

## **399 First Road West** Landfill Impact Assessment

## **D-4 Environmental Study**

**Project Location:** 399 First Road West Hamilton, ON

Prepared for: Hamilton-Wentworth District School Board 100 Main Street West PO Box 2558 Hamilton, ON L8N 3L1

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Engineers, Scientists, Surveyors.



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### **Executive Summary**

MTE has completed a landfill impact assessment in accordance with the Ministry of the Environment, Conservation and Parks (MECP) document "D-4 Land Use on or Near Landfills and Dumps", 1994 for a proposed school at 399 First Road West in Stoney Creek, Ontario.

The purpose of the study was to determine whether the proposed land use would require setback restrictions and/or significant environmental controls due to the Site's proximity to the Stoney Creek Regional Facility owned and operated by GFL Environmental Ltd. The study included a review of aerial photographs, historical records, previous environmental reports, and the completion of a Site inspection.

The subject Site consists of the vacant land parcel previously used for staging and stockpiling of soil and aggregate as part of construction of the surrounding residential developments. The GFL landfill accepts solid, non-hazardous residual material from commercial, industrial and institutional sectors, such as materials from the steel making industry and soils from infrastructure developments. The landfill does not accept any decomposable materials that can cause odours, generate landfill gases, or attract animals.

The Hamilton-Wentworth District School Board has been consulted as part of the landfill EA and ECA approvals and have in the past raised concerns to potential air quality and dust, noise, odour, groundwater, traffic, and visual aesthetics affecting the proposed school. The landfill EA and ECA approvals have incorporated this and other feedback and require GFL to meet specific conditions regarding air quality (including dust), noise, odour, groundwater, traffic, and visual aesthetics as well as operations, material placement, wastewater management, financial assurances, and public documentation. The landfill maintains full-time staff dedicated to ensuring environmental regulations are met.

Monitoring to fulfil the landfill EA and ECA approvals, show that methane has not been detected since 2012 in any of the wells which make up the landfill gas monitoring network surrounding the landfill, and surface water from the landfill will not adversely affect the Site.

Elevated ammonia attributed to the landfill was however identified in groundwater north-east of the proposed school Site in 2009. Human exposure to this ammonia would be through vapour to indoor air. Based on the concentrations identified in 2009, it was determined that the ammonia exposure to residents in dwellings would not result in adverse health effects provided a minimum of 1m of clayey silt soil (low permeable material) was present between the highest groundwater elevation and the basement of the building. MTE cannot confirm that the ammonia encountered in groundwater in 2009 has attenuated or would not be an ongoing concern.

However, a geotechnical investigation at the Site has demonstrated that the native silty clay/clayey silt above the limestone bedrock is 1.1 to 4.6 meters in thickness. This would effectively constitute a natural low permeable barrier (of <1m) between the highest groundwater elevation and the slab-on-grade floor of the building as recommended by MTE in 2010.

Therefore, based on the results of the records review and Site inspection, it is MTE's opinion that the landfill footprint or its' operations will not adversely impact the Site, and the proposed school itself will not create migration pathways for landfill gas, leachate in groundwater or surface water from the landfill. As such, provided that at least 1m thickness of natural clayey silt soil is maintained below the proposed slab-on-grade floor, no engineered controls or further setback distance from the landfill boundary is required at the Site.

Any decision to augment the proposed tree planting and landscape plan along the east and southern boundaries of the Site to assist in a visual barrier to the operating landfill approximately 190 metres to the southeast would be at the discretion of the Hamilton-Wentworth District School Board.

## **1.0 Introduction**

### 1.1 Site Description

MTE Consultants Inc. (MTE) was retained by the Hamilton Wentworth District School Board to complete a landfill impact study for a proposed two-storey school on a vacant development parcel at 399 First Road West in Stoney Creek, Ontario (the "Site"). The proposed Site layout and features are shown on **Figure 1**.

The Site is located to the north-west of the intersection of Green Mountain Road and First Road West and is approximately 3.15 ha in area. It is understood that the Site was most recently used for stockpiling of soil and aggregate as part of construction of the surrounding residential developments. These materials have been removed and topsoil has been stripped from the surface of the Site, leaving a thin layer of topsoil above native soils.

The Site is bordered by First Road West to the east, by Upper Red Hill Park to the north, and a woodland which forms a Vegetative Protection Zone (VPZ) and Environmentally Significant Area (ESA) to the west and south. Beyond the woodland to the south is a former landfill, and beyond Green Mountain Road to the southeast is an active landfill, which are both part of the Stoney Creek Regional Facility owned and operated by GFL Environmental Ltd (and formerly by Terrapure Environmental, NewAlta Corporation and Taro Aggregates Ltd).

### 1.2 Background

The GFL Stoney Creek Regional Facility (GFL landfill) is situated on 185.5-acres of land northwest of Mud Street and Upper Centennial Parkway (Highway 20) in the community of Upper Stoney Creek. The GFL landfill is made up of two equally sized areas, divided by First Road West.

A plan of the GFL landfill is presented as Figure 2, taken from GHD, 2020.

The western half forms the closed landfill which reportedly ceased operations in 1995 and was capped in 2000. This is now occupied by a passive park with post closure monitoring and maintenance in place. This area is known as Heritage Green Sports Park and occupies Lot 27 & 28, Concession 6, Hamilton City. Based on available information, the actual limit of landfilled waste is approximately 215m from the Site.

The eastern half forms the operating landfill which began accepting waste in 1996 and remains active. It is projected that the site can accept waste for the next 10-15 years before reaching capacity. The site is also referred to as the Stoney Creek Landfill and occupies Lot 25 & 26, Concession 6, Hamilton City. The operating landfill is approximately 190m to the south-east of the Site, beyond Green Mountain Road.

Both the closed landfill and active landfill were former quarries, and each has an extensive monitoring network as shown in **Figure 3.** 

### 1.3 **Purpose of Investigation**

As a condition of school development, the City of Hamilton requires that a landfill impact study be conducted in accordance with the MECP document "D-4 Land Use on or Near Landfills and Dumps" for any proposed sensitive land use within 500 metres of the fill area of a landfill.

The purpose of the landfill impact study was to determine whether development setback restrictions and/or environmental controls would be necessary at the Site to support the proposed school development, resulting from its' proximity to the closed and operating landfills.

This was accomplished by investigating issues of potential environmental concern to the Site related to the landfill limits, specifically:

- Potential migration of methane gas from the landfills to the Site;
- Migration of shallow groundwater from the landfills to the Site, if confirmed;
- Topography and surface water drainage and whether runoff from the landfills is or could be directed to the Site;
- Air, Noise, Dust, Odour emissions, vectors/vermin and fires associated with the closed landfill and existing waste management operations; and
- The potential for the school development itself to create preferential pathways for methane or leachate migration in groundwater or surface water.

### 1.4 Scope of Work

The work program included the following steps:

- Obtaining and reviewing relevant information regarding the history and physical setting of the landfill, including:
  - The most recent available annual monitoring reports for the landfills;
  - Ministry Approvals associated with the landfills;
  - Historical aerial photos illustrating the landfills and surrounding area; and
  - Geological, hydrogeological and topographic maps and reference materials.
- Site reconnaissance to observe the physical characteristics of the Site.

MTE has compiled a written report of findings and recommendations for use by the Hamilton Wentworth District School Board that has been prepared under the supervision of Mr. Robert Fedy, P. Eng., QP<sub>ESA</sub>.

### 2.0 Records Review

2.1 Taro East Quarry Environmental Assessment, Design and Operations Report. Prepared for Taro Aggregates Limited by Gartner Lee Limited, January 1995.

