



**Brooks Road  
Environmental**



**Leachate Assessment Report  
Brooks Road Environmental Landfill  
Fill Rate Amendment  
Environmental Screening Study**

**Brooks Road Landfill Site  
160 Brooks Road  
Haldimand County, Ontario**

**March 2021  
REF NO. 018235 (104)**

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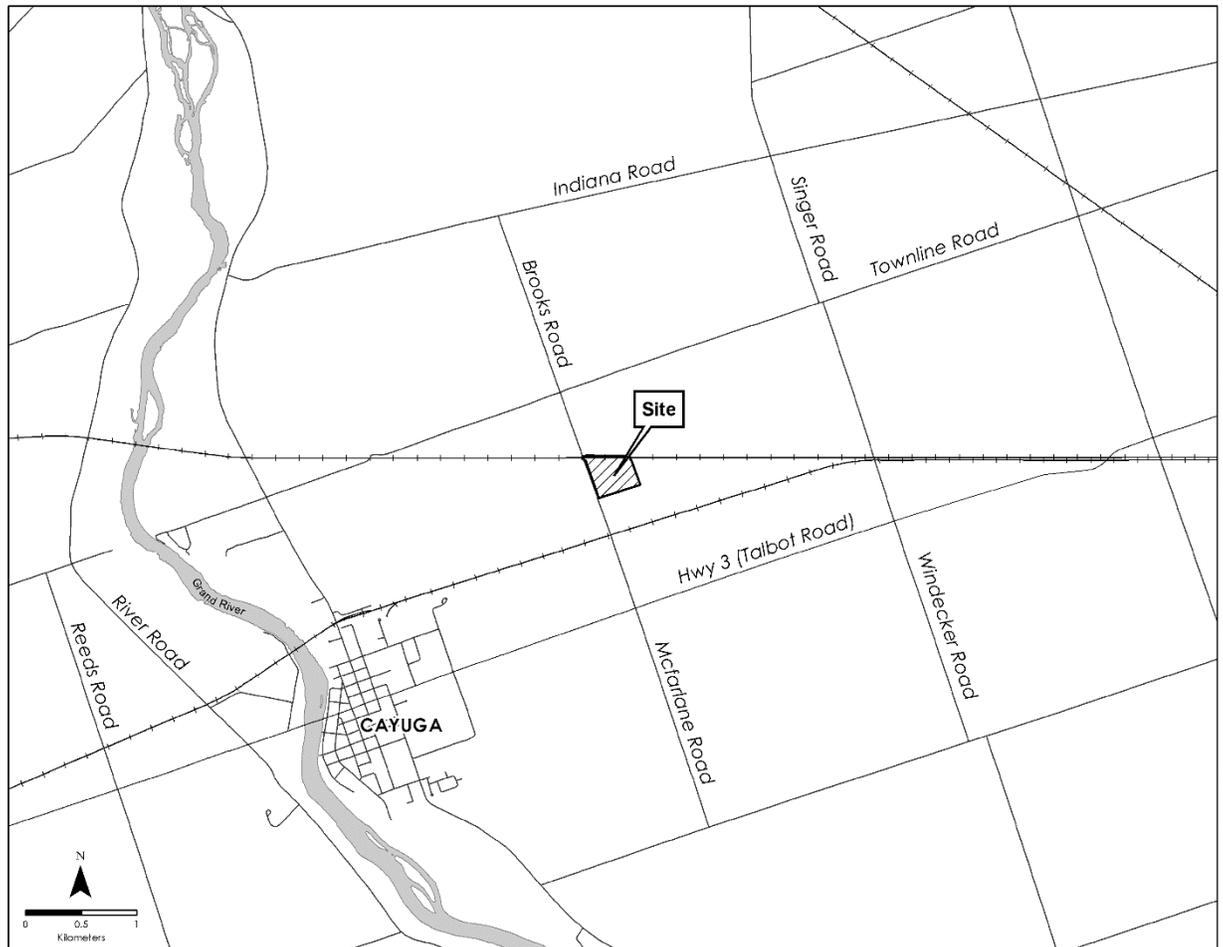
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## 1. Introduction

The Brooks Road Landfill Site (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 location of the Site is shown in **Figure 1.1**.



