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Executive Summary

This Environmental Assessment (EA) Report documents the planning and decision-making process followed for the proposed capacity increase of the Stoney Creek Regional Facility (SCRF, Facility, Site). In accordance with Section 4.3.1 of the Ministry of the Environment, Conservation and Park's (MECP) *Code of Practice for Preparing and Reviewing Environmental Assessments* (January 2014), this Executive Summary is organized by the section headings that appear in the main document.

1. Introduction

The SCRF is owned and operated by Revolution Landfill LP, operating as Terrapure Environmental (Terrapure). The SCRF is located at the northwest corner of Mud Street and Upper Centennial Parkway in the City of Hamilton (see **Figure E.1**). The Facility has been in operation since it was approved by the then-Minister of the Environment (now known as the Minister of the Environment, Conservation and Parks (Minister)) in 1996. The SCRF operates under Environmental Compliance Approval (ECA) No. A181008.

The Facility has an approved waste disposal capacity of 6,500,000 cubic metres (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 Facility 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, carbon dioxide gases and odours, and has the ability to attract vectors, such as seagulls, vermin, etc.).

The SCRF is an engineered landfill that ensures groundwater protection and leachate collection through a double-liner system with a hydraulic trap. The SCRF has a base liner system that is approximately 3 metres (m) thick and is constructed with two separate layers of natural clay and a single geo-membrane liner. The SCRF also has multiple primary and contingency systems for collecting leachate and groundwater that provide protection to the natural environment.

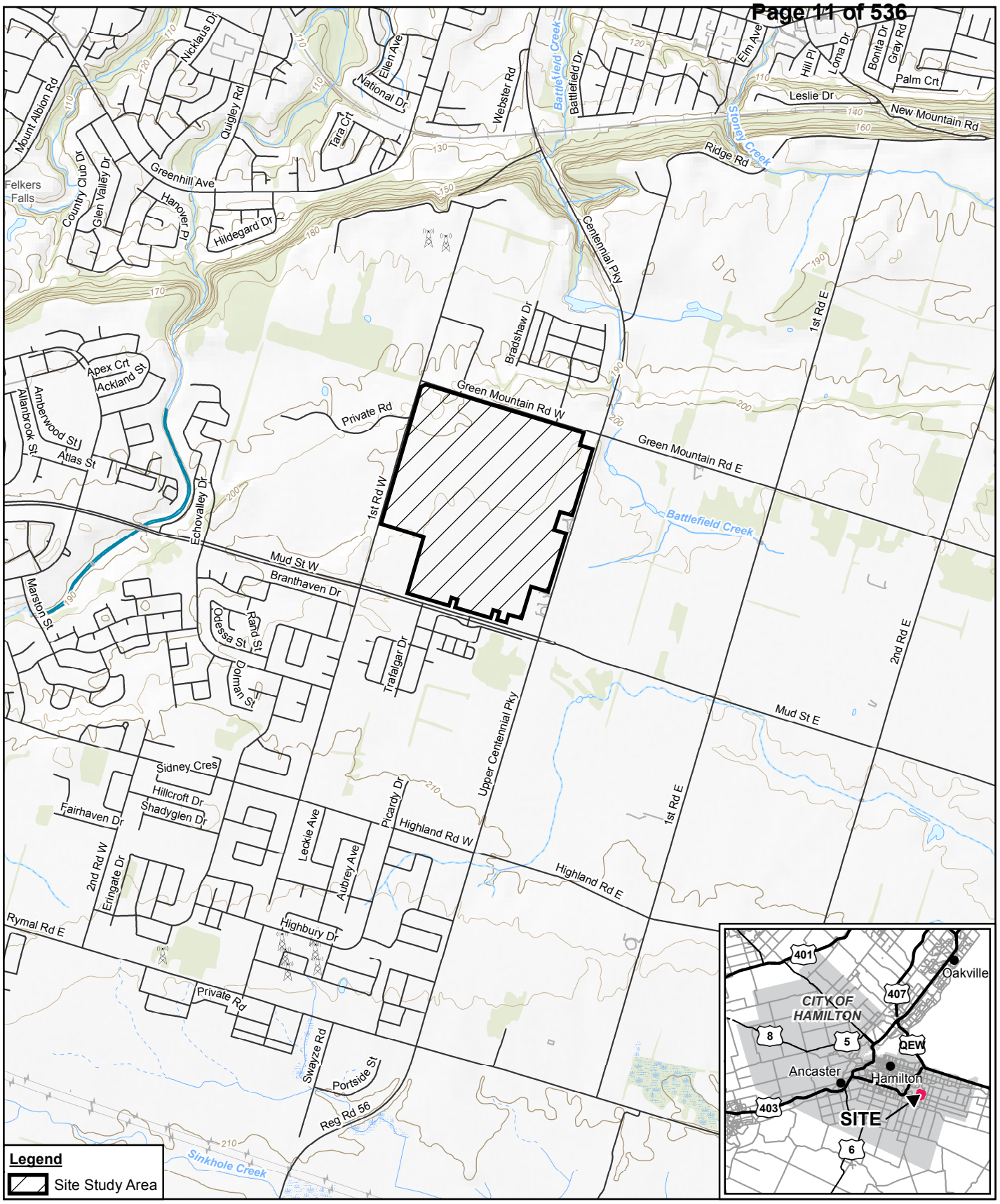
Since opening in 1996, the SCRF's ECA has been amended a number of times including the following:

- Amendment to Annual Waste Receipts and Service Area Provisions (2012).
- Landfill Footprint Reconfiguration (2013).
- Landfill Capacity Amendment (2018).

The amendments were all undertaken in accordance with appropriate legislative requirements, including the Environmental Screening Process under the Waste Management Projects Regulation – Ontario Regulation (O. Reg.) 101/07 and the *Environmental Protection Act*.

Terrapure, as the proponent, 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 the company 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, nor the approved service area for the SCRF, which is the Province of Ontario.

The proposed increase in capacity is subject to Part II of the *EA Act,* which requires Terrapure to undertake an EA consisting of a two-step approval process. The first step is the development and approval of the Terms of Reference (ToR), which Terrapure carried out in 2016 and 2017. In November 2017, the then-Minister of the Environment and Climate Change approved the Amended ToR for the SCRF EA. Since that time, Terrapure has been preparing the EA in accordance with the Minister-approved Amended ToR.



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0 250 500 750
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

LOCATION OF THE PROPOSED UNDERTAKING

11102771
Jul 18, 2018

FIGURE E.1

GIS File: N:\CA\Newmarket\Projects\Projects in Progress\8-chars\11------\1110----\111027--\11102771\05 - EA\GIS Figures\MXD\11102771_Site_Location.mxd

2. Overview of the Environmental Assessment Process and Study Organization

This EA was conducted and prepared in accordance with the Amended ToR approved by the Minister on November 9, 2017 (see **Appendix B**), as per Section 6(2)(c) and 6.1(3) of the *EA Act*, Regulation 334. The ToR was the first step of a two-step *EA Act* approval process for the proposed Undertaking, with the second step being the EA. An overview of the process followed for this EA is provided in **Figure E.2**.

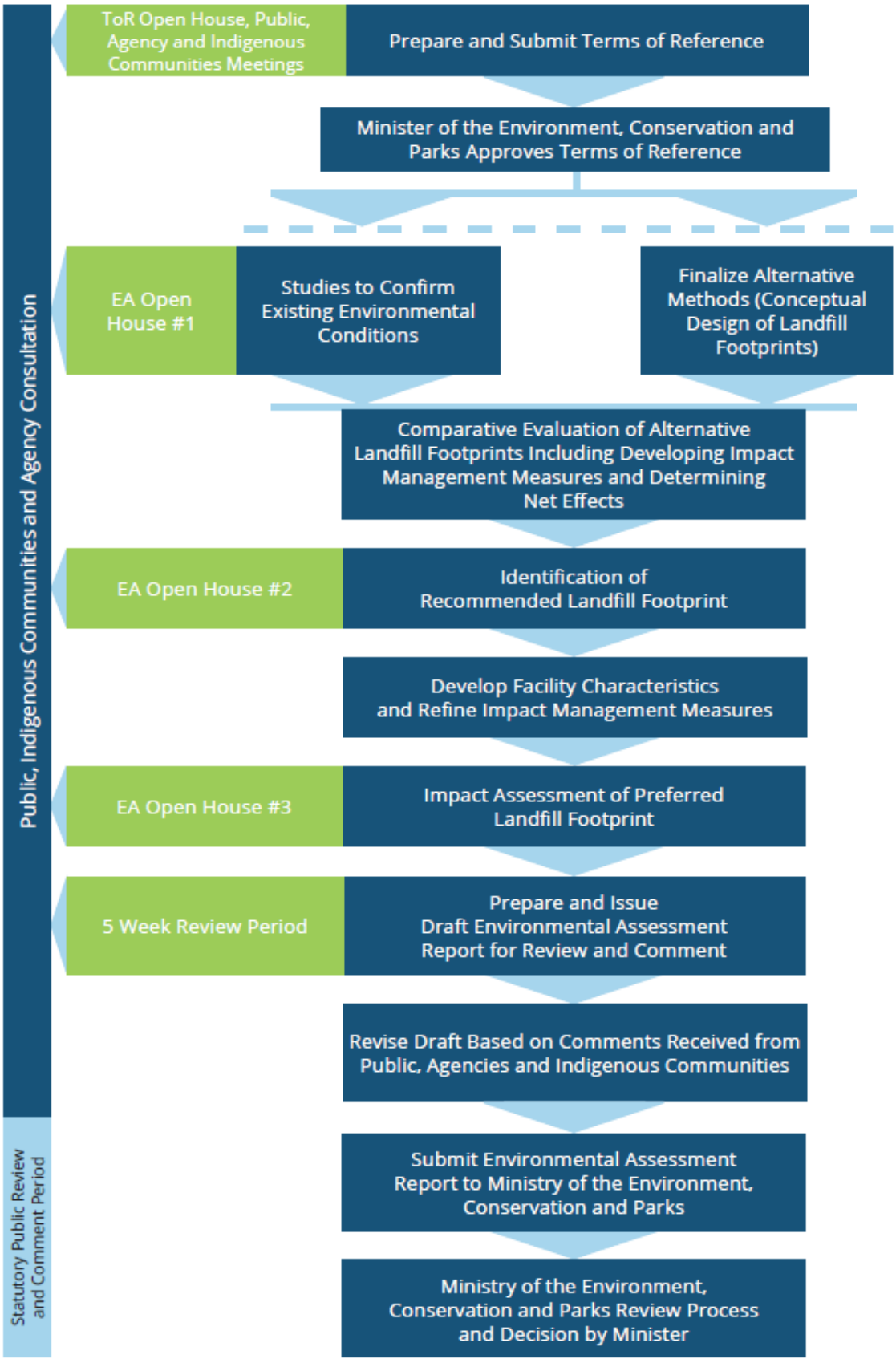


Figure E.2 SCRF Environmental Assessment Process

3. Overview of the Undertaking

The purpose of the proposed 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 materials.

Terrapure, being a privately owned and operated company conducting business in the Province of Ontario, carried out a Business Case Analysis in February 2017, with regards to the need for the services it provides to the marketplace (**Appendix E**). 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 and providing a safe, secure disposal outlet for 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 service facility and to provide continued service for local and regional customers.

The Business Case Analysis was reviewed by Terrapure as part of the SCRF EA to ensure it remained valid and appropriate to the business decisions made by the company. It was concluded that the analysis remains valid based on a review of the primary influential factors, which remain unchanged, including waste management policies, remaining provincial disposal capacity, and projected economic growth and generation rates of post-diversion solid, non-hazardous industrial residual material.

As documented in the Minister-approved Amended ToR, the most reasonable way for Terrapure to address the economic opportunity of providing additional residual disposal capacity is to examine various ways in which that capacity can be added to the existing SCRF. 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 was determined to be 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 that existing site.

4. Description of the Environment Potentially Affected by the Undertaking

The existing Site is located at 65 Green Mountain Road West in Hamilton, Ontario. A Site Study Area and the Local Study Area were defined for the purposes of describing the environment potentially affected by the proposed Undertaking:

- **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, as well as an additional 15 ha (approx.) of buffer zone; and
- **Local Study Area**, including all lands within a 1.5 km radius 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).

The environment associated with the Local and Site Study Areas potentially affected is described as defined in the *Environmental Assessment (EA) Act* (Natural Environment, Built Environment, Social Environment, Economic Environment, and Cultural Environment), based on existing information sources and supplemented with data from field visits/investigations, where necessary. In particular, the field investigations were carried out as part of providing a more detailed description and understanding of the environment, building on that provided in the Minister-approved Amended ToR.

Investigative studies of the following environmental components were carried out for the purpose of generating a more detailed description and understanding of the environment within the Site Study Area and Local Study Area:

Natural Environment
- Geology and Hydrogeology
- Surface Water
- Terrestrial and Aquatic Environment
- Atmospheric Environment - Air and Odour
- Atmospheric Environment – Noise

Built Environment
- Land Use

Social Environment
- Traffic
- Human Health

Economic Environment

Cultural Environment
- Archaeology and Built Heritage

5. Alternative Methods of Carrying Out the Undertaking

The Minister-approved Amended ToR presented six preliminary Alternative Methods of Carrying Out the Undertaking that have been refined and developed further during the EA for comparative analysis:

- Alternative Landfill Footprint No. 1 – Reconfiguration of the SCRF
- Alternative Landfill Footprint No. 2 – Horizontal Expansion of the SCRF
- Alternative Landfill Footprint No. 3 – Vertical Expansion of the SCRF
- Alternative Landfill Footprint No. 4 – Reconfiguration and Horizontal Expansion of the SCRF
- Alternative Landfill Footprint No. 5 – Reconfiguration and Vertical Expansion of the SCRF
- Alternative Landfill Footprint No. 6 – Horizontal and Vertical Expansion of the SCRF

As committed to in the Minister-approved Amended ToR for the SCRF EA, the detailed description of each of the preceding Alternative Landfill Footprints was based on a conceptual level of design reflecting existing regulatory requirements and the operational aspects of the SCRF. The 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 (Alternative Landfill Footprints) represent different ways of performing the same activity (i.e., increasing the approved capacity of the SCRF so that Terrapure can continue to receive post-diversion solid, non-hazardous industrial residual material generated within the Hamilton & Greater Toronto Area). 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.

Proposed evaluation criteria and indicators for assessing the six Alternative Landfill Footprints were also included in the Minister-approved Amended ToR. The Alternative Landfill Footprints and evaluation criteria and indicators were confirmed during the first stage EA following consultation with agencies, Indigenous communities and the public.

After establishing the final list of evaluation criteria and indicators, they were applied to each of the six Alternative Landfill Footprints through an evaluation process 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 of each Alternative Landfill Footprint and ultimately to identify a recommended Alternative Landfill Footprint. **Figure E.3** highlights the assessment and comparative evaluation process for the Alternative Landfill Footprints.

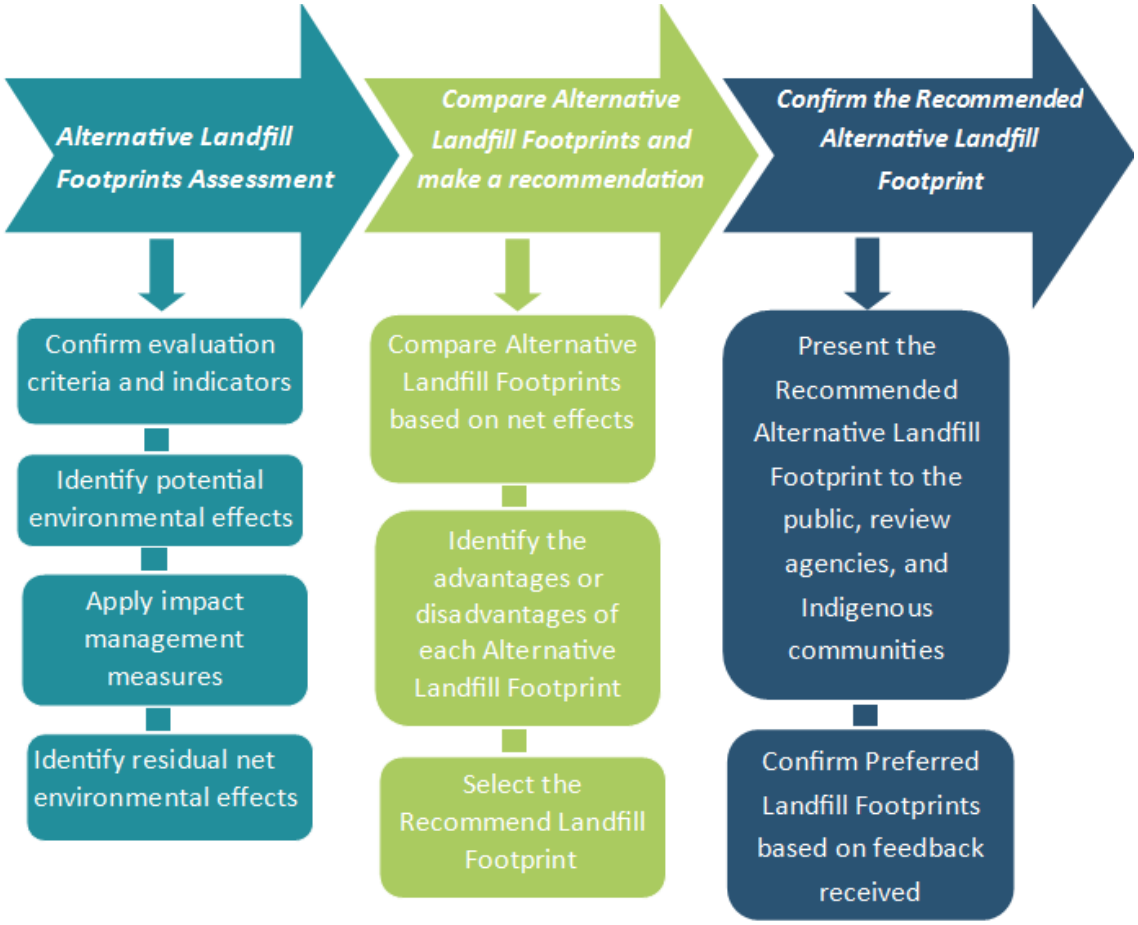


Figure E.3 Overview of the Alternative Landfill Footprints Assessment and Comparative Evaluation Methodology

The recommended Alternative was identified as **Alternative Landfill Footprint No. 5 - Reconfiguration and Vertical Expansion** of the SCRF (**Figure E.4**). From an advantages/ disadvantages perspective, Alternative Landfill Footprint No. 5 was recommended, with the advantages summarized as follows:

- A technically feasible design that provides for the full additional capacity being sought through the SCRF EA. This will allow Terrapure to continue to support the growing local economy by providing disposal capacity for industrial residual material generated within Ontario and more specifically Hamilton and the GTA.
- A lower height increase compared to Alternative Landfill Footprint Nos. 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 components, including Geology, Hydrogeology, Surface Water, Terrestrial, Aquatic, and Atmospheric.
- Potential for adverse effects on the Natural Environment can be minimized through the use of standard impact management measures.
- No impacts to current land use designation and no change to Land Use Zoning.

- No impacts to archaeological, built heritage, or Indigenous resources.
- Maximizes the economic benefits to the City of Hamilton, Upper Stoney Creek and local industry.
- Employment opportunities at the Site would be increased year over year.
- Open layout with a simple configuration and dedicated areas for the various components. Open and uniform configuration that will simplify Site closure requirements and overall layout and contours of the Site that will not limit the flexibility of potential post-closure uses.

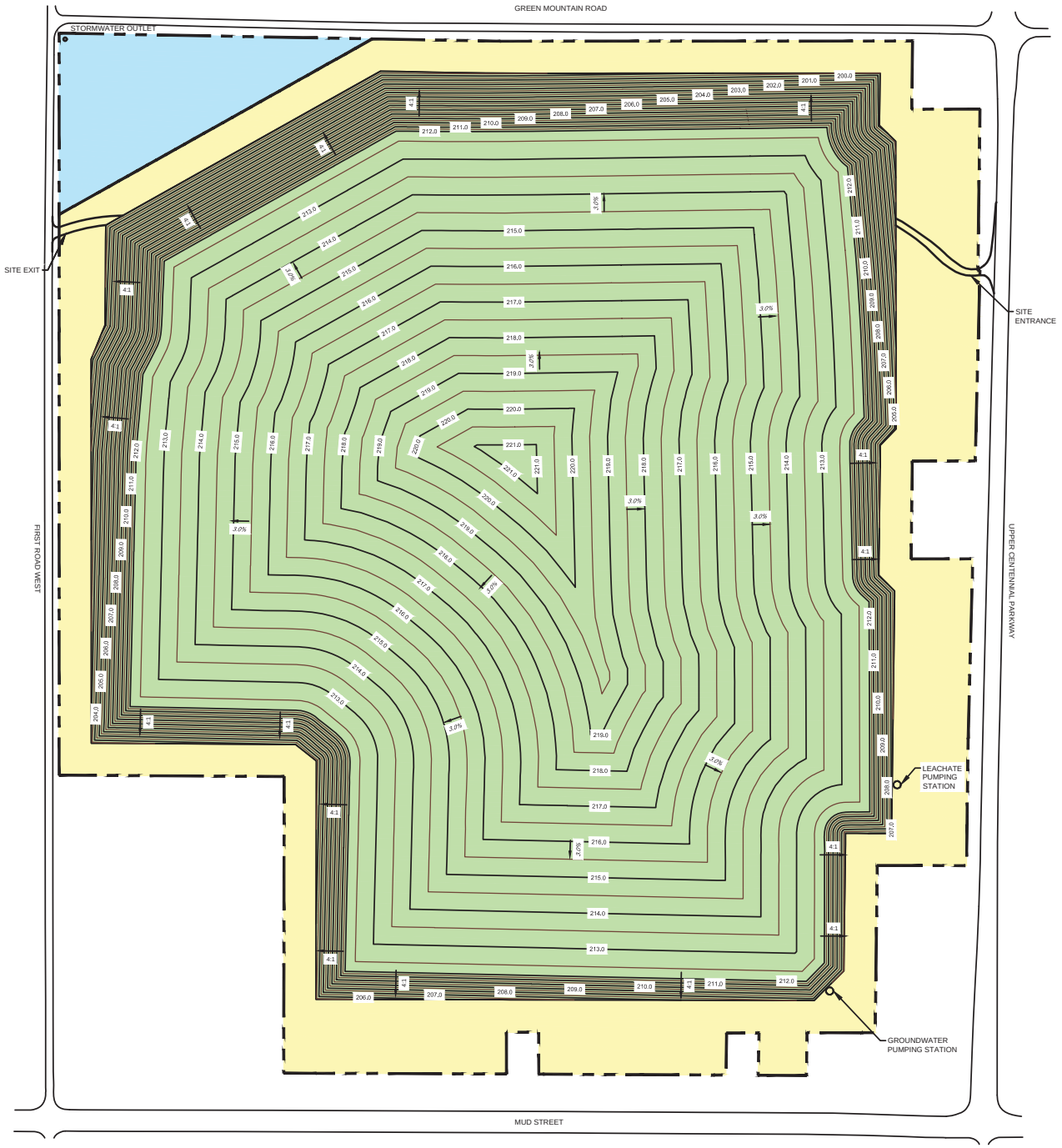
With the preceding advantages in mind, Alternative Landfill Footprint No. 5 - Reconfiguration and Vertical Expansion was identified as the Recommended Landfill Footprint for the SCRF EA. All of the other Alternative Landfill Footprints had fewer advantages and a greater number of disadvantages compared to Alternative Landfill Footprint No. 5, resulting in them being ranked lower.

The recommended **Alternative Landfill Footprint: Reconfiguration and Vertical Expansion** was presented to review agencies, Indigenous communities and the public for comments and feedback. Following consideration of all comments received and based on the comparative evaluation and advantages/disadvantages against all other alternatives as highlighted in **Section 5.6**, the recommended Alternative Landfill Footprint was then confirmed as the **Preferred Landfill Footprint**. This alternative was carried forward to the impact assessment stage, where additional detail was developed in terms of design and operations, as well as more detail and specifics applied in terms of impact management (i.e., mitigation) measures.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPERTY BOUNDARY
- RESIDUAL MATERIAL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

RECOMMENED LANDFILL FOOTPRINT NO. 5 - RECONFIGURATION AND VERTICAL EXPANSION

11102771-00
August 29, 2018

FIGURE E.4

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6. Detailed Impact Assessment of the Undertaking

Following confirmation of **Alternative Landfill Footprint No. 5: Reconfiguration and Vertical Expansion** as the Preferred Landfill Footprint (also referred to as the Preferred Method), a detailed impact assessment was carried out. The intent of impact assessment is to accomplish the following based on the Preferred Landfill Footprint being developed at a greater level of design then what was described at the Alternative Methods stage:

- Identify the potential environmental effects with more certainty;
- Develop more Site-specific impact assessment measures, as appropriate, for application;
- Identify the net environmental effects with more certainty;
- Define the appropriate monitoring requirements more clearly;
- Identify the specific approval/permitting requirements for the proposed Undertaking; and,
- Identify opportunities for design enhancements of the proposed Undertaking.

The Preferred Landfill Footprint proposes to increase the approved capacity for post-diversion, solid non-hazardous industrial residual material at the SCRF by 3,680,000 m^3. The type (i.e., post-diversion, solid non-hazardous industrial residual material) and annual volume (i.e., 750,000 tonnes per year) of residual material, as well as the maximum number of vehicles to the Site per day (i.e., 250) currently approved would remain unchanged with the Preferred Landfill Footprint. The capacity increase will incorporate technology and processes as set out in O. Reg. 232/98 Landfilling Sites 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.

Vertical limits will extend higher, increasing the peak height of the landfill by approximately 2.5 m from currently approved contour limits. Horizontal limits will extend further toward the north, back to the original approved footprint of the SCRF. The area currently approved to accept industrial fill will be replaced with a base liner system to accept post-diversion, solid non-hazardous industrial residual material.

Further details on the Preferred Landfill Footprint were provided within a Facility Characteristic Report (FCR) (**Appendix K**), which provides the following information:

- Accepted materials, capacity, and fill rate
- Site configuration, footprint layout, and contours, including the phases of landfill development
- buffer areas and setbacks
- infrastructure requirements
- base liners and cover systems
- leachate management
- stormwater management
- landfill gas management
- traffic management

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.

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 were also 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 Preferred

Landfill Footprint and other non-SCRF projects and activities that are existing, planned, approved, or reasonably foreseeable within the Study Area.

The following is a summary of the impact management measures developed for the proposed Undertaking:

- **Geology and Hydrogeology**
  - Groundwater will continue to be managed and protected by a state-of-the-art 3 m double-liner system and network of groundwater collection trenches and containment wells.
- **Surface Water**
  - Modify the existing stormwater management system to continue to collect and treat precipitation that falls on the SCRF before being discharged off-Site to the City of Hamilton's sanitary sewer.
- **Terrestrial and Aquatic**
  - Conduct any vegetation removal outside of the breeding bird window.
  - Retain vegetation for re-planting and compensate for vegetation loss to the extent possible.
  - Incorporate graminoid meadow habitats into the closure landscape plan.
  - Implement Best Management Practices during construction to protect birds and wildlife, including dust suppressants and protective fencing (where required).
  - Prepare and implement a Habitat Management Plan, with a description of where and how new habitat for eastern meadowlark will be created or enhanced.
  - Install and maintain erosion and sediment control measures around the stormwater management pond to mitigate impacts to water quality and to act as wildlife exclusion fencing.
- **Atmospheric (Air, Odour, Noise) and Human Health**
  - Implement a dust mitigation plan.
  - Continue to log and investigate complaints related to dust, odour and noise.
- **Land Use and Economic**
  - Maintain buffers for nuisance reduction.
  - Maintain existing screening berms and fencing to assist with visual screening from residential areas, and implement additional screening and vegetation, as necessary.
- **Design and Operations**
  - Design new base liner system and groundwater management system to integrate seamlessly with existing base liner system.
  - Modify existing stormwater management system to integrate seamlessly with existing stormwater management system.
  - Design new final cover system to integrate seamlessly with existing final cover system.
  - Maintain design and function of existing systems (leachate, stormwater, groundwater, gas) and infrastructure (access, roads, weigh scale, wheel wash).
  - Maintain open and uniform configuration that will simplify Site closure requirements and allow for flexibility of potential end uses.

Peer Review

Dr. R. Kerry Rowe was engaged to act in a peer review capacity for SCRF EA, specifically in relation to reviewing the overall design and operation as well as to review potential leachate impacts to groundwater and surface water. Dr. Rowe provided commentary on the draft analysis and findings, and identified recommendations for further refinement prior to final submission of the SCRF EA.

Where Dr. Rowe requested further information and detail on the contaminating lifespan calculations, GHD revised the calculations and provided Dr. Rowe with the detail he required to thoroughly review the results. These calculations are included in Appendix D of the Design and Operations

Impact Assessment Report (**Appendix J-9**). In short, Dr. Rowe reconfirmed his initial comments that "*the design (at the level of detail presented for the expansion) is such that if properly implemented and operated, the expansion will have negligible negative impact on off-site ground and surface water quality. Thus, the expansion will not measurably increase any impact on the groundwater quality".*

7. Public and Agency Consultation

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 *Environmental Assessment Act*, a comprehensive consultation program involving review agencies, Indigenous communities, and public stakeholders was carried out throughout the EA process.

Terrapure undertook several consultation activities that lasted the duration of the EA and that were used to engage all participant groups. 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. Terrapure sought and obtained input from the interested participants at key decision making points prior to moving forward with the next stages of the EA process. A summary of the consultation activities undertaken at these key decision-making milestones is provided in **Figure E.5.** The first key decision-making milestone point listed in **Figure E.5** was held as part of the preparation of the Minister-approved Amended ToR. The rest of the points listed were held as part of the preparation of the EA.

Figure E.5 Summary of Consultation Activities

8. Commitments and Monitoring of the Undertaking

To ensure that the proposed impact management 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 capacity increase.

Monitoring strategies have been developed for the Preferred Landfill Footprint to ensure that:

- Predicted net effects are not exceeded
- Unexpected negative effects are addressed
- Predicted impact management measure effects are realized

Table E.1 below summarizes the proposed monitoring.

Table E.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
Land Use	Existing environmental monitoring programs identified in the FCR (e.g., leachate, groundwater, surface water, landfill gas) and periodic program updates and adaptations.
	Maintain buffers and other visual impact management measures (e.g., fencing and vegetation)

Environmental Management Plans (EMPs), Best Management Practice Plans (BMPs) and a Compliance Monitoring Program will be prepared following approval of the proposed Undertaking by the Minister and prior to construction associated with the approved Undertaking. The EMP and/or BMP Plans identify a description of the proposed impact management measures, commitments and monitoring, as well as a description on the standard BMPs that are currently in place at the Site that will continue. The Compliance Monitoring Program will be prepared following approval of the proposed Undertaking, which will include the commitments outlined in **Section 8.3**, as well as any *EA Act* conditions of approval. Following establishment of the EA Compliance Monitoring Program, Terrapure will report annually on how it fulfilled the commitments until all commitments are fulfilled.

9. Approvals Required for the Undertaking

In addition to EA approval, further environmental approvals will be required in order to implement the proposed Undertaking at the SCRF. 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 Landfill Footprint will be documented in an update to the existing Design and Operations Report for the Site. Additionally, permits and approvals will be required from the City of Hamilton, and the Ministry of Natural Resources and Forestry and may be required from Hamilton Conservation Authority.

Terrapure Stoney Creek Regional Facility Environmental Assessment

The seven (7) week review period for the Terrapure Environmental Stoney Creek Regional Facility (SCRF) Environmental Assessment (EA) Report will be from January 11 to March 1, 2019.

Anyone wishing to provide comments on the Environmental Assessment must submit their comments in writing (i.e., letter, email, or fax) to the Ministry of the Environment, Conservation, and Parks (MECP) by **March 1, 2019**. All comment must be submitted to:

Jennie Weller, Project Officer
Environmental Assessment and Permission Branch
135 St. Clair Avenue West, 7th Floor, Toronto, ON M4V 1P5
Telephone: 416-314-7232
Fax: 416-314-8452
Email: Jennie.Weller@ontario.ca

A copy of all comments must be forwarded to Terrapure Environmental for their consideration. For more information about the project, please contact:

Kim Bailey
Terrapure Environmental
65 Green Mountain Road West
Stoney Creek, ON L8J 1X5
Email: info@terrapurestoneycreek.com
Website: www.terrapurestoneycreek.com
Phone: 1-844-898-2380
Fax: 905-549-4515

Changes to the Environmental Assessment Report

In response to comments received from agencies, Indigenous communities, and the public on the Draft SCRF EA Report that was made available for review from August 31 to October 24, 2018, a number of changes have been made. Some of these key changes include:

- Addition of text to clarify the purpose of the EA and the process followed.
- Revisions to Section 3.0 (Purpose of and Rationale for the Undertaking) to focus on the purpose of the undertaking.
- Revisions to Section 4.0 (Description of the Environment Potentially Affected by the Undertaking) to include information on potential Indigenous resources.
- Revisions to Section 5.0 (Alternative Methods of Carrying out the Undertaking) to clarify the potential effects, mitigation and net effects during each phase of the Undertaking, including construction, operation, closure, and post-closure.
- Revisions to Section 5.0 (Alternative Methods of Carrying out the Undertaking) to clarify how the recommended alternative became the preferred alternative.
- Revisions to the Detailed Noise Impact Assessment Report (Vol. 2 – Appendix J) to include modelling of additional noise receptors.
- Revisions to the Detailed Land Use and Economic Impact Assessment Report (Vol. 2 – Appendix J) to include additional information on agricultural uses in the study area, and additional information on potential impact to surrounding property values.
- Updates to the Detailed Geology and Hydrogeology Impact Assessment Report (Vol. 2 – Appendix J) to include additional details on calculations and methodologies used.
- Addition of a table to Section 6.0 (Detailed Impact Assessment of the Undertaking) to summarize the environmental component, potential effects, impact management measures, net effects, and proposed monitoring of the Undertaking.
- Removal of Section 10 (Amending the EA).

Table of Contents

Figure Index

1. Introduction

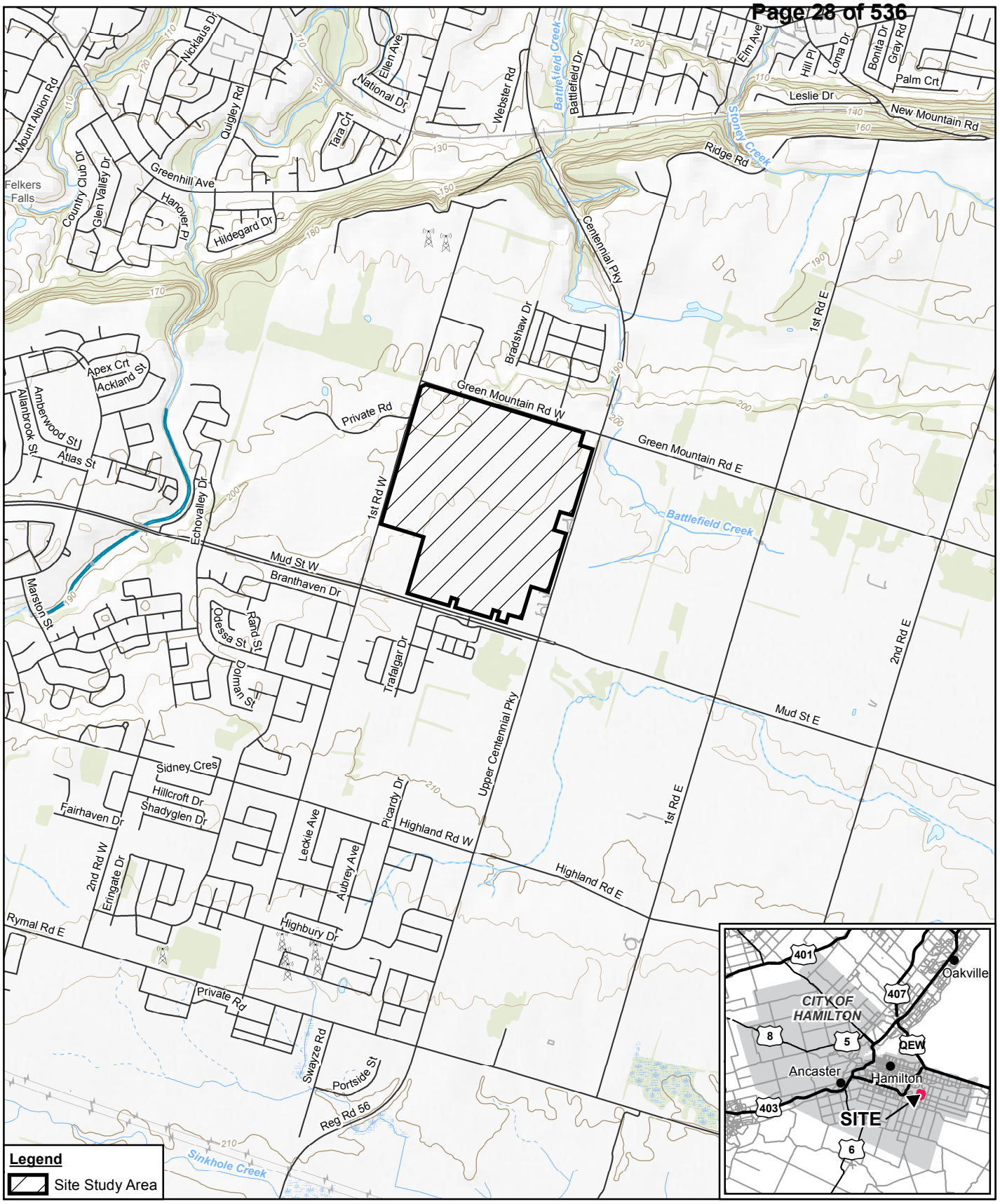
This report documents the planning and decision making process that was followed for the proposed capacity increase of the Stoney Creek Regional Facility (SCRF, Facility, Site). The SCRF is owned and operated by Revolution Landfill LP, operating as Terrapure Environmental, herein referred to as Terrapure (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 then-Minister of the Environment (now known as the Minister of the Environment, Conservation and Parks (Minister)) in 1996. The SCRF operates under Environmental Compliance Approval (ECA) No. A181008 (**Appendix A**), as amended. The SCRF has an approved waste disposal capacity of 6,500,000 cubic metres (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.

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 the company 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, nor the approved service area for the SCRF, which is the Province of Ontario.

Ontario Regulation (O. Reg.) 101/07 outlines the *Environmental Assessment (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 SCRF undertaking is therefore subject to Part II of the *EA Act,* which requires Terrapure to undertake an Environmental Assessment (EA) consisting of a two-step approvals process. The first step is the development and approval of the Terms of Reference (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 (second step). A ToR is submitted to the Minister for approval. If the ToR is approved by the Minister, then the EA must prepared in accordance with it.

In November 2017, the then-Minister of the Environment and Climate Change approved the Amended ToR for the SCRF EA. When the Minister approved the Amended ToR, an additional amendment was imposed, requiring Terrapure to examine and evaluate the feasibility and viability of implementing an on-site diversion program as part of the EA process. As such, even though there is minimal material received at the SCRF that has the potential to be reasonably diverted or recycled, Terrapure reviewed and evaluated the potential for on-Site diversion of residual materials received at the SCRF (see **Section 6.5**).



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018.

0 250 500 750
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

LOCATION OF THE PROPOSED UNDERTAKING

11102771
Jul 18, 2018

FIGURE 1.1

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1.1 Proponent

The Proponent for the SCRF EA is Terrapure, the owner and operator of the SCRF. As the Proponent, Terrapure is responsible for preparing the EA in accordance with the Minister-approved Amended 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 Terrapure's behalf. The Proponent's contact information is as follows:

Michael Jovanovic, Vice President Environmental Affairs
Office: 905.315.2666 **Cell:** 905-570-4285
Fax: 905.315.2209
Email: mjovanovic@terrapureenv.com
Address:
Terrapure Environmental National Corporate Office
1100 Burloak Drive, Suite 500
Burlington, ON L7L 6B2

1.2 Facility History & Operations

The SCRF has a been a fixture in the Stoney Creek/Hamilton area for over 20 years, providing environmental services to numerous local Hamilton- and Ontario-based generators of solid, non-hazardous industrial residual material. Newalta Corporation acquired the SCRF 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 that ensures groundwater protection and leachate collection through a double-liner system with a hydraulic trap. The SCRF has a base liner system that is approximately 3 m thick and is constructed with two separate layers of natural clay and a single geo-membrane liner. The SCRF also has multiple primary and contingency systems for collecting leachate and groundwater that provide protection to the natural environment. The operation of the SCRF is governed by the conditions of its ECA and applicable provincial legislation, including the *EA Act* and Ontario Regulation 101/07, the Waste Management Projects Regulation made under the *EA Act*.

Operations and Permitted Materials

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 SCRF does not accept waste capable of decomposing and generating gases, it has received a Ministry of the Environment Conservation and Parks (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. However, Terrapure may have to re-apply for an exemption to the requirement to have a landfill gas collection system under O. Reg. 232/98 if its proposed expansion receives *EA Act* approved from the Minister.

The residual materials accepted at the SCRF come from a variety of customers and businesses that have their own diversion and recovery systems. As a result, diversion takes place at their own operations before the remaining residual material are sent to the SCRF. Terrapure has Standard Operating Procedures (SOP) that address the screening and verification of received materials to ensure that they match the Generator's Waste Profile, and that the Generator has made the determination that the material cannot reasonably be diverted. Diversion at the source of the residual material considers both the economic viability of diversion, as well as ensuring that there is a viable end market for the diverted material.

With respect to the SOPs, 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 and are directed to park underneath a camera to have the load inspected before proceeding to the tipping area. 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 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 the Site and Terrapure issues an internal rejection report. The load rejections are also summarized in the Annual Monitoring Reports submitted to the MECP.

1.3 Amendments to Facility's Environmental Compliance Approval

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).
3. Landfill Capacity Amendment (2018).

The following sub-sections provide further details on each of the preceding amendments. The amendments 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 *Environmental Protection Act* (*EPA*), respectively. As mentioned, **Appendix A** includes the consolidated ECA.

1.3.1 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 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 where processing of the materials had previously occurred.

1.3.2 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 was approved to be constructed at that time. There was no change to the approved total disposal volume (6,500,000 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*.