Gartner Lee were retained by Taro Aggregates to create a design and operations report to be submitted as part of Taro's application for the proposed Taro East Quarry Landfill in January 1995.

This Environmental Assessment was written when landfilling operations were active in the western half of the landfill (now closed), at the time when it was referred to as the West Quarry Landfill. The document supports a proposal for continued landfilling at the East Quarry location which had not yet been approved.

- The West Quarry Landfill accepted solid, non-hazardous industrial, commercial and institutional waste.
- The assessment states that "Based on experience at the West Quarry landfill, it is known that the waste stream is a source of combustible gas. Combustible Gas generation at the West Quarry Landfill is significantly less than that at typical municipal landfill sites. The organic fraction of the west quarry wastes is less than 5%, whereas the organic fraction at municipal site is up to 50% or greater." The assessment does not include any details or further information on the sampling and analysis of the combustible gas.

- The assessment states that "Leachate from the West Quarry Landfill has migrated eastward through ground water flow zones. This has created a plume of impacted groundwater in bedrock beneath the western portion of the East Quarry." A number of control measures were being used to mitigate these impacts:
  - Storm drainage collected within the east quarry was discharged to a sanitary sewer;
  - Impacted waters were being recovered by pumping well M4 within the East Quarry;
  - Quarrying was limited to 190 mASL to lessen the need for dewatering; and
  - A grout curtain and collector trench were proposed in the East Quarry adjacent to the western wall to intercept eastward migrating ground water from the west quarry.
- Sources of noise from the landfill include operation of the waste trucks, the bulldozer and compactor used in filling operations, and construction equipment for the landfill control systems. A noise impact assessment was carried out and concluded noise from the landfill will produce a minimal increase in noise beyond the background noise from local roads.
- 2.2 Redhill Developments, Empire Communities and 706870 Ontario Limited Nash Neighbourhood, Revised Landfill Impact Assessment, dated February 8, 2010 and revised September 14, 2010. Prepared by MTE Consultants Inc. for Armstrong Hunter & Associates.

MTE was retained by Armstrong Hunter & Associates in 2010 to complete a Landfill Impact Assessment (LIA) for the proposed Nash Neighbourhood, which included properties owned by Empire Communities, Red Hill Developments and 706870 Ontario Limited. Pertinent information from the report relevant to the proposed school Site is summarized below:

### Historical and 2010 operations

- For the 2010 report, the proposed school Site was part of the larger subdivision development property which was being assessed. This larger development was located northwest of the intersection of Green Mountain Road and First Road West.
- The Closed Landfill (West Quarry), which was noted to have ceased operations in 1995 and capped in 2000, was occupied by a passive park with post closure monitoring and maintenance requirements.
- The Operating Landfill (East Quarry) began accepting waste in 1996, and at the time of writing the report, was scheduled to close in 2020.
- Neither the Operating nor Closed Landfill accepted liquid industrial, hazardous, putrescible (green garbage bag), or sewage wastes during operations. Typical wastes included: non-hazardous contaminated soil, non-recyclable residues from steelmaking operations, solidified/stabilized industrial wastes, non-hazardous construction and demolition waste; and asbestos.

### Landfill Gas

 A methane gas monitoring program had been ongoing at the Operating Landfill since 2003, and no combustible gas had been measured to date (2010). Based on this, it was assumed that there have been no gas impacts to the proponent lands (including the Site), and the risk of impacts in the future were low based on the nature of the accepted materials (i.e., no putrescible wastes).  A gas control air injection system was installed and operated along the southern boundary of the Closed Landfill. There was one methane measurement above the trigger level in 2009, however this did not reoccur/could not be reproduced and was considered anomalous. It was MTE's opinion that no additional methane control systems were required to address the Closed Landfill.

### Landfill design and leachate control

 The Operating Landfill was engineered and includes a groundwater collection system, a double liner system over a base grading layer, a compacted clay secondary liner, a hydraulic control layer, a geotextile synthetic membrane, and a leachate control system within a graded filter layer (i.e., crushed stone and perforated pipes along the landfill floor and slopes).

Leachate migration through the liner system was monitored and sampled quarterly. At the time of this report, no leachate had been found in the hydraulic control layer, therefore the primary liner system had not been breached.

- Leachate and contaminated groundwater from the Operating Landfill are directed to the retention pond then pumped to the equalization pond on the Closed Landfill property and dosed with hydrogen peroxide. It is then discharged to private sanitary sewer connected to the municipal sewer system.
- The Closed Landfill is not engineered, and the primary leachate controls identified included:
  - A historical drainage channel associated with former quarry dewatering;
  - A series of containment pumping wells around the perimeter of the property (including seven along the northern boundary, south of the Site);
  - A leachate piping system along the floor of the western boundary connected to the discharge from the containment wells;
  - A perimeter cut off drain;
  - A shatter trench collection system located north of the property; and
  - Capping of the landfill in 2000.
- Leachate and contaminated groundwater from the Closed Landfill are either collected from the containment wells or leachate piping system and pumped to the equalization pond, where it is dosed with hydrogen peroxided then discharged to the municipal sewer system; or collected in the shatter trench system and then then discharged to the municipal sewer system.
- The Operating and Closed Landfills had similar leachate quality, which included elevated levels of alkalinity, electrical conductivity, total phenols, chloride, sodium, sulphate, potassium, iron, molybdenum, ammonia, and TKN.

### Groundwater Quality

 Groundwater monitoring was undertaken for both landfills which included twenty-three monitoring well nests on the Operating Landfill, twenty-seven monitoring wells on the Closed Landfill, and various monitoring wells and private water wells with the surrounding areas/proposed development lands. None of the monitoring wells included in this program are located on the proposed school Site.

- Both the Closed and the Operating Facilities are located in fractured bedrock of the Niagara Escarpment, within mined out dolostone quarries that are underlain by a sequence of shale and dolostone. The groundwater flow direction at the landfill is complex and comprises a number of distinct flow zones within different bedrock strata.
- Shallow groundwater within overburden in the general area is expected to flow in a north-westerly direction. Groundwater flow zones with the Bedrock underlying the landfill flow in a general north-easterly direction or toward a pumping well in the south-east of the landfill site.
- The groundwater samples collected as part of this monitoring program were compared to the Ontario Drinking Water Standards (ODWS).
- Monitoring wells on or adjacent to the proposed development lands were noted to have leachate impacts in groundwater in 2009. One of the impacted monitoring wells (MW66-I) was located north-east of the proposed school Site and was denoted by elevated ammonia only. (It was noted that there were historical groundwater impacts identified at the Closed Landfill prior to the implementation of the remedial measures including the shatter trench and containment wells).
- Based on the identified information, no leachate controls or additional groundwater monitoring was recommended by MTE for the proposed development lands themselves, inclusive of the proposed school Site.

### Ammonia Vapour risk

- However, MTE completed a toxicological assessment for the elevated ammonia levels identified in the groundwater to determine the risk posed to human health for the proposed development lands. As groundwater in this area is not a potable source (i.e., the full development would be serviced by a municipal water source), the only human exposure would be through vapour to indoor air. Based on the concentrations identified in 2009, it was determined that the ammonia exposure to residents in this development would not result in adverse health effects provided a minimum of 1m of clayey silt soil was present between the highest groundwater elevation and the basement of any dwelling. It was noted that this would apply to all proposed development lands that were within 500m of the fill areas of the landfills (i.e., including the proposed school Site).
- A subsequent letter from MTE in February 2021 to a Client within 500m of the landfill, confirmed that substitution of the recommended 1m clayey silt soil barrier below basement foundations with an alternative 15 mil polyethylene vapour barrier (single-ply thickness) installed below the poured concrete floor slab, in accordance with manufacturer's specifications, is equivalent and suitable to mitigate risk to occupants from ammonia vapour intrusion.

