Table of Contents

Figure Index

1. Introduction and Background

1.1 Introduction

This Environmental Assessment (EA) Report documents the process followed and the results of the EA carried out for the proposed expansion of the Stoney Creek Regional Facility (SCRF), located at 65 Green Mountain Road West, in Hamilton, Ontario. In November 2017, the Minister of the Environment, Conservation and Parks (previously known as the Minister of the Environment and Climate Change) approved the Amended Terms of Reference (ToR) for the SCRF Expansion EA. An EA is a 2-step process, which includes a Terms of Reference (ToR) and the EA itself. The first step is the development and approval of the ToR. The ToR is a document prepared by a Proponent that sets out the framework or work plan for the planning and decision-making process to be followed during preparation of the EA. Once approved, the proponent then undertakes the EA in accordance with the approved ToR.

The SCRF is owned and operated by Revolution Landfill LP, operating as Terrapure Environmental, herein referred to as Terrapure (Owner, Proponent). The SCRF is located at the northwest corner of Mud Street and Upper Centennial Parkway in the City of Hamilton (formerly the City of Stoney Creek, **Figure 1.1**). The SCRF has been in operation since it was approved by the Ministry of the Environment, Conservation and Parks (MECP) (previously known as the Minister of the Environment and Climate Change (MOECC)) in 1996. The SCRF, which operates under Environmental Compliance Approval (ECA) No. A181008 (**Appendix B**), as amended, has a total approved site capacity of 8,320,000 cubic metres (m^3) (6,320,000 m^3 for solid, non-hazardous residual material and approximately 2,000,000 m^3 for industrial fill), with an approved maximum annual volume of 750,000 tonnes of residual material. The approved service area for the SCRF is the Province of Ontario, which will not change as a result of this EA.

Terrapure is proposing to increase the total approved capacity for post-diversion solid, non-hazardous industrial residual material at the SCRF by 3,680,000 m^3 so that Terrapure can continue to operate its business and receive this material to support local industry. The proposal would not change the type or annual volume of residual materials currently accepted at the facility, nor the maximum number of permitted vehicles to the site per day. Ontario Regulation (O. Reg) 101/07 outlines the *EA Act* requirements for waste management projects in the Province of Ontario. If a Proponent is proposing to increase the total waste disposal volume of an existing waste management facility by more than 100,000 m^3, then the proposal or “undertaking” is subject to Part II of the *EA Act*. This undertaking is therefore subject to Part II of the *EA Act,* which requires a proponent to undertake the 2-step EA process described above.

Based on the current economics and market dynamics for industrial fill, the original market demand is significantly less than what was forecasted. Accordingly, Terrapure undertook an internal review of the SCRF and its future role within their solid waste business. As per the business case established by Terrapure, given that there is a continued strong market demand for residual disposal capacity for the foreseeable future, Terrapure wants to take advantage of the economic opportunity for capturing post-diversion solid, non-hazardous industrial residual materials by increasing its approved capacity for this material by 3,680,000 m^3. The proposed undertaking will allow the facility to maintain its standing as a regional facility and provide continued service to the Hamilton & Greater Toronto Area (GTA) market for local and regional customers.

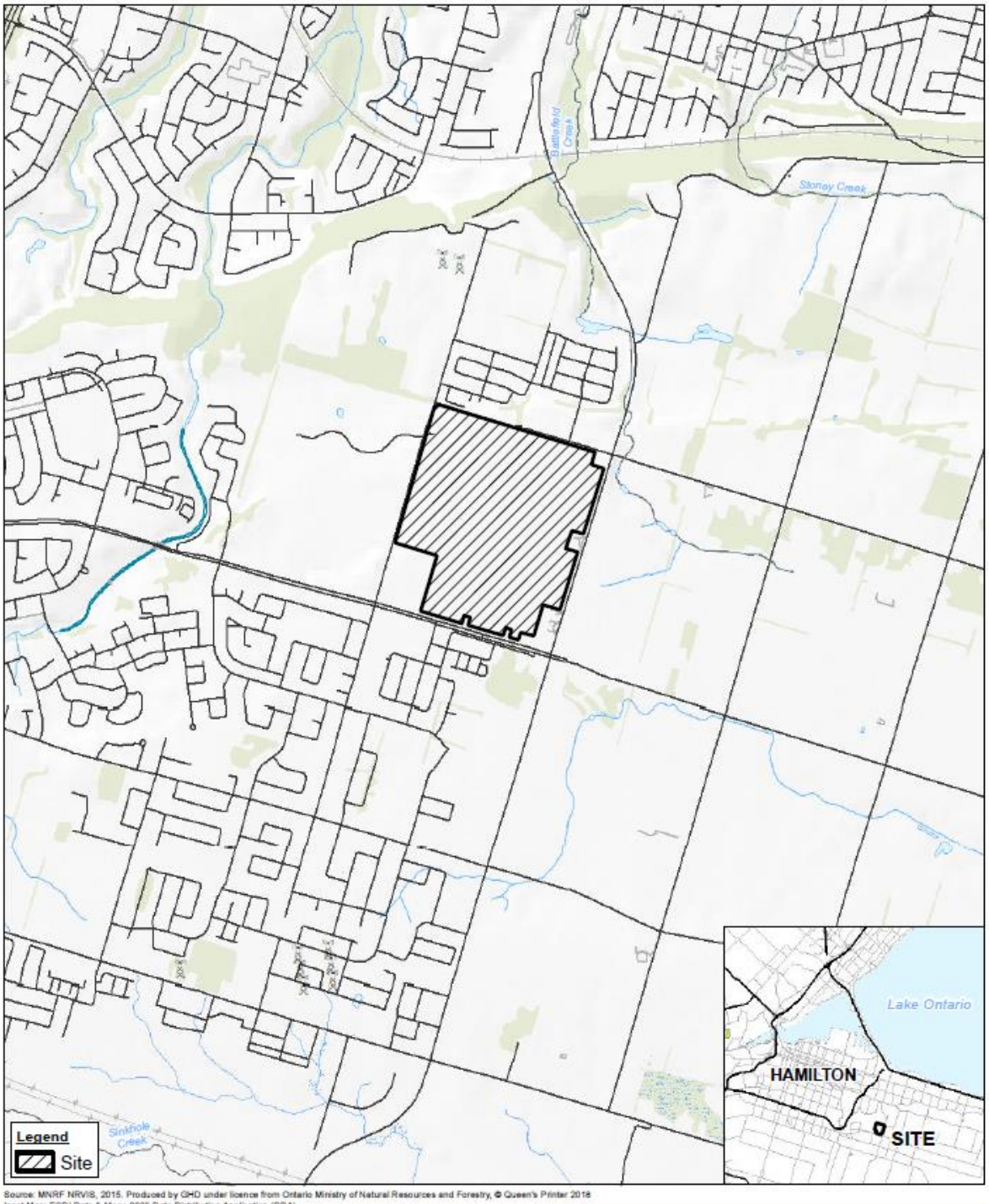


Figure 1.1 Location of the Proposed Undertaking

1.2 Proponent

The Proponent for the SCRF EA is Terrapure, the owner and operator of the SCRF. As the Proponent, Terrapure is responsible for the preparing the EA in accordance with the amended approved ToR. Terrapure is a leading Canadian provider of professional, cost-effective environmental services and recycling solutions that help address industry's environmental challenges. With an unwavering focus on environmental and health and safety excellence, the company provides services that minimize waste and maximize the recovery or recycling of valuable industrial by-products through a coast-to-coast facility network and on customer sites.

Terrapure is supported by a third party consulting team that undertook the EA on their behalf. The Proponent's contact information is as follows:

Kim Bailey
Office: 905.548.5870 Fax: 905.549.4515
Email: kbailey@terrapureenv.com
65 Green Mountain Road W
Stoney Creek, ON L8J 1X5

1.3 Site History & Operations

The SCRF has a been a fixture in the Stoney Creek/Hamilton area for 20 years, providing environmental services to numerous local and Ontario-based generators of solid, non-hazardous industrial residual material.

The SCRF has been in operation since 1996, when it was approved by the then Minister of Environment, following the successful completion of an EA. The SCRF's total approved disposal capacity under the Environmental Protection Act (EPA) approvals is 6,320,000 m^3 for residual materials, with an additional allowance for acceptance of approximately 2,000,000 m^3 of industrial fill/soils, for a site total of 8,320,000 m^3. The annual maximum approved fill rate for the site is 750,000 tonnes of residual material per year. Newalta Corporation acquired the site in 2006 from PSC Industrial Services Canada, and Terrapure took over ownership in 2015 with its acquisition of the former industrial division of Newalta.

The SCRF is an engineered landfill site that ensures groundwater protection and leachate collection through a double-liner system. The site is constructed with two levels of natural clay liner and a single geosynthetic membrane liner, along with extensive leachate and groundwater collection systems. The liner system is approximately 3 m thick and provides protection to the natural environment. The facility operates in accordance with the requirements of its ECA and other applicable provincial legislation.

The SCRF is regulated by the MECP under ECA No. A181008 (**Appendix B**). The SCRF operates Monday to Friday, from 7:00 a.m. to 5:00 p.m., and is permitted to receive up to 250 trucks per day. The SCRF provides a safe and efficient disposal option for industrial residual material, and is in a unique position based on the types of materials it accepts, as well as the proximity to where the industrial residual material is generated in Ontario. The SCRF is permitted to receive solid, non-hazardous residual material from the commercial, industrial and institutional sectors, consisting mainly of waste from the steel making industry (i.e., basic oxygen furnace oxide, slag) and soils from infrastructure development. The SCRF is not permitted to accept any residual materials that

are putrescible (i.e., waste that contains organic matter which is capable of decomposing and may generate methane, and carbon dioxide gases and odours, and has the ability to attract vectors, such as seagulls, vermin, etc.). Because the site does not accept waste capable of decomposing and generating gases, it has received a MECP exemption from the requirement to have a corresponding gas collection system in place (as stated in O. Reg. 232/98), based on supporting documentation, including a gas emission study and annual confirmatory monitoring.

The material accepted at the SCRF comes from a variety of customers and businesses that divert materials at their own operations and have implemented their own diversion and recovery systems to minimize any remaining residual materials. Terrapure has Standard Operating Procedures (SOP) that address the screening and verification of material that is received on-site to ensure the materials received on-site match the Generator's Waste Profile, and that the generator of the material has made the determination that the material cannot reasonably be diverted. Diversion at the source of the residual material from generators and customers considers both the economic viability of diversion, as well as ensuring that there is a viable end market for the diverted material. Although there is minimal waste material received at the SCRF that has the potential to be reasonably diverted or recycled, as part of the EA process, Terrapure has examined and evaluated the feasibility and viability of implementing an on-site diversion program as per the commitment made in the Amended Approved ToR. Further details are provided in Chapter 6 of this EA Report.

With respect to the SOP, prior to receiving waste, Terrapure requires a Generator's Waste Profile to be completed. The waste generator must complete the Waste Profile, which is checked by environmental technicians, and the waste requiring disposal is then analyzed by accredited, independent labs to ensure it does not contain unacceptable waste, and is compared against approved requirements. If the analytical results do not meet the criteria, or the waste contains unacceptable materials, a Waste Rejection Report is issued. Upon receipt at the SCRF, incoming waste is subject to inspections and random sampling to ensure it is consistent with the pre-screening analysis. Terrapure maintains full-time staff dedicated to ensuring environmental compliance at the SCRF.

Upon arrival at the SCRF, all trucks drive onto the scale for a gross weighing, unless the truck has already been weighed and recorded on the weigh bill. Drivers then proceed to the scale house for a document check. If the attendant determines that the paperwork is inappropriate, the load is rejected and the environmental technician issues a Waste Rejection Report. If the attendant determines that the paperwork is appropriate, the load is accepted and the attendant records the arrival information. If the load is to be subject to the random compliance testing program, it is segregated within the fill area and subjected to sampling and compliance testing.

Trucks are then directed to the active disposal area, and are directed to park underneath a camera to have the load inspected before proceeding to the tipping area. The landfill operator directs the waste vehicle to an appropriate tipping area at the tipping face and instructs the driver to begin emptying the load onto the ground. While the truck is unloading, the operator observes the waste for any non-compliant materials. Once unloaded, the material is spread in even lifts. If any non-compliant material is discovered, the operator contacts the Environmental Technicians (ET) and appropriate actions are taken to remove the non-compliant materials.

The ETs at the SCRF investigate material, and if they deem it non-compliant, they inform Terrapure site management of this finding. Terrapure then contacts the Generator to notify them of non-

compliant material and offers the Generator the option of returning material to the generator site or, if applicable, have the material sent to another facility that can receive and process the material. The non-compliant material is then removed from site and Terrapure issues an internal rejection report. The load rejections are also summarized in the Annual Monitoring Reports submitted to the MECP.

In addition to the residual material area and industrial fill area, the Site generally includes the following infrastructure:

- Access points on Upper Centennial Parkway and First Road West.
- A site office and parking area for administration staff.
- A weigh scale and scalehouse site office (for field technicians and operations staff).
- A truck wash facility to clean wheels and truck undercarriages prior to them exiting the Site, helping to reduce dust emissions and track-out onto surrounding roads.
- A maintenance building used for maintaining and repairing Site equipment.
- A training centre also used for storage.
- A leachate management system, consisting of a base liner system, collection pipes, pumping stations, equalization pond, and discharge to a sanitary sewer.
- A stormwater management system, consisting of final cover, drainage ditches, forebays, detention ponds, and outlet to a storm sewer.
- A groundwater management system, consisting of collection trenches, pipes, pumping station, and outlet to a sanitary sewer.

Regulatory requirements specify a minimum on-Site buffer width of 100 m between the limit of the residual footprint and the property boundary, but allow this to be reduced to 30 m if it is shown to be appropriate based on a site specific assessment (e.g., if the buffer provides adequate space for vehicle movements, ancillary facilities, and ensures that potential effects from the Site operations do not have unacceptable impacts outside of the Site).

Minimum buffer distances of 30 m are approved and maintained around the entire perimeter of the residual material area. These buffers extend to approximately 65 m in various areas along the east and south sides of the Site, and up to approximately 130 m in the vicinity of the existing stormwater management facility in the northwest corner of the Site.

The buffers improve the ability to mitigate potential nuisance effects (e.g., noise, odour, and dust) to surrounding receptors through physical separation and the implementation of additional Site controls. In addition, the buffer areas are used for the construction of on-Site infrastructure, such as roads, buildings, monitoring systems, maintenance structures, stormwater drainage ditches, visual screening (e.g., fences, earth berms), and vegetation.

1.3.1 Amendments to the SCRF ECA

It should be noted that since opening in 1996, the SCRF's ECA has been amended a number of times, including the following:

1. Amendment to Annual Waste Receipts and Service Area Provisions (2012).
2. Landfill Footprint Reconfiguration (2013).

Both of these alterations were undertaken in accordance with appropriate legislative requirements, including the Environmental Screening Process under the Waste Management Projects Regulation – O. Reg 101/07 and the EPA, respectively.

A copy of the consolidated ECA is provided in **Appendix B**.

1.3.2 Annual Waste Receipts and Service Area

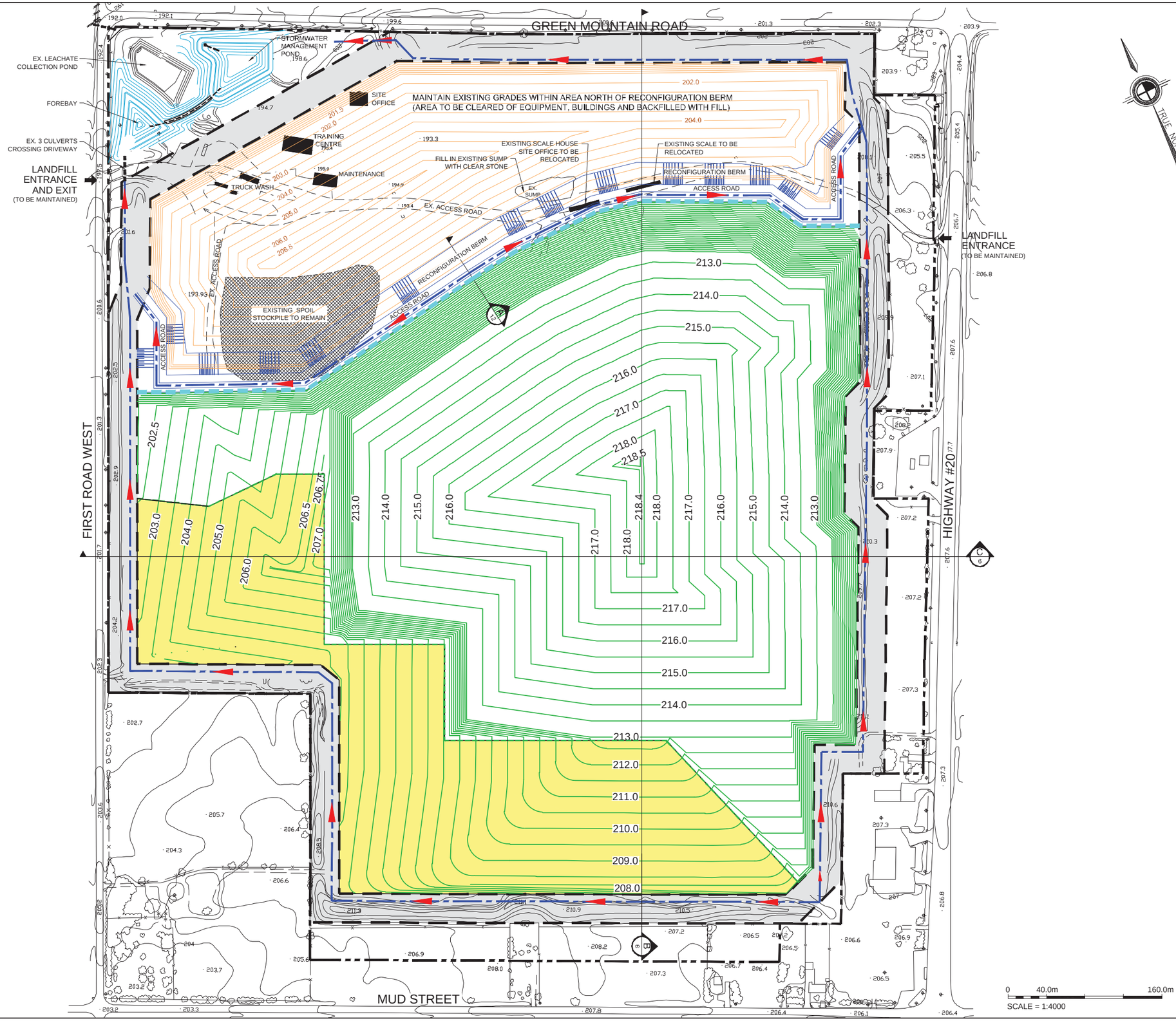
In 2012, the SCRF was subject to an Environmental Screening Process under O. Reg. 101/07 to amend the existing ECA to accomplish the following:

1. Allow the SCRF to continue to receive up to 750,000 tonnes of waste a year, but to allow for the limit to occur over any consecutive 12 month period, instead of the calendar year. This change provided operational flexibility by accommodating busier months of receiving waste.
2. Allow the SCRF to receive approved wastes from anywhere within the Province of Ontario. This change allowed for operational efficiency, as material from outside of Hamilton previously had to be processed at other facilities in Hamilton prior to being transported to the SCRF for disposal.

The amendments were approved by the MECP in 2013, improving the flexibility and efficiency of operations while significantly reducing truck traffic and related air emissions in the north-end industrial core of Hamilton around Terrapure's other waste management facilities.

1.3.3 Landfill Footprint Reconfiguration

In 2013, the size of the residual material footprint at the SCRF was reduced from the originally approved 59.1 hectares (ha) to an area consistent with the base liner system that had been constructed to date at that time. There was no change to the approved total disposal volume (6,320,000 m^3), and the reconfiguration effectively increased the height, while reducing the overall residual material footprint to approximately 41.5 ha. As a result, the setback distance between the limit of residual material and Green Mountain Road was increased from 30 m to a minimum of 140 m (**Figure 1.2**). This revision was approved by the MECP in 2014 as an amendment to the ECA under the EPA.



PROJECT

Stoney Creek Landfill Reconfiguration

Newalta Stoney Creek Landfill
65 Green Mountain Road
Stoney Creek, Ontario L8J 1X5

CLIENT

Newalta Corporation

1100 Burloak Drive, 5th Floor
Burlington, Ontario L7L 6B2
800 263 8602 tel

CONSULTANT

AECOM
300 - 300 Town Centre Blvd.
Markham, ON L3R 5Z 6
905 477 8400 tel 905 477 1456 fax
www.aecom.com

LEGEND:

- LIMIT OF LANDFILL
- PERIMETER DRAINAGE DITCH
- 216.0 — PROPOSED TOP OF WASTE CONTOURS AND ELEVATION
- 204.0 — PROPOSED TOP OF GRADED FILL MATERIAL CONTOURS AND ELEVATION
- 30m BUFFER ZONE
- AREA FOR STORMWATER MANAGEMENT PONDS
- AREA OF CONSTRUCTED FINAL COVER

REGISTRATION

ISSUE/REVISION

B	August 2013	Issued for Final Report
A	July 2013	Issued for Client Review
I/R	DATE	DESCRIPTION

PROJECT NUMBER

60290994

DRAWING TITLE

2013 AMENDMENT TO ECA

FIGURE NUMBER

1.2

Filename: P:\60290994\900-CAD-GIS\910 CAD_BIM\02-SHEETS\RECONFIGUREATION-D-O-FIGURES-FINAL\60290994-FIG-05_RB.DWG
Last saved by: WANGV Last Plotted: 2013-08-29
Project Management Initials: Designer: V.W. Checked: M.C. Approved: L.M.F.
Printed on ___% Post-Consumer Recycled Content Paper

In addition to the revised footprint, the SCRF was permitted to accept approximately 2,000,000 m^3 of fill to complete the final site grading in the area of the site that would no longer receive residual material. The fill material for the final site grading is to be “Table 3” industrial fill, which is “non-waste”.

1.4 Stoney Creek Regional Facility (SCRF) Landfill Expansion Environmental Assessment

This EA Report describes the process undertaken to assess and evaluate how the SCRF could add additional capacity and meet the requirements of the *EA Act*. The EA was initiated in November 2017, following approval of the amended ToR by the MECP on November 9, 2017[1]. Terrapure is proposing to increase the total approved capacity for post-diversion solid, non-hazardous industrial residual material at the SCRF by 3,680,000 m^3, so that Terrapure can continue to operate its business and receive this material to support local industry. The additional capacity Terrapure is seeking through this EA is based on current economics and market dynamics, and was established based on a reasonable business-planning scope for the next 10-15 years. The proposal will not change the type or annual volume of residual material currently accepted at the Facility, nor the maximum number of vehicles to the Site per day. The SCRF will include the extension of the same liner system currently in place and as described in Section 1.3. Minimum on-Site buffer distances of between 30 m and 130 m will be maintained around the perimeter of the residual material area. Further details on the proposed undertaking are provided in subsequent chapters of this EA Report.

[1] Notice of Commencement issued November 17, 2017.

Table of Contents

Figure Index

Table Index

2. Overview of the Environmental Assessment Process and Study Organization

This chapter of the EA Report provides an overview of the EA process carried out for the SCRF Expansion EA, describes the study organization, and provides an overview of the EA Report.

2.1 Environmental Assessment Process

This EA was conducted and prepared in accordance with the Approved Amended SCRF ToR approved by the Minister of the Environment, Conservation and Parks (MECP) on November 9, 2017 (see **Appendix C**), as per Section 6(2)(c) and 6.1(3) of the *EA Act*. The ToR was the first step of a two-step *EA Act* approval process for the proposed undertaking in the Province of Ontario, with the second step being the EA. An overview of the process followed for this EA is provided in **Figure 2.1**.

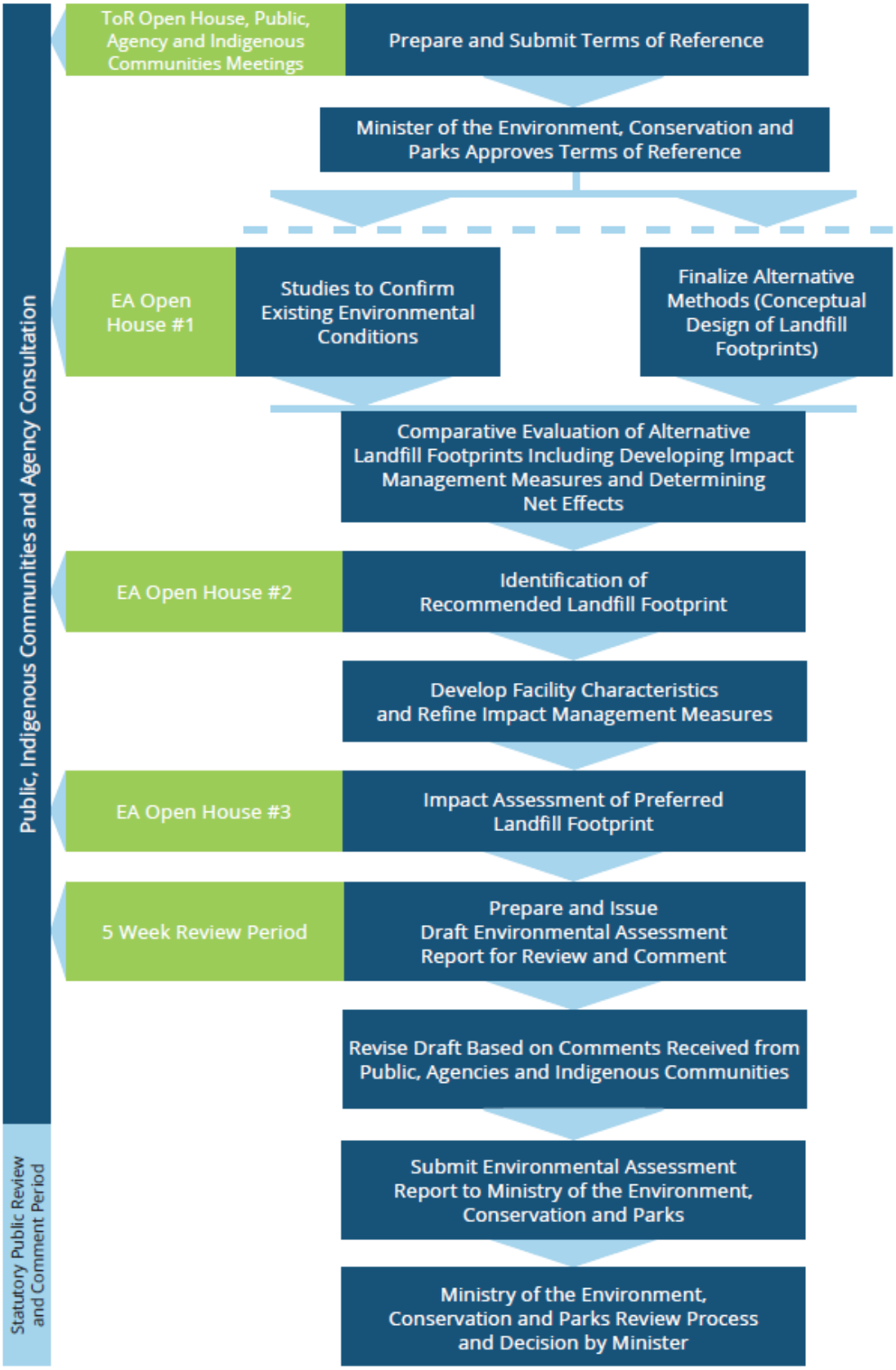


Figure 2.1 Stoney Creek Regional Facility EA Process

This EA Report has been prepared in accordance with and having regard for the following MECP Guidance Documents:

- Code of Practice Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario (MECP, January 2014)
- Code of Practice Preparing and Reviewing Environmental Assessments in Ontario (MECP, January 2014)
- Code of Practice Consultation in Ontario's Environmental Assessment Process (MECP, January 2014)
- Guide to Environmental Assessment Requirements for Waste Management Projects in Ontario (MECP, March 2007)
- Guide: Considering Climate Change in the Environmental Assessment in Ontario (October, MECP, 2017)

The methodology described in this EA Report, as well as within the Minister-approved ToR, reflects a focused process that meets the requirements of the *EA Act* and Ontario Regulation 101/07, the Waste Management Projects Regulation, made under the *EA Act*.

During preparation of this EA, as well as the Minister-approved ToR, the Proponent has consulted with the MECP, other federal, provincial and local government agencies, the public, Aboriginal communities, and other interested persons.

2.2 Ontario Environmental Assessment Act

The overall purpose of the *EA Act* is to promote sound environmental planning through the protection, conservation, and wise management of Ontario's environment. The intent is to predict environmental effects of proposed initiatives or projects before they are carried out. In order to achieve this, the *EA Act* ensures that environmental problems and opportunities associated with the project are considered along with project alternatives, and that potential effects are investigated and mitigated through the planning process prior to implementation and construction. A key component of the *EA Act*, in addition to requirements for thorough planning, is to ensure that reasonable and meaningful consultation opportunities for members of the public, agencies, other key stakeholders and Indigenous communities are provided throughout the process.

As noted previously, the *EA Act* requires a ToR to be prepared and approved by MECP prior to undertaking the EA. The ToR sets the framework for how the EA will be undertaken and prepared and provides overall direction for the EA. The SCRF Landfill Expansion EA ToR (approved November 2017) outlines the considerations required in the EA, as well as Proponent commitments and the overall framework to be followed. **Appendix D** of this EA Report details how the EA has fulfilled the requirements listed in the approved ToR. The EA was prepared in accordance with the requirements set out in the approved ToR and the *EA Act*, including:

- A description of the purpose of the undertaking;
- A description of the undertaking based on the consideration of alternative methods and detailed impact assessment;
- The rationale for the proposed undertaking;

- A description of the environment potentially affected by the undertaking;
- An assessment of the alternative methods of carrying out the undertaking;
- A description of the effects that will be caused or that might reasonably be expected to be caused on the environment by the undertaking or the alternative methods;
- A description of mitigation measures that are necessary to prevent or reduce significant adverse effects on the environment including a discussion of the undertaking and its effects on climate change;
- An evaluation of the advantages and disadvantages to the environment as a result of the undertaking and the alternative methods;
- An assessment of the cumulative effects; and,
- A description of consultation undertaken by Terrapure in association with the EA.

2.3 Canadian Environmental Assessment Act 2012

While the proposed undertaking is subject to the requirements of the *EA Act*, the *Canadian Environmental Assessment Act*, *2012* (*CEAA* 2012) does not apply. The proposed undertaking is not on the list of Activities subject to *CEAA* 2012 described in the *Regulations Designating Physical Activities* under *CEAA* 2012.

2.4 Organization of the EA Report

The EA Report is composed of the following sections, appendices, and supporting documents for addressing the requirements set out in the approved amended ToR and is organized according to the MECP's *Preparing and Reviewing Environmental Assessments in Ontario* Codes of Practice.

EA Sections

Section 1.0 - Introduction and Background

This section provides an introduction to and background information regarding the EA and the Proponent, Terrapure.

Section 2.0 - Overview of the Environmental Assessment Process and Study Organization

This section provides an overview of the EA Process and Study Organization, and describes the process used to carry out the EA, as well as outlining *EA Act* requirements and an overview of the EA Report.

Section 3.0 - Overview of the Undertaking

This section provides an overview of the Undertaking, identifies the purpose of and rationale for the Undertaking, and identifies the Preferred Alternative to the Undertaking.

Section 4.0 - Description of the Environmental Potentially Affected by the Undertaking

This section describes potential effects to the environment resulting from the Undertaking and details existing environmental conditions within the Study Area.

Section 5.0 - Alternative Methods of Carrying out the Undertaking

This section describes the Alternative Methods of Carrying Out the Undertaking (six expansion alternatives); describes the potential environmental effects, recommended mitigation measures, and resultant net environmental effects associated with the Alternative Methods; and summarizes the comparative evaluation processes leading to the identification of a Recommended Alternative Method.

Section 6.0 - Detailed Impact Assessment of the Undertaking

This section provides a detailed description of the Undertaking (Preferred Landfill Footprint) and presents an impact assessment of the Undertaking.

Section 7.0 - Public and Agency Consultation

This section summarizes the consultation process carried out as part of the EA.

Section 8.0 - Commitments and Monitoring of the Undertaking

This section describes the commitments, monitoring strategy, and schedule for the Preferred Undertaking.

Section 9.0 - Approvals and Agreements Required for the Undertaking

This section outlines the anticipated approvals required for implementing the Preferred Undertaking following *EA Act* approval.

Section 10.0 - Amending the EA

This section details the process for carrying out potential amendments to the EA.

Appendices

Appendix A – Glossary of Terms

Appendix B – ECA No. A181008

Appendix C – Approved Amended Terms of Reference

Appendix D – Terms of Reference Commitments Table

Appendix E – Existing Conditions Reports

Appendix F – Conceptual Design Report

Appendix G – List of Studies and Reports

Appendix H – Alternative Methods Report

Appendix I – Facility Characteristics Report

Appendix J – Detailed Impact Assessment Reports

Supporting Documents

Supporting Document No. 1 – Record of Consultation

Table 2.1 identifies where each of the *EA Act* requirements are addressed in the EA Report and its appendices.

Table 2.1 EA Act Requirements & Where They Are Addressed in the EA Report

EA Act Requirements	Section/Document where Requirement is Addressed
A description of the purpose of the Undertaking	Section 3.0 & Appendix C
A description of and a statement of the rationale for (i) the Undertaking	Section 3.0 & Appendix C
A description of and a statement of the rationale for (ii) alternative methods of carrying out the Undertaking	Section 5.0, Appendix C, & Appendix H
A description of and a statement of the rationale for (iii) the alternatives to the Undertaking	Section 3.0 & Appendix C
A description of (i) the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking, the alternative methods of carrying out the Undertaking and the alternatives to the Undertaking	Section 4.0, Section 5,0, Appendix C, & Appendix F
A description of (ii) the effects that will be caused or that might reasonably be expected to be caused to the environment, by the Undertaking, the alternative methods of carrying out the Undertaking	Section 5.0, Section 6.0 & Appendix H
A description of (iii) the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the Undertaking, the alternative methods of carrying out the Undertaking	Section 5.0, Section 6.0 & Appendix H
An evaluation of the advantages and disadvantages to the environment of the Preferred Undertaking	Section 6.0 & Appendix I
A description of any consultation about the Undertaking by the Proponent and results of the consultation	Section 7.0 & Supporting Document No. 1

Table of Contents

3. Purpose of and Rationale for the Undertaking

As committed to in the MECP approved Amended ToR for the SCRF EA, Terrapure has reviewed and confirmed the purpose of and rationale for the proposed Undertaking as part of the EA process.

3.1 Description of the Undertaking

The Undertaking proposed by Terrapure is an expansion of the existing Terrapure owned SCRF to increase the approved capacity for post-diversion, solid non-hazardous industrial residual material generated predominantly within the H&GTA by 3,680,000 m^3. The proposed undertaking will not change the type (post-diversion, solid non-hazardous industrial residual material) or annual volume (750,000 tonnes per year) of residual material currently accepted at the Facility, nor the maximum number of vehicles to the Site per day (250 per day). The expansion will incorporate technology and processes as set out in Ontario Regulation (O. Reg.) 232/98 Landfill Standards to ensure safety and efficiency, including a double-liner design, leachate collection systems, and monitoring to ensure long-term protection of air, groundwater, and surface water.

3.2 Purpose of the Undertaking

The purpose of the Undertaking is to take advantage of the economic opportunity for capturing post-diversion solid, non-hazardous industrial residual materials by increasing it approved capacity for this material by 3,680,000 m^3. Given that there is a continued strong market demand for residual disposal capacity for the forseeable future, Terrapure is proposing to increase the capacity at the SCRF to allow Terrapure to continue operating their solid waste management business in Ontario and provide continued service to the Hamilton & Greater Toronto Area (H&GTA) market for local and regional customers.

The business opportunity was determined based on the following factors:

- Current waste management policies and initiatives in Ontario;
- Historic volumes of material received at the SCRF;
- Current industrial waste diversion rate and disposal capacity in Ontario;
- Market and local business considerations;
- Minimizing environmental impacts by offering a modern, engineered landfill as a local solution for waste disposal (rather than exporting).

3.2.1 Purpose / Opportunity Statement

The purpose of the undertaking is to increase the approved capacity of the SCRF by 3,680,000 m^3 so that Terrapure can continue to receive post diversion solid, non-hazardous industrial residual material generated predominantly within the H&GTA.

Based on the current economics and market dynamics for industrial fill, the original market demand is significantly less than what was forecasted. As per the business case established by Terrapure, given that there is a continued strong market demand for residual disposal capacity for the foreseeable future, Terrapure wants to take advantage of the economic opportunity for capturing

post-diversion solid, non-hazardous industrial residual materials by increasing its approved capacity for this material by 3,680,000 m^3. The proposed undertaking will allow the facility to maintain its standing as a regional facility and provide continued service to the H&GTA market for local and regional customers.

3.3 Rationale for the Undertaking

3.3.1 Waste Management Framework in Ontario

Recently, the Ontario Government introduced the Waste-Free Ontario Act (WFOA), 2016 and its accompanying “Strategy for a Waste-Free Ontario: Building the Circular Economy" (Strategy). The WFOA and accompanying Strategy establish a framework for fundamental changes with regards to responsibility for the management of resources. It seeks to alter the current linear pattern of production, consumption and disposal towards circularity. By doing so, economic growth and prosperity is reconciled with environmental outcomes. However, as the Strategy outlines, while Ontario works towards its aspirational goal of “zero waste”, there will still be a need for landfill space in the interim. The Strategy forecasts the need for approximately 16 new or expanded landfills required by 2050, based on current waste generation rates. As a result, the following commitment was made under Action #7 of the Strategy: *Ensure landfills are well planned and managed to minimize their need to reduce greenhouse gas (GHG) emissions*.

Based on the above, increasing the capacity of an existing modern, well-managed, state of the art non-hazardous solid waste landfill site, such as SCRF, would ensure that a new landfill would not be required while the Province is working towards implementing the policies to get Ontario on track to be waste free. As the majority of the waste received at the SCRF is considered residual waste (i.e., remaining material once recovery/recycling options have been exhausted at-source), the expansion of the SCRF further supports the Strategy’s action to divert more waste from disposal. In addition, the proposed Undertaking supports the provincial government's desire to ensure that while the Province is looking to move to become "waste free", disposal capacity is maintained in Ontario, to ensure the waste that is generated within the Province, is managed in the Province. The Strategy also calls for focusing on expanding existing facilities that are already permitted, well-designed, and environmentally-secure.

This expansion would allow Terrapure to continue to accommodate solid, non-hazardous industrial residual waste disposal from H&GTA and the surrounding area while the Province rolls out the policies and programs within the WFOA over the next several years to work towards a "waste-free" Ontario. Furthermore, the Undertaking aligns with the government’s direction on continuing to require a permitted, well-designed, environmentally-secure facility to manage residual materials, namely through the Strategy for a Waste Free Ontario: Building The Circular Economy.[1]

3.3.2 Industrial Waste Diversion Rate & Disposal Capacity

The Statistics Canada Waste Management Industry Survey, produced in 2014, estimated that Ontario produced approximately 11.5 million tonnes of waste, of which approximately 70% was generated by the non-residential or Industrial, Commercial and Institutional (IC&I) sector. Of this total, approximately half were landfilled in Ontario, with a quarter landfilled in other jurisdictions (i.e., across the border to Michigan or New York), and another quarter diverted from landfill

[1] Strategy for Waste Free Ontario and Circular Economy, Page 27

(e.g., through recycling, composting, etc.). While IC&I waste makes up approximately 70% of the waste produced in Ontario, approximately only 10% of IC&I sector waste is diverted from landfill at present.

In 2016, the Ontario Waste Management Association (OWMA) published a State of Waste in Ontario: Landfill Report, which provided a breakdown on the amount of waste landfilled in Ontario, as well as the amount of waste exported to other jurisdictions, specifically Michigan and New York State. In 2014, Ontario landfills received a total of 7.7 million tonnes of waste. This includes MSW, industrial waste, hazardous waste, contaminated soil, and additional materials used for daily cover. These numbers do not include the nearly 3.5 million tonnes of waste that is exported annually to the United States. In its last report, Michigan indicated that 2.4 million tonnes of Canadian waste was imported, while New York has consistently imported around 1 million tonnes of waste from Ontario. The OWMA Report calculated Ontario's existing landfill capacity to be between 11.4 years (if all waste generated in Ontario were to be disposed of in Ontario) to 16.5 years (if 30% of Ontario's waste continues to be sent to the US for disposal). Recognizing that this represents all types of waste from various sectors, this quantification demonstrates the significant amount of waste generated in Ontario, landfilled in Ontario, and the impacts on landfill capacity of exporting waste to the United States. Further, it reinforces the fact that the amount of landfill capacity remaining in Ontario is decreasing – for all sectors. The expansion sought by Terrapure will address this crucial need and enable capacity to continue to accommodate solid, non-hazardous industrial residual waste disposal and support the transition to a zero waste province.

3.3.3 Historic Waste Volumes Received at the SCRF

As part of the business case established by Terrapure, a review of historical tonnages received at the SCRF was undertaken to understand the amount of post-diversion solid, non-hazardous industrial residual material generated within the approved service area of the SCRF. The SCRF has consistently accepted a high volume of solid, non-hazardous industrial residual material and the amount of this material has generally increased over the last 19 years. Over the last 5 years, the SCRF has accepted approximately 3.5 million tonnes of material, with a yearly average of approximately 700,000 tonnes. Based on the historic tonnages accepted at the SCRF, Terrapure determined that there is a sustainable economic opportunity for the company to continue to provide disposal capacity for post diversion solid, non-hazardous industrial residual material.

3.3.4 Market & Local Business Considerations

The existing SCRF has been successfully operating since 1996, and wishes to remain an active member of the community through the continued operation of this site. Terrapure recognized an economic opportunity to respond to the growing demands from local customers, particularly those in the H&GTA and allow the company to continue providing waste management services and remain economically competitive in the waste sector in Ontario.

Based on the current economics and market dynamics for industrial fill, the original market demand is significantly less than what was forecasted and the financial viability of the SCRF is therefore negatively affected under the current approvals. As per the business case established by Terrapure, given that there is a continued strong market demand for residual disposal capacity for the foreseeable future, Terrapure wants to take advantage of the economic opportunity for capturing post-diversion solid, non-hazardous industrial residual materials by increasing its approved capacity

for this material by 3,680,000 m^3. The proposed Undertaking will allow the Facility to maintain its standing as a regional facility and provide continued service to the H&GTA market for local and regional customers. The additional capacity Terrapure is seeking through this EA is based on current economics and market dynamics, and was established based on a reasonable business-planning scope for the next 10-15 years.

The SCRF plays a critical role in supporting local industry and the local economy with a well-located, environmentally sound disposal outlet for post-diversion industrial residual materials. Nearly 50% of the materials received at the facility come from industrial operations directly located within the City of Hamilton, while more than 93% of the materials received at the SCRF are generated at locations within the H&GTA.

Terrapure intends to continue serving its existing customer base and is responding to the economic opportunity of providing waste management services to address the continued and growing demand from local and regional industries that require a facility that is permitted to manage the residual materials they generate. This is especially true for those businesses and operations within the local Hamilton area. Local businesses, such as the steel industry and local infrastructure projects, rely on the SCRF to provide a safe and environmentally sound disposal facility. This in turn supports the growth of the local Hamilton economy, as well as portions of the GTA. To demonstrate the types of projects that the SCRF supports, a list of recent projects is provided as follows:

- Pan-am Aquatics Centre 2013
- McMaster Children's Hospital Expansion 2014/2015
- St. Joseph's Healthcare Centre 2014/2015
- James Street CN/GO Station/Metrolinx 2014/2015
- CN Centennial Parkway 2014/2015
- Stoney Creek Dairy (future site of retirement home) 2014
- Good Shepherd Centre 2015
- Upper James Road Remediation 2013
- Joseph Brant Hospital Expansion (Burlington) 2015-2016
- Burlington Bay James N. Allan Skyway Bridge refurbishing 2013-ongoing

In addition to the recent key projects, there are a number of future projects that Terrapure is aware of within the Hamilton area that are expected to occur within the next 3-5 years, including redevelopment of key areas of the City (i.e., Pier 7 & 8, other sites along Hamilton Harbour, etc.) that will require a facility that can manage residual materials.

If local SCRF customers had to transport residual waste to alternative landfill sites the increase in disposal costs is estimated to range from $4.8 million to $17.5 million per year. In present value terms, these higher costs range from about $28 million to $100 million over the course of the proposed additional residual capacity lifespan of the SCRF under the proposed Undertaking. The economic impacts of these increased costs are considerable, as four principal sectors of the Ontario economy would be affected – non-residential construction, waste management and remediation services, steel manufacturers, and petroleum refining operations.

The proposed Undertaking will allow Terrapure to continue to provide its existing regional customer base (i.e., local industrial clients, major public infrastructure undertakings within the H&GTA) with a local, reliable, secure and cost effective disposal option for post-diversion, solid non-hazardous industrial residual materials.

3.3.5 Environmental Solution

Terrapure believes that providing a local disposal option for post-diversion, solid non-hazardous industrial residual materials generated locally is an environmentally responsible practice and wishes to continue to provide this service. The proposed Undertaking will minimize the environmental impacts of GHG emissions through a reduction in the number of waste related trucks hauling material over longer distances.

3.4 Predetermined Alternative To the Undertaking

Given that Terrapure is successfully operating the Site and wishes to continue the business opportunity at this Site, the establishment of a new landfill site or an alternative form of waste disposal facility (e.g., a new landfill site or a thermal treatment facility) elsewhere are not feasible options. As a result, the expansion of the capacity of the existing Site is the only practical, environmentally sound, and financially feasible means of addressing Terrapure's solid, non-hazardous waste disposal business opportunity for the foreseeable future (approximately 10-15 years).

Factors influential to the Proponent’s business opportunity (i.e., geography, financial constraints, and a need for local, cost-effective, solid, non-hazardous waste disposal capacity) demonstrate that an EA undertaken in accordance with Section 6.(2)(c) of the *EA Act* is justified and appropriate in this case.

Terrapure examined different ways of meeting this economic opportunity and formally assessed "Alternatives To" the proposed Undertaking. During the ToR phase, Terrapure established a business plan where four potential options (Alternatives To) were developed and reviewed. However, as a private sector Proponent with a current facility (i.e., the SCRF), there are a limited number of reasonable ways of approaching or dealing with the opportunity of providing additional disposal capacity. These would typically include the establishment of a new facility or expanding the capacity of an existing facility, such as the SCRF. Expansion of the existing facility is the most reasonable solution to addressing the economic opportunity because:

- The SCRF is the only residual waste disposal facility that Terrapure owns and operates in Ontario.
- Terrapure does not own any other properties that would be suitable for a new facility that could accept post-diversion solid, non-hazardous industrial residual material.
- It would not be economically cost effective to buy additional properties and develop a new facility that could accept post-diversion solid, non-hazardous industrial residual material.
- The existing SCRF has waste management infrastructure in place that can be utilized and expanded.

Accordingly, it is generally accepted that the most reasonable way of approaching this opportunity of providing increased disposal capacity by a private sector proponent with an existing, permitted

and operational facility, would be to look at the various ways in which capacity can be increased at an existing site.

Terrapure is a privately owned and operated company, conducting business in the Province of Ontario. As such, the question as to whether there is a need for the services that Terrapure provides is largely based on business decisions. Similarly, the question as to how the company provides these services within the given regulatory framework is a Terrapure business decision. For example, an influential consideration related to the proposed undertaking that Terrapure has recently encountered is a stronger and more consistent market for residual material than for industrial fill.

There is an economic opportunity associated with the ability of the existing SCRF to accept additional post-diversion solid, non-hazardous industrial residual material. This opportunity is based, in part, on an internal business case for adding disposal capacity at the existing SCRF, which included a review of historic industrial waste generation in Ontario. This analysis determined there will be a continued demand for disposal capacity for this type of waste, and that the demand will significantly exceed the disposal capacity needed for industrial fill and soils, particularly as the Province moves forward with its updated Excess Soil Management Policy and subsequent regulatory updates to promote reuse of excess soils.

Based on the opportunity for expansion that has prompted the initiation of the EA process and the fact that Terrapure is a private sector Proponent, as stated above there are a limited number of reasonable ways in which the economic opportunity can be addressed; and, the most reasonable way of addressing the opportunity is to examine the various ways in which capacity can be added at the existing SCRF.

Discussion on the business plan and economic opportunity (Purpose of the Undertaking), as well as what options (Alternatives To) Terrapure considered, was prepared within the context of Terrapure operating the SCRF as a private facility within the Province of Ontario and is highlighted in Supporting Document #1 to the Approved Amended ToR (also found in **Appendix C** to this EA Report).

3.5 Benefits of the Undertaking

As described above, the proposed Undertaking will allow Terrapure to continue to provide local solutions to address in province waste management needs in an environmentally responsible and financially sound manner, and provides secure waste management infrastructure for the existing customer base.

The main benefits of the proposed Undertaking are as follows:

- A reliable, secure and environmental sound disposal option for post-diversion, solid non-hazardous industrial residual material;
- A new landfill facility for this type of material will not need to be established;
- Less of this type of waste will be exported to landfills in the other jurisdictions (other Provinces or to the United States);

- Material brought to the SCRF from the predominant customer base (H&GTA) will prevent additional transportation costs and GHG emissions associated with customers hauling lengthier distances;
- Continued generation of significant economic activity in the City of Hamilton;
- The proposed Undertaking aligns with the government's direction on continuing to require a permitted, well-designed, environmentally-secure facility to manage residual materials as the province transitions to a circular economy.

Table of Contents

Figure Index

Table Index

4. Description of the Environmental Potentially Affected by the Undertaking

The approved ToR for this EA included a preliminary description of the existing environmental conditions at the SCRF (Section 6.0 of the approved ToR, November 2017). A commitment was made in the ToR that a more detailed description of the existing environment would be provided in the EA. This section of the EA Report provides an overview of the existing environmental conditions associated with the Study Areas for the SCRF Landfill Expansion EA. Individual discipline Existing Condition Reports are provided in **Appendix E.** A complete list of all the studies conducted for the SCRF EA is provided in **Appendix G**.

4.1 Environmental Components

The environment, as defined by the EA Act, includes the natural, cultural, social, economic, and built environments, specifically:

i. *air, land or water,*

ii. *plant and animal life, including human life,*

iii. *social, economic and cultural conditions that influence the life of humans or a community,*

iv. *any building, structure, machine or other device or thing made by humans,*

v. *any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or*

vi. *any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.*

4.2 Study Areas

As outlined in the approved ToR, a preliminary study area was established, which extends 1.5 kilometers (km) from the four roads that border the existing SCRF (i.e., The preliminary study area for the SCRF EA (i.e., 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) (**Figure 4.1**). The preliminary study area was defined based on the following:

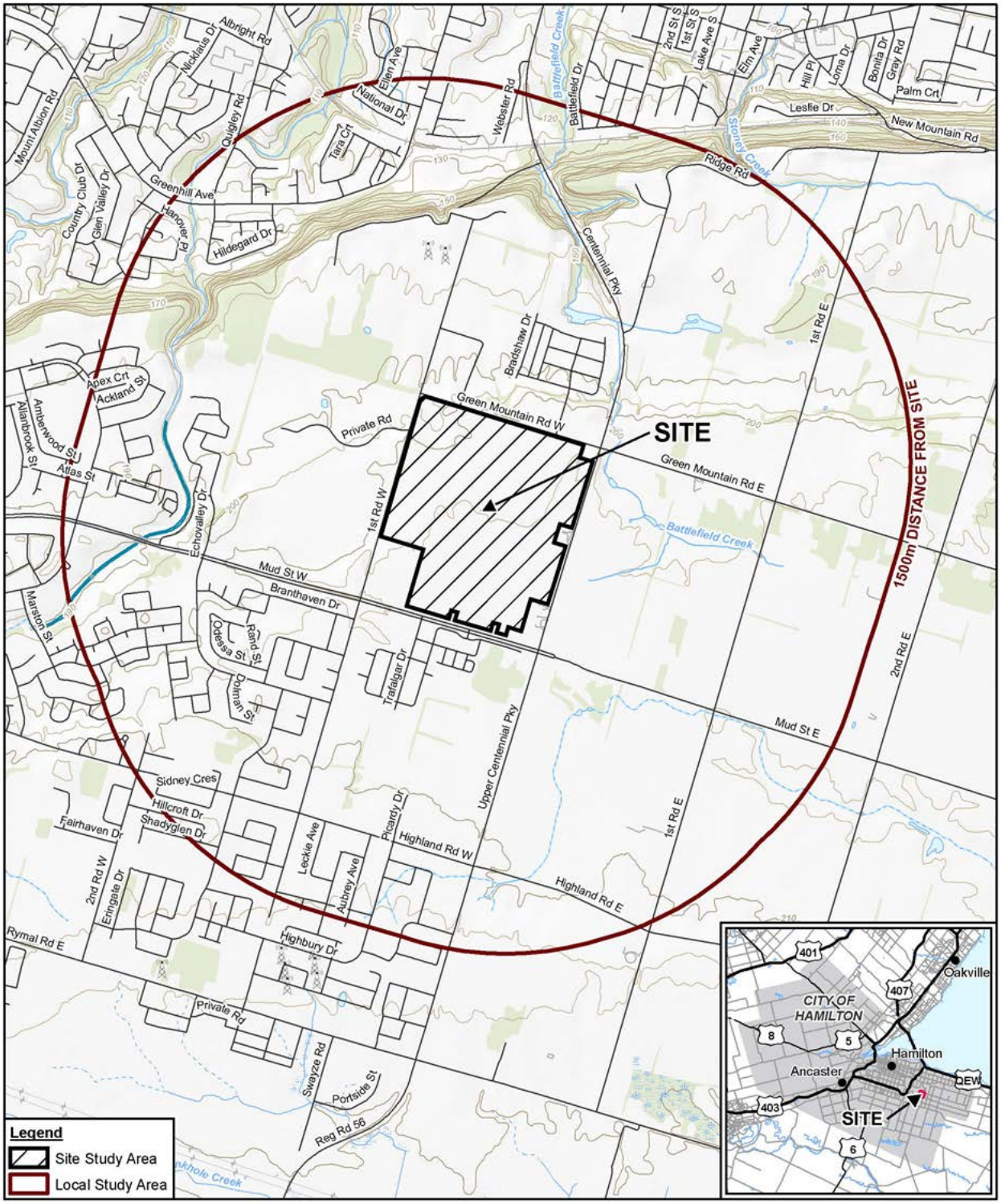
- The range of Alternative Methods that will be considered as part of preparing the SCRF EA (all of the Alternative Methods are situated within the confines of the four roads surrounding the existing SCRF).
- The study area identified as part of 1996 Taro East Quarry EA, which was 1500 m (or 1.5 km) from the proposed Taro East Quarry (now known as the SCRF).
- The data from monitoring the existing SCRF for the past 20 years, which demonstrates compliance with the approved ECA for the Facility and limited potential for and extent of off-Site adverse environmental effects.

As part of the Approved ToR, a commitment was made that the preliminary study area would be reviewed, modified (as required) and finalized during preparation of the SCRF EA. Each technical

discipline has completed a review of the preliminary study area relative to their specific environmental components. The preliminary study area serves as a starting point for technical disciplines and where the study area has been modified, a rationale for the change has been provided. Further, all technical disciplines characterized the environment for their specific components based on a Site Study Area, as well as the larger Local Study Area (see **Figure 4.1**). This allowed for more a more focused description of the environment for potential effects on-Site, as well as those potential effects that may occur outside of the on-Site operations. The Site Study area and the Local Study area are generally defined as:

- **Site Study Area**, including all lands within the existing, approved boundaries of the SCRF, as defined by ECA No. A181008, as amended. The Site retains an additional 18 ha for industrial fill area, as well as an additional 15 ha (approx.) of buffer zone; and
- **Local Study Area**, including all lands within a 1.5 km radius of the Site Study Area boundaries.

Further descriptions on the Study Areas are provided for each technical discipline and, where modified to suit the requirements of individual environmental components, a rationale for the alteration is provided.



Source: MNRF NRVIS, 2017. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017.

Figure 4.1 Study Areas

4.3 Existing Conditions

A description of the environment within the Study Areas addressing all components of the *EA Act* definition of the environment is provided in the following sections.

4.3.1 Natural Environment

4.3.1.1 Geology & Hydrogeology

For Geology and Hydrogeology components, both the Site Study Area and the Local Study Area described in Section 4.2 are appropriate to establish existing conditions and to assess potential changes to the natural environment as a result of the proposed undertaking. The Local Study Area represents a likely potential zone of influence with respect to potential groundwater impacts from the existing facility or its proposed expansion. Information on the Geology and Hydrogeology existing conditions within the Study Areas was gathered from a combination of secondary source research and Site-specific reports including:

- Jackman Geoscience Inc., 2017. Closed Hamilton (Stoney Creek) Landfill, Environmental Compliance Approval Number A130404 Annual Report 2016.
- Jackman Geoscience Inc., 2017. Hamilton (Stoney Creek) Landfill, Environmental Compliance Approval Number A181008 Annual Report 2016.
- Ontario Geological Survey 2000. Quaternary geology, seamless coverage of the Province of Ontario; Ontario Geological Survey, Data Set 14 --- Revised.
- Gao, C. et al., 2006. Bedrock topography and overburden thickness mapping, southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 207.
- Water Well Information System, 2017. Ontario Ministry of the Environment, Conservation and Parks (Accessed January 2017).
- Brunton, F.R., 2009. Update of Revisions to Early Silurian Stratigraphy of the Niagara Escarpment: Integration of Sequence Stratigraphy, Sedimentology and Hydrogeology to Delineate Hydrogeologic Units. Ontario Geological Survey. Open File Report 6240, Sedimentary Geoscience Section (25), Project Unit 08-004. 19p., pgs 5, 11-13.
- Armstrong, D.K. and Carter, T.R. 2010. The Subsurface Paleozoic Stratigraphy of Southern Ontario; Ontario Geological Survey, Special Volume 7, 301p., pgs 24, 59-67.
- Brunton, F.R., et al., 2013. Stratigraphic Architecture of the Lockport Group in Ontario and Michigan – A New Interpretation of Early Silurian 'Basin Geometrics' & 'Guelph Pinnacle Reefs'.
- Ministry of the Environment, Conservation and Parks (MECP) Technical Guideline and Standards.

The existing SCRF is located within fractured bedrock of the Niagara Escarpment in a former quarry. The closed Terrapure landfill, historically referred to as the "West Landfill" (closed landfill), located to the west of the SCRF (across 1st Road West), is also located within a former quarry. The SCRF and closed landfill are underlain by a sequence of shale and dolostone of the Lockport and Clinton formations.

Site Geology

A review of Quaternary geology mapping indicates that overburden geology in the Local Study Area is primarily comprised of glaciolacustrine deposits consisting of silt and clay with minor amounts of

sand, and silt to silty clay of the Halton Till closer to the escarpment. Beyond the Site Study Area, but within the Local Study Area, the overburden ranges in thickness, from 0.0 m where bedrock is exposed, to as much as 12.3 m where man-made materials have been deposited. The overburden geology of the Local Study Area is illustrated on **Figure 4.2**.

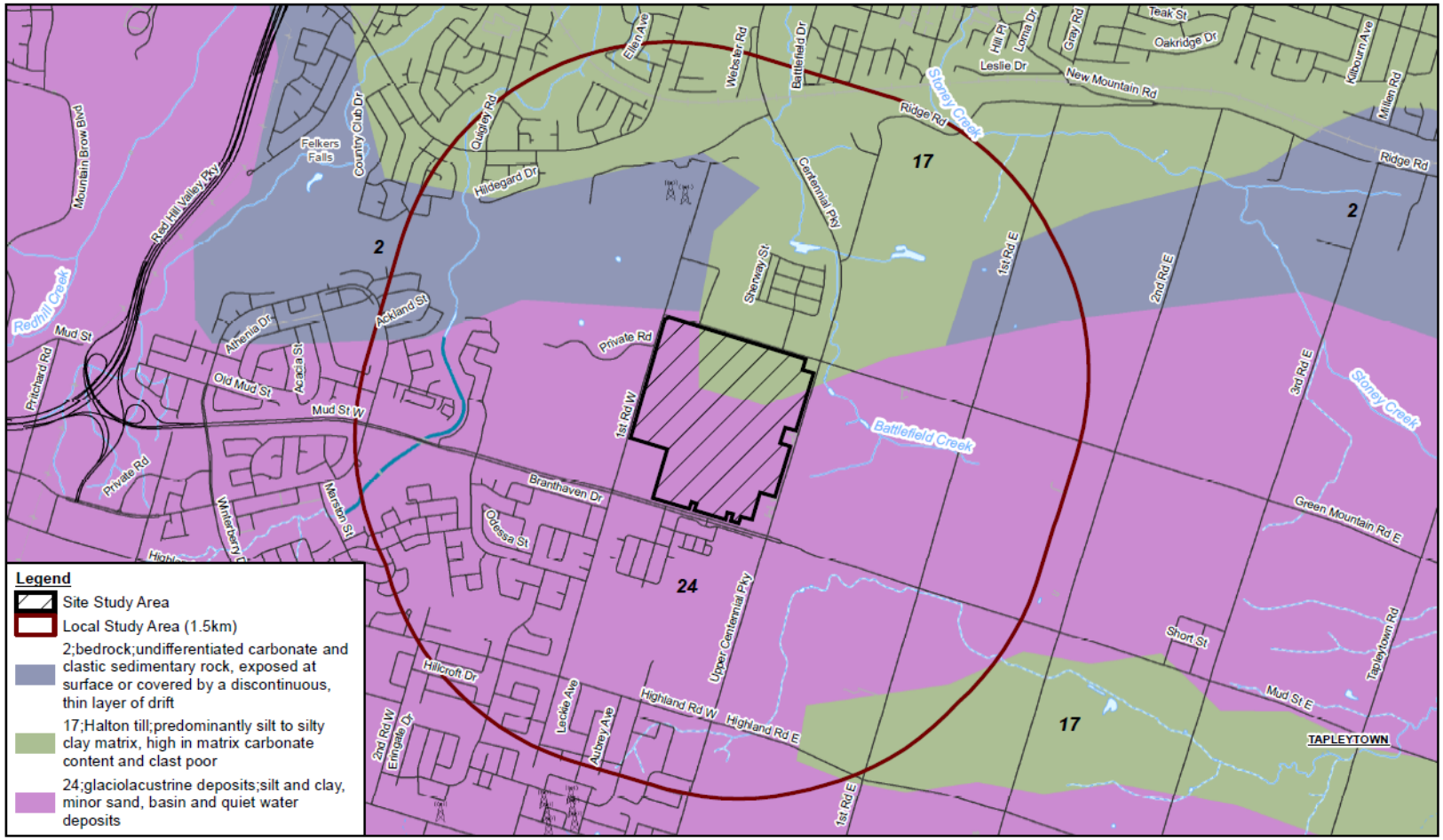


Figure 4.2 Overburden Geology of the Local Study Area

The prominent geologic feature in the Local Study Area is the Niagara Escarpment, located approximately 800 m to the north of the Site Study Area. This escarpment is approximately 80 m in height in the Local Study Area, and is illustrated by the apparent change in bedrock topographic elevation illustrated on **Figure 4.3**.

Source: MNRF NRVIS, 2017. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018;
Gao, C., Shirota, J., Kelly, R.I., Brunton, F.R. and van Haaften, S. 2006. Bedrock topography and overburden thickness mapping, southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 207.

0 300 600 900
Meters
Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST, STONEY CREEK, ONTARIO
GEOLOGY AND HYDROGEOLOGY
BEDROCK TOPOGRAPHY

11102771-03
Jul 9, 2018

FIGURE 4.3

GIS File: Q:\GIS\PROJECTS\11102000s\11102771\Layouts\005\11102771-03(005)GIS-WA005.mxd

Figure 4.3 Bedrock Topographic Elevation of the Study Areas

An additional notable geologic feature within the Site Study Area is a small escarpment known as the Eramosa Scarp, located along the northern extent of both the SCRF and closed landfill. The Eramosa Scarp was formed by the removal of some rock units at the surface during glacial advancement. Subsequent glacial activity has resulted in burial of the Eramosa Scarp beneath a veneer of overburden.

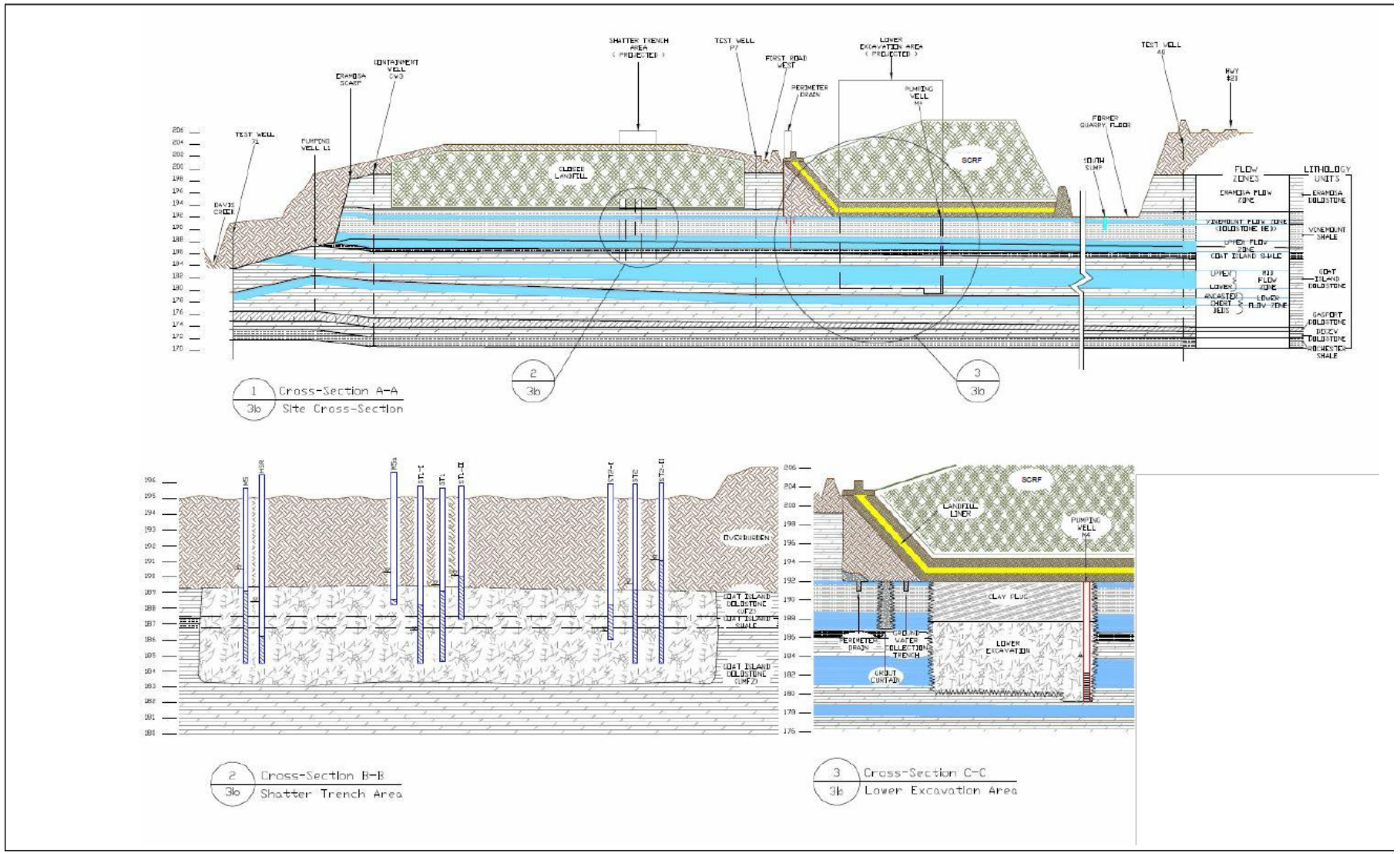
Site Hydrogeology

Previous investigations have identified five distinct bedrock groundwater flow zones within the Local Study Area. The following table summarizes these flow zones by name and associated lithologic unit.

Table 4.1 Groundwater Flow Zones

Flow Zone	Lithology Unit	Notes
Eramosa Flow Zone	Eramosa Dolostone	Water table aquifer within uppermost bedrock unit
Vinemount Flow Zone	Vinemount Shale	Upper 0.5 m of a 5 m thick shale unit is horizontally permeable. This zone represents the Vinemount Flow Zone
Goat Island Upper Flow Zone	Goat Island Dolostone	1.5 m layer of interbedded dolostone and shale within the upper portion of Goad Island Unit
Goat Island Mid Flow Zone	Goat Island Dolostone	Later split into Upper Mid and Lower Mid Flow Zones
Goat Island Lower Flow Zone	Ancaster Chert Beds	

The flow zones and their respective lithologic units are also illustrated on **Figure 4.4**.



Source: JACKMAN GEOSCIENCE INC., 2015. HAMILTON (STONEY CREEK) LANDFILL, PROVISIONAL CERTIFICATE OF APPROVAL No. A181008, ANNUAL REPORT 2014

Figure 4.4 Cross-section - Geologic Sequence and Groundwater Control Features

The Eramosa Dolostone and Vinemount Shale do not extend to the north of the Eramosa Scarp, as they were eroded by glacial advancement. Where these units do not exist, the water table generally occurs within the overburden, however seasonal fluctuations have historically dropped the water table to within the Goat Island Dolostone during dryer periods.

Beneath the Ancaster Chert Beds lie the Gasport Dolostone and Decew Dolostones. These units are interpreted to be less than 2 m in thickness in the Local Study Area, and do not represent significant groundwater flow zones. A Unit known as the Rochester Shale underlies the Decew Dolostone. Previous studies have determined that the Rochester Shale has a horizontal hydraulic conductivity of less than 10^{-8} cm/sec. Vertical hydraulic conductivities have been estimated between 10^{-8} and 10^{-10} cm/sec. On this basis, the Rochester Shale is interpreted to be an effective aquitard, and represents the bottom of active groundwater flow within the Local Study Area.

Natural groundwater flow direction in these flow zones within the Local Study Area would be to the northwest towards the Niagara Escarpment; however, there are several natural and man-made features that influence the movement of groundwater in the vicinity of the Local Study Area. These features are discussed in detail in the following section. Prior to quarry development and construction of several sub-surface infrastructure projects, groundwater flow was likely consistently northwest in all five flow zones.

In the northern portion of the Local Study Area, closer to the Niagara Escarpment, the rock units are more fractured and interconnected. This interconnecting of units results in a more vertical component of groundwater flow (downward) prior to reaching the Escarpment. As a result, groundwater springs along the Escarpment face are infrequent.

Numerous private water supply wells were historically used within the Local Study Area. Water supply in the Local Study Area is currently obtained through the municipal water distribution system, with no known private water supply wells in use. The long-term environmental monitoring program for the SCRF historically included two private water supply wells as part of the groundwater sampling program; however, these wells are no longer included in the program, and it is suspected that the properties formerly serviced by these private wells are now serviced by municipal water supply. As part of the alternatives assessment, a review of groundwater use within the Local Study Area will be undertaken.

Source Water Protection

In 2006, the provincial government made a commitment to the citizens of Ontario by passing the Clean Water Act, which aims to protect municipal drinking water in the province with a multi-barrier approach, starting with Source Water Protection. Within the City of Hamilton, the Halton-Hamilton Source Protection Committee has prepared a Source Water Protection Plan, which outlines potential vulnerable areas, as well as policy to address the potential threats to Source Water.

Source Water Protection Plans identify four vulnerable areas:

- **Wellhead Protection Areas (WHPA)** - Wellhead protection areas are areas on the land around a municipal well, the size of which is determined by how quickly water travels underground to the well, measured in years. The WHPA ranges from WHPA-A to WHPA-D, which represents a travel time between 0 - 25 years.

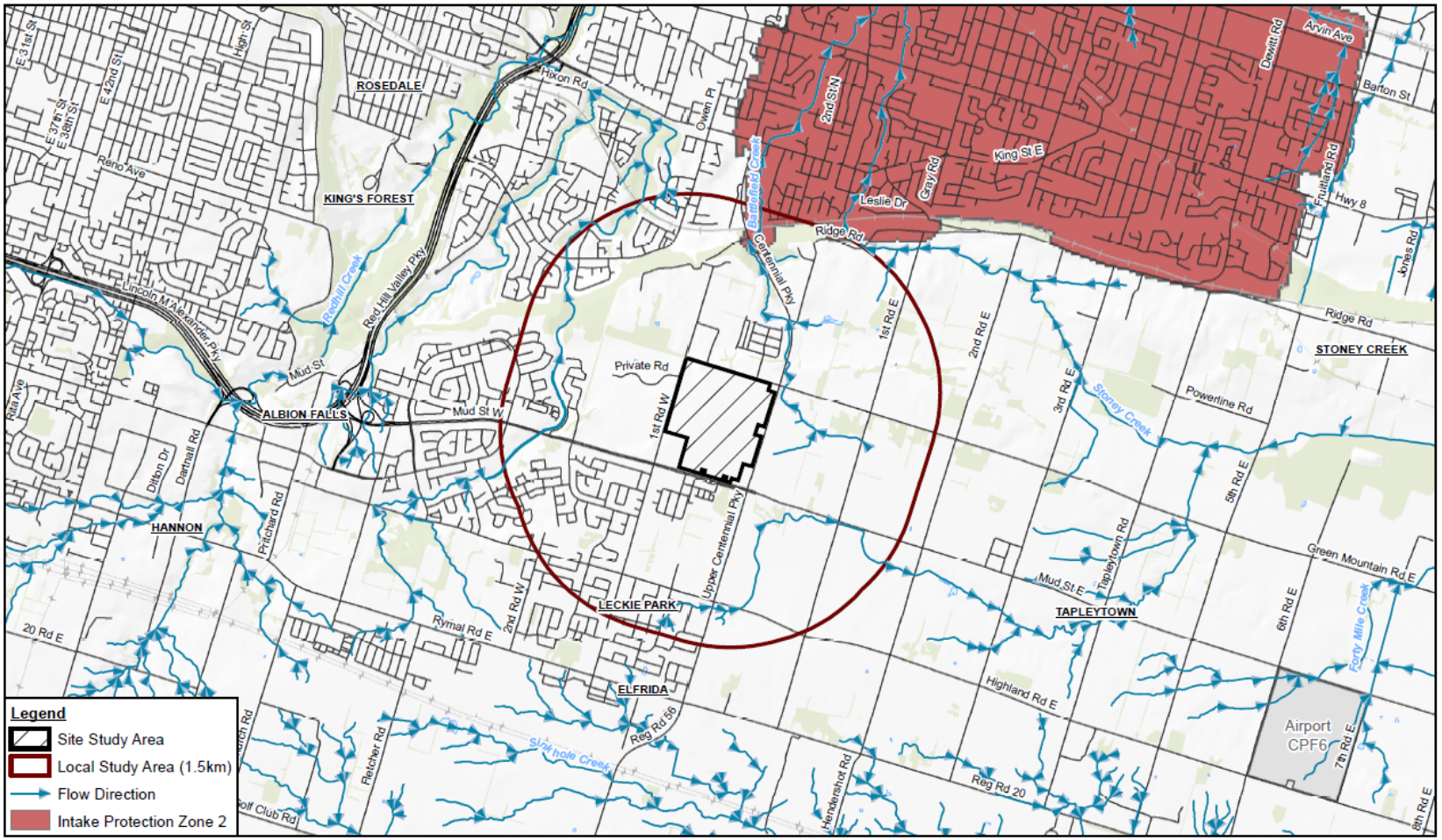
- **Intake Protection Zones (IPZ)** – Intake protection zones are the area on the water and land surrounding a municipal surface water intake. The size of each zone is determined by how quickly water flows to the intake, in hours.
- **Highly Vulnerable Aquifers (HVA)** – An aquifer is an area underground that is highly saturated with water – enough water that it can be drawn for human use. A highly vulnerable aquifer is one that is particularly susceptible to contamination, because of either its location near the ground's surface, or because of the type of materials found in the ground around it (for instance, clay versus sand versus fractured rock).
- **Significant Groundwater Recharge Areas (SGRA)** - These are areas on the landscape that are characterized by porous soils, such as sand or gravel, that allow the water to seep easily into the ground and flow to an aquifer. A recharge area is considered significant when it helps maintain the water level in an aquifer that supplies a community with drinking water.

The existing SCRF is not located within a WHPA or an IPZ. The mapping provided by the Source Water Protection Plan for Halton-Hamilton does show portions of the SCRF as HVA and SGRA. In reviewing the *Clean Water Act*, Table 1 identifies a number of Drinking Water Threats with respect to the establishment, operation, or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*. The Source Water Protection Policies for waste disposal sites apply to sites that are a 'Significant Threat', Vulnerability score of 8 to 10. Based on the Halton-Hamilton Source Water Protection Plan, portions of the SCRF are labelled HVA-6[1].

While mapping shows part of the SCRF falling within the HVA and SGRA, the existing SCRF is a fully engineered and lined facility that ensures groundwater protection. Further, as the area has developed over time, there are few (if any) drinking water sources (i.e., wells) for private use. The majority of the area is serviced by the municipal drinking water system. However, it should be noted that as part of further analysis and evaluation, the HVA and SGRA will be considered as part of the alternative methods evaluation process.

It should be noted that the municipal water supply is derived from an intake located within Lake Ontario. Source Water Protection zone mapping (**Figure 4.5**) indicates that with the exception of a very small area, the Local Study Area is located outside the limit of the IPZ, which has been based on the interpreted zone of potential groundwater influence on the City of Hamilton's water intake in Lake Ontario.

[1] Assessment Report Hamilton Region Source Protection Area, Figure 7-11 (August 5, 2015).



Source: MNRF NRVIS, 2017. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017. Hamilton Conservation Authority, 2017.

0 500 1,000 1,500
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST, STONEY CREEK, ONTARIO
GEOLOGY AND HYDROGEOLOGY
INTAKE PROTECTION ZONES

11102771-03
Dec 7, 2017

FIGURE 4.5

GIS File: Q:\GIS\PROJECTS\11102000s\11102771\Layouts\005\11102771-03(005)GIS-WA009.mxd

Figure 4.5 Intake Protection Zones

Potential Man-Made Influences on Groundwater Movement

Various construction and infrastructure projects within and in the vicinity of the Local Study Area have influenced local groundwater flow directions and/or gradients. For example, construction of sewers within or below groundwater flow zones can influence groundwater flow by creating preferential pathways for groundwater movement within the granular trench bedding. The following points summarize construction projects that have intersected the groundwater flow zones, and thus affected the movement of groundwater:

- A 2.1 m diameter storm sewer was installed within the median of Mud Street to the south of the landfill during 1994. Construction of this sewer involved removal of portions of the Eramosa Dolostone and the Vinemount Shale.
- Construction of a 42.7 m deep vertical sanitary sewer drop shaft began in 1974, as part of the Upper Stoney Creek subdivision development within the western portion of the Local Study Area. This drop shaft connects the sanitary sewer at the top of the Niagara Escarpment to the sanitary sewer system at the base of the Escarpment. Construction of this vertical shaft involved blasting and excavating through rock, and thus resulted in connection of the various groundwater flow zones in the immediate vicinity of the vertical shaft. A similar vertical shaft was constructed in the vicinity of Green Mountain Road West and Highway 20 between 2011 and 2012. A trunk sanitary sewer line construction trench which parallels Davis Creek penetrates the bedrock below the creek, and acts as an interceptor drain for groundwater flow where the trench intersects active flow zones. The trunk sanitary sewer was constructed during widening of Mud Street in 1994.
- The Centennial Parkway Trunk Sanitary Sewer (CPTSS) extension consists of a 2,550 mm diameter tunnel bored into the base of the Niagara Escarpment, roughly following the alignment of Highway 20. The 2.55 km tunnel is connected via a series of vertical shafts to the portion of the trunk sewer extension that runs along Upper Centennial Parkway to the east of the Site, towards the Town of Binbrook. Dewatering of the tunnel boring for the trunk sewer has been ongoing through construction, and the effects of this dewatering have been evident in water level monitoring within the Local Study Area. Phase One of the extension to the CPTSS began in September 2010.
- A former quarry dewatering sump referred to as the South Sump was excavated into the Vinemount Shale within the footprint of the SCRF in approximately 1990. The South Sump has been operating during construction of four of the landfill cells, in order to keep conditions dry for construction. This sump is connected to a series of granular trenches constructed for the purpose of expanding groundwater collection below the SCRF liner system. It should be noted that this construction took place early on in the life of the Site.
- A lower quarry excavation located within the footprint of the SCRF was completed into the Goat Island Dolostone for aggregate production in the early 1980s. The eastern portion of this excavation included a 9 m deep dewatering sump. At the completion of quarrying this lower portion, the excavation was backfilled with rubble and capped with a 3 m thick clay plug in 1991. The clay plug was placed at the elevation of the Vinemount Shale. Despite placement of a clay plug, the perimeter of the excavation represents a vertical connection between the Upper and Lower Flow Zones. A pumping well (M4) was installed below the clay plug in 1993, in order to use the highly permeable lower excavation as a source of groundwater capture.

- A series of Containment Wells are operated along the northern limit of the closed landfill for the purpose of groundwater collection. Operation of these wells affects groundwater flow.
- A Perimeter Drain was installed in 2001 and 2002 between the closed landfill and the operating SCRF for the purpose of mitigating the movement of impacted groundwater from the closed landfill to the operating SCRF. Eastward movement of groundwater from the closed landfill to the operating SCRF is the result of active groundwater pumping at the South Sump and pumping well M4. The Perimeter Drain system includes groundwater collection trenches and a grout curtain installed to reduce movement of groundwater in the Vinemount and Upper Flow Zones.

Closed Site – West of SCRF

Previous investigations undertaken within the Site Study Area identified groundwater impacts related to the closed landfill to the west of the existing SCRF. The impacts are the result of infiltrated rainwater coming into direct contact with buried waste within the un-engineered landfill cells. No impacts to groundwater from the SCRF are evident, as the SCRF is fully lined and under-drained. Historically, impacts from the closed Site have been primarily noted within the Eramosa, Vinemount, Upper and Mid Flow Zones. In response to the identified impacts, several groundwater remediation strategies have been implemented. The principal groundwater remediation strategy is through active leachate or groundwater extraction and control in the areas of identified impact. The following points summarize the groundwater remediation systems currently in place at the closed landfill.

- A series of Containment Wells are located along the northern boundary of the closed landfill. The locations of these wells correspond largely with the presence of the buried Eramosa Scarp. A total of seven Containment Wells have been installed and historically operated with groundwater pumped and discharged to the sanitary sewer system. With implementation of the Shatter Trench system (described below) and progressive closure of the closed landfill, decreases in available drawdown have been observed at the Containment Wells. These effects, combined with decreased performance due to mineral precipitation, have reduced the active network from 7 to 2 wells, as of 2017. Currently, only CW3 and CW16 continue to actively pump.
- A horizontal collection pipe runs along the western boundary of the closed landfill. This collection pipe was installed in 1994, and is intended to control the westward migration of impacted groundwater.
- A groundwater collection trench and grout curtain was constructed between the closed landfill and operating SCRF, for the purpose of reducing migration of impacted water from the closed landfill to the east.
- Operation of pumping well M4 is located within the lower excavation to the north of the operating SCRF. Operation of this pumping well controls groundwater impacts within the Upper and Mid Flow Zones.
- Operation of pumping well L1 near the west side of the closed landfill. L1 was installed in 1995, and has been in continuous operation since, with the exception of interruptions for maintenance, etc. L1 draws water from the Lower Flow zone.

- Operation of pumping wells within a Shatter Trench located to the north of the closed landfill. The Shatter Trench pumping wells remove groundwater from the Upper Flow Zone and the Upper-Mid Flow Zone. Currently, two pumping wells actively remove groundwater from the Shatter Trench (M5A, M5R). During 2016, decreased performance of the Shatter Trench pumping wells was observed in part due to decreased static water levels in the UFZ and the Upper-Mid Flow Zone, from the operation of M4 and the extensive dewatering conducted for the Centennial Parkway Trunk Sewer Extension.

The locations of these measures are presented in profile on **Figure 4.4** (where possible) and in plan view on **Figure 4.6** (where possible).

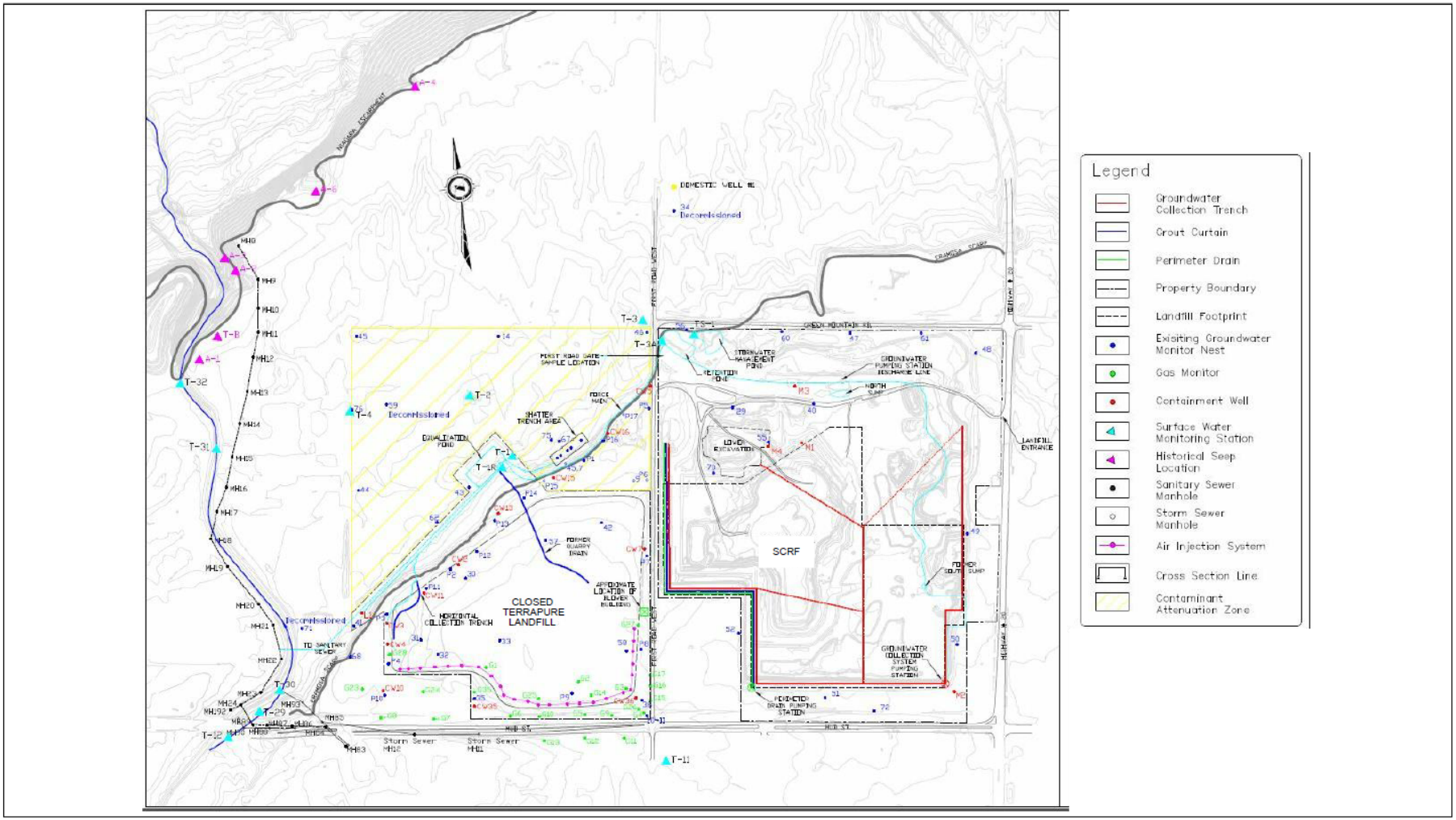


Figure 4.6 Site Plan and Monitoring Network

The results of the monitoring program for the closed landfill to the west of the SCRF has demonstrated that operation of the groundwater remediation systems has been effective at collecting and controlling impacted groundwater at the closed Site. As is discussed in Section 4.4, decreases in the effectiveness of the groundwater remediation systems were noted between 2009 and 2011. The decrease in effectiveness was due to deterioration of pumping rates, primarily at the Shatter Trench pumping wells, the M4 pumping well and the L1 pumping well. In 2014, M4 was inspected and performance tested, and underwent extensive rehabilitation and was re-equipped with a new pump and controller to allow a constant pumping level to be maintained. In 2015, L1, CW3, CW16, M5A, and M5R were inspected and performance tested. L1 was extensively redeveloped and, as a result, the specific capacity was significantly improved and production increased significantly in 2016. The other containment wells were also rehabilitated in 2016.

Improvements to the systems effectiveness were implemented as of 2012 through a well rehabilitation program, and improvements in groundwater quality following rehabilitation efforts have been observed through the closed landfill and SCRF groundwater monitoring programs.

As mentioned above, significant decreases in the available drawdown within the Shatter Trench Wells were observed in 2015 and 2016. These decreases are attributed to an observed lowering of the water table locally. The lowering of the water table is interpreted to be the result of improved groundwater extraction at M4 and the effects of extensive dewatering conducted in the eastern portion of the Local Study Area for the Centennial Parkway Trunk Sewer Extension.

Groundwater Flow

The regional groundwater flow system within the Local Study Area is generally characterized by groundwater movement from the southeast to the northwest towards the Niagara Escarpment. However, due to the various influences on groundwater movement in the Local Study Area, groundwater flow is complex. The following description is taken from the 2014-2016 Annual Reports for the closed landfill, and provides a conceptual description of the movement of groundwater through the Local Study Area.

"*Shallow groundwater flow in the Local Study Area occurs largely in the uppermost bedrock unit (Eramosa Dolostone). Groundwater flow in the area of the closed landfill flows from the south side of the Site Study Area toward the waste footprint and into the Vinemount Flow Zone, continuing on towards the northern portion of the Site Study Area. Some shallow groundwater will be intercepted by the perimeter drain, located between the closed landfill and operating SCRF, and some will be intercepted by the horizontal collector drain, which is located on the west side of the closed landfill. Beyond the northern limit of waste, the majority of this shallow groundwater is captured by pumping systems located along the Eramosa Scarp (Containment Wells and Shatter Trench pumping wells).*

In the vicinity of the operating SCRF, shallow groundwater enters from the south within the Eramosa Dolostone. The majority of the shallow groundwater is intercepted by the groundwater collection trenches located in the southern portion of the operating Site. From these trenches, groundwater is directed to the Groundwater Pumping Station, where it is pumped to the sanitary sewer system."

Groundwater flow in the deeper bedrock flow zones within the Site Study Area is largely affected by the groundwater remediation systems currently in operation, with influences from infrastructure

being apparent (e.g., vertical sewer shaft at Green Mountain West and Highway 20, Centennial Parkway Trunk Sewer Extension). The dominant horizontal hydraulic gradients in the lower flow zones indicate an overall groundwater flow direction from east to west, or towards Davis Creek and the Niagara Escarpment. As groundwater in each flow zone approaches the Niagara Escarpment, where vertical and horizontal fracturing is more frequent, groundwater moves downward as much as it moves horizontally. This pattern results in groundwater moving through deeper flow zones prior to reaching the escarpment. Groundwater that flows beyond the escarpment discharges to Lake Ontario.

Groundwater Quality

The groundwater monitoring network for the closed landfill and operating SCRF consists of:

- 23 monitoring locations within the closed landfill property
- 15 monitoring locations within the SCRF (operating Site)
- 23 off-property monitoring locations

Leachate was historically characterized through sampling the quarry underdrain, where the collected water discharged to a surface water pond north of the Site. Discharge ceased in 1993, following completion of the connection to the sanitary sewer system. Subsequent leachate characterization has been through sampling of individual leachate monitors. Leachate quality has been characterized as elevated in the following parameters:

- pH (historical range of 11 to 13)
- chloride (historical range of 17 to 35,000 mg/L)
- ammonia (historical range of 3 to 150 mg/L)
- phenols (historical range of 0.049 to 12 mg/L)

Detectable concentrations of various organic compounds including BTEX (benzene, toluene, ethylbenzene and xylenes), PAHs (polycyclic aromatic hydrocarbons), 2,4-dimethylphenol and PCBs (polychlorinated biphenyls) have also been historically detected in leachate samples.

Natural groundwater quality in the flow zones monitored beneath the closed landfill and operating SCRF ranges from generally non-potable shallow groundwater to saline or concentrated brine at depth. The natural poor groundwater quality is the result of the characteristics of the bedrock units and the relatively slow groundwater flow velocity. The Shale and Dolostone formations within the Local Study Area contain readily soluble salts, which result in naturally elevated total dissolved solids. Previous studies have concluded that the degree of groundwater salinity increases with depth.

Eramosa Flow Zone

Water quality within the Eramosa Flow Zone is variable spatially and seasonally. In general, landfill-related water quality alterations within this shallow flow zone have been improving during recent monitoring years. Closure of the closed landfill and operation of the leachate and groundwater collection systems has resulted in long-term trends of improving water quality.

Recent Reasonable Use Trigger Assessments of water quality in this flow zone have concluded that none of the wells considered in the assessment are leachate impacted. Very few Trigger Level

exceedances have been noted, and the exceedances noted are attributable to natural water quality variability or other sources (e.g., road salt).

Vinemount Flow Zone

An area of impacted groundwater within the Vinemount Flow Zone has been described in annual monitoring reports. This area extends beneath and along the southern boundary of the closed landfill, as well as east to the lower excavation and the former South Sump/Groundwater Pumping Station. A small area of impacted groundwater within the Vinemount Flow Zone is also apparent to the south of the operating SCRF. The distribution of this impacted groundwater within the Vinemount Flow Zone is interpreted to be the result of:

- Leachate circulation that occurred at the closed landfill during 1992-1993
- Ongoing operation of the Groundwater Pumping Station
- The presence of the lower excavation and active pumping at M4, completed within the lower excavation

Annual Reports for the closed landfill have concluded that the remedial systems in operation at the SCRF and closed landfill are generally effective in controlling the observed impacts within the Vinemount Flow Zone. The 2016 Annual Report recommended additional improvements to operation of the remedial systems to enhanced control of groundwater impacts within this flow zone.

Upper Flow Zone

A zone of impacted groundwater within the Upper Flow Zone has historically been observed. Leachate recirculation practices carried out in 1992-1993 are suspected to be the primary source of contaminant migration within this unit. Operation of the Containment Well system, the Shatter Trench pumping wells and M4 pumping well has historically resulted in a reduction in the spreading of impacted groundwater within this flow zone. Continued improvements in water quality have been noted within the majority of monitors located within this flow zone.

The southwest corner of the Site continues to show minor impact in the perimeter monitors. In 2014, M4 was rehabilitated, and new pumping equipment was installed in late 2015. These upgrades have made it possible to maintain a constant pumping level close to that of 2007, when historical lows were noted in monitors in this flow zone. In July of 2016, CW3, CW16, M5A and M5R were also rehabilitated, and this work is expected to improve the containment efficiency of the Containment Well system.

Upper Mid Flow Zone

As with the Upper Flow Zone, a zone of impacted groundwater is apparent within the Upper Mid Flow Zone. The source of groundwater impacts to this flow zone is interpreted to be leachate recirculation practices undertaken in 1992-1993, as well as connection of this flow zone to shallower flow zones as a result of construction activities (e.g., lower excavation).

Overall improvements in groundwater quality were observed within this flow zone following construction and operation of the various remedial systems in place. However, between 2009 and 2012, decreases in water quality were also observed in various wells completed within the Upper Mid Flow Zone. The changes in water quality are interpreted to be the result of decreasing

performance of several remedial systems, including the Shatter Trench pumping wells and the M4 pumping well during this period.

Improvements in the operation of the containment systems were implemented between 2012 and 2014, and a corresponding improvement in water quality within Upper Mid Flow Zone monitors has been observed. In addition, improvements to the operation of M4 have been demonstrated through 2016. Once the hydraulic effects of the Centennial Parkway Trunk Sewer Extension have abated, additional improvements in the effectiveness of M4 should be apparent.

Lower Mid Flow Zone

A zone of impacted groundwater exists within the Lower Mid Flow Zone, however, the real extent of impacts is smaller than that observed in the Upper Mid Flow Zone. In general, the area extends along the Eramosa Scarp in the vicinity of the closed landfill and extends east to the lower excavation. Previous interpretations have stated that construction of the Shatter Trench resulted in a temporary spread of impacted groundwater into this flow zone.

Active groundwater pumping at Shatter Trench pumping well M5R, and lower excavation pumping well M4 has reduced vertical gradients between the flow zones in these vicinities, and has reduced the spread of impacted groundwater. Pumping well L1, located to the west of the closed landfill also collects groundwater from the Lower Mid Flow Zone and, as such, helps to reduce contaminant migration.

Lower Flow Zone

Groundwater quality within the Lower Flow Zone is naturally poor, making interpretation of leachate-related water quality impacts more difficult. The pattern of landfill-related water quality impacts within the Lower Flow Zone is similar to that observed within the Lower Mid Flow Zone, running from the northern portion of the closed landfill in the vicinity of the Eramosa Scarp to the lower excavation.

A zone of impacted water quality within the Lower Flow Zone also exists to the west of the closed landfill. Pumping well L1 draws water from the Lower Flow Zone in this area to control the observed groundwater impacts, however, variable pumping patterns at L1 have been reported. The 2014 Annual Report for the closed landfill recommended that pumping patterns at this well be stabilized, and that the pumping level be set at approximately 178.5 m AMSL, in order to improve the zone of capture of this well. As referenced above, L1 was rehabilitated in 2015 and the pump and controller were replaced in October 2016. Since these works have been undertaken, improvements in performance at L1 have been demonstrated, with the largest total annual water taking from this well since installation occurring during 2016.

Recent improvements to the M4, CW3 and CW16 Containment Wells are expected to significantly improve containment, which will result in continued improvements in Lower Flow Zone water quality. It is expected that the effectiveness of these wells will be further improved once the hydraulic influence of the Centennial Parkway Trunk Sewer Extension project is eliminated.

Niagara Escarpment Seepage Sampling

Based on the results of seepage sampling conducted at various locations along the Niagara Escarpment, the groundwater seepage has not been impacted by historic landfilling activities within at the Site. It should be noted that the majority of seep locations are considered unsafe for sampling and, as such, have not been sampled during recent monitoring periods

4.3.1.2 Surface Water

For Surface Water both the Site Study Area and Local Study Area described in Section 4.2 are appropriate to establish existing conditions and to assess potential changes to the natural environment as a result of the proposed undertaking.

Available secondary sources of information were collected and reviewed to characterize surface water existing conditions within the study areas. The following sources of secondary information were collected and reviewed:

- Closed Hamilton (Stoney Creek) Landfill, ECA Annual Report – 2016
- Hamilton (Stoney Creek) Landfill, Provisional Certificate of Approval Annual Report – 2016
- Newalta Stoney Creek Landfill Footprint Reconfiguration Supporting Document, October 2013
- Considerations for Reduction of Newalta Stoney Creek Landfill Footprint Memo, October 9, 2012
- Amended ECA, No. A181008, Stoney Creek Landfill, March 1, 2016
- Certificate of Approval – Industrial Sewage Works, Newalta Stoney Creek Landfill, May 1, 2008

The Local Study Area is situated in the Stoney/Battlefield Creek Watershed. Three subwatersheds exist within the Local Study Area: Lower Davis Creek, Battlefield Creek and Stoney Creek.

Tributaries within the Battlefield Creek subwatershed drain the northern flank of the Niagara Falls Moraine to a main channel with westerly flowing water. Water flows within the eastern extent of the Felker's Falls Escarpment ESA and the western extent of the Devil's Punchbowl Escarpment ESA. The creek reaches Centennial Parkway, a major transportation corridor that ascends the Niagara Escarpment. At Centennial Parkway, Battlefield Creek flows down a natural valley between residential areas.

The Stoney Creek subwatershed almost completely surrounds the Battlefield Creek subwatershed. A network of tributaries drains the Niagara Falls Moraine in an easterly direction where they connect with the main channel. Water within the main channel flows in a westerly direction along the base of the Vinemount Moraine, an Area of Natural and Scientific Interest. This channel drains the Vinemount South Swamp and Tapleytown Woods ESAs.

Drainage Patterns

The Local Study Area is situated in the Stoney/Battlefield Creek Watershed which is regulated under the Hamilton Conservation Authority (HCA) jurisdiction. Several natural water features are present within the Local Study Area. Lower Davis Creek crosses a limited area of the western portion of the Local Study Area. Battlefield Creek, an intermittent watercourse, is present immediately northeast of the SCRF within the Local Study Area. On HCA regulated areas mapping,

a very small portion of the northeast corner of the SCRF is shown as regulated area, due to the presence of Battlefield Creek in the vicinity. An intermittent tributary of Stoney Creek is also shown to occur southeast of the SCRF within the Local Study Area. Lower Davis Creek and Battlefield Creek are both identified as having a warm water thermal regime within and in the vicinity of the Local Study Area.

The Lower Davis Creek receives water from the Upper Davis Creek at Felker's Falls. It also drains the lands above the escarpment to the east of Upper Davis Creek. Tributaries also drain the Felker's Falls Escarpment ESA along the face of the escarpment. Below the escarpment, the subwatershed is completely urbanized, primarily as residential properties. The only natural area is within the Red Hill Creek Escarpment Valley ESA. Lower Davis Creek joins Montgomery Creek and flows a short distance to empty into Red Hill Creek.

Source Water Protection mapping indicates that approximately 50% of the Local Study Area is within an area that has highly vulnerable aquifers. It should be noted that the municipal water supply is derived from an intake located within Lake Ontario, and not from the aquifers underlying the Site Study Area. Source Water Protection zone mapping also indicates that a small area in the northern portion of the Local Study Area is located within the limit of the Intake Protection Zone, which has been based on the interpreted zone of potential groundwater influence on the City of Hamilton's water intake in Lake Ontario

The Local Study Area consists of residential, agricultural and park areas. The residential areas are located to the north, northwest, west, southwest and south of the Site. The minor storm flows within the residential areas drain into catchbasins, which drain into the storm sewer collection system and discharge into the creeks. Major flows within the residential areas are conveyed by the roadways until discharging into the creeks. The park and agricultural areas make up the remaining Local Study Area, and these areas drain through overland flow. Major and minor flows from these areas are carried overland into the roadways or roadside ditches before discharging to the creeks.

The existing surface water conveyance and treatment system for the Site (see **Appendix E**) consists of a set of swales, sumps, and forcemains that convey stormwater runoff to a stormwater management pond in the northwest corner of the property for water quality treatment and runoff peak flow control. The drainage swales along the south and west sides of the landfill are in their final location. All other drainage swales and forcemains are temporary and will be moved as Site construction progresses. Under currently approved final closure conditions, the swales will wrap around the perimeter of the landfill area, as well as the remaining area on the northern portion of the Site, and convey stormwater runoff from the landfill cap to the stormwater management pond. The stormwater management pond will provide quantity and quality control for site runoff. The outlet for the stormwater management pond is near the southeast corner of First Road West and Green Mountain Drive. The outlet structure discharges into a manhole located at the southeast corner of the intersection of First Road West and Green Mountain Road. The flows then discharge into a sewer under First Road West. The outlet structure formerly discharged into the roadside swale on the west side of First Road West. In 2017, construction on Green Mountain Road caused the outlet to be redirected to the First Road West storm sewer. The outlet structure is equipped with a sluice gate that can be closed in the event of a trigger parameter failing during regular testing. If a trigger parameter fails twice in a row, the gate will be closed and the stormwater management pond will accumulate water until it overflows into the neighbouring leachate collection pond via the emergency overflow weir.

The leachate collection pond is a detention pond located in the northwest corner of the Site, sandwiched between the forebay and main cell of the current stormwater management pond. The detention pond receives water fed from groundwater pumping well M4 of the groundwater collection system and runoff from the truck wash pad. The water in the detention pond is periodically pumped to the leachate equalization pond, west of the SCRF. Any precipitation that falls within an active working area is collected by the leachate collection system and pumped to the equalization pond. The equalization pond flows via a gravity sewer west of the Site to a City of Hamilton sanitary sewer on Mistywood Drive, north of Mud Street. In the future, the collection pond will be removed and the stormwater management pond will be reconfigured to have two forebays to capture inflows from the south/west and east/north perimeter swales.

Perimeter berms along the edges of the property direct stormwater runoff away from the working area towards roadside swales surrounding the property. Stormwater runoff from the landfill cap will not come into contact with “clean” stormwater runoff from the edges of the Site or off-Site.

The storm sewer under First Road West flows north to Ridgeview Drive, where it turns west towards the Niagara Escarpment. The flow is conveyed over some falls along the escarpment and into storm sewers associated with a residential subdivision. The flow is eventually conveyed through the subdivision and discharged to Lower Davis Creek.

Surface Water Quality

Annual surface water quality monitoring is completed in accordance with the requirements of the Amended ECA and Certificate of Approval for Industrial Sewage Works. The monitoring program has been historically performed by Jackman Geoscience Inc., and involves monitoring for both the closed west landfill (located on the west side of First Road West) and the SCRF. For the purposes of this report, only monitoring relevant to the SCRF will be discussed. The purpose of the surface water monitoring program is to:

- Assess whether the SCRF is in compliance with the surface water quality policies of the MECP.
- Evaluate the effectiveness of on-Site sediment control measures.

Surface water monitoring related to the SCRF occurs at three locations within the Site Study Area and 18 locations in the Local Study Area. The exact monitoring program description is contained within Schedule D of ECA A181008, and Section 5 of C of A number 5400-7DSSHU. The surface water, monitoring locations are illustrated on **Figure 4.7**.

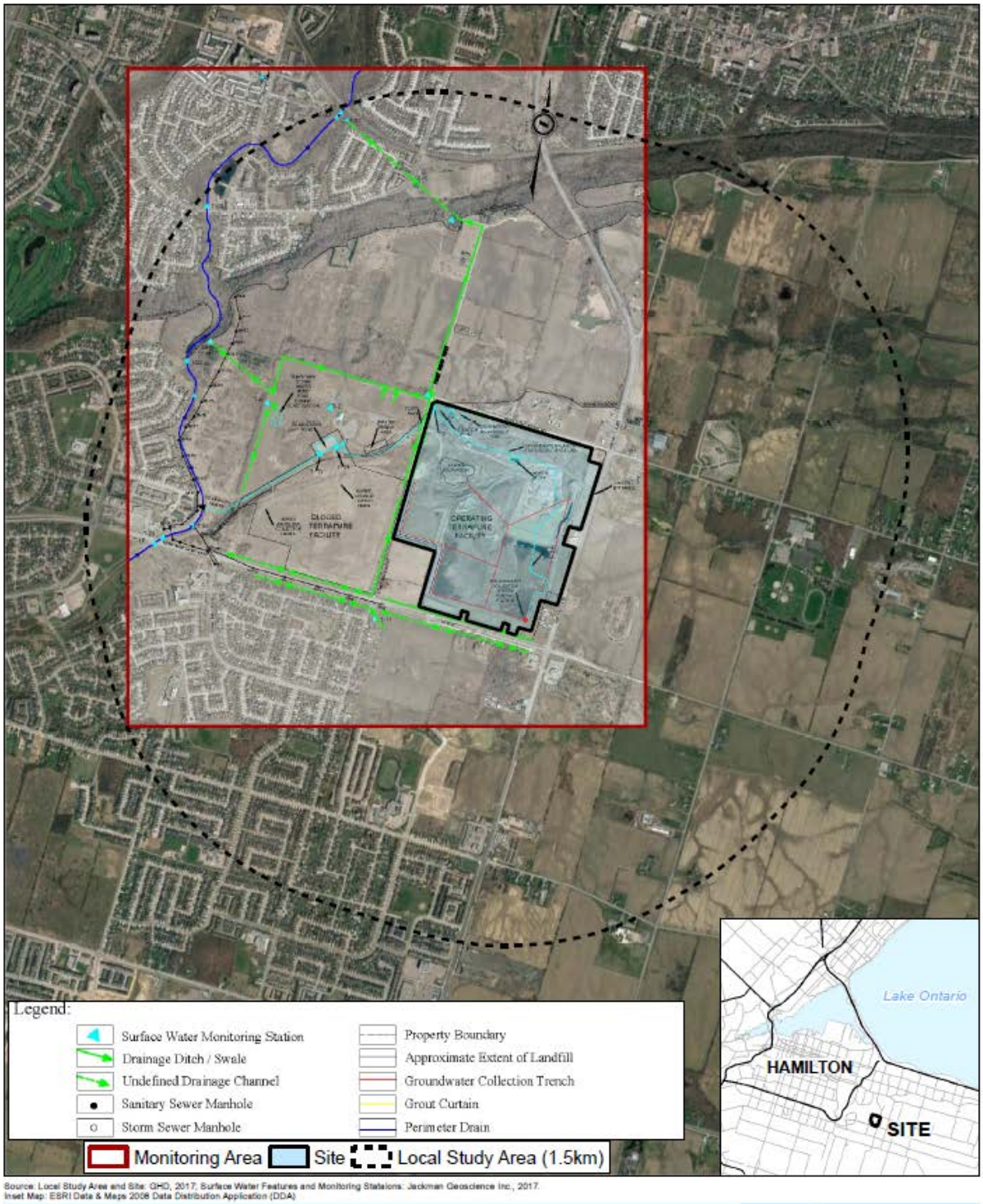


Figure 4.7 Surface Water Monitoring Locations

Since the completion of construction for the existing stormwater management pond, sampling has indicated that concentrations of phosphorus have exceeded the associated trigger level in the C of A in both the Site Study Area and the Local Study Area. Due to the exceedance of trigger levels for phosphorus, the stormwater management pond has been operated with the sluice gate closed, and has not discharged any stormwater into the storm sewer under First Road West or the roadside ditch along First Road West since its inception. The stormwater has been diverted into the leachate collection pond, which eventually discharges into the City sanitary sewer. Because the stormwater management pond has been operated with the sluice gate closed, none of the water samples obtained from monitoring locations within the Local Study Area are affected by SCRF surface water discharges. All of the Local Study Area surface water samples are affected by other sources within the Local Study Area.

Sampling at other surface water monitoring locations (within the Site Study Area and the Local Study Area) during 2016 periodically showed water quality results that exceeded Provincial Water Quality Objectives or trigger levels. However, as documented in the 2016 Annual Monitoring Report, these exceedances are not the result of landfill-related impacts from the SCRF, as all runoff that could have come in contact with waste is diverted to the retention pond, and eventually to City sanitary sewers. PWQO exceedances are interpreted to be largely related to background surface water quality, For example, during 2016 aluminum and Zinc were detected at concentrations above PWQO's at all off-Site sampling locations, for a majority of the sampling events, including upstream monitoring stations. Dissolved oxygen levels were above PWQO's at all sampling locations except for one occasion at station T-1R, which is a pond that receives impacted groundwater (located on the Closed Hamilton (Stoney Creek) Landfill).

During 2016, sampling location T-3, located downstream of the stormwater management pond, demonstrated water quality impacts that are interpreted to be the result of a combination of minor landfill-related and construction-related sources. Drag-out from trucks exiting the SCRF is suspected to be the primary source of landfill-related water quality impacts at T-3. The 2016 Annual Monitoring Report recommended that Terrapure investigate additional means to control drag-out from the SCRF as a means to improving off-Site surface water quality.

Sampling location T-3 no longer exists as drainage has been re-configured as part of the reconstruction of First Road West. Discharge from the stormwater management pond is now routed to a new storm sewer that has been installed under First Road West. A replacement sampling location for sampling location T-3 will be determined once construction activities are completed.

Given that the stormwater management pond has been operating with its outlet closed since its inception, any off-Site detection of any parameter at concentrations above PWQO's, or other trigger levels, is not a result of the discharge of impacted stormwater, as no stormwater has been discharged from the Site since the pond was built.

Sample results from the leachate collection pond, or other locations along the leachate conveyance system, had concentrations of various parameters that exceed PWQO's; however, the water from those ponds is discharged into the sanitary sewer system.