**Figure 1.1 Location of the Proposed Undertaking**

The Site, which operates under Environmental Compliance Approval (ECA) No. A110302, has an approved annual fill rate of 151,000 tonnes per year and a total capacity of 1,045,065 cubic metres (m<sup>3</sup>) (including waste and daily/final cover). The Site has accepted waste (in one form or another) since 1959 and received a Certificate of Approval (CofA) in 1980, with amendments approved by the Ministry of the Environment<sup>1</sup> in 1980, 2002, 2004, 2005, 2007, 2011, 2012, 2013, 2014, 2017 and 2018. Under the current ECA, the Site is licenced to receive post-diversion solid non-hazardous

<sup>1</sup> Now known as the Ministry of Environment, Conservation and Parks

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). Previously, the Site was approved to accept up to 500 tonnes per day. 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.

Any proposed change in the annual fill rate limits requires a modification to Condition 3(7) of the approved ECA, which specifies the maximum amount of waste that may be received at the landfill on an annual basis. The proposed Project would amend the approved ECA to allow for receipt of this maximum daily quantity (1,000 tonnes per day) throughout the year, increasing the annual fill rate from 151,000 tonnes per year to 250,000 tonnes per year. There is no change to the currently approved total landfill volume, size of landfill footprint, or final site contours. There is no change to the daily, interim, or final cover design, or the landfill base design. This change to the annual fill rate will allow for BRE to respond to the growing demands from waste generators/ customers who need a safe and reliable waste management facility for their residual material. 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) which the Site might not be able to accommodate with the current annual fill rate. If this project is approved and the maximum tonnage proposed as part of this Screening were received annually at the Site starting in 2021, the approved capacity of the site may be reached earlier.

This ECA amendment is subject to the Environmental Screening Process in accordance with Section 15 of the Waste Management Projects Regulation, (O. Reg. 101/07) of the EA Act. Ontario Regulation 101/07 – Waste Management Projects Act exempts this project from Part II of the Environmental Assessment Act and subjects it to the Environmental Screening Process. The Project falls under Section 15 of the Regulation – Change to Landfilling site, increase in rate of fill.

The Screening will be conducted in accordance with the planning and design process outlined in Ontario Ministry of Environment, Conservation and Parks (MECP) "*Guide to Environmental Assessment Requirements for Waste Management Projects*". The Screening process includes identifying and applying screening criteria to determine and describe potential environmental effects, public/external agency consultation, and the development of measures to mitigate identified environmental effects. The results of the Study will be documented in an Environmental Screening Report, which will be released for review to Stakeholders including Indigenous communities, the public, and government agencies. Upon completion of the Environmental Screening Process an application will be made to amend the existing ECA No. A110302.

GHD has prepared a leachate assessment on behalf of BRE for the proposed undertaking. This report documents the following as it relates to the leachate generation, collection, and treatment at the Site:

- Baseline/existing conditions
- Potential effects on the environment, mitigation measures and net effects
- Future monitoring requirements to be implemented

The Study Areas reviewed for the leachate assessment was as follows (see **Figure 1.2**):

- **On-Site** – the 14.3 ha Site containing the existing 6 ha landfill footprint
- **Leachate Management System** – includes the leachate collection system and Leachate Treatment Facility

The study area for the leachate assessment focuses on the landfill footprint, as the landfill is constructed with an engineered liner intended to contain leachate for collection and treatment. The majority of the collected leachate is pumped to the on-Site Leachate Treatment Facility (LTF) for treatment and discharged to the Brooks Road roadside ditch. For periods where leachate generation exceeds the approved discharge rate of the LTF, excess leachate is trucked from Site for treatment and disposal at a licensed treatment facility. As such, the leachate assessment focuses on evaluation of the proposed fill rate amendment with regards to leachate generation rates and operation of the Leachate Management System.