### Surface water

- A combined surface water monitoring program for both the Closed and Operating Landfills was conducted. The primary focus of this program was David Creek located west of the Closed Landfill and west of the subject Site.
  - The results of the monitoring program did not indicate surface water impairment due to either the Closed or Operating Landfills.
  - Additionally, neither of the landfills directly contribute impacted surface water or storm water to any local sources and no surface water or storm water flow from the Operating or Closed Landfills will be directed onto the Site.

 No surface water controls or additional contingency plans were recommended by MTE for the development lands including the proposed school Site.

### **Odours**

- Primary odour control measures occurring at the Operating Landfill included burying
  odorous wastes with other non-odorous wastes and dosing the leachate with hydrogen
  peroxide at the pumping stations.
  - Additional measures taken to control odours when required (i.e., in response to complaints) included treating the equalization pond on the Closed Landfill property with hydrogen peroxide and initiating aeration.
  - Based on these measures, MTE concluded that the odour controls at the Operating Landfill was sufficient to mitigate the impacts to the proposed development lands, including the proposed school Site.

### Visual

• The Operating Landfill is surrounded by a perimeter berm which blocks the view of the activities occurring on the property. In 2010, it was MTE's opinion that two-storey homes in the proposed development lands would not be at a higher elevation than the landfill perimeter berm, and therefore no concerns with visual impacts were identified. The landfill fill height in 2010 was 218.5 metres above mean sea-level (AMSL).

### <u>Dust</u>

• Air quality monitoring was conducted at the Operating Landfill and included comparisons to local meteorological conditions, MOE ambient air quality criteria for PM10 and historical PM10 measurements. During the 2008 and 2009 monitoring activities, there were multiple events which exceed the guidelines for PM10. Note that the monitor was located along the east side of the Operating Landfill and the wind directions were primarily from the southwest (i.e., not directed towards the proposed school Site).

### <u>Noise</u>

 Noise monitoring surveys were conducted for the Operating Landfill. The noise levels generated at the landfill were noted to be below the measured background noise for the surrounding areas, including the development Site.

### Litter, Traffic

- Dust, litter and vehicular traffic was noted to be properly managed at the Operational Landfill and was not identified as an environmental risk to the development lands.
   Landfill trucks are not permitted to use Green Mountain Road and would not likely pass in front of the Site along First Road West.
- As the Closed Landfill has been redeveloped into a passive park, there were no risk of impacts to the development lands due to odour, litter, dust, noise, traffic, aesthetics, and vectors/vermin identified by MTE.
- A Community Health Assessment Review was completed in 2009 and concluded that the Operating Landfill poses insignificant impact to the local community (humans and the natural environment).
- MTE conducted a site visit in August 2010 to the areas north of the Operating Landfill and along Davis Creek (west of the current Site) to observe the plant health and any phytotoxicity symptoms on vegetation in vicinity of the landfill. No phytotoxicity concerns were observed by MTE at that time.

## 2.3 Hamilton (Stoney Creek) Landfill Annual Report 2011. Prepared by Jackman Geoscience Inc. for Newalta Corporation, dated June 29, 2012.

An Annual Report was prepared for Newalta Corporation by Jackson Geoscience dated June 2012, to satisfy conditions of reporting under the Environmental Assessment Act and the Environmental Protection Act.

### Surface water quality

Upstream monitoring exceeded Provincial Water Quality Objectives (PWQO) for total phosphorous, iron, cobalt, copper, vanadium and zinc. At background level monitoring station, the PWQO was exceeded on all occasions for total phosphorous, zinc and dissolved oxygen, frequently for iron, and once for cobalt, chromium, copper, vanadium and zinc and unionized ammonia.

In 2011 phenols exceeded the trigger concentration on one occasion within a landfill equalization pond used for water treatment and returned to below detection levels on the next sampling occasion.

Organic compound monitoring was conducted in 2011. No organic compounds were detected in any of the samples taken.

### Landfill Gas

Monitoring began in 2003 and the first two years of monitoring did not detect any combustible gas. The monitoring results for 2011 indicate that at monitor GE5 located at the southwest corner of the operating site, low levels of combustible gas (Methane at 1.5%vol) below the lower explosive limit, were detected during three sampling events that year. It was proposed that small amounts of methane gas may be present in the perimeter drain system (a collection system for shallow groundwater which is migrating west to east from the closed landfill) as the pumping station is exposed to the atmosphere, and the natural presence of bacteria capable of producing methanogenic and hydrogen sulphide gas is more likely.

### Groundwater

In 2011, a number of monitoring points within a number of groundwater layers exceeded the trigger values for Iron, Manganese, Sodium, Chloride and Sulphate. These were generally explained as natural background quality fluctuations and did not exhibit impact ratios or Phenol levels that would indicate an impact from landfill leachate.

It was noted that the engineered liner had shown no indication that any contaminants have migrated through the upper clay liner or into the hydraulic control layer and therefore contaminants could not have penetrated through the lower clay liner.

### Air Quality

In 2011 the air quality monitoring was conducted a device continuously monitoring and recording air quality for PM10 sized particles. There were 11 24-hour ambient air quality criteria exceedances and 73 hourly exceedances. These were attributable to the landfill liner construction and neighboring subdivision construction. Dust complaints were not reported at any time during the 2011 reporting year.

### <u>Noise</u>

Noise monitoring was conducted twice in 2011 and confirmed that the noise levels generated at the landfill are below measured background noise for the surrounding area and are considered to be compliant with the Ministry of the Environment (MOE) guideline.

### <u>Odour</u>

During 2011, the landfill responded to nine odour complaints concerning the operation of the landfill. All complaints were followed up promptly, and steps were taken to detect and suppress the odour. The source of odours was generally from the West Retention Pond or an incoming load of waste material.

2.4 Stoney Creek Regional Facility, Annual Report 2015. Prepared by Jackman Geoscience Inc. for Terrapure Environmental, dated June 30, 2016.

An Annual Report was prepared for Terrapure Environmental by Jackson Geoscience dated June 2016, to satisfy conditions of reporting under the Environmental Assessment Act and the Environmental Protection Act.

### Surface water quality

The 2015 sampling results indicate that Aluminum and Zinc concentrations exceeded the PWQO for the majority of the sampling occasions at all of the offsite monitoring stations. Phenols were not detected above the detection limits on most of the sampling occasions.

### Landfill Gas

The monitoring results indicate that no methane has been detected at any of the monitors since December 2012.

### Groundwater quality

Triggers for Iron, Manganese, Sodium, Fluoride and Chloride were detected above background quality but were suspected as being partially from road salt.

### Air Quality

In 2015 there were 14 24-hour ambient air quality criteria exceedances and 88 hourly exceedances generally attributable to the facility operations. No dust complaints were received at the facility.

### <u>Noise</u>

Noise monitoring was conducted twice in 2015 and confirmed that the noise levels generated at the landfill are below measured background noise for the surrounding area and are considered to be compliant with the MOE guideline.

### <u>Odour</u>

During 2015 the landfill responded to three complaints concerning the operation of the landfill, all of which were related to Odour. All complaints were followed up promptly, and steps were taken to detect the odour. It was not possible to pinpoint a specific source on these occasions.

2.5 Ministry of the Environment, Conservation and Parks: Ministry Review of the Stoney Creek Regional Facility Environmental Assessment - June 2019 & Notice of Approval 2019

A proposal for expansion of the landfill was made to the Minister of the Environment, Conservation and Parks in January 2019.

The Environmental Assessment (EA) was prepared in accordance with the approved Terms of Reference (ToR) and was deemed to contain sufficient information to assess the potential environmental effects of the proponent's undertaking.