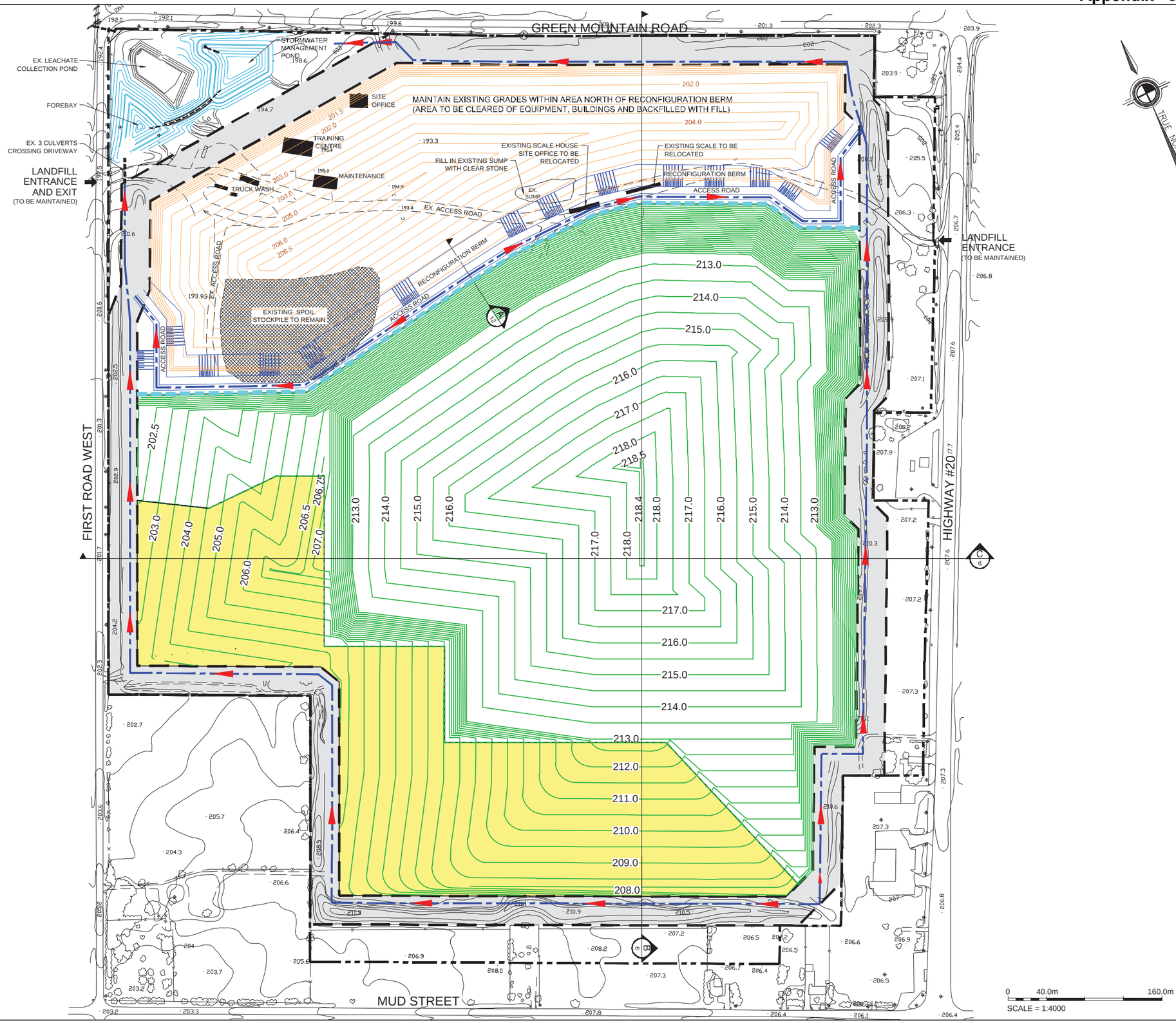
In addition to the revised footprint, the SCRF was permitted to accept approximately 2,000,000 m^3 of industrial fill to complete the final grading in the area of the Site that would no longer receive residual materials. The fill material for the final Site grading is to be "Table 3" industrial fill, which is "non-waste" by definition under the *EPA, Regulation 347*.

1.3.3 Landfill Capacity Amendment

During June of 2018, Terrapure submitted an application to the MECP for an administrative amendment to the ECA to address a discrepancy between the approved waste disposal capacity and the approved final waste contours.

Pre-existing waste and unsuitable materials were historically dumped at the site during the 1980s, prior to the development of the landfill. The materials consisted largely of construction debris, concrete, asphalt and excavation debris. When the landfill design concept was developed in 1995, an allowance of approximately 180,000 m^3 was made to accommodate the disposal of the pre-existing unsuitable materials in the landfill. As such, the landfill was designed with capacity of 6,320,000 m^3, in addition to the pre-existing 180,000 m^3 of material. This was reflected in the Design and Operations Report prepared for the landfill in 1995 and accepted by the Ministry of Environment at the time. However, only the amount for new material (i.e., 6,320,000 m^3) was reflected in the 1996 Certificate of Approval – now referred to as an ECA.

In September 2018, the MECP approved an administrative amendment to the ECA to reflect a total waste disposal capacity of 6,500,000 m^3, including 6,320,000 m^3 for waste and waste cover materials, and 180,000 m^3 for the pre-existing material. A subsequent application for an ECA administrative amendment was submitted to the MECP in December 2018, to adjust the final waste contours so that they reflect a total airspace of 6,500,000 m^3. As part of this application, notifications were distributed to property owners immediately adjacent to the SCRF.



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

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2. Overview of the Environmental Assessment Process and Study Organization

2.1 Ontario Environmental Assessment Act Requirements

The purpose of the *Environmental Assessment (EA) Act* is the betterment of the people of Ontario by providing for the protection, conservation, and wise management of Ontario's environment. This is to be achieved through a prescribed proponent-driven planning process that incorporates consideration of the environment into project planning and decision-making. The intent of the prescribed proponent process 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 required by Sections 6(2)(c) and 6.1(3) of the *EA Act (Regulation 334)*, the Stoney Creek Regional Facility Environmental Assessment (SCRF EA) was prepared in accordance with the Amended SCRF EA Terms of Reference (ToR) approved by the Minister on November 9, 2017 (**Appendix B**). As previously mentioned, the ToR is the first step of a two-step *EA Act* approval process for proposed undertakings in the Province of Ontario, with the second step being the actual EA itself.

With this in mind, **Appendix C** outlines where the requirements of the Minister-approved Amended ToR and *EA Act* are specifically addressed in this EA Report in accordance with Section 2 of the *EA Act*. **Appendix C** also lists the commitments set out in the Minister-approved Amended ToR and how they have been addressed during the SCRF EA.

2.2 Stoney Creek Regional Facility Environmental Assessment Process

Following Minister's approval of the Amended ToR, the SCRF EA process was carried out addressing the requirements of the *EA Act*. **Table 2.1** below demonstrates where each of the requirements was addressed as part of this EA report and its Appendices.

Figure 2.1 provides an overview of the SCRF EA process followed.

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

Environmental Assessment Act Requirements	EA Report Section/Appendix where Requirement is Addressed
A description of the purpose of the Undertaking	Section 3.0, Volume 2 - Appendix B
A description of and a statement of the rationale for (i) the Undertaking	Section 3.0, Volume 2 - Appendix B
A description of and a statement of the rationale for (ii) alternative methods of carrying out the Undertaking	Section 5.0, Volume 2 - Appendix B, Appendix I

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

Environmental Assessment Act Requirements	EA Report Section/Appendix where Requirement is Addressed
A description of and a statement of the rationale for (iii) the alternatives to the Undertaking	Section 3.0, Volume 2 - Appendix B
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, Volume 2 -Appendix B, Appendix F, Appendix J
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, Volume 2 -Appendix F, Appendix J
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, Volume 2 - Appendix F, Appendix J
An evaluation of the advantages and disadvantages to the environment of the Preferred Undertaking	Section 6.0, Volume 2 - Appendix J
A description of any consultation about the Undertaking by the Proponent and results of the consultation	Section 7.0, Volume 3 - Appendices

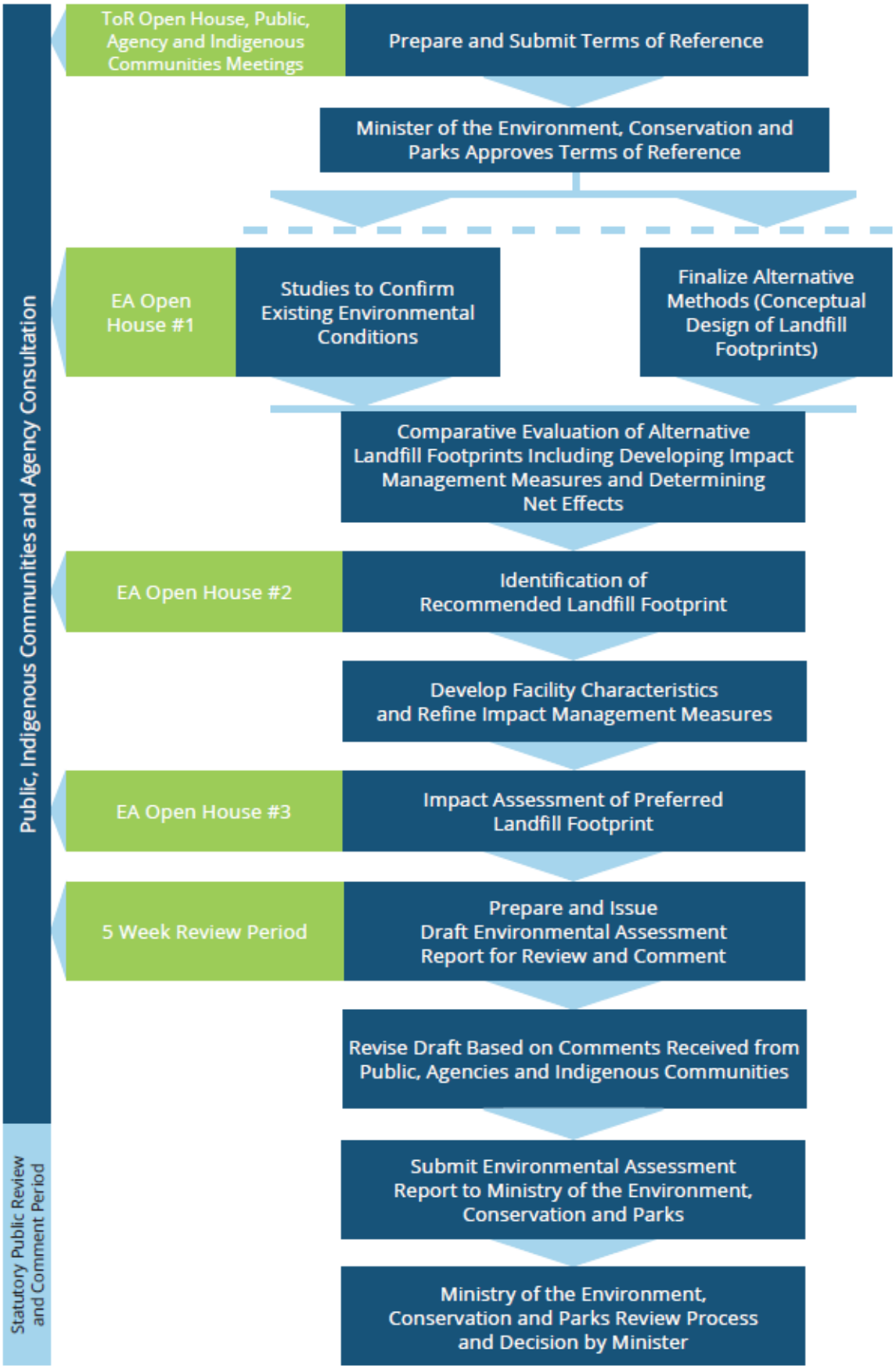

Figure 2.1 Stoney Creek Regional Facility Environmental Assessment Process

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 SCRF EA Report

This report has been prepared in accordance with and having regard for the following Ministry of the Environment, Conservation and Parks (MECP) Guidance Documents:

- 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 (MECP, October, 2017)

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

In documenting the SCRF EA planning and decision-making process, this report has been structured into three volumes reflecting the expectations set forth in the Ministry's *Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario*, January 2014. Volume One is the main document, which lays out the results of the planning and decision-making process in sufficient detail so as to stand on its own. Volume Two consists of a number of appendices that support the information provided in the main document. Since there are a number of appendices associated with the Consultation Summary, they have been provided as a separate Volume Three.

In accordance with *Regulation 334*, the SCRF EA contains the following items (see **Appendix D**):

- List of studies and reports under the control of Terrapure done in connection with the undertaking
- List of studies and reports not under the control of Terrapure on matters related to the undertaking

The following provides a brief overview of the contents found in each volume.

Volume One: EA Report

The SCRF EA Report consists of an Executive Summary plus the following nine sections:

Executive Summary

As per *Regulation 334*, the main points of Volume One are briefly summarized mirroring the organization of the SCRF EA Report.

Section 1.0 - Introduction

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 Environment 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 Landfill Footprint Alternatives); describes the potential environmental effects, recommended impact management 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 Landfill Footprint.

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 and monitoring strategy 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.

The information provided in the SCRF EA Report is supported by the following appendices making up Volume Two:

Volume Two (A): Appendices to Sections 1 to 5

Appendix A – ECA No. A181008

Appendix B – Approved Amended Terms of Reference

Appendix C – Terms of Reference Commitments Table

Appendix D – List of Studies and Reports

Appendix E – Business Case Analysis

Appendix F – Finalized Work Plans and Existing Conditions Reports

Appendix G – List of Secondary Sources to the Existing Conditions Reports

Appendix H – Conceptual Design Report

Appendix I – Alternative Methods Report

Volume Two (B): Appendices to Sections 6, 8, and 9

Appendix J – Detailed Impact Assessment Reports

Appendix J-1 – Geology and Hydrogeology Detailed Impact Assessment Report

Appendix J-2 – Surface Water Detailed Impact Assessment Report

Appendix J-3 - Terrestrial and Aquatic Environment Detailed Impact Assessment Report

Appendix J-4 – Air Quality and Odour Detailed Impact Assessment Report

Appendix J-5 – Noise Detailed Impact Assessment Report

Appendix J-6 – Land Use and Economic Detailed Impact Assessment Report

Appendix J-7 – Traffic Detailed Impact Assessment Report

Appendix J-8 – Human Health Detailed Impact Assessment Report

Appendix J-9 – Design and Operations Detailed Impact Assessment Report

Appendix K – Facility Characteristics Report

Appendix L – Peer Review

Appendix M - Existing Best Management Practice Plans and Standard Operating Procedures

Volume Three: Appendices to Section 7.0 – Consultation Summary

The information provided in Section 7.0 of the SCRF EA Report is supported by the following appendices making up Volume Three:

Vol. 3 - Appendix A – Review Agency Meeting Summaries

Vol. 3 - Appendix B – Correspondence with Review Agencies

Vol. 3 - Appendix C – Engagement with Haudenosaunee Development Institute

Vol. 3 - Appendix D – Engagement with Métis Nations of Ontario

Vol. 3 - Appendix E – Engagement with the Mississaugas of the New Credit First Nation

Vol. 3 - Appendix F – Engagement with Six Nations of the Grand River First Nation

Vol. 3 - Appendix G – List of Public Participants

Vol. 3 - Appendix H – Public Open House Summary Reports

Vol. 3 - Appendix I – Correspondence with Public Stakeholders

Vol. 3 - Appendix J – CLC Workshop Meeting Summary

Vol. 3 - Appendix K – Notifications of SCRF Draft EA

Vol. 3 - Appendix L – Meetings Held in Association with the Review of the SCRF Draft EA

Vol. 3 - Appendix M – Pest Control Management Plan

Vol. 3 - Appendix N – Correspondence with Agencies, Indigenous Communities, and the Public on the SCRF Draft EA

Vol. 3 - Appendix O – Notifications of SCRF EA Submission

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3. Purpose of the Undertaking

3.1 Purpose of the Undertaking

The purpose of the Undertaking is to increase the approved capacity of the Stoney Creek Regional Facility (SCRF) by 3,680,000 m^3 so that Terrapure can continue to receive post-diversion solid, non-hazardous industrial residual material. Currently, the SCRF is approved to receive up to 6,500,000 m^3 of post-diversion solid, non-hazardous industrial residual material and approximately 2,000,000 m^3 of industrial fill. The approved service area for the SCRF is the Province of Ontario, which will not change as a result of this Environmental Assessment (EA). Based on historic annual disposal fill rates for residual material, there is limited residual material capacity remaining at the SCRF as of the end of 2018.

In light of this, Terrapure, being a privately owned and operated company conducting business in the Province of Ontario, carried out a Business Case Analysis in February 2017, with regards to the need for the services it provides to the marketplace (**Appendix E**). Based on the current economics and market dynamics for industrial fill, the market demand is significantly less than what was forecasted previously and the financial viability of the SCRF is negatively affected under its current approval in terms of its requirement to bring in industrial fill.

As per the Business Case Analysis, 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 and providing a safe, secure disposal outlet for 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 service facility and to provide continued service for local and regional customers.

The Business Case Analysis was reviewed by Terrapure as part of the SCRF EA to ensure it remained valid and appropriate to the business decisions made by the company. It was concluded that the analysis remains valid based on a review of the primary influential factors, which remain unchanged, including waste management policies, remaining provincial disposal capacity, and projected economic growth and generation rates of post-diversion solid, non-hazardous industrial residual material.

3.2 Predetermined Alternative to the Undertaking

As documented in the Minister-approved Amended Terms of Reference (ToR), the most reasonable way for Terrapure to address the economic opportunity of providing additional residual disposal capacity is to examine various ways in which that capacity can be added to the existing SCRF. 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 was determined to be 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. The Business Case Analysis included in **Appendix E** provides further details supporting the predetermined “Alternative To”.

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4. Description of the Environment Potentially Affected by the Undertaking

The Minister-approved Amended Terms of Reference (ToR) for the Stoney Creek Regional Facility Environmental Assessment (SCRF EA) included a preliminary description of the existing environment, with the commitment that a more detailed description of it would be provided during the preparation of the EA reflecting the final study area.

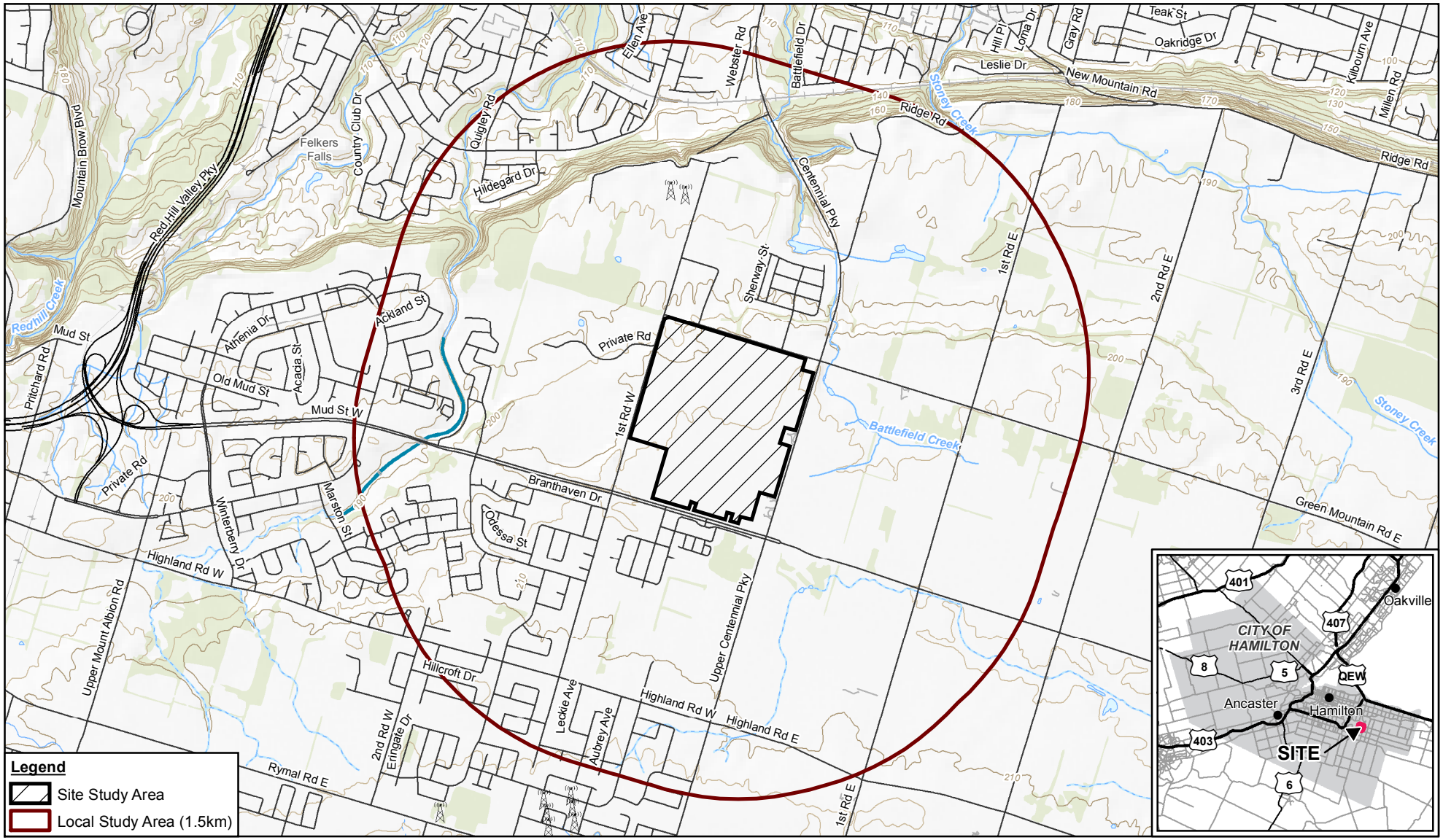
4.1 Local and Site Study Areas

With this in mind, two study areas were defined for the SCRF EA for the purposes of describing the environment in greater detail, based on a review of the preliminary study area. First, a Local Study Area was defined confirming the limits of the preliminary study area, as proposed in the Minister-approved Amended ToR. The Local Study Area, like the preliminary study area, extends 1.5 kilometres (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) (**Figure 4.1**). Similar to rationale provided for the preliminary study area, the Local Study Area was defined based on the following:

- The range of Alternative Methods being 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.

Notwithstanding this, the limits of the Local Study Area were tailored, as appropriate, to more accurately correspond to the particular component of the environment being described (e.g., noise, traffic, and land use). In these situations, a rationale for a tailored limit has been provided as part of describing that environmental component.

In addition, a Site Study Area was defined within the broader Local Study Area to allow for a more focused description of the environment associated with the SCRF (**Figure 4.1**). The Site Study Area includes all lands within the existing approved boundaries of the SCRF, as defined by ECA No. A181008, as amended, as well as the existing industrial fill area (18 ha) and the buffer zone (approximately 15 ha).



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

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

LOCAL AND SITE STUDY AREAS

11102771-03
Nov 30, 2017

FIGURE 4.1

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4.2 Description of the Environment Potentially Affected

The environment associated with the Local and Site Study Areas potentially affected by the Alternative Methods is described as defined in the *Environmental Assessment (EA) Act* (Natural Environment, Built Environment, Social Environment, Economic Environment, and Cultural Environment), based on existing information sources and supplemented with data from field visits/investigations, where necessary. In particular, the field investigations were carried out as part of providing a more detailed description and understanding of the environment, building on that provided in Minister-approved Amended ToR. Individual discipline Existing Condition Reports are provided in **Appendix F**, along with the final version of Work Plans that were presented in draft in the ToR**.** A complete list of all the studies conducted for the SCRF EA is provided in **Appendix D**.

4.2.1 Natural Environment

The individual components making up the Natural Environment have been described in the following order:

- Geology and Hydrogeology
- Surface Water
- Terrestrial & Aquatic
- Atmospheric Environment, including Air, Odour and Noise

Information on the Natural Environment existing conditions within the Study Areas was gathered from a combination of secondary source research and review. A full list and description of secondary sources used to characterize the Natural Environment is listed in **Appendix G.**

4.2.1.1 Geology & Hydrogeology

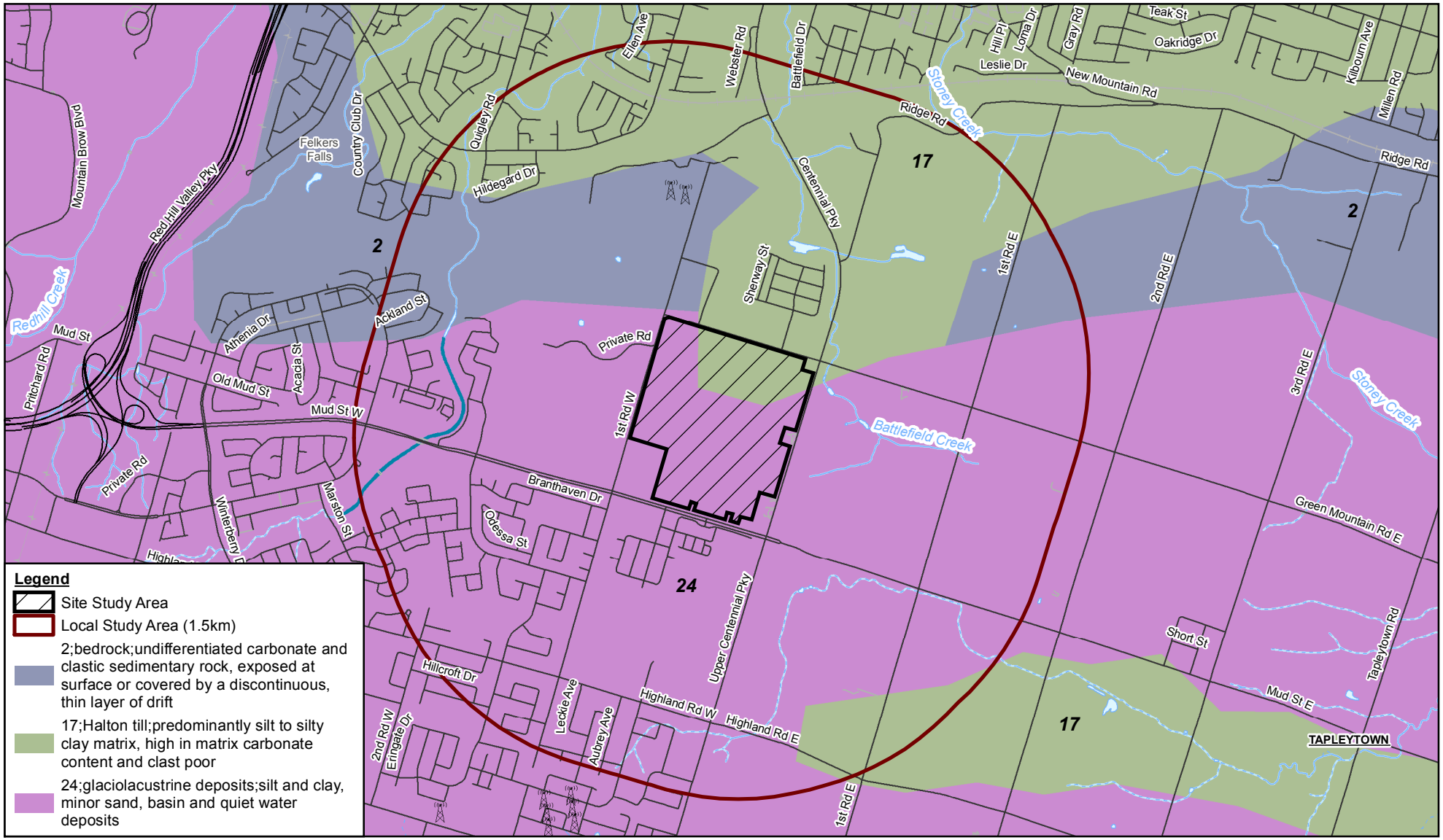
The existing SCRF is located within fractured bedrock of the Niagara Escarpment, in a former quarry. The closed Terrapure landfill, historically referred to as the "West Landfill" (closed landfill), located to the west of the SCRF (across 1st Road West), is also located within a former quarry. The SCRF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

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[1]. The overburden geology of the Local Study Area is illustrated on **Figure 4.2**[2].

[1] Ontario Geological Survey 2000. Quaternary geology, seamless coverage of the Province of Ontario; Ontario Geological Survey, Data Set 14 --- Revised

[2] Gao, C. et al., 2006. Bedrock topography and overburden thickness mapping, southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 207



Source: MNRF NRVIS, 2017. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017;
Ontario Geological Survey 2000. Quaternary geology, seamless coverage of the Province of Ontario; Ontario Geological Survey, Data Set 14---Revised.

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

11102771-03
Dec 4, 2017

OVERBURDEN GEOLOGY OF THE LOCAL STUDY AREA

FIGURE 4.2

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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**.

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[3].

Hydrogeology

Previous investigations have identified five distinct bedrock groundwater flow zones within the Local Study Area. **Table 4.1** 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 Goat 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**.

[3] Jackman Geoscience Inc., 2017. Hamilton (Stoney Creek) Landfill, Environmental Compliance Approval Number A181008 Annual Report 2016

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

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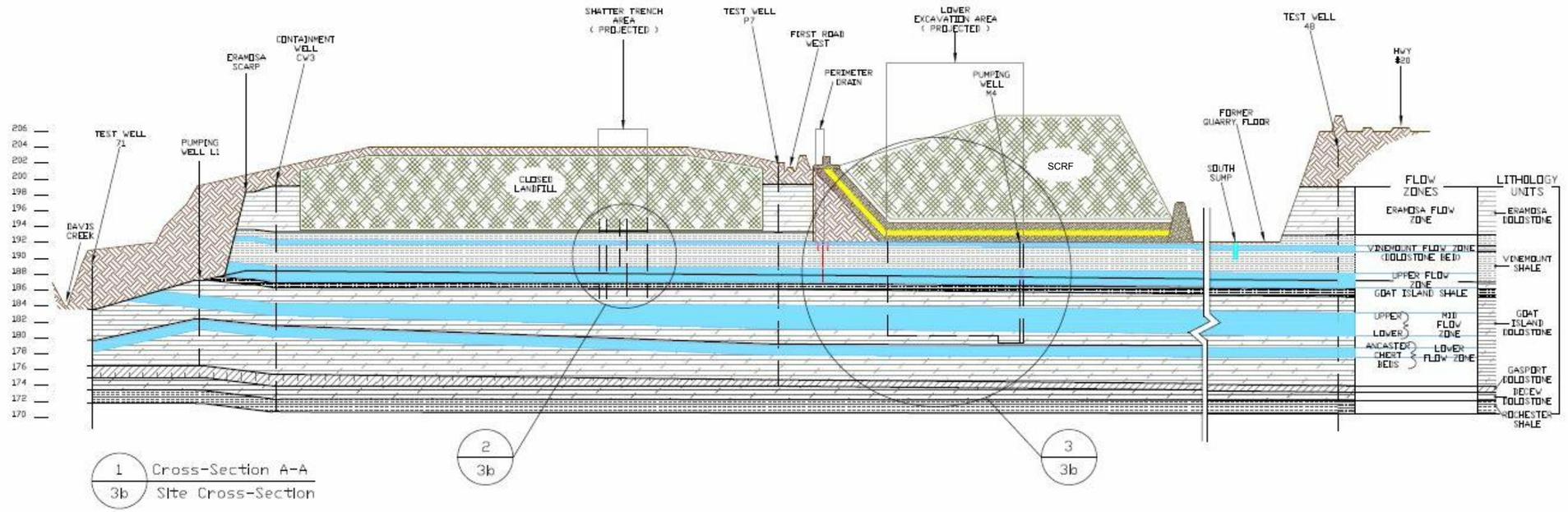

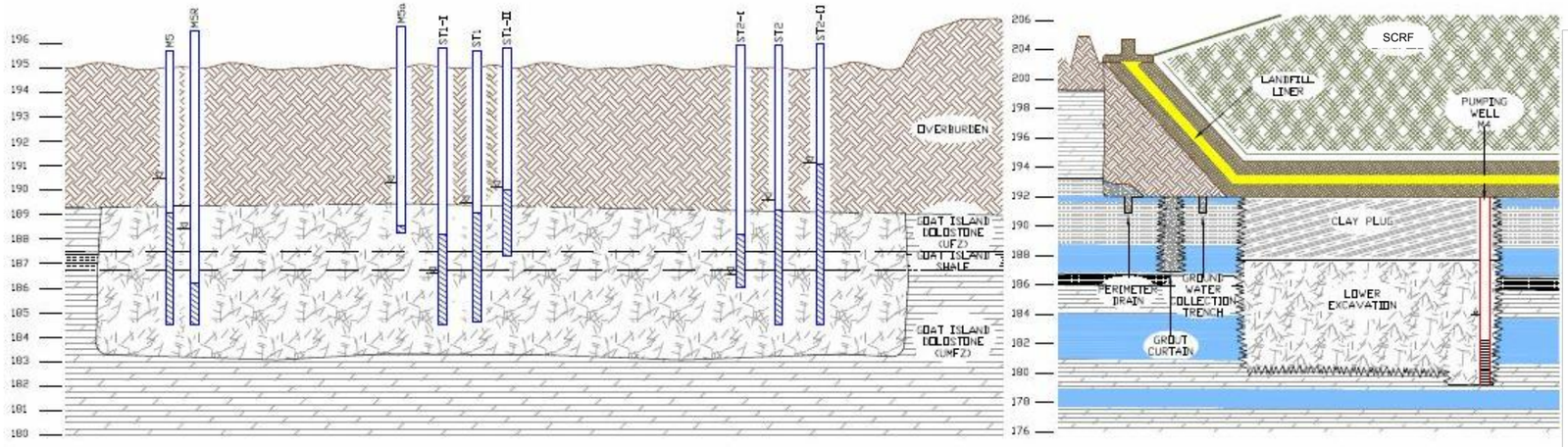

Source: JACKMAN GEOSCIENCE INC., 2015. HAMILTON (STONEY CREEK) LANDFILL, PROVISIONAL CERTIFICATE OF APPROVAL No. A181008, ANNUAL REPORT 2014

GHD

TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY ENVIRONMENTAL ASSESSMENT

CROSS-SECTION GEOLOGIC SEQUENCE AND GROUNDWATER CONTROL FEATURES

11102771-00
Dec 5, 2017

FIGURE 4.4

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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[4].

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, as they are now serviced by municipal water supply[5].

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).

[4] Jackman Geoscience Inc., 2017. Hamilton (Stoney Creek) Landfill, Environmental Compliance Approval Number A181008 Annual Report 2016

[5] Water Well Information System (WWIS), 2017. Ontario Ministry of the Environment, Conservation and Parks (Accessed January 2017).

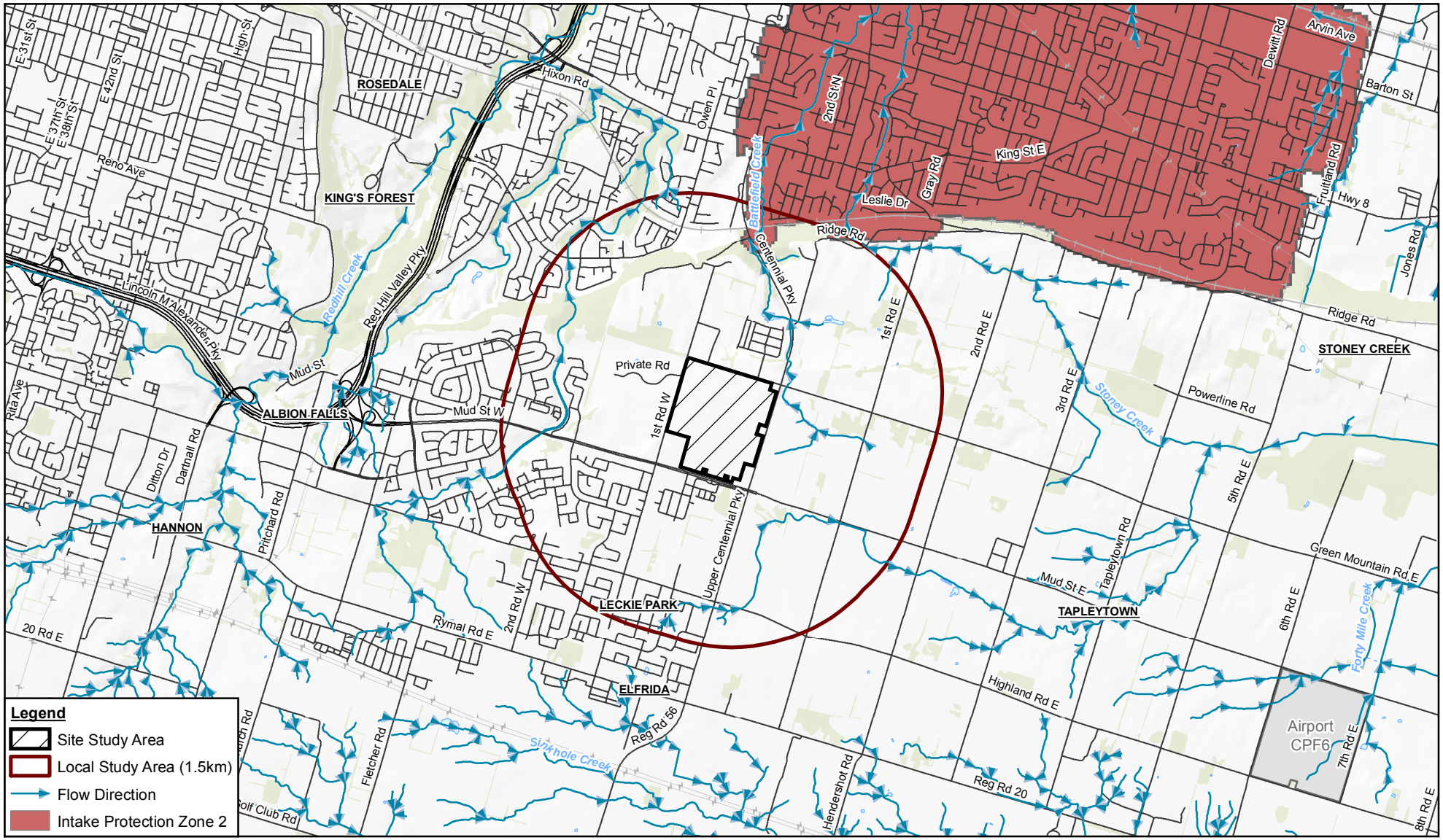
- **Significant Groundwater Recharge Areas (SGRA)** - These are areas on the landscape that are characterized by porous soils, such as sand or gravel, that allow the water to seep easily into the ground and flow to an aquifer. A recharge area is considered significant when it helps maintain the water 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.

While mapping shows part of the SCRF situated 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.

It is further 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[6].

[6] Assessment Report for the Hamilton Region Source Protection Area, July 2015; Approved by the Ministry of the Environment and Climate Change on August 5, 2015; Halton-Hamilton Source Protection Region



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

11102771-03
Dec 7, 2017

INTAKE PROTECTION ZONES

FIGURE 4.5

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

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, thus affected the movement of groundwater:

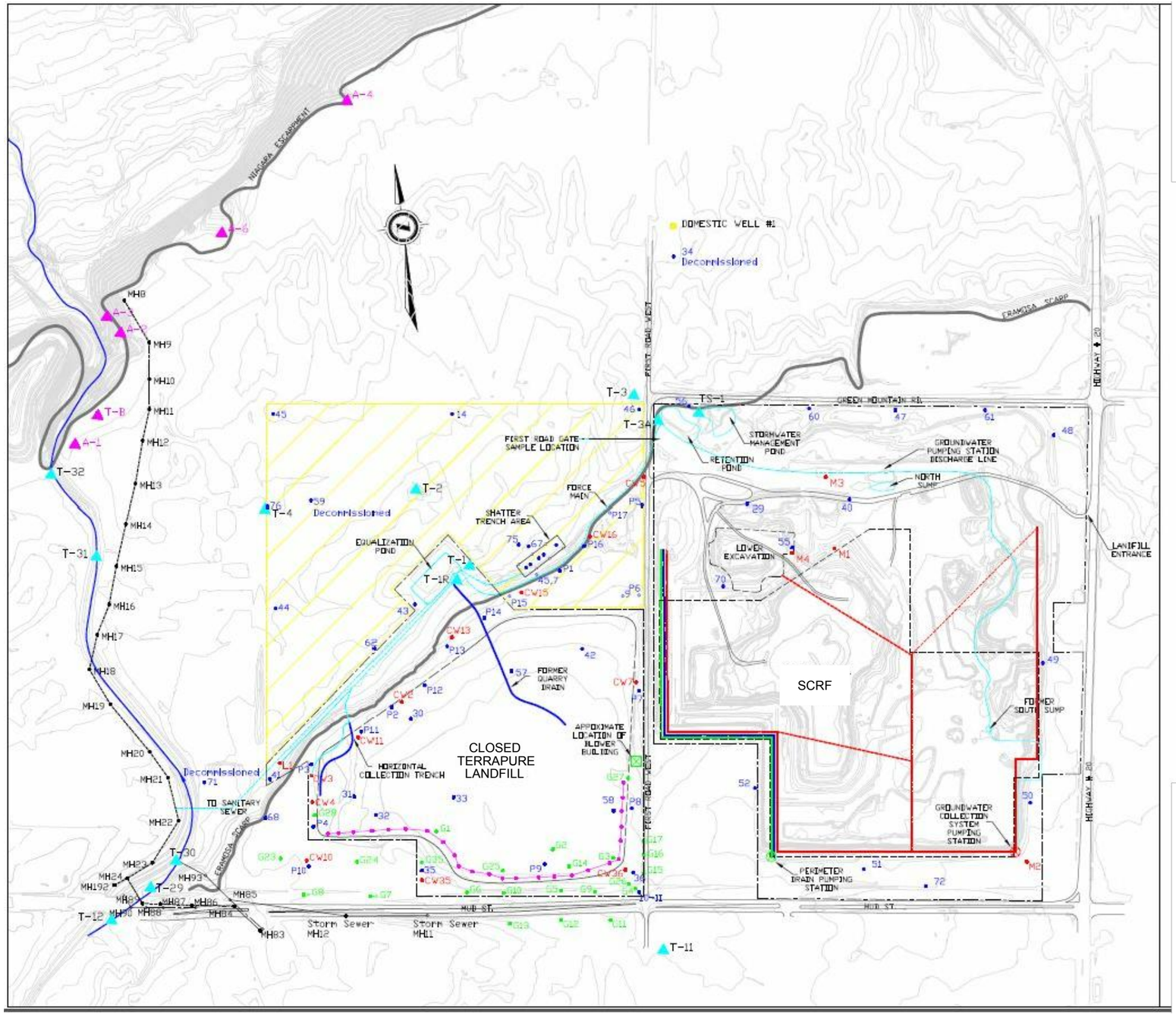
- A 2.1 m diameter storm sewer was installed within the median of Mud Street to the south of the SCRF landfill, during 1994. Construction of this sewer involved removal of portions of the Eramosa Dolostone and the Vinemount Shale.
- Construction of a 42.7 m deep vertical sanitary sewer drop shaft began 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 landfill 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 seven wells to two 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, 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, except for 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).



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

TERRAPURE ENVIRONMENTAL
STONEYCREEK REGIONAL FACILITY ENVIRONMENTAL ASSESSMENT

SITE PLAN AND MONITORING NETWORK

11102771-00
Dec 7, 2017

FIGURE 4.6

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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 further discussed below, 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, 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, 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 7.2 to 12 std. units)
- chloride (historical range of 109 to 5,010 mg/L)
- ammonia (historical range of 0.22 to 270 mg/L)
- phenols (historical range of 2 to 16 mg/L)

In comparison, the 2017 median concentrations for these parameters reported from the SCRF leachate monitoring program were as follows:

- pH (8.48 std. units)
- chloride (2,700 mg/L)
- ammonia (190 mg/L)
- phenols (2.9 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 enhance 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 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.

4.2.1.2 Surface Water

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. Information on the local watersheds was obtained from the *Assessment Report Hamilton Region Source Protection Area, Version 2.7*.[7]

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 traffic 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

[7] Halton-Hamilton Source Protection Committee, Assessment Report Hamilton Region Source Protection Area Version 2.7, July 25, 2015.