4.3.1.3 Terrestrial & Aquatic Environment

For the Terrestrial and Aquatic Environments, both the Site Study Area and Local Study Area described in Section 4.2 are appropriate to establish existing conditions and to assess potential

changes to the natural environment as a result of the proposed undertaking. Information on the terrestrial and aquatic environment existing conditions within the Study Areas was gathered from a combination of secondary source review, multiple site visits in 2016 and 2017, and agency consultation. A formal request for information was put in with the Ministry of Natural Resources and Forestry (MNRF), and a response was received on November 18, 2016. The following sources of secondary information were collected and reviewed:

Table 4.2 Secondary Source Information Reviewed

Source	Information reviewed
Ministry of Natural Resources and Forestry (MNRF)	• Species at Risk (SAR) • Natural Heritage Information Center (NHIC) mapping • Natural Heritage Features data layers from Land Information Ontario
Fisheries and Oceans Canada (DFO)	• Aquatic Species at Risk Mapping (2017)
Ontario Reptile and Amphibian Atlas	• Reptiles and Amphibian species records for Study Areas
Ontario Breeding Bird Atlas	• Breeding Bird Data for Study Areas
Ontario Butterfly Atlas	• Butterfly Records for Study Areas
Jackman Geoscience Inc. (June 30, 2015)	• Closed Hamilton (Stoney Creek) Landfill: Environmental Compliance Approval
Urban Hamilton Official Plan (2013, amended 2017); Rural Hamilton Official Plan (2012, amended 2016)	• Schedule B – Natural Heritage System • Schedule B-1 – Life Science ANSI • Schedule B-2 – Significant Woodlands • Schedule B-3 – Alvar and Tallgrass Prairie • Schedule B-4 – Wetlands • Schedule B-5 – Lakes and Littoral Zone • Schedule B-6 – Environmentally Significant Areas • Schedule B-7 – Earth Science ANSI • Schedule B-8 – Streams
Hamilton Conservation Authority	• Regulated areas mapping • Natural Areas Inventory data
eBird	• Avian species records in vicinity of Study Areas
Government of Canada	• The Atlas of Canada- Toporama
FishWerks	• Mapped barriers to fish passage

In order to characterize dominant vegetation communities, GHD conducted an Ecological Land Classification (ELC) of the Site and Local Study Areas. ELC mapping of select areas within the Site Study Area was completed in 2016, with minor revisions in 2017. ELC mapping was prepared in accordance with Lee et al (1998). The updated ELC categories were applied in the absence of suitable 1998 ELC categories (e.g., CV1-2 Disposal). ELC mapping of the Local Study Area was created at a coarser level, and was completed by interpreting aerial imagery and utilizing HCA Natural Areas Inventory (NAI) data for the NAI mapped natural areas present within the Local Study Area.

Breeding bird surveys were conducted in 2017 with the main purpose of documenting the presence of Species at Risk (SAR) bird species utilizing the SCRF and determining the probability of breeding within the SCRF boundaries. Surveys were conducted on June 21, June 28, and July 6, 2017, following a modified version of the point count methodology from the Ontario Breeding Bird Atlas

(Cadman et al., 2007). Three rounds of surveys were completed between 5:00 am and 10:00 am within the breeding bird window of May 24 and July 10, with at least a week between each visit. A 10-minute point count recorded all species heard or observed within a 100 m radius of the surveyor. A transect was then walked connecting the point counts with any new observations recorded. Point counts were spaced a minimum 250 m apart to prevent duplicate observations. For each observation, breeding evidence was recorded to determine if the species was a possible, probable, or confirmed breeder.

At each survey, weather conditions were recorded. Surveys were only completed during suitable weather conditions, including good visibility and wind speeds lower than 19 km/hr (or less than 3 on the Beaufort scale). **Table 4.3** summarizes the weather conditions of each visit. Weather conditions were stable across point counts, with only small variations in temperature and cloud cover.

Table 4.3 Weather Conditions During Breeding Bird Surveys

Date	Temperature (°C)	Wind (Beaufort Scale)	Visibility	Precipitation	Cloud Cover
June 21, 2017	17	0	Good	None	30%
June 28, 2017	18.9	1-2	Good	None	0%
July 6, 2017	22.6	0-1	Good	None	30%

The Site and Local Study Areas encompass a variety of land uses. North of the Site Study Area, there is active development and the creation of residential neighbourhoods. Actively farmed and/or fallow agricultural fields are present to the east of the Site Study Area, as well as a field to the immediate southwest of the Site Study Area. Two golf courses are present to the east and south, and patches of deciduous forest are present to the southeast and to the northwest of the Site Study Area, with another small patch of deciduous forest present to the north in the area of residential development. To the west is Heritage Green Community Trust Passive Park, a former landfill which has been capped and vegetated, and which now hosts a sports park, leash free dog park, pollinator gardens and walking trails.

Topography and Hydrology

The Site and Local Study Areas encompass several physiographic units, as shown on **Figure 4.8**. These units include till moraines, clay plains, and escarpments, with beaches and sand plains at the northernmost portion of the Local Study Area.

There are several significant natural landforms within the Local Study Area. The Niagara Escarpment is located in the northwest portion of the Local Study Area. Within the Local Study Area, the Niagara Escarpment is a north-facing cliff, approximately 70 m high, running roughly east west (Jackman Geoscience Inc., 2015). The Eramosa Escarpment is a buried mini escarpment which is located at the north side of the closed west landfill (Heritage Green Park). The Eramosa Escarpment is mostly buried by glacial till laid down during the last glacial period (Jackman Geoscience Inc., 2015).

The Local Study Area is situated in HCA jurisdiction. Several natural water features are present within the Local Study Area. Davis Creek crosses a limited area of the western portion of the Local Study Area. Battlefield Creek, an intermittent watercourse, is present immediately northeast of the SCRF within the Local Study Area. On HCA regulated areas mapping, a very small portion of the northeast corner of the SCRF is shown as regulated area due to the presence of Battlefield Creek in

the vicinity. An intermittent tributary of Stoney Creek is also shown to occur southeast of the SCRF within the Local Study Area. These water features are discussed in further detail.

There are also several manmade water features (e.g., stormwater management ponds and drainage ditches) within the Site and Local Study Areas. Surface water features are discussed in greater detail in the Surface Water Existing Conditions Report (GHD, 2017) (see Section 4.3.2 and **Appendix E**). Aquatic features within the Site Study Area are discussed in further detail as they relate to aquatic habitat.

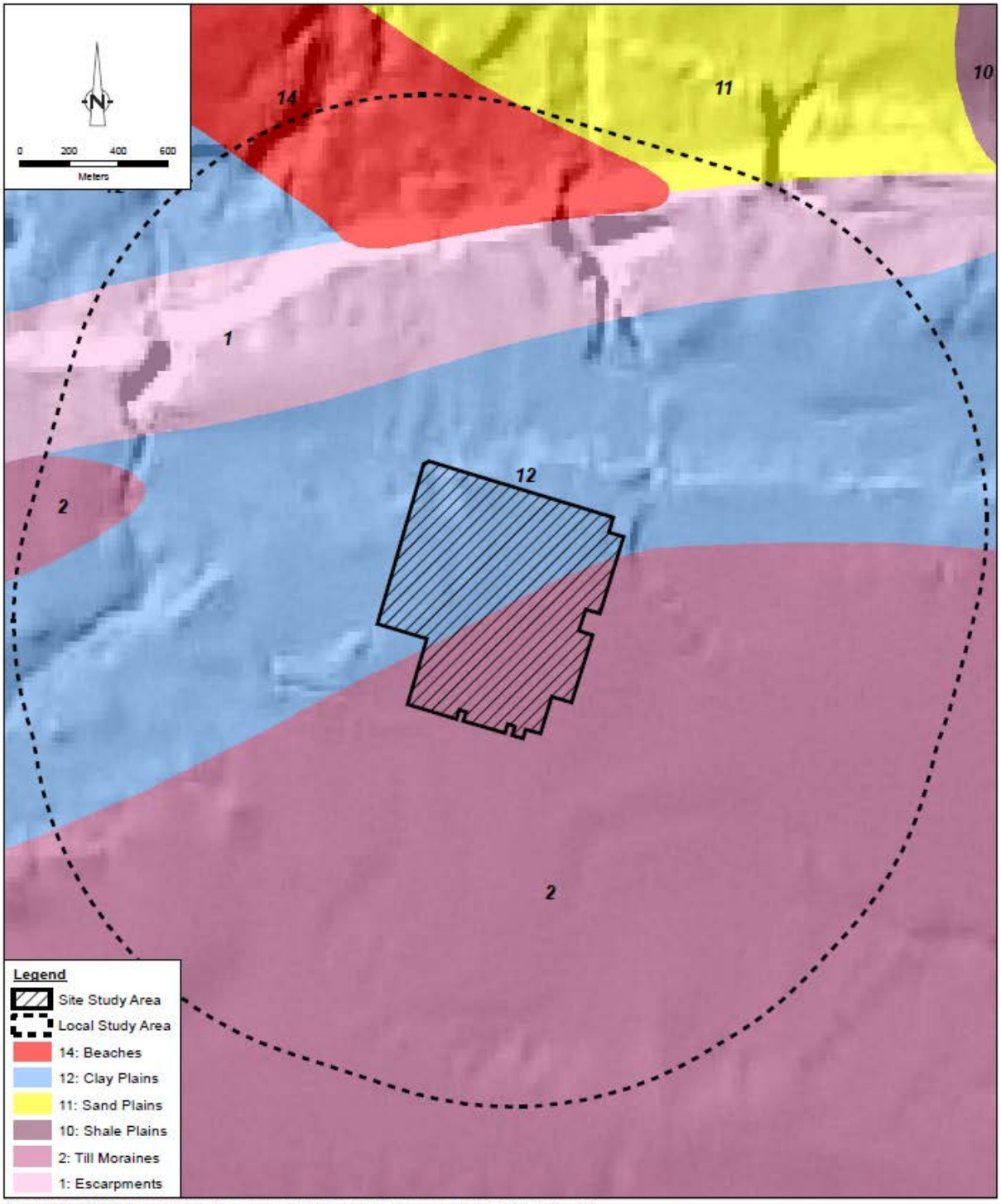


Figure 4.8 Physiography

Significant Natural Features

Significant natural features within the Site and Local Study Areas are shown on **Figure 4.9**.

No Significant Ecological Areas (SEA) or Provincially Significant Wetlands (PSW) are identified to occur within the Local Study Area; however, several significant natural heritage features are identified on Schedule B of the Urban Hamilton Official Plan (OP) and the Rural Hamilton OP as occurring within the Local Study Area. The majority of the area west of Centennial Parkway, including the Site Study Area, is under regulation of the Urban Hamilton OP, while the remainder of the eastern Local Study Area is under regulation of the Rural Hamilton OP.

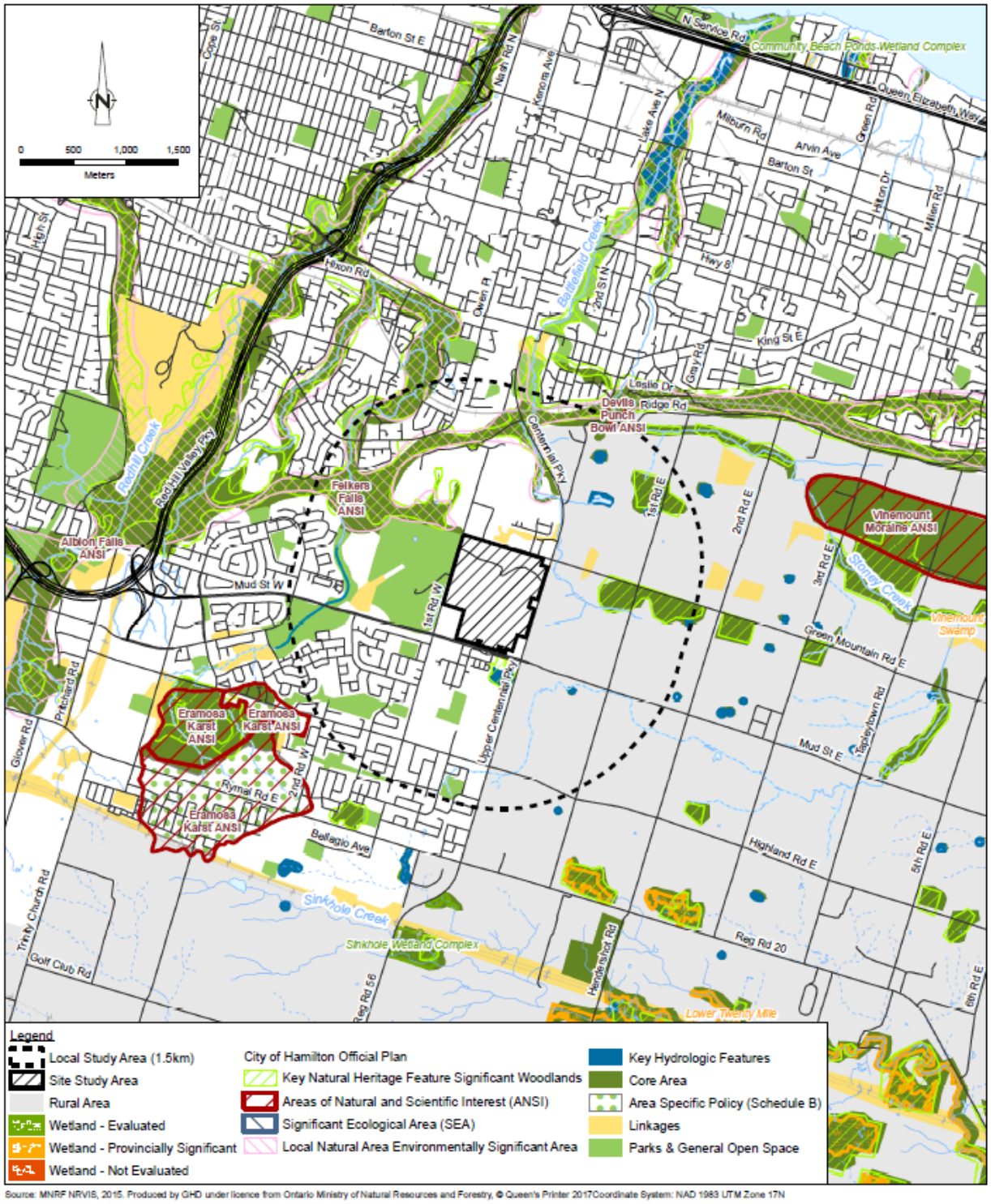
Immediately to the northwest of the Site Study Area, at the junction of Green Mountain Road West and First Road West, there is a forested area which extends into the Niagara Escarpment. This area is identified as Significant Woodland, Environmentally Significant Area, and Core Area and was observed to consist of a relatively young deciduous forest with a mixed canopy of maple, poplar and ash species with a dense understory of staghorn sumac and grape vines. Small Linkages are identified on Schedule B of the Urban Hamilton OP west and north of the Site Study Area. The Linkage immediately north of the SCRF, in the area of current residential development, was found to be an open willow and maple dominant deciduous forest, with a dense mixed understory of staghorn sumac and dogwood. Immediately south of the SCRF, in the vicinity of Penny Lane, there is a forested area with a small wetland to the south, which is identified on Schedule B as Significant Woodland and a Key Hydrologic Feature. It was observed to consist of maple, ash and poplar forest with a dense understory of dogwood, sumac and herbaceous species, such as asters and goldenrod. A wet area is also present, determined by phragmites observed in the vicinity of Penny Lane. Another Key Hydrologic Feature (Davis Creek) is located to the west of the Site Study Area near the border of the Local Study Area, and is discussed in further detail in Section 4.5.

Within the eastern portion of the Local Study Area addressed by the Rural Hamilton OP, Linkages are identified along Green Mountain Road to the east of the Site Study Area. Patches of Core Areas are shown to occur throughout the northeastern portion of the Local Study Area, with associated designations as Significant Woodlands. Several Key Hydrologic Features are also identified and are associated with various pond features in the northeastern and eastern portion of the Local Study Area.

With respect to Areas of Natural or Scientific Interest (ANSI), there are two that fall just within the Local Study Area, namely Felker's Falls ANSI and Devils Punch Bowl ANSI, and one that borders the southern portion of the Local Study Area, namely the Eramosa Karst ANSI.

The Felker's Falls Escarpment Valley contains Felker's Falls, a waterfall and plunge pool created by Davis Creek as it crossed the escarpment. A high concentration of Butternut (*Juglans cinerea*) is present on the talus slopes of the escarpment. Vegetation communities in this feature within the Local Study Area consists of deciduous forest, swamp thicket, shrub bluff, treed talus, and various cultural communities, including cultural thicket, old field, and coniferous plantation (HCA, 2014).

Devil's Punch Bowl is a 23 m high waterfall where Stoney Creek has eroded a semi-circular plunge pool. Vegetation communities in this feature within the Local Study Area include treed talus, deciduous forest, deciduous woodland, and deciduous savanna (HCA, 2014).



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017Coordinate System: NAD 1983 UTM Zone 17N

TERRAPURE ENVIRONMENTAL
65 GREEN MOUNTAIN ROAD WEST, HAMILTON, ONTARIO
STONEY CREEK REGIONAL FACILITY EA

11102771
Dec 6, 2017

SIGNIFICANT NATURAL FEATURES

FIGURE 4.9

GIS File: Q:\GIS\PROJECTS\11102000s\11102771\Layouts\004\11102771-00(004)GIS-WA003.mxd

Figure 4.9 Significant Natural Features

Terrestrial Environment and Habitat

The terrestrial environment of the Study Areas was assessed and classified using both secondary source resources (e.g., aerial photography, natural features records), and direct Site observations based on various Site visits between 2016 and 2017. Detailed field investigations were not conducted within the Local Study Area; ecological communities were mapped based on aerial imagery interpretation and secondary source information. ELC mapping of the Local Study Area is shown on **Figure 4.10**. Different types of vegetation communities include cultural meadow, deciduous forest, deciduous woodland, shrub bluff, treed talus, deciduous savanna, and swamp thicket. Anthropogenic communities include agricultural communities, as well as constructed areas, recreational areas, and golf courses.

Within the Site Study Area, main types of habitat available were classified using ELC, and are displayed on **Figure 4.11**. Eight ecological land classification community classes are represented within the Site Study Area and include wetland, upland and cultural systems. Characteristics of each of the identified community types are provided in the following paragraphs.

Wetland Communities

MAMM1-2: Cattail Graminoid Mineral Meadow Marsh

This unit consists of a small anthropogenic wetland feature south of the access road that was dry at the time of observation. This unit hosted larger amounts of graminoids and robust emergent vegetation, generally dominated by cattails (*Typha sp.*) with some phragmites (*Phragmites australis subsp. australis*) around the perimeter.

OAW: Open Water

Small man-made open water habitats are present throughout the northern portion of the Site Study Area. These areas include a water taking pond, groundwater pond, and various storm water ponds. The water taking pond is located immediately north of the access road, and had cattails and phragmites around its perimeter. The ground water pond hosted phragmites around its perimeter, and the other water feature immediately to the south had limited vegetation consisting primarily of cattails. The stormwater pond in the northwest corner was dry and did not have any aquatic vegetation at the time of observation. The large pond at the northeast corner of the property had very minimal aquatic vegetation, generally consisting of small pockets of phragmites. The water feature to the south of the access road on the west side of Site Study Area also had limited vegetation consisting primarily of cattails.

Upland Communities

TAGM5: Fencerow

This unit represents the fencerow surrounding a large portion of the SCRF. This area generally hosts a mixed forb/graminoid understory, with a variety of planted deciduous and coniferous tree species. The western and northern fencerows are dominated by spruces (*Picea sp.*), whereas the section bordering the agricultural field at the southwest corner is mixed deciduous and coniferous.

MEGM: Dry-Fresh Graminoid Meadow Ecosite

The dry-fresh graminoid meadow is mainly characterized by relatively low growing grass species. The soil on this site has been disturbed as this is a capped area of the SCRF and the vegetation present is typical of a disturbed site. There is a gravel road/pathway which runs through the meadow near the southern portion of the Site Study Area. This unit is generally dominated by fescues (*Festuca sp.*) in the southern portion, with reed canary grass (*Phalaris arundinacea*) becoming more dominant in northwest portion.

Cultural Communities

CUM1: Mineral Cultural Meadow Ecosite

This unit hosts upland vegetation species common in disturbed areas, such as coltsfoot (*Tussilago farfara*), common teasel (*Dipsacus fullonum*), vetches (*Vicia sp.)*, and clovers (*Trifolium sp.*), with large patches of bare ground and exposed patches of gravel and angular stone.

CUT: Cultural Thicket

This unit hosts a variety of smaller trees, shrubs and herbaceous species common in disturbed areas. Low growing staghorn sumac (*Rhus typhina*), Manitoba maple (*Acer negundo*), and a variety of other shrub species are present, with an herbaceous ground layer consisting of common species in disturbed areas.

CGL-2: Parkland

This area surrounds the main office and consists primarily of manicured lawn, with several isolated trees scattered throughout.

CVI-2: Disposal

This is the area of active landfilling activities, including access roads and associated on-Site amenities.

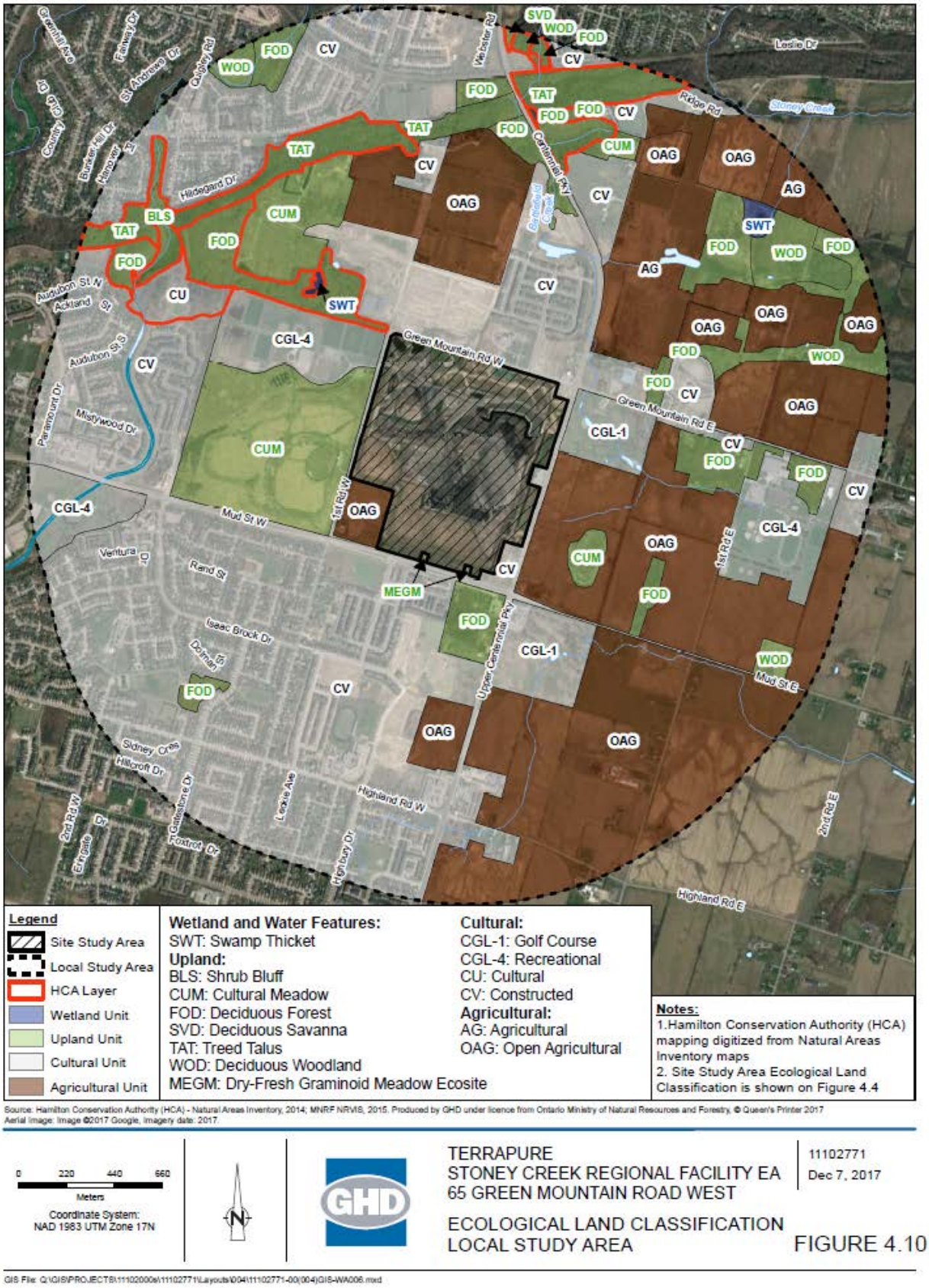


Figure 4.10 Ecological Land Classification – Local Study Area

Aquatic Environment and Habitat

As previously mentioned, several aquatic features traverse the Local Study Area, including Davis Creek, Battlefield Creek, and an intermittent tributary of Stoney Creek. Davis Creek and Battlefield Creek are both identified as having a warm water thermal regime within and in the vicinity of the Local Study Area. An impassable barrier to fish passage is identified on FishWerks mapping on Battlefield Creek, north of Green Mountain Road. On Davis Creek, a moderate barrier to fish passage is located around Greenhill Avenue. Davis Creek flows over Felker's Falls at the Niagara Escarpment and continues through a step-pool sequence downstream. The fish community in the vicinity of Felker's Falls Escarpment has been assessed as part of the Hamilton NAI, with eight species having been documented (HCA, 2014). As previously mentioned, intermittent tributaries of Stoney Creek traverse the southeastern portion of the Local Study Area. Immediately outside of the Local Study Area, Stoney Creek has eroded the escarpment below and formed the 'punch bowl' landform associated with the Devil's Punch Bowl ANSI (HCA, 2014).

Within the Site Study Area, several man-made aquatic features are present. These include a water taking pond, stormwater and groundwater ponds in the northwest corner of the SCRF, and drainage ditches along the perimeter of the property, with substrates ranging from sediment to gravel. Aquatic vegetation is generally minimal to absent, with some ponds hosting robust emergent vegetation, such as phragmites and cattails around their perimeter. Based on observations during the Site visits, these aquatic features appear to currently provide limited nesting habitat, but some foraging opportunities to wildlife species. The northwest pond was also noted to provide nesting material (mud) for barn swallows (*Hirundo rustica*).

Wildlife

Breeding bird surveys, with the main purpose of documenting breeding of SAR birds, were completed in 2017, and incidental observations of wildlife were collected during the 2016 and 2017 Site visits. A list of incidental wildlife observations, including species detected during the breeding bird surveys, is provided in **Appendix E**. A total of 31 bird species were observed within the Site and Local Study Areas during the various Site visits. This included two provincially Threatened bird species.

There is also anecdotal evidence provided by Site staff of additional species using the Site Study Area, in particular white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), and wild turkey (*Meleagris gallopavo*). However, the occurrence of these species within the Site Study Area has reportedly decreased in recent years. In addition, a number of common urban wildlife species have been observed in the Local Study Area (raccoons, skunks, squirrels, etc.).

No issues or interactions with wildlife as it relates to operations were observed, as confirmed by Site staff.

Species at Risk

In order to determine the potential for presence of SAR within the Study Areas, secondary sources of information were reviewed, the MNRF was consulted to request species records, incidental observations of SAR were collected at all Site visits, and breeding bird surveys were conducted in 2017 to determine the presence of SAR birds and their use of the SCRF as breeding habitat.

Provincially tracked species records for the Local Study Area are shown on **Figure 4.12**. The majority of records are historical (pre-1996) sightings, prior to the development of the existing SCRF; the most recent occurrence is of a snapping turtle (*Chelydra serpentina*) within the Site Study Area in 2010. No aquatic SAR have been identified on Fisheries and Oceans Canada (DFO) Fish and Mussel mapping (2017) as occurring within either the Site or Local Study Area.

A SAR screening activity was conducted to determine the potential for SAR within the Local Study Area, and is provided as **Appendix E**. Although much of the Local Study Area is developed in nature, many areas still may provide habitat for a number of species, in particular the areas associated with the Niagara Escarpment. Through this activity, the potential for 49 provincially listed SAR was identified within the Local Study Area. Of these 49 species, 31 were determined to have a moderate to high potential of occurrence within the Local Study Area, based on the availability of potentially suitable habitat.

From the list in **Appendix E**, SAR which were detected in the Site Study Area during the Site visits, or for which potentially suitable habitat is present within the Site Study Area, are detailed in the following paragraphs.

Eastern Meadowlar

The eastern meadowlark is a provincially Threatened species, and receives protection of both individuals and their habitat under the provincial *Endangered Species Act* (ESA). During field investigations in 2016, an eastern meadowlark was observed singing in suitable breeding habitat on the capped portion of the footprint in the MEGM ELC unit. To determine the extent which this species uses the Site, GHD completed breeding bird surveys during the 2017 field season.

Multiple eastern meadowlark were observed singing on all three breeding bird survey visits in 2017, and GHD is of the opinion that this species is using the capped portion of the property for breeding. MNRF will be contacted as part of the design stage to determine if the proposed works qualify for an exemption, or if they will require an application for a Notice of Activity or an Overall Benefit Permit from the MNRF.

Barn Swallow

Barn swallows are a provincially Threatened species. They are typically found in agricultural areas, cities, and suburbs, and along highways (Rodewald, 2016). Numerous barn swallows were observed foraging during the Site visits in multiple areas of the Site Study Area. One barn swallow was observed gathering mud from one of the on-Site ponds to be used in nest building activities. Nesting sites may exist within the Site Study Area where suitable structures exist (e.g., buildings, large culverts), whereas suitable foraging habitat is presumed to occur within the Site Study Area. No barn swallow nests were documented during the Site investigations, however targeted surveys of suitable habitat (e.g., buildings and large culverts) are recommended if it is determined that these structures may be altered through the course of the proposed works.

Snapping Turtle

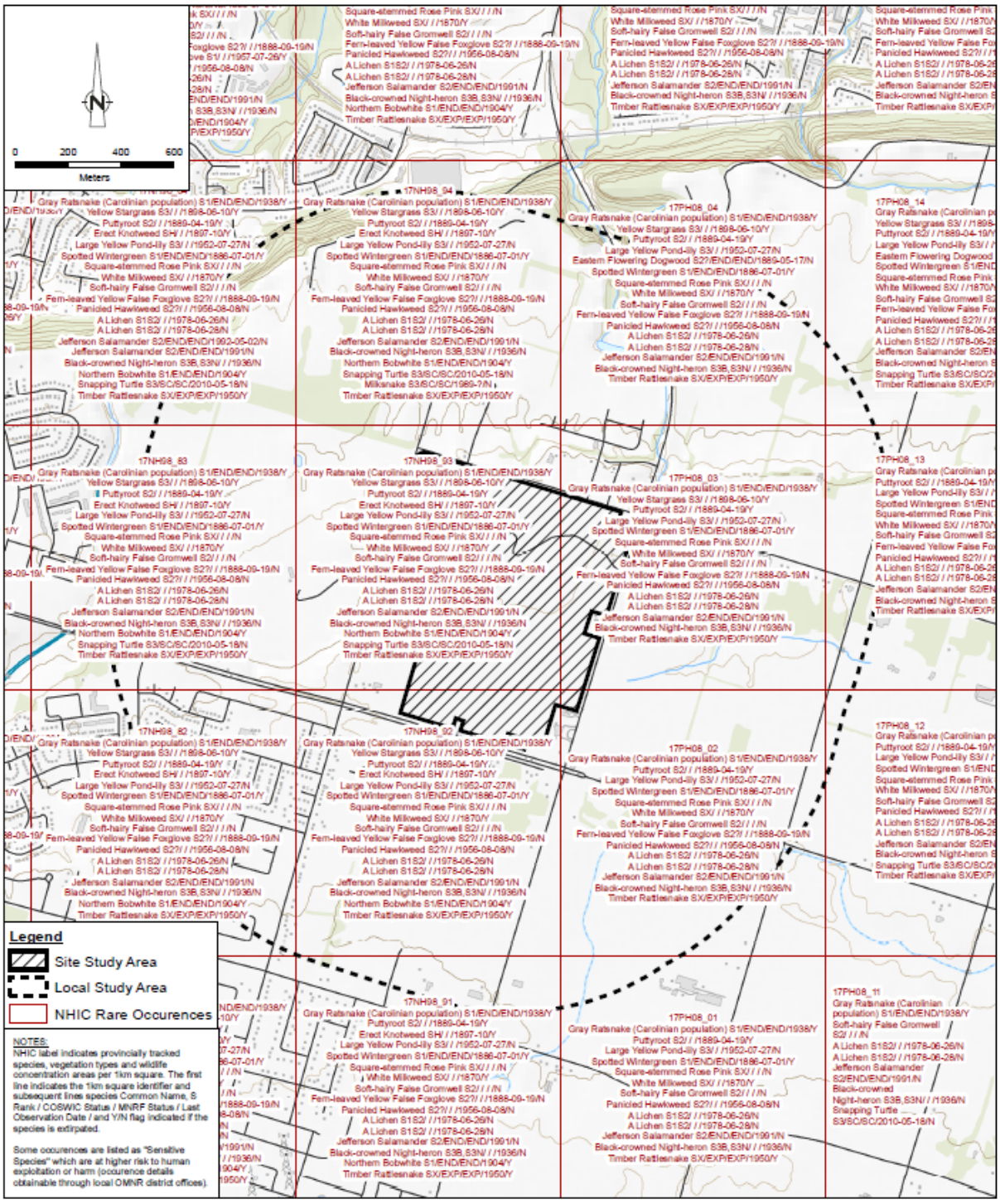
Snapping turtle is a provincially Special Concern species which may have the potential to occur within the Site Study Area. Snapping turtles prefer shallow waters with soft substrate (MNRF, 2017a), habitat which may be present in the multiple ponds present on Site (mapped as OAW).

However, the hard substrate and limited aquatic vegetation in the ponds reduces the likely usage of most on Site ponds by snapping turtles.

Butternut

Butternut (*Juglans cinerea*) is a provincially Endangered species that MNRF has identified during consultation as having the potential to occur within the Local Study Area. In Ontario, this species occurs in deciduous forests, preferring moist, well-drained soil and is often found along streams. This species does not do well in the shade, and often grows in sunny openings and near forest edges (MNRF, 2017b). Based on habitat available within the SCRF, GHD suspects that there is a low likelihood of presence within the Site Study Area, due to the lack of deciduous forest; however, this species is known to occur in the Felker's Falls area within the northwest corner of the Local Study Area.

Figure 4.11 Ecological Land Classification - Primary Habitat Types



Source: MNRF NRVIS, 2015. Produced by CRA under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017;
NHIC Rare Occurences - updated 2012/02/29Coordinate System: NAD 1983 UTM Zone 17N

GHD

TERRAPURE ENVIRONMENTAL
65 GREEN MOUNTAIN ROAD WEST, HAMILTON, ONTARIO
STONEY CREEK REGIONAL FACILITY EA

11102771-00
Dec 6, 2017

SPECIES AT RISK

FIGURE 4.12

GIS File: Q:\GIS\PROJECTS\11102000s\11102771\Layouts\004\11102771-00(004)GIS-WA004.mxd

Figure 4.12 Species at Risk

4.3.1.4 Atmospheric - Air and Odour

From an Atmospheric (air quality and odour) environment perspective both the Site Study Area and Local Study Area described in Section 4.2 are appropriate to establish existing conditions and to assess potential changes to the atmospheric (air and odour) environment as a result of the proposed undertaking. Information on the atmospheric (air quality and odour) existing conditions within the Study Areas was gathered from a combination of secondary source research and Site-specific reports including:

- Newalta/Terrapure Annual Reports for 2012, 2013, 2014, 2015, and 2016
- Ambient on-Site PM_{10} Monitoring Program (Rotek Environmental 2012, 2013, 2014, 2015, and 2016), which include wind speed and wind direction measurements
- Environnent Canada's National Air Pollution Surveillance (NAPS) network
- Hamilton Air Monitoring Network (HAMN)
- Ministry of the Environment, Conservation and Parks (MECP) dispersion meteorological data set for the area (MECP, 2017)

Meteorology

The SCRF is located in an area zoned as "Special Policy Area B", which has been identified as the Taro East Quarry Landfill. The surrounding area is made up of community parkland, open space, low-density residential, high-density residential, institutional, and general commercial. As part of the ECA the Facility is currently operating under, the Facility is required to monitor wind speed and wind direction, and provide monthly data to the City of Hamilton. The wind speed is monitored hourly by Rotek Engineering and included in the Facility's annual PM_{10} monitoring Report. Between 2012 and 2016, the Facility was able to provide wind speed and direction data for more than 99% of the reporting period.

Figure 4.13 presents the wind class frequency distribution from the Facility's monitoring station for the 2012 through 2016 period, showing the most common wind speed categories are 2.1 to 3.6 m/s (at 31.5% of the time) and 3.6 to 5.7 m/s (at 30.2% of the time).

Figure 4.14 presents a three-year Wind Rose diagram from the Facility's monitoring station for the 2012 through 2016 period. Winds are predominantly from the southwest, with significant contributions from south-southwest through west-southwest.

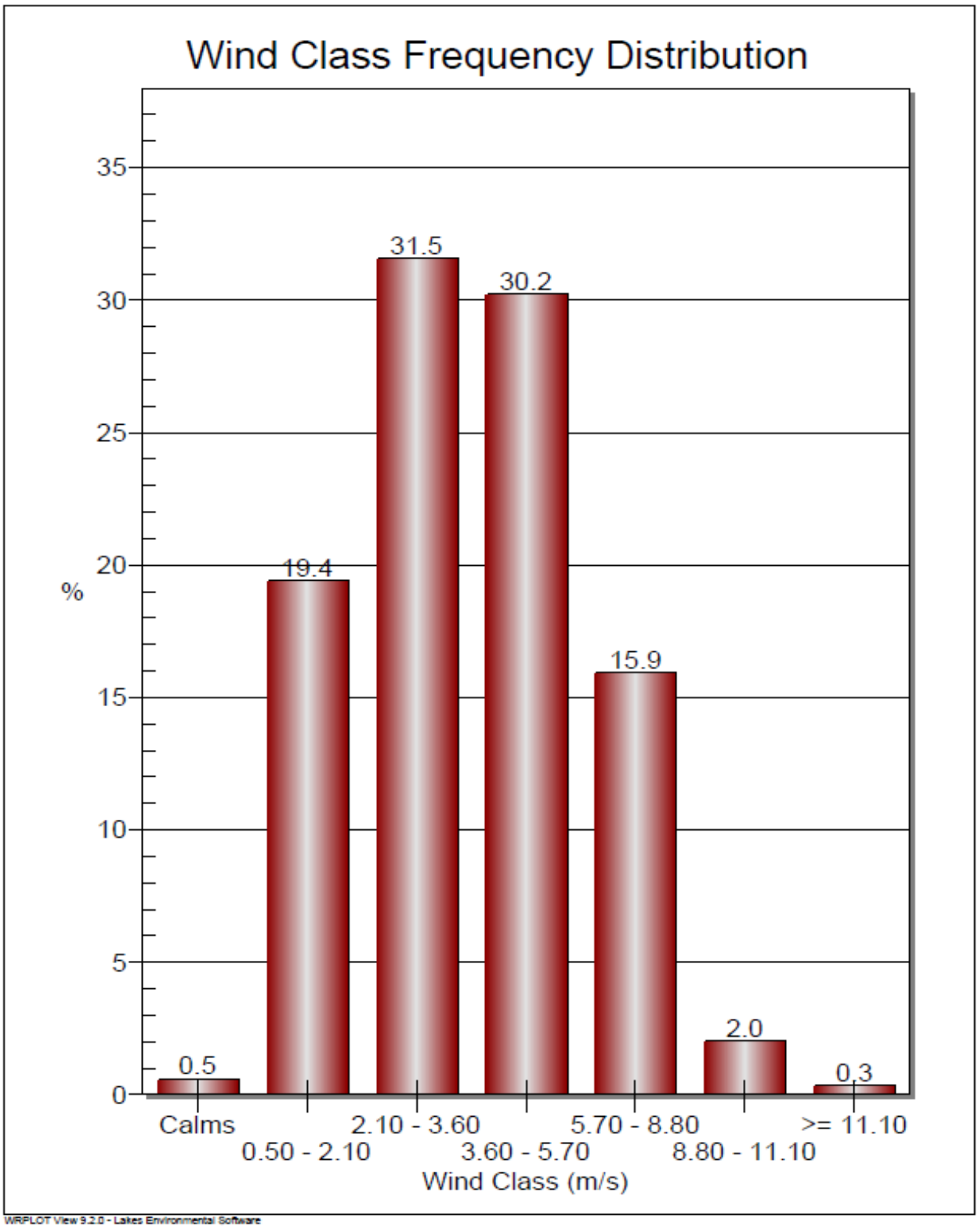
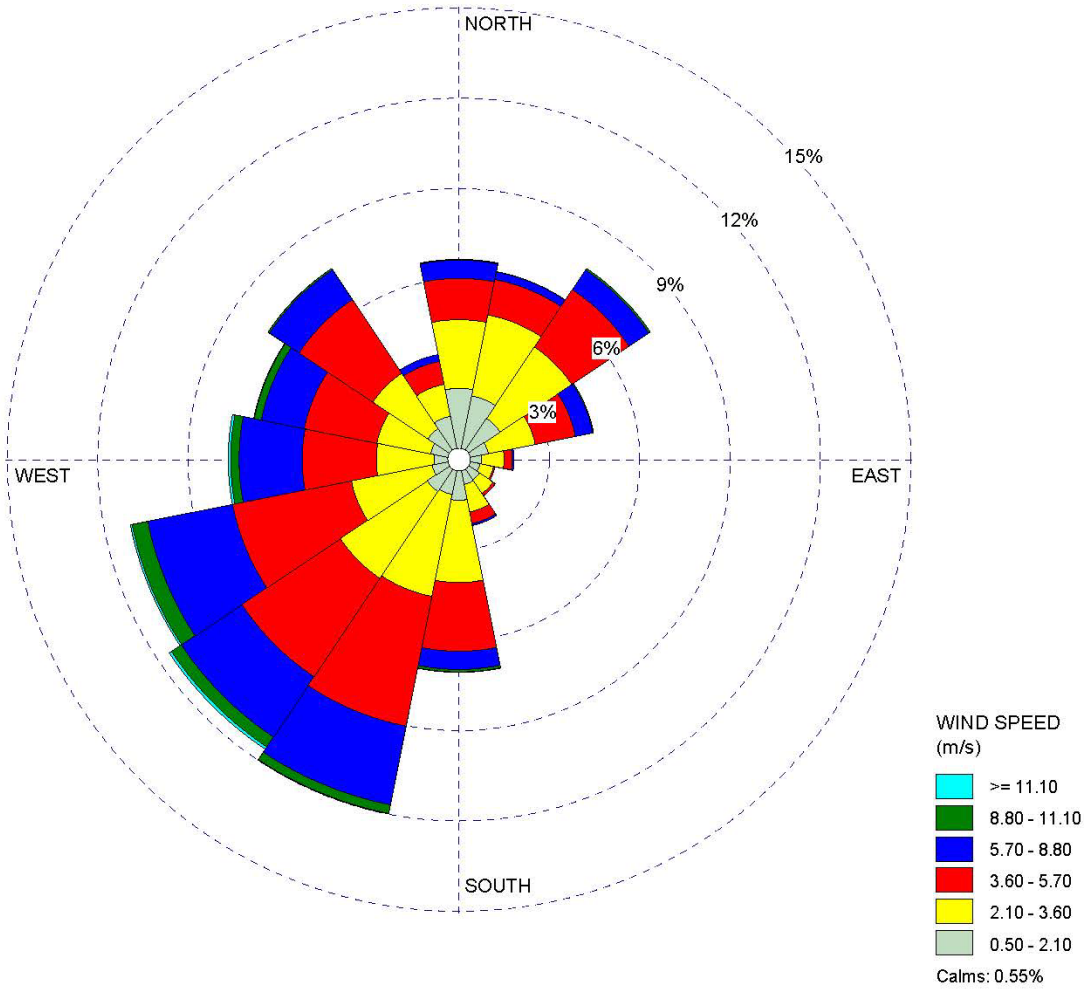


Figure 4.13 On-Site Wind Class Frequency Distribution (2012 – 2016)

WIND ROSE PLOT:
WIND ROSE - 2012-2016
ONSITE Dataset

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2012 - 00:00** **End Date: 12/31/2016 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.55%**	TOTAL COUNT: **43748 hrs.**	
	AVG. WIND SPEED: **3.83 m/s**	DATE: **9/20/2017**	PROJECT NO.: **11102771**

WRPLOT View - Lakes Environmental Software

Figure 4.14 On-Site Wind Rose (2012 – 2016)

For comparison, the same figures are provided below for the 1996 to 2000 dispersion meteorological data set from the MECP for this area. The data are identified as “West Central - Crops”, as the area is not “urban”, which is specific to the built-up downtown areas of cities, nor is the area wooded. The “Crops” data are suitable for this area, as much of the surrounding area within 3 km of the Facility is low-density industrial or commercial, with significant grass areas, few trees, and generally low buildings.

Figure 4.15 shows that the most common wind speed categories in the MECP regional data set are 3.6 – 5.7 m/s (at 31.8% of the time) and 0.5 to 2.1 m/s (at 29.5% of the time). Also in this data set, **Figure 4.16** shows that the predominant wind direction is from the west (northwest through southwest being the most common winds), with a secondary direction of winds from the east. The differences between these two wind roses are not likely the result of typical year-to-year variation. It is more likely that the differences are due to the different locations from which the data were obtained, as the MECP regional data set is based on surface data from London, Ontario, approximately 110 km west-southwest of the Facility, and 70 m higher in base elevation above sea level.

Based on the data presented, the MECP standard dispersion modelling data set is not representative of weather conditions at the Facility, and a Site-specific meteorological data set will be required for the dispersion modelling assessment for the EA for this Facility.

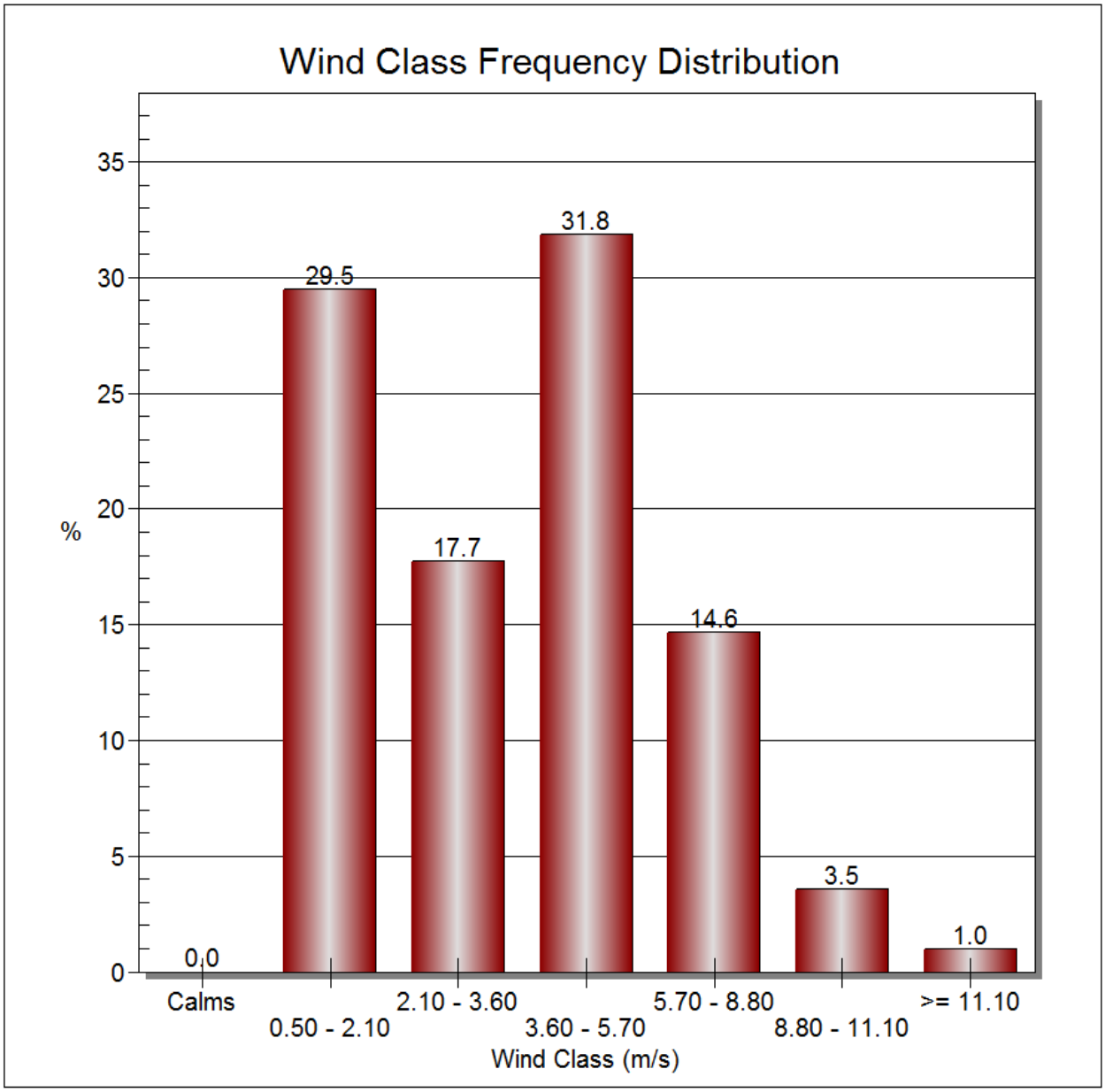
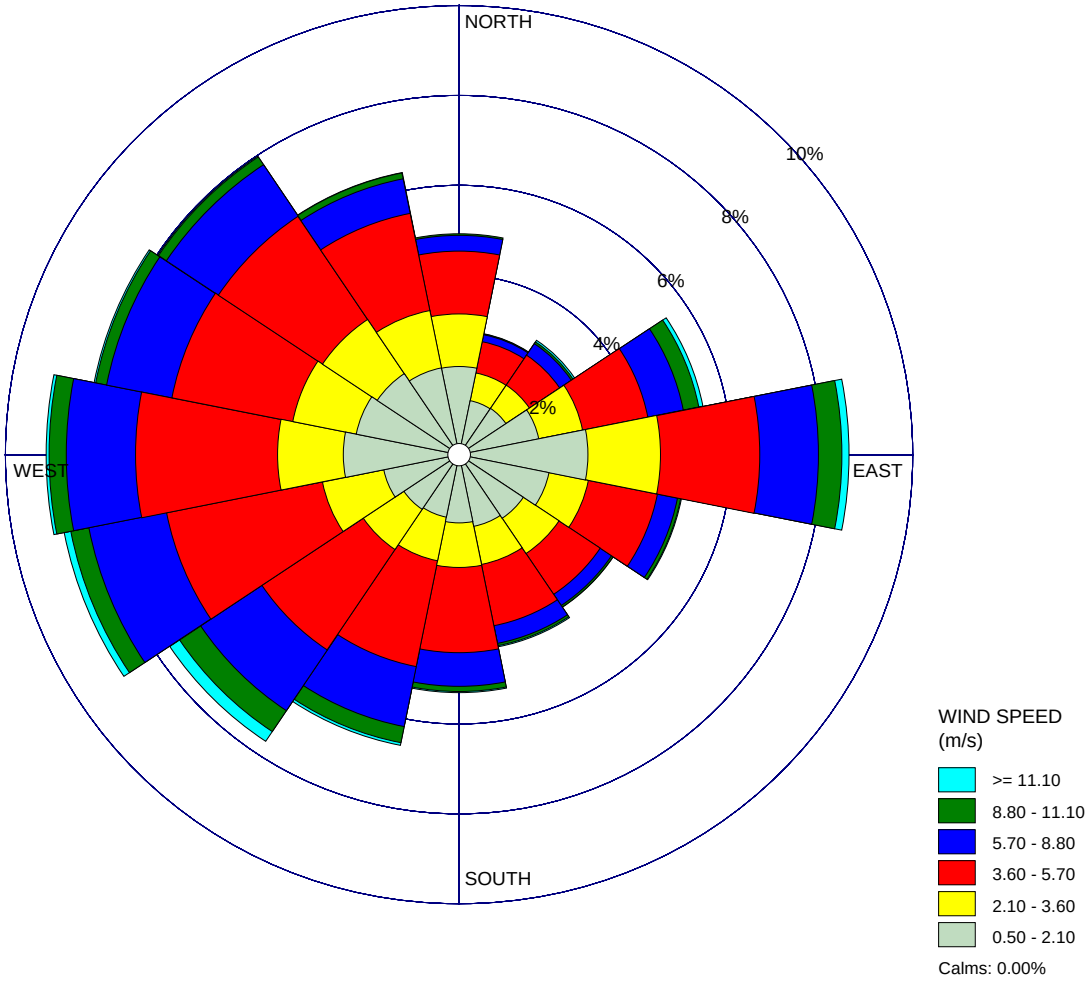


Figure 4.15 MECP Wind Class Frequency Distribution (1996 – 2000)

WIND ROSE PLOT:
WIND ROSE - 1996-2000
MOECC Dispersion Modelling Dataset (London)

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/1996 - 00:00** **End Date: 12/31/2000 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.00%**	TOTAL COUNT: **43027 hrs.**	
	AVG. WIND SPEED: **3.69 m/s**	DATE: **9/14/2017**	PROJECT NO.: **11102771**

WRPLOT View - Lakes Environmental Software

Figure 4.16 MECP Wind Rose (1996 – 2000)

Air Quality

The air contaminants of greatest concern from this Facility are particulate matter and odour. Particulate matter is emitted primarily from vehicle traffic on paved and unpaved roads on-Site and fugitive windblown dust. The particulate matter less than 10 micrometres (PM_{10}) is the inhalable particle size fraction. Larger particle sizes are likely to settle on or very close to the Facility.

As part of its ECA, the SCRF is required to monitor PM_{10} daily and provide to the City of Hamilton the PM_{10} concentration at an on-Site location. This program has continued to the current day, with reports being compiled and submitted annually.

For the purposes of assessing "background" concentrations, the on-Site particulate monitoring data are not the most appropriate, as it is anticipated that the Facility contributes significantly to the measured concentrations at that location. Therefore, regional stations have been considered as a source of background particulate data.

Odour complaints directed toward the SCRF are also compiled annually, and have been assessed based on local wind direction, date, time, and location of the complaint, to determine if the complaint may be related to the Facility. Odour is not part of any federal or provincial air quality monitoring program, and so is addressed herein based on the registered complaints.

Not all species of interest are measured at ambient air quality monitoring stations that are representative of the Site (either in proximity of the Facility, but not influenced by it; or located in similar types of locations, such as mixed residential/commercial/light industrial in close proximity to a major city with significant heavy industrial sources). In order to assess the existing background concentrations of species of interest, the following stations have been assessed for the 2012 – 2016 period (**Table 4.4**).

Table 4.4 Monitoring Station Information

Station	ID	Distance from Site (km)	Electronic Data Availability		
			SPM	PM_{10}	$PM_{2.5}$
On-Site station	—	0	—	2012 - 2016	—
Hamilton Downtown	60512	10	—	—	2012 - 2015
Hamilton Mountain	60513	8	—	—	2012 - 2015
St. Catharines	61302	44	—	—	2012 - 2015
Brantford	61402	43	—	—	2012 - 2015
Kitchener	61502	66	—	—	2012 - 2015
Guelph	61802	56	—	—	2012 - 2015
Simcoe	62601	56	—	—	2012 - 2015
HAMN	29102	9	2012 – 2016	2012 - 2016	—
HAMN	29113	8	2012 - 2013	2012 - 2013	—
HAMN	29153	6.5	—	2012 - 2016	—
HAMN	29154	11.5	—	2012 - 2014	—
HAMN	29160	10	2012 - 2016	—	—
HAMN	29164	8.5	2012 - 2016	—	—
HAMN	29166	6	2012 - 2016	—	—

Table 4.4 Monitoring Station Information

Station	ID	Distance from Site (km)	Electronic Data Availability		
			SPM	PM_{10}	$PM_{2.5}$
HAMN	29168	7	—	2012 - 2016	—
HAMN	29170	9	—	2012 - 2016	—
HAMN	29180	8	2014 - 2016	2014 - 2016	—
HAMN	29565	6	—	2012 - 2016	—
HAMN	29567	10	2012 - 2016	2012 - 2016	—

A brief description of each station follows, indicating why it was selected and how it compares to the Facility. Specific locations for the various stations may be found in the NAPS and HAMN annual reports.

Hamilton Downtown (60512) is a NAPS continuous monitoring station. This station is located in the downtown area of Hamilton, south of the portlands, where much of the heavy industry in the city is located. This is a highly urban monitoring location, significantly affected by highly-travelled roads, industrial emissions, marine emissions, and others. This station is unlikely to be representative of air quality at the Facility, but has been presented for the purposes of comparison, and likely represents an upper bound for any comparisons of regional air quality in the vicinity of the Facility.

Hamilton Mountain (60513) is a NAPS continuous monitoring station. This station is located at the top of Hamilton Mountain, at higher elevation than the downtown area and portlands. The area is urban-residential with less industrial influence, though in proximity to several highly travelled roadways. This location is generally “upwind” of Hamilton’s significant air quality sources, and is more likely to be representative of conditions near the Facility.

St. Catharines (61302) is a NAPS continuous monitoring station. This station is located in the City of St. Catharines, east of Hamilton. The station is in an urban residential location.

Brantford (61402) is a NAPS continuous monitoring station. This station is located in the Town of Brantford, west of Hamilton. The station is in a low density/low population urban residential location.

Kitchener (61502) is a NAPS continuous monitoring station. This station is located in the City of Kitchener, west of Hamilton. The station is in an urban residential location.

Guelph (61802) is a NAPS continuous monitoring station. This station is located in the City of Guelph, west of Hamilton. The station is in an urban residential location.

Simcoe (62601) is a NAPS continuous monitoring station. This station is located outside the Town of Simcoe at a rural location. Air quality measurements at this station are therefore likely to represent the lower bounds of what would be expected near the Facility.

HAMN STN29102 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, near the Burlington Skyway bridge. This station is in close proximity to, and generally downwind of, Hamilton’s highly industrialized portlands, and air quality measurements are likely to be higher than those near the Facility.

HAMN STN29113 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, located south of Hamilton's portlands. Measured air quality at this location is likely to be strongly influenced by local industrial sources.

HAMN STN29153 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, located on the east side of the portlands, and air quality at this location is likely to be strongly impacted by nearby industrial activities.

HAMN STN29154 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, near the west end of the Burlington Skyway bridge. Air quality measurements are likely to be highly influenced by highway traffic, but will be less influenced by Hamilton's heavy industry areas.

HAMN STN29160 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, at the west end of Hamilton's portlands. Air quality at this location is likely to be affected by nearby industrial activities, but it is generally upwind of many of Hamilton's major industrial locations.

HAMN STN29164 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, near the Burlington Skyway bridge. Air quality at this location is likely to be strongly affected by both the traffic over the bridge and the nearby industrial sites.

HAMN STN29166 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, toward the east end of Hamilton's downtown area. Air quality at this location is likely to be strongly affected by both traffic and nearby industrial sides.

HAMN STN29168 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, located south of the portlands, near Hamilton's downtown. Air quality at this location is likely to be strongly affected by nearby industrial activities.

HAMN STN29170 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, located at the west side of the portlands. Air quality at this location is likely to be affected by nearby industrial activities, but it is generally upwind of many of Hamilton's major industrial locations.

HAMN STN29180 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, near the Burlington Skyway bridge. Air quality at this location is likely to be strongly affected by both the traffic over the bridge and the nearby industrial sites.

HAMN STN29565 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, east of the portlands. Air quality at this location is likely to be strongly affected by both traffic and nearby industrial sites.

HAMN STN29567 is a non-continuous (one 24-hour sample collected every 12 days) HAMN station, west of the portlands. This location is upwind of many of Hamilton's industrial sources and may be more representative of conditions near the Facility.

Particulate Matter – $PM_{2.5}$

$PM_{2.5}$ is not measured on-site. **Table 4.5** summarizes the measured $PM_{2.5}$ concentrations at the regional stations identified.

Table 4.5 Regional $PM_{2.5}$ Monitoring Data (2012 – 2016)

Station	ID	Ambient Monitoring Results (24-hour µg/m³)				
		Average	Median	75th %ile	90th %ile	Maximum
Hamilton Downtown	60512	9.8	8.0	13.0	18.0	***45.0***
Hamilton Mountain	60513	8.5	7.0	11.0	16.0	***42.0***
St. Catharines	61302	7.7	7.0	10.0	14.0	29.0
Brantford	61402	*8.1*	7.0	10.0	*15.0*	***30.0***
Kitchener	61502	8.2	7.0	11.0	15.0	***38.0***
Guelph	61802	7.8	7.0	10.0	14.0	***38.0***
Simcoe	62601	7.6	7.0	10.0	13.8	28.0

During the 2012 to 2015 period for which data are available, five of the seven stations included in this assessment measured at least one exceedance of the MECP's guideline of 30 µg/m³ (shown in ***bold***) for 24-hour $PM_{2.5}$. Of these monitoring locations, Hamilton Downtown measured the highest concentrations. It is likely this station is not representative of the area around the Facility, due to the proximity of heavy industry and high level of urbanization. Hamilton Mountain also shows the influence of Hamilton's heavy industry in the measured $PM_{2.5}$ concentrations, though it is more similar to the other locations at the 90th percentile level. For the purposes of this assessment, a 90th percentile of 15.0 µg/m³ for 24-hour concentrations (shown in *italics*) appears most reasonable, this being the mid-point for monitoring data from urban locations not directly downwind of heavy industry, which is most representative for the SCRF.

Particulate Matter - PM_{10}

PM_{10} is measured on-Site and reported annually, and the reports are summarized in **Table 4.6** summarizing existing air quality at the Facility.

Table 4.6 On-Site PM_{10} Monitoring Data (2012 – 2016)

Year	Exceedances of 24-hour Limit	Exceedances not Attributable to SCRF Operations	Ambient Monitoring Results (24-hour µg/m³)	
			Maximum	Average
2012	29	1	225	25
2013	23	5	202	24
2014	11	2	178	22
2015	14	3	98	22
2016	12	2	123	18

The City of Hamilton's monitoring program (Hamilton Air Monitoring Network, or HAMN) reports summary statistics for PM_{10} at a number of locations in Hamilton. Full statistics are not reported, but the available regional data have been summarized below in **Table 4.7**.

Table 4.7 Regional PM_{10} Monitoring Data (2012 – 2016)

Station	ID	Ambient Monitoring Results (24-hour µg/m³)				
		Average	Median	75th %ile	90th %ile	Maximum
HAMN	29102	26	—	—	—	***163***
HAMN	29113	*23*	—	—	—	***133***
HAMN	29153	39	—	—	—	***200***
HAMN	29154	16	—	—	—	***113***
HAMN	29168	22	—	—	—	***104***
HAMN	29170	30	—	—	—	***311***
HAMN	29180	30	—	—	—	***99***
HAMN	29565	21	—	—	—	***104***
HAMN	29567	24	—	—	—	***94***

Concentrations higher than the MECP's 24-hour guideline of 50 µg/m³ were measured at every station each year, from 2012 through 2016, averaging between 4 and 89 exceeding days per year (depending on the station). Exceedances are shown in **Table 4.7** in ***bold***. For the purposes of the air quality assessment, it has been assumed to be the mid-point of the average of the 24-hour values available, or 23 µg/m³ (shown in *italics*).

PM_{10} is typically measured in concentrations of 1.5 to 2 times the measured $PM_{2.5}$. Based on the assumed background of 15 µg/m³ for $PM_{2.5}$, the estimated value of 23 µg/m³ for PM_{10} appears reasonable for this Facility. It should also be noted that the average PM_{10} concentrations measured throughout Hamilton are similar to those measured on-Site, indicating that regional sources and long-range transport represent most of the "average" concentration being measured at the on-Site station (which is reported at 18 – 24 µg/m³).

Total Suspended Particulate Matter (SPM)

SPM is not measured on-Site. The City of Hamilton's monitoring program (HAMN) reports summary statistics for SPM from several stations. Full statistics are not reported, but the available data have been summarized below in **Table 4.8**.

Table 4.8 Regional SPM Monitoring Data (2012 – 2016)

Station	ID	Ambient Monitoring Results (24-hour µg/m³)				
		Average	Median	75th %ile	90th %ile	Maximum
HAMN	29102	49	—	—	—	***206***
HAMN	29113	53	—	—	—	***212***
HAMN	29160	63	—	—	—	***590***
HAMN	29164	61	—	—	—	***339***
HAMN	29166	49	—	—	—	***355***
HAMN	29180	57	—	—	—	***220***
HAMN	29567	*52*	—	—	—	***225***

As all these stations are in close proximity to significant industrial sources, it is likely that these SPM values are larger than actual background concentrations in the vicinity of the Facility.

Concentrations higher than the MECP's 24-hour AAQC of 120 µg/m^3 were measured at every station each year from 2012 through 2016, averaging between 4 and 9 exceeding days per year (depending on the station). Exceedances are shown in **Table 4.8** in ***bold***. Because these stations are closer to the industrial centres of Hamilton than the Facility, the assumed background concentration for the purposes of the air quality assessment has been assumed to be the mid-point of the average of the 24-hour values available, or 52 µg/m^3 (shown in *italics*).

SPM is typically measured in concentrations of 1.5 to 2 times the measured PM_{10}. Based on this typical ratio, the estimated background concentration for SPM of 52 µg/m^3 is reasonable or slightly higher than would be expected, based on the measured regional PM_{10} concentrations from **Table 4.7**, making this a conservatively high estimate of background total particulate concentrations.

Landfill Gas

Because the Facility does not receive putrescible or organic material, very little landfill gas is produced at the SCRF and, as such, the Facility is not required to have a landfill gas collection system in place. Ontario Regulation 232/98 requires that a gas recovery system be installed at landfills with a capacity that exceeds 1.5 million m^3, unless it can be demonstrated that the Site does not generate significant quantities of landfill gas. In the past, Terrapure successfully applied to the MECP for an exemption from this requirement. The exemption application was supported by a gas emission study which included sampling for surface and point source gas (e.g., leachate collection clean-out structures) emissions, analysis of the samples for methane, carbon dioxide, hydrogen sulphide, and non-methane organic compounds, and predictive gas emission modelling (*Newalta Stoney Creek East Landfill Gas Emission Study*, dated January 24, 2011). Some of the key conclusions of this study are summarized as follows:

1. Site-wide emissions of methane, CO_2, and H_2S at the Site are estimated to be:
    - 9.8% of the estimated emissions from a mixed municipal waste landfill (MMWL) receiving the same volume of waste.
    - 21% of the estimated emissions from a MMWL with 1.5 million m^3 of waste.
2. Site-wide emissions of NMOCs at the Site are estimated to be:
    - 2.4% of the estimated emission from a MMWL receiving the same volume of waste.
    - 5.1% of estimated emissions from a MMWL with 1.5 million m^3 of waste.
3. Actual sampling results support the predictive modelling and suggest that the model estimates for the Terrapure site are conservative. Sampling results reflect 65%, 49%, 17% and 14% of the model results for methane, CO_2, H_2S, and NMOCs, respectively.

Notwithstanding this, the ECA for the SCRF requires that as each phase of the Site is constructed, gas monitors be installed around the Site. Eight monitoring wells have been installed around the perimeter of the SCRF since 2003. Ongoing monitoring has shown very few instances of combustible gas being detected. In cases where combustible gas was detected, all readings were well below the Lower Explosive Limit for Methane, and subsequent readings quickly returned to non-detectable levels. The leachate controls at the Site include a geomembrane/clay composite primary liner and a clay secondary liner. This design is considered to be very protective of the environment and effective in limiting the escape of landfill gas that may be present in the waste to the subsurface.

Based on the above, the current landfill gas monitoring program at the SCRF is as follows:

As each phase of the Site is constructed and capped, gas monitors should be installed in the waste, plus progressively every 200 m around the landfill, into the water table in the Eramosa bedrock. Monitoring will include combustible gas concentrations in all monitors.

Table 4.9 Current Landfill Gas Monitoring Program at the SCRF

Monitoring	Frequency
Routine Monitoring of Waste and Perimeter Monitors	Monthly
Monitoring of Perimeter Monitors After Detection of Combustible Gas	Weekly (until no further detection of combustible gas for 4 consecutive weeks)
Sampling of Waste Monitors	**Frequency**
One Gas Sample at Each Location (CO_2, CH_4, N_2, O_2, H_2, NMOCs)	Annually

Landfill gas emissions are not anticipated to change at the Site as a result of the proposed changes, and so these are not being carried forward for further review. The Site is also the only local source of landfill gases (other than CO_2, which is a naturally-occurring atmospheric gas, as well as being a product of combustion), and therefore background landfill gases in the vicinity of the Facility are likely dominated by the Site's emissions.

Odour

In recent years, the SCRF has implemented procedures to ensure that odour is continuously controlled. The major potential odour sources consist of the leachate pumping station, equalization tank, retention pond, and the working landfill face. The SCRF has implemented several odour abatement strategies to mitigate the potential for odour release. Given that the Facility is not permitted to accept putrescible material, odorous waste received at the Site is a rare occurrence. Notwithstanding this, any potential material that is brought to the Site that may have an odour is identified upon arrival and, once deposited in a cell, is immediately covered with another non-odorous material (impacted soil, other type of waste). The Facility also uses an odour control dosing system at the leachate pumping station and an aeration system at the equalization basin.

Of the few odour complaints received over the past five years from neighbouring residents and which were attributable to the SCRF, generally, the complaints were the result of pumping leachate into the retention ponds or equalization basins. The Facility typically only operates the pumps on weekdays during site operating hours. On occasion, during periods of high leachate generation (spring rains and snow melt), the facility may discharge leachate on weekends as well. If an odour complaint is received, and it has been determined the odour is coming from the retention ponds, the pumping operations are shut down until the odour can be mitigated.

Complaints

The Facility maintains a record of all environmental complaints received at the Site and has put in place the following standard procedures for responding to complaints:

- All complaints received will be assigned a control number and recorded electronically.
- Details of the complaint are forwarded to Terrapure Management for follow-up.
- Terrapure Management will ensure that the complaint is investigated and resolved in a timely manner.
- Terrapure Management will be advised of the result of the investigation.
- Terrapure Management will send a confirmation letter to the complainant within 10 days of receiving the details.
- Terrapure Management will notify the Community Liaison Committee (CLC) via email of the complaint immediately after the investigation has been completed.
- Complaints will be summarized for inclusion in the Annual Report.

A review of the complaint records from the past five years indicates that out of the 43 complaints received about the SCRF, 40 were related to odour perceived to be from the Site, and one (1) was related to dust from the Site. The Site also received a complaint for drag out along First Road West, and a complaint regarding a rusty waste vehicle.

When an odour complaint is received by the Facility or by the MECP, the Facility immediately completes an odour investigation at the complainant's location to confirm the odour and identify if the SCRF may be responsible or not. Many complaints have been demonstrated to be not attributable to the SCRF due to wind direction at the time of the complaint (i.e., winds at the time were not blowing from the SCRF toward the location of the complaint, and so the SCRF could not be responsible for the odour). However, because many of the complaints occur after hours, inspections cannot always occur the same day, making it difficult to accurately identify the potential source of the odour. Therefore, many of the odour complaints between 2012 and 2016 cannot be accurately attributed to on-site or off-Site sources. **Table 4.10** summarizes the complaints received per year by the Facility.

Table 4.10 Complaint Records by Type

Year	Total Complaints	Complaints for Noise	Complaints for Odour	Complaints for Dust	Other
2012	4	0	2	0	2
2013	20	0	20	0	0
2014	7	0	6	1	0
2015	3	0	3	0	0
2016	9	0	9	0	0
2017	2	0	2	0	0

As detailed in the complaints record, the number of complaints for odour decreased following the reconfiguration in 2013, as the Facility augmented best management practices, such as installing a

new dosing/aeration system and mitigation measures based on the monitoring data to reduce potential effects from and air quality and odour perspective.

Concerned residents or businesses can call the Facility directly, the City of Hamilton, or the MECP if a nuisance effect is perceived to have occurred because of the Facility. All complaints are recorded and investigated in accordance with the SCRF standard complaint procedures and templates. Each complaint is logged and, in many cases, Site staff will go to the location where the nuisance was recorded and conduct on-Site investigations. The date and time of the complaint are cross-referenced with data from the Facility, in order to determine if any adjustments to operations need to be made on-Site due to operating procedures. Each complaint received at the Facility is reported to the MECP.

Odour emissions are not anticipated to change as a result of the proposed site modifications, therefore, odour has not been carried forward for further assessment.

4.3.1.5 Atmospheric Environment - Noise

From a noise perspective both the Site Study Area and Local Study Area described in Section 4.2 are appropriate to establish existing conditions and to assess potential changes to the atmospheric (noise) environment as a result of the proposed undertaking. It should be noted though, that the MECP Noise Screening Process Questionnaire requires that industries with significant potential environmental noise profiles or equipment evaluate the off-Site environmental noise impact within 1 km (rather than 1.5 km) from the Site; the noise impact beyond 1 km is expected to be environmentally insignificant. Maximum sound level impacts will occur close to the property line and within a 500 m radius, which is representative of a more detailed and worst-case scenario assessment, however all receivers within the 1.5 km Study Area were considered when establishing the Noise existing conditions.

The rationale for the Local Study Area for the noise discipline is that the off-Site environmental noise impact from the existing Facility, or the development of the proposed alternatives to provide additional capacity, will be defined by the sound power generated by the equipment and activities on-Site and the proximity and line-of-sight noise exposure to the off-Site receiver locations which are the subjects of this analysis. In the absence of other developments and intervening built structures, such as businesses or institutions, the rural residential dwellings within the Local Study Area represent the receiver locations which are the subject of the assessment.

The nearest existing residential dwelling is approximately 110 m northeast of the existing property boundary. The nearest residential dwelling currently under construction is approximately 35 m north of the existing property boundary, approximately 55 m from site infrastructure (i.e., surface water ponds), near the intersection of Green Mountain Road West and First Road West. There are approximately 3,000 existing residential dwellings within the Local Study Area with the largest concentrations to the south and southwest of the Site along Mud Street. An additional subdivision is being constructed to the north.

Information on the Noise existing conditions within the Study Areas was gathered from a combination of secondary source research and Site-specific reports including:

- Review of historic complaints
- Review of current zoning plans, definitions and land use designations

- Aerial photographic mapping and field reconnaissance to confirm off-Site receptors
- Landfill design and operation data and associated topography
- Rotek Environmental Inc. Semi-Annual Noise Report – June 2016 – historic ambient monitoring data and road traffic modelling used to determine the existing acoustical conditions for the area
- AECOM Acoustic Assessment Report – June 2013
- Applicable MECP guidelines and technical standards (i.e., Noise guidelines for landfill sites, Oct 1998, NPC-103, NPC104, NPC-207 and NPC-300)

The environmentally significant noise sources or activities occurring on-Site and the subject of this analysis include:

- 1 x Water Truck
- 2 x Bulldozers
- 2 x Excavators
- 1 x Sweeper Truck
- 1 x Idling Trucks at Weigh Station
- 1 x Clean Fill Haul Route Trucks
- 1 x Waste Fill Haul Route Trucks

These noise sources generate continuous steady state mechanical noise. There are no ground-borne vibration sources at the Facility as defined in MECP Noise Pollution Control publication (NPC-207).

Characterization of the Existing Environment

The Terrapure SCRF currently conforms to the City of Stoney Creek Zoning By-law No. 3692-92 under Section 9.8.5 'Special Exemptions', as ME-1. In addition to permitted uses under the Extractive Industrial "ME" Zone, lands zoned ME-1 are permitted for operations associated with non-hazardous waste from industrial, commercial, and institutional sources (City of Hamilton, 2015(a)). The supporting information for the existing zoning and allowed uses has been referenced from GHD's Land Use and Social Environment Existing Conditions Report (See **Appendix E**). The surrounding area is made up of community park, open space, low density, high density, institutional and general commercial. The Facility is currently operating under ECA No. A181008.

The Facility is located approximately 6 km southwest of Stoney Creek and 13 km southeast of Hamilton. The closest residential building is approximately 120 m from the Site and there are no other major industrial sources within the Local Study Area as indicated in **Figure 4.1**.

With respect to background noise generation, there are four roads located within the Study Area including:

1. First Road West is a two-lane urban road with minimal local traffic only.
2. Mud Street West is a four-lane road with dominant local traffic.

3. Upper Centennial Parkway is a major four-lane road with significant 24-hour road traffic and is a major throughway for the City of Hamilton.
4. Green Mountain Road West is a two-lane urban road with minimal local traffic only.

Green Mountain Road West and First Road West experience low traffic volumes as confirmed by the past traffic studies, as well as through the traffic counts/surveys undertaken by GHD(further details provided in the Traffic Existing Conditions Report in **Appendix E**). Mud Street West and Upper Centennial Parkway traffic volumes are elevated during the morning and evening rush hour period as confirmed by previous traffic studies.

Background Noise Study Results

Adjacent road traffic travelling along the Mud Street West and Upper Centennial Parkway arterial roads are the predominant 24-hour ambient noise sources.

The historical background noise studies indicated that the ambient one-hour leq sound levels during the daytime periods ranged from 63 dBA to 67 dBA. Nighttime levels were not documented, as the SCRF does not operate at night.

Semi-Annual Noise Monitoring Survey

A semi-annual noise monitoring survey was completed during 2016 to measure noise levels at the nearest receptors around the SCRF. In addition, road traffic noise modeling was completed. The survey results are documented in **Figure 4.17**:

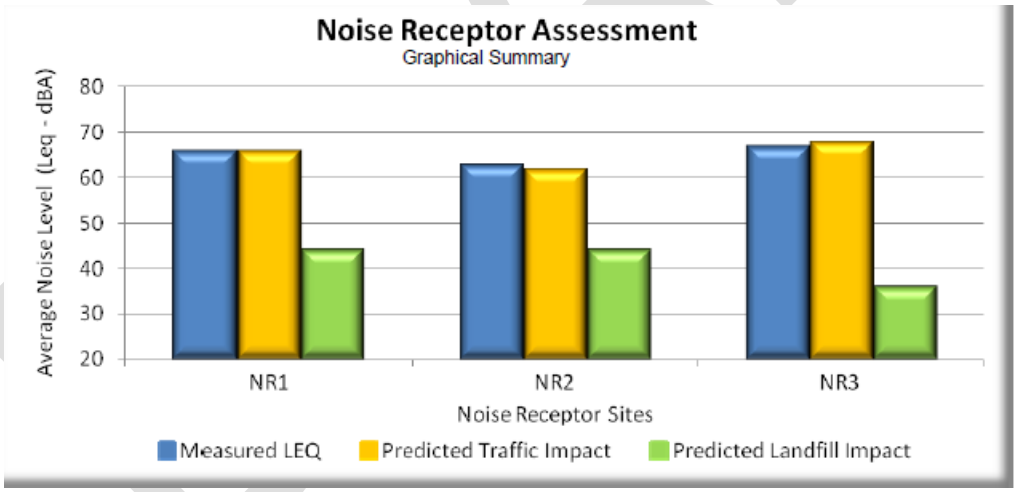


Figure 4.17 Noise Receptor Assessment

The annual noise monitoring report documented measured noise levels at the receivers around the SCRF (NR1-NR3) which included heavy contributions from adjacent road traffic. The existing Facility operations are predicted to be well below the predicted traffic impact.

Figure 4.18 details the locations of the sensitive receptors around the Facility that were the subjects of the previous Acoustic Assessment Reports and the Annual Noise Monitoring Survey for the SCRF. Sensitive receiver NR4 has been added to evaluate the proposed residential development to the North West along Green Mountain Road. The receivers are adjacent to major arterial roads that surround the Facility and have no blocked line-of-sight to roadways or landfill operations. The

maximum sound level impacts will occur close to the property line and within a 500 m radius, which is representative of a more detailed and worst-case scenario assessment, however all receivers within the larger 1.5 km Study Area were considered for evaluation.

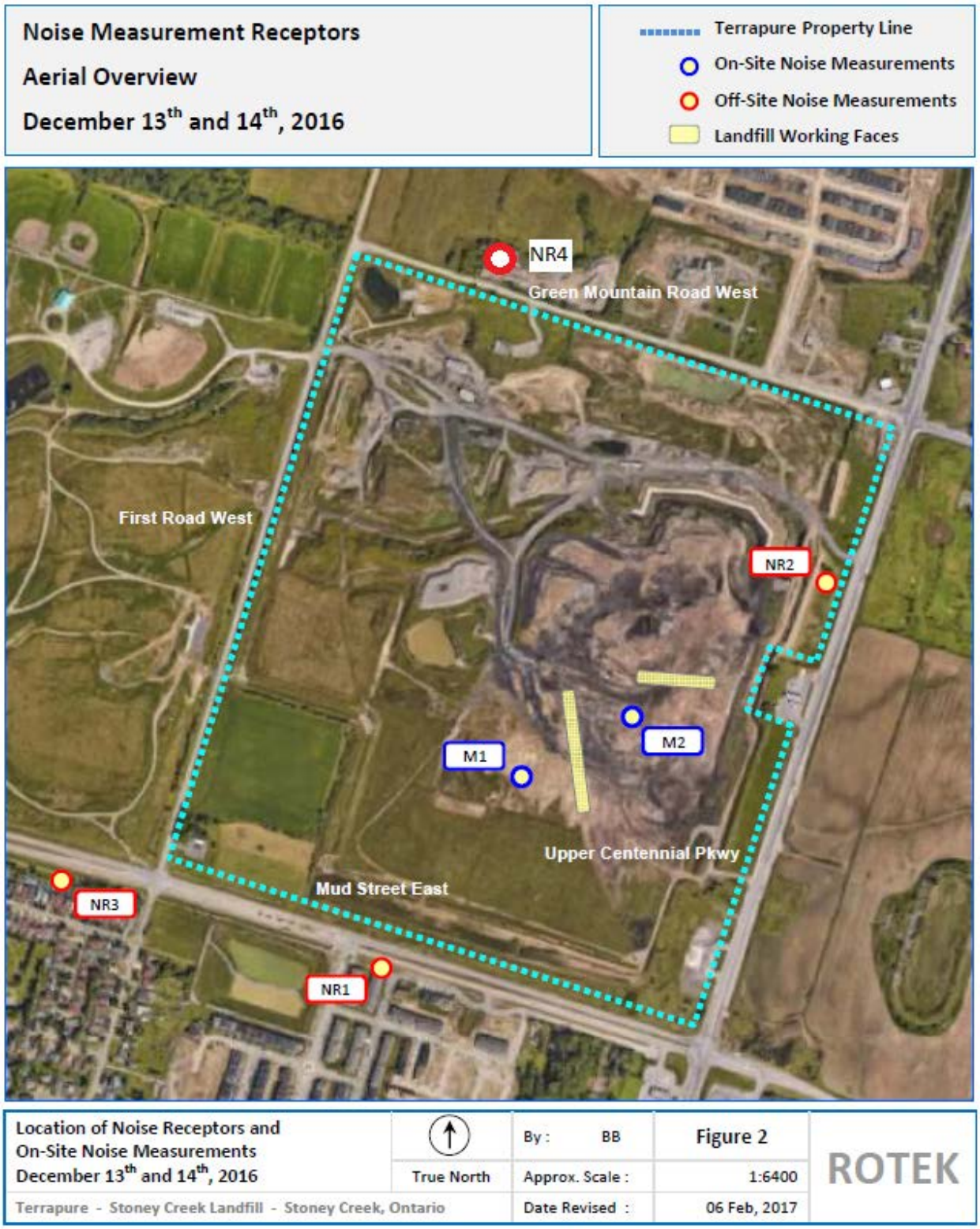


Figure 4.18 Noise Measurement Receptors – Aerial Overview

MECP Technical Guidelines and Standards

On-Site operations at the SCRF are compared directly against a daytime one-hour leq sound level limit of 55 dBA for landfill operations that are limited to 7 a.m. to 7 p.m. under the "Noise Guidelines for Landfill Sites" (N-1).

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

As stated in the guideline:

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

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

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

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

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

- A small community with less than 1000 population.
- Agricultural area.
- A rural recreational area, such as a cottage or a resort area.
- A wilderness area.

The Study Area is surrounded by urban land uses and is considered to be an urban Acoustic Class 1 Area.

Complaints

The Facility maintains a record of all environmental complaints received at the SCRF and has put in place the following standard procedures for responding to complaints:

- All complaints received will be assigned a control number and recorded electronically.
- Details of the complaint are forwarded to Terrapure Management for follow-up.
- Terrapure Management will send a confirmation letter to the complainant within 10 days of receiving the details.

- Terrapure Management will ensure that the complaint is investigated and resolved in a timely manner.
- Terrapure Management will be advised of the result of the investigation.
- Terrapure Management will forward a letter or report to the complainant detailing the results of the investigation.
- Terrapure Management will notify the Community Liaison Committee (CLC) via email of the complaint immediately after the investigation has been completed.
- Complaints will be summarized for inclusion in the Annual Report.

A review of the complaint records from the past three years, summarized in Table 4.10 above indicates that out of the 31 complaints, zero were related to noise perceived from the Facility.

Concerned residents or businesses can call the Facility directly, the City of Hamilton, or the MECP if a nuisance effect is perceived to have occurred because of the Facility. All complaints are recorded and investigated in accordance with the Facility standard complaint procedures and templates. Each complaint is logged and, in many cases, Site staff will go to the location where the nuisance was recorded and conduct on-Site investigations. The date and time of the complaint are cross-referenced with data from the Facility in order to determine if any adjustments to operations need to be made at the Site. Each complaint received at the Facility is reported to the MECP.

4.3.2 Built Environment

4.3.2.1 Land Use

From a Land Use perspective both the Site Study Area and Local Study Area described in Section 4.2 are appropriate to establish existing conditions and to assess potential changes to the built environment as a result of the proposed undertaking.

Information on the Land Use existing conditions within the Study Areas was gathered from a combination of the following secondary sources:

- Bill 151, Waste-Free Ontario Act, 1996
- Ontario Planning Act
- Provincial Policy Statement (2014)
- Provincial Guideline D-1: Land Use Compatibility
- Provincial Guideline D-4: Land Use On or Near Landfills and Dumps
- Urban Hamilton Official Plan (2013)
- Rural Hamilton Official Plan (2012)
- City of Stoney Creek Zoning By-law No. 3692-92
- City of Hamilton Zoning By-law No. 05-200
- City of Hamilton Development Applications Mapping (online tool)

Existing Land Use Conditions

The Terrapure SCRF is under the jurisdiction of the Urban Hamilton Official Plan and the City of Stoney Creek Zoning By-law No. 3692-92. The SCRF is also directly adjacent to areas designated under the Rural Hamilton Official Plan. The SCRF falls within the Nash Neighbourhood Secondary Plan Area designated under the Urban Hamilton Official Plan. **Figure 4.19** represents land use designations with the Nash Neighbourhood Secondary Plan.

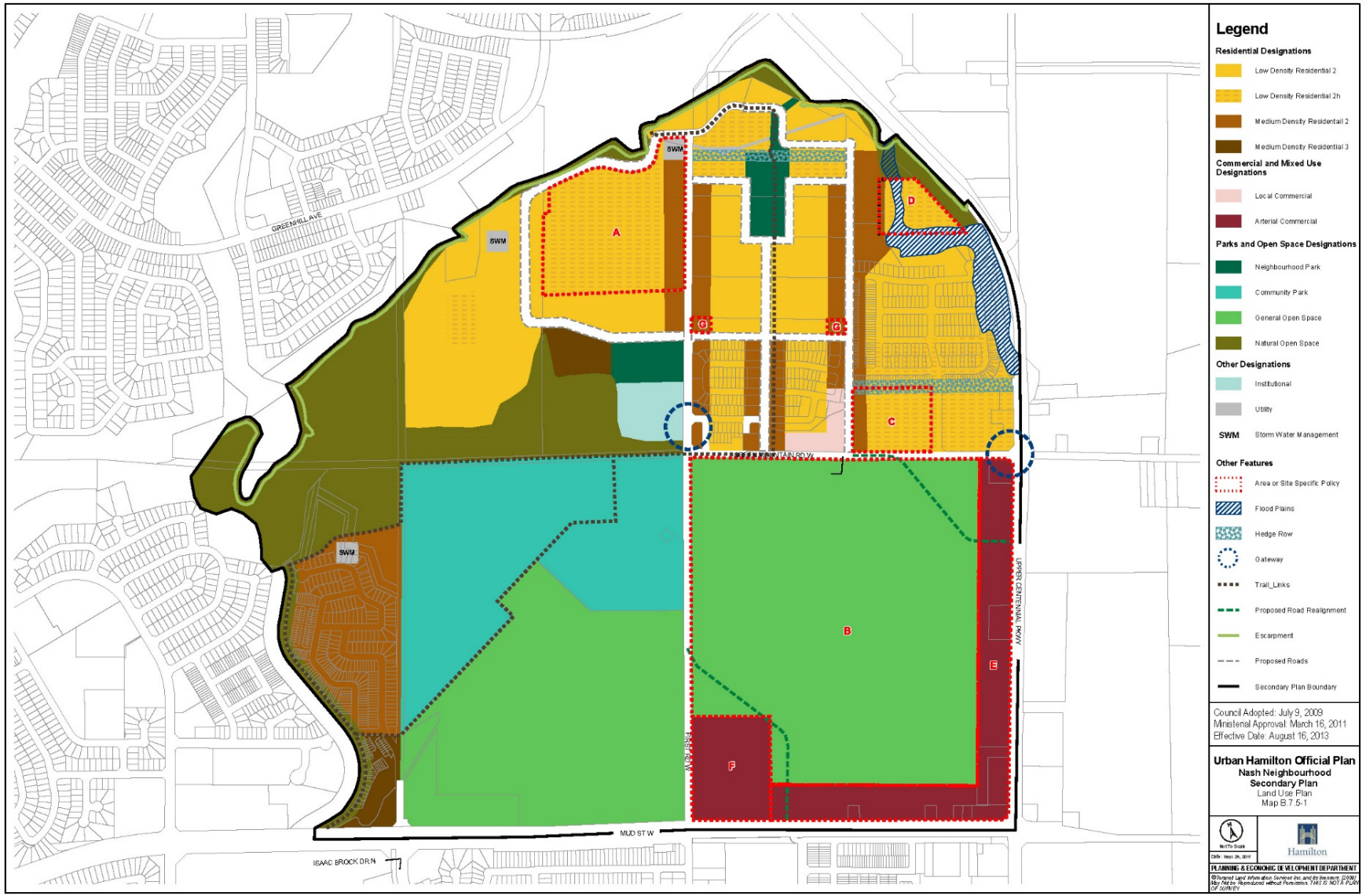


Figure 4.19 Official Plan Mapping – Nash Neighbourhood Secondary Plans

Urban Hamilton Official Plan (2013) Designations

The Urban Hamilton Official Plan identifies the Urban Structural Elements, Functional Road Classifications and Urban Land Use Designation comprising the Terrapure SCRF:

Urban Structure Elements (Schedule E)

Urban Structure Elements related to the Terrapure SCRF include the following (City of Hamilton, 2013):

- Neighbourhoods
- Secondary Corridor – Upper Centennial Parkway

Functional Road Classifications (Schedule C)

Classifications for the four roads encompassing the Terrapure SCRF are as follows (City of Hamilton, 2013):

- Major Arterial – Mud Street.
- Collectors – First Road West, Green Mountain Road, Upper Centennial Parkway.

Urban Land Use Designations (Schedule E-1)

Urban Land Use Designations for the Terrapure SCRF include the following (City of Hamilton, 2013):

- Open Space – As a result of recent official plan amendments, the Terrapure SCRF resides within land designated as General Open Space, in accordance with Schedule E-1 of the Urban Hamilton Official Plan (2013).
- Commercial and Mixed Use Designations – Arterial Commercial.

Table 4.11 Stoney Creek Secondary Plans – Nash Neighbourhood Secondary Plan (Site Study Area)

Secondary Plan Designations	Description of Built Form/Permitted Uses	Restrictions on Land Use (Density/GFA/Prohibited Uses)
Commercial and Mixed Use Designations		
Arterial Commercial	Permitted uses include: **(a)** commercial uses including banquet halls, restaurants including garden centres, furniture stores, building and lumber supply establishment, home improvement supply store, and retail primarily for the sale of building supplies; **(b)** automotive related uses primarily for vehicle sales, service and rental, parts sales, gas bars, car washes, and service stations; **(c)** commercial recreational uses, commercial entertainment uses, excluding theatres; **(d)** industrial supply and service and contractor sales; **(e)** accommodation, excluding residential uses; **(f)** enclosed storage including mini warehousing; and, **(g)** *accessory* uses.	Prohibited uses include: **(a)** department stores; **(b)** food stores; **(c)** residential uses; and, **(d)** stores primarily selling apparel, housewares, electronics, sporting goods, or general merchandise.
Parks and Open Space Designations		
General Open Space	Includes: golf courses, urban farms, community gardens, pedestrian and bicycle trails, walkways, picnic areas, beaches, remnant parcels of open space lands, and urban plazas, squares and core spaces. These areas do not function as parks but are used for both active and passive recreational activities.	N/A

City of Stoney Creek Zoning By-law No. 3692-92

The Terrapure SCRF currently conforms to the City of Stoney Creek Zoning By-law No. 3692-92 under Section 9.8.5 'Special Exemptions', as ME-1, identified in **Figure 4.20**. In addition to permitted uses under the Extractive Industrial "ME" Zone, lands zoned ME-1 are permitted for operations associated with non-hazardous waste from industrial, commercial, and institutional sources (City of Hamilton, 2015(a)).

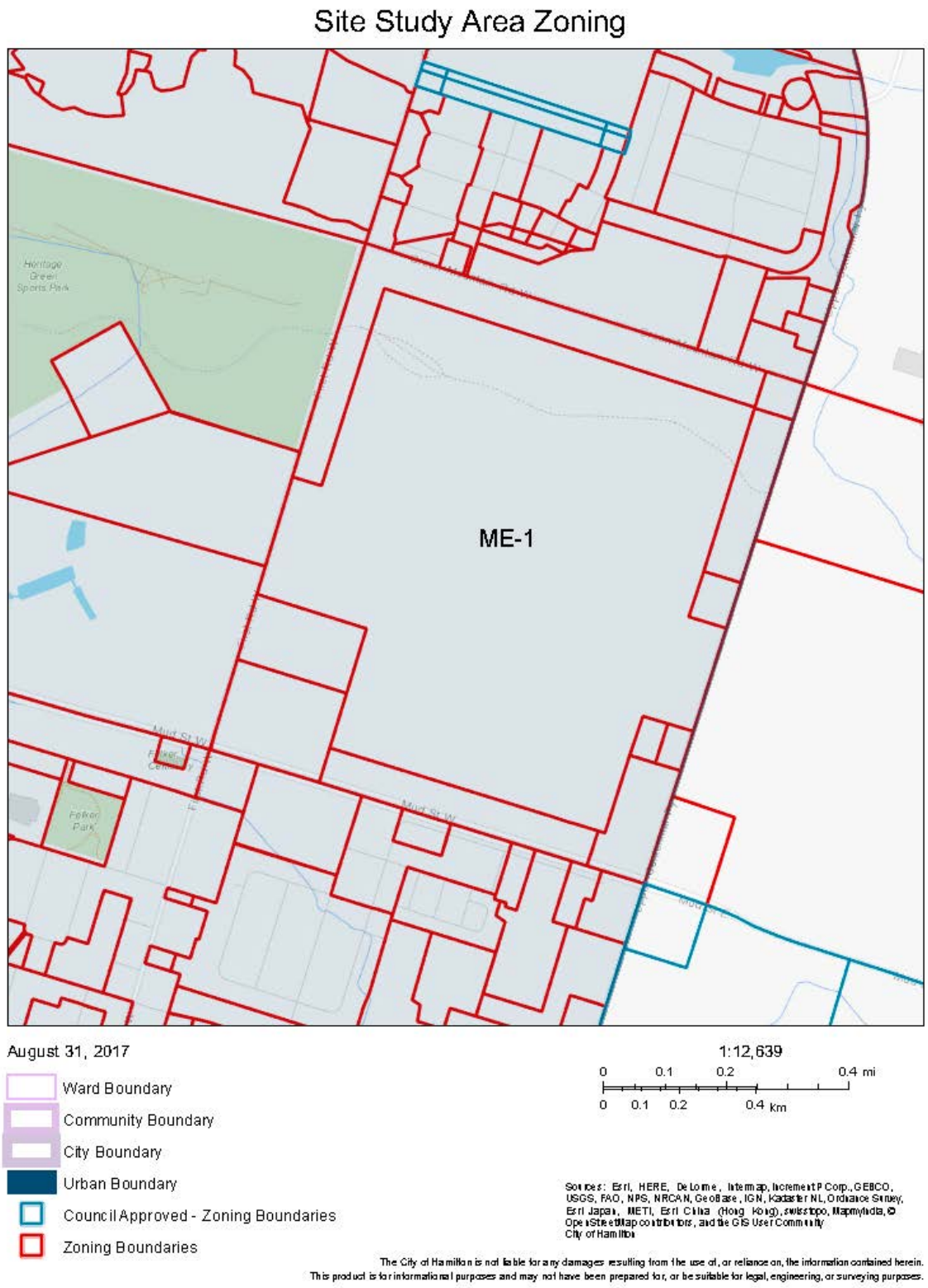


Figure 4.20 Site Study Area Zoning Map

Local Study Area: Existing Land Use Conditions

Historic Residential Development Activity

Areas within the identified Local Study Area have recently undergone residential development. **Table 4.12** summarizes residential development activity for sites within the Local Study Area (City of Hamilton, 2015(b)). **Figure 4.21** provides a visual representation of residential development activity within the 1.5 km Study Area, and corresponds to **Table 4.12**.

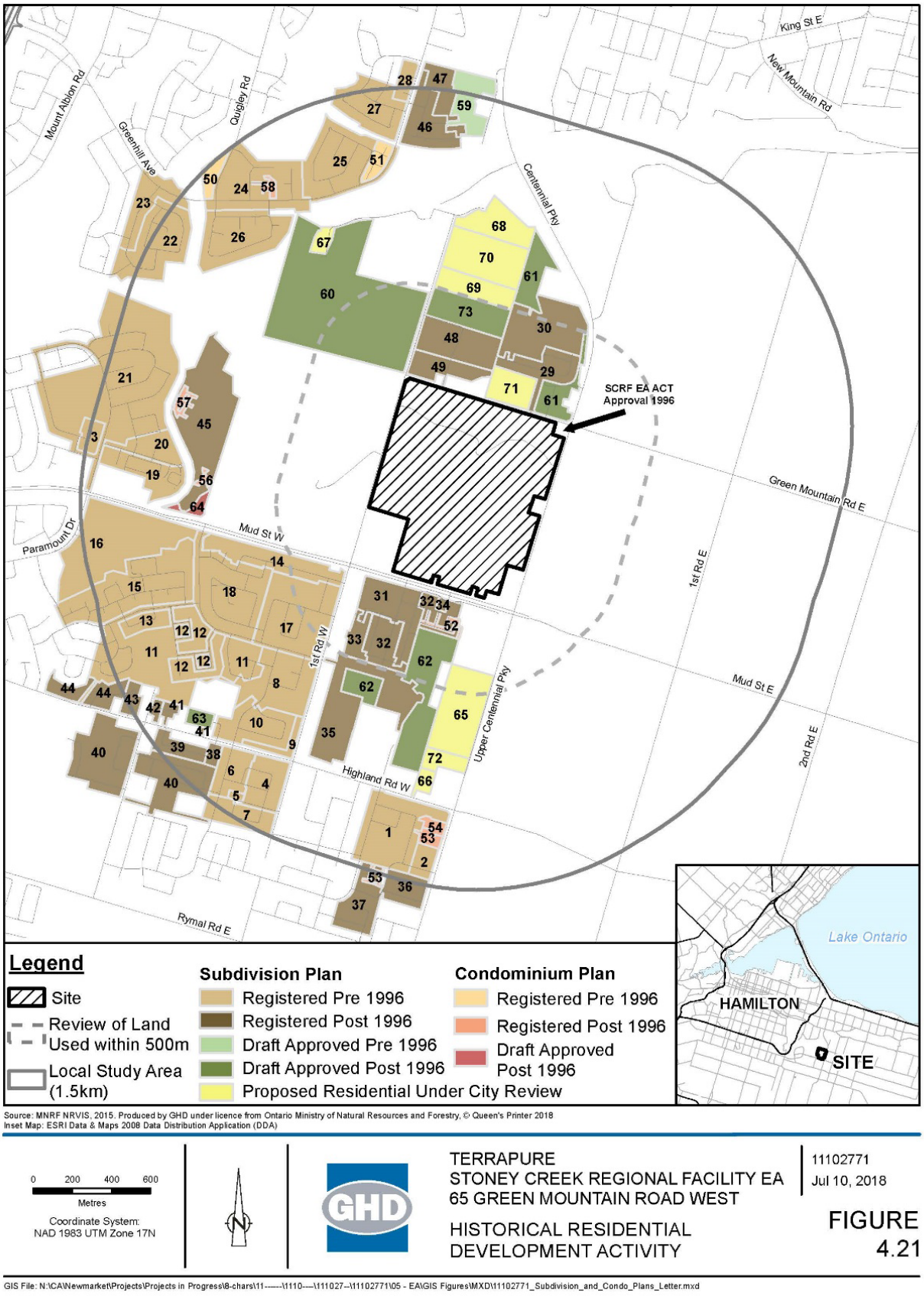


Figure 4.21 Historical Residential Development Activity

Table 4.12 Residential Development Activity – Registered Plans of Subdivision & Registered Plans of Condominium

ID#	Development	Date Registered	Original Address	Number of Units
Registered Plans of Subdivision (Pre 1996)				
1	PLAN#: 623 Highland Park Estates	8/4/1989	N/A	108 Single Units 30 Multi Units *(138 Total Units)*
2	PLAN#: 695 Highgate Mills	3/18/1992	N/A	9 Single Units 45 Multi Units *(54 Total Units)*
3	PLAN#: 354 Canfield Place	8/18/1983	N/A	Total Units 25
4	PLAN#: 636 Highland Gardens, Ph. 1	11/8/1989	N/A	Total Units 82
5	PLAN#: 732 Highland Gardens, Ph. 2	5/6/1993	N/A	Total Units 5
6	PLAN#: 737 Highland Gardens, Ph. 3	7/21/1993	N/A	Total Units 53
7	PLAN#: 774 Highland, St.1	1/17/1995	N/A	Total Units 68
8	PLAN#: 543 Heritage Green, St.2, Ph.1	1/20/1988	N/A	Total Units 163
9	PLAN#: 691 Heritage Green, St.2, Ph.2	11/4/1991	N/A	Total Units 32
10	PLAN#: 692 Heritage Green, St.2, Ph.3	1/24/1992	N/A	Total Units 94
11	PLAN#: 166 Gordon Drummond	7/15/1975	N/A	Total Units 75
12	PLAN#: 365 Heritage Green, Ph.4	11/29/1983	N/A	Total Units 105
13	PLAN#: 378 Heritage Green, Ph.4b	6/4/1984	N/A	Total Units 45
14	PLAN#: 499 Heritage Green, Ph.6	3/25/1987	N/A	Total Units 95
15	PLAN#: 254 Saltfleet Community Development	8/28/1978	N/A	Total Units 361
16	PLAN#: 168 Ridell Dalton Kelsey	7/3/1975	N/A	N/A
17	PLAN#: 155 John Murray Street Subdivision	4/3/1975	N/A	Total Units 137
18	PLAN#: 156 Rand Street Subdivision	4/8/1975	N/A	Total Units 154
19	PLAN#: 648 Heritage Green, Albion, St.1	3/1/1990	N/A	Total Units 263

ID#	Development	Date Registered	Original Address	Number of Units
20	PLAN#: 549 Paramount Gardens	3/29/1988	N/A	Total Units 48
21	PLAN#: 181 Albion Estates, Ph.1, St.1	2/12/1975	N/A	Total Units 286
22	PLAN#: 95 Glendale Estates, No.4, Ph.4	9/30/1972	N/A	Total Units 115
23	PLAN#: 65 Glendale Estates, No.2, Ph.2	6/16/1971	N/A	Total Units 83
24	PLAN#: 3 Veevers Estates, No.1	6/12/1968	N/A	Total Units 186
25	PLAN#: 106 Veevers Estates, No.2	4/12/1973	N/A	Total Units 156
26	PLAN#: 28 Veevers Estates, No.3	7/15/1969	N/A	Total units 126
27	PLAN#: 569 Greenhill Gardens, Ph.3	7/11/1988	N/A	Total Units 92
28	PLAN#: 597 Desantis Gardens	2/17/1989	N/A	Total Units 29
Registered Plans of Subdivision (Post 1996)				
29	PLAN#: 1199 Victory Ridge, Ph. 1	1/21/2014	22 Green Mountain Road	49 Single Units 62 Multi Units *(111 Total Units)*
30	PLAN#: 1206 Victory Ridge, Ph. 2	7/24/2014	22 Green Mountain Road	112 Single Units 67 Multi Units *(179 Total Units)*
31	PLAN#: 1172 Penny Lane Estates, Ph. 1	2/29/2012	222 First Road W.	47 Single Units 52 Multi Units *(99 Total Units)*
32	PLAN#: 1182 Penny Lane Estates, Ph. 2	11/30/2012	222 First Road W.	91 Single Units 121 Multi Units *(212 Total Units)*
33	PLAN#: 1208 Penny Lane Estates, Ph. 3	11/14/2014	222 First Road W.	35 Single Units
34	PLAN#: 1223 Penny Lane, Ph. 4	12/11/2015	222 First Road W.	15 Multi Units
35	PLAN#: 1219 198 First Road W., Ph. 2	9/9/2015	198 First Road W.	87 Single Units 102 Semi Units 29 Multi Units *(218 Total Units)*
36	PLAN#: 1138 Highgate Meadows	4/23/2010	Upper Centennial Parkway	38 Single Units 52 Multi Units *(90 Total Units)*
37	PLAN#: 1141 Mountain Gardens	6/25/2010	Highbury Drive	61 Single Units 99 Multi Units

ID#	Development	Date Registered	Original Address	Number of Units
				(160 Total Units)
38	PLAN#: 888 Highland Heights	9/13/1999	N/A	12 Single Units
39	PLAN#: 977 Highland West	2/25/2003	247 Highland Road W.	41 Single Units
40	PLAN#: 918 Shadyglen, Ph.1	11/30/2000	N/A	254 Total Units
41	PLAN#: 1134 Carlson Street Extension, Ph. 1	12/11/2009	218-250 Highland Road W.	12 Single Units 4 Semi Units *(16 Total Units)*
42	PLAN#: 1130 Carlson Estates	11/4/2009	264 Highland Road W.	8 Single units
43	PLAN#: 878 Dalma Gardens	4/27/1999	N/A	18 Single Units
44	PLAN#: 852 Valley Park, St.6	10/16/1998	N/A	42 Single Units
45	PLAN#: 1204 Paramount	4/3/2014	Mud Street	114 Single Units 48 Semi Units 164 Multi Units 32 Apt Units *(358 Total Units)*
46	PLAN#: 965 Nash Orchard Heights South, Ph.1	8/2/2002	N/A	110 Single Units
47	PLAN#: 1225 Vienna Orchards, Ph.1	1/21/2016	70 Webster Rd.	63 Single Units
48	PLAN#: 1232 Red Hill, Ph. 1	8/17/2016	N/A	61 Single Units 65 Multi Units *(126 Total Units)*
49	PLAN#: 1234 Red Hill, Ph. 2	10/19/2016	NA	61 Single Units 103 Multi Units *(164 Total Units)*
Registered Plans of Condominium (Pre 1996)				
50	PLAN#: 72001 350 Quigley Rd.	7/17/1972	350 Quigley Rd.	Total Units 278
51	PLAN#: 75 Veevers Estates	5/30/1978	N/A	Total Units 64
Registered Plans of Condominium (Post 1996)				
52	PLAN#: 201307 Parkside Development	4/12/2014	36 Waterbridge Street	N/A
53	PLAN#: 200311 Highland Park Ph.1	5/17/2004	39 Pinewoods Drive	30 Multi Units
54	PLAN#: 200311 Highland Park Ph. 2	4/13/2005	39 Pinewoods Drive	33 Multi Units
55	PLAN#: 201113 Mountain Gardens	12/20/2012	70 Highgate Drive	N/A

ID#	Development	Date Registered	Original Address	Number of Units
56	PLAN#: 201405 Stockridge Gardens	1/29/2016	42 Westbank Trail	N/A
57	PLAN#: 201403 Paramount Subdivision	6/25/2015	201 Westbank Trail	N/A
58	PLAN#: 201114 Greenhill Glen	1/16/2013	N/A	N/A
Draft Approved Plans of Subdivision (Pre 1996)				
59	PLAN#: 85033 Vienna Orchards	11/27/1985	70 Webster Rd	Total Units 34
Draft Approved Plans of Subdivision (Post 1996)				
60	PLAN#: 201301 Red Hill, Ph.2 (aka Red Hill, Ph. 3/4)	3/15/2013	435 First Rd W	Total Units 340
61	PLAN#: 200803 Victory Ridge (formerly Nash Neighbourhood)	4/17/2008	22 Green Mountain Rd W	Total Units 120
62	PLAN#: 200908 198 First Road West (Paletta Lands)	11/10/2009	198 First Road West	Total Units 457
63	PLAN#: 200714 Carlson Street Extension	11/22/2007	218250 Highland Rd W	Total Units 20
73	Plan#: 201510	11/09/2015	440 First Road West	Single Units 27 Multi Units 11 *(Total Units 38)*
Draft Approved Plans of Condominium (Pre 1996)				
None				
Draft Approved Plans of Condominium (Post 1996)				
64	PLAN#: 201606 23 Echovalley Drive	06/02/2016	23 Echovalley Dr.	Total Units 22
Proposed Plans of Subdivision Under Review (Post 1996)				
65	Development Application: 25T- 201503 165 Upper Centennial Parkway	12/22/2014	165 Upper Centennial Parkway	Total Units 450
66	Development Application: 25T-201608 56 Highland Road West	03/26/2017	56 Highland Road West	Total Units 50
67	Development Application: 25T-201601 2 Glover Mountain	02/11/2015	2 Glover Mountain	Total Units 6
68	Development Application: 25T- 201701 City View Estates	12/21/2016	15 Ridgeview Drive	Total Units 97
69	Development Application: 25T-201612 Nash Neighbourhood Phase 3	11/01/2016	464 First Road West	Total Units 135

ID#	Development	Date Registered	Original Address	Number of Units
70	Development Application: 25T-201611 Nash Neighbourhood Phase 2	11/01/2016	490 First Road West	Total Units 197
71	Development Application: ZAC-17-077 50 Green Mountain Road West	File Year 2017	50 Green Mountain Road West	Total Units 189
72	Development Application: ZAC-16-056 157, UHOPA-16-020 Upper Centennial Parkway,	File Year 2016	157 Upper Centennial Parkway	Total Units 52

Land Uses within 500m of the Site

Land uses within the Local Study Area include residential, commercial, recreational and institutional uses. **Figure 4.16** highlights the location of each of the land uses within 500 m with respect to the location of the Terrapure SCRF.

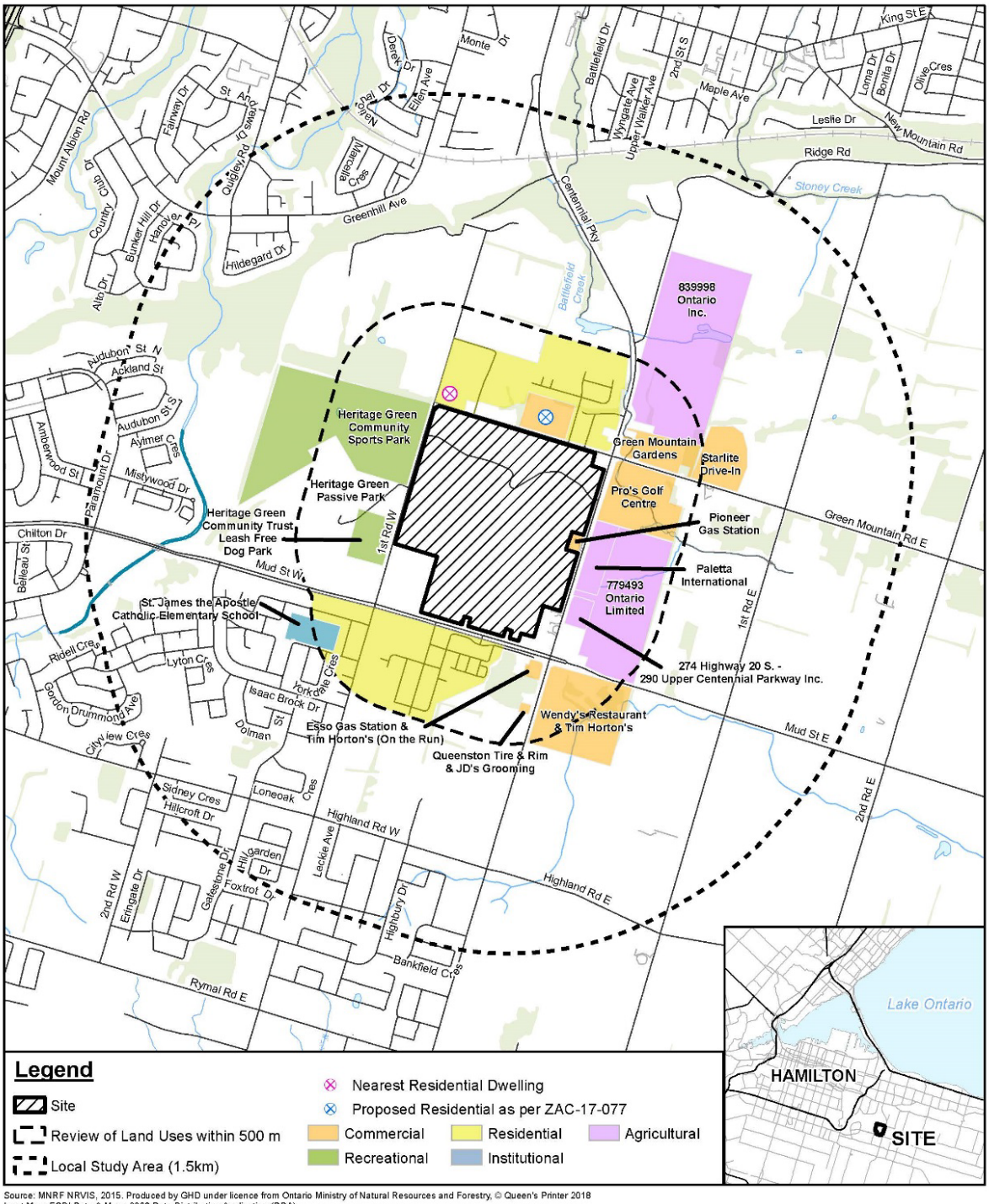


Figure 4.22 Land Uses within 500 m

Residential

The nearest residential dwelling (currently under construction) is approximately 35 m north of the existing property boundary, approximately 55 m from site infrastructure (i.e., surface water ponds), near the intersection of Green Mountain Road West and First Road West. The nearest existing residential dwelling in relation to the southern SCRF property boundary is approximately 60 m south (from the SCRF property line to the nearest residential property line).

