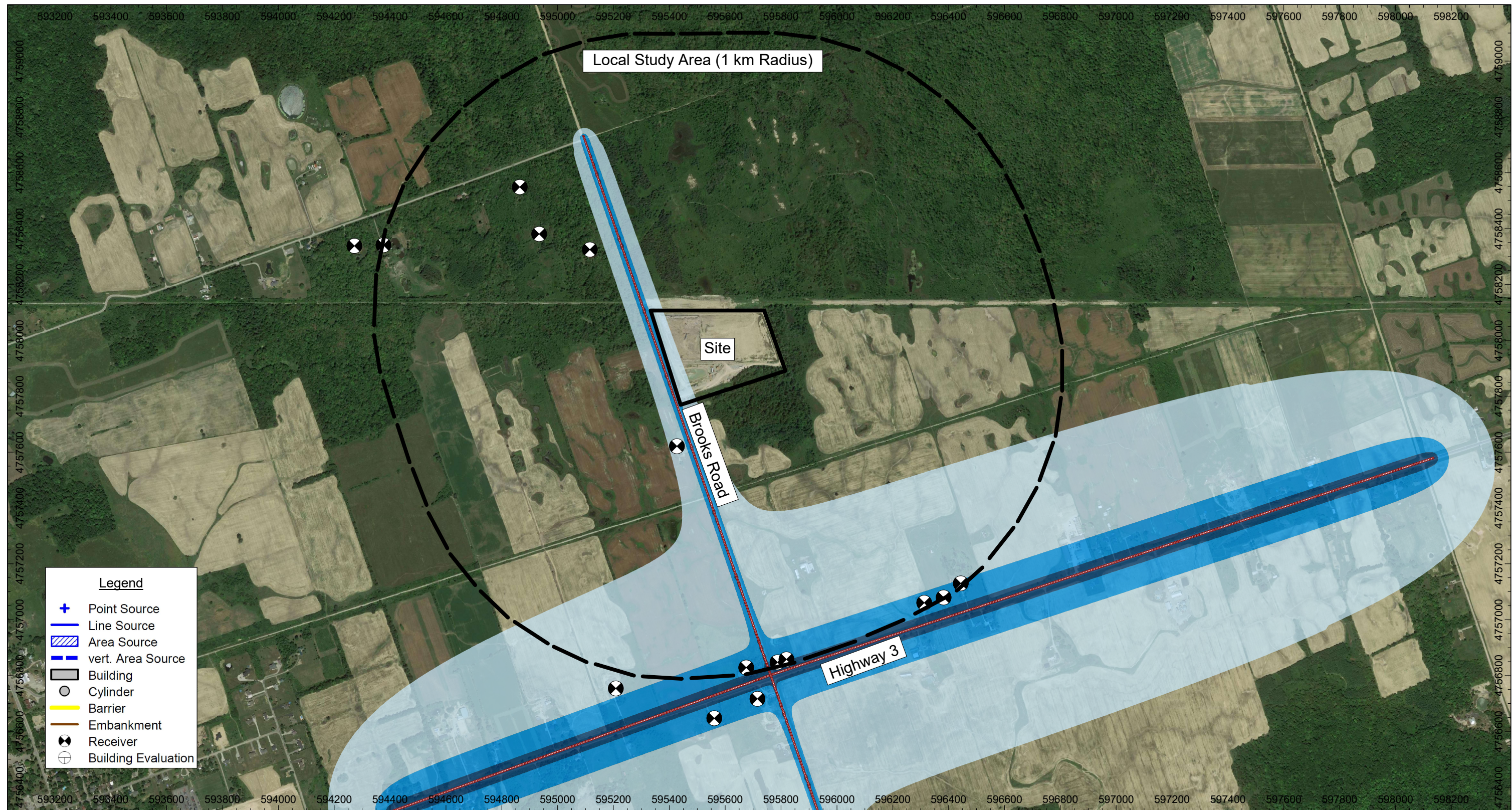
Notes:
Noise level contours presented above represent A-weighted 1-hour equivalent sound levels calculated at a grid height of 4.5 metres above grade.



NOISE ASSESSMENT REPORT
BROOKS ROAD ENVIRONMENTAL
BROOKS ROAD LANDFILL- 160 BROOKS ROAD, CAYUGA, ONTARIO
ROAD TRAFFIC SOUND LEVEL CONTOURS - DAY

12561524
17.10.2022

FIGURE 3.16



Source: Google Satellite



Legend

- < 30.0 dB dBA
- > 30.0 dB dBA
- > 40.0 dB dBA
- > 50.0 dB dBA

Notes:
Noise level contours presented above represent A-weighted 1-hour equivalent sound levels calculated at a grid height of 4.5 metres above grade.



NOISE ASSESSMENT REPORT
BROOKS ROAD ENVIRONMENTAL
BROOKS ROAD LANDFILL- 160 BROOKS ROAD, CAYUGA, ONTARIO
ROAD TRAFFIC SOUND LEVEL CONTOURS - NIGHT

12561524
17.10.2022

FIGURE 3.17

3.5.4.2 Off-Site Haul Routes

Highway 54 to Highway 3 is primarily used to reach Brooks Road and the off-Site haul route will not change regardless of the capacity modification. Any potential traffic increase to support the proposed increased landfill capacity will be evaluated using the noise model based on the future road traffic data.

3.5.4.3 MECP Technical Guidelines and Standards

The Noise character of the Study Area was defined in accordance with the MECP guidelines NPC-300 “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning,” October 2013.

As stated in the guideline:

A “Class 1 Area” means an area with an acoustical environment typical of a major population centre, where the background noise is dominated by the urban hum.

“Class 2 Area” means an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 Areas, and in which a low ambient sound level, normally occurring only between 23:00 and 07:00 hours in Class 1 Areas, will typically be realized as early as 19:00 hours.

Other characteristics which may indicate the presence of a Class 2 Area include:

- Absence of urban hum between 19:00 and 23:00 hours
- Evening background sound level defined by natural environment and infrequent human activity
- No clearly audible sound from stationary sources other than from those under impact assessment

“Class 3 Area” means a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as the following:

- A small community with less than 1,000 population
- Agricultural area
- A rural recreational area such as a cottage or a resort area
- A wilderness area

The urban sound level limits are 5 A-weighted decibels (dBA) greater in comparison to the rural limits to account for the elevated background sound level or the urban hum due to road traffic or adjacent industrial/commercial activities.

Landfill activities and on-Site operations are compared directly against a daytime one-hour Leq sound level limit of 55 dBA for landfill operations that are limited to 7 a.m. to 7 p.m. under the “Noise Guidelines for Landfill Sites” (N-1), October 1998.

3.5.5 2021 ECA and Existing Sensitive Receptors

The 2021 ECA amendment application that was prepared for the fill rate amendment confirmed that the Study Area immediately surrounding the Site is a mixed acoustical Class 2 and Class 3 area, depending on the proximity of the sensitive receiver to the adjacent road corridors and traffic volumes.

The Facility is located in a mixed acoustical Class 2 and Class 3 area, depending on the proximity of the sensitive receiver to the Highway 3 corridor. Acoustical Class 2 areas are defined by NPC-300 as an Noise environment with elevated daytime noise levels. Acoustical Class 3 areas are defined by NPC-300 as rural areas with an acoustical environment that is dominated by natural sounds having little or no road traffic.

The nine residential dwellings located along Highway 3 are considered to be Class 2 receivers and the five residential dwellings situated away from the corridor are considered to be Class 3 receivers. However, N-1 is the applicable regulatory Guideline for compliance assessment purposes for this Site and the proposed capacity increase.

The nearest residential dwelling is approximately 232 m from the property boundary.

3.5.5.1 Landfill Existing Conditions

Brooks Road Landfill is proposing to increase the total landfill capacity by 219,400 m³ maintaining the current daily approved fill rate. With this increase in mind, the equipment currently utilized on-Site is expected to continue. Therefore, the significant environmental noise sources at the Landfill include the following is considered a maximum volume to allow for flexibility in Site operations:

- 2x Leachate Aerator in an Enclosure (24/7 steady state operation) (91.4 dBA)
- 3x Bulldozers (daytime operation only) (106.3 dBA)
- 2x Compactors (daytime operation only) (106.5 dBA)
- 1x Rock Truck (daytime operation only) (105 dBA)
- 2x Excavators (daytime operation only) (106.5 dBA)
- 2x Skid Steers (daytime operation only) (109.1 dBA)
- 1x Sheepsfoot Packer (daytime operation only) (106.5 dBA)

SSA haul route truck activities are summarized below:

Table 3.4 On Site Vehicle Volumes

Type of Vehicle	Day 7a.m.- 7 p.m. (Trips/hour)	Evening 7p.m.- 11 p.m. (Trips /hour)	Night 11 p.m.- 7 a.m. (Trips /hour)
On-Site Haul Route (Source TR2)	16	0	0

These noise sources generate continuous steady state mechanical noise and will be the subject of analysis for the evaluation. These noise sources are input into an industry standard Noise model that includes all significant Site structures (buildings, equipment, storage tanks and silos).

CADNA A, version 2023, is based on the ISO 9613-2 standard “Noises – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation.” The CADNA A model is the industry standard for environmental noise modeling in Ontario.

The worst-case cumulative Site-wide sound levels estimated at the receptor(s) included attenuation effects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption and directivity, as applicable significant noise sources at off-Site buildings were input into the model as intervening structures.

CADNA A modelling assumptions applied include the following:

- **Noise Sources** | All sources were modelled using the 1/1 octave band data from manufacturer’s sound level data or reference materials
- **Noise Source Elevation** | The heights of the noise sources were modelled at the tallest point to represent the worst-case line of sight and emission of noise
- **Ground Absorption** | The model included water (G=0), soft/porous ground (G=1), and gravel/hard ground (G=0.25)
- **Receptor Elevation** | POR receptor heights were modelled appropriately to represent the worst-case elevation based on one or two-storey residences at the worst-case compass directions from the Site as no houses are present
- **Time-weighted Adjustment** | Time-weighted adjustments for sources that do not operate continuously were utilized
- **Tonality** | A +5 dBA adjustment was applied for tonal sources if applicable
- **Foliage** | Foliage attenuation was not considered in our analysis as a conservative assumption

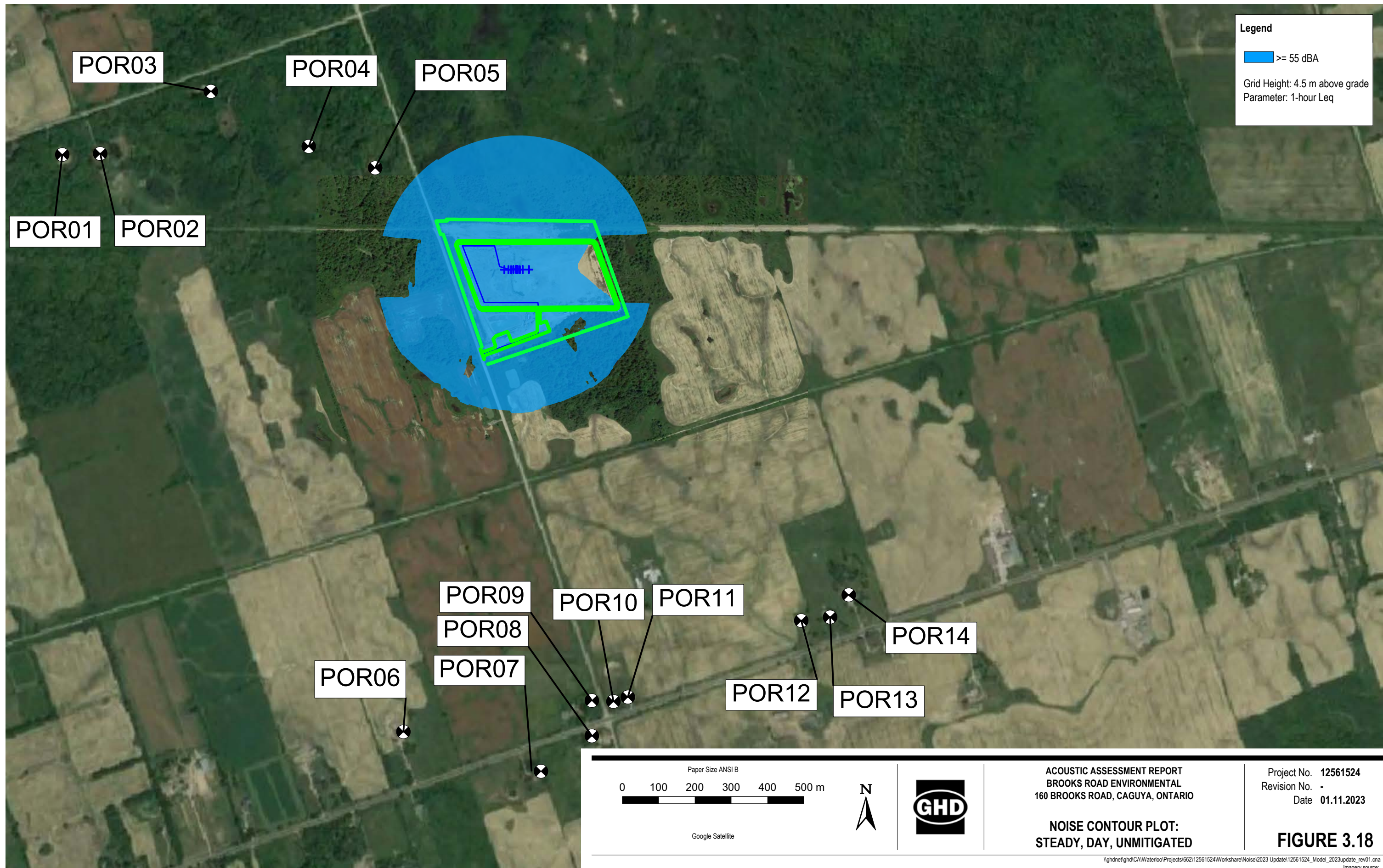
Table 3.5 *Noise Modelling Parameters*

Item	Model Parameters	Model Setting
1	Temperature	10°C
2	Relative humidity	70%
3	Wind speed	Downwind condition; wind speed of 3 m/s
4	Max. Search Radius (m)	2500 m
5	Noise propagation model	CADNA A (DataKustik 2023)
6	Standard	ISO 9613
7	Terrain parameters	Flat topography was assumed
8	Reflection parameters	2 orders of reflection

In order to predict the future worst-case noise impacts from the Project activities, representative octave band noise data was used, measured from construction/processing equipment similar to what is noted to be required for the Project. This data was obtained from the United Kingdom's Department of Environment Food and Rural Affairs (DEFRA) Update of Noise Database for Prediction of Noise on Construction and Open Sites, 2005 and 2006 (common source used globally). The United States Department of Transportation, Federal Highway Administration (FHWA) document FHWA Roadway Construction Noise Model User's Guide, 2006 was used as a supplemental document to obtain sound level data for equipment not listed by DEFRA.

The existing Landfill noise contours are presented on **Figure 3.17**. The noise impacts predicted at the 14 residential dwellings are below the 55 dBA noise limit (blue contour plot) defined in Guideline N-1. The future off-Site environmental noise impact from the Brooks Road Landfill Facility will be modelled using this industry standard acoustical model methodology to evaluate the capacity modifications in terms of the net effects.

See **Appendix E** for a detailed Noise Assessment Report.



3.6 Natural Environment

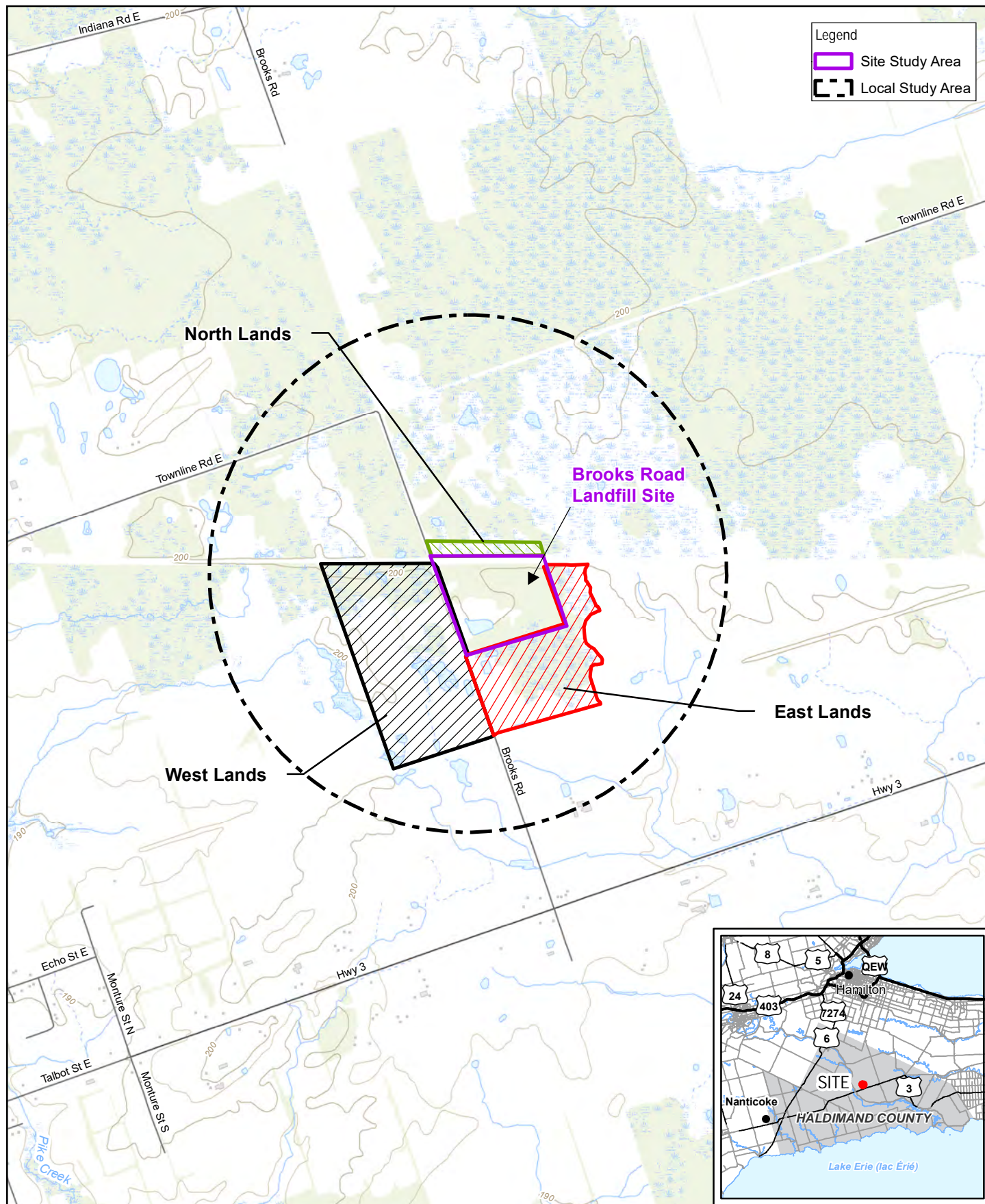
3.6.1 Study Area

The Natural Environment Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **SSA** – the 14.3 ha area within the existing, approved boundaries of the Site, as defined by ECA No. A110302, as amended
- **LSA** – all lands and waters within a 1 km radius of the SSA boundaries

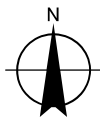
The lands surveyed within the LSA, surrounding the SSA, are referred to throughout this report as three areas: North Lands, East Lands, and West Lands.

The area to the south and east of the SSA (herein referred to as “East Lands”) consists of undeveloped rural property consisting of a combination of agricultural fields and forested lands. On the west side of Brooks Road (herein referred to as “West Lands”) is a rural property which is characterized by agricultural fields and small forested plots. To the north of the SSA, there is a rural property consisting of limited agricultural fields and forested lands.



Paper Size ANSI A
 0 125 250 375 500
 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: North American 1983
 Grid: NAD 1983 UTM Zone 17N



BROOKS ROAD LANDFILL
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SITE LOCATION MAP

FIGURE 3.19

3.6.2 Methodology

3.6.2.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Natural Environment Study Team to determine existing Natural Environment conditions within the Study Areas. The sources reviewed are outlined in **Table 3.6**.

Table 3.6 Secondary Source Information Reviewed

Source	Information Reviewed
Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR)	<ul style="list-style-type: none"> Species at Risk (SAR) Natural Heritage Features data layers from Land Information Ontario Aquatic Resource Area (ARA) Survey Points
MECP	<ul style="list-style-type: none"> SAR in Ontario
Fisheries and Oceans Canada (DFO)	<ul style="list-style-type: none"> 2022 SAR fish, mussel, and critical habitat maps for the Study Areas
GRCA	<ul style="list-style-type: none"> Fisheries Management Plan (2001) Wetlands map layer
Niagara Peninsula Conservation Authority (NPCA)	<ul style="list-style-type: none"> Wetlands map layer
GHD	<ul style="list-style-type: none"> Terrestrial and Aquatic Environment Assessment Report for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment (February 2017)
CRA	<ul style="list-style-type: none"> Scoped Environmental Impact Study Former Railway Corridor Lands North of Brooks Road Landfill, Haldimand County, ON (December 2013)
Ontario Breeding Bird Atlas (OBBA)	<ul style="list-style-type: none"> Breeding bird data for the Study Areas
Ontario Butterfly Atlas (OBA)	<ul style="list-style-type: none"> Species records for the Study Areas
Ontario Reptile and Amphibian Atlas (ORAA)	<ul style="list-style-type: none"> Species records for the Study Areas

3.6.2.2 Consultation

The Guelph District MNDMNR, the MECP, the GRCA, and the NPCA were consulted on March 2, 2022, to request available natural heritage information, aquatic records, relevant wildlife records and SAR records. A response was received from MNDMNR and NPCA on March 4, 2022, from GRCA on March 8, 2022, and from MECP on September 13, 2022. Additional information provided by the agencies was incorporated into this report. Agency correspondence is included in Appendix A of the Natural Environment Assessment Report (see **Appendix F**).

Although there was no direct consultation with the agencies during the preparation of this *Natural Environment Assessment Report*, the MNDMNR, GRCA, and NPCA were consulted extensively during the *Terrestrial and Aquatic Environment Assessment Report for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment* (GHD 2017). GRCA and NPCA also participated in a Site walk with GHD ecologists to confirm wetland boundaries in the North Lands on July 5, 2013. GRCA conducted an additional Site walk with GHD ecologists on June 12, 2014, to confirm the wetland boundaries of the East Lands.

A meeting was held with the Mississauga's of the Credit First Nation (MCFN) on July 19, 2022, and provided an opportunity for GHD to answer questions the MCFN had regarding the proposed capacity expansion of the Brooks Road Landfill.

3.6.2.3 Species at Risk Screening

Prior to conducting the field surveys, a screening of SAR with potential to be present within the Study Areas was completed. The term SAR is used to encompass species that are listed as Endangered (END), Threatened (THR), or Special Concern (SC) under the provincial *Endangered Species Act* (ESA; 2007) or under the federal *Species at Risk Act* (SARA; 2002). Only species listed as THR and END receive protection under the ESA. SC species may be protected under other policy instruments such as those for Significant Wildlife Habitat (OMNR 2000). With the exception of migratory birds protected by the *Migratory Bird Convention Act* (MBCA; 1994) and aquatic species, SARA generally does not apply on non-federal lands.

3.6.2.4 Field Investigations

GHD staff conducted various field investigations within the North and East Lands throughout 2020 to 2022 to identify natural environment habitats, and species and features present within the Study Areas (**Table 3.7**). Field surveys were conducted within the LSA that were directly adjacent to the SSA (up to 150 m radius or limited to the right-of-way of Brooks Road) to accurately characterize the neighbouring habitat and natural features present. No wildlife species surveys were conducted within the SSA due to active operation of the landfill and limited suitable habitat; however, incidental observations were collected at all field visits and are discussed in sections below.

Table 3.7 *Field Investigations*

Field Investigation	Dates
Ecological Land Classification and Vegetation Inventory	July 10, 2022 (East Lands) June 28, 2021 (North Lands)* June 29, 2020 (North Lands)*
Amphibian Surveys	April 12, May 11, and June 15, 2022 (North, East, and West Lands) March 25, April 13, and June 28, 2021 (North Lands)* May 28, 2020; June 29, 2020 (North Lands)*
Breeding Bird Surveys	June 10, June 27, and July 10, 2022 (East Lands)
Songmeter recording	June 13 to July 10, 2022 (North Lands)
Incidental Species Observations	Collected during all field visits
Notes	
* Completed as part of ECA monitoring of the North Lands which are provided here for a more fulsome characterization of the Study Areas (GHD 2021, 2022).	