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, obtained from the Geology and Hydrogeology Existing Conditions Report[8], 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 catch basins, 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 A** of the Surface Water Existing Condition Report included in **Appendix F**) 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

[8] GHD, 2017. Draft Geology and Hydrogeology Existing Conditions Report. September 2017, Ref. 11102771

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[9]. 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:

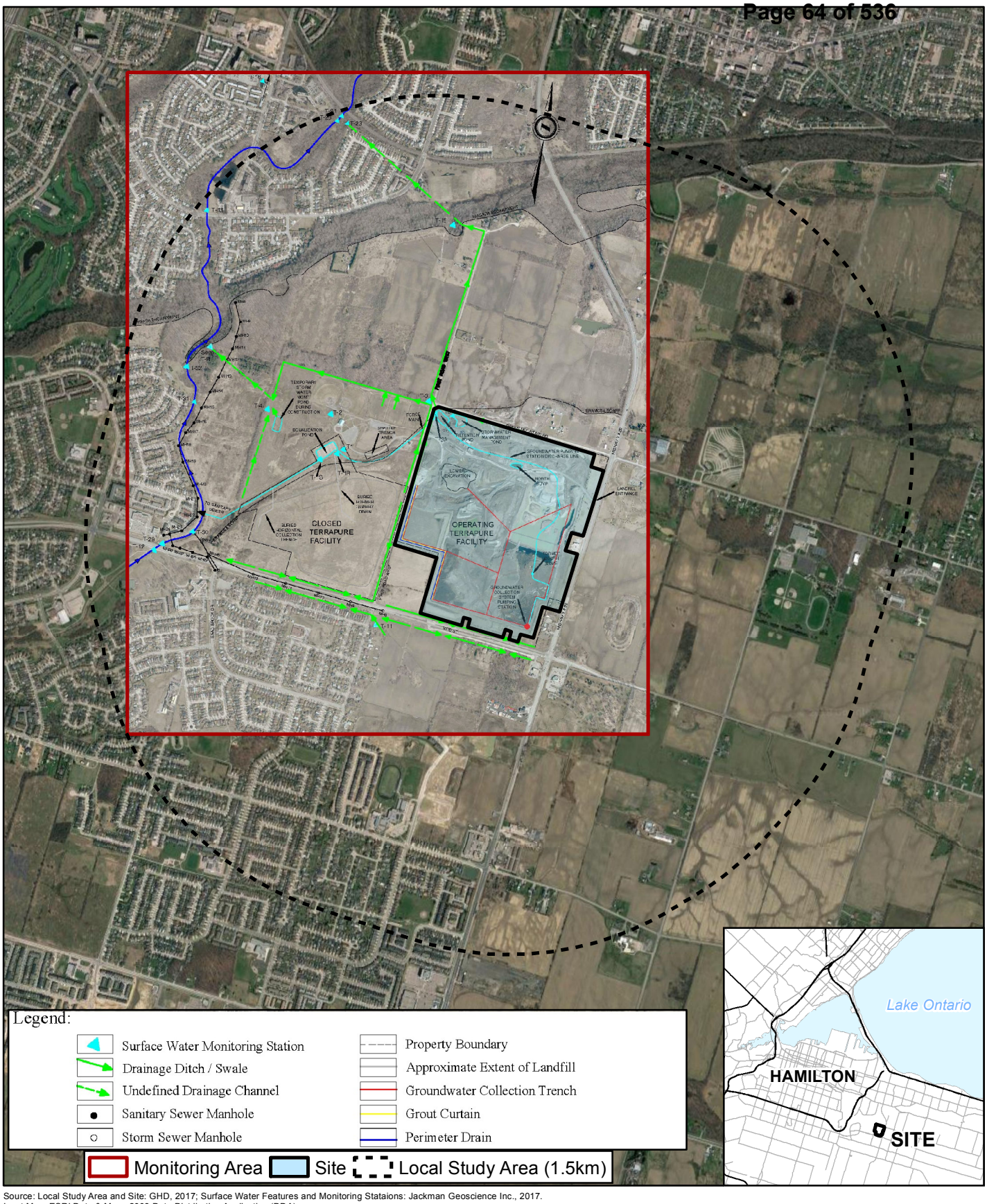
- Assess whether the SCRF is in compliance with the surface water quality policies of the MECP.
- Evaluate the effectiveness of on-Site sediment control measures.

Surface water monitoring related to the SCRF occurs at three locations within the Site Study Area, and 18 locations in the Local Study Area[10]. The exact monitoring program description is contained within Schedule D of ECA No. A181008, and Section 5 of C of A No. 5400-7DSSHU[11]. The surface water, monitoring locations are illustrated on **Figure 4.7**.

[9] Jackman Geoscience Inc., Closed Hamilton (Stoney Creek) Landfill, Environmental Compliance Approval No. A130404, Annual Report 2016. June 30, 2017 and Jackman Geoscience Inc., Operating Hamilton (Stoney Creek) Landfill, Provisional Certificate of Approval No. A181008, Annual Report 2016. June 30, 2017.

[10] Ibid.

[11] Ministry of the Environment, Conservation and Parks, Amended Environmental Compliance Approval, Number A181008, March 1, 2016 and Ministry of the Environment, Conservation and Parks, Certificate of Approval – Industrial Sewage Works, Number 5400-7DSSHU, May 1, 2008.



Source: Local Study Area and Site: GHD, 2017; Surface Water Features and Monitoring Stataions: Jackman Geoscience Inc., 2017.
Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

0 200 400 600
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

N

GHD

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

SURFACE WATER MONITORING LOCATIONS

11102771
Jul 9, 2018

FIGURE 4.7

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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 (PWQO) 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.

4.2.1.3 Terrestrial & Aquatic Environment

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)[12]. 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.

[12] Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and Its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG 02

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[13]. 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 one 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 4.2** summarizes the weather conditions of each visit. Weather conditions were stable across point counts, with only small variations in temperature and cloud cover.

Table 4.2 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.[14] 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[15].

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

[13] Cadman, M.D., D.A Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds.), 2007. Atlas of Breeding Birds of Ontario, 2001 2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp.

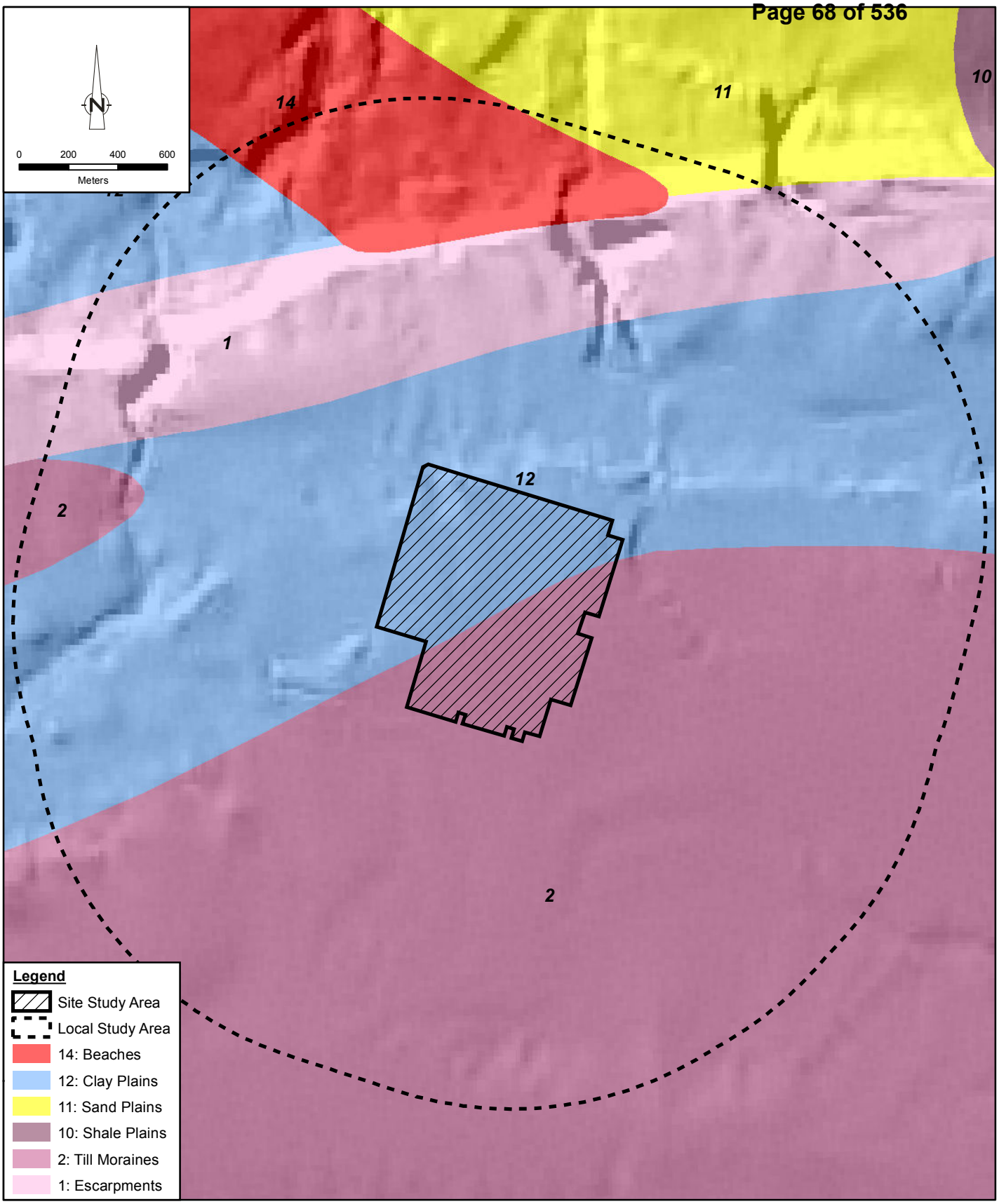
[14] Jackman Geoscience Inc., June 30, 2015. Closed Hamilton (Stoney Creek) Landfill: Environmental Compliance Approval.

[15] Ibid.

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 (included in **Appendix F**) which outlines the Local Study Area and site surface water conditions[16]. Aquatic features within the Site Study Area are discussed in further detail as they relate to aquatic habitat.

[16] GHD, 2017. Draft Surface Water Existing Conditions Report. September 2017, Ref. 11102771 (5)



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018
Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228Coordinate System: NAD 1983 UTM Zone 17N

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

11102771
Jul 9, 2018

PHYSIOGRAPHY

FIGURE 4.8

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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[17].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 below.

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.

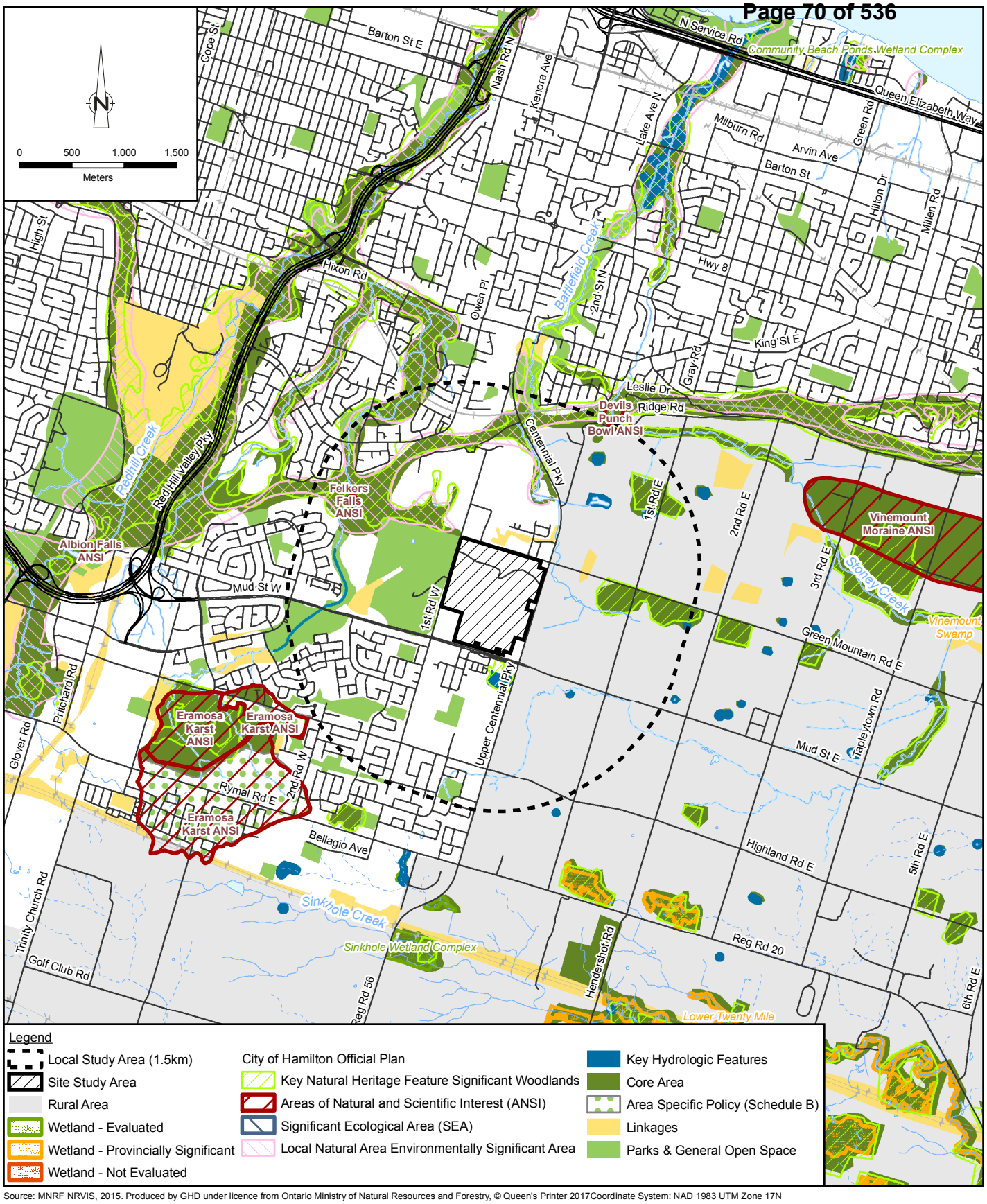
The Felker's Falls Escarpment Valley contains Felker's Falls, a waterfall and plunge pool created by Davis Creek as it crossed the escarpment. A high concentration of Butternut (*Juglans cinerea*) is present on the talus slopes of the escarpment. Vegetation communities in this feature within the Local Study Area consists of deciduous forest, swamp thicket, shrub bluff, treed talus, and various cultural communities, including cultural thicket, old field, and coniferous plantation[18].

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[19].

[17] City of Hamilton, 2012. Rural Hamilton Official Plan. Hamilton, Ontario. As amended 2016 and City of Hamilton, 2013. Urban Hamilton Official Plan. Hamilton, Ontario. As amended 2017.

[18] Hamilton Conservation Authority, 2014. Natural Areas Inventory Project 3rd Edition

[19] Ibid.



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

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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 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 stormwater 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

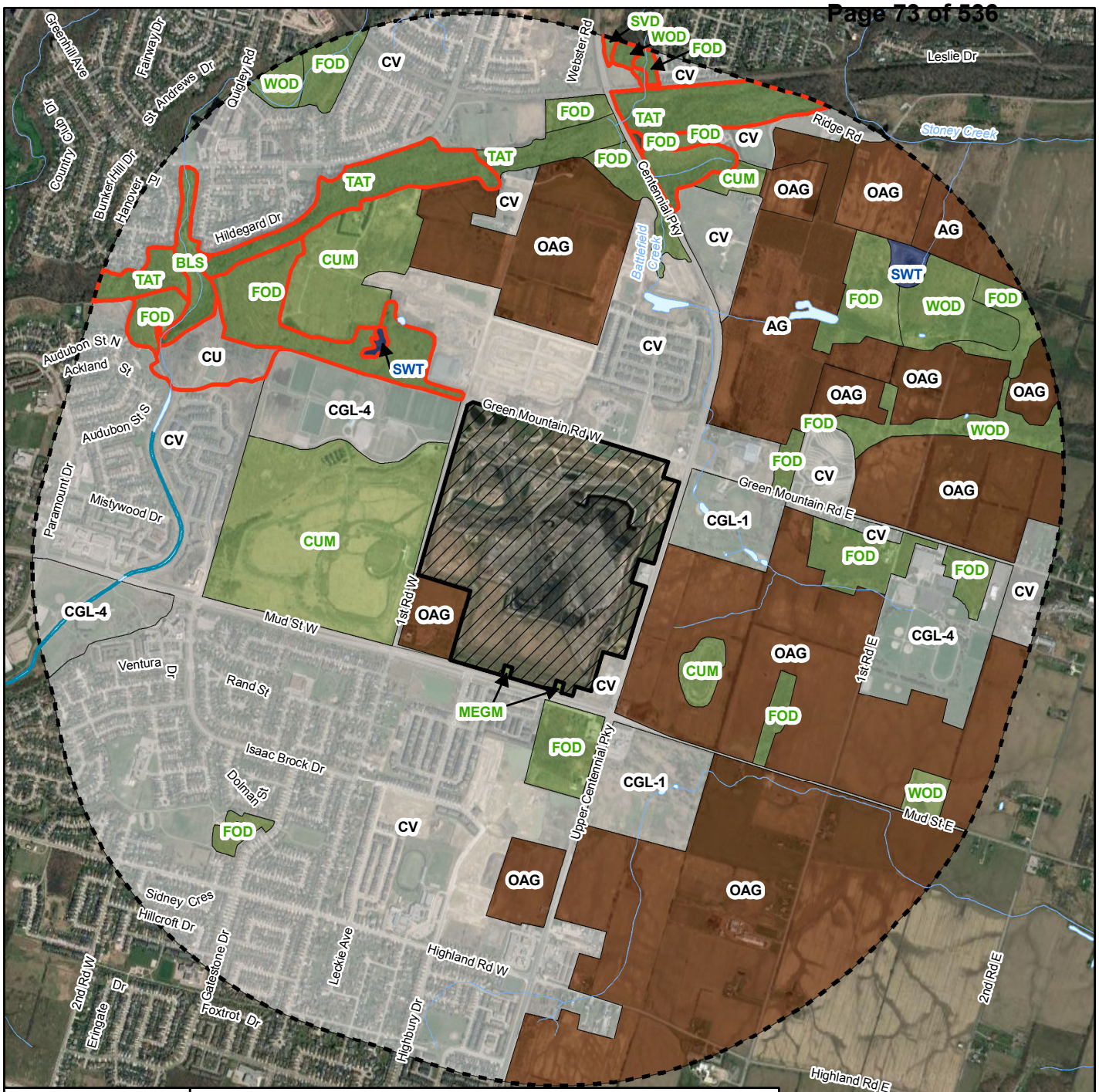
This unit hosts a variety of smaller trees, shrubs and herbaceous species common in disturbed areas. Low growing staghorn sumac (*Rhus typhina*), Manitoba maple (*Acer negundo*), and a variety of other shrub species are present, with an herbaceous ground layer consisting of common species in disturbed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



Legend

- Site Study Area
- Local Study Area
- HCA Layer
- Wetland Unit
- Upland Unit
- Cultural Unit
- Agricultural Unit

Wetland and Water Features:
SWT: Swamp Thicket

Upland:
BLS: Shrub Bluff
CUM: Cultural Meadow
FOD: Deciduous Forest
SVD: Deciduous Savanna
TAT: Treed Talus
WOD: Deciduous Woodland
MEGM: Dry-Fresh Graminoid Meadow Ecosite

Cultural:
CGL-1: Golf Course
CGL-4: Recreational
CU: Cultural
CV: Constructed

Agricultural:
AG: Agricultural
OAG: Open Agricultural

Notes:
1.Hamilton Conservation Authority (HCA) mapping digitized from Natural Areas Inventory maps
2. Site Study Area Ecological Land Classification is shown on Figure 4.4

Source: Hamilton Conservation Authority (HCA) - Natural Areas Inventory, 2014; MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017
Aerial Image: Image ©2017 Google, Imagery date: 2017.

0 220 440 660
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

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TERRAPURE
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65 GREEN MOUNTAIN ROAD WEST

ECOLOGICAL LAND CLASSIFICATION
LOCAL STUDY AREA

11102771
Dec 7, 2017

FIGURE 4.10

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Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2017 Aerial: Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation
Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

0 75 150 225
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

11102771
Dec 7, 2017

ECOLOGICAL LAND CLASSIFICATION
PRIMARY HABITAT TYPES

FIGURE 4.11

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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[20]. 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[21].

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 Table 4.1 of the Natural Environment Existing Condition Report included in **Appendix F**. A total of 31 bird species were observed within the Site and Local Study Areas during the various Site visits, including 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, including several Ministry of Natural Resources and Forestry (MNRF) species description documents, and 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[22].

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

[20] Ibid.

[21] Ibid.

[22] Ministry of Natural Resources and Forestry (MNRF), 2017. Species at Risk in Ontario (SARO) List. https://www.ontario.ca/environment and energy/species risk ontario list (Accessed: September 2017)

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[23].

A SAR screening activity was conducted to determine the potential for SAR within the Local Study Area, and is provided as **Appendix A** of the Natural Environment Existing Condition Report included in **Appendix F**. 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 A** of the Natural Environment Existing Condition Report included in **Appendix F**, 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 Meadowlark

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[24]. 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[25] 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

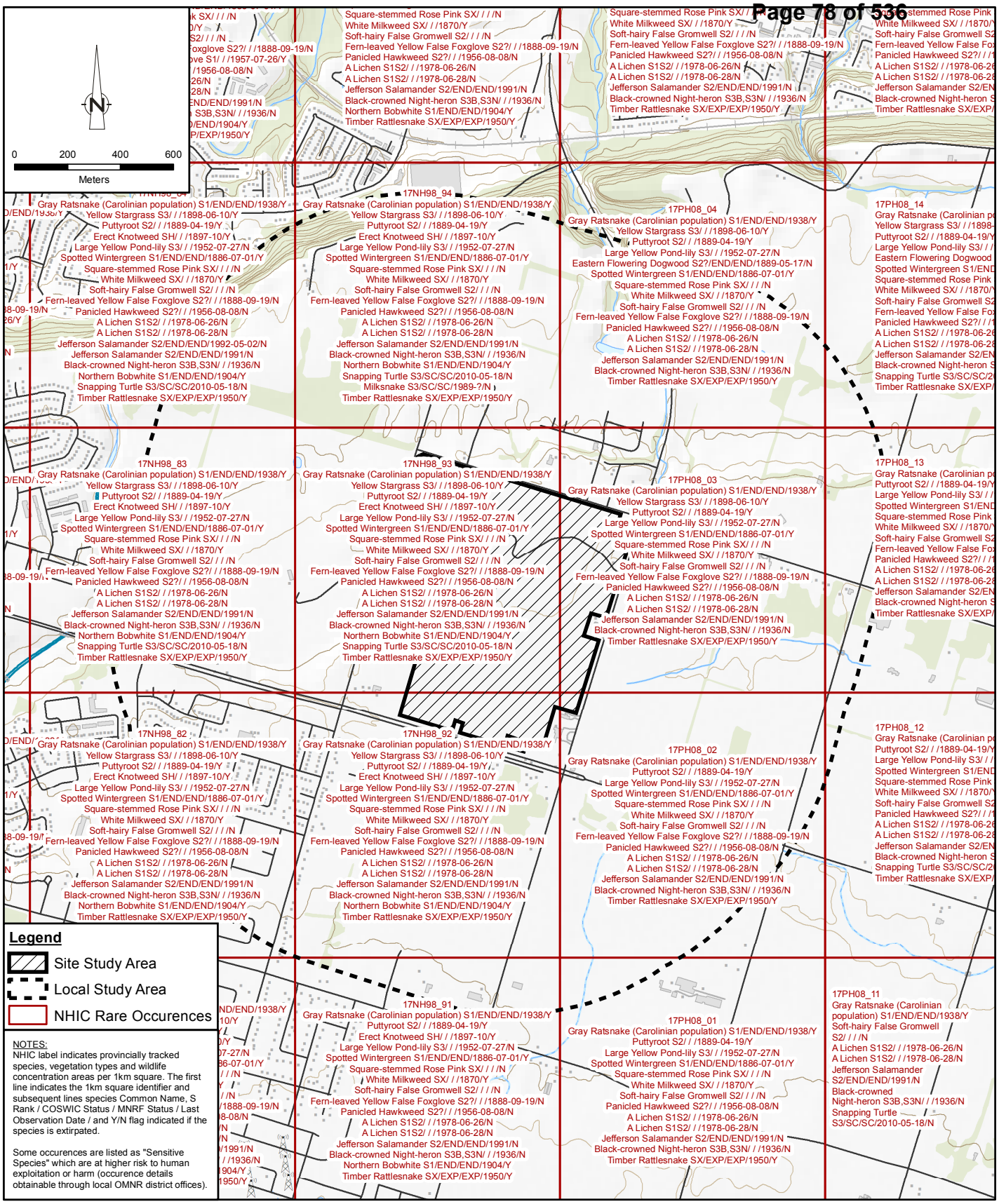
[23] Fisheries and Oceans Canada (DFO). 2017. Aquatic Species at Risk. Available at: http://www.dfompo.gc.ca/species especes/index eng.htm

[24] Rodewald, P. (Editor). 2016. The Birds of North America Online: http://bna.birds.cornell.edu/BNA/. Cornell Laboratory of Ornithology, Ithaca, NY

[25] Ministry of Natural Resources and Forestry (MNRF), 2017a. Snapping Turtle. Retrieved from https://www.ontario.ca/page/snapping-turtle (Accessed: September 2017)

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[26]. 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.

[26] Ministry of Natural Resources and Forestry (MNRF), 2017b. Butternut. Retrieved from https://www.ontario.ca/page/butternut-species-risk (Accessed: September 2017)



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

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

4.2.1.4 Atmospheric - Air and Odour

Meteorology

As designated by the Hamilton Urban Official Plan, 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[27]. The Facility is currently operating under the ECA, and as such, 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[28]. 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.

[27] City of Hamilton., 2013. Urban Hamilton Official Plan. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/city planning/official plan zoning by law/urban hamilton official plan

[28] Newalta 2013, 2014, 2015; Terrapure 2017a, 2017b

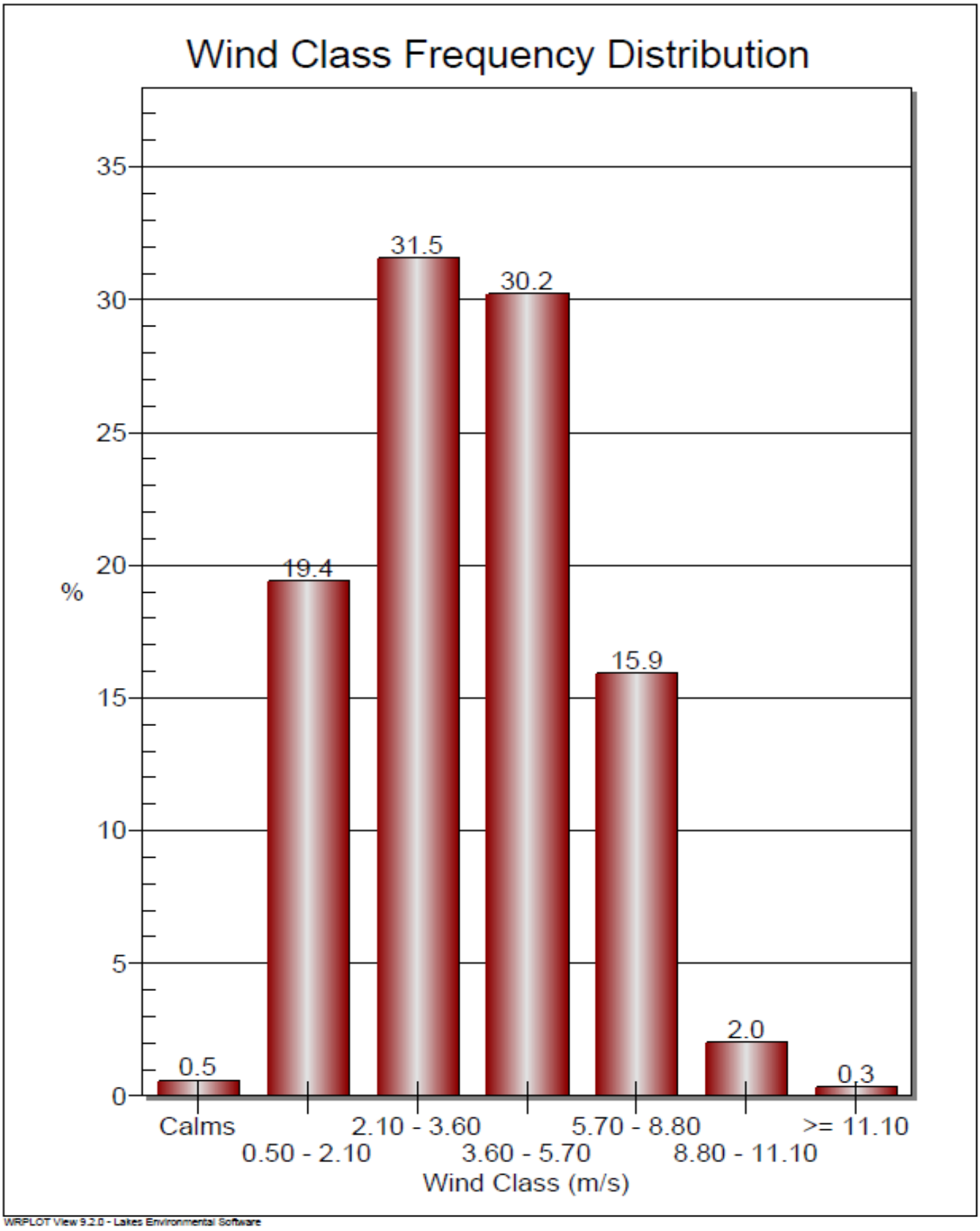
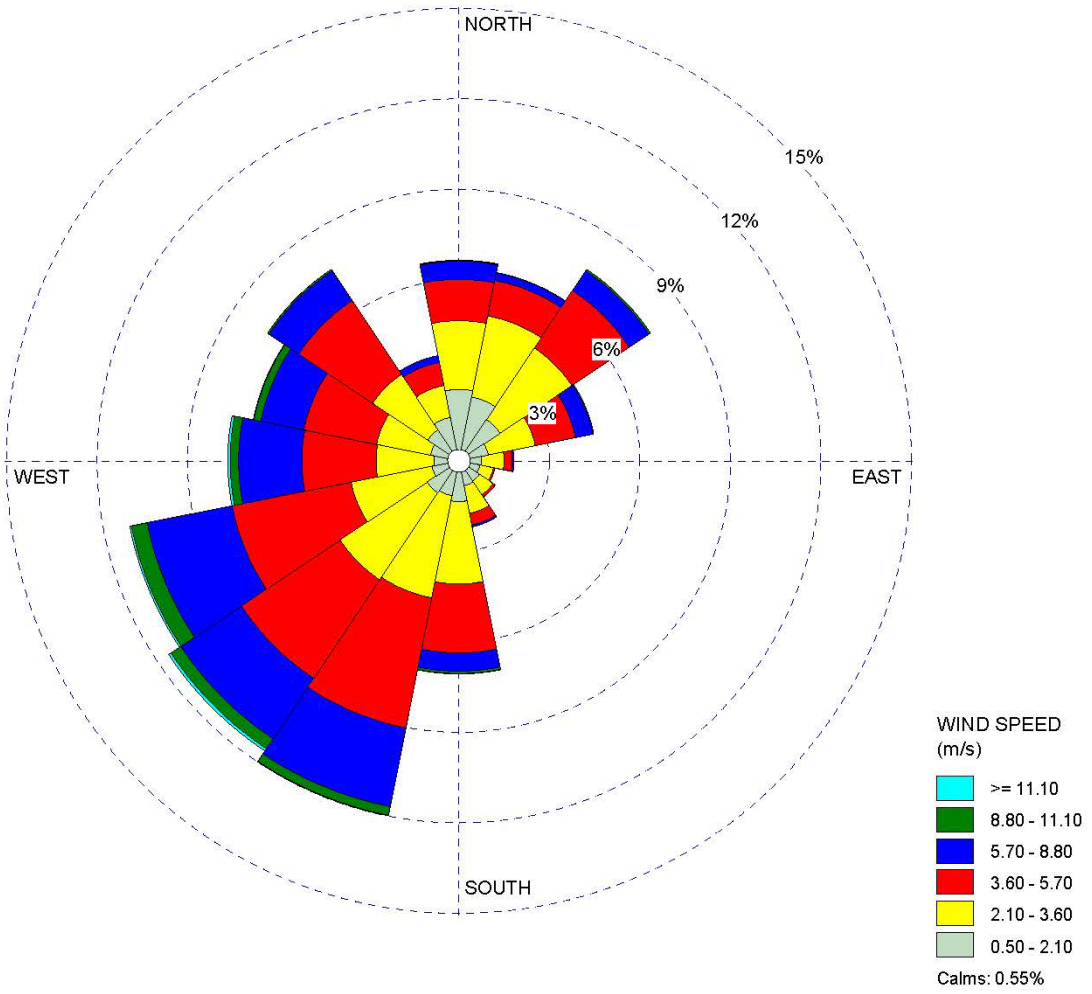


Figure 4.13 On-Site Wind Class Frequency Distribution (2012 – 2016)

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

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2012 - 00:00 **End Date: 12/31/2016 - 23:00**	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[29]. 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.

[29] MECP. 2017. Air Quality Ontario 2016. Accessed: September 18, 2017. Available at: http://airqualityontario.com/.

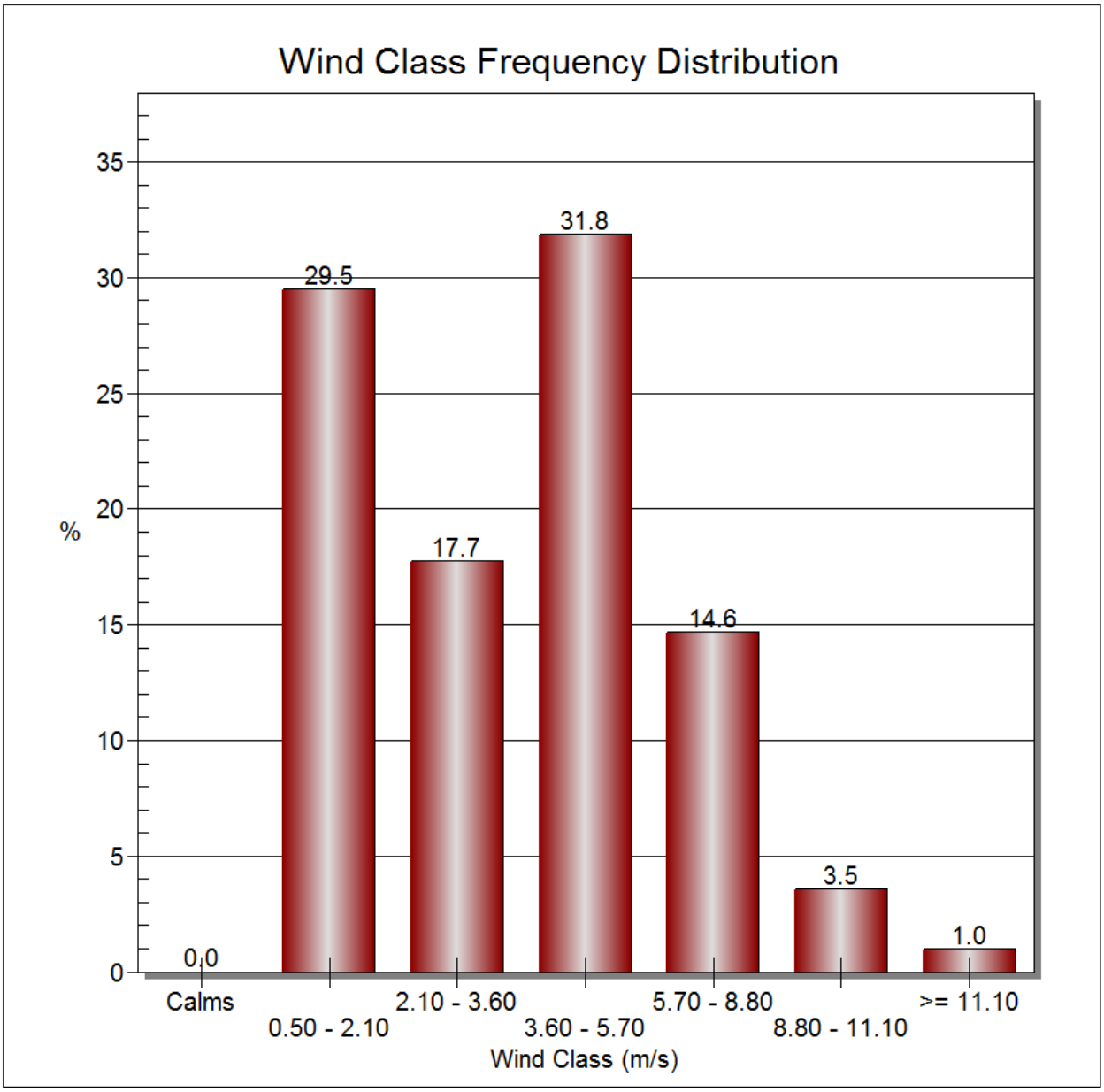


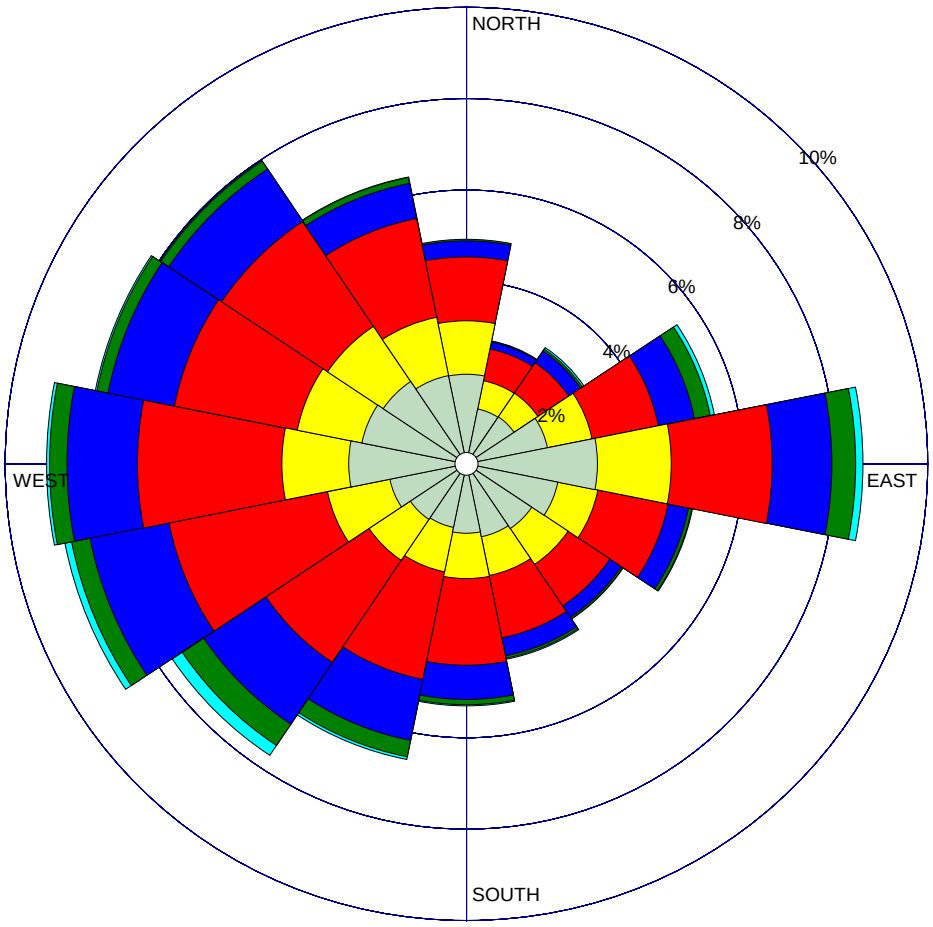
Figure 4.15 MECP Wind Class Frequency Distribution (1996 – 2000)

WIND ROSE PLOT:

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

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/1996 - 00:00 **End Date: 12/31/2000 - 23:59**	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 4.3**)[30].

Table 4.3 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	—	—
HAMN	29168	7	—	2012 - 2016	—
HAMN	29170	9	—	2012 - 2016	—
HAMN	29180	8	2014 - 2016	2014 - 2016	—
HAMN	29565	6	—	2012 - 2016	—

[30] Hamilton Air Monitoring Network. 2013 to 2017. 2012 Annual Air Quality Report. Accessed 14 September, 2017:http://www.hamnair.ca/reporting/HAMN-Annual-Reports.aspx; and Environment Canada. 2013. National Air Pollution Surveillance Network 2012. http://maps-cartes.ec.gc.ca/rnspa-naps/data.aspx. Accessed September 18, 2017 and MECP. 2013 to 2017. Air Quality Ontario 2012. Accessed: September 18, 2017. Available at: http://airqualityontario.com/

Table 4.3 Monitoring Station Information

Station	ID	Distance from Site (km)	Electronic Data Availability		
			SPM	PM_{10}	$PM_{2.5}$
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 National Air Pollution Surveillance Program (NAPS) and Hamilton Air Monitoring Network (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 4.4** summarizes the measured $PM_{2.5}$ concentrations at the regional stations identified.

Table 4.4 Regional $PM_{2.5}$ Monitoring Data (2012 – 2016)

Station	ID	Ambient Monitoring Results (24-hour µg/m^3)				
		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/m^3 (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/m^3 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 4.5** summarizing existing air quality at the Facility, as reported in the Ambient PM_{10} Monitoring Program,

Rotek Environmental reports for 2012, 2013, 2014, 2015, and 2016, included in the Newalta Annual Reports for these same years.

Table 4.5 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 (HAMN) reports summary statistics for PM_{10} at a number of locations in Hamilton[31]. Full statistics are not reported, but the available regional data have been summarized below in **Table 4.6**.

Table 4.6 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 4.6** 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 4.7**[32].

[31] Hamilton Air Monitoring Network. 2013 through 2017. Annual Air Quality Report. Accessed 14 September, 2017:http://www.hamnair.ca/reporting/HAMN-Annual-Reports.aspx

[32] Hamilton Air Monitoring Network. 2013 through 2017. Annual Air Quality Report. Accessed 14 September, 2017:http://www.hamnair.ca/reporting/HAMN-Annual-Reports.aspx

Table 4.7 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/m³ 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 4.7** 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/m³ (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/m³ is reasonable or slightly higher than would be expected, based on the measured regional PM_{10} concentrations from **Table 4.6**, 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 1,500,000 m³, 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[33]. 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 1,500,000 m³ of waste.
2. Site-wide emissions of non-methane organic compounds (NMOC) 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 1,500,000 m³ 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.

[33] Newalta Corporation. 2011. Newalta Stoney Creek East Landfill Gas Emission Study.

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 outlined in **Table 4.8**.

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 4.8 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 (as reported in the complaint records and templates from the Facility's Annual Reports[34]), 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 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- or off-Site sources. **Table 4.9** summarizes the complaints received per year by the Facility.

Table 4.9 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 impact management 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

[34] Newalta Corporation. 2013 to 2015. Hamilton (Stoney Creek) Landfill Provisional Certificate of Approval No. A181008 Annual Report 2013. June 27, 2014; and Terrapure Environmental Operating Stoney Creek Regional Facility. 2017a and b. Environmental Compliance Approval No. A181008 Annual Report 2015. June 30, 2016.

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.

4.2.1.5 Atmospheric Environment - Noise

From a noise perspective, both the Site Study Area and Local Study Area described in **Section 4.1** 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 Alternative Methods 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.

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)[35].

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

[35] Ontario Ministry of the Environment (1983) Model Municipal Noise Control By Law Publication NPC 207

Extractive Industrial "ME" Zone, lands zoned ME-1 are permitted for operations associated with non-hazardous waste from industrial, commercial, and institutional sources[36]. 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 F**). 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 included in **Appendix F**). 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[37].

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**[38]:

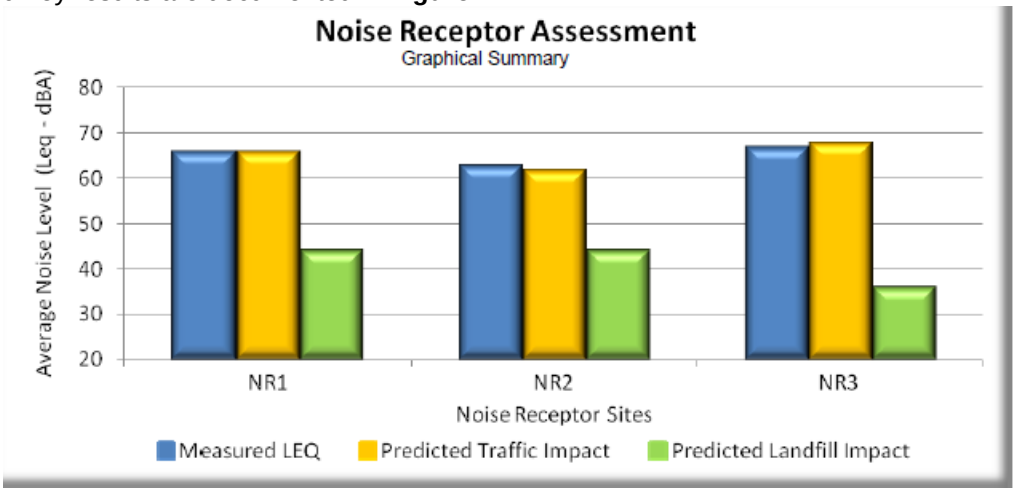


Figure 4.17 Noise Receptor Assessment

[36] City of Stoney Creek (2015) Zoning Bylaw No. 2692-92. Consolidated December 2017.
[37] Rotek Environmental Inc. (2017) Semi Annual Noise Monitoring Survey - 2
[38] Ibid.

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 7:00 a.m. to 7:00 p.m., under the "Noise Guidelines for Landfill Sites" (N-1)[39].

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[40].

As stated in the guideline:

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

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

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

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

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

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

The 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 CLC via email of the complaint immediately after the investigation has been completed.
- Complaints will be summarized for inclusion in the Annual Report.