There are approximately 1,200 existing or registered residential dwellings within 500 m of the Site Study Area boundary, with the largest concentrations to the north along Green Mountain Road, and south and southwest along Mud Street. An additional subdivision is under construction to the north of the SCRF. These residential properties are primarily located within the Urban Area, as identified in the Urban Hamilton Official Plan.

The majority of residential uses within the Local Study Area are located south of the SCRF. Lands to the south consist of existing and proposed phases of the Penny Lane Estates subdivision.

In accordance with the City of Hamilton's filed registered and draft approved plans of subdivision, there are approximately 6,800 residential units both existing and proposed within the preliminary Study Area. Of the approximate 6,800 residential units within the Local Study Area, approximately 5,800 residential units currently exist (registered), and the remaining approximately 1,000 residential units are proposed (draft approved).

Commercial

A cluster of commercial operations exists within the Local Study Area along major roads, including along Upper Centennial Parkway and Mud Street towards Red Hill.

There are 11 commercial uses within 500 m of the Study Area boundary. The commercial uses are as follows:

- Empire Developments (22 Green Mountain Road West) – Located In Urban Area
- Pro's Golf Centre (22 Green Mountain Road East) – Located in Rural Area
- Starlite Drive-In (59 Green Mountain Road East) – Located in Rural Area
- Green Mountain Gardens (398 Upper Centennial Parkway) - Located in Rural Area
- Pioneer Gas Station (333 Upper Centennial Parkway) – Located in Urban Area
- Esso Gas Station (249 Upper Centennial Parkway) – Located in Urban Area
- Tim Hortons (On the Run) (249 Upper Centennial Parkway) – Located in Urban Area
- Wendy's Restaurant (244 Upper Centennial Parkway) – Located in Rural Area
- Tim Horton's (244 Upper Centennial Parkway) – Located in Rural Area
- Queenston Tire & Rim (225 Upper Centennial Parkway) – Located in Urban Area
- JD's Grooming (225 Upper Centennial Parkway) – Located in Urban Area

Recreational

Heritage Green Community Sports Park, Heritage Green Passive Park, and Heritage Green Community Trust Leash Free Dog Park reside within 500 m of the Study Area boundary to the west.

These recreational parks are located within the Urban Area. Felker's Falls Conservation Area is located further west within the Local Study Area, past the Heritage Green parks.

Institutional

Institutional uses within 500 m of the Study Area boundary include St. James the Apostle Catholic Elementary School, which is approximately 270 m from the Terrapure SCRF property boundary, located within the Urban Area.

In accordance with the Nash Neighbourhood Secondary Plan, an institutional land use designation is present at the northwest corner of Green Mountain Road West and First Road West (435 First Road West). This land is reserved for the future development of a school (zoned Neighbourhood Institutional (I1), as approved by council on November 11, 2015, By-law No. 15-260); however, at this time, the property is owned by a developer.

Institutional uses within the Local Study Area consist of the following primary and secondary schools, public facilities and community services:

- Saltfleet High School (108 Highland Road West, approximately 700 m south of the SCRF)
- St. James the Apostle Catholic Elementary School (29 John Murray Street, approximately 500 m southwest of the SCRF)
- Mount Albion Public School (24 Kennard Street, approximately 1.2 km southwest of the SCRF)
- Hamilton Fire Station 17 (415 Arvin Avenue, approximately 1 km southwest of the SCRF)
- Family Church of Heritage Green (360 Isaac Brock Drive, approximately 800 m southwest of the SCRF)
- Heritage Green Child Care (360 Isaac Brock Drive, approximately 800 m southwest of the SCRF)
- Heritage Green Seventh Day Adventist Church (360 Isaac Brock Drive, approximately 900 m southwest of the SCRF)
- Salvation Army Winterberry Heights Church (300 Winterberry Drive, approximately 1.2 km west of the SCRF)
- Paramount Drive Alliance Church (1035 Paramount Drive, approximately 1.4 km west of the SCRF)
- Valley Park Recreation Centre and Arena (970 Paramount Drive, approximately 1.5 km southwest of the SCRF)
- Heritage Green Nursing Home (353 Isaac Brock Drive, approximately 1.1 km southwest of the SCRF)
- Heritage Green Seniors Centre (351 Isaac Brock Drive, approximately 1.1 km southwest of the SCRF)
- St. Paul Catholic Elementary School (24 Amberwood Street, approximately 1.5 km west of the SCRF)
- Billy Green Elementary School (1105 Paramount Drive North, approximately 1.5 km west of the SCRF)
- Gatestone Elementary School (127 Gatestone Drive, approximately 1.5 km south of the SCRF)

Agricultural

Agricultural Lands within 500m

There are currently four properties zoned for agricultural uses under City of Hamilton Zoning By-law 05-200 within 500 m of the Site. The location of these four properties relative to the Site are depicted in **Figure 4.16**. The four agricultural zoned properties have no registered municipal address and are referred to as follows:

- Part lot 24 Concession 5 Saltfleet Part 1 62R11599 except Part 1 62R15170; Stoney Creek, City of Hamilton, owned by 839993 Ontario Inc.
- Part Lot 24, Concession 6 Saltfleet, as in CD466796, except Part 1, 62R11668; Stoney Creek, City of Hamilton, owned by 779493 Ontario Limited
- Part Lot 24, Concession 6 Saltfleet, as in AB302248; Stoney Creek, City of Hamilton, owned by Paletta International
- 274 Highway 20 South; Stoney Creek, City of Hamilton, owned by 290 Upper Centennial Parkway Inc.

Soil Classifications

This assessment identifies soil classifications within the Local Study Area, as in accordance with Canadian Land Inventory, which is part of the National Soil Database. The following soil classes occur within the Local Study Area, as depicted in **Figure 4.17**[2]:

- *Class 1: Soils in Class 1 are level to nearly level, deep, well to imperfectly drained and have good nutrient and water holding capacity. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for the full range of common field crops.*
- *Class 2: These soils are deep and may not hold moisture and nutrients as well as Class 1 soils. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a wide range of common field crops.*
- *Class 3: The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. Under good management these soils are fair to moderately high in productivity for a wide range of common field crops.*
- *Class 5: The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants and may be improved through the use of farm machinery. Feasible improvement practices may include clearing of bush, cultivation, seeding, fertilizing or water control.*
- *Class 6: These soils may provide some sustained grazing for farm animals, but the limitations are so severe that improvement through the use of farm machinery is impractical. The terrain may be unsuitable for the use of farm machinery, or the soils may not respond to improvement, or the grazing season may be very short.*
- *Class 7: This class includes marsh, rockland and soil on very steep slopes.*

The following subclasses are present within the Local Study Area[3]:

- *Subclass D: Undesirable soil structure and/or low permeability*: *This subclass is used for soils which are difficult to till, or which absorb or release water very slowly, or in which the depth of rooting zone is restricted by conditions other than a high water table or consolidated bedrock.*

[2] OMAFRA, 2017. "Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario".

[3] Ibid.

In Ontario this subclass is based on the existence of critical clay contents in the upper soil profile.

- *Subclass E - Erosion*: *Loss of topsoil and subsoil by erosion has reduced productivity and may in some cases cause difficulties in farming the land e.g., land with gullies.*
- *Subclass I - Inundation by streams or lakes: Flooding by streams and lakes causes crop damage or restricts agricultural use.*
- *Subclass R - Consolidated bedrock: The occurrence of consolidated bedrock within 100 cm of the surface restricts rooting depth and limits moisture holding capacity. Conversely, in poorly drained soils the presence of the bedrock may, depending on depth, make artificial drainage impossible.*
- *Subclass T - Topography: This subclass denotes limitations due to slope steepness and length. Such limitations may hinder machinery use, decrease the uniformity of crop growth and maturity, and increase water erosion potential.*
- *Subclass W - Excess water: This subclass indicates the presence of excess soil moisture due to poor or very poor soil drainage. It is distinguished from Subclass I - water inundation which indicates risk of flooding from adjacent lakes or streams.*

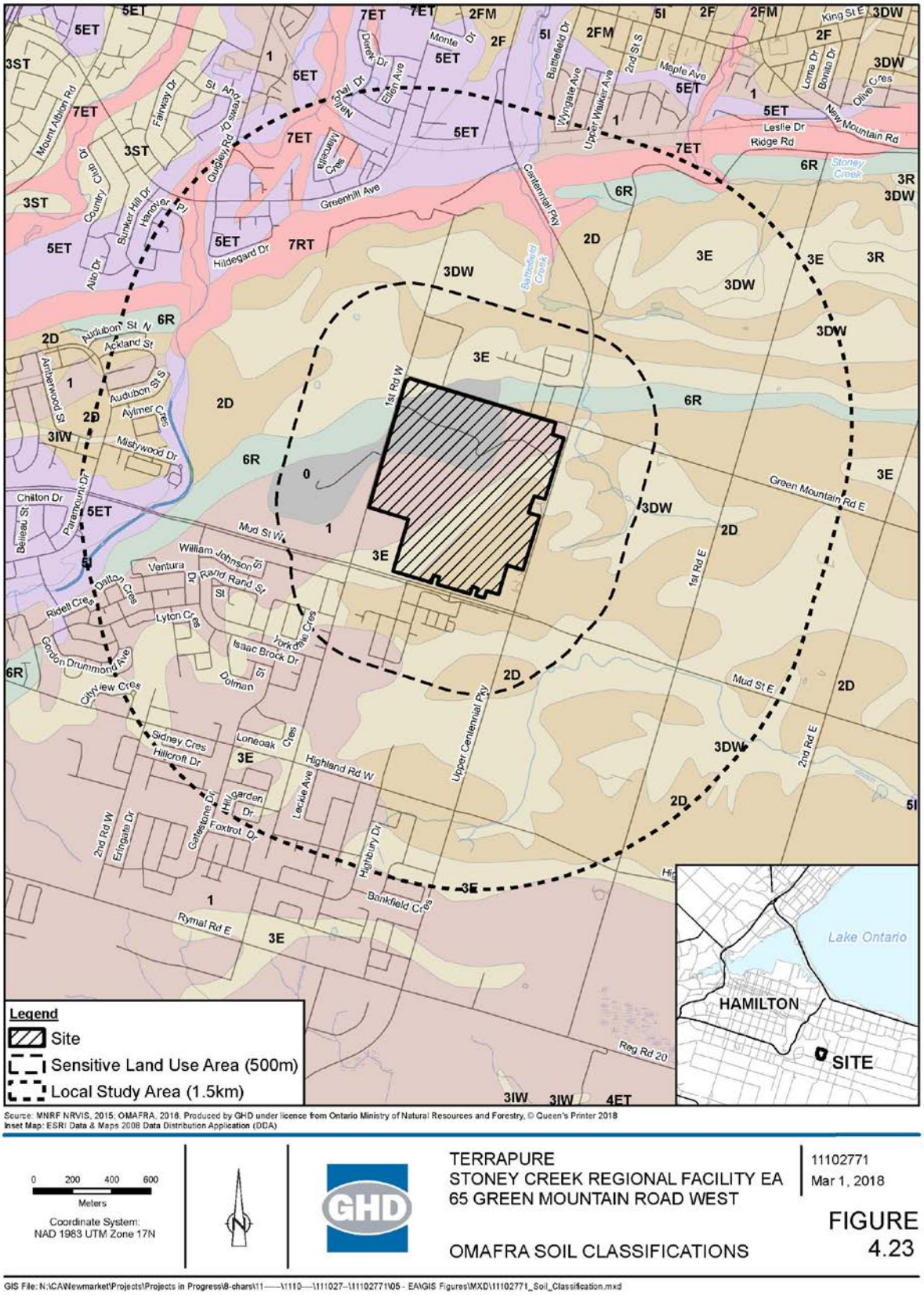


Figure 4.23 OMAFRA Soil Classifications

Urban Hamilton Official Plan (2013)

As previously mentioned, the Terrapure SCRF resides within the Urban Area, as designated under the Urban Hamilton Official Plan, 2013, but is also directly adjacent to lands that fall under the jurisdiction of the Rural Hamilton Official Plan, 2012. The Urban Hamilton Official Plan identifies the Urban Structural Elements, Functional Road Classifications and Urban Land Use Designation and Secondary Plan Areas, adjacent to the Terrapure SCRF and that fall within the Local Study Area.

Urban Structure Elements (Schedule E)

Urban Structure Elements related to the Local Study Area, include the following (City of Hamilton, 2013):

- Neighbourhoods
- Major Open Space
- Community Node
- Secondary Corridor – Upper Centennial Parkway
- Other Features – Niagara Escarpment

Functional Road Classification (Schedule C)

Classifications for the road network within the Local Study Area are as follows (City of Hamilton, 2013):

- Major Arterial – Mud Street, Rymal Road
- Secondary Arterial – Paramount Drive
- Collectors – First Road West, Green Mountain Road, Upper Centennial Parkway, Issac Brook Drive, Gatestone Drive, Highbury Drive, Highland Road West
- Proposed Collectors – Extension of Isaac Brock Drive and Highbury Drive.

Urban Land Use Designations (Schedule E-1)

Urban Land Use Designations for the Local Study Area include the following (City of Hamilton, 2013):

- Open Space
- Neighbourhoods
- Utility
- Institutional
- Commercial and Mixed Use Designations – Arterial Commercial
- Commercial and Mixed Use Designations – Medium Density

Secondary Plan Areas

As demonstrated in **Figure 4.24**, the Local Study Area infringes upon three Secondary Plan Areas within the Stoney Creek Rural Settlement Area. The Stoney Creek Secondary Plan Areas within the Local Study Area include the following:

1. Nash Neighbourhood Secondary Plan (**Figure 4.24**)
2. West Mountain Area (Heritage Green) Secondary Plan (**Figure 4.25**)
3. Old Town Secondary Plan (**Figure 4.26**)

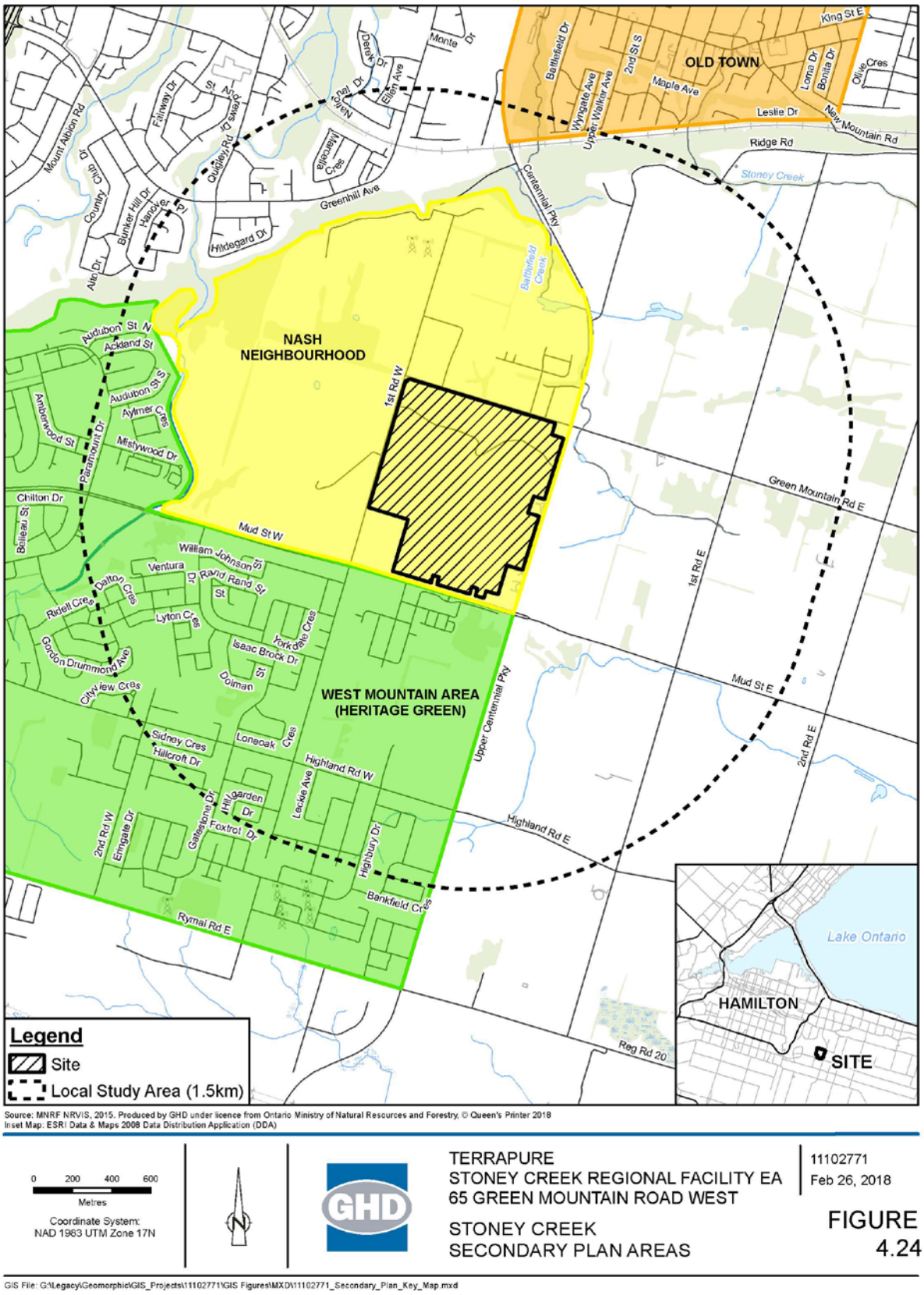


Figure 4.24 Secondary Plans within the Local Study Area

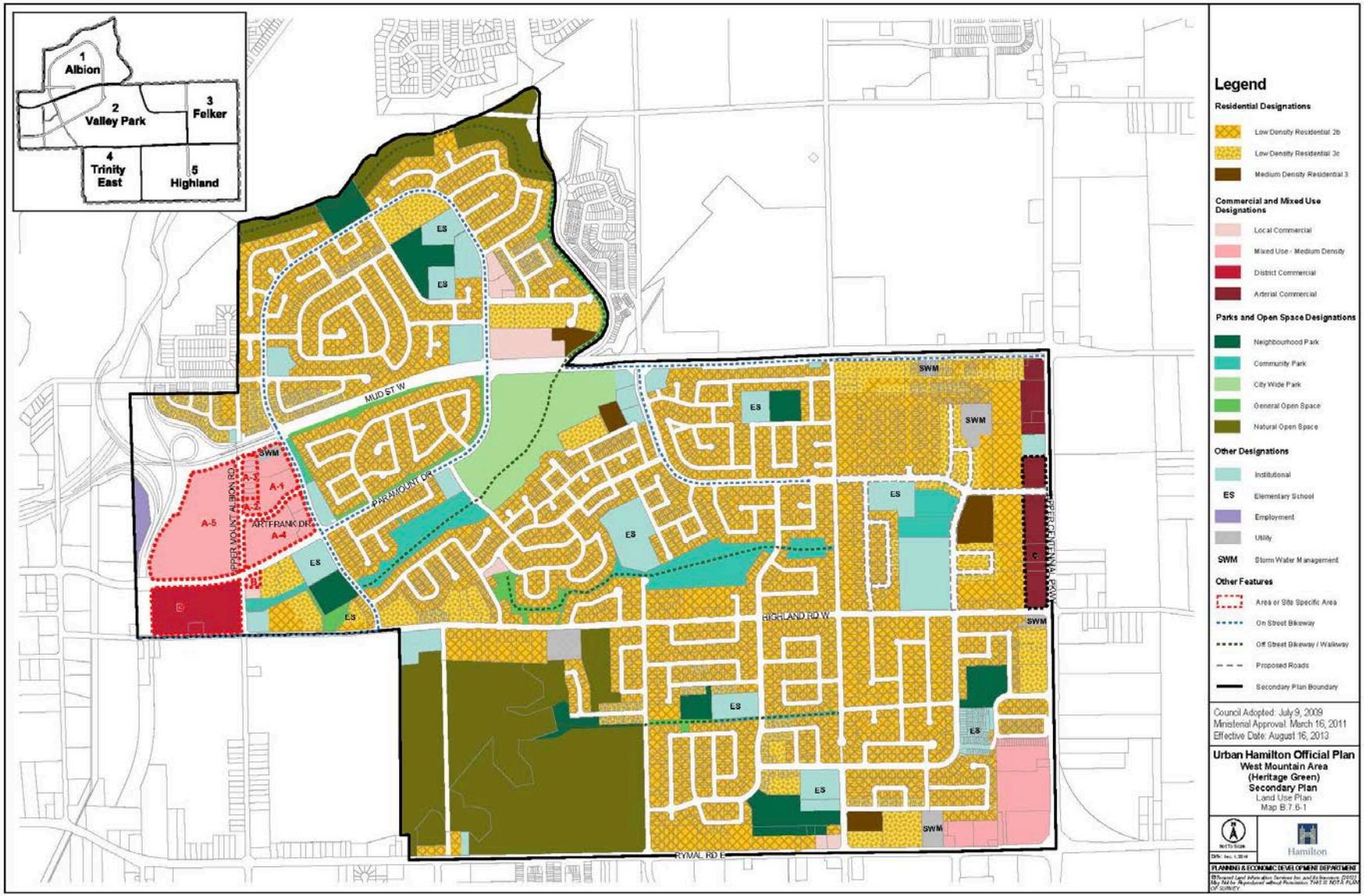


Figure 4.25 West Mountain Area (Heritage Green) Secondary Plan

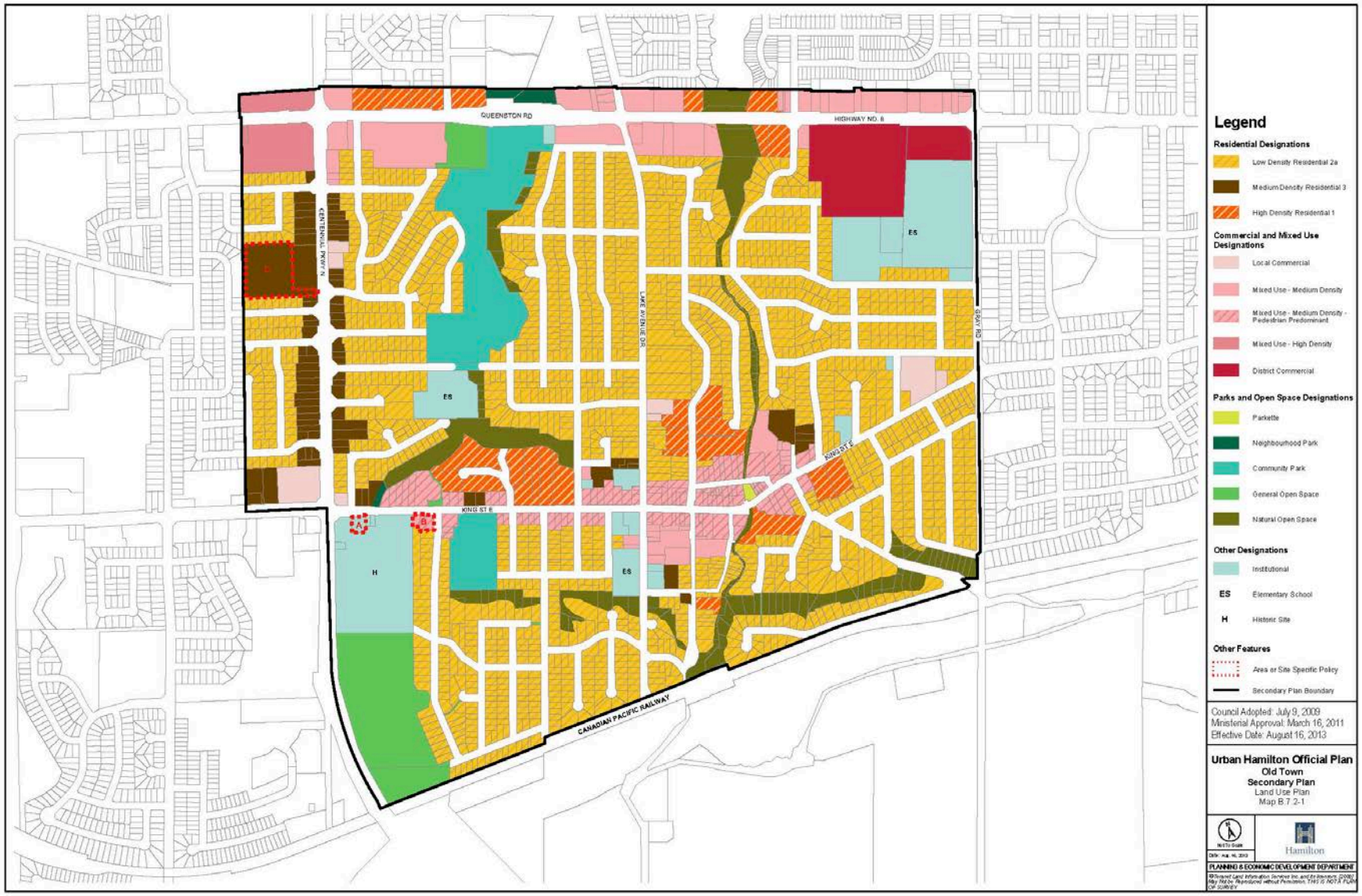


Figure 4.26 Old Town Secondary Plan

Table 4.13 identifies existing secondary plan designations within each secondary plan area residing within the 1.5 km Local Study Area.

Table 4.13 Stoney Creek Secondary Plans – Inventory of Existing Land Use Designations

Secondary Plan Designations	Nash Neighbourhood	West Mountain Area (Heritage Green)	Old Town
Residential Designations			
Low Density Residential 2	✓	×	×
Low Density Residential 2(a)	×	×	✓
Low Density Residential 2(b)	×	✓	×
Low Density Residential 3(c)	×	✓	×
Medium Density Residential 2	✓	×	×
Medium Density Residential 3	✓	✓	✓
High Density Residential 1	×	×	✓
Commercial and Mixed Use Designations			
Local Commercial	✓	✓	✓
Arterial Commercial	✓	✓	×
Mixed Use – Medium Density	×	✓	✓
Mixed Use – High Density	×	×	✓
Parks and Open Space Designations			
Neighbourhood Park	✓	✓	✓
Community Park	✓	✓	✓
City Wide Park	×	✓	×
Parkette	×	×	✓
General Open Space	✓	✓	✓
Natural Open Space	✓	✓	✓
Other Designations			
Institutional	✓	✓	×
Utility	✓	×	✓

Table 4.14 describes each secondary plan designation existing within the 1.5 km Local Study Area and identifies existing restrictions on land use within these secondary plan areas.

Table 4.14 Stoney Creek Secondary Plans – Designation Descriptions and Restrictions

Secondary Plan Designations	Description of Built Form/Permitted Uses	Restrictions on Land Use (Density/ GFA/ Prohibited Uses)
Residential Designations		
Low Density Residential 2	**(a)** Includes only single and semi-detached dwellings **(b)** Includes single, semi, and duplex dwellings **(c)** Includes street, block, and courtyard townhouses, as well as other innovative ground oriented attached housing forms **(d)** Includes single and semi-detached dwellings , row houses, and stacked and blocked townhouses, as well as innovative forms of attached housing **(e)** Includes single and semi-detached dwellings, duplex, link dwellings, cluster homes **(f)** Includes single and semi-detached dwellings, duplex, and triplex **(g)** Single detached, semi-detached and duplex dwellings, converted dwellings, shared accommodation, rooming and boarding houses and other similar forms of housing **(h)** Street and block townhouse dwellings, and other forms of multiple dwellings such as duplexes, triplexes and stacked townhouses.	20 – 40 units per hectare (uph)
Low Density Residential 2(a)	Includes only single and semi-detached dwellings	20 – 40 uph
Low Density Residential 2(b)	Includes single, semi, and duplex dwellings.	20 – 40 uph
Low Density Residential 3(c)	Low rise apartments, Row houses, Stacked & Block Townhouses & innovative forms of attached housing	40 – 60 uph
Medium Density Residential 2	**(a)** Low rise apartments **(b)** Stacked townhouses & low rise apartments **(c)** Apartments, townhouses, stacked townhouse dwellings and other forms of multiple attached dwellings as single form/mixed form.	60 – 75 uph
Medium Density Residential 3	Full range of housing forms – no singles or semis	75 – 100 uph
High Density Residential 1	All forms of townhouses, apartments, and other forms of multiple dwellings	100 – 200 uph

Secondary Plan Designations	Description of Built Form/Permitted Uses	Restrictions on Land Use (Density/ GFA/ Prohibited Uses)
Commercial and Mixed Use Designations		
Local Commercial	The following uses are permitted: **(a)** retail and service uses such as a craftsperson shop, day nursery, commercial school, financial establishment, medical office, business office, professional office, motor vehicle service station, personal service, place of worship, repair service, restaurant, studio, art gallery, tradesperson shop, and veterinary service; **(b)** medical offices or clinic, provided it has direct access to an arterial road and is adjacent to other local commercial uses; and, **(c)** residential uses, in accordance with Policy E.3.8.10 – Residential units located in the same building as local commercial uses, generally above the ground floor.	Maximum Gross Floor Area (GFA) – 500 square metres (sq. m.) Maximum GFA for grouped Local Commercial Uses – 1500 sq. m.
Arterial Commercial	Permitted uses include: **(a)** commercial uses including banquet halls, restaurants including garden centres, furniture stores, building and lumber supply establishment, home improvement supply store, and retail primarily for the sale of building supplies; **(b)** automotive related uses primarily for vehicle sales, service and rental, parts sales, gas bars, car washes, and service stations; **(c)** commercial recreational uses, commercial entertainment uses, excluding theatres; **(d)** industrial supply and service and contractor sales; **(e)** accommodation, excluding residential uses; **(f)** enclosed storage including mini warehousing; and, **(g)** *accessory* uses.	Prohibited uses include: **(a)** department stores; **(b)** food stores; **(c)** residential uses; and, **(d)** stores primarily selling apparel, housewares, electronics, sporting goods, or general merchandise.
Mixed Use – Medium Density	Permits a full range of retail, service commercial, entertainment, and residential accommodation at a moderate scale. Permitted uses include: **(a)** commercial uses such as retail stores, *auto* and *home centres*, *home improvement supply stores*, offices oriented to serving residents, personal services, financial establishments, live-work units, artist studios, restaurants, gas bars, and drive-through facilities; **(b)** Notwithstanding Policy E.4.6.5 a), drive-through facilities on *pedestrian predominant streets* shall only be permitted in accordance with Section E.4.6.29 and all other applicable policies of this Plan. **(c)** institutional uses such as hospitals, places of worship, and schools;	Maximum building heights of six stories. Prohibited uses include: **(a)** gas bars and car washes on *pedestrian predominant streets;* **(b)** vehicle dealerships; and,

Secondary Plan Designations	Description of Built Form/Permitted Uses	Restrictions on Land Use (Density/ GFA/ Prohibited Uses)
	(d) arts, cultural, entertainment, and recreational uses; **(e)** hotels; **(f)** *multiple dwellings*; and, **(g)** *accessory* uses.	**(c)** garden centres as a primary use.
Mixed Use – High Density	Permitted uses include: **(a)** commercial uses such as retail stores, *auto* and *home centres*, *home improvement supply stores*, offices, personal services, financial establishments, live work units, artist studios, restaurants, gas bars and drive-through facilities; **(b)** Notwithstanding Policy E.4.5.5 a), drive-through facilities on *pedestrian predominant streets* shall only be permitted in accordance with Section E.4.5.21 and all other applicable policies of this Plan. **(c)** institutional uses such as hospitals, places of worship, and schools; **(d)** arts, cultural, entertainment, and recreational uses; **(e)** hotels, conference and convention centres; **(f)** *multiple dwellings;* and, **(g)** *accessory* uses.	Prohibited uses include: **(a)** gas bars and car washes on *pedestrian predominant streets;* **(b)** vehicle dealerships; and, **(c)** garden centres as a primary use.
Parks and Open Space Designations		
Neighbourhood Park	Primarily cater to the recreational needs and interests of the residents living within its general vicinity. Residents can easily walk or bike to these parks. Neighbourhood Parks are generally comprised of municipal parkland, containing a mixture of passive areas, sports facilities, informal and formal play areas, and may include natural areas. They serve a population of approximately 5,000 people and have a minimum size of approximately 2 hectares.	Parkland Standards: 0.7 ha/1000 population 800 m service radius/walking distance.
Community Park	Serve more than one neighbourhood, but are not intended to serve the City as a whole. Community Parks have more intensive recreational facilities such as sports fields, and recreational and community centres. These facilities shall have good transportation access along adjacent arterial or collector roadways and provide adequate parking to meet anticipated demand. Community Parks in the urban area should appropriately be located along transit routes. They serve a population of approximately 20,000 people and have a minimum size of approximately 7 hectares city wide.	Parkland Standards: 0.7 ha/1000 population 2 km service radius/walking distance

Secondary Plan Designations	Description of Built Form/Permitted Uses	Restrictions on Land Use (Density/ GFA/ Prohibited Uses)
City Wide Park	Municipally, regionally, provincially or nationally significant destinations that meet the needs of residents and are of interest to visitors. These facilities are often associated with major recreation, education or leisure activities and may have natural, historic, or unique features. They range greatly in size and type.	Parkland Standards: 0.7 ha/1000 pop. N/A m service radius/ walking distance.
Parkette	Small open spaces which have no or limited recreational facilities. They are generally located in the older urban areas where they serve an important function in the provision of open space opportunities.	N/A
General Open Space	Includes: golf courses, urban farms, community gardens, pedestrian and bicycle trails, walkways, picnic areas, beaches, remnant parcels of open space lands, and urban plazas, squares and core spaces. These areas do not function as parks but are used for both active and passive recreational activities.	N/A
Natural Open Space	Include lands with significant natural features and landscapes such as woodlots, hazard lands, forested slopes, creek/ravine corridors, the Niagara Escarpment, environmentally sensitive areas (of natural and scientific interest), and areas of wildlife habitat. These areas perform important biological and ecological functions and provide passive recreational opportunities.	N/A
Other Designations		
Institutional	**(a)** educational facilities, except commercial schools; **(b)** religious facilities; **(c)** *cultural facilities*; **(d)** health care facilities; **(e)** long term care facilities; **(f)** day care facilities; **(g)** *accessory* uses; and, **(h)** *ancillary* uses, in accordance with Policy E.6.2.3.	Lands used for institutional purposes less than 4 hectares shall be permitted within the Neighbourhoods designation.
Utility	Permitted uses include: **(a)** major facilities, corridors, easements and rights–of-way for utilities and services, such as electric power, natural gas and oil pipelines, telecommunication, storm water management, solid waste management outside E*mployment* A*reas*, water and wastewater service; **(b)** municipal works yards outside E*mployment Areas;* **(c)** parking lots in conjunction with adjacent uses; **(d)** open space uses such as trails, urban farms and community gardens; **(e)** transportation yards; **(f)** heavy rail corridors and main lines; and, **(g)** *Waste management facilities.*	N/A

Rural Hamilton Official Plan (2012)

Lands to the east of Upper Centennial are designated under the Rural Hamilton Official Plan, as follows (City of Hamilton, 2012):

- Agricultural
- Specialty Crop
- Rural
- Open Space

Figure 4.27 is representative of the lands with these designations with respect to the Terrapure SCRF.

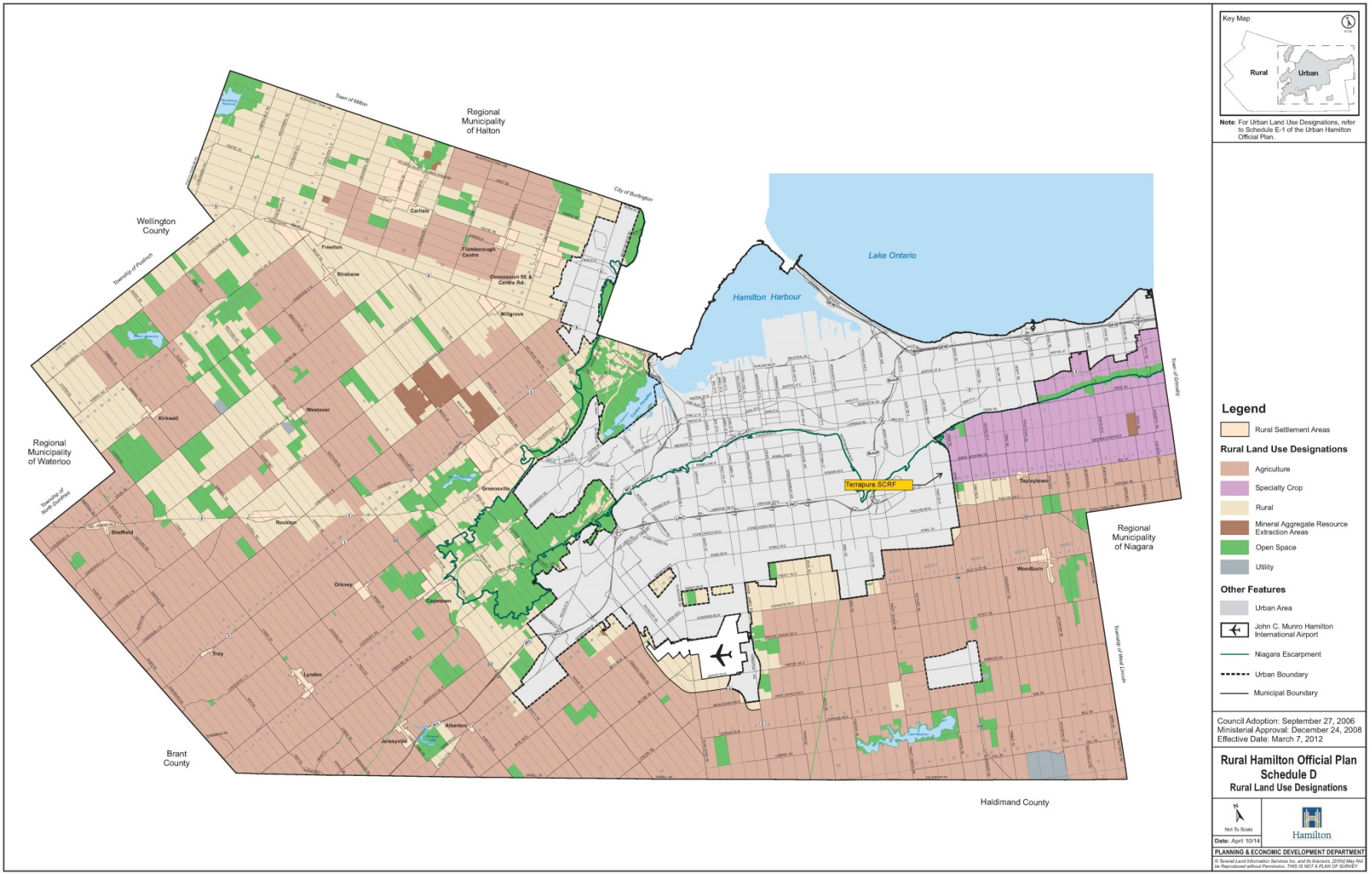


Figure 4.27 Rural Hamilton Official Plan Land Uses

City of Stoney Creek Zoning By-law No. 3692-92 & City of Hamilton Comprehensive Zoning By-law No. 05-200

Lands to the north within 500 m of the Site Study Area generally conform to the City of Stoney Creek Zoning By-law No. 3692-92. Lands to the northwest, west and east of the SCRF within 500 m of the Site Study Area generally conform to the City of Hamilton Zoning By-law No. 05-200. **Figure 4.28** shows the most current zoning information for the area within 500 m of the Site Study Area, as provided on the City of Hamilton website interactive zoning mapping tool.

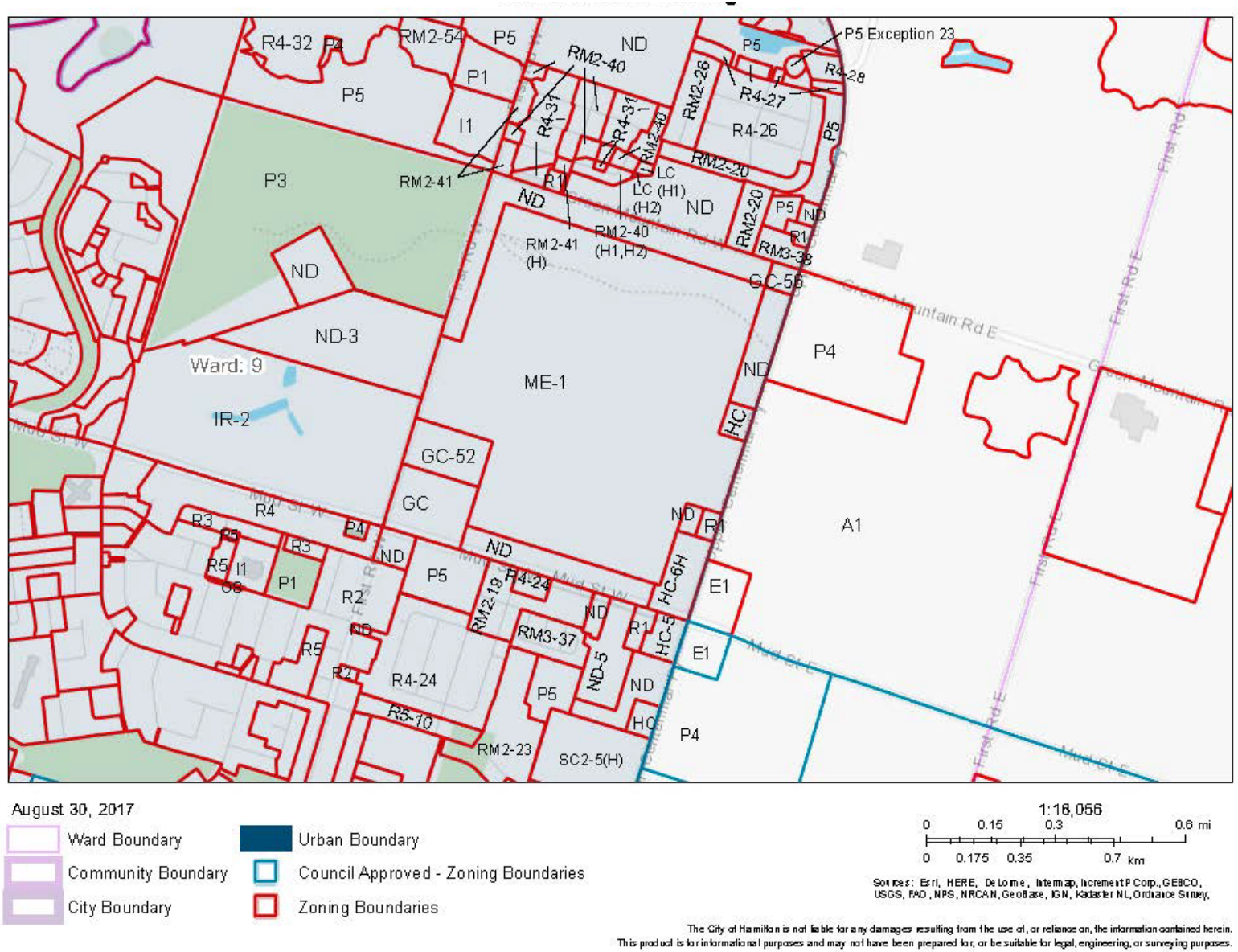


Figure 4.28 Zoning within 500 m of the Site Study Area – City of Hamilton Interactive Zoning Map

Figures 4.29 to **4.27** highlight applicable zoning in accordance with the City of Stoney Creek Zoning By-law No. 3692-92 & City of Hamilton Comprehensive Zoning By-law No. 05-200, with respect to the lands with the Local Study Area.

Figure 4.29 Hamilton Zoning Index Map 'H'

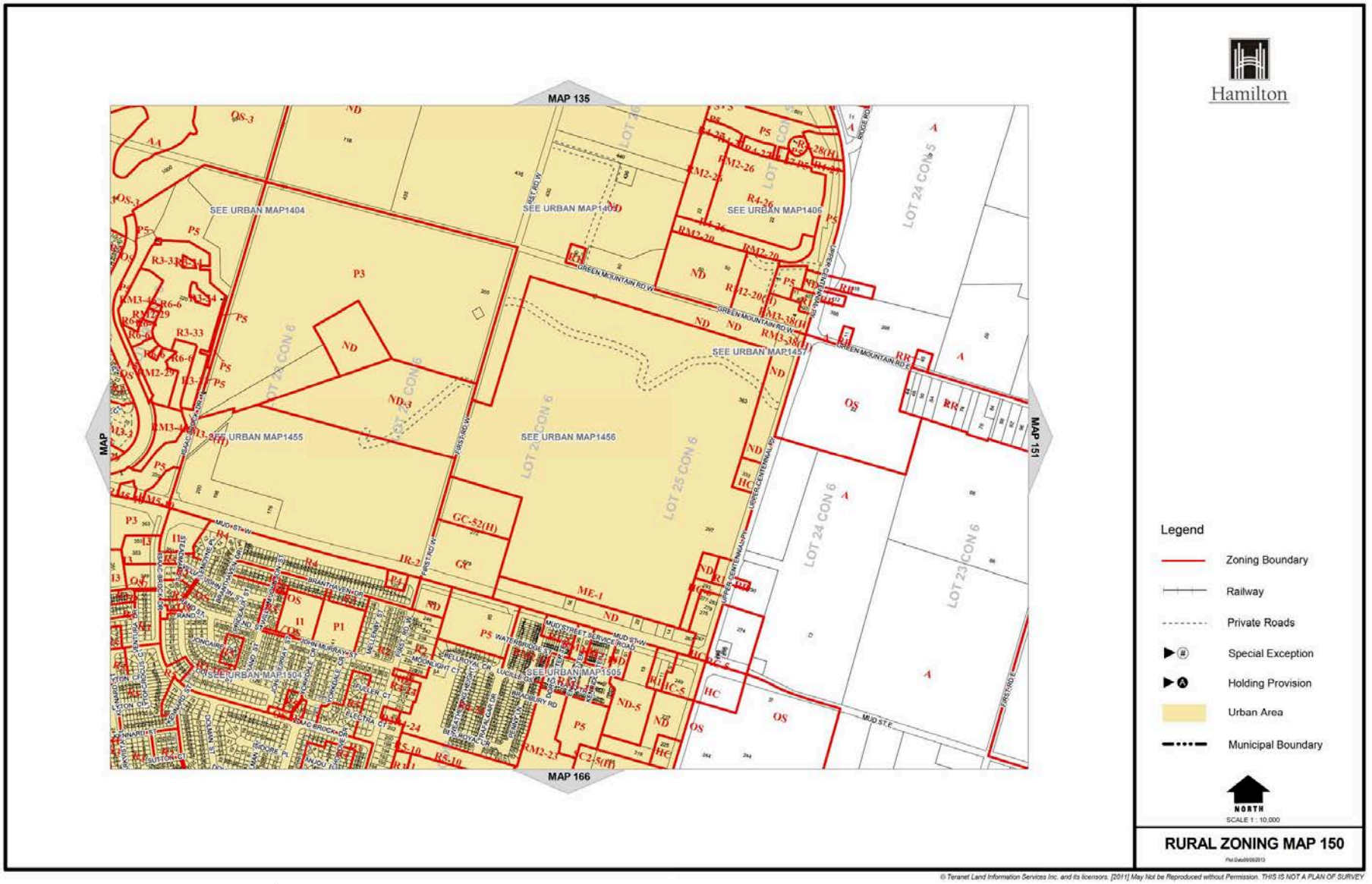


Figure 4.30 Rural Zoning Map 150

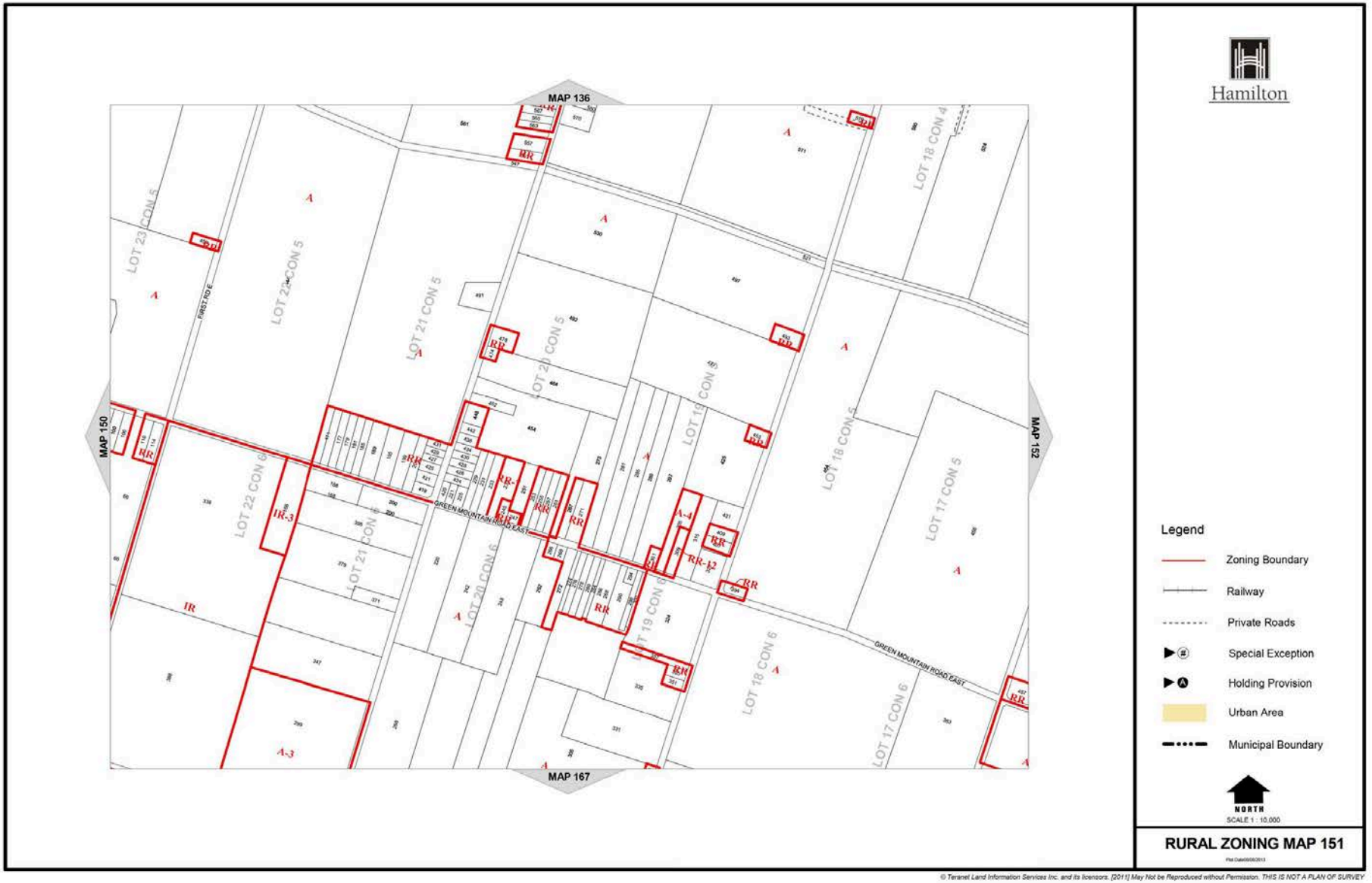


Figure 4.31 Rural Zoning Map 151

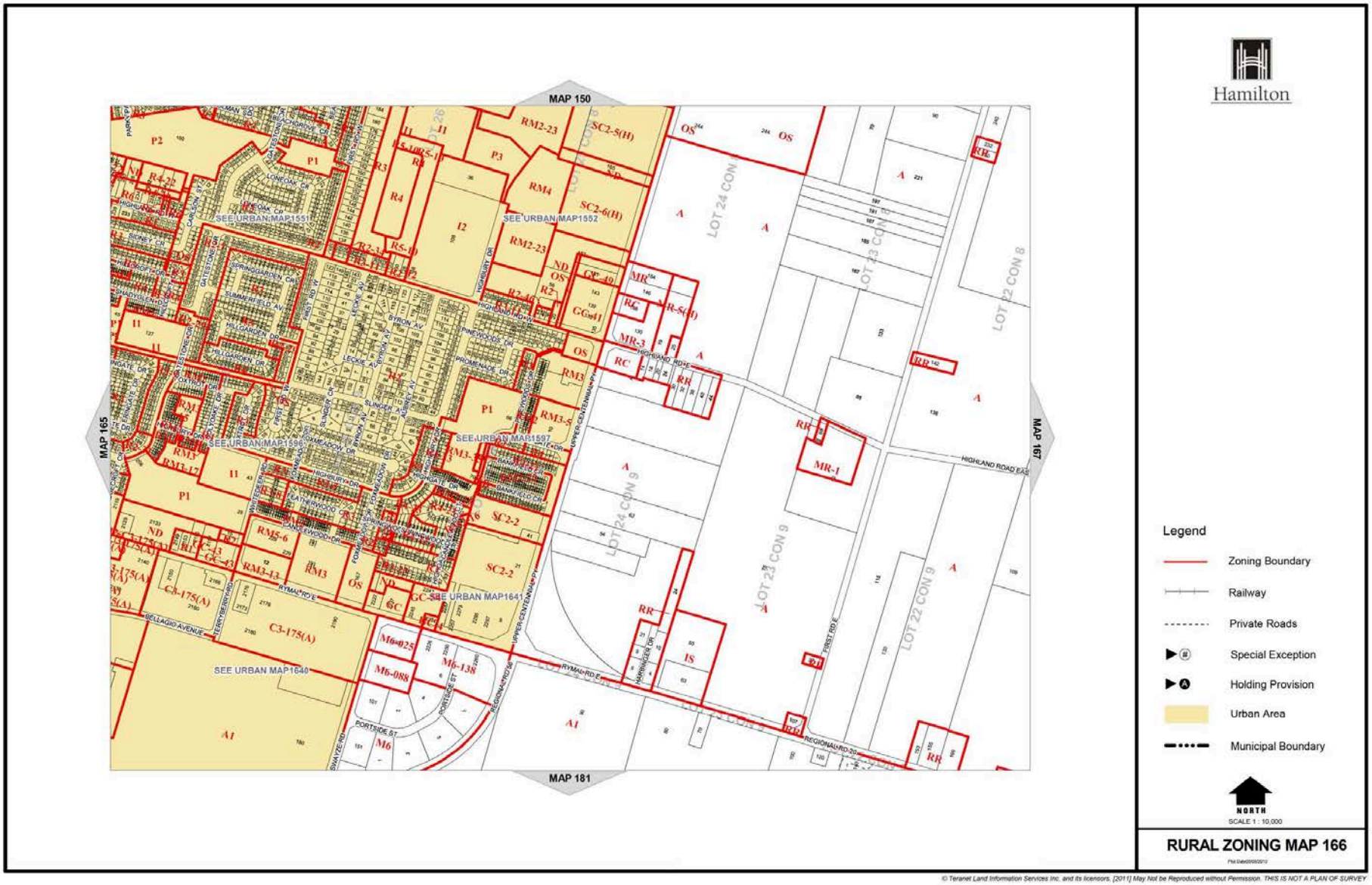


Figure 4.32 Rural Zoning Map 166

Table 4.15 identifies existing zoning designations. A full listing of the existing zoning designations and respective permissible uses within the Local Study Area, in accordance with both the City of Stoney Creek Zoning By-law No. 3692-92, and the City of Hamilton Comprehensive Zoning By-law No. 05-200, is provided in **Appendix E**.

Table 4.15 Local Study Area – Existing Zoning Designations

Zoning Designations	Zone Description
A	Agricultural
GC	General Commercial
GC-52, GC-56	General Commercial Special Exemptions
HC	Highway Commercial
HC-5, HC-6H	Highway Commercial Special Exemptions
IR2	Intensive Recreation
LC(H1)	Local Commercial (Hold) Special Exemptions – 420 First Road West
LC(H2)	Local Commercial (Hold) Special Exemptions – 420 First Road West
MR	Rural Industrial
ND	Neighbourhood Development
ND3	Neighbourhood Development Special Exemptions – West of First Road West, North of Mud Street West
ND-5	Neighbourhood Development Special Exemptions – West of Centennial Parkway, South of Mud Street West
OS	Open Space
OS3	Open Space Special Exemption – Niagara Escarpment Slope, Lots 1 to 33 (inclusive), Concessions 2 to 6 (inclusive)
R1	Single Residential
R2	Single Residential – Two
R3	Single Residential – Three
R4	Single Residential – Four
R4-24, R4-26, R4-27, R4-28, R4-31, R4-32	Single Residential – Four Special Exemptions
R5, R5-10	Residential – Five
R6	Residential – Six

Zoning Designations	Zone Description
RM2	Multiple Residential
RM2-19, RM2-20, RM2-23, RM2-26, RM2-40, RM2-40(H1, H2), RM2-41, RM2-41(H), RM2-54	Multiple Residential Special Exemptions
RM3	Multiple Residential
RM3-37, RM3-38	Multiple Residential Special Exemptions
RR	Rural Residential
SC2-5(H)	Community Shopping Centre Special Exception – 165 Upper Centennial Parkway
A1	Agriculture
E1	Existing Rural Commercial
I1	Neighbourhood Institutional
I2	Community Institutional
I3	Major Institutional
P1	Neighbourhood Park
P3	City Wide Zone
P4	Open Space
P5	Conservation/Hazard Lands
P5 Exception: 23	Conservation/Hazard Lands Special Exception

4.3.3 Social Environment

4.3.3.1 Traffic

From a traffic perspective, existing conditions are characterized through the consideration of intersections in the vicinity of the SCRF. The Study Area intersections that comprise the Local Study Area and that are to be reviewed in this existing conditions report include:

- Highway 20 at Green Mountain Road (signalized);
- Highway 20 at Highway 20 Site Access (entrance only);
- Highway 20 at Mud Street (signalized);
- Mud Street at First Road West (signalized);
- First Road West at First Road West Site Access (entrance and exit);
- Mud Street at Isaac Brock Drive (signalized); and
- Mud Street at Paramount Drive (signalized).

The future roundabout intersection of Green Mountain Road at First Road West will be analyzed under future conditions and will be included as part of the modeling that will take place for the alternative methods (footprint options) evaluation.

The Local Study Area intersections are identified in **Figure 4.33**.

Figure 4.33 Traffic Local Study Area

The following secondary sources of information were collected and reviewed to characterize existing traffic conditions within the Local Study Area:

- Amended Environmental Compliance Approval (ECA) No. A181008, dated May 16, 2016, as amended, Ministry of the Environment, Conservation and Parks
- 2010-2015 SCRF Truck Count Data
- 1997-2015 SCRF Tonnage Reports
- Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009
- Geometric Design Guide for Canadian Roads, Transportation Association of Canada, September 1999

Road Network

The following roads provide access to the SCRF site:

- **Highway 20 (Upper Centennial Parkway)** from Green Mountain Road to Mud Street is a north-south oriented four lane undivided arterial road with a posted speed limit of 70 km/h. It has a rural cross-section with gravels shoulders.
- **Green Mountain Road** from Highway 20 to First Road West is an east-west oriented two lane undivided local road with a posted speed limit of 60 km/h. The existing rural cross-section is currently being urbanized to include curb and gutters and sidewalk on the north side only.
- **Mud Street** from Highway 20 to Paramount Drive is an east-west oriented four lane divided arterial road with a posted speed limit of 70 km/h. It generally has a rural cross-section with gravel shoulders and a wide raised centre median with curb and gutter.
- **First Road West** from Mud Street to Green Mountain Road is a north-south oriented two lane undivided local road with a posted speed limit of 60 km/h. The existing rural cross-section is currently being urbanized to include curb and gutters and sidewalk on the west side only.
- **Isaac Brock Drive** intersects Mud Street and is a north-south oriented two-lane undivided collector road with a posted speed limit of 50 km/h north of Mud Street and 40 km/h south of Mud Street. It has an urban cross-section with curb and gutter.
- **Paramount Drive** intersects Mud Street and is a north-south oriented two-lane undivided collector road with a posted speed limit of 40 km/h north of Mud Street and 50 km/h south of Mud Street. It has an urban cross-section with curb and gutter. Paramount Drive curves to the south of Mud Street into an east-west orientation and transitions into Stone Church Road East which is an arterial road.

Traffic Volumes

Traffic data was collected at all Local Study Area intersections fronting the subject Site (intersections 1 to 5 as per **Figure 4.33**) on Tuesday May 24, 2016, and at the Isaac Brock Drive and Paramount Drive intersections on Mud Street (intersection 6 and 7 as per **Figure 4.33**) on Tuesday October 31, 2017, during a.m. and p.m. peak periods. The resulting a.m. and p.m. peak hour volumes are summarized in **Figure 4.34**. Detailed turning movement data sheets are provided in **Appendix E**.

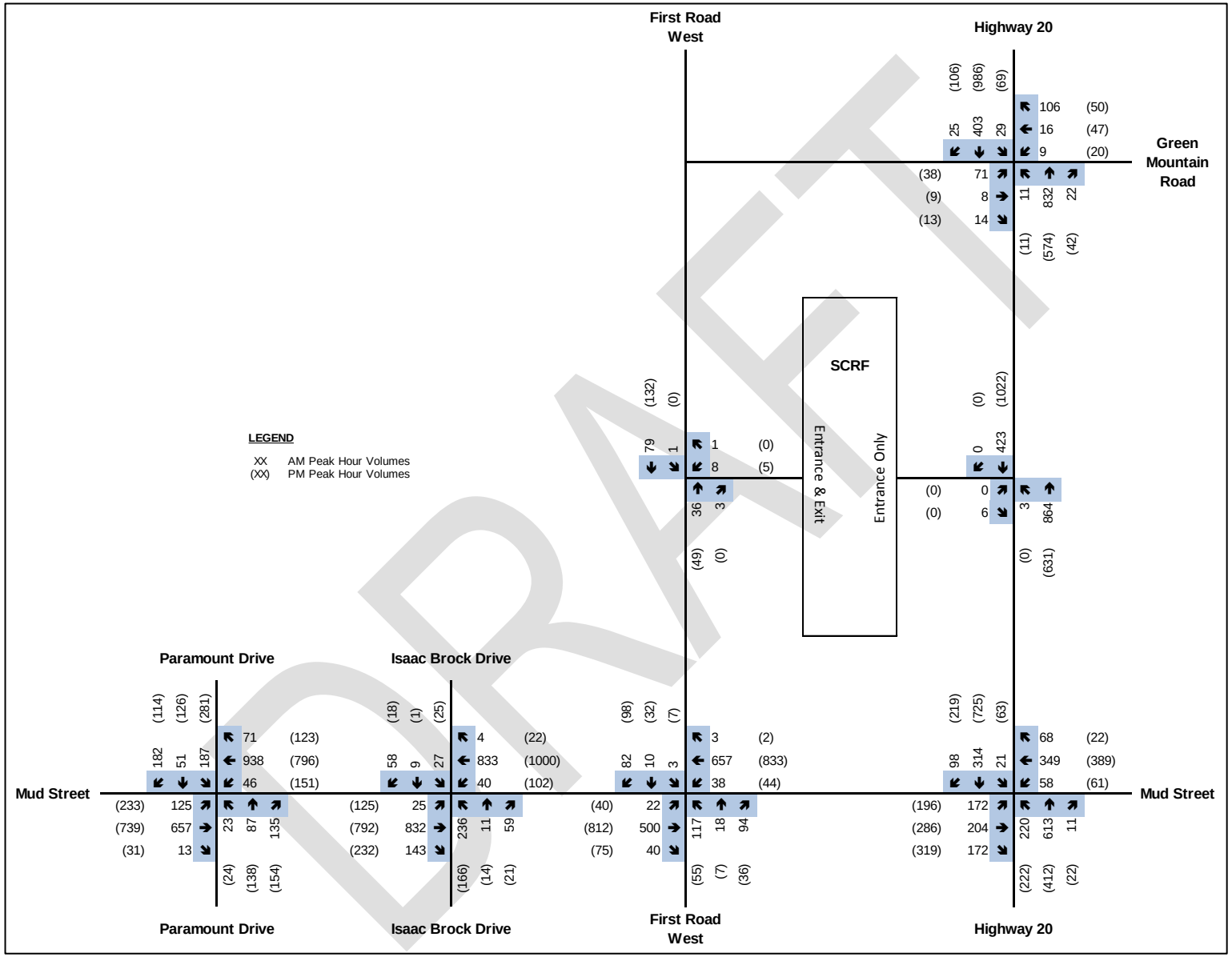


Figure 4.34 Existing Traffic Volumes

SCRF Vehicle Operations

Material is currently received at the Site between the hours of 7:00 a.m. and 5:00 p.m. on weekdays only. Inbound trips to the Site are typically from the north entering from Upper Centennial Parkway, while outbound trips from the Site are typically from the First Road West exit heading southbound.

The maximum annual tonnage of approved residual material received at the SCRF is restricted to 750,000 tonnes, with the maximum daily tonnage of approved residual material received at the Site not exceeding 8,000 tonnes. As per historical tonnage reports, the SCRF received an annual five-year average (2011-2015) of 704,652 tonnes. The highest recorded monthly five-year average of tonnage received was during July 2015, at 79,148 tonnes. Therefore, it can be assumed that an average of approximately 3,598 tonnes were received daily based on 22 July weekdays (excluding statutory holidays), which would represent peak daily operations.

The daily maximum number of vehicles depositing waste at the Site is restricted to 250 vehicles. As per five-year historical waste vehicle counts (2011-2015) at the SCRF, the Site received an average of 24,415 vehicles per year, or approximately 90-100 vehicles per day. It should be noted that one year within the five-year average was an anomaly, which increased the historical averages higher.

As per collected turning movement counts on Tuesday, May 24, 2016, at the Site's eastern access on Highway 20, during the a.m. peak traffic period (7:00 a.m. to 9:00 a.m.), 9 trucks were counted exiting the Site and travelling southbound, and 2 trucks were counted entering the Site from the south. During the p.m. peak traffic period (3:00 p.m. to 5:00 p.m.), 1 truck was counted entering the SCRF from the north. However, this truck traffic is not considered to be waste vehicles, as all waste vehicles are to exit the Site from First Road West.

As per collected turning movement counts on Tuesday, May 24, 2016, at the Site's western access on First Road West, during the a.m. peak traffic period, 6 trucks were counted exiting the Site and travelling southbound, and 1 truck was counted entering the Site from the south. During the p.m. peak traffic period, 8 trucks were counted exiting the SCRF and travelling southbound.

Based on the counts conducted on Tuesday, May 24, 2016, overall from 7:00 a.m. to 9:00 a.m., a total of 18 truck trips were generated, including 3 inbound trips and 15 outbound trips. From 3:00 p.m. to 5:00 p.m., a total of 9 truck trips were generated, including 1 inbound trip and 8 outbound trips. In comparing these peak period truck volumes with the above estimated vehicles per day (90-100 trucks per day), as per historical tonnage rates, it is evident that truck volumes at the Site accesses do not significantly "peak" with the peak operating periods of the surrounding Local Study Area intersections.

Intersection Capacity Analysis

As a measure of the capacity on the adjacent road network surrounding the SCRF at peak traffic periods, the Local Study Area intersections were analyzed using the peak operations turning movement volumes for the weekday a.m. and p.m. peak hours.

The capacity analysis identifies how well the intersections and driveways are operating. The analysis contained within this report utilized the Highway Capacity Manual (HCM) 2000 procedure within the Synchro Version 9 Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a

measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95th percentile queue for each turning movement.

In accordance with the City of Hamilton's Traffic Impact Study Guidelines, the analysis must highlight movements at signalized intersections where v/c ratios for through movements or shared through/turning movements will operate at 0.85 or greater, v/c ratios for exclusive movements will operate at 0.95 or greater, or queues for an individual movement are projected to exceed available turning lane storage. The analysis must also highlight movements at unsignalized intersections where LOS is "D" or greater, or queues for an individual movement are projected to exceed available turning lane storage.

A summary of the capacity analysis is contained below in **Table 4.16**, with detailed Synchro reports included in **Appendix E**.

Table 4.16 Existing Conditions Capacity Analysis

Intersection	Movement	v/c ratio (LOS) 95th Percentile Queue	
		A.M. Peak Hour	P.M. Peak Hour
Highway 20 at Green Mountain Road		Overall: 0.43 (A)	Overall: 0.41 (A)
	Eastbound Left-Through-Right	0.64 (D) 27m	0.45 (D) 18m
	Westbound Left	0.07 (C) <1 veh	0.16 (D) 9m
	Westbound Through-Right	0.16 (C) 16m	0.38 (D) 20m
	Northbound Left	0.02 (A) <1 veh	0.03 (A) <1 veh
	Northbound Through-Right	0.36 (A) 37m	0.23 (A) 18m
	Southbound Left	0.09 (A) <1 veh	0.13 (A) 10m
	Southbound Through	0.20 (A) 25m	0.40 (A) 55m
	Southbound Through-Right	0.02 (A) <1 veh	0.07 (A) <1 veh
Highway 20 at Access		Overall: 0.29 (A)	Overall: 0.32 (A)
	Eastbound Left-Right	0.00 (A) <1 veh	0.00 (A) <1 veh
	Northbound Left-Through	0.00 (A) <1 veh	0.00 (A) <1 veh
Highway 20 at Mud Street		Overall: 0.61 (C)	Overall: 0.74 (C)
	Eastbound Left	0.55 (C) 37m	0.67 (C) 44m
	Eastbound Through	0.46 (C) 51m	0.64 (C) 74m
	Eastbound Right	0.13 (C) 15m	0.22 (C) 20m
	Westbound Left	0.22 (C) 15m	0.27 (C) 16m
	Westbound Through-Right	0.67 (C) 51m	0.67 (D) 52m
	Northbound Left	0.75 (D) 59m	0.79 (D) 71m
	Northbound Through-Right	0.44 (B) 60m	0.33 (B) 42m
	Southbound Left	0.56 (E) 11m	0.53 (D) 24m
	Southbound Through	0.37 (C) 40m	0.71 (C) 86m
	Southbound Right	0.06 (B) 1 veh	0.21 (B) 24m
Mud Street at First Road West		Overall: 0.40 (B)	Overall: 0.39 (B)
	Eastbound Left	0.18 (B) 8m	0.30 (B) 10m
	Eastbound Through-Right	0.57 (C) 46m	0.67 (B) 60m
	Westbound Left	0.25 (B) 11m	0.34 (B) 11m
	Westbound Through-Right	0.68 (C) 57m	0.64 (B) 56m
	Northbound Left-Through-Right	0.26 (A) 27m	0.14 (B) 15m
	Southbound Left-Through-Right	0.07 (A) 1 veh	0.12 (A) 13m

Intersection	Movement	v/c ratio (LOS) 95th Percentile Queue	
		A.M. Peak Hour	P.M. Peak Hour
First Road West at Access		Overall: 0.15 (A)	Overall: 0.17 (A)
	Westbound Left-Right	0.01 (A) <1 veh	0.01 (A) <1 veh
	Southbound Left-Through	0.00 (A) <1 veh	0.00 (A) <1 veh
Isaac Brock Drive at Mud Street		Overall: 0.60 (B)	Overall: 0.53 (A)
	Eastbound Left	0.12 (A) <1 veh	0.53 (A) 28m
	Eastbound Through-Right	0.60 (A) 68m	0.50 (A) 53m
	Westbound Left	0.23 (A) 10m	0.43 (A) 20m
	Westbound Through-Right	0.54 (A) 58m	0.51 (A) 58m
	Northbound Left	0.60 (B) 48m	0.55 (C) 46m
	Northbound Through-Right	0.06 (B) 9m	0.05 (B) 9m
	Southbound Left	0.07 (B) 8m	0.09 (B) 10m
	Southbound Through-Right	0.06 (B) 8m	0.01 (B) 6m
Paramount Drive at Mud Street		Overall: 0.78 (C)	Overall: 0.83 (D)
	Eastbound Left	0.63 (D) 46m	0.78 (D) 89m
	Eastbound Through-Right	0.51 (B) 64m	0.65 (C) 106m
	Westbound Left	0.35 (D) 19m	0.64 (D) 56m
	Westbound Through-Right	0.84 (C) 124m	0.88 (D) 145m
	Northbound Left	0.13 (C) 10m	0.10 (D) 12m
	Northbound Through-Right	0.61 (C) 46m	0.78 (D) 91m
	Southbound Left	0.68 (C) 45m	0.78 (D) 79m
	Southbound Through-Right	0.22 (B) 22m	0.32 (C) 51m

Based on the results of the existing conditions capacity analysis, all intersections and individual movements are expected to be operating very well with ample reserve capacity, low levels of delay, and any queueing is expected to be accommodated within existing auxiliary turn lanes.

It is evident that existing truck traffic volumes servicing the Site are not having any negative identifiable operational impact on the Local Study Area intersections, including the Site accesses, and it is expected that the SCRF accesses could accommodate a substantial increase in truck traffic volumes without operational concerns. However, the proposed capacity expansion of the Site is not expected to impact average truck volumes, and therefore the Site will continue to operate satisfactorily, as per existing conditions.

Sightline Review

The Site access on First Road West provides the only exit point for all waste trucks, with the vast majority of vehicles destined to the south towards Mud Street in order to access either the Red Hill Valley Expressway to the west or Highway 20 to the east. This access is also used as an entrance/exit point for Site vehicles, deliveries, construction equipment, and other Site-related activities. As this access is the only designated egress point onto the surrounding road network, a sightline review was conducted in order to determine if existing sightlines meet industry sight distance requirements.

The Site access on Highway 20 is designated as entrance only, with the majority of waste trucks utilizing this access for Site entrance. Therefore no sightline review is required.

The First Road West access in its current location satisfies the sight distance requirements for trucks departing from the SCRF. First Road West has little deviation in the vertical and horizontal alignment of the roadway. The existing sight distance at this access greatly exceeds 200 m, which is the Transportation Association of Canada's (TAC) sight distance requirement for a posted speed limit of 60 km/h (70 km/h design speed).

4.3.3.2 Neighbourhood & Community Character

From a Socio-economic environment perspective both the Site Study Area and Local Study Area described in Section 4.2 are appropriate to establish existing conditions and to assess potential changes to the economic environment as a result of the proposed undertaking. Information on the Economic existing conditions within the Study Areas was gathered from a combination of secondary source research:

- City of Hamilton Ward Profiles – Ward 9 (2011)
- Stoney Creek Community Profile (2009)
- Statistics Canada – Niagara West – Glanbrook National Household Survey (NHS) Profile (2011)
- Statistics Canada Census Profile, 2016 Census, Hamilton, City (2016)
- Economic Impacts of the Stoney Creek Regional Facility
- Most recent aerial photos available of the Study Area

The existing SCRF Site is a 75.1 ha (185.5 acre) parcel of land at the northwest corner of Mud Street and Upper Centennial Parkway (Highway 20) in the community of upper Stoney Creek, squarely in the middle of The City of Hamilton's Ward 9, and within the Federal/Provincial electoral district of Niagara West-Glanbrook. The population of Ward 9 is reported to be 30,015 persons, which is approximately 5.6 percent of the total population of Hamilton (Statistics Canada, 2016). Population projections for Ward 9 show an increase of approximately 57 percent by 2031 (based on 2011 population data), coupled with a 44 percent increase in dwelling units from 10,165 in 2006, to 18,020 units in 2031 (City of Hamilton, 2011).

According to 2011 census data, the age group with the largest representation within Ward 9 is the 50 to 54 cohort, accounting for 8.3 percent of the population. In 2011, 51.2 percent of Ward 9 residents reported having some form of postsecondary certificate, diploma or degree, as compared to 50.9 percent of the total population of Hamilton (City of Hamilton, 2011). As of the 2011 census, the top three ethnicities within Ward 9 included English, Canadian, and Scottish (City of Hamilton, 2011). Twenty-two percent of Ward 9 residents identify as immigrants, of which 1.3 percent were considered recent immigrants in 2011 (City of Hamilton, 2011).

The nearest residential dwelling property boundary (currently under construction) is approximately 35 m north of the existing property boundary, approximately 55 m from site infrastructure (i.e., surface water ponds), near the intersection of Green Mountain Road West and First Road West. The nearest existing residential dwelling in relation to the southern SCRF property boundary is approximately 60 m south (from the SCRF property line to the nearest residential property line).

There are approximately 5,800 existing residential dwellings (built, under construction or approved) within the Local Study Area, with the largest concentrations to the south and southwest of the Site along Mud Street West. An additional subdivision is under construction to the north.

Visual

A combination of earth berms, vegetation, and fences are established around the perimeter of the Site to screen views of the SCRF from the surrounding built-up areas. These features will be maintained throughout the life of the SCRF operation, and will be left in place for as long as practical, until the final cover has been constructed or as directed in the closure plan. These features will also be upgraded periodically as required to accommodate changes in site operations or changes to the surrounding land uses.

Views of the existing SCRF from locations in and around the Local Study Area are provided in the photo log below, and the locations from which each of the photos were taken are shown on **Figure 4.35**.

As noted above, views of the SCRF from the surrounding built-up areas are generally obscured. Locations from which the SCRF operations are somewhat visible include: Heritage Green Community Sports Park; Heritage Green Passive Park; Heritage Green Community Trust Leash Free Dog Park; north along First Road West within approximately 500 m of the Site Study Area boundary, to the west of the SCRF; and along First Road East, near the eastern extreme of the Local Study Area. Views of the SCRF from the roads surrounding the SCRF site perimeter to the north (Green Mountain Road West), east (Upper Centennial Parkway), and south (Mud Street West) are primarily of the earth berms, vegetation, and fences.

Section 5.0 to this report consists of viewshed renderings related to the existing conditions as well as the proposed Alternative Methods (landfill footprints) considered in Terrapure's Approved Amended Terms of Reference for the Stoney Creek Regional Facility.

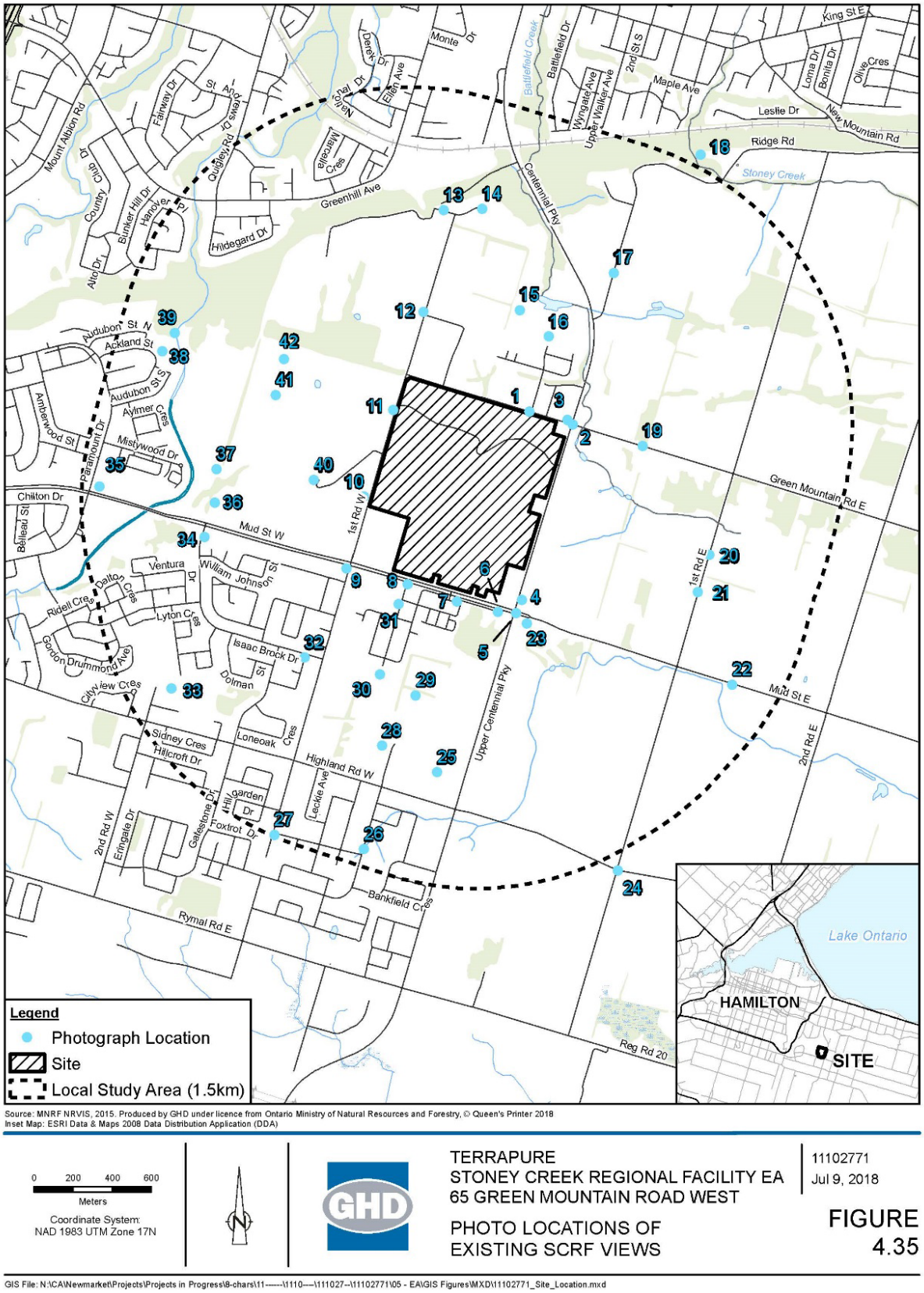


Figure 4.35 Local Study Area Photo Log Locations

Photo 1: Corner Morrisey Blvd. & Green Mountain Rd. W.

Photo 2: Green Mountain Rd. W., east of Morrisey Blvd.

Photo 3: Northeast corner Upper Centennial Pkwy. & Green Mountain Rd. W.

Photo 4: Upper Centennial Pkwy. & north of Mud St. W.

Photo 5: Southeast corner Upper Centennial Pkwy. & Mud St. W.

Photo 6: Southwest corner Upper Centennial Pkwy. & Mud St. W.

Photo 7: Corner Penny Ln.& Waterbridge St.

Photo 8: Southeast corner Mud St. W. & Trafalgar Dr.

Photo 9: Southwest corner Mud St. W.& First Rd. W. 	**Photo 10:** Heritage Green Community Trust Leash Free Dog Park Parking Lot 
Photo 11: Heritage Green Community Sports Park entrance 	**Photo 12:** First Rd. W. north of Green Mountain Rd. W. 
Photo 13: Northwest corner First Rd. W. & Glover Mountain Rd. 	**Photo 14:** Ridgeview Dr. east of First Rd. W. 

Photo 15: Crafters Cres. west of Sherway St.

Photo 16: Northwest corner Morrisey Blvd. & Aldgate Ave.

Photo 17: Ridge Rd north of Centennial Pkwy.

Photo 18: Devil's Punchbowl lookout

Photo 19: Green Mountain Rd. E. east of Upper Centennial Pkwy.

Photo 20: First Rd. E. south of Green Mountain Rd. E.

Photo 21: First Rd. E. north of Mud St. E.

Photo 22: Mud St. E. east of First Rd. E.

Photo 23: Mud St. E. east of Upper Centennial Pkwy.

Photo 24: Northeast corner Highland Rd. W. & First Rd. E.

Photo 25: Northwest corner of commercial plaza at northwest corner Upper Centennial Pkwy. & Mud St. W.

Photo 26: Highbury Dr. south of Slinger Ave.

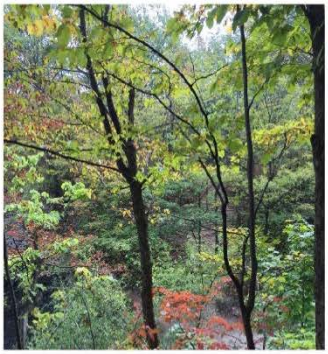
Photo 27: Southeast corner First Rd. W. & Slinger Ave.

Photo 28: North parking lot Salt Fleet High School

Photo 29: Unassumed road south of Salt Fleet High School

Photo 30: Southeast corner Trafalgar Dr. & unassumed road south of Bellroyal Cres.

Photo 31: Trafalgar Dr. south of Waterbridge St. 	**Photo 32:** Southeast corner Isaac Brock Dr. & Beachgrove Cres. 
Photo 33: Maplewood Park parking lot 	**Photo 34:** Southeast corner Isaac Brock Dr. & Mud St. W. (Family Church of Heritage Green) 
Photo 35: Northeast corner Mud St. W. & Paramount Dr. 	**Photo 36:** Echovalley Dr. north of Mud St. W. 

Photo 37: Echovalley Dr. north of Mud St. W. 	**Photo 38:** Felkers Falls parking lot 
Photo 39: Felkers Falls Conservation Area 	**Photo 40:** Heritage Green Passive Park 
Photo 41: Heritage Green Community Sports Park, south field 	**Photo 42:** Heritage Green Community Sports Park, northwest field 

Local Businesses, Institutions, Public Facilities and Community Services

As residential development with the Local Study Area is most highly concentrated in the south and southwest, so too are the majority of local businesses, institutions, public facilities and community services. There are also a number of local businesses to the southeast and east, as well as a few to the north.

Local Businesses (within 500 m)

- Empire Developments (22 Green Mountain Road West)
- Pro's Golf Centre (22 Green Mountain Road East)
- Starlite Drive-In (59 Green Mountain Road East)
- Green Mountain Gardens (398 Upper Centennial Parkway)
- Pioneer Gas Station (333 Upper Centennial Parkway)
- Esso Gas Station (249 Upper Centennial Parkway)
- Tim Hortons (On the Run) (249 Upper Centennial Parkway)
- Wendy's Restaurant (244 Upper Centennial Parkway)
- Tim Horton's (244 Upper Centennial Parkway)
- Queenston Tire & Rim (225 Upper Centennial Parkway)
- JD's Grooming (225 Upper Centennial Parkway)

Institutions

- Saltfleet High School (108 Highland Road West, approximately 700 m south of the SCRF)
- St. James the Apostle Catholic Elementary School (29 John Murray Street, approximately 500 m southwest of the SCRF)
- Mount Albion Public School (24 Kennard Street, approximately 1.2 km southwest of the SCRF)
- Heritage Green Child Care (360 Isaac Brock Drive, approximately 800 m southwest of the SCRF)
- Heritage Green Nursing Home (353 Isaac Brock Drive, approximately 1.1 km southwest of the SCRF)
- St. Paul Catholic Elementary School (24 Amberwood Street, approximately 1.5 km west of the SCRF)
- Billy Green Elementary School (1105 Paramount Drive North, approximately 1.5 km west of the SCRF)
- Gatestone Elementary School (127 Gatestone Drive, approximately 1.5 km south of the SCRF)

Public Facilities

- Hamilton Fire Station 17 (415 Arvin Avenue, approximately 1 km southwest of the SCRF)
- Family Church of Heritage Green (360 Isaac Brock Drive, approximately 800 m southwest of the SCRF)
- Heritage Green Seventh Day Adventist Church (360 Isaac Brock Drive, approximately 900 m southwest of the SCRF)

- Salvation Army Winterberry Heights Church (300 Winterberry Drive, approximately 1.2 km west of the SCRF)
- Paramount Drive Alliance Church (1035 Paramount Drive, approximately 1.4 km west of the SCRF)

Community Services

- Valley Park Recreation Centre and Arena (970 Paramount Drive, approximately 1.5 km southwest of the SCRF)
- Heritage Green Seniors Centre (351 Isaac Brock Drive, approximately 1.1 km southwest of the SCRF)

Recreation

There are a number of recreational facilities that support the surrounding residential developments in the vicinity of the SCRF. The following parks and recreational facilities are located within 500 m of the SCRF:

- Heritage Green Passive Park & Heritage Green Community Trust Leash Free Dog Park
- Heritage Green Community Sports Park
- Pro's Golf Centre
- Starlite Drive-In

Within the wider Local Study Area the parks and recreational facilities include:

- Maplewood Green Park
- Maplewood Park
- Felker Park
- Dofasco Park
- Felker's Falls Conservation Area

Agricultural Operations

Through a review of secondary sources and conducting a windshield survey of the agricultural zoned parcels within 500 m of the Site (as depicted in **Figure 4.29** and enhanced with a photo log from February 28, 2018), and previous field investigations of the Local Study Area, it is evident that these properties are used for crop production. Based on visual inspection of the properties conducted from the existing municipal right-of-way, without permission of access and seasonal restrictions, it is difficult to determine the exact species of flora at these locations. However, there is evidence of soy bean production, a typical cash crop of Southern Ontario, as well as the presence of a fruit or nut tree orchard.

A total of 41 additional properties within the Local Study Area are zoned for agricultural use, as in accordance with City of Hamilton Zoning By-law No. 05-200, and City of Stoney Creek Zoning By-law No. 3692-92.

4.3.3.3 Human Health

As part of the Approved ToR, Terrapure committed to reviewing Human Health as part of the environmental assessment process. On an annual basis, Terrapure completes a Community Health

Assessment Review as part of the ongoing operation of the SCRF (as required under the current approvals). The existing data and methodology established as part of the Community Health Assessment for the past 20 years, will be used during the alternative methods and impact assessment stage of the EA to analyze the potential effects to human health. The analysis relies on the Community Health Assessment Review reports along with the existing conditions reports for Air Quality, Geology/Hydrogeology and Surface Water. Further details on Human Health Assessment has been included in Section 5.0 and Section 6.0 of this EA Report.

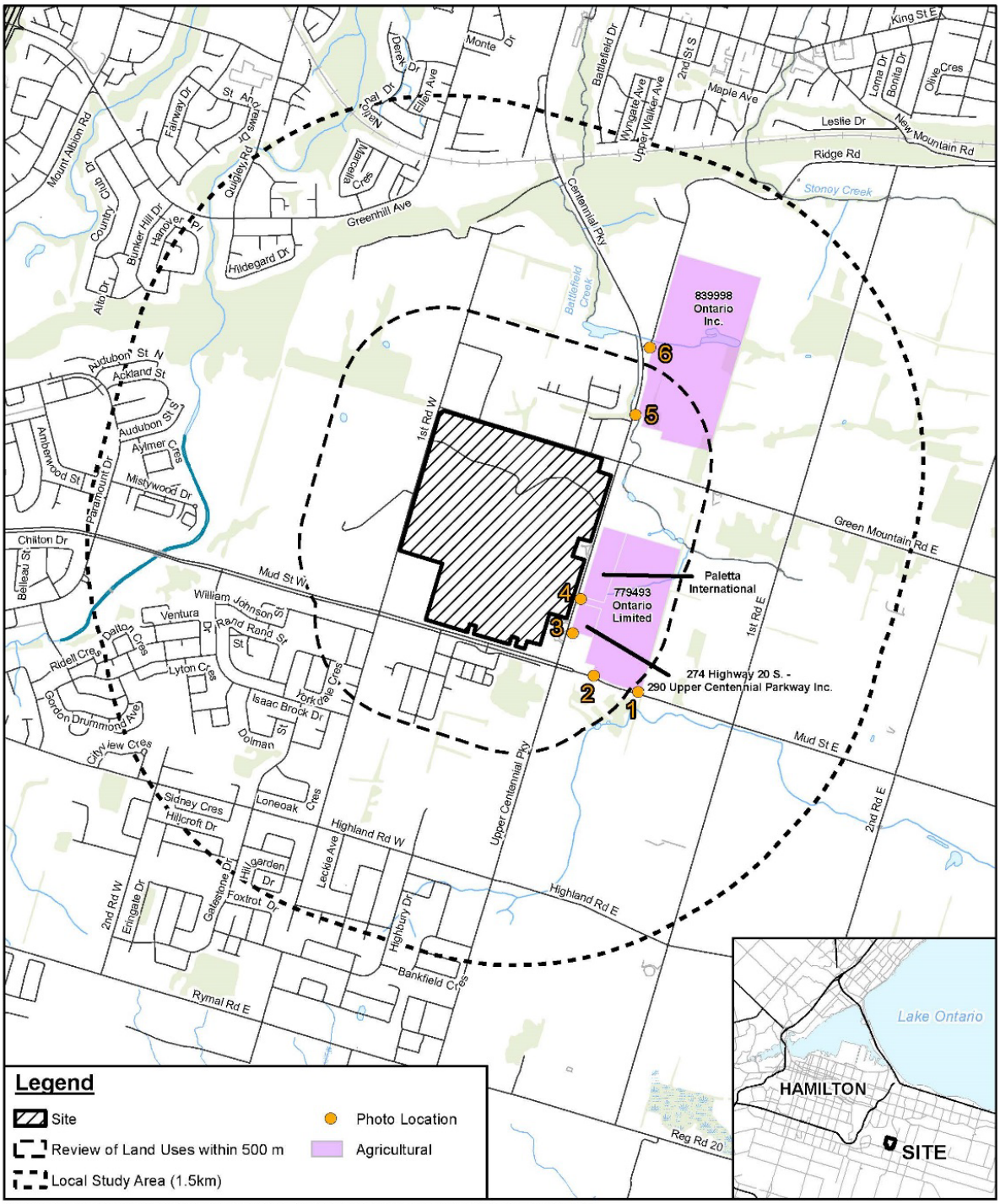


Figure 4.36 Agricultural Photo Locations

Photo 1: Property owned by 779493 Ontario Limited, facing north

Agricultural field –farmed for wheat or corn. Some marshy areas close to corner of Mud and Upper Centennial

Photo 2: Property owned by 779493 Ontario Limited, facing northeast

Agricultural field –farmed for wheat or corn. Some marshy areas close to corner of Mud and Upper Centennial

Photo 3: 290 Upper Centennial Parkway Inc., facing northeast

Agricultural field located east of Site on Upper Centennial - Mix of agricultural land and natural marshy land

Photo 4: Property owned by Paletta International, facing northeast

Agricultural field located east of the Site on Upper Centennial - potentially farmed for corn or soybeans or wheat

Photo 5: Property owned by 839998 Ontario Inc., facing northeast

Agricultural property located northeast of the Site with some cleared fields

Photo 6: Property owned by 839998 Ontario Inc., facing east

Appears to be a fruit or nut tree orchard in several locations on the property. It is unclear what type of trees they are and if they are currently being farmed.

4.3.4 Economic Environment

4.3.4.1 Local Employment, Labour Supply and Economic Base

In 2011, the total labour force aged 15 years and over within Ward 9 was 14,580 (City of Hamilton, 2011). The largest portion of the Ward 9 labour force (22.4 percent) was employed in the "sales and service" field in 2011, followed by "business, finance, and administration" (17.5 percent), and "trades, transport, agriculture, and related production" (16.7 percent) (City of Hamilton, 2011).

The unemployment rate within Ward 9 was 7.3 percent (as compared to 8.7 percent for Hamilton) in 2011 (City of Hamilton, 2011).

The SCRF directly employs approximately 13 people on a full-time basis.

An economic impact assessment was completed by RIAS Inc. in early-2016 regarding reconfiguration and vertical expansion of the SCRF and the potential output to the local economy. Based on the historical fill rate of 559,000 tonnes per year, the study determined the SCRF site generates $28.7 million in economic activity in the Hamilton area per year, adding $17.9 million in GDP, 51 jobs, and almost $2.6 million in wages for local workers (RIAS Inc., 2017). The SCRF's remaining lifespan, based on its current configuration, will generate between $94 million and $104 million in total economic activity in the Hamilton area, between $59 million and $65 million in GDP, and 164 to 190 jobs for local workers, earning a total of $8.4 million to $9.6 million in wages (RIAS Inc., 2017). The existing SCRF generates $2.2 million per year in local taxes, royalties and fees paid by Terrapure (RIAS Inc., 2017).

As a result of a potential capacity expansion of 3.68 million m^3 of residual material, using the reconfiguration and vertical expansion option, total economic activity in the Hamilton area generated by the SCRF is expected to range from $349 million to $372 million, with GDP from $218 million to $232 million, and an estimated total jobs to be between 662 and 671 (RIAS Inc., 2017).

Existing Compensation Agreements – Heritage Green Community Trust & City of Hamilton

It is important to note that $1 per tonne of residual material accepted at the SCRF is provided to the Heritage Green Community Trust and to the City of Hamilton (each) – this does not continue with the current future requirement for receiving industrial fill. If Terrapure were to proceed with the option to add disposal capacity at the SCRF, the financial contributions to both the Heritage Green Community Trust and the City of Hamilton would continue[4].

4.3.5 Cultural Environment

4.3.5.1 Archaeology and Built Heritage

For the Cultural Environment, the Local Study Area is applicable based on the previous analysis completed for the Site Study area during the original EA in 1996. Available secondary sources of information were collected and reviewed to determine Archaeological and Built Heritage existing conditions within the Local Study Area. The following sources of secondary information were collected and reviewed:

- City of Hamilton's Heritage Resource Mapping

[4] GHD 2017. Supporting Document #1: Terrapure Stoney Creek Regional Facility – Business Case Analysis.

Archaeological Resources

The entire SCRF has been subjected to recent, extensive and intensive disturbance and it is therefore considered that the Site Study Area does not have any archaeological potential. While there may be areas within the Local Study Area that have archaeological potential, as these areas will not be disturbed by the proposed expansion options, it was concluded that an assessment of the archaeological potential within the Local Study Area was not necessary. The completed "Criteria for Evaluating Archaeological Potential: A Checklist for the Non-Specialist" provided in **Appendix E** confirms that the Site does not possess archaeological potential.

Cultural & Heritage Resources

Following a review of the City of Hamilton's Heritage Resource Mapping it was concluded that there are no heritage properties located within the Local Study Area. The completed "Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes: A Checklist for the Non-Specialist" contained in **Appendix E** identifies the Site as having no potential for cultural heritage resources.

4.3.6 Design and Operations

Site Capacity and Fill Rate

The SCRF has a total approved site capacity of 8,320,000 m^3 (6,320,000 m^3 for solid, non-hazardous residual material and approximately 2,000,000 m^3 for industrial fill), with an approved maximum annual volume of 750,000 tonnes of residual material. No changes are being proposed to the maximum approved fill rate of up to 750,000 tonnes per year.

Footprint Size

As shown in **Figure 4.37**, the current approved footprint for the residual material is 41.5 ha, while the industrial fill material covers a footprint of approximately 17.6 ha. The maximum allowable footprint for the Site is limited by the size of the property currently owned by Terrapure. The property currently covers a total area of 75.1 ha, and is bounded by Green Mountain Road West in the north, Upper Centennial Parkway in the east, Mud Street in the south, and First Road West in the west. There are a few properties around the periphery of the Site that are privately owned and are not being considered for expansion of the SCRF footprint. Additional requirements surrounding buffers and setbacks from these properties are discussed further below.

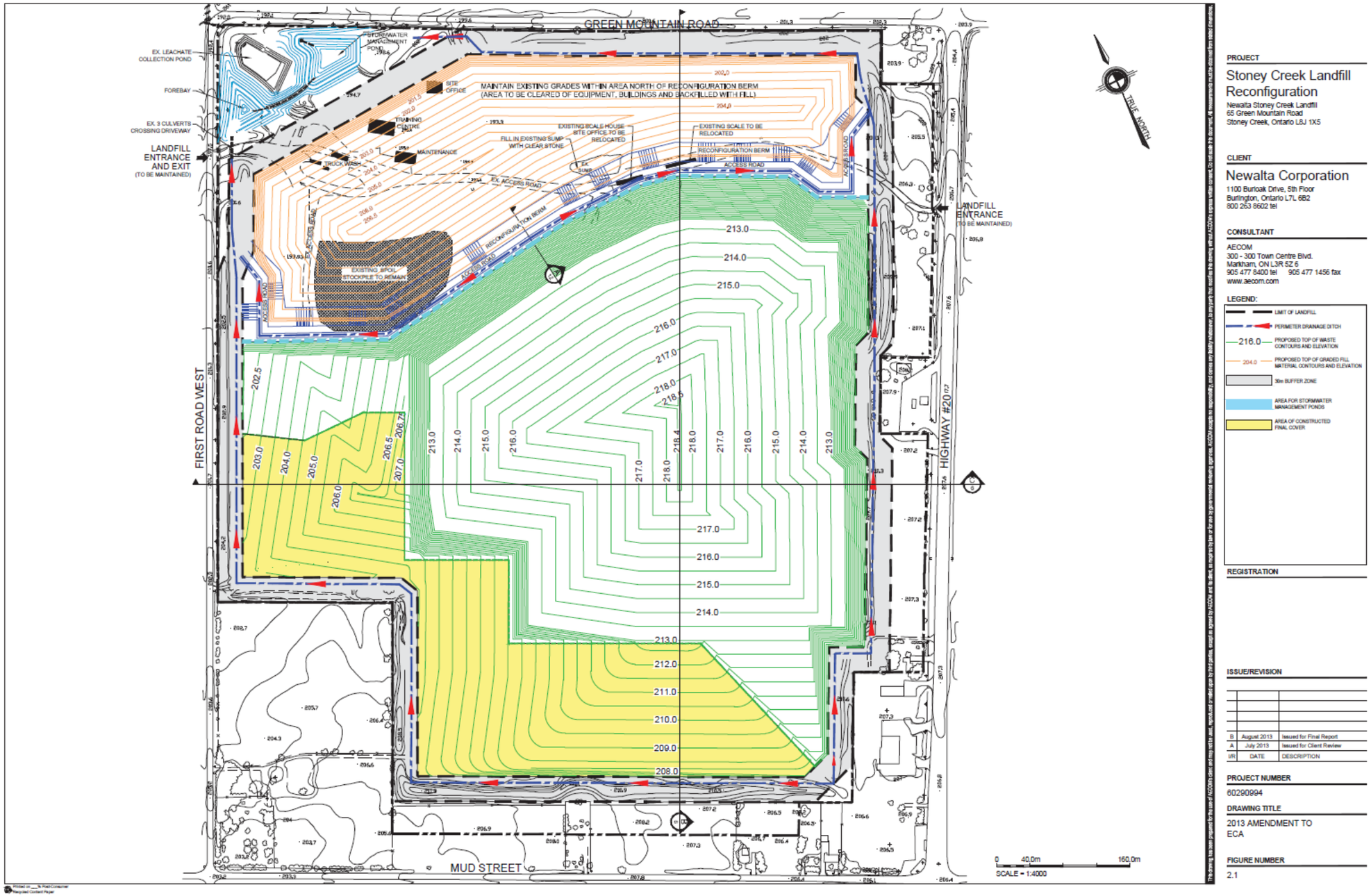


Figure 4.37 Approved Landfill Footprint

Final Contours and Slopes

The regulatory requirements specify a maximum slope of four units horizontal to one unit vertical (4H to 1V, or 25%) and a minimum slope of 20H to 1V (5%), but allow variance where it can be shown to be appropriate with respect to slope stability, erosion potential, end uses, and infiltration requirements for groundwater protection. Slopes of a minimum 33.3H to 1V (3%) are currently approved at the SCRF.

Peak Elevation and Height

The peak elevation of the SCRF refers to the highest point of the Site measured in metres above mean sea level (mAMSL), while the height of the SCRF is measured relative to the surrounding landscape. There are no regulatory requirements specifically constraining peak elevations or landfill height. However, the peak elevation is limited by the geometry of the Site and the maximum height is indirectly governed by regulatory requirements to ensure that adequate foundation conditions exist and that slopes are stable. There screening measures have been implemented as required based on the development of the Site and surrounding area.

Buffer Areas

Regulatory requirements specify a minimum buffer width of 100 metres (m) between the limit of the residual footprint and the Site boundary, but allow this to be reduced to 30 m if it is shown to be appropriate based on a site specific assessment (e.g., if the buffer provides adequate space for vehicle movements, ancillary facilities, and ensures that potential effects from the Site operations do not have unacceptable impacts outside of the Site).

As shown in **Figure 4.37**, minimum buffer areas of 30 m are currently approved around the perimeter of the residual material area. These buffers extend to approximately 65 m in various areas along the east and south side of the Site, and up to approximately 130 m in the vicinity of the existing stormwater management facility in the northwest corner of the Site.

Setbacks to Surrounding Developments

In addition to the on-Site buffers noted above that will be maintained in relation to the SCRF, additional buffer separation is achieved through road allowances and setbacks for other developments required in accordance with local planning by-laws.

The closest residential dwellings to the south of the Site is situated approximately 60 m from the property line, while the closest residential dwelling (currently under construction) to the property line in the north is situated approximately 35 m away. The closest existing residential dwelling to the east is situated approximately 150 m from the property line, while the closest residential dwellings in the west are situated approximately 795 m from the property line.

Infrastructure Requirements

The SCRF requires various infrastructure components in order to operate the Site, including:

- Site entrance and exit
- Scale facility
- Administrative facility

- Maintenance facility
- Groundwater management system
- Leachate management system
- Stormwater management system

The existing Site entrance is from Upper Centennial Parkway and the existing Site exit on to First Road West.

Groundwater Management

Groundwater is currently collected through a network of trenches and piping excavated within the bedrock below the base liner system. Groundwater drains by gravity to a pumping station in the southeast corner of the Site, where it is subsequently recovered for use in Site operations (i.e., dust control) or discharged to the sanitary sewer.

Leachate Management

Leachate is currently collected through a network of perforated pipes on top of the base liner system, under the residual material area, where it drains by gravity to a leachate pumping station in the southeast of the Site. Leachate is then pumped to the surface where it is discharged to a gravity main that flows to the equalization pond within the adjacent closed west Site before being discharged to the sanitary sewer under Mistywood Drive. However, Terrapure has started discussions with relevant stakeholders in order to establish a new connection to the sanitary trunk sewer currently under construction under Upper Centennial Parkway. Should a new discharge connection be established, it may allow the existing gravity main and equalization pond to be decommissioned.

Stormwater Management

O. Reg. 232/98 requires that landfill sites be designed to protect surface water to specified performance standards based on the following principles:

- Divert or control clean surface water flowing onto the Site.
- Control quality and quantity of runoff discharging from the Site to control erosion, sediment transport, and flooding.

Under the current design, clean runoff is shed from the final cover into perimeter drainage ditches, where it drains by gravity to a series of ponds (i.e., sediment forebay and detention pond) in the northwest corner of the Site before being discharged to the storm sewer under First Road West.

Gas Management

Because the Site does not accept waste capable of decomposing and generating gases, it has received a MECP exemption[5] from the requirement to have a gas collection system, (as stated in O. Reg. 232/98), based on supporting documentation, including a gas emission study and annual confirmatory monitoring.

[5] Confirmed by MECP in 2011 when the then owners of the site (Newalta) successfully applied for an exemption from a landfill gas collection requirement. Annual reports submitted by Terrapure identify the site as exempt from landfill gas collection requirements under O. Reg. 232/98.

Under the current ECA for the SCRF, Terrapure is required to monitor for landfill gas and provide the results in the Annual Monitoring Report submitted to the MECP by June 30th every calendar year. A Landfill Gas Assessment was conducted in 2011, demonstrating that very little gas is generated at the SCRF.

Operations

O. Reg. 232/98 requires that landfills be designed and operated to ensure that nuisance impacts are minimized, and the regulation requires that the proponent prepare a report describing all aspects of the operation as well as maintenance procedures that will be followed.

A key objective of Site operations is to minimize nuisance impacts including noise, litter, vectors, dust, and odour. Typical operating practices relating to these issues include:

- Vehicles transporting waste to and around the Site are covered to prevent odour and dust
- All materials received at the Site are verified and recorded to ensure compliance with regulatory conditions
- On-Site equipment is operated in such a manner as to minimize noise and visual impacts wherever possible
- All equipment required for the development, operation, or closure of the Site should comply with the noise levels outlined in applicable MECP guidelines and technical standards
- All vehicles leaving the Site must drive through a wheel-wash to minimize track-out of mud/dirt
- The Site design includes screening features, such as fences, berms and tree plantings, which mitigate visual impact and noise complaints

Table of Contents

Figure Index

Table Index

5. Alternative Methods of Carrying out the Undertaking

5.1 Alternative Methods for Expansion

A series of criteria and assumptions were established to guide the development of the Alternative Methods for the SCRF. These include Terrapure's projected waste disposal capacity requirements, and regulatory requirements relating to SCRF design geometry. In addition, O. Reg. 232/98 and the accompanying Landfilling Standards Guideline specify requirements and/or provide recommendations for key Site design parameters. Assumptions were also made relating to operational traffic levels, leachate generation rates, and aspects of Site design and operations. The criteria and assumptions used in the development of the Alternative Methods are discussed in the sections that follow. The conceptual designs of the Alternative Methods were developed to a conceptual level of detail and will be further developed during the technical design stage for the Preferred Alternative Method. The conceptual designs are based on the following characteristics:

- Site capacity and fill rate
- Footprint size
- Final contours and slopes
- Peak elevation and height relative to surrounding landscape
- Buffer areas between the SCRF footprint and the property boundary
- Setbacks to surrounding developments
- Infrastructure requirements
- Leachate management
- Stormwater management
- Gas management
- Traffic
- Operations

Furthermore, the Alternative Methods were prepared in consideration of the requirements outlined in the following documents:

- Approved Amended Terms of Reference, SCRF EA, GHD, November 2017
- O. Reg. 101/07 – Waste Management Projects, under the *EA Act*
- O. Reg. 232/98 – Landfilling Sites, under the *Environmental Protection Act* (Last amendment: O. Reg. 268/11, October 31, 2011)
- Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites, Ontario Ministry of the Environment (Last revision: January, 2012)
- ECA No. A110302 for Waste

These parameters and criteria are discussed in more detail in the following sections. The full Conceptual Design Report (CDR) has been included in **Appendix F** for reference.

5.1.1 Conceptual Design Basis

Site Capacity and Fill Rate

Currently, the SCRF has a total approved site capacity of 8,320,000 m^3 (6,320,000 m^3 for solid, non-hazardous residual material and approximately 2,000,000 m^3 for industrial fill), with an approved maximum annual volume of 750,000 tonnes of residual material. The expansion proposed under this EA is to increase the total approved capacity for post-diversion solid, non-hazardous industrial residual material at the SCRF by 3,680,000 m^3. No changes are being proposed to the maximum approved fill rate of up to 750,000 tonnes per year.

Footprint Size

As shown in **Figure 5.1**, the current approved footprint for the residual material is 41.5 ha, while the industrial fill material covers a footprint of approximately 17.6 ha. The maximum allowable footprint for the Site is limited by the size of the property currently owned by Terrapure. The property currently covers a total area of 75.1 ha, and is bounded by Green Mountain Road West in the north, Upper Centennial Parkway in the east, Mud Street in the south, and First Road West in the west. There are a few properties around the periphery of the Site that are privately owned and are not being considered for expansion of the SCRF footprint. Additional requirements surrounding buffers and setbacks from these properties are discussed further below.

Final Contours and Slopes

The regulatory requirements specify a maximum slope of four units horizontal to one unit vertical (4H to 1V, or 25%) and a minimum slope of 20H to 1V (5%), but allow variance where it can be shown to be appropriate with respect to slope stability, erosion potential, end uses, and infiltration requirements for groundwater protection. Slopes of a minimum 33.3H to 1V (3%) are currently approved at the SCRF. Final contours for the Alternative Methods were developed based on these slope requirements and in consideration of other aspects such as footprint configuration and stormwater management.

Peak Elevation and Height

The peak elevation of the SCRF refers to the highest point of the Site measured in metres above mean sea level (mAMSL), while the height of the SCRF is measured relative to the surrounding landscape. There are no regulatory requirements specifically constraining peak elevations or landfill height. However, the peak elevation is limited by the geometry of the Site and the maximum height is indirectly governed by regulatory requirements, to ensure that adequate foundation conditions exist and that slopes are stable. The suitability of the proposed height increase relative to the subsurface conditions will be evaluated in more detail, once a Preferred Alternative is chosen. Screening measures are currently in place at the Site to mitigate potential impacts from a visual and noise standpoint, including earth berms and fences. Additional screening measures will be implemented as required, based on the development of the Site and surrounding area.