The proposal was approved by the Minister and requirements for a compliance monitoring program and annual reporting, a complaints protocol, consultation with local communities and

indigenous communities, truck operating framework and an odour and dust management plan were added as conditions of the approval. Further discussion is provided below.

### Site History

The landfill first received approval under the Environmental Assessment Act in 1996.

The site receives solid, non-hazardous residual materials from industrial, commercial and institutional sources that have exhausted all recycling options. These materials include residues from local steelmaking and other industrial operations, excavation materials from industrial sites, construction/demolition materials, and rubble.

The landfill is designed as an engineered site and has a double liner system, which includes a natural clay liner and a single geosynthetic membrane liner to mitigate leachate and manage leachate collection. The site does not receive municipal garbage.

The site is permitted to receive 750,000 tonnes of material annually, taking in a combination of residual material and industrial soils, or "fill" with a total permitted capacity of 6.5 million m3. The site is permitted to receive up to 250 trucks per day. In 2019 it was proposed to increase the capacity by 3.68 million cubic metres (m3).

### Local Area

Four roads border the existing landfill, Upper Centennial Parkway to the east, Mud Street West to the south, First Road West to the west, and Green Mountain Road West to the north.

The nearest residential dwelling (under construction as part of a larger residential development) is approximately 35 metres north of the existing landfill boundary. There are approximately 5,800 residential dwellings (built, under construction or approved) within 1.5km of the landfill.

The existing landfill is located within the fractured bedrock near the Niagara Escarpment, in a former quarry. The prominent geologic feature in the local study area is the Niagara Escarpment, located approximately 800 metres to the north of the site study area. The area is serviced by the municipal drinking water system derived from an intake located within Lake Ontario. The majority of the local study area is located outside the limit of the Intake Protection Zone.

The proposed expansion involves the construction and operation of a reconfigured and vertically expanded landfill. The site would no longer be approved to receive industrial fill, but only postdiversion solid, non-hazardous industrial, commercial and institutional residual material. This would result in an increase of approved capacity up to 10.18 million m3.

The footprint area for residual material, which is currently 41.5 hectares would increase to 59.1 hectares, however the overall landfill footprint will not change. The peak elevation would increase from 218.5 to 221.0 metres above mean sea-level (AMSL).

The potential effects of the Reconfiguration and Vertical Expansion of the Stoney Creek Regional Facility landfill were assessed, and it was determined that there would be no net negative effects to surface water, groundwater quality and flow as base liners, leachate and stormwater management measures will be implemented. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota will be mitigated.

The potential for low net effects to air quality affecting off-site receptors were identified. The application of dust best management practices, in addition to the reduction in daily vehicle limits and to the speed limit, will mitigate effects.

No net effects to odours affecting off-site receptors are anticipated.

Net effects to noise affecting off-site receptors are anticipated to be low upon implementation of management measures that will include the installation of berms at the landfill perimeter to the north, which intervene the development lands.

Moderate net effects to views of the facility are anticipated. However, installation of visual screening elements, such as vegetation, fencing, or berms, will minimize views of the facility from the surrounding community.

No effects to road user safety or intersection level of service as a result of truck traffic are anticipated in the local study area. Landfill trucks are not permitted to use Green Mountain Road and would not likely pass in front of the Site along First Road West.

No net effects to human health resulting from predicted effects to leachate quantity, groundwater quality, surface water quality, or soil quantity are anticipated.

Low net effects to human health resulting from effects to air quality are anticipated. Volatile Organic Compound (VOC) emissions would be equivalent to the existing approved landfill design, where concentrations are expected to be below heath-based benchmarks.

Ongoing monitoring of the existing particulate/dust control impact management measures will be in place to confirm compliance with ambient guidelines.

The cumulative effects assessment of the proposed undertaking considered other projects/activities that are existing, planned/approved or reasonably foreseeable within the local study area. After application of mitigation measures, cumulative effects were identified as only having minor or moderate adverse effects, which are considered not significant, on two components: landscape composition and use and enjoyment of private property.

Effective mitigation of potential cumulative effects can be achieved by ensuring that all future development meets the broader planning objectives of the Provincial Policy Statement (2005) and policies set out in the City of Hamilton's official plan.

### Air Quality

The landfill receives primarily non-hazardous industrial, commercial and institutional fill with very little waste containing organics, such as municipal solid waste. As a result, the potential to produce methane and other greenhouse gases is significantly lower than a municipal solid waste landfill of the same size.

GFL committed to a number of mitigation measures to reduce the potential for effects to air quality including:

- Implement and enforce an anti-idling policy for all vehicles and machinery on-site during the construction stage and operation stage;
- Try to use materials that have a lower carbon footprint and a long lifespan;
- Reduce the size of the uncovered/working area; and
- Replace and plant additional vegetation to create a carbon sink.

### Leachate Treatment

An assessment of the existing leachate collection was completed. Leachate discharge was to via the sanitary sewer for treatment at the City of Hamilton's wastewater treatment plant. An existing agreement established with the City of Hamilton outlines requirements regarding the quantity and quality of the leachate that can be discharged from the site. The agreement will be revised as required through consultation with the City of Hamilton to ensure that the treatment system is able to handle the leachate discharged.

### **Consultation with Hamilton-Wentworth District School Board**

The Hamilton-Wentworth District School Board raised concerns to potential air quality and dust, noise, odour, groundwater, traffic, and visual aesthetics affecting the proposed school.

Mitigation measures have been committed to in the Environmental Assessment for these and other identified concerns. This includes a dust mitigation plan, a semi-annual noise monitoring, groundwater monitors, visual screening methods, and annual monitoring reports. Reports and impact assessments have also completed during the assessment process to outline the potential risk or non-risk posed by elements including traffic, odour, and site design.

Odour and dust management plans have been submitted with the ECA application to ensure ongoing odour and dust best management practices at the Stoney Creek Regional Facility continue to be followed, including requirements for the proponent to consult with the local community, City of Hamilton and the Hamilton School boards in the development of the dust and odour management and mitigation plans.

### **Aesthetic View**

The public is concerned that with the increase in height to the landfill, the impacts to the aesthetic view would contribute to a loss of property value.

Visual screen methods, including fencing, berms and tree planting have been used both on the landfill property and beyond to mitigate visual impact from the increased height of the landfill.

### Odour

Public comments indicate that residents are concerned with odour from the landfill. Odour and dust management and mitigation plans are in place to ensure ongoing odour and dust management best practices at the Stoney Creek Regional Facility.

### Traffic

Comments received by the ministry indicate that members of the public who live near the landfill, or have identified roadways used for trucking, have expressed dissatisfaction with the site's impact on local traffic. Similar concerns were shared by the City of Hamilton.

No effect on traffic is expected. Existing measures to monitor the effects on traffic, including inspections and washes for trucks entering and exiting the site. Landfill truck routes do not include Green Mountain Road and landfill trucks are unlikely to pass by the Site along First Road West. A Truck Operations Monitoring Framework describing proposed driver training and awareness strategies was developed in consultation with the City of Hamilton; to be maintained during construction and operations of the landfill.

## 2.6 Stoney Creek Regional Facility Annual Report 2020 Highlights. Prepared by GHD for Terrapure Environmental, dated 2021.

The SCRF Annual Monitoring Report was prepared by GHD on behalf of Terrapure Environmental for submission to the MECP.

In 2020, the SCRF met all of the quality and quantity requirements of the discharge agreement with the City of Hamilton related to leachate and surface water discharge.

No significant concentrations of landfill gas were detected between December 2012 and 2020.