Data collection focused on assessing vegetation and wildlife habitat characteristics within the Study Areas. Methodology for each field survey is provided below.

3.6.2.5 Aquatic Community Surveys

The MNDMNRF were consulted for aquatic community information. Aquatic community surveys were not completed during this round of Study Area investigations due to:

- The footprint of the SSA, from the natural environment perspective, is coincident with the existing property boundary
- Semi-aquatic species such as Blanding’s turtle will be considered to have assumed presence (based on local records)
- Water discharged from Site is governed by an ECA that is not anticipated to change because of these activities

- Additional Site controls and mitigation measures at this property boundary which limit natural environment interactions with the Site and surrounding areas are employed following the recommendations of the recent Vertical Expansion EA

3.6.2.6 Ecological Land Classification and Botanical Inventory

Vegetation communities within the East Lands were mapped and described following the *First Approximation – ELC System for Southern Ontario* (Lee et al. 1998) and the *Southern Ontario ELC Scheme* (Draft; Lee et al. 2008). A botanical inventory (including a search for rare plant species) was completed for each ELC unit where access permitted within the LSA. The vegetation inventory was compiled and refined by incidental observations recorded throughout all field visits.

3.6.2.7 Wetland Boundaries

Wetland boundaries were delineated by GHD, GRCA, and NPCA in the North Lands on July 5, 2013. GHD and GRCA delineated the wetland boundaries in the East Lands on June 12, 2014. Wetland delineations of the Study Areas were prepared following Ontario Wetland Evaluation System (OWES) methods (MNR 1994; MNR 2013). 2022 ELC mapping confirmed those wetland boundaries delineated in 2013 and 2014.

Calling Amphibian Surveys

Calling amphibian surveys were conducted according to the Marsh Monitoring Protocol (BSC 2009) and were carried out at six stations within wetlands in the North, East, and West Lands. All surveys commenced a half hour after sunset and consisted of listening at each station for three minutes after two minutes of silence. During the survey, any frogs or toads heard calling were documented and a measure of 1, 2, or 3 for the abundance of each species within 50 m of the survey point, 50 – 100 m of the survey point, or greater than 100 m of the survey point was applied.

Breeding Bird Surveys

Breeding bird surveys were conducted on June 10, June 27, and July 10, 2022, within the East Lands. This was conducted during the breeding season when most birds are on their territories engaged in breeding activities. Surveys were conducted between 5:00 and 11:00 a.m. A point count methodology was utilized, where a point count location was surveyed for five minutes, and all species seen and heard were recorded. Breeding evidence was recorded to determine if the species was a possible, probable, or confirmed breeder following protocols of the Ontario Breeding Bird Atlas (Cadman et al. 2007). Locations of the Breeding Bird Survey (BBS) stations were identified in the *Terrestrial and Aquatic EA Report for the Brooks Road Landfill Site Vertical Capacity Expansion EA* (GHD 2017).

A songmeter (SM1) was also installed in the North Lands to collect audio recordings of breeding bird occurrences outside of the survey periods. The songmeter collected recordings for five minutes of every hour for three hours after sunrise and three hours after sunset during from June 13, 2022, until July 11, 2022. This captured breeding bird presence during the time of the day when vocal calling was highest for songbird species. Audio recordings were analyzed by avian ecologists to determine species presence.

3.6.2.8 Incidental Wildlife Observations

Observations and signs of wildlife were recorded, including browse, tracks, trails, scat, burrows, remains, nests, and vocalizations.

3.6.3 Description of Natural Environmental Existing Conditions

The LSA was dominated by agricultural lands under active row crops, forests, and wetlands. A photographic log is presented in Appendix B of the Natural Environment Assessment Report (See **Appendix F**).

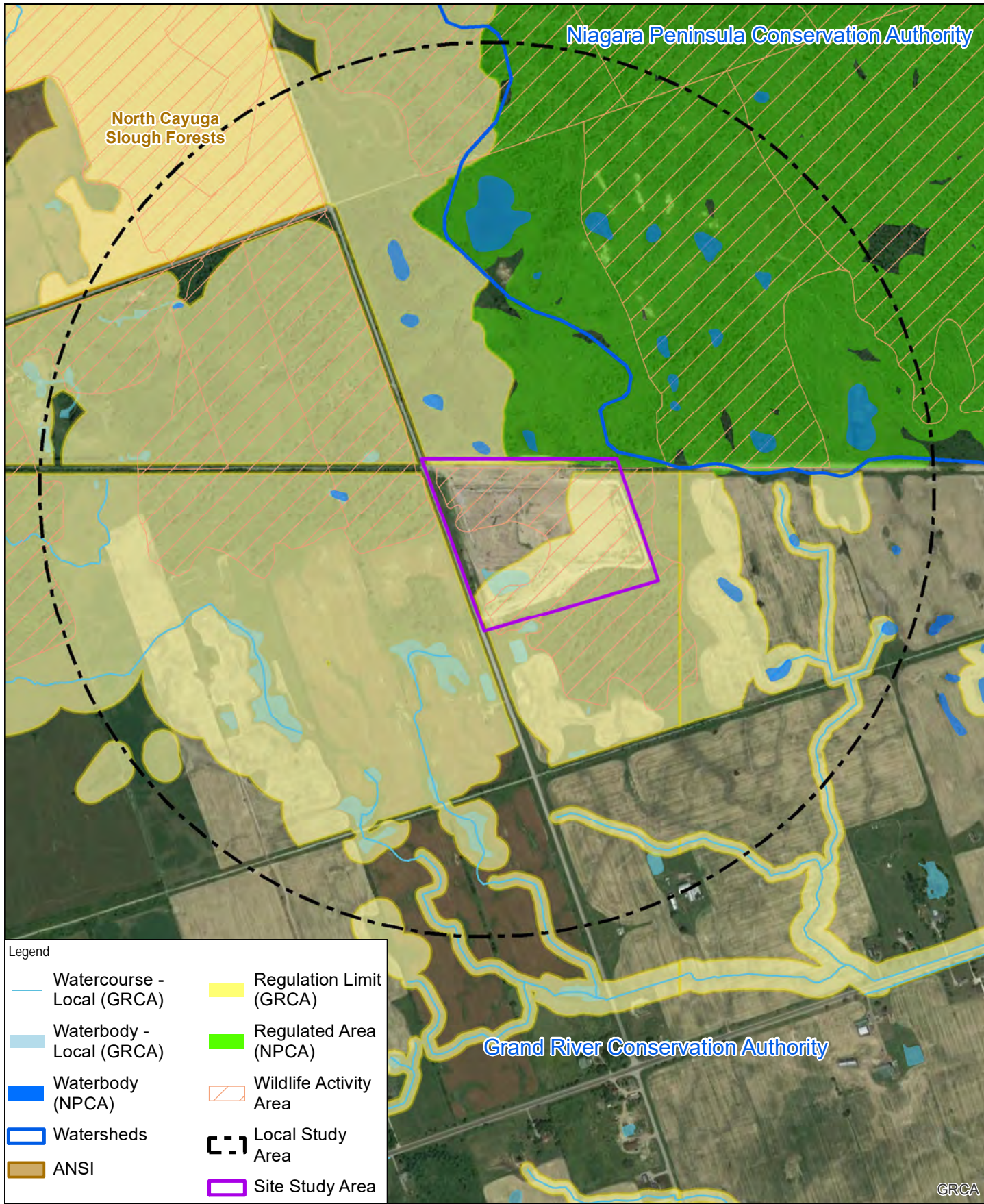
3.6.3.1 Designated Areas

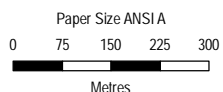
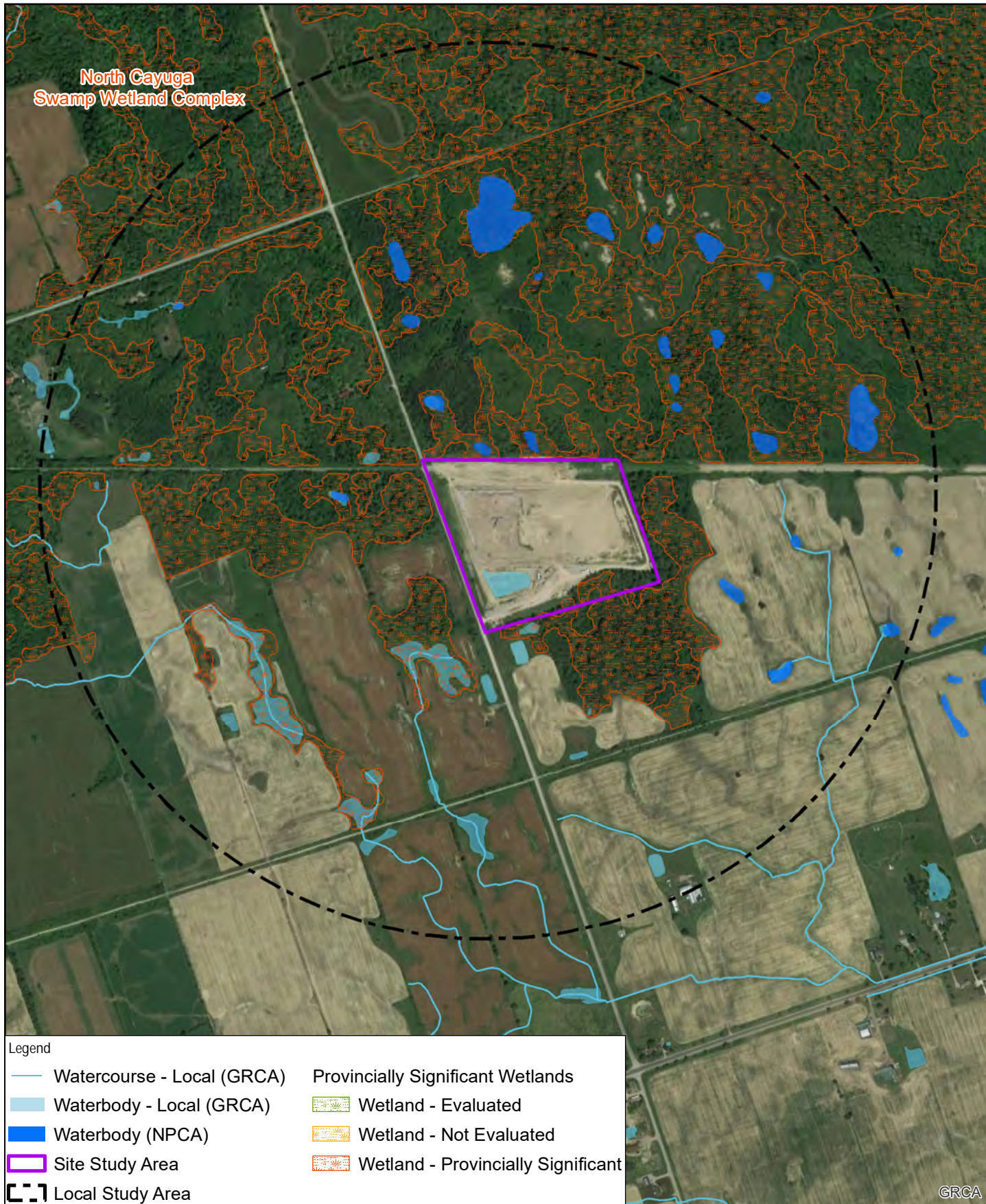
The LSA contains natural landscape features of provincial significance (see **Figure 3.19**).

The North Cayuga Slough Forest is an Area of Natural and Scientific Interest (ANSI), located in the northwest portion of the LSA and the Brooks Road/Townline Road intersection. This 1,214 ha landscape feature is composed of a diverse complex of woodlands, vernal pools and sloughs which are bordered by swamps (GRCA 1997). The sloughs are a result of the Beverly and Toledo silty clay plains and the Lincoln clay plains. Generally, the area is dominated by imperfectly to poorly drained lacustrine silty clay and heavy clay. The upland areas are dominated by sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*) and red oak (*Quercus rubra*). Red maple (*A. rubrum*), swamp white oak (*Q. bicolor*) and black ash (*F. nigra*) typically dominate the low, wet basins. Field communities are characterized by hawthorns (*Crataegus spp.*), southern arrowwood (*Viburnum dentatum*) and narrow-leaved meadowsweet (*Spirea alba*), representing some of the many transitional environments between the distinct upland and low land areas. This area is of special importance due to its textbook clay-plain sediments and sand ridges which lead to the very distinct vegetation patterns. Previous studies have documented that 14 vegetation species and four bird species that are rare nationally, provincially and/or regionally occur in the area. This area is also home to a heronry (GRCA 1997). Of the 14 rare vegetation species, only two were observed in the LSA. These species are discussed further in section below.

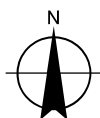
The North Cayuga Swamp Wetland Complex is a PSW complex that is also present within the SSA and throughout the LSA in general (see **Figure 3.21**). This wetland complex is made up of numerous individual wetlands dominated by swamp with some marsh wetlands. The PSW extends to the northernmost portion of the SSA and incorporates the wetland elements of the North Cayuga Slough Forest. The complex vegetation community is characterized by thicket swamps of narrow-leaved meadowsweet, buttonbush (*Cephalanthus occidentalis*), winterberry (*Ilex verticillata*), or speckled alder (*Alnus incana ssp. rugosa*) with red maple, gray dogwood (*Cornus foemina ssp. racemosa*), highbush blueberry (*Vaccinium corymbosum*), and willows (*Salix spp.*) as associates (NPCA 2010). The soil is a clay, loam, or silt composition.

Majority of the LSA is white-tailed deer (*Odocoileus virginianus*) wintering area as delineated by the MNDMNR (Figure 3.20). Online mapping shows the majority of the SSA is also included in this delineation; however, given the SSA's fencing and lack of suitable habitat it is unlikely to be used by white-tailed deer for wintering.





Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 17N



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PROVINCIAL SIGNIFICANT WETLANDS

FIGURE 3.21

3.6.3.2 Aquatic Communities

Consultation with the MNMNR identified Pike Creek as present within the LSA; approximately 500 m west of the SSA. Pike Creek has a warm thermal regime with the following species identified: black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), bluntnose minnow (*Pimephales notatus*), brook stickleback (*Culaea inconstans*), brown bullhead (*Ameiurus nebulosus*), central mudminnow (*Umbra limi*), common shiner (*Luxilus cornutus*), creek chub (*Semotilus atromaculatus*), gizzard shad (*Dorosoma cepedianum*), golden shiner (*Notemigonus crysoleucas*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), logperch (*Percina caprodes*), northern pike (*Esox Lucius*), pumpkinseed (*Lepomis gibbosus*), rock bass (*Ambloplites rupestris*), sunfishes (*Centrarchidae spp.*), and white sucker (*Catostomus commersonii*). Pike Creek does not drain from or into the SSA, therefore was not subject to field investigations.

3.6.3.3 Vegetation Communities and Flora

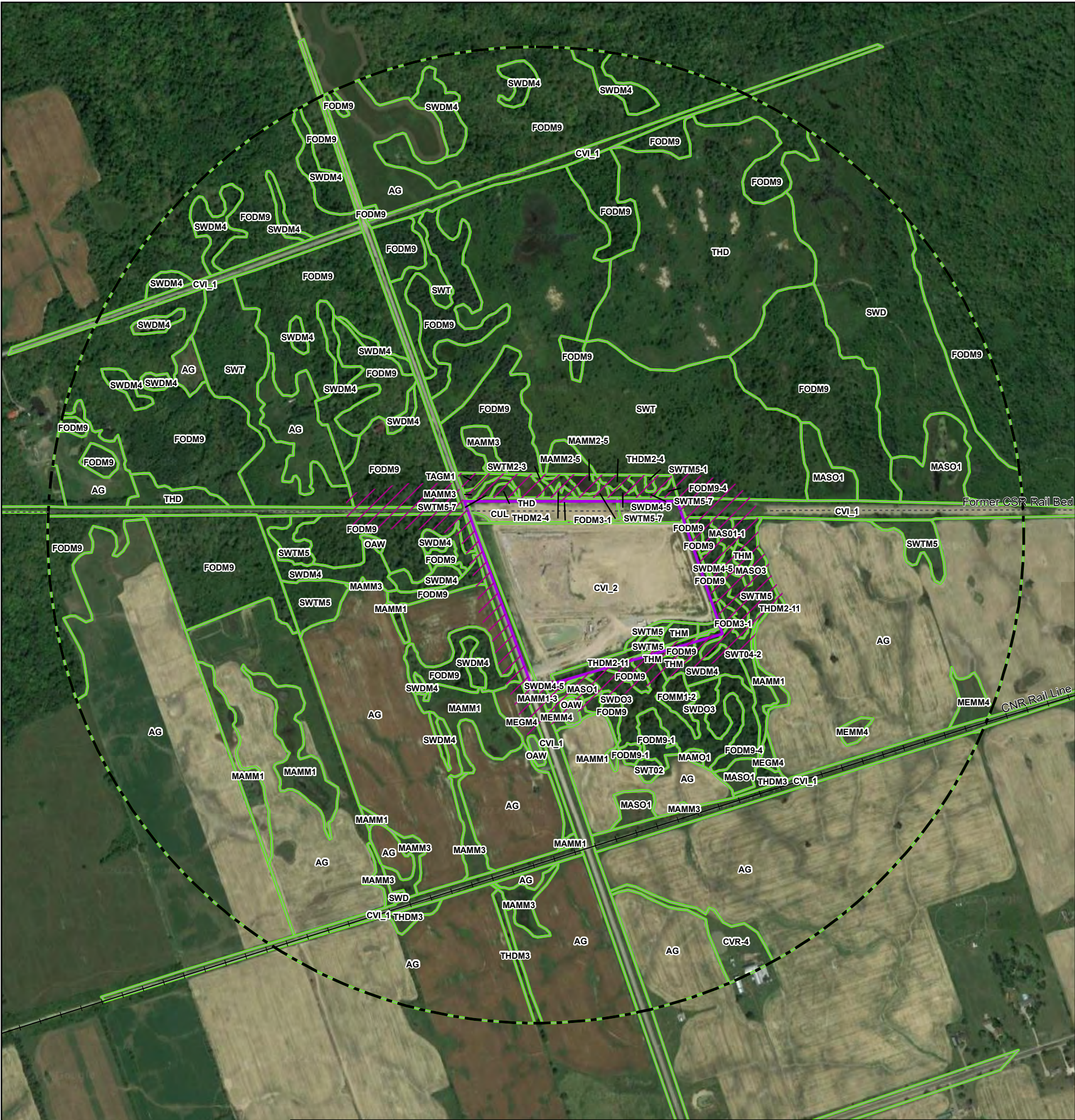
3.6.3.3.1 Vegetation Communities

In June 2022, GHD conducted a vegetation inventory and Ecological Land Classification (ELC) of select areas within the LSA which included the East and North Lands. This inventory and classification builds upon field visits completed between 2013 and 2015 for the *Terrestrial and Aquatic Environment Assessment Report for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment* (GHD 2017).

During the 2013 – 2015 EA surveys, a species of interest detected during field activities was pumpkin ash (*Fraxinus profunda*), which is ranked as S2 provincially and is a regionally rare species in the Haldimand-Norfolk County. It is found in swampy areas with standing water for most of the year. A single specimen in poor condition was found along the south base of the abandoned rail line to the east of the landfill property (within the LSA). During 2022 this species was not observed and was likely located outside the selected field areas surveyed.

Another species of interest that was detected in past field investigations conducted by others was black gum (*Nyssa sylvestre*). A small stand of black gum was found in the SSA by Natural Resource Solutions Inc. (NRSI) in 2004 at the southeast corner of the landfill prior to clearing activities. The stand of black gum was identified by GHD on the landfill property during 2016 field investigations (GHD 2017). The trees were found to be tagged and located in the direct vicinity of active landfilling activities, without any tree protection measures. Black gum is a provincially rare species (S3) in Ontario, but within Haldimand-Norfolk County black gum is considered common. Presence of these trees was not confirmed in 2022 surveys; however, wildlife exclusion fence installed around the on-Site wetlands in the southeast corner of the landfill restricts work in this area.

ELC mapping was prepared following Ecological Land Classification for Southern Ontario: A First Approximation (Lee et al. 1998) and is presented on **Figure 3.22**. To complete the classification, ELC-certified ecologists conducted field visits to assess the landform and parent material, soil, and vegetation present. Through assessment of these characteristics, classification of the ecological communities was completed for the North, East, and West Lands in 2016 by GHD. The balance of the LSA (up to a 1 km radius from the SSA) was assessed using aerial photography interpretation and knowledge of the area. Confirmation and update to any vegetation communities to the North and East Lands were completed during the summer of 2022. Thirty-nine ecological land classification community classes are represented within the LSA and include aquatic, swamp, marsh, meadow, thicket, forest, transportation and utilities, and cultural systems. The vegetation inventory is presented in Appendix C of the Natural Environment Assessment Report (see **Appendix F**).



Legend

- Ecological Land Classification
- Field Verified - 2022
- Site Study Area
- Local Study Area

TERRESTRIAL:

Upland:
AG: Agriculture

Transportation and Utilities:
CVL_1: Transportation
CVL_2: Disposal and Recycle
CVR_4: Rural Property
CUL: Cultural

Meadow:
MEGM4: Fresh-Moist Graminoid Meadow
MEMM4: Fresh-Moist Mixed Meadow

Forest:
FODM3-1: Dry-Fresh Poplar Deciduous Forest
FODM9: Fresh-Moist Oak-Maple-Hickory Deciduous Forest
FODM9-1: Fresh- Moist Oak-Sugar Maple Deciduous Forest
FODM9-4: Fresh-Moist Shagbark Hickory Deciduous Forest
FOMM1-2: Fresh-Moist White Pine-Hardwood Mixed Forest
TAGM1: Fine Mineral Coniferous Plantation

Thicket:
THD: Deciduous Thicket
THDM2-4: Gray Dogwood Deciduous Shrub Thicket
THDM2-11: Hawthorn Deciduous Shrub Thicket
THDM3: Dry-Fresh Deciduous Hedgerow Thicket
THM: Mixed Thicket

WETLAND:

Marsh:
MAMM1: Graminoid Mineral Meadow Marsh
MAMM1-3: Reed-canary Grass Graminoid Mineral Meadow Marsh
MAMM2-5: Purple Loosestrife Forb Mineral Meadow Marsh
MAMM3: Mixed Mineral Meadow Marsh
MAMO1: Graminoid Organic shallow Marsh
MASO1: Graminoid Organic Shallow Marsh
MASO1-1: Cattail Organic Shallow Marsh
MASO3: Mixed Organic shallow Marsh

Swamp:
SWD: Mineral Deciduous Swamp
SWDM4: Mineral Deciduous Swamp
SWDM4-5: Poplar Mineral Deciduous Swamp
SWDO3: Organic Deciduous Swamp
SWT: Thicket Swamp
SWTM2-3: Gray Dogwood Mineral Deciduous Thicket Swamp
SWTM5: Mineral Deciduous Thicket Swamp
SWTM5-1: Buttonbush Mineral Deciduous Thicket Swamp
SWTM5-7: Meadowsweet Mineral Deciduous Thicket Swamp
SWTO2: Willow Organic Deciduous Thicket Swamp
SWTO4-2: Gray Dogwood Organic Deciduous Thicket Swamp

Aquatic System:
OAW: Open water

3.6.3.3.1.1 ELC from 2022 Survey

Characteristics of each of the identified community types observed during the summer of 2022 are provided below. These communities are delineated in **Figure 3.22** as “Field Verified – 2022”.

Upland Communities

AG: Agriculture

Agricultural fields are present throughout the LSA and are actively farmed. At the time of survey, winter wheat (*Triticum aestivum*), corn (*Zea mays ssp. mays*), and soybean (*Glycine max*) crops were planted within the AG fields of the East and West Lands. Small wetland and drainage areas were present throughout the actively farmed agriculture fields.

CVI_1: Transportation

This area is composed of roadways, a decommissioned rail line from which rail ties have been removed, and an active rail line.

CVI_2: Disposal and Recycle

This is the Brooks Road Landfill Site, which is in active operation.

CVR_4: Rural Property

This is a rural property with residential and accessory structures.

CUL: Cultural

This classification is applied to the disturbed and actively managed areas of the clay stockpile. No vegetation is present.