Buffer Areas

Regulatory requirements specify a minimum buffer width of 100 metres (m) between the limit of the residual footprint and the Site boundary, but allow this to be reduced to 30 m if it is shown to be appropriate based on a site specific assessment (e.g., if the buffer provides adequate space for

vehicle movements, ancillary facilities, and ensures that potential effects from the Site operations do not have unacceptable impacts outside of the Site). As shown in **Figure 5.1**, minimum buffer areas of 30 m are currently approved around the perimeter of the residual material area. These buffers extend to approximately 65 m in various areas along the east and south side of the Site, and up to approximately 130 m in the vicinity of the existing stormwater management facility in the northwest corner of the Site.

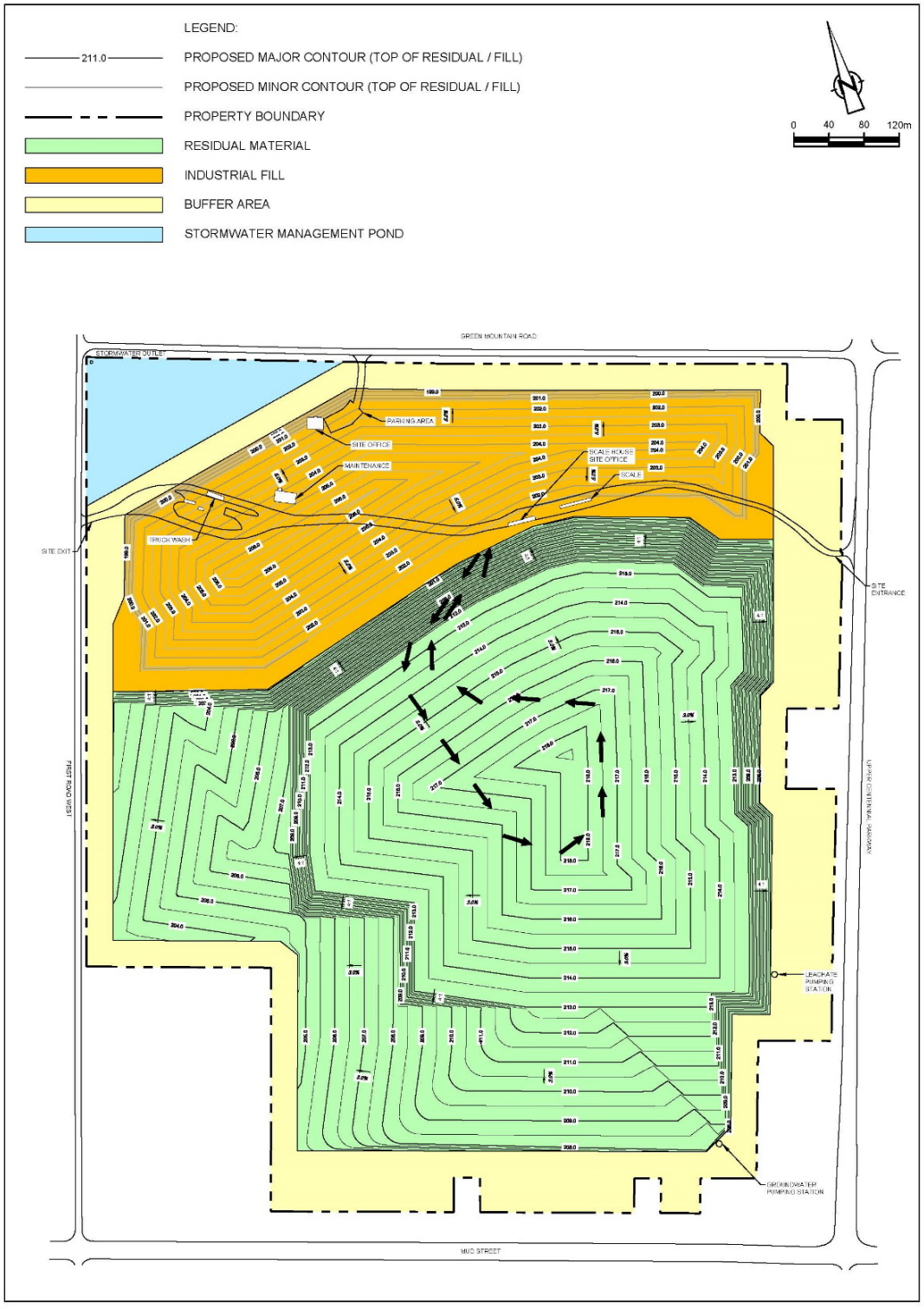


Figure 5.1 Current Approved Landfill Footprint

Setbacks to Surrounding Developments

In addition to the on-Site buffers noted above that will be maintained in relation to the SCRF, additional buffer separation is achieved through road allowances and setbacks for other developments required in accordance with local planning by-laws. The closest residential dwellings to the south of the Site is situated approximately 60 m from the property line, while the closest residential dwelling (currently under construction) to the property line in the north is situated approximately 35 m away. The closest existing residential dwelling to the east is situated approximately 150 m from the property line, while the closest residential dwellings in the west are situated approximately 795 m from the property line.

Infrastructure Requirements

The SCRF requires various infrastructure components in order to operate the Site, including:

- Site entrance and exit
- Scale facility
- Administrative facility
- Maintenance facility
- Groundwater management system
- Leachate management system
- Stormwater management system

The existing Site entrance from Upper Centennial Parkway and the existing Site exit to First Road West are anticipated to be maintained in their current locations. However, if they need to be relocated to accommodate other infrastructure or Site operations, Upper Centennial Parkway and First Road West will remain as the preferred connection points. The scale facility, administrative facility, and maintenance facility will be relocated as required, in order to accommodate development of the Site. This may include relocation to the buffer area, the industrial fill area, residual material area, or to an off-Site location. The groundwater management system, leachate management system, and stormwater management system will be reconfigured as required to accommodate the Alternative Methods. Further details are provided in the sections that follow.

Groundwater Management

Groundwater is currently collected through a network of trenches and piping excavated within the bedrock below the base liner system. Groundwater drains by gravity to a pumping station in the southeast corner of the Site, where it is subsequently recovered for use in Site operations (i.e., dust control) or discharged to the sanitary sewer. The groundwater collection system trenches and piping will be extended as required underneath any new residual material areas. No changes are anticipated to the groundwater pumping station or the discharge to the sanitary sewer.

Leachate Management

Leachate is currently collected through a network of perforated pipes on top of the base liner system, under the residual material area, where it drains by gravity to a leachate pumping station in the southeast of the Site. Leachate is then pumped to the surface, where it is discharged to a gravity main that flows to the equalization pond within the adjacent closed west Site, before being discharged to the sanitary sewer under Mistywood Drive. However, Terrapure has started

discussions with relevant stakeholders in order to establish a new connection to the sanitary trunk sewer currently under construction under Upper Centennial Parkway. Should a new discharge connection be established, it may allow the existing gravity main and equalization pond to be decommissioned.

The leachate collection system piping will be extended as required in any residual material areas where a new liner system is proposed. Alternate and/or additional locations for the leachate pumping station(s) and discharge location(s) may be required based on the Alternative Methods.

The leachate generation rate is an important parameter used in assessing the operational and environmental performance of a landfill site. Estimated leachate generation rates for each Option are summarized below in subsequent sections, and are supported by the calculations presented in **Appendix F**. However, it should be noted that the leachate generation rate will vary over the operational and post-closure period of the Facility, and is influenced by factors including precipitation, degree of landfill development (e.g., area of landfill that is actively undergoing development versus areas where interim/final cover has been placed), final cover design, and other factors.

Stormwater Management

O. Reg. 232/98 requires that landfill sites be designed to protect surface water to specified performance standards based on the following principles:

- Divert or control clean surface water flowing onto the Site.
- Control quality and quantity of runoff discharging from the Site to control erosion, sediment transport, and flooding.

Under the current design, clean runoff is shed from the final cover into perimeter drainage ditches, where it drains by gravity to a series of ponds (i.e., sediment forebay and detention pond) in the northwest corner of the Site, before being discharged to the storm sewer under First Road West.

While the overall function of the stormwater management system is not expected to change, the location and alignment of the existing ponds and ditches may need to be relocated to accommodate the Alternative Methods. The outlet to the existing storm sewer under First Road West will remain under all Alternative Methods. The capacity of the existing stormwater management system will be confirmed against each Alternative Method, although significant changes to the capacity are not expected to be required, since the overall catchment area of the Site will remain largely unchanged.

The design of the final cover system will not change under any of the Alternative Methods, with each consisting of 0.60 m of compacted clay and 0.15 m of vegetated topsoil.

Gas Management

Because the SCRF does not accept waste capable of decomposing and generating gases, it has received a MECP exemption[1] from the requirement to have a gas collection system (as stated in O. Reg. 232/98), based on supporting documentation, including a gas emission study and annual confirmatory monitoring. Under the current ECA for the SCRF, Terrapure is required to monitor for

[1] Confirmed by MECP in 2011 when the then owners of the site (Newalta) successfully applied for an exemption from a landfill gas collection requirement. Annual reports submitted by Terrapure identify the site as exempt from landfill gas collection requirements under O. Reg. 232/98.

landfill gas and provide the results in the Annual Monitoring Report submitted to the MECP by June 30 every calendar year. A Landfill Gas Assessment was conducted in 2011, demonstrating that very little gas is generated at the SCRF. Notwithstanding this, a commitment was made in the Approved Amended ToR that an update of the 2011 Assessment will be carried out as part of the SCRF EA, to determine the necessity, or lack thereof, of a landfill gas collection system being required. This assessment will be carried out once a Preferred Alternative Method (i.e., footprint) has been identified.

Traffic

Vehicle traffic associated with the development of the Site is important in assessing the potential impacts of the Site on various receptors. Traffic levels were estimated based on the following:

- Each Alternative Method is projected to increase the total approved capacity for post-diversion solid, non-hazardous industrial residual material at the SCRF by up to 3,680,000 m^3
- Some Alternative Methods will also include the placement of up to 2,000,000 m^3 of industrial fill
- Although some material stockpiles currently exist on-Site (i.e., liner clay, topsoil, aggregate), to be conservative, all construction materials are assumed to be imported from off-Site
- Total vehicle traffic volumes were calculated based on assumed vehicle types and average capacities
- Traffic associated with staff vehicles or other Site operations is assumed to be negligible
- Traffic levels are kept within the approved limit of 250 vehicles/day

Estimated traffic levels for each Option are supported by the calculations presented in **Appendix F**. However, it should be noted that traffic levels will vary depending on Site operations and construction scheduling. Traffic volumes will be further refined during the detailed impact assessment of the Preferred Alternative.

Operations

O. Reg. 232/98 requires that landfills be designed and operated to ensure that nuisance impacts are minimized, and the regulation requires that the proponent prepare a report describing all aspects of the operation, as well as maintenance procedures that will be followed. A key objective in planning Site operations is to minimize nuisance impacts, including noise, litter, vectors, dust, and odour. Typical operating practices relating to these issues include:

- Vehicles transporting waste to and around the Site are covered to prevent odour and dust
- All materials received at the Site are verified and recorded to ensure compliance with regulatory conditions
- On-Site equipment is operated in such a manner as to minimize noise and visual impacts wherever possible
- All equipment required for the development, operation, or closure of the Site should comply with the noise levels outlined in applicable MECP guidelines and technical standards
- All vehicles leaving the Site must drive through a wheel-wash to minimize track-out of mud/dirt
- The Site design includes screening features, such as fences, berms and tree plantings, which mitigate visual impact and noise

These operating practices will be common to all Alternative Methods. While these would not significantly influence the comparative analysis, they should nevertheless be considered in reviewing the Alternative Methods. Any modifications to the design and operations will be outlined during the detailed impact assessment of the Preferred Alternative.

5.1.2 Description of Landfill Footprint Options

The Approved ToR presented six preliminary Alternative Methods that have been refined and developed further during the EA for comparative analysis, and have been identified herein as Options 1 to 6. It should be noted that as committed to in the Approved ToR, the Status Quo or Do Nothing Option will be considered to assist in the assessment of Options 1-6. The Status Quo or Do Nothing option is represented as the currently approved footprint and has been included to represent what would happen if none of the six options were carried out. The 'Do Nothing' alternative has been considered as a benchmark (but not as a viable option to implement) against the Recommended Alternative Method as a way of measuring and comparing the environmental advantages and disadvantages. Further discussion is included in Section 6 of this report.

The intent of the Alternative Methods described below are to provide a maximum increase in capacity for post-diversion solid, non-hazardous industrial residual material of 3,680,000 m^3 at the SCRF.

The six Alternative Methods were identified in consideration of the criteria and indicators outlined in Approved ToR (**Appendices B and C**) and reviewed and finalized based on agency and public input received during the first consultation event for the EA. A summary of the criteria and indicators follows the description of alternative methods:

Alternative Option 1- Reconfiguration

Option 1 is shown in **Figure 5.2** and has the following general attributes:

- The area at the SCRF currently approved for receiving industrial fill would be replaced with post-diversion solid, non-hazardous industrial residual material. As a result, the SCRF would no longer be approved to receive industrial fill with Option 1.
- The area at the SCRF currently approved for receiving residual material would remain unchanged.
- Option 1 would not include either a horizontal or vertical expansion.

Alternative Option 2 – Footprint Expansion

Option 2 is shown in **Figure 5.3** and has the following general attributes:

- The area at the SCRF currently approved for receiving industrial fill would remain unchanged. Therefore, the SCRF would still be approved to receive industrial fill with Option 2.
- The areas at the SCRF not currently approved for receiving either industrial fill or residual material would be expanded into, so that they would be able to receive post-diversion solid, non-hazardous industrial residual material.
- A minimum 30 m buffer would be established around the entire area for receiving industrial fill or post-diversion solid, non-hazardous industrial residual material.

- Option 2 would include a horizontal expansion, but not a vertical expansion. The peak height currently approved would remain unchanged.

Alternative Option 3 – Height Increase

Option 3 is shown in **Figure 5.4** and has the following general attributes:

- The area at the SCRF currently approved for receiving industrial fill would remain unchanged. Therefore, the SCRF would still be approved to receive industrial fill with Option 3.
- The area at the SCRF currently approved for receiving residual material would be expanded vertically, so that additional post-diversion solid, non-hazardous industrial residual material could be received.
- Option 3 would not include a horizontal expansion, but would include a vertical expansion, increasing the overall height of the area currently approved to receive post-diversion solid, non-hazardous industrial residual material.

Alternative Option 4 – Reconfiguration and Footprint Expansion

Option 4 is shown in **Figure 5.5** and has the following general attributes:

- Option 4 reflects a combination of Options 1 and 2. The currently approved area at the SCRF for receiving industrial fill would be replaced with post-diversion solid, non-hazardous industrial residual material. In addition, the areas at the SCRF not currently approved for receiving either industrial fill or residual material would be expanded into, so that they would be able to receive post-diversion solid, non-hazardous industrial residual material.
- The SCRF would no longer be approved to receive industrial fill, but only post-diversion solid, non-hazardous industrial residual material.
- A minimum 30 m buffer would be established around the entire area for receiving post-diversion solid, non-hazardous industrial residual material.
- Option 4 would include a horizontal expansion, but would not include a vertical expansion. The peak height currently approved would remain unchanged.

Alternative Option 5 – Reconfiguration and Height Increase

Option 5 is shown in **Figure 5.6** and has the following general attributes:

- Option 5 reflects a combination of Options 1 and 3. The currently approved area at the SCRF for receiving industrial fill would be replaced with post-diversion solid, non-hazardous industrial residual material. The entire area at the SCRF currently approved for receiving either industrial fill or post-diversion solid, non-hazardous industrial residual material would be expanded vertically, so that additional residual material could be received.
- The SCRF would no longer be approved to receive industrial fill, but only post-diversion solid, non-hazardous industrial residual material.
- A minimum 30 m buffer would be established around the entire area for receiving post-diversion solid, non-hazardous industrial residual material.
- Option 5 would not include a horizontal expansion, but would include a vertical expansion. The peak height currently approved would be increased.

Alternative Option 6 – Footprint Expansion and Height Increase

Option 6 is shown in **Figure 5.7** and has the following general attributes:

- Option 6 reflects a combination of Options 2 and 3. The existing approved area at the SCRF for receiving industrial fill would remain unchanged. Therefore, the SCRF would still be approved to receive industrial fill with Option 6.
- The area at the SCRF currently approved for receiving post-diversion solid, non-hazardous industrial residual material would be expanded vertically, and the areas at the SCRF not currently approved for receiving either industrial fill or post-diversion solid, non-hazardous industrial residual material would be expanded into, so that they would be able to receive post-diversion solid, non-hazardous industrial residual material.
- A minimum 30 m buffer would be established around the entire area for receiving industrial fill or post-diversion solid, non-hazardous industrial residual material.
- Option 6 would include both horizontal and vertical expansions, thus increasing the currently approved peak height.

Summary

A summary table comparing the details of each of the Options is presented in **Table 5.1**.

Table 5.1 Comparison of Alternatives

Option No.	Figure No.	Description	Volume (m^3)		Footprint Area (ha)		Peak Elevation (mAMSL)	Height Relative to Surrounding Area (m)		Stormwater Management	Leachate Management	Construction Considerations	Traffic
			Residual Material	Industrial Fill	Residual Material	Industrial Fill		Green Mountain & First Road (192 mAMSL)	Upper Centennial & Mud (205 mAMSL)				
-	Figure 2.1	Existing Approved	6,320,000	2,000,000	41.5	12.9	218.5	26.5	13.5				
1	Figure 5.2	> Replace industrial fill area with residual material > No horizontal or vertical expansion	8,830,000	N/A	54.4	N/A	218.5	26.5	13.5	> Drainage ditches around perimeter of residual material area. > Reconfiguration of existing stormwater management ponds in northwest corner of site. > Discharge to First Rd. W. storm sewer.	> Extension of existing leachate collection system at base of residual material area. > Approximate leachate generation rate of 7.4 L/s during active operation. > Approximate leachate generation rate of 5.0 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of residual material area. > Leachate discharge to existing/new sanitary sewer.	> Requires staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > May require liner perforation for pumping well M4. > Residual material area extends over existing clay plug.	> Approximately 183,423 trucks associated with residual material. > Approximately 64,914 trucks associated with construction.
2	Figure 5.3	> Maintain industrial fill area > Expand limits of residual material area horizontally, maintaining minimum 30 m buffer > Maintain currently approved peak elevation	7,630,000	2,000,000	47.3	12.9	218.5	26.5	13.5	> Drainage ditches around perimeter of residual material areas. > Drainage ditches around perimeter of industrial fill area. > Construction of new stormwater management ponds in west buffer and north buffer. > Discharge to First Rd. W. storm sewer.	> Extension of existing leachate collection system at base of main residual material area. > Construction of new leachate collection system at base of secondary residual material area. > Approximate leachate generation rate of 6.4 L/s during active operation. > Approximate leachate generation rate of 4.4 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of main residual material area. > Construction of new leachate pumping station in secondary residual material area. > Leachate discharge to existing/new sanitary sewer.	> Requires staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Requires excavation (i.e., residual material, soil, bedrock) to extend base liner system in east buffer and south buffer. > Requires reconfiguration of screening berms/fences in east buffer and south buffer.	> Approximately 95,731 trucks associated with residual material. > Approximately 226,154 trucks associated with industrial fill material. > Approximately 48,074 trucks associated with construction.
3	Figure 5.4	> Maintain industrial fill area > Maintain current limit of residual material area > Increase peak elevation of residual material area	10,000,000	2,000,000	41.5	12.9	229.5	37.5	24.5	> Drainage ditches around perimeter of residual material area. > Drainage ditches around perimeter of industrial fill area. > Reconfiguration of existing stormwater management ponds in northwest corner of site. > Discharge to First Rd. W. storm sewer.	> Maintain existing leachate collection system at base of residual material area. > Approximate leachate generation rate of 5.6 L/s during active operation. > Approximate leachate generation rate of 3.8 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of residual material area. > Leachate discharge to existing/new sanitary sewer.	> Requires staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).	> Approximately 268,923 trucks associated with residual material. > Approximately 226,154 trucks associated with industrial fill material. > Approximately 27,678 trucks associated with construction.
4	Figure 5.5	> Replace industrial fill area with residual material > Expand limits of residual material area horizontally, maintaining minimum 30 m buffer > Maintain currently approved peak elevation	9,780,000	N/A	63.2	N/A	218.5	26.5	13.5	> Drainage ditches around perimeter of residual material area. > Construction of new stormwater management ponds in west buffer and north buffer. > Discharge to First Rd. W. storm sewer.	> Extension of existing leachate collection system at base of residual material area. > Approximate leachate generation rate of 8.6 L/s during active operation. > Approximate leachate generation rate of 5.9 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of residual material area. > Leachate discharge to existing/new sanitary sewer.	> Requires staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Requires excavation (i.e., residual material, soil, bedrock) to extend base liner system in east buffer and south buffer. > Requires reconfiguration of screening berms/fences in east buffer and south buffer. > May require liner perforation for pumping well M4. > Residual material area extends over existing clay plug.	> Approximately 252,846 trucks associated with residual material. > Approximately 93,970 trucks associated with construction.
5	Figure 5.6	> Replace industrial fill area with residual material > Increase peak elevation of residual material area	10,000,000	N/A	54.4	N/A	221.0	29.0	16.0	> Drainage ditches around perimeter of residual material area. > Reconfiguration of existing stormwater management ponds in northwest corner of site. > Discharge to First Rd. W. storm sewer.	> Extension of existing leachate collection system at base of residual material area. > Approximate leachate generation rate of 7.4 L/s during active operation. > Approximate leachate generation rate of 5.0 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of residual material area. > Leachate discharge to existing/new sanitary sewer.	> Requires staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > May require liner perforation for pumping well M4. > Residual material area extends over existing clay plug.	> Approximately 268,923 trucks associated with residual material. > Approximately 64,914 trucks associated with construction.
6	Figure 5.7	> Maintain industrial fill area > Expand limits of residual material area horizontally, maintaining minimum 30 m buffer > Increase peak elevation of residual material area	10,000,000	2,000,000	47.3	12.9	225.5	33.5	20.5	> Drainage ditches around perimeter of residual material areas. > Drainage ditches around perimeter of industrial fill area. > Construction of new stormwater management ponds in west buffer and north buffer. > Discharge to First Rd. W. storm sewer.	> Extension of existing leachate collection system at base of main residual material area. > Construction of new leachate collection system at base of secondary residual material area. > Approximate leachate generation rate of 6.4 L/s during active operation. > Approximate leachate generation rate of 4.4 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of main residual material area. > Construction of new leachate pumping station in secondary residual material area. > Leachate discharge to existing/new sanitary sewer.	> Requires staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Requires excavation (i.e., residual material, soil, bedrock) to extend base liner system in east buffer and south buffer. > Requires reconfiguration of screening berms/fences in east buffer and south buffer.	> Approximately 268,923 trucks associated with residual material. > Approximately 226,154 trucks associated with industrial fill material. > Approximately 48,074 trucks associated with construction.

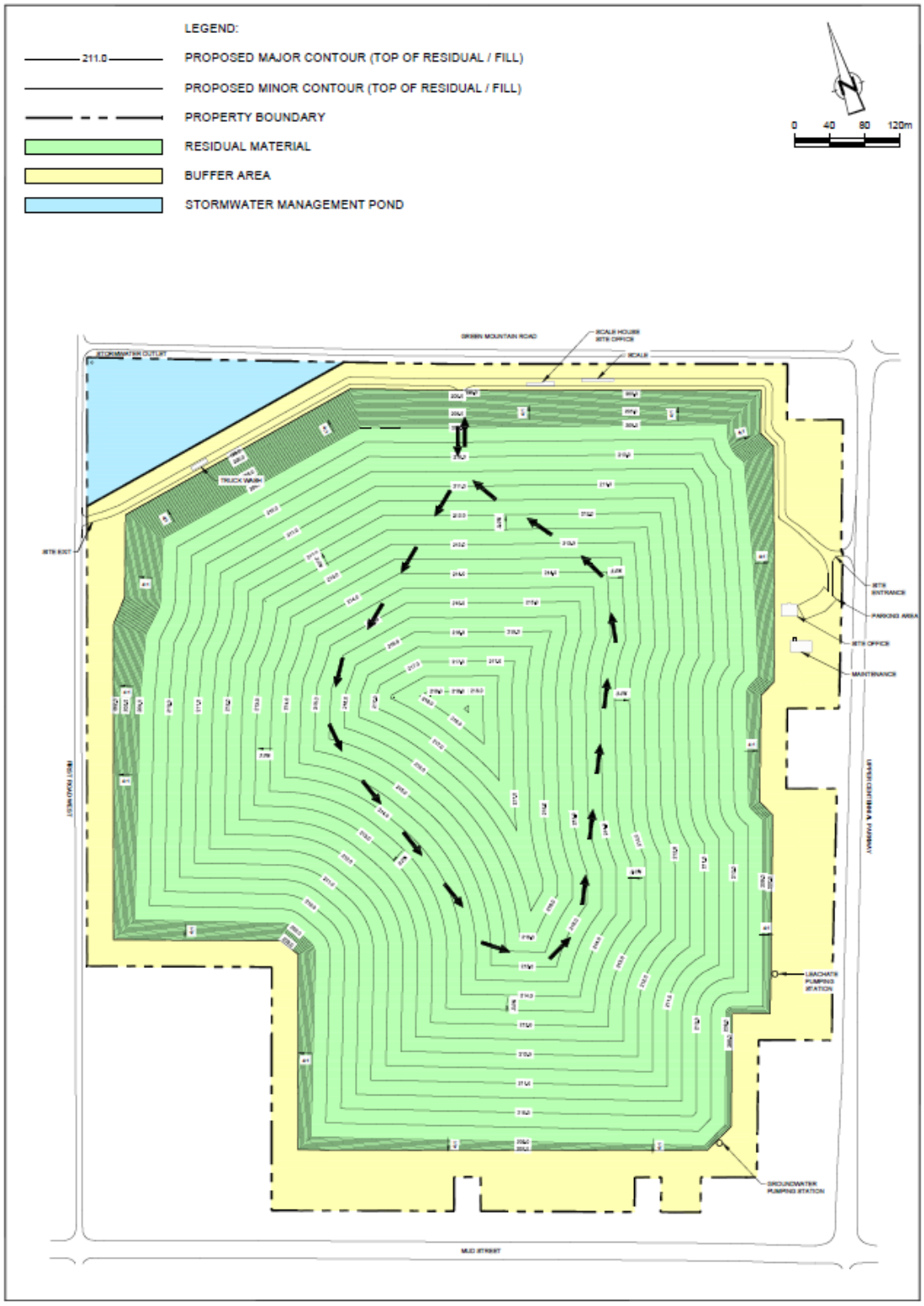


Figure 5.2 Option 1 – Reconfiguration

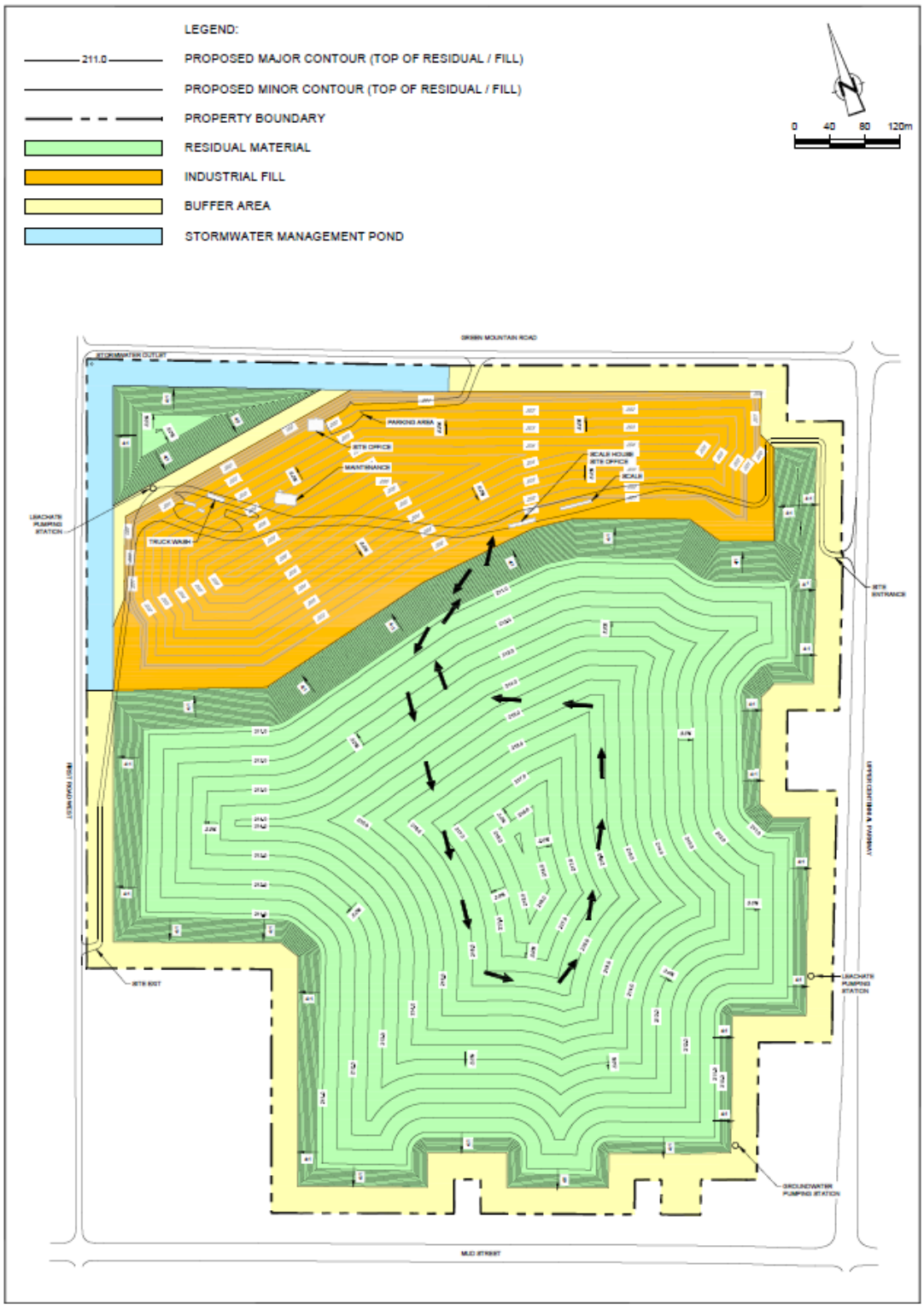


Figure 5.3 Option 2 – Footprint Expansion

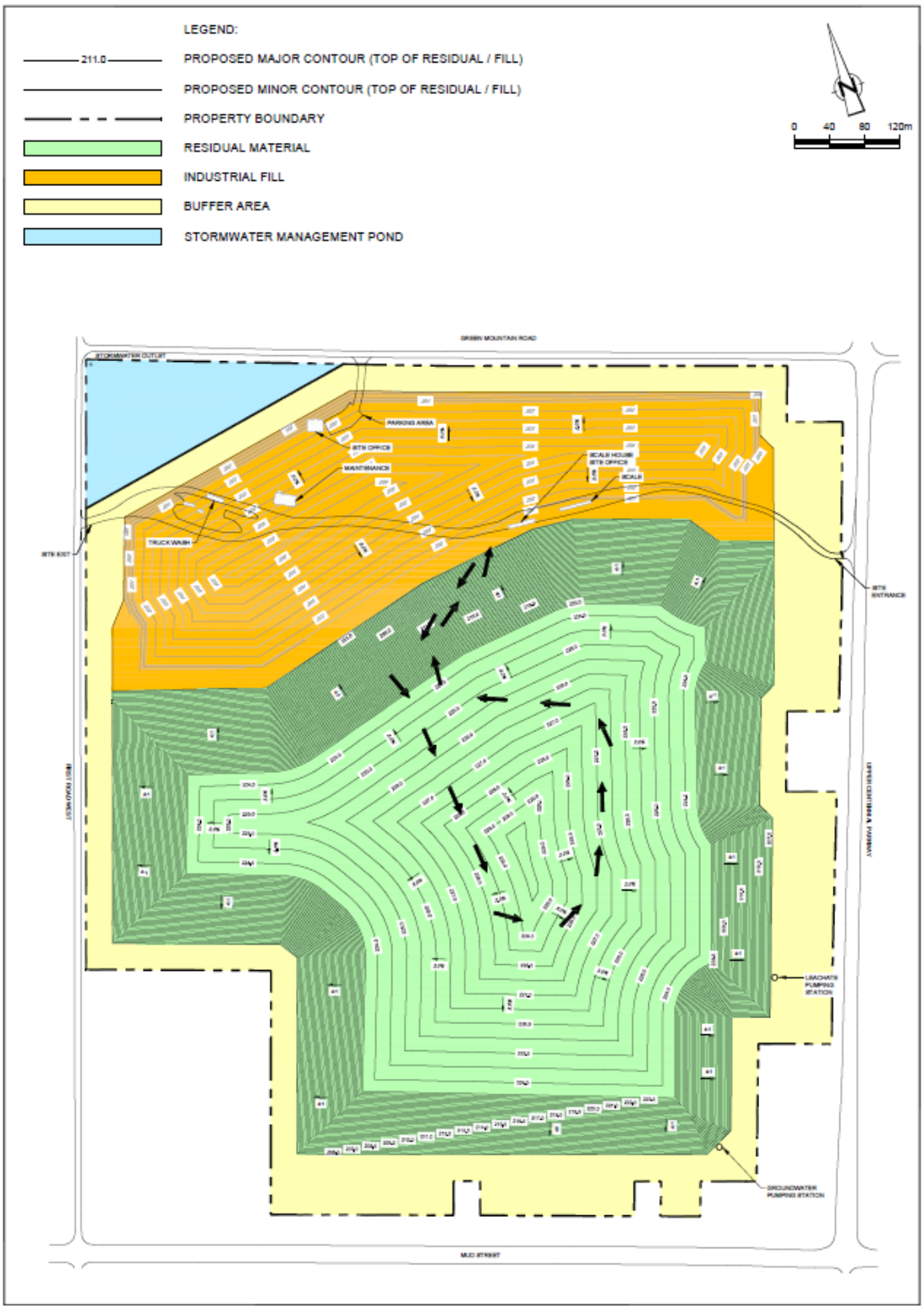


Figure 5.4 Option 3 – Height Increase

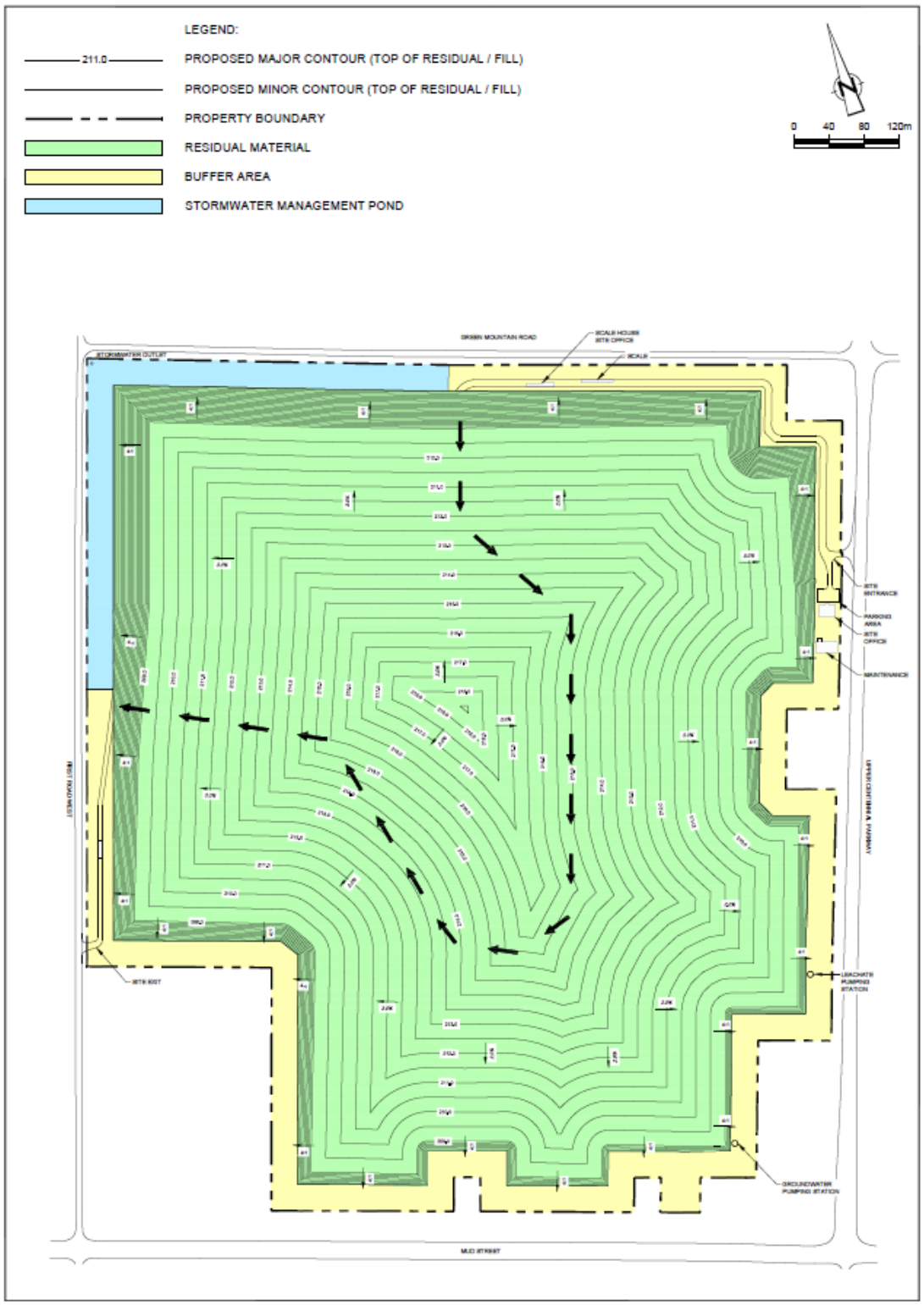


Figure 5.5 Option 4 – Reconfiguration and Footprint Expansion

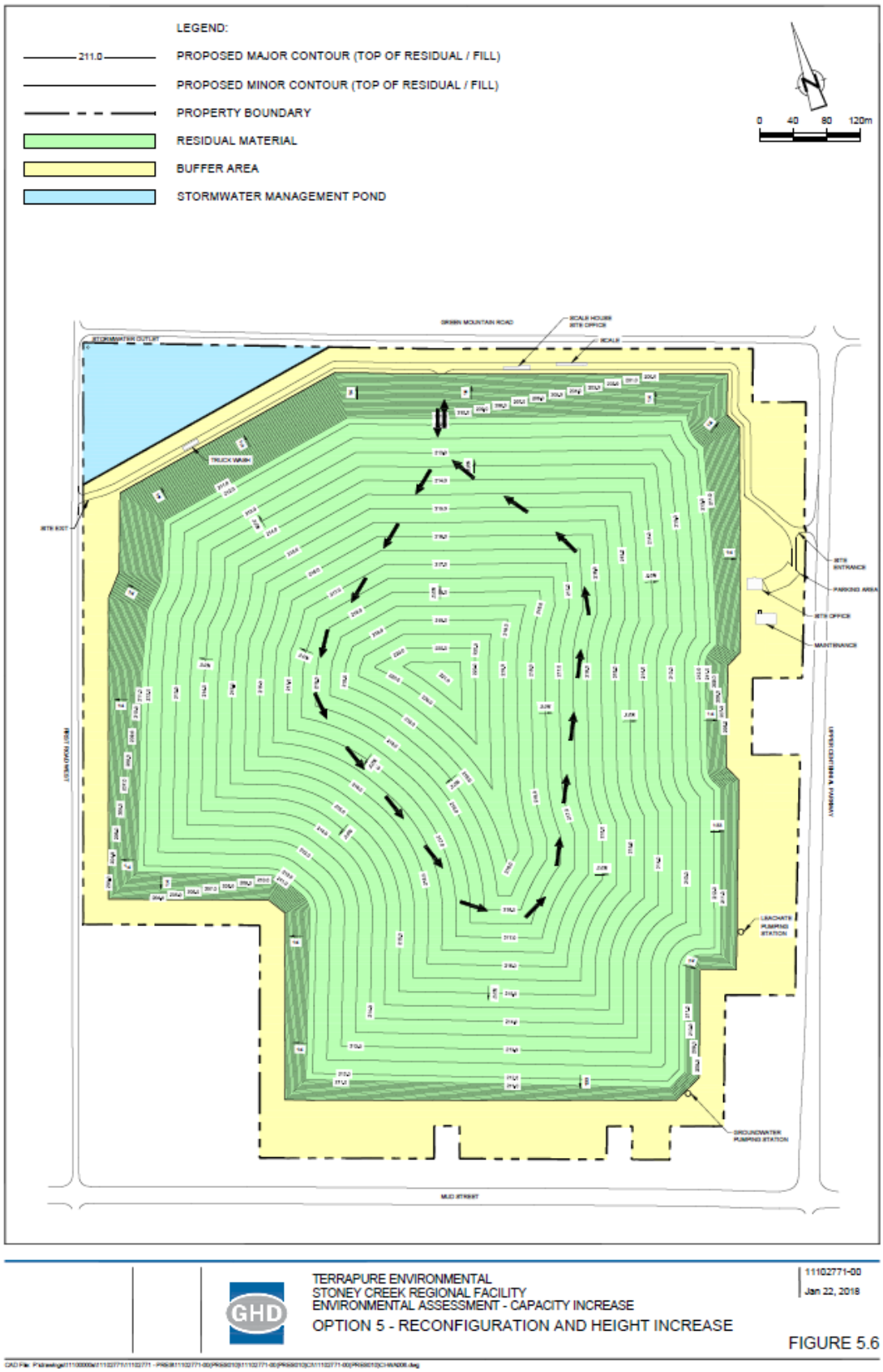


Figure 5.6 Option 5 – Reconfiguration and Height Increase

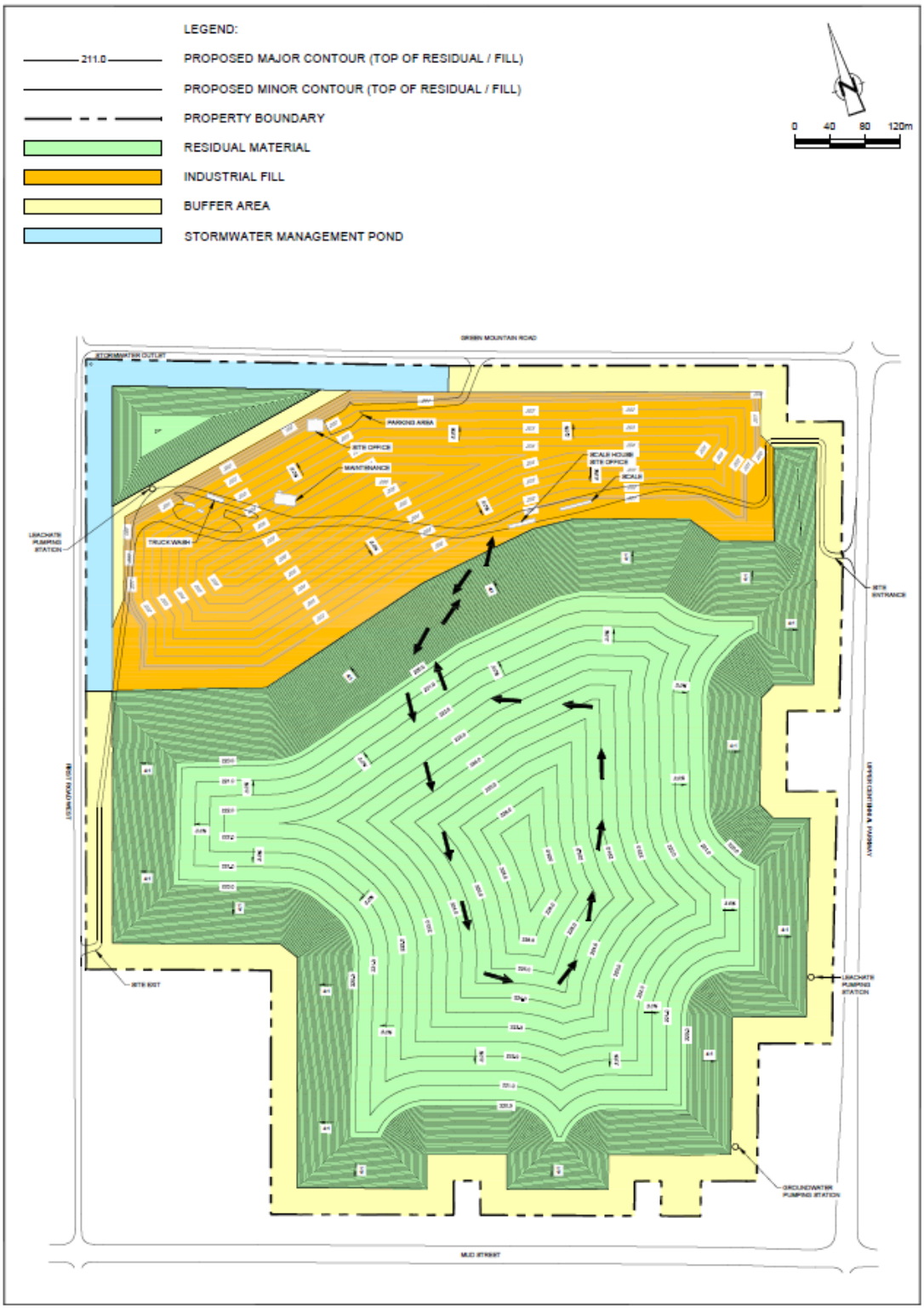


Figure 5.7 Option 6 – Footprint Expansion and Height Increase

5.2 Rationale for Alternative Methods of Carrying Out the Undertaking

The preceding Alternative Methods of Carrying Out the Undertaking were included for consideration in the SCRF EA for a number of reasons. Firstly, all of the Alternative Methods represent different ways of performing the same activity (i.e., increasing the approved capacity of the SCRF by 3,680,000 m^3 so that Terrapure can continue to receive post diversion solid, non-hazardous industrial residual material generated within the H&GTA). Secondly, all of the Alternative Methods are situated within Terrapure's existing SCRF property boundary. Thirdly, all of the Alternative Methods will reflect the regulatory design requirements under O. Reg. 232/98: Landfilling Sites (e.g., setbacks, slopes, etc.). Finally, all of the Alternative Methods are within the ability of Terrapure to implement.

The preceding Alternative Methods maximize the use of Terrapure's current property ownership at the SCRF. Consequently, Terrapure would have to purchase additional property from a private land owner in order to consider any other Alternative Methods. However, Terrapure would only be able to purchase additional property from a "willing seller" because, unlike a public authority (i.e., municipality), it does not have a statutory power to expropriate private lands and premises to achieve the purpose of the proposed undertaking. Even if a private land owner was willing to sell, Terrapure would be subject to the terms and conditions established by the "willing seller" including the price of land, which would be cost prohibitive.

Also, the use of any additional private property would require amendments to both the City of Hamilton's Official Plan and Zoning By-Law so that landfilling of the residual material is a permitted use on the newly purchased lands. In both cases, the City would have to approve the proposed amendments. Consequently, the dependence upon both a "willing seller" and the City means that any alternative method reliant upon additional property would be outside of Terrapure's ability to implement on its own.

In addition, the existing SCRF is bordered on all four sides by publically travelled roads (i.e., City of Hamilton ownership). As a result, a horizontal expansion in any direction beyond any one of the existing publically travelled roads would represent, for all intents and purposes, a new waste management facility separated from the existing SCRF. This means that the existing waste management infrastructure associated with the SCRF could not be used to accommodate the additional capacity being sought to address the economic opportunity. Instead, Terrapure would have to establish entirely new waste management infrastructure, which would be cost prohibitive

5.3 Assessment Methodology

Following the identification of the alternative landfill footprints, a detailed assessment and evaluation of the six footprints was undertaken. The multi-step process began with confirming the evaluation criteria and indicators proposed in approved ToR and confirmed at public meetings, including Open House #1. With a final list of evaluation criteria and indicators established, they were applied to each of the six footprint options through a "net effects analysis" to determine the net positive or negative environmental effects. Next, a Reasoned Argument method was carried out using this information to determine the advantages and disadvantages to the environment and ultimately identify a recommended landfill footprint. **Figure 5.8** below highlights the process of the Alternative Methods assessment.

The assessment and evaluation of the alternative landfill footprints was conducted in three steps:

- **Step 1** – Confirm Evaluation Criteria and Indicators/Measures
- **Step 2** – Undertake the Net Effects Analysis
- **Step 3** – Carry out the Comparative Evaluation

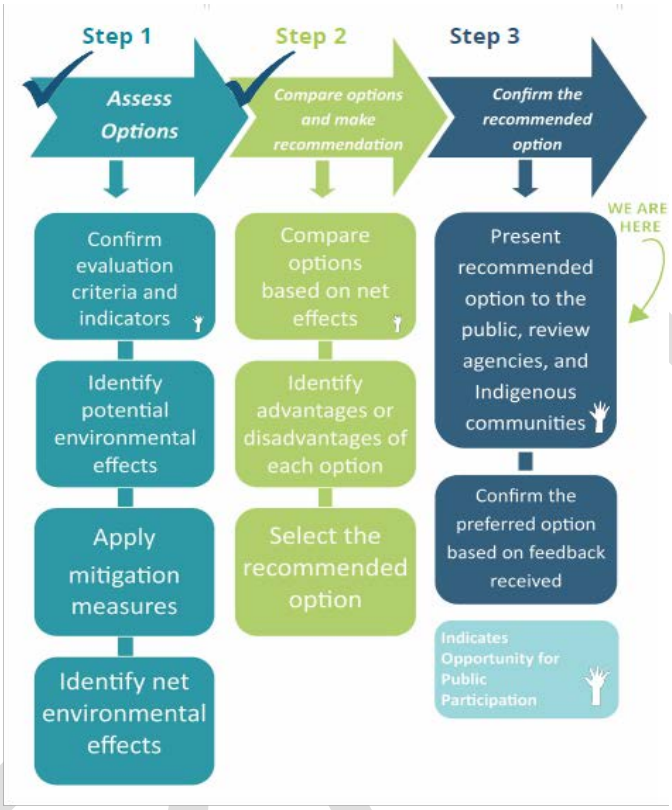


Figure 5.8 Alternative Methods Assessment

Each step is described in further detail below.

Step 1 – Confirm Evaluation Criteria and Indicators/Measures

Prior to undertaking the net effects analysis, the evaluation criteria, indicators, and measures previously developed in the ToR were reviewed with the public during Open House events and confirmed for application to each of the landfill footprint alternatives. As part of the amended ToR, a commitment to analyze the potential effects to human health during Alternative Methods utilizing the existing data and methodology established as part of the on-going SRCF Community Health Assessment was made. Given that the studies in the EA will be completed and be benchmarked against human health parameters, such as air quality and groundwater, Terrapure will not only continue to complete the annual Community Health Assessment Review as part of the ongoing operation of the SCRF (as required under the current approvals), but will also utilize the existing data and methodology established as part of the Community Health Assessment for the past 20 years, to analyze the potential effects to human health during the Alternative Methods assessment and evaluation. Evaluation criteria were developed for each Environmental Component listed below:

- Geology and Hydrogeology;
- Surface Water Resources;
- Terrestrial and Aquatic Environment;

- Land Use
- Atmospheric Environment (Air Quality, Odour and Noise);
- Human Health
- Transportation
- Economic
- Archaeology and Built Heritage; and,
- Design and Operations.

The approved SCRF ToR set out the draft criteria and indicators for evaluating the 'Alternative Methods' (i.e., alternative landfill footprint options) in the EA. As a result, the draft criteria, indicators, and measures provided for in the ToR were reviewed and modified appropriately to suit the evaluation of the landfill footprint alternatives. Specifically, the criteria and indicators were modified in consultation with review agencies and the public to ensure that an appropriate level of scrutiny and rigour was applied in evaluating the landfill footprint alternatives. In doing so, the results of the evaluation phase will consist of clearly defined net effects for each landfill footprint alternative. The list of criteria and indicators can be seen in **Table 5.2** below.

Table 5.2 Evaluation Criteria and Indicators

Component	Criteria	Indicators
Geology and Hydrogeology	Groundwater Quality	Predicted effects to groundwater quality at property boundaries and off-Site
		Predicted effects to Source Water Protection Area
	Groundwater Flow	Predicted effects to groundwater flow at property boundaries and off-Site
Surface Water Resources	Surface Water Quality	Predicted effects on surface water quality on-Site and off-Site
	Surface Water Quantity	Predicted change in drainage areas
		Predicted occurrence and degree of off-Site effects
Terrestrial and Aquatic Environment	Terrestrial ecosystems	Predicted impact on vegetation communities
		Predicted impact on wildlife habitat
		Predicted impact on vegetation and wildlife including rare, threatened or endangered species
	Aquatic ecosystems	Predicted impact on aquatic habitat
		Predicted impact on aquatic biota
Atmospheric Environment	Air quality on off-Site receptors	Predicted off-Site point of impingement concentrations (ug/m^3) of indicator compounds
		Number of off-Site receptors potentially affected (residential properties, public facilities, businesses and institutions)
	Odours on off-Site receptors	Predicted off-Site odour concentrations (ug/m^3 and odour units)
		Number of off-Site receptors potentially affected (residential properties, public facilities, businesses and institutions)
	Noise on off-Site receptors	Predicted off-Site noise level
		Number of off-Site receptors potentially affected (residential properties, public facilities, businesses and institutions)
Land Use	Effect on existing land use	Current land use
	Effect on views of the Facility	Predicted changes in views of the Facility from the surrounding area
Human Health	Air Quality	Predicted impacts to air quality and their potential effects on human health

Table 5.2 Evaluation Criteria and Indicators

Component	Criteria	Indicators
	Leachate Quantity	Predicted effects of leachate quality (inorganic and organic chemicals) on human health
	Groundwater Quality	Predicted impacts to groundwater quality and their potential effects on human health
	Surface Water Quality	Predicted impacts to surface water quality and their potential effects on human health
	Soil Quantity	Predicted impacts to soil and their potential effects on human health
Transportation	Effect on Traffic	Potential for traffic collisions Level of Service at intersections around the SCRF
Economic	Effect on approved/planned land uses	Number, extent, and type of approved/planned land uses affected
	Economic benefit to the City of Hamilton and Local Community	Total Employment at site (number and duration)
Archaeology and Built Heritage	Effect on known or potential significant archaeological resources	Number and type of potentially significant, known archaeological sites affected Area (ha) of archaeological potential (i.e., lands with potential for the presence of significant archaeological resources) affected
	Effect on built heritage resources and cultural heritage landscapes	Number and type of built heritage resources and cultural heritage landscapes displaced or disrupted
Design and Operations	Potential to Provide Service for Disposal	Ability to provide 3,680,000 m^3 of additional disposal capacity for post diversion solid, non-hazardous industrial residual material
	Leachate Management	Design and operating complexity
	Stormwater Management	Design and operating complexity
	Construction	Complexity and constructability of components
	Site Operations	Complexity and operability of components
	Closure and Post-Closure	Flexibility of design and operations
	Cost of Facility	Approximate relative cost of Alternative Methods

Step 2 – Undertake the Net Effects Analysis

With the evaluation criteria, indicators and measures confirmed through the preceding step, a net effects analysis of the alternative landfill footprint options was carried out, consisting of the following activities:

- Identify potential effects on the environment;
- Develop and apply impact management measures (avoidance/ mitigation/ compensation/ enhancement measures); and,
- Determine net effects on the environment.

Each of these activities will be documented in a separate table for each alternative landfill footprint options.

Identify the Potential Effects

Potential effects on the environment are based on the information contained in the Existing Conditions reports. After determining the alternatives, the evaluation criteria will be applied to each alternative landfill footprint option to determine the potential environmental effects. Specifically, this will be accomplished by applying the indicators to each alternative landfill footprint option. The results of applying these indicators will be expressed in the context of their corresponding measures, either quantitatively or qualitatively, as appropriate, in the potential effects column of the net effects table.

Develop and Apply the Impact Management Measures

Once the potential effects on the environment have been identified for each alternative landfill footprint option, the appropriate impact management measures (avoidance/ mitigation/ compensation/ enhancement measures) will be developed and documented in the net effects table for each indicator. The intent of these measures is as follows:

Avoidance: The first priority is to prevent the occurrence of negative effects (adverse environmental effects) associated with implementing an alternative.

Mitigation: Where adverse environmental effects cannot be avoided, it will be necessary to develop the appropriate measures to remove or alleviate to some degree the negative effects associated with implementing the alternative.

Compensation: In situations where appropriate mitigation measures are not available, or significant net adverse effects will remain following the application of mitigation, compensation measures may be required to counterbalance the negative effect through replacement in kind, or provision of a substitute or reimbursement.

Enhancement: Wherever possible, the opportunity should be taken to enhance the positive environmental effects associated with implementing an alternative rather than simply mitigate and/or compensate.

With these intentions in mind, the impact management measures will be developed based on the professional expertise of the Project Team reflecting current procedures, historical performance, and existing environmental conditions. These developed measures will be documented in the avoidance/ mitigation/ compensation/ enhancement measures column of the net effects table.

Determine the Net Effects

Once the appropriate impact management measures have been developed and applied to the potential environmental effects of each alternative landfill footprint option, the remaining net negative or net positive effect will be determined and documented by the Project Team members in the “net effects” column of the net effects table. In cases where the net negative or net positive effect cannot be addressed through the application of avoidance/ mitigation/ compensation/ enhancement measure(s), the potential net effect will remain unchanged and therefore, will still be identified as the “net effect”.

The net effects associated with each alternative landfill footprint option will be identified and carried forward to Step 3.

Step 3 – Carry out the Comparative Evaluation

In Step 3, the net effects identified for each alternative landfill footprint option in Step 2 were compared to one another in order to identify a "recommended landfill footprint". The comparison of net effects was completed using a "Reasoned Argument" evaluation methodology, as provided for in the approved SCRF EA ToR.

This method is based on the following two activities:

- **1st Activity:** Identify the level of effect ('No', 'Low', 'Moderate' or 'High') associated with each alternative landfill footprint option for each indicator
- **2nd Activity**: Rank each alternative landfill footprint option from most preferred to least preferred through:
    - Criteria rankings for each landfill footprint option (1st through 6th, tied for 1st, etc. based on the identified level of effect from each indicator
    - Factor specific rankings (preferred) for each landfill footprint option; and,
    - Overall landfill footprint rankings (most preferred to least preferred).

The process followed in Step 3 and the results of these two activities are described in further detail in the following sections.

Level of Effect Determination of the Alternative Landfill Footprint Options

As mentioned, the "Reasoned Argument" method will be used to highlight the relative level of effect of each landfill footprint option based on the net effects determined in Step 2. More specifically, a level of effect ranging from 'No effect', 'Low effect', 'Moderate effect' or 'High effect' will be determined for each landfill footprint option by each indicator.

Ranking of the Alternative Landfill Footprint Options

The net effects identified for each alternative in the previous step will then be compared to one another in order to identify a "recommended" footprint location. The comparison of net effects will be completed using a "Reasoned Argument", as provided for in the approved ToR.

Under the Reasoned Argument approach, the difference in net effects associated with the various alternatives is highlighted. Based on these differences, the advantages and disadvantages of each alternative are identified according to the evaluation of the various evaluation criteria and indicators. The relative significance of potential impacts is examined to provide a clear rationale for the selection of a Recommended Alternative.

Each alternative will be compared against the others to distinguish relative differences in terms of advantages and disadvantages to the environment, taking into account possible mitigation measures.

For example, during the detailed Comparative Evaluation of the alternative landfill footprints, the rankings (1st-6th) will be combined (aggregated) for each Environmental Indicator and Criteria into

preference ranking/rationale for each environmental component. These results will be aggregated further into a single preference rating for each alternative landfill footprint in order to rank the alternatives (incorporating advantages/disadvantages and professional judgement) and identify a Recommended Alternative landfill footprint.

This method is based on the following two activities (example provided below):

- **1st Activity:** Identify the level of effect ('No Effect', 'Low', 'Medium' or 'High') associated with each alternative for each indicator
- **2nd Activity:** Rank each alternative from most preferred to least preferred based on the identified level of effect from each indicator; Criteria rankings for each alternative landfill footprint option (1^{st}-6^{th}); component specific rankings based on rationale for preference for each alternative landfill footprint option; and, overall alternative landfill footprint option rankings (most preferred to least preferred).

Each team member first assigned rankings for each individual Criteria based on the level of effect determined for each Indicator under that Criteria. For example, the "Atmospheric Environment" Environmental Component has three Criteria, each of which have two Indicators that will be given a level of effect ('No', 'Low', 'Medium' or 'High') and then consolidated to determine an overall Criteria ranking. After each Criteria are ranked, a rationale will be provided to rank by preference each Environmental Component based on the rankings (1^{st} - 6^{th}) from each evaluation criteria. For example, in the case of the Atmospheric Environment component, the Technical Consultant will consider the identified rankings for an alternative corresponding to their evaluation criteria (incorporating advantages/disadvantages and their professional judgment) in determining the Atmospheric Environment component ranking.

Following this, the Project Team determined an overall ranking of each alternative based on the individual Environmental Component preference rankings. With this in mind, the Team will then assign an overall ranking of Most Preferred to Least Preferred for the overall landfill evaluations demonstrating key advantages/disadvantages to the environment.

Do Nothing or Status Quo

In addition and as previously mentioned, the *Status Quo* ("Do Nothing") option has been included to serve as a benchmark against other alternatives. The Status Quo represents the currently approved footprint and would mean that all existing approvals for the SCRF would be maintained and the current SCRF would no longer have the capacity to accept post-diversion solid, non-hazardous industrial residual material after the currently approved capacity for waste is exhausted in the coming years, but would still continue to operate by accepting industrial fill. Under the *Status Quo* option, a number of long-standing users of the SCRF, including major Hamilton steel making businesses, would be forced to haul their industrial residual material further to an appropriately sized and approved facility (the closest facility is approximately 50 km further east from the SCRF, one way travel). This would increase the cost to users to manage their residual material, and would increase the associated carbon footprint. In addition, the SCRF has provided the Hamilton and Greater Toronto Area (H&GTA) with the closest regional option for waste generated during major infrastructure and development projects in the H&GTA, including the McMaster Children's Hospital expansion, the new James Street GO Station, and the Stoney Creek Dairy future site remediation, thereby negating long-haul trips and reducing GHG output.

The “Do Nothing” option is included as part of the SCRF EA to serve as a benchmark against all other landfill options (Alternative Methods). The “Do Nothing” option does not address the Purpose of the Undertaking, as described in the Approved Amended ToR for the SCRF EA, dated November 9, 2017, and is therefore not a viable option. The “Do Nothing” option is used as a matter of best practice, in order to establish a “benchmark” when evaluating and assessing the advantages and disadvantages of following alternative landfill footprint options (Alternative Methods) being considered.

5.4 Net Effects Assessment

Now that the methodology of the Assessment of Alternative Methods has been presented, the following sections will review the net effects analysis for each of the Landfill footprint options by technical discipline, followed by a summary for each Option. The net effects analysis has taken into account the construction, operation and closure/post-closure periods of the proposed undertaking and, where possible, used highly conservative estimates which will be refined at the Detailed Impact Assessment stage of the EA when more construction, operation and closure/post-closure details are provided on the preferred Alternative.

5.5 Natural Environment

5.5.1 Geology and Hydrogeology

The net effects relating to the Geology and Hydrogeology for all Options considered the following criteria and indicators;

Groundwater Quality:

- Predicted effects to groundwater quality at property boundaries and off-Site
- Predicted effects to Source Water Protection Area

Groundwater Flow:

- Predicted effects to groundwater flow at property boundaries and off-Site
- Predicted effects to Source Water Protection Area

Considerations and General Assumptions

In order to fully characterize these indicators and to adopt measures by which potential effects could be identified, several considerations were developed for each indicator. These considerations are shown below in **Table 5.3**:

Table 5.3 Considerations for Indicators

Criteria	Indicators	Considerations
Groundwater Quality	• Predicted effects to groundwater quality at property boundaries and off-Site • Predicted effects to Source Water	• Leachate generation estimates • Leachate quality – how will leachate leakage from the SCRF affect existing groundwater quality? • Existing groundwater quality – what is background groundwater quality? Is it impacted by the existing landfill or other sources? What is the predicted future quality?

Table 5.3 Considerations for Indicators

Criteria	Indicators	Considerations
	Protection Area (SWPA)	• Leachate breakthrough – how does the design of the Alternatives affect the ability for leachate to break through the liner? • Monitorability – the ability to define, identify and monitor the hydrostratigraphic units; to understand the groundwater flow gradients & velocities; to define low head areas; and to distinguish impacts from the new landfill versus other sources. • Ability to mitigate effects on groundwater quality • SWPA impacts – how will the impacts to groundwater quality change the quality of groundwater and surface water within the SWPA?
Groundwater Flow	• Predicted effects to groundwater flow at property boundary and off-Site	• Hydraulic characteristics of hydrostratigraphic units – ability to identify units; hydraulic conductivity, flow directions • Results of flow modelling – predicted changes to the groundwater flow with each alternative

The potential effects for each alternative were then identified on the basis of these considerations. As described above, the two groundwater criteria (groundwater quality and groundwater flow) were assessed by evaluating the indicators presented in **Table 5.2**. The following sections explains the evaluation methodology used to assess the criteria.

Groundwater Quality

The effects on groundwater quality for each alternative were assessed by:

- Estimating the leachate generation rate;
- Predicting the leachate discharge through the liner;
- Assessing the leachate quality;
- Determining the effect on downgradient groundwater quality; and,
- Determining the effect on groundwater and surface water within the SWPA.

The groundwater quality was assessed for each alternative under closed conditions (i.e., final cover in place) and assumed the leachate collection system was operating to minimize leachate head. The alternatives were assessed under closure conditions in order to allow a comparative analysis of the effects of each alternative on the indicators.

The leachate generation rate was estimated using the Hydrologic Evaluation of Landfill Performance (HELP) model for each of the alternatives. The HELP model is a USEPA recognized program that is commonly used to estimate water balance for landfill sites. Local or site-specific data is used in the calculations, including precipitation, vegetation, soil/ geosynthetic liner types, layer thicknesses, hydraulic conductivities, and slopes. The HELP model was used to calculate daily, monthly, and annual averages for the amount of surface water runoff, evapotranspiration, drainage, and leachate collection. The HELP model was also used to predict the theoretical leachate discharge through the liner. Separate HELP models were created to simulate the differing final landfill configurations for each alternative. A more detailed description of the HELP modelling undertaken as part of this evaluation is included in **Appendix H**.

In order to estimate groundwater quality at the downgradient Site boundary for the various Site closure configurations, a generalized water balance and mass balance approach was used. A water balance was developed to quantify the hydrogeologic characteristics and functioning in the vicinity of the landfill. The water balance was used to estimate groundwater flow (flux) beneath the landfill and to incorporate predicted leachate discharge through the liner (calculated using the HELP model). A contaminant mass balance using the groundwater flux and predicted leachate discharge (mass loading) was used to calculate the contaminant concentrations at the Site boundary. Contaminant concentrations were compared to established trigger levels for the Site in order to identify potential compliance issues for each alternative. The impacts on local groundwater quality will be used to determine potential effects on groundwater and surface water within the SWPA.

Groundwater Flow

Groundwater flow could be impacted by the alternatives by affecting the groundwater flow direction and/or groundwater flow rates. The direction and flow rate of groundwater is dependent on hydraulic conductivities, saturated thicknesses, and hydraulic gradients (i.e., the change in hydraulic head over a horizontal length).

Of these parameters, the hydraulic gradient is the variable that could potentially be impacted. An increase in leachate leakage through the liner could affect the distribution of hydraulic head under the landfill footprint, and thus changing horizontal hydraulic gradients. The results of the HELP modeling were used to calculate the potential change in hydraulic head through the use of the estimated leakage rate through the liner system under each alternative. The change in hydraulic head was used to determine the potential alterations of hydraulic gradients and subsequently, impacts on groundwater flow rates and direction. A detailed description of the groundwater flow calculations is provided in **Appendix H**.

Contaminating Lifespan

In order to evaluate the differences in contaminating lifespans for the various alternatives, the contaminating lifespan for each alternative was calculated using two different modelling approaches. The first approach involved simulating the degradation of leachate indicator parameters utilizing the 1DTRANSEN model (One-Dimensional Mass Transport and Sensitivity Analysis). The second approach utilized a model developed by Rowe (1991), which projects the decrease in leachate strength for a conservative contaminant species (e.g., chloride) where the decrease in strength is essentially due to dissolution as water infiltrates through the waste over time. A detailed description of the contaminating lifespan calculations using the models referenced above is provided in **Appendix H**.

Evaluation Results

Groundwater Quality

This section discusses the evaluation results in terms of the predicted effects of each alternative on groundwater quality. Discussions of predicted leachate generation and leakage through the liner are included as these are integral parts of the groundwater quality evaluation.

Leachate Generation

As discussed in Section 4, the HELP model was used to predict the leachate generation rates for each alternative. Leachate generation rates are provided by the HELP model as leakage through the final cover system into the waste mound. Based on the HELP modelling conducted, **Table 5.4** summarizes the predicted leachate generation rates under closure conditions for the six alternatives, as well as the existing approved configuration.

Table 5.4 Predicted Leachate Generation Rates

Landfilling Section	Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Approved	54.4	121,143
Alternative 1	54.4	158,891
Alternative 2	59.3	135,509
Alternative 3	54.4	121,182
Alternative 4	62.3	181,948
Alternative 5	54.4	158,896
Alternative 6	59.3	135,373

The results presented in **Table 5.4** demonstrate that leachate generation rates for all six Alternatives being considered are similar, however Alternatives 1, 4 and 5 result in greater leachate generation than the remainder of the alternatives. Further details on the HELP model is provided in **Appendix H.**

Effects on Downgradient Water Quality

A generalized water balance and mass balance approach was used to estimate groundwater quality at the downgradient Site boundary for each of the six alternatives. The water balance considered the primary inputs, and movements of water across the Site using both Site hydrogeologic data and theoretical calculations. The water balance and groundwater flow beneath the landfill was estimated by using Site specific groundwater elevations, gradients, and hydraulic conductivities. Based on the groundwater flux and contaminant mass loadings from predicted leachate leakage, downgradient groundwater quality was then estimated for each alternative.

A detailed description of calculation methodology and individual parameter results are provided in **Appendix H**.

It is important to note the following with respect to the results of the groundwater quality assessment:

1. The downgradient groundwater quality predictions have not taken into account the groundwater control systems incorporated into the landfill design. These systems are currently in operation

and will be expanded as part of continued landfill development. These systems are discussed further in Section 6 (Mitigation Measures).

2. The predicted downgradient groundwater quality for each of the six Alternatives is very similar to the predicted downgradient groundwater quality for the existing approval under closure conditions, modelled using the same methodology.

Effects on Source Water Protection

Any potential impacts to groundwater and/or surface water quality within the SWPA will be dependent on groundwater quality from the alternative options migrating into the IPZ for the City of Hamilton water intake. All six Alternative options show minimal effects on predicted groundwater quality prior to implementation of mitigation measures.

It is important to note that these predictions to downgradient groundwater and/or surface water quality within the SWPA do not consider the use of the groundwater control systems (mitigation measures). These systems will be operated and expanded as part of the continued landfill development and will mitigate the migration of potentially contaminated groundwater offsite. With the continued operation of the groundwater control systems, it is anticipated there will be no impacts on groundwater quality entering the IPZ.

Groundwater Flow

The estimated theoretical leakage rate of leachate through the liner, calculated using the HELP model, was used to determine the potential impacts of each alternatives on groundwater flow (See **Appendix H**). The HELP outputs show that leakage from the landfill liner will contribute approximately 0.064 mm each year. This leakage will predominantly enter the Vinemount Flow Zone (which directly underlies the base of the landfill footprint in each of the six alternatives), which could increase the hydraulic head beneath the landfill footprint. The increase in hydraulic head could affect groundwater flow by altering horizontal hydraulic gradients.

Based on the 2017 groundwater elevations measured at the Site, groundwater levels within the Vinemount Flow Zone are heavily influenced by groundwater extraction at M4 as well as the Phase One Centennial Parkway Trunk Sanitary Sewer (CPTSS) construction; however, historic reports (Taro East Quarry Environmental Assessment Hydrogeological, Impact Assessment Final Report, Gartner Lee, January 1995) show that the baseline potentiometric surface ranges from 201.0 to 192.6 mAMSL across the Site. Thus, the change in hydraulic head across the Site is on the order of several metres across a distance of approximately 900 m (i.e., i = (201mAMSL – 192.6mAMSL) / 900 m = 0.093 m/m).

Under each scenario of landfill expansion (Alternatives 1 through 6), the theoretical landfill leakage contributes, an additional hydraulic head of 0.064 mm/year. Conservatively assuming this will happen instantaneously, the hydraulic gradient under the various alternatives is equal to the additional hydraulic head added to the downgradient groundwater elevation. Thus, the maximum increase in hydraulic gradient due to leachate leakage under all alternatives is negligible. The change in hydraulic gradient will produce negligible changes to groundwater flow rate and no observable change in direction.

Contaminating Lifespan

As discussed above, a detailed description of the predicted contaminating lifespan for each alternative is provided in **Appendix H**.

Three scenarios were modeled using the Rowe Model, as follows.

- **Scenario 1:** Maximum anticipated indicator parameter concentration in leachate and average indicator parameter percentage in waste
- **Scenario 2:** Average anticipated indicator parameter concentration in leachate and average indicator parameter percentage in waste
- **Scenario 3:** Maximum anticipated indicator parameter concentration in leachate and maximum indicator parameter percentage in waste

The Rowe model differentiates between alternatives by taking into consideration waste area, volume and mass. **Table 5.5** below summarizes the contaminating lifespans calculated for chloride, as estimated using the Rowe Model, for each of the three scenarios for the approved existing conditions and the six alternatives.

Table 5.5 Contaminating Lifespan using the Rowe Model

Alternative Option	Contaminating Lifespan (years)		
	Scenario 1	Scenario 2	Scenario 3
Approved	19	31	29
Alternative 1	19	31	30
Alternative 2	19	31	29
Alternative 3	26	43	41
Alternative 4	18	30	28
Alternative 5	21	35	34
Alternative 6	19	32	30

A comparison of the contaminating lifespan values indicates that Alternatives 1, 2, 4, and 6 perform similarly to the existing approved design. Calculated contaminating lifespans are longer for Alternatives 3 and 5, both of which involve height increases without an expansion of the landfill footprint. The contaminating lifespan for Alternative 3 is significantly higher than the other options, primarily due to the increased elevation, and subsequent waste thickness, relative to the other options.

Potential Environmental Effects

Alternative Option 1

Minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits reaching wellhead protection area. Minimal anticipated impacts to water quality within the SWPA.

No changes in groundwater flow as the proposed alternative will have minimal effect on groundwater recharge patterns.

Alternative Option 2

Minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits reaching wellhead protection area. Minimal anticipated impacts to water quality within the SWPA.

No changes in groundwater flow as the proposed alternative will have minimal effect on groundwater recharge patterns.

Alternative Option 3

Minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits reaching wellhead protection area. Minimal anticipated impacts to water quality within the SWPA.

No changes in groundwater flow as the proposed alternative will have minimal effect on groundwater recharge patterns. Minimal anticipated impacts to water quality within the SWPA.

Alternative Option 4

Minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits reaching wellhead protection area.

No changes in groundwater flow as the proposed alternative will have minimal effect on groundwater recharge patterns. Minimal anticipated impacts to water quality within the SWPA.

Alternative Option 5

Minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits reaching wellhead protection area.

No changes in groundwater flow as the proposed alternative will have minimal effect on groundwater recharge patterns. Minimal anticipated impacts to water quality within the SWPA.

Alternative Option 6

Minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits reaching wellhead protection area. Minimal anticipated impacts to water quality within the SWPA.

No changes in groundwater flow as the proposed alternative will have minimal effect on groundwater recharge patterns.

Mitigation Measures

The evaluation of potential environmental effects provided above has been completed without taking into consideration several environmental control systems incorporated into the landfill design. These control systems are important aspects of the Site's groundwater protection strategy and accordingly they are being taken into consideration as mitigation measures for each of the six alternatives. The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of the six alternatives.

Groundwater Extraction Well M4

Around 1985, the Lower Excavation portion of the active quarry (at the time), was made through the Vinemount Shale floor to allow access to the Goat Island Dolostone. Dewatering for this quarrying operation from the Lower Excavation created a draw of impacted groundwater from the closed landfill located immediately to the west. The Lower Excavation ceased to be used and was backfilled in 1990 with clean rock rubble with a 3 m thick clay plug installed to simulate the low permeability of the former Vinemount Shale floor of the quarry. The contact between the clay plug was imperfect and flow from the VFZ and UFZ mixed within the rock rubble with groundwater from the lower flow zones. In order to control movement and extract contaminated groundwater migrating from the closed landfill, M4 extraction well was established in one corner of the former Lower Excavation.

Based upon observations of the system performance, a target pumping level was set for the M4 pumping well as a means of maintaining inward gradients toward the pumping well. Monitoring well observations during initial testing indicated that monitors across the length of the north boundary responded to the pumping of M4.

Potentiometric groundwater surfaces provided in the 2016 Annual Monitoring Report (Jackman, June 2017) show groundwater flow in each of the flow zones was heavily influenced by the operation of M4. Inwards, horizontal hydraulic gradients are shown across the northern Site boundary of both the SCRF and closed landfill.

In 2016, M4 extracted an average of 70,000 L/day (when in operation) which is greater than the combined flux estimates for the VFZ, UFZ, and UMFZ/LMFZ. It should be noted that in 2016, groundwater levels at the SCRF were being affected by dewatering associated with sewer construction along HWY. 20 which resulted in a historically low extraction volume from M4.

Based on data presented in the 2016 Annual Monitoring Report (Jackman, June 2017) (extraction greater than estimated flux values and measured inward horizontal hydraulic gradients), operation of M4 will be sufficient to capture potential future landfill-related water quality impacts within the VFZ, UFZ, and UMFZ/LMFZ.

Groundwater Collection Trench Network

The existing developed portion of the SCRF includes a network of shallow groundwater collection trenches that surround the landfill footprint and connect through a network of trenches underlying the landfill liner. These trenches are excavated through the VFZ and keyed into the underlying Vinemount Shale aquitard. The trenches are connected to a groundwater pumping station located at the southeast corner of the SCRF. Accordingly, the groundwater collection trench system is capable of containing all groundwater flow within the VFZ below the landfill footprint. As the VFZ would be the primary receptor of direct leachate leakage from the liner, this system is capable of mitigating leakage from the liner, should this condition be observed in the future.

Hydraulic Control Layer

The liner system for the SCRF includes a hydraulic control layer (HCL) between the two 1 m sections of compacted clay liner. The HCL consists of a coarse granular material, which, once fully constructed, will be flooded and maintained at a specified hydraulic head to induce an upward

vertical gradient across the upper portion of the compacted clay liner. Maintaining an upward hydraulic gradient across the clay liner will ensure that downward leaking of leachate across the clay cannot occur. Accordingly, operation of the HCL will provide a substantial degree of additional protection against discharge of leachate through the liner into the natural environment.

Geology/Hydrogeology Net Effects

The result of the Net Effects Analysis is that for each of the alternatives, no effects to groundwater quality or groundwater flow are anticipated. The key factors leading to this result are the use of the mitigation measures described in Section 6 and the use of these mitigation measures at this site for over 2 decades.

5.5.2 Surface Water

The net effects relating to the Surface Water components for all Options considered the following criteria and indicators;

Surface Water Quality:

- Predicted effects to surface water quality at property on and off-Site

Surface Water Quantity:

- Predicted change in drainage areas;
- Predicted occurrence and degree of off-Site effects.

Surface Water Modelling

Predictive modelling was performed using PCSWMM Version 7.1 with SWMM5 version 5.1.012 for the current approved design of the SCRF (baseline condition) and each of the alternate options being considered. This modelling served to evaluate the changes to the peak flows and runoff volumes for each of the alternatives when compared to the baseline condition. The results of the modeling of the peak flows and runoff volume for each condition are summarized in the tables below. The modelling results assume uncontrolled flows, meaning it was assumed that there were no measures to contain and capture the runoff (i.e., perimeter ditches and stormwater management ponds).

Table 5.6 Peak Flow Comparison

Options	Uncontrolled 2-year Storm		Uncontrolled 100-year Storm	
	Peak Flow (m^3/s)	Percent Difference to Baseline	Peak Flow (m^3/s)	Percent Difference to Baseline
Existing/Baseline	0.969	N/A	6.616	N/A
Option 1 (Reconfiguration)	0.967	-0.21%	5.929	-10.38%
Option 2 (Footprint Expansion)	0.929	-4.13%	5.932	-10.34%
Option 3 (Height Increase)	0.971	0.21%	6.927	4.70%
Option 4	0.925	-4.54%	5.641	-14.74%

Table 5.6 Peak Flow Comparison

Options	Uncontrolled 2-year Storm		Uncontrolled 100-year Storm	
	Peak Flow (m^3/s)	Percent Difference to Baseline	Peak Flow (m^3/s)	Percent Difference to Baseline
(Reconfiguration and Footprint Expansion)				
Option 5 (Reconfiguration and Height Increase)	0.969	0.00%	6.313	-4.58%
Option 6 (Footprint Expansion and Height Increase)	0.933	-3.72%	6.631	0.23%

Table 5.7 Total Runoff Volume Comparison

Options	Uncontrolled 2-year Storm		Uncontrolled 100-year Storm	
	Runoff Volume (m^3)	Percent Difference to Baseline	Runoff Volume (m^3)	Percent Difference to Baseline
Existing/Baseline	14,051	N/A	57,985	N/A
Option 1 (Reconfiguration)	15,501	10.32%	61,676	6.37%
Option 2 (Footprint Expansion)	14,343	2.08%	58,795	1.40%
Option 3 (Height Increase)	14,108	0.41%	58,069	0.14%
Option 4 (Reconfiguration and Footprint Expansion)	15,881	13.02%	62,624	8.00%
Option 5 (Reconfiguration and Height Increase)	15,564	10.77%	61,735	6.47%
Option 6 (Footprint Expansion and Height Increase)	14,438	2.75%	58,876	1.54%

As can be seen in the tables, the options that involve reconfiguration or a footprint expansion result in increased runoff volume. Most options showed a decrease in peak flows. This can be attributed to the fact that the average slopes in most of the options was slightly less than in the baseline condition. Generally, an increase in height resulted in an increase in peak flows. In some cases, there was very little or no increase in peak flows due to a height increase and this may be attributed to other factors, such as reconfiguration of the Site changing the flow length or travel time of flows over the Site and to the outlet. The Net effects analysis is described for each option below.

Potential Effects to Surface Water Quality and Quantity

Alternative Option 1

Option 1 maintains the same footprint and height as the current approved design of the SCRF (baseline condition). The area currently approved for industrial fill will be used for residual material that will require a less pervious final cover during closure conditions. The final cover for the residual

material will produce more runoff than the final cover for industrial fill since the residual material final cover requires a layer of clay that is 600 mm thick. The clay layer will be less pervious than the cover for the industrial fill resulting in a larger runoff volume.

Surface Water Quality

The effect on surface water quality is minimal when compared to the baseline condition, as the same material (post diversion solid, non-hazardous industrial residual material) will continue to be accepted and disposed of. The SCRF will receive final cover with vegetation similar to the current approved design. The only contaminant of concern is total suspended solids (TSS) which occurs as stormwater flows over the final cover of the SCRF. With a similar cover, there will be similar TSS levels. The height of the residual material is also the same as the baseline, which will result in similar peak flows, minimizing any additional TSS that may be collected from the final cover during a storm event.

Surface Water Quantity - Change in Drainage Areas

The overall drainage area is the same as in the baseline condition. The area will be less permeable due to the increased area of residual material with the clay layer as part of the final cover. This will result in an increase in runoff volume.

Surface Water Quantity - Occurrence and Degree of Off-Site Effects

During the 2-year through 100-year storm events, uncontrolled flows from the SCRF (assuming there are no perimeter ditches or stormwater management pond to capture runoff) will produce a larger runoff volume than the baseline condition. The predicted increase in runoff volume is approximately 10% during the 2-year event and 6% during the 100-year event. There is no expected increase in peak flows due the height of the residual fill staying the same as baseline conditions. Runoff will flow off-Site and cause an increase in flows in the roadside ditches and creeks within the local study area. There may also be erosion or flooding in these areas during larger storm events.

Alternative Option 2

Option 2 maintains the same height as the current approved design of the SCRF (baseline condition) and the SCRF will continue to receive industrial fill. The buffer area will be reduced to a minimum of 30 m and the SWM pond will be placed within the buffer area in the northwest corner of the Site. This results in an increased area for residual material. An increase in residual material area with a final cover that requires a layer of less pervious clay will result in a larger runoff volume.

Surface Water Quality

The effect on surface water quality is minimal when compared to the baseline condition as the same material (post diversion solid, non-hazardous industrial residual material) will continue to be accepted and disposed of. The SCRF will receive final cover with vegetation similar to the current approved design. The only contaminant of concern is TSS that occurs as stormwater flows over the final cover of the SCRF. With a similar cover, there will be similar TSS levels. The height of the residual material is also the same as the baseline that will result in similar peak flows, minimizing any additional TSS that may be collected from the final cover during a storm event.

Surface Water Quantity - Change in Drainage Areas

The overall residual/fill drainage area is larger than the baseline condition. The area will be less permeable due to the increased area of residual material with the clay layer as part of the final cover. This will result in an increase in runoff volume.

Surface Water Quantity - Occurrence and Degree of Off-Site Effects

During the 2-year through 100-year storm events, uncontrolled flows from the SCRF (assuming there are no perimeter ditches or stormwater management pond to capture runoff) will produce a larger runoff volume than the baseline condition. The predicted increase in runoff volume is approximately 2% during the 2-year event and 1% during the 100-year event. There is no expected increase in peak flows due the height of the residual fill staying the same as baseline conditions. Runoff will flow off-Site and cause an increase in flows in the roadside ditches and creeks within the local study area. There may also be erosion or flooding in these areas during larger storm events.

Alternative Option 3

Option 3 maintains the same footprint area as the current approved design of the SCRF (baseline condition). The SCRF will continue to receive both industrial fill and residual material. The volume of runoff produced from the Site will be similar to baseline conditions due to similar areas being reserved for both industrial fill and residual material. The final cover in Option 3 will be similar to the final cover in the currently approved design. The residual material will have a vertical expansion, resulting in a larger area with steeper slopes. This will cause an increase in peak flows.

Surface Water Quality

The effect on surface water quality is minimal when compared to the baseline condition, as the same material (post diversion solid, non-hazardous industrial residual material) will continue to be accepted and disposed of. The SCRF will receive final cover with vegetation similar to the current approved design. The only contaminant of concern is TSS that occurs as stormwater flows over the final cover of the SCRF. With a similar cover, there will be similar TSS levels. The height of the residual material will increase which will result in higher peak flows, which may cause additional TSS to be collected from the final cover during a storm event.

Surface Water Quantity - Change in Drainage Areas

The overall drainage area is the same as in the baseline condition but there will be a height increase. The area will have a similar permeability due to similar areas of industrial fill and residual material. This will result in an increase to peak flows but similar runoff volumes.

Surface Water Quantity - Occurrence and Degree of Off-Site Effects

During the 2-year through 100-year storm events, uncontrolled flows from the SCRF (assuming there are no perimeter ditches or stormwater management pond to capture runoff) will produce a similar runoff volume than the baseline condition but having higher peak flows. The predicted increase in peak flows is less than 1% during the 2-year event and approximately 5% during the 100-year event. Runoff will flow off-Site and cause an increase in peak flows in the roadside ditches and creeks within the local study area. There may also be erosion or flooding in these areas during larger storm events.

Alternative Option 4

Option 4 maintains the same height as the current approved design of the SCRF (baseline condition) and the SCRF will no longer receive industrial fill. The buffer area will be reduced to a minimum of 30 m and the SWM pond will be placed within the buffer area in the northwest corner of the Site. This results in an increased area for residual material. An increase in residual material area with a final cover that requires a layer of less pervious clay will result in a larger runoff volume.

Surface Water Quality

The effect on surface water quality is minimal when compared to the baseline condition as the same material (post diversion solid, non-hazardous industrial residual material) will continue to be accepted and disposed of. The SCRF will receive final cover with vegetation similar to the current approved design. The only contaminant of concern is TSS that occurs as stormwater flows over the final cover of the SCRF. With a similar cover, there will be similar TSS levels. The height of the residual material is also the same as the baseline that will result in similar peak flows, minimizing any additional TSS that may be collected from the final cover during a storm event.

Surface Water Quantity - Change in Drainage Areas

The overall residual material drainage area is larger than the baseline condition. The area will be less permeable due to the increased area of residual material with the clay layer as part of the final cover. This will result in an increase in runoff volume.

Surface Water Quantity - Occurrence and Degree of Off-Site Effects

During the 2-year through 100-year storm events, uncontrolled flows from the SCRF (assuming there are no perimeter ditches or stormwater management pond to capture runoff) will produce a larger runoff volume than the baseline condition. There is no expected increase in peak flows due the height of the residual fill staying the same as baseline conditions. The predicted increase in runoff volume is approximately 13% during the 2-year event and 8% during the 100-year event. Runoff will flow off-Site and cause an increase in flows in the roadside ditches and creeks within the local study area. There may also be erosion or flooding in these areas during larger storm events.

Alternative Option 5

Option 5 maintains the same footprint area as the current approved design of the SCRF (baseline condition) but there will be an increase in height. SCRF will no longer receive industrial fill so the area currently approved for industrial fill will be used for residual material. The additional residual material will require a less pervious final cover during closure conditions. The final cover for the residual material will produce more runoff than the final cover for industrial fill since the residual material final cover requires a layer of clay that 600 mm thick. The clay layer will be less pervious than the cover for the industrial fill resulting in a larger runoff volume. The residual material will have a vertical expansion, resulting in steeper slopes. The reconfiguration of the Site to have additional residual area will cause an increase in flow length and travel time of the runoff. This will cause a reduction in peak flows.

Surface Water Quality

The effect on surface water quality is minimal when compared to the baseline condition, as the same material (post diversion solid, non-hazardous industrial residual material) will continue to be accepted and disposed of. The SCRF will receive final cover with vegetation similar to the current approved design. The only contaminant of concern is TSS that occurs as stormwater flows over the final cover of the SCRF. With a similar cover, there will be similar TSS levels.

Surface Water Quantity - Change in Drainage Areas

The overall drainage area is the same as in the baseline condition but there will be a height increase. The area will have lower permeability due the replacement of industrial fill with residual material. This will result in an increase peak flows and runoff volumes.

Surface Water Quantity - Occurrence and Degree of Off-Site Effects

During the 2-year through 100-year storm events, uncontrolled flows from the SCRF (assuming there are no perimeter ditches or stormwater management pond to capture runoff) will produce more runoff volume and higher peak flows than the baseline condition. The predicted increase in runoff volume is approximately 11% during the 2-year event and 6% during the 100-year event. Runoff will flow off-Site and cause increased flows in the roadside ditches and creeks within the local study area. There may also be erosion or flooding in these areas during larger storm events.

Alternative Option 6

Option 6 provides an increase in footprint and height from the current approved design of the SCRF (baseline condition). The SCRF will continue to receive industrial fill. The buffer area will be reduced to a minimum of 30 m and the SWM pond will be placed within the buffer area in the northwest corner of the Site. This results in an increased area for residual material. An increase in residual material area with a final cover that requires a layer of less pervious clay will result in a larger runoff volume.

Surface Water Quality

The effect on surface water quality is minimal when compared to the baseline condition, as the same material (post diversion solid, non-hazardous industrial residual material) will continue to be accepted and disposed of. The SCRF will receive final cover with vegetation similar to the current approved design. The only contaminant of concern is TSS that occurs as stormwater flows over the final cover of the SCRF. With a similar cover, there will be similar TSS levels. The height of the residual material will increase which will result in higher peak flows, which may cause additional TSS to be collected from the final cover during a storm event.

Surface Water Quantity - Change in Drainage Areas

The overall residual material drainage area is larger than the baseline condition and there will be a height increase. The area will be less permeable due to the increased area of residual material with the clay layer as part of the final cover. This will result in an increase in peak flows and runoff volume.

Surface Water Quantity - Occurrence and Degree of Off-Site Effects

During the 2-year through 100-year storm events, uncontrolled flows from the SCRF (assuming there are no perimeter ditches or stormwater management pond to capture runoff) will produce a larger runoff volume than the baseline condition. There will also be an increase in peak flows due the height increase of the residual fill. The predicted increase in runoff volume is approximately 3% during the 2-year event and 2% during the 100-year event. Peak flows are expected to only increase by less than 1% during the 100-year event. The increased runoff volume will flow off-Site which will cause increased peak flows and flow volumes in the roadside ditches and creeks within the local study area. There may also be erosion or flooding in these areas during larger storm events.

Mitigation

The addition of perimeter ditches that can convey up to the 100-year storm event will prevent any flows from leaving the Site. A stormwater management pond with two forebays can be designed to treat the runoff to the required levels and to control the release of the 2-year- through 100-year storm events to pre-development levels. This will prevent erosion and flooding off-Site.

The allocated SWM pond area is large enough to size a pond that can treat and control the Site runoff. There may be some complications in the design of the pond due to the elevation difference between the residual material toe of slope and the elevations of the roads adjacent to the SWM pond. The berm separating the SWM pond from Green Mountain Road West and First Road West will need to have significant design considerations. This may result in a costly design and construction of the SWM pond. Since the SWM pond will be built within the 30 m buffer area, the berm sloping from the SWM pond to the roads will take up more than half the width allocated for the pond. This will cause additional design and construction constraints.

The pond design will include emergency shut-off valves so that stormwater will not be released into the storm sewer system below First Road West, which ultimately discharges into Davis Creek, if water quality testing determines that the water quality is not suitable for discharge. Contingency measures include “status quo”, which is to discharge stormwater to the sanitary sewer for treatment at the City’s water pollution control plant.

Surface Water Net Effects

The SWM pond and perimeter ditches will able to treat and control the runoff from the Site to the same level as the current approved design and results in low net environmental effects from all Alternative Options.

5.5.3 Terrestrial and Aquatic (Natural) Environment

The net effects relating to the Natural Environment for all Options considered the following criteria and indicators:

Effect on terrestrial ecosystems:

- Predicted impact on vegetation communities, wildlife habitat including rare, threatened or endangered species.

Effect on Aquatic Ecosystems:

- Predicted impact on aquatic habitat and aquatic biota

Potential Effects on Terrestrial Ecosystems

Through the Net Effects Analysis process, potential effects on terrestrial ecosystems were identified for all alternatives. Potential effects included temporary loss of existing vegetation communities (e.g., marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of regrading activities and expansion into buffer areas (for Options 2, 4 and 6) as well as temporary loss of approximately 13 ha of habitat of a threatened species (eastern meadowlark) in the dry-fresh graminoid meadow ecosite at the south and west portion of the Site. No off-Site impacts are anticipated as a result of any of the alternatives. The effects were identified as 'Temporary' based on the assumptions that not all vegetated areas will be disturbed simultaneously and that habitats will be re-established on-Site following landfill closure. Additional details are provided in **Appendix H**.

Effects on Aquatic ecosystems

Through the Net Effects Analysis process, potential effects on aquatic ecosystems were identified for all alternatives. This included:

- Loss of on-Site aquatic habitat and disturbance of aquatic biota associated with open water habitats in stormwater infrastructure due to regrading activities and modifications to stormwater ponds at the northwest corner of the Site (for Alternatives 2, 4 and 6).

No off-Site impacts are anticipated as a result of any of the alternatives. Additional details are provided in **Appendix H**.

Mitigation Measures

In order to mitigate these potential effects to terrestrial ecosystems, the following mitigation measures will be employed:

- Conduct any vegetation removal activities outside of the breeding bird window (i.e., no removals between late March - late August).
- Consult with MNRF to determine if there is a need for any registrations, permits or approvals related to the presence of eastern meadowlark to avoid contravention of the provincial *Endangered Species Act*. Incorporate graminoid meadow habitats into the closure landscape plan, managed for grassland birds.
- Compensation for the loss of vegetation communities could occur elsewhere on-Site where there are areas that could be revegetated. Where possible, salvage plant material for restoration from areas where vegetation is removed.

Best Management Practices (BMPs) that are recommended across all alternatives include the following:

- Use of dust suppressants;
- Installation of protective fencing (where required);

- Conduct a nest survey of on-Site facilities and infrastructure prior to relocation or removal of structures to mitigate impacts to bird species which may use anthropogenic structures for nesting. If nests are found, consult a biologist/MNRF for further direction;
- Any wildlife incidentally encountered during Site operation activities will not be knowingly harmed and will be allowed to move away from the area on its own;
- In the event that an animal encountered during Site operation activities does not move from the area, or is injured, the Site Supervisor, a biologist, and MNRF will be notified;
- In the event that the animal is a known or suspected SAR, the Site Supervisor will contact MNRF SAR biologists for advice; and,
- Include naturalized landscape features into the stormwater management facilities design (e.g., emergent robust vegetation, shallow slope).

In order to mitigate the potential effects to aquatic ecosystems, the following mitigation measures will be employed:

- Characterize use of on-Site aquatic features by fish and wildlife prior to modification/removal. Obtain necessary permits for and complete fish/wildlife rescue activities prior to initiation of any in-water works, as appropriate.
- Install erosion and sediment control (ESC) measures to mitigate impacts to water quality and to act as wildlife exclusion fencing prior to construction, and maintain them appropriately throughout landfill construction and operation.

Natural Environment Net Effects

With the implementation of the mitigation measures described above including BMPs, net effects on terrestrial and aquatic ecosystems are anticipated to be low for all Alternative Options.

5.5.4 Atmospheric Environment - Air and Odour

Atmospheric Environment criteria were evaluated with indicators for each landfill footprint alternative (including number and significance) to support the reasoned argument in the comparative rankings:

Effect of Air Quality on Off-Site Receptors

- Predicted off-Site point of impingement concentrations of particulate matter size fractions

Effect of Odours on off-Site Receptors

- Predicted off-Site point of impingement concentrations of volatile organic compounds

General Assumptions

Assumptions included in the assessment for each indicator include the following, for each alternative:

Air Quality

- Predicted concentrations of three size fractions of particulate matter (TSP, PM10 and PM2.5) at off-Site receptors compared to the MECP's Point of Impingement Standards and Ambient Air Quality criteria (for 24-hour and annual averaging periods).

- Likelihood of predicted concentrations of the particulates to be similar to, greater than, or less than the concentrations resulting from the currently approved plan for the Facility.
- Location and extent of potentially affected off-Site receptors.
- The maximum permitted 250 trucks per day was assumed for all alternative landfill footprints – this is highly conservative as the vehicle movements on-Site are typically half. This was used as a starting point and will be refined during the impact assessment stage in concert with mitigation measures to more realistic and current truck per day movements.

Odour

- Predicted concentrations of volatile and semi-volatile compounds present in the impacted leachate (such as benzene, toluene, xylenes and others, which are odourous).
- Likelihood of predicted concentrations of odourous species to be similar to, greater than, or less than the concentrations resulting from the currently approved plan for the Facility.
- Location and extent of potentially affected off-Site receptors.

Net Effects for Air and Odour

The following assumptions were made for the emissions estimates and dispersion modelling:

- All numerical modelling was carried out using the U.S. EPA AERMOD model (v. 16216r, for the inclusion of annual averages), and MECP-provided terrain and meteorological data for the vicinity of the Facility.
- Operational hours of the landfill are from 7 AM to 5 PM (10 hours per day).
- A single footprint and elevation was assessed for each alternative. Elevations were assumed to conform to final (maximum) elevations.
- Unpaved roads were assumed for all scenarios.
- The maximum permitted 250 trucks per day was assumed for all alternative landfill footprints – this is highly conservative as the vehicle movements on-Site are typically half. This was used as a starting point and will be refined during the impact assessment stage in concert with mitigation measures to more realistic and current truck per day movements
- The active area was assumed to be within the area defined by the proposed haul route for each alternative.
- Material handling was assumed to consist of drop operations, as 250 trucks per day unloaded their waste; and earth moving/bulldozing of the waste material into the working area – this is highly conservative as the vehicle movements on-Site are typically half. This was used as a starting point and will be refined during the impact assessment stage in concert with mitigation measures to more realistic and current truck per day movements
- The annual average was assessed assuming maximum daily operations at the Site, 365 days per year – this is a conservative estimate as the Site's ECA allows for normal operating hours from Monday to Friday only (The ECA explicitly states that the Site shall be closed on weekends and statutory holidays).
- Odour emissions were assumed to be mostly originating from the leachate pumping station, where pre-treated leachate is brought to the surface for treatment, prior to be being pumped back underground, and diverted to holding areas or the municipal sanitary sewer.

These assumptions are highly conservative, and take into account Best Management Practices (BMP), but will require more specific mitigation measures at the impact assessment stage (discussed further in Chapter 6.0) and so a qualitative analysis has been undertaken, comparing the worst-case for each option. It is understood that a refinement to the existing customized BMP for dust mitigation will be required for the Facility, which will ensure suitable and appropriate mitigation is implemented to allow the Facility to operate within MECP guidelines.

The greatest differences between the various alternative scenarios consisted of the location and length of the on-Site haul route, and the final elevation of the landfill. Two alternatives also included the addition of a second pre-treatment leachate pumping station, potentially affecting the emission of odourous compounds.

Air and Odour Potential Effects

Under worst-case (maximum) operating conditions, with minimum dust mitigation, predicted off-Site concentrations of particulate species (TSP, PM_{10}, and $PM_{2.5}$) were predicted to exceed existing AAQC or POI standards at one or more off-Site receptors for all options. Once a recommended option is selected, specific mitigation measures will be designed in order for the Facility to meet MECP air quality criteria.

From an odour perspective, there is little difference between the identified options for this site. The addition of a second leachate pumping station at the opposite side of the Site may potentially reduce some odours because pre-treatment leachate will be split between the two pumping stations. Odours are not anticipated to change significantly between the proposed options and currently approved operations. Odour mitigation measures currently implemented at the Site will be required to be adequately maintained and operated in order for the Facility to meet MECP odour guidelines.

Mitigation

Mitigation measures and effectiveness will be determined based on the recommended alternative and will include Best Management Practices (BMPs) as well as other options including:

- Paving on-Site roads
- Road cleaning (watering, application of calcium chloride or other dust suppressants)
- Re-routing on-Site roads so they are further from the Site fenceline
- Limiting vehicle speeds on on-Site roads
- Review of the number of vehicles accessing the Site on a daily basis
- Detailed assessment of the progression of the Site operations for the Preferred Alternative
- Other options as identified during the design of the Preferred Alternative

Based on the identified mitigation required for the Preferred Alternative, a refined Dust Management Plan will be developed and implemented at the Facility.

Air and Odour Net Effects

From an atmospheric environment perspective, the Facility will be required to meet MECP criteria for air quality and odour. Through the implementation of effective and best practice mitigation

measures, the Facility will operate in accordance with MECP criteria for air quality. All six Options will be able to implement mitigation measures to meet the specified criteria to ensure there are no off-Site exceedances and meet MECP criteria.

5.5.5 Atmospheric Environment – Noise

The net effects relating to the Atmospheric Environment Noise components for all Options considered the following criteria and indicators;

Effect on Noise:

- Predicted off-Site noise level
- Number of off-Site receptors potentially affected (residential, commercial, institutional)

General Assumptions

The worst-case equipment locations were selected based on proximity and elevated line-of-sight exposure to the off-Site residential dwellings. The worst-case elevation was selected based on landfill cell development and the corresponding topography detail.

The analysis also accounts for the potential residential development on the residentially zoned vacant lots to the north and the agricultural zoned lot to the East which allows a single detached dwelling to be built.

Environmental Effects to Noise and Mitigation

Up to 75 off-Site residential dwellings located in the Study Area will be potentially impacted by noise from the landfill activities. The predicted noise impacts at the residential areas range from 40 to 59 dBA (rounded). The existing and potential residences near the northwest corner of the landfill are the most impacted as they are either approaching or exceeding the 55 dBA daytime noise limit for the six landfill design Alternatives.

- From a potential noise impact exposure perspective, Alternative Methods 1, 2 and 4 are nearly identical as the final landfill height is similar to existing conditions as discussed below. However, the now shortened separation distance from Site activities to adjacent residential areas due to the expansion will result in a potential change to the line-of-sight noise impact exposure for the off-Site residential dwellings.
- The increased height of the final landfill in addition to the shortened separation distances to residential areas for Alternative methods 3, 5 and 6 will result in a potential changes to the line-of-sight noise impact exposure to the off-Site residential dwellings.
- Landfill activities and on-Site operations are compared directly against a daytime one-hour Leq sound level limit of 55 dBA for landfill operations that are limited to 7 a.m. to 7 p.m. under the MECP “Noise Guidelines for Landfill Sites” (N-1).

In order to meet the noise limit, the north property line berm height needs to be constructed at an appropriate height to block the line of sight to the residential areas to the north. The required height of the berm varies between 7 and 10 meters above the base landfill elevations. Further information is provided in **Appendix H**.

Alternative Method 1

Potential change to the predicted off-Site noise impacts occur due to increased line-of-sight due to the landfill reconfiguration associated with Alternative Method 1 and the decrease in the separation distance between the landfill activities and the adjacent residential properties.

Potential noise mitigation measures include berms at the landfill perimeter to the north. The height of barriers and/or berm are required to be an additional 7 m above existing base elevations (199 m ASL to 207 m ASL).

Alternative Method 2

Potential changes to the predicted off-Site noise impacts occur due to the Footprint Expansion associated with Alternative Method 2 and the decrease in the separation distance between the landfill activities and the adjacent residential properties.

Potential noise mitigation measures include berms at the landfill perimeter to the north. The height of barriers and/or berm are required to be an additional 10 meters above existing base elevations (203 m ASL to 210 m ASL).

Alternative Method 3

Potential changes to the predicted off-Site noise impacts occur due increased line-of-sight due to the elevation change associated with Alternative Method 3 and the decrease in the separation distance between the landfill activities and the adjacent residential properties.

Potential noise mitigation measures include berms at the landfill perimeter to the north. The height of barriers and/or berm are required to be an additional 7 m above existing base elevations (200 m ASL to 207 m ASL).

Alternative Method 4

Potential changes to the predicted off-Site noise impacts occur due to the Reconfiguration and Footprint Expansion associated with Alternative Method 4 and the decrease in the separation distance between the landfill activities and the adjacent residential properties.

Potential noise mitigation measures include berms at the landfill perimeter to the north. The height of barriers and/or berm are required to be an additional 9 m above existing base elevations (201 m ASL to 208 m ASL).

Alternative Method 5

Potential changes to the predicted off-Site noise impacts occur due increased line-of-sight from the elevation change associated with Alternative Method 5 and the decrease in the separation distance between the landfill activities and the adjacent residential properties.

Potential noise mitigation measures include berms at the landfill perimeter to the north. The height of barriers and/or berm are required to be an additional 8 m above existing base elevations (201 m ASL to 208 m ASL).

Alternative Method 6

Potential changes to the predicted off-Site noise impacts occur due increased line-of-sight from the elevation change associated with Alternative Method 6 and the decrease in separation distance between the landfill activities and the adjacent residential properties.

Potential noise mitigation measures include berms at the landfill perimeter to the north. The height of barriers and/or berm are required to be an additional 9 mmeters above existing base elevations (202 m ASL to 209 m ASL).

Noise Net Effects

After mitigation measures, noise levels at receptors will be below the applicable noise criteria at the each receptor, which is based on the higher of the background sound level and the MECP's minimum sound level limits. Further details are provided in **Appendix H**.

5.6 Built Environment

5.6.1 Land Use

The net effects relating to the Land Use components for all Options considered the following criteria and indicators:

Effect on existing Land Use:

- Current land Use

Effect on views of the Facility:

- Predicted changes in views of the Facility from the surrounding area

General Considerations for Land Use

The current land use of the SCRF is designated under the Urban Hamilton Official Plan and is designated as Open Space. The Site is currently zoned as ME-1 under City of Stoney Creek Zoning By-law No. 3692-92, which is a special designation that permits operations associated with non-hazardous waste from industrial, commercial and institutional sources. Land uses within 500 m of the Site and within the 1500 m Local Study Area are identified and consist of a mix of residential, commercial, institutional, recreational, and agricultural uses. For each of the alternatives, the environmental effects with respect to existing land uses are primarily the removal or loss of the existing land uses and their replacement with a waste management facility. There are no mitigation measures proposed with respect to the existing land use indicator; consequently, the potential and net effects are considered the same. Further detail is provided below.

Residential

The nearest existing residential dwelling is approximately 60 m south of the Site (across Mud Street). Approximately 1,200 existing residential units registered under a plan of subdivision post 1996 are located within 500 m of the Site. These residential properties are primarily located within the Urban Area, as identified in the Urban Hamilton Official Plan (2013). The majority of the existing residential uses within the Local Study Area are located south of the SCRF. Lands to the south

consist of existing and proposed phases of the Penny Lane Estates subdivision. In accordance with the City of Hamilton's filed registered and draft approved plans of subdivision, there are approximately 6,800 residential units both existing and proposed within the preliminary Study Area. Of the approximate 6,800 residential units within the Local Study Area, approximately 5,800 (registered) residential units currently exist. All landfill footprint options do not physically extend or impede on the existing residential parcel fabric of the Local Study Area. As such, neighbouring residential uses to the Site and within the Local Study Area are not subject to direct physical impact requiring alteration of land or change in land use or zoning.

Commercial

A cluster of 11 existing commercial properties resides within 500 m of the Site, along the arterial roads along Upper Centennial Parkway and Mud Street towards Red Hill Valley Parkway (i.e., Gas station(s), Golf course, Restaurants, Mixed Use, etc). The locations of these commercial properties are located in both the Urban Area and Rural Area, as identified in the Urban Hamilton Official Plan (2013). All landfill footprint options do not physically extend or impede on the potential use and/or operations of the 11 commercial facilities within 500 m of the Site. As such, the 11 existing commercial facilities are not subject to direct physical impact requiring alteration of land or change in land use or zoning.

Recreational

Heritage Green Community Sports Park, Heritage Green Passive Park, and Heritage Green Community Trust Leash Free Dog Park reside within 500 m of the Site. All landfill footprint options do not physically extend or impede on the potential use and/or operations of the recreational facilities within 500 m. As such, these facilities are not subject to direct physical impact requiring alteration of land or change in land use or zoning.

Parks and recreational facilities located within the Local Study Area include Felker's Falls Conservation Area, Dofasco Park, Felker Park, Maplewood Park, and Maplewood Green Park. All landfill footprint options do not physically extend or impede on the potential use and/or operations of the recreational uses within the Local Study Area. As such, the recreational uses within the Local Study Area are not subject to direct physical impact requiring alternation of land or change in land use or zoning.

Institutional

Institutional uses within 500 m of the Site include St. James the Apostle Catholic Elementary School. This property is not subject to direct physical impact requiring alternation of land or change in land use or zoning. The Local Study Area consists of 15 existing institutional uses, including primary and secondary schools, public facilities and community services. Institutional uses within the Local Study Area are not subject to direct physical impact requiring alternation of land or change in land use or zoning. As such, no net effects to the physical location of institutional uses resulting from the landfill footprint options considered are anticipated.

Agricultural

Four agricultural properties/parcels are located within 500 m of the Site and are located along Upper Centennial Parkway between Mud Street and Green Mountain Rd. and at the corner of

Mud Street. As per the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) soil classifications, the four agricultural properties consist of Class 1, 2, and 6 soils. Soil classes 1 and 2 are described as moderately high to high productivity of common field crops. Soil class 6 is consistent with severe limitations to soil capabilities. All landfill footprint options do not physically extend or impede on the potential use and operations of the four agricultural properties within 500 m of the Site. As such, no net effects to agricultural lands as a result of the landfill footprint options considered are anticipated.

A total of 41 additional properties within the Local Study Area are currently zoned for agricultural use, as in accordance with City of Hamilton Zoning By-law No. 05-200 and City of Stoney Creek Zoning By-law No. 3692-92. All landfill footprint options do not physically extend or impede on the potential use and operations of the agricultural properties within Local Study Area. As such, no net effects to agricultural lands within the Local Study Area as a result of the landfill footprint options considered are anticipated.

Mitigation

Mitigation Measures are not required for existing land uses within the Local Study Area, since each landfill footprint option and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Mitigation measures would be established to manage any potential nuisance influenced by site operations of each landfill footprint options relative to noise, air quality (including odour), and traffic, as described in the Comparative Analysis Memos for noise, air quality, and traffic.

Existing Land Use Mitigation and Net Effects

All landfill footprint options considered do not warrant a change to the existing land use designation or zoning designation of the Site and do not warrant a change to existing land use designations or zoning designations of the adjacent properties, properties and land uses within 500 m, and properties and land uses within the Local Study Area. As such, no physical impact to properties or change in land use of properties within the Local Study Area are anticipated resulting from the potential implementation of the landfill footprint options considered.