Noise monitoring was conducted twice in 2020 and noise levels are below the measured background noise and meet provincial guidelines.

There were three odour and one visual complaint from community members. All were investigated, responded to the complainant, discussed with the liaison committee and submitted to the MECP.

There was 1 event that exceeded MECP guidelines relating to particulate matter attributable to the SCRF. No dust complaints were received at the site. The landfill continues to employ and update dust control procedures.

Based on the 2020 Annual Report, the Community Health Assessment Review concluded once again that, "no adverse health effects within the surrounding community should be expected as a consequence of current operations at the SCRF"

## 2.7 Stoney Creek Regional Facility Annual Report 2021 Highlights. Prepared by GHD for Terrapure Environmental, dated 2022.

The SCRF Annual Monitoring Report was again prepared by GHD on behalf of Terrapure Environmental for submission to the MECP.

In 2021, the SCRF met all of the quality and quantity requirements of the discharge agreement with the City of Hamilton related to leachate and surface water discharge.

No significant concentrations of landfill gas were detected between December 2012 and 2021.

Noise monitoring was conducted twice in 2021 and noise levels are below the measured background noise and meet provincial guidelines.

In 2021, there were seven odour and one visual complaint from community members. All were investigated by GFL, responded to the complainant, discussed with the CLC, and submitted to the MECP.

In 2021, there were four exceedances of the daily PM10 guideline attributable to the SCRF. No dust complaints were received at the Site.

Based on the 2021 Annual Report, the Community Health Assessment Review concluded once again that, "no adverse health effects within the surrounding community should be expected as a consequence of current operations at the SCRF"

## 2.8 Truck Operations Monitoring Framework. Prepared by GHD for Terrapure Environmental, dated January 2020.

A "Truck Operations Monitoring Framework", including "driver training and awareness strategies, as well as monitoring and evaluation strategies on an annual and/or semi-annual basis" has been implemented at the SCRF.

The daily maximum number of vehicles depositing residual material at the SCRF will continue to be restricted to 250 vehicles. However, traffic levels are anticipated to remain similar to the current average of approximately 70 - 100 vehicles/day. Truck traffic associated with the operation of the landfill generally includes dump trailers, triaxles, luggers and roll-off trucks hauling waste to the landfill.

Trucks will continue to use the existing entrance on Upper Centennial Parkway and exit on First Road West, heading southbound. As per the Environmental Compliance Approval (ECA), no waste vehicles will be permitted on Green Mountain Road and would not likely pass in front of the Site along First Road West.

Additionally, best management practices are employed to minimize dust and noise impacts of vehicles within the property and on surrounding municipal roads, including road sweeping and washing. Additional information on these procedures is included in Stoney Creek Regional Facility Dust Management Plan.

## 2.9 Dust Management Plan. Prepared by GHD for Terrapure Environmental, dated September 2021.

A dust management plan was prepared in accordance with conditions relating to the SCRF EA 2019.

To minimize the potential for off-site dust events for the existing and future operations of the SCRF, a Best Management Practices Plan has been developed that outlines measures that will be taken throughout the life of the landfill.

The plan identifies the main dust sources at the site, outlining the intended target and listing the control methods, implementation times, and record keeping procedures. The plan outlines the procedures to control the potential for dust emissions from the SCRF including daily inspection and maintenance, training, analytical measurements and reporting and preventative and corrective action.

2.10 Odour Management Plan. Prepared by GHD for Terrapure Environmental, dated June 2021.

An odour management plan was prepared in accordance with conditions relating to the SCRF EA 2019.

To minimize the potential for off-site odour complaint events for the existing and future operations of the SCRF, a Best Management Practices Plan has been developed that outlines measures that will be taken throughout the life of the landfill.

It is expected that the proposed waste stream will not routinely generate offensive odours; however, some of the wastes are expected to occasionally generate hydrocarbon odours. These are not routine occurrences and typically occur during the actual dumping and spreading of certain waste loads. The odour concerns typically associated with municipal landfills will not exist with the proposed waste stream.

The plan outlines potential sources of odours including:

- Incoming Waste Control Operations and Active Landfill Areas;
- Exposed Areas through Waste Movement and Construction Operations; and
- Leachate and Leachate Pumping.

Inspection and maintenance procedures, Monitoring, training, and corrective action are recommended in the report along with periodic reviews.

2.11 Geotechnical Investigation – Proposed Nash Elementary School. Prepared by Soil-Mat Engineers & Consultants Limited for Hamilton Wentworth District School Board and dated October 14, 2022.

Soil-Mat Engineers & Consultants Limited prepared a Geotechnical Investigation for Hamilton Wentworth District School Board in October 2022 to assess the subsurface soil conditions at the Site and provide comment on the design and construction of the proposed school.

A total of twenty-four boreholes were advanced across the Site. The boreholes were advanced using continuous flight power auger equipment to auger refusal on assumed bedrock at depths of approximately 1.1 to 4.6 meters below the existing grade.

The Site was previously used for staging and stockpiling of soil and aggregate as part of construction of the surrounding developments. The topsoil has been stripped from the surface of the Site, leaving a generally thin veneer of topsoil and the underlying native soils. The Site is reported as generally flat and roughly level with First Road West.

No visual indication of waste material was observed in any boreholes advanced at the Site.

The subsurface conditions are summarised as follows:

### Silty Clay/Clayey Silt

Native silty clay/clayey silt was encountered at all borehole locations. The soil is cohesive, brown in color, contains traces of sand and gravel and was generally stiff to hard in consistency. The upper levels of the silty clay/clayey silt generally had a 'reworked' appearance. The native silty clay/clayey silt extends to auger refusal on limestone bedrock at depths of approximately 1.1 to 4.6 metres.

### Limestone Bedrock

Limestone bedrock was inferred from auger/spoon refusal at depths of approximately 1.1 to 4.6 metres. The depths to bedrock were generally shallower in the east of the site and deeper in the west. Based on review of available published information, the bedrock consists of limestone of the Lockport formation.

### Groundwater Observations

All the boreholes were noted to be open and 'dry' upon completion. The static groundwater level is estimated to be within the limestone bedrock, below the depths of the investigation and the anticipated depths of construction.

### Excess soil analysis

Two representative samples of the subsurface soils recovered from the boreholes were submitted to an analytical laboratory for metal and inorganic parameters as well as petroleum hydrocarbons (PHCs).

Based on the results of initial testing, an additional five samples were submitted for metals parameters and one of the original samples was resubmitted for Toxicity Characteristic Leaching Procedure (TCLP) testing to characterise the subsurface soils and provide preliminary comment with respect to the off-site disposal of surplus soil during construction.

The material at BH6 SS2 has been shown to exceed the Table 2.1 and 3.1 ICC Standards for Zinc. This localized area at BH6 SS2 is not significant (and not landfill related) but would not likely be accepted at off-site Table 1, 2, or 3 properties.

All other results for the samples meet the O. Reg. 406/19 Table 1, 2.1 and 3.1 (RPI and ICC) Standards for the parameters tested and accordingly are suitable for re-use on another property.

### 2.12 Environmental Source Information

### 2.12.1 Environmental Compliance Approvals

The design and operation of the SCRF is carried out in accordance with the requirements of the Environmental compliance Approval (ECA) No. A181008 which was issued on September 6, 1996, and amendment on October 31, 2019, and a minor amendment on February 23, 2021.

The 2019 amendment approved an expansion of the Operating Facility. The Amended ECA defines a 59.1 ha (146 acre) landfill site within a total site area of 73.9 ha (185.5 acres). The maximum volume of waste and cover materials, excluding final cover, is now 10,180,000 m3. The maximum annual and fill daily rates are now 750,000 tonnes and 8,000 tonnes respectively.