FODM3-1: Dry-Fresh Poplar Deciduous Forest

The dry-fresh poplar deciduous forest is located along the edge of the existing waste disposal area. The topography is relatively flat with moist soil. Trembling aspen (*Populus tremuloides*) dominates the semi closed canopy of this community, with red maple, red oak (*Quercus rubra*), and various shrub species also present within the unit. The sub-canopy, understory and ground layer are dominated by typical upland species such as riverbank grape (*Vitis riparia*), buckthorn (*Rhamnus spp.*), dogwood (*Cornus spp.*), pasture rose (*Rosa carolina*), goldenrod, and bedstraw (*Galium sp.*).

FODM9: Fresh-Moist Oak- Maple-Hickory Deciduous Forest

This forest type is located west of Brooks Road and in close proximity to swamps and is a dense deciduous community composed of shagbark hickory (*Carya ovata*), red maple, sugar maple (*Acer saccharum*), balsam poplar (*Populus balsamifera*), silver maple (*Acer saccharinum*), red oak, white pine (*Pinus strobus*), American beech (*Fagus grandifolia*), ironwood (*Ostrya virginiana*), and swamp white oak (*Quercus bicolor*). Due to the large area of this unit, ground vegetation varied throughout the area and included sensitive fern (*Onoclea sensibilis*), bracken fern (*Pteridium aquilinum*), spotted jewelweed (*Impatiens capensis*), Canada mayapple (*Podophyllum peltatum*), highbush cranberry (*Viburnum trilobum*), garlic mustard (*Alliaria petiolata*), trout lily (*Erythronium americanum*), Canada thistle (*Cirsium arvense*), black raspberry (*Rubus occidentalis*), woodland strawberry (*Fragaria vesca*), and lesser burdock (*Arctium minus*).

FODM9-4: Fresh-Moist Shagbark Hickory Deciduous Forest

This low forested area is adjacent to one of the slough wetlands and is dominated by shagbark hickory with ironwood, white ash, red oak, red maple, and swamp white oak being present. The soil in this area is moist with a rolling topography. The groundcover includes goldenrod species, trout lily, running strawberry bush (*Euonymus obovatus*), ostrich fern (*Matteuccia struthiopteris*), and other herbaceous species.

THD: Deciduous Thicket

A small pocket of deciduous thicket was observed north of the existing fence line and is dominated by a gray dogwood (*Cornus racemosa*) with patchy canopy coverage of white ash (*Fraxinus americana*), elm (*Ulmus spp.*), hawthorn (*Crataegus ssp.*), and red maple (*Acer rubrum*). The ground layer is dominated by timothy grass (*Phleum pratense*), common milkweed (*Asclepias syriaca*), goldenrod (*Solidago sp.*), Canada bluegrass (*Poa compressa*), common cinquefoil (*Potentilla simplex*), oxeye-daisy (*Leucanthemum vulgare*), deptford pink (*Dianthus armeria*), and woodland sedge (*Carex blanda*).

THDM2-4: Gray Dogwood Deciduous Shrub Thicket

This mid-age transitional community is present in multiple locations throughout the LSA and is typically associated with the drier edges of wetlands. The area is similar to the cultural thicket (CUT1) community but is characterized by a dominant shrub cover of gray dogwood. Other community species indicative of an upland environment includes white ash, hawthorn, and goldenrod.

THDM2-11: Hawthorn Deciduous Shrub Thicket

This flat area of mineral soil is located in close proximity to an agricultural field. Hawthorn species dominate this landscape. Very few trees are located within this thicket and other species present include gray dogwood, serviceberry (*Amelanchier sanguinea*), and white pine.

THM: Mixed Thicket

Located to the east of the landfill property, this upland thicket is adjacent to two wetlands. A few large mature white pines have established, and hawthorn, gray dogwood, and European buckthorn are present within the sub canopy.

Wetland Communities

MAMM1: Graminoid Mineral Meadow Marsh

This unit has a broad range of vegetation composition in the shrub and ground vegetation layers. Within the wetland, narrow-leaved cattail (*Typha angustifolia*) and reed-canary grass (*Phalaris arundinacea var. arundinacea*) dominates. Vegetation along the edge of this unit includes common teasel (*Dipsacus fullonum*), common chicory (*Cichorium intybus*), red clover (*Trifolium pratense*), cow parsnip (*Heracleum maximum*), goldenrod, bird's-foot trefoil (*Lotus tenuis*), serviceberry, gray dogwood, reed-canary grass, and oxeye daisy.

MAMM1-3: Reed-canary Grass Graminoid Mineral Meadow Marsh

Located directly to the east of Brooks Road and on the south-west corner of the landfill property, this marsh is dominated by reed-canary grass and very little other vegetation except for a small pocket of narrow-leaved cattail located within a ditch.

MAMM2-5: Purple Loosestrife Forb Mineral Meadow Marsh

Purple loosestrife (*Lythrum salicaria*), large-fruited bur-reed (*Sparganium eurycarpum*), buttonbush (*Cephalanthis occidentalis*), and wool grass (*Scirpus cyperinus*) create a dense understory in this community. This community provides a transition between the bur-reed mineral shallow marsh and a meadowsweet mineral deciduous thicket swamp (SWTM5-7) present in the LSA, north of the SSA.

MAMM3: Mixed Mineral Meadow Marsh

This marsh is located directly beside an agriculture field and receives surface water flow from the surrounding agricultural area due to its low elevation. Graminoid and forb species dominate, and the composition includes European reed grass (*Phragmites australis ssp. Australis*), goldenrod, bird's-foot trefoil, common teasel, reed-canary grass, Queen Anne's lace (*Daucus carota*), and purple loosestrife. Narrow-leaved cattail, narrow-leaved meadowsweet (*Spiraea alba*), awl fruited sedge (*Carex stipata*), fowl mannagrass (*Glyceria striata*), broadleaf arrowhead (*Sagittaria latifolia*), duckweed (*Lemna minor*), and large-fruited bur-reed are also present within the understory layer.

MASO1-1: Cattail Organic Shallow Marsh

The cattail organic shallow marsh is a small community located at the base of the old rail line to the east of the landfill property. The marsh is comprised of organic soils and is dominated by narrow-leaved cattail. The other vegetation consisted of bog hemp (*Boehmeria cylindrica*), greater pond sedge (*Carex riparia*), and spotted jewelweed. This wetland is attached by a small channel which flows south to another wetland (MASO3).

MASO3: Mixed Organic Shallow Marsh

The mixed organic shallow marsh is comprised of organic soils and surface water with maximum depths over 0.5m in some areas. The vegetation community consists of phragmites (*Phragmites australis* var. *australis*), duckweed, water-plantain (*Alisma* spp.), and enchanter's nightshade (*Circaea canadensis* ssp. *canadensis*). Willow trees (*Salix* spp.) and shrubs are present throughout the wetland.

SWDM4: Mineral Deciduous Swamp

The mineral deciduous swamp is located within a forest community near agricultural fields. Aerial photographic interpretation was used to determine this habitat. Based on this interpretation, it is expected that this swamp is comprised of mineral soils and many deciduous tree species. Field investigations found red maple, trembling aspen, and balsam poplar. Gray dogwood was observed in the shrub layer, as well as sensitive fern and mosquito bulrush (*Scirpus hattorianus*). The ground layer was comprised of celery buttercup (*Ranunculus sceleratus*), red raspberry (*Rubus idaeus*), fowl mannagrass, and riverbank grape.

SWDM4-5: Poplar Mineral Deciduous Swamp

This habitat is found in multiple locations across the property, typically along the edge of the existing waste disposal facility. It is characterized as a transition between wetland and forest habitats. The majority of the canopy is located along the edge of the existing waste disposal property and is dominated by trembling aspen. Red maple, blue spruce (*Picea pungens*), sugar maple, pin oak (*Quercus palustris*), white ash, and red oak all compose the tree canopy. Many shrub species, including red osier dogwood, hawthorn, and nannyberry (*Viburnum lentago*), are present within this unit. Spotted jewelweed, sensitive fern, narrow-leaved meadowsweet, reed-canary grass, yarrow (*Achillea millefolium*), white sweet clover (*Mellilotus albus*), water-plantain, shallow sedge (*Carex lurida*), and common cinquefoil composes the dominant ground vegetation. Standing surface water and buttressed roots are present within the unit.

SWTM2-3: Gray Dogwood Mineral Deciduous Thicket Swamp

The gray dogwood mineral deciduous thicket swamp represents a mid-age transition community between the similarly characterized meadowsweet mineral deciduous thicket swamp (SWTM5-7) and the large mixed mineral meadow marsh (MAMM3). It is characterized by a robust sub-canopy dominated by gray dogwood. Specimens of red maple, speckled alder (*Alnus incana*), and common alder (*Alnus glutinosa*) form the canopy layer. The other species constituting the vegetation community are meadowsweet, sensitive fern, reed-canary grass, spotted jewelweed, boneset (*Eupatorium perfoliatum*), pussy willow (*Salix discolor*), and bottle brush sedge (*Carex hystericina*).

SWTM5: Mineral Deciduous Thicket Swamp

The mineral deciduous thicket swamp is present at multiple locations and is composed of primarily shrub species. Aerial photographic interpretation was used to determine this habitat in multiple areas but a field verified unit exists to the east of the landfill property. Species including gray dogwood, serviceberry, red osier dogwood, and hawthorn species are present within this unit. Ground vegetation includes narrow-leaved meadowsweet, sedge, rush, grass, and forb species. Small pockets of narrow-leaved cattail and reed-canary grass are also present.

SWTM5-1: Buttonbush Mineral Deciduous Thicket Swamp

The buttonbush mineral deciduous thicket swamp is surrounded by a large meadowsweet mineral deciduous thicket swamp (SWTM5-7). This community is comprised of thick sub-canopy of buttonbush and willow species. Bladderwort (*Utricularia vulgaris*), cypress-like sedge (*Carex pseudocyperus*), meadowsweet, swamp white oak, rye grass (*Lolium perenne*), soft-stemmed rush (*Juncus effusus*), and blue vervain (*Verbena hastata*) were also present.

SWTM5-7: Meadowsweet Mineral Deciduous Thicket Swamp

The meadowsweet mineral deciduous thicket swamp is characterized by a robust understory composed of obligate and facultative wetland species such as narrow-leaved meadowsweet, gray dogwood, and purple loosestrife. Ground cover includes moss and fowl meadow grass (*Poa palustris*). The silty clay soil lacked horizons, but mottles were observed within the top 10 centimetres (cm) of the surface.

SWTO4-2: Gray Dogwood Organic Deciduous Thicket Swamp

The gray dogwood organic deciduous thicket swamp is a mid-age community present and is typically associated with wet low-lying habitat. The swamp is characterized by organic soils, deciduous community vegetation, and is driven by a dominant shrub cover of gray dogwood with a various species including sensitive fern, lily of the valley (*Convallaria majalis*), false solomon's seal (*Maianthemum racemosum ssp. racemosum*), and narrow-leaved meadowsweet, all of which are indicative of a wetland environment.

3.6.3.3.1.2 ELC from 2016 Survey

Characteristics of each of the identified community types previously reported in the *Terrestrial and Aquatic Environment Assessment Report for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment* (GHD 2017) is provided below. These communities are delineated in **Figure 3.21** outside of the “Field Verified – 2022” hatching.

Upland

MEGM4: Fresh Moist Graminoid Meadow

The fresh moist graminoid meadow is mainly characterized by mineral soil and low growing grass species. Garlic mustard, cow vetch (*Vicia cracca*), goldenrod, blueberry (*Vaccinium sp.*), Bebb's sedge (*Carex bebbi*), reed-canary grass, common teasel, lesser burdock, large-fruited bur-reed, wood sorrel (*Oxalis acetosella*), and other sedge, forb, and grass species are present within this meadow. Serviceberry, hawthorn (*Crataegus spp.*), and European buckthorn present along its periphery. A very small stream also runs through this unit.

MEMM4: Fresh-Moist Mixed Meadow

The fresh-moist mixed meadow is located in an upland area surrounding a pond excavated for agricultural use. The area has disturbed soils and is primarily composed of forb and graminoid species such as reed-canary grass, common milkweed, bird's-foot trefoil, Queen Anne's lace, asters (*Aster spp.*), and common chicory. No trees or shrubs are present.

FODM9-1: Fresh- Moist Oak – Sugar Maple Deciduous Forest

This upland forest interior landscape is surrounded by slough wetlands. Sugar maple, red maple, shagbark hickory, ironwood and swamp white oak compose the canopy of this forest. The understory is composed of fern species (*Polypodiidae spp.*), trout lily, mayapple, garlic mustard, spotted jewelweed, and Canada thistle.

FOMM1-2: Fresh-Moist White Pine-Hardwood Mixed Forest

This raised elevation area compared to the surrounding supports both coniferous and deciduous tree species and associated vegetation. The mineral soil is well drained and mature white pine, sugar maple, and white ash are present within this unit. Trout lily, mayapple, garlic mustard, and Canada thistle are also present.

TAGM1: Fine Mineral Coniferous Plantation

The fine mineral coniferous plantation is a mid-age treed community that reflects the surroundings and historic land use as a tree farm. The canopy is composed exclusively of blue spruce. The dominance within the sub-canopy is roughly divided between blue spruce and gray dogwood. Additional upland species include common teasel, goldenrod species, orchard grass (*Dactylis glomerata*), broadleaf plantain (*Plantago major*) and common cinquefoil in the understory and as ground cover.

THDM3: Dry-Fresh Deciduous Hedgerow Thicket

This area is located south of the SSA and is situated along a rail bed. It is surrounded by marsh and agricultural fields. It has a raised topography compared to the surrounding landscape and is comprised of hawthorn species, common apple (*Malus pumila*), European buckthorn, amongst others.

Wetland

MAMO1: Graminoid Organic Shallow Marsh

The graminoid organic shallow marsh comprises a small wetland area located adjacent to an agricultural field and on the edge of a forest habitat. Vegetation includes primarily emergent sedge and graminoid species with small willow shrubs located on the periphery of the wetland.

MASO1: Graminoid Organic Shallow Marsh

The graminoid organic shallow marsh is a large wetland area dominated by tall robust vegetation. Standing water was present during multiple field surveys. Species composition is dominated by reed-canary grass, broad leaved water plantain (*Alisma subcordatum*), duckweed, pondweed (*Potamogeton sp.*), Queen Anne's lace, purple loosestrife, and vetch species (*Vicia spp.*).

SWDO3: Organic Deciduous Swamp

Sloughs with deep organic soils are present in most areas of the maple organic deciduous swamp unit. The canopy layer is dominated by red maple, American beech, shagbark hickory, and sugar maple. Small sporadic open water habitats are present, and many wetland sedges, ferns, and aquatic species are present. These include sensitive fern, bracken fern, spotted jewelweed, duckweed, false solomon's seal, narrow-leaved meadowsweet, etc.

SWD: Deciduous Swamp

This swamp is a diverse community comprised of many small tree stands containing deciduous tree species including red maple, shagbark hickory, trembling aspen, ironwood, hawthorn species, and burr oak (*Quercus macrocarpa*). Shrub species include gray dogwood, red osier dogwood, and serviceberry, among others.

SWT: Thicket Swamp

This swamp is a diverse community with small tree stands. It contains small patches of deciduous trees including trembling aspen, red maple, American beech, and ironwood. Shrub species dominate the landscape and include gray dogwood, red osier dogwood, and serviceberry, among others.

SWT02: Willow Organic Deciduous Thicket Swamp

The willow organic deciduous thicket shrub wetland is a small wetland with organic soil and an open water feature surrounded by willow tree and shrub species. This wetland overflows across a farmed field into a marsh wetland during the wet season. Other vegetation includes serviceberry, gray dogwood, duckweed, and graminoid species.

OAW: Open Water

Small open water habitats are present within the LSA, located near agriculture fields. These open water habitats were historically created by farmers for irrigation of crops within the surrounding fields. These ponds are uniform in shape and have little aquatic vegetation present.

3.6.3.3.2 Flora

A total of 139 vascular plants were identified to species level during field investigations, with one identified to genus (hawthorn [*Crataegus sp.*]). Of the species identified, 87 are native, 52 are non-native. 67 of the native species for which information is available have S-Ranks²² of 'S5', indicating they are 'secure' in the province. Virginia creeper,

²² Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

southern water-plantain, American reed, and Black walnut have an S-Rank of 'S4?' indicating they are 'apparently secure' in the province, however some uncertainty about the assigned rank exists. 10 species possess a ranking of S4 indicating that they are uncommon but not rare, with some cause for long-term concern due to declines or other factors.

81 of the native species for which information is available have co-efficient of conservatism²³ (CC) values of 0-6, indicating they are tolerant to moderately tolerant of disturbance. Six species possess a ranking of 7-9 which indicates that they have a low tolerance for disturbance.

No SAR plants were identified during the field investigation.

A list of vascular plant species identified during field investigations is provided in Appendix C of the Natural Environment Assessment Report (see **Appendix F**).

3.6.3.4 Herpetofauna

Herpetofauna encompasses all amphibians and reptiles. Calling amphibian monitoring was conducted and is further discussed below. Reptile-specific field surveys were not conducted during field investigations. However, the Ontario Reptile and Amphibian Atlas was reviewed, and incidental species observations were recorded at each field visit.

Herptile species identified in the Ontario Reptile and Amphibian Atlas as occurring within the Study Areas include:

- American bullfrog (*Lithobates catesbeianus*)
- American toad (*Anaxyrus americanus*)
- Blanding's turtle (*Emydoidea blandingii*)*
- Blue-spotted salamander (*Ambystoma laterale*)
- Dekay's brownsnake (*Storeria dekayi*)
- Eastern gartersnake (*Thamnophis sirtalis sirtalis*)
- Eastern Milksnake (*Lampropeltis triangulum*)
- Eastern red-backed salamander (*Plethodon cinereus*)
- Eastern ribbonsnake (*Thamnophis sauritus*)
- Gray treefrog (*Hyla versicolor*)
- Green frog (*Lithobates clamitans*)
- Midland painted turtle (*Chrysemys picta marginata*)
- Northern leopard frog (*Lithobates pipiens*)
- Northern map turtle (*Graptemys geographica*)
- Northern watersnake (*Nerodia sipedon sipedon*)
- Red-bellied snake (*Storeria occipitomaculata*)
- Red-spotted newt (*Notophthalmus viridescens viridescens*)
- Smooth greensnake (*Opheodrys vernalis*)
- Snapping turtle (*Chelydra serpentina*)
- Spotted salamander (*Ambystoma maculatum*)
- Spring peeper (*Pseudacris crucifer*)
- Western chorus frog (*Pseudacris triseriata*), Carolinian population
- Wood frog (*Lithobates sylvaticus*)

²³ Rank of 0 to 10 based on plant's degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters (Oldham et al., 1995).

Note: * denotes historical record (pre-2000)

American bullfrog, eastern gartersnake, eastern milksnake, green frog, northern leopard frog, northern watersnake, eastern red-backed salamander, and red-bellied snake were observed during 2020 – 2022 field investigations. Additional calling amphibians recorded in the LSA are detailed below. Blanding's turtle, snapping turtle, and Dekay's brownsnake were observed during 2013 – 2015 LSA field surveys (GHD 2017).

3.6.3.4.1 Calling Amphibian Surveys

Six calling amphibian stations were surveyed in the North, East, and West Lands according to the Great Lakes Marsh Monitoring Protocol (BSC 2009) in spring 2022 (**Figure 23**). All stations had detections of calling amphibians. Results of the calling amphibian surveys during 2020 – 2022 can be found in Appendix D of the Natural Environment Assessment Report (see **Appendix F**).

The composition of species detected during the amphibian surveys is representative of the amphibian population in the adjacent areas, where suitable habitat exists. Surveys in the North and East Lands confirmed the presence of American bullfrog, American toad, gray treefrog, green frog, northern leopard frog, spring peeper, and western chorus frog. Surveys in the West Lands confirmed the presence of the same species, with the exception of American bullfrog. In total, eight species of calling amphibians were documented in the LSA.

Each of the species recorded during 2020 – 2022 calling amphibian surveys had been previously documented in the vicinity as part of the *Terrestrial and Aquatic Environment Assessment Report for the Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment* (GHD 2017). No species listed under the provincial ESA or the federal SARA were recorded during calling amphibian surveys.

3.6.3.5 Birds

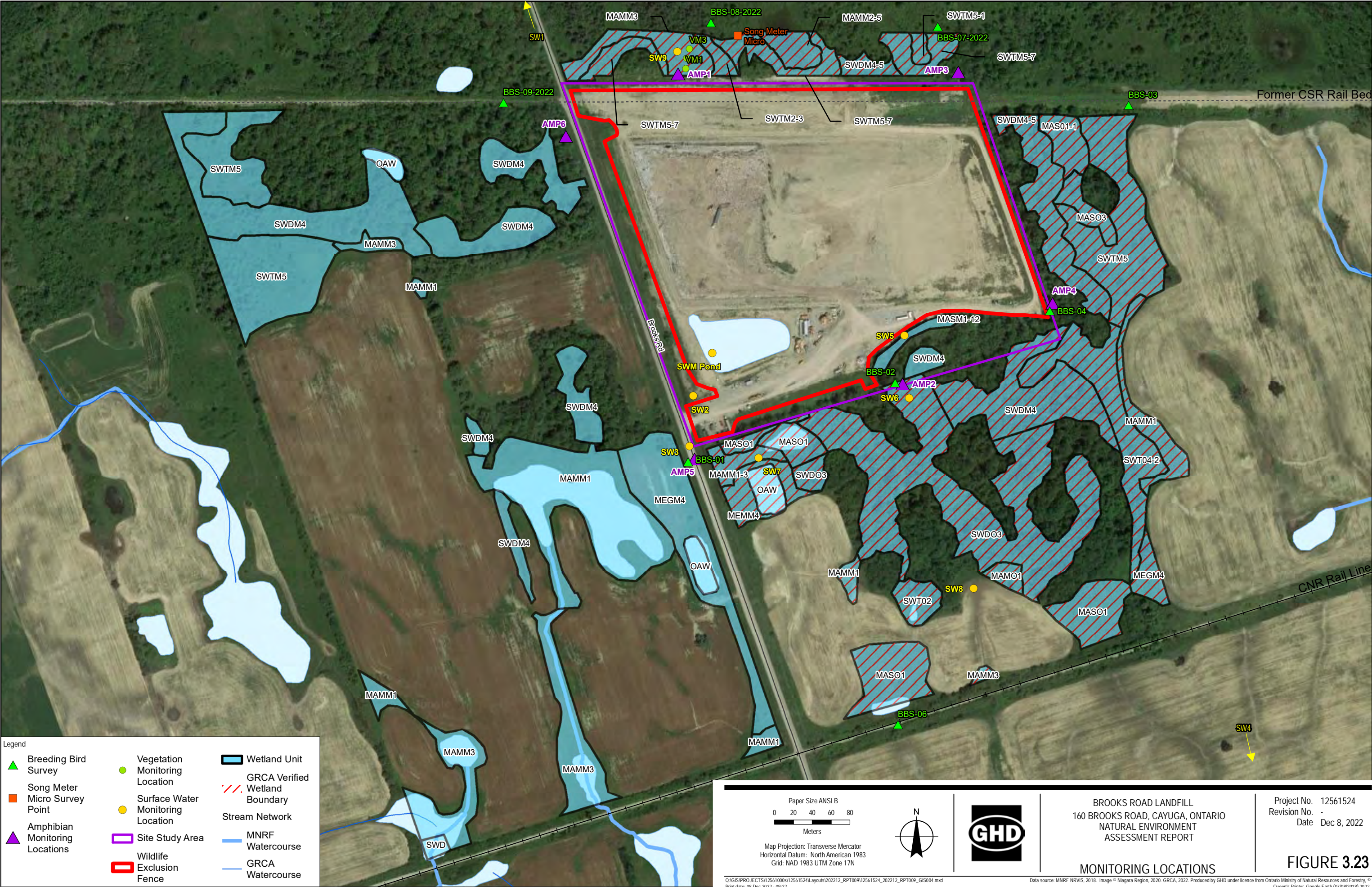
Breeding bird surveys were conducted on June 10, June 27, and July 10, 2022, in the East Lands. A total of 61 species were detected during the surveys, 44 of which displayed evidence of breeding. A list of the species detected with evidence of breeding is provided in Appendix E of the Natural Environment Assessment Report (see **Appendix F**).