General Considerations for Visual Aspects

Photographic renderings of the 6 options were developed (**Appendix H**) to show what each of the options would look like from various viewpoints. The viewpoints include;

- First Road West looking South
- Morrissey Blvd. looking South
- Green Mountain Rd. West looking South
- Green Mountain Rd. West and Centennial Parkway looking southwest
- First Rd. East Looking West
- Upper Centennial Parkway and Mud Street East looking North West
- Trafalgar Drive Looking North
- Mud Street East and First Rd. West Looking Northeast
- Heritage Green Community Trust Leash Free Dog Park Looking East

Potential Effects – Visual Perspectives

The visual net effects analysis used the renderings described above to determine how the views of the Facility might change.

Alternative Option 1

Option 1 does not result in a height change, but a reconfiguration of the waste within the landfill. Views are therefore minimally affected by the reconfiguration. Application of visual screening and vegetation would mitigate the views and result in low effects.

Alternative Option 2

Option 2 maintains the same height as the current approved design of the SCRF (baseline condition) but requires a change to the current footprint and the buffer areas are reduced to 30 m minimum. The change in footprint results in increased views of the Facility from neighboring residential properties, as the residual material will be closer to the property boundary. Application of visual screening and vegetation would mitigate the views and result in low effects.

Alternative Option 3

Option 3 maintains the same footprint area and buffer areas as the current SCRF (baseline condition), but results in a height increase of 12 m. From a visual perspective, a 12 m increase results in a noticeable change to the views of the Facility from adjacent and surrounding properties in all directions. The residual material would be highly visible from all viewpoints. The installation of additional visual screens will help to mitigate some of the view, however, some views will still be visible particularly from adjacent residential properties along Mud Street and Green Mountain Road. Option 3 results in High Net Effects.

Alternative Option 4

Option 4 maintains the same height as the current approved design of the SCRF (baseline condition) but requires a change to the current footprint and the buffer areas are reduced to 30 m minimum. The views of the Facility are minimally affected by the reconfiguration and expansion. Application of visual screening and vegetation would mitigate the views and result in low effects.

Alternative Option 5

Option 5 results in a small height increase of 2.5 m and reconfiguration, but maintains current buffers and footprint. The slight height increase will result in slight view change to the Facility in all directions. However, the application of additional visual screens will mitigate the view. Application of visual screening and vegetation would mitigate the views and result in low effects.

Alternative Option 6

Option 6 results in a height increase of 8 m, and the buffer areas are reduced to 30 m minimum. The height increase as well as changes to the current footprint will result in changes to views of the Facility. The residual material will not only become closer to the property boundary, but will also become quite visible with an 8 m increase. The material will be visible from all directions, but particularly from adjacent properties. Installation of visual screens and added vegetation will

mitigate views, but will not be able to mitigate all views. Option 6 results in a high change to the viewsheds analyzed.

Mitigation

A combination of earth berms, vegetation, and fences are established around the perimeter of the Site to screen the views of the SCRF from the surrounding built-up areas. Installation of additional visual screening elements, such as adding additional vegetation or increasing the berm height would help to mitigate the view from surrounding areas. However, visual mitigation measures may not be able to sufficiently block or mitigate all changing views, particularly for Options 3 and 6.

Visual Net Effects

In regards to visual impacts, it was determined that there would be varying levels of effects from the options. All of the Options will cause a change to view sheds from neighboring and adjacent properties. However, Options 3 and 6 will result in high effects as the height increases will be difficult to mitigate completely.

5.7 Social Environment

5.7.1 Traffic

The net effects relating to the Transportation components for all Options considered the following criteria and indicators;

Effect on Traffic:

- Potential for traffic collisions
- Level of Service at intersections around the SCRF

Traffic Effects

With respect to the “Potential for traffic collisions” indicator, the expected effect of each alternative option on future frequency and severity of traffic collisions within the Local Study Area was assessed. All alternative options are not expected to impact average daily SCRF truck volumes. Therefore with no expected change in SCRF truck volumes within the Local Study Area for any of the alternative options, all alternative options are considered to have an equally negligible impact on the potential for traffic collisions in the Local Study Area. No mitigation measures are required, with no resulting net effects.

New residential housing is being planned and built adjacent to the property in the North and it is expected that this new housing will bring additional traffic to the area. However, despite an increase in background traffic, the number of trucks on the Site will not be increasing and therefore potential for collisions will not increase. For example, if 10 site trucks occur in one hour, with each Alternative, the maximum number of collisions with a site truck is still 10.

With respect to the “Level of Service at intersections around the SCRF” indicator, the expected effect of each alternative option on intersection Level of Service within the Local Study Area was assessed. Level of Service, with respect to intersection traffic operations, is a measure of the average delay for each turning movement at the selected intersection. As per the completed

Existing Traffic Conditions Report, it was concluded that existing SCRF truck volumes servicing the Site are not having any negative identifiable operational impact on the Local Study Area intersections, including with respect to Level of Service among other key measures.

Mitigation

All alternative options are not expected to impact average daily SCRF truck volumes. Therefore with no expected change in SCRF truck volumes within the Local Study Area for any of the alternative options, all alternative options are considered to have an equally negligible impact on the Level of Service at intersections in the Local Study Area. No mitigation measures are required, with no resulting net effects

Traffic Net Effects

Based on the fact that the Site will continue to operate under current conditions and there won't be an increase in additional vehicles at the Site on a daily basis, no net effects are expected for Traffic for all Alternative Options. Further details are provided in **Appendix H**.

5.7.2 Human Health

As previously mentioned, the amended ToR made a commitment to analyze the potential effects to human health during Alternative Methods assessment and evaluation utilizing the existing data and methodology established as part of the on-going SRCF Community Health Assessment Review (CHAR), which is completed on an annual basis. Given that the studies in the EA will be completed and be benchmarked against human health parameters, such as air quality and groundwater, data from the technical disciplines net effects analysis as was coupled with the data collected and used to complete the annual CHAR (20+ years of data) to analyze the potential effects to human health for each of the footprint options. With the exception of impacts to soil, the criteria below have been evaluated in the annual Community Health Assessment Review that Intrinsik has conducted since 1996. The evaluation of potential human health effects with these five (5) indicators has been completed by utilizing the existing annual CHAR report as a basis and enhancing it to sufficiently meet the MECP's requirements. The proposed approach will incorporate existing data and any new modelled data provided by other technical disciplines (Hydrogeology, Surface Water, Air Quality) as part of the EA process, and compare the current projected data to those used in the original 1996 Community Health Assessment Study (CHAS) to determine, much like the annual CHAR, whether the proposed expansion would result in any potential change in the conclusions of the original CHAS. Further, more detailed analysis will be completed during the impact assessment stage of the EA.

Five criteria were evaluated for each landfill footprint alternative (including number and significance) to support the reasoned argument in the comparative rankings:

Effect on Air Quality:

- Predict impacts to air quality and their potential effects on human health

Effect of Leachate Quality:

- Predict effects of leachate quality (inorganic and organic chemicals) on human health

Effect on Groundwater Quality

- Predict impacts to groundwater quality and their potential effects on human health
- Effect on Surface Water Quality
- Predict impacts to surface water quality and their potential effects on human health

Effect on Soil Quality

- Predict impacts to soil and their potential effects on human health

Alternative Option 1

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of PM2.5 size fraction would be higher than the existing approved landfill design, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community. When one evaluated the PM10 size fraction, short-term (i.e., 24-hour) concentrations have the potential under worst-case conditions to marginally exceed health-based benchmarks, compared to the existing base case. It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigative measures be considered at the design phase to reduce ambient PM10 particulate concentrations.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Method would not be expected to result in any health risks different than the existing approved landfill design.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative Method has leachate leakage rates through the liner that are substantially similar to the existing approved landfill design. Furthermore, the predicted downgradient groundwater quality is predicted to be very similar to the existing approved landfill design.

Surface Water Quality

Results of the surface water study indicate that stormwater management ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently mitigated to meet ambient guidelines at the fenceline (a condition that is, for the most part, being met under current operations, based on ongoing monitoring), then predicted deposition for this proposed Alternative Method should not be significantly different than those experienced with the

existing approved landfill design. Therefore, predicted impacts on soil quality in the surrounding community would be expected to be negligible.

Mitigation

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigation measures be considered at the design phase to reduce ambient PM10 particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control mitigation measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

Net Effect

Marginal increase in larger particulate size fractions (i.e., PM10) compared to the existing approved landfill design with the potential for transient short-term health concerns. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

Alternative Option 2

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of PM2.5 size fraction would be higher than the existing approved landfill design, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community. When one evaluated the PM10 size fraction, short-term (i.e., 24-hour) concentrations have the potential under worst-case conditions to marginally exceed health-based benchmarks, compared to the existing base case. It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigative measures be considered at the design phase to reduce ambient PM10 particulate concentrations.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Method would not be expected to result in any health risks different than the existing approved landfill design.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative Method has leachate leakage rates through the liner that are substantially similar to the existing approved landfill design. Furthermore, the predicted downgradient groundwater quality is predicted to be very similar to the existing approved landfill design.

Surface Water Quality

Results of the surface water study indicate that stormwater management ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently mitigated to meet ambient guidelines at the fenceline (a condition that is, for the most part, being met under current operations, based on ongoing monitoring), then predicted deposition for this proposed Alternative Method should not be significantly different than those experienced with the existing approved landfill design. Therefore, predicted impacts on soil quality in the surrounding community would be expected to be negligible.

Mitigation

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigation measures be considered at the design phase to reduce ambient PM10 particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control mitigation measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

Net Effect

Marginal increase in larger particulate size fractions (i.e., PM10) compared to the existing approved landfill design with the potential for transient short-term health concerns. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

Alternative Option 3

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of the PM10 and PM2.5 size fractions would be marginally higher than the existing approved landfill design, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Method would not be expected to result in any health risks different than the existing approved landfill design.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative Method has leachate leakage rates through the liner that are substantially similar to the existing approved landfill design. Furthermore, the predicted downgradient groundwater quality is predicted to be very similar to the existing approved landfill design.

Surface Water Quality

Results of the surface water study indicate that stormwater management ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently mitigated to meet ambient guidelines at the fenceline (a condition that is, for the most part, being met under current operations, based on ongoing monitoring), then predicted deposition for this proposed Alternative Method should not be significantly different than those experienced with the existing approved landfill design. Therefore, predicted impacts on soil quality in the surrounding community would be expected to be negligible.

Mitigation

It is recommended that standard mitigation measures be employed to minimize dust generation, as well as standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control mitigation measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

Net Effect

No predicted net effects when compared to existing approved landfill design.

Alternative Option 4

Option 4 maintains the same height as the current approved design of the SCRF (baseline condition) and the SCRF will no longer receive industrial fill. The currently approved area at the SCRF for receiving industrial fill would be replaced with post-diversion solid, non-hazardous industrial residual material. In addition, the areas at the SCRF not currently approved for receiving either industrial fill or residual material would be expanded into so that they would be able to receive post-diversion solid, non-hazardous industrial residual material.

A minimum 30 m buffer would be established around the entire area for receiving post-diversion solid, non-hazardous industrial residual material. Therefore, this option would include a horizontal expansion, but would not include a vertical expansion, with the peak height currently approved remaining unchanged.

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of PM2.5 size fraction would be higher than the existing approved landfill design, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community. When one evaluated the PM10 size fraction, short-term (i.e., 24-hour) concentrations have the potential under worst-case conditions to marginally exceed health-based benchmarks, compared to the existing base case. It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigative measures be considered at the design phase to reduce ambient PM10 particulate concentrations.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Method would not be expected to result in any health risks different than the existing approved landfill design.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative Method has leachate leakage rates through the liner that are substantially similar to the existing approved landfill design. Furthermore, the predicted downgradient groundwater quality is predicted to be very similar to the existing approved landfill design.

Surface Water Quality

Results of the surface water study indicate that stormwater management ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently mitigated to meet ambient guidelines at the fenceline (a condition that is, for the most part, being met under current operations, based on ongoing monitoring), then predicted deposition for this proposed Alternative Method should not be significantly different than those experienced with the existing approved landfill design. Therefore, predicted impacts on soil quality in the surrounding community would be expected to be negligible.

Mitigation

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigation measures be considered at the design phase to reduce ambient PM10 particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control mitigation measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

Net Effect

Marginal increase in larger particulate size fractions (i.e., PM10) compared to the existing approved landfill design with the potential for transient short-term health concerns. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

Alternative Option 5

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of PM2.5 size fraction would be higher than the existing approved landfill design, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community. When one evaluated the PM10 size fraction, short-term (i.e., 24-hour) concentrations have the potential under worst-case conditions to marginally exceed health-based benchmarks, compared to the existing base case. It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigative measures be considered at the design phase to reduce ambient PM10 particulate concentrations.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Method would not be expected to result in any health risks different than the existing approved landfill design.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative Method has leachate leakage rates through the liner that are substantially similar to the existing approved landfill design. Furthermore, the predicted downgradient groundwater quality is predicted to be very similar to the existing approved landfill design.

Surface Water Quality

Results of the surface water study indicate that stormwater management ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently mitigated to meet ambient guidelines at the fenceline (a condition that is, for the most part, being met under current operations, based on ongoing monitoring), then predicted deposition for this proposed Alternative Method should not be significantly different than those experienced with the existing approved landfill design. Therefore, predicted impacts on soil quality in the surrounding community would be expected to be negligible.

Mitigation

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigation measures be considered at the design phase to reduce ambient PM10 particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control mitigation measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

Net Effect

Marginal increase in larger particulate size fractions (i.e., PM10) compared to the existing approved landfill design with the potential for transient short-term health concerns. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

Alternative Option 6

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of PM2.5 size fraction would be higher than the existing approved landfill design, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community. When one evaluated the PM10 size fraction, short-term (i.e., 24-hour) concentrations have the potential under worst-case conditions to marginally exceed health-based benchmarks, compared to the existing base case. It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigative measures be considered at the design phase to reduce ambient PM10 particulate concentrations.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Method would not be expected to result in any health risks different than the existing approved landfill design.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative Method has leachate leakage rates through the liner that are substantially similar to the existing approved landfill design. Furthermore, the predicted downgradient groundwater quality is predicted to be very similar to the existing approved landfill design.

Surface Water Quality

Results of the surface water study indicate that stormwater management ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently mitigated to meet ambient guidelines at the fenceline (a condition that is, for the most part, being met under current operations, based on ongoing monitoring), then predicted deposition for this proposed Alternative Method should not be significantly different than those experienced with the existing approved landfill design. Therefore, predicted impacts on soil quality in the surrounding community would be expected to be negligible.

Mitigation

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further mitigation measures be considered at the design phase to reduce ambient PM10 particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control mitigation measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

Human Health Net Effect

Marginal increase in larger particulate size fractions (i.e., PM10) compared to the existing approved landfill design with the potential for transient short-term health concerns. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

Further details are provided in **Appendix H**.

5.8 Economic Environment

The net effects relating to the Economic components for all Options considered the following criteria and indicators;

Effect on approved/planned Land Uses:

- Number, extent, and type of approved/planned land uses affected

Economic benefit to the City of Hamilton and Local Community:

Employment at site (number and duration)

Potential Effects – Approved/Planned Land Uses

Located within 500 m of the Site are several planned residential and institutional uses. The net effects of the landfill footprint options considered on these planned land uses, relative to potential economic implications, is further assessed, as follows:

Residential

The closest residential dwelling (currently under construction) is located approximately 35 m north of the Site.

There are currently four draft approved plans of subdivision within the Local Study Area, as well as eight proposed plans of subdivision currently under municipal review, totaling approximately 2,100

future residential units to be developed within the Local Study Area. This includes a development application (ZAC-17-077) to re-zone 50 Green Mountain Road West from ND (Neighbourhood Development) to RM-3 (Multiple Residential). The effects on approved/planned and proposed residential uses within the Local Study Area is contingent on direct physical impact requiring alteration of land or change in land use or zoning required as a result of the landfill footprint options considered. However, all landfill footprint options considered, and relative 30 m buffer, do not physically extend or impede on planned residential uses. Therefore, no net effects to the physical location of planned residential uses resulting from the landfill footprint options considered are anticipated. Further, application of landfill operation best management practices and mitigation measures from other environmental components (i.e., noise, dust, traffic) will ensure there are no effects on future planned land uses.

Institutional

In accordance with the Nash Neighbourhood Secondary Plan, an institutional land use designation is present at the northwest corner of Green Mountain Road West and First Road West (435 First Road West). This land is reserved for the future development of a school (zoned Neighbourhood Institutional (I1), as approved by council on November 11, 2015, By-law No. 15-260); however, at this time the property is owned by a developer. All landfill footprint options do not physically extend or impede on the potential future use and/or operation of 435 First Road West. As such, no net effects to the physical location or site alteration of this property resulting from the options considered are anticipated. Further, application of landfill operation best management practices and mitigation measures from other environmental components (i.e., noise, dust, traffic) will ensure there are no effects on future planned land uses.

Mitigation

Mitigation Measures are not required for approved/planned and/or proposed land uses within the Local Study Area, since each landfill footprint option and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Mitigation measures would be established to manage any potential nuisance influenced by site operations of each landfill footprint options relative to noise, air quality (including odour), and traffic, as described in the Comparative Analysis Memos for noise, air quality, and traffic.

Approved/Planned Land Use Net Effects

In regards to the economic indicators, specifically the potential effect on approved/planned land uses including; number, extent, and type of approved/planned land uses affected, all six of the alternative options result in no net effects. Landfill operation best management practices and mitigation measures such as; storm water management pond, landfill liner system, dust and noise control measures will ensure potential effects to land uses are managed and mitigated. None of the presented landfill footprint options results in a change to proposed land uses within the Site or local study area. Therefore, there are no net effects and no mitigation steps required for the approved/land use indicator.

Potential Effects - Economic Benefits to the City of Hamilton and Local Community

Alternative Option 1

Option 1 allows for an increase in capacity at the SCRF, but does not meet the economic opportunity for Terrapure. The economic benefits to the City and local community are low as the City and community compensation would be reduced based on the current $ per tonne agreements. Further, reduced expansion capacity would not allow for maximum economic activity as demonstrated through the economic analysis[2]. Employment opportunities at the Site would be reduced (year over year) under Option 1 based on the reduced amount of employees required for the amount of residual material that this Option could be expanded by. Staffing requirements would be 15 full-time equivalents on site while the total years of employment for all employees for construction, operation and post-closure monitoring would be approximately 180 years.

Alternative Option 2

Option 2 allows for an increase in capacity at the SCRF, but does not meet the economic opportunity for Terrapure. The economic benefits to the City and local community are low as the City and community compensation would be reduced based on the current $ per tonne agreements. Further, reduced expansion capacity would not allow for maximum economic activity as demonstrated through the economic analysis (RIAS Inc). Employment opportunities at the Site would be reduced (year over year) under Option 2 based on the reduced amount of employees required for the amount of residual material that this Option could be expanded by. Staffing requirements would be 15 full-time equivalents on site while the total years of employment for all employees for construction, operation and post-closure monitoring would be approximately 170 years.

Alternative Option 3

Option 3 allows for an increase in capacity at the SCRF and meets the economic opportunity for Terrapure to allow for a 3.68 million m^3 increase in capacity. Option 3 would result in total economic activity of $349 million to $372 million, with GDP from $218 million to $232 million. The economic benefits to the City and local community are high as the City and community compensation would be maintained and maximized based on the current $ per tonne agreements. Employment opportunities at the Site would be increased (year over year) under Option 3 based on the increased amount of employees required for the amount of residual material that this Option could be expanded by. Staffing requirements would be 15 full-time equivalents on site while the total years of employment for all employees for construction, operation and post-closure monitoring would be approximately 250 years.

Alternative Option 4

Option 4 allows for an increase in capacity at the SCRF, but does meet the economic opportunity for Terrapure (slightly under the increase of 3.68 million m^3) Option 4 would result in total economic activity similar to Options 3, 5 and 6 based on the total increase in capacity for post diversion solid, non-hazardous residual material. The economic benefits to the City and local community are high as the City and community compensation ($ per tonne) would be slightly lower than other options

[2] Economic Impacts of the Stoney Creek Regional Facility, RIAS Inc., 2017

based on the total increase in capacity. Employment opportunities at the Site would be increased (year over year) under Option 4 based on the increased amount of employees required for the amount of residual material that this Option could be expanded by. Staffing requirements would be 15 full-time equivalents on site while the total years of employment for all employees for construction, operation and post-closure monitoring would be approximately 240 years.

Alternative Option 5

Option 5 allows for an increase in capacity at the SCRF and meets the economic opportunity for Terrapure to allow for a 3.68 million m^3 increase in capacity. Option 5 would result in total economic activity of $349 million to $372 million, with GDP from $218 million to $232 million. The economic benefits to the City and local community are high as the City and community compensation would be maintained and maximized based on the current $ per tonne agreements. Employment opportunities at the Site would be increased (year over year) under Option 5 based on the increased amount of employees required for the amount of residual material that this Option could be expanded by. Staffing requirements would be 15 full-time equivalents on site while the total years of employment for all employees for construction, operation and post-closure monitoring would be approximately 250 years.

Alternative Option 6

Option 6 allows for an increase in capacity at the SCRF and meets the economic opportunity for Terrapure to allow for a 3.68 million m^3 increase in capacity. Option 6 would result in total economic activity of $349 million to $372 million, with GDP from $218 million to $232 million. The economic benefits to the City and local community are high as the City and community compensation would be maintained and maximized based on the current $ per tonne agreements. Employment opportunities at the Site would be increased (year over year) under Option 6 based on the increased amount of employees required for the amount of residual material that this Option could be expanded by. Staffing requirements would be 15 full-time equivalents on site while the total years of employment for all employees for construction, operation and post-closure monitoring would be approximately 250 years.

Economic Net Effects

In regards to the potential economic benefit to the City of Hamilton and local community, specifically in regards to total economic activity, city and community compensation and employment at the Site, all of the options presented result in positive effects. An economic impact assessment was completed in 2017 (RIAS Inc.) regarding the reconfiguration and vertical expansion of the SCRF and the potential output to the local economy. Based on the historical fill rate, it was determined that the current SCRF site generates $28.7 million in economic activity in the Hamilton area, adding 17.9 million in GDP and 51 jobs for local workers. Based on the current configuration and remaining lifespan, the SCRF will generate between $94 and $104 million in total economic activity and 164 to 190 local jobs. It was concluded in the assessment that if an expansion of 3.68 million m^3 of residual material was approved, total economic activity is expected to range between $349 and $372 million, with GDP from $218 million to $232 million and an estimated total jobs between 662 and 671 (RIAS Inc., 2017). Further, the options that allow for Terrapure to realize the economic opportunity for the SCRF (i.e., increase the capacity by 3.68 million m^3) would ensure maximum return with respect to the compensation agreements ($ per tonne). Based on the above estimated

figures, it was determined that Options 3,5 and 6 result in high positive effects as the option allows for potential capacity of 3.68 million m^3 of residual material. Option 1, 2 and 4 were ranked as having medium positive effects because although they will result in increased residual material, they would not yield the 3.68 million m^3 of residual material and therefore would yield a lower overall economic benefit and would result in fewer jobs. Further details are provided in **Appendix H**.

5.9 Cultural Environment

5.9.1 Archaeology and Built Heritage

The net effects relating to the Archaeology and Built Heritage components for all Options considered the following criteria and indicators;

Effect on known or potential significant archaeological resources:

- Number and type of potentially significant, known archaeological sites affected
- Area (ha) of archaeological potential (i.e., lands with the potential for the presence of significant archaeological resources) affected.

Effect on built heritage resources and cultural heritage landscapes:

- Number and type of built heritage resources and cultural heritage landscapes displaced or disrupted

Archaeology and Built Heritage Potential Effects

Alternative Option 1

Option 1 does not require a change to the current footprint. The Site has been previously excavated and quarried and only one cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. Due to the previous disturbance on-Site (excavation for quarry operation), Option 1 does not affect a known or potential archaeological resource and therefore no mitigation measures are required.

Alternative Option 2

Option 2 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. Due to the previous disturbance on-Site (excavation for quarry operation), Option 2 does not affect a known or potential archaeological resource and therefore no mitigation measures are required.

Alternative Option 3

Option 3 does not require a change to the current footprint. The Site has been previously excavated and quarried and only one cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. Due to the previous disturbance on-Site (excavation for quarry operation), Option 3 does not affect a known or potential archaeological resource and therefore no mitigation measures are required.

Alternative Option 4

Option 4 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. Due to the previous disturbance on-Site (excavation for quarry operation), Option 4 does not affect a known or potential archaeological resource and therefore no mitigation measures are required.

Alternative Option 5

Option 5 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. Due to the previous disturbance on-Site (excavation for quarry operation), Option 5 does not affect a known or potential archaeological resource and therefore no mitigation measures are required.

Alternative Option 6

Option 6 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. Due to the previous disturbance on-Site (excavation for quarry operation), Option 6 does not affect a known or potential archaeological resource and therefore no mitigation measures are required.

Mitigation

No mitigation is required as no potentially significant archaeological resources or built heritage landscapes will be disturbed or displaced because of any of the Alternative Options.

Archaeology and Built Heritage Net Effects

The current SCRF site is located within a former quarry and is therefore considered to be previously disturbed from a cultural heritage and archaeological perspective. A copy of the quarry license and permit is included as **Appendix H** to demonstrate the extent of the quarry limits/ disturbed area relative to the alternative footprint options. All of the lands have been previously excavated and therefore it is concluded that there will be no potentially significant or known archeological sites or lands with the presence of archaeological resources disturbed or affected. No Net Effects or Mitigation measures are anticipated or required from an archaeological perspective.

A review of the designated culturally significant built heritage and cultural landscapes was completed to assist in the *Land Use Existing Conditions report*. The review determined that there was only one designated built heritage resource, known as the Billy Green House, 30 Ridge Rd (**Appendix H**) located within the 1.5km of the SCRF. None of the 6 Options will result in the designated resource to be disturbed or displaced and therefore No Net Effects and no mitigation measures are anticipated or required from a built/cultural heritage resource perspective.

It should be noted that as part of the 1996 Taro East EA, which established the currently approved facility, the Ministry of Culture, Tourism and Recreation (now known as Ministry of Tourism, Culture

and Sport) confirmed that there was a low potential for impacting cultural heritage resources on site due to the fact that the study area (for the landfill footprint) is limited to an exhausted quarry pit[3].

5.10 Design and Operations

Seven criteria were evaluated with seven indicators for each landfill footprint alternative (including number and significance) to support the reasoned argument in the comparative rankings. It should be noted that this factor area was expanded upon to include additional criteria and indictors based on commitments made within the Approved SCRF ToR. This includes a commitment to review how the existing leachate system would be able to accommodate the proposed alternatives and whether further upgrades would be required. This has been captured in the criteria "Leachate Management". Further, a commitment around closure and post-closure was also made in the SCRF ToR, which has been assessed under the Criteria "Closure and Post Closure". Further details on the broad framework for closure and post-closure is described in Section 6.

- Potential to Provide Service for Disposal
- Ability of Alternative Methods to provide disposal capacity for post-diversion, solid, non-hazardous residual material
- Cost of Facility
- Approximate relative cost of Alternative Methods
- Leachate Management
- Design and operating complexity
- Stormwater Management
- Design and operating complexity
- Construction
- Complexity and constructability of components
- Site Operations
- Complexity and operability of components
- Closure and Post-Closure
- Flexibility of design and operations

Effects Analysis

The net effects analysis serves to assess the changes to the additional design and operational requirements associated with each of the options when compared to the current approved design of the SCRF (baseline condition).

The changes for each of the options are discussed in further detail below.

[3] See Supporting Document #2 to the Stoney Creek Regional Facility Environmental Assessment Minister Approved Amended Terms of Reference for correspondence.

Alternative Option 1

Potential to Provide Service for Disposal

Option 1 only provides 8,830,000 m^3 of total disposal capacity for residual material. Option 1 does not meet the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Leachate Management

Option 1 requires the design and construction of additional base liner and leachate collection system for the expanded residual material area. The residual material is placed in a single area with one leachate pumping station. The shape and contours of the residual area are generally uniform. The larger footprint of the residual material area will see a moderate increase to the leachate generation rate.

Stormwater Management

Option 1 includes a triangular stormwater pond layout which is consistent with the current approved design. The layout of the stormwater pond provides design and operational flexibility.

Construction

Option 1 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Option 1 does not require expanding the base liner and leachate collection system horizontally to include other areas of the Site. This option has an open layout with a simple configuration and dedicated areas for the various components.

Site Operations

Option 1 does not include the importing of industrial fill, meaning that his material will no longer need to be managed. Leachate will be managed from a single area with one leachate pumping station. The proposed layout of the stormwater management pond provides operational flexibility. Access and egress from the Site will be maintained in their current configuration. Development of the Site will require the relocation or removal of existing infrastructure.

Closure and Post-Closure

Option 1 reflects an open and uniform configuration that will simplify site closure requirements. The overall layout and contours of the Site do not limit the flexibility of potential post-closure uses.

Cost of Facility

Option 1 will see increased costs related to the design, construction, operation, and maintenance of additional base liner and leachate collection system. There will be no additional construction costs associated with the excavation of adjacent areas of the Site to expand the base liner and leachate collection system. Additional costs will be incurred for the relocation or removal of existing infrastructure. Potential savings could be realized by no longer having to manage industrial fill material.

Mitigation

The potential effects associated with design and operational changes to the SCRF can only be mitigated through modifications to the Site's design and/or operation. There are also design and operating limitations that can affect the ability to mitigate these effects. For Option 1, the magnitude of the potential effects is anticipated to be small relative to the current approved layout since many aspects of the Site will only require minor modifications from their existing configuration.

Net Effect

Option 1 will have low net effects relative to the current approved layout since many aspects of the Site will only require minor modifications from their existing configuration. However, Option 1 does not meet the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Alternative Option 2

Potential to Provide Service for Disposal

Option 2 only provides 7,420,000 m^3 of total disposal capacity for residual material. Option 2 does not meet the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Leachate Management

Option 2 requires the design and construction of additional base liner and leachate collection system for the expanded residual material area. The residual material is placed in two separate areas with two separate leachate pumping stations. The shape and contours of the residual area are irregular. The larger footprint of the residual material area will see a small increase to the leachate generation rate.

Stormwater Management

Option 2 includes an "L" shaped stormwater pond layout which is not consistent with the current approved design. The layout of the stormwater pond limits design and operational flexibility.

Construction

Option 2 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Option 2 requires expanding the base liner and leachate collection system horizontally to include other areas of the Site. This option has a complex layout with an integrated configuration of the various components.

Site Operations

Option 2 includes the importing of industrial fill, meaning that his material will continue to be managed. Leachate will be managed from two separate areas with two separate leachate pumping stations. The proposed layout of the stormwater management pond limits operational flexibility. Access and egress from the Site will be modified from their current configuration. Development of the Site will require the relocation or removal of existing infrastructure.

Closure and Post-Closure

Option 2 reflects a complex layout with an integrated configuration that may complicate site closure requirements. The overall layout and contours of the Site limit the flexibility of potential post-closure uses.

Cost of Facility

Option 2 will see increased costs related to the design, construction, operation, and maintenance of additional base liner and leachate collection system. There will be additional construction costs associated with the excavation of adjacent areas of the Site to expand the base liner and leachate collection system. Additional costs will be incurred for the relocation or removal of existing infrastructure.

Mitigation

The potential effects associated with design and operational changes to the SCRF can only be mitigated through modifications to the Site's design and/or operation. There are also design and operating limitations that can affect the ability to mitigate these effects. For Option 2, the magnitude of the potential effects is anticipated to be large relative to the current approved layout since many aspects of the Site will require significant modifications from their existing configuration.

Net Effect

Option 2 will have high net effects relative to the current approved layout since many aspects of the Site will require significant modifications from their existing configuration. However, Option 2 does not meet the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Alternative Option 3

Potential to Provide Service for Disposal

Option 3 provides 10,000,000 m^3 of total disposal capacity for residual material. Option 3 meets the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Leachate Management

Option 3 does not require the design and construction of additional base liner and leachate collection system for an expanded residual material area. The residual material is placed in a single area with one leachate pumping station. The shape and contours of the residual area are irregular. Since the footprint of the residual material area is consistent with the current approved design, the leachate generation rate is also expected to remain relatively consistent with the current rate.

Stormwater Management

Option 3 includes a triangular stormwater pond layout which is consistent with the current approved design. The layout of the stormwater pond provides design and operational flexibility.

Construction

Option 3 will not require the construction of additional base liner and leachate collection system for an expanded residual material area. Option 3 does not require expanding the base liner and leachate collection system horizontally to include other areas of the Site. This option has a complex layout with an integrated configuration of the various components.

Site Operations

Option 3 includes the importing of industrial fill, meaning that his material will continue to be managed. Leachate will be managed from a single area with one leachate pumping station. The proposed layout of the stormwater management pond provides operational flexibility. Access and egress from the Site will be maintained in their current configuration. Development of the Site will require the relocation or removal of existing infrastructure.

Closure and Post-Closure

Option 3 reflects a complex layout with an integrated configuration that may complicate site closure requirements. The overall layout and contours of the Site limit the flexibility of potential post-closure uses.

Cost of Facility

Option 3 will not see increased costs related to the design, construction, operation, and maintenance of additional base liner and leachate collection system. There will be no additional construction costs associated with the excavation of adjacent areas of the Site to expand the base liner and leachate collection system. Additional costs will be incurred for the relocation or removal of existing infrastructure.

Mitigation

The potential effects associated with design and operational changes to the SCRF can only be mitigated through modifications to the Site's design and/or operation. There are also design and operating limitations that can affect the ability to mitigate these effects. For Option 3, the magnitude of the potential effects is anticipated to be small relative to the current approved layout since some aspects of the Site will require modifications from their existing configuration.

Net Effect

Option 3 will have low net effects relative to the current approved layout since many aspects of the Site will only require minor modifications from their existing configuration. Option 3 also meets the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Alternative Option 4

Potential to Provide Service for Disposal

Option 4 only provides 9,580,000 m^3 of total disposal capacity for residual material. Option 4 does not meet the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Leachate Management

Option 4 requires the design and construction of additional base liner and leachate collection system for the expanded residual material area. The residual material is placed in a single area with one leachate pumping station. The shape and contours of the residual area are generally uniform. The larger footprint of the residual material area will see a large increase to the leachate generation rate.

Stormwater Management

Option 4 includes an “L” shaped stormwater pond layout which is not consistent with the current approved design. The layout of the stormwater pond limits design and operational flexibility.

Construction

Option 4 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Option 4 requires expanding the base liner and leachate collection system horizontally to include other areas of the Site. This option has an open layout with a simple configuration and dedicated areas for the various components.

Site Operations

Option 4 does not include the importing of industrial fill, meaning that his material will no longer need to be managed. Leachate will be managed from a single area with one leachate pumping station. The proposed layout of the stormwater management pond limits operational flexibility. Access and egress from the Site will be modified from their current configuration. Development of the Site will require the relocation or removal of existing infrastructure.

Closure and Post-Closure

Option 4 reflects an open and uniform configuration that will simplify site closure requirements. The overall layout and contours of the Site do not limit the flexibility of potential post-closure uses.

Cost of Facility

Option 4 will see increased costs related to the design, construction, operation, and maintenance of additional base liner and leachate collection system. There will also be additional construction costs associated with the excavation of adjacent areas of the Site to expand the base liner and leachate collection system. Additional costs will be incurred for the relocation or removal of existing infrastructure. Potential savings could be realized by no longer having to manage industrial fill material.

Mitigation

The potential effects associated with design and operational changes to the SCRF can only be mitigated through modifications to the Site’s design and/or operation. There are also design and operating limitations that can affect the ability to mitigate these effects. For Option 4, the magnitude of the potential effects is anticipated to be small relative to the current approved layout since some aspects of the Site will require modifications from their existing configuration.

Net Effect

Option 4 will have moderate net effects relative to the current approved layout since some aspects of the Site will require significant modifications from their existing configuration. However, Option 4 does not meet the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Alternative Option 5

Potential to Provide Service for Disposal

Option 5 provides 10,000,000 m^3 of total disposal capacity for residual material. Option 5 meets the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Leachate Management

Option 5 requires the design and construction of additional base liner and leachate collection system for the expanded residual material area. The residual material is placed in a single area with one leachate pumping station. The shape and contours of the residual area are generally uniform. The larger footprint of the residual material area will see a moderate increase to the leachate generation rate.

Stormwater Management

Option 5 includes a triangular stormwater pond layout which is consistent with the current approved design. The layout of the stormwater pond provides design and operational flexibility.

Construction

Option 5 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Option 5 does not require expanding the base liner and leachate collection system horizontally to include other areas of the Site. This option has an open layout with a simple configuration and dedicated areas for the various components.

Site Operations

Option 5 does not include the importing of industrial fill, meaning that his material will no longer need to be managed. Leachate will be managed from a single area with one leachate pumping station. The proposed layout of the stormwater management pond provides operational flexibility. Access and egress from the Site will be maintained in their current configuration. Development of the Site will require the relocation or removal of existing infrastructure.

Closure and Post-Closure

Option 5 reflects an open and uniform configuration that will simplify site closure requirements. The overall layout and contours of the Site do not limit the flexibility of potential post-closure uses.

Cost of Facility

Option 5 will see increased costs related to the design, construction, operation, and maintenance of additional base liner and leachate collection system. There will be no additional construction costs associated with the excavation of adjacent areas of the Site to expand the base liner and leachate collection system. Additional costs will be incurred for the relocation or removal of existing infrastructure. Potential savings could be realized by no longer having to manage industrial fill material.

Mitigation

The potential effects associated with design and operational changes to the SCRF can only be mitigated through modifications to the Site's design and/or operation. There are also design and operating limitations that can affect the ability to mitigate these effects. For Option 5, the magnitude of the potential effects is anticipated to be small relative to the current approved layout since some aspects of the Site will require modifications from their existing configuration.

Net Effect

Option 5 will have low net effects relative to the current approved layout since many aspects of the Site will only require minor modifications from their existing configuration. Option 5 also meets the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Alternative Option 6

Potential to Provide Service for Disposal

Option 6 provides 10,000,000 m^3 of total disposal capacity for residual material. Option 6 meets the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Leachate Management

Option 6 requires the design and construction of additional base liner and leachate collection system for the expanded residual material area. The residual material is placed in two separate areas with two separate leachate pumping stations. The shape and contours of the residual area are irregular. The larger footprint of the residual material area will see a small increase to the leachate generation rate.

Stormwater Management

Option 6 includes an "L" shaped stormwater pond layout which is not consistent with the current approved design. The layout of the stormwater pond limits design and operational flexibility.

Construction

Option 6 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Option 6 requires expanding the base liner and leachate collection system horizontally to include other areas of the Site. This option has a complex layout with an integrated configuration of the various components.

Site Operations

Option 6 includes the importing of industrial fill, meaning that his material will continue to be managed. Leachate will be managed from two separate areas with two separate leachate pumping stations. The proposed layout of the stormwater management pond limits operational flexibility. Access and egress from the Site will be modified from their current configuration. Development of the Site will require the relocation or removal of existing infrastructure.

Closure and Post-Closure

Option 6 reflects a complex layout with an integrated configuration that may complicate site closure requirements. The overall layout and contours of the Site limit the flexibility of potential post-closure uses.

Cost of Facility

Option 6 will see increased costs related to the design, construction, operation, and maintenance of additional base liner and leachate collection system. There will also be additional construction costs associated with the excavation of adjacent areas of the Site to expand the base liner and leachate collection system. Additional costs will be incurred for the relocation or removal of existing infrastructure.

Mitigation

The potential effects associated with design and operational changes to the SCRF can only be mitigated through modifications to the Site's design and/or operation. There are also design and operating limitations that can affect the ability to mitigate these effects. For Option 6, the magnitude of the potential effects is anticipated to be high relative to the current approved layout since some aspects of the Site will require significant modifications from their existing configuration.

Net Effect

Option 6 will have moderate net effects relative to the current approved layout since some aspects of the Site will require significant modifications from their existing configuration. Option 6 also meets the economic opportunity put forward by Terrapure to increase the total approved capacity for post-diversion, solid, non-hazardous residual material at the SCRF by 3,680,000 m^3.

Further details are provided in **Appendix H**.

5.11 Summary of Net Effects

The net effects for each environmental component and details on the mitigation for each of the 6 options can be viewed in the Net Effects Tables (6 total) as part of **Appendix H**. However, a brief overview of the net effects is summarized below.

Option 1

Table 5.8 summarizes the net effects of each environmental component for Option 1:

Table 5.8 Option 1 – Summary of Net Effects

Environmental Component	Summary of Net Effects
Geology and Hydrogeology	No Net Effects to groundwater quality or groundwater flow are anticipated. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of mitigation measures.
Surface Water	No Net Effects to surface water quality or quantity are anticipated.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of Best Management Practices.
Land Use	No Net Effects to existing land uses within the Local Study area are anticipated. Low Net Effects to views of the Facility are anticipated. Installation of visual screening elements would obscure views of the Facility from sensitive receptors.
Economic	No Net Effects to approved or planned land uses within the Local Study Area are anticipated. Low (positive) Net Effects on economic benefits to the City of Hamilton and local community are anticipated.
Atmospheric	Low Net Effects to air quality affecting off-Site receptors are anticipated. Application of Dust BMPs and reduction in daily vehicle limits will mitigate effects to acceptable and approvable levels from an air quality for off-Site receptors. No Net Effects to odours affecting off-Site receptors are anticipated. Low Net Effects to noise affecting off-Site receptors are anticipated upon implementation of on-Site mitigation measures.
Human Health	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. VOC emissions would be equivalent to the existing approved landfill design, where concentrations are expected to be below heath-based benchmarks.
Transportation	No Net Effects to road user safety or intersection Level of Service are anticipated in the Local Study Area.
Archaeology and Built Heritage	No Net Effects to known or potential archaeological resources or built and cultural heritage resources are anticipated.
Design and Operations	Option 1 fails to meet the objectives for disposal and requires a small increase in cost relative to expansion.

Option 2

Table 5.9 summarizes the net effects of each environmental component for Option 2:

Table 5.9 Option 2 – Summary of Net Effects

Environmental Component	Summary of Net Effects
Geology and Hydrogeology	No Net Effects to groundwater quality or groundwater flow are anticipated. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of mitigation measures.
Surface Water	Low Net Effects to surface water quality and quantity are anticipated. There may be the potential for limitations to the design and construction of perimeter ditches and the stormwater management pond within the allocated areas.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of Best Management Practices.
Land Use	No Net Effects to existing land uses within the Local Study area are anticipated. Low Net Effects to views of the Facility are anticipated. Installation of visual screening elements would obscure views of the Facility from sensitive receptors.
Economic	No Net Effects to approved or planned land uses within the Local Study Area are anticipated. Low (positive) Net Effects on economic benefits to the City of Hamilton and local community are anticipated.
Atmospheric	Low Net Effects to air quality affecting off-Site receptors are anticipated. Application of Dust BMPs and reduction in daily vehicle limits will mitigate effects to acceptable and approvable levels from an air quality for off-Site receptors. No Net Effects to odours affecting off-Site receptors are anticipated. Low Net Effects to noise affecting off-Site receptors are anticipated upon implementation of on-Site mitigation measures.
Human Health	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. VOC emissions would be equivalent to the existing approved landfill design, where concentrations are expected to be below heath-based benchmarks.
Transportation	No Net Effects to road user safety or intersection Level of Service are anticipated in the Local Study Area.
Archaeology and Built Heritage	No Net Effects to known or potential archaeological resources or built and cultural heritage resources are anticipated.
Design and Operations	Option 2 fails to meet the objectives for disposal and requires a large increase in cost relative to expansion.

Option 3

Table 5.10 summarizes the net effects of each environmental component for Option 3:

Table 5.10 Option 3 – Summary of Net Effects

Environmental Component	Summary of Net Effects
Geology and Hydrogeology	No Net Effects to groundwater quality or groundwater flow are anticipated. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of mitigation measures.
Surface Water	No Net Effects to surface water quality or quantity are anticipated.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of Best Management Practices.
Land Use	No Net Effects to existing land uses within the Local Study area are anticipated. High Net Effects to views of the Facility are anticipated. Option 3 results in a height increase of 12 m and cannot be sufficiently mitigated.
Economic	No Net Effects to approved or planned land uses within the Local Study Area are anticipated. High (positive) Net Effects on economic benefits to the City of Hamilton and local community are anticipated.
Atmospheric	Low Net Effects to air quality affecting off-Site receptors are anticipated. Application of Dust BMPs and reduction in daily vehicle limits will mitigate effects to acceptable and approvable levels from an air quality for off-Site receptors. No Net Effects to odours affecting off-Site receptors are anticipated. Low Net Effects to noise affecting off-Site receptors are anticipated upon implementation of on-Site mitigation measures.
Human Health	No Net Effects to human health resulting from predicted effects to air quality, leachate quantity, groundwater quality, surface water quality, or soil quantity are anticipated.
Transportation	No Net Effects to road user safety or intersection Level of Service are anticipated in the Local Study Area.
Archaeology and Built Heritage	No Net Effects to known or potential archaeological resources or built and cultural heritage resources are anticipated.
Design and Operations	Option 3 does not deviate in current design and supports adequate disposal capacity and results in high economic benefits.

Option 4

Table 5.11 summarizes the net effects of each environmental component for Option 4:

Table 5.11 Option 4 – Summary of Net Effects

Environmental Component	Summary of Net Effects
Geology and Hydrogeology	No Net Effects to groundwater quality or groundwater flow are anticipated. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of mitigation measures.
Surface Water	Low Net Effects to surface water quality and quantity are anticipated. There may be the potential for limitations to the design and construction of perimeter ditches and the stormwater management pond within the allocated areas.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of Best Management Practices.
Land Use	No Net Effects to existing land uses within the Local Study area are anticipated. Low Net Effects to views of the Facility are anticipated. Installation of visual screening elements would obscure views of the Facility from sensitive receptors.
Economic	No Net Effects to approved or planned land uses within the Local Study Area are anticipated. Low (positive) Net Effects on economic benefits to the City of Hamilton and local community are anticipated.
Atmospheric	Low Net Effects to air quality affecting off-Site receptors are anticipated. Application of Dust BMPs and reduction in daily vehicle limits will mitigate effects to acceptable and approvable levels from an air quality for off-Site receptors. No Net Effects to odours affecting off-Site receptors are anticipated. Low Net Effects to noise affecting off-Site receptors are anticipated upon implementation of on-Site mitigation measures.
Human Health	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. VOC emissions would be equivalent to the existing approved landfill design, where concentrations are expected to be below heath-based benchmarks.
Transportation	No Net Effects to road user safety or intersection Level of Service are anticipated in the Local Study Area.
Archaeology and Built Heritage	No Net Effects to known or potential archaeological resources or built and cultural heritage resources are anticipated.
Design and Operations	Option 4 fails to meet the objectives for disposal and requires a small increase in cost relative to expansion.

Option 5

Table 5.12 summarizes the net effects of each environmental component for Option 5:

Table 5.12 Option 5 – Summary of Net Effects

Environmental Component	Summary of Net Effects
Geology and Hydrogeology	No Net Effects to groundwater quality or groundwater flow are anticipated. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of mitigation measures.
Surface Water	No Net Effects to surface water quality or quantity are anticipated.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of Best Management Practices.
Land Use	No Net Effects to existing land uses within the Local Study area are anticipated. Low Net Effects to views of the Facility are anticipated. Installation of visual screening elements would obscure views of the Facility from sensitive receptors.
Economic	No Net Effects to approved or planned land uses within the Local Study Area are anticipated. High (positive) Net Effects on economic benefits to the City of Hamilton and local community are anticipated.
Atmospheric	Low Net Effects to air quality affecting off-Site receptors are anticipated. Application of Dust BMPs and reduction in daily vehicle limits will mitigate effects to acceptable and approvable levels from an air quality for off-Site receptors. No Net Effects to odours affecting off-Site receptors are anticipated. Low Net Effects to noise affecting off-Site receptors are anticipated upon implementation of on-Site mitigation measures.
Human Health	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. VOC emissions would be equivalent to the existing approved landfill design, where concentrations are expected to be below heath-based benchmarks.
Transportation	No Net Effects to road user safety or intersection Level of Service are anticipated in the Local Study Area.
Archaeology and Built Heritage	No Net Effects to known or potential archaeological resources or built and cultural heritage resources are anticipated.
Design and Operations	Option 5 supports adequate disposal capacity and results in high economic benefits.

Option 6

Table 5.13 summarizes the net effects of each environmental component for Option 6:

Table 5.13 Option 6 – Summary of Net Effects

Environmental Component	Summary of Net Effects
Geology and Hydrogeology	No Net Effects to groundwater quality or groundwater flow are anticipated. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of mitigation measures.
Surface Water	Low Net Effects to surface water quality and quantity are anticipated. There may be the potential for limitations to the design and construction of perimeter ditches and the stormwater management pond within the allocated areas.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of Best Management Practices.
Land Use	No Net Effects to existing land uses within the Local Study area are anticipated. High Net Effects to views of the Facility are anticipated. Option 6 results in a height increase of 8 m and cannot be sufficiently mitigated.
Economic	No Net Effects to approved or planned land uses within the Local Study Area are anticipated. High (positive) Net Effects on economic benefits to the City of Hamilton and local community are anticipated.
Atmospheric	Low Net Effects to air quality affecting off-Site receptors are anticipated. Application of Dust BMPs and reduction in daily vehicle limits will mitigate effects to acceptable and approvable levels from an air quality for off-Site receptors. No Net Effects to odours affecting off-Site receptors are anticipated. Low Net Effects to noise affecting off-Site receptors are anticipated upon implementation of on-Site mitigation measures.
Human Health	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. VOC emissions would be equivalent to the existing approved landfill design, where concentrations are expected to be below heath-based benchmarks.
Transportation	No Net Effects to road user safety or intersection Level of Service are anticipated in the Local Study Area.
Archaeology and Built Heritage	No Net Effects to known or potential archaeological resources or built and cultural heritage resources are anticipated.
Design and Operations	Option 6 fails to meet the objectives for disposal and requires a large increase in cost relative to expansion.

5.12 Comparative Evaluation & Identification of the Preferred Alternative Solution

As described above, the comparative evaluation of the Alternative Methods was completed using a “Reasoned Argument” method, with evaluation criteria as the basis for comparison. Under the Reasoned Argument approach, the differences in the net effects associated with each Alternative Method are highlighted in a Comparative Evaluation Table included in **Appendix H**. Based on these differences, the advantages and disadvantages of each alternative can be identified according to the evaluation between the various evaluation criteria and indicators. The comparative evaluation results are summarized within the sections below with additional details provided in **Appendix H**. **Table 5.14** provides a summary of the results, while full details are provided within **Appendix H.**

Table 5.14 Comparative Evaluation Options Summary

Comparative Evaluation of Options Summary (Revised)

	Environmental Component	Evaluation Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Built	Land Use	Effect on existing land uses	🟢	🟢	🟢	🟢	🟢	🟢
		Effect on views of the facility	🟡	🟡	🔴	🟡	🟠	🔴
		Rationale	Options 1,2,and 4 are all more preferred because there is either no proposed height increase or a relatively low height increase and the views can be minimized through screening. Option 5 includes a greater height increase and views can be minimized through screening. Options 3 and 6 are less preferred because there is a relatively greater height increase and the views cannot be fully minimized through screening.					
Economic	Economic	Effect on approved/planned land uses	🟢	🟢	🟢	🟢	🟢	🟢
		Economic benefit to the City of Hamilton and local community	🟠	🟠	🟢	🟠	🟢	🟢
		Rationale	Options 3,5 and 6 are all more preferred because they would yield the highest benefit to the City of Hamilton and local economy in terms of economic activity and jobs. Options 1, 2 and 4 are less preferred because they all result in the lowest economic benefit to the City and local economy.					
Cultural	Archaeology and Built Heritage	Effect on known or potential significant archaeological resources	🟢	🟢	🟢	🟢	🟢	🟢
		Effect on built heritage resources and cultural heritage landscapes	🟢	🟢	🟢	🟢	🟢	🟢
		Rationale	All Options are equally preferred from a Cultural Environment perspective because no cultural or heritage landscapes would be disturbed or displaced and the site has been previously excavated and disturbed for quarrying. Therefore, no archaeological resources would be adversely affected.					
Natural	Geology & Hydrogeology	Effect on groundwater quality	🟢	🟢	🟢	🟢	🟢	🟢
		Effect on groundwater flow	🟢	🟢	🟢	🟢	🟢	🟢
		Rationale	All Options are equally preferred from a groundwater quality and flow perspective because no adverse effects are expected.					
	Surface Water Resources	Effect on surface water quality	🟢	🟡	🟢	🟡	🟢	🟡
		Effect on surface water quantity	🟢	🟡	🟢	🟡	🟢	🟡
		Rationale	Options 1,3 and 5 are all more preferred because they maintain the site's existing stormwater management ponds. Options 2, 4 and 6 are all less preferred because the site's existing stormwater management ponds would need to be relocated/redesigned to accommodate the proposed footprint.					
	Terrestrial & Aquatic Environment	Effect on terrestrial ecosystems	🟡	🟡	🟡	🟡	🟡	🟡
		Effect on aquatic ecosystems	🟡	🟡	🟡	🟡	🟡	🟡
		Rationale	All Options are equally preferred because they would all have a low potential for adverse effects to the terrestrial and aquatic ecosystems, which would be further minimized through the use of standard mitigation measures.					

Table 5.14 Comparative Evaluation Options Summary (cont'd)

	Environmental Component	Evaluation Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Natural	Atmospheric Environment	Effect of air quality on off-site receptors	🟡	🟡	🟡	🟡	🟡	🟡
		Effect of odours on off-site receptors	🟢	🟢	🟢	🟢	🟢	🟢
		Effect of noise on off-site receptors	🟡	🟡	🟡	🟡	🟡	🟡
		Rationale	All Options are equally preferred because there would be a low potential for adverse effects to area residents from a dust and noise perspective, which would be further minimized through the use of standard mitigation measures and no effects from an odour perspective.					
Social	Transportation	Effect on traffic	🟢	🟢	🟢	🟢	🟢	🟢
		Rationale	All Options are equally preferred because the number of trucks permitted at the site would remain unchanged resulting in no adverse effects on road user safety or intersection capacity.					
	Human Health	Air Quality	🟡	🟡	🟢	🟡	🟡	🟡
		Leachate Quantity	🟢	🟢	🟢	🟢	🟢	🟢
		Groundwater Quality	🟢	🟢	🟢	🟢	🟢	🟢
		Surface Water Quality	🟢	🟢	🟢	🟢	🟢	🟢
		Soil Quality	🟢	🟢	🟢	🟢	🟢	🟢
		Rationale	Option 3 is considered preferred from a human health perspective. All other options are considered less preferred, but would have a low potential for adverse effects with the continuation of the existing site's mitigation measures augmented with additional Best Management Practices, where proposed, and on-going monitoring.					
Technical	Design & Operations	Potential to provide service for disposal	🔴	🔴	🟢	🔴	🟢	🟢
		Leachate Management	🟡	🟠	🟢	🟠	🟡	🟠
		Stormwater Management	🟢	🟠	🟢	🟠	🟢	🟠
		Construction	🟡	🔴	🟢	🔴	🟡	🔴
		Site Operations	🟢	🔴	🟢	🟠	🟢	🔴
		Closure and Post-Closure	🟢	🟠	🟡	🟢	🟢	🟠
		Cost of facility	🟡	🔴	🟢	🔴	🟡	🔴
		Rationale	Options 3 and 5 are both considered more preferred compared to the other Options from a design and operations perspective including their ability to provide the additional capacity being sought through the EA, but Option 3 is more preferred because it would be easier to construct and have a lower overall capital cost.					

🟢 **No Negative or Positive Net Effect** | 🟡 **Low Negative Net Effect** | 🟠 **Moderate Negative Net Effect** | 🔴 **High Negative Net Effect**

Geology and Hydrogeology

All six alternatives are considered equivalent from the perspective of net environmental effects on the geologic and hydrogeological receptors and therefore all alternatives are all are 'preferred.'

Surface Water Resources

The triangular pond layout from Options 1, 3 and 5 is preferred over the narrower "L" shaped layout from Options 2, 4 and 6. This preference is due to the limitations and complications that may occur during the design and construction of the SWM pond in the "L" shaped layout within the buffer zone. The berm that will need to be constructed will utilize more than half the area allocated to constructing the SWM pond (conservatively estimated 30% compared to the conservative 50% assumed for the triangular SWM pond layout). This will be slightly more limiting and complex in design and construction that the triangular pond layout. For these reasons, Options 1, 3 and 5 are more preferred.

Terrestrial and Aquatic

Although Options 2, 4, and 6 result in a greater initial amount of vegetation and associated wildlife habitat (in the buffer areas) as well as disturbance to aquatic habitat and biota (stormwater pond relocations), the loss is temporary and can be mitigated to the same levels as Options 1, 3 and 5. Therefore, all options are equally preferred because they would all have a low potential for adverse effects to the terrestrial and aquatic ecosystems, which would be further minimized through the use of standard mitigation measures.

Land Use and Economic

All options are preferred from a current land use perspective, as no change or effects to the current land use both on site and to surrounding properties. From a visual perspective, Options 1,2, and 4 are more preferred, because there is either no proposed height increase or a relatively low height increase and the views can be minimized through screening. Options 3, and 6 are less preferred because there is a relatively greater height increase and the views cannot be fully minimized through screening.

Further, Options 3, 5 and 6 are all more preferred because they would yield the highest benefit to the City of Hamilton and local economy in terms of economic activity and jobs. Options 1, 2 and 4 are less preferred because they all result in the lowest economic benefit to the City and local economy.

Air and Odour

From an atmospheric environment perspective, the Facility will be required to meet MECP criteria for air quality and odour. The desired facility footprint and operations will be required, regardless of the option selected, to implement effective mitigation such that the Facility will operate in accordance with MECP criteria. During the detailed impact assessment, more in-depth and detailed mitigation measures/ plan will be applied to the recommended option demonstrating that the Facility can operate in accordance with provincial air quality and odour criteria.

All Options are equally preferred because there would be a low potential for adverse effects to area residents from a dust perspective, which would be further minimized through the use of standard

mitigation measures. All six options are capable of operating within MECP guidelines with suitable dust mitigation measures implemented.

Human Health

All of the options, except Option 3, have low net effects due to a marginal increase in larger airborne particulate size fractions (i.e., PM10) modelled in the surrounding community compared to the existing approved landfill design with the potential for transient short-term health concerns. Option 3 did not have this concern. However, it is expected that these predicted exceedances are due to conservatism built into the Air Quality assessment.

Option 3 is considered preferred from a human health perspective. All other options are considered less preferred, but would have a low potential for adverse effects with the continuation of the existing site's mitigation measures augmented with additional Best Management Practices, where proposed, and on-going monitoring.

Noise

The mitigation measure considered in this assessment are building a barrier on top of the future built screening berm at landfill perimeter at the North of the landfill perimeter. All of the alternatives can achieve the required noise limits. The construction of a berm along the north property line will effectively shield the residences to the north. The height of the berm is dependent on the alternative and the final detailed design put forward for approval. All Options are equally preferred because there would be a low potential for adverse effects to area residents from a noise perspective, which would be further minimized through the mitigation measures proposed.

Transportation

There is no distinction between the alternative options in terms of their effects on the potential for collisions and Level of Service at intersections in the Local Study Area. All Options are equally preferred because the number of trucks permitted at the Site would remain unchanged resulting in no adverse effects on road user safety or intersection capacity.

Archeology and Built Heritage

All of the footprint changes will occur on already previously excavated and quarried lands and the one designated heritage landscape (located off-Site) will not be disturbed or displaced. Therefore, all options are equally preferred from a Cultural Environment perspective because no cultural or heritage landscapes would be disturbed or displaced and as the Site has been previously excavated and disturbed for quarrying, no archaeological resources would be adversely affected.

Design and Operations

Options 3 and 5 are both considered more preferred compared to the other Options from a design and operations perspective including their ability to provide the additional capacity being sought through the EA, but Option 3 is more preferred because it would be easier to construct and have a lower overall capital cost.

5.12.1 Ranking of the Options and Selection of the Recommended Option

Based the relative rankings and preference rankings for each alternative at the criteria and factor levels summarized above (See **Appendix H** for further detail), the overall ranking for each Option is as follows:

- Option 1 – Less Preferred
- Option 2 – Least Preferred
- Option 3 – Less Preferred
- Option 4 – Less Preferred
- Option 5 – Most Preferred
- Option 6 – Less Preferred

Using the reasoned argument approach, the Recommended Alternative as “Most Preferred” is #5: Reconfiguration and Height Increase. From an advantages/disadvantages perspective, Alternative #5 is Recommended as it represents:

- A technically feasible design that provides for the additional capacity being sought through the EA. This will allow Terrapure to continue to support the growing local economy by providing disposal capacity for industrial residual material generated within Hamilton and the GTA.
- A lower height increase compared to Options 3 and 6, which can be screened through such measures as constructed berms, tree plantings, fencing, etc.
- A low potential for adverse effects to the natural environment which would be further minimized through the use of standard mitigation measures.
- Maintains the existing stormwater management ponds.
- A low potential for adverse effects to area residents which would be further minimized through the use of standard mitigation measures.
- Maximizes the economic benefits to the City of Hamilton, Upper Stoney Creek, and local industry.

Option 5 is therefore put forward at this point in the process as the Recommended Option for consultation and feedback. Following this feedback, we will confirm the Preferred option, which will be carried forward to the impact assessment stage, which will allow for additional details to be developed from a design and operations perspective, as well as more detail on the impact management measures (mitigation/avoidance/compensation/enhancement).

Table of Contents

Figure Index

Table Index

6. Detailed Impact Assessment of the Undertaking

In March of 2018, the recommended landfill expansion option (**Option # 5 - Reconfiguration and Height Increase**) was presented to the public, stakeholders, and the Government Review Team (GRT) for comments and feedback. Following stakeholder and agency engagement, the recommended option was confirmed and **Option # 5** became the 'Preferred' Landfill Footprint (also referred to as the Preferred Method). Following confirmation of the Preferred Landfill Footprint a detailed impact assessment was carried out.

The intent of the impact assessment is to allow for additional details to be developed on the Preferred Landfill Footprint from a design and operations perspective and to then review the impact management measures and resultant net effects described in the Alternative Methods stage within the context of the more detailed design for the Preferred Landfill Footprint. Specifically, the following can be accomplished:

- Potential environmental effects can be identified with more certainty
- More site-specific impact assessment measures can be developed for application
- Net environmental effects can be identified with more certainty
- Appropriate monitoring requirements can be clearly defined
- Specific approval/permitting requirements for the proposed undertaking can be identified

At the completion of the impact assessment of the Preferred Landfill Footprint, the advantages and disadvantages to the environment of the Preferred Landfill Footprint were identified. Climate change mitigation and adaptation measures will also be reviewed as part of the detailed site design established for the Preferred Landfill Footprint. In addition, during the impact assessment stage of the SCRF EA, Terrapure completed an assessment of the cumulative effects of the proposed undertaking and other non-SCRF projects/activities that are existing, planned/approved or reasonably foreseeable within the Study Area.

A Facilities Characteristics Report (FCR) for the SCRF has been prepared so that potential environmental effects and mitigation or compensation measures identified for the Preferred Landfill Footprint during the Alternative Methods phase of the EA could be more accurately defined, along with enhancement opportunities and approval requirements.

The discipline-specific work plans developed during the ToR outlined how impacts associated with the Preferred Landfill Footprint would be assessed. The results of these assessments have been documented in the following nine standalone Detailed Impact Assessment Reports:

- Atmospheric including: 1) Air Quality and Odour, and 2) Noise
- Geology and Hydrogeology
- Surface Water
- Terrestrial and Aquatic
- Transportation
- Land Use and Economic
- Design and Operations
- Human Health

6.1.1 Description of the Preferred Landfill Footprint

The proposed expansion of the SCRF will increase the overall size of the landfill. Vertical limits will extend higher increasing the peak height by approximately 2.5 m. Horizontal limits will extend

further toward the north, back to original approved footprint of the SCRF. The area currently approved to accept industrial fill will be replaced with a base liner system to accept residual material.

The proposed refined layout of the SCRF is presented in **Figure 6.1** below. The limits of the base liner system will be expanded back to the original approved footprint of 59.1 ha. The overall Site area of 75.1 ha. will not change. The figure shows the final extent of the landfill area after the final cover has been installed (the Post-Closure phase).

Minimum on-Site buffer distances of 30 m will be maintained around the perimeter of the residual material area throughout all phases. On-Site buffers currently extend to approximately 65 m in various areas along the east and south side of the Site, and up to approximately 130 m in the vicinity of the existing stormwater management facility in the northwest corner of the Site. These buffer distances will also be maintained.

As previously stated, the proposed expansion of the SCRF will increase the approved capacity by 3,680,000 m^3, resulting in a total Site capacity of 10,000,000 m^3 for post-diversion, solid, non-hazardous residual material. No changes are being proposed to the maximum approved fill rates of up to 750,000 tonnes of residual material in any consecutive 12 month period, or up to 8,000 tonnes per day.

The SCRF will continue to accept post-diversion, solid, non-hazardous industrial residual material. The SCRF will no longer be approved to accept industrial fill material. The SCRF will continue to accept residual material from sources from within the Province of Ontario. The overall composition of the residual material is expected to remain relatively consistent as the main sources (i.e., steel making industry, soils from infrastructure development projects) will not change. Additional descriptive details on the design of the Preferred Landfill Footprint can be found in the detailed Facilities Characteristics Report (**Appendix I**).

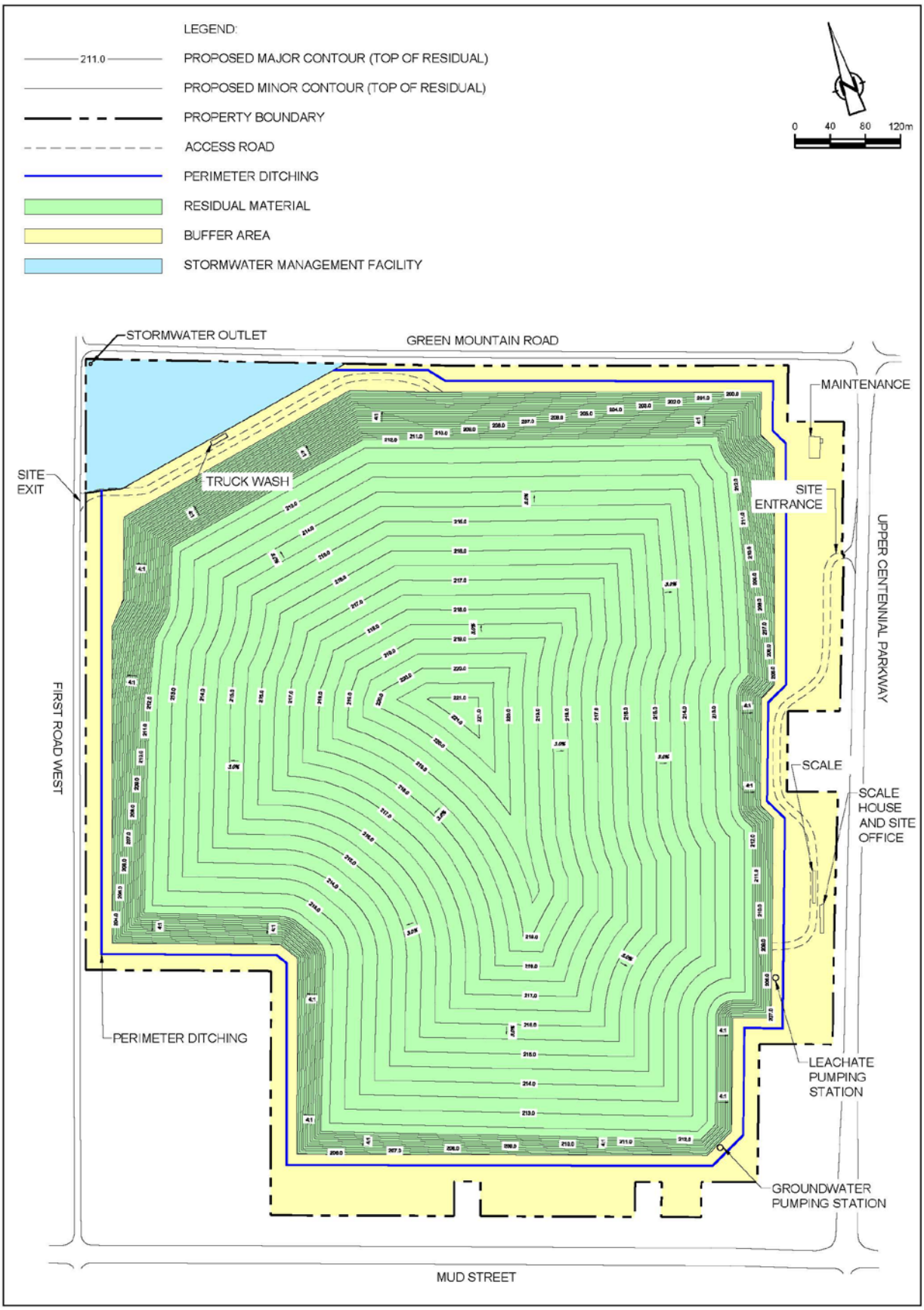


Figure 6.1 Preferred Landfill Footprint

6.1.2 Facility Characteristic Report

The FCR presents preliminary design and operations information for the Preferred Landfill Footprint and provides information on all main aspects of landfill design and operations including.

- site layout design including existing and proposed site characteristics;
- stormwater management;
- leachate management;
- landfill gas management; and,
- landfill development sequence and daily operations.

The FCR also provides estimates of parameters relevant to the detailed impact assessment, including estimates of leachate generation, contaminant flux through the liner system, landfill gas generation, and traffic levels associated with waste and construction materials haulage. The full FCR has been included in **Appendix I** for reference.

6.1.3 Study Area

The specific Site Study Area, and Local Study Area for the Preferred Landfill Footprint used for the Impact Assessment for each Environmental Component are consistent with the Study Areas used during the Alternative Methods phase (see **Section 5.3**).

6.1.4 Impact Assessment Methodology

The assessment of impacts associated with the Preferred Alternative Landfill Footprint was undertaken through a series of steps that were based, in part, on a number of previously prepared reports (Existing Conditions Report, Alternative Methods Report Assessment of Landfill Expansion Alternatives). The net effects associated with the Six Alternative Landfill Footprint Options identified during the Alternative Methods phase of the EA were based on Conceptual Designs. These effects were reviewed within the context of the detailed design plans developed for the Preferred Alternative, as identified in the FCR, to determine the type and extent of any additional investigations required to ensure a comprehensive assessment of net effects. Additional investigations were then carried out, where necessary, in order to augment the previous work undertaken.

With these additional investigations in mind, the potential impact on the Natural, Built, Social, Economic and Cultural environment of the Preferred Alternative was documented.

With a more detailed understanding of the Natural, Built, Social, Economic and Cultural environment developed, the previously identified potential effects and recommended impact management measures associated with the Preferred Alternative (documented in the Alternative Methods Report March 2018) were reviewed to ensure their accuracy in the context of the preliminary design. Based on this review, the potential effects, mitigation or compensation measures, and net effects associated with the Preferred Alternative were confirmed and documented. In addition to identifying mitigation or compensation measures, potential enhancement opportunities associated with the preliminary design for the Preferred Alternative were also identified, where possible.

Following this confirmatory exercise, the requirement for monitoring in relation to net effects was identified, where appropriate (See **Chapter 8** of this EA Report). Finally, any additional approvals

required as part of the implementation of the Preferred Alternative were also identified (See **Chapter 9** of this EA Report).

6.2 Impact Assessment Results

The findings of the impact assessment are summarized in the following sections. The impact assessment has taken into account the construction, operation, and closure/post-closure periods of the proposed undertaking.

6.3 Natural Environment

6.3.1 Geology and Hydrogeology

This section discusses the evaluation results in terms of the predicted effects of the Preferred Landfill Footprint on groundwater quality and groundwater flow. Discussions of predicted leachate generation and leakage through the liner are included, as these are integral parts of the groundwater quality evaluation.

The net effects relating to the Geology and Hydrogeology considered the following criteria and indicators;

Groundwater Quality:

- Predicted effects to groundwater quality at property boundaries and off-Site
- Predicted effects to Source Water Protection Area

Groundwater Flow:

- Predicted effects to groundwater flow at property boundaries and off-Site
- Predicted effects to Source Water Protection Area

6.3.1.1 Potential Effects on Geology and Hydrogeology

Groundwater Quality

Leachate Generation

As discussed in **Appendix J**, the HELP model was used to predict leachate generation rates for the Preferred Landfill Footprint. Leachate generation rates are provided by the HELP model as leakage through the final cover system into the waste mound. Based on the HELP modeling conducted, **Table 6.1** summarizes the predicted leachate generation rates under various stages of landfill development, including closure conditions for the Preferred Landfill Footprint, as well as the existing approved configuration.

Table 6.1 Predicted Leachate Generation Rates

Landfilling Section	Active Landfilling Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Conditions	28.9	164,712
Phase 1	40.2	183,219
Phase 2	21.8	153,084
Phase 3	16.8	172,634

Table 6.1 Predicted Leachate Generation Rates

Landfilling Section	Active Landfilling Area (ha)	Leachate Generation Rate (m^3/yr)
Phase 4	18.8	203,357
Post Closure	0	172,567
Existing Approved Post Closure	0	172,509

The leachate generation rates presented above represent the total volume of leachate generated per year during various the Phases of landfill development. Leachate generation was modeled for the developed landfill footprint during each Phase, with the portion of the developed landfill footprint as active landfilling area taken into consideration in the modeling, as indicated. The results presented in **Table 6.1** demonstrate that leachate generation rates are variable during the different stages of landfill development. Leachate generation is predicted to be the highest during Phase 4, with 203,357 m^3 of leachate generated per year. It is important to note that the predicted post-closure leachate generation for the Preferred Landfill Footprint is essentially the same as the predicted post-closure leachate generation for the existing approved landfill configuration.

Leachate Leakage Through Liner

To understand the possible impacts of leachate leakage through the liner system, it is necessary to model the amount of leachate that could potentially leak through the liner. In order to ensure this step in the impact assessment is conservative, the leakage modeling is undertaken as a “worst case” scenario by excluding the additional protection resulting from the hydraulic control layer. The liner system incorporated into the landfill design is highly protective of the natural environment and the likelihood of leachate leakage is very remote. Notwithstanding, the following paragraphs describe the results of leachate leakage modeling undertaken for the purpose of this conservative assessment.

The HELP model was used to predict the **potentia**l leakage rates through the liner system for the Preferred Landfill Footprint during the stages of landfill development. Based on the HELP modeling conducted, **Table 6.2** summarizes the predicted leachate leakage rates under existing conditions, four Phases of development, and closure conditions for the Preferred Landfill Footprint.

Table 6.2 Predicted Leachate Leakage Rates

Landfilling Section	Active Landfilling Area (ha)	Leachate Leakage Rate (m^3/yr)
Existing Conditions	28.9	34.7
Phase 1	40.2	38.4
Phase 2	21.8	32.3
Phase 3	16.8	36.7
Phase 4	18.8	43.2
Post Closure	0	37.0
Existing Approved Post Closure	0	34.7

The results presented in **Table 6.3** demonstrate that the modeled potential leachate leakage rates are low (not actually occurring), with the highest rate modeled during Phase 4 of landfill

development under the Preferred Landfill Footprint. In order to ensure a conservative approach to predicting the effects of landfill development on future groundwater quality and flow, the Phase 4 leakage rates presented in **Table 6.4** have been used for the purposes of the groundwater quality and flow assessments discussed below.

It is important to note that the predicted post-closure leachate leakage rate for the Preferred Landfill Footprint is essentially the same as the predicted post-closure leachate leakage rate for the existing approved landfill configuration.

Effects on Downgradient Water Quality

A generalized water balance and mass balance approach was used to estimate groundwater quality at the downgradient Site boundary for the Preferred Landfill Footprint. The water balance considered the primary inputs, and movements of water across the Site using both Site hydrogeologic data and theoretical calculations. The water balance and groundwater flow beneath the landfill was estimated by using Site specific groundwater elevations, gradients, and hydraulic conductivities. Based on the groundwater flux and contaminant mass loadings from predicted leachate leakage, downgradient groundwater quality was then estimated.

A detailed description of calculation methodology and individual parameter results is provided in **Appendix J**.

Additional contaminant mass from leachate leakage marginally increases some contaminant concentrations at the downgradient boundary. For the purposes of comparing the effects of the preferred Landfill Footprint on downgradient groundwater quality, chloride has been selected as a surrogate for leachate impacts. Chloride is a contaminant species where changes in concentration are due to physical, non-destructive, processes (e.g., mechanical dispersion, dilution) and is not subject to biochemical breakdown, precipitation, or adsorption. Thus, chloride provides a conservative estimate of potential future impacts. **Table 6.4** provides a summary of the forecasted chloride concentrations in monitoring wells located at the downgradient boundary under final development (closure conditions) for both the Preferred Landfill Footprint, as well as the existing approved final closure conditions. The table provides a summary of the monitoring wells within the Vinemount Flow Zone (VFZ). The VFZ directly underlies the landfill liner and has comparatively limited upgradient flux. Thus, the VFZ is anticipated to be most affected by leachate mass loading. In order to ensure the results of the projected concentrations are conservative and comparable, the projections have been made assuming all leachate leakage would enter the VFZ.

Table 6.3 Predicted Downgradient Groundwater Quality

Well ID	Existing Approved	Preferred Landfill Footprint
	Chloride	Chloride
	(mg/L)	(mg/L)
47-III	300	320
48-V	880	890
60-III	400	420
61-III	550	570

Notes: all concentrations are in mg/L (m^3/year / m^3/day) leachate leakage rate

As shown in **Table 6.3**, the predicted downgradient groundwater quality is very similar for the Preferred Landfill Footprint and the Existing Approved scenarios. The detailed results for predicted groundwater quality, including general chemistry and metals leachate indicator parameters, are included in **Tables B.1** through **B.4** within **Appendix B** of the Geology and Hydrogeology Impact Assessment Report (**Appendix J**). The results included in the tables show a consistent pattern in that the predicted downgradient groundwater quality is similar to, but with slightly higher concentrations in water quality parameters than existing water quality. This is not unexpected as the modeling has added contaminant mass to the flow zone. The most significant modeled increases in downgradient parameter concentrations noted are for chloride and sodium.

Although the modeled parameter increases are relatively minor, it is important to note the following with respect to the results of the groundwater quality assessment:

1. The downgradient groundwater quality predictions have not taken into account any attenuation of leachate impacts. The modeling has maintained the contaminant mass from the point of discharge beneath the liner system to the downgradient boundary.
2. The HELP modeling that was used to estimate the liner leakage did not take into account the hydraulic control layer component of the liner system.
3. The downgradient groundwater quality predictions have not taken into account the groundwater control systems incorporated into the landfill design. These systems are currently in operation and will be expanded as part of continued landfill development. These systems are discussed further in **Section 6.3.1.2** (Proposed Mitigation Measures).

Points 1 through 3 provided above are relevant in that they speak to the very conservative nature of the predictive modeling presented here. Despite these conservative elements of the approach, the predicted downgradient groundwater quality for the Preferred Landfill Footprint is very similar to the predicted downgradient groundwater quality for the existing approval under closure conditions, modeled using the same methodology.

Effects on Source Water Protection

Any potential impacts to groundwater and/or surface water quality within the Source Water Protection Area (SWPA) will be dependent on groundwater quality migrating into the Intake Protection Zone (IPZ) to the City of Hamilton water intake. As detailed in **Table 6.3**, conservative predictions of downgradient groundwater quality show very similar results for the Preferred Landfill Footprint and the existing approval. The modeling results show minimal effects on predicted groundwater quality prior to implementation of mitigation measures.

It is important to note that these predictions to downgradient groundwater and/or surface water quality within the SWPA do not consider the use of the groundwater control systems (mitigation measures). These systems will be operated and expanded as part of the continued landfill development and will mitigate the migration of potentially contaminated groundwater off-Site. With the continued operation of the groundwater control systems, it is anticipated there will be no impacts on groundwater quality entering the IPZ.

Groundwater Flow

The estimated potential leakage rate of leachate through the liner (which is not actually occurring but modeled), calculated using the HELP model, was used to determine the potential impacts of each Alternative on groundwater flow. The HELP outputs show that leakage from the landfill liner

will contribute approximately 0.056 mm of hydraulic head each year. This leakage will predominantly enter the VFZ (which directly underlies the base of the landfill footprint), which could increase the hydraulic head beneath the landfill footprint. The increase in hydraulic head could affect groundwater flow by altering horizontal hydraulic gradients.

Based on the 2017 groundwater elevations measured at the Site, groundwater levels within the VFZ are heavily influenced by groundwater extraction at M4, as well as the Phase One Centennial Parkway Trunk Sanitary Sewer (CPTSS) construction; however, historic reports (Taro East Quarry Environmental Assessment Hydrogeological, Impact Assessment Final Report, Gartner Lee, January 1995) show that the baseline potentiometric surface ranges from 201.0 to 192.6 mAMSL across the Site. Thus, the change in hydraulic head across the Site is on the order of several metres across a distance of approximately 900 m (i.e., i = (201mAMSL – 192.6mAMSL) / 900 m = 0.093 m/m).

Under the landfill expansion with the Preferred Landfill Footprint, predicted landfill leakage would contribute an additional hydraulic head of 0.056 mm/year. Thus, the maximum increase in hydraulic gradient due to leachate leakage is negligible. The change in hydraulic gradient will produce negligible changes to groundwater flow rate and no observable change in direction.

6.3.1.2 Mitigation and/or Compensation Measures

The evaluation of potential environmental effects provided above has been completed without taking into consideration several environmental control systems incorporated into the landfill design. These control systems are important aspects of the Site's groundwater protection strategy and accordingly they are being taken into consideration as mitigation measures for the Preferred Landfill Footprint. Because of the minor changes in downgradient water quality predicted, new mitigation measures are not being proposed for the Preferred Alternative. The existing groundwater control systems at the SCRF, properly maintained and operated, will provide adequate additional protection of the groundwater flow systems.

The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of the Preferred Landfill Footprint.

Groundwater Extraction Well M4

Groundwater extraction well M4 was completed within the Lower Excavation of the former quarry, originally for the purpose of controlling the movement of historical groundwater impacts from the closed landfill. M4 is located within the northwest quadrant of the SCRF landfill footprint and accordingly is ideally located to optimally affect hydraulic gradients in the vicinity of the SCRF. The location of M4 is illustrated on Figure 4.2. M4 has been operated as a means of maintaining inward gradients towards the well and minimizing the potential for downgradient migration of landfill-affected water quality.Potentiometric groundwater surfaces provided in the 2016 Annual Monitoring Report (Jackman, June 2017) show groundwater flow in each of the flow zones was heavily influenced by the operation of M4. Inwards, horizontal hydraulic gradients are shown across the northern Site boundary of both the SCRF and closed landfill. This observation is consistent with previous presentations of groundwater flow with extraction well M4 in operation.

In 2016, M4 extracted an average of 70,000 L/day (when in operation) which is greater than the combined flux estimates for the VFZ, UFZ, and UMFZ/LMFZ. It should be noted that in 2016,

groundwater levels at the SCRF were being affected by dewatering associated with sewer construction along Highway 20, which resulted in a historically low extraction volume from M4. Recent monitoring data has demonstrated a rebound in static groundwater elevations at the SCRF, indicating a progressive reduction in the influence of the sewer construction dewatering.

Based on data presented in the 2016 Annual Monitoring Report (Jackman, June 2017) (extraction greater than estimated flux values and measured inward horizontal hydraulic gradients), operation of M4 will be sufficient to capture potential future landfill-related water quality impacts within the VFZ, UFZ, and UMFZ/LMFZ. On the basis of historical performance of this extraction well, potential leakage from the landfill under the scenario of Preferred Landfill Footprint development will be mitigated by operation of M4.

It is recommended that extraction well M4 is maintained and operated for the purpose of collecting potentially impacted groundwater and maintaining inward gradients under the scenario of landfill development with the Preferred Landfill Footprint.

Groundwater Collection Trench Network

The existing developed portion of the SCRF includes a network of shallow groundwater collection trenches that surround the landfill footprint and connect through a network of trenches underlying the landfill liner. These trenches are excavated through the VFZ and keyed into the underlying Vinemount Shale aquitard. The trenches are connected to a groundwater pumping station located at the southeast corner of the SCRF. Accordingly, the groundwater collection trench system is capable of containing all groundwater flow within the VFZ below the landfill footprint. As the VFZ would be the primary receptor of direct leachate leakage from the liner, this system is capable of mitigating leakage from the liner, should this condition be observed in the future.

It is recommended that construction of the network of groundwater collection trenches is completed beneath the liner system as landfill cells are constructed (as per the existing design). Evacuation of these collection trenches via the groundwater pumping station will assist in controlling the lateral movement of potentially impacted shallow groundwater.

Hydraulic Control Layer

The liner system for the SCRF includes a hydraulic control layer (HCL) between the two 1 m sections of compacted clay liner. The HCL consists of a coarse granular material, which, once fully constructed, will be flooded and maintained at a specified hydraulic head to induce an upward vertical gradient across the upper portion of the compacted clay liner. Maintaining an upward hydraulic gradient across the clay liner will ensure that downward leaking of leachate across the clay cannot occur. Accordingly, operation of the HCL will provide a substantial degree of additional protection against discharge of leachate through the liner into the natural environment.

6.3.1.3 Geology and Hydrogeology Net Effects

The net environmental effects of the Preferred Landfill Footprint on geology and hydrogeology have been determined through applying the mitigation measures described above to the potential environmental effects identified in **Sections 6.3.1.1**.

In consideration of the minor variations in predicted downgradient groundwater quality between the Preferred Landfill Footprint and the Existing Approval, and the very conservative nature of the

modeling performed to predict the potential environmental effects, the mitigation measures described in **Section 6.3.1.2** will adequately negate any potential environmental effects related to Site development under the Preferred Landfill Footprint.

On the basis of the above, it is concluded that there will be no net environmental effects from the Preferred Landfill Footprint on the geologic or hydrogeologic conditions within the Site Study Area.

Table 6.4 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Geology and Hydrology

Potential Effect	Mitigation/Compensation	Net Effect
Leachate leakage through the primarily liner	Maintaining inward gradient across the liner system through flooding the HCL.	No net effect on downgradient groundwater quality.
Leachate leakage through the secondary liner	Collection of impacted water and hydraulic control of local groundwater through operation of M4 extraction well, shatter trench wells and containment wells.	No net effect on downgradient groundwater quality

6.3.2 Surface Water

As mentioned, the previously identified potential effects and recommended mitigation or compensation measures associated with the Preferred Landfill Footprint were reviewed to ensure their accuracy in the context of the preliminary design of the Preferred Alternative, based on the more detailed understanding of the Surface Water environment developed through the additional investigations. With this in mind, the confirmed potential effects, mitigation or compensation measures, and net effects are described in detail in the sections below.

Predictive modeling was performed using PCSWMM Version 7.1 with SWMM5 version 5.1.012 for the current approved design of the Site (baseline condition) and the Preferred Landfill Footprint. This modeling served to evaluate the changes to the peak flows and runoff volumes for Preferred Landfill Footprint when compared to the baseline condition. Modeling from the Alternative Methods Evaluation was used to demonstrate the uncontrolled flows from the Site, meaning it was assumed that there were no measures to contain and capture the runoff (i.e., perimeter ditches, stormwater management ponds, etc.). Additional modeling was performed which includes preliminary SWM measures, which means the modeling results assume controlled flows. Rough preliminary sizing was performed so that measures that contain and capture the runoff could be shown in the modeling results. This was done to show that the proposed mitigation measures are able to function at the Site.

The results of the modeling of the uncontrolled peak flows and runoff volumes for each condition are summarized in the tables below. The net effects relating to the Surface Water components considered the following criteria and indicators:

Table 6.5 Peak Flow Comparison

Options	Uncontrolled 2-year Storm		Uncontrolled 100-year Storm	
	Peak Flow (m^3/s)	Percent Difference to Baseline	Peak Flow (m^3/s)	Percent Difference to Baseline
Existing/Baseline	*0.969*	*N/A*	*6.616*	*N/A*
Preferred Landfill Footprint (Option #5)	*0.969*	*0.00%*	*6.313*	*-4.58%*

Table 6.6 Total Runoff Volume Comparison

Options	Uncontrolled 2-year Storm		Uncontrolled 100-year Storm	
	Peak Flow (m^3/s)	Percent Difference to Baseline	Peak Flow (m^3/s)	Percent Difference to Baseline
Existing/Baseline	*14,051*	*N/A*	*57,985*	*N/A*
Preferred Landfill Footprint (Option #5)	*15,564*	*10.77%*	*61,735*	*6.47%*

Surface Water Quality:

- Predicted effects to surface water quality at property on- and off-Site

Surface Water Quantity:

- Predicted change in drainage areas
- Predicted occurrence and degree of off-site effects.

6.3.2.1 Potential Effects on Surface Water Quality and Quantity

The effect on surface water quality is minimal when compared to the baseline condition, as the same material (post diversion solid, non-hazardous industrial residual material) will continue to be accepted and disposed. The Site will receive final cover with vegetation similar to the current approved design. The only contaminant of concern is Total Suspended Solids (TSS) that occurs as stormwater flows over the final cover of the SCRF. With a similar cover, there will be similar TSS levels.

The overall drainage area is the same as in the baseline condition but there will be a height increase. The area will have lower permeability due the replacement of industrial fill with residual material. This will result in an increase peak flows and runoff volumes.

During the 2-year through 100-year storm events, uncontrolled flows from the Site (assuming there are no perimeter ditches or stormwater management pond to capture runoff) will produce more runoff volume and higher peak flows than the baseline condition. The predicted increase in runoff volume is approximately 11% during the 2-year event and 6% during the 100-year event. Runoff will flow off-Site and cause increased flows in the roadside ditches and creeks within the local study area. There may also be erosion or flooding in these areas during larger storm events

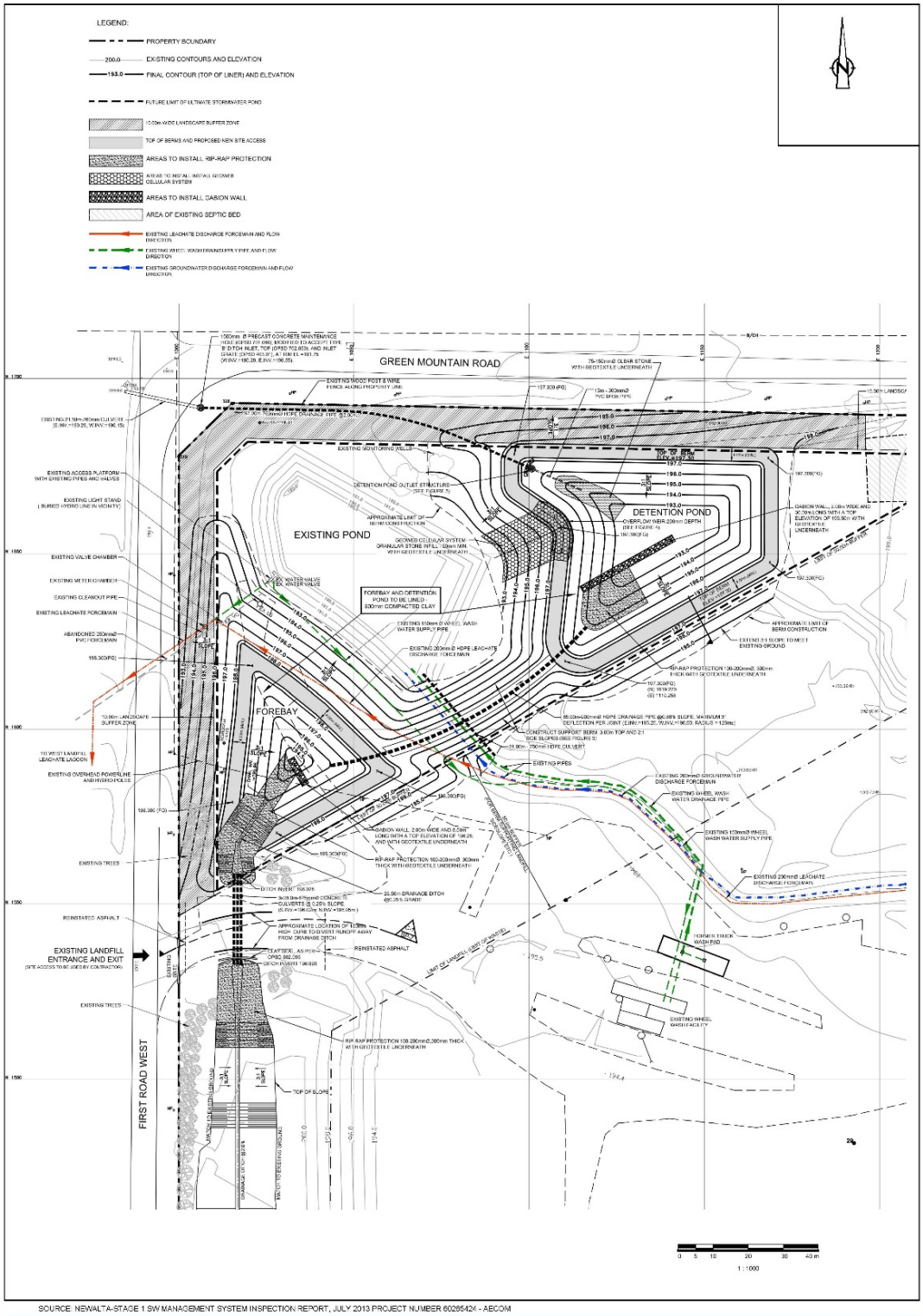
6.3.2.2 Mitigation and/or Compensation Measures

The existing SWM measures at the Site include perimeter ditches to the south and west, a forebay and a detention pond. The forebay and detention pond are located in the northwest corner of the Site. The ponds have been sized to provide quantity and quality control for the current Phase 1 of the landfill. The detention pond has an outlet shut-off valve that allows the outlet to be closed if the stormwater is not meeting water quality objectives. The valve can be re-opened once water quality issues have been addressed and water quality objectives are being met. The existing SWM ponds are shown on **Figure 6.2**.

The addition of perimeter ditches that can convey up to the 100-year storm event will prevent any flows from leaving the Site. A SWM pond with two forebays can be designed to treat the runoff to the required levels and to control the release of the 2-year- through 100-year storm events to pre-development levels. This will prevent erosion and flooding off-Site.

The allocated SWM pond area is large enough to size a pond that can treat and control the Site runoff. There may be some complications in the design of the pond due to the elevation difference between the residual material toe of slope and the elevations of the roads adjacent to the SWM pond. The berm separating the SWM pond from Green Mountain Road West and First Road West will need to have significant design considerations. This may result in a costly design and construction of the SWM pond. Since part of the SWM pond will be built within the 30 m buffer area, the berm sloping from the SWM pond to the roads will take up more than half the width of the buffer area. This means there is less area available for the SWM pond.

The preliminary SWM measure sizing used in the predictive modeling shows that minor alterations to the current SWM ponds will be able to provide adequate storage for quality and quantity control. This means that the SWM pond will have enough volume to remove TSS and to contain the 2-year through 100-year storms. The minor alterations to the current SWM ponds include additional ditches along the north and west perimeter of the Site, converting the current SWM detention pond into a second forebay and re-grading the future detention pond to increase the depth and surface area of the pond. The future detention pond is currently the pond used for wheel wash and dust control water storage. For the predictive modeling the perimeter ditches were assumed to have a bottom width of 1m, depth of 1m, 3H:1V side slopes and a longitudinal slope of 0.7%. The approximate SWM pond sizing used in in the predictive modeling is shown in **Figure 6.3**.



SOURCE: NEWALTA-STAGE 1 SW MANAGEMENT SYSTEM INSPECTION REPORT, JULY 2013 PROJECT NUMBER 60285424 - AECOM

TERRAPURE ENVIRONMENTAL
65 GREEN MOUNTAIN RD. W, STONEY CREEK, ONTARIO
DETAILED IMPACT ASSESSMENT TERRAPURE EA - SURFACE WATER

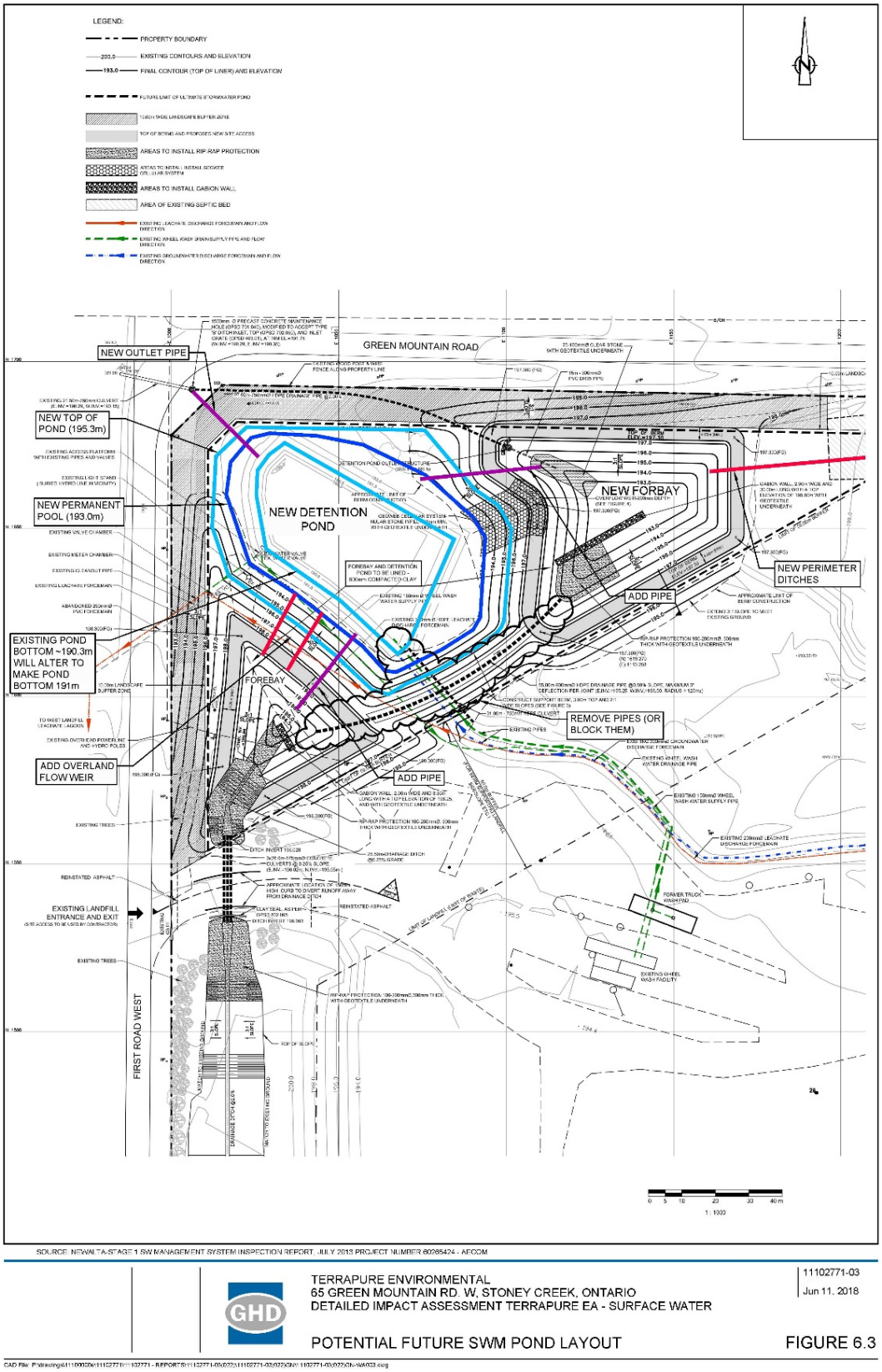
11102771-03
Jun 8, 2018

EXISTING SWM POND LAYOUT

FIGURE 6.2

CAD File: P:\drawings\11102771\11102771 - REPORT\11102771-03(022)\11102771-03(022)GN-WM02.dwg

Figure 6.2 Existing SWM Pond Layout



SOURCE: NEWALTA STAGE 1 SW MANAGEMENT SYSTEM INSPECTION REPORT, JULY 2013 PROJECT NUMBER 60285424 - AECOM

GHD

TERRAPURE ENVIRONMENTAL
65 GREEN MOUNTAIN RD. W, STONEY CREEK, ONTARIO
DETAILED IMPACT ASSESSMENT TERRAPURE EA - SURFACE WATER

11102771-03
Jun 11, 2018

POTENTIAL FUTURE SWM POND LAYOUT

FIGURE 6.3

CAD File: P:\Hradng\61100\Dbr\11102771\11102771 - REPORT\11102771-03\022\11102771-03-022xDWG 11102771-03-022xDWG-WA003.dwg

Figure 6.3 Potential Future SWM Pond Layout

The pond design will include emergency shut-off valves so that stormwater will not be released into the storm sewer system below First Road West, which ultimately discharges into Davis Creek, if water quality testing determines that the water quality is not suitable for discharge. Contingency measures include “status quo”, which is to discharge stormwater to the sanitary sewer for treatment at the City’s water pollution control plant.

6.3.2.3 Surface Water Net Effects

Based on the controlled conditions modeling (which includes preliminary SWM measures), the SWM pond and perimeter ditches will able to treat and control the runoff from the Site to the same level as the current approved design and results in low net environmental effects.

Table 6.7 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Surface Water

Potential Effect	Mitigation/ Compensation	Net Effect
Surface quality to be similar to baseline since additional residual material will have final cover. Contaminants of concern in the runoff are TSS.	*The existing stormwater management pond will be altered as required and described (provide adequate permanent pool volume and active storage volume) to treat TSS from the stormwater runoff.* *Stormwater from the pond will not be released to surface water body (i.e., storm sewer system that drains into Davis Creek) until testing determines all parameters have been met to discharge. Contingency measures include “status quo”, which is to discharge stormwater to sanitary sewer for treatment at the City’s water pollution control plant.*	*Discharge to either surface water or to sanitary sewer with no increase in TSS and related parameter concentrations*
The increased area of residual material results in an increase in impermeable area due to the residual material final cover. *This will produce an increase runoff volume of 11% during the 2-year storm event and 6% during the 100-year storm event. Increased runoff volume will result in increased flooding ditches to the northwest, in the sewer below First Road West and Davis Creek. Erosion of the creek and ditches may also occur because of the increased runoff volume.*	*Perimeter ditches will keep the increased runoff on-Site and direct flows to the modified stormwater management pond. The stormwater management pond will be sized to capture the 2-year through 100-year storm events and control the release rate to prevent flooding and erosion off-site.* *Contingency measures include “status quo”, which is to discharge excess stormwater to sanitary sewer for conveyance to the City’s water pollution control plant.*	*No increase in peak flows to the roadside ditches to the northwest of the Site, sewer under First Road West and Davis Creek*

6.3.3 Terrestrial and Aquatic Environment

As mentioned, the previously identified potential effects and recommended mitigation or compensation measures associated with the Preferred Landfill Footprint were reviewed to ensure their accuracy in the context of the preliminary design of the Preferred Landfill Footprint, based on the more detailed understanding of the Terrestrial and Aquatic environment developed through the additional investigations. With this in mind, the confirmed potential effects, mitigation or compensation measures, and net effects are described in detail in the sections below.

The net effects relating to the Natural Environment considered the following criteria and indicators:

Effect on terrestrial ecosystems:

- Predicted impact on vegetation communities, wildlife habitat including rare, threatened or endangered species.

Effect on Aquatic Ecosystems:

- Predicted impact on aquatic habitat and aquatic biota

6.3.3.1 Potential Effects on the Natural Environment

A photographic log with examples of the types of habitats to be affected as part of the Preferred Landfill Footprint is provided as **Appendix J**.

Construction-related Effects

During construction, there will be the potential for effects to the terrestrial and aquatic environment as the Site is prepared for accepting additional waste, and include impacts to vegetation, wildlife habitat, aquatic habitat, and aquatic biota.

As part of the Preferred Landfill Footprint, there would be a temporary loss of approximately 18.5 ha of existing vegetation communities (e.g., meadow and thicket habitat), as well as the wildlife habitat value that these areas currently provide. Furthermore, the habitat of a Threatened bird species (eastern meadowlark) will be removed as part of the regrading activities that will occur during Phase 1 in the south and southwest portion of the Site. In total, approximately 11.5 ha of habitat for this species will be temporarily lost in the dry-fresh graminoid meadow ecosite as a result of Site preparation and regrading activities.

Furthermore, a loss of on-Site aquatic habitat and disturbance to aquatic biota in open water habitats associated with the Site stormwater infrastructure is also anticipated as a result of construction due to changes in Site configuration throughout the project stages.

Off-Site impacts to the terrestrial and aquatic environment during construction are not anticipated as a result of the Preferred Landfill Footprint.

Operation-related Effects

Similar to during construction, daily operations (including but not limited to Site grading, relocation of Site infrastructure including buildings and ponds, building of access roads) have the potential to affect the terrestrial and aquatic environment. The potential effects from the Preferred Landfill Footprint on the terrestrial and aquatic environment during operation include impacts to vegetation, wildlife habitat, aquatic habitat, and aquatic biota.

As part of the Preferred Landfill Footprint, there would likely be a temporary loss of existing vegetation communities (e.g., meadow and thicket habitat) that are anticipated to naturally re-generate in disturbed areas during the progressive Site operation, as has occurred under existing Site operation conditions activities. As these regenerating areas continue to be disturbed, there would also be a loss of associated wildlife habitat value.

With regard to the habitat of eastern meadowlark, it is assumed that the majority of impact to this species will be during the construction phase, when the existing capped portion of the Site is removed to allow for further acceptance of waste. Habitat will be created for this species incidentally throughout operation as areas are capped and planted with the final vegetative cover, which will incorporate graminoid meadow habitat.

There are also potential effects during operation to another threatened bird species during operation. Barn swallow (observed on Site in 2016 and 2017) may be affected by the removal and/or relocation of Site structures as part of Phases 2, 3, and closure. Barn swallow may use these anthropogenic structures for nesting, and their habitat may be destroyed during building relocation, should active or remnant nests be present.

Furthermore, a loss of on-Site aquatic habitat and disturbance to aquatic biota associated in open water habitats associated with the Site stormwater infrastructure is also anticipated throughout operation, as a result of regrading activities and changes in Site configuration throughout the project stages.

Off-Site or local study area impacts to the terrestrial and aquatic environment during operation are not anticipated as a result of the Preferred Landfill Footprint.

6.3.3.2 Mitigation and/or Compensation Measures

Construction

In order to mitigate the impacts to eastern meadowlark during construction related to the destruction of habitat, the following mitigation measures are required:

- A Notice of Activity process will be followed, to ensure protection of the species and their habitat and compliance with the *Endangered Species Act*. This process will involve registering the work with MNRF, and preparing and following a Habitat Management Plan, which will also describe how new or enhanced habitat will be created and managed. Within 12 months of the date development begins, the new or enhanced habitat will be created, subject to minimum size and species composition parameters specified by the MNRF. The created habitat will be managed and monitored for at least five years, and a report detailing mitigation followed, status of new habitat, results of annual monitoring efforts will also be prepared on an annual basis.
- Incorporate graminoid meadow habitats into the closure landscape plan (see **Figure 6.4** below for an example)

Impacts to vegetation communities and their associated wildlife habitat function, as well as impacts to aquatic habitat and biota, can be minimized by implementing the best management practices during construction and the Compensation/Restoration Plan (**Section 8**).

Figure 6.4 Example of Graminoid Meadow as Part of Final Cover

Operation

In order to mitigate potential impacts during operation to migratory bird species (including barn swallow) which may nest on anthropogenic structures, the following measures are required:

- A qualified avian biologist should conduct a nest survey of on-Site facilities and infrastructure prior to relocation or removal of structures to determine use by migratory bird species for nesting. If nests of protected migratory bird species are found, the biologist will determine the appropriate mitigation to ensure protection of the nest (e.g., removal of the structure outside of the breeding bird season). Should active or remnant nests of barn swallow be found, a Notice of Activity process under the *Endangered Species Act* will be followed to ensure protection of the species and their habitat and compliance with the *Endangered Species Act.*

Impacts to vegetation communities and their associated wildlife habitat function, as well as impacts to aquatic habitat and biota, can be minimized by implementing the best management practices (**Section 8**) during operation. A Compensation/Restoration Plan will be developed as the project progresses to identify areas where compensation may occur on Site during operation, and also provide recommendations for plantings as part of the landfill closure plan. The plan will also detail habitat enhancement opportunities, such as the creation of pollinator habitat in buffer areas (see **Figure 6.5** below for example of pollinator habitat).

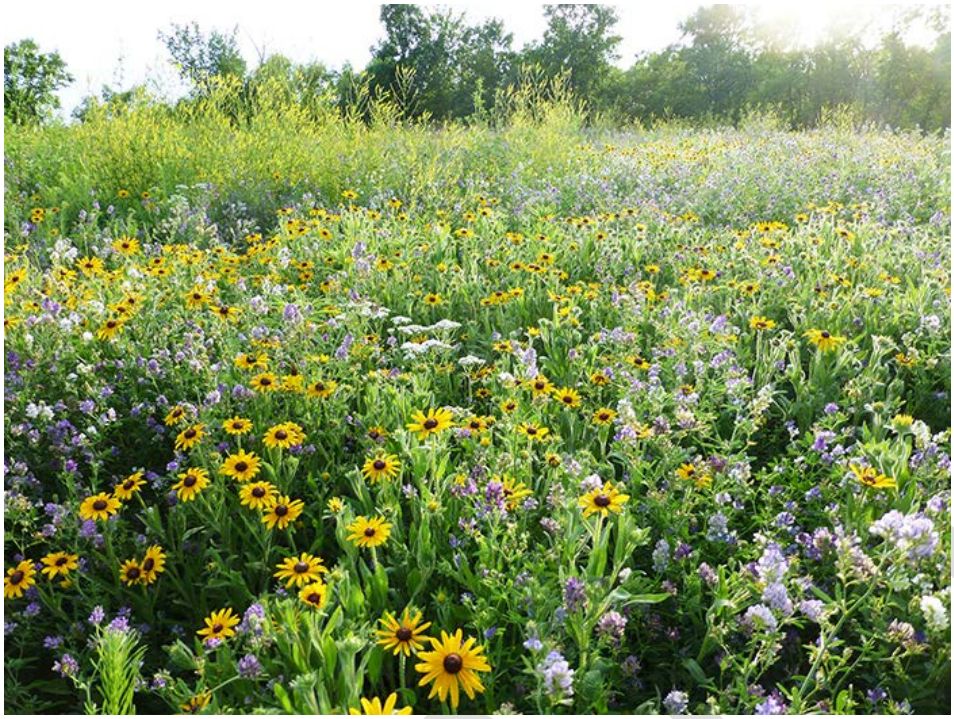


Figure 6.5 Example of Pollinator Habitat. Source: http://beeandbutterflyfund.org/our-solution

Furthermore, to compensate for the temporary loss of aquatic habitat, naturalized landscape features can be incorporated into the stormwater management facilities design (e.g., wet meadows, robust emergent vegetation, shallow slope). See **Figure 6.6** below for an example of a naturalized aquatic landscape feature.

Figure 6.6 Example of Naturalized Aquatic Landscape Feature (Wet Meadow)

6.3.3.3 Terrestrial and AquaticNet Effects

Net effects as they relate to the terrestrial and aquatic environment are discussed in **Table 6.8** below.

Table 6.8 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Terrestrial and Aquatic

Potential Effect	Mitigation/ Compensation	Net Effect
• Temporary loss of approximately 18.5 ha of existing vegetation communities (e.g. marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of regrading activities.	• Conduct any vegetation removal activities outside of the breeding bird window (i.e., no removals between late March - late August). • Retain vegetation and compensate for vegetation loss to the extent possible (e.g., create pollinator habitat in buffer areas) • Incorporate graminoid meadow habitats into the closure landscape plan	• The temporary loss of approximately 18.5 ha of vegetation and wildlife habitat will be minimized through implementation of the mitigation measures.
• Temporary disturbance to terrestrial species during Site works and landfilling operations.	• Implement BMP's including: • Use of dust suppressants • Installation of protective fencing (where required) • Conduct a nest survey of on-Site facilities and infrastructure prior to relocation or removal of structures to mitigate impacts to bird species which may use anthropogenic structures for nesting. If nests are found, consult a biologist/MNRF for further direction. • Any wildlife incidentally encountered during Site operation activities will not be knowingly harmed and will be allowed to move away from the area on its own. • In the event that an animal encountered during Site operation activities does not move from the area, or is injured, the Site Supervisor and MNRF will be notified. • In the event that the animal is a known or suspected SAR, the Site Supervisor will contact MNRF SAR biologists for advice. • Include naturalized landscape features into the stormwater management facilities design (e.g. wet meadows, emergent robust vegetation, shallow slope)	• The temporary disturbance to terrestrial species will be minimized through implementation of the mitigation measures.
• Temporary loss of approximately 11.5 ha of habitat of a Threatened species (eastern meadowlark) in the dry-fresh graminoid meadow ecosite at the south and west portion of the Site.	• Consult with MNRF to determine specific requirements (e.g. habitat enhancement and/or creation requirements) of the Notice of Activity process related to the presence of eastern meadowlark to avoid contravention of the provincial Endangered Species Act. Incorporate graminoid meadow habitats into the closure landscape plan. • As part of the Notice of Activity process, a Habitat Management Plan will be created and implemented prior to the initiation of any construction. This plan which will document the areas to be affected and detail where and how new habitat will be created or enhanced.	• The temporary loss of SAR habitat will be minimized through implementation of the mitigation measures.
• Loss of on-Site aquatic habitat and disturbance to aquatic biota associated with open water habitats in stormwater infrastructure due to regrading activities.	• Install ESC measures to mitigate impacts to water quality and to act as wildlife exclusion fencing prior to construction, and maintain them appropriately throughout landfill construction and operation. • Characterize use of on-Site aquatic features by fish and wildlife prior to modification/removal. Obtain necessary approvals for/complete fish/wildlife rescue activities prior to initiation of any in-water works, as appropriate.	• The temporary loss of on-Site aquatic habitat and disturbance to aquatic biota will be minimized through implementation of the mitigation measures.