The February 23, 2021, amendment incorporated final cover approval.

In addition to ECA No. A181008, operations of the Stormwater Management Pond are governed by SWM Pond - Industrial Sewage ECA No. 5400-7DSSHU. Compliance with ECA No. 5400-

7DSSHU is discussed in Section 4.5, below. Water taking at the site are largely used to manage the groundwater impacts of the Closed Facility. These takings are regulated by Permit To Take Water (PTTW) No. 6543-9ZGNU5.

### 2.13 Physical Setting Sources

### 2.13.1 Topography, Hydrogeology, Geology

MTE reviewed Ontario Base Map (OBM) 10 17 5950 47800, which was created based on 1984 aerial photography. Topography across the Site is generally flat or sloping very gently to the north. Elevations appear to range between 190 and 200 m AMSL.

In 1984 no landfilling was apparent. A copy of the OBM is included in Appendix A.

Both the Closed, and the Operating Landfill sites are located in fractured bedrock of the Niagara Escarpment within mined out dolostone quarries that are underlain by a sequence of shale and dolostone of the Lockport and Clinton Formations. The rock formations beneath the landfill allow the movement of groundwater through a variety of openings created by the various geomorphologic processes acting upon the rock over time. Groundwater movement through these openings also dissolves some of the rock, and soluble minerals which can result in elevated levels of naturally occurring compounds that are not landfill sourced.

The groundwater flow system near the Operating and Closed Facilities is characterized by groundwater movement from the southeast to the northwest towards the Site and more notably, the Niagara Escarpment. However, groundwater movement is also influenced by the remedial measures implemented to control groundwater impacts from the Operating and the Closed landfill.

### 2.13.2 Aerial Photography

Aerial photographs and maps were reviewed for information pertaining to the Site, landfill property and surrounding area. Aerial photographs were obtained from First Base Solutions Inc, the National Air Photo Library and from Google Earth. The earliest available aerial photograph of the Site and surrounding area was from 1934. Additional aerial images were available to MTE and are described below. Copies of the reviewed images are provided in **Appendix A**.

### **1934 Aerial Photograph**

The 1934 aerial photograph depicts the Site as a cultivated agricultural field, located on the western side of First Road W. The landfill properties are also made up from several agricultural fields. Mud Street W is present in its current configuration to the south of the current landfill areas. No indications of landfilling were observed within the boundaries of the Site or surrounding areas.

### 1962 Aerial Photograph

The 1962 aerial photograph again depicts the Site as a cultivated agricultural field. The current closed landfill site is in use as a quarry, with the central section being excavated. A small section in the north-east of the current operating landfill site is also being excavated. The general area is predominantly agricultural in land use. No indications of landfilling were observed within the boundaries of the development Site.

### 1986 Aerial Photograph

The Site appears unchanged and in use as open land. The current closed landfill site remains in use as a quarry or potentially as a landfill and the current operating landfill site is also being excavated. The general area to the west and south of the site is significantly more residential and several subdivisions have been constructed. No indications of landfilling were observed within the boundaries of the development Site.

### **1992 Aerial Photograph**

The 1992 aerial photograph does not appear to show any significant changes to the Site. Infilling can be seen in the current closed landfill site. The extent of infilled land within the current closed landfill site is demonstrated to be approximately 215m south of the subject Site. No indications of landfilling were observed within the boundaries of the subject Site.

### 2002 Aerial Photograph

The 2002 aerial photograph shows no significant changes to the subject Site. The current closed landfill site has been covered by this stage and appears to be no longer in operation as a landfill.

### 2017 Aerial Photograph

The Site is in use at this time as part of the development area for a subdivision being constructed on the east side of First Road W. A large stockpile of material is present on Site with other equipment associated with the construction works.

### 2019 Aerial Photograph

The subdivision to the east of the Site has been completed and the large stockpile of presumed topsoil material has been removed from the Site. A new subdivision is being constructed to the north and the north-west of the site and again, the Site and the adjacent northerly site are being used as a work area in relation to the construction work.

### 2021 Aerial Photograph

The Site has been cleared of all materials and is unoccupied. The property adjacent to the north has been developed as a small park.

### Summary

A review of air photos confirms that the Site was not developed and was not used for landfilling. Soil stockpiles were evident between 2016 and 2020 in relation to the development of residential subdivisions in the area.

## 3.0 Review and Evaluation of Information

Based on a review of the requirements in the D-4 Guideline, there are a number of factors that require assessment for sensitive land use development within 500 metres of a landfill.

For an operating landfill site, the D-4 Guideline requires that the following factors be considered in an assessment:

- Landfill-generated gases, particularly methane gas;
- Ground and surface water contamination by leachate;
- Odour;
- Litter;
- Contaminant discharges from associated vehicular traffic;
- Visual impact;
- Dust;
- Noise;

- Other air emissions;
- Fires;
- Surface runoff; and
- Vectors and vermin.

In addition, because the Site is also located with 500m of a non-operating landfill site, the D-4 Guideline requires that the following additional factors be considered:

- Ground settlement; and
- Soil contamination and hazardous waste.

### 3.1 Migration of Landfill Generated Gases

The following findings have been considered by MTE, demonstrating that engineered controls are not required at the Site to mitigate concern posed by landfill generated gases:

- Neither the Operating nor Closed Landfill accepted liquid industrial, hazardous, putrescible (green garbage bag), or sewage wastes during operations. Typical accepted wastes included: non-hazardous contaminated soil, non-recyclable residues from steelmaking operations, solidified/stabilized industrial wastes, non-hazardous construction and demolition waste, and asbestos. The potential to produce methane and other greenhouse gases is significantly lower than a municipal solid waste landfill of the same size.
- A methane gas monitoring program had been undergoing at the Operating Landfill since 2003 and monitoring continues under the regulations of the landfill ECA. The monitoring results indicate that combustible gas has not been detected at any of the monitor stations since December of 2012.
- The engineered liner system of the operating landfill is constructed such that it presents a physical barrier to the movement of any landfill gases. In addition, the Operating Facility is not yet completely capped and therefore the path of least resistance for the movement of gas from the Facility is upwards through the waste to the surface where it vents naturally to the atmosphere.
- The Taro East Quarry Landfill Environmental Assessment Report 1995 anecdotally suggests that the current closed landfill area is understood to have historically produced some level of landfill generated gas. A gas control air injection system was installed and operated along the southern boundary of the Closed Landfill. There was one exceedance above the trigger level concentrations in 2009, however this did not reoccur/could not be reproduced and was considered anomalous.
- The new school development is to be constructed without any areas of basement.

Accordingly, there is no concern for landfill generated gases to impact the Site.

### 3.2 Groundwater Contamination by Leachate

The shallow groundwater is expected to move across the landfill sites in a north-westerly direction toward the subject Site. A diagram of the shallow groundwater flow is presented as **Figure 4.** 

The following findings have been considered by MTE, demonstrating that engineered controls are not required at the Site to mitigate concern posed by landfill leachate to groundwater:

- The construction of the Operating Landfill was engineered and includes a groundwater collection system, a double liner system over a base grading layer, a compacted clay secondary liner, a hydraulic control layer, a geotextile synthetic membrane, and a leachate control system within a graded filter layer. Leachate migration through the liner system is monitored and sampled quarterly. No leachate had been found in the hydraulic control layer; therefore, the primary liner system has not been breached.
- Leachate and contaminated groundwater from the Operating Landfill are directed to the retention pond then pumped to the equalization pond on the Closed Landfill property and dosed with hydrogen peroxide. It is then discharged to private sanitary sewer connected to the municipal sewer systems.
- The Closed Landfill is not engineered, and leachate has historically (prior to 1995) migrated eastward through ground water flow zones from the closed landfill. This has created a plume of impacted groundwater in bedrock flow zones beneath the western portion of the operating landfill. Several control measures were being used to control these impacts prior to 1995:
  - Storm drainage collected within the east quarry was discharged to a sanitary sewer;
  - Impacted waters were being recovered by pumping well M4 within the east quarry;
  - Quarrying within the east quarry was limited to 190 mAMSL to lessen the need for dewatering; and
  - A grout curtain and collector trench were proposed in the east quarry adjacent to the western wall to intercept eastward migrating ground water from the west quarry.