[39] Ontario Ministry of the Environment (1998) N-1: Noise Guidelines for Landfill Sites

[40] Ontario Ministry of the Environment and Climate Change (2013) Publication NPC 300: Stationary and Transportation Sources – Approval and Planning.

A review of the complaint records from the past three years, summarized in **Table 4.9** above indicates that out of the 31 complaints, zero were related to noise perceived from the Facility[41].

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.

4.2.2 Built Environment

The individual components making up the Built Environment include:

- Land Use

Information on the Built Environment existing conditions within the Study Areas was gathered from a combination of secondary source research and review. A full list and description of the secondary sources used to characterize the Built Natural Environment is listed in **Appendix G.**

4.2.2.1 Land Use

Existing Land Use Conditions

The Terrapure SCRF is under the jurisdiction of the Urban Hamilton OP, which identifies applicable land uses within the Study Area, and the City of Stoney Creek Zoning By-law No. 3692-92, which dictates development within the Study Area. The SCRF is also directly adjacent to areas designated under the Rural Hamilton OP. The SCRF falls within the Nash Neighbourhood Secondary Plan Area designated under the Urban Hamilton OP. **Figure 4.19** represents land use designations with the Nash Neighbourhood Secondary Plan[42].

[41] Terrapure (2016) Terrapure Environmental Operating Stoney Creek Regional Facility - Annual Report 2016.

[42] City of Hamilton, 2013. Urban Hamilton Official Plan. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/city planning/official plan zoning by law/urban hamilton official plan

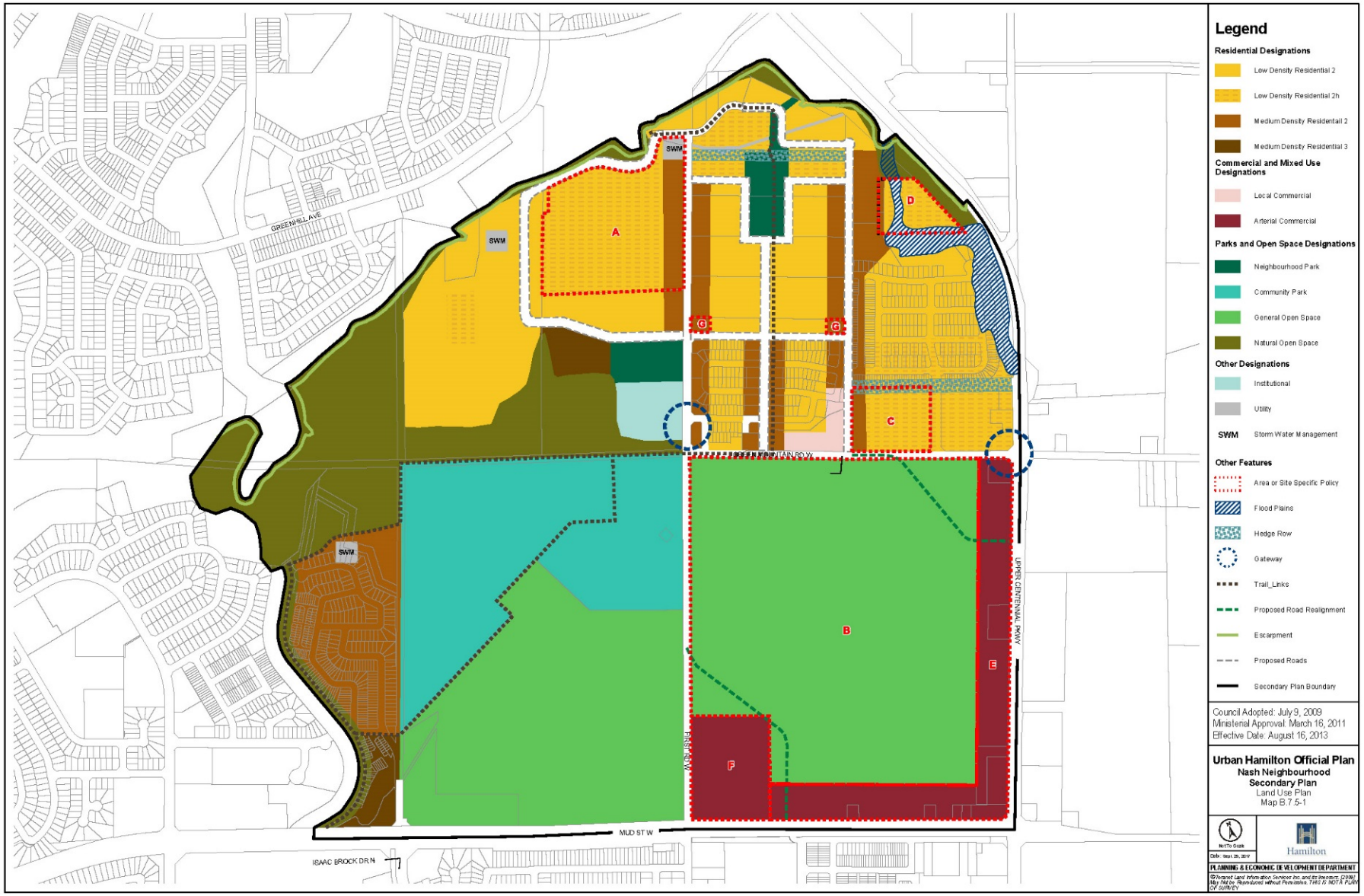


Figure 4.19 Official Plan Mapping – Nash Neighbourhood Secondary Plans

Urban Hamilton Official Plan (2013) Designations

The Urban Hamilton OP[43] identifies the Urban Structural Elements, Functional Road Classifications and Urban Land Use Designation comprising the Terrapure SCRF (see **Table 4.10**).

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 OP amendments, the Terrapure SCRF resides within land designated as General Open Space, in accordance with Schedule E-1 of the Urban Hamilton OP (2013).
- Commercial and Mixed Use Designations – Arterial Commercial.

Table 4.10 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

[43] City of Hamilton, 2013. Urban Hamilton Official Plan. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/city planning/official plan zoning by law/urban hamilton official plan

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**. The Zoning By-law identifies permitted land use activities within specific area. 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[44].

Local Study Area: Existing Land Use Conditions

Historic Residential Development Activity

Areas within the identified Local Study Area have recently undergone residential development. **Table 4.11** summarizes residential development activity for sites within the Local Study Area[45]. **Figure 4.21** provides a visual representation of residential development activity within the 1.5 km Study Area, and corresponds to **Table 4.11**.

[44] City of Hamilton, 2015(a). City of Stoney Creek Zoning By law 3692 92. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/city planning/official plan zoning by law/zoning by laws former communities

[45] City of Hamilton, 2015(b). iMapper. City of Hamilton, Ontario – Geographic Information Systems. Accessed: May 20, 2016. Available at: http://map.hamilton.ca/iMapper.aspx#

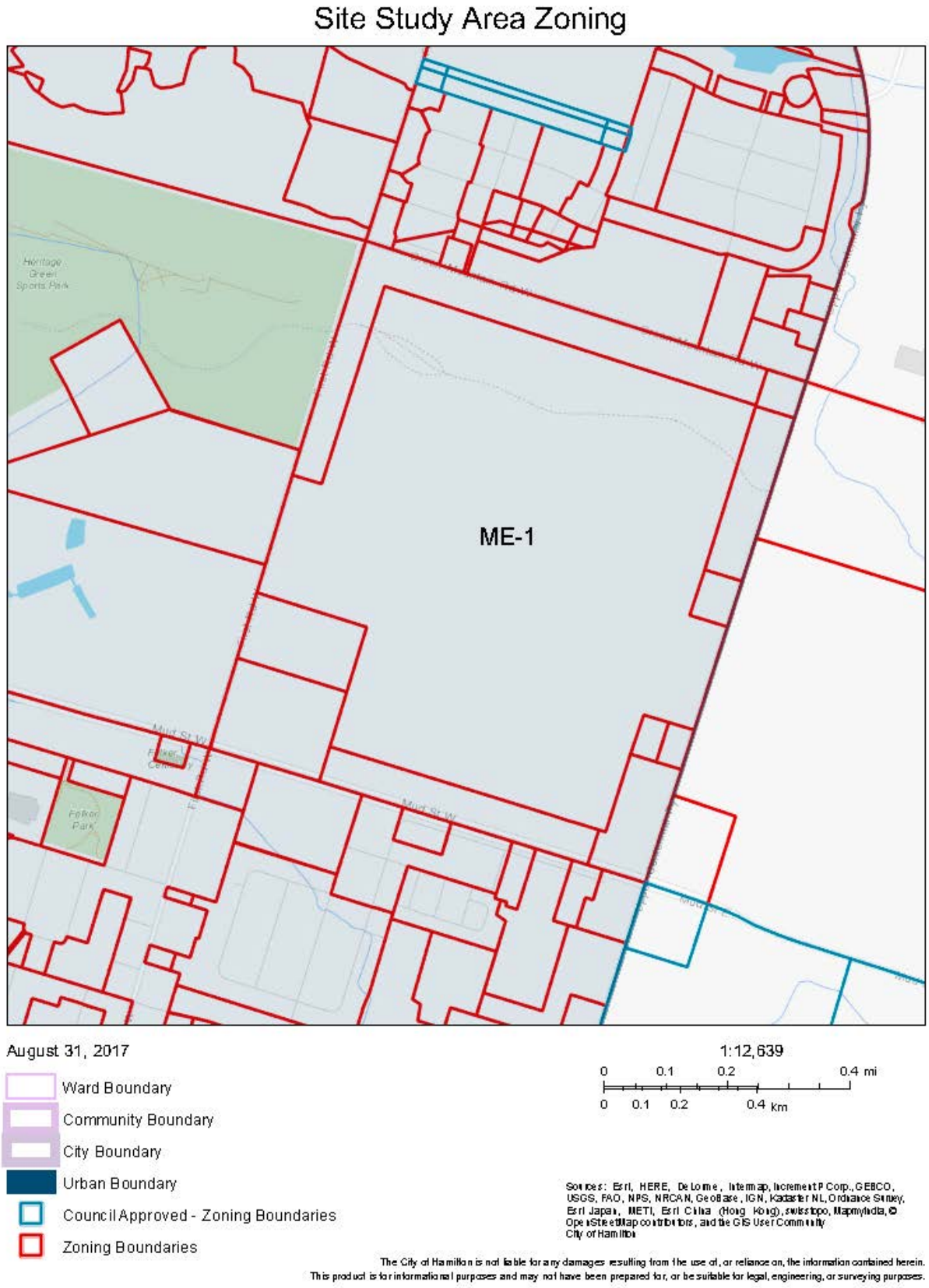
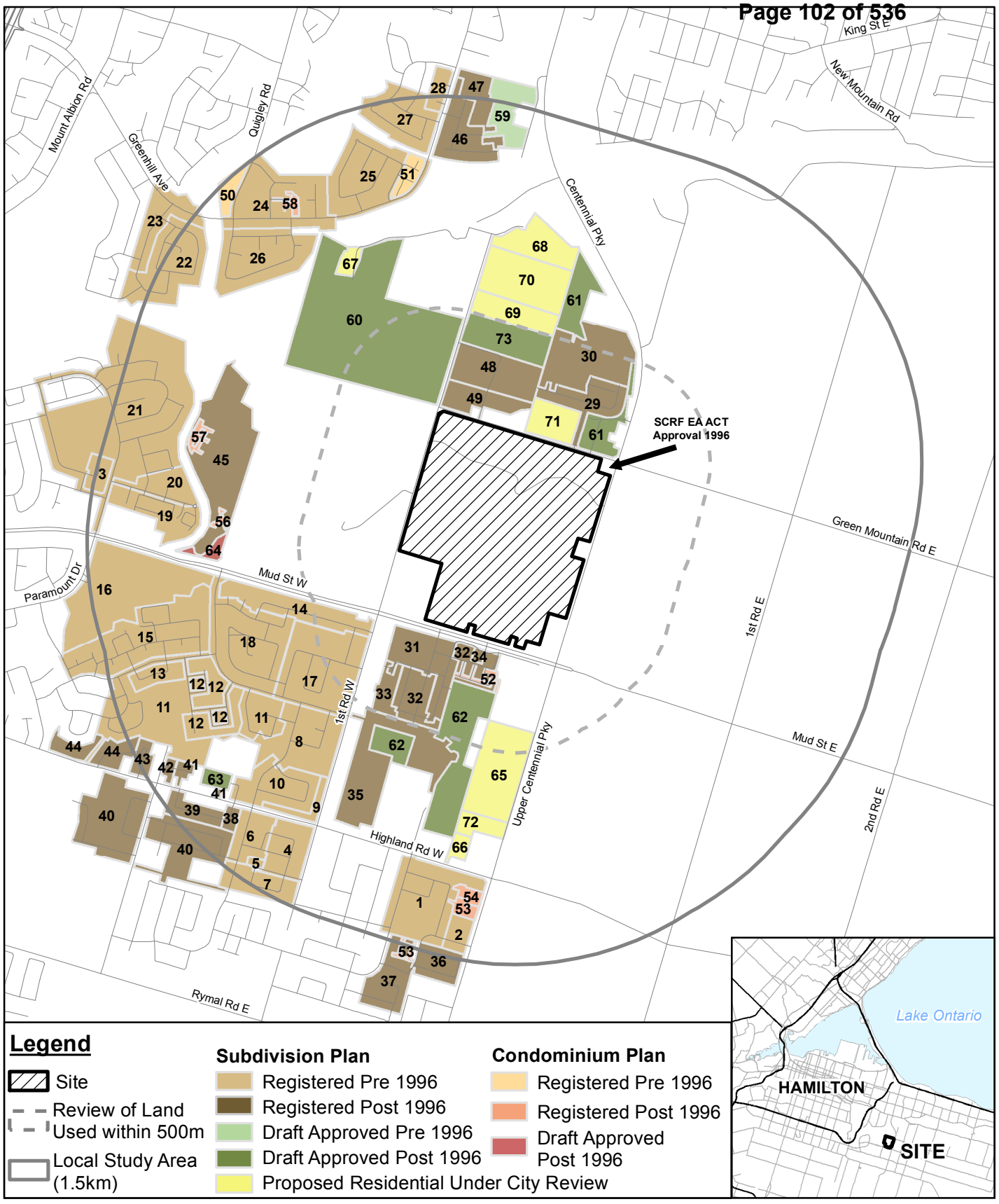


Figure 4.20 Site Study Area Zoning Map



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018
Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

0 200 400 600
Metres

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

HISTORICAL RESIDENTIAL DEVELOPMENT ACTIVITY

11102771
Jul 10, 2018

FIGURE 4.21

GIS File: N:\CA\Newmarket\Projects\Projects in Progress\8-chars\11------\1110----\111027--\11102771\05 - EA\GIS Figures\MXD\11102771_Subdivision_and_Condo_Plans_Letter.mxd

Table 4.11 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
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	9/30/1972	N/A	Total Units 115

Table 4.11 Residential Development Activity – Registered Plans of Subdivision & Registered Plans of Condominium

ID#	Development	Date Registered	Original Address	Number of Units
	Glendale Estates, No.4, Ph.4			
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 *(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 St. Extension, Ph. 1	12/11/2009	218-250 Highland Road W.	12 Single Units 4 Semi Units

Table 4.11 Residential Development Activity – Registered Plans of Subdivision & Registered Plans of Condominium

ID#	Development	Date Registered	Original Address	Number of 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
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

Table 4.11 Residential Development Activity – Registered Plans of Subdivision & Registered Plans of Condominium

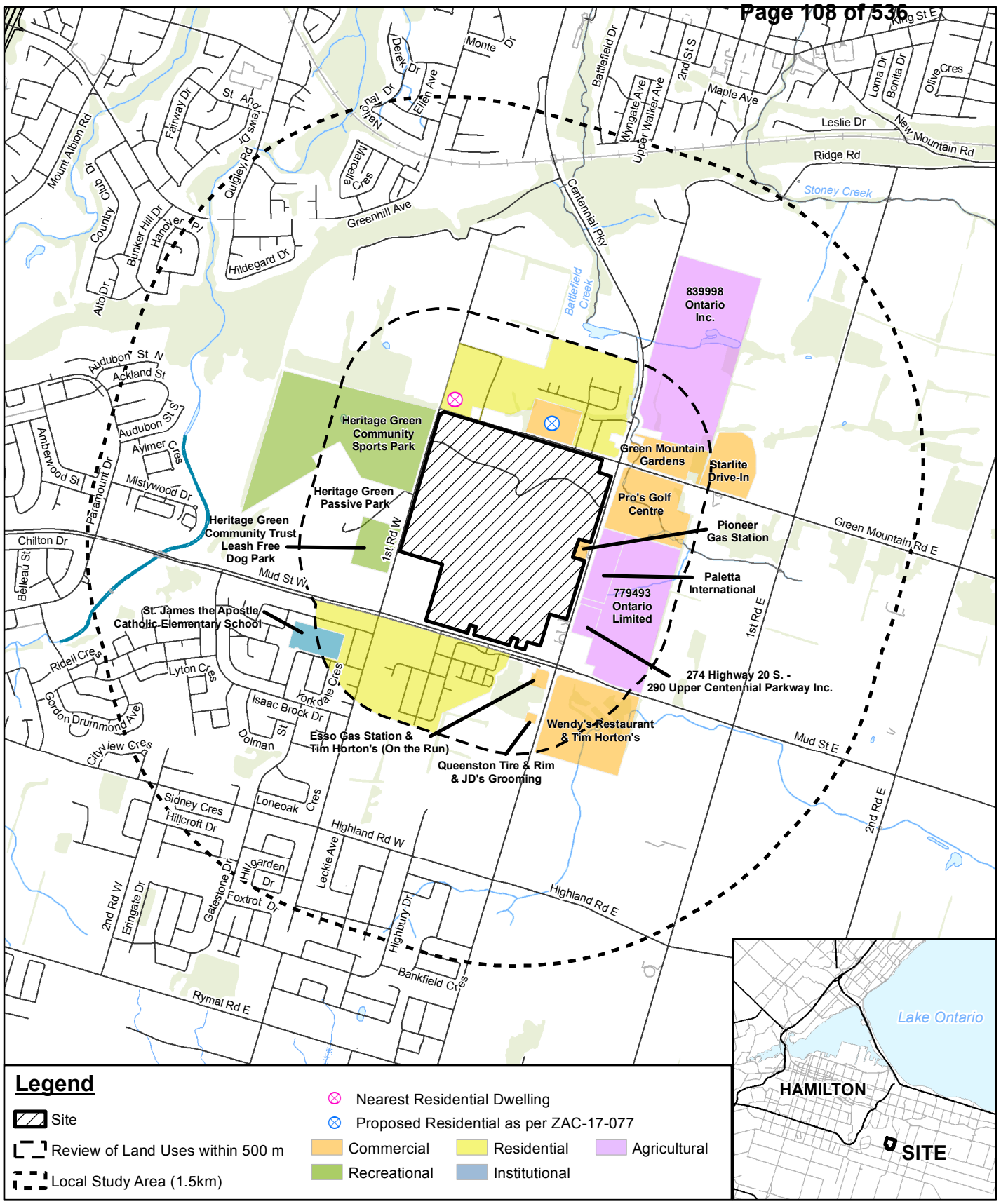
ID#	Development	Date Registered	Original Address	Number of Units
Draft Approved Plans of Subdivision (Post 1996)				
60	PLAN#: 201301 Red Hill, Ph.2 (aka Red Hill, Ph. 3/4)	3/15/2013	435 First Rd W	Total Units 340
61	PLAN#: 200803 Victory Ridge (formerly Nash Neighbourhood)	4/17/2008	22 Green Mountain 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
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 500 m of the Site

Land uses within the Local Study Area include residential, commercial, recreational and institutional uses. **Figure 4.22** highlights the location of each of the land uses within 500 m with respect to the

location of the Terrapure SCRF. The MECP has developed two relevant guidelines regarding land use in vicinity to landfills.

- Guideline D-1: Land Use Compatibility identifies recommended separation distances and control measures for sensitive land uses with respect to landfills in order to minimize potential adverse effects (MECP, 1995).
- Guideline D-4: Land Use On or Near Landfills and Dumps works in collaboration with Guideline D-1 and provides direction for the restriction of land uses in vicinity of landfills. Guideline D-4 recommends that sensitive land uses be restricted within 500 m of the fill area. However, Guideline D-4 also recognizes that actual influence areas for individual landfills vary and are dependent on a number factors.



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018
Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

0 200 400 600
Metres

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

LAND USES WITHIN 500 M

11102771
Mar 1, 2018

FIGURE
4.22

GIS File: G:\Legacy\Geomorphic\GIS_Projects\11102771\GIS Figures\MXD\11102771_Sensitive_Land_Use.mxd

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 OP.

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

Agricultural

Agricultural Lands within 500 m

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 4.22**. 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.

Urban Hamilton Official Plan (2013)

As previously mentioned, the Terrapure SCRF resides within the Urban Area, as designated under the Urban Hamilton OP, 2013, but is also directly adjacent to lands that fall under the jurisdiction of the Rural Hamilton OP, 2012. The Urban Hamilton OP identifies the Urban Structural Elements,

Functional Road Classifications, Urban Land Use Designation, and Secondary Plan Areas adjacent to the Terrapure SCRF, and that fall within the Local Study Area[46].

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):

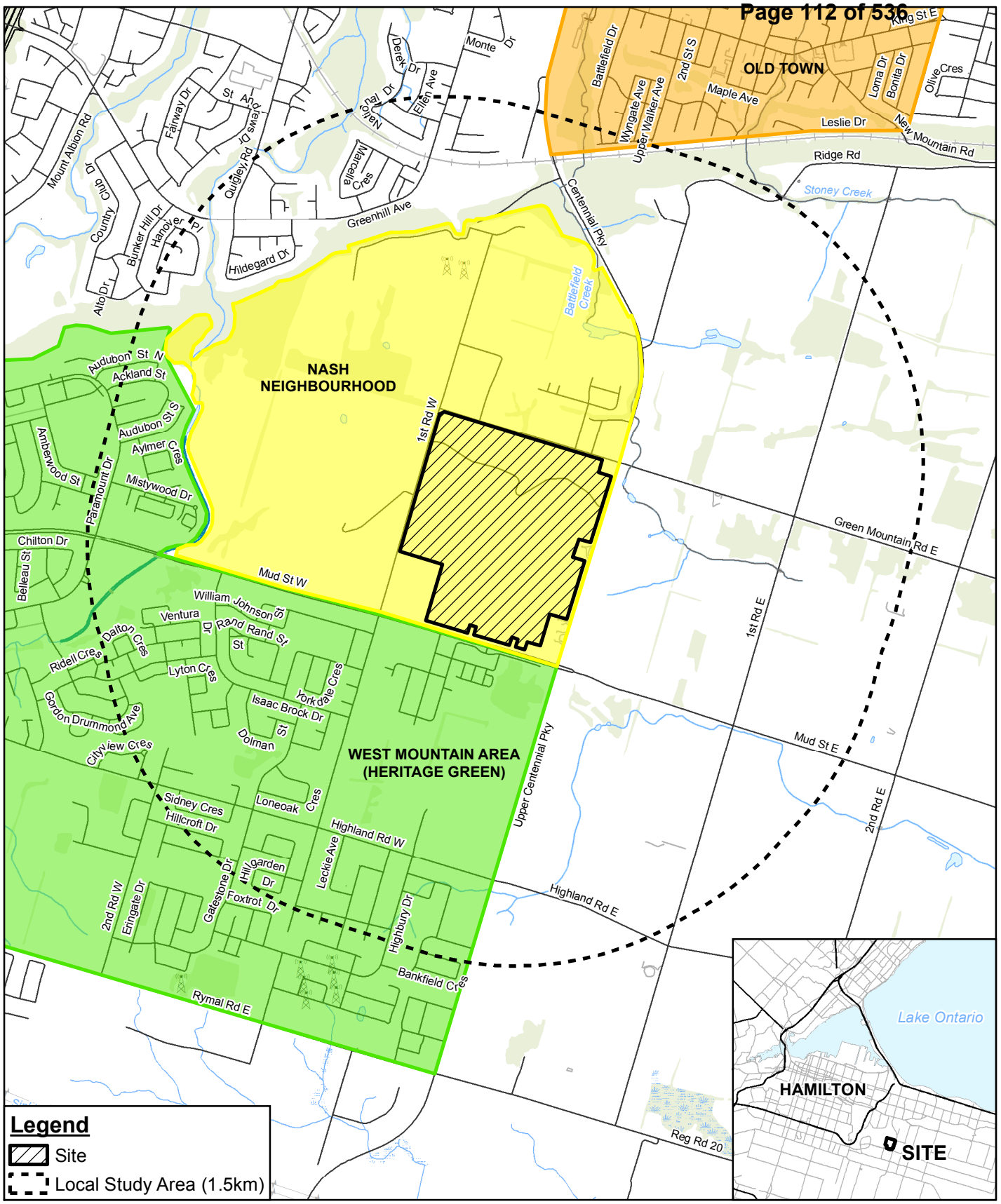
- Open Space
- Neighbourhoods
- Utility
- Institutional
- Commercial and Mixed Use Designations – Arterial Commercial
- Commercial and Mixed Use Designations – Medium Density

Secondary Plan Areas

As demonstrated in **Figure 4.23**, 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 4.23**)
2. West Mountain Area (Heritage Green) Secondary Plan (**Figure 4.24**)
3. Old Town Secondary Plan (**Figure 4.25**)

[46] City of Hamilton, 2013. Urban Hamilton Official Plan. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/city planning/official plan zoning by law/urban hamilton official plan



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018
Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

0 200 400 600
Metres

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

SECONDARY PLANS WITHIN THE LOCAL STUDY AREA

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Feb 26, 2018

FIGURE 4.23

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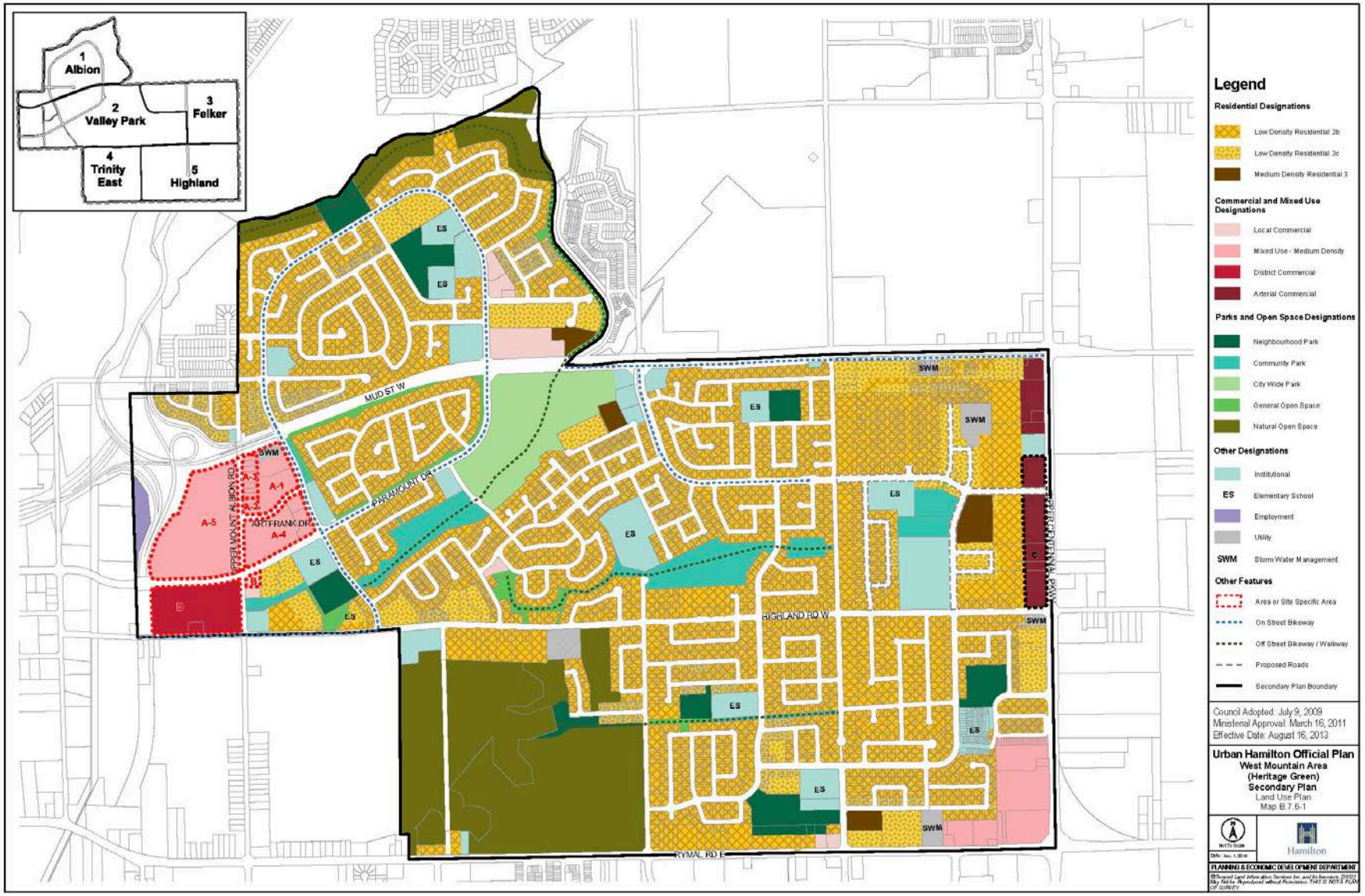


Figure 4.24 West Mountain Area (Heritage Green) Secondary Plan

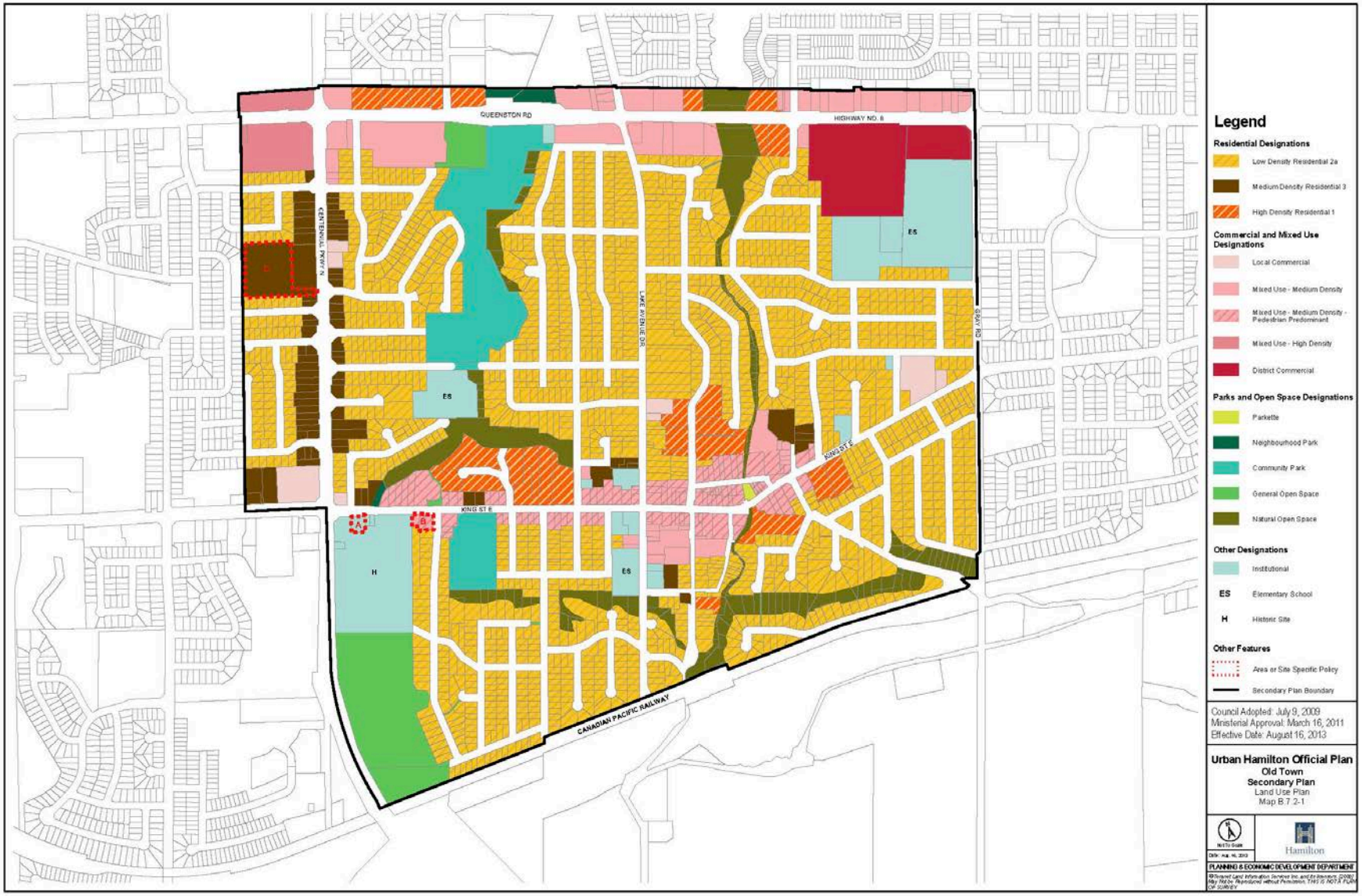


Figure 4.25 Old Town Secondary Plan

Table 4.12 identifies existing secondary plan designations within each Secondary Plan Area residing within the 1.5 km Local Study Area.

Table 4.12 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 4.13 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 4.13 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; **(d)** arts, cultural, entertainment, and recreational uses; **(e)** hotels; **(f)** *multiple dwellings*; and, **(g)** *accessory* uses.	Maximum building heights of six stories. Prohibited uses include: **(a)** gas bars and car washes on *pedestrian predominant streets;* **(b)** vehicle dealerships; and, **(c)** garden centres as a primary use.

Secondary Plan Designations	Description of Built Form/Permitted Uses	Restrictions on Land Use (Density/ GFA/ Prohibited Uses)
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 traffic 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
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

Secondary Plan Designations	Description of Built Form/Permitted Uses	Restrictions on Land Use (Density/ GFA/ Prohibited Uses)
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, stormwater 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 OP, as follows[47]:

- Agricultural
- Specialty Crop
- Rural
- Open Space

Figure 4.26 is representative of lands with these designations with respect to the Terrapure SCRF.

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 4.27** 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.

[47] City of Hamilton, 2012. Rural Hamilton Official Plan. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/city planning/official plan zoning by law/rural hamilton official plan

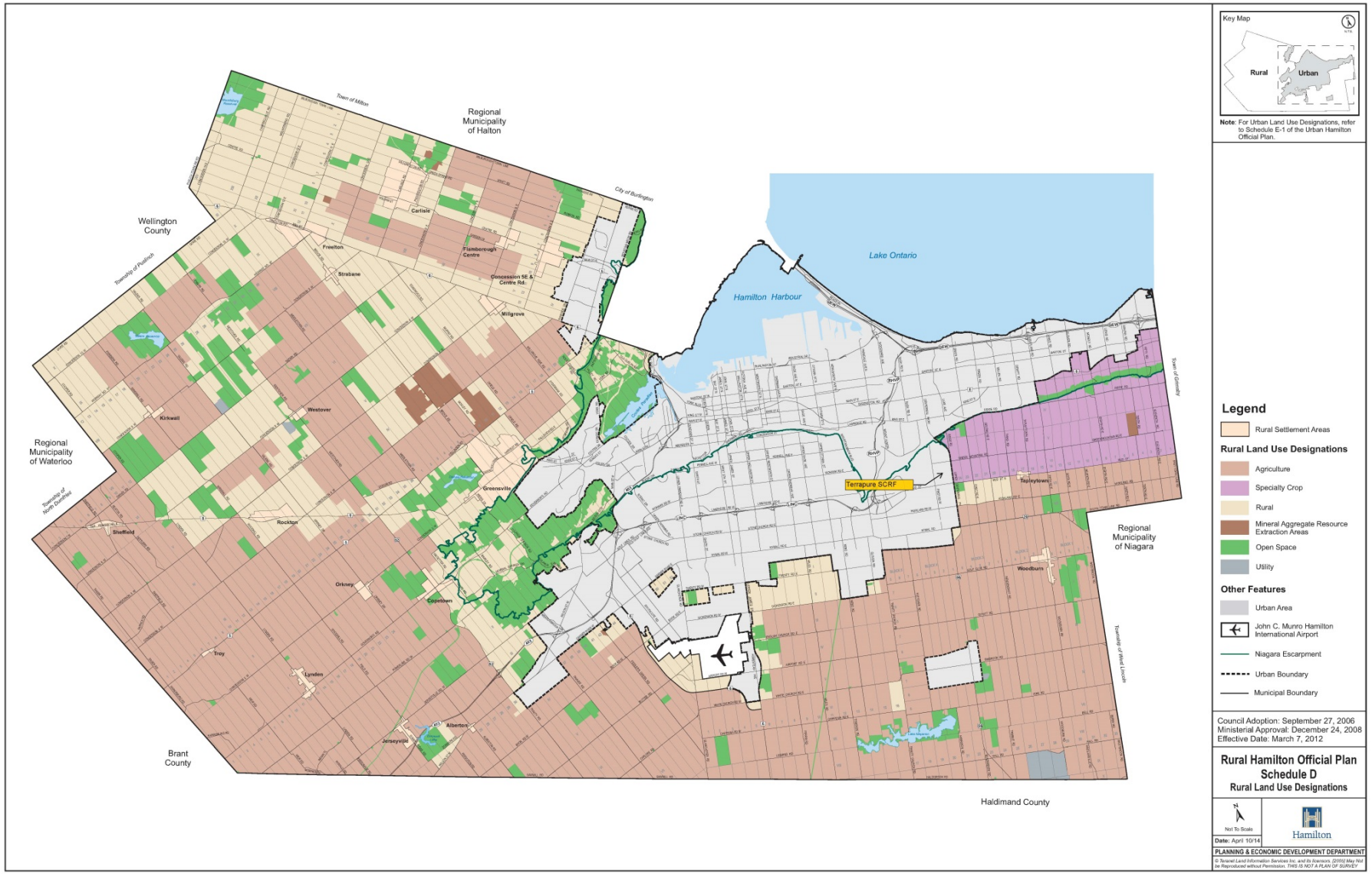


Figure 4.26 Rural Hamilton Official Plan Land Uses

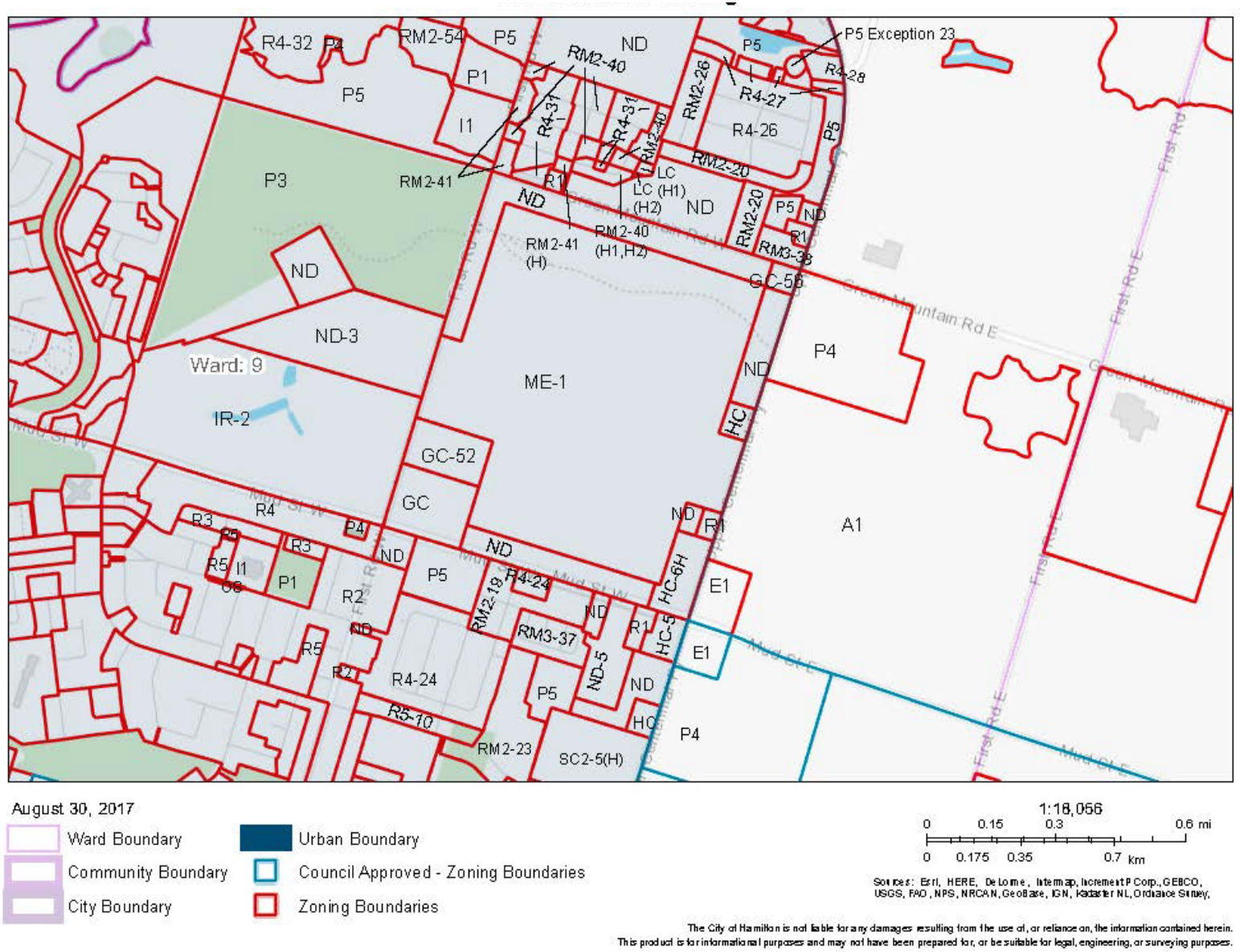


Figure 4.27 Zoning Within 500 m of Site Study Area – City of Hamilton Interactive Zoning Map

Figures 4.28 to **4.31** 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 4.28 Hamilton Zoning Index Map 'H'