6.3.4 Atmospheric Environment - Air and Odour

Atmospheric Environment criteria were evaluated with indicators to support the reasoned argument in the comparative rankings:

Effect of Air Quality on Off-Site Receptors

- Predicted off-Site point of impingement concentrations of particulate matter size fractions

Effect of Odours on off-Site Receptors

- Predicted off-Site point of impingement concentrations of volatile organic compounds

6.3.4.1 Potential Effects on Air QAuality and Odour

The SCRF is anticipating operating 10 hours per day, with up to 100 trucks per day of waste coming onto the site and being deposited into the active area of the landfill. While some roads on Site are currently paved (or may be paved in future), unpaved roads and material handling operations are known to be potentially significant sources of fugitive dust, which can have an effect on nearby sources. In order to mitigate potential effects of these operations on local and regional air quality, in particular airborne dust, it is necessary for mitigation measures to be implemented, and special care may be required if operations are occurring in close proximity to the Facility fence line. Dispersion modeling has shown that with reasonable mitigation, the Facility is able to meet air quality criteria during future operations. When operations are particularly close to the fenceline, it is possible that the MECP's SPM standard may be exceeded (up to 5 times per year or 1.3% of the time), including background contributions to air quality.

Based on differences in road and active area configuration, there are some differences between the predictions of airborne dust for the different phases of this project. The potential sources of odour emissions remain the same (the leachate pumping station and the aeration pond) throughout the life of the project, and so potential future effects on odour from site operations are identical to the current scenario (i.e., there is no measurable change for odour between current and future operations).

6.3.4.2 Mitigation and/or Compensation Measures

The SCRF currently has a dust mitigation plan. For the purposes of this assessment, best practices dust mitigation were assumed to be implemented at the site for all phases of the work, including:

- Paving Site access roads (entry and exit) within the buffer area, including any roads which do not cross active or closed portions of the landfill;
- Use of road watering on paved and unpaved roads, to minimize dust generation on Site;
- Minimizing the level of daily activity, or increasing dust mitigation activities, when operations are near the fenceline; and
- Continued use of the wheel-washing station near the Site exit, to reduce track-out of material from the Site onto First Road West.

For the purposes of the assessment, it was assumed the Site would achieve a 75% overall re-suspended road dust suppression. This is highly achievable in this area, as Hamilton already receives measurable precipitation 156 days per year (Environment Canada, 2018), providing

natural dust mitigation, so additional watering on dry days should provide adequate dust suppression.

It has also been assumed that on-Site vehicles will not travel more than 30 km/hr, and that material handling operations will be undertaken in such a way as to limit, as much as reasonable, fugitive dust emissions (such as from drop operations, or the use of loaders, bulldozers, or graders on active landfill sections).

Finally, it was assumed that once a section has been filled to the planned capacity, the area will be capped and re-vegetated to eliminate windblown dust.

These measures were included in the emissions estimates for this Facility, and therefore included in the dispersion modeling and the effects assessment for the planned capacity increase for the SCRF.

6.3.4.3 Air Quality and Odour Net Effects

A facility such as the SCRF may periodically contribute to local elevated particulate concentrations, particularly under windy or dry conditions which can increase fugitive dust emissions from the Site. With the implementation of appropriate mitigation measures, particularly for the control of fugitive dust from paved and unpaved roads, and material handling on Site, the net effects of the proposed activities on the local and regional air quality is expected to be able to meet MECP guidelines and current and future Federal CAAQS, with some added mitigation or slightly reduced operations during periods when operations are occurring near the Facility fenceline, particularly in Phase 3 when operations may be occurring near the north side of the property.

The Facility will be expected to continue to document air quality complaints related to dust or odour, and to investigate complaints to attempt to identify those which are related to Facility operations (versus those related to off-Site/unrelated air quality concerns). The Net Effects as assessed in this Impact Assessment are summarized in **Table 6.9**.

Table 6.9 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Air Quality and Odour

Potential Effect	Mitigation/Compensation	Net Effect
Elevated dust concentrations in the local study area	Implementation of dust mitigation plan. Logging of complaints and investigation into contribution(s) of the site to local air quality issues.	Facility can meet MECP and CAAQS guidelines, provided care is taken when operations are occurring near the fenceline.
Odour in the local study area	Logging of complaints and investigation into contribution(s) of the site to local air quality issues.	The site is unlikely to contribute to significant odour issues in the area.

6.3.5 Atmospheric Environment – Noise

The net effects relating to the Atmospheric Environment Noise components considered the following criteria and indicators:

Effect on Noise:

- Predicted off-Site noise level
- Number of off-Site receptors potentially affected (residential, commercial, institutional)

6.3.5.1 General Assumptions and Additional Modeling

The worst-case equipment locations were selected based on proximity and elevated line-of-sight exposure to the off-Site residential dwellings. The worst-case elevation was selected based on landfill development staging phases and the corresponding topography detail.

The analysis also accounts for the potential residential development on the residentially zoned vacant lots to the north and the agricultural zoned lot to the East which allows a single detached dwelling to be built.

Cadna A modeling assumptions used in this Study are presented below:

- **Noise Sources**: All sources were modeled using the 1/1 octave band data source measurements; and reference materials.
- **Reflection Order**: A maximum reflection order of 1.0 was used to evaluate indirect noise impact from one reflecting surface.
- **Ground Absorption**: The model included soft/porous ground (G=1), gravel (G=0.5) and pavement (G=0.25).
- **Receptor Elevation**: POR receptor heights were modeled appropriately to represent the worst-case elevation.
- **Associated Terrain**: Contour lines up to 500 m around site were used and on Site final development topography were considered.

GHD conducted road traffic noise modeling to evaluate the sound levels generated by road traffic at the closest sensitive receptor (i.e., POR1) shown on Figure 5.2. The modeling was necessary in order to quantify the significant noise generated by vehicular traffic in the area and the effect on the sensitive PORs.

GHD used the MECP STAMSON ORNAMENT (STAMSON) acoustic model to quantify the noise of the road traffic. The STAMSON model is the required industry and MECP standard for line type noise generated from road traffic. Facility-specific noise exposure conditions were input, including the number of road segments, number of house rows, the positional relationship of the receptor to a noise source or barrier in terms of physical separation distance and angle of exposure, ground/receptor/source elevation(s), the basic Site topography, the ground surface type, road traffic volumes and composition, and the posted speed limit.

GHD reviewed the Traffic Detailed Impact Assessment Report (Traffic Study) completed by GHD dated June 19, 2018 as part of the Stoney Creek Regional Facility Environmental Assessment. The

Traffic Study predicts the future 2023 AM and PM peak hour traffic volumes based on the anticipated additional future traffic based on increased traffic volumes from the developing communities. GHD used the future 2023 hourly traffic counts for Green Mountain Road between First Road West and Highway 20. The daytime Average Hourly Volume on Green Mountain Road was determined by utilizing the Ontario Traffic Manual's formula based on the AM and PM peak periods. The daytime Average Hourly Volume was used to estimate the future background sound levels due to road traffic for stationary impact assessments as per the MECP NPC-300 guideline document.

GHD used the following STAMSON inputs to estimate the sound level impact at the PORs:

The receptor height was set to 4.5 metres (m) for consistency with the evaluation of stationary noise impacts. A 25 meter distance was measured from the south façade of POR1 shown in Figure 6.7 to the centre of the roadway. For the purposes of the analysis, GHD assumed traffic on this section of Green Mountain Road consisted of 5% medium trucks and 5% heavy trucks.

The rounded STAMSON modeling results are summarized in Section 5 and a sample printout of the STAMSON calculations are provided in Appendix I.

The applicable noise criteria at the PORs are based on the higher of the background sound level and the MECP's minimum sound level limits. Based on the STAMSON model predicted future background sound level for POR1 is 60 dBA for daytime hours of 7:00 am to 7:00 pm.

6.3.5.2 Potential Effects on Noise

Up to 75 off-Site residential dwellings located in the Study Area will be potentially impacted by noise from the landfill activities. The predicted noise impacts at the residential areas range from 40 to 60 dBA (rounded). The existing and potential residences near the north of the landfill are the most impacted as they are either approaching or exceeding the 55 dBA daytime noise limit for the landfill design Preferred Alternative.

The increased height of the landfill in addition to the shortened separations distance to residential areas for the Preferred Landfill Footprints will result in a potential changes to the line-of-sight noise impact exposure to the off-Site residential dwellings.

Landfill activities and on-Site operations are compared directly against a daytime one-hour Leq sound level limit of 55 dBA for landfill operations that are limited to 7 a.m. to 7 p.m. under the "Noise Guidelines for Landfill Sites" (N 1) or Site-specific noise limits based on an ambient evaluation of the road traffic noise in the area.

The Noise Impact Assessment is based on the worst case cumulative Site wide sound levels estimated at each POR, based on the worst-case location of the noise sources relative to the closest POR, dependent on which phase is active. The sound levels estimated at the PORs are summarized in **Table 6.10**. The noise contour plot is provided on **Figure 6.7.**

Table 6.10 Point of Reception Noise Impact

Point of Reception	Phase-1 Sound Levels (Leq) (dBA)	Phase-2 Sound Levels (Leq) (dBA)	Phase-3 Sound Levels (Leq) (dBA)	Phase-4 Sound Levels (Leq) (dBA)	Performance Limit(1) (Leq) (dBA)
POR-1	54	52	60	60	60 (2)
POR-2	47	46	47	44	55
POR-3	55	51	39	37	63 (2)
POR-4	45	42	36	36	63 (2)
POR-5	55	55	55	46	55

Notes:
(1) Minimum MECP sound level limits as defined in “Noise Guidelines for Landfill Sites" (N 1)
(2) Site specific noise limits based on road traffic predictions.

Since noise levels estimated at all PORs will meet the MECP sound level limit for Landfill operations or the Site-specific noise limits based on road traffic predictions, noise mitigation measures are not required.

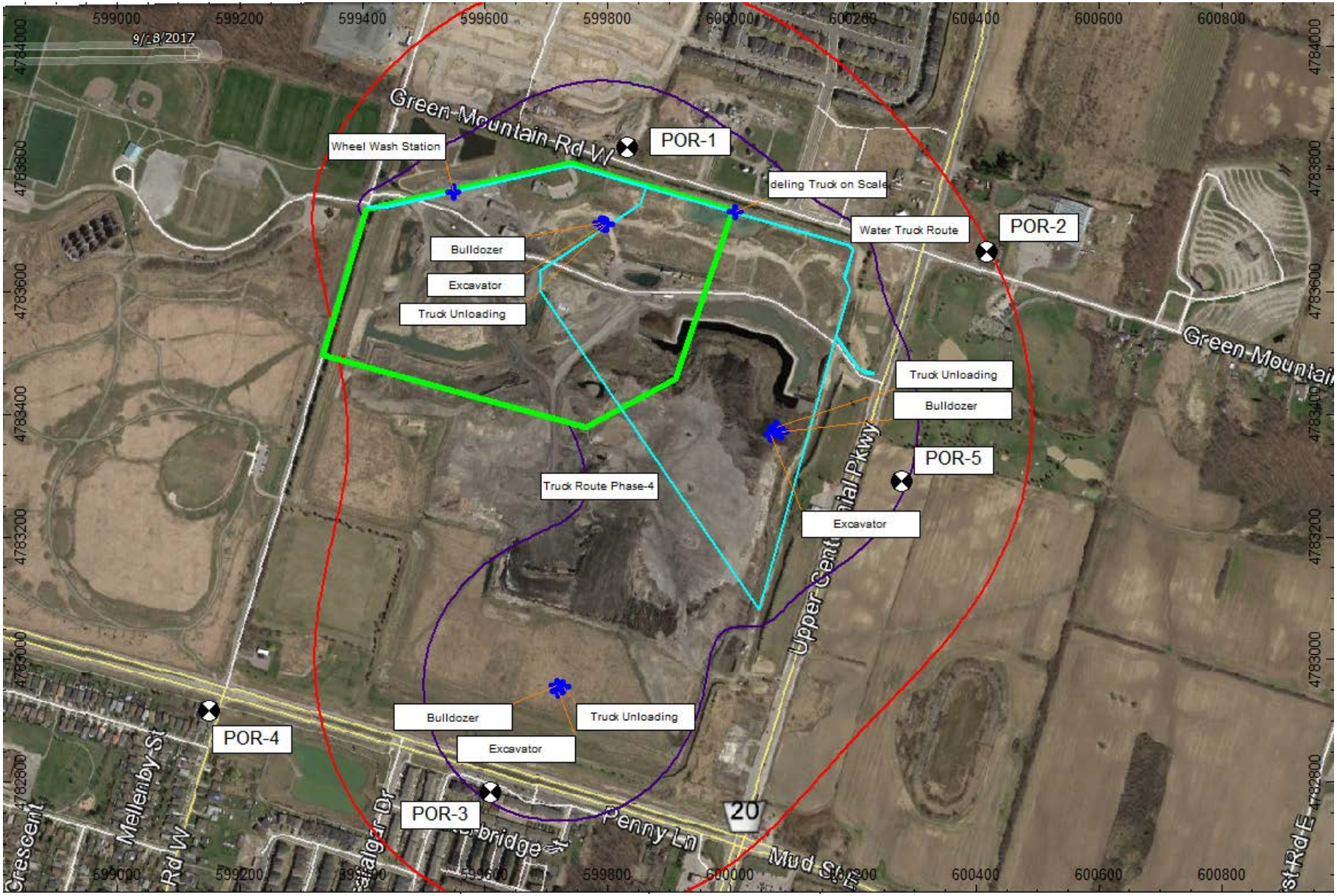


Figure 6.7 Noise Contour Plot – 4.5 m Above Grade

6.3.5.3 Mitigation and/or Compensation Measures

Based on the background noise levels, no further mitigation measures are required.

Table 6.11 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Noise

Potential Effect	Mitigation/Compensation	Net Effect
Potential change to the predicted off-Site noise impact based on increased line-of-sight due to reconfiguration and the decrease in the separation distance between the landfill activities and the adjacent residential properties. *POR1=60 dBA* *POR2=47 dBA* *POR3=55 dBA* *POR4=45 dBA* *POR5=55 dBA*	***Existing Residential Properties:*** *No Mitigation measures required.* ***Potential Future Development of Surrounding Properties:*** *No Mitigation measures required.*	Net sound level change for all off-Site receptors is 5 dBA or lower. There are some residences to the north which may experience a noise level increases of up to +5 dBA from the existing conditions.
Net sound level change for up to 200 off-Site receptors is 5 dBA or lower: ▪ Approximately 75 residences (to the north): +5 dBA change ▪ POR5=55 dBA	No Mitigation measures required.	Noise levels at receptors are below the MECP sound level limits, and Site specific noise limits.

6.3.5.4 Noise Net Effects

Net sound level change for all off-Site receptors is 5 dBA or lower. There are some residences to the north which may experience a noise level increases of up to +5 dBA from the existing conditions.

6.4 Built Environment

6.4.1 Land Use

The net effects relating to the Land Use components considered the following criteria and indicators:

Potential Effect on existing Land Use: For the Preferred Landfill Footprint there is no change to the existing land use or zoning of the SCRF during the SCRF's operational lifespan. As such, there are no potential effects associated with the Preferred Landfill Footprint relative to the site and adjacent land uses. Therefore, any mitigation measures identified as part of the existing land use criteria are specifically considered in order to address any nuisance related effects to adjacent land uses identified from an air quality, noise and/or traffic perspective.

Potential Effects to Views: As part of the detailed impact assessment on visual components, GHD developed visual renderings and cross sections of the Preferred Landfill Footprint, to confirm

the impacts that the Preferred Landfill Footprint may have on existing views as the level of visual impact varies from different locations around the Site. These renderings and cross sections are included in **Appendix J**.

6.4.1.1 Mitigation and/or Compensation Measures

As there are no potential effects associated with the Preferred Landfill Footprint relative to the Site and adjacent land uses, no mitigation measures are required with respect to the existing land use indicator beyond basic landfill operating measures. Impacts to sensitive land uses are not anticipated based on the proposed mitigation measures put forward by other disciplines, including air quality, noise, traffic and human health, therefore existing land uses are considered to have no net effects resulting from the Preferred Landfill Footprint. Mitigation measures are not required for existing land uses within the Local Study Area, since the Preferred Landfill Footprint and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Mitigation measures identified relative to the existing land use indicator are established to manage any potential nuisance related effects influenced by site operations relative to noise, air quality (including odour), and traffic, as described in the respective Impact Assessment Reports. Basic landfill operating mitigation measures are described below. Additional details on landfill operations can be found in the FCR.

6.4.1.1.1 Proposed Mitigation / Compensation Measures for Existing Land Uses

The following mitigation measures for existing land uses within the Local Study Area are only applicable to potential nuisance related effects due to on-Site construction and operations:

- Maintain buffers for nuisance reduction;
- Basic landfill operations for nuisance mitigation; and
- Best Management Practices (BMPs) for nuisance mitigation.

Maintain Buffers for Nuisance Reduction

Regulatory requirements specify a minimum on-Site buffer width of 100 m between the limit of the residual footprint and the property boundary, but allow this to be reduced to 30 m if it is shown to be appropriate based on a site specific assessment (e.g., if the buffer provides adequate space for vehicle movements and ancillary facilities, and ensures that potential effects from the Site operations do not have unacceptable impacts outside of the Site).

Minimum buffer distances of 30 m are approved and maintained around the entire perimeter of the residual material area. These buffers extend to approximately 65 m in various areas along the east and south sides of the Site, and up to approximately 130 m in the vicinity of the existing stormwater management facility in the northwest corner of the Site.

Minimum buffer distances of 30 m will be maintained around the perimeter of the residual material area throughout all phases of site operations. The buffers improve the ability to mitigate potential nuisance effects (e.g., noise, odour, and dust) to surrounding receptors and land uses through physical separation and the implementation of additional Site controls. In addition, the buffer areas are used for the construction of on-Site infrastructure, such as roads, buildings, monitoring systems, maintenance structures, stormwater drainage ditches, visual screening (e.g., fences, earth berms), and vegetation.

Basic Landfill Operations for Nuisance Mitigation

Landfill design and operations will minimize potential nuisance impacts including noise, litter, vectors, dust, and odour. Typical operating practices relating to these issues will include:

- Vehicles transporting waste to and around the Site will be covered to prevent odour and dust;
- All materials received at the Site will be verified and recorded to ensure compliance with regulatory conditions;
- On-Site equipment will be operated in such a manner as to minimize noise and visual impacts wherever possible;
- All equipment required for the development, operation, or closure of the Site will comply with the noise levels outlined in applicable MECP guidelines and technical standards;
- All vehicles leaving the Site will be required to drive through a wheel-wash to minimize track-out of mud/dirt; and,
- The Site design will include screening features, such as fences, berms and tree plantings, which mitigate visual impact and noise.

Best Management Practices (BMP) for Nuisance Mitigation

Landfill operation best management practices and mitigation measures, such as stormwater management pond, landfill liner system, dust and noise control measures will ensure potential effects to land uses are managed and mitigated. BMP's relative to potential nuisance effects to existing land uses may include:

- Use of Dust suppressants;
- Installation of protective fencing;
- Naturalized landscape features;
- Erosion and Sediment control (ESC) measures;
- Leachate Management and Control;
- Stormwater and Groundwater Management.

6.4.1.1.2 Proposed Visual Mitigation / Compensation Measures

The Site design will include screening features, such as fences, berms and tree plantings, which mitigate visual impact and noise. Specific screening techniques will be developed further during detailed design to mitigate the visual impact from the surrounding community. Screening techniques will be tailored to site conditions and anticipated visual impact from surrounding vantage points. Screening techniques that are being considered include the following:

- Traditional berms, which currently exist within the buffer on all sides of the SCRF (see **Figure 6.8**). Traditional berms can be built with a typical slope of 3:1.
- Vegetation. Currently a single layer of Spruce trees have been planted in several locations within the buffer on the north, south and west sides of the SCRF (see **Figure 6.9**). Additional vegetation screening could be considered to provide a more naturalistic look through layering, uneven spacing and/or riparian vegetation.
- Fencing with privacy screen or vegetation. Privacy screen may include coloured mesh screen, which currently exists at several locations within the buffer (see **Figure 6.8**); or a hedge screen (see **Figure 6.10**). Alternatively, live vegetation may be used for screening (see **Figure 6.11**). An exemption would be required from the City of Hamilton Fence By-Law 10-142 if fencing is more than 3 m.
- Mechanically stabilized earth berm (see **Figure 6.12**). Since they are internally reinforced mechanically stabilized earth berms can be built with steeper slopes than traditional berms.

- Freestanding green wall (see **Figure 6.13**). Green walls are freestanding structures with integrated vegetation.

Figure 6.8 View of Current Berm and Fence with Dark Green Privacy Screen on Upper Centennial Parkway

Figure 6.9 View of Current Vegetation Screening on Green Mountain Road

Figure 6.10 Example of Fencing with Hedge Screen

Figure 6.11 Example of Fencing with Live Vegetation

Figure 6.12 Mechanically Stabilized Earth Berm (Strata System)

Figure 6.13 Green Wall (Greenscreen®)

6.4.1.2 Summary of Net Effects to Land Use

Table 6.12, below, summarizes the net effects to the existing land use and views of the Facility as derived from the identified potential effects and proposed mitigation / compensation measures relative to the Preferred Landfill Footprint.

Table 6.12 Land Use – Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects

Criteria	Indicators	Potential Effect	Mitigation / Compensation	Net Effects
Effect on existing land use	Current land use	No change to the current land use designation (Open Space / Commercial) and no change to Land Use Zoning (ME-1).	No mitigation measures are required as there are no anticipated change required to existing site-specific and adjacent land uses and zoning of the facility during operation; no change anticipated to existing adjacent land uses as a result of the implementation of the Preferred Landfill Footprint. The following existing mitigation / compensation measures will continue to be in effect: • Maintain Buffers for Nuisance Reduction • In effect nuisance preventative measures for landfill operating practices • Best Management Practices for landfill operations	No change in current site-specific and study area land uses
Effect on views of the facility	Predicted changes in views of the facility from the surrounding area	Slight height increase and property buffers are maintained. Visibility increased mostly for sensitive receptors and properties adjacent to site including residential dwellings to South on Green Mountain Rd. as well as homes along Mud Street.	Maintaining the existing screening berms and fencing will assist with visual screening from residential areas, but will not be able to mitigate views completely. Additional screening guards and vegetation can be implemented to mitigate views for sensitive receptors. Progressive capping of the landfill will assist in revegetating areas as the site is of the site to create a natural look	Installation of visual screening elements will sufficiently obscure a majority of views of the facility from sensitive receptors. Relative to the existing conditions, the changes are minimal.

6.5 Social Environment

6.5.1 Transportation

The net effects relating to the Transportation components considered the following criteria and indicators;

Effect on Traffic:

- Potential for traffic collisions
- Level of Service at intersections around the SCRF

6.5.1.1 Potential Effects on Traffic

The Preferred Landfill Footprint is not expected to result in any additional daily SCRF truck traffic to current volumes generated by the Site. Furthermore, as per the results of the 2023 future conditions intersection analysis, assuming daily SCRF truck traffic was to increase to the maximum allowable 250 vehicles per day, the operational impact is expected to be negligible, with any change in intersections operations not expected to be identifiable from a driver's perspective.

6.5.1.2 Mitigation and/or Compensation Measures

No improvements to the study area intersections are recommended in response to the SCRF Site truck traffic (**Table 6.13**).

6.5.1.3 Traffic Net Effects

Table 6.13 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Traffic

Potential Effect	Mitigation/ Compensation	Net Effect
No change to the existing level of road user safety and intersection Level of Service within the Local Study Area	No mitigation measures required.	No net effects.

6.5.2 Human Health

The net effects relating to the Human Health components considered the following criteria and indicators;

Effect on Air Quality:

- Predict impacts to air quality and their potential effects on human health

Effect of Leachate Quality:

- Predict effects of leachate quality (inorganic and organic chemicals) on human health

Effect on Groundwater Quality

- Predict impacts to groundwater quality and their potential effects on human health
- Effect on Surface Water Quality
- Predict impacts to surface water quality and their potential effects on human health

Effect on Soil Quality

- Predict impacts to soil and their potential effects on human health

6.5.2.1 Potential Effects on Human Health

Air Quality

Air quality modeling of particulate concentrations indicated that while predicted concentrations of the PM2.5 size fraction would be slightly higher than the existing approved landfill design at some receptor locations, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community. In other words, as noted in **Tables 6.14** and **6.15** below, all predicted short- and long-term Concentration Ratios – both landfill-specific and cumulative – were less than the CR benchmark of 1 (*i.e.,* predicted exposures were all less than the respective regulatory health-based benchmark). In fact, in most cases, emissions from the landfill are expected to be a minimal to negligible addition to existing background conditions.

Table 6.14 Predicted Worst-case Concentration Ratios for 24-hour PM2.5 Exposures at each Sensitive Receptor Location in the Surrounding Community

Receptors	PM2.5 24-Hour Concentration Ratio (CR)										
	Back ground	Existing		Phase 1		Phase 2		Phase 3		Phase 4	
		Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul
HHRA1	0.32	0.0044	0.33	0.0063	0.33	0.0025	0.33	0.0042	0.33	0.0038	0.33
HHRA2	0.32	0.028	0.35	0.030	0.35	0.013	0.34	0.026	0.35	0.025	0.35
HHRA3	0.32	0.025	0.35	0.025	0.35	0.010	0.33	0.022	0.35	0.017	0.34
HHRA5	0.32	0.027	0.35	0.038	0.36	0.013	0.34	0.012	0.34	0.014	0.34
HHRA6	0.32	0.024	0.35	0.034	0.36	0.010	0.33	0.0091	0.33	0.012	0.34
HHRA7	0.32	0.012	0.34	0.015	0.34	0.0090	0.33	0.0088	0.33	0.011	0.33
HHRA8	0.32	0.0088	0.33	0.013	0.34	0.0078	0.33	0.0081	0.33	0.0093	0.33
HHRA9	0.32	0.0071	0.33	0.012	0.34	0.0050	0.33	0.0066	0.33	0.0080	0.33
HHRA10	0.32	0.0065	0.33	0.012	0.34	0.0045	0.33	0.0064	0.33	0.0078	0.33
HHRA11	0.32	0.0060	0.33	0.0094	0.33	0.0049	0.33	0.0054	0.33	0.0065	0.33
MAXIMUM	**0.32**	**0.028**	**0.35**	**0.038**	**0.36**	**0.013**	**0.34**	**0.026**	**0.35**	**0.025**	**0.35**

Note: Background refers to predicted risks from regional background air concentrations measured as part of the Hamilton Air Monitoring Network (HAMN); Landfill refers to predicted risks arising from emissions from the landfill itself; and, Cumul refers to predicted risks based on cumulative exposures from both background + landfill emission sources.

Table 6.15 Predicted Worst-case Concentration Ratios for Annual Average PM2.5 Exposures at each Sensitive Receptor Location in the Surrounding Community

Receptors	PM2.5 Annual Average Concentration Ratio (CR)										
	Back ground	Existing		Phase 1		Phase 2		Phase 3		Phase 4	
		Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul
HHRA1	0.92	0.00068	0.92	0.00087	0.92	0.00041	0.92	0.00059	0.92	0.00056	0.92
HHRA2	0.92	0.0019	0.92	0.0022	0.92	0.0010	0.92	0.0015	0.92	0.0018	0.92
HHRA3	0.92	0.0046	0.93	0.0051	0.93	0.0025	0.92	0.0046	0.93	0.0033	0.92
HHRA5	0.92	0.0020	0.92	0.0033	0.92	0.0011	0.92	0.0010	0.92	0.0014	0.92
HHRA6	0.92	0.0016	0.92	0.0025	0.92	0.00085	0.92	0.00081	0.92	0.0011	0.92
HHRA7	0.92	0.00090	0.92	0.0012	0.92	0.00051	0.92	0.00053	0.92	0.00071	0.92
HHRA8	0.92	0.00073	0.92	0.0010	0.92	0.00042	0.92	0.00044	0.92	0.00059	0.92
HHRA9	0.92	0.00034	0.92	0.00047	0.92	0.00019	0.92	0.00025	0.92	0.00030	0.92
HHRA10	0.92	0.00033	0.92	0.00046	0.92	0.00017	0.92	0.00023	0.92	0.00028	0.92
HHRA11	0.92	0.00025	0.92	0.00034	0.92	0.00015	0.92	0.00018	0.92	0.00022	0.92
MAXIMUM	**0.92**	**0.0046**	**0.93**	**0.0051**	**0.93**	**0.0025**	**0.92**	**0.0046**	**0.93**	**0.0033**	**0.92**

Note: Background refers to predicted risks from regional background air concentrations measured as part of the Hamilton Air Monitoring Network (HAMN); Landfill refers to predicted risks arising from emissions from the landfill itself; and, Cumul refers to predicted risks based on cumulative exposures from both background + landfill emission sources.

Like the PM2.5 results, particulate modeling indicated that while predicted 24-hour concentrations of PM10 size fraction would be slightly higher than the existing approved landfill design at some receptor locations, concentrations are still expected to be less than the respective short- and long-term health-based benchmarks at all receptor locations in the surrounding community. In other words, as noted in **Table 6.16** below, all predicted short-term Concentration Ratios – both landfill-specific and cumulative – were less than the CR benchmark of 1 (i.e., predicted exposures were all less than the respective regulatory health-based benchmark). In fact, in most cases, emissions from the landfill are expected to be a minimal to negligible addition to existing background conditions.

Table 6.16 Predicted Worst-case Concentration Ratios for 24-hour PM10 Exposures at each Sensitive Receptor Location in the Surrounding Community

Receptors	PM10 24-Hour Concentration Ratio (CR)										
	Back ground	Existing		Phase 1		Phase 2		Phase 3		Phase 4	
		Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul
HHRA1	0.46	0.019	0.48	0.029	0.49	0.025	0.48	0.017	0.48	0.015	0.48
HHRA2	0.46	0.13	0.59	0.14	0.60	0.11	0.57	0.11	0.57	0.11	0.57
HHRA3	0.46	0.10	0.56	0.11	0.57	0.094	0.55	0.10	0.56	0.077	0.54
HHRA5	0.46	0.12	0.58	0.18	0.64	0.096	0.56	0.050	0.51	0.060	0.52
HHRA6	0.46	0.11	0.57	0.16	0.62	0.080	0.54	0.038	0.50	0.053	0.51
HHRA7	0.46	0.052	0.51	0.071	0.53	0.060	0.52	0.032	0.49	0.050	0.51
HHRA8	0.46	0.039	0.50	0.057	0.52	0.053	0.51	0.029	0.49	0.043	0.50
HHRA9	0.46	0.029	0.49	0.057	0.52	0.033	0.49	0.024	0.48	0.030	0.49
HHRA10	0.46	0.026	0.49	0.055	0.52	0.028	0.49	0.024	0.48	0.031	0.49
HHRA11	0.46	0.026	0.49	0.043	0.50	0.033	0.49	0.020	0.48	0.026	0.49
MAXIMUM	**0.46**	**0.13**	**0.59**	**0.18**	**0.64**	**0.11**	**0.57**	**0.11**	**0.57**	**0.11**	**0.57**

Note: Background refers to predicted risks from regional background air concentrations measured as part of the Hamilton Air Monitoring Network (HAMN); Landfill refers to predicted risks arising from emissions from the landfill itself; and, Cumul refers to predicted risks based on cumulative exposures from both background + landfill emission sources.

However, when one evaluates predicted annual average concentrations of the PM10 size fraction, typical background concentrations already exceed the regulatory health-based benchmark under worst-case conditions in the Hamilton Area. These worst-case values are based on data provided by the Hamilton Air Monitoring Network (HAMN), which includes monitoring stations located in the industrialized areas of Hamilton and are not specifically located at the landfill itself. It was also extrapolated from worst-case 24-hour monitoring data. As such, it is expected that this regional background level used in this assessment is conservative and overestimating potential background concentrations of PM10 in the area in and around the landfill.

Table 6.17 Predicted Worst-case Concentration Ratios for Annual Average PM10 Exposures at each Sensitive Receptor Location in the Surrounding Community

Receptors	PM10 Annual Average Concentration Ratio (CR)										
	Back ground	Existing		Phase 1		Phase 2		Phase 3		Phase 4	
		Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul	Landfill	Cumul
HHRA1	1.2	0.0025	1.2	0.0034	1.2	0.0014	1.2	0.0021	1.2	0.0020	1.2
HHRA2	1.2	0.0070	1.2	0.0085	1.2	0.0033	1.2	0.0051	1.2	0.0061	1.2
HHRA3	1.2	0.016	1.2	0.018	1.2	0.0079	1.2	0.017	1.2	0.012	1.2
HHRA5	1.2	0.0080	1.2	0.014	1.2	0.0039	1.2	0.0036	1.2	0.0054	1.2
HHRA6	1.2	0.0064	1.2	0.010	1.2	0.0031	1.2	0.0029	1.2	0.0043	1.2
HHRA7	1.2	0.0035	1.2	0.0049	1.2	0.0017	1.2	0.0019	1.2	0.0026	1.2
HHRA8	1.2	0.0028	1.2	0.0040	1.2	0.0014	1.2	0.0016	1.2	0.0022	1.2
HHRA9	1.2	0.0012	1.2	0.0018	1.2	0.00061	1.2	0.00083	1.2	0.0010	1.2
HHRA10	1.2	0.0012	1.2	0.0018	1.2	0.00057	1.2	0.00078	1.2	0.00098	1.2
HHRA11	1.2	0.00094	1.2	0.0013	1.2	0.00049	1.2	0.00063	1.2	0.00078	1.2
MAXIMUM	**1.2**	**0.016**	**1.2**	**0.018**	**1.2**	**0.0079**	**1.2**	**0.017**	**1.2**	**0.012**	**1.2**

Note: Background refers to predicted risks from regional background air concentrations measured as part of the Hamilton Air Monitoring Network (HAMN); Landfill refers to predicted risks arising from emissions from the landfill itself; and, Cumul refers to predicted risks based on cumulative exposures from both background + landfill emission sources.

When one then compares the background concentration to that predicted from the existing landfill and the various phases of the preferred landfill design, it demonstrates that the landfill results in a negligible impact on human health. As noted in **Table 6.18**, the worst case CR for PM10 emissions from the existing landfill is 0.016 and 0.018 for the worst case phase of the preferred landfill design (i.e., predicted worst-case annual average concentrations are only 1.6% and 1.8% of the regulatory health-based benchmark, respectively). This is further illustrated by the fact that the predicted cumulative concentration is the same as the background concentration in all cases (i.e., 1.2) showing the negligible contribution from the landfill to annual average PM10 concentrations in the surrounding community.

Based on the results of this screening level human health risk assessment on air quality impacts, the Preferred Landfill Footprint would not be expected to result in any health risks to the surrounding community and would not be expected to be any different than the existing approved landfill design.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, the Preferred Landfill Footprint would not be expected to result in any health risks different than the existing approved landfill design.

Groundwater Quality

Results of the hydrogeology assessment indicate that Preferred Landfill Footprint has leachate leakage rates through the liner that are substantially similar to the existing approved landfill design. Furthermore, the predicted downgradient groundwater quality is predicted to be very similar to the existing approved landfill design, which has more than 20 years of ongoing groundwater monitoring demonstrating the lack of adverse impact.

Surface Water Quality

Results of the surface water study indicate that stormwater management ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards. As such, no human health risks are expected.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently mitigated to meet ambient guidelines at the fenceline (a condition that is, for the most part, being met under current operations, based on ongoing monitoring), then predicted deposition for this Preferred Landfill Footprint should not be significantly different than those experienced with the existing approved landfill design. This is borne out by the results of particulate deposition modeling conducted as part of the Air Quality Assessment (GHD, 2018b).

Table 6.18 Comparison of Predicted Annual Total Particulate Deposition for the Existing Configuration and the Various Phases of the Preferred Landfill Footprint

Receptor	Maximum Predicted Annual Total Deposition (g/m^2)					
	Existing Configuration	Preferred Landfill Footprint				
		Phase 1	Phase 2	Phase 3	Phase 4	Average of 4 Phases
HHRA1	0.33	0.43	0.02	0.25	0.25	0.24
HHRA2	0.47	0.57	0.21	0.24	0.37	0.35
HHRA3	2.02	2.25	1.04	2.14	1.42	1.71
HHRA5	0.66	1.02	0.28	0.25	0.44	0.50
HHRA6	0.52	0.78	0.23	0.21	0.35	0.39
HHRA7	0.19	0.25	0.08	0.09	0.13	0.14
HHRA8	0.15	0.20	0.07	0.08	0.11	0.11
HHRA9	0.05	0.07	0.03	0.03	0.04	0.04
HHRA10	0.05	0.06	0.02	0.03	0.04	0.04
HHRA11	0.04	0.05	0.02	0.02	0.03	0.03

As noted in **Table 6.18**, the maximum predicted annual total deposition of particulate in the surrounding community is typically less than those modeled for the existing landfill, which is evaluated as part of the annual monitoring program and has not shown any potential health risks to date. Only the brief construction phase (i.e., Phase 1) showed predicted particulate deposition to be slightly above the existing configuration. Given the brief duration of this phase, with the remainder of the phases showing significantly less particulate deposition than the existing configuration, the Preferred Landfill Footprint is not expected to result in any significant long-term particulate impacts to soil within the Study Area and beyond.

Therefore, predicted impacts on soil quality in the surrounding community would be expected to be negligible.

6.5.2.2 Mitigation and/or Compensation Measures

As noted in the Air Quality Assessment report (GHD, 2018b), the SCRF currently has a dust mitigation plan. For the purposes of the Air Quality assessment, best practices for dust mitigation were assumed to be implemented at the site for all phases of the work. To account for this mitigation, the Air Quality Study assumed a 75% reduction in re-suspended road dust from the Site, as well as other standard mitigation measures such as restriction of on-Site vehicles from travelling more than 30 km/hour.

Furthermore, it is recommended that the annual Community Health Assessment Review be continued as part of the approvals process to ensure the assumptions and conclusions of the original 1996 Community Health Assessment Study and this report hold in the future.

As with the Air Quality Study, these mitigation measures are necessary to ensure the conclusions of the Human Health Study that there are no potential health risks.

6.5.2.3 Human Health Net Effects

As noted in the Air Quality Study (GHD, 2018b), there is the potential for local elevated particulate concentrations arising from the SCRF, particularly under windy or dry conditions which can increase fugitive dust emissions from the site. These are expected to be addressed through the implementation of appropriate mitigation measures (e.g., control of fugitive dusts from paved and unpaved roads, careful management of construction activities, and appropriate material handling on site) (**Table 6.19**).

Table 6.19 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Human Health

Potential Effect	Mitigation/ Compensation	Net Effect
Elevated dust concentrations in the local study area.	Implementation of dust mitigation plan and ongoing monitoring/assessment	Acceptable dust concentrations with no unacceptable health risks to surrounding community. Ongoing monitoring, assessment and reporting on an annual basis to demonstrate this to all stakeholders.

6.6 Economic Environment

The net effects relating to the Economic components considered the following criteria and indicators:

Effect on approved/planned Land Uses:

- Number, extent, and type of approved/planned land uses affected

Economic benefit to the City of Hamilton and Local Community:

- Employment at site (number and duration)

6.6.1.1 Potential Effects on Approved/Planned Land Uses

Residential

The closest residential dwelling (currently under construction) is located approximately 35 m north of the Site. There are currently four (4) draft approved plans of subdivision within the Local Study Area, as well as eight (8) proposed plans of subdivision currently under municipal review, totaling approximately 2,100 future residential units to be developed within the Local Study Area. This includes a development application (ZAC-17-077) to re-zone 50 Green Mountain Road West from ND (Neighbourhood Development) to RM-3 (Multiple Residential). The effects on approved/planned and proposed residential uses within the Local Study Area is contingent on direct physical impact requiring alteration of land or change in land use or zoning required as a result of the landfill footprint considered. However, landfill footprint the Preferred Landfill Footprint, and relative 30 m buffer, will not physically extend or impede on planned residential uses. Therefore, no net effects to the physical property of planned and proposed residential uses resulting from the Preferred Landfill Footprint are anticipated. Further, application of landfill operation best management practices and mitigation measures from other environmental components (i.e., noise, dust, traffic) will ensure there are no net effects causing physical disturbance to future planned residential land uses, as well as minimal nuisance related effects to future planned residential land uses.

Institutional

In accordance with the Nash Neighbourhood Secondary Plan, an institutional land use designation is present at the northwest corner of Green Mountain Road West and First Road West (435 First Road West). This land is reserved for the future development of a school (zoned Neighbourhood Institutional (I1), as approved by council on November 11, 2015, By-law No. 15-260); however, at this time, the property is owned by a developer. The Preferred Landfill Footprint will not physically extend or impede on the potential future use and/or operation of 435 First Road West. As such, no potential effects to the physical location or site alteration of this property resulting from the Preferred Landfill Footprint are anticipated. Further, application of landfill operation best management practices and mitigation measures from other environmental components (i.e., noise, dust, traffic) will ensure there are no net effects causing physical disturbance to future planned institutional land uses, as well as minimal nuisance related effects to future planned institutional land uses.

Summary of Potential Effects on Approved/Planned Land Uses

In regards to the economic indicators, specifically the potential effect on approved/planned land uses, including number, extent, and type of approved/planned land uses affected, the Preferred Landfill Footprint results in no potential, and therefore no net effects. Landfill operation best management practices and mitigation measures, such as storm water management pond, landfill liner system, dust and noise control measures will ensure potential effects to land uses are appropriately managed and mitigated. The Preferred Landfill Footprint will not result in a change to proposed land uses within the Site or Local Study Area. Therefore, there are no net effects and no mitigation measures required for approved/planned land uses. However, any mitigation measures identified as part of the planned/approved land use criteria are specifically considered in order to address any potential nuisance related effects to planner or approved land uses within the Local Study Area, as identified from an air quality, noise and/or traffic perspective.

6.6.1.1 Potential Effects - Economic Benefits to the City of Hamilton and Local Community

In regards to the potential economic benefit to the City of Hamilton and local community, specifically in regards to total economic activity, city and community compensation and employment at the Site, the Preferred Landfill Footprint will result in positive socioeconomic effects. An economic impact assessment was completed in 2017 (RIAS Inc.) regarding the reconfiguration and vertical expansion of the SCRF and the potential output to the local economy. Based on the historical fill rate, it was determined that the current SCRF site generates $28.7 million in economic activity in the Hamilton area, adding $17.9 million in GDP and 51 jobs for local workers. Based on the current configuration and remaining lifespan, the SCRF will generate between $94 and $104 million in total economic activity and 164 to 190 local jobs. It was concluded in the assessment that if an expansion of 3.68 million m^3 of residual material was approved, total economic activity is expected to range between $349 million and $372 million, with GDP from $218 million to $232 million and an estimated total jobs between 662 and 671 (RIAS Inc., 2017). Further, the Preferred Landfill Footprint would allow for Terrapure to realize the economic opportunity for the SCRF (i.e., increase the capacity by 3.68 million m^3) would ensure maximum return with respect to the compensation agreements ($ per tonne). The Preferred Landfill Footprint results in high positive potential effects as the Preferred Landfill Footprint allows for potential capacity of 3.68 million m^3 of residual material.

The Preferred Landfill Footprint would allow for an increase in capacity at the SCRF and meets the economic opportunity for Terrapure to allow for a 3.68 million m^3 increase in capacity. The Preferred Landfill Footprint would result in total economic activity of $349 million to $372 million, with GDP from $218 million to $232 million. The economic benefits to the City and local community are high as the City and community compensation has the potential to add up to $14 Million based on the current $ per tonne agreements. Employment opportunities at the site would be increased as a result of the Preferred Landfill Footprint, based on the operational requirements. The Preferred Landfill Footprint results in additional staffing requirements of 15 full-time equivalents on-Site during operation and post-closure monitoring, as required for approximately 250 years.

Based on the land use, Terrapure pays a higher property tax rate than for lands that would be zoned open space recreational (which is the future anticipated land use). In 2011, Terrapure paid $339,028 in property taxes, while in 2017 Terrapure paid $584,021 in property taxes.

6.6.1.2 Mitigation and/or Compensation Measures

As mentioned above, the Preferred Landfill Footprint will not result in any negative effects to the Economic environment, and therefore no mitigation measures beyond the basic landfill operating measures will be required. Impacts to land uses are not anticipated based on the proposed mitigation measures put forward by other disciplines, including air quality, noise, traffic and human health, therefore existing land uses are considered to have no net effects resulting from the Preferred Landfill Footprint. Mitigation measures identified relative to the existing land use indicator are established to manage any potential nuisance related effects influenced by Site operations relative to noise, air quality (including odour), and traffic, as described in the respective Impact Assessment Reports. Basic landfill operating mitigation measures are described below. Additional details on landfill operations can be found in the FCR. In addition, the City will continue to be paid property taxes that are higher than the future anticipated land use (open space recreational).

6.6.1.2.1 Mitigation / Compensation Measures for Approved / Planned Land Uses

The following mitigation measures for approved/planned land uses within the Local Study Area are only applicable to potential nuisance related effects due to on-Site construction and operations:

- Encourage Surrounding Land Use Development
- Encourage buffers for nuisance reduction;
- Encourage minimum setback distances for residential development;
- Basic landfill operations for nuisance mitigation; and
- BMPs for nuisance mitigation.

Encourage Surrounding Land Use Development

Lands surrounding the Site are expected to continue to include a mix residential, commercial, and recreational uses. Additional development is anticipated in the area to the northwest of the Site, and possibly to the east of the Site in the future. Existing residential lands to the south of the Site are expected to remain relatively unchanged. Additional recreational facilities may be established in the existing park to the west of the Site.

Off-Site separation distances are expected to remain similar to current conditions in areas to the north, south, and west of the Site over all phases. Current separation distances to the east of the Site may change if development of the existing properties occurs in the future.

Encourage Buffers for Nuisance Reduction

Regulatory requirements specify a minimum on-Site buffer width of 100 m between the limit of the residual footprint and the property boundary, but allow this to be reduced to 30 m if it is shown to be appropriate based on a site specific assessment (e.g., if the buffer provides adequate space for vehicle movements, ancillary facilities, and ensures that potential effects from the Site operations do not have unacceptable impacts outside of the Site).

Minimum buffer distances of 30 m are approved and maintained around the entire perimeter of the residual material area. These buffers extend to approximately 65 m in various areas along the east and south sides of the Site, and up to approximately 130 m in the vicinity of the existing stormwater management facility in the northwest corner of the Site.

Minimum buffer distances of 30 m will be maintained around the perimeter of the residual material area throughout all phases of site operations. The buffers improve the ability to mitigate potential nuisance effects (e.g., noise, odour, and dust) to surrounding receptors and land uses through physical separation and the implementation of additional Site controls. In addition, the buffer areas are used for the construction of on-Site infrastructure, such as roads, buildings, monitoring systems, maintenance structures, stormwater drainage ditches, visual screening (e.g., fences, earth berms), and vegetation.

Encourage Minimum Setback Distances for Residential Development

In addition to the on-site buffers noted above, separation from surrounding developments and land uses is also achieved through road allowances and setbacks for other developments required in

accordance with local planning by-laws. The following provides a general overview of the setbacks to surrounding developments:

- The closest residential dwelling (currently under construction) to the north is situated approximately 35 m from the property line.
- The closest residential dwelling to the east is situated approximately 150 m from the property line.
- The closest residential dwelling to the south is situated approximately 60 m from the property line.
- The closest residential dwelling to the west is situated approximately 795 m from the property line.

Basic Landfill Operations for Nuisance Mitigation

Landfill design and operations will minimize potential nuisance impacts including noise, litter, vectors, dust, and odour. Typical operating practices relating to these issues will include:

- Vehicles transporting waste to and around the Site will be covered to prevent odour and dust;
- All materials received at the Site will be verified and recorded to ensure compliance with regulatory conditions;
- On-Site equipment will be operated in such a manner as to minimize noise and visual impacts wherever possible;
- All equipment required for the development, operation, or closure of the Site will comply with the noise levels outlined in applicable MECP guidelines and technical standards;
- All vehicles leaving the Site will be required to drive through a wheel-wash to minimize track-out of mud/dirt; and,
- The Site design will include screening features, such as fences, berms and tree plantings, which mitigate visual impact and noise.

Best Management Practices (BMP) for Nuisance Mitigation

Landfill operation best management practices and mitigation measures, such as stormwater management pond, landfill liner system, dust and noise control measures will ensure potential effects to land uses are managed and mitigated. More detailed information on BMPs can be found in the Impact Assessment Report. BMP's relative to potential nuisance effects to existing land uses may include;

- Use of Dust suppressants;
- Installation of protective fencing;
- Naturalized landscape features;
- Erosion and Sediment control (ESC) measures;
- Leachate Management and Control;
- Stormwater and Groundwater Management;

6.6.1.2.2 Proposed Mitigation / Compensation Measures for Economic Factors

As a result of high positive potential effects to economic factors, as well as economic benefits resulting from the Preferred Landfill Footprint, mitigation and compensation measures are not

required. Positive net effects are anticipated as a result of the implementation of the Preferred Landfill Footprint.

6.6.1.3 Economic Environment Net Effects

Table 6.20, below, summarizes the net effects to the Economic environment as derived from the identified potential effects and proposed mitigation / compensation measures relative to the Preferred Landfill Footprint.

Table 6.20 Economic Environment – Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects

Criteria	Indicators	Potential Effect	Mitigation / Compensation	Net Effects
Effect on approved/planned land uses	Number, extent, and type of approved/planned land uses affected	Approximately 1,200 residential dwellings, 11 commercial units, 4 agricultural properties, 1 recreational, 1 institutional within 500 m of site. No anticipated effects to these land uses through various landfill operation mitigation measures.	No mitigation measures are required as there is no anticipated change required to existing site-specific and adjacent land uses and zoning of the facility during operation; no change anticipated to existing adjacent land uses as a result of the implementation of the Preferred Landfill Footprint. Basic landfill operation mitigation measures including; storm water management, leachate treatment, dust and noise control will assist in mitigating effects to surrounding properties. The following existing mitigation / compensation measures will continue to be in effect: • Maintain Buffers for Nuisance Reduction • In effect nuisance preventative measures for landfill operating practices • Best Management Practices for landfill operations	No net effects to approved/planned land uses.
Economic benefit to the City of Hamilton and the local community	Employment at site (number and duration)	Expansion and reconfiguration would result in maximum increase of jobs and increase to economy and GDP (Range of economic activity between $349 and $372 million with GDP from $218-$232 million and between 662-671 jobs) Property taxes paid to City at a higher rate will continue	No mitigation or compensation measures are required.	Positive economic benefits to local community. Meets Disposal objectives.

6.7 Cultural Environment

6.7.1 Archaeology and Built Heritage

Based on the Preferred Undertaking and through correspondence with the Ministry of Tourism, Culture and Sport (MTCS), it was determined that there are no net effects on archaeological resources or built heritage landscapes.

The current SCRF site is located within a former quarry and is therefore considered to be previously disturbed from a cultural heritage and archaeological perspective. A copy of the quarry license and permit is included as **Appendix H** to demonstrate the extent of the quarry limits/ disturbed area relative to the alternative footprint options. All of the lands have been previously excavated and therefore it is concluded that there will be no potentially significant or known archeological sites or lands with the presence of archaeological resources disturbed or affected. Therefore, no net effects or mitigation measures are anticipated or required from an archaeological perspective.

A review of the designated culturally significant built heritage and cultural landscapes was completed to assist in the *Land Use Existing Conditions report*. The review determined that there was only one designated built heritage resource, known as the Billy Green House, 30 Ridge Rd (**Appendix H**) located within the 1.5km of the SCRF. None of the 6 Options will result in the designated resource to be disturbed or displaced and therefore No Net Effects and no mitigation measures are anticipated or required from a built/cultural heritage resource perspective.

It should be noted that as part of the 1996 Taro East EA, which established the currently approved facility, the Ministry of Culture, Tourism and Recreation (now known as Ministry of Tourism, Culture and Sport) confirmed that there was a low potential for impacting cultural heritage resources on site due to the fact that the study area (for the landfill footprint) is limited to an exhausted quarry pit[1].

6.8 Design and Operations

6.8.1.1 Potential Effects on Design and Operations

Accepted Materials

The SCRF will continue to accept post-diversion, solid, non-hazardous industrial residual material from sources from within the Province of Ontario. The SCRF will no longer be approved to accept industrial fill material.

Detailed records of the residual materials accepted at the Site each year are documented in the Annual Monitoring Report. **Table 6.21** provides a summary of the residual materials accepted at the Site and their approximate fraction of the overall total based on records from 1997 to 2017. The general composition of the residual material accepted at the Site in the future is not expected change significantly since the primary sources of material (i.e., steel making industry, soils from infrastructure development projects) are expected to remain the same.

[1] See Supporting Document #2 to the Stoney Creek Regional Facility Environmental Assessment Minister Approved Amended Terms of Reference for correspondence.

Table 6.21 Summary of Accepted Materials (1997-2017)

Material	Approximate Fraction of Total
Non-Hazardous Industrial Waste	60.4%
Non-Hazardous Contaminated Soils	15.7%
Basic Oxygen Furnace Oxide	13.7%
Mixed Waste	8.5%
Construction & Demolition Waste, Asbestos, Slag Fines	1.7%
TOTAL	100.0%

Fill Rate

No changes are being proposed to the maximum approved fill rate for residual material of up to 750,000 tonnes in any consecutive twelve month period, or up to 8,000 tonnes per day.

Timing

The proposed expansion of the SCRF will increase the approved capacity by 3,680,000 m^3 for post-diversion, solid, non-hazardous residual material. Based on the total tonnage and volume of residual material received at the Site between 1997 and 2017, an in-situ, compacted density of approximately 1.9 tonnes/m^3 has been achieved for the residual material. Using a density conversion of 1.9 tonnes/m^3 would yield additional capacity for approximately 6,992,000 tonnes of residual material.

Assuming the maximum allowable fill rate of up to 750,000 tonnes per year, the Site could reach capacity in as little as 10 years. Using the actual average fill rate between 1997 and 2017 of approximately 562,000 tonnes per year, the Site would reach capacity in 13 years. Allowing for up to an additional 2 years to achieve Site closure, it is anticipated that the operating stage of the SCRF would be between approximately 10-15 years. However, it should be noted that these values represent estimates based on currently available information and may change depending on actual operating conditions encountered at the Site.

Construction activities associated with the SCRF (e.g., base liner system, stormwater management system, Site infrastructure) will be undertaken as required, but will occur concurrently with Site operations over the entire operating period of approximately 15 years. Post-Closure activities (e.g., maintenance and monitoring) are expected to last for a minimum of 25 years immediately following the closure of the Site.

Site Infrastructure

There are no additional requirements beyond the existing Site infrastructure as a result of the implementation of the Preferred Landfill Footprint. The existing Site infrastructure will generally be reconfigured as follows over the life of the Site:

- Trucks will continue to use the Site entrance from Upper Centennial Parkway and the Site exit onto First Road West throughout all phases.
- Site offices and parking areas will be relocated to the southeast buffer area during Phase 2.

- New, paved access roads will be established in the east buffer and north buffer areas during Phase 2.
- The weigh scale and scale house will be relocated to the southeast buffer area during Phase 2.
- The maintenance facility will be relocated to the northeast buffer area during Phase 3.
- The truck wash facility will be relocated to the northwest buffer area during Phase 3.
- The training center will be decommissioned during Phase 3.

All Site infrastructure (with the potential exception of the Site entrance and exit) will be decommissioned during the closure stage, as dictated by the proposed end use(s) for the Site.

Buffers

Minimum on-Site buffer distances of 30 m will be maintained around the perimeter of the residual material area throughout all phases. On-Site buffers currently extend to approximately 65 m in various areas along the east and south side of the Site, and up to approximately 130 m in the vicinity of the existing stormwater management facility in the northwest corner of the Site. These buffer distances will also be maintained. It should be noted that while the residual material area will expand toward the north of the Site, this area would have been occupied by industrial fill under the current configuration, which also would have maintained a minimum 30 m separation with the northern property boundary.

The buffer area will be used for the construction of on-Site infrastructure such as roads, buildings, monitoring systems, maintenance structures, stormwater drainage ditches, visual screening (e.g., fences, earth berms), and vegetation.

Off-Site separation distances are expected to remain similar to current conditions in areas to the north, south, and west of the Site over all phases. Current separation distances to the east of the Site may change if development of the adjacent properties occurs in the future.

Base Liner System

The design of the base liner system as presented in Section 2.11 of the FCR will remain unchanged as a result of the implementation of the Preferred Landfill Footprint. The base liner system will continue to be constructed in stages as required by landfilling operations and will be connected to the existing base liner system. The base liner system will be constructed in the northeast portion of the Site in Phase 2, and in the northwest portion of the Site in Phase 3.

In order to verify the suitability of the proposed height increase, it was also necessary to check that the installed geotextile would continue to provide sufficient protection of the HDPE liner from being punctured by the overlying granular material. Detailed calculation are provided in **Appendix J**.

It was determined that the existing 445 g/m^2 non-woven, needle-punched geotextile installed for the protection of the HDPE geomembrane meets the required factor of safety for protection against puncture. It was also determined that a geotextile with a minimum mass of 405 g/m^2 would be required to prevent damage to the HDPE geomembrane from construction, which is less than the proposed geotextile mass of 445 g/m^2, therefore the protection form construction procedures is fully satisfied.

Daily Operations

General Site operations are not expected to change from current practices (as presented in **Section 2.12** of the FCR (**Appendix I**)) as a result of the implementation of the Preferred Landfill Footprint. This includes:

- Operating hours
- Staffing
- Equipment
- Waste receiving process
- Site administration
- Operations management
- Maintenance work
- Environmental monitoring

The key objective for the landfill design and operations will continue to be the minimizing of potential nuisance impacts including noise, litter, vectors, dust, and odour. Typical operating practices relating to these issues will continue to include:

- Vehicles transporting waste to and around the Site will be covered to prevent odour and dust;
- All materials received at the Site will be verified and recorded to ensure compliance with regulatory conditions;
- On-Site equipment will be operated in such a manner as to minimize noise and visual impacts wherever possible;
- All equipment required for the development, operation, or closure of the Site will comply with the noise levels outlined in applicable MECP guidelines and technical standards;
- All vehicles leaving the Site will be required to drive through a wheel-wash to minimize track-out of mud/dirt; and,
- The Site design will include screening features, such as fences, berms and tree plantings, which mitigate visual impact and noise.

Traffic

No changes are being proposed to the current maximum allowable traffic limit of 250 vehicles/day. Traffic levels for the expanded SCRF are anticipated to remain similar to the current average of approximately 70-100 vehicles/day.

Trucks will continue to use the existing entrance and exit over the life of the Site. New, paved access roads will be constructed in the east and north buffers during Phase 2. The location of other internal access roads will vary over the life of the Site depending on construction staging and the location of the active landfilling area.

Truck traffic associated with the operation of the landfill will generally include transfer trailers, tri-axles, and roll-off trucks hauling waste to the Site. Construction activities will also require the

importation of materials using tri-axles, flatbeds, and transfer trailer trucks. Traffic volumes will vary over the life of the Site depending on construction and landfilling activities.

Leachate Management

Leachate is formed when precipitation infiltrates into waste materials and dissolves various minerals, elements, and chemical compounds out of the waste. As the leachate infiltrates the landfill, it is collected through a network of perforated pipes on top of the base liner system which covers the entire landfill footprint. The leachate collection system is sloped at 0.5% towards the southeast where it drains by gravity to a leachate pumping station. The leachate is then pumped to the surface of the landfill where it is discharged to a gravity main that flows to the equalization pond in the adjacent closed west Site.

The SCRF currently produces leachate that exceeds various regulatory limits for surface and groundwater quality and thus cannot be released to the environment. Terrapure currently has a sewer use agreement with the City of Hamilton which allows for the controlled discharge of leachate from the Site to the sanitary sewer under Mistywood Drive.

The leachate generation rate will vary over the life of the Site depending on precipitation, waste characteristics, the size of the constructed base liner system, and the progress of final cover construction. The leachate generation rate in the post-closure condition (i.e., with final cover constructed) was estimated to be approximately 4.2 litres per second (L/s) in the Design and Operations Report. The amount of leachate generated and discharged from the Site is documented in the Annual Monitoring Report. In 2016, approximately 98,000,000 litres of leachate was discharged to the sanitary sewer, corresponding with a leachate generation rate of approximately 3.1 L/s.

In order to determine the potential future impacts related to leachate as a result of the implementation of the Preferred Landfill Footprint, GHD utilized the Hydrologic Evaluation of Landfill Performance (HELP) modeling to determine leachate management requirements. The anticipated leachate generation rates for each Site configuration are presented in **Table 6.22**. Detailed HELP modeling results are presented in **Appendix I**.

Table 6.22 Estimated Leachate Generation Rates

	Existing Conditions	Phase 1	Phase 2	Phase 3	Phase 4	Post-Closure
Leachate generation rate (L/s)	5.3	5.9	4.9	5.5	6.5	5.5

As can be seen, leachate generation rates are anticipated to increase as a result of the expanded SCRF when compared to current estimates. This is to be expected since the generation rate is largely tied to the overall footprint of the residual material area. However, it should also be noted that the values presented are assumed to be conservative, since the HELP model provides a much higher estimate for the leachate generation rate under existing conditions than the actual recorded values.

The existing sewer use agreement with the City of Hamilton to allow the controlled discharge of leachate would need to be amended. Leachate discharge from the Site is expected to increase

slightly compared to current operations. The leachate quality (i.e., chemistry) is expected to be similar to current operations since the residual materials accepted at the Site are expected to remain relatively consistent.

It is anticipated that no changes would be required to the existing leachate collection system at the SCRF to accommodate the leachate from the expanded footprint. As per the current plans, the leachate pumping station will be reconfigured into its final location in the southeast corner of the Site. Terrapure are also looking into establishing a new discharge point to the existing sanitary sewer under Upper Centennial Parkway.

Final Cover

The final cover acts as a barrier between the waste and the environment. The cover also serves to intercept clean stormwater, reducing infiltration and leachate generation. The approved final cover design consists of 0.60 m of compacted clay overlain by 0.15 m of vegetated topsoil.

The regulatory requirements specify a maximum slope of four units horizontal to one unit vertical (4H to 1V, or 25%) and a minimum slope of 20H to 1V (5%), but allow variance where it can be shown to be appropriate with respect to slope stability, erosion potential, end uses, and infiltration requirements for groundwater protection. Slopes of a minimum 33.3H to 1V (3%) are currently approved at the SCRF.

The general design of the final cover system will remain unchanged as a result of the implementation of the Preferred Landfill Footprint. Final cover will be constructed as active landfilling areas are progressively filled to the approved final contours, eventually covering the entire landfill. The progression of final cover construction over the operating and closure stages of the Site will generally be as follows:

- Existing final cover over the south east portion of the Site will be removed in Phase 1
- Final cover will be constructed over the south east portion of the Site in Phase 2
- Final cover will be constructed over the east central portion of the Site in Phase 3
- Final cover will be constructed over the north east portion of the Site in Phase 4
- Prior to closure, final cover will be constructed over all remaining areas in the north west portion of the Site

Stormwater Management

Ontario Regulation 232/98 requires that landfill sites be designed to protect surface water to specified performance standards based on the following principles:

- Divert or control clean surface water flowing onto the Site.
- Control quality and quantity of run-off discharging from the Site to control erosion, sediment transport, and flooding.

Under the current design, clean surface run-off is shed from the final cover into perimeter drainage ditches, where it drains by gravity to a series of ponds (i.e., sediment forebay and detention pond) in the northwest corner of the Site before being discharged to the storm sewer under First Road West.

While the overall function of the stormwater management system will not change as a result of the implementation of the Preferred Landfill Footprint, the location and alignment of the existing ponds and ditches will be updated over the life of the Site to reflect current conditions.

The existing stormwater management system consists of perimeter ditching along the south and west sides of the capped landfill, as well as a forebay and detention pond in the northwest corner of the Site. This configuration would be maintained until Phase 3, when perimeter ditching will be constructed on the east and north sides of the capped landfill, and the existing ponds will be reconfigured to allow for two separate forebays and one large detention pond.

The existing stormwater outlet to the storm sewer under First Road West will remain. Significant changes to the approved configuration or capacity of the stormwater management system are not expected to be required since the overall catchment area of the Site will remain largely unchanged. Additional details are presented in the Detailed Impact Assessment for the Surface Water Discipline.

Landfill Gas Management

Ontario Regulation 232/98 requires that landfills greater than 1.5 million m^3 in capacity have a landfill gas control system in place. However, this applies primarily to sites that accept wastes that are capable of decomposing and generating gases. Since the SCRF does not accept these types of materials, a landfill gas emission study was prepared in 2011 demonstrating that very little gas is generated at the SCRF, and the Site was granted an exemption from the MECP from the requirement to have a landfill gas collection system.

The relatively small amount of landfill gas generated at the SCRF is passively vented to the atmosphere through the final cover system. Confirmatory monitoring for landfill gas is documented in the Annual Monitoring Report.

In order to provide an estimate of the potential future impacts related to landfill gas as a result of the implementation of the Preferred Landfill Footprint, GHD utilized a form of the Scholl Canyon equation in order to model the maximum methane generation rate within the landfill. The methane generation within a landfill for a given year can be calculated based on historical waste records and future projections of the annual waste acceptance rate.

Results of the landfill gas modeling carried out using the Scholl Canyon model are presented in **Appendix I**. The Scholl Canyon model projects a maximum of 4,766 tonnes of methane to be generated in 2028, which equates to 119,154 tonnes of carbon dioxide equivalents (CO_2e) assuming a global warming potential of 25 for methane. Accounting for cover oxidation, the total portion of methane emitted in 2028 is anticipated to be approximately 3,575 tonnes (89,636 CO_2e).

For comparison purposes, a model run was also performed assuming that the SCRF is composed of 100% municipal solid waste (MSW). Under this scenario, the maximum methane generated was estimated to be approximately 50,422 tonnes (1,260,547 CO_2e). As such, it is estimated that the expanded SCRF would have methane and CO_2e emissions that are approximately 7.1% of emissions anticipated from a similar sized MSW landfill.

Based on these projections, it is anticipated that a gas collection system would not be warranted for the expanded SCRF, and that an exemption from the related requirements of Ontario Regulation

232/98 would again be granted by the MECP. Notwithstanding this, an update to the landfill gas emission study will also be undertaken during the summer of 2018.

Groundwater Management

The dissolution of constituents from the residual material into leachate is an ongoing process, and, eventually, a sufficient amount of these constituents will be removed from the waste so that the leachate can no longer adversely impact the environment. The “contaminating lifespan” is thus defined as the length of time that the wastes can produce leachate that is unacceptable for direct release to the environment. The contaminating lifespan of the SCRF was estimated to be in the range of 200 to 300 years in the Design and Operations Report.

GHD is currently undertaking a detailed review of the contaminating lifespan calculations for the SCRF, and believes that the original estimate of 200 to 300 years is very conservative. This is based on the following preliminary observations:

- Previous modeling assumed a much higher amount of evapotranspiration than the value determined through current HELP modeling, reducing the amount of precipitation available for infiltration (i.e., precipitation surplus). Despite applying a higher percentage of this precipitation surplus as infiltration than current HELP modeling indicates, previous modeling returned a much lower infiltration rate, resulting in a more conservative estimate of the contaminating lifespan due to less water being available to dissolve contaminants from the waste mass.
- The target concentrations for the contaminants of concern should be evaluated against the reasonable use guideline (MECP Guideline B-7) which requires compliance at the boundary of the adjacent property. Horizontal migration of leachate between the base of the landfill and the compliance boundary would further reduce contaminant concentrations, further lowering the contaminating lifespan.
- Original estimates assumed that the full amount of each parameter would be available for dissolution. In reality, numerous parameters will be in a low solubility form, meaning that the initial contaminant concentrations in the leachate would be lower, in turn leading to a lower contaminating lifespan.

For these reasons it is anticipated that the updated modeling will yield a much lower contaminating lifespan for the SCRF. Additional details of the potential effects of leachate on groundwater are presented in the Detailed Impact Assessment for the Geology and Hydrogeology Discipline.

Site Closure and End Use

Closure of the Site will be undertaken immediately following the completion of landfilling to the approved final contours. Closure activities will include the construction of final cover, removal of roads and other infrastructure (e.g., weigh scales, truck wash, maintenance facility) that is not required in the post-closure period, and the implementation of a long-term monitoring and maintenance program. The overall Site closure requirements will remain unchanged as a result of the implementation of the Preferred Landfill Footprint.

Site end use will be determined through consultation with the local community and other stakeholders as part of the EA approvals process. Potential end uses may include public open

space (e.g., park) that could accommodate various passive or active recreational activities, or a restricted access open space.

Ongoing landfill monitoring and maintenance requirements will need to be incorporated into end use planning. Specific considerations will include but are not limited to:

- Access to leachate and gas control systems for ongoing operations, maintenance and monitoring;
- Access to environmental monitoring locations;
- Prevention of public access to operational or monitoring areas; and,
- Impact of potential end use activities on the Site's leachate, or surface water controls.

6.8.1.2 Mitigation and/or Compensation Measures

The potential effects associated with design and operational changes to the SCRF as a result of the implementation of the Preferred Landfill Footprint can only be mitigated through modifications to the Site's design and/or operations. There are also design and operating limitations that can affect the ability to mitigate these effects. Overall, the magnitude of the net effects from a Design and Operations standpoint is anticipated to be small since many aspects of the Site would have required modifications from their existing configuration in order to achieve their approved final configuration anyways.

6.8.1.3 Design and Operations Net Effects

The potential effects, mitigation or compensation measures, and net effects associated with the Preferred Landfill Footprint as they relate to the Design and Operations Discipline are summarized below in **Table 6.23**.

Table 6.23 Potential Effects, Proposed Mitigation and Compensation Measures, and Resulting Net Effects, Design and Operations

	Potential Effect	Mitigation/Compensation	Net Effect
Leachate Management	Increased design and operating complexity of leachate management system	Design of new base liner system to integrate seamlessly with existing base liner system. Use of only one leachate pumping station. Establish new connection to sanitary sewer. Maintain uniform shape and contours of the residual material area.	Small increase in complexity relative to current leachate management system associated with: additional base liner and leachate collection system; increased leachate generation rate.
Stormwater Management	Increased design and operating complexity of stormwater management system	Design of new stormwater management system to integrate seamlessly with existing stormwater management system. Extend perimeter drainage ditches to accommodate new residual material area. Maintain current approved location and layout of stormwater pond. Maintain existing stormwater outlet to storm sewer.	No increase in complexity relative to current stormwater management system. The design and layout of the stormwater management system provides design and operational flexibility.

	Potential Effect	Mitigation/Compensation	Net Effect
Groundwater Management	Increased design and operating complexity of groundwater management system	Design of new groundwater management system to integrate seamlessly with existing groundwater management system. Extend groundwater collection trenches to accommodate new residual material area. Maintain existing location of groundwater outlet. Establish new connection to sanitary sewer.	No increase in complexity relative to current groundwater management system. The design and layout of the groundwater management system provides design and operational flexibility.
Landfill Gas Management	Increased design and operating complexity of landfill gas management system	Continue acceptance of waste types that do not decompose and generate significant quantities of gas. Maintain MECP exemption from the requirement to have a gas collection system.	No increase in complexity relative to current passive system for management of landfill gas. No requirement to implement gas collection system.
Construction	Increased complexity and reduced constructability of facility components	Design of new base liner system to integrate seamlessly with existing base liner system. Design of new final cover system to integrate seamlessly with existing final cover system. Maintain open layout with simple configuration and dedicated areas for the various infrastructure components.	Small increase in complexity relative to current construction requirements associated with: additional base liner and leachate collection system, additional final cover.
Site Operations	Increased complexity and reduced operability of facility components	Maintain design and function of existing systems (leachate, stormwater, groundwater, gas) and infrastructure (access, roads, weigh scale, wheel wash). Maintain operational flexibility of existing systems and infrastructure.	No increase in complexity or reduction in operability relative to current site operations.
Closure and Post-Closure	Increased closure and post-closure requirements and reduced flexibility of potential end uses	Maintain open and uniform configuration that will simplify Site closure requirements. Maintain overall layout and contours that do not limit the flexibility of potential end uses.	Simplified closure requirements and increased flexibility of potential end uses relative to current design.

6.9 Cumulative Effects of the Environment

During the ToR, Terrapure committed to including a discussion of the cumulative effects of the SCRF expansion on the environment. Terrapure committed to completing an assessment of the cumulative effects of the proposed undertaking and other non-SCRF projects/activities that are existing, planned/ approved or reasonably foreseeable[2] within the Study Area.

Although an assessment of cumulative environmental effects is not required as part of the provincial EA process, the Code of Practice for preparing an Environmental Assessment in Ontario

[2] The term “reasonably foreseeable” is defined in the Cumulative Effects Assessment Practitioners Guide as projects that are, ‘directly associated with the project under review, identified in an approved development plan or identified in an approved development plan in which approval is imminent”,

encourages proponents to include information about potential cumulative effects of the project in combination with past, present and reasonably foreseeable future activities where possible[3]. Proponents are advised to consult with government agencies to identify projects that will be built in the future ad to consider their future cumulative effects. Terrapure consulted and reviewed examples of how to approach cumulative effects as part of the federal EA process, as described in the Canadian Environmental Agency's Operational Policy Statement and the Cumulative Effects Assessment Practitioners Guide[4].

Cumulative environmental effects are defined as effects that are likely to result from the proposed project in combination with other projects or activities that have been or will be carried out within the foreseeable future. The cumulative effects assessment completed for this project focused on the resultant net effects of the Preferred Landfill Footprint combined with the other planned and approved or reasonably foreseeable projects in the Local Study Area.

6.9.1 Projects and Activities at the Site and Local Study Area

Stoney Creek Regional Facility (SCRF) Activities

In operation since 1996, the SCRF is an engineered landfill site that currently accepts industrial residual waste generated in Ontario. Prior to being an active landfill the SCRF study area was a former Quarry (Taro East Quarry). Typical operating activities at the site include; vehicles (trucks and construction vehicles) transporting waste to and around the site, as well as scale-house and wheel-wash activities. The site currently receives on average 70 to 80 trucks per day of waste material and is permitted to receive 750,000 tonnes of material annually.

Site and Local Study Area Land Uses and Activities

There are approximately 1,200 existing or registered residential dwellings within 500 m of the Site Study Area boundary, with the largest concentrations to the north along Green Mountain Road, and south and southwest along Mud Street. An additional subdivision is under construction to the north of the SCRF. These residential properties are primarily located within the Urban Area, as identified in the Urban Hamilton Official Plan. The majority of residential uses within the Local Study Area are located south of the SCRF. Lands to the south consist of existing and proposed phases of the Penny Lane Estates subdivision. In accordance with the City of Hamilton's filed registered and draft approved plans of subdivision, there are approximately 6,800 residential units both existing and proposed within the preliminary Study Area. Of the approximate 6,800 residential units within the Local Study Area, approximately 5,800 residential units currently exist (registered), and the remaining approximately 1,000 residential units are proposed (draft approved).

Located directly west of the SCRF are recreational uses consisting of the Heritage Green Sports Park and off-leash Dog Park. The Heritage Green Sports Park opened in 2005 and is a former closed landfill site. Institutional uses within 500 m of the Study Area boundary include St. James the Apostle Catholic Elementary School, which is approximately 270 m from the Terrapure SCRF property boundary, located within the Urban Area. There are currently four properties zoned for agricultural uses under City of Hamilton Zoning By-law 05-200 within 500 m of the Site. A cluster of commercial operations exists within the Local Study Area along major roads, including along Upper

[3] Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario, January 2014.
[4] Cumulative Effects Practitioners Guide, 1999. https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=43952694-1

Centennial Parkway and Mud Street towards Red Hill. There are 11 commercial uses within 500 m of the Study Area boundary.

The SCRF is under the jurisdiction of the Urban Hamilton Official Plan and the City of Stoney Creek Zoning By-law No. 3692-92. The SCRF is also directly adjacent to areas designated under the Rural Hamilton Official Plan. The SCRF falls within the Nash Neighbourhood Secondary Plan Area designated under the Urban Hamilton Official Plan. The Urban Hamilton Official Plan identifies the Urban Structural Elements, Functional Road Classifications and Urban Land Use Designation comprising the Terrapure SCRF.

The SCRF currently conforms to the City of Stoney Creek Zoning By-law No. 3692-92 under Section 9.8.5 'Special Exemptions', as ME-1. In addition to permitted uses under the Extractive Industrial "ME" Zone, lands zoned ME-1 are permitted for operations associated with non-hazardous waste from industrial, commercial, and institutional sources In accordance with the City of Hamilton's Urban and Rural Official Plans, Zoning By-law 05-200 and the City of Stoney Creek Zoning By-law No. 3692-92 land use designations within 1500m preliminary study area of the SCRF primarily include residential, commercial, recreational, institutional and agricultural uses as described above.

As mentioned above, there are over 1,000 residential developments proposed to be constructed within the Study area suggesting there will be continued construction works around and adjacent to the Site Area including improvements and additions to the transportation corridors to accommodate the increased residential and associated traffic and pedestrian growth. In addition to potential residential growth, an institutional land use designation is present at the northwest corner of Green Mountain Road West and First Road West (435 First Road West). This land is reserved for the future development of a school (zoned Neighbourhood Institutional (I1), as approved by council on November 11, 2015, By-law No. 15-260); however, at this time, the property is owned by a developer. Additional information regarding the current and planned land uses can be found in the ***Existing Land Use Conditions Report*** **(Appendix E)** and the ***Detailed Land Use Impact Assessment Report*** **(Appendix J).**

Existing and Planned Traffic Corridor and Networks

The study area includes major road corridors of Upper Centennial Parkway and Mud Street. Both of these roads carry the predominant traffic as they feed into the Red Hill Expressway and to the QEW highway. Major intersections around the SCRF also include:

- Upper Centennial Parkway at Green Mountain Road (signalized)
- Upper Centennial Parkway at Upper Centennial Parkway Access (entrance only)
- Upper Centennial Parkway at Mud Street (signalized)
- Mud Street at First Road West (signalized)
- First Road West at First Road West Access (entrance and exit)

Given the current development applications planned for the area including 1,000 residential homes and a school, it is likely that alterations or additions to the current road corridors will be made to accommodate increased vehicular and pedestrian traffic in the area. There is current roadway improvements being completed on Upper Centennial and improvements are planned for First Road

West to accommodate increased growth in the area. Traffic Impact Studies completed for *Empire Communities* (2013) recommended infrastructure improvements for roads in the study area based on proposed residential development and within the horizon year of 2018.

Additional information about current and future Traffic Conditions and activities can be found in the ***Traffic Existing Conditions Report*** **(Appendix E)** and the ***Detailed Traffic Impact Assessment Report*** **(Appendix F).**

6.9.2 Valued Ecosystem Components (VECs)

In a typical cumulative effects analysis, Valued Ecosystem Components (VEC) are identified which represent specific features or attributes of the environment that are considered to be important for regulatory reasons, or because of their social, cultural, economic or ecological value. VEC's are the assessment endpoints and represent meaningful measures of the environmental effects that may be caused by a project. The VEC's for the analysis of the SCRF EA were taken from the list of Criteria and Indicators used in the Alternative Methods and Impact Assessment evaluation. Based on the net effects analysis completed during the Alternative Methods stage and the findings of the Detailed Impact Assessment the VEC's under consideration include the following:

Table 6.24 Rationale for Potential VEC's

VEC	Rationale	Effects Considerations
Air Quality Sensitive Receptors	1. Assess compliance in terms of Provincial regulations 2. Changes in air quality have the potential to affect receptors and socio-economic conditions	3. Potential for changes in air quality
Noise Sensitive Receptors	4. Assess compliance in terms of Provincial regulations • Changes in noise levels have the potential to affect receptors and socio-economic conditions	• Potential for changes in sound levels during construction • Type and timing of construction activities • Absolute sound exposure levels (55 dBA) at Noise Sensitive Areas • Change in sound exposure levels (55 dBA) at Noise Sensitive Areas
Natural Environment (Aquatic and Terrestrial Ecosystems)	5. Specialized and sensitive wildlife habitat provide unique habitat functions and contribute to biodiversity 6. Species at Risk are indicators of specialized conditions in study areas. They contribute to biodiversity and need to be considered under the *Species At Risk Act*.	• Presence and effects on: o Breeding bird species richness and diversity o Habitat diversity o Vegetation o Species of Conservation Concern o Amphibian breeding habitat o Habitat block size o Habitat continuity • Presence and effects on habitats for Species At Risk

VEC	Rationale	Effects Considerations
Use and Enjoyment of Private Property (Surrounding Land Uses)	7. Nuisance effects from proximity to the SCRF have the potential to affect use and enjoyment of private property including Agricultural land uses.	• Projected levels of noise, dust and other air emissions
Landscape Composition	8. Changes in landscape composition by way of views and viewsheds	• Change to current views and viewsheds

These VEC's are utilized to conduct the cumulative effects analysis, which looks at the combined effects of the proposed landfill and other WCEC facilities, both on a temporal and spatial basis. Cumulative effects are analyzed when one project effect acts in a cumulative fashion with the effects of other projects and their effects.

6.9.3 Cumulative Effects Analysis and Results

Table 6.25 provides a summary of the likely cumulative effects and mitigation measures of the Project in combination with other projects and activities.

Table 6.25 Cumulative Effects Table

Environmental Factors	Effects of the Project	Project Phase	Cumulative Effects	Mitigation/ Compensation	Residual Cumulative Effect
Air Quality	Infrequent occasions where exceedance of applicable threshold occurs. The largest effect on air quality is due to releases of TSP (i.e. fugitive dust).	Construction	• Exceedance of TSP may occur more frequently. This cumulative effect is most likely to occur when project construction activities are being undertaken simultaneously with other projects being undertaken in close proximity such as housing construction in the immediate study area.	• Effective mitigation of adverse cumulative effects can be achieved by controlling the timing and coordination of multiple projects and activities	Increased dust levels
Noise	Increased noise levels around the Site.	Construction & Operation	• Exceedance of noise may occur more frequently. This cumulative effect is most likely to occur when project construction activities are being undertaken simultaneously with other projects being undertaken in close proximity	• Effective mitigation of adverse cumulative effects can be achieved by controlling the timing and coordination of multiple construction projects • Noise levels are at acceptable levels with background traffic being the dominant source and maintaining existing noise barriers (berm)	Increased noise levels around the Site

Environmental Factors	Effects of the Project	Project Phase	Cumulative Effects	Mitigation/ Compensation	Residual Cumulative Effect
Natural Environment	Disruption to Aquatic, Vegetative and Terrestrial Habitat	Construction	• 18 ha cumulative loss (temporary) of vegetation communities (marsh, meadow, and thicket habitat, threatened bird species (eastern meadowlark), and threatened bird species; barn swallow, where structures will be removed and relocated as part of Phase 2, 3, and closure. • Loss of on-Site aquatic habitat and disturbance of aquatic biota associated with open water habitats associated with the Site stormwater infrastructure is also anticipated as a result of regrading activities and changes in Site configuration throughout the project stages.	• Restore and enhance elsewhere or as appropriate.	Some loss of vegetation and vegetation communities
	Disruption to Species at Risk	Construction	• Highly unlikely that other projects will affect Species at Risk	• Protection as per appropriate legislation	Not anticipated to be affected
Socio-Economic	Disruption to use and enjoyment of private property	Construction and Operation	• The project has the potential to affect up to approximately 7,000 properties (number of receptors within 500m of the Site) due to disruption of their use and enjoyment of property resulting from nuisance related effects	• Implement dust, air and noise mitigation measures • Effective mitigation of adverse effects on the socio-economic environment 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 Ottawa official plan	Disruption to use and enjoyment of private property

Environmental Factors	Effects of the Project	Project Phase	Cumulative Effects	Mitigation/ Compensation	Residual Cumulative Effect
Socio-Economic	Change in landscape composition	Operation	• Change in visual appearance, topography, loss of agricultural land	• Implement appropriate screening measures	Changes in landscape composition

6.9.4 Significance Assessment

The following criteria were defined in relation to assessing the significance of the residual adverse effects from the SCRF EA:

Magnitude The size or degree of the effects compared against baseline conditions or reference levels, and other applicable measurement parameters (i.e., standards, guidelines, objectives).

Extent The geographic area over or throughout which the effects are likely to be measurable.

Duration The time period over which the effects are likely to last.

Frequency The rate of recurrence of the effects (or conditions causing the effect).

Permanence The degree to which the effects can or will be reversed (typically measured by the time it will take to restore the environmental attribute or feature).

Ecological Context The importance of the environmental attribute or feature to ecosystem health and function.

Table 6.26 provides the framework that was used to assess the degree of residual adverse effects. This framework includes the assessment criteria and definitions for three degrees of residual effects - low, medium and high. The determination of the degree of residual effects framed to generally reflect provincial regulatory and industry standards and guidelines to the extent possible. Specific documents were also consulted to determine the significance level of the effects in conjunction with reasonably foreseeable projects and activities within the Site and Local Study Area. Some of the documents used to identify potential activities and projects include:

- ***City of Hamilton Development Application Mapping Tool***[5] – Used to determine potential location and size of developments within the Local Study Area.
- ***City of Hamilton Transportation Master Plan Review and Update Future Travel Demands Background Report***[6] – Used to determine intersection and roadway improvements planned for Local Study Area
- **City of Hamilton Official Plan**[7] – Used to determine land uses and zoning around Site and Local Study Area.
- ***Land Use Existing Conditions*** and ***Alternative Methods Reports*** for the Terrapure SCRF EA

[5] https://www.hamilton.ca/develop-property/planning-applications/development-applications-mapping

[6] https://d3fpllf1m7bbt3.cloudfront.net/sites/default/files/media/browser/2018-06-06/draft-tmp-backgroundreport-futuredemand-9.pdf

[7] https://www.hamilton.ca/city-planning/official-plan-zoning-by-law

- ***Traffic Impact Study – Red Hill Residential Development – Phase 2 (2013) –*** Documents traffic impact for proposed residential development located in the North-West quadrant of the Green Mountain Road West/First Road West
- ***Traffic Impact Study – Nash Neighborhood Secondary Plan – City of Hamilton (2009) –*** Documents traffic impacts for proposed secondary plan at the northwest quadrant of Mud Street West and Centennial Parkway.

In cases where these points of reference were not available, the assessments were made based on best professional judgement concerning the type and nature of the environmental effects and the surrounding study area and land uses.

Table 6.26 Significance Assessment Framework

Significance Assessment Criteria	Significance Level		
	Low	Medium	High
Magnitude of Effect	Project-specific and/or cumulative effects may be noticeable and/or measureable, but are not likely to exceed a reference criterion or guideline value.	Project-specific and/or cumulative effects are likely to be noticeable and measureable, representing a small change relative to existing condition. Adverse effects may exceed a reference criterion or guideline value on occasion and/or at an individual location.	Project-specific and/or cumulative effects are likely to be noticeable and measureable, representing large measureable changes relative to existing conditions. Adverse effects caused by the Project are likely to result in the exceedance of a reference criterion or guideline on an ongoing basis across the Study Area.
Extent of Effect	Project-specific and/or cumulative effects are likely to be measureable within an area immediately surrounding the SCRF, generally within 500 m.	Project-specific and/or cumulative effects are likely to be noticeable and/or measureable within the Study Area	Project specific and/or cumulative effects are likely to be noticeable or measureable within the Study Area. Adverse effects will be experienced by VECs beyond the Study Area.
Duration/Timing (of effect)	Project-specific and/or cumulative effects result from short-term events, are considered to be short-term disturbances or losses limited to within the planning horizon (i.e., 10 years)	Project-specific and/or cumulative effects are ongoing effects related to the Construction and/or Operations phases of the SCRF	Project-specific and/or cumulative effects are ongoing effects that are likely to persist beyond the Construction and/or Operations phases of the SCRF and their effects are not readily reversible despite the implementation of mitigation and/or compensation measures (see Permanence criterion below).
Frequency (or probability)	Conditions or phenomena causing a Project-specific effect occur infrequently or are effectively one-time events during the project phase in which they occur. A few other projects or activities causing cumulative effects are likely to occur with the SCRF. They will occur periodically over the planning horizon (i.e., 10 years)	Conditions or phenomena causing a Project-specific effect occur at regular but infrequent intervals during the project phase in which they occur. Several projects or activities causing cumulative effects are likely to occur along with the SCRF. They will occur periodically over the planning horizon (i.e., 10 years)	Conditions or phenomena causing a Project-specific effect occur at regular and frequent intervals, or are ongoing conditions during the project phase in which they occur. The majority of projects or activities causing cumulative effects are likely to occur along with the SCRF. They are likely to occur frequently or repeatedly over the planning horizon (i.e., 10 years).

Significance Assessment Criteria	Significance Level		
	Low	Medium	High
Permanence (of effect)	Measureable or noticeable project-specific and/or cumulative effects are not likely to persist over the planning horizon (i.e., 10 years). Project-specific mitigation and/or compensation measures and potentially those of other projects and activities will ensure that long term cumulative effects attributable to the Project are not measureable.	Measureable or noticeable project-specific and/or cumulative effects are likely to persists for some time over the planning horizon. Adverse regional trends and cumulative effects attributable to the Project are potentially reversible.	Project-specific and/or cumulative effects are not readily reversible despite the implementation of mitigation and/or compensation measures. Adverse regional trends and cumulative effects attributable to the Project are likely to persist.
Ecological Importance (of a resource or VEC)	Not Applicable	The resource / VEC is common and abundant. The resource / VEC will continue to fulfill its ecological functions.	The resource / VEC is not common across the LSA. Abundance and quality is required for the resource / VEC to continue to fulfill its ecological functions.

Based on the application of this framework, an effect could be categorized as negligible, minor, moderate or significant, according to the following definitions:

a) **Negligible Effect (Not Significant)** are those environmental effects which, after taking into consideration applicable mitigation measures have been assessed to have a “low” level of significance for the majority of the significance criteria described above; or having a “low” or “medium” level of significance for the majority of the criteria with “low” permanence.

b) **Minor Adverse Effects (Not Significant)** are those environmental effects which, after taking into consideration mitigation measures, have been assessed to have a “low” or “medium” level of significance for the majority of the criteria described above.

c) **Moderate Adverse Effects (Not Significant)** are those environmental effects which, after taking into consideration mitigation measures, have been assessed to have a “medium” level of significance for the majority of the criteria described above or having a “low” or “medium” level of significance for the majority of the criteria with “high” permanence.

d) **Significant Adverse Effects** are those environmental effects which, after taking into consideration mitigation measures, have a magnitude that has a “high” magnitude, “high” extent and “high” duration.

Table 6.27 provides the significance assessment for the residual adverse effects, which includes the consideration of the residual adverse effects of the Project (i.e., Project-specific effects) and cumulative effects.

Table 6.27 Cumulative Effects Significance Assessment Summary

Significance of Residual Adverse Effects									
Residual Adverse Effects	**Project Phase**	**VEC Affected**	**Significance Levels**						**Overall Significance of Residual Adverse Effects**
			Magnitude	***Extent***	***Duration***	***Frequency***	***Permanence***	***Ecological Importance (of resource or VEC)***	
Increased dust levels	Construction	Air Quality Sensitive Receptors	**Low** Increased dust levels during construction of the SCRF and cumulative effects will be mitigated to the reference criterion or guideline value	**Low** Increased dust levels due to the Project and in combination with other projects and activities are likely to be measureable within 500 m of the SCRF	**Medium** Adverse effects are ongoing effects related to both the Construction and/or the Operations and Maintenance Phases of the SCRF	**Low** Project-specific effects will occur periodically, but infrequently during the construction phase. Cumulative effects may occur as a result of a few other projects/activities that are likely to occur in proximity to the SCRF	**Low** Project-specific and cumulative effects are not likely to persist once the activities causing the effects have ceased.	**High** Good air quality is required for the VEC to continue to function.	**Negligible Effect (Not Significant)**
Increased noise levels	Construction & Operation	Noise Sensitive Receptors	**Low** Noise levels during construction may exceed a reference criterion or guideline value on occasion or at an individual receptor location	**Low** Adverse effects are likely to be measureable within 500 m of the SCRF	**Medium** Adverse effects are ongoing effects related to both the Construction and/or the Operations and Maintenance Phases of the SCRF	**Low** Project-specific effects will occur periodically, but infrequently during the construction phase. Cumulative effects will occur periodically during the construction phase as a result of a few other projects/activities that are likely to occur within proximity to the SCRF	**Low** Adverse effects are not likely to persist once the activities causing the effects have ceased.	**N/A**	**Negligible Effect (Not Significant)**
Disruption to Natural Environment (Aquatic and Terrestrial Ecosystems	Construction	Specialized and Sensitive Wildlife, Aquatic and Vegetative Habitat	**Low** Disruption may be noticeable and/or measureable. Adverse effects may exceed a reference criterion or guideline value at an individual location	**Low** Adverse effects are likely to be measureable in close proximity to the SCRF and/or other projects and activities	**Medium** Adverse effects are ongoing effects related to the Construction and Operations Phases of the SCRF and/or	**Medium** Project-specific effects will occur periodically	**Low** Adverse effects are not likely to persist once the activities causing the effects have ceased and mitigation	**Low** VEC species are common and abundant. The resource / VEC will continue to fulfill its	**Negligible Effect (Not Significant)**

Significance of Residual Adverse Effects									
Residual Adverse Effects	**Project Phase**	**VEC Affected**	**Significance Levels**						**Overall Significance of Residual Adverse Effects**
			Magnitude	***Extent***	***Duration***	***Frequency***	***Permanence***	***Ecological Importance (of resource or VEC)***	
					those of other projects and activities		(compensation) has occurred.	ecological functions.	
Disruption to Species at Risk	Construction	Species at Risk	**Low** Adverse effects are likely to be measurable and/or noticeable within the known habitats of these species within proximity of the SCRF	**Low** Adverse effects are likely to be measureable in close proximity to the transportation corridor and/or other projects and activities	**Medium** Adverse effects are ongoing effects related to the Construction, and Operations Phases of the SCRF and/or those of other projects and activities	**Medium** Project-specific effects will occur periodically	**Low** Given the *Endangered Species Act* requirements for mitigation, measurable project-specific and cumulative effects attributable to the SCRF are not likely to persist over the planning horizon.	**Low** Some Species at Risk habitats are common in the Study Area.	**Negligible Effect (Not Significant)**
Disruption to use and enjoyment of private property	Construction and Operation	Use and Enjoyment of Private Property	**Low** Adverse effects represent small changes relative to baseline conditions	**Low** Adverse effects are likely to be measureable within 500 m of the SCRF	**Medium** Adverse effects are ongoing effects related to both the Construction and Operations Phases of the SCRF and those of other projects and activities	**Medium** Project-specific effects will occur periodically	**Medium** Adverse effects are likely to persist for some time over the planning horizon for existing residents.	**N/A**	**Minor Adverse Effect (Not Significant)**
Change in landscape composition	Operation	Landscape Composition	**Low** Adverse effects due to changes in landscape/viewshed composition are likely to represent a small change relative to baseline conditions in a Local Study Area context.	**Low** Adverse effects are likely to be noticeable in a limited portion of the built up areas within proximity to the SCRF.	**Medium** Adverse effects are ongoing effects related to both the Construction and Operations Phases of the SCRF and/or those of other projects and activities	**Medium** Conditions or phenomena causing Project-specific effects to occur are ongoing conditions.	**Medium** Adverse effects are likely to persist for some time over the planning horizon for existing residents.	**N/A**	**Moderate Adverse Effect (Not Significant)**

6.10 Climate Change Considerations

In support of the province of Ontario's Climate Change Action Plan the MECP has developed a Guide entitled "Consideration of Climate Change in Environmental Assessment in Ontario" (the Guide). The guide provides direction on ways to incorporate climate change consideration into environmental assessments, including the consideration of:

- greenhouse gas (GHG) emissions;
- the effects of a project on climate change;
- the effects of climate change on a project; and,
- identifying and minimizing negative effects during project design.

The guide was consulted in preparation of this report, in particular the Guide was reviewed when considering the Alternative Methods as well as the Preferred Landfill Footprint from a Climate Change perspective and addressing potential climate risks to key infrastructure components at the landfill site.

6.10.1 Historical Climate and Meteorological Trends

In order to sufficiently determine the potential net effects from a climate change perspective, considering accepts such as potential power outages, physical damage, stormwater management and reduced access to the Site, and to develop potential climate change adaptation and mitigation measures, an in-depth understanding of the historical climate/meteorological trends, as well as the potential for extreme weather events must be established. The following sections provides a brief summary of the historical climate/ meteorological trends Hamilton, which is in the southern part of Ontario. Southern Ontario has a humid continental climate influenced by the Great Lakes with warm summers and no dry season. The Great Lakes moderate the effects of the weather of the surrounding areas. Hamilton wraps around the westernmost part of Lake Ontario and has an escarpment that divides upper and lower parts of the city, which creates noticeable differences in weather over short distances. Hamilton experiences warm summers, moderate temperatures in the spring and fall with higher precipitation rates and cold winters.

Temperature

Regional baseline climate data (climate normal data) were obtained from Environment Canada (EC). The closest EC climate station to the SCRF with 30-year climate normal data from 1981 to 2010 available is the Hamilton A Station (John C. Munro Hamilton International Airport) (climate ID 6153194) approximately 14 km south-west of the SCRF. The Hamilton A Station is located at latitude 43.10 N, longitude 79.56 W (Elevation: 237.7 m). The temperature data for the Hamilton A Station are provided in **Table 6.28**. The annual mean temperature is estimated as 7.9˚C. The mean summer high temperature is 20.9˚C for July, while the winter mean low temperature is -5.5˚C in January. The lowest extreme minimum temperature was in January of 2004 at -30.0˚C, and the highest extreme maximum was in July of 1988 at 37.4˚C (**Table 6.29**).

Table 6.28 Mean Temperature Profiles from 1981 to 2010 at Hamilton A Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Daily Average (˚C)	-5.5	-4.6	-0.1	6.7	12.8	18.3	20.9	20.0	15.3	9.3	3.7	-2.3	7.9
Daily Maximum (˚C)	-1.7	-0.5	4.3	11.8	18.5	23.9	26.5	25.3	21.2	14.1	7.5	1.2	13.7
Daily Minimum (˚C)	-9.3	-8.6	-4.5	1.5	7.1	12.6	15.2	14.5	10.4	4.5	-0.2	-5.8	3.1

Note:
Source: EC 1981 to 2010 Canadian Climate Normals (climate ID: 6153194)

Table 6.29 Minimum and Maximum Temperature Extremes

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Extreme Maximum (˚C)	16.7	15.8	25.0	29.7	33.1	35.0	**37.4**	36.4	34.4	30.3	24.4	20.7
Year	2005	1997	1998	1990	2006	1988	**1988**	2001	1973	2007	1961	1982
Extreme Minimum (˚C)	**-30.0**	-26.7	-24.6	-12.8	-3.9	1.1	5.6	1.1	-2.2	-7.8	-19.3	-26.8
Year	**2004**	1994	2003	1972	1966	1998	1961	1965	1974	1965	2000	1980

Note:
Source: EC 1981 to 2010 Canadian Climate Normals (climate ID: 6153194)

Precipitation

The mean climate normal monthly precipitation data are provided in **Table 6.30**. The mean annual average precipitation is 929.8 mm. Approximately 85 percent of the total precipitation was in the form of rain and 15 percent as snowfall. The extreme daily participation amounts are shown form 1981 to 2010 (**Table 6.31**). The highest rainfall experienced was 107.0 mm in 1989 and the highest snowfall experienced was 43.2 cm in 1966.

Table 6.30 Mean Monthly Precipitation Profiles from 1981 to 2010 at Hamilton A Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precipitation (mm)	64.0	57.8	68.4	79.1	79.4	84.9	100.7	79.2	81.9	77.4	84.3	73.0	929.8
Rainfall (mm)	29.7	28.2	42.6	71.3	78.7	84.9	100.7	79.2	81.9	76.5	74.4	43.8	791.7
Snowfall (cm)	40.8	35.1	26.5	8.4	0.5	0.0	0.0	0.0	0.0	0.7	11.0	33.5	156.5

Note:
Source: EC 1981 to 2010 Canadian Climate Normals (climate ID: 6153194)

Table 6.31 Extreme Daily Precipitation at Hamilton A Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Extreme Daily Precipitation (mm)	44.6	54.1	42.8	45.2	39.9	66.6	**107.0**	90.8	59.4	91.0	58.8	56.8
Year	1982	1990	2010	1996	1969	1984	**1989**	1981	1996	1995	1999	1990
Extreme Daily Rainfall (mm)	39.3	54.1	41.0	45.2	39.9	66.6	**107.0**	90.8	59.4	91.0	58.8	56.8
Year	1995	1990	2010	1996	1969	1984	**1989**	1981	1996	1995	1999	1990
Extreme Daily Snowfall (cm)	**43.2**	30.4	28.0	29.2	11.0	0.0	0.0	0.0	0.0	23.6	21.5	35.6
Year	**1966**	2007	1999	1979	1989	1960	1960	1960	1960	1962	1997	1969

Note:
Source: EC 1981 to 2010 Canadian Climate Normals (climate ID: 6153194)

Rainfall Intensity Duration Frequency (IDF) data for 2010 were obtained from the Ontario Ministry of Transportation's (MTO) IDF Curve Look-up for the Site at latitude 43.19, longitude -79.77 (**Table 6.33**). The maximum estimated amount of rain is 127.8 mm for a 100-year 24 hour storm event. It should be noted that the information presented in **Table 6.32** is not a prediction of the future, but an estimation of the probability of a storm occurring within a certain time period (return period) for a certain duration and the intensity of that storm based on statistical analysis of past data.

Table 6.32 Extreme Daily Precipitation

Return Period (year)	Rainfall Depth (mm) by Storm Duration								
	5 min	10 min	15 min	30 min	1 hr	2 hr	6 hr	12 hr	24 hr
2	10.5	12.9	14.6	18.0	22.2	27.4	38.1	46.9	57.8
5	13.9	17.1	19.4	23.9	29.4	36.2	50.4	62.1	76.5
10	16.2	19.9	22.5	27.8	34.2	42.1	58.6	72.3	89.0
25	19.0	23.4	26.5	32.6	40.2	49.5	68.9	84.9	104.6
50	21.2	26.1	29.5	36.3	44.7	55.1	76.7	94.4	116.3
100	23.2	28.6	32.3	39.9	49.1	60.5	84.2	103.7	127.8

Source: MTO IDF Curve Look-up for the SCRF (latitude 43.19, longitude -79.77)

Wind

The speed of the monthly maximum gust obtained from 2000 to 2010 data from Hamilton A Station (climate ID: 6153194) are representative of those that typically occur in much of Ontario and are presented in **Table 6.33** (EC 2016b). Predominate wind comes from the west (36 percent of the time), south west (13 percent of the time), and east (12 percent of the time)[8]. In winter, typically there are more high-speed winds coming mainly from the west. The average maximum gust speed was the highest in December, which was approximately 78 km/h. Winds are the lowest in the summer months; the lowest average maximum gust speed was in August, which was approximately 60 km/h. In the summer, the southwestern component is the strongest, with roughly 17 percent of the wind coming from the southwest.

Table 6.33 Average Observed Speed of the Max Gust from Hamilton A Station from 2000 to 2011

Month	Observed Average Speed of Max Gust (2000-2011) (km/h)
January	71.00
February	75.27
March	74.64
April	77.09
May	71.55
June	66.64
July	67.09
August	60.18
September	71.55
October	71.45
November	73.18
December	77.82

Source:
EC Historical Data (climate ID: 6153194)

[8] Based on historical records from Hamilton RBG CS Station (climate ID: 6153301) from 2005 to 2012.

The historical climate and climate trends described above were used to identify any possible climate change risks of concern for the construction, operation, closure, and post closure stages of the landfill.

6.10.2 Potential Effects of the Undertaking on Climate Change

The SCRF receives primarily non-hazardous industrial fill with very little waste containing organics such as municipal solid waste (MSW). As a result, the potential to produce methane and other GHGs is significantly lower than a MSW landfill of the same size. Any gas produced at the Site migrates to the surface and dissipates into the atmosphere; there is currently no landfill gas collection system in place, nor is one required under O. Reg. 232/98 and the "Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfill Sites" (MECP, 2012). Terrapure is required (under current approval) to monitor for landfill gas and provide results in the Annual Monitoring Report (submitted to the MECP every calendar year on June 30th). A landfill gas assessment was conducted in 2011, which confirmed that very little gas is generated at the SCRF.

Section 6.1.12 provides an overview of the landfill gas generation, as well as the estimated GHG emissions estimates.

Upon closure, the landfill will be sealed with a clay cap. This will significantly reduce the already low amount of GHGs released by the landfill. During post-closure the landfill will release less and less GHG emissions as each year passes.

6.10.2.1 Mitigation

In order to minimize or offset the effects of the Undertaking on climate change, in particular to reduce the GHG emissions associated with the construction, operation, closure and post-closure stages of the landfill, mitigation measures will be implemented. The MECP Guide defines mitigation as "The use of measures or actions to avoid or reduce greenhouse gas emissions, to avoid or reduce effects on carbon sinks, or to protect, enhance, or create carbon sinks" (MECP 2016, Page 40). Mitigation measures include actions such as utilizing different technologies and construction materials. Mitigation measures and BMPs to reduce the Undertaking's effect on the environment will be determined and implemented at the onset of each stage of the landfill. Possible BMP/mitigation measures for the four stages of the landfill include:

- 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
- Replace and plant additional vegetation to create a carbon sink

In addition to the above mitigation measures the Air Quality Monitoring Program will continue to ensure all emissions fall within accepted standards.

As the GHGs released by the landfill are already below required standards and with the implementation of BMP/mitigation measures the proposed Undertaking is not anticipated to have a potential effect on climate change.

6.10.3 Effect of Climate Change on the Undertaking

Key potential effects of climate change that may occur during the Undertaking may include:

- Increasing frequency of unusually high or low daily temperature extremes.
- Long-term increasing or decreasing mean annual temperatures and/or precipitation.
- Increasing or decreasing frequency of storm events (e.g., rainfall, snowfall, extreme wind).

Extreme and adverse weather could affect the Site operations. As an example, an increase in storm events could affect the facilities and systems that have been engineered for the Site as part of the Undertaking, such as the stormwater management system. Furthermore, extreme weather events could also cause potential power outages, physical damage and reduced access to the Site. The potential impacts for the Preferred Landfill Footprint are considered to be "low" or "nil". "Low" indicates that the effect may cause a minor impact on the Site, Site operations or the Site design/features. "Nil" indicates that no effect is projected due to the potential change. **Table 6.34**, below, summarizes the assessment of potential adverse effects of climate change on the SCRF.

Table 6.34 Estimated Sensitivity of the Undertaking to Potential Climate Change Effects[9]

Climate Parameters	Landfill Stage				Explanation
	Construction[10]	Operation[11]	Closure[12]	Post-Closure[13]	
Mean Temperature	NIL	NIL	NIL	NIL	A slight change in mean temperature will not impact landfill operations. Landfill operations are successfully conducted in areas with significantly higher/lower mean and extreme temperatures.
Frequency and/or Severity of Extreme Temperature	LOW	LOW	LOW	NIL	
Total Annual Rainfall	LOW	LOW	LOW	LOW	A slight change in annual precipitation will not impact landfill operations. Landfill operations are successfully conducted in areas with significantly higher/lower annual precipitation.
Total Annual Snowfall	LOW	LOW	LOW	LOW	
Frequency and/ or Severity of Precipitation and Weather Extremes	LOW	LOW	LOW	LOW	The landfill components have been designed to accommodate a Regional storm event. The Site has sufficient area to increase the stormwater works to accommodate larger storms. The system is designed to return to normal operating conditions within two days.
Soil Moisture & Groundwater	LOW	LOW	LOW	LOW	These items relate to potential weather changes Landfill operations are successfully conducted in areas with significantly different weather conditions.
Evaporation Rate	LOW	LOW	LOW	LOW	
Wind Velocity	LOW	LOW	LOW	NIL	

9 Table modified from: "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (Federal-Provincial-territorial Committee on Climate Change, November 2003).

10 Excavation and grading of new waste cells; placement and grading of final cover on closed cells.

11 Placement, grading, and compaction of waste during life of each active cell.

12 Placement and grading of final cover on remaining active areas of waste area, decommissioning of ancillary Site facilities.

13 Monitoring of surface water and groundwater, observation, and repair (as necessary) of closed Site conditions (e.g., erosion, vegetation re-planting, etc.).

A slight change in annual precipitation and frequency and/ or severity of precipitation and weather extremes does not have the potential to impact specific stages (construction, operation, closure and post closure) of the undertaking, or cause any severe damage to any of the landfill components, except potentially the leachate management system and the stormwater system during closure and post-closure (**Table 6.35**). The leachate and stormwater management systems have been designed to accommodate a Regional storm, which is much greater than the historical daily maximum precipitation amount of 107 mm (**Table 6.31**), and the rainfall depth estimated for the 100-year storm event for the SCRF of 127.8 mm (**Table 6.32**). The leachate and stormwater management systems and are designed to return to normal operating conditions within approximately two days. There is also a slight potential for the berms to be impacted through erosion and impact to vegetation cover due to an increase in intensity and frequency of precipitation events. Changes to soil moisture and groundwater, evaporation rate and wind velocity as a result of changes to temperature and precipitation will have little to no impact to the landfill components during any stage of the landfill. There is a slight potential for an increase in wind velocity, changes to soil moisture and evaporation rates to lead to issues with erosion and vegetation establishment on the final cover during post-closure affecting the quality of surface water runoff.

Table 6.35 Potential Severity of Climate Impacts on Components of the Waste Management Infrastructure

Climate Parameters	Waste Management Infrastructure Components					Explanation
	Berms	Geotextile Liner	Leachate Management System	Stormwater System	Waste Piles	
Mean Temperature	NIL	NIL	NIL	NIL	NIL	A slight change in mean temperature will not impact landfill components. The landfill components listed function successfully in areas with significantly higher/lower mean and extreme temperatures.
Frequency and/or Severity of Extreme Temperature	NIL	NIL	LOW	LOW	NIL	
Total Annual Rainfall	LOW	NIL	LOW	LOW	NIL	A slight variation in annual precipitation will not impact the landfill components. The landfill components listed function successfully in areas with significantly higher/lower annual precipitation.
Total Annual Snowfall	NIL	NIL	LOW	LOW	NIL	
Frequency and/ or Severity of Precipitation and Weather Extremes	LOW	NIL	LOW	LOW	LOW	The landfill components have been designed to accommodate a Regional storm event. The Site has sufficient area to increase the stormwater works to accommodate larger storms. The system is designed to return to normal operating conditions within two days
Soil Moisture & Groundwater	LOW	NIL	NIL	NIL	NIL	These items relate to potential weather changes, the listed landfill components function successfully in areas with significantly different weather conditions.
Evaporation Rate	NIL	NIL	NIL	LOW	NIL	
Wind Velocity	LOW	NIL	NIL	NIL	LOW	

Monitoring of groundwater and surface water is currently carried out for the Site, and a report summarizing these results and other Site conditions is submitted to the MECP annually. These measures mitigate the kinds of potential extreme adverse effects and events noted above; longer-term, more gradual changes are managed through regulatory changes and adaptive management by Terrapure.

As part of the Detailed Impact Assessment of the Preferred Landfill Footprint climate change was considered for each environmental component. Specific discussion on climate change and potential mitigation or adaptation from the perspective of various environmental components are discussed in detail within their respective reports.

6.10.3.1 Adaptation

Additional analysis was undertaken to determine what adaptation measures may be required for the Site. Adaptation will be focused on addressing effects of climate change on the Undertaking. The MECP's Guide defines adaptation as "The process of adjustment in the built and natural environments in response to actual or expected climate change and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects" (MECP 2016, Page 38). Although it was determined climate change will have no appreciable adverse effects on the proposed Undertaking identification of possible adaptation measures was undertaken to increase both the project's and the local ecosystem's resilience to climate change.

To increase the project's and the local ecosystem's resilience to climate change, the project's and local ecosystem's vulnerability to climate change need to be reduced. The degree of vulnerability is associated with unpredictability of climate change. The unpredictability of climate change increases over time. Therefore the stage with the greatest vulnerability (e.g., most likely to be impacted by climate change) is the stage that occurs over a long period of time, which is post-closure. As such resources will be focused on employing adaption measures upon closure of the landfill to ensure the landfill is resilient to climate change during post-closure stage.