## 2. Screening Criteria Checklist

At the beginning of the Environmental Screening, the Screening Criteria Checklist (provided as Schedule I, pp 62 – 64, to the “Guide to Environmental Assessment Requirements for Waste Management Projects”) 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 *Ontario Environmental Assessment 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 Environmental Screening Report, 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 is provided in the Environmental Screening Report in order to support the “no effects” conclusion”. Each criterion is based on a question which is prefaced with the phrase, “Might the Project...”.

A “Yes” was not applied to any leachate related criteria, however this criteria was included based on consultation with the MECP.

As part of the consultation process, BRE carried out a follow-up meeting with the MECP to discuss comments provided on the initial Environmental Screening Checklist results. As part of the discussions between BRE and MECP, BRE agreed to include the potential effects related to leachate generation. Specifically, MECP requested the effects of increasing the fill rate be evaluated within the context of the Leachate Management Plan (LMP) that was developed and incorporated into the ECA issued in March 2020. GHD has prepared this Leachate Assessment Report on behalf of BRE for the proposed undertaking

## 3. Existing Conditions

The following subsections describe the existing conditions that are found within the On-Site and Site Vicinity Study Areas of the proposed project.

## 3.1 Methodology

### 3.1.1 Available Secondary Source Information Collection and Review

Available secondary sources of information were collected and reviewed by the Leachate Assessment Team to determine existing Leachate Management System conditions within the study area(s). The following sources of secondary information were collected and reviewed:

- Design and Operations Report, Vertical Expansion, Brooks Road Landfill Site, 2270386 Ontario Inc., Prepared by GHD, April 18, 2019
- Environmental Assessment Report, Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment, Prepared by GHD, February 2017
- Leachate Removal Plan - Revision 1, Brooks Road Landfill Site, 2270386 Ontario Inc., Prepared by GHD, June 22, 2020

### 3.1.2 Process Undertaken

The Leachate Assessment Team conducted a review of the existing Leachate Management System, including the current design and operating conditions of the following:

- Landfill footprint, capacity, and final contours
- Landfill phasing and cover placement
- Landfill liner and cover (i.e., daily, interim, and final) design
- Leachate collection system
- Leachate Treatment System
- Leachate generation rates and expected leachate quality

The proposed fill rate amendment was reviewed to identify any anticipated changes to the Leachate Management System.

## 3.2 Description of Existing Conditions

The Site is 14.3 hectares (ha) with an approved landfill footprint of 6 ha. The landfill footprint forms a trapezoidal shape with a north side length of 365 m, a south side length of 367 m, and east and west side lengths of 176 m. The landfill footprint and final contours are shown on **Figure 3.1**. The final contours have a maximum slope of 4:1 (25%) side slopes to the crest elevation of 221 mASL, and a top (peak) slope of 20H to 1V (5%), with a peak elevation of 221.5 mASL.