Today the primary leachate controls at the closed landfill include:

- A historical drainage channel associated with former quarry dewatering;
- A series of containment pumping wells around the perimeter of the property (including seven along the northern boundary, south of the subject Site);
- A leachate piping system along the floor of the western boundary connected to the discharge from the containment wells;
- A perimeter cut off drain;
- A shatter trench collection system; and
- Capping of the landfill in 2000.
- Leachate and contaminated groundwater from the closed landfill are either collected from the containment wells or leachate piping system and pumped to the equalization pond, where it is dosed with hydrogen peroxided then discharged to private sanitary sewer connected to the municipal sewer systems; or collected in the shatter trench system and then then discharged to private sanitary sewer connected to the municipal sewer systems.
- Groundwater monitoring is conducted under the landfill ECA for both landfills and includes included twenty-three monitoring well nests on the Operating Landfill property, twenty-seven monitoring wells nets on the Closed Landfill property, and various monitoring wells and private water wells with the surrounding areas/proposed development lands. The analytical results for groundwater samples collected at monitoring wells network, do not show that the landfill is negatively impacting groundwater in the area.

It is noted that leachate impacts to the groundwater were noted in 2009 when a monitoring well (MW66-I) in the development site investigated by MTE was affected by elevated ammonia concentrations. MTE completed a toxicological assessment for the elevated ammonia levels identified in the groundwater to determine the risk posed to human receptors in the proposed development lands. As groundwater in this area is not a potable source (i.e., the development would be serviced by a municipal water source), the only human exposure would be through vapour intrusion to indoor air. It was determined that ammonia exposure to residents in this development would not result in adverse health effects if a minimum of 1m of clayey silt soil was present between the highest groundwater elevation and the basement foundation. It was noted that this would apply to all proposed development lands that were within 500m of the fill areas of the landfills (i.e., including the school Site).

However, the native silty clay/clayey silt which has been shown to exist above the limestone bedrock at the Site is 1.1 to 4.6 meters in thickness. This would effectively constitute the 1m of clayey silt soil required between the highest groundwater elevation and the foundation of the building as recommended by MTE in 2010, and therefore would not be expected to result in adverse health effects for occupants of the Site.

### 3.3 Surface Water Contamination by Leachate / Surface Run-off

A leachate collection system in the operating landfill is monitored to measure leachate levels at different points across landfill. The liner and the leachate collection system are regularly inspected for early detection of potential leaks in the clay liner. There have been no leaks in the clay liner at the SCRF.

Leachate and contaminated groundwater from the closed landfill are either collected from the containment wells or leachate piping system and pumped to the equalization pond; or collected in the shatter trench system.

Leachate is treated on site to meet quantity and quality requirements as laid out in a discharge agreement with the City of Hamilton. After leachate is treated, it is discharged to the City's sanitary system to be treated at the sewage treatment plant. In 2021, SCRF met all the quality and quantity requirements of the discharge agreement with the City of Hamilton.

Rain that falls on capped areas of the site is transported to a stormwater management pond through a series of ditches. It is then tested to meet quality and quantity parameters before it is discharged off site. Rain that falls on the active landfill area is collected and treated as leachate.

Surface water monitoring includes 8 locations focused on the watercourses downstream of the Site. In 2021, there were 16 surface water samples collected during 8 monitoring events. There were no indications of surface water impact from the landfill in 2021.

Accordingly, it is very unlikely that surface water runoff from the landfill property would impact the Site.

### 3.4 Ground Settlement

No visual indications of waste material were observed in boreholes advanced at the Site as part of a geotechnical investigation in 2021. Historical aerial photographs confirmed that waste disposal did not extend to the Site. Accordingly, there is no concern for ground settlement at the Site related to waste disposal.

### 3.5 Visual Impact

The Site was attended by MTE on November 24, 2022.

The vegetated screening berm (a mound of earth along the north boundary of the operating landfill) was observed from the subject Site, looking toward the south-east. The berm blocks the

majority of landfill operations from the subject Site and only the berm and a pond in the northwest corner of the operating landfill are plainly visible.

An increased height of the fill material was permitted in the 2019 ECA amendment from 218.5 mAMSL to 221.0mAMSL. Typically, the elevation of the subject Site is on the order of 190 to 200 mAMSL. Occasionally an extended excavator or tipping truck on the operating landfill 190 m south-east could barely be observed from the Site, however it should be noted that no actual landfilling of waste is observable from the Site.

With reference to the **Figure 1** Site plan, the intended landscaping for the school includes a number of planted trees along First Road West and along the southern boundary of the Site, which will aid as a visual barrier. Any further visual barriers along the south-east boundary would be at the discretion of the Hamilton-Wentworth District School Board. A potential additional visual barrier could be considered by Hamilton City by tree planting in the existing roundabout between the school and the landfill, <u>subject to traffic safety considerations</u>.

The view toward the closed landfill is blocked by a stand of mature trees. Since the closed landfill is capped, and vegetated, there is no ongoing visible waste filling area and visually the area resembles mature parkland.

### 3.6 Soil Contamination and Hazardous Waste

Based on the results of the records review, MTE is not aware of any historical handling and disposal of 'hazardous' waste at the landfill property. A review of borehole logs and included in the 2021 Geotechnical report at the site indicates that no odours or staining of the soil on the Site. Two representative samples of the subsurface soils which were analysed from the Site were not determined to constitute Hazardous Waste.

### 3.7 Fugitive Emissions (Air, Noise, Dust, Odour, Traffic)

The closed landfill is not considered to be a source of fugitive dust emissions, air pollution, odour or noise issues as the final cap and vegetated cover is in place and is maintained.

Based on MTE's understanding of current operations at the operating landfill property, the following are potential fugitive air emission sources:

- Air emissions (i.e., particulate matter) from landfill operations.
- Noise emissions from vehicle traffic accessing the landfill and from the operational equipment within the landfill.
- Fugitive dust emissions from the landfill exit on First Road W.
- Odour emissions from waste deposited in the landfill site and from leachate treatment on site.

It is noted that in order to obtain the amended ECA for the landfill, the landfill operator was tasked to produce Truck Operations Monitoring Framework, a Dust Management Plan and an Odour Management Plan intended to address these specific issues and concerns. For example, there are defined truck routes that prohibit use of Green Mountain Road, and the operator is bound to demonstrate that air, odour, dust and noise emissions from operations at the facility are negligible, or meet the applicable risk based MECP standards at the property fence line and nearby sensitive receptors, which are protective of human health.

It should be noted that the 2021 Annual Report indicates that noise levels were below the measured background noise and met provincial guidelines. In addition, the report relates that seven odour complaints were received and that odour instances can be controlled by making adjustments to operations as needed. All complaints are followed up by investigations conducted to ensure the facility continues to meet MECP regulations. No dust complaints were

received at the Site in 2021 and the SCRF continues to employ and update a dust monitoring and control procedure. A wheel wash, a water truck and sweeper are also used to control dust.

Accordingly, it is considered that no engineered controls are required for the Site to address these issues.