The SM1 recorder was deployed in the North Lands from June 10 – July 10, 2022, at the location identified on **Figure 3.23**. For consistency, the recordings were analyzed by the avian ecologist who completed the in-field breeding bird surveys. A list of all species detected by the SM1 is provided in **Appendix E** of the Natural Environment Assessment Report (see **Appendix F**). The SM1 could only document presence of singing species and cannot provide visual observation of species.

In total, 71 species of birds were observed in the LSA and SSA during 2022 breeding bird surveys by GHD ecologists. Four of these species are SAR: barn swallow, eastern wood-pewee (*Contopus virens*), Canada warbler (*Cardellina canadensis*), and wood thrush (*Hylocichla mustelina*). Least bittern (*Ixobrychus exilis*) was heard vocalising within the East Lands in 2014 (GHD 2017). This species was not detected during the 2022 surveys within the LSA or SSA. Species at risk are discussed in greater detail in **Section 3.6.3.8**.

3.6.3.6 Mammals

Mammal-specific field surveys were not conducted as part of the project, but incidental observations were recorded. During field investigations big brown bat (*Eptesicus fuscus*), eastern cottontail (*Sylvilagus floridanus*), northern raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), white-tailed deer (*Odocoileus virginianus*), and unidentified bats were observed.



Legend

Breeding Bird Survey	Vegetation Monitoring Location	Wetland Unit
Song Meter Micro Survey Point	Surface Water Monitoring Location	GRCA Verified Wetland Boundary
Amphibian Monitoring Locations	Site Study Area	Stream Network
	Wildlife Exclusion Fence	MNRF Watercourse
		GRCA Watercourse

<p>Paper Size ANSI B</p> <p>0 20 40 60 80</p> <p>Meters</p> <p>Map Projection: Transverse Mercator Horizontal Datum: North American 1983 Grid: NAD 1983 UTM Zone 17N</p>			<p>BROOKS ROAD LANDFILL 160 BROOKS ROAD, CAYUGA, ONTARIO NATURAL ENVIRONMENT ASSESSMENT REPORT</p> <p>MONITORING LOCATIONS</p>	<p>Project No. 12561524 Revision No. - Date Dec 8, 2022</p> <p>FIGURE 3.23</p>
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Print date: 08 Dec 2022 - 09:22

Data source: MNRF NRVS, 2018. Image: © Niagara Region, 2020. GRCA, 2022. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry. © Queen's Printer, Google Earth (07/08/2018) 2022.

3.6.3.7 Incidental Wildlife Observations

Wildlife observations were collected during each field visit in addition to breeding bird and amphibian surveys. A list of incidental faunal species observations can be found in **Table 3.8**.

Table 3.8 Incidental wildlife observed within the Study Areas from 2020 to 2022

Species Observed		S-Rank	Conservation Status	
Common Name	Scientific Name		SARO	SARA
Amphibians				
American bullfrog	<i>Lithobates catesbeianus</i>	S4	N/A	N/A
Red-backed salamander	<i>Plethodon cinerus</i>	S5	N/A	N/A
Birds				
American robin	<i>Turdus migratorius</i>	S5B	N/A	N/A
American woodcock	<i>Scolopax minor</i>	S4B	N/A	N/A
Barn swallow	<i>Hirundo rustica</i>	S5	Threatened	Threatened
Canada goose	<i>Branta canadensis</i>	S5	N/A	N/A
Chipping sparrow	<i>Spizella passerina</i>	S5B	N/A	N/A
Common grackle	<i>Quiscalus quiscula</i>	S5B	N/A	N/A
Common yellowthroat	<i>Geothlypis trichas</i>	S5B	N/A	N/A
Eastern towhee	<i>Pipilo erythrophthalmus</i>	S4B	N/A	N/A
Great blue heron	<i>Ardea herodias</i>	S4	N/A	N/A
Gray catbird	<i>Dumetella carolinensis</i>	S4B	N/A	N/A
Indigo bunting	<i>Passerina cyanea</i>	S4B	N/A	N/A
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N	N/A	N/A
Mourning dove	<i>Zenaida macroura</i>	S5	N/A	N/A
Northern cardinal	<i>Cardinalis cardinalis</i>	S5	N/A	N/A
Red-winged blackbird	<i>Agelaius phoeniceus</i>	S4	N/A	N/A
Song sparrow	<i>Melospiza melodia</i>	S5B	N/A	N/A
Swamp sparrow	<i>Melospiza georgiana</i>	S5B	N/A	N/A
Turkey vulture	<i>Cathartes aura</i>	S5B	N/A	N/A
Wild turkey	<i>Meleagris gallopavo</i>	S5	N/A	N/A
Yellow warbler	<i>Setophaga petechia</i>	S5B	N/A	N/A
Unidentified duck	N/A	N/A	N/A	N/A
Unidentified gull	Laridae spp.	N/A	N/A	N/A
Crustaceans				
Unidentified terrestrial crayfish	N/A	N/A	N/A	N/A
Insects				
Monarch	<i>Danaus plexippus</i>	S2N, S4B	Special Concern	Special Concern

Species Observed		S-Rank	Conservation Status	
Common Name	Scientific Name		SARO	SARA
Mammals				
Big brown bat	<i>Eptesicus fuscus</i>	S5	N/A	N/A
Eastern cottontail	<i>Sylvilagus floridanus</i>	S5	N/A	N/A
Northern raccoon	<i>Procyon lotor</i>	S5	N/A	N/A
Red fox	<i>Vulpes vulpes</i>	S5	N/A	N/A
Striped skunk	<i>Mephitis mephitis</i>	S5	N/A	N/A
White-tailed deer	<i>Odocoileus virginianus</i>	S5	N/A	N/A
Unidentified bat	N/A	N/A	N/A	N/A
Reptiles				
Eastern gartersnake	<i>Thamnophis sirtalis sirtalis</i>	S5	N/A	N/A
Eastern milksnake	<i>Lampropeltis triangulum</i>	S4	N/A	N/A
Northern watersnake	<i>Nerodia sipedon sipedon</i>	S5	N/A	N/A
Red-bellied snake	<i>Storeria occipitomaculata</i>	S5	N/A	N/A
Notes				
S-Rank: Sub-national Rank S2: Very rare in Ontario; usually between 5-20 occurrences S4: Common in Ontario: apparently secure, usually more than 100 occurrences S5: Very common in Ontario, demonstrably secure B: Breeding species N: Non-breeding species SARO: Species at Risk in Ontario (provincial) SARA: Species at Risk Act (federal)				

3.6.3.8 Species at Risk

Numerous SAR have been observed within the Study Areas or have been flagged through agency correspondence or background review as having the potential occur within the Study Areas (**Table 3.9**). Incidental observations of all species, including any SAR encountered, were collected during field investigations and were detailed previously in **Table 3.8**. SAR species-specific surveys were not completed for a number of reasons including:

- Natural areas within the SSA are very small and limited to a small section of the southern boundary of the SSA. This area provides little available habitat for any of the listed SAR based on its proximity to the Site operations, small size, and presence of a chain link fence at the SSA boundary.
- Mitigation measures currently in place to dissuade wildlife access/use of the landfill property include:
 - Chain link fence is present around the perimeter of the property which dissuades larger reptile and mammal access to the SSA
 - Silt fence along the perimeter of the property is an effective deterrent for small reptiles, mammals, and amphibian access to the SSA
 - Daily landfilling activities (e.g., noise, human presence, heavy machinery) also provide deterrents for use of the SSA by wildlife

Operational practices (i.e., daily cover) further act to deter wildlife use of the SSA.

Table 3.9 Species at Risk Summary

Species		Observed within the Local Study Area	Conservation Status	
Common Name	Scientific Name		SARO	SARA
Birds				
Bank swallow	<i>Riparia riparia</i>	No	Threatened	Threatened
Barn swallow	<i>Hirundo rustica</i>	Yes*	Threatened	Threatened
Bobolink	<i>Dolichonyx oryzivorus</i>	No	Threatened	Threatened
Canada warbler	<i>Cardellina canadensis</i>	Yes	Special Concern	Threatened
Cerulean warbler	<i>Setophaga cerulea</i>	No	Threatened	Endangered
Chimney swift	<i>Chaetura pelagica</i>	No	Threatened	Threatened
Eastern meadowlark	<i>Sturnella magna</i>	No	Threatened	Threatened
Eastern wood-pewee	<i>Contopus virens</i>	Yes	Special Concern	Special Concern
Golden-winged warbler	<i>Vermivora chrysoptera</i>	No	Special Concern	Threatened
Grasshopper sparrow <i>pratensis</i> subspecies	<i>Ammodramus savannarum pratensis</i>	No	Special Concern	Special Concern
Least bittern	<i>Ixobrychus exilis</i>	Yes^	Threatened	Threatened
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	No	Endangered	Endangered
Wood thrush	<i>Hylocichla mustelina</i>	Yes	Special Concern	Threatened
Yellow-breasted chat	<i>Icteria virens</i>	No	Endangered	Endangered
Insects				
Monarch	<i>Danaus plexippus</i>	Yes	Special Concern	Special Concern
Mammals				
Eastern small-footed myotis	<i>Myotis leibii</i>	No	Endangered	N/A
Little brown myotis	<i>Myotis lucifugus</i>	No	Endangered	Endangered
Northern myotis	<i>Myotis septentrionalis</i>	No	Endangered	Endangered
Tri-coloured bat	<i>Perimyotis subflavus</i>	No	Endangered	Endangered
Reptiles				
Blanding's turtle – Great Lakes/St. Lawrence population	<i>Emydoidea blandingii</i>	Yes^	Threatened	Threatened
Eastern ribbonsnake	<i>Thamnophis sauritus</i>	No	Special Concern	Special Concern
Midland painted turtle	<i>Chrysemys picta marginata</i>	No	Under consideration	Special Concern
Eastern milksnake	<i>Lampropeltis triangulum</i>	Yes*	Not at risk	Special Concern
Northern map turtle	<i>Graptemys geographica</i>	No	Special Concern	Special Concern
Snapping turtle	<i>Chelydra serpentina</i>	Yes^	Special Concern	Special Concern

Species		Observed within the Local Study Area	Conservation Status	
Common Name	Scientific Name		SARO	SARA
Vascular Plants				
American chestnut	<i>Castanea dentata</i>	No	Endangered	Endangered
Black ash	<i>Fraxinus nigra</i>	Yes^	Endangered	N/A
Butternut	<i>Juglans cinerea</i>	No	Endangered	Endangered
Eastern flowering dogwood	<i>Cornus florida</i>	No	Endangered	Endangered
Notes				
* Observed within the SSA ^ Observed within the LSA during 2013 – 2015 surveys (GHD 2017) SARO: Species at Risk in Ontario (provincial) SARA: Species at Risk Act (federal)				

Background review found 29 SAR which have historically been recorded in the Study Areas. Twenty-four species with a moderate or high likelihood of occurrence within the LSA are discussed further. The complete list of SAR and their potential to occur is provided in Appendix F of the Natural Environment Assessment Report (see **Appendix F**).

3.6.3.8.1 Endangered Species

Birds

Red-headed woodpecker (*Melanerpes erythrocephalus*) is a provincially and federally designated endangered species with a moderate likelihood of occurrence within the LSA due to suitable habitat being present.

Yellow-breasted chat (*Icteria virens virens*) is a provincially and federally endangered species and has a moderate likelihood of occurrence as suitable habitat is present within the LSA.

Mammals

Little brown myotis (*Myotis lucifugus*), tri-colored bat (*Perimyotis subflavus*), and northern myotis (*Myotis septentrionalis*) are all provincially and federally endangered species with a high likelihood of occurrence within the LSA due to the presence of suitable habitat (i.e., trees for roosting). Eastern small-footed myotis (*Myotis leibii*) is provincially endangered, not listed federally, and has a moderate likelihood of occurrence within the LSA due to suitable habitat (i.e., rocky areas for roosting) potentially being present.

Vascular Plants

American chestnut (*Castanea dentata*) is listed as endangered provincially and federally. This species has a moderate likelihood of occurrence as suitable habitat is present within the LSA; however, was not detected during any of the field investigations.

Black ash (*Fraxinus nigra*) is listed as endangered provincially and not listed federally. Protection under the ESA has been suspended until January 26, 2024, under O. Reg. 23/22 in order to document a proper approach and consultation with all parties. This species was observed by GHD in 2016 in the LSA and has a moderate likelihood of occurrence as suitable habitat is present; however, was not detected during any of the field investigations within the SSA.

Butternut (*Juglans cinerea*) is a provincially and federally endangered species. Butternut has a moderate likelihood of occurrence as suitable habitat is present within the LSA; however, was not detected during any of the field investigations.

Eastern flowering dogwood (*Cornus florida*) is a provincially and federally endangered species. Eastern flowering dogwood has a moderate likelihood of occurrence as suitable habitat is present within the LSA; however, was not detected during any of the field investigations.

3.6.3.8.2 Threatened Species

Birds

Bank swallow (*Riparia riparia*) is a provincially and federally threatened species. They have a moderate likelihood of occurrence as potentially suitable habitat is present within the LSA.

Barn swallow (*Hirundo rustica*) is a provincially and federally threatened species. Barn swallows were observed throughout the Study Areas on multiple occasions and have a high likelihood of occurrence within the Study Areas due to suitable foraging habitat.

Cerulean warbler (*Setophaga cerulea*) is a provincially threatened and federally endangered species with a moderate likelihood of occurrence within the LSA due to the presence of potentially suitable habitat.

Least bittern (*Ixobrychus exilis*) is a provincially and federally threatened species with a high likelihood of occurrence within the LSA due to the presence of suitable habitat. Least bittern was observed vocalising in the East Lands during 2014 surveys (GHD 2017).

Reptiles

Blanding's turtle (*Emydoidea blandingii*) is a provincially and federally threatened species. A Blanding's turtle was observed on Brooks Road in the vicinity of the entrance of the landfill, on June 12, 2014, during wetland delineation with GRCA (GHD 2017). This species has a high likelihood of occurrence within the LSA due to suitable habitat being present.

3.6.3.8.3 Special Concern Species

These species do not receive protection under the ESA or SARA; however, populations and habitats of ESA-listed special concern species may be considered Significant Wildlife Habitat. Impacts to these species should be avoided where possible by avoiding natural habitat features beyond the SSA.

Birds

Canada warbler (*Cardellina canadensis*) is a provincially designated special concern species, and a federally designated threatened species. Canada warbler was detected in the North Lands via the SM1 and has a high likelihood of occurrence within the LSA.

Eastern wood-pewee (*Contopus virens*) is a provincially and federally designated special concern species. Eastern wood-pewee was detected on multiple occurrences during the breeding bird surveys. This species has a high likelihood of occurrence due to suitable habitat being present within the LSA.

Wood thrush (*Hylocichla mustelina*) is a provincially designated special concern species, and a federally designated threatened species. Wood thrushes were detected on during the breeding bird surveys and SM1 audio recordings. They have a high likelihood of occurrence within the LSA due to suitable habitat being present.

Insects

Monarch (*Danaus plexippus*) is listed as special concern provincially and federally and was observed within the LSA. This species is considered to have a high likelihood of occurring as their larval foodplant, common milkweed, is present within the Study Areas.

Reptiles

Eastern ribbonsnake (*Thamnophis sauritus*) are a provincially and federally designated special concern species. They have a high likelihood of occurrence as suitable habitat is present within the LSA.

Midland painted turtle (*Chrysemys picta marginata*) is a federally designated special concern species and is currently under consideration for provincial designation. Midland painted turtles have a high likelihood of occurrence within the LSA as suitable habitat is present.

Eastern milksnake (*Lampropeltis triangulum*) is listed as not at risk provincially but is listed as special concern federally. Eastern milksnake was observed within the SSA and have a high likelihood of occurring within the LSA due to suitable habitat being present. Wildlife exclusion fencing has since been installed to limit the presence of wildlife within the SSA and is maintained as part of mitigation measures associated with the 2019 facility expansion (Notice of Approval EA File number 03-08-02 (Approval), issued in 2019 under the *Environmental Assessment Act*).

Northern map turtle (*Graptemys geographica*) is listed as special concern provincially and federally. This species has a high likelihood of occurring within the LSA due to suitable habitat being present.

Snapping turtle (*Chelydra serpentina*) is listed as special concern provincially and federally. A snapping turtle was observed within the LSA during 2013 field investigations (GHD 2017) and has a high likelihood of occurring within the LSA due to suitable habitat being present.

3.7 Cultural Heritage Environment

Cultural Heritage resources include archeological resources, built heritage resources, and cultural heritage landscapes.

3.7.1 Study Area

The Cultural Heritage Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **SSA:** Including all lands (i.e., 14.3 ha) within the existing, approved boundaries of the Site
- **LSA:** Including all lands and waters within a 1 km radius of the SSA boundaries including agricultural, residential, and municipal properties

3.7.2 Methodology

Available secondary sources of information were collected and reviewed to determine Heritage and Culture existing conditions within the LSA. The following sources of secondary information were collected and reviewed:

- Heritage Haldimand Designated Properties Inventory

3.7.3 Existing Conditions

3.7.3.1 Archaeological Resources

The screening checklist, Criteria for Evaluating Archeological Potential, developed by the Ministry of Citizenship and Multiculturalism, was completed as part of the Environmental Screening Report (see **Appendix G1**) determining that archeological potential within the study area is low and therefore archeological assessment was not undertaken.

3.7.3.2 Built Heritage Resources and Cultural Heritage Landscapes

Following a review of the Heritage Haldimand Designated Properties Inventory²⁴ it was concluded that there are no heritage properties located within the LSA. The “Criteria for Evaluating Potential for Built Heritage Resources and

²⁴ Heritage Haldimand, 2015. Heritage Haldimand Designated Properties. Available at: <http://www.haldimandcounty.on.ca/residents.aspx?id=68>

Cultural Heritage Landscapes: A Checklist for the Non-Specialist” (see **Appendix G2**) was completed and identifies the Site is within the Grand River watershed, which is a designated Canadian Heritage River watershed. There are no known heritage attributes located within the LSA. The Site has been subjected to extensive and intensive disturbance and is therefore considered to not have any potential for cultural heritage resources.

3.8 Transportation Existing Conditions

3.8.1 Study Area

The Transportation Study Areas to be discussed in relation to the preparation of this ESR are as follows:

- **SSA** – the 14.3 ha area within the existing, approved boundaries of the Site, as defined by ECA No. A110302, as amended
- **LSA** – the area within the vicinity of the Site extending approximately 1 km in all directions from the SSA boundaries



Legend

Site Study Area

Local Study Area (1km Radius)

075150225300

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 17N

N

GHD

BROOKS ROAD LANDFILL
160 BROOKS ROAD, CAYUGA, ONTARIO
Transportation

STUDY AREAS

Project No. 12561524
Revision No. -
Date Oct 21, 2022

FIGURE 3.24

Q:\GIS\PROJECTS\12561000s\12561524\Layouts\202210_Geo\12561524_202210_Geo_GIS001.mxd
Print date: 21 Oct 2022 - 13:33

Data source: Google Earth Imagery, Date: 07/08/2018

3.8.2 Methodology

3.8.2.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Transportation Study Team to determine existing Transportation conditions within the Study Areas. The following sources of secondary information were collected and reviewed in completing the 2018 Individual Environmental Assessment:

- Haldimand County Annual Average Daily Traffic (AADT) data, 2005
- Haldimand County Annual AADT data, 2011

3.8.2.2 Process Undertaken

Information on the Transportation Existing Conditions within the Study Areas was gathered from a combination of secondary source research, field investigations and discussions with Haldimand County staff.

3.8.2.3 Field Investigations

As part of the 2018 Individual Environmental Assessment, turning movement counts were conducted at the intersection of Highway 3 and Brooks Road and at the existing Brooks Road Landfill Site driveway during the weekday a.m., mid-day and p.m. peak periods and Saturday mid-day peak periods. These counts were completed on Saturday, December 5, 2015 and on Monday, December 7, 2015.

3.8.2.4 Agency Consultation

Also, as part of the 2018 Individual Environmental Assessment, discussions with Haldimand County staff took place in December 2015 to confirm AADT data.

3.8.3 Description of Traffic Existing Conditions

3.8.3.1 Road Network

The following two major roads provide access to the existing Brooks Landfill:

Highway 3 (Talbot Road) – within the vicinity of Brooks Road, Highway 3 (Talbot Road) is a two-lane road with a posted speed limit of 80 km/hour (kph). The intersection of Highway 3 and Brooks Road is stop controlled on Brooks Road with both eastbound and westbound right turn taper on Highway 3.

Brooks Road – Brooks Road is a two-lane road that extends from Highway 3 (Talbot Road) in the south and terminates at Indiana Road to the north. The speed limit on this road is 50 kph. Brooks Road is paved from Highway 3 to just north of the Brooks landfill driveway access where it changes to a gravel road for the remaining length to Indiana Road.

3.8.3.2 Traffic Data

Historical AADT data was obtained from Haldimand County. The 2005 AADT on Brooks Road approximately 500 m north of Highway 3 was 144 two-way trips. In 2011 the AADT was slightly lower at 114 two-way trips. Discussions with staff confirmed that the split is approximately 50/50 between north and south volumes.

Turning movement counts were also conducted on Saturday, December 5, 2015 and on Monday, December 7, 2015 at both the intersection of Highway 3 and Brooks Road and at the existing Brooks Road Landfill Site driveway during the weekday a.m., mid-day and p.m. peak periods and Saturday mid-day peak periods. Detailed turning movement data sheets are found in Appendix A for the Transportation Assessment Report (see **Appendix H**).

3.8.3.3 2022 Base Traffic Conditions

To establish the base 2022 traffic conditions and capture any expected background growth in traffic volumes at the study area intersections, a conservative compound annual growth rate of 2.0% was adopted and utilized to forecast grow the 2015 turning movement counts to 2022. The base 2022 traffic volumes also includes the estimated 16 Site trucks per day as a result of the proposed vertical expansion approved in 2018. To provide a conservative and worst-case scenario analysis, all 16 of the daily truck trips associated with the vertical expansion were applied to each peak hour (i.e., all 16 will enter/exit the Site within each of the peak hours which results in a large over estimation of the daily traffic volumes to the Site).

The resulting 2022 weekday a.m., mid-day and p.m. peak hour as well as the Saturday peak hour volumes are summarized in **Figure 3.25**.

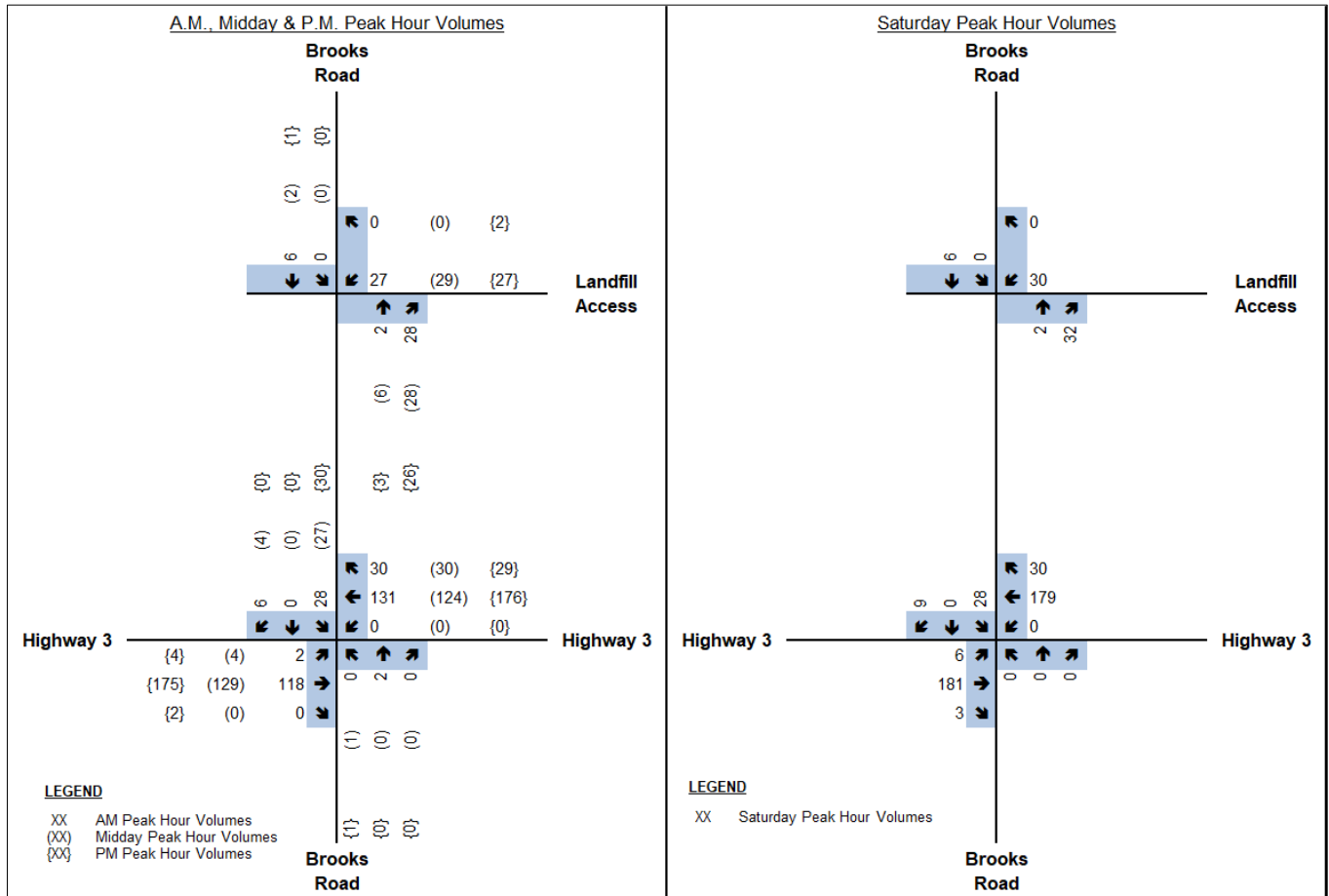


Figure 3.25 2022 Existing Peak Hour Volumes

Traffic on Brooks Road is predominately truck traffic specific to the landfill operation, traffic on Highway 3 is a mix of both commuter and truck traffic.