Adaptation measures will be aimed at strengthening and increasing the resilience of the landfill cover and leachate management system. Such measures could include:

- Choosing vegetation known, to withstand erosion and climatic stressors such as extreme heat, drought tolerance, and flood resistance;
- Planting additional vegetation every five to ten years; and
- Modification of existing stormwater management ponds, if necessary.

The above is by no means a comprehensive list of the additional adaption measures that will be considered upon closure of the Site. As required by Section 31 of the *O. Reg. 232/98 a Closure Report* is to be created two years before the anticipated closure date of a landfill or when 90 percent of the waste disposal volume is reached. In addition to detailing the activities for post-closure care the Closure Report will state the commitments to climate change adaptation and how they will be implemented. Emerging technologies and current climate projections will be reviewed during the development of the adaptation measures in the Closure Report. In addition, the development of BMP’s will be prepared such that they can flexible enough to adapt to a changing climate.

6.11 On-Site Diversion Assessment

6.11.1 Background

The SCRF is a unique facility in Ontario in that it only accepts post-diversion solid, non-hazardous industrial residual material, consisting mainly of material from the steel making industry (i.e., basic oxygen furnace oxide, slag) and excavated soils from infrastructure development projects. The majority of these waste materials have exhausted all recycling or recovery options and cannot otherwise be utilized.

Although there is minimal material received at the SCRF that has the potential to be reasonably diverted or recycled, Terrapure has reviewed and evaluated the potential for on-Site diversion of waste materials received at the Site. The Minister Approved ToR requested that on-Site diversion be considered as part of the environmental assessment. In addition, considering the possibility of on-Site diversion is in keeping with the goals for the Province's new Waste Free Ontario Act (WFOA) and its Strategy for a Waste-Free Ontario: Building the Circular Economy for managing residual material in attempt to move the Province to an aspirational goal of "zero waste".

As such, Terrapure committed in the ToR to examine and evaluate the feasibility and viability of implementing an on-Site diversion program as part of the environmental assessment process. This includes the consideration and assessment of a reasonable number of ways in which to divert the types of waste materials typically received at Site. Further, Terrapure has reviewed the potential for on-Site diversion in accordance with best management practices and in consideration of new and emerging technologies.

Currently the material accepted at the SCRF comes from a variety of customers and businesses that have implemented their own diversion and recovery systems, as per the WFOA and the Strategy for a Waste-Free Ontario, which places emphasis on requiring the industrial, commercial, and institutional (IC&I) sector to divert more of the waste they produce.

6.11.2 Terrapure's Current Diversion Initiatives

Terrapure has Standard Operating Procedures (SOP) that dictate that materials received at the SCRF are screened and verified to ensure they match the Generator's Waste Profile, and that the Generator of the material has made the determination that the material cannot reasonably be diverted or reintroduced into the circular economy from both an economical and technical feasibility perspective. Diversion at the source of the generated residual material from generators and customers considers both the economic viability of diversion, as well as ensuring that there is a viable end market for the diverted material.

Terrapure understands the importance of WFOA, its diversion goals and the need to establish a circular economy. To this end, Terrapure is constantly reviewing diversion technologies for existing waste generating customers. Terrapure's new Business Transformation Team (BTT) is leading initiatives to achieve higher performance and efficiency throughout the company. One of these initiatives is exploring the opportunity to recycle steel making waste through the BOF (basic oxygen furnace) steel making process with waste received from ArcelorMittal Dofasco (AMD). The production of wastes with high iron content, such as mill scale, dust and sludge are unavoidable during the steel making process. The re-use of these wastes is extremely important in preserving our non-renewable natural resources (Kumar, et al., 2017). An attractive option to recycle these

wastes is through the BOF process, where BOF oxide waste is converted into briquettes using various binding agents and then is reintroduced back into the steel making process as a feedstock (Kumar, et al., 2017).

By converting the BOF oxide into a usable form, a substantial volume of material could be diverted from SCRF. This is an indication of the efforts that large companies such as AMD make in diverting materials from landfill and that landfill is typically only chosen when other viable options are not available. Additionally, Terrapure regularly explores opportunities to divert and recover materials within its own operations network to prevent unnecessary material ending up at the SCRF for disposal.

6.11.3 Assessment Methodology

Terrapure conducted an assessment of potential on-Site diversion programs, through a literature review to explore other jurisdictions' best management practices and possible new and emerging technologies for diverting industrial residual materials. A challenge encountered during the literature review was the majority of information discusses diversion of residual mixed solid waste, rather than the diversion of residual solid non-hazardous industrial waste. As previously mentioned, the SCRF is a unique facility in Ontario in that it only accepts post-diversion solid, non-hazardous industrial residual material, thus finding similar examples was difficult.

Mainly the literature discusses technologies involving thermal and combustion processes, as well as chemical and biological processes and fuel development alternatives. However, it should be noted that as per the Strategy for a Waste-Free Ontario: Building the Circular Economy, the conversion of waste to energy or alternative fuels (thermal and combustion processes), while permitted as waste management options, does not count towards diversion in Ontario[14].

The technologies (some still theoretical in nature) discussed for diversion of residual mixed solid waste in the literature include:

- Mechanical biological treatment (MBT)
- Refuse-derived fuel (RDF) with stoker firing
- RDF with fluidized bed combustion
- Catalytic depolymerization
- Hydrolysis
- Pyrolysis
- Gasification
- Plasma arc gasification

Although as listed above there are a number of technologies for dealing with residual mixed solid waste, landfills are still the most common method to address residual industrial waste. However, trends are emerging to attempt to reduce the amount of material that requires disposal to landfill.

[14] Strategy for a Waste Free Ontario, p.10

In-Situ Stabilization of Contaminated Soils

One such trend is the use in-situ stabilization techniques in Ontario, which are being applied to various site remediation locations where brownfield legislation issued by the MECP allows low levels of contaminants to remain at a site when there, will be limited after use of the site. An example of this is at a brownfield site in Sudbury, where heaps of slag, the by-product from iron and nickel ore mining operations, were regraded, 18 inches of silty-clay was added and wildflower seed mix was planted to remediate the site (Sudbury Star, 2014). This program resulted in a significant amount of material being diverted from landfills. Stabilized waste materials have also been used as landfill cover.

Thermal & Combustion Technologies

Although, as stated above, thermal and combustion technologies are not considered as diversion in Ontario, these technologies were investigated for the purpose of completing a thorough review of how other jurisdictions are diverting industrial waste. In Australia, thermal waste to energy technologies have shown potential in treating a wide range of industrial wastes (WSP, 2013). However, it was noted that using thermal waste to energy technologies to treat industrial waste, is not yet financially viable and that fiscal measures/incentives would have to be provided for the technologies to be financially competitive with landfills (WSP, 2013).

6.11.4 Viability of Identified Diversion Options

In 2010, it was determined that the cost of disposing waste in a landfill is about 40% lower than the cost of recovering waste (MECP, 2010). In addition to the large discrepancy in cost between recovering waste versus sending it to a landfill, the technology to recover waste, specifically waste heading to the SCRF, has not progressed enough to make it as affordable as processing raw materials. For example in 2017, the cost associated with BOF oxide process described above was more than double the price of iron ore (**Figure 6.14**). The high cost of drying the sludge and the binders required to provide strength for the recycling of steel wastes into feedstock is the main reason that makes BOF processing economically unattractive (Singh et al., 2011). This demonstrates the need for further development and improvement of the BOF processing technology before it can become a financially viable solution to divert waste from landfills.

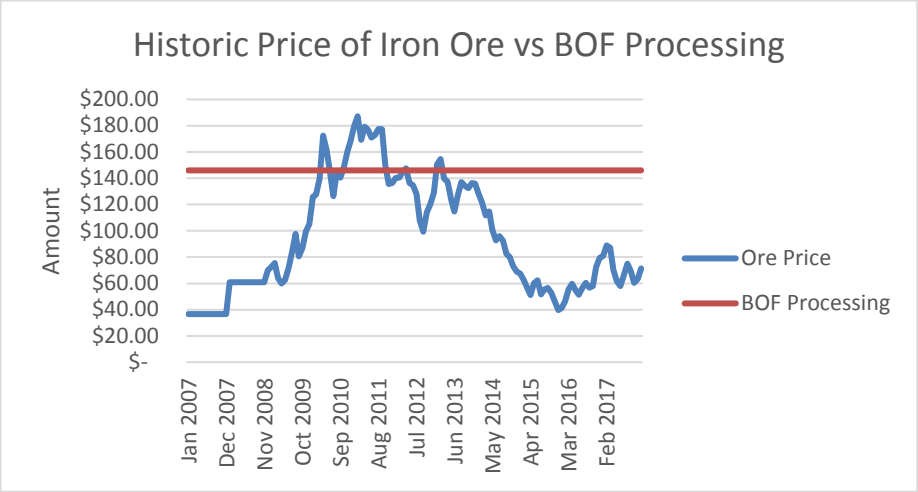


Figure 6.14 Cost of Raw Iron Ore Compared to Cost of Recovering Steel Wastes Through BOF Oxide Recovery/Processing Process

At this time, the solutions for diversion of residual industrial waste discussed above, including the recovery of steel making wastes through BOF recovery and processing, are still in their formative stages. Information on the generation and flow rates in Ontario is required to ensure the financial viability and strength of the end market.

In addition to the technologies investigated not being technically feasible and economically viable at this time, the infrastructure associated with the technologies would require greater space than currently available at the SCRF. The only potential location for an on-Site diversion program would be in the buffer areas surrounding the SITE's footprint; however, the size of the buffer areas will not be large enough to accommodate the required infrastructure footprint. Therefore, it is not appropriate or reasonable at this time for Terrapure to develop a diversion plan at the SCRF given that the volumes of material that could be potentially diverted are minimal, the lack of an established and financially viable end-market, as well as the limited space on Site for required infrastructure.

As Terrapure continues to develop its business, it will continue to investigate emerging technologies for potential diversion options, both on- and off-Site as more information on emerging technologies' financial viability becomes available. As per the commitment in the Environmental Compliance Approval (ECA) the SCRF operates under, Terrapure will also continue to review the 3R's technology with respect to landfill diversion every five years. Terrapure will also continue to work with its customers to ensure diversion at the source of the generated material takes place. Furthermore, Terrapure will monitor the introduction of regulations that may assist in creating more financially viable diversion tools, as well as the establishment of viable end-markets for the diverted material.

6.12 Impact Assessment Summary

The information presented in Section 6.2 to 6.4 has been summarized and included in **Table 6.36.** As the table indicates 'No' to 'Low' net effects are anticipated across all environmental components considered for the implementation of the Preferred Alternative. Net effects for all environmental components are listed in **Table 6.37** along with a summary of associated mitigation measures.

Table 6.36 Preferred Undertaking – Potential Environmental Effects, Mitigation Measures & Net Effects

Environmental Component/Criteria	Potential Effects	Mitigation Measures	Net Effects
Geology and Hydrogeology	1. Leachate leakage through the primarily liner 2. Leachate leakage through the secondary liner	1. Maintaining inward gradient across the liner system through flooding the HCL. 2. Collection of impacted water and hydraulic control of local groundwater through operation of M4 extraction well, shatter trench wells and containment wells.	1. No net effect on downgradient groundwater quality. 2. No net effect on downgradient groundwater quality
Surface Water	1. Surface quality will be similar to baseline since additional residual material will have final cover. Contaminants of concern in the runoff are TSS. 2. The increased area of residual material results in an increase in impermeable area due to the residual material final cover. This will produce an increase runoff volume of 11% during the 2-year storm event and 6% during the 100-year storm event. Increased runoff volume will result in increased flooding ditches to the northwest, in the sewer below First Road West and Davis Creek. Erosion of the creek and ditches may also occur because of the increased runoff volume.	1. The existing stormwater management pond will be altered as required and described (provide adequate permanent pool volume and active storage volume) to treat TSS from the stormwater runoff. 2. Stormwater from the pond will not be released to surface water body (i.e., storm sewer system that drains into Davis Creek) until testing determines all parameters have been met to discharge. Contingency measures include “status quo”, which is to discharge stormwater to sanitary sewer for treatment at the City’s water pollution control plant.	1. Discharge to either surface water or to sanitary sewer with no increase in TSS and related parameter concentrations 2. No increase in peak flows to the roadside ditches to the northwest of the Site, sewer under First Road West and Davis Creek Based on the controlled conditions modeling (which includes preliminary SWM measures), the SWM pond and perimeter ditches will able to treat and control the runoff from the Site to the same level as the current approved design and results in low net environmental effects.
Terrestrial and Aquatic	1. Temporary loss of approximately 18.5 ha of existing vegetation communities (e.g. marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of regrading activities. 2. Temporary disturbance to terrestrial species during Site works and landfilling operations. 3. Temporary loss of approximately 11.5 ha of habitat of a Threatened species (eastern meadowlark) in the dry-fresh graminoid meadow ecosite at the south and west portion of the Site. 4. Loss of on-Site aquatic habitat and disturbance to aquatic biota associated with open water habitats in stormwater infrastructure due to regrading activities.	1. Conduct any vegetation removal activities outside of the breeding bird window (i.e., no removals between late March - late August). Retain vegetation and compensate for vegetation loss to the extent possible (e.g., create pollinator habitat in buffer areas) Incorporate graminoid meadow habitats into the closure landscape plan 2. Implement BMP’s including: Use of dust suppressants Installation of protective fencing (where required) Conduct a nest survey of on-Site facilities and infrastructure prior to relocation or removal of structures to mitigate impacts to bird species which may use anthropogenic structures for nesting. If nests are found, consult a biologist/MNRF for further direction. Any wildlife incidentally encountered during Site operation activities will not be knowingly harmed and will be allowed to move away from the area on its own. In the event that an animal encountered during Site operation activities does not move from the area, or is injured, the Site Supervisor and MNRF will be notified. In the event that the animal is a known or suspected SAR, the Site Supervisor will contact MNRF SAR biologists for advice. Include naturalized landscape features into the stormwater management facilities design (e.g. wet meadows, emergent robust vegetation, shallow slope)	1. The temporary loss of approximately 18.5 ha of vegetation and wildlife habitat will be minimized through implementation of the mitigation measures. 2. The temporary disturbance to terrestrial species will be minimized through implementation of the mitigation measures. 3. The temporary loss of SAR habitat will be minimized through implementation of the mitigation measures. 4. The temporary loss of on-Site aquatic habitat and disturbance to aquatic biota will be minimized through implementation of the mitigation measures.

Table 6.36 Preferred Undertaking – Potential Environmental Effects, Mitigation Measures & Net Effects

Environmental Component/Criteria	Potential Effects	Mitigation Measures	Net Effects
		3. Consult with MNRF to determine specific requirements (e.g. habitat enhancement and/or creation requirements) of the Notice of Activity process related to the presence of eastern meadowlark to avoid contravention of the provincial Endangered Species Act. Incorporate graminoid meadow habitats into the closure landscape plan. As part of the Notice of Activity process, a Habitat Management Plan will be created and implemented prior to the initiation of any construction. This plan which will document the areas to be affected and detail where and how new habitat will be created or enhanced. 4. Install ESC measures to mitigate impacts to water quality and to act as wildlife exclusion fencing prior to construction, and maintain them appropriately throughout landfill construction and operation. Characterize use of on-Site aquatic features by fish and wildlife prior to modification/removal. Obtain necessary approvals for/complete fish/wildlife rescue activities prior to initiation of any in-water works, as appropriate.	
Atmospheric	**Air & Odour** 1. Elevated dust concentrations in the local study area 2. Odour in the local study area **Noise** 1. Potential change to the predicted off-Site noise impact based on increased line-of-sight due to reconfiguration and the decrease in the separation distance between the landfill activities and the adjacent residential properties. *POR1=60 dBA* *POR2=47 dBA* *POR3=55 dBA* *POR4=45 dBA* *POR5=55 dBA* 2. Net sound level change for up to 200 off-Site receptors is 5 dBA or lower: ▪ Approximately 75 residences (to the north): +5 dBA change 1. POR5=55 dBA	1. Implementation of dust mitigation plan. Logging of complaints and investigation into contribution(s) of the site to local air quality issues. 2. Logging of complaints and investigation into contribution(s) of the site to local air quality issues. 1. **Existing Residential Properties:** No Mitigation measures required. **Potential Future Development of Surrounding Properties:** No Mitigation measures required. 2. No Mitigation measures required.	1. Facility can meet MECP and CAAQS guidelines, provided care is taken when operations are occurring near the fenceline. 2. The site is unlikely to contribute to significant odour issues in the area. 1. Net sound level change for all off-Site receptors is 5 dBA or lower. There are some residences to the north which may experience a noise level increases of up to +5 dBA from the existing conditions. 2. Noise levels at receptors are below the MECP sound level limits, and Site specific noise limits.

Table 6.36 Preferred Undertaking – Potential Environmental Effects, Mitigation Measures & Net Effects

Environmental Component/Criteria	Potential Effects	Mitigation Measures	Net Effects
Land Use	1. No change to the current land use designation (Open Space / Commercial) and no change to Land Use Zoning (ME-1). 2. Slight height increase and property buffers are maintained. Visibility increased mostly for sensitive receptors and properties adjacent to site including residential dwellings to South on Green Mountain Rd. as well as homes along Mud Street.	1. No mitigation measures are required as there are no anticipated change required to existing site-specific and adjacent land uses and zoning of the facility during operation; no change anticipated to existing adjacent land uses as a result of the implementation of the Preferred Landfill Footprint. The following existing mitigation / compensation measures will continue to be in effect: • Maintain Buffers for Nuisance Reduction • In effect nuisance preventative measures for landfill operating practices Best Management Practices for landfill operations 2. Maintaining the existing screening berms and fencing will assist with visual screening from residential areas, but will not be able to mitigate views completely. Additional screening guards and vegetation can be implemented to mitigate views for sensitive receptors. Progressive capping of the landfill will assist in revegetating areas as the site is of the site to create a natural look	1. No change in current site-specific and study area land uses. 2. Installation of visual screening elements will sufficiently obscure a majority of views of the facility from sensitive receptors. Relative to the existing conditions, the changes are minimal.
Human Health	Elevated dust concentrations in the local study area.	Implementation of dust mitigation plan and ongoing monitoring/assessment	Acceptable dust concentrations with no unacceptable health risks to surrounding community. Ongoing monitoring, assessment and reporting on an annual basis to demonstrate this to all stakeholders.
Transportation	No change to the existing level of road user safety and intersection Level of Service within the Local Study Area	No mitigation measures required.	No net effects.
Economic	1. Approximately 1,200 residential dwellings, 11 commercial units, 4 agricultural properties, 1 recreational, 1 institutional within 500 m of site. No anticipated effects to these land uses through various landfill operation mitigation measures. 2. Expansion and reconfiguration would result in maximum increase of jobs and increase to economy and GDP (Range of economic activity between $349 and $372 million with GDP from $218-$232 million and between 662-671 jobs) Property taxes paid to City at a higher rate will continue	1. No mitigation measures are required as there is no anticipated change required to existing site-specific and adjacent land uses and zoning of the facility during operation; no change anticipated to existing adjacent land uses as a result of the implementation of the Preferred Landfill Footprint. Basic landfill operation mitigation measures including; storm water management, leachate treatment, dust and noise control will assist in mitigating effects to surrounding properties. The following existing mitigation / compensation measures will continue to be in effect: • Maintain Buffers for Nuisance Reduction • In effect nuisance preventative measures for landfill operating practices • Best Management Practices for landfill operations 2. No mitigation or compensation measures are required.	1. No net effects to approved/planned land uses. 2. Positive economic benefits to local community. Meets Disposal objectives.
Archaeology and Built Heritage	The Recommended Option requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. One cultural heritage	No mitigation is required as no potentially significant archaeological resources or built heritage landscapes will be disturbed or displaced.	No Net Effects or Mitigation measures are anticipated or required from an archaeological perspective.

Table 6.36 Preferred Undertaking – Potential Environmental Effects, Mitigation Measures & Net Effects

Environmental Component/Criteria	Potential Effects	Mitigation Measures	Net Effects
	landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. Due to the previous disturbance on-Site (excavation for quarry operation), the Recommended Option does not affect a known or potential archaeological resource.		
Design and Operations	1. Increased design and operating complexity of leachate management system 2. Increased design and operating complexity of stormwater management system 3. Increased design and operating complexity of groundwater management system 4. Increased design and operating complexity of landfill gas management system 5. Increased complexity and reduced constructability of facility components 6. Increased complexity and reduced operability of facility components 7. Increased closure and post-closure requirements and reduced flexibility of potential end uses	1. Design of new base liner system to integrate seamlessly with existing base liner system. Use of only one leachate pumping station. Establish new connection to sanitary sewer. Maintain uniform shape and contours of the residual material area. 2. Design of new stormwater management system to integrate seamlessly with existing stormwater management system. Extend perimeter drainage ditches to accommodate new residual material area. Maintain current approved location and layout of stormwater pond. Maintain existing stormwater outlet to storm sewer. 3. Design of new groundwater management system to integrate seamlessly with existing groundwater management system. Extend groundwater collection trenches to accommodate new residual material area. Maintain existing location of groundwater outlet. Establish new connection to sanitary sewer. 4. Continue acceptance of waste types that do not decompose and generate significant quantities of gas. Maintain MECP exemption from the requirement to have a gas collection system. 5. Design of new base liner system to integrate seamlessly with existing base liner system. Design of new final cover system to integrate seamlessly with existing final cover system. Maintain open layout with simple configuration and dedicated areas for the various infrastructure components. 6. Maintain design and function of existing systems (leachate, stormwater, groundwater, gas) and infrastructure (access, roads, weigh scale, wheel wash). Maintain operational flexibility of existing systems and infrastructure. 7. Maintain open and uniform configuration that will simplify Site closure requirements. Maintain overall layout and contours that do not limit the flexibility of potential end uses.	1. Small increase in complexity relative to current leachate management system associated with: additional base liner and leachate collection system; increased leachate generation rate. 2. No increase in complexity relative to current stormwater management system. The design and layout of the stormwater management system provides design and operational flexibility. 3. No increase in complexity relative to current groundwater management system. The design and layout of the groundwater management system provides design and operational flexibility. 4. No increase in complexity relative to current passive system for management of landfill gas. No requirement to implement gas collection system. 5. Small increase in complexity relative to current construction requirements associated with: additional base liner and leachate collection system, additional final cover. 6. No increase in complexity or reduction in operability relative to current site operations. 7. Simplified closure requirements and increased flexibility of potential end uses relative to current design.

6.13 Advantages & Disadvantages of the Undertaking

In accordance with the approved ToR, the advantages and disadvantages to the environment of the Preferred Undertaking are summarized in **Table 6.37**, below. The advantages and disadvantages are based on the net effects described above and on the rationale for the undertaking described in **Section 3.0** of the EA Report. The proposed landfill expansion, with specific mitigation and impact management programs in place, will have low and acceptable net effects on all environmental components and the facility construction and operation will have a positive economic impact in the community.

Table 6.37 Advantages and Disadvantages of the Preferred Undertaking

Environmental Component	Advantages	Disadvantages
Geology and Hydrogeology	• Minor variations in predicted downgradient groundwater quality will be mitigated primarily through existing environmental control systems outlined in Section 6.2.1	• Potential minor variations in groundwater quality prior to mitigation
Surface Water	• Low net environmental effects owing to the ability of the surface water management pond and perimeter ditches to treat runoff, No change from current approved operating conditions	• Potential minor variations in surface water quality runoff prior to mitigation
Terrestrial and Aquatic	• Habitat enhancement through mitigation measures • Naturalized landscape features	• Temporary loss of habitat and disturbance to aquatic biota
Land Use	• Visual screening elements will obscure the majority of views of the facility from sensitive receptors. Relative to existing conditions, changes are minimal • A new landfill facility will not need to be established	• Minimal visual changes for sensitive receptors • BMPs will be implemented to manage nuisance related effects during construction and operation for nearby residences and business
Economic	• A technically feasible design that provides for additional capacity. This will allow Terrapure to continue to support the growing local economy by providing disposal capacity for industrial residual material generated within Hamilton and the GTA • Continued generation of significant economic activity in the City of Hamilton • The Undertaking aligns with the provincial government's direction on continuing to require a permitted, well-designed, environmentally-secure facility to manage residual materials as the province transitions to a circular economy	• Site will be partially visible from surrounding agricultural areas and businesses

Environmental Component		Advantages	Disadvantages
Atmospheric	**Air Quality**	• Regulatory guidelines can and will be met regarding particulate matter • Reduced/maintained Site boundary and off-Site odour concentrations	• Minimal increase in dust to some receptors
	Noise	• Predicted noise levels at receptors are below regulatory limits	• Some receptors may experience a temporary noise level increase
Human Health		• Ongoing monitoring, assessment, and reporting will maintain dust concentrations that pose no risk to human health • A reliable, secure and environmental sound disposal option for post-diversion solid non-hazardous waste	• Minimal increase in dust to some receptors
Transportation		• No road improvements required • No bird strike hazard to aircraft in Local Study Area • The SCRF can continue to accept residual waste which will prevent additional transportation costs and GHG emissions associated with customers have to haul waste further away	• Minor temporary construction-related effects (lane closures, movement of exit location during different phases of operation)
Archaeology & Cultural Heritage		• No loss of or disturbance to cultural and heritage resources and archaeological resources within the Local Study Area	• There are no disadvantages to the Archaeology and Cultural Heritage Environment
Site Design & Operations		• Proposed expansion utilizes existing environmental control systems	• There are no disadvantages to Site Design & Operations

Table of Contents

Table Index

Figure Index

7. Public and Agency Consultation

7.1 Overview of the Consultation Process

This section of the EA Report provides an overview of the consultation program undertaken as part of the SCRF EA. In accordance with the MECP's *Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario* (January 2014) and as required by Section 5.1 of the EA Act, a comprehensive consultation program involving review agencies, public stakeholders and Indigenous communities was carried out throughout the EA process.

The EA Consultation Plan included in the Approved Amended Terms of Reference (2017) included the following four elements:

- Key decision making milestones when consultation would occur during the SCRF EA (**Section 7.2**).
- Interested participant groups from which input would be obtained and specified how that input would be obtained from each group during the SCRF EA. Specifically the Consultation Plan identifies three categories of participants: review agencies, Indigenous communities, and the public (**Sections 7.4.1**, **7.5.1** and **7.6.1**).
- Consultation activities to be carried out during the SCRF EA. The consultation activities carried out were similar to those undertaken during the ToR. While some consultation activities were used to engage all three participant groups (**Section 7.3**), many were tailored to each (**Sections 7.4**, **7.5**, and **7.6)**.
- Issues resolution strategy for resolving potential issues or disputes raised during the SCRF EA (**Section 7.7**).

7.2 Key Decision Making Milestones and Consultation Activities

A wide variety of consultation activities were carried out throughout the preparation of the EA. The consultation activities provided multiple opportunities and a variety of methods for review agencies, Indigenous communities, and public stakeholders to be involved and provide comments for consideration during the preparation of the EA.

The SCRF EA Consultation Plan outlined three key decision making milestone points where consultation would specifically occur during the preparation of the SCRF EA. As a result, Terrapure sought and obtained input from the interested participants at these key decision making points prior to moving forward with the next phase of the EA process. The key decision making milestone points outlined in the Consultation Plan are provided in **Figure 7.1.** The first key decision making milestone point listed in **Figure 7.1** was held as part of the preparation of the SCRF EA ToR.

Figure 7.1 Consultation Key Milestones

7.3 Ongoing Consultation Activities

Terrapure undertook several consultation activities that lasted the duration of the EA and were used to engage all participant groups. Primarily, these activities were undertaken to increase the level of understanding of the SCRF, the Project, and of the EA process, and included easy-to-understand plain language communications tools. Specifically, this included:

- Project website (see **Section 7.3.1**)
- Social media (see **Section 7.3.2**)
- Educational Videos (see **Section 7.3.3)**
- Media Relations (see **Section 7.3.4**)
- Toll-Free Telephone Number (see **Section 7.3.5**)

Further, Terrapure implemented an adaptive management strategy to consultation, adding activities as necessary. For example, Terrapure heard from community members during the ToR that it would be beneficial to have access to videos as a tool for understanding the complexities of the environmental protection measures required of the SCRF if the EA was approved. As a result of this suggestion, Terrapure produced three videos that described environmental protection at the SCRF, the waste acceptance process, and the proposed capacity increase.

These activities are each described in the following subsections.

7.3.1 Project Website

A project specific website (www.terrapurestoneycreek.com) was launched during the ToR stage and maintained throughout the EA process. The website was established to provide clear and accurate information to participants as well as to give feedback to Terrapure. During the SCRF EA process, Terrapure posted up-to-date information on the website about project activities, available documents for review, and notices of upcoming consultation opportunities to provide feedback and comment.

In addition, participants were able to submit questions, comments or feedback directly on the website and subscribe to project notifications.

Finally, the project website was used for three Online Open Houses to augment the In-Person Open Houses. The Online Open Houses are further described in **Section 7.6.4**.

7.3.2 Social Media

In addition to a project specific website, Terrapure was active on social media throughout the EA process. Through engagement on Facebook (@TerrapureStoneyCreek) and Twitter (@TerrapureSCRF), Terrapure was able to:

- Increase awareness of the project, key dates for consultation opportunities, potential benefits of the project to the community and ongoing operational activities.
- Increase transparency and active communication throughout the EA process.
- Allow Terrapure to engage meaningfully with hard to engage demographics by responding to concerns and comments raised on social media.

Although the SCRF social media accounts received limited attention and followers during the EA phase, there were a few noteworthy engagement moments identified including invitations to the

Public Open Houses, the promotion of the Heritage Green Community Trust funds, and the educational videos.

7.3.3 Educational Videos

In response from comments received from the public, Terrapure created two education videos: Stoney Creek Regional Facility Environmental Protection, and Stoney Creek Regional Facility Waste Acceptance Process. These two videos were developed and published in November 2017. As of July 2018, the Stoney Creek Regional Facility Environmental Protection video received 110 views and the Stoney Creek Regional Facility Waste Acceptance Process received 179 views.

At the third Open House on June 19, 2018, Terrapure released a new video which provided further details about the preferred undertaking. Specifically, the video described the changes from the existing approved to the preferred undertaking including changes to the footprint (i.e., horizontal and vertical alterations), moving on-Site operational infrastructure and phasing plan for landfilling.

7.3.4 Media Relations

At key milestones throughout the preparation of the EA Terrapure engaged with the media to provide updates and answer questions about the progress of the SCRF EA. A representative from the Stoney Creek News was in attendance at each of the Public Open Houses. Following each Public Open House, a related article was published in the Stoney Creek News.

In addition to articles related to the Public Open Houses, Terrapure participated in in-person interviews on Cable 14 News on December 19, 2017, and March 27, 2018.

7.3.5 Toll-Free Telephone Number

The dedicated project specific toll-free telephone number established during the ToR phase and was continued during the EA phase (1 844 898 2380). The purpose of the toll free telephone number was to handle inquiries related to the SCRF EA.

Phone calls received were primarily related to a stakeholder looking for additional information after receiving an invitation(s) to an upcoming Public Open House.

7.4 Agencies

7.4.1 Agencies Consulted

During the ToR, Terrapure consulted broadly with review agencies, including federal departments, provincial ministries and agencies, and regional and local agencies. From the original 18 review agencies contacted[1], only 12 responded with interest in reviewing the ToR. As such, the following 12 agencies were consulted during the preparation of the SCRF EA, including provincial ministries and agencies, and regional and local agencies:

[1] The six agencies not included in the SCRF EA confirmed that they would not be involved in reviewing the SCRF EA during the Terms of Reference and requested to be removed from the contact list.

Federal and Provincial Agencies	
Environment Canada	Ministry of Economic Development and Growth
Ministry of Agriculture, Food, and Rural Affairs	Ministry of Natural Resources and Forestry
Ministry of the Environment, Conservation, and Parks	Ministry of Tourism, Culture, and Sport
Ministry of Transportation	Ontario Provincial Police
Municipal and Regional Agencies	
Hamilton Conservation Authority	Hamilton-Wentworth Catholic District School Board
City of Hamilton: Planning, Economic Development, Water, Public Health, Transportation, Legal, City manager	Hamilton-Wentworth District School Board

Staff from government ministries and agencies who contribute to the review of the environmental assessment documentation are collectively known as the Government Review Team (GRT).

From the 12 agencies consulted during the preparation of the SCRF EA, some agencies, including the City of Hamilton, the Hamilton-Wentworth District School Board, and the Ministry of Environment, Conservation, and Parks were more substantially interested and involved.

7.4.2 Overview of Consultation Activities with Agencies

A number of consultation activities took place with review agencies throughout the SCRF EA process, including the following:

- Circulation of the Notices of Commencement and Public Open Houses (see **Section 7.6.1**)
- Four GRT Webinars (see **Section 7.4.3**)
- Individual meetings (see **Section 7.4.4**)
- Circulation of draft reports (see **Section 7.4.5**)
- Circulation of the Draft Environmental Assessment and posting of the Final Environmental Assessment (see **Sections 7.8** and **7.9**)

7.4.3 GRT Webinars

GRT Webinars were held immediately after Public Open Houses and were an opportunity for agencies to receive an update on the project and ask questions. All members of the GRT received an invitation to participate.

7.4.3.1 GRT Webinar #1

Date: December 8, 2017 at 2:00 p.m.

Attendees:

- City of Hamilton (Community Planning)
- City of Hamilton (Public Health)
- City of Hamilton (Public Works)
- Hamilton Conservation Authority
- Hamilton-Wentworth Catholic School Board
- Hamilton-Wentworth District School Board
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of the Environment and Climate Change (Approvals Branch)
- Ministry of the Environment and Climate Change (West Central Region)
- Ministry of Natural Resources and Forestry
- Ministry of Tourism and Culture

Purpose: Provide agencies with an overview of the project, detail the role of the GRT during the EA, discuss the approval of the Amended ToR and recap on the Public Open House #1, and the next steps for the project.

Questions and Comments:

- A question was raised by the City of Hamilton's Department of Public Health looking for clarification on what the health assessment will include. Terrapure explained that they will be using the Annual Community Health Review as the basis for the health assessment in this EA.

7.4.3.2 GRT Webinar #2

Date: March 23, 2018 at 2:00 p.m.

Attendees:

- City of Hamilton (Community Planning)
- City of Hamilton (Public Health)
- City of Hamilton (Public Works)
- Ministry of Agriculture, Food and Rural Affairs
- **Purpose**: Provide a project update including presenting the results of the Alternative Evaluation Assessment, the details of the Public Open House #2, upcoming review timelines and next steps.

Questions and Comments:

- None of the GRT members asked questions during this call. The GRT was informed that they would receive an email with an electronic copy of the Draft Alternative Assessment Report, with a specific request to review and provide comment on the relevant technical information by April 27, 2018.

7.4.3.3 GRT Webinar #3

Date: June 20, 2018 at 1:00 p.m.

Attendees:

- Ministry of Agriculture, Food, and Rural Affairs

Purpose: Present the Preferred Alternative and details of the Impact Assessment, discuss cumulative effects and climate change and finally, and provide details for review timelines and next steps for the EA.

Questions and Comments:

- The Ministry of Agriculture, Food, and Rural Affairs had no comments or questions during this call. Terrapure requested the review agencies provide their comments on the Draft Impact Assessment Report by July 20, 2018.

7.4.4 Individual Meetings

In-person meetings and conference calls were held with individual review agencies on an as needed basis to discuss the project and provide project updates. These meetings primarily coincided with key milestones and provided an opportunity for review agencies to discuss their comments on the progress of the SCRF EA including on the Existing Conditions, Alternative Methods, Preferred Alternative, and Detailed Impact Assessment.

Specifically, meetings were held with the following agencies:

Date of Meeting	Name of Agency or Organization	Meeting Purpose
24-Nov-2017	Ministry of the Environment, Conservation and Parks	Discuss the upcoming SCRF EA process based on the Amended Approved ToR.
8-Jan-2018	City of Hamilton	Review and discuss any outstanding comments submitted during the SCRF ToR
17-Jan-2018	Ministry of Tourism, Culture, and Sport	Discussion with Terrapure on MTCS's mandate, a review of the Alternative Methods, and if any of the Alternatives would go beyond the previously disturbed quarry lands.
1-Feb-2018	Ministry of Agriculture, Food and Rural Affairs	Discussion regarding the Land Use Existing Conditions Report
13-Mar-2018	Hamilton-Wentworth Catholic District School Board	Present the comparative evaluation on the Alternative Methods and discuss concerns such as traffic, road safety, and increased urbanization
26-Mar-2018	City of Hamilton	SCRF EA project update and review and discussion of key milestones and review timelines for the City of Hamilton
20-Apr-2018	Ministry of Environment, Conservation, and Parks	SCRF EA project update with technical review team at the MECP to discuss the Comparative Evaluation of the Alternative Methods and upcoming review timelines.
1-May-2018	City of Hamilton	Meeting with Mayor to provide an update on the SCRF EA and the involvement to-date by the City of Hamilton staff

Date of Meeting	Name of Agency or Organization	Meeting Purpose
24-May-2018	Ministry of Environment, Conservation, and Parks	Meeting to discuss SCRF EA Closure Planning
28-Jun-2018	City of Hamilton	SCRF EA progress update webinar on the detailed impact assessment of the preferred option.

7.4.5 Circulation of Draft Reports

Terrapure proactively circulated draft reports to agencies for their review and comment throughout the SCRF EA. This was done to ensure the potential impacts of the undertaking related to their individual mandates were considered and addressed. Specifically, the following draft documents were circulated for review and comment:

- Draft Air, Odour, and Meteorology Work Plan and Draft Air, Odour, and Meteorology Existing Conditions Report – December 14, 2017
  - Received correspondence from: City of Hamilton
- Draft Geology and Hydrogeology Work Plan and Draft Geology and Hydrogeology Existing Conditions Report – December 14, 2017
  - Received correspondence from: City of Hamilton
- Draft Land Use and Economic Work Plan and Draft Land Use and Economic Existing Conditions Report – December 14, 2017
  - Received correspondence from: City of Hamilton, Ontario Ministry of Agriculture, Food and Rural Affairs, Ministry of the Environment, Conservation, and Parks,
- Draft Natural Environment Work Plan and Draft Natural Environment Existing Conditions Report – December 14, 2017
  - Received correspondence from: Ministry of Natural Resources and Forestry
- Draft Noise Work Plan and Draft Noise Existing Conditions Report – December 14, 2017
  - Received correspondence from: City of Hamilton, Ministry of the Environment, Conservation, and Parks
- Draft Surface Water Work Plan and Draft Surface Water Existing Conditions Report – December 14, 2017
  - Received correspondence from: City of Hamilton
- Draft Traffic Work Plan and Draft Traffic Existing Conditions Report – December 14, 2017
- Draft Archaeological and Built Heritage Work Plan – December 14, 2017
  - Received correspondence from: Ministry of Tourism, Culture, and Sport
- Draft Conceptual Design Report – December 14, 2017
- Draft Alternative Methods Report – March 29, 2018
  - Received correspondence from: Ministry of Natural Resources and Forestry, City of Hamilton (Council, Planning, Public Works, Legal, Capital Budgets), Hamilton Wentworth Catholic District School Board, Hamilton Wentworth District School Board, Ministry of Tourism, Culture, and Sport, Conservation Hamilton
- Draft Facility Characteristics Report – June 25, 2018
- Draft Air, Odour, and Meteorology Detailed Impact Assessment Report – June 25, 2018

- Draft Geology and Hydrogeology Detailed Impact Assessment Report – June 25, 2018
  - Received correspondence from: Hamilton Conservation Authority
- Draft Land Use and Economic Detailed Impact Assessment Report – June 25, 2018
- Draft Natural Environment Detailed Impact Assessment Report – June 25, 2018
- Draft Noise Existing Conditions Detailed Impact Assessment Report – June 25, 2018
- Draft Surface Water Detailed Impact Assessment Report – June 25, 2018
  - Received correspondence from: Hamilton Conservation Authority
- Draft Traffic Detailed Impact Assessment Report – June 25, 2018

7.4.6 Consideration of Comments Received and Issues Raised

In light of the numerous consultation activities carried out by Terrapure with review agencies during the preparation of the SCRF EA, various comments were received reflecting a number of issues. In response, Terrapure considered these comments and attempted in good faith to resolve the raised issues so that both they and the interested person(s) had an agreeable resolution during the SCRF EA.

- As noted in **Section 7.4.1**, agencies that were more substantially interested and involved included the City of Hamilton, the Hamilton-Wentworth District School Board, Ministry of Agriculture, Food, and Rural Affairs, and the Ministry of Environment, Conservation, and Parks. A summary of the comments received from these agencies and how those comments were considered is described in the following subsections.
- A description of comments received from all review agencies and how they were considered by Terrapure is included in **Table 7.1.** This table is organized by review agency in accordance with Section 4.3.7 of the Ministry of the Environment's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014).

7.4.6.1 City of Hamilton

As the host municipality of the proposed SCRF, Terrapure regularly communicated and consulted with various staff and councillors at the City of Hamilton throughout the EA process. The City of Hamilton has particular interest related to traffic, property value, and the visual impacts from the revised height of the proposed capacity increase. Specifically, as a result of this consultation the following changes were made to the SCRF EA:

- Request to include a section that references to the existing compensation agreement as part of the Land Use and Economic Existing Conditions Report.
  - A section on existing compensation was added.
- The Residential Development Activity should include a reference to residential development proposals currently being reviewed by the City of Hamilton that fall within the Study Area.
  - Residential Development Activity was added to the Land Use and Economic Existing Conditions Report.
- Change the nearest residential dwelling to 60 m in the Noise Existing Conditions Report
  - The location of the nearest dwelling was changed to 60 m.
- Reference historical background noise to substantiate the ambient sound level as part of the Noise Control Study in the future.
  - References to the background noise reports were added.

- Add a figure identifying location of approved residential developments to the north, which must be included as a sensitive receptor.
  - A figure identifying the residential properties was added to identify as a sensitive receptor.
- Request to add within the conclusion section of the Alternative Methods Report, the details for next steps which should include assessing impacts the SCRF EA will have on existing agreements with the City and Heritage Green Community Trust.
  - Terrapure has committed to meeting with the City to discuss the possibility of establishing a new host/compensation agreement in relation to the proposed undertaking.

7.4.6.2 Hamilton-Wentworth District School Board

The Hamilton-Wentworth District School Board is proposing an elementary school site located at the northwest corner of Green Mountain Road and First Road West. Presently, it is anticipated that the new school will open by 2023. Their concerns, as was stated during the ToR and reinforced during the SCRF EA, are with any potential adverse effects of the proposal on the planned elementary school including air quality, noise, traffic, groundwater and leachate. In response, potential impacts on the proposed elementary school was assessed as part of the SRCF EA.

7.4.6.3 Ontario Ministry of Agriculture, Food and Rural Affairs

During the review of the Land Use and Economic Environment Existing Conditions Report, the Ontario Ministry of Agriculture, Food, and Rural Affairs indicated that they would like to see a list for agricultural lands or farm lands within the report, specifically a list of the farms and farm operations within the Local Study Area.

In response, Terrapure added a section on Agriculture in the Land Use and Economics Existing Conditions Report, including discussion of existing Agriculture properties, types, and uses.

7.4.6.4 Ministry of the Environment, Conservation and Parks

As a technical review agency and the coordinator of the Ministry review of the SCRF EA Report, the MECP plays a critical role in the SCRF EA project. Terrapure provided the MECP Project Officer with frequent updates by phone and email, which also provided Terrapure the opportunity to address any concerns or respond to questions from the MECP.

Table 7.1 Review Agency Comments and Consideration by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
Hamilton Conservation Authority	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	8-Dec-2017	GRT Meeting	Conservation Hamilton participated in the GRT Meeting #1 Webinar	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2018	GRT Meeting
	N.A.	N.A.	N.A.	Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies	14-Dec-2017	Email
				Good morning, Thank you for participating in the GRT meeting on December 8, 2017. As a follow up from this meeting please see attached the Surface Water, Terrestrial and Aquatic/Natural Environment and Geology & Hydrogeology Work Plans and Draft Existing Condition Reports and the Draft Conceptual Design Report for your review. The Work Plans and Existing Condition Reports attached are for the disciplines that reflect your Agency's jurisdictional mandate. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plans attached were previously circulated to you during the Terms of Reference process and are the final versions that were included as part of the Amended Approved Terms of Reference. We are passing on these work plans as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used. Once you have reviewed the attached material we would like to set up a meeting with you either in-person or by conference call. Please advise on a date between January 4 and January 12, 2017 that works best for you.	14-Dec-2017	Email
	19-Jan-2018	Email	Thank you for emailing me the meeting request and advising that you are now a key contact person on the project. We are very appreciated that you are keeping us in loop regarding the project flow. We also understand that it was GHD's recommendation to setup separate meetings with all interested parties including the Hamilton Conservation Authority. At this stage of the design, we believe that it is not necessary to setup a meeting or teleconference as we will rely on the MOECC and City of Hamilton commenting issues related to surface water quality and quantity controls respectively. However, we would request GHD keeping us informed about further changes in the project including the surface drainage, groundwater and leachate sampling and other monitoring programs. If we will find that it is necessary to discuss project constrains with GHD and owners, we will request a meeting or teleconference.	N.A.	N.A.	N.A

	24-Apr-2018	Email	Hi, It is our understanding that the Assessment of Landfill Expansion Alternatives emailed to us on the 29th of March, 2018, recommends to adopt Alternative 5 for the landfill expansion. It is also our understanding that a PCSWMM model developed for the alternatives comparison demonstrates that the uncontrolled flow volumes will be increased for all range of storm events as a result of the re-development. However, a SWM facility within the landfill likely is intended to provide appropriate quantity control of the surface runoff that can be generated within the landfill. Recommendations related to the surface water quality control and groundwater and leachate management also seem reasonable. Therefore, we have no further comment on the selected alternative. Please continue keeping us informed about the project updates. Thanks	Good Morning, Thank you for the email and we appreciate your engagement in this process. We will continue to provide you applicable documents and keep you informed of any project updates. Have a great day!	24-Apr-2018	Email
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	N.A	N.A	N.A	Good Morning, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest report for review. For the last several months our Technical team has been assessing the expansion options (6 total) and Terrapure recently hosted a public open house (March 22, 2018) to present the technical assessment of the alternative options and to let the public know that the most preferred option from a technical, environmental, social and economic perspective is Option #5. Over the next several weeks Terrapure will be receiving feedback on the selected option from the public and the technical review team and will then begin a detailed impact assessment of the preferred Option (Option 5). I have attached the Draft Alternative Methods Report for your review and comment. This report provides a description of each of the potential expansion Options and also summarizes the technical/environmental analysis of each of the Options. Detailed analysis supporting the results can be found in Appendix B of the report. We would appreciate your review and comments by April 27th, 2018. In addition if you would like to view any additional materials/reports please go to the project website here: http://www.terrapurestoneycreek.com/document-library/ Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	29-Mar-2018	Email
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	N.A	N.A	N.A	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the	25-June-2018	Email

				proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below: Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.		
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports). As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.	18-Jul-2018	Email
	19-Jul-2018	Email	We provide the following comments for your consideration 1. Calculations supporting the sediment settling and dispersion lengths are recommended to demonstrate that the forebays are designed as per the MOE Guideline, 2003 recommendations 2. The MOE Guideline, 2003 recommends to demonstrate that the drawdown time does not exceed 48 hours. 3. It is recommended to check velocities in the forebays as per the MOE Guideline, 2003 in order to demonstrate that the average velocity in both forebays is less than 0.15m/s. 4. It is recommended to discuss whether or not hydrocarbons from the truck/wheel wash area will discharge to the SWM facility, and if so, is any additional treatment proposed? 5. A safe overland spillway from the pond is recommended to divert flows that may exceed the 100-year storm event or in case of the system clogging. 6. The stability of the berm separating the SWM pond from Green Mountain Road West and First Road West may need to be investigated in order to demonstrate that the berm is designed to withstand the anticipated hydrostatic and hydrodynamic forces.		Aug-2018	Email/Letter

			We have no comments on the hydrogeology report.			
City of Hamilton	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	5-Dec-2017	Email	Thank you! I think we have about 7 people who intend on coming so far.	Good afternoon Government Review Team, We have not heard back from you about the Government Review Team Meeting for the Terrapure Stoney Creek Regional Facility Environmental Assessment. The details are as follows: Date: December 8, 2017 Time: 2:00 pm to 3:00 pm Location: Webinar Meeting Kindly confirm your attendance and we will provide you with an appointment/link for the Webinar.	5-Dec-2017	Email
	7-Dec-2017	Open House	City of Hamilton Staff participated at the SCRF EA Open House #1	Terrapure hosted the SCRF EA Open House #1	7-Dec-2017	Open House
	8-Dec-2017	GRT Meeting	City of Hamilton Staff participated at the GRT Meeting #1 webinar	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2017	GRT Meeting
	14-Dec-2017	Email	Thank you for this information. Attached is a draft copy of the summary of comments comparing our March 10th, 2017 comments to the approved ToR. I am expecting potentially some more comments from staff so this is still a draft chart. Once I have heard back from everyone I will send an updated version to you so you have time to prepare for the January 8th meeting with City staff.	Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies	14-Dec-2017	Email
	8-Jan-2018	Meeting	Purpose of the meeting was to meet with representatives from the City of Hamilton to review and discuss outstanding comments previously submitted by the City on the SCRF ToR In addition, the group discussed ideas for how Terrapure can consult with new residents in Empire Development Overview of City's Comments Received: GHD and Terrapure reviewed the written responses to the 11 comments Visual Impacts: Question on if fencing will be part of the solution. Terrapure indicated that ideally berms and vegetation is better. Draining, servicing impacts, and future urbanization: On the 20 years of reporting of surface quality monitoring completed by Terrapure that gets distributed to Matt Lawson at the City who hires a toxicologist to review and who has never had any issues Transportation and Traffic: About the current average truck traffic being between 70-80 trucks/day with a 250 max	Terrapure provided the City with an update on the status of the SCRF EA and went through the comments response table submitted by the City. Terrapure answered and discussed any outstanding questions for clarification.	8-Jan-2018	Meeting

			Discussed the need for a review of current agreement with City of Hamilton: Terrapure and the City can continue to have discussions although they are subject to the approval of the EA and noted that the MOECC has not been involved in these previous discussions Discussed submission timeline for the EA: Next Steps: The City representatives will provide comments on the Draft Existing Conditions Report by the end of January 2018			
	8-Jan-2018	Email	Thank you for coming in today and addressing the comments and questions from staff directly. Please send me a PDF copy of your PowerPoint presentation to circulate to the City Staff. I will be setting up another meeting in three weeks for staff only, to consolidate our comments regarding your draft existing conditions reports. All feedback received will be communicated to you directly at the end of the month. With regards to further public consultation to residents who are not yet living in the area, we agree with Sally's suggestion that having a notification sign (similar to a development application notification sign) posted in an area of the site that is visible to future residents driving by is the most efficient. Many home buyers check out the progress of their property every few weeks in anticipation of their move-in date and hopefully they will notice the sign when they swing by.	Please find attached formal responses from Terrapure to the comments provided in your December 14, 2017 email. Let me know if you have any questions or concerns.	26-Jan-2018	Email
	14-Dec-2017	Email/Letter	**Impacts on approved and planned residential development to the north of the facility if a reduced distance between the residual material and the residential developments is approved by MOECC:** - The EA should include the Holding Zone as one of the indicators in the evaluation criteria regarding the "Effect on Existing Land Uses" and "Effect on approved/planned land uses". - "Effect on approved/planned land uses" is not included in the Land Use Work Plan, but is included in Appendix D-7 Economic Environment Work Plan, unclear why the differentiation is made under the Economic Environment Work Plan but not the Land Use Work Plan - Preliminary study area boundary is 1.5 km (1500 metres), which is beyond the former 160 metre holding zone radius	- The areas within the holding zone are included as "approved/planned land uses" - The "effect on the approved/planned land uses" is included in the Economic Environment Work Plan and reflects the "environment" definition in the EA Act & MOECC's Code of Practice - Correct, the study area boundary is 1.5km	26-Jan-2018	Email/Letter
			Need for a Landfill Impact Assessment to be carried as part of the EA: - Staff requests that 6.2.6.2 Investigative Studies should include a Landfill Impact Assessment, or similar detailed study regarding the potential effects and compatibility of the Alternative Methods on the approved residential developments north of Green Mountain Road West. - The list provided in 6.2.6.2 does state, "The investigative studies include, but are not limited to, the following…"	- The Land Use and Social Environment Existing Conditions report include details on the Landfill Impact Assessment - For context purposes, in 2010, a Landfill Impact Assessment (LIA) was completed by the owner of lands to the north of the SCRF as part of the draft plan of subdivision conditions. This LIA was prepared by MTE Consultants, peer reviewed (at the request of the City) by AMEC and submitted to the City to satisfy the condition to develop lands to the north of the SCRF as residential housing. - The LIA determined that no mitigation measures were required to be placed on the proposed development lands beyond 500 m from the limit of fill at the SCRF, which under the SCRF's original approval which was in place at the time was 30 m from the property boundary. Therefore, the		

				current potential proposed changes to the SCRF should not affect the clay barrier requirements. Regardless, it should also be noted that Terrapure revised the ToR to include additional alternative methods for consideration in the SCRF EA. - Terrapure is carrying out studies that will evaluate the potential effects on the environment, similar to the types of studies that would be undertaken through an LIA. The key difference is that an LIA is undertaken by a developer wishing to develop residential properties within close proximity to an existing or closed landfill, while Terrapure is subject to the Ontario *Environmental Assessment Act* and the process laid out in this legislation and O. Reg. 101/07 (Waste Management Regs).		
			Visual Impacts: A comprehensive visual impact assessment must be included in the EA: - Visual impacts from increased height of the landfill must be studied in detail. Staff requests that 6.2.6.2 Investigative Studies should include a "detailed visual assessment". Is included in the Land Use Work Plan Appendix D-4, but not as an Investigative Study - Niagara Escarpment Commission (NEC) should be contacted regarding any proposed changes to the maximum height and associated visual impacts.	- As part of the SCRF EA, a visual assessment will be carried out, where view sheds will be analyzed and appropriate screening measures determined. Screening measures may include earth berms, vegetation, and fencing, which would be used to ensure that views of the SCRF are minimized/mitigated from the surrounding community. Detailed visual assessment is included as part of Land Use Investigative Study - The NEC was notified of the commencement of the SCRF EA Terms of Reference (ToR) process and was invited to comment on the Draft ToR. The NEC has confirmed that the SCRF is not located within the Niagara Escarpment Plan Area and is outside the area of Development Control. For this reason, the NEC has indicated that they will not be commenting on the draft ToR. - The NEC correspondence is found in the Record of Consultation of the Minister Approved ToR.		
			Air Quality and Noise Impacts: - The dwellings in the approved residential development to the north side of Green Mountain Road must be considered as "sensitive receptors" in these studies. Not specifically included, but Appendix D-5 Table 5.1 states the following under indicators, "Number of off-site receptors potentially affected (residential properties, public facilities, businesses, and institutions)"	- Residences in Empire Victory residential development are included as sensitive receptors in the noise and air quality existing conditions reports and will analyzed as part of the alternative methods evaluation as well.		
			Financial Assessment. An assessment of potential changes in property value and assessment value must be included in the EA: - Evaluation and indicator criteria does not specify temporary and/ or long-term impacts to approved and planned land uses - Evaluation and indicator criteria does not specifically include an assessment of potential changes to residential property value	- Areas within the holding zone are included as "approved/planned land uses". - In April 2017, Terrapure committed to working with the City of Hamilton to design a property value assessment (e.g., research, consult with experts – land economists, etc.) for implementation during the Impact Assessment of the Preferred Method stage of the SCRF		
			Drainage, servicing impacts, and future urbanization of roads abutting the subject lands: - The Surface Water Resources work plan does not include a potential spillage contingency plan. - The Surface Water Resources work plan does not speak about future water quality and quantity monitoring plan.	- Existing Stormwater Contingency and Remedial Action Plan is in place in accordance with ECA 5400-7DSSHU - Please refer to Surface Water Existing Conditions Report for the monitoring plan		
			Transportation and traffic, specifically the items expected to be addressed during the EA phase:	- The Traffic Impact Analysis boundaries are 1.5km - There is no change proposed to the maximum number of vehicles to the site per day or annually.		

			- Transportation work plan does not explicitly state in the boundaries of the traffic impact analysis, but it is assumed that it will be the same as the preliminary study area for the SCRF EA which extends 1500 m (or 1.5 km) from the four roads that border the existing SCRF (i.e., 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) (page 23 of the PDF or 31 of PDF) - Specific truck routes are not identified in Transportation work plan - Transportation is listed in the list of Investigative Studies (p. 34 or 42 of PDF). - Truck Route Master Plan is not identified in work plan - Pedestrian and cyclist impacts are not identified in work plan - Clarity on if the work plan will assess ultimate service ability versus predicted service	- The service ability is addressed in the Existing Conditions report - With respect to pedestrian and cyclist impacts, this will be factored in to the potential for traffic collisions indicator.		
			Source water protection, specifically the items expected to be addressed during the EA phase: - The Geology and Hydrogeology work plan does not clearly outline leachate collection system and future leachate chemistry monitoring details as requested in City's previous comments - Further details regarding future monitoring plan for all monitoring stations has not been included - Work plan appears to be relying on existing data and not additional field work investigation. The work plan should include additional geology and hydrogeology investigation (borehole work) to document existing/baseline conditions of groundwater systems - Work plan does not include groundwater quantity impact assessment	- For the leachate collection system and future chemistry monitoring details, please refer to the Geology and Hydrogeology Existing Conditions Report - Additional future monitoring, if required, will be identified as part of the Impact Assessment - No additional borehole work is anticipated based on existing groundwater monitoring well network - Effect on groundwater flow is included as an evaluation criteria		
			Confusing/conflicting information on the total amount of waste/fill: - The SCRF's total approved disposal capacity under the Environmental Protection Act (EPA) approvals is 6,320,000 m3 for residual materials, with an additional allowance for acceptance of approximately 2,000,000 m3 of industrial fill/soils, for a site total of 8,320,000 m3 - Increasing the approved capacity of the SCRF by 3,680,000 m3 additional post-diversion solid, non-hazardous industrial residual material - The limit in question relates to residual material waste	- The proposed undertaking is an expansion of the existing SCRF so as to increase its approved capacity by 3,680,000 m^3 to receive additional post-diversion solid, non-hazardous industrial residual material.The proposed undertaking (which is subject to the Ontario Environmental Assessment Act) relates to post-diversion solid, non-hazardous industrial residual material - Currently, there are alternative methods that maintain the existing approvals at the site for industrial fill and there are alternative methods that do not include the industrial fill. The evaluation of the alternative methods is currently underway.		
			EA Process: Pre-determination of the "Alternatives To" and the exclusion of a null option: - "Null Option" was added - Section 5.1 Description of the Alternative Methods of Carrying Out the Undertaking (p. 22 or p. 30 of PDF) - It is not explicitly listed as an alternative that will be evaluated through the EA process. It appears the 6 alternatives remain the same and that the "Null Option" is considered a base for comparison only	- "Null Option" is included to represent the benchmark - The "Do Nothing" option does not address the Purpose of the Undertaking and is therefore not a viable option; however it will be utilized in the alternative methods evaluation as a benchmark against all other alternative methods.		
			Need for a review of current agreements with City of Hamilton: - The Economic work plan does refer to defining costs of services to customers and economic benefits to local	- Terrapure is willing to review these specific arrangements with the City while the SCRF EA is being carried out		

			municipality, which may capture reviewing existing compensation agreements. Clarification is needed - The Economic work plan does not directly address the impacts to existing compensation agreements nor does it mention revisiting them	- Any revisions to the Trust and Royalty Program would be subject to EA Act approval being received from the Minister for the Proposed Undertaking		
	31-Jan-2018	Email/Letter	**Air and Odour Existing Conditions Report & Atmospheric Environmental Work Plan:** Include a figure that indicates the location of receptors within 1.5 km and 5.0 km of the subject site	A figure that indicates the location of receptors will be added within the 1.5 km of site. Indicating receptors at the 5.0 km mark fall outside of the Preliminary Study Area identified in the Minister Approved Terms of Reference. Further, given the type of facility, the operational data and through professional air quality experts, the 1.5 km preliminary study is determined to be appropriate and reasonable to establish existing conditions to complete an effects assessment. The Air Quality team will undertake dispersion modelling using MOECC guidance regarding receptor spacing and extent (ADGMO v3, February 2017, PIBs #5165e03) within the 1.5 km study area. The sources at the SCRF are ground-based (re-suspended road dust, material handling by trucks, loaders, and dozers), therefore maximum predicted concentrations are anticipated to be predicted on or very near the property boundary. The property 1.5 km radius out from the property boundary is anticipated to fully encompass the region most likely to experience any potential effects from site operations as it relates to air quality.	20-Feb-2018	Email/Letter
			Geology & Hydrogeology Existing Conditions Report & Work Plan: Relying too heavily on secondary sources (previous studies) to establish existing conditions	Terrapure collects monitoring data on an annual basis and has done so for over 20-years. Therefore, the existing conditions report for Geology/Hydrogeology is based on both primary and secondary sources. Copies of the Annual Monitoring Report are provided to both the MOECC and the City of Hamilton for review. Further, it should be noted that during the Alternative methods evaluation and the impact assessment stages of the EA, predictive modelling will be undertaken to determine the overall net effects and impacts to Geology and Hydrogeology.		
			Geology & Hydrogeology Existing Conditions Report & Work Plan: There should be consideration/discussion regarding future growth as there are several developments approved yet to be built, and other development proposals under review	Future growth and development is considered and discussed within the Land Use report and will be assessed further during the Alternative methods evaluation and impact assessment stage of the EA.		
			Land Use and Economic Environment Existing Conditions Report & Work Plan: Include a section that references existing compensation agreements with the City of Hamilton	A section on the existing compensation agreements will be added.		
			Land Use and Economic Environment Existing Conditions Report & Work Plan: There is no reference to conducting a Visual Impact Assessment of the 6 alternative methods. Utilize the baseline photographic information collected from selected visual receptors/ viewpoint areas and show a superimposed visual change to the landscape based on each proposed alternative method and mitigative measures to manage potential impacts (i.e. screening, buffering/filtering) at each viewpoint	We agree with your comment and provided existing viewsheds within the Land Use existing conditions report. We have also completed renderings for each of the footprint options from various viewsheds, which were presented at Public Open House #1 and are available on the project website. It should be noted that visual impacts will be considered during the alternative methods evaluation stage, which will also identify visual mitigation measures.		
			Land Use and Economic Environment Existing Conditions Report & Work Plan: Residential Development Activity section should also include reference to residential development proposals currently being reviewed by the City of Hamilton within the study area: • UHOPA-17-01/ZAC-17-001 – 15 Ridgeview Drive – 97 Units • ZAC-17-077 – 50 Green Mountain Road West – 189 Units • ZAC-16-056 – 157 Upper Centennial Parkway – 52 Units • UHOPA-16-27/ZAC-16-066 – 464 First Road West – 135 Units • More information can be obtained at map.hamilton.ca/development	Residential development activity will be added to the report.		
			Noise Existing Conditions Report: On page 2 the report states that the nearest residential dwelling is 100 m northeast of the property. On page 5 the report states that the nearest residential	The location of the nearest dwelling will be corrected to 60 m.		

			building is 120 m from the property. Both of these comments are incorrect. The nearest residential dwellings are located approximately 60 m to the south of the property.			
			Noise Existing Conditions Report: On page 5, the report identifies "historical background noise studies" indicated the ambient sound levels to be 63dBA to 67 dBA. These "historical background noise studies" should be identified, and the data must be provided to substantiate the ambient sound level as part of the Noise Control Study in the future.	References to the background noise reports will be added.		
			Noise Existing Conditions Report: A figure identifying the locations of the recently approved residential developments to the north, which must be included as sensitive receptors, should be provided.	A figure identifying the residential properties will be added and identified as sensitive receptors.		
			Surface Water Existing Conditions Report & Work Plan: Relying too heavily on secondary sources (previous studies) to establish existing conditions	Terrapure collects monitoring data on an annual basis and has done so for over 20 years. Therefore, the existing conditions report for surface water is based on both primary and secondary sources. Copies of the Annual Monitoring Report are provided to both the MOECC and the City of Hamilton for review. During the Alternative methods evaluation and the impact assessment stages of the EA, predictive modelling will be undertaken to determine the overall net effects and impacts to Surface Water.		
			Traffic Existing Conditions Report & Transportation Work Plan: No comments	Acknowledged		
			Natural Environment Existing Conditions Report & Terrestrial Aquatic Environment Work Plan: No comments	Acknowledged		
			Design & Operations Work Plan: No comments	Acknowledged		
			Miscellaneous Comments: Staff feel strongly that there should be signage on Terrapure's site, similar to that of a development application sign to notify new home owners who are not yet living in the study area of the EA process underway (as discussed in the January 8th meeting with City Staff)	Thank you for the suggestion. As we discussed with the City, Terrapure has been exploring a number of potential ways to communicate with new homeowners in the study area, in the interest of being as transparent as possible in sharing information with potentially interested stakeholders.		
			Miscellaneous Comments: Consider providing push notification to smart phones advising people driving by that there is an EA and a link to how they can stay informed	Thank you for the suggestion. Upon considering the concept of providing push SMS notification, we do not believe it is technologically possible nor legal to track the location of mobile phone users without their permission or send mobile phone users unsolicited SMS messages.		
				I am emailing because we would like to schedule a meeting with you, Christine and Steve to go over a few items regarding the Terrapure SCRF EA. Some of the items we would like to discuss include; - Review of comments/responses on draft existing conditions, address any outstanding comments/questions; - Review project schedule and review timeline for upcoming reports; and, - Discuss content of upcoming Public Open House #2 on March 22, 2018 Please provide a time and location that works for you, Christine and Steve and let us know if you have any other items you would like to discuss. One hour should be sufficient to go over these items.	01-Mar-2018	Email
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	22-Mar-2018	Open House	City of Hamitlon Staff attended and participated in the SCRF EA Open House #2 on March 22, 2018	Terrapure hosted the SCRF EA Open House #2	22-Mar-2018	Open House

	23-Mar-2018	GRT Meeting	City of Hamilton Staff participated in the GRT Meeting #2 Webinar.	The purpose of the meeting was to provide a project update including presenting the results of the Alternative Evaluation Assessment, the details of the Public Pen House #2, upcoming review timelines and next steps.	23-Mar-2018	GRT Meeting
	26-Mar-2018	Meeting	Purpose of the meeting was to discuss remaining key milestones and timelines for review by the City of Hamilton. The City of Hamilton highlighted specific key dates including the planning committee meeting in September 2018 and a reminder for the upcoming municipal election.	Terrapure provided detailes of the progress of the SCRF EA including anticipated remaining timelines and review milestones.	26-Mar-2018	Meeting
	N.A.	N.A.	N.A	Thanks again for taking the time to meet with us on Monday. As mentioned, here are the key milestone dates we are driving towards for your internal planning purposes: - Comments back from GRT/Stakeholders on Recommended Option – April 27 - Public Open House to present detailed design and impact assessment results – Second last week of June - Draft EA Report – published in late August to late September (6 weeks) - Revise Draft EA Report based on comments received from GRT/ Stakeholders – Nov-Dec (Oct would be used for receiving comments on Draft) - Finalize and submit EA to MOECC – 1st week of Jan	30-Mar-2018	Email
	19-Apr-2018	Email	Thank you for sending this. I will ensure staff and Councillors receive it.	Please find attached the a matrix of the visual renderings as you requested. It has also been uploaded to the website document library here: http://www.terrapurestoneycreek.com/document-library/ I hope this is what you were looking for and can assist in showing what each of the options would look like more easily to city staff and councilors. Let me know if you have questions.	19-Apr-2018	Email
	27-Apr-2018	Email	Please see the attached PDF letter containing staff comments regarding the latest Draft Alternative Methods Evaluation Report. Let me know if you have any comments or need clarification on anything.	I just wanted to send a friendly reminder that the comments on the Alternative Methods Report are due back to us by this Friday April 27th 2018. Please let me know if you have questions/concerns.	23-Apr-2018	Email
	N.A.	N.A.	N.A	As part of our commitments made during the Terms of Reference (ToR) phase of the EA we committed to working with the City of Hamilton to determine financial value/assessment of the properties surrounding the landfill and how they are/have been potentially impacted. We committed to completing this research and findings during the next phase (Impact Assessment) of the EA and therefore is something we would like to get started on very soon given the tight schedule. Attached is the comment (last row) from the City as well as our response/commitment. To get the ball rolling, I think it may be best to set up a phone call or in person meeting so that we can determine the best approach for completing this research. Let me know your thoughts and we can go from there.	24-Apr-2018	Email
	01-May-2018	Meeting	Meeting with the City of Hamilton and the Mayor to provide an update on the process, the recommended option selected, what we heard from the public at the 2nd Open House. City staff provided the details to the Mayor regarding the comments submitted on the Draft Alternative Methods Report. Discussed the terms of the existing Royalty Program.	Terrapure provided an update on the status of the SCRF EA progress and answered clarifying questions	1-May-2018	Meeting

			City of Hamilton – Council Members: Council have expressed concerns that a null and void option was not reviewed as a 7th Alternative Option for base comparison purposes.	Thank you for your comment. Within the Alternative Methods Report a 'do nothing' or "null and void" option was discussed in Section 4.1.1. The "Do Nothing" option was used as a matter of best practice, in order to establish a "benchmark" when evaluating and assessing the advantages and disadvantages of 6 alternative landfill footprint options (Alternative Methods) that were considered and evaluated. While the 'do nothing' option was included and assessed as described above, it should be noted that it does not address the Purpose of the Undertaking as described in the Approved Amended Terms of Reference and therefore is not a viable option. The Do Nothing option was also assessed during the Terms of Reference as part of the Alternatives To/Options to address the economic opportunity, which was included as Supporting Doucment #1 to the Amended ToR.		
			City of Hamilton – Planning and Economic Development Department, Community Planning Section, Development Planning Section: Within the conclusion section of this report there should be a section regarding next steps which should include assessing impacts this EA will have on existing agreements with the City and Heritage Green Community Trust. It is imperative that this be reviewed as part of the Environmental Assessment process.	As the existing agreements relate to the current approvals at the SCRF and therefore come to an end when the current capacity for residual materials is reached, Terrapure has committed to meeting with the City to discuss the possibility of establishing a new host/compensation agreement in relation to the proposed undertaking. We understand that a meeting between Terrapure and the City (through Finance and Legal departments) is being coordinated to occur within the next few weeks.		
			Public Works Department, Environmental Services: From a technical standpoint, staff have no issues with the listed options.	Thank you for your comment.		
			Planning and Economic Development Department, Infrastructure Planning: Overall we concur with their preferred option 5 as this option allows Terrapure to achieve their economic goals while minimizing impacts.	Thank you for your comment.		
	27-Apr-2018	Email/Letter	**Public Health, Health Hazards Program:** Public Health Services' staff have reviewed the report "Draft Alternative Methods Report Assessment of Landfill Expansion Alternatives" for the Stoney Creek Regional Facility Environmental Assessment and provide the following comments: 1. The Evaluation of expected human health impact, based upon indicators of leachate, groundwater, surface water, and soil quality for all alternative options are expected to have no net effect on human health. 2. The evaluation of expected human health impacts based upon the indicator of air quality indicates that 'option 3' is preferred. That said, all alternative options are indicated to present 'low potential for adverse effects with the continuation of the existing site's mitigation measures augmented with additional Best Management Practices, where proposed, and on-going monitoring." 3. If summary tables or charts for modelled end values be included for all 6 options. Parameters would include Pm2.5 and 10, Tsp and VOCs. Full modelling datasets are not required.	Thank you for your comment. Summary tables including parameters of Pm 2.5 and 10 and Tsp and VOCs will be provided at the detailed impact stage/assessment for the preferred alternative (Alternative #5) once further modeling has been undertaken.	24-May-2018	Email/Letter
			City Manager's Office, Dispute Resolution Section (Legal Services): The EA should consider revisiting the Compensation Agreements as part of the proposed reconfiguration of the site.	As the existing agreements relate to the current approvals at the SCRF and therefore come to an end when the current capacity for residual materials is reached, Terrapure has committed to meeting with the City to discuss the possibility of establishing a new host/compensation agreement in relation to the proposed undertaking. We understand that a meeting between Terrapure and the City (through Finance and Legal departments) is being coordinated to occur within the next few weeks.		

			Corporate Services (Capital Budgets): Compensation agreements have not been mentioned. It should be included once the decision of which alternative option has been finalized.	Terrapure has committed to meeting with the City to discuss the possibility of establishing a new host/compensation agreement in relation to the proposed undertaking. We understand that a meeting between Terrapure and the City (through Finance and Legal departments) is being coordinated to occur within the next few weeks. It should be noted though, that this process will occur in parallel with the EA process.		
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	19-Jun-2018	Open House	City Staff attended the SCRF EA Open House #3	Terrpaure hosted the SCRF EA Open House #3	19-Jun-2018	Open House
	20-Jun-2018	Email	I have a meeting from 9 – 12 on Tuesday. So could one of the following work: 9 – 10 am Wednesday June, 27th 9 – 10 am Thursday June, 28th 10 - 11 am Thursday June, 28th	For the update call/webinar as we discussed last night how is next Tuesday (26th) sometime between 9am and 2pm or Wednesday (27th) at 2pm. We would need an hour. Let me know what works best for you and other staff. Below is the agenda and presentation content: Agenda Items: 1. Welcome and Introductions 2. EA Process 3. Summary of Technical Work/Reports 4. Preferred Option 5. Detailed Impact Assessment Results and Mitigation Measures 6. Cumulative Effects and Climate Change 7. Overview of Open House # 3 8. Upcoming Review/Project Milestones 9. Questions and Discussions	20-Jun-2018	Email
	N.A.	N.A.	N.A	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below: Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report	25-Jun-2018	Email

				We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.		
	28-Jun-2018	Meeting	The City of Hamilton and City councillors asked clarifying questions about the status of the project, upcoming review timelines, and the detailed impact assessment results. Some of the discussion quesionts included: - Can you elaborate on the timeframe for MOECC review and and process. - Can you provide the visual cross sections and explain them. - Can you explain progressive caping and when you will begin the process. - Have you done a Traffic Impact Study? - How did you come up with 2.5m? Can you reduce to 1.5m - Is there any way to restrict the truck limit to around 100 per day instead of 250? - How often have you reached the 250 limit or how close have you gotten? - When will the Heritage Green Community Trust be discussed - What about assessing property value and property taxes? How was this done?	Terrapure presented the EA process, the technical work completed, the detailed impact assessment of the preferred option, how cumulative effects and climate change were incorporated as well as an overview of the Open House #3 and the upcoming project milestones and next steps. In addition, Terrapure answered questions asked by City of Hamilton staff and councillors.	28-Jun-2018	Meeting
	N.A.	N.A.	N.A	See below for summary of the EA Phase and anticipated timelines. I hope this helps in understanding when you can expect to comment/review. I also attached the flow diagram on review timelines from the EA Codes of Practice (this is the one we were looking at during the Open House) EA Phase Pre-submission or Draft EA – Terrapure committed to a pre-submission/draft in the Terms of Reference. This will be for 5 weeks for review and comment by stakeholders (including the City, comments come directly to Terrapure) August 24th 2019 to September 28th 2018 After Pre-submission - Terrapure will make changes and addresses comments on draft EA to finalize for submission October 1st 2018 to December 2018 Final EA is submitted with the Notice of Submission – 7 week review period for stakeholder review of Final version of EA from date of Notice (City will provide comments to MOECC at this time) Jan 4th 2019 to Feb 22nd 2019 Notice of Completion of Ministry Review of EA – 5 week review period for Ministry to review Final EA and the comments received during the 7 week period, Ministry posts their review (in the form of a review document) at the end of 5 week period. The review is focused on things like, did the proponent undertake the EA in accordance with the approved Terms of Reference, what are advantages/disadvantages to the environment, what consultation was undertaken and how was it incorporated into the EA, etc) Feb 22nd 2019 to March 29th 2019	29-Jun-2018	Email

				Public Inspection of Ministry Review – 5 weeks for public to comment on the Ministry's review (City can comment here as well) March 29th 2019 to May 3rd 2019 Minister Review and Decision - Minister has 13 weeks after the 5 week public inspection review period to make a decision May 3rd 2019 to August 2nd 2019		
	N.A.	N.A.	N.A	I wanted to just send a friendly reminder that we are looking to get any comments and feedback on the detailed impact assessment reports for the SCRF EA by this Friday July 20th 2018. Thank you for coordinating and let me know if you need anything for me.	18-Jul-2018	Email
	20-Jul-2018	Email/Letter	**Planning and Economic Development Department, Community Planning Section, Development Planning Section:** In the Traffic Detailed Impact Assessment Report (Draft for Discussion), prepared by GHD, dated June 19, 2018, the summary of 7.1 Potential Effects on Traffic, states that with the 2023 future conditions intersection analysis, the operational impact is expected to be negligible. The current maximum allowable vehicles today is 250 vehicles, whereas the site currently receives on average 100 vehicles per day. Please provide more detail on the analysis leading to the opinion that increasing the vehicular traffic by 1.5 times will be negligible.			
			Planning and Economic Development Department, Community Planning Section, Development Planning Section: With regards to the Noise Detailed Impact Assessment Report (Draft for Discussion), prepared by GHD, dated June 19, 2018, the following comments and questions should be addressed:			
			- A Noise Impact Assessment must be signed and stamped by a qualified professional, preferably an engineer specializing in environmental acoustics. Ensue that future versions meet this requirement.			
			- Please provide the background noise studies which were conducted to identify the ambient sound level of 62 dBA based on local traffic volumes. This is critical because the measured sound levels at POR 1 exceed the MOECP sound level limit but are deemed to comply with the ambient sound level limit of 62 dBA. The background study needs to be reviewed to confirm the ambient sound level.			
			- Page 8 identifies POR 3 as being located approximately 130 m south of the site. It appears that POR 3 is actually 60 m south of the site limits. Please clarify.			
			- Please provide the CadnaA modelling information which was used to calculate the sound levels at each POR. This should be provided as an appendix to the report.			
			- Table 6.1 on page 16 - is the site specific noise limit 62 or 63 dBA? On page 5 it was listed as 62 dBA, but the table indicates both values. Again, this stresses the need for the background noise studies, as indicated above, to clarify the ambient sound level limit.			
			- The study concludes that noise mitigation measures will not be required. However, the previous study "Draft Alternative			

			- Methods Report Assessment of Landfill Expansion Alternatives, March 22, 2018" had identified that noise mitigation in the form of a berm on the north side would be required for any of the options. Please provide further explanation.			
			- Page 18, section 6.3 Net Effects, includes the statement "There are some residences to the north which may experience a noise level increase of +5 dBA from the existing conditions". This is vague -which residences will be impacted (how many), and does this require mitigation? Impacted residences should be plotted on a figure.			
			Public Works Department, Source Water Protection: The following comments are provided regarding the Geology and Hydrogeology Impact Assessment Report and the Design & Operations Detailed Impact Assessment (Draft for Discussion), both prepared by GHD, dated June 19, 2018:			
			- Clay Liner construction details should be provided discussing how the liner was continued after being capped. What Quality control or testing was completed to ensure seamless construction and similarity of source material.			
			- Off-Site domestic water quality information should be provided to Hamilton Water, Source Water Protection.			
			- Details pertaining to the establishment of true background water quality and RUC calculations should be provided.			
			- Clay liner leachate compatibility testing should be provided. Clay liner hydraulic performance under the range of pressures associated with the range of waste depths proposed should be assessed.			
			Planning and Economic Development Department, Real Estate: The Land Use and Economic Detailed Impact Assessment Report (Draft for Discussion), prepared by GHD, dated June 19, 2018, appears to have gaps within the analysis regarding tax and property valuation impacts. During the draft Terms of Reference phase, staff had recommended that Terrapure and its consultants undertake some research on the impacts of landfill developments on property value and consult with an expert such as a Land Economist. It was recommended that they also include an assessment of the impact on the City's tax assessment base. Further, it was recommended that they engage a land economist and an appraiser to complete this detailed analysis.			
			Public Health, Health Hazards Program: At this point Public Health Services staff has no formal detailed comments as it deals with the environmental technical reports. However, future comments may be expected upon our review of the modified Human Health Risk Assessment Report (HHRA).	Thank you for your comment.		
			Corporate Services (Capital Budgets): There are no comments regarding the draft detail impact assessments. However, we express that future discussions regarding compensation agreements should consider the details of the preferred alternative option and design and these agreements should be finalized before the completion of the EA	Thank you for your comment.		
			City Council: Restated that their position on the SCRF size and configuration is according to the Environmental Compliance Approval (ECA) No. A181008, as amended in 2013.			

			Furthermore, Council does not support any expansion and reconfiguration of the proposed facility and they have expressed concerns that a null and void option was not reviewed as a 7th Alternative Option for base comparison purposes.			
Hamilton-Wentworth Catholic District School Board	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	08-Dec-2017	GRT Meeting	HWCDSB attended the GRT#1 Webinar	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2018	GRT Meeting
	N.A.	N.A.	N.A.	Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies	14-Dec-2017	Email
	24-Jan-2018	Email	Thank you for sending the reports to us. I have forwarded them to our Planning Department Staff for their review and thoughts. If we have any comments I will get them back to you by the 31st.	In mid-December you received an email from my colleague as a follow up to a meeting you attended for the Terrapure Stoney Creek Regional Facility Environmental Assessment on December 8th, 2017. The email included several reports for your review including; Land Use & Economic Work Plan and Draft Existing Condition Report and the Draft Conceptual Design Report. If you have any comments or questions on these reports please provide by Wednesday January 31st, 2018. If you would like to schedule a meeting or phone call to discuss, please respond back and we can have this set up. Alternatively, if you would like to be removed from the project contact/distribution list please let me know. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plan attached was previously circulated to you during the Terms of Reference process and is the final version that was included as part of the Amended Approved Terms of Reference. We are passing on this work plan as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used.	24-Jan-2018	Email
	31-Jan-2018	Email	Nicole and I have reviewed the documents and think that it would be worthwhile to be able to meet with you. If you are able to provide some dates, we can proceed to set something up.	No problem, we would be happy to meet and discuss. Please let me know a date/time and location that work for you and Nicole and I will get it scheduled.	1-Feb-2018	Email
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	13-Mar-2018	Meeting	HWCDSB provided and information and questions including: - Public School planned for North of Heritage Green Passive Park - In review of Secondary Plan, no need for addition Catholic school, but potential for addition to St. Paul and replacement at St. James with larger school - As residential development increases, so will need for additional school capacity, no defined timeline - Ministy of Education reviews need for capital project and St. James was identified as a high priority but no funding received yet - Approval process usually 1.5 years to build	- Presented the comparative evaluation of the Alternative Methods - Discussed urbanization, traffic, road safety - Informed of next Open House and GRT webinar	13-Mar-2018	Meeting

			- Interested in project safety including safe streets, sidewalks, and bus routes - Would like to see safety be addressed in Traffic Impact Assessment			
				Sorry for the delay, but I wanted to pass along my meeting notes from our discussion on the 13th regarding the Terrapure EA and traffic impacts. Please let me know if you have any questions, comments or additions. Also, here is the link to our project website which contains all of the reports/documents completed so far: http://www.terrapurestoneycreek.com/document-library/ . The most recent report and the topic of our last public open house (march 22) is the DRAFT Alternative Methods Evaluation report which highlights the results of our net effects analysis of each option on the various environmental components including Traffic and also states the reasoning behind choosing the selected/preferred option (Option #5). Please feel free to browse the document and let me know if you have questions or would like to discuss in person/phone call. Thank you again for your engagement and interest in this project.	28-Mar-2018	Email
	25-Apr-2018	Email	We are reviewing the report and will have comments to you by Friday	I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest report for review. For the last several months our Technical team has been assessing the expansion options (6 total) and Terrapure recently hosted a public open house (March 22, 2018) to present the technical assessment of the alternative options and to let the public know that the most preferred option from a technical, environmental, social and economic perspective is Option #5. Over the next several weeks Terrapure will be receiving feedback on the selected option from the public and the technical review team and will then begin a detailed impact assessment of the preferred Option (Option 5). I have attached the Draft Alternative Methods Report for your review and comment. This report provides a description of each of the potential expansion Options and also summarizes the technical/environmental analysis of each of the Options. Detailed analysis supporting the results can be found in Appendix B of the report. We would appreciate your review and comments by April 27th, 2018. In addition if you would like to view any additional materials/reports please go to the project website here: http://www.terrapurestoneycreek.com/document-library/ Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	29-Mar-2018	Email
	27-Apr-2018	Email/Letter	Thank you for providing us with an opportunity to review the Terrapure Stoney Creek Regional Facility Environmental Assessment and Alternative Methods Report. We have completed our review and the following are our comments. Terrapure is seeking the approval to increase the capacity for post diversion solid and non-hazardous industrial residual materials by 3.68 million cubic meters at the Stoney Creek Regional Facility (SCRF). The proposed additional capacity would be used by Terrapure to continue to provide disposal capacity for industrial residual material generated within the Hamilton and the Greater Toronto Area. Option 5 has been identified as the preferred option.	Thank you for your comment and information regarding the local schools and busses. Based on current information from the City of Hamilton, no sidewalks are being proposed fronting the SCRF. Sidewalks will be on the north side of Green Mountain Road, and the west side of First Road. In addition, site trucks will not be utilizing Green Mountain Road – same as is the case today. Trucks will enter the site from Centennial Parkway, and exit the site on First Road, heading south. This is as per the existing approvals for the site (Environmental Compliance Approval). Further, students attending St. James will likely be walking the length of First Rd West to cross at Mud Street. At this time there is no pedestrian crossing at Mud Street at this location (signalized intersection) but we believe it appropriate that for the City to install pedestrian signals and painted	24-May-2018	Letter

			The Stoney Creek Regional Facility is located at 65 Green Mountain Road West. The developing residential community immediately adjacent to the north of the facility is accommodated at St. James Catholic Elementary School, St. Paul Catholic Elementary School and Bishop Ryan Catholic Secondary School. Students are bused to these schools on a daily basis. Through the development of the community, it is expected that First Road West will become urbanized with municipal sidewalks. As a result, and in accordance to the Transportation policy of the Board, the provision of school bus transportation services is expected to be reduced in the area. Therefore, students are expected to rely on other modes of transportation, including walking, cycling etc. to and from school. The Stoney Creek Regional Facility relies entirely on industrial truck traffic for the operation of the facility and up to 250 vehicles are anticipated to continue to operate at the facility on a daily basis. Industrial truck traffic is not considered compatible with neighbourhood residential and pedestrian traffic. Based on the above and in order to ensure student safety, we request that all truck traffic associated with the facility be prohibited on First Road West. It is our understanding that the truck traffic is currently prohibited on Green Mountain Road West.	crosswalk once a sidewalk is constructed for the length of the west side of First Rd W. Further, there are pathways for active transportation through the Heritage Green Community Park that students may choose to utilize over the sidewalk on the west side of First Road West. The Facility is permitted to accept a maximum of 250 trucks per day, however, on average the site sees approximately 70 trucks per day. Terrapure takes safety to the surrounding community seriously and we would be pleased to discuss this important issue with you further to provide up-to-date information on the sidewalks being planned on the west side of First Road West.		
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	N.A.	N.A.	N.A	I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below. As you have indicated previously, of most interest to you will likely be the Traffic report which discusses traffic impacts in the areas as well as proposed mitigation and safety measures. We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so. Report Links: Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water	25-Jun-2018	Email

				- Traffic - Design & Operations - Facility Characteristics Report		
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports). As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.	18-Jul-2018	Email
	19-Jul-2018	Letter	Thank you for providing us with an opportunity to review the latest Terrapure Stoney Creek Regional Facility Environmental Assessment Reports. We have completed our review and re-affirm our comments of April 27, 2018. We have also received a request from your consultant team for a meeting next week, which we understand will provide an update to the project.	N.A	N.A	N.A
	26-Jul-2018	Meeting	Project update		26-Jul-2018	Meeting
Hamilton-Wentworth District School Board	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	8-Dec-2017	GRT Meeting	HWDSB participated at the GRT Meeting #1	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2018	GRT Meeting
	N.A.	N.A.	N.A.	Thank you for participating in the GRT meeting on December 8, 2017. As a follow up from this meeting please see attached the Land Use & Economic Work Plan and Draft Existing Condition Report and the Draft Conceptual Design Report for your review. If you would like to review other Work Plans and Existing Condition Reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plan attached was previously circulated to you during the Terms of Reference process and is the final version that was included as part of the Amended Approved Terms of Reference. We are passing on the Work Plan as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used. Once you have reviewed the attached material we would like to set up a meeting with you either in-person or by conference call. Please advise on a date between January 4 and January 12, 2017 that works best for you.	14-Dec-2017	Email
	N.A.	N.A.	N.A.	In mid-December you received an email from my colleague as a follow up to a meeting you attended for the Terrapure Stoney Creek Regional Facility Environmental Assessment on December 8th, 2017. The email included several reports for your review including; Land Use & Economic Work Plan and Draft Existing Condition Report and the Draft Conceptual Design Report.	24-Jan-2018	Email

				If you have any comments or questions on these reports please provide by Wednesday January 31st, 2018. If you would like to schedule a meeting or phone call to discuss, please respond back and we can have this set up. Alternatively, if you would like to be removed from the project contact/distribution list please let me know. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plan attached was previously circulated to you during the Terms of Reference process and is the final version that was included as part of the Amended Approved Terms of Reference. We are passing on this work plan as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used.		
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	N.A.	N.A.	N.A.	I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest report for review. For the last several months our Technical team has been assessing the expansion options (6 total) and Terrapure recently hosted a public open house (March 22, 2018) to present the technical assessment of the alternative options and to let the public know that the most preferred option from a technical, environmental, social and economic perspective is Option #5. Over the next several weeks Terrapure will be receiving feedback on the selected option from the public and the technical review team and will then begin a detailed impact assessment of the preferred Option (Option 5). I have attached the Draft Alternative Methods Report for your review and comment. This report provides a description of each of the potential expansion Options and also summarizes the technical/environmental analysis of each of the Options. Detailed analysis supporting the results can be found in Appendix B of the report. We would appreciate your review and comments by April 27th, 2018. In addition if you would like to view any additional materials/reports please go to the project website here: http://www.terrapurestoneycreek.com/document-library/ Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	29-Mar-2018	Email
	25-Apr-2018	Email	Thank you for the continued summary/update on the SCRF EA. HWDSB has no additional comments other than those expressed regarding the Terms of Reference – letters dated February 2017 and November 2016. HWDSB looks forward to continued updates.	Thank you for your continued engagement on this project and process. We appreciate the HWDSB taking the time to review the summary and update. We will be sure to send you future project updates.	24-May-2018	Letter
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	N.A.	N.A.	N.A	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team	25-Jun-2018	Email

				and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below: Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.		
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports). As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.	18-Jul-2018	Email
Ministry of Natural Resources and Forestry (MNRF)	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	8-Dec-2017	GRT Meeting	MNRF participated at the GRT Meeting #1	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2018	GRT Meeting
	N.A.	N.A.	N.A.	Good morning, Thank you for participating in the GRT meeting on December 8, 2017. As a follow up from this meeting please see attached the Surface Water, Terrestrial and Aquatic/Natural Environment and Geology & Hydrogeology Work Plans and Draft Existing Condition Reports and the Draft Conceptual Design Report for your review. The Work Plans and Existing Condition Reports attached reflect the MNRF's jurisdictional mandate. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plans attached were previously circulated to you during the Terms of Reference process and are the final versions that were included as part of the Amended Approved Terms of Reference. We are passing on these work plans as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used.	14-Dec-2017	Email

				Once you have reviewed the attached material we would like to set up a meeting with you either in-person or by conference call. Please advise on a date between January 4 and January 12, 2017 that works best for you. Please let me know if you have any questions. Kind Regards,		
	18-Dec-2017	Email	MNRF staff have reviewed the natural environment work plan, and have no comments to add. Once the work has been completed, MNRF staff can provide assistance as required (e.g. advice regarding species at risk, mitigation, etc). Would you mind clarifying what the conference call in January would be for? Please let us know how we can be of further assistance.	Thank you for confirming that you have reviewed the natural environment work plan, and that you have no comments to add. The purpose of the conference call in January is to go through the Natural Environment Existing Condition Report with you to obtain any feedback or comments that you may have.	18-Dec-2017	Email
	09-Mar-2018	Email	I will not be attending. Thank you,	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	N.A.	N.A.	N.A	Good Morning, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest report for review. For the last several months our Technical team has been assessing the expansion options (6 total) and Terrapure recently hosted a public open house (March 22, 2018) to present the technical assessment of the alternative options and to let the public know that the most preferred option from a technical, environmental, social and economic perspective is Option #5. Over the next several weeks Terrapure will be receiving feedback on the selected option from the public and the technical review team and will then begin a detailed impact assessment of the preferred Option (Option 5). I have attached the Draft Alternative Methods Report for your review and comment. This report provides a description of each of the potential expansion Options and also summarizes the technical/environmental analysis of each of the Options. Detailed analysis supporting the results can be found in Appendix B of the report. We would appreciate your review and comments by April 27th, 2018. In addition if you would like to view any additional materials/reports please go to the project website here: http://www.terrapurestoneycreek.com/document-library/ Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	29-Mar-2018	Email
	27-Apr-2018	Email	Hi, Thank you for the opportunity to review the latest report as part of the Terrapure Stoney Creek Regional Facility EA and the Information Gathering Form (IGF) submitted April 2, 2018. Our review was undertaken to assess the potential impacts of the proposal on species protected under the Endangered Species Act, 2007 (ESA 2007). Please find Ministry of Natural Resources and Forestry (MNRF) comments below: Eastern Meadowlark: Based on a review of the information, MNRF staff have determined the activities associated with this project, as they are currently	Thank you for the response. Our natural environment scientists and technical team are in the process of developing a plan to address Eastern Meadowlark and habitat and will continue to engage and consult with the MNRF during the next stage of the EA – the Impact Assessment. Our team are aware of the online registry process and prior to any work commencing, the team will register the work with MNRF through the online registry. The Guelph MNRF office will continue to be sent project updates and any applicable changes that may affect the Natural Environment.	24-May-2018	Letter

			proposed, will adversely affect Eastern Meadowlark and its habitat and therefore would be prohibited under Section 9 (species protection) and/or Section 10 (habitat protection) of the ESA 2007 without authorization from MNRF. This project may be eligible for online registry under Section 23.6 of O.Reg. 242/08. An email from Lisa Horn at GHD (April 26, 2018) indicated that the area of habitat for Eastern Meadowlark would be approximately 11.5 hectares. The regulation stipulates that impacts less than 30 hectares in size may be eligible to register if the rules in regulation are followed. More information is available on the MNRF's website: https://www.ontario.ca/page/bobolink-and-eastern-meadowlark-habitats-and-land-development. If the rules in regulation cannot be met, the proponent may require a permit under section 17(2)(c) to provide an overall benefit to the species. Please be advised that applying for a permit does not guarantee approval. Barn Swallow: The information gathering form did not identify any features currently being used by Barn Swallow for nesting. If further studies show that nests are present on any anthropogenic structures that are being removed or relocated, the proposed work may be eligible to be registered if the project parameters meet the criteria described in Section 23.5 of O.Reg. 242/08. If no impacts to nests are anticipated, the activities will not likely contravene the ESA 2007, and no authorization would be required with respect to this species. Please be advised that it is your responsibility to comply with all other relevant provincial or federal legislation, municipal by-laws, other MNRF approvals or required approvals from other agencies. Should any of the project parameters change, please notify the MNRF Guelph District office immediately to obtain advice on whether the changes may require authorization under the ESA 2007. Thank you and kind regards,			
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	27-June-2018	Email	Hi, Our Management Biologist, has had the opportunity to review the updated reporting (Terrestrial and Aquatic Environment), and can provide the following comments: From an Endangered Species Act (ESA) perspective, the project team has identified the need to register for the impacts to Eastern Meadowlark, and if nesting Barn Swallows are found, the need to follow the ESA to register has been identified. At this time, there do not appear to be any other requirements under the ESA. Please note, however, that the ESA is dynamic	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below:	25-Jun-2018	Email

			legislation, with species being uplisted and downlisted, and any changes should be considered throughout the whole process.	Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.		
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports). As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.	18-Jul-2018	Email
Ministry of the Environment, Conservation and Parks (MECP)	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	24-Nov-2017	Meeting	The project officer provided further details for the amendments to the Approved Terms of Reference and			
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	N.A.	N.A.	N.A.	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2018	GRT Meeting
	13-Dec-2017	Email	For the purposes of efficiency, I would suggest that GHD distribute the materials to all relevant members of the GRT and MOECC technical reviewers. I would ask that once the materials have been distributed, that you please send me an e-mail confirming this; and, that the e-mail include a list that identifies each member of the GRT and each MOECC technical reviewer to whom the materials were sent.	Terrapure provided the Project Officer with email updates with the details of materials distributed.		
	14-Dec-2017	Email	The Ministry of Indigenous Relations and Reconciliation (MIRR) has replaced the Ministry of Aboriginal Affairs. As part of this change, the role of MIRR has changed with respect to the EA process. In particular, the MOECC now provides advice and guidance to proponents about those Indigenous communities that are to be consulted, and the requirements Indigenous consultation.	Thank you for letting us know about the change in the MIRR's role in the EA process. Based on this change we will remove the MIRR from the Project Contact List.	18-Dec-2017	Email
	19-Dec-2017	Email	I understand that as part of the follow-up to the GRT meeting that Terrapure Environmental held on December 8, 2017, the Work Plans, Existing Conditions Reports and the Conceptual Design Report were circulated to members of the GRT for review. Please note that although ministry staff can provide advice and guidance in terms of whether these materials meet or address ministry legislative requirements or expectations, approval or "sign off" of	Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies	14-Dec-2017	Email

			these materials by the ministry cannot take place until the final EA is submitted. Accordingly, ministry staff will, where appropriate, provide an opinion as to whether these materials meet or address the ministry's legislative requirements and expectations. Based on the conclusions of the ministry's review, we can work towards determining whether there is a need to meet. Should you have any questions or concerns, please feel free to contact me at your earliest convenience.			
	31-Jan-2018	Email	I have reviewed the noise document: "Draft Noise Existing Conditions Report" for the Terrapure Stoney Creek Regional Facility and have no additional noise comments on this file at this time.	N.A.	N.A.	N.A.
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	20-Apr-2018	Meeting	SCRF EA Update Meeting - Provide an update on where Terrapure is at in the process, outcomes of the last Open House on March 22, 2018. - Reviewed next steps - Reviewed stakeholder engagement/indigenous consultation - Reviewed timelines for agency review during the Impact Assessment		20-Apr-2018	Meeting
	18-May-2018	Email	Thank you very much for notifying the Ministry about the availability of the Public Open House #2 Summary Report. The Ministry appreciates being kept abreast about the various consultation and engagement opportunities that form part of the current environmental assessment process; and, their results. Should you have any questions or concerns please feel free to contact me at your earliest convenience.	The Public Open House #2 Summary report is now available on the Project Website (www.terrapurestoneycreek.com) or by clicking here. The report summarizes the Public Open House held as part of the Stoney Creek Regional Facility Environmental Assessment. This was the second of three open houses that will be held during this EA. The Public Open House #2 included an In-Person Open House held on March 22, 2018 and an Online Open House held between March 22 and April 20, 2018. We have started planning the final Public Open House #3. It is currently planned for Tuesday June 19, 2018 as the date. More details to come!	18-May-2018	Email
	24-May-2018	Meeting	Meeting to discuss closure planning		24-May-2018	Meeting
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
Ministry of Tourism, Culture, and Sport (MTCS)	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	8-Dec-2017	GRT Meeting	MTCS participated in the GRT Meeting #1 Webinar	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2018	GRT Meeting
	15-Dec-2017	Email	Thank you for forwarding these materials. Unfortunately I won't be around at all between January 4 and 12. I would be available for a call the week of January 15th, if you'd like. If that's too late for your schedule I can find some time next week.	Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies	14-Dec-2017	Email
	17-Jan-2018	Teleconference	Discussion on the MTCS mandate for this project and reference to the existing documentation provided by the Ministry of Culture,	Terrapure proposed and committed to send copies of the Archaeological and Cultural Heritage screenings to MTCS with supporting documentation (i.e. extent	17-Jan-2018	Teleconference

			Tourism and Recreation (now known as MTCS) in 1994 with regarding no concerns with landfill proposal from a cultural heritage perspective due to the fact that there was low potential for impacting cultural heritage given the site is an exhausted quarry pit. This was agreed upon but the MTCS questioned the alternatives that go beyond the original approved footprint that we have put forward for analysis – do any of the proposed alternatives go beyond the licensed quarry area/ previously disturbed lands by quarry operations. While it would still be a low archaeological potential, having this information would be helpful in addressing the MTCS mandate on this undertaking. MTCS agreed with this approach and asked that GHD ensure consideration of the adjacent properties when completing the cultural heritage screening in terms of potential sites and impacts from a visual perspective (i.e. height increase for some options).	of quarrying operations/ license, etc) for their review and schedule a follow-up call after reviewing the information.		
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	N.A.	N.A.	N.A	Good Morning, We wanted to provide you an update on the Terrapure SCRF EA project and would appreciate your review/comment on some items. For the last several months our Technical team has been assessing the expansion options (6 total) and Terrapure recently hosted a public open house (March 22, 2018) to present the technical assessment of the alternative options and to let the public know that the most preferred option from a technical, environmental, social and economic analysis is Option #5. Over the next several weeks Terrapure will be receiving feedback on the selected option and the technical team will then begin a detailed impact assessment of the preferred Option (Option 5). I have attached the Draft Alternative Methods Report for your review and comment. This report provides a description of each of the potential expansion Options and also summarizes the technical/environmental analysis of each of the Options. Detailed analysis supporting the results can be found in Appendix B of the report. Within the report, Section 5.10 describes and summarizes the analysis of each Option from a Archeology and Built Heritage perspective. Due to the fact that Option 5 is essentially going back to the Original approved footprint, which was an excavated quarry pit (See attached Quarry Permit License) it was determined that there will be no effects to any archeologically significant resources. In addition, as identified in the attached memo on Designated Cultural Heritage Buildings/Sites, there is only one building (Billy Green House) within the local study area that is a designated cultural heritage building but will not be disrupted or displaced by the expanding footprint/slight height increase. I have also attached the Screening Checklists for your review. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so. In addition if you would like to view any additional materials/reports please go to the project website here: http://www.terrapurestoneycreek.com/document-library/	27-Mar-2018	Email

				Thank you!		
	27-Apr-2018	Email	Thank you for the opportunity to review the alternative methods evaluation report. Given that none of the alternatives carry likely impacts to cultural heritage resources, I have no concerns.	Thank you for the email. We appreciate your engagement in this process and taking the time to review the document. We will continue to provide you applicable documents and keep you informed of any project updates.	24-May-2018	Letter
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	N.A.	N.A.	N.A	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below: Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report If you have comments on any of the reports listed above in this email, please provide by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	25-Jun-2018	Email
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports). As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.	18-Jul-2018	Email
Ministry of Transportation (MTO)	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	N.A.	N.A.	N.A.	Good morning, Sorry you were not able to participate in the GRT meeting on December 8, 2017. As a follow up from this meeting please see attached the Transportation Work Plan	14-Dec-2017	Email

				and the Draft Traffic Existing Condition Report and the Draft Conceptual Design Report for your review. The Work Plan attached reflects your Agency's jurisdictional mandate. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plan attached was previously circulated to you during the Terms of Reference process and is the final version that was included as part of the Amended Approved Terms of Reference. We are passing on this work plan as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used. Once you have reviewed the attached material we would like to set up a meeting with you either in-person or by conference call. Please advise on a date between January 4 and January 12, 2017 that works best for you. Please let me know if you have any questions. Kind Regards,		
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	N.A.	N.A.	N.A	Good Morning, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest report for review. For the last several months our Technical team has been assessing the expansion options (6 total) and Terrapure recently hosted a public open house (March 22, 2018) to present the technical assessment of the alternative options and to let the public know that the most preferred option from a technical, environmental, social and economic perspective is Option #5. Over the next several weeks Terrapure will be receiving feedback on the selected option from the public and the technical review team and will then begin a detailed impact assessment of the preferred Option (Option 5). I have attached the Draft Alternative Methods Report for your review and comment. This report provides a description of each of the potential expansion Options and also summarizes the technical/environmental analysis of each of the Options. Detailed analysis supporting the results can be found in Appendix B of the report. We would appreciate your review and comments by April 27th, 2018. In addition if you would like to view any additional materials/reports please go to the project website here: http://www.terrapurestoneycreek.com/document-library/ Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	29-Mar-2018	Email
	N.A.	N.A.	N.A	Good Morning, A few weeks ago I sent the email below providing you a summary and update on the Stoney Creek Regional Facility Environmental Assessment (SCRF EA) and the most recent report (Alternative Methods Report) available for comment/feedback. If you have comments on the attached report please provide them to me by this Friday April 27th 2018. Thank you for your interest and engagement in this project and if you have any questions please let me know.	23-Apr-2018	Email

	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	N.A.	N.A.	N.A	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below: Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	25-Jun-2018	Email
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports). As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.	18-Jul-2018	Email
Ontario of Agriculture, Food and Rural Affairs (OMAFRA)	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	8-Dec-2018	GRT Meeting	OMAFRA participated in the GRT Meeting #1 Webinar	Terrapure hosted the GRT Meeting #1. The purpose of the meeting was to provide agencies with an overview of the project, discuss the role of review agencies, discuss the approval of the Amended Terms of Reference, recap the Public Open House #1, and the next steps for the project.	8-Dec-2018	GRT Meeting
	N.A.	N.A.	N.A.	Good Afternoon, In mid-December you received an email from my colleague as a follow up to a meeting you attended for the Terrapure Stoney Creek Regional Facility Environmental Assessment on December 8th, 2017. The email included several reports for your review including; Land Use & Economic Work Plan and Draft Existing Condition Report and the Draft Conceptual Design Report.	14-Dec-2017	Email

				If you have any comments or questions on these reports please provide by Wednesday January 31st, 2018. If you would like to schedule a meeting or phone call to discuss, please respond back and we can have this set up. Alternatively, if you would like to be removed from the project contact/distribution list please let me know. The Work Plan attached reflects OMAFRA's jurisdictional mandate. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plan attached was previously circulated to you during the Terms of Reference process and is the final version that was included as part of the Amended Approved Terms of Reference. We are passing on this work plan as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used.		
	01-Feb-2018	Teleconference	Discussion regarding the Agriculture section n the Land Use Report including: - Land use report did not mention or list agricultural lands or farms in LSA - Would like to see list of farms and farm operations within the LSA - Need to address other factors such as; how would surface water be affected and how will this affect agriculture, how will transportation affect agriculture? - Table 4.1 in CDR – What criteria/indicators will be used to assess agriculture, how will business/economics be assessed? - Do not clump agriculture in with other businesses, ensure you look at agricultural businesses separate than commercial for example. - Better organization of reports on website would be appreciated, organize so you can see what phase of the EA process you are in, possibly provide dates within title of report.	- Terrapure let OMAFRA know that these factors will be assessed as part of alternative methods evaluation - The criteria and indicators will be used (as listed in ToR)	01-Feb-2018	Teleconference
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	23-Mar-2018	GRT Meeting	OMFRA participated in the teleconference and provided additional comments following reviewing the Draft Alternative Methods Report.	Terrapure provided the details for the results of the comparative evaluation on the Alternative Methods as well as the details for the Public Open House on March 22, 2018.	23-Mar-2018	GRT Meeting
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	20-Jun-2018	GRT Meeting	OMAFRA participated in the GRT Meeting #3	Terrapure provided an update regarding the SCRF EA Detailed Impact Assessment and an overview of the Public Open House #3	20-Jun-2018	GRT Meeting
	N.A.	N.A.	N.A	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below:	25-Jun-2018	Email

				Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.		
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports). As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.	18-Jul-2018	Email
Ontario Provincial Police (OPP)	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Mailed Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 on December 7, 2017 and invitation to GRT Meeting #1 on December 8, 2017	28-Nov-2017	Email
	N.A.	N.A.	N.A.	Good morning, Sorry you were not able to participate in the GRT meeting on December 8, 2017. As a follow up from this meeting please see attached the Transportation Work Plan and the Draft Traffic Existing Condition Report and the Draft Conceptual Design Report for your review. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plan attached was previously circulated to you during the Terms of Reference process and is the final version that was included as part of the Amended Approved Terms of Reference. We are passing on this work plan as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used. Once you have reviewed the attached material we would like to set up a meeting with you either in-person or by conference call. Please advise on a date between January 4 and January 12, 2017 that works best for you. Please let me know if you have any questions.	14-Dec-2017	Email
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #2 on March 22, 2018 and a GRT specific webinar on March 23, 2018	08-Mar-2018	Email
	N.A.	N.A.	N.A	Good Morning, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest report for review. For the last several months our Technical team has been assessing the expansion options (6 total) and	02-Mar-2018	Email

				Terrapure recently hosted a public open house (March 22, 2018) to present the technical assessment of the alternative options and to let the public know that the most preferred option from a technical, environmental, social and economic perspective is Option #5. Over the next several weeks Terrapure will be receiving feedback on the selected option from the public and the technical review team and will then begin a detailed impact assessment of the preferred Option (Option 5). I have attached the Draft Alternative Methods Report for your review and comment. This report provides a description of each of the potential expansion Options and also summarizes the technical/environmental analysis of each of the Options. Detailed analysis supporting the results can be found in Appendix B of the report. We would appreciate your review and comments by April 27th, 2018. In addition if you would like to view any additional materials/reports please go to the project website here: http://www.terrapurestoneycreek.com/document-library/ Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.		
	N.A.	N.A.	N.A	Terrapure provided an email to the GRT with an invitation to the SCRF EA Public Open House #3 on June 19, 2018 and a GRT specific webinar on June 20, 2018	04-Jun-2018	Email & Mailed Letter
	N.A.	N.A.	N.A	Good Afternoon, I wanted to touch base to provide you an update on the Terrapure SCRF EA project and to provide you the latest reports for review. For the last several months our Technical team has been completing a detailed impact assessment of the preferred Option #5 (Reconfiguration and Height Increase) and outlining the proposed mitigation measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed mitigation measures from the public and the government review team and will then begin to draft the Environmental Assessment Report. Several reports have been completed (located on Project Website here: http://www.terrapurestoneycreek.com/document-library/) or can be found through direct links below: Draft Detailed Impact Assessment Reports for the Preferred Option - Air Quality and Odour - Geology and Hydrogeology - Land Use and Economic - Terrestrial and Aquatic Environment - Noise - Surface Water - Traffic - Design & Operations - Facility Characteristics Report We would appreciate your comment and review by Friday July 20th 2018. Thank you very much for taking the time to engage with us on the project and please let me know if you have questions or comments on anything I have provided. If you would like to schedule a meeting/phone call to discuss we would be happy to do so.	25-Jun-2018	Email
	N.A	N.A	N.A	I am contacting you because you received the email below a few weeks ago providing an update on the ***Stoney Creek Regional Facility Environmental Assessment (EA)*** and links to the most recent reports available for review (Detailed Impact Assessment Reports).	18-Jul-2018	Email

				As a friendly reminder we are looking for any feedback and comments to be sent by no later than **this Friday July 20th, 2018.** Thank you for your interest and engagement in this project.		
Ministry of Environment and Climate Change Canada	N.A.	N.A.	N.A.	Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies	14-Dec-2017	Email
	18-Dec-2017	Email	Hello, As indicated in our response to Gavin Battarino of the Ontario Ministry of Environment & Climate Change (on February 8, 2017) regarding the Terms of Reference for the Terrapure Stoney Creek Regional Facility, Environment & Climate Change Canada will not be participating in this provincial environmental assessment review. Regards	Good morning, Thank you confirming that Environment & Climate Change Canada will not be participating in the provincial environmental assessment review for the Terrapure Stoney Creek Regional Facility. We will remove you from the Project Contact List. Thanks	21-Dec-2017	Email
Ministry of Economic Development and Growth				Sorry you were not able to participate in the GRT meeting on December 8, 2017. As a follow up from this meeting please see attached the Land Use & Economic Work Plan and Draft Existing Condition Report and the Draft Conceptual Design Report for your review. The Work Plan attached reflects the your Agency's jurisdictional mandate. If you would like to review other Work Plans or reports, we would be happy to send them to you or you can view them on the Project website here. The Work Plan attached was previously circulated to you during the Terms of Reference process and is the final version that was included as part of the Amended Approved Terms of Reference. We are passing on this work plan as a reminder of the proposed methodology of the assessment and the criteria and indicators that will be used. Once you have reviewed the attached material we would like to set up a meeting with you either in-person or by conference call. Please advise on a date between January 4 and January 12, 2017 that works best for you. Please let me know if you have any questions.	14-Dec-2017	Email
	14-Dec-2017	Email	Thank you for sharing information on the Terrapure Stoney Creek Regional Facility Environmental Assessment and for the invitation to December 8, 2017 meeting. As a general practice, the Ministry of Economic Development and Growth provides comments only on those proposals that have a significant regional or province wide supply chain economic development and/or employment impact. Examples include a major mineral development, energy infrastructure or manufacturing investment, or other proposals where business stakeholders have come forward to the Ministry and expressed a strong interest. Beyond this scope, the Ministry lacks the technical expertise to comment on Environmental Assessments in detailed fashion. If you would still like to discuss, my schedule is currently open January 4,5, 8 and 9.	Thank you for your email indicating that this project is not within the scope that the Ministry of Economic Development and Growth usually provides comments. Can you please confirm if we can remove the Ministry of Economic Development and Growth from the Project Contact List.	21-Dec-2017	
	27-Dec-2017	Email	It would be appropriate to remove MEDG from the contact list. Thanks and Happy Holidays	N.A.	N.A.	N.A.