### 3.8 Fires, Vermin and Vectors

As indicated above, the control of fires, vermin and vectors related to the waste disposal area of the closed landfill is not considered to be a concern with respect to the potential for adverse effects at the new residential development as landfilling operations have ceased and the final cover is in place.

The potential for fires, vermin and vectors resulting from operating landfill are unlikely to become a concern at the Site based on the type of wastes accepted. No open burning is permitted. The landfill receives solid, non-hazardous residual materials. These materials include residues from local steelmaking and other industrial operations, excavation materials from industrial sites, construction/demolition materials and rubble, and no liquid waste or putrescible material is accepted at the landfill. As such bird and rodent problems would not occur and engineered measures at the Site are not warranted.

### 4.0 Summary and Conclusion

MTE completed a landfill impact assessment in accordance with the MECP document "D-4 Land Use on or Near Landfills and Dumps", 1994 for a proposed school at 399 First Road West in Stoney Creek, Ontario.

The purpose of the study was to determine whether the proposed land use would require setback restrictions and/or significant environmental controls due to the Site's proximity to the Stoney Creek Regional Facility owned and operated by GFL Environmental Ltd. The study included a review of aerial photographs, historical records, previous environmental reports, and the completion of a Site inspection.

The subject Site consists of the vacant land parcel previously used for staging and stockpiling of soil and aggregate as part of construction of the surrounding residential developments. The GFL landfill accepts solid, non-hazardous residual material from commercial, industrial and institutional sectors, such as materials from the steel making industry and soils from infrastructure developments. The landfill does not accept any decomposable materials that can cause odours, generate landfill gases, or attract animals.

The Hamilton-Wentworth District School Board has been consulted as part of the landfill EA and ECA approvals and have in the past raised concerns to potential air quality and dust, noise, odour, groundwater, traffic, and visual aesthetics affecting the proposed school. The landfill EA and ECA approvals have incorporated this and other feedback and require GFL to meet specific conditions regarding air quality (including dust), noise, odour, groundwater, traffic, and visual aesthetics as well as operations, material placement, wastewater management, financial assurances, and public documentation. The landfill maintains full-time staff dedicated to ensuring environmental regulations are met.

Monitoring to fulfil the landfill EA and ECA approvals, show that methane has not been detected since 2012 in any of the wells which make up the landfill gas monitoring network surrounding the landfill, and surface water from the landfill will not adversely affect the Site.

Elevated ammonia attributed to the landfill was however identified in groundwater north-east of the proposed school Site in 2009. Human exposure to this ammonia would be through vapour to indoor air. Based on the concentrations identified in 2009, it was determined that the ammonia exposure to residents in dwellings would not result in adverse health effects provided a minimum of 1m of clayey silt soil (low permeable material) was present between the highest groundwater elevation and the basement of the building. MTE cannot confirm that the ammonia encountered in groundwater in 2009 has attenuated or would not be an ongoing concern.

However, a geotechnical investigation at the Site has demonstrated that the native silty clay/clayey silt above the limestone bedrock is 1.1 to 4.6 meters in thickness. This would effectively constitute a natural low permeable barrier (of <1m) between the highest groundwater elevation and the slab-on-grade floor of the building as recommended by MTE in 2010.

Therefore, based on the results of the records review and Site inspection, it is MTE's opinion that the landfill footprint or its' operations will not adversely impact the Site, and the proposed school itself will not create migration pathways for landfill gas, leachate in groundwater or surface water from the landfill. As such, provided that at least 1m thickness of natural clayey silt soil is maintained below the proposed slab-on-grade floor, no engineered controls or further setback distance from the landfill boundary is required at the Site.

Any decision to augment the proposed tree planting and landscape plan along the east and southern boundaries of the Site to assist in a visual barrier to the operating landfill approximately 190 metres to the southeast would be at the discretion of the Hamilton-Wentworth District School Board.

### 5.0 Limitations

Services performed by **MTE Consultants Inc.** (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Environmental Engineering & Consulting profession. No other warranty or representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of MTE and the Client. It was completed in accordance with the Scope of Work referred to in Section 1.4. As such, this report may not deal with all issues potentially applicable to the Site and may omit issues, which are or may be of interest to the reader. Reasonable care was exercised to identify the important features, including the important environmental features, and this report addresses only those features as provided in the Scope of Work. All findings and conclusions presented in this report are based on the Site conditions as they existed during the time period of the investigation. This report is not intended to be exhaustive in scope or to imply a risk-free condition.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such third parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by any third party as a result of decisions made or actions taken, based upon this report. Others with interest in the Site should undertake their own investigations and studies to determine how or if the condition affects them or their plans.

It should be recognized that the passage of time may affect the views, conclusions and recommendations (if any) provided in this report because environmental conditions at and surrounding the Site can change.

All of which is respectfully submitted,

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#### AMO: sdm

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## 6.0 References

Reference / Source	Date
Aerial Photographs, First Base Solutions Inc.	1934-2021
Chapman and Putnam. Physiography of Southern Ontario.	1984
Ontario Base Map10 17 5950 47800	1984 (date of aerial photography)
Ontario Ministry of the Environment. Waste Disposal Site Inventory.	June 1991
Ontario Ministry of the Environment. <i>Guideline D-4 Land Use on or Near Landfills and Dumps</i> .	April 1994
Ontario Ministry of the Environment. <i>MOE Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario</i>	May 1996
Ontario Ministry of the Environment. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario	April 15, 2011
Ontario Ministry of the Environment. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act	April 15, 2011
Ontario Ministry of Northern Development and Mines. Bedrock Geology of Ontario, Southern Sheet. Scale 1:1,000,000.	1991
Ministry of the Environment, Conservation and Parks. Access Environment Online Mapping Tool.	December 5, 2022 (date of search)
Stoney Creek Regional Facility – Online Document Library	December 5, 2022 (date of search)

# **Figures**

















NORTH

NORTH

**MTE** Engineers, Scientists, Surveyors Ph. (519) 743-6500 Hamilton-Wentworth District School Board Landfill Impact Assessment 399 First Road West Stoney Creek, ON Monitoring Network Surround the Stoney Creek Regional Facility eviewed By MFC repared By Diect awn By EMM 3 January 2023



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ROUNDWATER COLLECTION TRENCH		
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Apr 7, 2021	399 First F Stoney C	Road West Creek, ON
FIGURE 4.4A	Shallow Groundwater	
	Reviewed By	
	Prepared By AMO	Project No. 52543-100
	Drawn By EMM	
	Date January 2023	<u> </u>

![](_page_33_Picture_0.jpeg)

# Mapping and Aerial Photography

![](_page_33_Picture_2.jpeg)

![](_page_34_Figure_0.jpeg)

(SITE LOCATION)

![](_page_36_Figure_0.jpeg)

![](_page_37_Picture_0.jpeg)

![](_page_38_Picture_0.jpeg)

![](_page_39_Figure_0.jpeg)

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![](_page_41_Picture_0.jpeg)

![](_page_42_Picture_0.jpeg)

# Site Photographs

![](_page_42_Picture_2.jpeg)

![](_page_43_Picture_1.jpeg)

Photograph No. 1 – View of the proposed school site, facing west from First Road W.

![](_page_43_Picture_3.jpeg)

Photograph No. 2 – View from the Site looking toward the operating landfill in a south-easternly direction.

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![](_page_44_Picture_1.jpeg)

Photograph No. 3 – View from the Site looking south toward the closed landfill in a southernly direction.

![](_page_44_Picture_3.jpeg)

Photograph No. 4 – View east from the Site of residential housing which is located adjacent to the north of the operating landfill.

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![](_page_45_Picture_1.jpeg)

Photograph No. 5 – View of the Berm and the pond in the north-western corner of the operating landfill.