3.8.3.4 Landfill Operations

The Brooks Road Landfill Site is currently open and accepting waste during the week and on Saturdays. The Site currently handles 1,000 tonnes of material per day based on the following five different truck configurations:

- Walking floor – can handle 25 to 40 metric tonnes per load
- Roll-off – can handle 0.5 to 10 metric tonnes per load
- Front End – can handle 3 to 12 metric tonnes per load

- Tri-axle – can handle 14 to 22 metric tonnes per load
- Dump trailer – can handle 34 to 42 metric tonnes per load

The current maximum daily truck traffic at the landfill assuming delivery of 1,000 tonnes of material per day is 16 to 24 walking floor trucks, 2 to 4 front end trucks and 2 to 6 roll-offs for a total of 34 inbound and 34 outbound trucks plus another one or two trips for staff over the period of a day. This number can increase slightly if there are certain soil jobs on the Site as the walking floor trucks are replaced with Dump trailers and Tri-axle trucks.

The turning movement counts conducted at the Site driveway on Saturday December 5, 2015 and Monday December 7, 2015, show the following total volume of trucks entering and exiting the landfill during the peak hours:

- Weekday am peak hour – 12 inbound and 11 outbound
- Weekday mid-day peak hour – 12 inbound and 13 outbound
- Weekday pm peak hour – 10 inbound and 13 outbound
- Saturday mid-day peak hour – 16 inbound and 14 outbound

The traffic volumes confirm that the peak operating times for the landfill occur during both the weekday and Saturday mid-day peak hours when the maximum volumes of inbound and outbound traffic were observed.

Coincidentally, a review of the 2015 traffic counts confirms that the volume of inbound and outbound traffic from the landfill during the two survey dates was considerably higher than the typically expected volumes provided by the operator assuming delivery of 1,000 tonnes of material per day. It was confirmed that during the two survey dates, there was a transfer of clean clay to another property that resulted in approximately 75 additional loads throughout both days.

As a result, the analysis of the existing 2022 conditions not only includes the approved vertical expansion but also includes additional traffic that is not typical for existing operations and results in slightly reduced capacity at both the Site driveway on Brooks Road and at the intersection of Brooks Road and Highway 3.

3.8.3.5 Capacity Analysis

As a measure of the existing capacity on the adjacent road network surrounding the Brooks Landfill, both the Site access on Brooks Road and the stop-controlled intersection of Brooks Road and Highway 3 were analyzed using the projected 2022 turning movement volumes for the weekday am, mid-day, pm and Saturday peak hours (see **Table 3.10**). A summary of the capacity analysis using Synchro version 10 is summarized in the following table with detailed reports provided in Appendix A of the Transportation Assessment Report (**Appendix H**).

Table 3.10 Existing Capacity Analysis

Intersection	Movement v/c ratio (LOS) delay			
	A.M. Peak	Mid-Day Peak	P.M. Peak	Sat Peak
Brooks Road and Landfill access	WBLR = 0.03 LOS A 9 Sec NBTR = 0.02 LOS A 0 Sec SBTL = 0 LOS A 0 Sec	WBLR = 0.03 LOS A 9 Sec NBTR = 0.02 LOS A 0 Sec SBTL = 0 LOS A 0 Sec	WBLR = 0.03 LOS A 9 Sec NBTR = 0.02 LOS A 0 Sec SBTL = 0 LOS A 0 Sec	WBLR = 0.03 LOS A 9 Sec NBTR = 0.02 LOS A 0 Sec SBTL = 0 LOS A 0 Sec
Brooks Road and Highway 3	EBTLR = 0 LOS A 0 Sec WBTLR = 0 LOS A 0 Sec NBTLR = 0 LOS B 11 Sec SBTLR = 0.05 LOS B 10 Sec	EBTLR = 0 LOS A 0 Sec WBTLR = 0 LOS A 0 Sec NBTLR = 0 LOS B 11 Sec SBTLR = 0.05 LOS B 11 Sec	EBTLR = 0 LOS A 0 Sec WBTLR = 0 LOS A 0 Sec NBTLR = 0 LOS B 12 Sec SBTLR = 0.06 LOS B 12 Sec	EBTLR = 0.01 LOS A 0 Sec WBTLR = 0 LOS A 0 Sec NBTLR = 0 LOS A 0 Sec SBTLR = 0.07 LOS B 12 Sec

The turning movements at both study intersections currently operate with levels of service 'B' or better during the weekday am, mid-day, pm and Saturday mid-day peak hours.

The analysis of existing conditions confirms no current capacity constraints at either study intersection despite the higher than normal traffic volumes captured during the survey of existing traffic volumes as a result of the movement of clean clay off-Site.

3.8.3.6 Safety Analysis

Collision Analysis

A review of available data shows that there is no indication that either Highway 3 in the vicinity of Brooks Road, or Brooks Road north to the Site has experienced significantly higher collision frequency than the historical average accident rate along Highway 3 in Haldimand County.

Sight Line Analysis

The Site entrance in its current location satisfies the sight distance requirements for trucks approaching and departing from the Site. Brooks Road is fairly straight with little deviation in the horizontal or vertical alignment. Existing sight distances are in excess of 350 metres both to the north and south of the driveway access which exceeds the required sight distance based on TACC standard of 85 m for stopping sight distance which for a posted speed limit of 50 kph (60 kph design speed).

4. Potential Environmental Effects, Mitigation Measures, and Net Environmental Effects

This section documents the potential effects on the environment, mitigation measures and net environmental effects for each technical disciplines resulting from the proposed landfill expansion. In addition, any future monitoring requirements to be implemented for each discipline are also described.

4.1 Methodology

A project description, based on the Design and Operation Report, was prepared so that potential environmental effects and mitigation measures could be identified. The Site Layout Plan is provided in **Figure 1.2** and the following is a general summary of the proposed undertaking.

The project for which the Environmental Screening Process is being undertaken is a proposed capacity expansion of 219,400 m³ and involves a change to the final Site capacity, contours, and footprint. Some level of construction is required to implement the proposal. This will be a combination of re-engineering the Site's final contours to expand the Site vertically in the expansion area (not to exceed current approved peak contours), as well as increasing the existing landfill footprint to expand the Site horizontally. Modification to the northern perimeter access road and stormwater drainage ditch will be required to accommodate the proposed changes to the final Site contours. The former railway property will continue to provide buffer land for the Site. The Brooks Road Landfill will continue to operate within currently approved operating hours and current construction activities and daily operations will continue as usual. There are no changes to the annual fill rate limits (maximum 1,000 tonnes per day and 250,000 tonnes per year) proposed as part of this project.

A summary of the key elements of the proposed capacity expansion compared to the existing approved Site is provided in **Table 4.1**.

Table 4.1 *Summary of Proposed Brooks Road Landfill Capacity Expansion Design vs Existing Landfill*

Design Component	Existing Landfill	Proposed Capacity Expansion
Volume (m ³)	1,045,065	1,264,4651
Footprint Area (ha)	6.07	7.15
Peak Elevation (mAMSL) (top of final cover)	221.50	225.66
Peak Elevation – top of waste (mAMSL)	220.75	224.91
Crest of Slope Elevation (mAMSL)	221.0	225.30
Slopes (Top/Sides)	Top – 20:1 (5%) Sides – 4:1 (25%)	Top – 20:1 (5%) Sides – 4:1 (25%) New stage is 4:1 (25%) north side slope, extends to a new peak elevation (i.e., elevated 20:1 [5%] plateau), and the south side slope (25%) ties-in to existing approved top of waste plateau. All other sides remain the same.
Stormwater Pond	Permanent pool – 1,266 m ³ Total live storage – >5,502 m ³	Pond capacity is sufficient for the proposed expansion based on existing Stormwater Management Plan.
Stormwater Drainage Ditch		Stormwater drainage ditch shifted north by 30 m. East and west ditches will extend north to maintain full perimeter ditch.
Perimeter Roads		Northern perimeter access road shifted by 29 m. East access road extended as appropriate. Access road will extend west, proposed to connect to Brooks Road as a secondary site access (locked during normal operation). A turnaround area will be provided in the northwest corner.
Maximum Daily Truck Traffic	25 to 50	25 to 50
Post-Closure Leachate Generation Rate	33 m ³ /day	39 m ³ /day
Capacity anticipated to be reached (year)	2024	2026

4.2 Surface Water

The assessment of effects associated with the proposed undertaking was carried out through a series of steps that is based, in part, on the description of existing conditions as well as the Project Description and Site Plan. The assessment of effects was also undertaken within the context of the previously completed Screening Criteria Checklist, as summarized in **Section 2.0** of this report.

The assessment of effects was achieved by conducting a hydrologic modelling of predicted effects of the landfill on surface water based on the proposed expansion scenario. The existing computer model PCSWMM 2012 Version 5.0.022 was updated to complete a hydrologic analysis to estimate changes in peak flows and runoff volumes from the Site under various storm event conditions for the proposed vertical expansion. Distinct design storm hyetographs were created in PCSWMM, based on the Environment Canada's Rainfall Intensity Duration Frequency

(IDF) Values for the Hamilton Airport. The 2, 5, 10, 25, 50, and 100-year 24-hour, SCS Type 2 distribution, storm events were considered in the hydrologic modelling to provide a design basis for on Site SWM features (quantity control).

The stormwater management system for the Site was designed to provide water quality and water quantity control of surface water runoff. Water quality treatment is provided through extended detention of the 4-hour duration 25 mm storm event. The SWM pond is designed to provide water quantity control for all storm events up to the 100-year storm, via attenuation of peak flows to below the Pre-Development Condition. Estimated runoff from the Regional Storm (Hurricane Hazel) has been assessed to demonstrate an ability to safely convey flow to downstream receivers.

At minimum, internal drainage ditches were sized to accommodate the peak flow generated from the 3-hour duration 25-year storm, as required by the MECP Guidelines.

The effects of the proposed landfill expansion on surface water is forecasted to be minimal based on the minor changes in contributing drainage areas in SSA.

This Section provides an assessment of the potential negative environmental effects (i.e., those for which a “Yes” answer was given in the Screening Criteria Checklist) for those Surface Water criteria which might be affected by the project as identified in **Section 2.0**. The effects assessment describes how existing environmental conditions in the Study Area(s) will change as a result of the construction and operation of the proposed undertaking.

As described in **Section 2.0**, a “Yes” was applied to the following Surface Water criteria:

Might the Project:

- *Cause negative effects on surface water quality, quantities, or flow?*
- *Cause negative effects on surface or groundwater from accidental spills or releases (e.g., leachate) to the environment?*

With respect to the above criteria/criterion, a description of the potential negative environmental effects, necessary mitigation measures and the resultant net effects on the environment are discussed. Studies conducted during the Environmental Screening Process showed that the anticipated effects will be much less than expected or will not occur at all. In all cases, impact management (mitigation) measures have been identified that, when applied, will eliminate the potential environmental effects, or reduce them to acceptable levels.

4.2.1 Surface Water Potential Effects

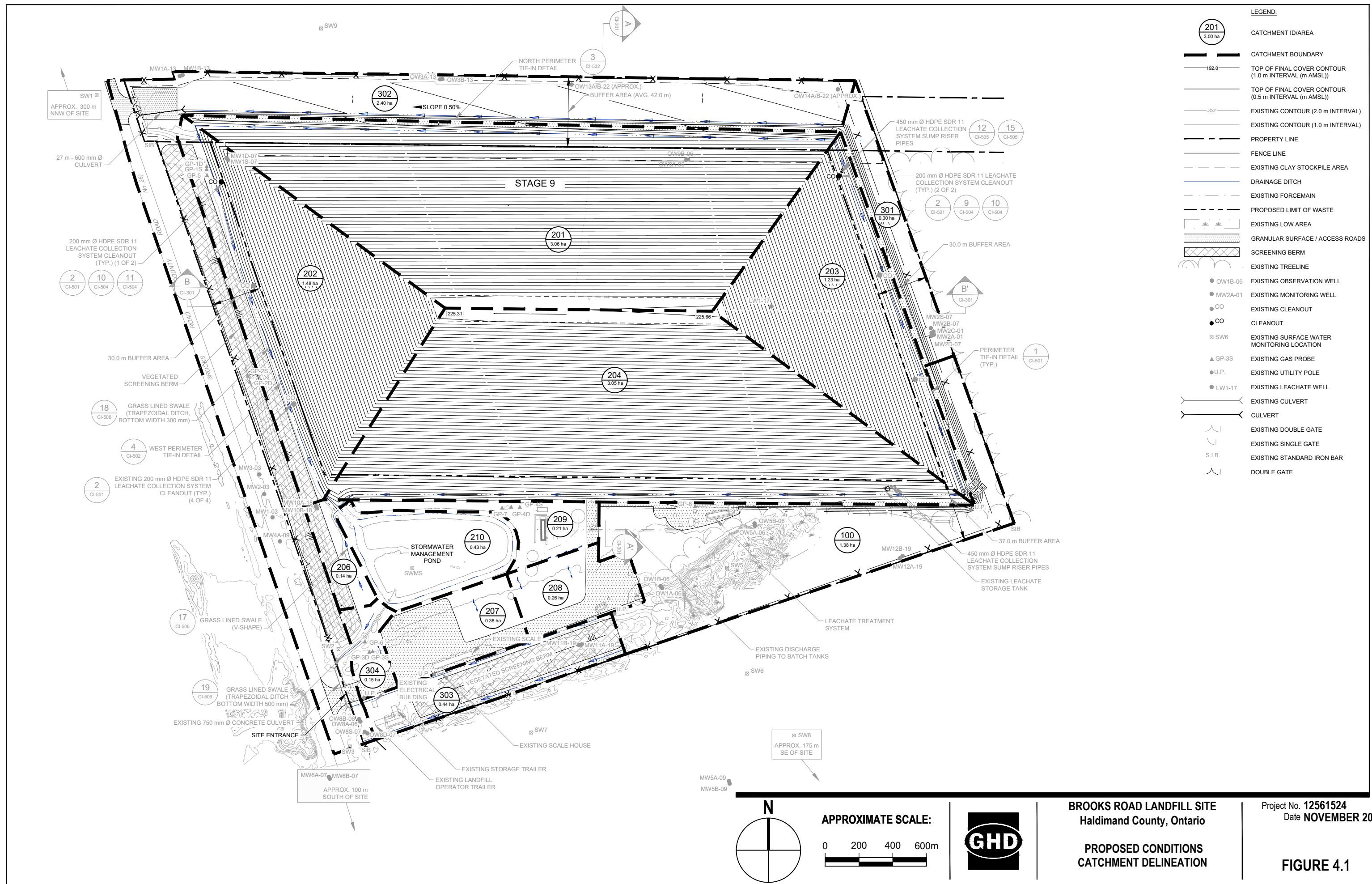
The proposed landfill expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations especially towards the northern side of the Site. These changes may cause negative effects on the following with respect to surface water:

- Surface water quality: minor erosion/soil loss due to slope transition from the proposed milder slope to the existing approved steep landfill slopes. Based on the Universal Soil Loss Equation (USLE), an increased slope will lead to increased soil loss due to erosion. The increase in soil loss will be minor as slope is only one of numerous factors that affect soil loss. The erosion will show up in stormwater runoff as slightly increased concentrations of Total Suspended Solids (TSS) and TSS related pollutants (e.g., metals entrained in the soil).
- Surface water quantity: similar runoff peak flows and volumes to existing landfill are expected. Based on hydrologic modelling completed in the SWM Plan report, there is no significant increase in runoff peak flow rates or volumes for the existing landfill slopes compared to the approved final closure conditions. Although the modelling was performed on the design for the existing condition, it is expected that the results for the proposed expansion will be similar.

The revised drainage areas are presented on **Figure 4.1** and a summary of the subcatchment parameters for contributing drainage areas to the SWM pond is presented in **Table 4.2** below:

Table 4.2 *Proposed Subcatchment Parameters for Contributing Drainage Areas to SWM Pond*

Catchment ID	Area (ha)	Slope (%)	Imperviousness Area (%)	Imperviousness Area (ha)	SCS Curve Number
201	3.06	25	5	0.15	73
202	1.48	25	7	0.10	74
203	1.23	25	5	0.06	72
204	3.05	25	8	0.24	73
206	0.14	2	5	0.01	72
207	0.38	2	95	0.36	98
208	0.26	2	95	0.25	98
209	0.21	2	5	0.01	72
210	0.43	10	100	0.43	98
Total	10.24				



4.2.2 Surface Water Mitigation Measures

Mitigation measures such as SWM controls are provided within the Site to convey surface runoff and provide sufficient water quality storage prior to discharge off-Site. These control measures will help to attenuate peak discharge for water quantity and meet the water quality requirement in accordance with the MECP Planning and Design Manual 2003 (SWMP Manual). Also, best management practices such as good vegetative coverage will be established on the final cover of the landfill to reduce erosion and maintain existing hydrologic conditions.

The existing stormwater controls within SSA include drainage ditches and the SWM pond which are summarized in subsequent sections.

4.2.2.1 Drainage Ditch

The existing drainage ditches on Site have a maximum depth of 1 m with side slopes of 4H:1V on landfill side and 3H:1V on the perimeter access roadside of the ditches. Surface runoff is conveyed from the final cover and access road to the SWM pond. The ditches were designed with sufficient capacity to convey flow in excess of that generated by the 100-year or Regional storm.

4.2.2.2 SWM Pond

The existing SWM pond has a maximum permanent pool depth of 0.6 m, 4H:1V side slopes, and a berm in the midsection of the pond that will create an extended flow path, which will allow for additional settling of suspended solids. Surface water runoff volumes up to the 5-year storm event will be discharged via the riser pipe outlet. The outlet structure provides 24 hours of extended detention for the 25 millimetre (mm) storm event runoff volume.

In the case of water quality concern (i.e., spill) within the Site, the riser pipe outlet is equipped with a sluice gate which can be closed to contain the impacted water and temporarily prevent discharge from the pond up to a 5-year storm event. The waters will be tested and disposed in accordance with the applicable guidelines and via appropriate means and methods.

The SWM pond with a permanent pool volume of 1,266 m³ and a total live storage volume in excess of 5,502 m³ has sufficient capacity to detain the runoff from all storm events up to and including the Regional storm event.

4.2.3 Surface Water Net Environmental Effects

This section documents the net effects assessment for the Brooks Road Landfill Site Expansion Screening from a Surface Water Resources perspective. The net effect analysis is based on the following assumptions:

- The final cover will be vegetated and no pollutants of any kind (i.e., pesticides, herbicides, fertilizers) will be applied to the final cover once it has been fully vegetated.
- Only areas on the final cover and access roads to the north are changing, no other area of the landfill will change slopes or have its drainage significantly re-configured in any way.
- No surface water will ever come in contact with waste. Any surface water that infiltrates through the final cover will be captured by the leachate collection system and treated.
- There will be no leachate seeps or exchange of surface water and leachate.

The proposed expansion of the landfill will increase the imperviousness percent of the contributing drainage areas to the SWM pond by less than 2 percent, and expanded areas will maintain equal percent impervious area as the existing condition with a good vegetative coverage. The design capacity and storage volume for the existing drainage ditches and SWM pond respectively, exceeds the MECP requirements for Enhanced level protection. Therefore, the SWM pond as designed will mitigate all water quality and quantity effects leading to minimal impact to surface water on Site.

Hydrologic modelling results including comparison tables and output files for the existing approved and vertical expansion proposed condition are provided in the Surface Water Assessment Report (see **Appendix A**).

4.2.4 Surface Water Monitoring Requirements

As specified in the Landfill and Industrial Sewage ECAs, the monitoring requirements for the Site includes the following:

- Quarterly grab samples from the monitoring locations,
- Laboratory analysis of grab samples, and
- Annual monitoring reports.

4.3 Geology & Hydrogeology

The assessment of effects associated with the proposed undertaking was carried out through a series of steps that are based, in part, on the description of existing conditions as well as the Project Description and Site Plan. The assessment of effects was also undertaken within the context of the previously completed Screening Criteria Checklist, as summarized in **Section 2.0** of this report.

The assessment of effects was carried out by modelling the predicted effects of the landfill on the hydrogeologic regime under the scenario of the proposed expansion. The modelling took into consideration the existing conditions at the Site, the known hydrogeologic characteristics, as documented extensively in previous reports (including the most recent annual monitoring reports), and the proposed modifications to the Site design. Modelling was undertaken to estimate the quantitative and qualitative effects on the local hydrogeologic regime resulting from the lateral expansion of the waste footprint and landfilling of additional waste. The modelling takes into consideration the proposed design, including final cover, the liner system and the leachate collection system. The modelling considered scenarios that included worst-case mass loading to the underlying hydrogeologic regime (i.e., used maximum measured concentrations in leachate between 2017-2021 and considers the period when landfilling is near final capacity and maximum leachate generation volumes were reached).

Modelling included two scenarios. The first scenario involved 6 m of leachate mounding over the composite liner for 50 years, followed by complete failure of the HDPE liner. In this scenario, the leachate collection system and the HDPE liner were modelled with a service life of 50 years in order to maintain consistency with the previously modelled failure scenario. Following the 50 year service period, the HDPE liner was removed from the liner system and the leachate head was maintained at 6 m above the base of the collection system. The second scenario modelled the effect of 6 m of head on the liner system with the HDPE liner entirely absent for the duration of the model.

Appendix A of the Geology & Hydrogeology Assessment Report includes a report entitled Hydrogeologic Assessment – Landfill Expansion, Brooks Road Landfill (GHD, 2022) (Hydrogeologic Assessment Report). This report provides a full description of the hydrogeologic assessment of the proposed landfill expansion design, including descriptions of the methodology, existing conditions and predicted results of the expansion modelling. The results of the modelling demonstrate that the Site design features are sufficiently protective of the local hydrogeologic regime. The results of modelling indicate that concentrations of contaminants of concern entering the basal till aquifer will be reduced by an average factor of 4 prior to off-Site migration.

Groundwater quality is forecasted to be acceptable at the downgradient boundary with respect to the Ontario Drinking Water Standards (ODWS) and Site-specific Reasonable Use Concept (RUC) criteria.

This Section provides an assessment of the potential negative environmental effects (i.e., those for which a “Yes” answer was given in the Screening Criteria Checklist) for those geology and hydrogeology criteria which might be affected by the project as identified in **Section 2.0**. The effects assessment describes how existing environmental conditions in the Study Areas will change as a result of the construction and operation of the proposed undertaking.

As described in **Section 2.0**, a “Yes” was applied to the following geology and hydrogeology criteria:

Might the Project:

- *Cause negative effects on groundwater quality, quantity, or movement?*

- *Cause negative effects on surface or groundwater from accidental spills or releases (e.g., leachate) to the environment?*

With respect to the above criteria/criterion, a description of the potential negative environmental effects, necessary mitigation measures and the resultant net effects on the environment are discussed. Studies conducted during the Environmental Screening Process showed that the anticipated effects will be much less than expected or will not occur at all. In all cases, impact management (mitigation) measures have been identified that, when applied, will eliminate the potential environmental effects, or reduce them to acceptable levels.