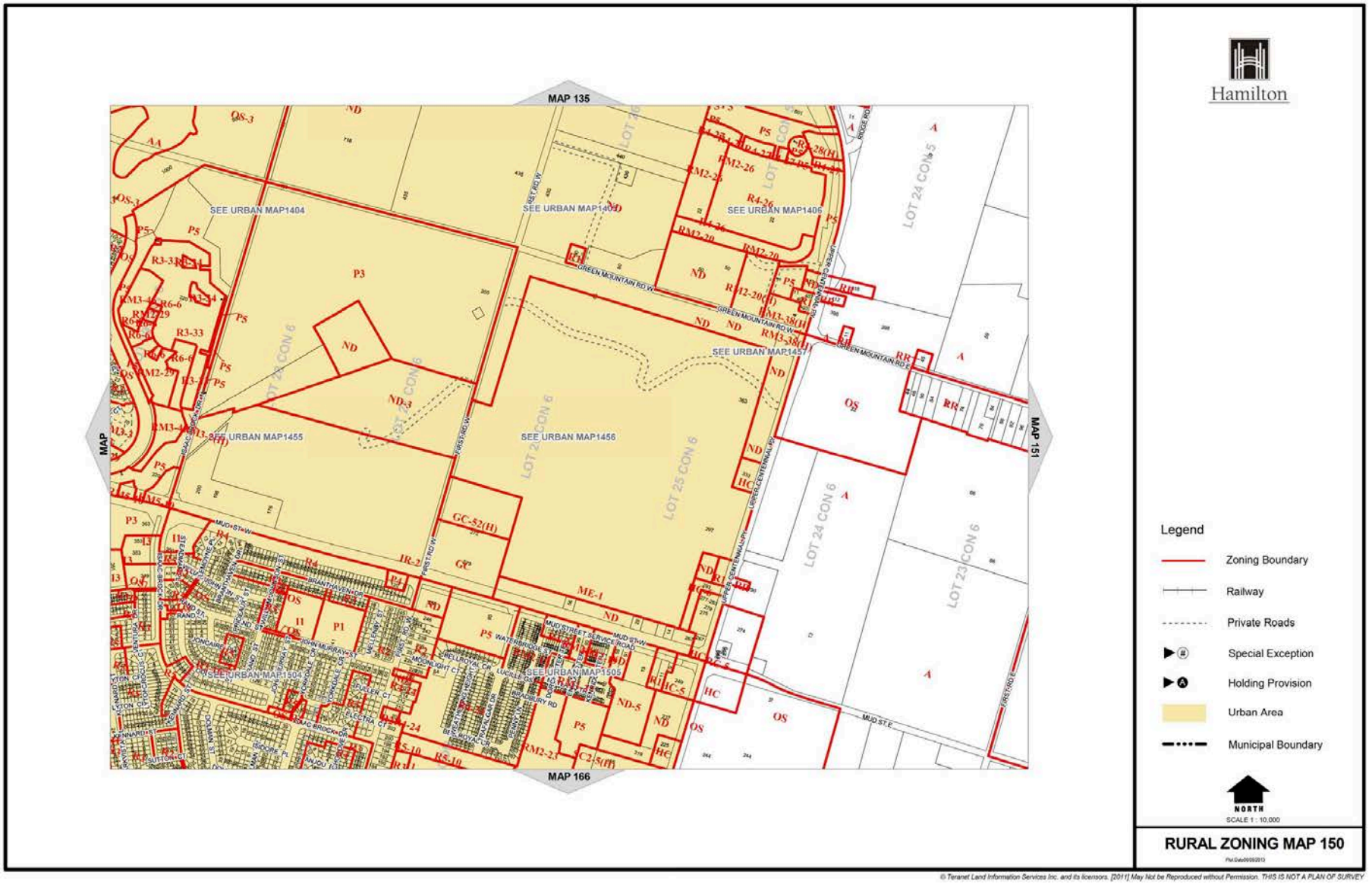


Figure 4.29 Rural Zoning Map 150

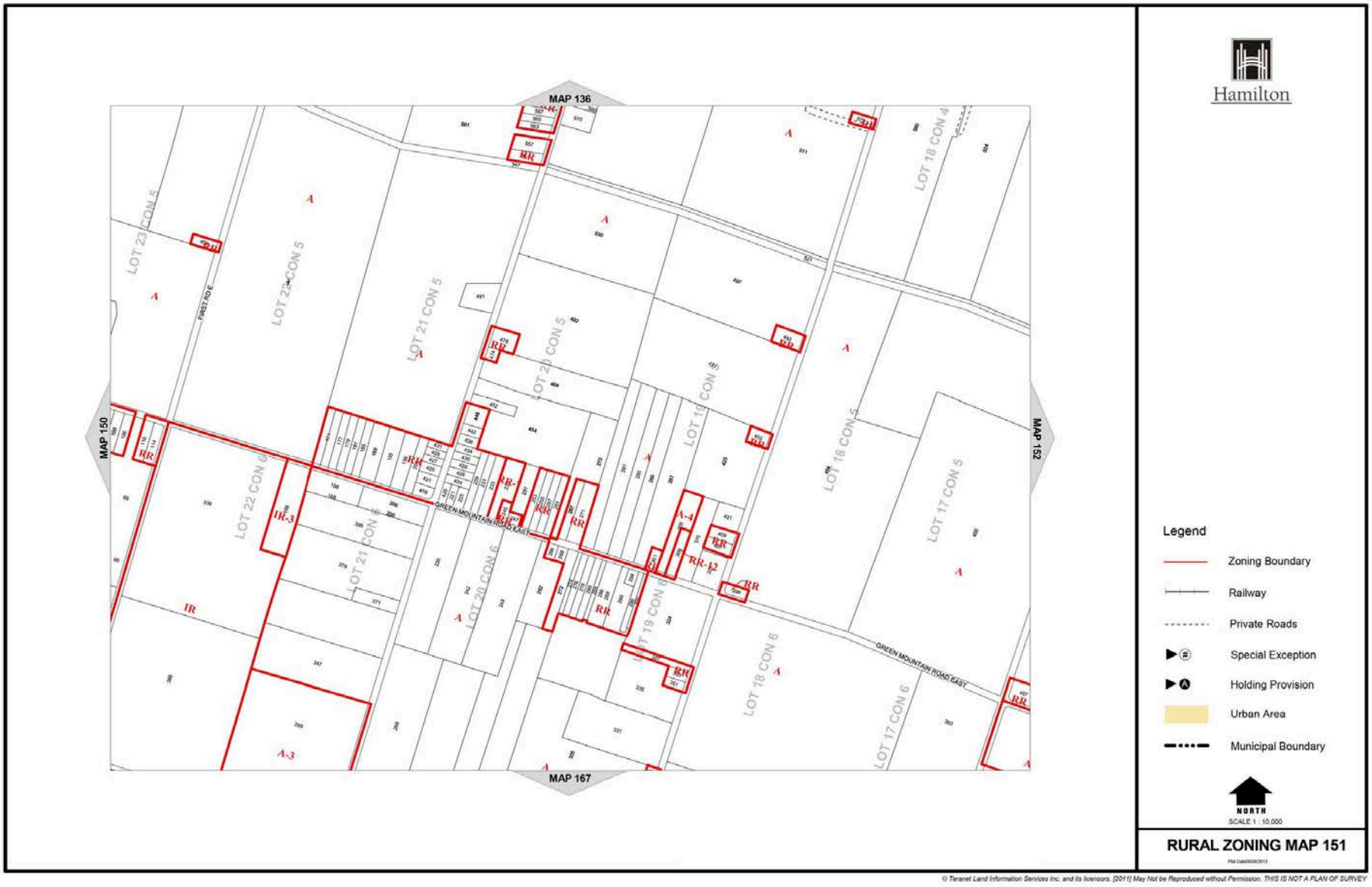


Figure 4.30 Rural Zoning Map 151

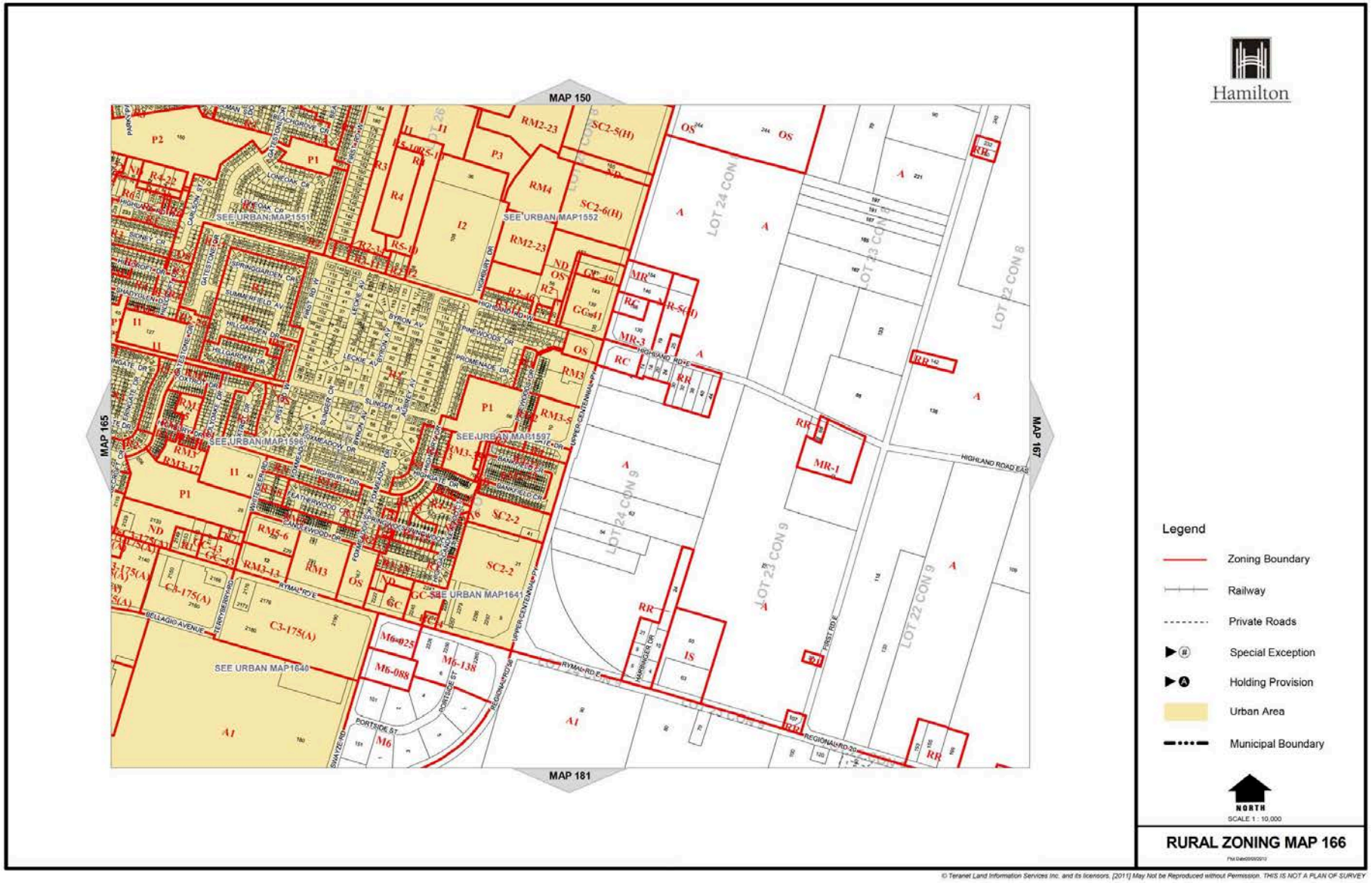


Figure 4.31 Rural Zoning Map 166

Table 4.14 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 the Land Use and Economic Existing Condition Report included in **Appendix F**.

Table 4.14 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
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

Table 4.14 Local Study Area – Existing Zoning Designations

Zoning Designations	Zone Description
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

4.2.3 Social Environment

The individual components making up the Social environment have been described in the following order:

- Traffic
- Neighborhood and Community Character
- Human Health

Information on the Social Environment existing conditions within the Study Areas was gathered from a combination of secondary sources. A full list and description of secondary sources used to characterize the Social Environment is listed in **Appendix G.**

4.2.3.1 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).

From a traffic standpoint, there is no reason to analyze intersections that will not be on the routes of the SCRF truck traffic. Therefore, the intersections listed above were chosen, as they immediately surround the SCRF Site, and would reasonably be impacted by SCRF truck traffic.

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 modelling that will take place for the Alternative Methods (Landfill Footprints) evaluation.

The Local Study Area intersections are identified in **Figure 4.32**.

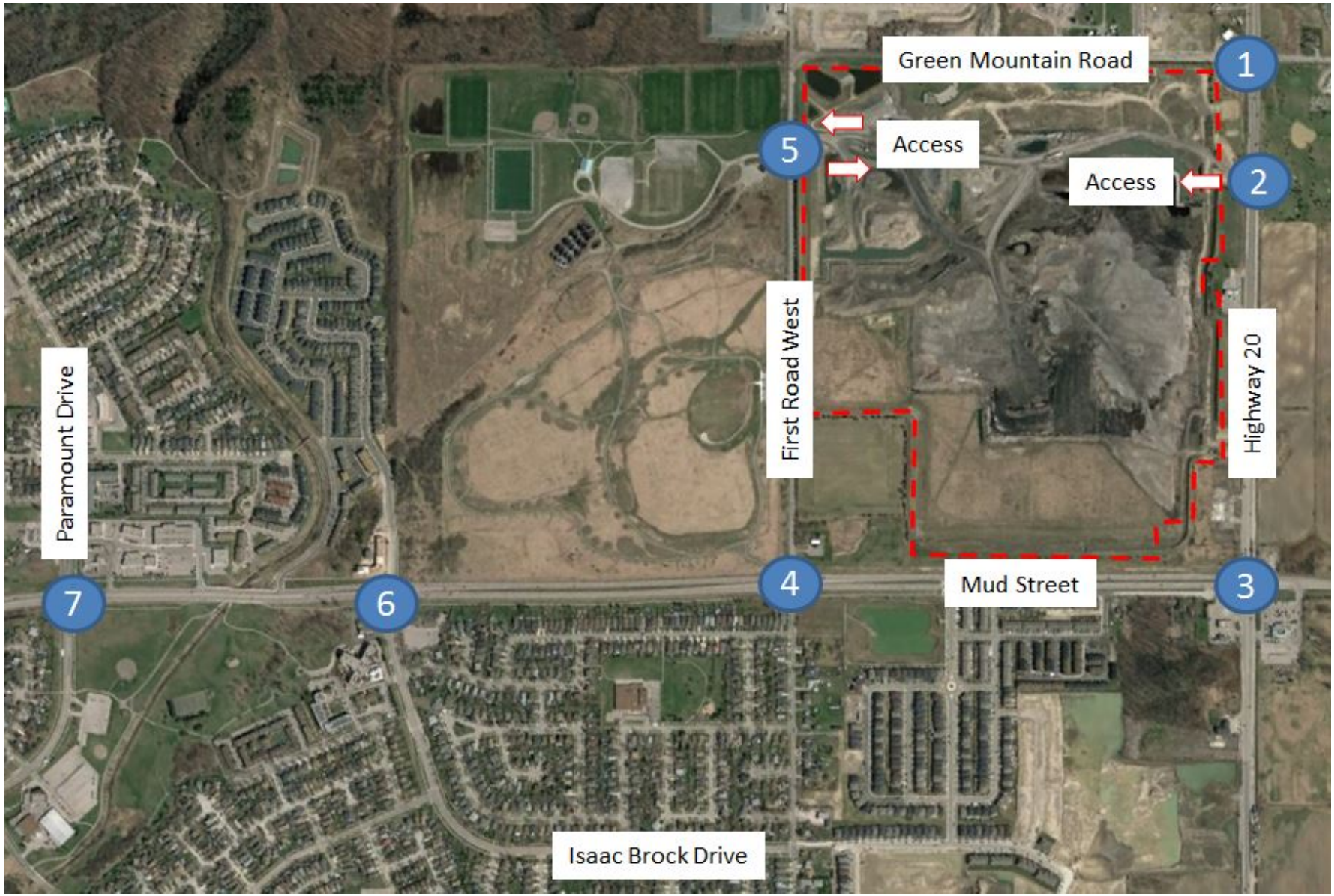


Figure 4.32 Traffic Local Study Area

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

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 4.32**) on Tuesday May 24, 2016; and at the Isaac Brock Drive and Paramount Drive intersections on Mud Street (Intersections 6 and 7 as per **Figure 4.32**) 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 4.33**. Detailed turning movement data sheets are provided in **Appendix A** of the Traffic Existing Condition Report included in **Appendix F**.

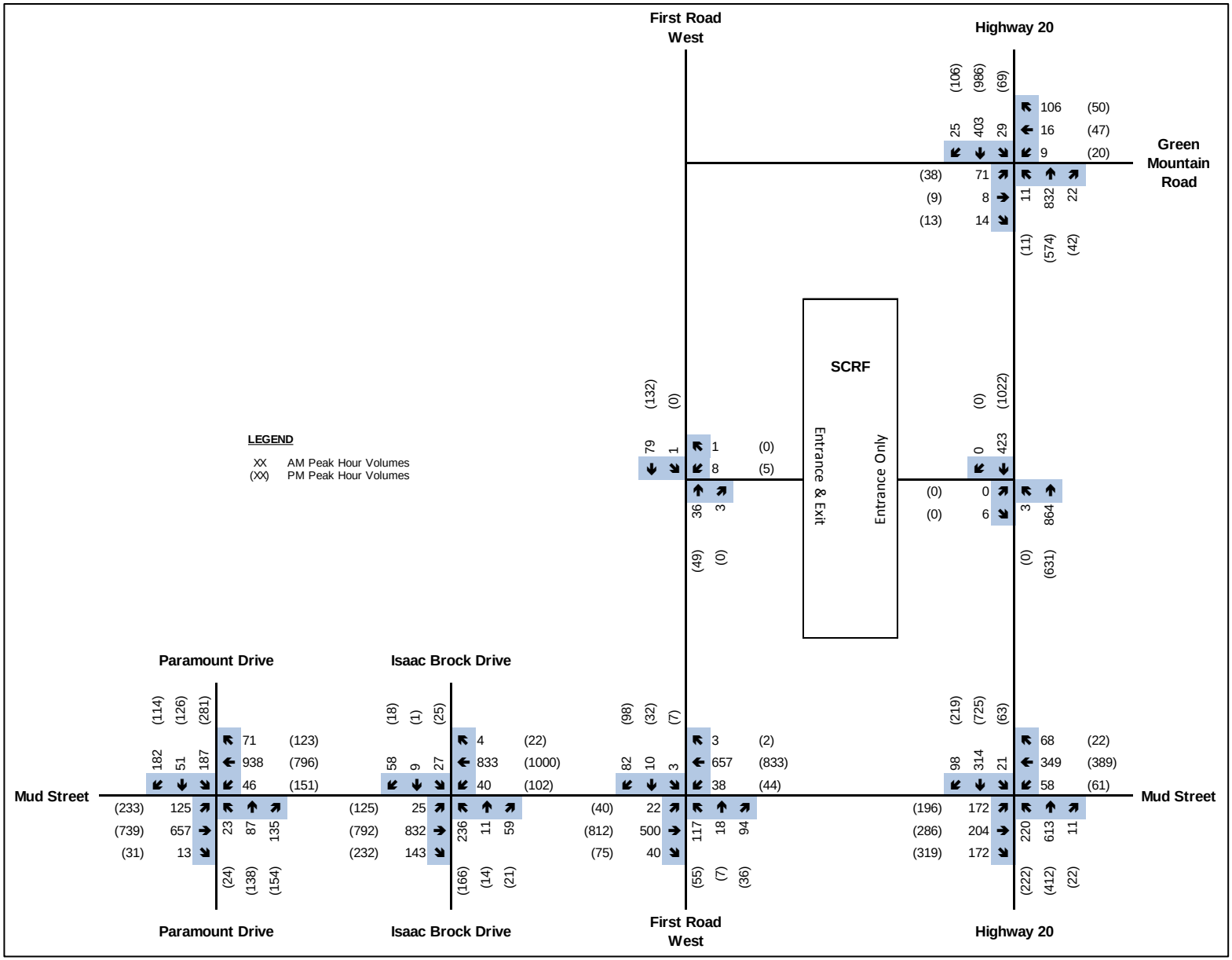


Figure 4.33 Existing Traffic Volumes

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[48]. The highest recorded monthly five-year average of tonnage received was during July 2015, at 79,148 tonnes[49]. 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[50]. 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.), nine trucks were counted exiting the Site and travelling southbound, and two 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.), one 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, six trucks were counted exiting the Site and travelling southbound, and one truck was counted entering the Site from the south. During the p.m. peak traffic period, eight 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 three inbound trips and 15 outbound trips. From 3:00 p.m. to 5:00 p.m., a total of nine truck trips were generated, including one inbound trip and eight 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[51], 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

[48] 1997-2015 SCRF Tonnage Reports

[49] Ibid.

[50] 2010-2015 SCRF Truck Count Data

[51] Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009

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 4.15**, with detailed Synchro reports included in **Appendix B** of the Traffic Existing Conditions Report included in **Appendix F**).

Table 4.15 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
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

Table 4.15 Existing Conditions Capacity Analysis

Intersection	Movement	v/c ratio (LOS) 95th Percentile Queue	
		A.M. Peak Hour	P.M. Peak Hour
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 increase 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).

4.2.3.2 Neighbourhood & Community Character

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[52]. The population of Ward 9 is reported to be 30,015 persons, which is approximately 5.6 percent of the total population of Hamilton[53]. Population projections for

[52] City of Hamilton, 2011. City of Hamilton Ward Profiles Ward 9. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/sites/default/files/media/browser/2015 06 01/ward profiles 2011 ward 9.pdf

[53] Statistics Canada, 2016. Census Profile, 2016 Census, Hamilton, City. Accessed: September 27, 2017. Available at: http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3525005&Geo2=CD&Code2=3525&Data=Count&SearchText=hamilton&SearchType=Begins&SearchPR=01&B1=All&TABID=1

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[54].

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 post-secondary certificate, diploma or degree, as compared to 50.9 percent of the total population of Hamilton[55]. As of the 2011 census, the top three ethnicities within Ward 9 included English, Canadian, and Scottish[56]. Twenty-two percent of Ward 9 residents identify as immigrants, of which 1.3 percent were considered recent immigrants in 2011[57].

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 4.34**.

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.

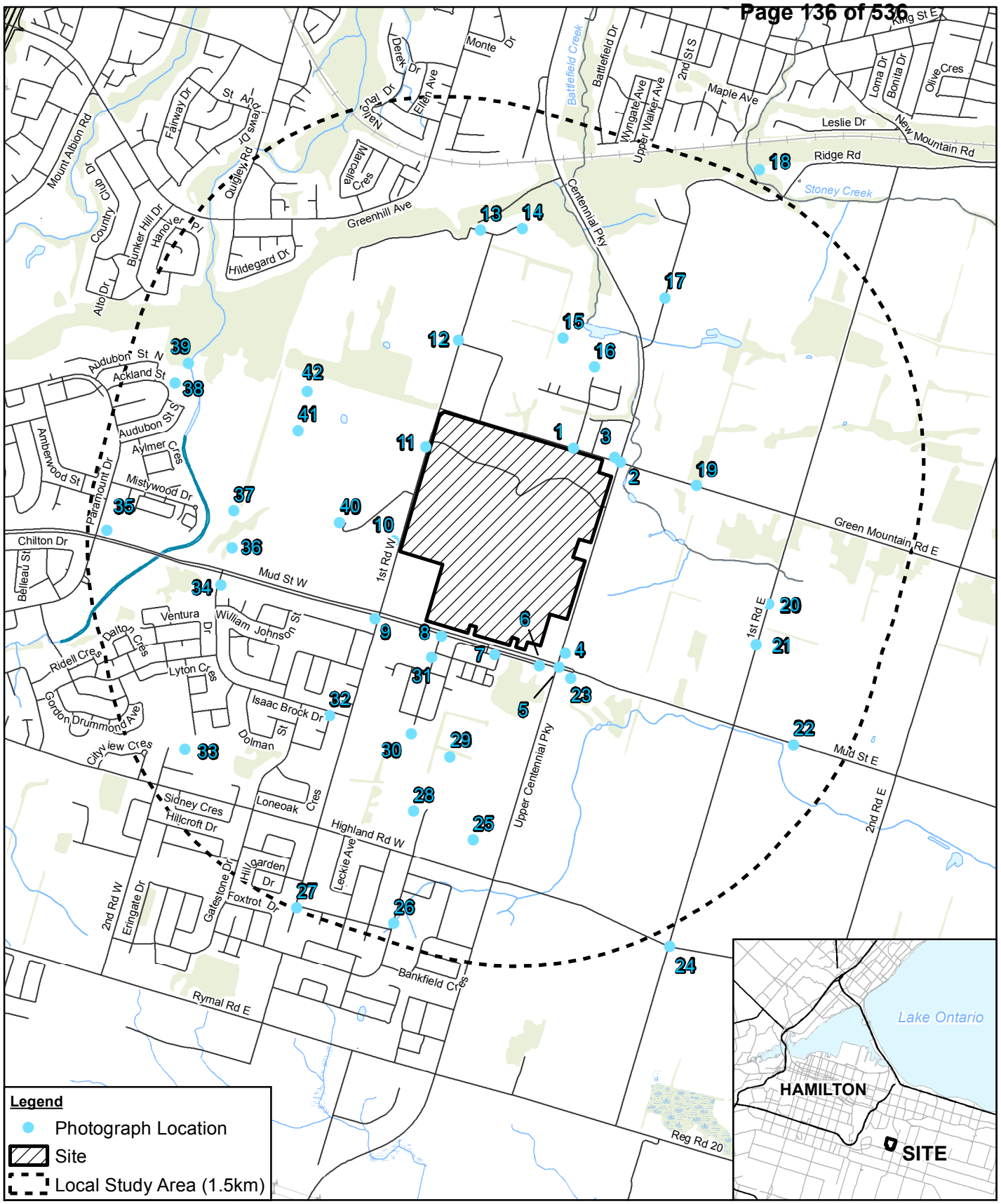
Section 5.0 of this report consists of viewshed renderings related to the existing conditions, as well as the proposed Alternative Methods (Landfill Footprints) considered in the Minister-approved Amended ToR for the SCRF EA.

[54] Statistics Canada, 2011. Niagara West – Glanbrook NHS Profile. Accessed: May 20, 2016. Available at: http://www12.statcan.gc.ca/nhs enm/2011/dp pd/prof/details/page.cfm?Lang=E&Geo1=FED&Code1=35055&Data=Count&SearchText=Niagara%20West%20%20Glanbrook&SearchType=Begins&SearchPR=01&A1=All&B1=All&GeoLevel=PR&GeoCode=055&TABID=1

[55] Ibid.

[56] Ibid.

[57] Ibid.



Source: MNRF NRVIS, 2015. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2018
Inset Map: ESRI Data & Maps 2008 Data Distribution Application (DDA)

0 200 400 600
Meters

Coordinate System:
NAD 1983 UTM Zone 17N

TERRAPURE
STONEY CREEK REGIONAL FACILITY EA
65 GREEN MOUNTAIN ROAD WEST

LOCAL STUDY AREA PHOTO LOG LOCATIONS

11102771
Jul 9, 2018

FIGURE
4.34

GIS File: N:\CA\Newmarket\Projects\Projects in Progress\8-chars\11------\1110----\111027--\11102771\05 - EA\GIS Figures\MXD\11102771_Site_Location.mxd

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 

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

Public Facilities

- Hamilton Fire Station 17 (415 Arvin Avenue, approximately 1 km southwest of SCRF)
- Family Church of Heritage Green (360 Isaac Brock Drive, approximately 800 m southwest of SCRF)
- Heritage Green Seventh Day Adventist Church (360 Isaac Brock Drive, approximately 900 m southwest of SCRF)
- Salvation Army Winterberry Heights Church (300 Winterberry Drive, approximately 1.2 km west of SCRF)
- Paramount Drive Alliance Church (1035 Paramount Drive, approximately 1.4 km west of SCRF)

Community Services

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

4.2.3.2.2 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

4.2.3.2.3 Agricultural Operations

An individual assessment was undertaken to assess and document the agricultural characteristics of an area identified as extending 500 m to the east side of the Terrapure Environmental facility located at 65 Green Mountain Road West in Stoney Creek. The study was completed using a similar approach as is used when completing an Agricultural Impact Assessment (AIA), and included review of secondary sources in addition to a reconnaissance level survey of land use surrounding the SCRF. A full description and details on the study methodology and approach can be viewed in more detail in **Appendix B** of the Land Use and Economic Environment Existing Conditions Report included in **Appendix F**.

Findings

A reconnaissance level survey of land use was completed on December 13, 2018. The conditions at the time of the survey were overcast and foggy, with a temperature near 0 degrees Celsius. The ground was covered with a thin layer of light snow (less than one centimeter). Agricultural crop residue was visible in the fields and allowed for an assessment of the 2018 cropping land use.

Tile Drainage and Irrigation

Observations noted during the reconnaissance survey indicated that properties within the Study Area are not irrigated, that the properties are not set up for the use of irrigation equipment, and the properties have limited tile drainage and little capital investment in agricultural drainage systems.

Land Use and Infrastructure

The survey further revealed the agricultural and non-agricultural land use of the Local Study Area. **Figure 4.35** illustrates the respective land uses. The lands north of Green Mountain Road East include a mix land uses, including scrub lands (land that have not been used for agricultural for less than 5 years), built-up areas (residences and lands associated with a residence; commercial operations (greenhouse), recreation (drive in theatre), woodlots, and apple orchards (remnant and intensive). The lands located between Mud Street East and Green Mountain Road East include a mix of land uses, including scrublands, built-up areas (residences), recreation (golf course), woodlots, grassed areas and agricultural lands (winter wheat and soybean). An abandoned horse track area (scrub) was noted in the central portion of this area. The lands south of Mud Street East comprised built-up areas (restaurant – Wendy's and Tim Horton's) and recreation (remnant golf course).

There were no agricultural facilities (barns) located within the Study Area. One greenhouse operation was noted north of Green Mountain Road East. There are no livestock facilities within the Study Area. There are no agricultural equipment dealers (tractors, implements), tire repair, hydraulic hose repair, grain storage, grain drying operations, processing or transportation facilities within the Study Area. It is evident from **Figure 4.35** that the Study Area (500 m east of the Terrapure Environmental facility) is a mix of agricultural and non-agricultural land uses. These mixes of land uses are characteristic of areas that are under transition, or under pressure due to development of urban areas, and the resulting decline of intensive agriculture in the immediate surrounding area.

There are no agricultural markets, abattoirs, pick-your own operations, nurseries, frozen food manufacturing, livestock assets and services, and meat plants within the Study Areas.

The Study Area (500 m east of the Terrapure Environmental facility) comprises numerous smaller parcels of varying size and shape. Modern agriculture relies on the use of mechanized inputs, such as large tractors and implements. The smaller parcels and small parcels with odd shapes would be detrimental to the use of larger mechanized equipment. The size, shape and numbers of smaller parcels are also characteristic of areas that are under transition, or areas that are under pressure due to development or urban areas, and the resulting decline of large, intensive agricultural operations in the immediate surrounding area.

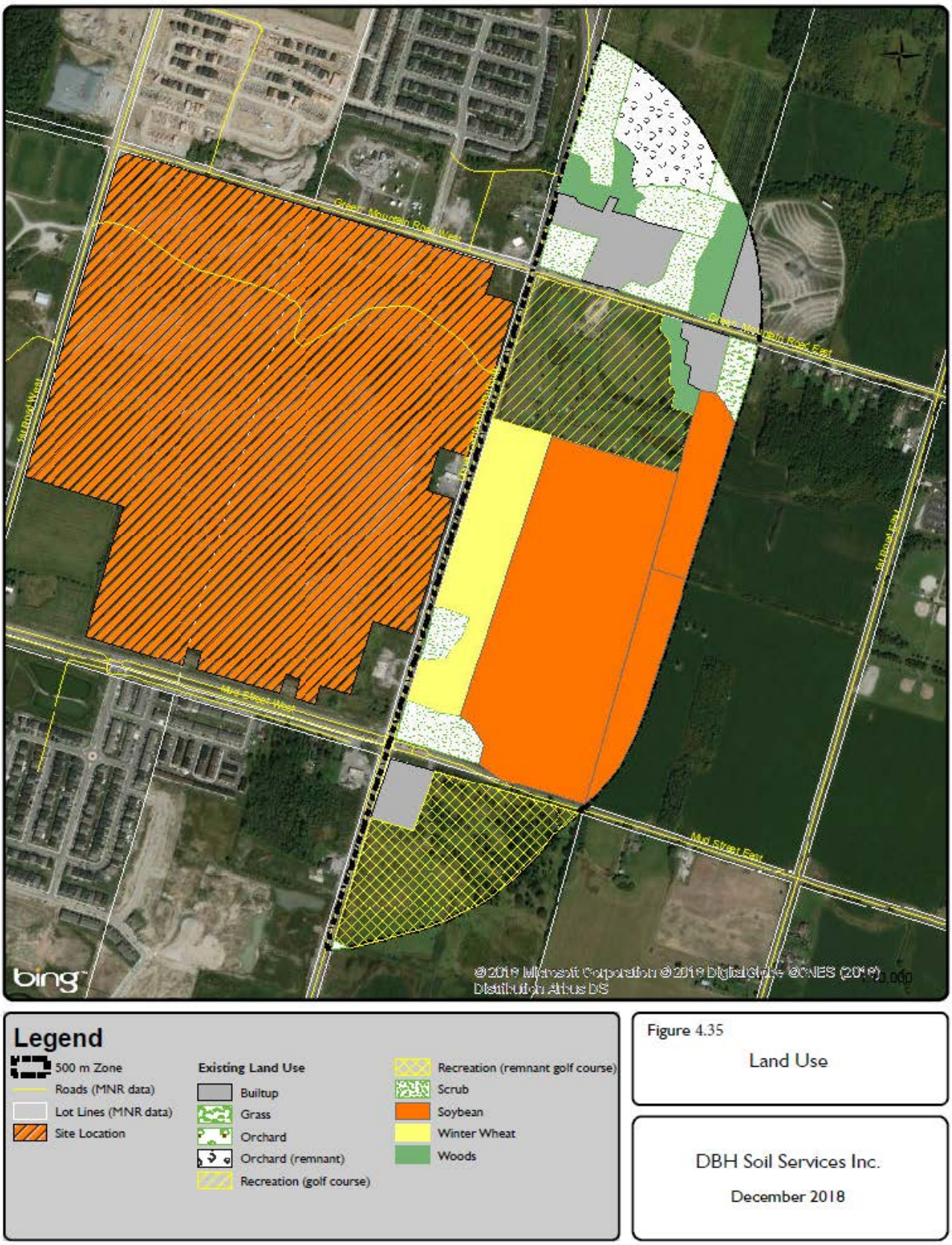
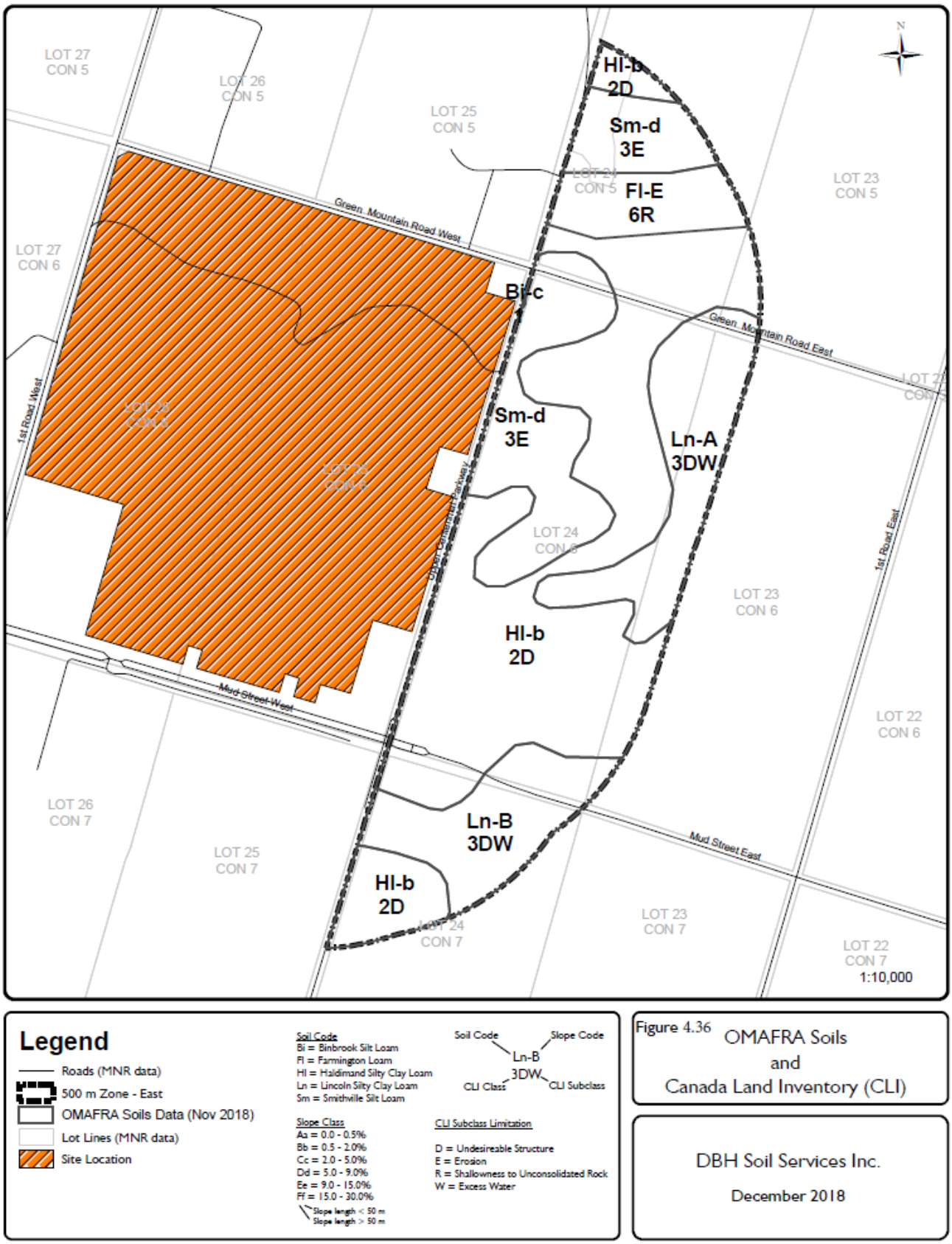


Figure 4.35 Land Use

Soils and Crop Ratings

Figure 4.36 illustrates the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) soils and Canada Land Inventory (CLI) information for the Study Area. Five soil series were noted in the Study Area. The five soil series were identified as: Binbrook Silt Loam; Farmington Loam; Haldimand Silty Clay Loam; Lincoln Loam; and Smithville Silt Loam. Within the Study Area: Binbrook Silt Loam soils have been rated as CLI Class 1; Farmington Loam soils have been rated as CLI Class 6R; Haldimand Silty Clay Loam soils have been rated as CLI Class 2D; Lincoln Loam soils have been rated as CLI Class 3DW; and Smithville Silt Loam soils have been rated as CLI Class 3E. The soils within the Study Area are predominantly CLI Class 1-3, and are considered as Prime Agricultural soils. It is evident that the soil series identified within the Study Area are not particularly well suited to tree fruit, grapes, or berry crops.



Legend

- Roads (MNR data)
- 500 m Zone - East
- OMAFRA Soils Data (Nov 2018)
- Lot Lines (MNR data)
- Site Location

Soil Code
Bi = Binbrook Silt Loam
Fl = Farmington Loam
Hl = Haldimand Silty Clay Loam
Ln = Lincoln Silty Clay Loam
Sm = Smithville Silt Loam

Soil Code — Slope Code
Ln-B 3DW
CLI Class — CLI Subclass

Slope Class
Aa = 0.0 - 0.5%
Bb = 0.5 - 2.0%
Cc = 2.0 - 5.0%
Dd = 5.0 - 9.0%
Ee = 9.0 - 15.0%
Ff = 15.0 - 30.0%
Slope length < 50 m
Slope length > 50 m

CLI Subclass Limitation
D = Undesireable Structure
E = Erosion
R = Shallowness to Unconsolidated Rock
W = Excess Water

Figure 4.36 OMAFRA Soils and Canada Land Inventory (CLI)

DBH Soil Services Inc.
December 2018

Figure 4.36 OMAFRA Soils and Canada Land Inventory (CLI)

Roads and Traffic

The reconnaissance land use survey also made note of existing road structure. It was observed that the Upper Centennial Parkway was a four-lane paved road with wide graveled shoulders and traffic control lights at the Mud Street and Green Mountain intersections. Mud Street East and Green Mountain Road East were two-lane paved roads with narrow shoulders. Traffic into the Terrapure Environmental facility is controlled through dedicated entrance and exits to the west side of Upper Centennial Parkway. As a result, the potential continued traffic flow to and from the facility should have limited impact on the agricultural activities to the east of Upper Centennial Parkway.

4.2.3.3 Human Health

As part of the Minister-approved Amended ToR, Terrapure committed to reviewing Human Health as part of the EA 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)[58]. The existing data and methodology established as part of the Community Health Assessment for the past 20 years was 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.

4.2.4 Economic Environment

The individual components making up the Economic environment include:

- Economic (Employment, Labour, Economic Base)

Information on the Economic Environment existing conditions within the Study Areas was gathered from a combination of secondary source research and review. A full list and description of secondary sources used to characterize the Economic Environment is listed in **Appendix G**.

4.2.4.1 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)[59].

The unemployment rate within Ward 9 was 7.3 percent (as compared to 8.7 percent for Hamilton) in 2011[60]. 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[61]. 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

[58] Intrinsik. 2018. Community Health Assessment Review: Terrapure Stoney Creek Regional Facility based on 2016 Monitoring Report. Final Report. Intrinsik Corp. Project # 400401. June 2018.
[59] City of Hamilton, 2011. City of Hamilton Ward Profiles Ward 9. Accessed: May 20, 2016. Available at: https://www.hamilton.ca/sites/default/files/media/browser/2015 06 01/ward profiles 2011 ward 9.pdf
[60] Ibid.
[61] RIAS Inc., 2017. Economic Impacts of the Stoney Creek Regional Facility. 440 Laurier Avenue West, Suite 200, Ottawa ON

190 jobs for local workers, earning a total of $8.4 million to $9.6 million in wages[62]. The existing SCRF generates $2.2 million per year in local taxes, royalties, and fees paid by Terrapure[63].

As a result of a potential capacity increase of 3,680,000 m^3 of residual material, using the reconfiguration and vertical expansion alternative, 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[64].

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 each of the Heritage Green Community Trust and to the City of Hamilton – this does not continue with the current future requirement for receiving industrial fill. Agreements with the City of Hamilton and Heritage Green Community Trust, and the obligations resulting therefrom, remain in force irrespective of the EA process. However, should the SCRF EA be approved, the financial contributions to both the Heritage Green Community Trust and the City would continue[65]. Compensation agreement terms would also be reviewed upon Minister approval.

4.2.5 Cultural Environment

The individual components making up the Cultural environment are as follows:

- Archaeology and Built Heritage

Information on the Cultural Environment existing conditions within the Study Areas was gathered from a combination of secondary source research and review. A full list and description of secondary sources used to characterize the Cultural Environment is listed in **Appendix G**.

4.2.5.1 Archaeology and Built Heritage

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 Undertaking, 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 F** 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[66]. The completed "Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes: A Checklist for the Non-Specialist" contained in **Appendix F** identifies the Site as having no potential for cultural heritage resources.

Indigenous Resources

As described in **Section 7.5.1**, four Indigenous communities were consulted during preparation of the EA: Haudenosaunee Development Institute, on behalf of Haudenosaunee Confederacy Chiefs Council; Métis Nation of Ontario; Mississaugas of the New Credit First Nation; and, Six Nations of the Grand River First Nation. As part of this consultation, Indigenous communities were asked to identify potential Indigenous resources in the Study Area. No Indigenous resources in the Study Area were identified as a result of these consultations, or as a result of the archaeological review described above.

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[62] Ibid.

[63] Ibid.

[64] Ibid.

[65] Ibid.

[66] City of Hamilton, 2018. https://www.hamilton.ca/city-planning/heritage-properties/heritage-resources?pedisable=false. 2018

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5. Alternative Methods of Carrying out the Undertaking

5.1 Description of the Alternative Methods of Carrying Out the Undertaking

The Minister-approved Amended Terms of Reference (ToR) for the Stoney Creek Regional Facility Environmental Assessment (SCRF EA) identified the following six alternative methods (Alternative Landfill Footprints) with the commitment that they would be elaborated upon in detail and consulted on during the preparation of the EA prior to their finalization:

- Alternative Landfill Footprint No. 1: Reconfiguration of the Stoney Creek Regional Facility.
- Alternative Landfill Footprint No. 2: Horizontal Expansion of the Stoney Creek Regional Facility.
- Alternative Landfill Footprint No. 3: Vertical Expansion of the Stoney Creek Regional Facility.
- Alternative Landfill Footprint No. 4: Reconfiguration and Horizontal Expansion of the Stoney Creek Regional Facility.
- Alternative Landfill Footprint No. 5: Reconfiguration and Vertical Expansion of the Stoney Creek Regional Facility.
- Alternative Landfill Footprint No. 6: Horizontal and Vertical Expansion of the Stoney Creek Regional Facility.

A number of parameters and assumptions were established to guide the development of the alternative methods that would be considered as part of the EA process for increasing the current capacity of the SCRF, which are described further in **Section 5.1.1**.

In addition, a “Do Nothing” alternative was included as part of the SCRF EA to represent what is expected to happen if none of the Alternative Footprints being considered is carried out. The “Do Nothing” alternative 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.

Although the “Do Nothing” alternative does not address the Purpose of the Undertaking, and is therefore not a viable option, it is included in the SCRF EA as a matter of best practice to represent the benchmark against which the advantages and disadvantages of the Alternative Landfill Footprints being considered can be compared. The preceding Alternative Landfill Footprints were consulted as part of the SCRF EA with review agencies, Indigenous communities, and the public through a number of consultation activities, including as part of Public Open House No. 1 where they were presented for comment. No modifications to the presented Alternative Landfill Footprints, nor any additional alternatives were proposed based on the comments received. As a result, the six Alternative Landfill Footprints included in the Minister-approved Amended ToR were finalized as-is. **Section 7.0** provides additional details on the consultation activities carried out and comments received.