7.5 Indigenous Communities

7.5.1 Indigenous Communities Consulted

Indigenous communities identified during the ToR for continued consultation during the preparation EA include:

- Haudenosaunee Development Institute on behalf of Haudenosaunee Confederacy Chiefs Council
- Métis Nation of Ontario
- Mississaugas of the New Credit First Nation
- Six Nations of the Grand River First Nation

Indigenous communities were consulted in accordance with the Indigenous Consultation Plan established at the outset of the SCRF EA. Recognizing that the Haudenosaunee Confederacy Chiefs Council, the Métis Nation of Ontario, the Mississaugas of the New Credit First Nation, and the Six Nations of the Grand River First Nation are separate communities with distinct interests, consultation was undertaken with each community individually. Input from each community was obtained through individual meetings, telephone calls, and written and email correspondence.

From the consultation activities carried out by Terrapure with Indigenous communities during the preparation of the SCRF EA, Terrapure considered comments received and attempted in good faith to resolve the raised issues so that both Terrapure and the Indigenous Community member had an agreeable resolution during the SCRF EA.

The following subsections describe how consultation was undertaken with each community, what, if any, comments were received, and how those comments were considered by Terrapure.

7.5.2 Haudenosaunee Development Institute

During the ToR, the Haudenosaunee Confederacy Chiefs Council confirmed by phone in January 2017 that all correspondence should be directed to the Haudenosaunee Development Institute (HDI).

With that direction in mind, Terrapure provided the Notice of Commencement to HDI on November 17, 2017, by email and registered letter. On November 24, 2017, Terrapure sent the Notice of the SCRF EA Public Open House #1 by email. That email also included an invitation for an in-person meeting at the convenience of HDI.

In response to that request, GHD met with HDI on March 8, 2018. The purpose of the meeting was for GHD to provide an introduction to the project, and for HDI to provide information on how they review these types of projects. HDI indicated that if they had an interest in this project, they would provide Terrapure with a development application. Once the application is submitted HDI would then review the project. HDI indicated that they could not review any project information until the application is received.

Terrapure provided the Notices of Open House #2 and Open House #3 to HDI on March 8, 2018, and June 5, 2018, respectively.

Following this meeting, Terrapure indicated by email that they would be interested in completing the development application. As of July 2018, a complete development application has not been provided to Terrapure and HDI has not provided comments on the Project.

Table 7.2 describes the email, letter and telephone correspondence with HDI. This table is organized by Indigenous community in accordance with Section 4.3.7 of the Ministry of the Environment's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014).

7.5.3 Métis Nation of Ontario

During the ToR, the Métis Nation of Ontario (MNO) indicated that they had no comments on the draft ToR, but requested to be kept informed on forthcoming reports and commenting opportunities during the EA.

With that direction in mind, Terrapure provided the Notice of Commencement to MNO on November 17, 2017 by email and registered letter. On November 24, 2017, Terrapure sent the Notice of the SCRF EA Public Open House #1 by email, which was followed up by a voicemail message on November 30, 2017. That email and voicemail message also included an invitation for an in-person meeting at the convenience of MNO.

Since no response to the above notifications were received, on January 30, 2018, Terrapure provided a project update by email, which included an invitation to review and provide comments on the Proposed Work Plans, Draft Existing Condition Reports and the Draft Conceptual Design Report. This was followed up by a phone call on February 25, 2018, at which point MNO advised that they will not be reviewing the documents provided, but would like to continue to be kept informed.

Terrapure provided the Notice of Open House #2 on March 8, 2018, by email and registered letter. Since no response to this letter was received, on May 9, 2018, Terrapure provided a project update by email, which included an invitation to review and provide comments on the Draft Alternative Methods Report. While MNO confirmed by phone on May 30, 2018, that they received the email, they did not indicate whether they were interested in reviewing the document.

Terrapure provided the Notice of Open House #3 on June 5, 2018, by email and registered letter. Since no response to this letter was received, on June 29, 2018, Terrapure provided a project update by email, which included an invitation to review the draft Impact Assessment Reports and Facility Characteristics Report. This was followed up by a phone call on July 13, 2018, where MNO confirmed they received the email and would follow-up.

As of July 2018, MNO had not provided any comments for consideration in the SCRF EA. **Table 7.2** describes the email, letter and telephone correspondence with MNO. This table is organized by Indigenous community in accordance with Section 4.3.7 of the Ministry of the Environment's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014).

7.5.4 Mississaugas of the New Credit First Nation

During the ToR the Mississaugas of the New Credit First Nation (MNCFN) indicated that they wanted Terrapure to follow the Nation's best practices for consultation which includes:

- Engage early in the planning process, before decisions are made.
- Provide information in meaningful and understandable formats.
- Convey willingness to transparently describe the project and consider any MNCFN concerns.
- Recognize the significance of cultural activities and traditional practices of the MNCFN.

- Demonstrate a respect for MNCFN knowledge and uses of land and resources.
- Understand the importance of youth and elders in First Nation communities.
- Act with honour, openness, transparency and respect.
- Be prepared to listen and allow time for meaningful discussion.

With that direction in mind, Terrapure provided the Notice of Commencement to MNCFN on November 17, 2017, by email and registered letter. On November 24, 2017, Terrapure sent the Notice of the SCRF EA Public Open House #1 by email, which was followed up by a voicemail message on November 30, 2017. That email also included an invitation for an in-person meeting at the convenience of MNCFN.

In response to these notifications, MNCFN requested a meeting with Terrapure, which was held on February 6, 2018. Prior to this meeting, Terrapure provided the Proposed Work Plans, Draft Existing Condition Reports and the Draft Conceptual Design Report and invited the MNCFN to review and provide comments on those reports. At the meeting, MNCFN gave a presentation on the history of their people and Terrapure gave a presentation on the project and answered questions about the SCRF and Project, including:

- Where does the SCRF receive waste from?
- What was the feedback from the community at the Public Open House #1?
- What was the condition of approval of the ToR?
- Is rehabilitation part of the Environmental Assessment?
- When was the west landfill closed?

MNCFN indicated they would review the documents previously emailed and follow-up if they had any questions or comments. A summary of this meeting is included in **Appendix X**. Following the meeting, Terrapure did not receive any comments from MNCFN on the documents provided.

Terrapure provided an update on the SCRF EA, as well as an invitation to the Public Open House #2 on March 22, 2018. Following this, Terrapure gave a project update by phone and email on April 11, 2018. This included an invitation to review the draft Impact Assessment Reports and Facility Characteristics Report. Emails were exchanged between Terrapure and MNCFN between April 11, and April 17, 2018.

Within that email exchange, it was agreed to have a conference call/Webex to present the impact assessment reports, once they were available in draft. As well, in response to a request from the MNCFN, Terrapure committed to invite MNCFN Field Liaison Representatives to participate in any future field surveys to be undertaken during the EA, and discuss involvement in post-EA monitoring activities once those monitoring requirements are established. As of July 2013, no additional field surveys had been undertaken.

Terrapure provided the Notice of Open House #3 on June 5, 2018, by email and registered letter. Following up on the earlier committed to setup a conference call to discuss the results of the impact assessment, Terrapure sent an email to MNCFN on June 29, 2018, to setup that conference call, which was followed up by a voicemail. That email also included links to the Impact Assessment Reports and Facility Characteristics Report. As of July 2018, no response to that email had been received.

Table 7.2 describes the comments received from MNCFN through correspondence (written and electronic), telephone calls, and meetings and how they were considered by Terrapure, as well as all email, letter and telephone correspondence with MNCFN. This table is organized by Indigenous community in accordance with Section 4.3.7 of the Ministry of the Environment's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014).

7.5.5 Six Nations of the Grand River First Nation

Terrapure provided the Notice of Commencement to Six Nations of the Grand River First Nation (Six Nations) on November 17, 2017, by email and registered letter. On November 24, 2017, Terrapure sent the Notice of the SCRF EA Public Open House #1 by email, which was followed up by a voicemail message on November 30, 2017. That email and voicemail message also included an invitation for an in-person meeting at the convenience of Six Nations.

Since no response to the above notifications were received, on January 30, 2018, Terrapure provided a project update by email, which included an invitation to review and provide comments on the Proposed Work Plans, Draft Existing Condition Reports and the Draft Conceptual Design Report. This was followed up by a voicemail on February 26, 2018. In response Six Nations responded to setup a meeting, which was held on April 6, 2018.

Prior to that meeting Terrapure provided the Notice of Open House #2 on March 8, 2018, by email and registered letter.

At the April 6, 2018 meeting, Six Nations provided information on the history of their people and their interest in the SCRF EA. Terrapure presented information on the SCRF EA, the proposed capacity increase, the alternatives and how they were evaluated to inform the recommended alternative.

There were no specific comments raised by Six Nations about the SCRF EA during the meeting. As an outcome of the meeting, Terrapure committed to continue to engage and provide updates as the EA continued to move forward.

On May 9, 2018, Terrapure provided a project update by email, which included an invitation to review and provide comments on the Draft Alternative Methods Report, Draft Existing Conditions Report, and Draft Conceptual Design Report. No response to this email was received.

Terrapure provided the Notice of Open House #3 on June 5, 2018, by email and registered letter. Since no response to this letter was received, on June 29 2018, Terrapure provided a project update by email, which included an invitation to review the draft Impact Assessment Reports and Facility Characteristics Report. This was followed up by a voicemail. As of July 2018, no response to that email had been received.

As of July 2018, Six Nations had not provided any comments for consideration in the SCRF EA. **Table 7.2** describes the email, letter and telephone correspondence with Six Nations. This table is organized by Indigenous community in accordance with Section 4.3.7 of the Ministry of the Environment's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014).

Table 7.2 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
Haudenosaunee Confederacy Chiefs Council	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Registered Mail Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 and an invitation for an in-person meeting at the convenience of the Indigenous community.	24-Nov-2017	Email
	N.A.	N.A.	N.A.	Terrapure made follow up telephone calls and left voicemail to Indigenous Communities with information regarding the Notice of Commencement and Public Open House #1	30-Nov-2017	Voicemail
	8-Mar-2018	Meeting	The meeting purpose was information gathering and provided Terrapure an opportunity to meet with, introduce themselves and learn from HDI. HDI provided an overview of their process including three components: assessment, monitoring of operations, and land.	The meeting purpose was information gathering and provided Terrapure an opportunity to meet with, introduce themselves and learn from HDI. Terrapure provided background information about the Terrapure site, the purpose of the SCRF EA and the consultation activities to date. Terrapure clarified what materials are accepted at the SCRF and what health studies have been completed.	8-Mar-2018	Meeting
	N.A.	N.A.	N.A.	Terrapure provided an update on the SCRF EA as well as an invitation to the Public Open House #2 on March 22, 2018 where Terrapure will present the recommended option for the capacity increase based on technical feasibility, potential environmental impacts and input received from the public, agencies, and Indigenous groups.	8-Mar-2018	Email & Registered Mail
	N.A.	N.A.	N.A.	Terrapure provide an update on the SCRF EA as well as an invitation to the Public Open House #3 on June 19, 2018 where Terrapure will present the detailed impact assessment for the preferred option for capacity increase to the community.	5-Jun-2018	Email & Registered Mail
Métis Nation of Ontario	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Registered Mail Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 and an invitation for an in-person meeting at the convenience of the Indigenous community.	24-Nov-2017	Email
	N.A.	N.A.	N.A.	Terrapure made follow up telephone calls and left voicemail to Indigenous Communities with information regarding the Notice of Commencement and Public Open House #1	30-Nov-2017	Voicemail
	N.A.	N.A.	N.A.	Following up on our email below, I am writing to give you an update on the Terrapure Stoney Creek Regional Facility Environmental Assessment. As mentioned in our previous correspondence, we would be pleased to meet with the Métis Nation of Ontario at your office at your convenience to discuss the project, present the information provided at the Open House and bring our technical experts to answer any questions you may have. As part of this stage of the EA, below are links to the Proposed Work Plans, Draft Existing Condition Reports and the Draft Conceptual Design Report. As well, I have attached a copy of the MTCS Screening Checklist for Archaeological Potential. We are requesting that you confirm what material you are interested in reviewing, if any. You may download these documents from our website, or we would then be happy to send you printed or electronic copies directly. Work Plans (See Appendix D, pg 170) - Geology and Hydrogeology Work Plan - Surface Water Resources Work Plan - Terrestrial and Aquatic Environment Work Plan - Land Use Work Plan - Atmospheric Environment Work Plan (including Air Quality, Odour and Noise) - Transportation Work Plan - Economic Work Plan	30-Jan-2018	Email

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				- Archaeology and Built Heritage Work Plan - Design and Operations Work Plan Existing Conditions Reports - Air, Odour and Meteorology - Geology and Hydrogeology - Land Use and Economic Environment - Natural Environment - Noise - Surface Water - Traffic Draft Conceptual Design Report For context, the Proposed Work Plans were included in the Amended Approved Terms of Reference. They outline the proposed methodology for the assessment and the criteria and indicators that will be used. The Draft Existing Conditions Reports document the results of site investigations and review of existing data sources. The Draft Conceptual Design Report presents the conceptual design for each of the six options. If you have any questions on the preceding information or would like to set up a meeting please contact me directly by phone at 416-866-2365 or 647-326-4302. Thank you in advance and I look forward to your reply.		
	25-Feb-2018	Telephone	Requested to be kept in the loop of the SCRF EA but that the MNO would not be revieweing the Comparative Evaluation or the Archaeology Work Plan for the project but that the MNO would like to continue to be informed about the project	Phoned the MNO to provide an update on the SCRF EA, discuss the MNO's interest in the SCRF EA and to see if there were any questions or concerns about the project at this time. Committed to following up by email and continuing to engage and keep the MNO in the loop as the project progresses	25-Feb-2018	Telephone
	27-Feb-2017	Email	Thank you	Thanks for talking with me earlier this week. Just to confirm our conversation (and for our records), you will not be reviewing the materials below; however if someone from MNO would like to be further involved you will let me know. We will continue to keep you informed as the project progresses.	27-Feb-2018	Email
	N.A.	N.A.	N.A.	Terrapure provided an update on the SCRF EA as well as an invitation to the Public Open House #2 on March 22, 2018 where Terrapure will present the recommended option for the capacity increase based on technical feasibility, potential environmental impacts and input received from the public, agencies, and Indigenous groups. Included in the email was a request to confirm what material the MNO is interested in reviewing, if any.	8-Mar-2018	Email & Registered Mail
	N.A.	N.A.	N.A.	Email fto keep the MNO updated on the progress of the SCRF EA.	9-May-2018	Email
	30-May-2018	Telephone	At the time of the call, the MNO had not reviewed any of the materials provided by email about the SCRF EA. There has been a change in the staff at the MNO. There was interest in continuing to be kept engaged on the project.	I am writing to keep you apprised of progress on this Environmental Assessment as per our earlier discussions. If more efficient to discuss over the phone please feel free to give me a call. Since I last emailed you in late January, we have completed the assessment of the Alternative Methods and identified the recommended option for Terrapure's proposed capacity increase – to reconfigure the site within its existing property boundaries and increase the height. Currently, our technical experts are further developing the landfill expansion design, refining the proposed mitigation measures to address any environmental effects, and developing monitoring plans. Below are links to the most recent documentation released and available for comment. If you'd like a quicker primer, I suggest taking a look at the Online Open House: • Draft Alternative Methods Report – This report documents the method used to the evaluation the six options for the capacity increase, and the results of the evaluation from the perspective of the various environmental disciplines	30-May-2018	Telephone

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				• Air, Odour and Meteorology Existing Conditions Report – Has had minor updates to address comments from review agencies • Land Use and Economic Environment Existing Conditions Report – Has had minor updates to address comments from review agencies **I am again requesting that you confirm what material you are interested in reviewing, if any.** You may download these documents from our website, or we would then be happy to send you printed or electronic copies directly. **Next Steps** We are currently in the Impact Assessment stage. We expect that the draft Impact Assessment Reports for each of the seven disciplines will be available in June for review and comment. We expect the Draft Environmental Assessment Report will be available for review and comment in early fall, followed by the Final Environmental Assessment Report. When we submit the Final Environmental Assessment Report to the Ministry of the Environment and Climate Change, both us and the Ministry will ask you for acknowledgment that your community is satisfied that its specific rights and interests have been adequately identified and considered during the Environmental Assessment. **With that in mind, can you advise whether your community's rights and interests have been adequately considered up to this point in the EA?** As previously discussed, I will continue to send you updates and links to EA documents and information for your review and comment. If you are not interested in reviewing or providing comment on specific documents, just let me know. If you do not have sufficient resources or capacity to participate, please let me know and we will work with you to identify a solution.		
	N.A.	N.A.	N.A.	Terrapure provide an update on the SCRF EA as well as an invitation to the Public Open House #3 on June 19, 2018 where Terrapure will present the detailed impact assessment for the preferred option for capacity increase to the community.	5-Jun-2018	Email & Registered Mail
	N.A.	N.A.	N.A.	Following up on our phone call on May 30, I am writing to give you an update on this Environmental Assessment. I know my earlier emails got caught by your junk mail folder so I will give you a call early next week to confirm you received this. For the last several months the technical team has been completing a detailed impact assessment of the preferred option (reconfigure the site within its existing property boundaries and increase the height), including outlining the proposed mitigation measures and monitoring plans. This is documented in several draft impact assessment reports, available for review and comment. Below are links to the most recent documentation that is available for review and comment. The Online Open House also provides a good summary of the information: • Draft Impact Assessment Reports: Air Quality and Odour, Geology and Hydrogeology, Land Use and Economic, Terrestrial and Aquatic Environment, Noise, Surface Water, Traffic, Design & Operations • Facility Characteristics Report All documents are always available in the Document Library section of the website. I am requesting that you confirm what material you are interested in reviewing, if any. You may download these documents from our website, or we would then be happy to send you printed or electronic copies directly. I will continue to send you updates and links to EA documents and information for your review and comment. If you are not interested in reviewing or providing comment on specific documents, just let me know. Next Steps The Draft Environmental Assessment (EA) Report will be available for review and comment from August 24 to September 28 (tentative). The review period for the Final EA Report is tentatively scheduled for	29-Jun-2018	Email

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				January/February 2019. Please let me know if you are interested in reviewing the Draft and Final EA Report and have sufficient resources and capacity to do so; and if you are interested in meeting in-person or via webex when the Draft EA Report is available . If you do not have sufficient resources or capacity to review the Draft or Final EA Report we will work with you to identify a solution. When we submit the Final Environmental Assessment Report to the Ministry of the Environment and Climate Change, both us and the Ministry will ask you for acknowledgment that your community is satisfied that its specific rights and interests have been adequately identified and considered during the Environmental Assessment. With that in mind, can you advise whether your community's rights and interests have been adequately considered up to this point in the EA?		
	13-Jul-2018	Telephone	Confirmed with MNO that they have received the email with the request to acknowledge the receipt of the SCRF EA documents and the MNO's interest in reviewing. Said would get back to Terrpaure once back from vacation.	Followed up with email send on June 29, 2018 with request to confirm what materials the MNO is interested in revieweing.	13-Jul-2018	Telephone
	N.A.	N.A.	N.A.	Terrapure left a voicemail following up on the last email and telephone call regarding the MNO's interest in reviewing the SCRF EA documents.	26-Jul-2018	Telephone
Mississaugas of the New Credit First Nation	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Registered Mail Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 and an invitation for an in-person meeting at the convenience of the Indigenous community.	24-Nov-2017	Email
	N.A.	N.A.	N.A.	Terrapure made follow up telephone calls and left voicemail to Indigenous Communities with information regarding the Notice of Commencement and Public Open House #1	30-Nov-2017	Voicemail
	19-Dec-2017	Email	Thank you for the notice on the Terms of Reference for the increase of materials for the Stoney Creek Regional Facility. We would like to meet with you to discuss this project. Does the capacity increase mean an expansion in lands? And what types of materials does the facility accept? Please get in touch with me to schedule a meeting for the month of February.	Hi – thanks for the email. The expansion is limited to the lands that Terrapure currently owns and in some cases, the footprint would go back to the original approved footprint from the 1996 EA. The facility accepts industrial waste only, and is not allowed to accept MSW or other putrescible (organic) wastes. We can certainly expand on these items when we meet and look forward to sitting down with you in February. I will provide some potential dates after I have checked with others on the team that would attend the meeting as well.	19-Dec-2017	Email
				Hello, We are looking forward to meeting you next Tuesday. In preparation, please find attached our proposed agenda (see attached). Please let me know if you have any comments or revisions to this. Additionally, as part of this stage of the EA, below are links to the Proposed Work Plans, Draft Existing Condition Reports and the Draft Conceptual Design Report. As well, I have attached a copy of the MTCS Screening Checklist for Archaeological Potential. We are requesting that you confirm what material you are interested in reviewing, if any. You may download these documents from our website, or we would then be happy to bring printed copies to our meeting. Work Plans (See Appendix D, pg 170) Geology and Hydrogeology Work Plan Surface Water Resources Work Plan Terrestrial and Aquatic Environment Work Plan Land Use Work Plan Atmospheric Environment Work Plan (including Air Quality, Odour and Noise) Transportation Work Plan Economic Work Plan Archaeology and Built Heritage Work Plan Design and Operations Work Plan	30-Jan-2018	Email

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				Existing Conditions Reports - Air, Odour and Meteorology - Geology and Hydrogeology - Land Use and Economic Environment - Natural Environment - Noise - Surface Water - Traffic Draft Conceptual Design Report For context, the Proposed Work Plans were included in the Amended Approved Terms of Reference. They outline the proposed methodology for the assessment and the criteria and indicators that will be used. The Draft Existing Conditions Reports document the results of site investigations and review of existing data sources. The Draft Conceptual Design Report presents the conceptual design for each of the six options. Thank you in advance and please let me know if you have any questions.		
	6-Feb-2018	Meeting	The following is a summary of comments and questions raised by MNCFN: Conserving and preserving water and restoring watersheds is currently an important issue for band members - Where does the SCRF receive waste from? - What was the feedback from the community? - What was the condition of approval of the Terms of Reference? - Is rehabilitation part of the Environmental Assessment? - When was the west landfill closed? - Fawn requested copies of any archaeological reports - Caron noted that she will review the documents previously emailed and follow-up with GHD if she has any questions or comments.	-The SCRF receives waste from Ontario with nearly 50% of materials coming directly from City of Hamilton. -Comments from the community has been primarily related to the height and when will the site will close. -The Minister amended Subsection 2.1.1 (Receiving Post Diversion Material at the SCRF) to state that Terrapure will examine and evaluate the feasibility and viability of implementing an onsite diversion program as part of the environmental assessment process. -As part of the Environmental Assessment, we will consider potential effects on the environment associated with construction, operation and closure/post-closure. As well, separate from the EA Terrapure has initiated the process of consulting with the community on the closure of the site and post-closure land use. -The west landfill was closed and capped in 1998 and the current facilities (i.e. the dog park, trails, pollinator gardens, etc.) were built between 1998 and 2017. -Katrina had previously sent the archaeological screening checklist -GHD and Terrapure offered to have separate meetings, with appropriate technical experts, if this would be useful	6-Feb-2018	Meeting
	N.A.	N.A.	N.A.	Just wanted to thank you again on behalf of our team for taking the time yesterday to talk about our project and especially for sharing the history of the Mississaugas of the New Credit. The opportunity for us to learn and understand was really invaluable. I took notes of your questions about our project so I will type those up and circulate a meeting summary. I called your office and there is still space available for the Historical Gathering next week so I signed up to attend on Wednesday. Hopefully I will see you there. As promised here is the link to the Annual Report Highlights we referred to in the meeting: http://www.terrapurestoneycreek.com/s/Stoney-Creek-Regional-Facility-2016-Annual-Report-Highlights_digital-cwca.pdf When I come to the Historical Gathering next week I'll drop off a few copies. As well, if you or other staff are ever interested, we are more than happy to arrange a tour of the operating east landfill (the SCRF) and the closed west landfill. A few follow-up questions: • Do you have digital PDF copies of the three documents you shared (Treaties booklet, Past and Present history, and Rights, Responsibility and Respect)?	7-Feb-2018	Email

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				• Caron – I understand you were working for Six Nations. Do you know who has taken over your role there? I'm having a hard time getting a hold of someone to setup a similar meeting.		
	N.A.	N.A.	N.A.	Good afternoon, Attached is a summary of our meeting earlier this month. I've included a PDF of the presentation at the end. Caron – How is your review coming, do you have any questions or do you want to talk to any of our discipline leads? I couriered you a few copies of the Annual Report Highlights last week, let me know if you didn't receive them. By the way I attended the first day of the Historical Gathering. It was really interesting, kudos to everyone that put that on.	1-Mar-2018	Email
	N.A.	N.A.	N.A.	Terrapure provided an update on the SCRF EA as well as an invitation to the Public Open House #2 on March 22, 2018 where Terrapure will present the recommended option for the capacity increase based on technical feasibility, potential environmental impacts and input received from the public, agencies, and Indigenous groups.	8-Mar-2018	Email & Registered Mail
	11-Apr-2018	Telephone	MNCFN requested the links to the most recent documentation as part of the SCRF EA along with the link to the project website.	GHD called MNCFN with an update on the SCRF and to see if there was interest in reviewing the Draft Alternative Methods Reports or any other reports pertaining to the project at this time.	11-Apr-2018	Telephone
	N.A.	N.A.	N.A.	I had a quick chat with Caron today about this project. As you may have seen in the official notice we sent in March, we've identified the recommended option for Terrapure's proposed capacity increase – to reconfigure the site and increase the height. The recommended option does not include any footprint expansion outside of the limits of the quarry that was previously disturbed. Between now and June, our technical experts are further developing the landfill expansion design, refining the proposed mitigation measures to address any environmental effects, and developing monitoring plans. I suggested to Caron that we setup a meeting in June to present those results for your feedback. Between June and August, we will be finalizing those details into a draft Environmental Assessment Report (which will also be available for review/comment). If you are in agreement with that approach I'll reach out to you again in mid-May to find a date that works for your team. Caron – As promised, here are the links to the most recent documentation released as part of this project. If you'd like a quicker primer, I suggest taking a look at the Online Open House (its officially open for comment until April 20, but if you need access after that I'm happy to provide): • Draft Alternative Methods Report – This report documents the method used to the evaluation the six options for the capacity increase, and the results of the evaluation from the perspective of the various environmental disciplines • Air, Odour and Meteorology Existing Conditions Report – Has had minor updates to address comments from review agencies • Land Use and Economic Environment Existing Conditions Report – Has had minor updates to address comments from review agencies All project documentation is available in the document library.	11-Apr-2018	Email
	11-Apr-2018	Email	Can you tell us what field surveys still need to be done or monitoring on site so Megan can get a contract signed for FLR participation? In terms of presenting your results you could send us the results to be reviewed then we could have a conference call to discuss them?	Yes we could certainly send you the impact assessment reports then have a conference call/webex to discuss. I will be in touch when we have the impact assessment reports are complete. Regarding your other question of what field surveys still need to be done or monitoring on site, we don't anticipate further field work at this time during the EA. Perhaps only confirmatory visits to look at where mitigation measures may occur for enhancing habitat/vegetation to replace that which will be temporarily removed. Would you like to have FLRs participate in those field visits? If so, please send me the details.	17-Apr-2018	Email

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				Regarding monitoring, the post-EA monitoring requirements will be outlined in the impact assessment reports noted above. Once you have had a chance to review we can discuss your future involvement in that monitoring. As well, as we previously mentioned you are more than welcome to come for a tour of the site.		
	N.A.	N.A.	N.A.	Terrapure provide an update on the SCRF EA as well as an invitation to the Public Open House #3 on June 19, 2018 where Terrapure will present the detailed impact assessment for the preferred option for capacity increase to the community.	5-Jun-2018	Email & Registered Mail
				We had discussed setting up a conference call in July to present the results of the impact assessment. If you are still interested in that, do you have availability for either of the following times? • Tuesday July 10, 8:30 - 9:30 am or 11:00 am - 12:30 pm • Friday, July 13, 10:30 am – 12:00 pm or 1:00 - 2:30 pm If none of those times work I can find something else the following week. If you would like to review any documents separate from our conference call, the impact assessment is documented in several draft impact assessment reports, available for review and comment. Below are links to the most recent documentation that is available for review and comment. The Online Open House also provides a good summary of the information: • Draft Impact Assessment Reports: Air Quality and Odour, Geology and Hydrogeology, Land Use and Economic, Terrestrial and Aquatic Environment, Noise, Surface Water, Traffic, Design & Operations • Facility Characteristics Report All documents are always available in the Document Library section of the website. Next Steps The Draft Environmental Assessment (EA) Report will be available for review and comment from August 24 to September 28 (tentative). The review period for the Final EA Report is tentatively scheduled for January/February 2019. When we submit the Final Environmental Assessment Report to the Ministry of the Environment, Conservation and Parks, both us and the Ministry will ask you for acknowledgment that your community is satisfied that its specific rights and interests have been adequately identified and considered during the Environmental Assessment. With the above in mind, I have two requests: • Please let me know if you are interested in reviewing the Draft and Final EA Report and have sufficient resources and capacity to do so; and if you are interested in meeting in-person or via webex when the Draft EA Report is available . If you do not have sufficient resources or capacity to review the Draft or Final EA Report we will work with you to identify a solution. • Can you advise whether your community's rights and interests have been adequately considered up to this point in the EA? Thanks again. Please give me a call if you'd like to discuss.	29-Jun-2018	
	N.A.	N.A.	N.A.	Terrapure left a follow up voicemail following the request to set up a meeting or interest in reviewing the SCRF EA documentation	26-Jul-2018	Voicemail
Six Nations of the Grand River First Nation	N.A.	N.A.	N.A.	Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment	17-Nov-2017	Email & Registered Mail Letter
	N.A.	N.A.	N.A.	Terrapure provided the Notice of the SCRF EA Public Open House #1 and an invitation for an in-person meeting at the convenience of the Indigenous community.	24-Nov-2017	Email
	N.A.	N.A.	N.A.	Terrapure made follow up telephone calls and left voicemail to Indigenous Communities with information regarding the Notice of Commencement and Public Open House #1	30-Nov-2017	Voicemail
	N.A.	N.A.	N.A.	Following up on our email below, I am writing to give you an update on the Terrapure Stoney Creek Regional Facility Environmental Assessment. As mentioned in our previous correspondence, we would be pleased to meet with the Six Nations of the Grand River First Nation at your office at your convenience to discuss the project, present the information provided at the Open House and bring our technical experts to answer any questions you may have.	30-Jan-2018	Email

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				As part of this stage of the EA, below are links to the Proposed Work Plans, Draft Existing Condition Reports and the Draft Conceptual Design Report. As well, I have attached a copy of the MTCS Screening Checklist for Archaeological Potential. We are requesting that you confirm what material you are interested in reviewing, if any. You may download these documents from our website, or we would then be happy to send you printed or electronic copies directly. Work Plans (See Appendix D, pg 170) - Geology and Hydrogeology Work Plan - Surface Water Resources Work Plan - Terrestrial and Aquatic Environment Work Plan - Land Use Work Plan - Atmospheric Environment Work Plan (including Air Quality, Odour and Noise) - Transportation Work Plan - Economic Work Plan - Archaeology and Built Heritage Work Plan Design and Operations Work Plan - Existing Conditions Reports - Air, Odour and Meteorology - Geology and Hydrogeology - Land Use and Economic Environment - Natural Environment - Noise - Surface Water - Traffic Draft Conceptual Design Report For context, the Proposed Work Plans were included in the Amended Approved Terms of Reference. They outline the proposed methodology for the assessment and the criteria and indicators that will be used. The Draft Existing Conditions Reports document the results of site investigations and review of existing data sources. The Draft Conceptual Design Report presents the conceptual design for each of the six options. If you have any questions on the preceding information or would like to set up a meeting please contact me directly by phone at 416-866-2365 or 647-326-4302. Thank you in advance and I look forward to your reply.		
	26-Feb-2018	Email	My name is Mathew Jocko, Consultation Point Person for Lands and Resources for Six Nations. My director Lonny Bomberry sent me over your contact information and I was told that you were wanting to have a meeting with us regarding your project. Can you send me some dates that work for you and I will try to organize my staff.	Left a voicemail following up the previous email sent on January 30, 2018 with a request to confirm if the Six Nations of the Grand River First Nation was interested in reviewing any of the SCRF EA materials at this time.	26-Feb-2018	Voicemail
	N.A.	N.A.	N.A.	Terrapure provided an update on the SCRF EA as well as an invitation to the Public Open House #2 on March 22, 2018 where Terrapure will present the recommended option for the capacity increase based on technical feasibility, potential environmental impacts and input received from the public, agencies, and Indigenous groups.	8-Mar-2018	Email & Registered Mail
	6-Apr-2018	Meeting	An opportunity for Terrpaure to learn more about the history of the Six Nations of the Grand River (Six Nations) and their interest in the Stoney Creek Regional Facility (SCRF) Environmental Assessment (EA)	Terrapure presented information on the SCRF EA, the proposed capacity increase, the options and how they were evaluated and the recommended option.	6-Apr-2018	Meeting

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				Terrapure answered questions regarding the history of the site, the existing operations and about the SCRF EA including what kind of materials is currently accepted, how does Terrapure screen material that comes into the site and archaeological potential during this EA. Terrapure committed to continue to engage and update Six Nations as the EA moves forward and offered a tour of the site should Six Nations wish to see how they currently operate.		
	N.A.	N.A.	N.A.	Please let me know if there are any of these documents that Six Nations would like to review and provide comment on. I've included the direct links below, but all are available in the document library: Draft Alternative Methods Reports Existing Conditions Reports • Air, Odour and Meteorology • Geology and Hydrogeology • Land Use and Economic Environment • Natural Environment • Noise • Surface Water • Traffic Draft Conceptual Design Report We can also provide printed copies of any documents. If you will not be reviewing these documents, I would also appreciate you letting me know. Next Steps As mentioned in the meeting, we are currently in the Impact Assessment stage. We expect that the draft Impact Assessment Reports for the seven disciplines noted above will be available in June for review and comment. We expect the Draft Environmental Assessment Report will be available for review and comment in early fall, followed by the Final Environmental Assessment Report. When we submit the Final Environmental Assessment Report to the Ministry of the Environment and Climate Change, both us and the Ministry will ask you for acknowledgment that your community is satisfied that its specific rights and interests have been adequately identified and considered during the Environmental Assessment. With that in mind, can you advise whether your community's rights and interests have been adequately considered up to this point in the EA? I will continue to provide you with EA documents and information for your review and comment. If you are not interested in reviewing or providing comment on specific documents, just let me know. If you do not have sufficient resources or capacity to participate, please let me know and we will work with you to identify a solution. Thanks again. Please give me a call if you'd like to discuss.	9-May-2018	Email
	N.A.	N.A.	N.A.	I am writing to give you an update on this Environmental Assessment. For the last several months the technical team has been completing a detailed impact assessment of the preferred option (reconfigure the site within its existing property boundaries and increase the height), including outlining the proposed mitigation measures and monitoring plans. This is documented in several draft impact assessment reports, available for review and comment. Below are links to the most recent documentation that is available for review and comment. The Online Open House also provides a good summary of the information: • Draft Impact Assessment Reports: Air Quality and Odour, Geology and Hydrogeology, Land Use and Economic, Terrestrial and Aquatic Environment, Noise, Surface Water, Traffic, Design & Operations • Facility Characteristics Report All documents are always available in the Document Library section of the website.	29-Jun-2018	Email

Indigenous Communities	Comment Date	Method	Comments from Aboriginal Community	Terrapure's Response	Response Date	Method
				I am requesting that you confirm what material you are interested in reviewing, if any. You may download these documents from our website, or we would then be happy to send you printed or electronic copies directly. I will continue to send you updates and links to EA documents and information for your review and comment. If you are not interested in reviewing or providing comment on specific documents, just let me know. Next Steps The Draft Environmental Assessment (EA) Report will be available for review and comment from August 24 to September 28 (tentative). The review period for the Final EA Report is tentatively scheduled for January/February 2019. Please let me know if you are interested in reviewing the Draft and Final EA Report and have sufficient resources and capacity to do so; and if you are interested in meeting in-person or via webex when the Draft EA Report is available . If you do not have sufficient resources or capacity to review the Draft or Final EA Report we will work with you to identify a solution. When we submit the Final Environmental Assessment Report to the Ministry of the Environment, Conservation and Parks, both us and the Ministry will ask you for acknowledgment that your community is satisfied that its specific rights and interests have been adequately identified and considered during the Environmental Assessment. With that in mind, can you advise whether your community's rights and interests have been adequately considered up to this point in the EA?		
	N.A.	N.A.	N.A.	Left a voicemail following up on an email sent on Friday June 29, 2018 regarding an update on the SCRF EA project including the completion of the detailed impact assessment. Included in the email was the request to confirm which materials Six Nations would be interested in reviewing, if any.	13-Jul-2018	Voicemail
	26-Jul-2018	Telephone Call	Requested to resend the last email with the details of the SCRF EA documents for review.	Spoke about the last email with the request for Six Nations to confirm their interest in reviewing the SCRF EA documentation.	26-Jul-2018	Telephone Call

7.6 Public Stakeholders

7.6.1 Public Participants Consulted

As key stakeholders, Terrapure consulted widely and frequently with community members throughout the SCRF EA process in a variety of way to elicit their feedback and address concerns they may have with the project. Specifically, public stakeholders consulted throughout the SCRF EA process included:

- Property owners immediately adjacent to the SCRF
- Residents and businesses within 1.5 km of the SCRF property boundary
- Members of the public, primarily residents and businesses, who provided their contact information and were interested in the project
- Municipal, provincial, and federal elected officials
- Community Representatives on the Community Liaison Committee (CLC)
- Non-government organizations and community based organizations with interest in the project
- Terrapure customers

Throughout the EA process, newly interested public stakeholders who participated in any of the numerous consultation activities were added to the project contact list for continued engagement and notification of project updates.

7.6.2 Overview of Consultation Activities with Public Stakeholders

Consultation with public stakeholders began at the Notice of EA Commencement and continued at the various key milestones throughout the SCRF EA. Input from the public was obtained throughout each of the consultation activities and considered at each key milestone of the SCRF EA. The full list of consultation activities undertaking with public stakeholders throughout the EA process included the following:

- Circulation of the Notices of Commencement and Public Open Houses (see **Section 7.6.3**)
- Three Public Open Houses (In-person and Online) (see **Section 7.6.4**)
- Individual meetings, telephone calls, email correspondence (see **Section 7.6.5**)
- Community Liaison Committee Workshop (see **Section 7.6.6**)
- Circulation of draft reports (see **Section 7.6.7**)
- Circulation of the Draft Environmental Assessment and circulation of the Final Environmental Assessment (see **Sections 7.8** and **7.9**)

7.6.3 Notices of Commencement and Open Houses

7.6.3.1 Notice of Commencement & Notice of Open House # 1

Following the approval of the Amended ToR for the SCRF by the MOECC on November 9, 2017, Terrapure distributed a Notice of Commencement announcing the start of the EA process. The Notice of Commencement included the locations for where the approved amended ToR is available for viewing as well as the encouragement for public, agencies, and Indigenous communities to stay tuned for upcoming consultation opportunities regarding the SCRF EA.

The Notice of Commencement was published on November 17, 2017, and was distributed via the following means:

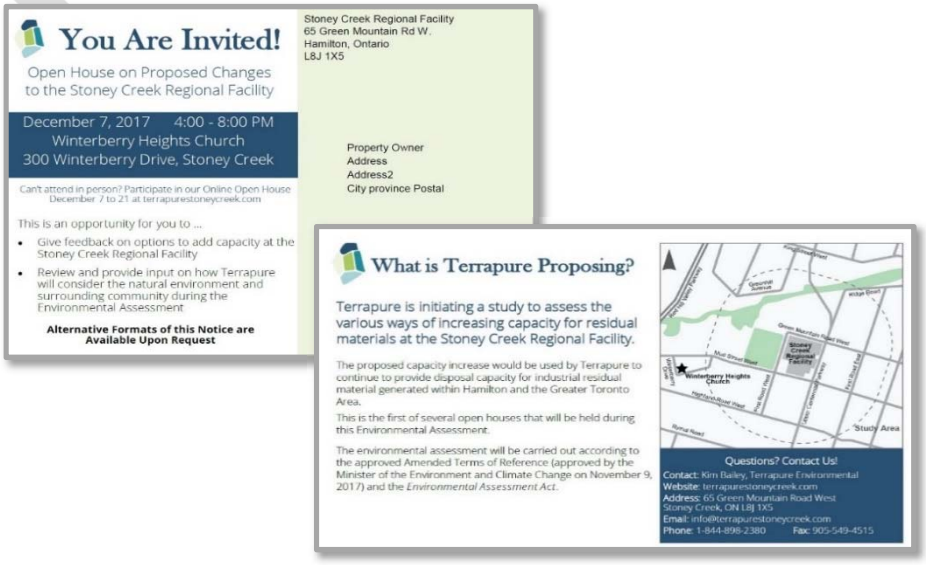
- Direct mailing and emailing on November 17, 2017, to all identified agencies, Indigenous communities, and members of the public on the project-specific database.
- Registered mail to immediate adjacent property owners on November 17, 2017.
- On Terrapure SCRF Social Media Channels on November 17, 2017.
- Ad in the Hamilton Spectator on November 17, 2017.
- Ad in the Stoney Creek News on November 23, 2017.

Terrapure notified stakeholders of the Notice of Commencement, Public Open House and Online Open House through a variety of means to increase awareness and the potential number of public members attending. For each of the notifications, we promoted both the in-person public Open House as well as the Online Open House. Specifically, the following notifications for the event were distributed:

- Two advertisements in the Hamilton Spectator on November 23, and December 2, 2017.
- Advertisement in the Stoney Creek News on November 30, 2017.
- Direct mailing and/or emailing between November 21-24, 2017, to all identified agencies, Indigenous communities, and members of the public in the project-specific contact database.
- Registered mail to immediate adjacent property owners on November 24, 2017.
- Unaddressed postcard mailed between November 22-24, 2017, advertising the Open House to 7,256 residences and businesses within 1.5 km of the Site.
- Reminder email distributed to those in the project-specific contact database about the Online Open House on December 7, 2017 and January 11, 2018.
- Notices on the SCRF website and advertised on SCRF Twitter and Facebook accounts were published on November 23 & 29, 2017

New! Mobile Sign Advertising

We placed a mobile sign announcing the Open House beginning on November 22, 2017 on the Terrapure property south of the south-west corner of Upper Centennial Parkway and Green Mountain Road.

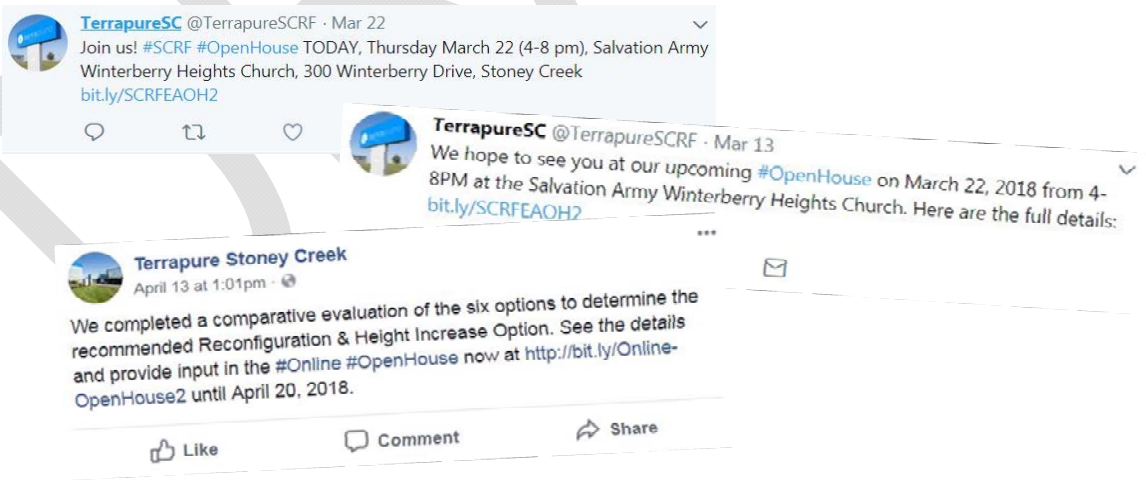


- Information about the Open House posted on the Empire Victory Community private Facebook Group.
- An article in the Stoney Creek News was published on November 30, 2017.

7.6.3.2 Notice of Open House # 2

Terrapure notified stakeholders of Public Open House through a variety of means, promoting both the In-Person Open House and the Online Open House. Specifically, the following notifications for the event(s) were distributed:

- Two advertisements in the Hamilton Spectator on March 9, and March 17, 2018.
- Two advertisements in the Stoney Creek News on March 15, and March 22, 2018.
- Direct mailing and/or emailing to all identified agencies, Indigenous communities, and members of the public in the project-specific contact database between March 8-15, 2018.
- Registered mail to immediate adjacent property owners on between March 8-15, 2018.
- Unaddressed mail between March 8-15, 2018, of a postcard advertising the Public Open House #2 to 7,381 residences and businesses within 1.5 km of the Site.
- A mobile sign announcing the Open House was placed on Terrapure's property south of the southwest corner of Upper Centennial Parkway and Green Mountain Road between March 8-22, 2018.
- Reminder emails distributed to those on the project database about the Online Open House and its upcoming deadline on April 17, 2018.
- An article in the Stoney Creek News was published on March 16, 2018.
- Notices on the SCRF website and advertised on SCRF Twitter and Facebook accounts were published leading up to the Public Open House #2 on March 22, throughout March, and ongoing for the Online Open House until April 20, 2018.



7.6.3.3 Notice of Open House #3

Terrapure notified stakeholders of Public Open House through a variety of means, promoting both the In-Person Open House and the Online Open House. Specifically, the following notifications for the event(s) were distributed:

- Two advertisements in the Hamilton Spectator on June 5, and June 18, 2018.
- Two advertisements in the Stoney Creek News on June 7, and June 14, 2018.
- Direct mailing and/or emailing to all identified agencies, Indigenous communities, and members of the public in the project-specific contact database between June 5-12, 2018.
- Registered mail to immediate adjacent property owners between June 5-12, 2018.
- Unaddressed postcard mailed between June 5-12, 2018, advertising the Public Open House #3 to 8,246 residences and businesses within 1.5 km of the Site.
- A mobile sign announcing the Open House was placed on Terrapure's property south of the southwest corner of Upper Centennial Parkway and Green Mountain Road between June 5-19, 2018.
- Reminder emails distributed to those on the project database about the Online Open House and its upcoming deadline on July 19, 2018.
- An article in the Stoney Creek News was published on June 27, 2018.
- Notices on the SCRF website and advertised on SCRF Twitter and Facebook accounts were published leading up to the Public Open House #3 on June 19, throughout June, and ongoing for the Online Open House until July 20, 2018.

7.6.4 Public Open Houses

As part of this EA, Terrapure held three Public Open Houses at three key decision-making milestones:

- **Public Open House #1** – discussion on the developed options, the evaluation criteria and indicators to be applied to the options, and the evaluation methodology that will be utilized.
- **Public Open House #2** - reviewing the comparative evaluation results of the options and identifying the recommended option.
- **Public Open House #3** - reviewing the impact assessment results of the preferred option, including potential environmental effects, recommended impact management measures, proposed monitoring requirements, and proposed approvals/permits required for implementing the preferred option.

All three Public Open Houses were held on a weekday evening between 4 p.m. to 8 p.m., at the Salvation Army Winterberry Heights Church (300 Winterberry Drive, Stoney Creek). This location was chosen because of its close proximity to the SCRF, its familiarity to local community members, its accessibility and compliance under the Accessibility for Ontarians with Disabilities Act (AODA), and its size to accommodate attendees.

In an effort to broaden Terrapure’s reach and based on feedback received by community members, Online Open Houses for the stakeholders were held in conjunction with each of the three In-Person Open Houses. For each, the Online Open House was available for comment for one month, starting on the date of the In-Person Open House.

The Online Open House is a way to give interested stakeholders and community members who may not be able to or interested in attending the open house the opportunity to review the information and provide meaningful input. The Online Open House was accessible by visiting the project website. The information on the Online Open House included all of the same consultation materials (display boards, handouts and comment sheets) presented at the In-Person Open House. Terrapure will consider feedback received from the Online Open House equally with feedback provided at the In-Person Open House.

7.6.4.1 Public Open House #1

Date: Thursday, December 7, 2017 from 4 p.m. to 8 p.m.

Purpose:

Provide the community members with an opportunity to review and provide comments on the:

- EA process
- Six options to accommodate the capacity increase
- Proposed evaluation methodology
- Existing environmental conditions in and around the SCRF
- Proposed consultation methods with the public going forward

7.6.4.2 Public Open House #2

Date: Thursday, March 22, 2018 from 4 p.m. to 8 p.m.

Purpose: Provide community members with an opportunity to review, ask questions, seek clarifications, and provide comments on the:

- EA process
- Assessment and Evaluation Methodology
- Results of the evaluation for each of the six options, as well as the comparative evaluation of the six options against one another
- Recommended Reconfiguration and Height Increase Option (5)
- Further considerations of the natural environment and surrounding community during the next phase (Impact Assessment)
- Proposed consultation methods with the public going forward

7.6.4.3 Public Open House #3

Date: Tuesday, June 19, 2018 from 4 p.m. to 8 p.m.

Purpose: Provide community members with an opportunity to review, ask questions, seek clarifications, and provide comments on the:

- EA process
- Confirmation of the preferred reconfiguration and height increase option
- Results of the detailed impact assessment for the preferred option
- Proposed impact management measures, monitoring and commitments
- Next steps and future consultation opportunities

7.6.5 Individual Meetings, Emails and Telephone Calls

Terrapure met with various individuals and groups expressing an interest in the project throughout the preparation of the SCRF EA. The primary purpose of these meetings were to address concerns and comments from the individual and make best efforts to resolve any outstanding issues in a mutually beneficial way. Summaries of the meetings are not provided due to privacy considerations.

In addition to the formal and informal in-person meetings, Terrapure received telephone calls and email correspondence regarding the SCRF EA. These means of engagement with the public were commonly utilized by members of the public and by Terrapure as a means to more quickly exchange information (i.e., provide comments, ask questions, etc.).

7.6.6 Community Liaison Committee Workshop

The existing Terrapure SCRF Community Liaison Committee (CLC) meets quarterly to discuss the Site's current operations outside of the SCRF EA. The CLC is comprised of citizen members from the local community surrounding the Facility, representatives of Terrapure, the City of Hamilton, and the Ministry of the Environment, Conservation and Parks.

At key milestones, Terrapure provided the CLC with an opportunity to hold CLC Workshops outside of the regularly scheduled CLC meetings, as a forum for in-depth discussion of project issues and act as a conduit with the local community.

The CLC only requested an additional workshop meeting at the Notice of Commencement in advance to the Public Open House #1. The workshop was held on Monday December 4, 2017, at the Winterberry Heights Church (300 Winterberry, Stoney Creek). At the meeting CLC Members confirmed that they received the Notice for the open house, had discussions about the difference between residual and industrial fill and asked clarifying questions including:

- How many people typically attend In-Person Open Houses
- The duration for the Online Open House
- The EA process
- Closure timelines
- Concerns regarding potential for contaminants leaking
- Consideration of Comments Received and Issues Raised

In light of the numerous consultation activities carried out by Terrapure with members of the public during the preparation of the SCRF EA, various comments were received reflecting a number of

issues. In response, Terrapure considered these comments and attempted in good faith to resolve the raised issues so that both they and the interested person(s) had an agreeable resolution during the SCRF EA.

Table 7.3 summarizes the comments received from the public through correspondence (written and electronic), telephone calls, and meetings and how they were considered by Terrapure. This table is organized by type of comment or issue in accordance with Section 4.3.7 of the Ministry of the Environment's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014).

Several of the comments and concerns raised resulted in changes to the SCRF EA, including the following:

- In response to concerns raised about the visual impact of the SCRF and the proposed height increase, Terrapure presented and asked for feedback on several conceptual screening techniques at Open House #3. Terrapure has committed to implementing visual screening measures during construction, as appropriate. Further, Terrapure prepared visual renderings and cross sections to illustrate the anticipated change in the visibility of the SCRF.
- In response to concerns about the ranking of the "Effects of Views of the Facility" criteria, Terrapure modified the comparative evaluation, changing Option 5 from yellow (low negative net effect) to orange (medium negative net effect).
- In response to concerns about the accuracy of some of the maps and figures used in the reports, specifically related to the road network, Terrapure revised these maps and figures to reflect the most up-to-date information.
- In response to suggestions to present technical information in a more public-friendly way, Terrapure released two videos, described in **Section 7.3.3**,

Table 7.3 Public Stakeholder Comments and Consideration by Terrapure

Comment from Member of the Public	How the Comment was Considered
Purpose of the Undertaking/Alternatives To the Undertaking	
Opposition to any of the expansion options; desire to close the SCRF.	Terrapure Environmental is currently undergoing an Environmental Assessment under the Provincial *Environmental Assessment Act.* The purpose of the undertaking, to assess the various ways of increasing capacity for residual material at the Stoney Creek Regional Facility, was established in the Minister-approved Terms of Reference in November, 2017. This capacity increase is based on the identified need for continued disposal capacity for industrial residual material generated within Hamilton and the Greater Toronto Area.
Please look to the future for other options outside a residential community.	Terrapure considered finding an alternative site for a new facility during the Terms of Reference stage of the project and determined it not to be feasible.
EA Process and Public Consultation	
Terrapure can better help the public understand the current operations compared to the proposed options.	This comment will be considered, as we continue to develop educational resources to help the community to better understand who Terrapure is and what happens at the SCRF. Existing resources are available on the project specific website (www.terrapurestoneycreek.ca) including two videos on the waste acceptance process and the current operations at the site. These videos are also available here: http://bit.ly/SCRFvideos To provide Terrapure with further suggestions on how to better communicate and engage with the community, residents are encouraged to send their suggestions to info@terrapurestoneycreek.com
Would like Terrapure to consider funding for the community to seek out independent expert input, which was once a standard for the environmental assessment process.	Although Terrapure has not provided funding for the community to seek out an independent expert, there is a Government Review Team which is comprised of a team of independent experts from the Ministry of the Environment and Climate Change, the City of Hamilton and other government agencies. The Government Review Team reviews and scrutinizes the work completed by Terrapure's team of experts to ensure the EA to ensure that it is conducted using best practices.
Concerned with the use of the terms industrial fill and residual material which is inconsistent with what the MOECC uses to describe these different materials. The material that will be landfilled is 'non-hazardous industrial waste' and, I believe it should be referred to as such.	Terrapure uses the term "residual material" to describe non-hazardous solid industrial waste interchangeably. We have published a video on the waste acceptance process at the site which helps explain what kind of materials are received at the SCRF. It can be found here: http://bit.ly/SCRFvideos
The Environmental Assessment Process diagram shows the Ministry making a decision on the EA in Spring 2019. Will Terrapure suspend operations at the Stoney Creek Landfill site if the current site license is reached before that time?	Terrapure is and will continue to operate within the approved capacity limits currently set out in the existing ECA.
Felt like the presentation of the material indicated that the proposed expansion is already a "done deal".	This comment will be taken into consideration to improve the way we present information at the next Open House (anticipated to be held in early summer 2018). Once Terrapure completes the documentation for the EA, it will be submitted to the Minister of the Environment and Climate Change for review. The proposed capacity increase is not final until the Minister approves, rejects or approves with conditions Terrapure's Environmental Assessment Report.
This format only invites comments to the promotional content on the site. The person completing the survey should be invited to comment on a broader list of issues or any other matter of concern. The Online Open House and the Open House on June 19th (which I attended) was just very similar to the last open house. I was not invited to fill out any comment form at the live open house and the various stations were not all attended by a member of the PR team.	Thank you for your feedback on the Online Open House and In-Person Open House #3. The Online Open House did include opportunity for feedback as embedded forms which invited participants to provide comments on the Environmental Assessment, including feedback forms with specific questions (i.e. “Do you have any comments on the detailed impact assessment? and Do you have any comments on the proposed impact management measures for the preferred option”) and general feedback forms (i.e. “Other Comments”). At the In-person Open House, comment forms were available throughout the room and 17 staff were available both at the various stations and circulating throughout the room.

<table>
<tr><th>Comment from Member of the Public</th><th>How the Comment was Considered</th></tr>
<tr><td colspan="2">Study Area and Existing Conditions</td></tr>
<tr><td>Consider expanding the Study Area to include all areas west of the site to the freeway since these residents travel along Mud Street to Hwy 20. and are subject to the views, noises, traffic, and odour of the site.</td><td>As part of evaluating the six options, we used a 1.5km study area to establish the existing conditions for elements of the environment such as visual, noise, traffic, and odour. The study areas will be reviewed, and if necessary modified during the EA, including when the extent of potential environmental effects are better known.</td></tr>
<tr><td>Attached are pdf’s for documents, Figure 2.1, 4.4 and 6.1 which are from the Terrapure website. As can be seen the dotted area around the dump is called the local study area. Within this area the roads infrastructure is shown between the concession lines. We take issue with the misleading portrayal of the local study area on these maps, as it tends to indicate for lands around the dump that are merely open fields when in fact there are numerous new roads or streets in housing areas that are not shown on the map. See the attached PDF titled “Neighbourhoods around Dump” a summary of the information is as follows:

a.)Neighbourhoods to the North immediately across the road from the Dump consist of over 2 miles of additional streets not shown in these documents, with over 200 homes in the area.

b.)Neighbourhoods to the West of the Dump site consists of over 1 mile of additional streets not shown in the documents references, with over 250 homes in this area.

c.) Neighbourhoods to the South of the Dump site consists of over 1.5 miles of additional streets not shown in the documents references, with over 200 homes in the area, plus the many 100’s of homes already there and even more to come in the parcel of land now being developed to the East.

These new streets and roads must be shown in any map of the study area. There are also two schools within the study area as well that we feel should be noted as they are important sites to have an appreciation for in this process. There may be other references in other documents on this application going forward any reference maps referencing the study area should show all streets.

Then there are the various applications being made by developers for housing sites within the local study area where roads are not in place as yet. These developments consist of the following additional housing units to be around the Dump and are noted in the attached screen shots of the City of Hamilton Planning Dept. web site

• ZAC-13-005 has 340 units
• ZAR-13-025 has 96 units
• ZAC-15-015- has 450 units
• ZAC -15-059 has 39 units
• ZAC-16-065 has 197 units
• ZAC-16-066 has 135 units
• ZAC-17-001 has 97 units

In total, another 1354 housing units are to be built within the local study area. A large number of homes cannot be ignored and left out of the discussions going forward. Their inclusion as an item of references on the study area documents to be submitted in the application and on documents for the community should be required factor in the analysis of this request being made of the MOECC.</td><td>You are correct that the road infrastructure shown on Figures 2.1, 4.4, and 6.1 does not reflect the new roads and streets. The road network shown on these maps was generated in 2016. As a result of your comment, we have now obtained the most recent road network map data, which does shown the new roads and streets. Going forward, all maps that we generate for this project will reflect the most recent road network available. We apologize for this error and, while it was not our intent to be misleading, we will correct this in the future.

Notwithstanding the above, please be assured that the neighbourhoods that you have highlighted in your letter have been considered as part of this project. Specifically, these neighbourhoods are included in Figure 4.3 and Table 4.2 of the Land Use Existing Conditions Report. The purpose of the Land Use Existing Conditions Report is to identify the existing land use, zoning and official plan designations, and more specifically describes the existing and surrounding neighbourhoods. The Land Use Existing Conditions Report was reviewed by City of Hamilton Planning staff.

The two schools included on your figure are St. James Apostle School and Saltfleet High School. You are correct that both these schools are within the Local Study Area and both of these schools have been taken into consideration in this EA. They are included in Section 4.2.2.4 of the Land Use Existing Conditions Report. In addition, we have consulted the Hamilton-Wentworth District School Board and the Hamilton-Wentworth District Catholic School Board regarding this project, and they have been provided with these reports for their review.

We have reviewed the various development applications referenced in your letter and can confirm that they have been considered as part of this project. The applications you referenced are included in Figure 4.3 and Table 4.2 of the Land Use Existing Conditions Report as follows:

<table>
<tr><th>Application #</th><th>Number of Units</th><th>ID# in Table 4.2 of the Land Use Existing Conditions Report</th></tr>
<tr><td>ZAC-13-005</td><td>340 units</td><td>#60</td></tr>
<tr><td>ZAC-13-025</td><td>96 units</td><td>#61 (our records indicate 120 units)</td></tr>
<tr><td>ZAC-15-015</td><td>450 units</td><td>#65</td></tr>
<tr><td>ZAC-15-059</td><td>39 units</td><td>Not included in the Existing Conditions Report, as this the status of this application recently changed status. This development will be considered in the impact analysis stage.</td></tr>
<tr><td>ZAC-16-065</td><td>197 units</td><td>#70</td></tr>
<tr><td>ZAC-16-066</td><td>135 units</td><td>#69</td></tr>
<tr><td>ZAC-17-001</td><td>97 units</td><td>#68</td></tr>
</table>
As development applications are updated or as new applications are submitted, we will include these within our analysis and evaluation, as necessary.</td></tr>
</table>

Comment from Member of the Public	How the Comment was Considered
	As you have noted, a large number of homes have recently been built or are proposed to be built within the Local Study Area. The potential effect of the proposed capacity increase on planned and future land uses, including new residential development within 1.5 km of the SCRF, was considered as part of evaluating the options. As well, this will continue to be considered as part of the impact assessment stage, utilizing updated information as necessary.
In Figure 4.4 the colour shading shows that properties across from the Dump on Upper Centennial parkway are coded agricultural lands for current zoning info. However, there has not been minimal agricultural activity on these lands for the past decade and in fact these pink coded properties are owned by those that are involved with housing developments. So another influx of neighbourhoods around this Dump to come on top of all the current and approved properties in the area.	A visual assessment of these properties was conducted in February 2018 (photos are included in Section 5.5 of the ***Land Use Existing Conditions Report***), which concluded that these fields are farmed or used for the purpose of agriculture. The Ontario Ministry of Agriculture and Rural Affairs was provided a copy of the report for review and comment as well. As of April 13th, 2018, the City of Hamilton does not have any proposed development plans for these parcels. As well, they are currently zoned for agriculture purposes. As a result, we cannot assume that the property owners intend to develop these properties, despite the fact that they are owned by those involved with housing developments.
Alternative Methods	
Interested in the type and quantity of waste material to be accepted now and with the six options.	The SCRF is only permitted to receive industrial solid non-hazardous residual materials from operations like the local steel producers and infrastructure projects like the new James Street GO station and the McMaster Children's Hospital expansion. Through this Environmental Assessment, we are not seeking approval to change the type of waste we accept on-site.
Concern that Terrapure used the evaluation criteria and process to select their preferred desired outcome and not one that incorporated the comments received from community members. Belief that the criteria and scoring of the Land Use, Visual, Economic and Design & Operation was incorrect. Disagreement with the methodology used by Terrapure to determine the outcome.	The environmental components were selected to reflect the broad definition of the environment under the Environmental Assessment Act, specifically the natural, social, economic, cultural, and built environments. These components and the comparative evaluation methodology are consistent with other Environmental Assessments undertaken throughout Ontario, and were approved by the Minister of the Environment and Climate Change in the Terms of Reference. The results of the comparative evaluation are being reviewed by the MOECC and other independent subject-matter experts as part of the Government Review Team that oversees the EA to ensure that it is conducted using best practices.
Did not like the way the comparative evaluation was presented. Found it difficult to understand the impacts of the current operations versus the options being proposed.	This comment will be taken into consideration to improve the way we present information at the next Open House (anticipated to be held in early summer 2018). We make a continuous efforts to ensure that the work being completed for the EA is presented in a way that is easy to understand and easy to provide input.
Consideration of closure time. None of the evaluation criteria currently pertains to site closure.	While closure timing is not included as a separate evaluation criteria, every criteria will be assessed in relation to timeframes of construction, operation, and closure/post-closure, as per the Minister Approved Amended Terms of Reference. Therefore, any potential effects during construction/operation would be considered to have a greater impact in those alternatives that have longer construction/operation durations.
Under "Highlights of Community Feedback", Terrapure says "We have selected a preferred option with the lowest height increase of all the options". That is simply not correct as Options 1, 2 and 4 have no height increase compared to the 2.5 meter increase for Option 5. Please revise that comment.	The text in the "Highlight of Community Feedback" section does not state that we have selected a preferred option with the lowest height increase. The text is as follows: "We understand the community's concerns around height and we will implement impact management measures to minimize the visibility of the SCRF. The preferred option has a lower height increase compared to other options with low environmental impact."
In the November 22, 2017 Stoney Creek News, Greg Jones was quoted as saying "the company will use public feedback to pick a preferred option which will be presented at a second Open House", yet Option 5 was selected which had zero support from the community based on Terrapure Table 4.1 Summary of Comments Received on the Six Options on GHD/Terrapure – EA Open House #1 Summary Report as compared to Option 1 where there were 17 positive comments from the community. Consequently, please remove the comment "Confirmed the Preferred Option taking into consideration feedback from members of the community, agencies and Indigenous groups" as that is obviously not true.	Since none of the feedback received on the recommended option (including feedback received at the second Open House) changed the results of the comparative evaluation, Option 5 was confirmed as preferred. Terrapure also did receive feedback from stakeholders acknowledging that Option 5 was the best compromise, minimizing height increase while still providing the additional capacity being sought in the EA.

Comment from Member of the Public	How the Comment was Considered
From the March 22 Open House the 'Comparative Evaluation of Options Summary" handout was provided to attendees. We take issue with this analysis. As stated by GHD in other documents, the preferred option for Terrapure going forward is Option 5. We found it amazing that Option 5 did not have one red circle in its evaluation on the Summary sheet; kinda misleading and in our minds simply a portrayal to unjustly favour Terrapures wishes.	It is correct that the circles used to indicate a level of net impact were determined by the team of scientists, engineers and other technical staff. Each technical discipline arrived at their rankings independently. Option 5 was determined to be the recommended option as a result of the comparative analysis of the net overall outcome of these independent rankings. This methodology is described in further detail in the ***Draft Alternative Methods Report*** and in the Minister-approved Terms of Reference. The results of the comparative evaluation presented at the open house are draft for review and comment by stakeholders, including yourself. We will take your comments below into consideration as we finalize the comparative evaluation.
In the "Land Use" component there are Red Circles for Option 3 and 6 which have 11 metre (36 feet) and 8 metre (26 feet) of landfill height increases. Whereas Options 1, 2 and 4 have no height increase changes and are not Red Circled which would seem appropriate. But when looking at Option 5 info, there is not a Red Circle shown. There should be a Red Circle shown as the height will increase by 2.5 meters (8 feet). The consultant from GHD (Brian Dermody) confirmed at the open house that this colour coding was their opinion on things and not that of the community of residents around the Dump. This evaluation of height needs to take into consideration the results of the survey feedback on what was said to GHD by the community, which overwhelmingly the comments back were that residents did not want to see any height increase at the Dump. A height increase is a height increase and as noted in this handout under "Effect on views of the facility" there is an effect that we residents around the Dump are not wanting, so a Red Circle needs to appear in this section under Option 5.	The ranking for this category was based on visual impact and the ability for it to be mitigated, rather than height in and of itself, as this better represents the impact that residents will experience. Visual renderings were produced from a variety of viewpoints around the SCRF to determine the visual impact. Option 5 resulted in a yellow circle as opposed to a red circle, because, with a height increase of 2.5m, it results in a much lower effect compared to that of Options 3 and 6 with a 12m and 8m increase. Through the application of mitigation measures such as additional vegetation and/or fencing, a height increase of 2.5m can be mitigated or blocked sufficiently, whereas as a 12m and 8m height increase cannot be sufficiently mitigated through fencing or vegetation. We appreciate your comment however and we will certainly review this and get back to you on the final rankings after the closure of the comment period.
For Visual – Option 1 should be green as there is no change to current height approval and Option 5 should be at least orange because it represents a 2.5m height increase.	This comment, as well as any others provided by members of the public or review agencies, will be taken into consideration as the comparative evaluation is finalized. The rationale for the draft rankings in this category is as follows: Option 1 resulted in a yellow circle because even though there is no height increase from the existing approved contours, there would be a change from what is currently visible. There is still a visual impact from the site on the surrounding community that would need to be mitigated through measures such as vegetation and/or fencing. Option 5 resulted in a yellow circle as opposed to orange or red circle because, with a height increase of 2.5 m, it results in a much lower effect compared to that of Options 3 and 6, which had a 12 m and 8 m increase, respectively. Through the application of mitigation measures such as additional vegetation and/or fencing, a height increase of 2.5 m can be mitigated or blocked sufficiently, whereas as a 12 m and 8 m height increase cannot be sufficiently mitigated through fencing or vegetation – thus creating a greater net impact.
On the ranking summary for Visual "Effect of Views of the Facility", I continue to maintain that Option 1 should be green as there is no change to the currently approved height (regardless of whether it is Industrial Fill or Residual Material).	Thank you for your comment. As previously mentioned, Option 1 at closure will have a visual impact as compared to the current view and will required screening techniquest to minimize the views of the SCRF from the surrounding community.
In the "Economic" component. See the comments in 1 above, these Orange Circled options are merely taken from the point of view of Terrapure and its profit/operation viability and not the views of the current residents, and future ones we would expect, living by the Dump.	As stated above, the details of the economic analysis can be viewed in greater detail in the ***Draft Alternative Methods report***. However, to provide some brief context, the results of the economic analysis were based from a background report completed by RIAS on the *Economic Impacts of the SCRF*. This report, which was included in the approved Terms of Reference, highlights the economic benefits to the City of Hamilton and surrounding community, including detailed discussions on job duration, total GDP that the facility will contribute based on duration of landfill operations. It is these factors on which the net economic effects assessment were based. Options 3, 5 and 6 would all result in the greatest economic benefits to the City of Hamilton and surrounding community. Profit/operation viability is not considered as part of this criteria.
In the "Surface Water Resources " component there is really no need for any of the options to not be coloured Yellow as all should be Green as there is a 72" (6 foot) storm sewer system recently installed along Upper Centennial that runs	The City and MOECC require surface water runoff (i.e. stormwater) to be treated onsite before it is discharged to a storm sewer or watercourse. As a result, a stormwater management pond needs to be accommodated onsite to treat stormwater

Comment from Member of the Public	How the Comment was Considered
along the side of the property. Any discussion on the water management ponds, which are about the size of 4 or 5 Olympic sized pools, as having an effect on the Options is meaningless. This new storm sewer system can be utilized. The "Surface Water Existing Conditions Report" in draft form makes no mention of the 72 " sewer system trunk passing by the property and this needs to factored into any water management criteria on the options.	before it is discharged to a sewer. Currently, stormwater is discharged to an existing storm sewer to the north of the site under First Road West following treatment at the stormwater management pond.
In the "Transportation" component, there is no consideration given to the length of time frames (years) for the traffic to be in area. The various options have short to very long terms of life for the Dump, there needs to be a table line added on this page with a Green Circle going under the shortest time frame option and a Red Circle under the longest time option with the varying colours in between.	Time frame (years) was considered as part of the existing conditions and alternative methods evaluation, as both current and future traffic counts were included in the analysis. Specifically, we evaluated the potential current and future impact on traffic at intersections surrounding the SCRF as a result of trucks coming to and from the SCRF. Since the number of trucks per day allowed to the site will not change with any of the options, there is no increased potential for collisions or increases to level of service at any of the intersections. Therefore, none of the Options present effects to Traffic. Further, the detailed impact analysis (in the next phase of EA) will include an analysis on traffic levels through both the design and operation phase as well as the decommissioning phase of the Facility.
For the transportation component, Option 1 should be green and Option 5 should be red to reflect closure dates.	For transportation, the evaluation criteria was "effect on traffic". In this case, none of the options results in a change in the number of trucks allowed to the site, or result in increased potential for collisions or increased level of service at any intersection. In the next phase of the EA, the detailed impact assessment there will be an analysis on traffic levels through both the design and operation phase as well as the decommissioning phase of the Facility.
In the "Design & Operations" component, The Stormwater management line should all be Green circles as the 72" sewer trunk runs right beside the property. The Rationale comment should include the words at the start of the sentence " The above colour coding favours the best business case for Terrapure's profitability”	As noted above, stormwater from the site must be treated onsite in a stormwater management pond. The rationale for evaluating the options under the stormwater management component included the design and operating complexity of the stormwater management system. Only one of the criteria in the “Design and Operations” component is related to the option’s ability to provide the additional capacity being sought. The Terms of Reference does state that this purpose was determined, in part, by the economic opportunity available to Terrapure. We will consider ways to make this more transparent in future open houses.
Land Use and Economic	
Consider the large population expansion within the area and of the sensitive land uses of the surrounding area because of rapid population growth.	As part of evaluating the six options, we will assess their potential impact on the existing and future land uses, including planned and approved new development.
Would like assurance that the MOECC guidelines for distances from the landfill are respected within the decision for the Site.	The environmental assessment (EA) is being carried out according to the Minister Approved Amended Terms of Reference, the requirements of the *Environmental Assessment Act,* and O.Reg 232/98, which outlines design guidelines and considerations for property boundary setbacks and buffer zones.
Interested in where waste would be sent if this facility closes and the potential CO2 emissions and cost of transport.	Thank you for your comment. Closure of the existing SCRF would create a significant gap in the company’s services for long-standing customers within the H&GTA. Historically, approximately 50 percent of the annual disposal capacity for residual material is generated by businesses and operations located within the City of Hamilton and 93 percent within the H&GTA. The additional trucking required to take the industrial residual material has the potential to increase GHG emissions for longer trips to other waste facilities by approximately 23,500 to 64,000 tonnes per year. The requirement to ship to other locations would also create a financial burden to Ontario industries, ranging from about $28 million to $100 million, in present value terms over the course of the proposed additional residual capacity lifespan of the SCRF under the proposed undertaking. More information on these details can be found in Supporting Document #1: Terrapure SCRF – Business Case Analysis.

Comment from Member of the Public	How the Comment was Considered
Visual	
I would like to see a comprehensive landscape plan for the beautification of the boundaries at the site for viewing and public comment at the next Open House (or sooner online).	Thank you for your suggestion. The potential screening measures presented at the Open House will be included in the Land Use Impact Assessment Report and Environmental Assessment Report. We would appreciate any feedback you have on these screening measures.
Opposition to the height increase	We understand that some community members are concerned with any increase in height. The visual effects of each of the options were considered as part of the evaluation, which included consideration of height increases. Option 5 has an estimated height increase of 2.5 m that, through the application of mitigation measures such as additional vegetation and/or fencing, can be mitigated or blocked sufficiently.
Should the proponent proceed with additional screening, please do not opt to use any artificial greenery. One of the photos above seems to show artificial green on a fence system. We urge that the proponent make use of real vegetation ideally native to screen the site. This will bring other benefits including creating habitat in the area.	Thank you for your recommendation for the screening surrounding the SCRF to be real vegetation, ideally native. Different screening techniques may be used at various locations around the site and, where possible, native vegetation will be used.
Air Quality and Odour	
We are concerned about the fact that there will be a decrease in the separation distance between the landfill activities and adjacent residential properties to the north of the SCRF. This means that there is the potential for impacts on 'sensitive receptors' like residential areas and the school proposed to the northwest of the site because these uses will be in such close proximity to the operating landfill.	The potential for odour from the facility is not predicted to change in the future compared to current conditions. The facility has an existing procedure for responding to odour complaints, including identifying if the odour is likely to originate from the site (based on wind direction), checking the leachate pumping station and surface run-off pond for operational issues, and addressing any issues if found. Odour complaints are summarized in the annual report, and the MECP is informed of all complaints and how each complaint has been addressed. Adherence to the MECP Point of Impingement (POI) Criteria for particulates is predicted through dispersion modelling, with receptors identified at 20 m intervals around the perimeter of the site, and at defined intervals (gridded receptors) extending up to 5 km from the property boundary, per MECP requirements. The dispersion modelling for the SCRF determined that predicted concentrations of dust in the community met MECP guidelines, but based on some phases of the operations, and some traffic levels, there was a potential for dust concentrations at the fenceline to exceed MECP guidelines. The SCRF is able to increase onsite dust mitigation activities (such as watering and sweeping the on-site roads, reducing on-site vehicle speed, limiting activities near the property boundary during periods of higher winds, and not operating at maximum capacity on a daily basis) such that MECP guidelines are met at all locations. In the event of dust complaints, the SCRF also has a complaint procedure, including identifying if (based on wind direction) it is likely the SCRF is the source of the dust, inspecting the work areas to ensure dust mitigation activities are being implemented, and if necessary increasing dust mitigation activities to address any issues.
Provide more detail around the 2.5 µm particulate matter size fraction (PM2.5) results from the Air Quality Impact Assessment Report.	The Air Quality Impact Assessment assessed $PM_{2.5}$ for the existing and four proposed operational phases of the project. For each phase, anticipated vehicle traffic and material handling was modelled. In addition, a cumulative effects assessment was carried out, by adding the estimated background $PM_{2.5}$ concentrations measured at local air quality monitoring stations (operated by the Hamilton Air Monitoring Network and National Air Pollution Surveillance network) to the predicted results for the facility operations. The results present an estimate of air quality because of operations at the facility and other sources in the area.
We wonder whether the reference to on-site monitoring of PM_{10} is a plan to do a one-off monitoring exercise or whether there is an on-going commitment to undertake PM monitoring along the facility fenceline - something we believe should be	Under its Approval to Proceed (1996), the SCRF implemented an ongoing PM_{10} monitoring program (managed and maintained by Rotek Environmental), with annual reports submitted to the MOECC. The last 5 years of reports are also posted on the Company's website. The approval to proceed with the undertaking was subject to 23 terms and conditions under the

Comment from Member of the Public	How the Comment was Considered
happening now anyway. We would add that the proponent should also be required to monitor for PM2.5 -now confirmed as a known cause of lung cancer in humans.	Environmental Assessment Act, and 115 terms and conditions under the Environmental Protection Act. The annual air quality monitoring reports are prepared annually with the objective of satisfying Condition 2.4 under the Environmental Assessment Act and Condition 54 under the Environmental Protection Act. This includes continuous PM_{10} monitoring at the Met One BAM 1020 monitor located at the east property line, downwind of the facility operations. PM_{10} was selected as the airborne particulate species of interest in accordance with environmental monitoring practices and standards at that time. The equipment has been maintained according to accepted practices, and is audited by the MOECC on an annual basis. PM_{10} incorporates $PM_{2.5}$, and the existing monitoring program continues to be deemed acceptable by the MOECC for the purposes of monitoring airborne particulates in the vicinity of the SCRF. Based on the emissions inventory and dispersion modelling for the facility as part of the ongoing EA process, the facility is unlikely to be a major contributor to elevated $PM_{2.5}$ concentrations in the area.
Add PM monitors around the SCRF.	At this time, we do not believe that it is necessary to add additional monitors since monitoring and best management practices on-site are sufficiently meeting the requirements set out in the Environmental Compliance Approval. The results of air quality monitoring is published annually in the Annual Report, which is provided to the Ministry of the Environment, Parks and Conservation, and the City of Hamilton.
Include Isopleth Maps in the Air Quality Impact Assessment Report	Isopleth maps provide information regarding continuous distribution over an area and are often used to depict elevation, temperature, rainfall or other data. During the Terms of Reference (ToR), the Ministry of the Environment, Conservation, and Parks (MECP) reviewed the Air Quality technical work plan and isopleth maps were not requested or required to be included in the Impact Assessment Report. That is why they were not developed or included as part of the Air Quality Impact Assessment Report presented at the In-Person Open House #3. The MECP bases their assessment of a project on the maximum predicted concentrations of airborne contaminants, regardless of where these might occur off-site (including at the fenceline).
Natural Environment	
Consider the future impact of the Facility on animal populations.	As part of evaluating the six options, we will assess their potential impact on the existing and future terrestrial and aquatic ecosystems, including wildlife and fish.
We wonder whether there is any risk currently, or with potential future scenarios, for wildlife in and around the stormwater management pond. Are there contaminants present that wildlife might be exposed to?	The stormwater ponds manage only stormwater; any water associated with or generated from landfilling activities (e.g. leachate) is isolated from the stormwater management ponds. A surface water sampling program tests for a suite of parameters to ensure the water quality being discharged off the Site does not pose a risk to the environment, and to ensure no leachate is getting into the surface water on Site. Current contaminants of concern in the stormwater management pond include total suspended solids (TSS) and phosphorus. TSS is removed in the pond and should not affect downstream waterbodies and wildlife, but phosphorus levels are known to be elevated in both on-Site and off-Site locations. The stormwater management pond also has a shut-off valve; if there is a surface water quality issue, surface water can be contained on-Site. With the surface water sampling program in place to detect and control changes which may be harmful to the environment, we do not anticipate that contaminants (TSS and phosphorus) in the stormwater ponds pose a risk for wildlife in and around the stormwater ponds under the existing or proposed scenarios.
The text states that 'Temporary impacts during construction and operation to vegetation, wildlife habitat, aquatic habitat, and aquatic biota will be minimized.' The text goes on to read that the proponent will 'Conduct any vegetation removal outside of the breeding bird window'. Does this mean that the proponent will replace all lost breeding bird habitat?	You are correct. Any habitat potentially used by breeding birds that will be removed during construction of the SCRF will be replaced. In addition, Terrapure will consult with the Ministry of Natural Resources and Forestry (MNRF) and will file a *Notice of Activity* to ensure the protection of species and habitat.

Comment from Member of the Public	How the Comment was Considered
Traffic	
By stating that 'SCRF truck traffic will be restricted from Green Mountain Road - do you mean restricted from using this roadway? Are the only allowable access points Highway 20 and First Road West? Will there be lower speed limits put in place and enforced on First Road West and Green Mountain Road for added safety in the neighbourhood?	You are correct. Truck traffic will continue to enter the SCRF from Upper Centennial Parkway and leave at First Road West turning towards Mud Street, avoiding the need for any truck traffic to Green Mountain Road. Safety for our neighbours, staff, and customers is very important to Terrapure. Terrapure already does and will continue to enforce reduced speed limits on-site and encourages drivers to maintain reduced speeds as they exit.
How much will the project affect the future efforts to make Upper Stoney Creek more valuable and transit friendly?	As part of the evaluating the six options, we will assess the effect on traffic, approved/planned land uses, and the economic benefits to the City of Hamilton and local economy. Terrapure has provided over $22 million to the City of Hamilton and the Heritage Green Community Trust over the history of the SCRF. We continue to look forward to providing funding to the City.
Human Health	
Concern for human health	Human Health was considered as part of the comparative evaluation of the options and will be further assessed during the Impact Assessment phase. The results of the comparative evaluation indicated that there would be a low potential for adverse effects with the continuation of the existing site. Best Management Practices, ongoing monitoring and augmented mitigation measure would be used to reduce or eliminate any impacts. In addition, Terrapure has been in operation for 20 years, with more and more neighbours and residential development building up around us, and we have never had an incident affecting health or the environment. The Hamilton Public Health has reviewed all of the extensive health and environmental monitoring data accumulated over 20 years in existence and confirmed there is nothing that poses a risk to the community.
Concern with air quality, dust particulate blowing, and long term exposure on human health and belief that the health studies are inconclusive because there has not been enough time to determine the health risks.	Air quality (including dust) and human health were considered as part of the comparative evaluation of the options and will be further assessed during the Impact Assessment phase. Terrapure also wants to ensure that the human health of employees and the surrounding community are not adversely affected by operations. For the past 20 years of our operations, with more and more neighbours and residential development building up around us, and we have never had an incident affecting health or the environment. The Hamilton Public Health has reviewed all of the extensive health and environmental monitoring data accumulated over 20 years in existence and confirmed there is nothing that poses a risk to the community.
Heritage Green Community Trust	
Reviewing the text, we wonder why the wording is that this 'may provide' an additional $14 million to the Heritage Trust. All of the other points are made with more certainty. Should the company receive approval to proceed with the preferred option is there a chance that the Trust will not see this amount of money? If so, why is this the case?	The Heritage Green Community Trust and City of Hamilton royalty program, which receive $1 for each tonne of residual material received annually, are linked exclusively to the facility receiving residual materials. As such, with the current approval, these contributions would only continue for approximately 1 to 2 more years. Terrapure has agreed to begin negotiating a new arrangement in good faith with the City of Hamilton that could be enacted should the EA and the ability to bring in additional residual materials be approved.
The financial contributions are not as important as the cost to the community	Terrapure has provided over $22 million to the City of Hamilton and the Heritage Green Community Trust over the history of the SCRF without compromising environmental protection or public health.

Comment from Member of the Public	How the Comment was Considered
Closure Planning	
Interest in what the closure plan will include. Ideas presented included gardens, ski hill, small restaurant, and golf course.	Terrapure must develop a closure plan when permitted capacity gets to a certain level (90%) or within two years prior to closure. Terrapure committed to developing a closure plan in our approved Terms of Reference and in keeping with our ongoing commitment to robust community consultation we are starting it as early as possible. These recommendations will be provided to and discussed with the Closure Planning Advisory Committee.
Operations of the Existing SCRF	
Skeptical of the current operations and proposal following contacting the Ministry of the Environment and Climate Change and the City of Hamilton and still don't have any clear answers on the impacts of the landfill in 30 years.	Terrapure's Stoney Creek Regional Facility has an exemplary compliance record when it comes to environmental protection and human health. We operate in compliance with or exceed regulatory requirements. We have been in operations for 20 years and have never had an incident affecting human health or the environment. In addition, as part of the EA, potential impacts identified will be addressed through the use of best management practices and mitigation measures. At the next Public Open House, the public will be able to review and provide input on proposed mitigation measures.
Concern about acceptance of hazardous material.	The SCRF does not receive hazardous materials; we only accept solid, non-hazardous residual material from industrial operations like the local steel producers and infrastructure projects like the James Street GO Station. We have recently released a video which tours the Stoney Creek Regional Facility and speaks to what kind of materials are accepted at the site. It can be found on our homepage at www.terrapurestoneycreek.com
Concern with odour coming from the existing SCRF.	SCRF is only permitted to receive non-hazardous residual material from industrial, commercial and institutional sources. We are not permitted to receive any compost or garbage that decomposes and has the potential to cause odours. Often, when we receive inquiries related to odour, it is determined to be associated with other activities happening nearby. We do however have a community response line (905-561-0305), which we encourage residents to call and communicate with us to document and investigate any odours that could be coming from our facility. You may also call the Ministry of the Environment, Conservation and Parks at 416-325-3000 or 1-800-268-6060. Odour was assessed during the Impact Assessment and no off-site odours are anticipated as a result of the proposed undertaking. The SCRF will continue to monitor air quality on-site and will investigate and respond to any odour issues at the SCRF.
Concern with existing visual aesthetics of the site. Does not like the black fencing, damage from the wind storm, and general lack of beautification around the SCRF.	Terrapure takes pride in ensuring that we operate in a manner that is respectful of our neighbours. We have heard and continue to receive feedback from community members regarding the visibility of the site from surrounding vantage points. In response, we implemented additional visual screening measures at the site. Berms have been heightened to increase screening around site access points and fencing has been installed on the west side of the site. In addition, as part of the SCRF EA the visual impact assessment view-sheds were analyzed and a variety of appropriate screening measures presented for consideration. Attendees were invited to comment on the proposed screening measures for consideration as part of the EA.

7.7 Peer Review

A Peer Reviewer was retained for the SCRF EA process with the objective of providing an independent review of the technical information developed as part of the SCRF EA. The peer reviewer assisted in identifying opportunities for improvement based on design standards, best management practices, regulatory requirements, and other relevant recommendations related to engineered landfills and their environmental control systems.

Dr. R. Kerry Rowe, the Peer Reviewer, is a Professor in the Department of Civil Engineering at Queen's University, and the Canadian Research Chair in Geotechnical and Geoenvironmental Engineering. In Ontario, Dr. Rowe has been involved with numerous landfills, including sites in Halton, Grimsby, Vaughan, Hagersville, Kirkland Lake, Flamborough, Tiny Township, Warwick, Innisfil , Peel, Port Colborne, Cambridge, and Canborough.

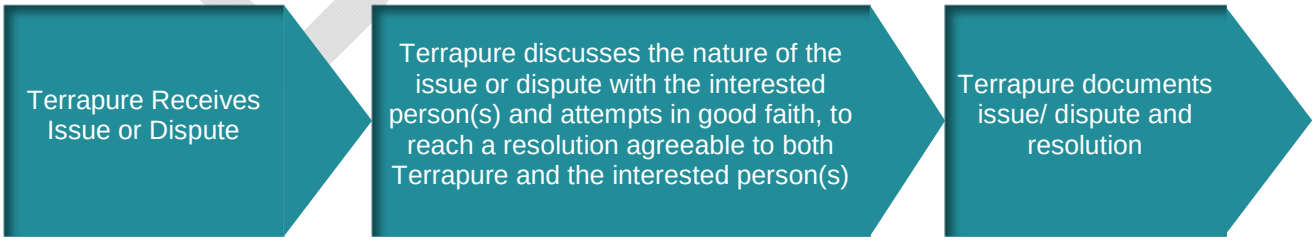
Dr. Rowe has also been involved with the Development of Design Standards for Ontario Landfills for the MECP, making him well-suited for the role of Peer Reviewer for the noted technical aspects of the Terrapure SCRF EA.

The Peer Reviewer had the opportunity to review and provide recommendations at each key milestone of the SCRF EA process including reviewing the following documents:

- Draft Alternative Methods Report
- Draft Conceptual Design Report
- Facility Characteristics Report
- Draft Impact Assessment Reports
- Draft SCRF EA Report
- Final SCRF EA Report

7.8 Issues Resolution Strategy

Terrapure implemented the issues resolution strategy proposed in the amended approved SCRF EA ToR during preparation of the SCRF EA. The issue resolution process was implemented to ensure that disputes were effectively and appropriately dealt with. . In the event that a mutually agreeable resolution does not occur, by the time of formally submitting the SCRF EA, Terrapure will refer the matter to MECP. The following summarizes the issue or dispute process followed by Terrapure during the preparation of the SCRF EA:



With this in mind, the following **Section 7.9** summarizes the issues raised during preparation of the SCRF EA including from who along with how they were attempted to be resolved by Terrapure.

7.9 Review of the Draft Environmental Assessment

The following section will be completed following the Draft EA Review period.

7.9.1 Availability for and Notification of the Review of the Draft SCRF EA

7.9.2 Consideration of Comments Received on the Draft SCRF EA Report

7.10 Submission of the Environmental Assessment

The following section will be completed following the Draft EA Review period.

7.10.1 Availability for and Notification of the Review of the SCRF EA

7.11 Commitments for On-Going Consultation

7.12 Consideration of Comments Received and Issues Raised during the Stoney Creek Regional Assessment Environmental Assessment

Table of Contents

Table Index

8. Commitments and Monitoring of the Undertaking

To ensure that the proposed mitigation measures set out in **Section 6.0** address predicted effects for each discipline, monitoring strategies were developed so that any respective environmental effects can be monitored during construction, operation and closure/post-closure of the SCRF expansion.

8.1 Environmental Effects Monitoring

Monitoring strategies have been developed for the Preferred Alternative to ensure that:

- Predicted net effects are not exceeded
- Unexpected negative effects are addressed
- Predicted mitigation effects are realized

Table 8.1 below summarizes the potential effects and the proposed monitoring by discipline for the Preferred Landfill Footprint.

Table 8.1 Proposed Monitoring

Discipline	Proposed Monitoring
Geology & Hydrogeology	Groundwater monitoring Leachate monitoring
Surface Water Resources	Surface water monitoring
Terrestrial and Aquatic	Erosion and sediment control Wildlife exclusion fencing Vegetation monitoring Species at Risk monitoring
Air Quality & Odour	Leachate monitoring
	Dust Monitoring
Noise	Routine landfill equipment monitoring
Surface Water Resources	Surface water monitoring
Land Use	Existing environmental monitoring programs identified in the FCR (i.e., leachate, groundwater, surface water, landfill gas) and periodic program updates and adaptations

8.1.1 Geology & Hydrogeology Monitoring

The Site hydrogeologic environmental performance is currently monitored through a comprehensive long-term groundwater monitoring program. This monitoring program includes collection of static water levels and groundwater quality samples four times per year at an extensive network of monitoring wells screened within the various flow zones on-Site and in the Site Study Area. The monitoring well network has evolved through the many years of Site monitoring to provide a very detailed account of the distribution of hydraulic head (static groundwater conditions) and groundwater quality within the various flow zones.

Groundwater quality samples are collected for a comprehensive list of analytes to identify landfill-related alterations to groundwater quality. This monitoring program is currently in place and will be maintained through landfill development under the Preferred Landfill Footprint. The long-term

groundwater monitoring program tracks changes in groundwater quality and flow over time and will be used to assess the validity of the model predictions regarding the performance of the Preferred Landfill Footprint. The results of long-term monitoring will be reviewed and interpreted in detail annually as part of the annual reporting process. Annual data interpretation and reporting is used to ensure any deteriorations in environmental performance are identified and addressed through changes in operational practices or implementation of augmented remedial responses.

As with any environmental monitoring program, modifications to the program are occasionally necessary to adapt the program to evolving conditions. Accordingly, the monitoring program will be reviewed, as part of the annual reporting process to ensure that the monitoring program is adequately characterizing Site conditions with respect to the presence and movement of landfill-related groundwater quality alterations.

8.1.2 Surface Water Resources Monitoring

The existing surface water sampling program will continue to ensure that stormwater is being treated effectively by the SWM ponds. As the Site continues to be developed, the sampling locations will need to be updated to reflect the changing surface water conditions, both on- and off-Site. Water quality parameters will be sampled to ensure that the water quality of the surface water leaving the Site is meeting quality objectives. The current monitoring program samples for many surface water parameters, such as pH, alkalinity, dissolved oxygen, temperature, conductivity, total suspended solids (TSS), total phosphorous, chloride, total ammonia, and phenols. Sampling occurs at locations on-Site as well, and in locations in the downstream receivers. Lower Davis Creek is sampled both upstream and downstream of the discharge location to see if there is any impact that may be attributed to the Site. A similar monitoring program should be in place for the new SWM measures to ensure that there are no impacts on the surrounding surface water features. As with the current sampling program, the SWM pond outlet should be able to be shut-off in the event that water quality objectives are not being met.

Annual inspections of the SWM ponds, like the inspections currently implemented, will be required to ensure that the SWM pond is operating correctly. Recording the level of sediment accumulation within the ponds will be required to ensure TSS are being effectively removed. Periodic cleaning of the ponds to remove accumulated sediments will be required to ensure that that pond continues to function as designed. The pond will also be inspected to other items that may affect the function of the pond, such as bank erosion, damage to concrete structures and quality of the pond vegetation. These issues can be addressed on an as needed basis.

8.1.3 Terrestrial and Aquatic Monitoring

A monitoring strategy and schedule has been developed based on the Natural Environment Impact Assessment carried out for the Preferred Landfill Footprint to ensure that: 1) predicted net negative effects are not exceeded; 2) unexpected negative effects are addressed; and, 3) the predicted benefits are realized.

8.1.3.1 Environmental Effects Monitoring

Environmental Effects Monitoring programs during construction and operation will vary in terms of parameters monitored, duration and outcome, depending on the issue being monitored, and will direct adaptive management efforts.

8.1.3.1.1 Erosion and Sediment Control/Wildlife Exclusion Fencing

Dual purpose ESC and wildlife exclusion fencing will be inspected on a regular basis to ensure it is functioning properly and as intended. If regular inspections identify deficiencies (e.g., tears and holes, slumping), these deficiencies will be communicated to the appropriate person and rectified promptly to ensure continued protection/exclusion.

8.1.3.1.2 Vegetation

The vegetation monitoring program may include the following components: verification of seed mix/plant species to be planted, plant survivorship monitoring, and invasive species management. Vegetation monitoring programs will be developed in greater detail during subsequent design phases, and pending consultation with MNRF with respect to vegetative habitat compensation.

8.1.3.1.3 Species at Risk

Monitoring requirements related to SAR are specified as part of the applicable Notice of Activity protocol, and are described in further detail below.

Table 8.2 Species at Risk Monitoring Requirements

Species	Proposed Monitoring Requirement	Associated Licenses, Permits or Authorizations
Eastern Meadowlark	Monitor the created or enhanced new habitat for 5 years, which will entail at least 3 breeding bird surveys annually during the appropriate timing window	Notice of Activity
Barn Swallow (if applicable)	If barn swallow nests are detected on Site infrastructure scheduled to be relocated during the operation stage, monitoring requirements as part of the Notice of Activity protocol will be applicable.	Notice of Activity

8.1.4 Air Quality & Odour Monitoring

The SCRF currently supports a monitoring station (operated by Rotek Environmental, under contract to Terrapure Environmental) specifically to monitor for airborne PM_{10} and local meteorological conditions (for investigating the likely source(s) of air quality and odour complaints). This station will continue to operate through the lifetime of the Facility, per the Facility's waste Environmental Compliance Approval.

8.1.5 Noise Monitoring

As mentioned, a monitoring strategy and schedule was developed based on the Noise Impact Assessment carried out for the Preferred Landfill Footprint to ensure that: 1) predicted net negative

effects are not exceeded; 2) unexpected negative effects are addressed; and, 3) the predicted benefits are realized.

A semi-annual noise monitoring survey was completed during 2016 to measure noise levels at the nearest receptors around the SCRF. This monitoring will continue to operate through the lifetime of the Facility, per the Facility's waste Environmental Compliance Approval. This would also occur during the proposed expansion.

8.1.6 Land Use Monitoring

The current environmental monitoring programs identified in the FCR (i.e., leachate, groundwater, surface water, landfill gas) and Best Management Practices (BMPs) will continue over the life of the Site. Existing methods and protocols may need to be amended periodically to accurately reflect Site conditions. Confirmatory monitoring programs will continue to be documented in the Annual Monitoring Report.

8.2 Development of Best Management Practice Plans

Environmental Management Plans (EMP) will be prepared following approval of the Undertaking by the Minister of the Environment, Conservation and Parks and prior to construction. The EMPs will include a description of the proposed mitigation measures, commitments, and monitoring. This will also include a description on the standard BMP that are currently in place at the Site that will continue.

BMP Plans are tools by which Terrapure and its agent(s) can demonstrate how the EA commitments, monitoring requirements, and approval conditions have been addressed through subsequent construction and operation phases. They will also act as a reference document for use by Terrapure during the construction of the approved Undertaking.

8.3 Commitments & Fulfillment

The commitments made in this EA by Terrapure that are related to the construction, operation and closure/post-closure of the undertaking are outlined in **Table 8.3**. Specifically, the following components are outlined:

- **Category**
  Discipline or topic to which the commitment applies (e.g., Air Quality & Odour, Noise, etc.)
- **EA Commitment**
  Specific commitment made in the EA
- **Commitment Timing**
  Appropriate phase of the undertaking during which commitment is to be implemented (e.g., pre-implementation, ongoing)

Table 8.3 Commitments Overview

Category	EA Commitment	Commitment Timing
Geology and Hydrogeology	Operation of the M4 extraction well to control hydraulic gradients beneath and immediately surrounding the SCRF. Completion of the network of shallow groundwater collection trenches. Flooding of the hydraulic control layer to induce an upward hydraulic gradient to prevent leachate leakage. Sampling and testing of hydraulic control layer water to confirm leachate leakage is not occurring. Continue comprehensive groundwater monitoring program. Review results along with interpretation and recommendations annually. Review monitoring program annually to determine if adjustments are needed to track potential landfill-related water quality alterations.	Pre-implementation of undertaking; ongoing and post-closure
Surface Water	Minor modifications to the SWM ponds include additional perimeter ditches along the north and west perimeter of the Site, converting the current SWM detention pond into a second forebay, and re-grading the future detention pond to increase the depth and surface area of the pond. Approval will need to be obtained prior to the construction of the modified SWM ponds.	Pre-implementation of undertaking; as part of undertaking
Terrestrial and Aquatic	An MNRF Notice of Activity process will be followed to acknowledge the presence of eastern meadowlark habitat within the Site Study and in compliance with the *Endangered Species Act*. As part of the Notice of Activity process, a Habitat Management Plan will be created prior to the initiation of any construction which will document the areas to be affected and detail where and how new habitat will be created or enhanced. No barn swallow nests were documented during the Site investigations, however targeted surveys of suitable habitat are recommended when it is determined that these structures will be altered through the course of the proposed works. If any barn swallow nests are detected, MNRF will be consulted and a Notice of Activity process will be followed. A Compensation/Restoration Plan will be developed as the project progresses to identify areas where compensation may occur on Site during operation, and also provide recommendations for plantings as part of the landfill closure plan.	Pre-implementation of undertaking; ongoing
Air Quality & Odour	Terrapure Environmental will update their Best Management Practices Plan with respect to the mitigation/control of re-suspended road dust. On-Site roads in the buffer zone or at the entrance and exit to the Facility will be paved. The SCRF will continue to use a wheel-washing station near the SCRF exit to reduce track-out of road dirt from the Site onto public roads. The SCRF will continue to operate the existing air quality monitoring station and investigate the likely conditions and/or sources contributing to any air quality or odour complaints received by the Facility.	Pre-implementation of Undertaking; ongoing

Noise	The SCRF will continue to complete semi-annual noise monitoring and investigate the likely conditions and/or sources contributing to any noise complaints received by the Facility.	Pre-implementation of undertaking; as part of undertaking; ongoing
Land Use	The Site design will include screening features, such as fences, berms and tree plantings, which mitigate visual impact and noise. Specific screening techniques will be developed further during detailed design to mitigate the visual impact from the surrounding community. Screening techniques will be tailored to site conditions and anticipated visual impact from surrounding vantage points.	Pre-implementation of undertaking; as part of undertaking
Human health	Those commitments outlined for the other disciplines are required to ensure proper operation of SCRF, including described mitigation measures, to prevent potential human health concerns. Continuation of the preparation of the Community Health Assessment Review as part of the Annual Monitoring Report for the SCRF.	Pre-implementation of undertaking; ongoing and post-closure
Design and Operations	Preparation of an update to the original Design and Operations Report (Gartner Lee Limited, 1995). Development of detailed designs and specifications for all major components of the SCRF. Revisions to Site operating manuals and protocols. Updates to existing environmental monitoring programs.	Pre-implementation of undertaking; as part of undertaking; ongoing

If the proposed Undertaking is approved by the MECP under the EA Act, then Terrapure will prepare an EA Compliance Monitoring Program, which will include all of the commitments outlined in **Table 8.3**, as well as any EA Act conditions of approval.

8.4 Contingency Plans

Contingency plans are developed to proactively identify measures or a process for taking action on unexpected problems resulting from landfill operations. Terrapure has a number of contingency plans in place and these plans will be reviewed and modified for the Proposed Undertaking accordingly during the Detailed Design. These plans include actions to be taken, timing, and roles and responsibilities. The existing contingency plans are outlined in EPA documentation (i.e., the amended Design and Operation Report for the Site) and as mentioned, will be modified accordingly. **Table 8.4** below provides an example of an existing contingency plan that will be modified as required.

Table 8.4 Contingency Plan Overview

Contingency Plan	Contingency Plan Details
Contingency and Emergency Response Plan (to include): • Spill Response • Leachate System • Surface Water and Groundwater	A Contingency and Emergency Response Plan will be modified as part of the amended Design and Operation Report for the Site and will include the following information: • List of persons responsible for the Site, including contact information • List of emergency phone numbers for applicable emergency entities • Description of fire protection, control system, and emergency procedures • Description of safety devices and maintenance procedures • Training of Site personnel • Site plan including location of all emergency equipment

Contingency Plan	Contingency Plan Details
• Storms and Inclement Weather • Accidents and Injuries	The Contingency and Emergency Response Plan will be kept in a central location at all times. Training will be provided for personnel in all CERP procedures. General elements of the Contingency and Emergency Response Plan may include: • Have crew trained on notification and clean-up procedures so personnel and equipment can attend to local waste spill. • Cooperate with local officials (e.g., police, road crews, environment officials, etc.). • Prevent contact with ditches and watercourses and retrieve from vulnerable locations. • Clean-up spilled material into roll off or appropriate containers and remove to landfill. • Clean-up liquid or solids into appropriate leak-proof containers, such as drums or lugger boxes. • Dispose to proper facility. • Assemble appropriate protective equipment and containment equipment. • Contain spill with absorbent material, ponds and berms. • Ditch, berm or excavate sump as required to contain spill.

Table of Contents

9. Approvals and Agreements Required for the Undertaking

In addition to EA approval, further environmental approvals will be required in support of the proposed undertaking. This section outlines the other approvals that will be required for the proposed undertaking. In some cases, the approval identified may be a section or condition of the ECA for the site overall, as opposed to a separate approval.

9.1 Environmental Compliance Approval

An application to amend the existing ECA for the Site will need to be submitted to the MECP for approval. Changes to the design and operations of the landfill required as a result of the Preferred Alternative will be documented in an update to the existing Design and Operations (D&O) Report for the Site.

9.2 Natural Environment

9.2.1 Geology & Hydrogeology

Additional approvals that may be required for the Geology / Hydrogeology management of the Site include:

- Permit/approval from the City of Hamilton;
- ECA amendment from the MOECC.

9.2.2 Surface Water Resources

The updated D&O and amended ECA will include details of any changes required to the approved on-Site stormwater management system. No other approvals are expected to be required with respect to surface water.

Additional approvals that may be required for the Stormwater Management of the Site include:

- Permit/approval from the Hamilton Conservation Authority (HCA);
- Permit/approval from the City of Hamilton;
- ECA amendment from the MOECC.

9.2.3 Terrestrial & Aquatic

With respect to the terrestrial environment, additional approvals that will be required include the following:

- A Notice of Activity process with the Ministry of Natural Resources and Forestry (MNRF) will be followed to acknowledge the presence of eastern meadowlark habitat within the Site Study Area, protection of the species and their habitat, in compliance with the Endangered Species Act.

With respect to the aquatic environment, additional approvals that may be required include the following:

- Obtain necessary approvals for fish/wildlife rescue activities (e.g., MNRF License to Collect Fish for Scientific Purposes) prior to initiation of any in-water works, as appropriate.

9.2.4 Air Quality & Odour

No further approvals are required from an air quality & odour perspective. As previously indicated, given the types of material accepted the Site generates very little landfill gas and falls below the regulatory threshold for a gas collection system (more than 1,500,000 m^3 waste capacity).

The Facility is not required to register for an Environmental Activity and Sector Registry (EASR), or apply for an Environmental Compliance Approval (air and odour), under current regulations. The SCRF will maintain their Dust Management Plan in order to ensure local air quality is maintained to regulatory standards.

9.2.5 Noise

The updated D&O and amended ECA will include any additional mobile noise sources, such as crushing equipment for C&D processing. Other landfill operations equipment and potential on-Site noise sources, including intermittent, will be addressed under the ECA for the Site overall. No other approvals are expected to be required with respect to noise.

The Facility is not required to register for an EASR or apply for an Environmental Compliance Approval (noise), under current regulations.

9.3 Built Environment

9.3.1 Land Use

A Zoning By-law Amendment will be required for the Site, post-closure of the SCRF. The current in-effect zoning of the Site, as identified in the City of Stoney Creek Zoning By-law No. 3692-92, is ME-1 (Extractive Industrial), which is permitted for operations associated with non-hazardous waste from industrial, commercial, and institutional sources. The intended future use of the Site, as identified in the City of Hamilton Nash Neighbourhood Secondary Plan under the Urban Hamilton Official Plan, is Open Space / Parkland. A Zoning By-law Amendment will be required to facilitate the change in use of the Site, which will be initiated by the property owner of the Site at the time of post-closure of the SCRF.

Table of Contents

10. Amending the EA

Some aspects of an approved Undertaking may require changes following approval by the Minister under the *EA Act*, as design details are further developed during the latter stages of project design, construction, and/or operation. It may also be necessary to amend the EA because of changes in environmental, social, or economic conditions, development of new impact mitigation measures, or the identification of previously unknown concerns. In recognition of this, Terrapure is proposing an amendment procedure in accordance with the *EA Act*. This amendment procedure would benefit all parties potentially involved by providing an agreed to, and well understood approvals process for ensuring that proposed changes are effectively and appropriately dealt with.

As such, it is proposed that any unforeseen changes to the approved Undertaking be first reviewed by Terrapure staff in conjunction with the MECP, and then grouped into 1 of 3 categories: (1) no amendment required; (2) a minor amendment required; or, (3) a major amendment required. As a result of this approach, two amendment procedures are being proposed: one associated with minor amendments, and one associated with major amendments.

It should be noted that the maximum proposed capacity increase for the Preferred Undertaking presented in this EA is 3,680,000 m^3. Therefore, if there was a desire to increase the landfill capacity, Terrapure would be required to complete a separate approval under the *EA Act* in accordance with this process.

10.1 Change Review Process

During the detailed design, construction and/or operation of the Preferred Undertaking, changes to some aspects of the project's design may occur due to:

- Unforeseen site specific problems encountered only during detailed design, construction, and/or operation;
- Improvements in the design to provide greater environmental benefits and/or less adverse effects;
- Circumstances that develop at the time of construction;
- Issues identified in other approvals processes;
- Changes to the regulatory framework (i.e., new legislation or regulations).

Where such changes may occur, a process must be followed to consider them within the context of the MECP approved EA, and determine if an amendment is required based on the significance of the change. Therefore, any unforeseen change to the MECP approved Preferred Undertaking will be reviewed by Terrapure in conjunction with MECP prior to it being carried out. With respect to this consultation, the following questions will be applied to the proposed change, as part of the review to determine how it should be dealt with within the context of the EA amendment procedure:

1. Is there a change to what was proposed to be built?
2. Is there a change to where something was to be built?

3. Is there a change to how something was to be built?

4. Is there a change to when something was to be built?

Following discussions with MECP regarding the potential change, Terrapure will utilize the responses to these questions to determine how the proposed change will be handled. For example, in the case of a "Yes" response being provided to any of these questions, Terrapure will determine the significance of that change in terms of its net effect on the environment, a stakeholder (including the public), and/or a commitment made in the Minister approved EA.

If the significance of the change is determined to be negligible, then no amendment would be required and Terrapure could proceed with implementing the change. An example of this may be a shift in the internal road network.

If, however, the change was to result in an increased net adverse effect (i.e., as a whole after considering potential benefits from the change), the review will be documented by Terrapure and then categorized as either a potential minor or major amendment, subject to discussions with the MECP's Environmental Assessment and Permissions Branch and concurrence from the Director. The same criteria and indicators described in the EA will be used for this comparative process to determine potential benefits from the change. Descriptions of the processes for addressing minor and major amendments are provided below.

10.2 Minor Amendments

A proposed change to the approved EA that would not alter the Preferred Undertaking significantly in terms of what would be built, where it would be built, how it would be built, and when it would be built, but may result in an increased net environmental effect would be categorized as a minor amendment.

In the case of a minor amendment, regardless of the changes proposed, the conclusion that the Preferred Undertaking is required, and its status as the Preferred Undertaking in relation to the other alternatives considered during the EA, would not be affected or opened to re-evaluation, unless otherwise directed by the Minister.

In the cases where the proposed change is categorized by Terrapure as a potential minor amendment, then the following process will be followed prior to implementing it:

1. Terrapure will discuss the proposed design change and categorization with staff at the MECP's Environmental Assessment and Permissions Branch.

2. If staff at the MECP's Environmental Assessment and Permissions Branch agree that the proposed design change is a minor amendment, Terrapure will prepare an amendment review document to describe:
    a. The proposed design change to the Preferred Undertaking
    b. The rationale for the proposed design change
    c. Implications of the proposed design change on the social, cultural and natural environment, stakeholders, or an EA commitment

d. Proposed mitigation/compensation measures, if required, to address any potential adverse effects of the change
e. Any net effects following implementation of mitigation/compensation measures

3. Terrapure will distribute the amendment review document to directly affected stakeholders, interested Indigenous communities, MECP's Environmental Assessment and Permissions Branch, and the City of Hamilton for 30 calendar days for review and comment.
4. Terrapure will consider comments received during the 30 calendar day review period.
5. Terrapure will implement the proposed change, subject to receiving written concurrence from the Director of the MECP's Environmental Assessment and Permissions Branch that the proposed change is a minor amendment, ensuring that any required mitigation/compensation measures are provided for and carried out.

10.3 Major Amendments

Proposed changes to the approved EA of a much more significant nature would be categorized as major amendments. In general, these proposed changes would alter the design of the Preferred Undertaking significantly in terms of what would be built, where it would be built, and how it would be built.

In cases where the proposed change is determined to be a major amendment, Terrapure will conduct a new EA process for the major amendment that will be considered, as applicable in the circumstances, to be a new undertaking as per Section 12 of the *EA Act*.