4.3.1 Geology & Hydrogeology Potential Effects

The potential effects on the geology and hydrogeology environment are related primarily to the release of waste-related contaminants into the subsurface hydrogeologic regime. This release will occur as a result of leachate generated within the waste mound exiting the landfilled waste mass through the bottom or sides of the landfill and migrating into the shallow water table aquifer or the basal till/bedrock aquifer. Leachate-related impacts could travel downward from within the waste mass until reaching the basal till/bedrock aquifer. Once entering this aquifer, the impacts will travel laterally as advective flow in the direction of the natural horizontal hydraulic gradient (to the south).

4.3.2 Geology & Hydrogeology Mitigation Measures

The mitigation measures implemented into the design to reduce or eliminate the potential effects on the geology and hydrogeology environment include:

1. The final cover
2. The leachate collection system
3. The liner system

In addition to these engineered controls, the Site is also situated within a fine-grained (clay-rich) stratigraphic sequence with significant vertical thickness. This natural feature provides additional protection of the underlying aquifer as well as some beneficial attenuation capacity.

Section 6 of the Hydrogeologic Assessment Report provides a fulsome description of the modelling inputs, which includes the relevant design elements of engineered controls and the natural geologic setting. These elements in combination represent the measures which mitigate the potential effects of the proposed landfill expansion.

4.3.3 Geology & Hydrogeology Net Effects

The net effects of the proposed landfill expansion on geology and hydrogeology are those anticipated remaining effects after mitigation measures are applied. Accordingly, the results of the predictive modelling undertaken to estimate the magnitude of groundwater alteration resulting from the Project represent the net effects.

Section 6.5.3 of the Hydrogeologic Assessment Report describes the results of the predictive modelling. The primary receptor of concern with respect to the net effects is groundwater quality within the basal till/bedrock aquifer at the downgradient Site boundary. As described in Section 6.5.3 of the Hydrogeologic Assessment Report, water quality at the downgradient Site boundary within the basal till/bedrock aquifer is predicted to meet ODWS and Site-specific RUC criteria even at peak concentrations under the scenario of leachate collection system failure. On the basis of this predictive modelling, the proposed expansion is expected to result in only negligible or insignificant alterations to the geology and hydrogeology environment.

4.3.4 Geology & Hydrogeology Monitoring Requirements

A comprehensive leachate and groundwater monitoring program (water levels and quality) is proposed. This proposed program includes a trigger level and contingency implementation plan in order to supplement the routine program and

ensure appropriate responses are implemented in the event that water quality results indicate that an undesirable effect on groundwater quality is imminent.

The proposed routine monitoring program and trigger level and contingency implementation plan are outlined in detail in Section 7 of the Hydrogeologic Assessment Report.

4.4 Land Use & Socio-Economic

The assessment of effects associated with the proposed undertaking was carried out through a series of steps that is based, in part, on the description of existing conditions as well as the Project Description and Site Plan. The assessment of effects was also undertaken within the context of the previously completed Screening Criteria Checklist, as summarized in **Section 2.0** of this report.

The land use and socio-economic existing conditions characterized for each criterion identified in the Screening Criteria Checklist were assessed taking into consideration the project description and Site Plan in order to identify potential effects that may result from the proposed undertaking. Following the determination of potential effects, measures required to mitigate any potential effects were developed and the resulting net effects (with the application of mitigation measures) were determined.

This Section provides an assessment of the potential negative environmental effects (i.e., those for which a “Yes” answer was given in the Screening Criteria Checklist) for those Land Use criteria which might be affected by the project as identified in **Section 2.0**. The effects assessment describes how existing environmental conditions in the Study Area(s) will change as a result of the construction and operation of the proposed undertaking.

As described in Section 2.0, a “Yes” was applied to the following Land Use & Socio-Economic Criteria:

Might the Project:

- *Use hazard lands or unstable lands subject to erosion?*
- *Result in aesthetics impacts (e.g., visual and litter impacts)?*
- *Cause negative effects related to traffic?*
- *Be located within 8 km of an aerodrome/airport reference point?*

4.4.1 Land Use & Socio-Economic Potential Effects

The proposed undertaking is compatible with planning and by-law documents for the area and will continue to be consistent with the Provincial Policy Statement. Operation of the landfill will not affect land uses within 500 m as all operations will take place within the Site boundaries. BMPs will be implemented by BRE to manage nuisance related effects during construction and operation.

The proposed expansion may require the use of hazard lands or lands subject to erosion such as GRCA-regulated lands. On-site operations may cause potential negative effects on the geology and hydrogeology as well as on the natural habitat and wildlife in this area.

As identified in the Screening Criteria Checklist and Section 3.3.3.5 above, portions of the SSA, Site Vicinity Study Area, and LSA are GRCA regulated areas and zoned as Wetland. The proposed expansion will require GRCA permit to expand within the regulated lands.

As identified in Section 2, there are no potential effects anticipated to neighborhood or community character as the Site of the proposed expansion is located within an area currently zoned as Disposal Industrial. No negative effects on local businesses, institutions, or public facilities are anticipated. There will be no negative impacts on recreation, cottaging, and tourism as there are no recreational lands designated in the SSA and LSA. There will be no increase in the demand for community services and/or infrastructure as a result of the proposed expansion and no change in the economic base of the surrounding community, local employment, or labour supply.

The proposed undertaking is a horizontal and vertical expansion of the existing landfill and will cause an increase in the landfill height and may cause negative visual and aesthetic impact in absence of mitigation measures. However, this will not exceed currently approved peak contours and can be mitigated.

The results of the Transportation Assessment Report (see **Appendix H**) conducted as part of this Environmental Screening Process concluded that the truck traffic associated with the proposed capacity expansion will not contribute any additional traffic within the study area due to maintaining the maximum approved fill rates. With no additional traffic being generated by the Site, minimal impact is expected to traffic safety, and traffic operations. No potential road improvements are required or recommended.

Three local airfields, Cayuga (Bruce Field) Airport, Cayuga East Airport, and Grand River Executive (York) Airport, are located within 8 km of the Site. However, the proposed expansion will not cause negative impacts to the airports and will not interfere with the flight paths as no tall structures, such as stacks, exist or are proposed at the Site.

4.4.2 Land Use & Socio-Economic Mitigation Measures

Potential negative effects on the natural environment and wildlife will be mitigated through BMPs such as the final cover system, leachate collection system, and liner system. In addition to these engineered controls, the Site is also situated within a fine grained (clay rich) stratigraphic sequence with significant vertical thickness. This natural feature provides additional protection of the underlying aquifer as well as some beneficial attenuation capacity. A silt fence is also installed in areas of possible sediment migration.

Detailed mitigation measures are outlined in the Natural Environment Assessment Report (see Appendix B) and Geology and Hydrogeology Assessment Report (see Appendix B)..

With no additional truck traffic generated by the proposed capacity expansion, no mitigation measures are recommended in order to avoid or minimize impacts on transportation.

There is a wire fence around the perimeter of the site. The western part of the existing Site located on Books Road has a visual berm which includes a chain link fence with visual screen as mitigation to visual impact, providing a visual barrier to passersby. The visual screen will be augmented in response to the increased landfill height as a visual and aesthetic mitigation measure.

4.4.3 Land Use & Socio-Economic Net Environmental Effects

Potential negative environmental effects during construction related to dust, odour, noise, and traffic will be mitigated through the use of best management practices.

The results of the Land Use and Socio-Economic Assessment indicate that there will be a change to the current visual scenario as a result of the proposed expansion. However, this can be mitigated by increasing the height of the existing visual screen, vegetating the screening berm and/or introducing additional plantings on the Site. This would minimize views of the Site from surrounding areas.

4.5 Air Quality

The assessment of effects associated with the proposed undertaking was carried out through a series of steps that is based, in part, on the description of existing conditions as well as the Project Description and Site Plan. The assessment of effects was also undertaken within the context of the previously completed Screening Criteria Checklist, as summarized in **Section 2** of this report.

This Section provides an assessment of the potential negative environmental effects (i.e., those for which a “Yes” answer was given in the Screening Criteria Checklist) for those Air Quality criteria which might be affected by the project as identified in **Section 2**. The effects assessment describes how existing environmental conditions in the Study Areas will change as a result of the construction and operation of the proposed undertaking.

As described in **Section 2**, a “Yes” was applied to the following geology and hydrogeology criteria:

Might the Project:

- *Cause negative effects on air quality due to emissions (for parameters such as temperature, thermal treatment exhaust flue gas volume, nitrogen dioxide, sulphur dioxide, residual oxygen, opacity, hydrogen chloride, suspended particulates, or other contaminants)?*
- *Cause negative effects from the emission of greenhouse gases (e.g., carbon dioxide, carbon monoxide, methane)?*
- *Cause negative effects from the emission of dust or odour?*

With respect to the above criteria/criterion, a description of the potential negative environmental effects, necessary mitigation measures and the resultant net effects on the environment are discussed. Studies conducted during the Environmental Screening Process showed that the anticipated effects will be much less than expected or will not occur at all. In all cases, impact management (mitigation) measures have been identified that, when applied, will eliminate the potential environmental effects, or reduce them to acceptable levels.

4.5.1 Air Quality Potential Effects

4.5.1.1 Potential Odour Effects

Ontario does not have an odour standard. However, a value of one odour unit (OU) is sometimes used by the MECP as a limit for odour impacts at sensitive receptors such as residences. Based on the existing conditions odour studies, it has been shown that the frequency of exceedances of the odour levels at the nearest sensitive receptors will not exceed than 0.5% for any modelled year.

As discussed previously, the estimated landfill gas production for the Site is extremely small and is not expected to result in any off-Site odour impacts.

Additionally, GHD conducted numerous odour analyses in 2014, 2016, 2017, 2019 and 2022, and concluded that there were high on-Site odour levels near the leachate tank and the working face in the earlier studies but were lower in the 2019 studies after the installation of the leachate treatment system. Odours at the concentration currently observed at the Site typically do not result in complaints at off-Site sensitive receptor locations. This has been investigated through numerous odour monitoring programs that did not identify any on-Site odours being observed at off-Site locations.

Lastly, the Site currently implements several operational measures in order to reduce and/or mitigate odour impacts from the Site and will continue to implement these operational measures. These include:

- Continuing with the daily odour monitoring program carried out by the Site Operator.
- If odours are evident on the property boundary, increase the amount of daily cover applied on the waste.
- Minimize the active working face. Apply interim cover at a minimum thickness of 300 mm on areas of the landfill where landfilling has ceased for 6 months or more.
- Continue with the use of odour control granules for odour mitigation. Assess areas of placement and their effect on odour mitigation.

4.5.1.2 Potential Air Quality Effects

The air contaminant of concern for this Site is particulate matter. Other air contaminants are expected to be insignificant. As previously discussed, potential tailpipe and brake and tire wear emissions from vehicles operating at the landfill are insignificant. Also, the estimated landfill gas production of only 297 m³/hour (175 cubic feet per minute) confirms that any potential off-Site impacts of compounds in the gas, such as methane, will be insignificant.

Particulate is primarily produced by vehicle traffic on the landfill roads. The particulate matter that is of concern is based on the re-suspension of particulate matter from traffic on the roads. The tailpipe and brake and tire wear has been determined to be insignificant sources of particulate matter. The Ontario ambient air quality criterion for TSP is

120 $\mu\text{g}/\text{m}^3$ on a 24-hour basis. There are other particulate provincial and federal criteria for PM_{10} and $\text{PM}_{2.5}$. These particulate emissions will also occur from vehicle traffic on the landfill roads.

It is GHD's experience that if one can show compliance with the TSP standard, a site with road traffic being the major source, then the PM_{10} and $\text{PM}_{2.5}$ concentrations will also be below criteria.

However, for completeness, GHD has modeled the TSP, PM_{10} and $\text{PM}_{2.5}$ emissions in the assessment of the alternatives.

The TSP, PM_{10} and $\text{PM}_{2.5}$ emissions from the on-Site roads were estimated based on truck traffic and emissions factors from the United States Environmental Protection Agency (USEPA).

Particulate off-Site concentrations were estimated using the AERMOD air dispersion model which is an approved dispersion model under O. Reg. 419/05. The AERMOD model incorporates five years of meteorological data to determine the worst-case air concentration. Therefore, the modeling results can be considered to be conservative.

The on-Site haul roads were previously modelled for 50 trucks per day. This is the same amount of daily trucks proposed in this amendment. The Site has paved the on-Site roadway from the Site entrance to the landfill as was identified in the previous study.

TSP, PM_{10} and $\text{PM}_{2.5}$ from the Site were previously evaluated at the property boundary and all residential dwellings. The predicted worst case particulate impact at the property boundary is as follows:

- TSP – 50 trucks per day – 122.4 $\mu\text{g}/\text{m}^3$
- PM_{10} – 50 trucks per day – 64.18 $\mu\text{g}/\text{m}^3$
- $\text{PM}_{2.5}$ – 50 trucks per day – 8.8 $\mu\text{g}/\text{m}^3$

The predicted maximum worst case particulate impact at the sensitive receptors is as follows:

- TSP – 50 trucks per day – 5.78 $\mu\text{g}/\text{m}^3$
- PM_{10} – 50 trucks per day – 4.56 $\mu\text{g}/\text{m}^3$
- $\text{PM}_{2.5}$ – 50 trucks per day – 0.61 $\mu\text{g}/\text{m}^3$

MECP AAQC for TSP is 120 $\mu\text{g}/\text{m}^3$, 50 $\mu\text{g}/\text{m}^3$ for PM_{10} , and 27 $\mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$. The modelled concentration at the sensitive receptors are well below the MECP AAQC for all particulate matter fractions. The modelled concentration at the property boundary is right at the AAQC for TSP and PM_{10} and the concentration of $\text{PM}_{2.5}$ remains well below the MECP AAQC. There have been no changes to the modelled impacts from the previous application.

4.5.1.3 Climate Change Assessment

The existing landfill operations had an estimated greenhouse gas (GHG) emissions of approximately 15,000 tonnes of CO_2 equivalents (CO_2e) in 2023. With the current landfill approval, the GHG emissions are estimated to reach about 20,000 tonnes CO_2e . With the proposed Stage 9 expansion, the GHG emissions are projected to be approximately 22,600 tonnes CO_2e . This amounts to an increase in GHG emissions of about 2,600 tonnes CO_2e relative to the current landfill's estimated maximum GHG emissions.

Ontario's 2021 GHG emissions were reported to be 150.6 million tonnes CO_2e and Ontario's goal is to reach 144 million tonnes CO_2e by 2030. The projected increase in CO_2e emissions as a result of the Brook Road Landfill expansion (2,600 tonnes) is only 0.002% of Ontario's 2030 GHG emissions target. Therefore, the Brooks Road Landfill GHG emissions can be considered insignificant relative to Ontario's total GHG emissions.

4.5.2 Air Quality Mitigation Measures

The Site has completed numerous mitigation measures since the previous application such as the introduction of SOPs for odour and dust and operation of a leachate treatment system. The Air Quality and Odour were assessed for the proposed conditions in the previous assessment and the identified mitigation measures were implemented. The Site is committed to continuing the mitigation measures.

Construction operations during the expansion may impact TSP emissions from the site. A dust management plan will be developed during the construction period to mitigate these emissions.

4.5.3 Air Quality Net Effects

No change to the net effects from the existing landfill operation are anticipated as a result of the proposed capacity change, based on the continued implementation of the mitigation measures.

4.5.4 Air Quality Monitoring Requirement

There are no additional monitoring requirements at this time.

4.6 Noise

The assessment of effects associated with the proposed undertaking was carried out through a series of steps that is based, in part, on the description of existing conditions as well as the Project Description and Site Plan. The assessment of effects was also undertaken within the context of the previously completed Screening Criteria Checklist, as summarized in **Section 2** of this report.

Steady State Sound Level Impact Assessment

The worst-case assessment of steady-state noise sources at the selected points-of-reception was based on measured sound pressure levels. CADNA A version 2023 was used to model the potential impacts of the significant noise sources. CADNA A calculates sound level emissions based on the ISO 9613-2 standard “Noises – Attenuation of Sound during Propagation Outdoors”.

The worst-case cumulative Facility-wide attenuated sound levels estimated at the receptor(s) included attenuation affects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption and directivity, as applicable for all significant noise sources. Off-Site buildings were input as intervening structures.

Future Landfill Operation Sound Levels

In order to consider future compliance of noise levels from the Site, an evaluation was carried out on the predicted sound levels that will be associated with the proposed capacity increase. The criteria for landfilling-related sound levels are established in the MECP guidelines for Site²⁵, and are as follows:

- 55 dBA for daytime operations (7 am to 7 pm)
- 45 dBA for nighttime operations (7 pm to 7 am)

The assessment considered the potential changes in existing truck traffic routes on-Site and on the haul route to support the proposed capacity increase.

These noise sources are input into an industry standard Noise model that includes all significant on-Site structures (buildings, equipment, storage tanks and silos). CADNA A version 2023 is based on the ISO 9613-2 standard “Noises – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation.” The CADNA A model is the industry standard for environmental noise modeling in Ontario.

The worst-case cumulative Site-wide sound levels estimated at the receptor(s) included attenuation effects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption and directivity, as applicable significant noise sources at off-Site buildings were input into the model as intervening structures.

In order to predict the future worst-case noise impacts from the Project activities, representative octave band noise data was used, measured from construction/processing equipment similar to what is noted to be required for the Project. This data was obtained from the United Kingdom's Department of Environment Food and Rural Affairs

²⁵ MECP's NPC-300 “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning,” October 2013.

(DEFRA) Update of Noise Database for Prediction of Noise on Construction and Open Sites, 2005 and 2006 (common source used globally). The United States Department of Transportation, Federal Highway Administration (FHWA) document FHWA Roadway Construction Noise Model User's Guide, 2006 was used as a supplemental document to obtain sound level data for equipment not listed by DEFRA.

Final (near closure) landfill topography was selected to evaluate the worst-case noise impact exposure for off-Site residences based on the final vertical expansion. The final landfill topography elevates the source height and documents the worst-case position of the noise sources relative to the off-Site receivers based on line-of-sight. Representative noise specifications were used for all mobile equipment such as trucks and bulldozers and applied to the on-Site travel routes based on the cell development design concept.

Landfill activities and supporting equipment are compared directly against a daytime one-hour Leq sound level limit of 55 dBA for landfill operations for all PORs.

This Section provides an assessment of the potential negative environmental effects (i.e., those for which a "Yes" answer was given in the Screening Criteria Checklist) for those Noise criteria which might be affected by the project as identified in **Section 2**. The effects assessment describes how existing environmental conditions in the Study Area(s) will change as a result of the construction and operation of the proposed undertaking.

As described in **Section 2**, a "Yes" was applied to the following Noise criteria:

Might the Project:

- *Cause negative effects from the emission of noise?*

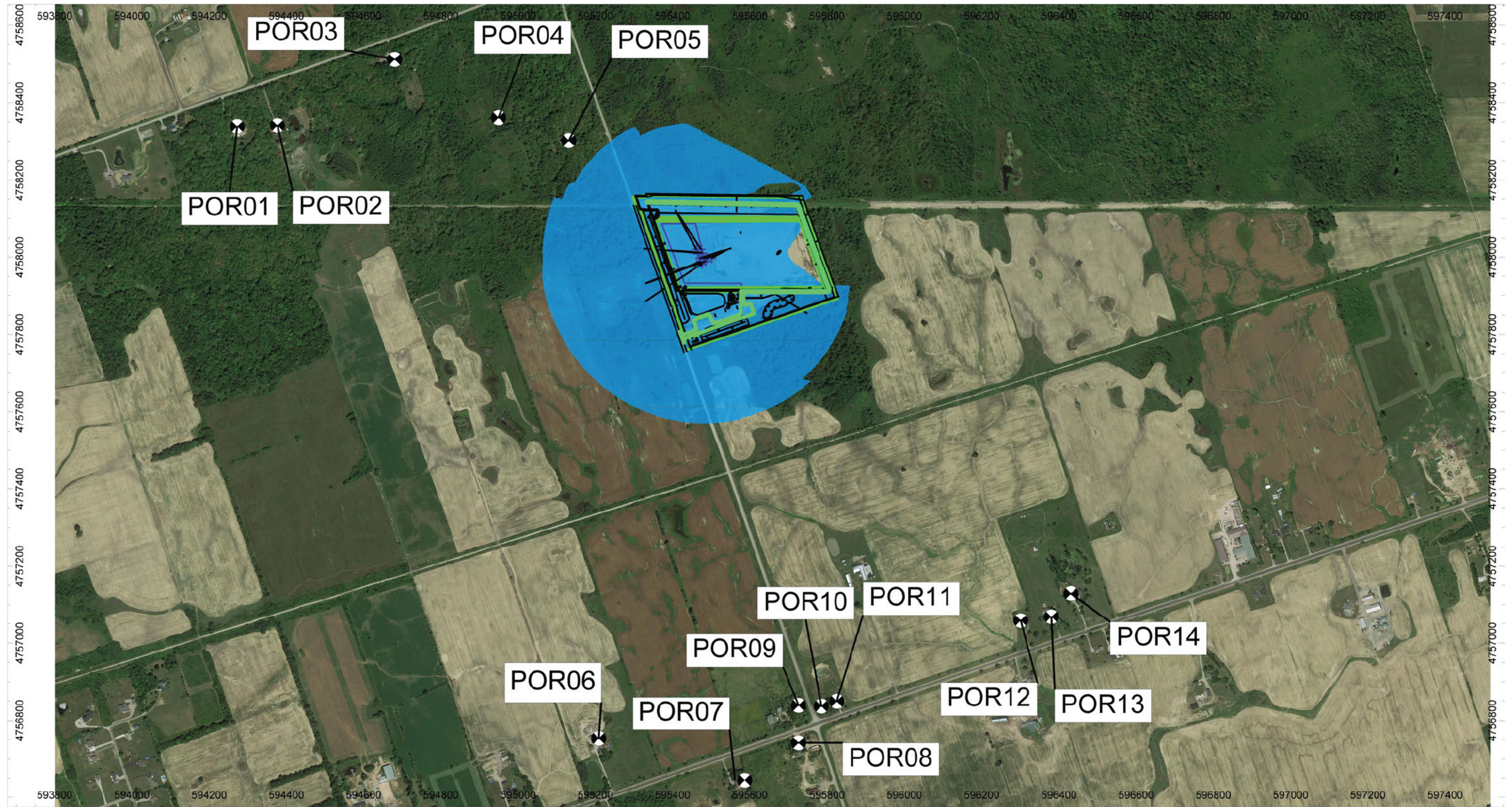
With respect to the above criteria/criterion, a description of the potential negative environmental effects, necessary mitigation measures and the resultant net effects on the environment are discussed. Studies conducted during the Environmental Screening Process showed that the anticipated effects will be much less than expected or will not occur at all. In all cases, impact management (mitigation) measures have been identified that, when applied, will eliminate the potential environmental effects, or reduce them to acceptable levels.

4.6.1 Noise Potential Effects

The proposed capacity increase will result in noise emissions associated with truck movements to/from the Site and on-Site landfill equipment requirements. Fourteen off-Site residential dwellings will be potentially impacted from the existing Landfill activities. The predicted noise impact range is 42 to 53 dBA (rounded). POR5 is the most impacted at 53 dBA. All residential dwellings are below the 55 dBA noise limit.

From a potential noise impact exposure perspective, the future conditions for additional capacity are near identical and the only difference is the potential for truck traffic on the haul route up to 16 trucks per hour during daytime operations only and the elevated height of the tracked vehicles at the worst-case elevation when approaching cell closure.

Noise contours for the proposed Future Conditions are presented on **Figure 4.2**.



Source: Google Satellite



ACOUSTIC ASSESSMENT REPORT
BROOKS ROAD ENVIRONMENTAL
160 BROOKS ROAD, CAGUYA, ONTARIO

NOISE CONTOUR PLOT - STATIONARY SOURCES, DAY

12561524
25.10.2022

FIGURE 4.2

4.6.2 Noise Mitigation Measures

Based on the description of the proposed capacity increase provided in **Section 1** and the characterization of Noise Existing Conditions within the Study Areas described in **Section 3**, there are no mitigation measures recommended to be incorporated into the future conditions designs in order to avoid or minimize impacts from Noise. Mitigation measures are not required because the predicted off-Site noise impact meets the applicable 55 dBA regulatory noise limit.