5.1.1 Conceptual Design Basis for the Alternative Landfill Footprints

As committed to in the Minister-approved Amended ToR for the SCRF EA, the detailed description of each of the preceding Alternative Landfill Footprints was based on a conceptual level of design reflecting existing regulatory requirements and the operational aspects of the SCRF. In addition to the Minister-approved Amended ToR for the SCRF EA, the following documents were considered as part of developing the detailed descriptions:

- O. Reg. 101/07 – Waste Management Projects, under the *Environmental Assessment Act (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).
- Waste Environmental Compliance Approval (ECA) No. No. A181008.

Each of the conceptual designs incorporated the following elements as fully documented in the SCRF EA Conceptual Design Report (CDR) (**Appendix H**):

- 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 development;
- infrastructure requirements;
- leachate management;
- stormwater management;
- gas management;
- traffic; and,
- operations.

For context purposes, an overview of each of the preceding elements common to the six Alternative Landfill Footprints is provided first in the following subsections, followed by the detailed description of each Alternative Landfill Footprint in **Sections 5.1.2** to **5.1.7**.

Site Capacity and Fill Rate

As previously mentioned, the SCRF currently has a total approved capacity of 6,500,000 m^3 for residual material and an additional 2,000,000 m^3 for industrial fill. The SCRF is permitted to receive a maximum of 750,000 tonnes of residual material in any consecutive 12-month period, as calculated on a daily basis. The maximum daily tonnage of approved residual material received at the Site for final disposal is 8,000 tonnes. The change 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. A description of the capacity increase for each Alternative Landfill Footprint is provided in **Sections 5.1.2** to **5.1.7**. No changes are being proposed to the maximum annual approved fill or daily tonnage.

Footprint Size

As shown in **Figure 5.1**, the current approved footprint for 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.

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 Landfill Footprints were developed based

on these slope requirements and in consideration of other aspects, such as footprint configuration and stormwater management (SWM).

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. Screening measures are currently in place at the Site to mitigate potential impacts from a visual and noise standpoint, including earth berms and fences.

Buffer Areas

Regulatory requirements specify a minimum buffer width of 100 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 SWM facility in the northwest corner of the Site.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPERTY BOUNDARY
- RESIDUAL MATERIAL
- INDUSTRIAL FILL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m

TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

CURRENT APPROVED LANDFILL FOOTPRINT

11102771-00
August 29, 2018

FIGURE 5.1

CAD File: \\ghdnet\ghd\CA\Waterloo\Projects\CAD\drawings\11102771\11102771 - PRES\11102771-00(PRES010)\11102771-00(PRES010)CI\11102771-00(PRES010)CI-WA001_C3D 2018.dwg

Setbacks to Surrounding Developments

In addition to the on-Site buffers 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, including:

- site entrance and exit;
- scale facility;
- administrative facility;
- maintenance facility;
- groundwater management system;
- leachate management system; and,
- 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 with the Alternative Landfill Footprints. 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 SWM system will be reconfigured as required to accommodate each Alternative Landfill Footprints.

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 corner 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 along 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 Landfill Footprints.

The leachate generation rate is an important parameter used in assessing the operational and environmental performance of a landfill site. However, it should be noted that the leachate generation rates will vary over the life 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 SWM system is not expected to change, the location and alignment of the existing ponds and ditches may need to be relocated depending upon the Alternative Landfill Footprint. The outlet to the existing storm sewer under First Road West will remain the same for all of the Alternative Landfill Footprints. The capacity of the existing SWM system will be confirmed for each Alternative Landfill Footprint, although significant changes to the capacity are not expected to be required because the overall catchment area of the Site will remain largely unchanged.

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

Gas Management

O. Reg. 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 conducted in 2010, and the Site was granted an exemption from the Ministry of the Environment, Conservation and Parks (MECP) from the requirement to have a landfill gas collection system.

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 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, an update of the 2011 Assessment was carried out as part of this EA to determine the necessity, or lack thereof, of a landfill gas collection system for the Preferred Alternative Landfill Footprint (**Section 6.0**).

Traffic

Vehicle traffic associated with the Alternative Landfill Footprints is important in assessing the potential impacts of them on receptors. Traffic levels were estimated based on the following:

- Each Alternative Landfill Footprint 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 Landfill Footprints 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 Alternative Landfill Footprint are supported by the calculations presented in **Appendix H**. However, it should be noted that traffic levels will vary depending on-Site operations and construction scheduling.

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 impacts 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 impacts wherever possible, and to 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.

The preceding operating practices are common to all Alternative Landfill Footprints.

With the preceding context in mind, **Table 5.1** summarizes the specific details associated with each of the Alternative Landfill Footprints, which are elaborated upon in the following sections.

Table 5.1 Summary Description of the Alternative Landfill Footprints

Alternative Landfill Footprint No.	Figure No.	Description	Volume (m^3)		Footprint Area (ha)		Peak Elevation (mAMSL)	Height Relative to Surrounding Area (m)		Stormwater Management	Leachate Management	Traffic	Construction	Operation	Closure / Post-Closure
			Residual Material	Industrial Fill	Residual Material	Industrial Fill		Green Mountain & First Road (192 mAMSL)	Upper Centennial & Mud (205 mAMSL)						
-	Figure 5.1	Existing Approved	6,500,000	2,000,000	41.5	17.6	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	59.1	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 8.0 L/s during active operation. > Approximate leachate generation rate of 5.5 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of residual material area. > Leachate discharge to existing/new sanitary sewer.	> Approximately 183,423 trucks associated with residual material. > Approximately 78,481 trucks associated with construction.	> Construction of additional base liner system in north area. > Construction of additional groundwater and leachate collection systems. > Existing stormwater ponds reconfigured in northwest corner of site. > May require liner perforation for pumping well M4. > Residual material area extends over existing clay plug.	> Residual material placed in existing area before progressing to the north following the construction of new cells. > No changes to operation of groundwater, leachate, and stormwater systems. > Staged relocation of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).	> Anticipated closure sooner than current configuration. > Progressive construction of final cover from south to north. > Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Flexibility of post-closure design with uniform grading extending over the majority of the site.
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	17.6	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.	> Approximately 95,731 trucks associated with residual material. > Approximately 226,154 trucks associated with industrial fill material. > Approximately 48,074 trucks associated with construction.	> Excavation (i.e., residual material, soil, bedrock) in south and east buffer areas. > Construction of additional base liner system in south and east buffer areas, as well as northwest corner of site. > Construction of additional groundwater and leachate collection systems. > Construction of new stormwater management ponds in west buffer and north buffer. > Construction of new leachate pumping station in secondary residual material area.	> Residual material placed in existing area before progressing to the south, east, and northwest following the construction of new cells. > Monitoring and maintenance of additional leachate pumping station. > No changes to operation of groundwater and stormwater systems. > Staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Reconfiguration of screening berms/fences in east buffer and south buffer.	> Anticipated closure over similar timeframe as current configuration. > Progressive construction of final cover from west to east. > Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Limitations of post-closure design given complex grading over the majority of the site.

Alternative Landfill Footprint No.	Figure No.	Description	Volume (m^3)		Footprint Area (ha)		Peak Elevation (mAMSL)	Height Relative to Surrounding Area (m)		Stormwater Management	Leachate Management	Traffic	Construction	Operation	Closure / Post-Closure
			Residual Material	Industrial Fill	Residual Material	Industrial Fill		Green Mountain & First Road (192 mAMSL)	Upper Centennial & Mud (205 mAMSL)						
-	Figure 5.1	Existing Approved	6,500,000	2,000,000	41.5	17.6	218.5	26.5	13.5						
3	Figure 5.4	> Maintain industrial fill area > Maintain current limit of residual material area > Increase peak elevation of residual material area	10,180,000	2,000,000	41.5	17.6	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.	> Approximately 282,077 trucks associated with residual material. > Approximately 226,154 trucks associated with industrial fill material. > Approximately 27,678 trucks associated with construction.	> Existing stormwater ponds reconfigured in northwest corner of site.	> Residual material placed in existing area progressing from west to east. > No changes to operation of groundwater, leachate, and stormwater systems. > Staged relocation of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).	> Anticipated closure over similar timeframe as current configuration. > Progressive construction of final cover from west to east. > Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Limitations of post-closure design given complex grading over the majority of the site.
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	64.9	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 8.8 L/s during active operation. > Approximate leachate generation rate of 6.0 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of residual material area. > Leachate discharge to existing/new sanitary sewer.	> Approximately 252,846 trucks associated with residual material. > Approximately 98,877 trucks associated with construction.	> Excavation (i.e., residual material, soil, bedrock) in south and east buffer areas. > Construction of additional base liner system in south and east buffer areas, as well as north area of site. > Construction of additional groundwater and leachate collection systems. > Construction of new stormwater management ponds in west buffer and north buffer. > May require liner perforation for pumping well M4. > Residual material area extends over existing clay plug.	> Residual material placed in existing area before progressing to the south, east, and northwest following the construction of new cells. > No changes to operation of groundwater, leachate, and stormwater systems. > Staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Reconfiguration of screening berms/fences in east buffer and south buffer.	> Anticipated closure sooner than current configuration. > Progressive construction of final cover from west to east, and from south to north. > Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Flexibility of post-closure design with uniform grading extending over the majority of the site.
5	Figure 5.6	> Replace industrial fill area with residual material > Increase peak elevation of residual material area	10,180,000	N/A	59.1	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 8.0 L/s during active operation. > Approximate leachate generation rate of 5.5 L/s post-closure. > Leachate collection via existing leachate pumping station in southeast of residual material area. > Leachate discharge to	> Approximately 282,077 trucks associated with residual material. > Approximately 78,481 trucks associated with construction.	> Construction of additional base liner system in north area. > Construction of additional groundwater and leachate collection systems. > Existing stormwater ponds reconfigured in northwest corner of site. > May require liner perforation for pumping well M4. > Residual material area extends over existing clay plug.	> Residual material placed in existing area before progressing to the north following the construction of new cells. > No changes to operation of groundwater, leachate, and stormwater systems. > Staged relocation of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).	> Anticipated closure sooner than current configuration. > Progressive construction of final cover from south to north. > Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Flexibility of post-closure design with uniform grading extending over the majority of the site.

Alternative Landfill Footprint No.	Figure No.	Description	Volume (m^3)		Footprint Area (ha)		Peak Elevation (mAMSL)	Height Relative to Surrounding Area (m)		Stormwater Management	Leachate Management	Traffic	Construction	Operation	Closure / Post-Closure
			Residual Material	Industrial Fill	Residual Material	Industrial Fill		Green Mountain & First Road (192 mAMSL)	Upper Centennial & Mud (205 mAMSL)						
-	Figure 5.1	Existing Approved	6,500,000	2,000,000	41.5	17.6	218.5	26.5	13.5						
											existing/new sanitary sewer.				
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	10,180,000	2,000,000	47.3	17.6	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.	> Approximately 282,077 trucks associated with residual material. > Approximately 226,154 trucks associated with industrial fill material. > Approximately 48,074 trucks associated with construction.	> Excavation (i.e., residual material, soil, bedrock) in south and east buffer areas. > Construction of additional base liner system in south and east buffer areas, as well as northwest corner of site. > Construction of additional groundwater and leachate collection systems. > Construction of new stormwater management ponds in west buffer and north buffer. > Construction of new leachate pumping station in secondary residual material area.	> Residual material placed in existing area before progressing to the south, east, and northwest following the construction of new cells. > Monitoring and maintenance of additional leachate pumping station. > No changes to operation of groundwater and stormwater systems. > Staged relocation/closure of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Reconfiguration of screening berms/fences in east buffer and south buffer.	> Anticipated closure over similar timeframe as current configuration. > Progressive construction of final cover from west to east. > Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access). > Limitations of post-closure design given complex grading over the majority of the site.

5.1.2 Alternative Landfill Footprint No. 1 – Reconfiguration

Alternative Landfill Footprint No. 1 proposes to reconfigure the SCRF and is described as follows (**Figure 5.2**):

- 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. This change would result in an increase of approved residual material up to 8,830,000 m^3.
- The area at the SCRF currently approved for receiving residual material would remain unchanged.
- There would be no horizontal or vertical expansion.
- The footprint area for residual material would increase to 59.1 ha.
- The peak elevation and height relative to the surrounding areas would remain the same as currently approved.
- With respect to SWM, drainage ditches would be modified to ensure they are placed around the perimeter of the new residual material area. In addition, reconfiguration of the existing SWM ponds in northwest corner of Site would occur. The discharge point from the stormwater pond would be maintained to the First Road West storm sewer.
- With respect to leachate collection and management, the extension of the existing leachate collection system at base of residual material area would be implemented. It is anticipated that the approximate leachate generation rate of 8.0 L/s during active operation and 5.5 L/s post-closure would occur.
- Leachate collection would occur via the existing leachate pumping station in southeast of residual material area and would be discharged to an existing/new sanitary sewer.
- In terms of traffic, there would be approximately 78,481 trucks associated with construction and 183,423 trucks associated with residual material over the life of the Alternative Landfill Footprint.

From a Construction and Operations perspective, the following activities would occur:

- Construction of additional base liner system in north area.
- Construction of additional groundwater and leachate collection systems.
- Reconfiguration of the existing stormwater ponds in northwest corner of the Site.
- May require liner perforation for pumping well M4.
- Residual material area extends over existing clay plug.
- Placement of residual material in existing landfilled area before progressing to the north after the construction of new landfill cells.
- No changes to the operations of the groundwater, leachate, and stormwater systems.
- Staged relocation of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).

From a Closure/Post-Closure perspective, the following activities would occur:

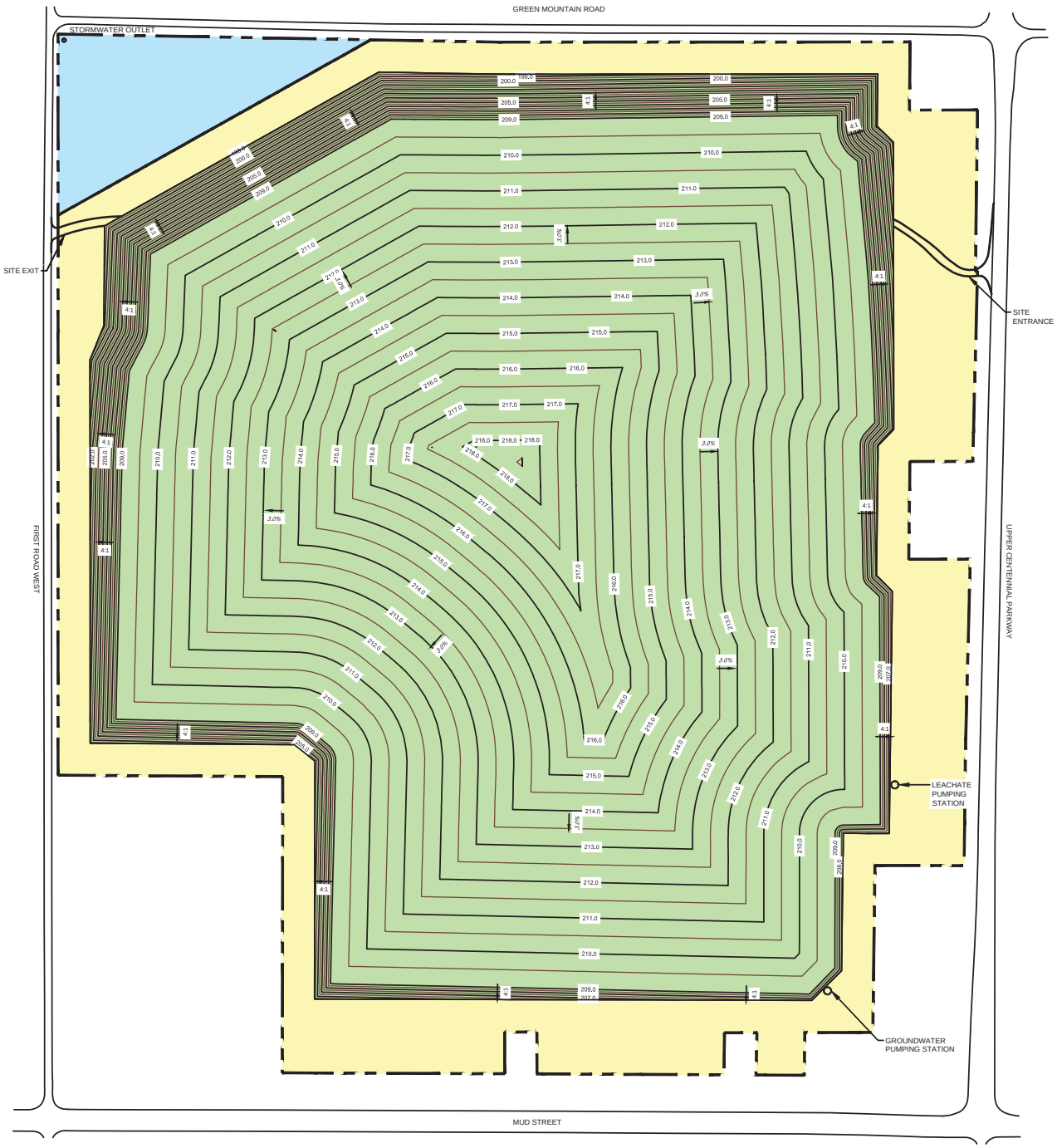
- Progressive application of final cover (vegetative) from south to north.
- Removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).
- Maintain and keep in place the infrastructure required to manage leachate (leachate collection system).

- Maintain and keep in place the infrastructure required to monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).
- Flexibility of post-closure design with uniform grading extending over the majority of the Site.
- Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first).
- The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPERTY BOUNDARY
- RESIDUAL MATERIAL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

ALTERNATIVE LANDFILL FOOTPRINT NO. 1 - RECONFIGURATION OF THE SCRF

11102771-00
August 29, 2018

FIGURE 5.2

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5.1.3 Alternative Landfill Footprint No. 2 – Horizontal Expansion of the Stoney Creek Regional Facility

Alternative Landfill Footprint No. 2 proposes a horizontal expansion of the SCRF and is described as follows (**Figure 5.3**):

- 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 Alternative Landfill Footprint No. 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. This change would result in an increase of approved residual material up to 7,630,000 m^3.
- 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.
- Alternative Landfill Footprint No. 2 would include a horizontal expansion, but not a vertical expansion.
- The footprint area for residual material would increase to 47.3 ha, while the industrial fill would remain unchanged.
- The peak elevation and height relative to the surrounding areas would remain the same as currently approved.
- With respect to SWM, drainage ditches would be modified to ensure they are placed around the perimeter of the new residual material and industrial fill area. In addition, construction of new SWM ponds in the west buffer and north buffer would occur. The discharge point from the stormwater pond would be maintained to the First Road West storm sewer.
- With respect to leachate collection and management, the existing leachate collection system at the base of main residual material area would be extended and a new collection system at the base of the secondary residual area would be constructed. It is anticipated that approximate leachate generation rate of 6.4 L/s during active operation and 4.4 L/s post-closure would occur.
- Leachate collection would occur via the existing leachate pumping station southeast of main residual material area and a new leachate pumping station constructed in the secondary residual material area. Both would discharge to an existing/new sanitary sewer.
- In terms of traffic, there would be approximately 48,074 trucks associated with construction, 95,731 trucks associated with residual material, and 226,154 trucks associated with industrial material over the life of the Alternative Landfill Footprint.

From a Construction and Operations perspective, the following activities would occur:

- Excavation (i.e., residual material, soil, bedrock) in the south and east buffer areas.
- Construction of additional base liner system in the south and east buffer areas and in the northwest corner of the Site.
- Construction of additional groundwater and leachate collection systems.
- Construction of new SWM ponds in the west and north buffer areas.
- Construction of a new leachate pumping station in the secondary residual material area.
- Placement of residual material in existing landfilled area before progressing to the south, east, and northwest following the construction of new landfill cells.
- Monitoring and maintenance of the additional leachate pumping station.
- No changes to the operations of the groundwater and stormwater systems.

- Staged relocation/closure of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).
- Reconfiguration of screening berms/fences in the east and south buffer areas.

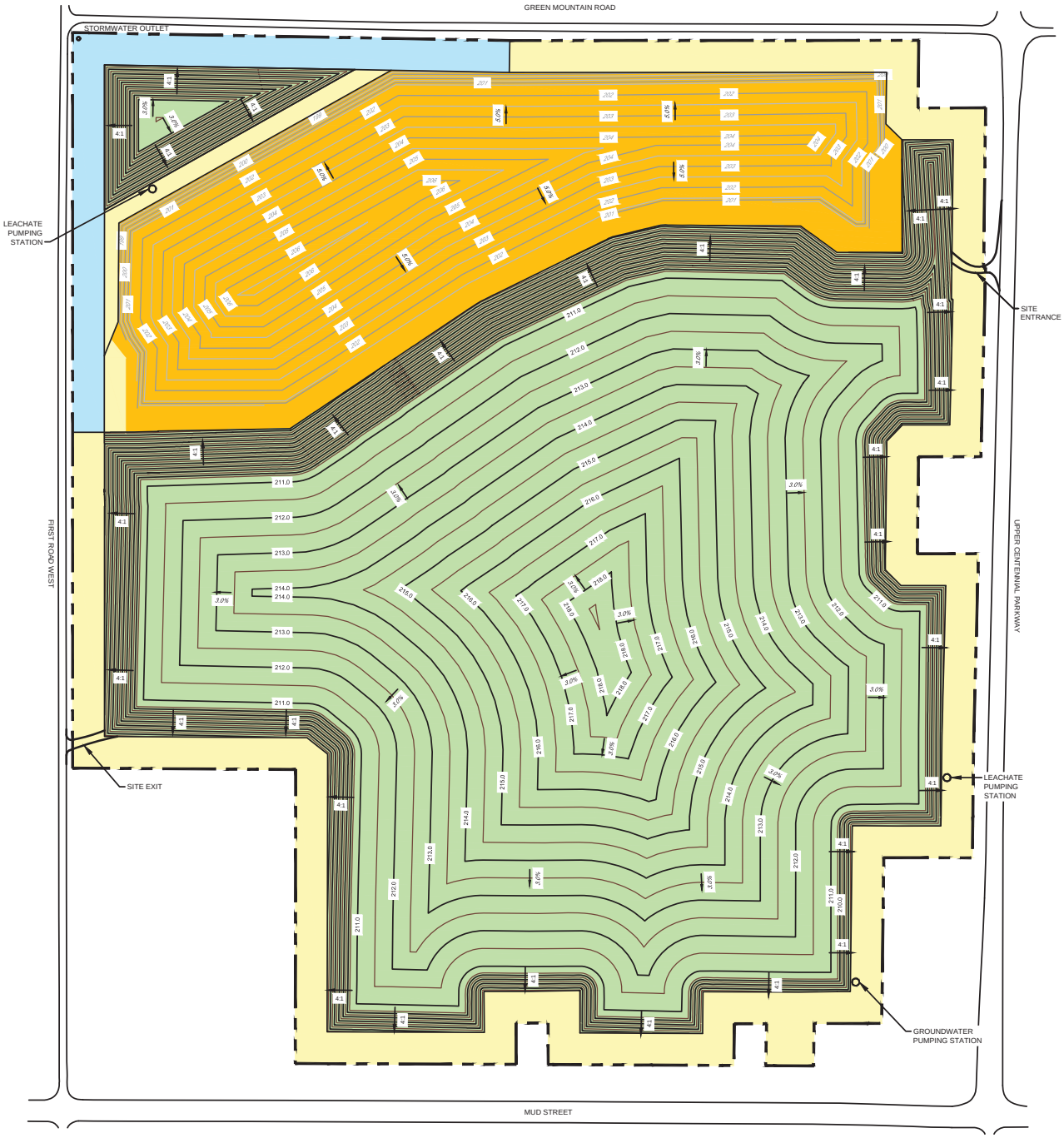
From a Closure/Post-Closure perspective, the following activities would occur:

- Progressive application of final cover (vegetative) from west to east.
- Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).
- Maintain and keep in place the infrastructure required to manage leachate (leachate collection system).
- Maintain and keep in place the infrastructure required to monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).
- Flexibility of post-closure design with uniform grading extending over the majority of the Site.
- Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first).
- The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends for the Site to be used for open space and/or recreational uses and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPERTY BOUNDARY
- RESIDUAL MATERIAL
- INDUSTRIAL FILL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

ALTERNATIVE LANDFILL FOOTPRINT NO. 2 - HORIZONTAL EXPANSION OF THE SCRF

11102771-00
August 29, 2018

FIGURE 5.3

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5.1.4 Alternative Landfill Footprint No. 3 – Vertical Expansion of the Stoney Creek Regional Facility

Alternative Landfill Footprint No. 3 proposes a vertical expansion of the SCRF and is described as follows (**Figure 5.4**):

- 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 Alternative Landfill Footprint No. 3.
- The area at the SCRF currently approved for receiving residual material would be expanded vertically, but not horizontally so that additional post-diversion solid, non-hazardous industrial residual material could be received. This change would result in an increase of approved residual material up to 10,180,000 m^3.
- The footprint area for residual material and industrial fill would remain unchanged.
- The peak elevation would increase from 218.5 to 229.5 mAMSL.
- The height of the Alternative Landfill Footprint relative to Green Mountain Road and First Road West would increase from 26.5 m to 37.5 m and relative to Upper Centennial Parkway and Mud Street would increase from 13.5 m to 24.5 m.
- With respect to SWM, drainage ditches would be modified to ensure they are placed around the perimeter of the new residual material and industrial fill area. In addition, reconfiguration of the existing SWM ponds in the northwest corner of the site would occur. The discharge point from the stormwater pond would be maintained to the First Road West storm sewer.
- With respect to leachate collection and management, the existing leachate collection system at the base of the residual material area would be extended. It is anticipated that the approximate leachate generation rate of 5.6 L/s during active operation and 3.8 L/s post-closure would occur.
- Leachate collection would occur via the existing leachate pumping station in the southeast corner of the residual material area and would be discharged to an existing/new sanitary sewer.
- In terms of traffic, there would be approximately 27,678 trucks associated with construction, 282,077 trucks associated with residual material, and 226,154 trucks associated with industrial material over the life of the Alternative Landfill Footprint.

From a Construction and Operations perspective, the following activities would occur:

- The existing stormwater ponds would be reconfigured in the northwest corner of the Site.
- Placement of residual material in existing landfilled area progressing from west to east.
- No changes to the operations of the groundwater, leachate, and stormwater systems.
- Staged relocation of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).

From a Closure/Post-Closure perspective, the following activities would occur:

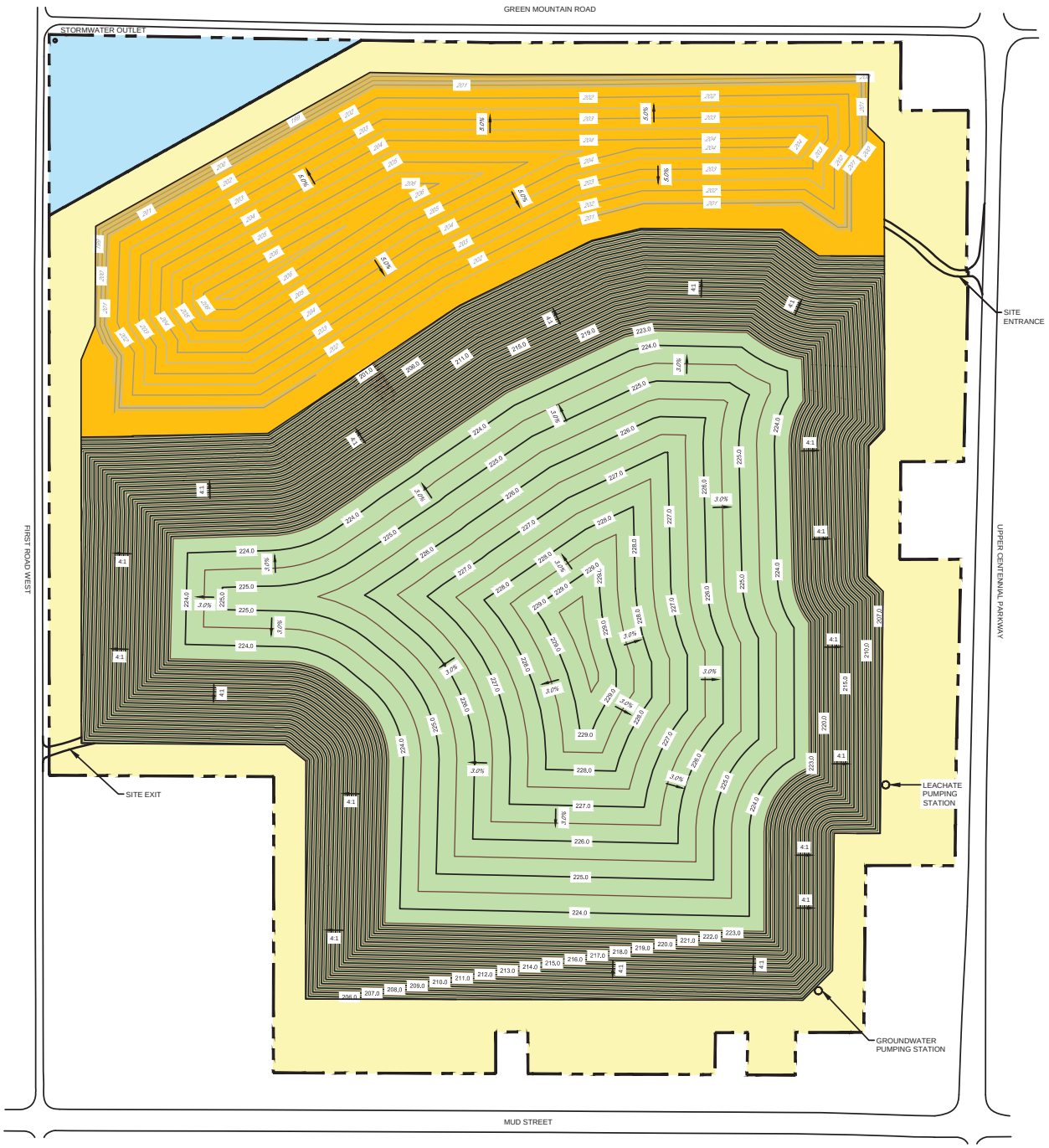
- Progressive application of final cover (vegetative) from west to east.
- Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).
- Maintain and keep in place the infrastructure required to manage leachate (leachate collection system).
- Maintain and keep in place the infrastructure required to monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).
- Flexibility of post-closure design with uniform grading extending over the majority of the Site.

- Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity, or two years of remaining capacity (whichever comes first).
- The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends for the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPERTY BOUNDARY
- RESIDUAL MATERIAL
- INDUSTRIAL FILL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

ALTERNATIVE LANDFILL FOOTPRINT NO. 3 - VERTICAL EXPANSION OF THE SCRF

11102771-00
August 29, 2018

FIGURE 5.4

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5.1.5 Alternative Landfill Footprint No. 4 – Reconfiguration and Horizontal Expansion of the Stoney Creek Regional Facility

Alternative Landfill Footprint No. 4 proposes a combination of Alternative Landfill Footprint Nos. 1 (reconfiguration) and 2 (horizontal expansion) at the SCRF and is described as follows (**Figure 5.5**):

- 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. This would result in an increase of approved residual material up to 9,780,000 m^3.
- A minimum 30 m buffer would be established around the entire area for receiving post-diversion solid, non-hazardous industrial residual material.
- There would be no vertical expansion. As a result, the peak height currently approved would remain unchanged.
- The footprint area for residual material would increase to 64.9 ha.
- The peak elevation and height relative to the surrounding areas would remain the same as currently approved.
- With respect to SWM, drainage ditches would be modified to ensure they are placed around the perimeter of the new residual material area. In addition, construction of new SWM ponds in the west and north buffer areas would occur. The discharge point from the stormwater pond would be maintained to the First Road West storm sewer.
- With respect to leachate collection and management, the existing leachate collection system at base of residual material area would be extended. It is anticipated that the approximate leachate generation rate of 8.8 L/s during active operation and 6.0 L/s post-closure would occur.
- Leachate collection would occur via the existing leachate pumping station in the southeast corner of the residual material area and would be discharged to an existing/new sanitary sewer.
- In terms of traffic, there would be approximately 98,877 trucks associated with construction and 252,846 trucks associated with residual material over the life of the Alternative Landfill Footprint.

From a Construction and Operations perspective, the following activities would occur:

- Excavation (i.e., residual material, soil, bedrock) in the south and east buffer areas.
- Construction of additional base liner system in the south and east buffer areas and the north area of the Site.
- Construction of additional groundwater and leachate collection systems.
- Construction of new SWM ponds in the west and north buffer areas.
- May require liner perforation for pumping well M4.
- Residual material area extends over existing clay plug.
- Placement of residual material in existing landfilled area before progressing to the south, east, and northwest following the construction of new landfill cells.
- No changes to the operations of the groundwater, leachate, and stormwater systems.
- Staged relocation/closure of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).
- Reconfiguration of screening berms/fences in the east and south buffer areas.

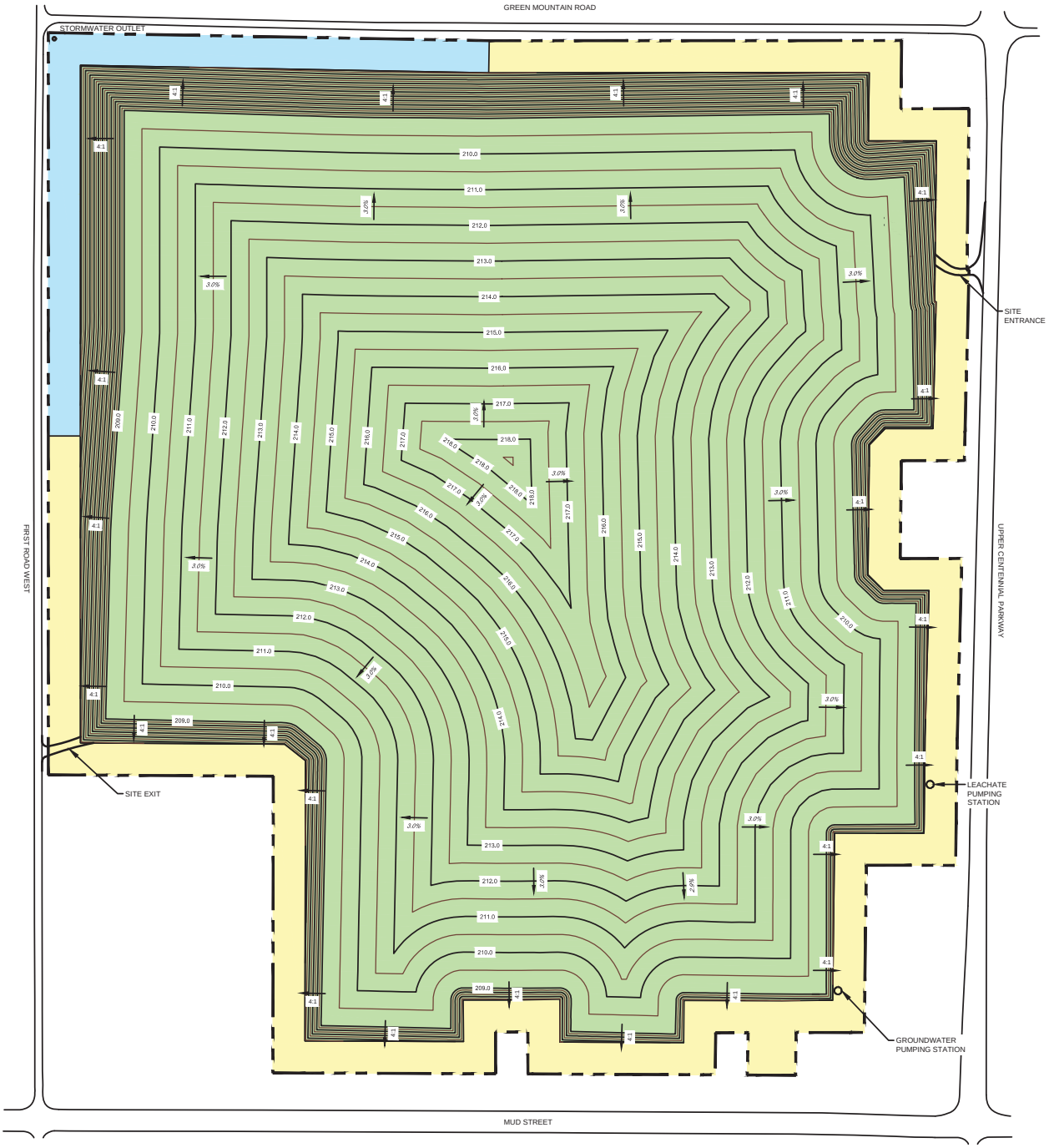
From a Closure/Post-Closure perspective, the following activities would occur:

- Progressive application of final cover (vegetative) from west to east and then south to north.
- Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).
- Maintain and keep in place the infrastructure required to manage leachate (leachate collection system).
- Maintain and keep in place the infrastructure required to monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).
- Flexibility of post-closure design with uniform grading extending over the majority of the Site.
- Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first).
- The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends for the Site to be used for open space and/or recreational uses and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPERTY BOUNDARY
- RESIDUAL MATERIAL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

ALTERNATIVE LANDFILL FOOTPRINT NO. 4 - RECONFIGURATION AND HORIZONTAL EXPANSION OF THE SCRF

11102771-00
August 29, 2018

FIGURE 5.5

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5.1.6 Alternative Landfill Footprint No. 5 – Reconfiguration and Vertical Expansion of the Stoney Creek Regional Facility

Alternative Landfill Footprint No. 5 reflects a combination of Alternative Landfill Footprint Nos. 1 (reconfiguration) and 3 (vertical expansion) at the SCRF and is described as follows (**Figure 5.6**):

- 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. This would result in an increase of approved residual material up to 10,180,000 m^3.
- A minimum 30 m buffer would be established around the entire area for receiving post-diversion solid, non-hazardous industrial residual material.
- The footprint area for residual material would increase to 59.1 ha.
- The peak elevation would increase from 218.5 to 221.0 mAMSL.
- The height of the Alternative Landfill Footprint relative to Green Mountain Road and First Road West would increase from 26.5 m to 29.0 m and relative to Upper Centennial Parkway and Mud Street would increase from 13.5 m to 16.0 m.
- With respect to SWM, drainage ditches would be modified to ensure they are placed around the perimeter of the new residual material area. In addition, reconfiguration of the existing SWM ponds in the northwest corner of the Site would occur. The discharge point from the stormwater pond would be maintained to the First Road West storm sewer.
- With respect to leachate collection and management, the existing leachate collection system at base of residual material area would be extended. It is anticipated that the approximate leachate generation rate of 8.0 L/s during active operation and 5.5 L/s post-closure would occur.
- Leachate collection would occur via the existing leachate pumping station in the southeast corner of the residual material area and would be discharged to an existing/new sanitary sewer.
- In terms of traffic, there would be approximately 78,481 trucks associated with construction and 282,077 trucks associated with residual material over the life of the Alternative Landfill Footprint.

From a Construction and Operations perspective, the following activities would occur:

- Construction of additional base liner system in the north area.
- Construction of additional groundwater and leachate collection systems.
- Reconfiguration of the existing stormwater ponds in the northwest corner of the Site.
- May require liner perforation for pumping well M4.
- Residual material area extends over existing clay plug.
- Placement of residual material in existing landfilled area before progressing to the north following the construction of new landfill cells.
- No changes to the operations of the groundwater, leachate, and stormwater systems.
- Staged relocation of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).

From a Closure/Post-Closure perspective, the following activities would occur:

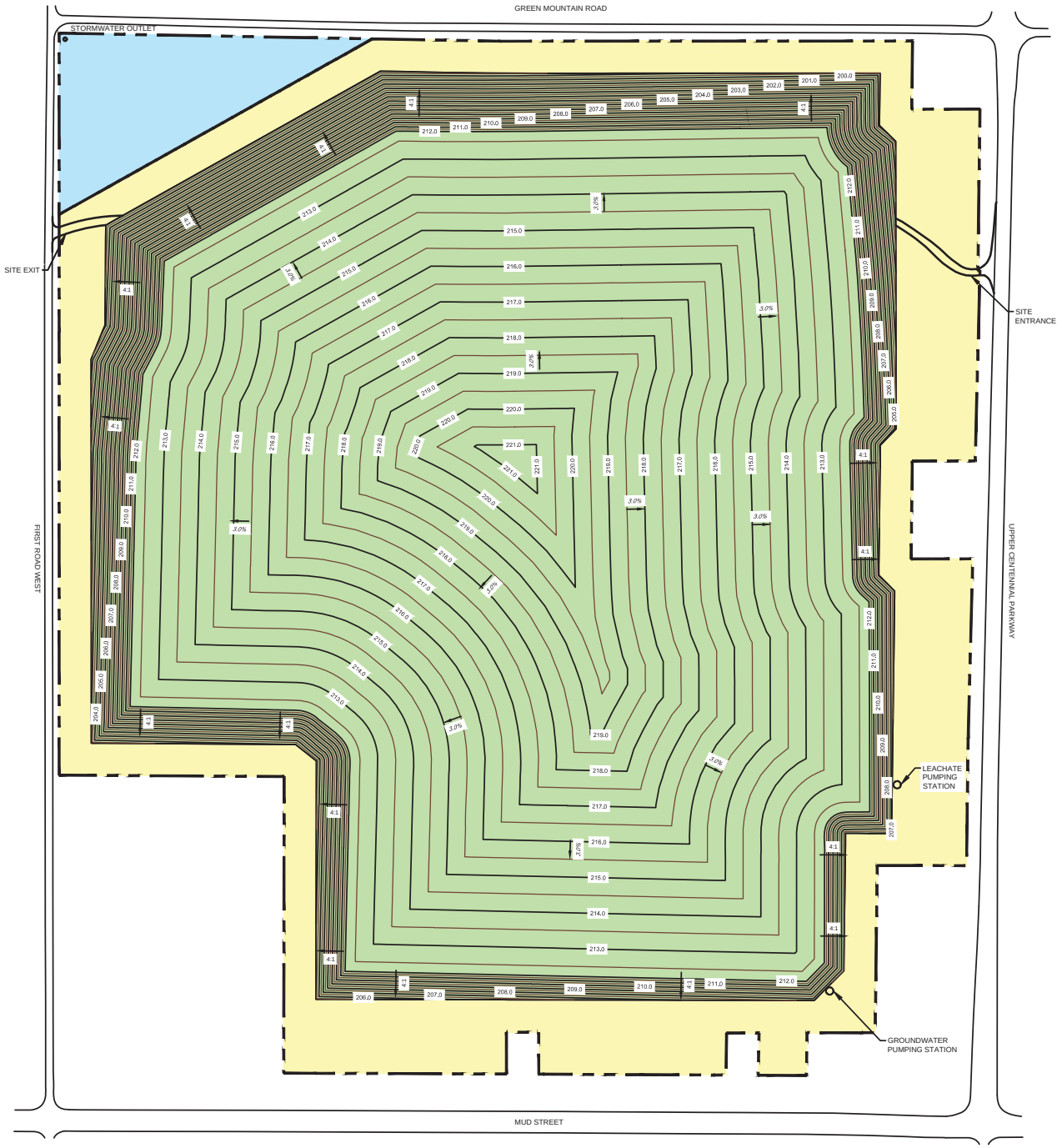
- Progressive application of final cover (vegetative) from south to north.