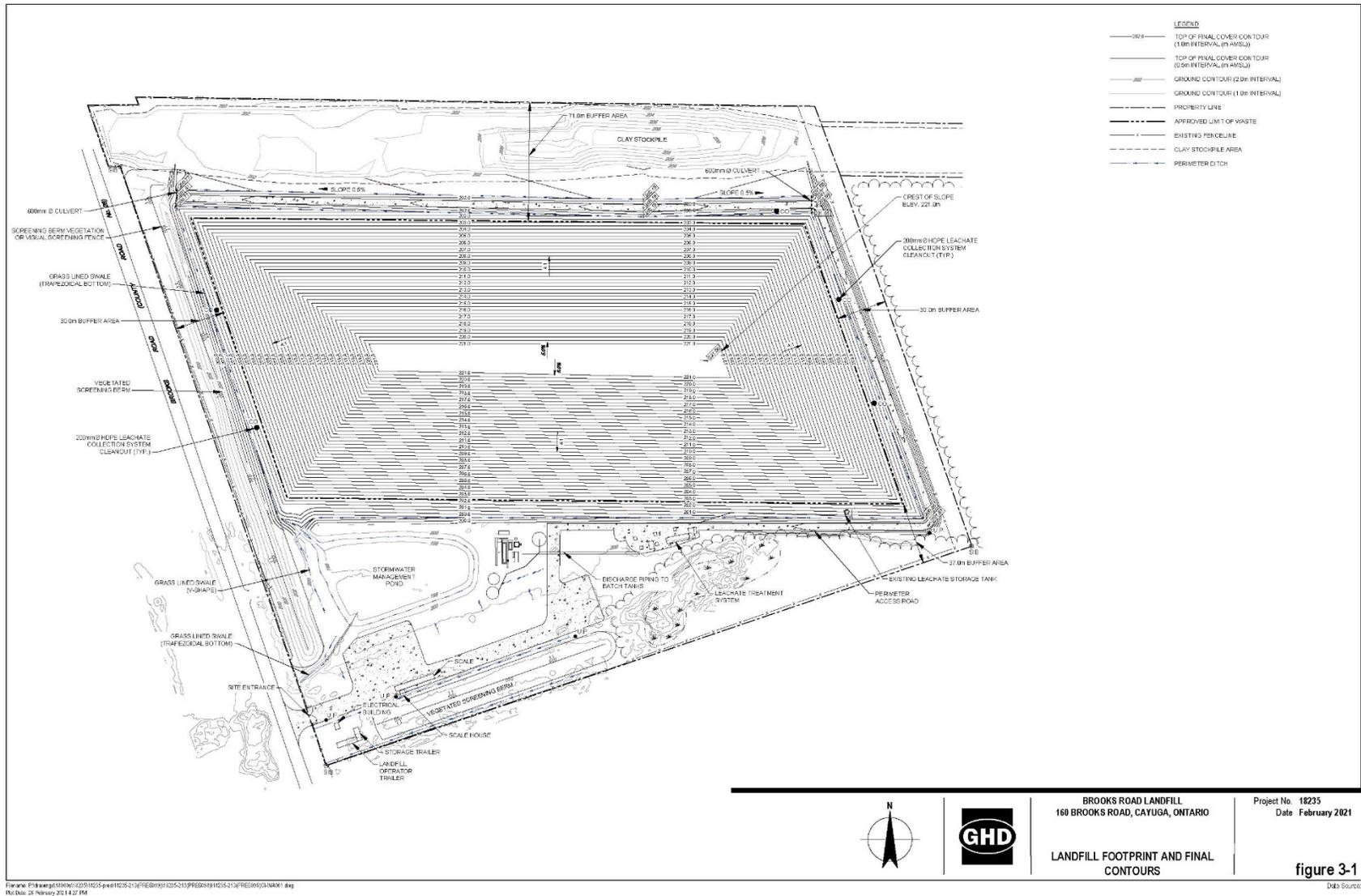


Figure 3.1 Landfill Footprint and Final Contours

The Site has an approved landfill capacity of 1,045,065 m<sup>3</sup>, including waste and daily cover. Waste is placed and compacted to an assumed typical compacted refuse density of between 0.8 tonnes/m<sup>3</sup> and 1.8 tonnes/m<sup>3</sup>.

The Site currently has an approved fill rate of 1,000 tonnes per day to a maximum of 151,000 tonnes per calendar year. Landfilling is conducted in stages, with progressive placement of cover material, as follows:

- **Daily Cover:** Daily cover is placed on the working face of the landfill at the end of each working day to cover exposed refuse at a thickness of 150 mm. Daily cover consists of either soil, compost, or woodchips.
- **Interim Cover:** Certain areas of the landfill may be completed with interim cover to allow additional settlement and consolidation of the waste prior to final refuse placement to final contours. Interim cover is generally applied to areas that will remain inactive for longer than six months. Interim cover consists of a 0.3 m layer of soil placed over the waste and graded to promote surface runoff. Any surface water runoff from areas completed with interim cover, which does not come into contact with waste, is considered to be clean and is directed to the on-Site surface watercourse(s). Surface water that does contact waste is treated as leachate. Prior to resumption of landfilling, interim cover will be removed to promote hydraulic connections between waste lifts.
- **Final Cover:** The landfill final cover will consist of a 0.6 m thick cover soil layer, overlaid by a 0.15 m thick vegetated topsoil layer. The final cover will be constructed progressively, as the various stages reach final waste contours. Progressive final cover placement will reduce leachate generation by promoting surface runoff thereby reducing infiltration into the landfill.