As all residential dwellings are below the 55 dBA noise limit, no specific mitigation measures are required. The implementation of BMPs, as recommended in the Vertical Capacity Expansion EA such as barriers and/or berms at Landfill perimeter and administrative controls that limit on-Site landfilling activities will serve to minimize noise impacts from the Site.

The Site also has a Noise BMP Plan (BMPP) that Facility staff adhere to which was developed in January 2021. The BMPP details the following recommended activities to minimize noise emissions on Site:

4.6.2.1 Equipment Inspection and Maintenance Procedures

As a minimum, the following activities or events shall be inspected and recorded in the inspection logs:

- Monthly inspection of haul routes and roadways will be carried out and maintenance will be performed within 1 month or as soon as conditions will allow
- Unpaved roads and regularly travelled portions of the Site will be re-graded as required
- All on-Site BRE and contractor heavy mobile equipment is to be inspected before first use and annually afterwards to comply with NPC-115 equipment guidelines
- All heavy mobile equipment shall be kept in good working order and fitted with working mufflers if required. Effective Noise control depends on machinery being in good condition and fitted with working mufflers

4.6.2.2 Best Practices and Control Measures for Landfilling Activities

Landfill operators, machine operators and contractors are recommended to review and follow the practices and controls as outlined below:

- All heavy mobile equipment activities will be limited to daytime hours (07:00 to 19:00 hours).
- All heavy mobile equipment shall be kept in good working order as deterioration may increase equipment sound levels.
- Vehicle movements are recommended to stay within movements areas and reduce the use of back-up alarms, where practical. This should coincide with safety considerations.
- If alternate hauling route is proposed by BRE, a qualified individual should be consulted and approve the change.
- Administrative controls are required to eliminate uncontrolled tailgate banging and the use of experienced equipment operators.
- Where equipment back-up alarms will be used near areas that are potentially environmentally sensitive, alternative alarms should be used to reduce sound levels and annoyance. Ambient adjustable, strobe light or broadband alarms are options to consider.
- Landfilling activities should be limited to daytime hours (07:00 to 19:00 hours).

It is noted that due to improvements in operations and change in waste acceptance type has limited the Landfill's issues with pests over the last two years and have never used a audible pest control system. Should pest control devices or similar activities be utilized in the future these systems will be assessed for noise to ensure no negative off-Site noise impacts prior to operation.

4.6.2.3 Recordkeeping

Records shall be kept of when and how Noise control measures are implemented and when complaints, if any, are received. Example of a complaint form is provided in Appendix D. The form will be updated every 5 years or upon employee turnover. As a minimum, the following activities will take place if a complaint is received:

- Complaints or concerns expressed directly to contractors or Site personnel should be communicated immediately to the Site Manager so the formal complaint process can be initiated and followed up
- The complaint form will provide the description of the complaint, environmental conditions, operations at time of incident, and description of all responses and follow up actions
- Reporting will be conducted with the intent to manage any potential Noise issues through operational changes to construction and landfilling
- If the complaint is valid or persistent (i.e., not an upset condition), investigation through sound level measurements will be conducted and reported
- On an annual basis, the complaint records will be reviewed and any unfavourable trends will be examined further to identify corrective actions and included in the annual report

4.6.3 Noise Net Environmental Effects

Similar to the Vertical Capacity Expansion EA and Fill Rate Amendment Screening, the 14 residences that were anticipated to experience a change in the predicted off-Site noise impact due to the previously approved landfill expansion, may continue to hear landfill activities; however, even with the increased capacity, no change from the noise analysis completed as part of the Vertical Capacity Expansion EA and Fill Rate Amendment will occur. With existing mitigation measures and best practices, all residential dwellings are below the 55 dBA noise limit.

4.6.4 Noise Monitoring Requirements

No monitoring requirements are needed for on-going noise compliance.

4.7 Natural Environment

The assessment of effects associated with the proposed undertaking was carried out through a series of steps that is based, in part, on the description of existing conditions as well as the Project Description and Site Plan. The assessment of effects was also undertaken within the context of the previously completed Screening Criteria Checklist, as summarized in **Section 2** of this report.

The assessment of the proposed capacity expansion was conducted in two steps:

- **Step 1: Confirm Screening Criteria and Indicators/Measures**
Prior to undertaking the net effects assessment, the Natural Environment screening criteria, indicators, and measures were reviewed and confirmed for application to the proposed capacity expansion
- **Step 2: Undertake the Net Effects Analysis**
With the screening criteria, indicators, and measures confirmed through the preceding step, a net effects analysis of the proposed capacity expansion was carried out consisting of the following activities:
 - Identify potential effects (based on measures) on the Natural Environment
 - Develop and apply avoidance/mitigation/compensation/enhancement measures
 - Determine net effects on the Natural Environment

General Assumptions

The following evaluation was carried out under the assumption that the 2023 Design and Operations Report (GHD 2023) for the Brooks Road Landfill Site depicts the most up-to-date conceptual design for the proposed capacity

expansion. Should the conceptual design change, the need for mitigation and the potential for net effects will need to be reassessed.

This Section provides an assessment of the potential negative environmental effects (i.e., those for which a “Yes” answer was given in the Screening Criteria Checklist) for those Natural Environment criteria which might be affected by the project as identified in **Section 2**. The effects assessment describes how existing environmental conditions in the Study Areas will change as a result of the construction and operation of the proposed undertaking.

As described in **Section 2 (Table 2.1)**, a “Yes” was applied to the following Natural Environment criteria:

Might the Project:

- *Cause negative effects on rare (vulnerable), threatened or endangered species of flora or fauna or their habitat?*
- *Cause negative effects on designated wetlands?*
- *Cause negative effects on wildlife habitat, populations, corridors, or movement?*

With respect to the above criteria, a description of the potential negative environmental effects, necessary mitigation measures and the resultant net effects on the environment are discussed. Studies conducted during the Environmental Screening Process showed that the anticipated effects will be much less than expected or will not occur at all. In all cases, impact management (mitigation) measures have been identified that, when applied, will eliminate the potential environmental effects, or reduce them to acceptable levels.

4.7.1 Natural Environment Potential Effects

4.7.1.1 Cause Negative Effects on Rare (Vulnerable), Threatened or Endangered Species of Flora or Fauna or their Habitat

There are several rare (vulnerable), threatened or endangered species of flora and fauna or their habitat within the LSA and/or SSA. The proposed capacity expansion could have a negative effect on these species and/or habitats, potentially causing the species to become extirpated (i.e., locally extinct).

4.7.1.2 Cause Negative Effects on Designated Wetlands

The proposed capacity expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects on designated wetlands. PSWs are present on all sides of the Site and are also located within the southeastern boundary of the SSA. The proposed capacity expansion could cause negative effects to the PSWs through changes in water quality, impacts to wetland habitat, and impacts to flora and fauna species.

4.7.1.3 Cause Negative Effects on Wildlife Habitat, Populations, Corridors, or Movement

The proposed capacity expansion will result in changes to the existing landfill footprint, final contours, and on-Site operations and may cause negative effects on wildlife habitats, populations, corridors, or movements. The MNDMNR's Natural Heritage Information Centre (NHIC) mapping delineates Wildlife Activity Area (WAA; white-tailed deer wintering area) throughout most of the SSA and LSA. The proposed capacity expansion will not reduce the available WAA.

4.7.2 Natural Environment Mitigation Measures

There are a number of existing mitigation measures in place to dissuade wildlife access to the existing landfill Site and to prevent human/wildlife conflicts. Chain link fence is present around the perimeter of the property, which dissuades larger reptile and mammal access to the Site. Based on the proximity to the PSW, a wildlife exclusion fence was installed in December 2021 within the chainlink fence as an effective deterrent for small reptile, amphibian, and mammal access to the Site. Also, in December 2021, a new silt fence was installed along the northern perimeter of the

property and at several locations around the Site where run-off potential is high. There are also very limited natural areas on the landfill Site itself and daily landfilling activities (e.g., noise, human presence, heavy machinery) also provide deterrents for wildlife use of the Site. Other operational practices (i.e., daily cover) further act to deter wildlife use of the Site.

General BMPs for continued operation of the landfill should include:

- Notify Site operators and delivery contractors of the presence of reptiles and amphibians in the surrounding areas. This includes visual identification tools for SAR common to the area.
- Any wildlife incidentally encountered during Site operation activities will not be knowingly harmed and will be allowed to move away from the area on its own if at all possible.
- In the event that an animal encountered during Site operation activities does not move from the area, or is injured, the Site Supervisor will be notified.
- In the event that the animal is a known or suspected SAR, the Site Supervisor will contact MNDMNRF SAR biologists for advice.
- Wildlife exclusion fence and erosion and sediment controls shall be maintained until all disturbed areas of the Site, including the pond and swales, have fully stabilized and vegetated areas have achieved 70 percent of the native background density of growth. The condition of all swales, culverts, vegetation, infiltration basin outlet, and outflow channels leading to the Brooks Road drainage ditch and off Site will be noted at regular intervals.

4.7.3 Natural Environment Net Effects

The proposed capacity expansion will migrate the northern landfill perimeter north by approximately 30 m. This land is already within the Site boundary and within the chainlink, wildlife exclusion, and silt fences; as such, net effects are anticipated to be negligible. **Table 4.3** details the potential effects, mitigation measures, and net effects on the Natural Environment.

Table 4.3 Natural Environment Potential Effects, Mitigation Measures, and Net Effects

Screening Criteria	Indicators	Potential Effects	Mitigation Measures	Net Effects
Negative effects on rare (vulnerable), threatened or endangered species of flora or fauna or their habitat	Predicted impact on flora and fauna including rare (vulnerable), threatened, or endangered species	Potential to cause species to become extirpated (i.e., locally extinct)	Chainlink and wildlife exclusion fence to prevent fauna entering Site No clearing to be conducted outside of the Site boundary	No net effects to flora and fauna within the Site and Local Study Areas
	Predicted impact on flora and fauna habitat	Clearing and grubbing may cause destruction to flora and fauna habitat	No clearing or grubbing to be conducted outside of the Site boundary	No net effects to flora and fauna habitat within the Site and Local Study Areas
Negative effects on designated wetlands	Predicted changes in water quality	Water quality could deteriorate with the migration of sediment from the landfill into the wetland	Silt fence is installed in areas of possible sediment migration	No net effects to water quality in designated wetlands within the Site and Local Study Areas
	Predicted impact on wetland habitat	Wetland habitat could deteriorate with the migration of sediment from the landfill into the wetland	Silt fence is installed in areas of possible sediment migration	No net effects to wetland habitat in designated wetlands within the Site and Local Study Areas
	Predicted impact on flora and fauna	Migration of sediment from the landfill into the wetland may have	Silt fence is installed in areas of possible sediment migration	No net effects to flora and fauna in designated wetlands

Screening Criteria	Indicators	Potential Effects	Mitigation Measures	Net Effects
		a negative impact on flora and fauna		within the Site and Local Study Areas
Negative effects on wildlife habitat, populations, corridors, or movement	Predicted impact on wildlife habitat	WAA (white-tailed deer wintering area) is present throughout most of the SSA and LSA and the increased footprint may reduce the available WAA	Existing chainlink and wildlife exclusion fence prevent fauna entering Site. The proposed expansion is confined to the fenced Site	No net effects on wildlife habitat within the Site and Local Study Areas
	Predicted impact on wildlife populations	The proposed capacity increase may lead to reduced or increased wildlife populations	The proposed expansion is confined to the existing Site boundary	No net effects on wildlife populations within the Site and Local Study Areas
	Predicted impact on habitat linkages within the Local Study Area	The proposed capacity increase may impact habitat linkages in the Local Study Area	The proposed expansion is confined to the existing Site boundary	No net effects on habitat linkages within the Site and Local Study Areas

4.7.4 Natural Environment Monitoring Requirements

To ensure that the mitigation measures identified are implemented as envisioned, a strategy and schedule was developed for monitoring environmental effects. With these mitigation measures and monitoring requirements in mind, commitments have also been proposed for ensuring that they are carried out as part of the construction, operation, and maintenance of the proposed undertaking.

Calling Amphibian Monitoring

Calling amphibians are recommended to be monitored annually to confirm there is no migration of sediment from the proposed capacity expansion (i.e., from grading throughout the SSA, final cover construction) is not causing negative impacts to the wildlife inhabiting the surrounding wetlands. Monitoring should focus on Locations 1 through 4, as the potential impacts to the natural environment at Locations 5 and 6 are considered to be negligible given their distance from the SSA. These annual monitoring events should be conducted during Year 1, Year 2, and every three years following for a minimum of four monitoring events, commencing in the first year of construction. When conducted in accordance with the Marsh Monitoring Protocol (BSC 2009).

Surface Water Quality Monitoring

The Site currently implements a surface water monitoring program based on the requirement of ECA No. A110302. The surface water monitoring program includes water quality monitoring and surface water flow measurements. This program consists of a network of nine monitoring stations (one on-Site and eight off-Site) indicated in **Figure 3.22** and is conducted to confirm run-off is not causing negative impacts to the wetland. Water quality monitoring and surface water flow measurements at all of the surface water stations take place on a quarterly basis (generally March, May, August, December) with an attempt to correlate the surface water monitoring with rainfall events. Continuation of this program provides a reasonable monitoring effort for potential effects monitoring. Further information on surface water quality monitoring is available in the *Design and Operations Report* (GHD 2022).

Fencing Inspections

The following measures will be conducted to mitigate potential effects associated with the perimeter wildlife exclusion/silt fence and confirm that it is effective:

- Routine inspections of the integrity of the perimeter wildlife exclusion/silt fence. Inspections are to be conducted quarterly with copies of the inspection reports maintained on-Site for two years

- Incidental observations of wildlife exclusion/silt fence or perimeter chainlink fence disrepair and/or evidence of wildlife attempting to enter the SSA should be reported immediately to the Site Supervisor or Site Manager and addressed in a timely fashion
- Any fencing disrepair is to be addressed by BRE in a timely fashion

4.8 Traffic

The assessment of effects associated with the proposed undertaking was carried out through a series of steps that is based, in part, on the description of existing conditions as well as the Project Description and Site Plan. The assessment of effects was also undertaken within the context of the previously completed Screening Criteria Checklist, as summarized in **Section 2.0** of this report.

Based on the description of the proposed capacity increase provided in **Section 2.0** and the characterization of Transportation Existing Conditions within the Study Area described in **Section 3.0**, the following section provides the Transportation Future Conditions within the Study Areas and any recommended mitigation measures for the 2026 horizon year when the Site is anticipated to reach capacity. The future conditions traffic analysis utilizes the existing 2022 conditions as a baseline and incorporates additional corridor growth to the traffic volumes.

As previously presented in **Table 3.9**, the maximum daily truck traffic before and after the proposed capacity expansion does not change and remains at 25 to 50 trucks per day. As a result, the turning volumes entering and exiting the Site access are not expected to change from existing conditions.

Horizon Year

The proposed capacity expansion for the existing Site is expected to extend the life of the landfill by approximately two years from 2024 to 2026. Therefore, a future horizon year of 2026 has been assumed representing the worst-case scenario which includes the anticipated corridor growth expected until the Site reaches capacity. Haldimand County's Traffic Impact Study Guidelines for developments generating less than 500 peak hour vehicle trips requires future conditions traffic analysis be conducted for both the opening year and 5 years after opening. However, post 2026, the Site will generate no traffic onto the surrounding road network and therefore, analysis of future conditions was limited to the 2026 horizon year.

Background Volume Growth Rate

In order to capture any expected background growth in traffic volumes at the study area intersections, a conservative compound annual growth rate of 2.0 percent has been adopted and will be utilized to forecast for the 2026 traffic volumes.

Future Traffic Volumes

The Forecasted 2026 turning movement counts were projected at both the intersection of Highway 3 and Brooks Road and at the existing Brooks Road Landfill Site driveway during the weekday a.m., mid-day and p.m. peak periods and Saturday mid-day peak periods. This includes the existing truck traffic corresponding to approximately 1,000 tonnes per day. As previously noted, to provide a conservative and worst-case scenario analysis, the daily truck trips associated with the Site were applied to each peak hour (i.e., the total amount of daily truck trips will enter/exit the Site within each of the peak hours). The resulting weekday a.m., mid-day and p.m. peak hour as well as the Saturday peak hour volumes are summarized in **Figure 4.3**. No additional Site trips were accounted for in the 2026 horizon year as the maximum daily number of trucks generated by the Site remains at 25 to 50 trucks after the proposed capacity expansion.

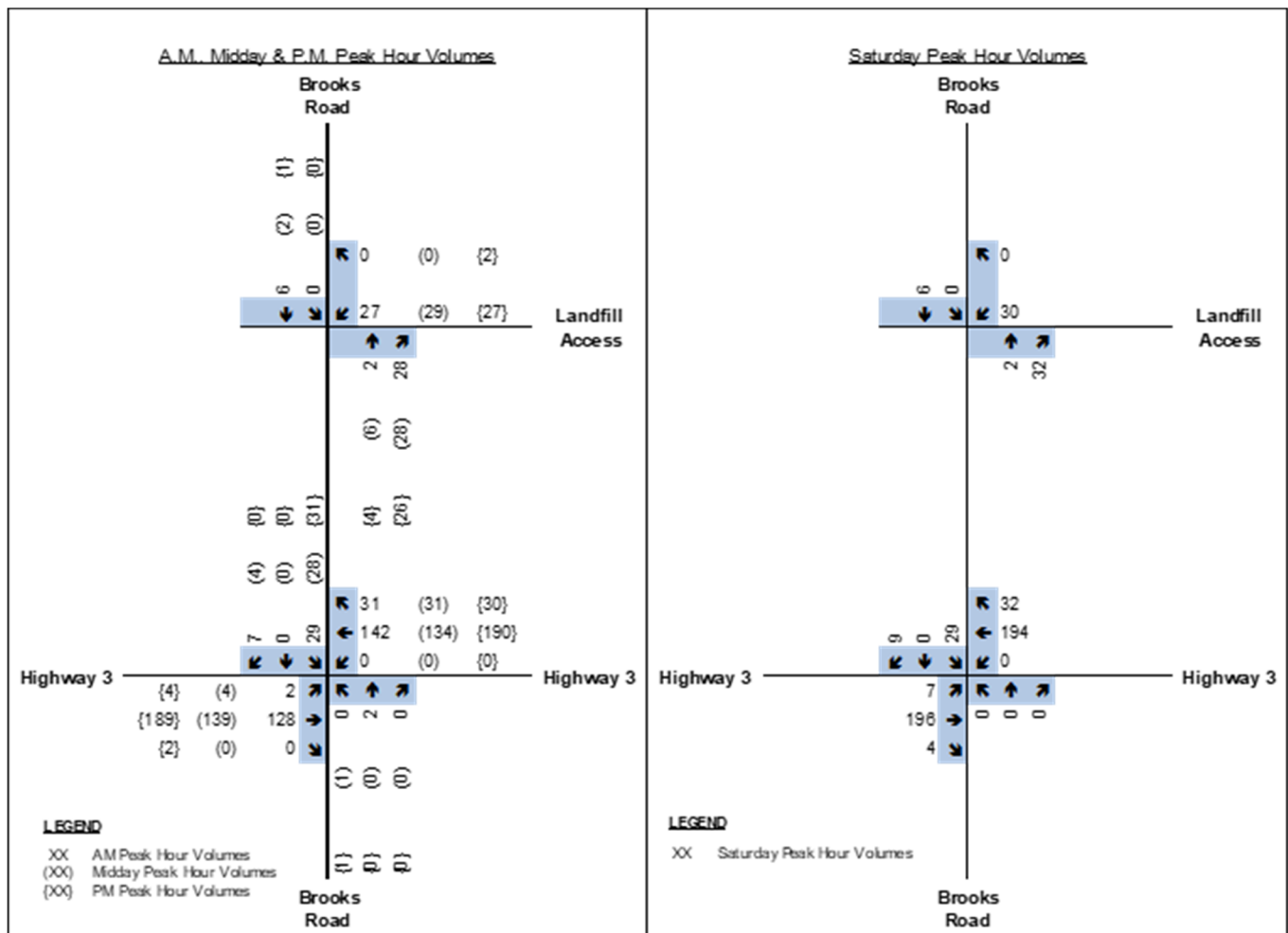


Figure 4.3 2026 Future Total Peak Hour Volumes

Capacity Analysis

As a measure of the capacity on the adjacent road network surrounding the Brooks Road Landfill at peak operations (i.e., 1,000 tonnes of material per day translating to 25 to 50 daily trucks), both the Site access on Brooks Road and the stop-controlled intersection of Brooks Road and Highway 3 were analyzed using the projected 2026 peak turning movement volumes for the weekday a.m., mid-day, p.m. and Saturday peak hours. A summary of the capacity analysis using Synchro version 10 is summarized in the **Table 4.4** with detailed reports provided in Appendix A of the Traffic Assessment Report (**Appendix H**).

Table 4.4 Future Conditions Capacity Analysis at Peak Operations

Intersection	Movement v/c ratio (LOS) delay			
	A.M. Peak	Mid-Day Peak	P.M. Peak	Sat Peak
Brooks Road & Brooks Road Landfill Site access	WBLR = 0.03 LOS A 9 SEC NBTR = 0.02 LOS A 0 SEC SBTL = 0 LOS A 0	WBLR = 0.03 LOS A 9 SEC NBTR = 0.02 LOS A 0 SEC SBTL = 0 LOS A 0 SEC	WBLR = 0.03 LOS A 9 SEC NBTR = 0.02 LOS A 0 SEC SBTL = 0 LOS A 0 SEC	WBLR = 0.03 LOS A 9 SEC NBTR = 0.02 LOS A 0 SEC SBTL = 0 LOS A 0 SEC
Brooks Road & Highway 3	EBTLR = 0 LOS A 0 SEC WBTLR = 0 LOS A 0 SEC NBTLR = 0 LOS B 11 SEC SBTLR = 0.06 LOS B 11 SEC	EBTLR = 0 LOS A 0 SEC WBTLR = 0 LOS A 0 SEC NBTLR = 0 LOS B 11 SEC SBTLR = 0.05 LOS B 11 SEC	EBTLR = 0 LOS A 0 SEC WBTLR = 0 LOS A 0 SEC NBTLR = 0 LOS B 12 SEC SBTLR = 0.06 LOS B 12 SEC	EBTLR = 0.01 LOS A 0 SEC WBTLR = 0 LOS A 0 SEC NBTLR = 0 LOS A 0 SEC SBTLR = 0.08 LOS B 12 SEC

Both intersections overall are expected to operate with minimal delay and substantial excess capacity under future 2026 conditions. Individual movements at both study intersections are expected to operate with levels of service 'B' or better representing minimal delay, and volume-to-capacity (v/c) ratios not exceeding 0.08 representing substantial excess capacity, during the weekday a.m., mid-day, p.m. and Saturday mid-day peak hours.

The analysis of future 2026 conditions under peak operations confirms no vehicle delay issues or capacity constraints at either study intersection resulting from the proposed capacity expansion.

Safety Analysis

Collision Analysis

Existing conditions collision analysis determined no indication that either Highway 3 in the vicinity of Brooks Road or Brooks Road north to the Site has experienced significantly higher collision frequency than the historical average accident rate along Highway 3 in Haldimand County. Since no additional Site traffic is generated by the proposed capacity expansion, safety conditions remain unchanged.

Sight Line Analysis

Existing conditions sight line analysis determined the Site entrance in its current location satisfies the sight distance requirements for trucks approaching and departing from the Site.

As described in **Section 2.0**, a "Yes" was applied to the following Transportation criteria:

Might the Project:

- Cause negative effects related to traffic?

With respect to the above criterion, a description of the potential negative environmental effects, necessary mitigation measures and the resultant net effects on the environment are discussed.

4.8.1 Traffic Potential Effects

Based on the Future Conditions traffic analysis undertaken in this section, it is expected that the proposed capacity expansion will have a negligible transportation effect at the study area intersections and surrounding road network. Truck traffic associated with the proposed capacity expansion will not contribute any additional truck traffic within the study area, therefore it is not expected to adversely affect residents, businesses, institutions and movement of farm vehicles in the local study area.

4.8.2 Traffic Mitigation Measures

With no additional truck traffic generated by the proposed capacity expansion, no mitigation measures are recommended in order to avoid or minimize impacts on Transportation.

4.8.3 Traffic Net Environmental Effects

As no mitigation measures beyond those incorporated into the design are recommended, the net impacts of the capacity expansion from a transportation perspective are expected to be negligible as represented in the Future Transportation Conditions analysis undertaken in this section.