- Removal of existing site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, site office, site access).
- Maintain and keep in place the infrastructure required to manage leachate (leachate collection system).
- Maintain and keep in place the infrastructure required to monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).
- Flexibility of post-closure design with uniform grading extending over the majority of the Site.
- Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity, or two years of remaining capacity (whichever comes first).
- The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends for the Site to be used for open space and/or recreational uses and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPERTY BOUNDARY
- RESIDUAL MATERIAL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

ALTERNATIVE LANDFILL FOOTPRINT NO. 5 -
RECONFIGURATION AND VERTICAL EXPANSION OF THE SCRF FIGURE 5.6

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August 29, 2018

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5.1.7 Alternative Landfill Footprint No. 6 – Horizontal and Vertical Expansion of the Stoney Creek Regional Facility

Alternative Landfill Footprint No. 6 proposes a combination of Alternative Landfill Footprint Nos. 2 (horizontal expansion) and 3 (vertical expansion) and is described as follows (**Figure 5.7**):

- 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.
- 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. This would result in an increase of approved residual material up to 10,180,000 m^3.
- 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.
- The footprint area for residual material would increase to 47.3 ha, while the industrial fill footprint area would remain unchanged.
- The peak elevation would increase from 218.5 to 225.5 mAMSL.
- The height of the Alternative Landfill Footprint relative to Green Mountain Road and First Road West would increase from 26.5 m to 33.5 m and relative to Upper Centennial Parkway and Mud Street would increase from 13.5 m to 20.5 m.
- With respect to SWM drainage, ditches would be modified to ensure they are placed around the perimeter of the new residual material and industrial fill area. In addition, construction of new SWM ponds in the west and north buffer areas would occur. The discharge point from the stormwater pond would be maintained to the First Road West storm sewer.
- With respect to leachate collection and management, the existing leachate collection system at base of main residual material area would be extended and a new collection system at the base of the secondary residual area would be constructed. It is anticipated that approximate leachate generation rate of 6.4 L/s during active operation and 4.4 L/s post-closure would occur.
- Leachate collection would occur via the existing leachate pumping station in the southeast corner of the main residual material area and a new leachate pumping station constructed in the secondary residual material area. Both would discharge to an existing/new sanitary sewer.
- In terms of traffic, there would be approximately 48,074 trucks associated with construction, 282,077 trucks associated with residual material, and 226,154 trucks associated with industrial material over the life of the Alternative Landfill Footprint.

From a Construction and Operations perspective, the following activities would occur:

- Excavation (i.e., residual material, soil, bedrock) in the south and east buffer areas.
- Construction of additional base liner system in the south and east buffer areas and in the northwest corner of the Site.
- Construction of additional groundwater and leachate collection systems.
- Construction of new SWM ponds in the west and north buffer areas.
- Construction of new leachate pumping station in the secondary residual material area.
- Placement of residual material in existing landfilled area before progressing to the south, east, and northwest following the construction of new landfill cells.
- Monitoring and maintenance of additional leachate pumping station.
- No changes to the operations of the groundwater and stormwater systems.

- Staged relocation/closure of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).
- Reconfiguration of screening berms/fences in the east and south buffer areas.

From a Closure/Post-Closure perspective, the following activities would occur:

- Progressive application of final cover (vegetative) from west to east.
- Removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).
- Maintain and keep in place the infrastructure required to manage leachate (leachate collection system).
- Maintain and keep in place the infrastructure required to monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).
- Flexibility of post-closure design with uniform grading extending over the majority of the Site.
- Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity, or two years of remaining capacity (whichever comes first).
- The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends for the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

LEGEND:

- 211.0 — PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL / FILL)
- PROPOSED MINOR CONTOUR (TOP OF RESIDUAL / FILL)
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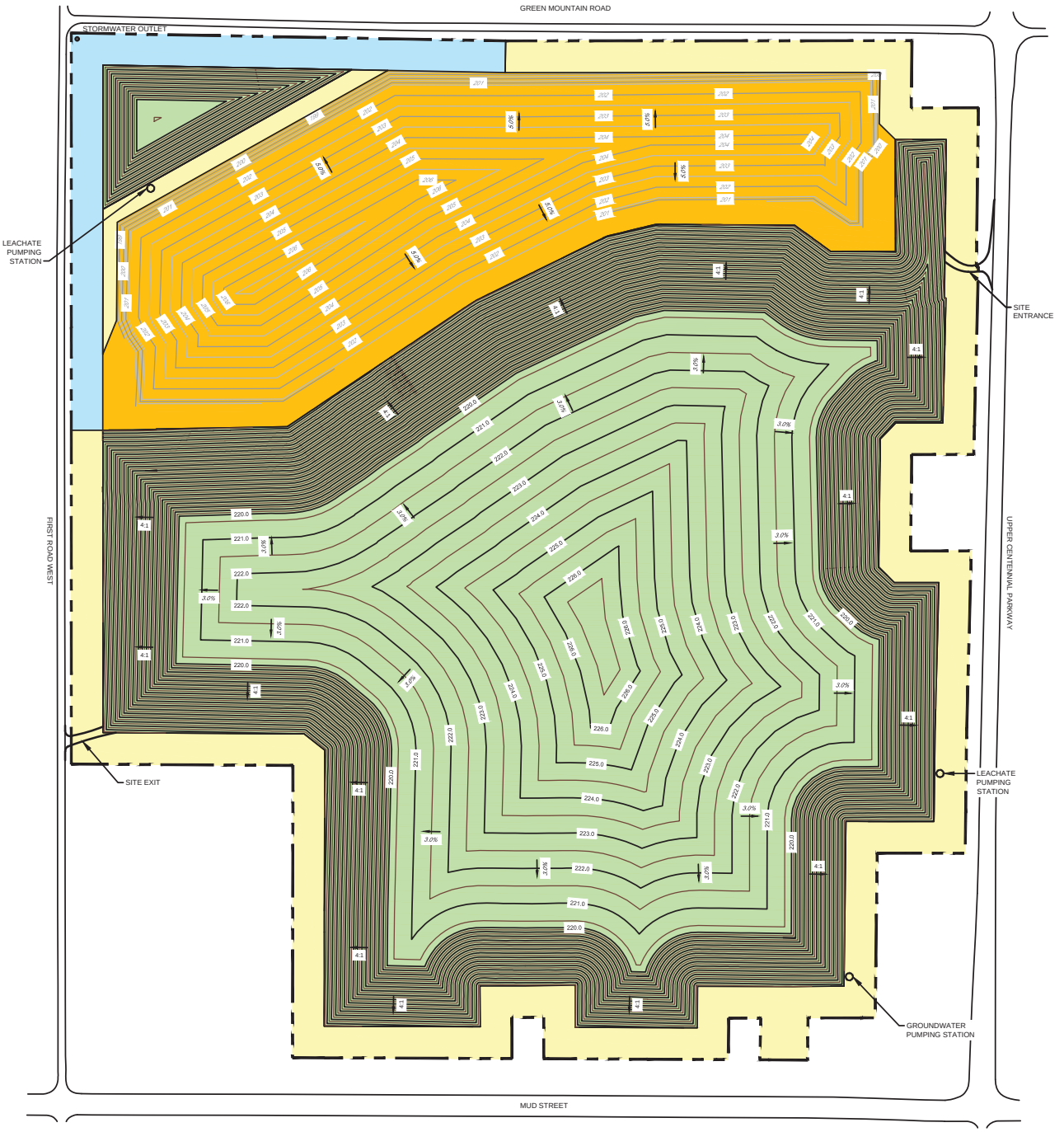
- RESIDUAL MATERIAL
- INDUSTRIAL FILL
- BUFFER AREA
- STORMWATER MANAGEMENT POND

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

ALTERNATIVE LANDFILL FOOTPRINT NO. 6 -
HORIZONTAL AND VERTICAL EXPANSION OF THE SCRF

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August 29, 2018

FIGURE 5.7

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5.2 Rationale for the 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 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 Landfill Footprints maximize the use of Terrapure's current property ownership at the SCRF. Consequently, Terrapure would have to purchase additional property from a private landowner 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 Landfill Footprint 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 publicly travelled roads (i.e., City of Hamilton ownership). As a result, a horizontal expansion in any direction beyond any one of the existing publicly 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 Description of the Assessment and Evaluation Methodology

After developing the conceptual designs for the six Alternative Landfill Footprints, an assessment and comparative evaluation of them was undertaken. The assessment and comparative evaluation of the Alternative Landfill Footprints consisted of the following three steps as stated in the Minister-approved Amended ToR (**Figure 5.8**):

- Step 1 – Assessment of the Alternative Landfill Footprints
- Step 2 – Comparative evaluation of the Alternative Landfill Footprints and selection of the Recommended Method
- Step 3 – Identification of the Preferred Landfill Footprint

Further details on each of the preceding steps are provided in the following sub-sections.

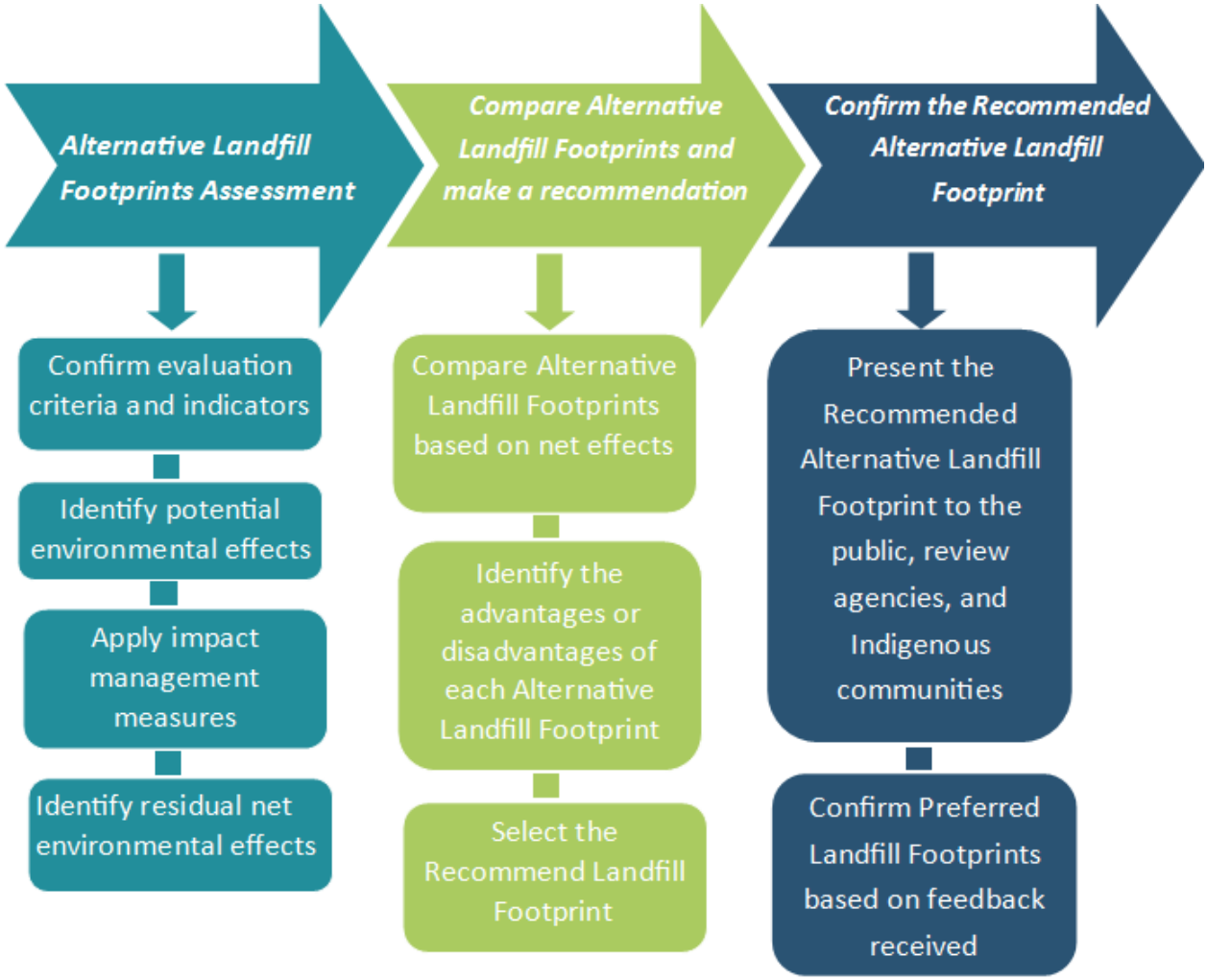

Figure 5.8 Overview of the Alternative Landfill Footprints Assessment and Comparative Evaluation Methodology

5.3.1 Description of the Assessment Methodology

The Alternative Landfill Footprints were assessed through a "net effects analysis" consisting of the following activities:

1. Confirm evaluation criteria and indicators
2. Identify potential effects on the environment (both positive and negative)
3. Develop appropriate impact management measures
4. Apply the impact management measures to the identified potential environmental effects to identify net effects on the environment (both positive and negative)

The "net effects analysis" took into account the construction, operation, and closure/post-closure timeframes or stages of the Alternative Landfill Footprints and, where possible, used highly conservative estimates. The estimates will be refined at the Impact Assessment stage of the SCRF EA when more construction/operation and closure/post-closure details are provided on the Preferred Alternative.

With regards to the timeframes, the construction and operation stages were considered together as a single combined stage for the net effects analysis, because the activities associated with each stage will be ongoing and concurrent with one another on the Site. For example, the construction of

the base liner system will be taking place in one location of the Site (construction stage) while waste material is being disposed of in another location of the Site (operation stage). Similarly, closure and post-closure includes placing final cover and revegetating the Site, as well as removal of applicable on-Site infrastructure and the implementation of a Post-closure Plan.

In accordance with the Minister-approved Amended ToR, 'closure/post-closure' was used instead of 'decommissioning' for continuity purposes. Although 'decommissioning' is referenced in the Codes of Practice for preparing and reviewing EAs in Ontario[1] to describe a project after it closes, the term 'post-closure' was used at the ToR stage, because it is more appropriate when describing landfills after they close and aligns with O.Reg. 232/98: Landfilling Sites.

5.3.1.1 Confirmation of the Preliminary Evaluation Criteria and Indicators

In order to identify the potential effects of the Alternative Landfill Footprints on the environment in a traceable, logical, understandable, and reproducible manner, the preliminary list of evaluation criteria and indicators put forward in the Minister-approved Amended ToR were first finalized reflecting input from review agencies, Indigenous communities, and the public through a number of consultation activities, including part of Public Open House No. 1 where they were presented for comment.

In general, the preliminary evaluation criteria and indicators remained unchanged with minor revisions including the addition of criteria to specifically address issues raised, as well as removal of indicators because of redundancy. **Table 5.2** present the finalized evaluation criteria and indicators. **Section 7.0** provides additional details on the consultation activities carried out and comments received.

[1] Code of Practice Preparing and Reviewing Environmental Assessments in Ontario (MECP, January 2014)

Table 5.2 Final Evaluation Criteria and Indicators Applied to the Alternative Landfill Footprints

	Component	Criteria	Indicators
Natural	**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)
Built	**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
Social	**Human Health**	Air Quality	Predicted impacts to air quality and their potential effects on human health
		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

Table 5.2 Final Evaluation Criteria and Indicators Applied to the Alternative Landfill Footprints

	Component	Criteria	Indicators
	Traffic	Effect on Traffic	Potential for traffic collisions Level of Service at intersections around the SCRF
Economic	**Economic**	Effect on approved/ planned land uses	Number, extent, and type of approved/planned land uses affected
		Economic benefit to City of Hamilton and Local Community	Total Employment at Site (number and duration)
Cultural	**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
Technical	**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 Landfill Footprints

5.3.1.2 Application of the Net Effects Analysis

Following the finalization of the evaluation criteria and their respective indicators, the three activities associated with the “net effects analysis” were carried out for the Alternative Landfill Footprints. The “net effects analysis” was applied to each of the Alternative Landfill Footprints based on expert opinion and analysis from the Project Team, a literature review of secondary sources (listed in **Appendix G**), and field investigations of the Study Area. Predictive Modelling was also used for several of the environmental components including:

- Geology and Hydrogeology (HELP Model, 1DTRANSEN Model)
- Surface Water (PCSWMM Version 7.1, SWMM5 Version 5.1.012)
- Air and Odour (US EPA AERMOD model Version 16216r)
- Land Use (Photographic Renderings)

Identify Potential Effects on the Environment

The potential effects on the environment (both positive and negative) were identified for each of the Alternative Landfill Footprints by applying the final evaluation criteria and indicators to each of them. The application was completed within the context of the developed conceptual designs, the associated environment as documented in the Existing Conditions Reports, and for all three defined timeframes (construction, operation, and closure/post-closure).

The identified potential effects from applying the indicators was expressed within the context of their corresponding measures either quantitatively or qualitatively, as appropriate, in the “Potential Effects” column of the net effects analysis tables for each alternative.

Develop and Apply Impact Management Measures

Next, impact management measures were developed, where possible and as required, and applied to prevent/minimize/offset potential negative environmental effects for each Alternative Landfill Footprint.

More specifically, the intent of the impact management measures is as follows:

- **Avoidance:** The first priority is to prevent the occurrence of negative effects (adverse environmental effects) associated with implementing an Alternative Landfill Footprint.
- **Mitigation:** Where adverse environmental effects cannot be avoided, appropriate measures to remove or alleviate, to some degree, the negative effects associated with implementing an Alternative Landfill Footprint were sought.
- **Compensation:** In situations where appropriate impact management measures were not available, or significant net adverse effects would remain following the application of mitigation, compensation measures may be required to counterbalance the negative effects through replacement in kind, substitution, reimbursement, or other agreed compensation.

The impact management measures were developed based on professional expertise of the Project Team reflecting on current procedures, historical performance, and existing environmental conditions. These measures were documented in the “Impact Management Measures” column of the net effects analysis tables for each Alternative Landfill Footprint.

Determine Net Effects on the Environment

Once the appropriate impact management measures were developed and applied to the potential environmental effects of each Alternative Landfill Footprint, the remaining net effect(s) were determined and documented in the “Net Effects” column of the net effects analysis tables for each Alternative Landfill Footprint. In cases where the net effect could not be improved through the application of impact management measure(s), the potential net effect remained unchanged. Therefore, it was still be identified as the “net effect.”

With the preceding three activities in mind, the completed net effects analysis for the six Alternative Landfill Footprints is provided in **Appendix C** (**Table C-1** to **C-6**) of the Alternative Methods Report (**Appendix I**).

5.3.1 Description of Comparative Evaluation Methodology

With the net effects determined, the Alternative Landfill Footprints were comparatively evaluated using a "Reasoned Argument" methodology to select a Recommended Landfill Footprint as specified in the Minister-approved Amended ToR. Specifically, the methodology was composed of the following activities to identify the advantages or disadvantages of each Alternative Landfill Footprint based on their net effects:

- **1st Activity:** First, the net effects identified for each Alternative Landfill Footprint by criteria were compared to one another to identify the level of effect ('No Net Effects', 'Low Net Effects', 'Moderate Net Effects' or 'High Net Effects'), in order to facilitate a ranking of the Alternative Landfill Footprints associated with the Second Activity.
- **2nd Activity**: Establish environmental component specific rankings based on level of effect and discipline specific professional judgement/analysis accompanied by a rationale for each Alternative Landfill Footprint (e.g., more preferred, less preferred, etc.).
- **3rd Activity**: Establish overall rankings for each Alternative Landfill Footprint (e.g., most preferred, less preferred, least preferred) based on the established component specific rankings.

The results of applying the preceding comparative evaluation approach are documented in **Appendix D** of the Alternative Methods Report (**Appendix I**).

5.4 Application of Assessment Methodology and Results

The application of the assessment methodology to the Alternative Landfill Footprints is documented individually, beginning with Alternative Landfill Footprint No. 1, and ending with Alternative Landfill Footprint No. 6. With this in mind, the potential effects are described first, in their entirety. This is followed by identification of the proposed impact management measures in their entirety. Finally, the resulting net effects resulting from the application of the proposed impact management measures are presented in their entirety.

5.4.1 Alternative Landfill Footprint No. 1 – Reconfiguration of the SCRF

5.4.1.1 Potential Effects

As mentioned, the potential effects, proposed impact management measures, and the resultant net effects associated with Alternative Landfill Footprint No. 1 are described in the following sections. **Appendix C** of the Alternative Methods Report (**Appendix I**) provides the net effects table for Alternative Landfill Footprint No. 1 (**Table C-1**), and **Appendix E** of the Alternative Methods Report provides the discipline specific memos.

5.4.1.1.1 Natural Environment

5.4.1.1.1.1 Geology/Hydrogeology

Groundwater Quality

This section discusses the evaluation results in terms of the potential effects for Alternative Landfill Footprint No. 1 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

Leachate generation rates are provided by the HELP model as leakage through the final cover system into the waste mound. The HELP model was used to predict the leachate generation rates

for each alternative. Based on the HELP modelling conducted, **Table 5.3** summarizes the predicted leachate generation rates under closure conditions for Alternative Landfill Footprint No. 1, as well as the existing approved configuration. Closure conditions were utilized, as this represents the most conservative assessment for leachate generation during the life of the Facility.

Table 5.3 Predicted Leachate Generation Rates (Total)

Landfilling Section	Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Approved	41.5	121,143
Alternative No. 1	59.1	172,619

In terms of leachate generation rates during construction/operation, it was estimated to be approximately 8.0 L/s during active operation, and 5.5 L/s post-closure.

Potential 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 Landfill Footprint No. 1.

A detailed description of calculation methodology and individual parameter results are provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

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

- 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 under the impact management measures.
- The predicted downgradient groundwater quality for Alternative Landfill Footprint No. 1 is very similar to the predicted downgradient groundwater quality for the existing approval under closure conditions, modelled using the same methodology.

Potential Effects on Source Water Protection Area

Any potential impacts to groundwater and/or surface water quality within the Source Water Protection Area (SWPA) will be dependent on groundwater quality from the Alternative Landfill Footprints migrating into the Intake Protection Zone (IPZ) for the City of Hamilton water intake. Alternative Landfill Footprint No. 1 shows minimal effects on predicted groundwater quality prior to implementation of impact management 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 (impact management 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 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 E** of the Alternative Methods Report (**Appendix I**)). The HELP model 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 (VFZ) (which directly underlies the base of the landfill footprint in each of the Alternative Landfill Footprints), 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 = (201 mAMSL – 192.6 mAMSL) / 900 m = 0.093 m/m).

Under Alternative Landfill Footprint No. 1, 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 (Closure/Post-Closure)

As discussed above, a detailed description of the predicted contaminating lifespan for each alternative is provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

Three scenarios were modelled 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 5.4** below summarizes the contaminating lifespans calculated for chloride, as estimated using the Rowe (1991) model, for each of the three scenarios for the approved existing conditions and Alternative Landfill Footprint No. 1.

Table 5.4 Contaminating Lifespan Using the Rowe Model

Alternative Landfill Footprint	Contaminating Lifespan (years)		
	Scenario 1	Scenario 2	Scenario 3
Approved	32	53	65
Alternative No. 1	29	48	59

A comparison of the contaminating lifespan values indicates that Alternative Landfill Footprint No. 1 performs similarly to the existing approved design.

Summary

Based on the analysis completed, potential effects to groundwater quality include minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits of wellhead protection area may occur during construction/operation and closure/ post-closure. Minimal potential impacts to water quality within the SWPA during construction/ operation and closure/post-closure.

With respect to groundwater flow, no potential effects are anticipated, as there will be no change in groundwater flow due to the implementation of this alternative and therefore will have minimal effect on groundwater recharge patterns during construction/operation and closure/post-closure.

5.4.1.1.1.2 Surface Water

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 Methods being considered[2]. 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 modelling 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 SWM ponds).

Table 5.5 Peak Flow Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 1 (Reconfiguration)	0.967	-0.21%	5.929	-10.38%

Table 5.6 Total Runoff Volume Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 1 (Reconfiguration)	15,501	10.32%	61,676	6.37%

The modelling above represents closure/post-closure effects as this represents the greatest potential effect to surface water criteria based on the impervious cap that will be put in place at closure, which increases the runoff volumes. The final cover for the residual material will produce more runoff than during operation, as the residual material final cover requires a layer of clay that is 600 mm thick.

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 SWM 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

[2] PCSWMM Version 7.1, Computational Hydraulics International, 2018, 2), United States Environmental Protection Agency (US EPA), EPA SWMM 5 (Version 5.0.012), 2018

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.

5.4.1.1.1.3 Terrestrial and Aquatic

Potential effects resulting from Alternative Landfill Footprint No. 1 are predicted as temporary (assumed not all vegetated areas will be disturbed simultaneously) loss of existing vegetation communities (e.g., marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of re-grading construction and operation activities. Temporary loss (it is assumed habitat will be restored following landfill closure) 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 is anticipated during construction and operation. No off-Site impacts are anticipated from Alternative Footprint No. 1.

Potential effects to aquatic ecosystems include the potential loss of on-Site aquatic habitat and disturbance of aquatic biota associated with open water habitats in stormwater infrastructure due to regrading activities during construction and operation. No potential off-Site impacts are anticipated.

5.4.1.1.1.4 Atmospheric

Air, Odour and Noise

With respect to Alternative Landfill Footprint No. 1 and air quality, there is a potential for off-Site concentrations of particulate species (TSP, PM_{10} and $PM_{2.5}$) to exceed current air quality criteria during construction/operation. This primarily has the potential to affect receptors north of Green Mountain Road.

The potential effects for this alternative predicts higher concentrations of particulate species than the maximum allowable operations permitted under the current license, due to changed on-Site road and material handling area layout. No effects are anticipated closure/post-closure.

From an odour perspective, this Alternative Landfill Footprint is not anticipated to be different from the current operations, as the Site is not permitted to receive putrescible waste (i.e., organic material that can break down and cause odours). No effects are anticipated closure/post-closure.

With respect to Alternative Landfill Footprint No. 1 and noise during construction/operation, there is a potential for 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. The net sound level change for up to 200 off-Site receptors is 2 dBA or lower, however there are approximately 75 residences (to the north) that have the potential for a +2 dBA change. 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 Alternative Landfill Footprint No. 1.

From a potential noise impact exposure perspective, Alternative Landfill Footprint No. 1 is similar to existing conditions, 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.

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 7:00 a.m. to 7:00 p.m. under the MECP “Noise Guidelines for Landfill Sites” (N-1). Minimal effects from a noise perspective are anticipated during closure/post-closure due to the limited types of works and associated noise sources associated with this stage.

5.4.1.1.2 Built Environment

5.4.1.1.2.1 Land Use

From a land use perspective, there are no potential effects to current land use designation (Open Space/Commercial) and no change to existing land use Zoning (ME-1) during construction/ operation or closure/post-closure.

From a visual perspective, no change to the height of the landfill will occur, but there will be a potential change in views of the Facility based on the reconfiguration of material on the Site. Therefore, the potential exists to alter the existing views of the Site and potential visibility will increase for sensitive receptors adjacent to the Site, including residential dwellings to South on Green Mountain Road, as well as homes along Mud Street during construction/operation and closure/post closure.

5.4.1.1.3 Social Environment

5.4.1.1.3.1 Human Health

The Minister-approved Amended ToR made a commitment to analyze the potential effects to human health during the assessment and evaluation of the Alternative Landfill Footprints utilizing the existing data and methodology established as part of the ongoing SCRF Community Health Assessment Review (CHAR)[3], which is completed on an annual basis (full report can be viewed in **Appendix F** of the Alternative Methods Report (**Appendix I**)). 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 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 Alternative Landfill Footprints. With the exception of impacts to soil, the criteria below have been evaluated in the annual Community Health Assessment Review that Intrinsik has been conducting since 1996. The evaluation of potential human health effects with five indicators (air quality, leachate quality, groundwater quality, surface water quality, soli quality) 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.

Information from the Air Quality, Surface Water, and Hydrogeology analyses were used to provide data for the net effect analysis related to Human Health impacts for Alternative Landfill Footprint No. 1.

Air Quality

Results of the air quality assessment indicate that the VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of $PM_{2.5}$ 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 PM_{10} 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 during construction/operation. No effects are expected during closure/post closure.

[3] Intrinsik. 2018. Community Health Assessment Review: Terrapure Stoney Creek Regional Facility based on 2016 Monitoring Report. Final Report. Intrinsik Corp. Project # 400401. June 2018

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Landfill Footprint would not be expected to result in any health risks different than the existing approved landfill design during construction/operation or closure/post-closure.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative 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 during construction/operation and closure/post-closure.

Surface Water Quality

Results of the surface water study indicate that SWM ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards during construction/operation and closure/post-closure.

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 Landfill Footprint 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 during construction/operation and closure/post-closure.

5.4.1.1.3.2 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 Landfill Footprint 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 Footprints 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.

With respect to the “Potential for traffic collisions” indicator, the expected effect of each Alternative Landfill Footprint on future frequency and severity of traffic collisions within the Local Study Area was assessed. With respect to the “Level of Service at intersections around the SCRF” indicator, the expected effect of each Alternative Landfill Footprint 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.

Using previous traffic counts for the intersections around the SCRF and truck count data and tonnage reports from the SCRF[4], traffic modelling[5] was completed and concluded that Alternative Landfill Footprint No. 1 is not expected to impact average daily SCRF truck volumes. With no expected change in SCRF truck volumes within the Local Study Area for Alternative Landfill

[4] 2010-2015 Truck Count Data and 1997-2015 Tonnage Reports

[5] Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009

Footprint No. 1; this alternative's potential for traffic collisions is negligible within the Local Study Area. It should be noted that traffic levels during the closure/post-closure timeframe are significantly lower than during the construction/operation stage.

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; therefore, potential for collisions will not increase. For example, if 10 Site trucks occur in one hour, with Alternative Landfill Footprint No. 1, the maximum number of collisions with a Site truck is still 10.

Alternative Landfill Footprint No. 1 is not expected to impact average daily SCRF truck volumes. Therefore, with no expected change in SCRF truck volumes within the Local Study Area, Alternative Landfill Footprint No. 1 is considered to have an equally negligible impact on the Level of Service at intersections in the Local Study Area.

5.4.1.1.4 Economic Environment

5.4.1.1.4.1 Economic

Approved/Planned Land Uses

With regard to 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 Landfill Footprints result in no potential effects. Landfill operation BMPs and impact management measures, such as the SWM pond, landfill liner system, dust, and noise control measures will ensure potential effects to land uses are managed and mitigated. None of the presented Alternative Landfill Footprints result in a change to proposed land uses within the Site or Local Study Area. Therefore, there are no potential effects and no impact management steps required for the approved/land use indicator. Impact management measures are not required for approved/planned and/or proposed land uses within the Local Study Area, since each Alternative Landfill Footprint and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Impact management measures would be established to manage any potential nuisance influenced by Site construction/operations of each Alternative Landfill Footprints relative to noise, air quality (including odour), and traffic, as described in **Section 5.4.1.2**.

Economic Benefits to the City of Hamilton and Local Community

Potential effects related to Alternative Landfill Footprint No. 1 include an increase in capacity at the SCRF, but a shortfall in meeting the economic opportunity for Terrapure. Economic benefits to the City and local community are low, as the City and community compensation would be reduced based on the current dollar per tonne agreements. Further, reduced expansion capacity would not allow for maximum economic activity as demonstrated through the economic analysis[6]. Employment opportunities at the Site would be reduced (year over year) under Alternative Landfill Footprint No. 1, based on the reduced amount of employees required for the amount of residual material by which this Footprint could be expanded. 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.

5.4.1.1.5 Cultural Environment

5.4.1.1.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 1 does not require a change to the current footprint. The Site has been previously excavated and quarried. Due to the previous disturbance on-Site (excavation for quarry operation), Alternative Landfill Footprint No. 1 does not affect a known or potential archaeological resource; therefore, no impacts are anticipated during all project timeframes. Only one cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not

[6] Economic Impacts of the Stoney Creek Regional Facility, RIAS Inc., 2017.

be impacted, displaced or disturbed. No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA.

5.4.1.1.6 Technical Environment

5.4.1.1.6.1 Design and Operations

Alternative Landfill Footprint No. 1 maintains the same footprint and peak height for the residual material area as the current approved design of the SCRF, but also expands the residual material area to the north to include the area currently approved for industrial fill. Industrial fill would no longer be accepted at the Site under Alternative Landfill Footprint No. 1.

Potential to Provide Service for Disposal

Alternative Landfill Footprint No. 1 only provides 8,830,000 m^3 of total disposal capacity for residual material. Alternative Landfill Footprint No. 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

Alternative Landfill Footprint No. 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. This infrastructure will be modified during construction/operation and will be maintained during closure/post-closure.

Stormwater Management

Alternative Landfill Footprint No. 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. This infrastructure will be modified during construction/operation and will be maintained during closure/post-closure (as necessary).

Construction

Alternative Landfill Footprint No. 1 will require the construction of additional base liner and leachate collection system for the expanded residual material area. This Alternative Landfill Footprint has an open layout with a simple configuration and dedicated areas for the various components.

Site Operations

Alternative Landfill Footprint No. 1 does not include the importing of industrial fill, meaning that this material will no longer need to be managed. Leachate will be managed from a single area with one leachate pumping station during construction/operation and closure/post-closure. The proposed layout of the SWM pond provides operational flexibility. Access and egress from the Site will be maintained in their current configuration. Development of the Site will require the staged relocation or removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).

Closure and Post-Closure

Alternative Landfill Footprint No. 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. During this stage, removal of existing Site infrastructure would occur (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access), but maintain and keep in place the infrastructure required to manage leachate (leachate collection system) and monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).

Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first).

The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

Cost of Facility

Alternative Landfill Footprint No. 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.

5.4.1.2 Impact Management Measures

As previously mentioned, impact management measures were developed, where possible and as required, and applied to prevent/minimize/offset potential negative environmental effects associated with Alternative Landfill Footprint No. 1.

5.4.1.2.1 Natural Environment

5.4.1.2.1.1 Geology/Hydrogeology

The evaluation of potential environmental effects described above was 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 impact management measures for Alternative Landfill Footprint No. 1. The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of Alternative Landfill Footprint No. 1. The existing liner system will be expanded to accommodate new waste placement areas.

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.

No impact management measures are required for effects on groundwater flow.

5.4.1.2.1.2 Surface Water

The existing SWM pond will be altered as required (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.

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 and address any water quality issues.

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 be redesigned.

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.

5.4.1.2.1.3 Terrestrial and Aquatic

Potential effects to terrestrial ecosystems 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.

In order to mitigate these potential effects to terrestrial ecosystems, the following impact management measures will be employed throughout construction/operation and closure/ post-closure:

- conduct any vegetation removal activities outside of the breeding bird window (i.e., no removals between late March - late August);
- consult with Ministry of Natural Resources and Forestry (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; and,
- compensation for the loss of vegetation communities which 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.

Implementing Best Management Practices (BMP) 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 species at risk (SAR), the Site Supervisor will contact MNRF SAR biologists for advice; and,
- include naturalized landscape features into the SWM facilities design (e.g., emergent robust vegetation, shallow slope).

In order to mitigate potential effects to aquatic ecosystems, the following impact management measures are recommended:

- 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.

5.4.1.2.1.4 Atmospheric

Air, Odour and Noise

In order for the Facility to meet MECP air quality criteria for Alternative Landfill Footprint No. 1, the following impact management measures will be required and include implementing BMPs such as:

- 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-Site roads;
- reviewing the number of vehicles accessing the Site on a daily basis;
- conducting a detailed assessment of the progression of Site operations for the Preferred Landfill Footprint; and,
- other options as identified during the design of the Preferred Landfill Footprint.

Review number of vehicles accepted daily as part of further impact assessment. Models were completed using highly conservative amount of 250 trucks/day. Average trucks currently to the Site is approximately 90 trucks/day.

This scenario is not anticipated to be different from the current license from an odour perspective. Maintaining operational measures currently in place to reduce/mitigate odour impacts from the Site is recommended during the vertical expansion, including current impact management activities, such as a complaint handling and monitoring program.

No impact management measures are required for existing residential properties. Regarding the potential future development of surrounding properties, potential noise impact management measures may require 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 (199m ASL to 207m ASL).

5.4.1.2.2 Built Environment

5.4.1.2.2.1 Land Use

No change to the current land use designation (Open Space/Commercial) and no change to Land Use Zoning (ME-1), and as such, no impact management measures are required. Regarding views of the Facility, installation of visual screening elements such as vegetation, fencing, or berms would minimize views of the Facility from the surrounding community during construction/operation.

5.4.1.2.3 Social Environment

5.4.1.2.3.1 Human Health

Further impact management measures would be implemented at future design stages to reduce ambient PM_{10} particulate concentrations. Standard planned leachate treatment and management would be required to prevent direct exposure to leachate. Continuation of existing groundwater and surface water mitigation and management practices and implementation of proposed measures is recommended. Finally, continuing existing particulate/dust control impact management measures, with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill is recommended under Alternative Landfill Footprint No. 1.

5.4.1.2.3.2 Traffic

As no effects to traffic are anticipated for Alternative Landfill Footprint No. 1, and as such no impact management measures are required.

5.4.1.2.4 Economic Environment

5.4.1.2.4.1 Economic

Regarding effects on approved or planned land uses, basic landfill operation impact management measures, including stormwater management, leachate treatment, and dust and noise control will assist in mitigating effects to surrounding properties. Impact management measures are not applicable to the relative economic benefits of each Alternative Landfill Footprint.

5.4.1.2.5 Cultural Environment

5.4.1.2.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 1 does not affect known or potential archaeological resources; therefore, no impact management measures are required. Due to proximity of the heritage landscape, no interaction will occur; therefore, no impact management measures are required. Alternative Landfill Footprint No. 1 does not affect Indigenous resources; therefore, no impact management measures are required.

5.4.1.2.6 Technical Environment

5.4.1.2.6.1 Design and Operations

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 Alternative Landfill Footprint No. 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.

5.4.1.3 Net Effects

As previously mentioned, the resultant net effects associated with Alternative Landfill Footprint No. 1 were established based on the application of the developed impact management measures to the potential effects first identified.

5.4.1.3.1 Natural Environment

5.4.1.3.1.1 Geology/Hydrogeology

Based on the impact management measures proposed above, no effects to groundwater quality or groundwater flow are anticipated during construction/operation, nor during closure/post-closure. The key factors leading to this outcome are the use of the impact management measures and controls, including the extraction well, the groundwater collection trench network and the HCL described, and the use of these impact management measures at this Site for more than two decades.

5.4.1.3.1.2 Surface Water

Regarding surface water quality, alterations to the existing stormwater management pond to provide adequate permanent and active storage volumes, and subsequent discharge to surface water or sanitary sewer will result in negligible or no increase in TSS or related parameter concentrations. Perimeter ditches, in combination with the management pond, will manage flow and increases in peak flows are thus not expected.

5.4.1.3.1.3 Terrestrial and Aquatic

With the implementation of impact management measures, net effects on terrestrial and aquatic ecosystems are anticipated to be low, as any loss in habitats during construction/operation are considered temporary and habitats will be re-established on-Site during closure/post-closure.

5.4.1.3.1.4 Atmospheric

Application of dust BMPs and remodelling, based on lower daily trucks per day, will mitigate effects to air quality during construction/operation to acceptable and approvable levels from an air quality for off-Site receptors, resulting in low net effects. No net effects are expected during closure/post-closure.

This scenario is not anticipated to be different from the current license from an odour perspective during construction/operation. No net effects are expected during closure/post-closure.

Following the implementation of impact management measures such as barriers and berms, noise levels at receptors will be below the MECP's minimum sound level limits during construction/ operation, resulting in low net effects. No net effects are expected during closure/post-closure.

5.4.1.3.2 Built Environment

5.4.1.3.2.1 Land Use

No change in current land uses during construction/operation and closure/post-closure would occur under Alternative Landfill Footprint No. 1, as such, no net effects are anticipated during any project stage. Installation of visual screening elements would minimize views of the Facility from the surrounding community during construction/operation, resulting in a low net effect.

5.4.1.3.3 Social Environment

5.4.1.3.3.1 Human Health

A marginal increase in larger particulate size fractions (i.e., PM_{10}), compared to the existing approved landfill design, with the potential for transient short-term health concerns is anticipated under Alternative Landfill Footprint No. 1. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

5.4.1.3.3.2 Traffic

Despite an increase in background development traffic, the number of potential collisions is not expected to increase, as the number of trucks to and from the Site during construction/operation will not increase and do not result in any net effects under Alternative Landfill Footprint No. 1. No effects are expected during closure/post-closure.

5.4.1.3.4 Economic Environment

5.4.1.3.4.1 Economic

No effects to approved/planned land uses during construction/operation or closure/post-closure is expected, and as such no changes to approved or planned land uses are expected.

Employment is reduced (year over year) under Alternative Landfill Footprint No. 1 during construction/operation, with subsequent employment reduction as the Facility moves into closure/ post-closure. There are Low economic benefits to the City and local community during construction/ operation, with a new use established during closure/post-closure.

5.4.1.3.5 Cultural Environment

5.4.1.3.5.1 Archaeology/Built Heritage/Indigenous Resources

Due to the previous disturbance on-Site (excavation for quarry operation), no effects to archaeological sites or resources during construction/operation or closure/post-closure are anticipated under Alternative Landfill Footprint No. 1. No impacts are expected on cultural heritage resources during construction/operation or closure/post-closure. Since no known cultural resources that are of value to Indigenous communities were identified, no effects to Indigenous resources are anticipated.

5.4.1.3.6 Technical Environment

5.4.1.3.6.1 Design and Operations

Alternative Landfill Footprint No. 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, Alternative Landfill Footprint No. 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.

5.4.1.4 Summary of the Net Effects

Table 5.7 summarizes the net effects established for Alternative Landfill Footprint No. 1 – Reconfiguration of the SCRF.

Table 5.7 Alternative Landfill Footprint No. 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 during construction/operation or closure/ post-closure. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of impact management 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 as the effects to terrestrial environment will be temporary during construction/ operation and re-established during closure/ post-closure. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of BMPs.
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 minimize views of the Facility from the surrounding community.
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 impact management measures. No net effects expected during closure/ post-closure.
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.
Traffic	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, built and cultural heritage resources, or indigenous resources are anticipated.
Design and Operations	Alternative Landfill Footprint No. 1 fails to meet the objectives for disposal and requires a small increase in cost relative to expansion.

5.4.2 Alternative Landfill Footprint No. 2 – Horizontal Expansion of the SCRF

5.4.2.1 Potential Effects

As mentioned, the potential effects, proposed impact management measures, and the resultant net effects associated with Alternative Landfill Footprint No. 2 are described in the following sections.

Appendix C of the Alternative Methods Report (**Appendix I**) provides the net effects table for Alternative Landfill Footprint No. 2 (**Table C-2**) and **Appendix E** of the Alternative Methods Report provides the discipline specific memos.

5.4.2.1.1 Natural Environment

5.4.2.1.1.1 Geology/Hydrogeology

Groundwater Quality

This section discusses the evaluation results in terms of the potential effects for Alternative Landfill Footprint No. 2 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

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 5.8** summarizes the predicted leachate generation rates under closure conditions for Alternative Landfill Footprint No. 2, as well as the existing approved configuration. Closure conditions were utilized, as this represents the most conservative assessment for leachate generation during the life of the Facility.

Table 5.8 Predicted Leachate Generation Rates (Total)

Landfilling Section	Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Approved	41.5	121,143
Alternative No. 2	47.3	138,137

In terms of leachate generation rates during construction/operation, it was estimated to be approximately 6.4 L/s during active operation, and 4.4 L/s post-closure.

A detailed description of calculation methodology and individual parameter results are provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

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

- 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 under the impact management measures.
- The predicted downgradient groundwater quality for Landfill Footprint No. 2 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 Landfill Footprints migrating into the IPZ for the City of Hamilton water intake. Landfill Footprint No. 2 shows minimal effects on predicted groundwater quality prior to implementation of impact management 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 (impact management 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 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 E** of the Alternative Methods Report (**Appendix I**)). The HELP model outputs show that leakage from the landfill liner will contribute approximately 0.064 mm each year. This leakage will predominantly enter the VFZ (which directly underlies the base of the landfill footprint in each of the Alternative Landfill Footprints), 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 = (201 mAMSL – 192.6 mAMSL) / 900 m = 0.093 m/m).

Under Alternative Landfill Footprint No. 2, 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 (Closure/Post-Closure)

As discussed above, a detailed description of the predicted contaminating lifespan for each alternative is provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

Three scenarios were modelled 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 5.9** below summarizes the contaminating lifespans calculated for chloride, as estimated using the Rowe (1991) model, for each of the three scenarios for the approved existing conditions and Alternative Landfill Footprint No. 2.

Table 5.9 Contaminating Lifespan Using the Rowe Model

Alternative Landfill Footprint	Contaminating Lifespan (years)		
	Scenario 1	Scenario 2	Scenario 3
Approved	32	53	65
Alternative No. 2	31	52	64

A comparison of the contaminating lifespan values indicates that Alternative Landfill Footprint No. 2 performs similarly to the existing approved design.

Summary

Based on the analysis completed, potential effects to groundwater quality include minor increases in leachate indicator parameters at downgradient wells, and minor increases in leachate indicator

parameters reaching upgradient limits, reaching the wellhead protection area during construction/ operation and closure/post-closure.