The landfill has been constructed with a landfill base, which consists of a single composite liner consisting of a 1.5 mm thick high density polyethylene (HDPE) liner overlying a 750 mm thick engineered clayey liner. The landfill base has 2:1 side slopes and a bottom that is contoured and sloped to facilitate the leachate collection system overlying the composite liner. The base is divided into two halves, each with a central swale (i.e., lateral swale) that are joined to a common header swale at the toe of the east slope.

The leachate collection system consists of a stone layer placed over the base of the landfill at a minimum thickness of 0.3 m on the side slopes and a minimum thickness of 0.5 m elsewhere. Non-woven geotextile was installed between the stone layer and the underlying geomembrane layer. Woven geotextile was installed on top of the stone layer to provide separation from the overlying waste. Perforated leachate collection pipes are located within each of the two base lateral swales and the header swale. A main leachate pump riser pipe is connected to the leachate collection system pipe network in the southeast corner of the landfill. The leachate pump discharges through a buried HDPE forcemain that feeds the on-Site LTS.

The on-Site LTS treats collected leachate prior to discharge to the Brooks Road roadside ditch. The LTS uses an activated sludge process to remove BOD and ammonia while also filtering out

suspended solids. The activated sludge process consists of a membrane bioreactor system that includes the following components:

- A primary settling tank with baffle walls to settle coarse solids
- Aeration tanks for BOD removal and nitrification
- Membrane filtration for removal of solids
- Chemical injection for pH adjustment as necessary, to enhance coagulation of solids, and for membrane cleaning
- UV disinfection
- Sludge storage for transport back to the landfill
- Effluent pumps and storage tanks

The LTS was designed with a maximum treatment capacity of 200 cubic metres per day (m<sup>3</sup>/day). The current Industrial Sewage Works ECA No. 1122-BKUPSM permits the discharge of an average 45 m<sup>3</sup>/day of treated leachate. Treated effluent in excess of the rated capacity for discharge to the roadside ditch is store prior to hauling off Site to a facility licensed to receive the treated effluent or such other removal of effluent from the Site completed in compliance with law, including Ontario Regulation 347.

Leachate generation forecasting was completed as part of the Design and Operations Report - Vertical Expansion using the Hydrologic Evaluation of Landfill Performance (HELP) model. The HELP model scenarios presented in the D&O Report were used to develop infiltration rates (and therefore leachate generation rates) for three surface types; active waste areas, interim cover, and final cover. The resulting rates are then applied to the respective areas of the landfill based on current and future site development. As noted in the D&O Report, the estimated leachate generation rate ranges from a peak of 49 m<sup>3</sup>/day during the final stage of filling to 33 m<sup>3</sup>/day during the post-closure period.

## **4. Potential Effects, Mitigation Measures & Net Effects**

A Project Description, which includes a Site Plan, was prepared so that potential environmental effects and mitigation measures could be identified. The following subsections provide a general summary of the proposed undertaking:

### **4.1 Purpose and Opportunity**

The purpose of the project is to increase the annual waste fill rate currently approved at the Site. The proposed project would allow for receipt of a maximum daily quantity (1,000 tonnes per day) throughout the year, which would increase the permitted annual fill rate from 151,000 tonnes per year to 250,000 tonnes per year. This annual maximum assumes the site will operate 5 days a

week, (closed on holidays) accepting 1,000 tonnes per day<sup>2</sup>. The proposed change to the annual fill rate requires no additional landfill infrastructure and there is no change to the currently approved landfill volume, footprint, or final contours.

The proposed undertaking provides an opportunity for BRE to capture additional wastes generated by their customers during busier months of operation and to fill the site rapidly. If this proposed undertaking is approved and the maximum tonnage proposed as part of this Screening were received annually at the Site starting in 2021, the ultimate approved capacity of the site may be reached earlier than contemplated as part of the 2018 EA.