4.9 Cultural Heritage

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the Ontario Heritage Act.

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11 the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.

4.10 Other

The proposed landfill expansion will not change the types of wastes the facility is permitted to receive and will not result in the creation of non-hazardous waste materials requiring disposal (the landfill currently receives non-hazardous wastes as permitted by the existing Environmental Compliance Approval).

The proposed expansion will not cause any other negative environmental effects not covered by the criteria outlined in this presentation.

4.11 Summary of Net Environmental Effects

Table 4.5 provides a summary of the anticipated net environmental effects associated with the proposed facility.

Table 4.5 Net Effects Summary Table

Environmental Component	Summary of Predicted Net Environmental Effects
Surface Water	<ul style="list-style-type: none"> – Continuous operation of the stormwater management pond to remove the excess TSS and ensuring good vegetative coverage in the expanded areas to reduce erosion will result in no net effects on surface water quality on-site or off-site. – Slight change in drainage areas. The proposed expansion of the landfill will increase the imperviousness percent of the contributing drainage areas to the SWM pond by less than 2 percent. However, the SWM pond capacity is sufficient to accommodate this change. – No off-site effects to surface water quantity with continued operation of the stormwater management pond to attenuate peak flows to protect downstream receivers from potential changes in water quantity.

Environmental Component	Summary of Predicted Net Environmental Effects
Geology & Hydrogeology	<ul style="list-style-type: none"> – The Site is characterized by two relevant groundwater units (a water table unit and a confined basal till overburden/shallow bedrock aquifer) which are separated by a thick layer of stratified silty clay, silty clay till and varved clays which form an aquitard of very low hydraulic conductivity. – The proposed landfill design includes a base constructed of a single composite liner design consisting of a 1.5 mm thick high density polyethylene (HDPE) liner overlying a 750 mm thick engineered clayey liner. – Leachate produced within the landfill will be collected in a leachate collection system installed above the HDPE liner and will be removed from the landfill mound on a continuous basis and treated on Site prior to discharge. – Based on the existing leachate and groundwater quality at the Site and the high level of protection provided by the engineered composite liner and the natural silty clay aquitard, as well as the continuation of a robust monitoring and trigger level program, no net effects to the groundwater quality are anticipated from the proposed expansion.
Land Use & Socio-Economic	<ul style="list-style-type: none"> – The Site is located in an area zoned as Disposal Industrial. Potential negative effects during construction related to dust, odour, noise, and traffic will be mitigated through the use of BMPs. – There are no net negative environmental effects anticipated with respect to Land Use for the operation from the proposed expansion. – There are no net negative environmental effects anticipated with respect to traffic. – By implementing the height increase of the existing fence on the west side of the Site will mitigate any visual and aesthetic impacts. – No net negative effects are anticipated with respect to Land Use and Socio-Economic environment from the proposed expansion
Air Quality	<ul style="list-style-type: none"> – The assessment shows that the concentrations of TSP, PM10 and PM2.5 were all well below the AAQC at the sensitive receptors and will continue to be so with the proposed amendment. The cumulative effect for PM2.5 was below the PM2.5 AAQC at the sensitive receptors as well. – The Site has implemented the control measures such as the introduction of SOPs for odour and dust and the operation of a leachate treatment system and will continue with these controls to minimize the Air Quality and Odour impacts from the Site operations. – No change to the net effects from the existing landfill operation are anticipated as a result of the proposed capacity change, based on the continued implementation of the mitigation measures

Environmental Component	Summary of Predicted Net Environmental Effects
Noise	<ul style="list-style-type: none"> – The BRE Facility is located in a mixed acoustical Class 2 and Class 3 area based on the MECP NPC 300 guideline and depending on the proximity of the off-Site residential dwellings to Highway 3. – Nine residential dwellings located along Highway 3 are considered to be Class 2 receivers and the five residential dwellings situated away from the corridor are considered to be Class 3 receivers. N-1 is the applicable regulatory Guideline for compliance assessment purposes for the Facility and the proposed capacity increase requires that the BRE Facility achieve a noise limit of 55 dBA at all off-Site residential dwellings of concern. The Landfill is limited to daytime only operations from 7 a.m. to 7 p.m. The Existing Conditions at the BRE Facility are below the 55 dBA noise limit. – The capacity increase considers one future conditions evaluation which will remain well below the Guideline N-1 noise limit of 55 dBA at all existing sensitive points of reception. –
Natural Environment	<ul style="list-style-type: none"> – The proposed capacity expansion will migrate the northern landfill perimeter north by approximately 30 m. This land is already within the Site boundary and within the chainlink, wildlife exclusion, and silt fences; as such, net effects are anticipated to be negligible.
Traffic	<ul style="list-style-type: none"> – The analysis of future conditions undertaken for the 2026 horizon year when the Site is anticipated to reach maximum capacity, indicates the site will continue to be acceptable from a traffic operations and safety perspective. – Under peak operations no vehicle delay issues or capacity constraints at either study intersection are expected. – Concerning safety, it is expected that since no additional site traffic is generated by the proposed capacity expansion, existing safety conditions will not deteriorate, and Site traffic will continue to be safely accommodated by the existing site entrance; therefore, there are no net negative effects.
Cultural Heritage	<ul style="list-style-type: none"> – The screening checklist, Criteria for Evaluating Archaeological Potential, developed by the Ministry of Citizenship and Multiculturalism, was completed as part of the Environmental Screening Report (see Appendix G1) determining that archaeological potential within the study area is low and therefore archaeological assessment was not undertaken. – The screening checklist, Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes, developed by the Ministry of Citizenship and Multiculturalism, was completed as part of the Environmental Screening Report (see Appendix G2) determining that the study area has low potential for built heritage resources and cultural heritage landscapes. Therefore, no technical cultural heritage studies have been undertaken.

5. Consultation and Engagement

BRE strived to openly communicate the facts of the Project to various stakeholder groups who might be affected by the Project. The stakeholder groups who have been consulted include Government Agencies, Indigenous Communities, and the public (**Table 5.1**).

The consultation activities described in the following sections, and the consultation documentation provided in **Appendix K** were developed in accordance with the consultation expectations set out in the *Ontario Environmental Assessment Act*, MECP's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario²⁶, and in MECP's Guide to Environmental Assessment Requirements for Waste Management Projects²⁷.

Table 5.1 *List of Agencies and Indigenous Communities Contacted*

Conservation Authorities
GRCA
NPCA
Provincial Agencies
MECP
Ministry of Environment, Conservation and Parks – Hamilton District Office
Ministry of Agriculture, Food and Rural Affairs (MAFRA) – Central Southwest Ontario (Haldimand County)
Ministry of Heritage, Sport, Tourism, Culture Industries (MHSTCI)
Ministry of Education (MOE)
Grand Erie District School Board
Ministry of Municipal Affairs and Housing (MMAH)
MNDMNRF
MTO
Ontario Provincial Police (OPP)
Ontario Provincial Police – Haldimand County
Municipal Agencies
Haldimand County
Indigenous Communities
Six Nations of the Grand River First Nation
Mississaugas of the New Credit First Nation
Métis Nation of Ontario (Head Office, Niagara Region Métis Council, and Hamilton-Wentworth Métis Council)
Haudenosaunee Confederacy Chiefs Council

²⁶ Ministry of the Environment/Ministry of the Environment, Conservation and Parks. (2014, January). *Code of Practice: Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario*. Source: <https://dr6j45jk9xcmk.cloudfront.net/documents/1809/3-8a-11-preparing-and-reviewing-eas-en.pdf>

²⁷ Ministry of the Environment, Conservation and Parks. (2021, July 5). *Guide to Environmental Assessment Requirements for Waste Management Projects*. Source: <https://www.ontario.ca/page/guide-environmental-assessment-requirements-waste-management-projects>

5.1 Consultation Activities

BRE has consulted with various stakeholder groups in a number of ways, ranging from verbal communication, email correspondence and the delivery of presentations, to the organization of consultation events. The major consultation milestones held and organised by BRE include:

- Circulation and Publication of the Notice of Commencement and Notice of Public Open House – weeks of June 13 and 20, 2022
- Public Open House #1 – June 29, 2022
- Public Open House #2 – October 24, 2023

5.1.1 Notice of Commencement and Public Open House # 1

As noted above, BRE commenced the Environmental Screening process with the publication of a Notice of Commencement and Notice of Public Open House in the Sachem/Glanbrook Gazette and Haldimand Press, the local newspaper in the vicinity of the proposed Site, during the weeks of June 13 and 20, 2022. The Notice of Commencement was also distributed via letter and/or email to members of the Government Review Team, Indigenous Communities, and to 1,674 addresses within N0A postal code, covering the town of Cayuga, via unaddressed Canada Post mail-drop during week of June 20, 2022. The Notice was also posted on the BRE Project website (www.brenvironmental.com) in the “About Brooks Road” and the “2022 Environmental Screening” section. A copy of the Notice of Commencement and Public Open House is provided in **Appendix I**.

5.1.2 Public Open House #1

Public Open House # 1 was held on June 29, 2022 at the Cayuga Kinsmen Community Centre, 15 Thorburn Street South, Cayuga from 5 p.m. to 7 p.m. Notification of this first public Open House was included in the Notice of Commencement, published in the Sachem/Glanbrook Gazette and Haldimand Press during the weeks of June 13 and 20, 2022 and sent via letter and/or email to the contacts on the preliminary Project Contact List, inviting interested stakeholders and members of the community to attend the event. As noted above, a copy of the Notice of Commencement and Public Open House is provided in **Appendix I**. The first Public Open House included an overview of the Environmental Screening Process, including the Screening Criteria Checklist, and preliminary information about the proposed expansion. The objective was to offer opportunity to discuss and solicit feedback and comments on the proposed undertaking. A total of 14 individuals attended Public Open House #1. Attendees included local residents and landowners; members of the Public Liaison Committee for the existing landfill; and a member of the media. Comments and questions (both verbal and written) were welcomed and are summarized in the Public Open House #1 Summary Report along with copies of the display boards and reference material (see **Appendix I**).

In general, the comments ranged from against the proposal to supportive. A majority of comments received during the Open House related to the operations of the existing landfill. Landowners within the immediate vicinity of the Site asked questions regarding the possible height of the expansion, visual impact, odour, noise, wetland protection, potential for impacts to surface and groundwater, traffic, Site life, and post-closure use. Overall, there was good dialogue between the staff and the attendees.

5.1.3 Public Open House #2

Public Open House #2 was held on October 24, 2023 at the Cayuga Kinsmen Community Centre, 15 Thorburn Street South, Cayuga from 6 p.m. to 8 p.m. Notification of the second Public Open House was published in the Sachem online and Haldimand Press newspaper during the weeks of October 12 and 19, 2023 and sent via letter and/or email to the Government Agencies, Indigenous Communities, Project Contact List and to 2,019 addresses within N0A postal code, covering the town of Cayuga, via unaddressed Canada Post mail-drop during week of October 19, inviting interested stakeholders and members of the community to attend the event. Copies of notification for the second Public Open House is provided in **Appendix I**. The second Public Open House included an overview of the Environmental Screening Process, detailed project description, results of various environmental studies conducted

including potential effects, mitigations measures and overall net effects from the proposed expansion along with any monitoring requirements as well as project schedule. The key information presented at the second Open House was the change in planned capacity increase from previously proposed 100,000 cubic metres to 219,400 cubic meters as a result of the change in O. Reg 101/07. The objective was to offer opportunity to discuss and solicit feedback and comments on the proposed undertaking. A total of 13 individuals attended the Public Open House #2. Attendees included local residents and landowners; members of the Public Liaison Committee for the existing landfill; a municipal staff, and a member of the media. Comments and questions (both verbal and written) were welcomed and are summarized in the Public Open House #2 Summary Report along with copies of the display boards and reference material (see **Appendix I**).

Similar to Open House #1, the comments ranged from against the proposal to supportive. A majority of comments received during the Open House related to the Regulation change allowing BRE to seek an increase in the total capacity requested (change from the 1st Open House) as well concerns around the overall timing of the landfill operations and ultimate closure. Residents asked questions regarding the increased height of the expansion from a visual perspective, concerns around landfill liner design, odour, wetland protection, and eventual post-closure use. Overall, there was good dialogue between the staff and the attendees.

5.2 Stakeholder Tracking Database

A stakeholder tracking database was created for the BRE Landfill Expansion Project and includes a list of names and contact information for all stakeholders, serving as a starting point for all project-related communication (see **Appendix I**).

5.3 Indigenous Community Consultation

From the outset of the Screening Process, BRE established and maintained regular contact and communication with Indigenous Communities in the region of the proposed undertaking. A total of four Indigenous communities were contacted including:

- Six Nations of the Grand River First Nation
- Mississaugas of the New Credit First Nation
- Métis Nation of Ontario (Head Office, Niagara Region Métis Council, and Hamilton-Wentworth Métis Council)
- Haudenosaunee Confederacy Chiefs Council

As required at the start of the Screening Process, a copy of the Notice along with the Screening Checklist was provided to each of the Indigenous groups listed above. All four Indigenous Communities were also invited to attend Public Open House #1 and #2 and offers were also extended to organise separate meetings specifically designed to engage each community in meaningful discussions concerning the project. Follow-up phone calls were made in June 2022 to each community to confirm whether they had received the Notice of Commencement and Open House 1 and if they had any questions. A virtual meeting with the Mississaugas of the Credit First Nation was held on July 19, 2022.

A member of the Six Nations of the Grand River First Nation reached out to have a meeting with the project team in response to the Notice of Open House #2. An in-person meeting was held on January 12, 2024, to discuss the project and outcomes with the project team and members of the Six Nations.

None of the consulted Indigenous communities provided comments during Online Open House #2.

Copies of all correspondence with Indigenous communities are included in **Appendix I**.

5.4 Review of the Draft Environmental Screening Report

A Draft ESR was issued to the government agencies from January 8 to February 5, 2024 and to the indigenous communities, public, and interested stakeholders from January 16 to February 13, 2024 with an opportunity to review

and provide comments. According to the Guide, this step is highly encouraged to address any fundamental concerns or to avoid disagreement being raised at a late stage in the process and any technical issues can be suitably resolved prior to the preparation of a final ESR and issuance of a Notice of Completion.

The comments on the Draft ESR along with the responses are summarized and included in **Appendix I**.

5.5 Notice of Completion

As part of the process of making the ESR available for review, BRE issued a formal Notice of Completion to review agencies, Indigenous Communities, and the public beginning on April 3, 2024. A copy of the Notice is included in Appendix J. Specifically, this involved the following activities:

- Publication in the Haldimand Press and Sachem online within the Hamilton Spectator.
- Letter and/or email to members of the Government Review Team, Indigenous Communities, PLC members, and interested members of the public.
- Canada Post mail blast to postal code N0A, within a 5 km radius of Brooks Road Landfill.

The Environmental Screening Process requires proponents to post the ESR for a minimum 60-calendar day review period. The Brooks Road Landfill vertical and horizontal ESR was available for review from April 3, 2024, to June 2, 2024, whereby any interested person can inspect the Environmental Screening Report and provide comments. The comments, including any issues or concerns, should be sent first to GHD, on behalf of the BRE, for potential resolution.

5.6 Summary of the Comments Received & Responses Provided

Over the course of the Screening Process, numerous comments have been directed to BRE and the Project Team. **Table 5.2** summarizes the questions and concerns raised at meetings and obtained via regular mail, email, fax, telephone from members of the public, agencies, PLC and Indigenous Communities

Table 5.2 *Summary of Comments Received and Responses Provided*

Topic	Agency/ organisation/ community	Comment	Response
Agencies			
Consultation	GRCA	I've recently been assigned Haldimand County coverage for the GRCA. Please include me on the circulation list for this project going forward.	Thank you for your response. We will add you to the contact list. Should we continue to include planning@grandriver.ca in addition to yourself?

Topic	Agency/ organisation/ community	Comment	Response
Consultation	GRCA	no need to include the general GRCA planning email. Also, wondering if any of the public engagement materials from the open house will be posted on Brooks Road's document library either before or after the session. Not sure if I'll be able to make the session, and they'd also be helpful for circulating our Natural Heritage staff. Let me know if you can.	Yes, we will be posting all of the Public Open House display boards to the document library on the website following the event next week. We will also hold a Government Review Team meeting during the Environmental Screening Process to present and discuss the project and provide an opportunity for agencies to ask questions.
Consultation	OPP	My name is Rod LeClair and I'm with the OPP Provincial Liaison Team. Our role is to maintain open lines of communication with groups who may be affected by major events such as protests or demonstrations. I'm not sure if you're familiar with our team or not. We are aware of the Brooks Road Landfill Capacity Expansion project in Cayuga that is currently at the environmental screening process stage. I have been checking your website for information. We would like to attend any meetings in the future about this project if you would be so kind to add me to your distribution list.	Thank you for your message. You have been added to the project contact list, as requested. We will keep you informed of upcoming project events as well as project notices.
Consultation	MECP	Please find attached MECP's Letter of Acknowledgement and attachments in response to the Notice of Commencement for Brook Road Landfill Capacity Expansion Environmental Screening.	Comment recorded in the communication log.
Consultation/ Land Use	NPCA	NPCA staff provide the following preliminary screening comments regarding the Brooks Road Landfill Expansion Environmental Assessment (with accompanying map): <ul style="list-style-type: none"> – The subject property is located outside NPCA's watershed jurisdictional area; however, a portion of the northern property line borders our jurisdiction. 	Comment recorded in the communication log.

Topic	Agency/ organisation/ community	Comment	Response
		<ul style="list-style-type: none"> – The subject property is adjacent on all sides (including the area within NPCA's jurisdiction) to Provincially Significant Wetlands, specifically the North Cayuga Swamp Wetland Complex. – Given the above, the proposed landfill expansion will not require a permit from NPCA, however we will review and comment on the proposal to ensure the proposed works do not negatively impact the PSW within our jurisdictional area. <p>Please continue to circulate updates and materials regarding this project to NPCA (directly to me is fine).</p>	
Indigenous Communities			
Consultation/Open House 2	Six Nations	Phone Call – In response to the email notification of Open House #2, requested a separate in-person/online meeting to discuss the project	Email sent by GHD proposing multiple meeting times. Followed up on the meeting time to schedule the meeting. Currently waiting for a response.
Public			
Consultation		Two ongoing concerns: Stink, and noise from tracked vehicles.	Comment recorded in the communication log.
Consultation		<p>Comments Questions Suggestions</p> <p><u>Vegetated screening berm (with fence)</u></p> <ul style="list-style-type: none"> – Increase fence height as required for increased height of land fill. – Start planting trees on berm for wind screening and visual appeal. <p><u>Buffer area</u></p> <ul style="list-style-type: none"> – Start planting permanent vegetation and trees if not already in progress. <p><u>Proposed expansion and temporary fill storage</u></p> <ul style="list-style-type: none"> – The area along the north boundary and maybe other areas not visible from the road. 	Comment recorded in the communication log.

Topic	Agency/ organisation/ community	Comment	Response
		<ul style="list-style-type: none"> – Plant cover crop, vegetation – better than weeds – May be an opportunity for farmers. – Achieves dust, erosion and runoff control. – Plant permanent vegetation and trees as slopes are completed. <p><u>Dust control</u></p> <ul style="list-style-type: none"> – Due to increased height of fill, use portable windscreens on hilltops as capacity. – expansion progresses. – Reference Stelco Nanticoke coal fields. <p><u>Stormwater management pond</u></p> <ul style="list-style-type: none"> – Plant native species typical of marsh – Improve filtering and subsequent runoff water quality. <p><u>Odour and gaseous emissions</u></p> <ul style="list-style-type: none"> – Found answers to most of my concerns in the FAQ section: – Are smelly additions perfumed or are they treated? – Treat with “odour control product”, hydrogen peroxide or some other oxidizer other than – bleach? – Aerate or vacuum the build-up with underlaid temporary piping as it progresses? – Has a ground gas collection and treatment system been installed? – If not will it be installed as filling progresses? <p><u>Future use</u> – toboggan hill!</p>	

Topic	Agency/ organisation/ community	Comment	Response
Consultation		Keep your garbage in Metro Toronto. Pollute there instead of finding out of city locations to destroy with your arrogance. Your last expansion was suppose to be the last!!	Comment recorded in the communication log.

6. Overall Advantages and Disadvantages of the Project

In accordance with the *EA Act* and the Guide, the advantages and disadvantages to the environment of the proposed undertaking are required under O. Reg. 101/07. Advantages are positive net environmental effects, and disadvantages are negative net environmental effects. The advantages and disadvantages are based on the net effects described in **Section 4** and the problem/opportunity and purpose of the undertaking described in **Section 1.4**. The purpose of this exercise is to provide an overall conclusion as to whether the net negative environmental effects of the Project are acceptable, based on a balanced assessment against the positive benefits, the screening criteria, and the results and conclusions of the screening process.

In general, the advantage of the Project is that it will provide BRE with an opportunity to respond to the growing demands from existing customers (waste generators) who need a safe and reliable waste management facility for their residual material for approximately two additional years. This includes the ability to accommodate BRE's customers facing seasonal volume increases at certain times of the year (i.e., increased construction generated wastes). The assessment completed demonstrate that there are no net negative environmental effects to increasing the total waste disposal capacity by 219,400 m³. Based on the net effects evaluation and the advantages outlined above, the advantages of this Project outweigh any potential disadvantages as there are no new net negative effects on the environment.

7. Next Steps

Publishing of the Notice of Completion marks the beginning of the 60-calendar-day review period, during which time agencies, Indigenous communities, the public, and other interested parties can review the Environmental Screening Report and provide comments.

If there are outstanding concerns that the Project may adversely impact constitutionally protected Aboriginal and treaty rights, which cannot be resolved in discussion with BRE, then a person or party may request that the Minister make an order for the Project to comply with Section 16 of the *Environmental Assessment Act*. This is referred to as a Section 16 Order, which addresses Individual Environmental Assessments.

If no Section 16 Order requests are received within the 60-day review period, or if a Section 16 Order request is resolved or withdrawn, a Statement of Completion form (per Schedule II of the Guide to Environmental Assessment Requirements for Waste Management Project) will be submitted to the MECP. Upon acknowledgment of the Statement of Completion by the MECP, an application to amend ECA No. A110302 will be prepared and submitted to the MECP by BRE.

8. Summary and Conclusion

Brooks Road Environmental, owners and operators of the Brooks Road Landfill, initiated an Environmental Screening process in accordance with the Waste Management Projects Regulation (O. Reg. 101/07) of the Ontario *Environmental Assessment Act* (EA Act) in order to amend the existing Environmental Compliance Approval (ECA) for the landfill. The landfill is currently approved to receive up to 1,000 tonnes per day and 250,000 tonnes per year of post-diversion solid non-hazardous Industrial, Commercial & Institutional (IC&I) waste and has a total approved capacity of 1,045,065 cubic metres (m³) (including waste and daily/final cover).

Brooks Road Environmental is seeking to expand the total waste disposal capacity by approximately 219,400 cubic metres and consequently to amend the approved ECA to change the approved maximum volumetric capacity for the site including waste and daily cover from 1,045,065 cubic metres to approximately 1,264,465 cubic metres, to change the approved footprint fill area from 6 ha to approximately 7.15 ha and, to change the approved maximum elevation of the fill zone, including final cover from 221.50 metres above mean sea level (mAMSL) to 225.66 mAMSL. There is no change to the currently approved fill rate and accepted waste types.

A change in the above-mentioned components requires a modification to Conditions 3(6), 3(8), and 3(8a) of the approved ECA, which specifies the maximum volumetric capacity of the site, approved footprint fill area, and maximum elevation of the fill zone respectively. This ECA amendment is subject to the Environmental Screening Process in accordance with section 13 of the Waste Management Projects Regulation, (O. Reg. 101/07) of the *EA Act*. This change to the landfill will allow Brooks Road Environmental to continue serving its existing customer base and to respond to the economic opportunity of providing waste management services to address the continued and growing demand from local and regional customers that require a facility that is permitted to manage the residual materials they generate. It will provide BRE with increased flexibility in terms of how best to serve its existing waste clients while remaining competitive within the marketplace.

Through the Environmental Screening Process, the potential for the Project to result in adverse environmental effects was assessed. From the results of various environmental studies conducted to assess the Project's potential environmental effects, it was concluded that minor environmental impacts are expected. However, through the application of mitigation measures, the Project is not anticipated to result in any new net effects on the environment. As a result, the advantages of the project outweigh the disadvantages.