## 4.2 Description of Project Components and Activities

The proposed project outlined in this report does not involve a change to the final site capacity, contours or footprint. No construction is required to implement the proposal. There will be no change to the existing infrastructure and no new facilities are proposed on Site. The Site will continue to operate within currently approved operating hours and current construction activities and daily operations will continue as usual.

From a traffic perspective there will be no changes to existing haul routes or Site entrance. Increasing the maximum annual fill rate will result in increased truck traffic on the haul route from Highway 3 along Brooks Road on an annual basis. It should be noted that as part of the recently completed Vertical Capacity Expansion EA, the assessment of impacts to traffic was based on 1,000 tonnes per day to demonstrate that the Site could manage this daily quantity and the potential effects resulting from this volume of traffic could be mitigated to acceptable levels. GHD built on the analysis completed in the 2018 Vertical Capacity Expansion EA which reviewed the total daily maximum quantity of waste that the site can accommodate from an operational perspective (1,000 tonnes per day) to evaluate the potential effects and mitigation measures required to maintain this daily volume over the course of a year to reach the annual fill rate of 250,000 tonnes per year.

If this project is approved and the maximum tonnage proposed as part of this Screening were received annually at the Site starting in 2021, the approved capacity of the site may be reached earlier than contemplated as part of the 2018 EA.

## 4.3 Methodology and Investigations

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 assessment was based on a review of the existing approved conditions and comparison against proposed conditions. The proposed fill rate amendment will not result in a change in the landfill base or cover designs, and there are no changes to the landfill footprint or operations. As such, the previous estimates of infiltration rates (i.e., HELP model results) and leachate generation rates remain unchanged from those identified in the D&O Report. Additionally, leachate quality is

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<sup>2</sup> 1,000 tonnes per day over 250 days (5 days per week minus 10 public holidays) equals 250,000

anticipated to remain consistent and therefore evaluation of the anticipated LTS performance is not required.

#### **4.4 Leachate Net Effects**

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 leachate related 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) would change as a result of the construction and operation of the proposed undertaking.

As described in **Section 2**, a “Yes” was not applied to any leachate related criteria, however this criterion was included based on consultation with the MECP.

As part of the consultation process, BRE carried out a follow-up meeting with the MECP to discuss comments provided on the initial Environmental Screening checklist results. As part of the discussions between BRE and MECP, BRE agreed to include the potential effects related to leachate generation. Specifically, MECP requested the effects of increasing the fill rate be evaluated within the context of the Leachate Management Plan (LMP) that was developed and incorporated into the ECA issued in March 2020.

It should be noted that the proposed fill rate amendment will not change any existing approved conditions of the operation of the Leachate Management System. The increased fill rate may result in earlier closure of the landfill than contemplated as part of the 2018 Vertical Capacity Expansion EA, resulting in the landfill progressing to the lower leachate generation rates (i.e., final cover conditions) earlier than currently projected. This in turn will result in peak leachate generation rates reducing below the LTS discharge limits earlier than currently projected, reducing the requirement to haul excess treated leachate off-Site for disposal (i.e., reduction in truck traffic).

No mitigation measures are required for leachate management as a result of the proposed fill rate amendment.

## **5. Monitoring Requirements and Additional Approvals**

No mitigation measures have been identified with regards to the Leachate Management System. As such, there are no anticipated adjustments to monitoring requirements and no additional approvals necessary.

## **6. Conclusion**

The proposed fill rate adjustment will not change the currently approved total landfill volume, size of landfill footprint, final Site contours, Site operations, or cover and base designs. As such, there are no anticipated changes to the conditions or operation of the Leachate Management System.

Therefore, there are no anticipated net effects associated with the Leachate Management System (i.e., no mitigation measures, monitoring requirement adjustments, or additional approvals).

## **7. References**

GHD, 2017. Brooks Road Landfill Site Vertical Capacity Expansion Environmental Assessment Report.

GHD, 2019. Design and Operations Report, Vertical Expansion, Brooks Road Landfill Site, 2270386 Ontario Inc.

GHD, 2020. Leachate Removal Plan - Revision 1, Brooks Road Landfill Site, 2270386 Ontario Inc.