With respect to groundwater flow, no potential effects are anticipated, as the proposed expansion will have minimal effect on groundwater recharge patterns during construction/operation and closure/post-closure.

5.4.2.1.1.2 Surface Water

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 Methods being considered[7]. 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 modelling 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 SWM ponds).

Table 5.10 Peak Flow Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 2 (Horizontal Expansion)	0.929	-4.13%	5.932	-10.34%

Table 5.11 Total Runoff Volume Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 2 (Horizontal Expansion)	14,343	2.08%	58,795	1.40%

The modelling above represents closure/post-closure effects, as this represents the greatest potential effect to surface water criteria based on the impervious cap that will be put in place at closure, which increases the runoff volumes. The final cover for the residual material will produce more runoff than during operation, as the residual material final cover requires a layer of clay that is 600 mm thick.

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. During construction and operation, potential effects to surface water quality related to TSS will be minimized through effective use of existing and proposed stormwater management ponds. With respect to closure and post-closure conditions, 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.

[7] PCSWMM Version 7.1, Computational Hydraulics International, 2018, 2), United States Environmental Protection Agency (US EPA), EPA SWMM 5 (Version 5.0.012), 2018

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 during closure/post-closure.

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 SWM pond to capture runoff) will produce a larger runoff volume than the baseline condition during construction/operation or closure/post-closure. 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.

5.4.2.1.1.3 Terrestrial and Aquatic

Potential effects resulting from Alternative Landfill Footprint No. 2 are predicted as temporary (assumed not all vegetated areas will be disturbed simultaneously) loss of existing vegetation communities (e.g., marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of construction and operation activities. Temporary loss (it is assumed habitat will be restored following landfill closure) 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 is anticipated during construction and operation. No off-Site impacts during construction/operation and closure/post-closure are anticipated from Alternative Footprint No. 2.

Potential effects to aquatic ecosystems include the potential loss of on-Site aquatic habitat and disturbance of aquatic biota associated with open water habitats in stormwater infrastructure due to construction and operation activities. No potential off-Site impacts during construction/operation and closure/post-closure are anticipated.

5.4.2.1.1.4 Atmospheric

Air, Odour and Noise

With respect to Alternative Landfill Footprint No. 2 and air quality, there is a potential for off-Site concentrations of particulate species (TSP, PM_{10} and $PM_{2.5}$) to exceed current criteria during construction and operation. This primarily has the potential to affect receptors near the northeast corner of the Site, and north of Green Mountain Road.

This scenario predicts higher concentrations of particulate species than the maximum allowable operations permitted under the current license due to changed on-Site road and material handling area layout. No effects to air quality are predicted during closure/post-closure.

From an odour perspective during construction and operation, this Alternative Landfill Footprint is not anticipated to be different from the current operations, as the Site is not permitted to receive putrescible waste (i.e., organic material that can break down and cause odours). No effects related to odour are anticipated during closure/post-closure.

With respect to Alternative Landfill Footprint No. 2 and noise, during construction and operation, there is a potential for 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. The net sound level change for up to 200 off-Site receptors is 2 dBA or lower, however there are approximately 75 residences (to the north) that have the potential for a +1 dBA change. 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 Alternative Landfill Footprint No. 2. No effects related to sound are anticipated during closure/ post-closure.

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 7:00 a.m. to 7:00 p.m. under the MECP "Noise Guidelines for Landfill Sites" (N-1).

5.4.2.1.2 Built Environment

5.4.2.1.2.1 Land Use

From a land use perspective, there are no potential effects to current land use designation (Open Space/Commercial) and no change to existing land use Zoning (ME-1) during construction/ operation or closure/post-closure.

From a visual perspective, there will be no change to the Facility height, but there will be a potential change in views of the Facility based on reduction of property buffers to 30 m minimum. Visibility would increase for sensitive receptors and properties adjacent to the Site, including residential dwellings to the South on Green Mountain Road, as well as homes along Mud Street during construction/operation or closure/post-closure.

5.4.2.1.3 Social Environment

5.4.2.1.3.1 Human Health

The Minister-approved Amended ToR made a commitment to analyze the potential effects to human health during assessment and evaluation of the Alternative Landfill Footprints, utilizing the existing data and methodology established as part of the ongoing SCRF CHAR[8], which is completed on an annual basis (full report can be viewed in **Appendix F** of the Alternative Methods Report (**Appendix I**)). 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 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 Alternative Landfill Footprints. With the exception of impacts to soil, the criteria below have been evaluated in the annual CHAR that Intrinsik has conducted since 1996. The evaluation of potential human health effects with five indicators (air quality, leachate quality, groundwater quality, surface water quality, soil quality) 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 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.

Information from the Air Quality, Surface Water, and Hydrogeology analyses were used to provide data for the net effect analysis related to Human Health impacts for Alternative Landfill Footprint No. 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 during construction/operation.

Particulate modelling indicated that while predicted concentrations of $PM_{2.5}$ 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 PM_{10} size fraction, short-term (i.e., 24-hour) concentrations have the potential under worst-case conditions to marginally exceed health-based

[8] Intrinsik. 2018. Community Health Assessment Review: Terrapure Stoney Creek Regional Facility based on 2016 Monitoring Report. Final Report. Intrinsik Corp. Project # 400401. June 2018

benchmarks, compared to the existing base case during construction/operation. No effects are anticipated during closure/post-closure.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Landfill Footprint would not be expected to result in any health risks different than the existing approved landfill design during construction/operation or closure/post-closure.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative 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 during construction/operation and closure/post-closure.

Surface Water Quality

Results of the surface water study indicate that SWM ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards during construction/operation and closure/post-closure.

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 Landfill Footprint 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 during construction/operation and closure/post-closure.

5.4.2.1.3.2 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 Landfill Footprint 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 Footprints 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.

With respect to the “Potential for traffic collisions” indicator, the expected effect of each Alternative Landfill Footprint on future frequency and severity of traffic collisions within the Local Study Area was assessed. With respect to the “Level of Service at intersections around the SCRF” indicator, the expected effect of each Alternative Landfill Footprint 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.

Using previous traffic counts for the intersections around the SCRF and truck count data and tonnage reports from the SCRF[9], traffic modelling[10] was completed and concluded that Alternative Landfill Footprint No. 2 is not expected to impact average daily SCRF truck volumes. With no expected change in SCRF truck volumes within the Local Study Area for Alternative Landfill Footprint No. 2, this alternative's potential for traffic collisions is negligible within the Local Study Area. It should be noted that traffic levels during the closure/post-closure timeframe are significantly lower than during the construction/operation stage.

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; therefore, potential for collisions will not increase. For example, if 10 Site trucks occur in one hour, with Alternative Landfill Footprint No. 2, the maximum number of collisions with a Site truck is still 10.

Alternative Landfill Footprint No. 2 is not expected to impact average daily SCRF truck volumes. Therefore, with no expected change in SCRF truck volumes within the Local Study Area, Alternative Landfill Footprint No. 2 is considered to have an equally negligible impact on the Level of Service at intersections in the Local Study Area during construction/operation and closure/post-closure.

5.4.2.1.4 Economic Environment

5.4.2.1.4.1 Economic

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, all six of the Alternative Landfill Footprints result in no potential effects. Landfill operation BMPs and impact management measures, such as SWM pond, landfill liner system, dust, and noise control measures will ensure potential effects to land uses are managed and mitigated. None of the presented Alternative Landfill Footprints result in a change to proposed land uses within the Site or Local Study Area. Therefore, there are no net effects and no impact management steps required for the approved/land use indicator. Impact management measures are not required for approved/planned and/or proposed land uses within the Local Study Area, since each Alternative Landfill Footprint and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Impact management measures would be established to manage any potential nuisance influenced by Site construction/operations of each Alternative Landfill Footprints relative to noise, air quality (including odour), and traffic, as described in **Section 5.4.2.2**.

Economic Benefits to the City of Hamilton and Local Community

Potential effects related to Alternative Landfill Footprint No. 2 include a shortfall in meeting the maximum economic opportunity for Terrapure. Economic benefits to the City and local community are low, as the City and community compensation would be reduced based on the current dollar per tonne agreements. Employment opportunities at the Site would be reduced (year over year) under Alternative Footprint No. 2, based on the reduced amount of employees required for the amount of residual material by which this Alternative could be expanded. 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. Further, reduced expansion capacity would not allow for maximum economic activity as demonstrated through the economic analysis[11].

[9] 2010-2015 Truck Count Data and 1997-2015 Tonnage Reports

[10] Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009

[11] Economic Impacts of the Stoney Creek Regional Facility, RIAS Inc., 2017

5.4.2.1.5 Cultural Environment

5.4.2.1.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 2 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. Due to the previous disturbance on-Site (excavation for quarry operation), Alternative Landfill Footprint No. 2 does not affect a known or potential archaeological resource; therefore, no impacts are anticipated during all project timeframes. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced, or disturbed. No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA.

5.4.2.1.6 Technical Environment

5.4.2.1.6.1 Design and Operations

Alternative Landfill Footprint No. 2 maintains the same peak height for the residual material area as the current approved design of the SCRF. The residual material area will be expanded horizontally to include other areas of the Site, maintaining a minimum 30 m buffer to the property line. This Alternative Landfill Footprint also maintains the same footprint and peak height for the industrial fill material area.

Potential to Provide Service for Disposal

Alternative Landfill Footprint No. 2 only provides 7,630,000 m^3 of total disposal capacity for residual material. Alternative Landfill Footprint No. 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

Alternative Landfill Footprint No. 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. This infrastructure would be maintained during closure/post-closure.

Stormwater Management

Alternative Landfill Footprint No. 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. This infrastructure would be modified during construction/operation and will be maintained during closure/post-closure (as necessary).

Construction

Alternative Landfill Footprint No. 2 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Alternative Landfill Footprint No. 2 requires expanding the base liner and leachate collection system horizontally to include other areas of the Site. This Alternative Landfill Footprint has a complex layout with an integrated configuration of the various components.

Site Operations

Alternative Landfill Footprint No. 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 during construction/ operation and closure/post-closure. The proposed layout of the SWM pond limits operational flexibility. Access and egress from the Site will be modified from their current configuration. Development of the Site will require the staged relocation

or removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).

Closure and Post-Closure

Alternative Landfill Footprint No. 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. During this stage, removal of existing Site infrastructure would occur (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access), but maintain and keep in place the infrastructure required to manage leachate (leachate collection system) and monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).

Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first). The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

Cost of Facility

Alternative Landfill Footprint No. 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.

5.4.2.2 Impact Management Measures

As previously mentioned, impact management measures were developed, where possible and as required, and applied to prevent/minimize/offset potential negative environmental effects associated with Alternative Landfill Footprint No. 2.

5.4.2.2.1 Natural Environment

5.4.2.2.1.1 Geology/Hydrogeology

The evaluation of potential environmental effects described in section above was 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 impact management measures for Alternative No. 2. The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of Alternative No. 2. The existing liner system will be expanded to accommodate new waste placement areas.

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 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.

No impact management measures are required for effects on groundwater flow.

5.4.2.2.1.2 Surface Water

A new SWM pond will be constructed within the northwest buffer area to treat TSS from the stormwater runoff. The pond will provide adequate permanent pool volume and active storage volume.

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.

Perimeter ditches will keep the increased runoff on-Site and direct flows to the new SWM pond. The new SWM 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.

5.4.2.2.1.3 Terrestrial and Aquatic

Potential effects to terrestrial ecosystems 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.

In order to mitigate these potential effects to terrestrial ecosystems, the following impact management measures will be employed throughout construction/operation and closure/ post-closure:

- 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; and,
- compensation for the loss of vegetation communities which 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.

Implementing Best Management Practices (BMP) 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 species at risk (SAR), the Site Supervisor will contact MNRF SAR biologists for advice; and,
- include naturalized landscape features into the SWM facilities design (e.g., emergent robust vegetation, shallow slope).

In order to mitigate potential effects to aquatic ecosystems, the following impact management measures are recommended:

- 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.

5.4.2.2.1.4 Atmospheric

Air, Odour and Noise

In order for the Facility to meet MECP air quality criteria for Alternative Landfill Footprint No. 2, the following impact management measures will be required, and include implementing BMPs, such as:

- 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-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; and,
- other options as identified during the design of the Preferred Landfill Footprint.

Review number of vehicles accepted daily as part of further impact assessment. Models were completed using highly conservative amount of 250 trucks/day. Average trucks currently to the Site is approximately 90 trucks/day.

Maintain the operational measures currently in place to reduce/mitigate odour impacts from the Site during the vertical expansion, including current mitigation activities, complaint handling and monitoring program. Alternative Landfill Footprint No. 2 may require the construction of a 7 m tall barrier and/or berm to north above existing grade (199 mASL to 207 mASL), increasing the north property line barrier/berm height by an additional 2 m above the proposed future screening berm.

5.4.2.2.2 Built Environment

5.4.2.2.2.1 Land Use

No change to the current land use designation (Open Space/Commercial) and no change to Land Use Zoning (ME-1). As such, no impact management measures are required with respect to land use.

Regarding views of the Facility, installation of visual screening elements such as vegetation, fencing, or berms would minimize views of the Facility from the surrounding community during construction/operation.

5.4.2.2.3 Social Environment

5.4.2.2.3.1 Human Health

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further impact management measures be considered at the design stage to reduce ambient PM_{10} particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control impact management measures with ongoing monitoring to confirm compliance with ambient guidelines, to prevent soil quality impacts over the lifetime of the landfill.

5.4.2.2.3.2 Traffic

As no effects to traffic are anticipated for Alternative Landfill Footprint No. 2, and as such no impact management measures are required.

5.4.2.2.4 Economic Environment

5.4.2.2.4.1 Economic

Regarding effects on approved or planned land uses, basic landfill operation impact management measures including storm water management, leachate treatment, and dust and noise control will assist in mitigating effects to surrounding properties. Impact management measures are not applicable to the relative economic benefits of each Alternative Landfill Footprint.

5.4.2.2.5 Cultural Environment

5.4.2.2.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 2 does not affect a known or potential archaeological resource, therefore, no impact management measures are required. Due to the proximity of the heritage landscape, no interaction will occur, therefore no impact management measures are required. Alternative Landfill Footprint No. 2 does not affect Indigenous resources, therefore, no impact management measures are required.

5.4.2.2.6 Technical Environment

5.4.2.2.6.1 Design and Operations

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 Alternative Landfill Footprint No. 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.

5.4.2.3 Net Effects

As previously mentioned, the resultant net effects associated with Alternative Landfill Footprint No. 2 were established based on the application of the developed impact management measures to the potential effects first identified.

5.4.2.3.1 Natural Environment

5.4.2.3.1.1 Geology/Hydrogeology

No off-Site groundwater receptors will be affected during construction/operation or closure/ post-closure. No net effects to groundwater within source water protection areas during construction/ operation or closure/post-closure are anticipated. No off-Site groundwater receptors will be affected during construction/operation or closure/post-closure.

5.4.2.3.1.2 Surface Water

Net effects to surface water include potential discharge to either surface water or to sanitary sewer with no increase in TSS or related parameter concentrations during construction/operation or closure/post-closure.

No increase in peak flows to the roadside ditches to the northwest of the Site, nor to the sewer under First Road West and Davis Creek are anticipated during construction/operation or closure/ post-closure.

Notwithstanding, there may be the potential for limitations to the design and construction of perimeter ditches and the SWM pond within the allocated areas.

5.4.2.3.1.3 Terrestrial and Aquatic

With the implementation of impact management measures, net effects on terrestrial and aquatic ecosystems are anticipated to be low, as any loss in habitats during construction/operation are considered temporary and habitats will be re-established on-Site during closure/post-closure.

5.4.2.3.1.4 Atmospheric

Application of dust BMPs and remodelling, based on lower daily trucks per day, will mitigate effects to air quality during construction/operation to acceptable and approvable levels from an air quality

for off-Site receptors, resulting in low net effects. No net effects are expected during closure/ post-closure.

This scenario is not anticipated to be different from the current license from an odour perspective during construction/operation. No net effects are expected during closure/post-closure.

Following the implementation of impact management measures such as barriers and berms, noise levels at receptors will be below the MECP's minimum sound level limits during construction/ operation, resulting in low net effects. No net effects are expected during closure/post-closure.

5.4.2.3.2 Built Environment

5.4.2.3.2.1 Land Use

No change in current land uses during construction/operation or closure/post-closure will occur under Alternative Landfill Footprint No. 2, and as such, no net effects are anticipated. Regarding views of the Facility, installation of visual screening elements would minimize views of the Facility from the surrounding community during construction/operation resulting in a low net effect.

5.4.2.3.3 Social Environment

5.4.2.3.3.1 Human Health

A marginal increase in larger particulate size fractions (i.e., PM_{10}), compared to the existing approved landfill design, with the potential for transient short-term health concerns is anticipated under Alternative Landfill Footprint No. 2. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

5.4.2.3.3.2 Traffic

Despite an increase in background development traffic, the number of potential collisions is not expected to increase, as the number of trucks to and from the Site during construction/operation will not increase and do not result in any net effects under Alternative Landfill Footprint No. 2. Therefore, no effects are expected during closure/post-closure.

5.4.2.3.4 Economic Environment

5.4.2.3.4.1 Economic

No effects to approved/planned land uses during construction/operation or closure/post-closure is expected, and as such no changes to approved or planned land uses are expected.

Employment would be reduced (year over year) during construction/ operation, with subsequent employment reduction as the Facility moves into closure/post-closure. Low economic benefits to City and local community during construction/operation, with a new use established during closure/ post-closure.

5.4.2.3.5 Cultural Environment

5.4.2.3.5.1 Archaeology/Built Heritage/Indigenous Resources

Due to the previous disturbance on-Site (excavation for quarry operation), no effects to archaeological sites or resources are expected during construction/operation or closure/ post-closure. No impacts on cultural heritage resources are anticipated during construction/ operation or closure/post-closure. Since no known cultural resources that are of value to Indigenous communities were identified, no effects to Indigenous resources are anticipated.

5.4.2.3.6 Technical Environment

5.4.2.3.6.1 Design and Operations

Alternative Landfill Footprint No. 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. Alternative Landfill Footprint No. 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.

5.4.2.4 Summary of Net Effects

Table 5.12 summarizes the net effects established for Alternative Landfill Footprint No. 2 – Horizontal Expansion of the SCRF.

Table 5.12 Alternative Landfill Footprint No. 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 during construction/ operation or closure/ post-closure. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of impact management 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 SWM pond within the allocated areas
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated as the effects to terrestrial environment will be temporary during construction/ operation and re-established during closure/ post-closure. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of BMPs.
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 minimize views of the Facility from the surrounding community.
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 during construction/operation, no effects are anticipated closure/post-closure. 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 impact management measures during construction/operation and closure. No net effects expected during closure/ post-closure.
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.
Traffic	No Net Effects to road user safety or intersection Level of Service are anticipated in the Local Study Area during construction operation or closure/post-closure.
Archaeology and Built Heritage	No Net Effects to known or potential archaeological resources, built and cultural heritage resources, or indigenous resources are anticipated.
Design and Operations	Alternative Landfill Footprint No. 2 fails to meet the objectives for disposal and 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.

5.4.3 Alternative Landfill Footprint No. 3 – Vertical Expansion of the SCRF

5.4.3.1 Potential Effects

As mentioned, the potential effects, proposed impact management measures, and the resultant net effects associated with Alternative Landfill Footprint No. 3 are described in the following sections. **Appendix C** of the Alternative Methods Report (**Appendix I**) provides the net effects table for Alternative Landfill Footprint No. 3 (**Table C-3**) and **Appendix E** of the Alternative Methods Report provides the discipline specific memos.

5.4.3.1.1 Natural Environment

5.4.3.1.1.1 Geology/Hydrogeology

Groundwater Quality

This section discusses the evaluation results in terms of the predicted effects for Alternative Landfill Footprint No. 3 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

Leachate generation rates are provided by the HELP model as leakage through the final cover system into the waste mound. The HELP model was used to predict the leachate generation rates for each alternative. Based on the HELP modelling conducted, **Table 5.13** summarizes the predicted leachate generation rates under closure conditions for Alternative Landfill Footprint No. 3, as well as the existing approved configuration. Closure conditions were utilized, as this represents the most conservative assessment for leachate generation during the life of the Facility.

Table 5.13 Predicted Leachate Generation Rates (Total)

Landfilling Section	Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Approved	41.5	121,143
Alternative No. 3	41.5	121,182

In terms of leachate generation rates during construction/operation, it was estimated to be approximately 5.6 L/s during active operation, and 3.8 L/s post-closure.

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 E** of the Alternative Methods Report (**Appendix I**).

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

- 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 under the impact management measures.

- The predicted downgradient groundwater quality for Alternative Landfill Footprint No. 3 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 Area

Any potential impacts to groundwater and/or surface water quality within the SWPA will be dependent on groundwater quality from the Alternative Landfill Footprints migrating into the IPZ for the City of Hamilton water intake. Alternative Landfill Footprint No. 3 shows minimal effects on predicted groundwater quality prior to implementation of impact management 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 (impact management 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 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 E** of the Alternative Methods Report (**Appendix I**)). The HELP model outputs show that leakage from the landfill liner will contribute approximately 0.064 mm each year. This leakage will predominantly enter the VFZ (which directly underlies the base of the landfill footprint in each of the Alternative Landfill Footprints), 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 = (201 mAMSL – 192.6 mAMSL) / 900 m = 0.093 m/m).

Under Alternative Landfill Footprint No. 3, 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 (Closure/Post-Closure)

As discussed above, a detailed description of the predicted contaminating lifespan for each alternative is provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

Three scenarios were modelled 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 5.14** below summarizes the contaminating lifespans calculated for

chloride, as estimated using the Rowe (1991) model, for each of the three scenarios for the approved existing conditions and Alternative Landfill Footprint No. 3.

Table 5.14 Contaminating Lifespan Using the Rowe Model

Alternative Landfill Footprint	Contaminating Lifespan (years)		
	Scenario 1	Scenario 2	Scenario 3
Approved	32	53	65
Alternative No. 3	48	80	99

A comparison of the contaminating lifespan values indicates that Alternative Landfill Footprint No. 3 performs similarly to the existing approved design.

Summary

Based on the analysis completed, potential effects to groundwater quality include minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits of wellhead protection area may occur during construction/operation and closure/ post-closure. Minimal potential impacts to water quality within the SWPA during construction/ operation and closure/post-closure.

With respect to groundwater flow, no potential effects are anticipated, as there will be no change in groundwater flow due to the implementation of this alternative, therefore, it will have minimal effect on groundwater recharge patterns during construction/operation and closure/post-closure.

5.4.3.1.1.2 Surface Water

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 Methods being considered[12]. 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 modelling 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 SWM ponds).

Table 5.15 Peak Flow Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 3 (Vertical Expansion)	0.971	0.21%	6.927	4.70%

Table 5.16 Total Runoff Volume Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 3 (Vertical Expansion)	14,108	0.41%	58,069	0.14%

The modelling above represents closure/post-closure effects, as this represents the greatest potential effect to surface water criteria based on the impervious cap that will be put in place at

[12] PCSWMM Version 7.1, Computational Hydraulics International, 2018, 2), United States Environmental Protection Agency (US EPA), EPA SWMM 5 (Version 5.0.012), 2018.

closure, which increases the runoff volumes. The final cover for the residual material will produce more runoff than during operation, as the residual material final cover requires a layer of clay that is 600 mm thick.

5.4.3.1.1.3 Terrestrial and Aquatic

Potential effects resulting from Alternative Landfill Footprint No. 3 are predicted as temporary (assumed not all vegetated areas will be disturbed simultaneously) loss of existing vegetation communities (e.g., marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of re-grading activities during construction and operation. Temporary loss (it is assumed habitat will be restored following landfill closure) 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 is anticipated during construction and operation. No off-Site impacts are anticipated from Alternative Landfill Footprint No. 3 during construction/operation closure/post-closure.

Potential effects to aquatic ecosystems include the potential loss of on-Site aquatic habitat, and disturbance of aquatic biota associated with open water habitats in stormwater infrastructure, due to construction and operation activities. No potential off-Site impacts are anticipated during construction/operation or closure/post-closure.

5.4.3.1.1.4 Atmospheric

Air, Odour and Noise

With respect to Alternative Landfill Footprint No. 3 and air quality, there is a potential for off-Site concentrations of particulate species (TSP, PM_{10} and $PM_{2.5}$) to exceed current air quality criteria during construction/operation. This primarily has the potential to affect receptors north of Green Mountain Road. No effects to air quality are anticipated during closure/post-closure.

From an odour perspective, this Alternative Landfill Footprint is not anticipated to be different from the current operations, as the Site is not permitted to receive putrescible waste (i.e., organic material that can break down and cause odours). No effects are anticipate closure/post-closure.

With respect to Alternative Landfill Footprint No. 3 and noise, there is a potential for change to the predicted off-Site noise impact due to the +12 m proposed elevation change and the decrease in the separation distance between the landfill activities and the adjacent residential properties. The net sound level change for up to 200 off-Site receptors is 2 dBA or lower, however there are approximately 75 residences (to the north) that have the potential for a +2 dBA change. 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 that would occur under Alternative Landfill Footprint No. 3. These impacts are associated with construction/operation.

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 7:00 a.m. to 7:00 p.m. under the MECP “Noise Guidelines for Landfill Sites” (N-1).

5.4.3.1.2 Built Environment

5.4.3.1.2.1 Land Use

From a land use perspective, there are no potential effects to current land use designation (Open Space/Commercial) and no change to existing land use Zoning (ME-1) during construction/ operation or closure/post-closure.

From a visual perspective, there is a significant height change (12 m) associated with Alternative No. 3, but buffers do not change. Visibility of the Facility increased for all properties and sensitive receptors in all directions during construction/operation and closure/post-closure.

5.4.3.1.3 Social Environment

5.4.3.1.3.1 Human Health

The Minister-approved Amended ToR made a commitment to analyze the potential effects to human health during assessment and evaluation of the Alternative Landfill Footprints utilizing the existing data and methodology established as part of the ongoing SCRF CHAR[13], which is completed on an annual basis (full report can be viewed in **Appendix F** of the Alternative Methods Report (**Appendix I**)). 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 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 Alternative Landfill Footprint. 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 five indicators (air quality, leachate quality, groundwater quality, surface water quality, soil quality) 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 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.

Information from the Air Quality, Surface Water, and Hydrogeology analyses were used to provide data for the net effect analysis related to Human Health impacts for Alternative Landfill Footprint No. 3.

Air Quality

Results of the air quality assessment indicate that VOC emissions from this method would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of the PM_{10} and $PM_{2.5}$ 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 during construction/operation and closure/ post closure. No effects are anticipated closure/post-closure.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Landfill Footprint would not be expected to result in any health risks different than the existing approved landfill design during construction/operation or closure/post-closure.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative 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 during construction/operation and closure/post-closure.

Surface Water Quality

Results of the surface water study indicate that SWM ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards during construction/operation and closure/post-closure.

[13] Intrinsik. 2018. Community Health Assessment Review: Terrapure Stoney Creek Regional Facility based on 2016 Monitoring Report. Final Report. Intrinsik Corp. Project # 400401. June 2018

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 Landfill Footprint 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 during construction/operation and closure/post-closure.

5.4.3.1.3.2 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 Landfill Footprint 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 Footprints 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.

With respect to the “Potential for traffic collisions” indicator, the expected effect of each Alternative Landfill Footprint on future frequency and severity of traffic collisions within the Local Study Area was assessed. With respect to the “Level of Service at intersections around the SCRF” indicator, the expected effect of each Alternative Landfill Footprint 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.

Using previous traffic counts for the intersections around the SCRF and truck count data and tonnage reports from the SCRF[14], traffic modelling[15] was completed and concluded that Alternative Landfill Footprint No. 3 is not expected to impact average daily SCRF truck volumes. With no expected change in SCRF truck volumes within the Local Study Area for Alternative Landfill Footprint No. 3; this alternative’s potential for traffic collisions is negligible within the Local Study Area. It should be noted that traffic levels during the closure/post-closure timeframe are significantly lower than during the construction/operation stage.

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; therefore, potential for collisions will not increase. For example, if 10 Site trucks occur in one hour, with Alternative Landfill Footprint No. 3, the maximum number of collisions with a Site truck is still 10.

Alternative Landfill Footprint No. 3 is not expected to impact average daily SCRF truck volumes. Therefore, with no expected change in SCRF truck volumes within the Local Study Area, Alternative Landfill Footprint No. 3 is considered to have an equally negligible impact on the Level of Service at intersections in the Local Study Area during construction/operation and closure/post closure.

[14] 2010-2015 Truck Count Data and 1997-2015 Tonnage Reports

[15] Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009

5.4.3.1.4 Economic Environment

5.4.3.1.4.1 Economic

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, all six of the Alternative Landfill Footprints result in no potential effects. Landfill operation BMPs and impact management measures, such as SWM pond, landfill liner system, dust, and noise control measures will ensure potential effects to land uses are managed and mitigated. None of the presented Alternative Landfill Footprints result in a change to proposed land uses within the Site or Local Study Area. Therefore, there are no potential effects and no impact management steps required for the approved/land use indicator. Impact management Measures are not required for approved/ planned and/or proposed land uses within the Local Study Area, since each Alternative Landfill Footprint and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Impact management measures would be established to manage any potential nuisance influenced by Site construction/ operations of each Alternative Landfill Footprints relative to noise, air quality (including odour), and traffic, as described in **Section 5.4.3.2**.

Economic Benefits to the City of Hamilton and Local Community

Alternative Landfill Footprint No. 3 allows for an increase in capacity at the SCRF and meets the economic opportunity for Terrapure to allow for a 3,680,000 m^3 increase in capacity. Alternative No. 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 dollar per tonne agreements. Employment opportunities at the Site would be increased (year over year) under Alternative Landfill Footprint No. 3 based on the increased amount of employees required for the amount of residual material that this Alternative 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.

5.4.3.1.5 Cultural Environment

5.4.3.1.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 3 does not require a change to the current footprint. The Site has been previously excavated and quarried. Due to the previous disturbance on-Site (excavation for quarry operation), Alternative Landfill Footprint No. 3 does not affect a known or potential archaeological resource; therefore, no impacts are anticipated during all project timeframes. Only one cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA.

5.4.3.1.6 Technical Environment

5.4.3.1.6.1 Design and Operations

Alternative Landfill Footprint No. 3 maintains the same footprint for the residual material area as the current approved design of the SCRF. The residual material area will be expanded vertically, increasing the peak elevation. Alternative Landfill Footprint No. 3 also maintains the same footprint and peak height for the industrial fill material area.

Potential to Provide Service for Disposal

Alternative Landfill Footprint No. 3 provides 10,180,000 m^3 of total disposal capacity for residual material. Alternative Landfill Footprint No. 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

Alternative Landfill Footprint No. 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. This infrastructure would be maintained during closure/post-closure.

Stormwater Management

Alternative Landfill Footprint No. 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. This infrastructure would be maintained during closure/post-closure (as necessary).

Construction

Alternative Landfill Footprint No. 3 will not require the construction of additional base liner and leachate collection system for an expanded residual material area. Alternative Landfill Footprint No. 3 does not require expanding the base liner and leachate collection system horizontally to include other areas of the Site. Alternative Landfill Footprint No. 3 has a complex layout with an integrated configuration of the various components.

Site Operations

Alternative Landfill Footprint No. 3 includes the importing of industrial fill, meaning that this material will continue to be managed. Leachate will be managed from a single area with one leachate pumping station during construction/operation and closure/ post-closure. The proposed layout of the SWM pond provides operational flexibility. Access and egress from the Site will be maintained in their current configuration. Development of the Site will require the staged relocation or removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).

Closure and Post-Closure

Alternative Landfill Footprint No. 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. During this stage, removal of existing Site infrastructure would occur (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access), but maintain and keep in place the infrastructure required to manage leachate (leachate collection system) and monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).

Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity, or two years of remaining capacity (whichever comes first). The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

Cost of Facility

Alternative Landfill Footprint No. 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.

5.4.3.2 Impact Management Measures

As previously mentioned, impact management measures were developed, where possible and as required, and applied to prevent/minimize/offset potential negative environmental effects associated with Alternative Landfill Footprint No. 3.

5.4.3.2.1 Natural Environment

5.4.3.2.1.1 Geology/Hydrogeology

The evaluation of potential environmental effects described in the section above was 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 impact management measures for Alternative No. 3. The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of Alternative No. 3. No expansion of the liner system is required under this alternative.

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 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.

No impact management measures are required for effects on groundwater flow.

5.4.3.2.1.2 Surface Water

The existing SWM pond will be altered as required (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.

Perimeter ditches will keep the increased runoff on-Site and direct flows to the modified SWM pond. The SWM 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.

5.4.3.2.1.3 Terrestrial and Aquatic

Potential effects to terrestrial ecosystems 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.

In order to mitigate these potential effects to terrestrial ecosystems, the following impact management measures will be employed throughout construction/operation and closure/ post-closure:

- 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; and,
- compensation for the loss of vegetation communities which 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.

Implementing Best Management Practices (BMP) 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 species at risk (SAR), the Site Supervisor will contact MNRF SAR biologists for advice; and,
- include naturalized landscape features into the SWM facilities design (e.g., emergent robust vegetation, shallow slope).

In order to mitigate potential effects to aquatic ecosystems, the following impact management measures are recommended:

- 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.

5.4.3.2.1.4 Atmospheric

In order for the Facility to meet MECP air quality criteria for Alternative Landfill Footprint No. 3, the following impact management measures will be required and include implementing BMPs such as:

- 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-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 Landfill Footprint.

Review number of vehicles accepted daily as part of further impact assessment. Models were completed using a highly conservative number of 250 trucks per day. The average number of trucks currently to the Site is approximately 90 trucks per day.

Regarding odour, it is recommended to maintain the operational measures currently in place to reduce/mitigate odour impacts from the Site during the vertical expansion, including current mitigation activities, complaint handling, and related monitoring program.

Alternative Landfill Footprint No. 3 may require the construction of a 7 m tall barrier and/or berm (north of the Site) above existing grade (200 mASL to 207 mASL) to manage noise impacts.

5.4.3.2.2 Built Environment

5.4.3.2.2.1 Land Use

Regarding current land use designation (Open Space/Commercial) and no change to Land Use Zoning (ME-1), no changes will occur and thus no impact management measures are required.

Regarding views of the Facility, installation of visual screening elements such as vegetation, fencing, or berms would reduce views of the Facility from the surrounding community during construction/operation, but would not fully minimize views.

5.4.3.2.3 Social Environment

5.4.3.2.3.1 Human Health

It is recommended that standard impact management measures be employed to minimize dust generation, as well as standard planned leachate treatment and management being required to prevent direct exposure to leachate. Finally, to continue existing particulate/dust control impact management measures with ongoing monitoring to confirm compliance with ambient guidelines is recommended to prevent soil quality impacts over the lifetime of the landfill.

5.4.3.2.3.2 Traffic

As no effects to traffic are anticipated for Alternative Landfill Footprint No. 3, and as such no impact management measures are required.

5.4.3.2.4 Economic Environment

5.4.3.2.4.1 Economic

Basic landfill operation impact management measures, including stormwater management, leachate treatment, dust, and noise control will assist in mitigating effects to surrounding properties. Impact management measures are not applicable to the relative economic benefits of each Alternative Landfill Footprint.

5.4.3.2.5 Cultural Environment

5.4.3.2.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 3 does not affect a known or potential archaeological resource, therefore no impact management measures are required. Due to proximity of the heritage landscape, no interaction will occur, therefore no impact management measures are required. Alternative Landfill Footprint No. 3 does not affect Indigenous resources, therefore, no impact management measures are required.

5.4.3.2.6 Technical Environment

5.4.3.2.6.1 Design and Operations

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 Landfill Footprint No. 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.

5.4.3.3 Net Effects

5.4.3.3.1 Natural Environment

As previously mentioned, the resultant net effects associated with Alternative Landfill Footprint No. 3 were established based on the application of the developed impact management measures to the potential effects first identified.

5.4.3.3.1.1 Geology/Hydrogeology

No off-Site groundwater receptors will be affected during construction/operation or closure/ post-closure. No effects to groundwater within source water protection area during construction/ operation or closure/post-closure are anticipated. No off-Site groundwater receptors will be affected during construction/operation or closure/post-closure.

5.4.3.3.1.2 Surface Water

Net effects to surface water include potential discharge to either surface water or to sanitary sewer with no increase in TSS and related parameter concentrations during construction/operation or closure/post-closure.

No increase in peak flows to the roadside ditches to the northwest of the Site, sewer under First Road West and Davis Creek during construction/operation or closure/post-closure are anticipated.

5.4.3.3.1.3 Terrestrial and Aquatic

With the implementation of impact management measures, net effects on terrestrial and aquatic ecosystems are anticipated to be low, as any loss in habitats during construction/operation are considered temporary and habitats will be re-established on-Site during closure/post-closure.

5.4.3.3.1.4 Atmospheric

Application of dust BMPs and remodelling, based on lower daily trucks per day, will mitigate effects to air quality during construction/operation to acceptable and approvable levels from an air quality for off-Site receptors, resulting in low net effects. No net effects are expected during closure/ post-closure.

This scenario is not anticipated to be different from the current license from an odour perspective during construction/operation. No net effects are expected during closure/post-closure.

Following the implementation of impact management measures such as barriers and berms, noise levels at receptors will be below the MECP's minimum sound level limits during construction/ operation, resulting in low net effects. No net effects are expected during closure/post-closure.

5.4.3.3.2 Built Environment

5.4.3.3.2.1 Land Use

Regarding current land use, no change in current land uses during construction/operation would occur. No effects are anticipated during closure/post-closure.

Regarding views of the Facility, installation of visual screening elements would reduce views of the Facility from the surrounding community during construction/operation, but would not fully minimize views, resulting in a high net effect.

5.4.3.3.3 Social Environment

5.4.3.3.3.1 Human Health

There would be a marginal increase in larger particulate size fractions (i.e., PM_{10}), 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.

5.4.3.3.3.2 Traffic

Despite an increase in background development traffic, the number of potential collisions is not expected to increase, as the number of trucks to and from the Site during construction/operation will not increase and do not result in any net effects under Alternative Landfill Footprint No. 3. No effects are expected during closure/post-closure.

5.4.3.3.4 Economic Environment

5.4.3.3.4.1 Economic

No effects to approved/planned land uses during construction/operation or closure/post-closure is expected, and as such no changes to approved or planned land uses are expected.

Employment would increase (year over year) during construction/ operation, with subsequent employment reduction as the Facility moves into closure/ post-closure. Increased economic benefits are anticipated for City and local community during construction/operation, with a new use established during closure/post-closure.

5.4.3.3.5 Cultural Environment

5.4.3.3.5.1 Archaeology/Built Heritage/Indigenous Resources

Due to the previous disturbance on-Site (excavation for quarry operation), no effects to archaeological sites or resources are expected during construction/operation or closure/ post-closure. No impacts on cultural heritage resources are anticipated during construction/ operation or closure/post-closure. Since no known cultural resources that are of value to Indigenous communities were identified, no effects to Indigenous resources are anticipated.

5.4.3.3.6 Technical Environment

5.4.3.3.6.1 Design and Operations

Alternative Landfill Footprint No. 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. Alternative Landfill Footprint No. 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.

5.4.3.4 Summary of Net Effects

Table 5.17 summarizes the net effects established for Alternative Landfill Footprint No. 3 – Vertical Expansion of the SCRF.

Table 5.17 Alternative Landfill Footprint No. 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 during construction/operation or closure/ post-closure. Off-Site groundwater receptors and source water protection areas are not anticipated to be affected upon implementation of impact management 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 as the effects to terrestrial environment would be temporary during construction/ operation and re-established during closure/ post-closure. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of BMPs.
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, since visual screening would not fully minimize views of the Facility.
Economic	No Net Effects to approved or planned land uses within the Local Study Area during construction/operation closure/post-closure 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

Table 5.17 Alternative Landfill Footprint No. 3 – Summary of Net Effects

Environmental Component	Summary of Net Effects
	approvable levels from an air quality for off-Site receptors during construction/operation, no effects are anticipated closure/post-closure. 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 impact management measures during construction/operation and closure. No net effects are not anticipated closure/ post-closure.
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 when compared to the existing approved landfill design.
Traffic	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, built and cultural heritage resources, or indigenous resources are anticipated.
Design and Operations	Alternative Landfill Footprint No. 3 meets the objectives for disposal and 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.

5.4.4 Alternative Landfill Footprint No. 4 – Reconfiguration and Horizontal Expansion of the SCRF

5.4.4.1 Potential Effects

As mentioned, the potential effects, proposed impact management measures, and the resultant net effects associated with Alternative Landfill Footprint No. 4 are described in the following sections. **Appendix C** of the Alternative Methods Report (**Appendix I**) provides the net effects table for Alternative Landfill Footprint No. 4 (**Table C-4**), and **Appendix E** of the Alternative Methods Report provides the discipline specific memos.

5.4.4.1.1 Natural Environment

5.4.4.1.1.1 Geology/Hydrogeology

Groundwater Quality

This section discusses the evaluation results in terms of the predicted effects of Alternative Landfill Footprint No. 4 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

The HELP model was used to predict the leachate generation rates for each Alternative 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 modelling conducted, **Table 5.18** summarizes the predicted leachate generation rates under closure conditions for Alternative Landfill Footprint No. 4 as well as the existing approved configuration.

Table 5.18 Predicted Leachate Generation Rates (Total)

Landfilling Section	Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Approved	41.5	121,143
Alternative No. 4	64.9	189,542

In terms of leachate generation rates during construction/operation, it was estimated to be approximately 8.8 L/s during active operation, and 6.0 L/s post-closure.

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 E** of the Alternative Methods Report (**Appendix I**).

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

- 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 under the impact management measures.
- The predicted downgradient groundwater quality for Alternative Landfill Footprint No. 4 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 Area

Any potential impacts to groundwater and/or surface water quality within the SWPA will be dependent on groundwater quality from the Alternative Landfill Footprints migrating into the IPZ for the City of Hamilton water intake. Alternative Landfill Footprint No. 4 shows minimal effects on predicted groundwater quality prior to implementation of impact management 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 (impact management 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 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 E** of the Alternative Methods Report (**Appendix I**)). The HELP model outputs show that leakage from the landfill liner will contribute approximately 0.064 mm each year. This leakage will predominantly enter the VFZ (which directly underlies the base of the landfill footprint in each of the Alternative Landfill Footprints), 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 = (201 mAMSL – 192.6 mAMSL) / 900 m = 0.093 m/m).

Under Alternative Landfill Footprint No. 4, 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 (Closure/Post-Closure)

As discussed above, a detailed description of the predicted contaminating lifespan for each alternative is provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

Three scenarios were modelled 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 5.19** below summarizes the contaminating lifespans calculated for chloride, as estimated using the Rowe (1991) model, for each of the three scenarios for the approved existing conditions and Alternative Landfill Footprint No. 4.

Table 5.19 Contaminating Lifespan Using the Rowe Model

Alternative Landfill Footprint	Contaminating Lifespan (years)		
	Scenario 1	Scenario 2	Scenario 3
Approved	32	53	65
Alternative No. 4	29	48	59

A comparison of the contaminating lifespan values indicates that Alternative Landfill Footprint No. 4 performs similarly to the existing approved design.

Summary

Based on the analysis completed, potential effects to groundwater quality include minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits of wellhead protection area may occur during construction/operation and closure/ post-closure.

With respect to groundwater flow, no potential effects are anticipated as there will be no change in groundwater flow due to the implementation of this Alternative, therefore it will have minimal effect on groundwater recharge patterns during construction/operation and closure/post-closure.

5.4.4.1.1.2 Surface Water

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 Methods being considered[16]. 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 modelling 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 SWM ponds).

[16] PCSWMM Version 7.1, Computational Hydraulics International, 2018, 2), United States Environmental Protection Agency (US EPA), EPA SWMM 5 (Version 5.0.012), 2018

Table 5.20 Peak Flow Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 4 (Reconfiguration)	0.925	-4.54%	5.641	-14.74%

Table 5.21 Total Runoff Volume Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 4 (Reconfiguration)	15,881	13.02%	61,624	8.00%

The modelling above represents closure/post-closure effects as this represents the greatest potential effect to surface water criteria, based on the impervious cap that will be put in place at closure, which increases the runoff volumes. The final cover for the residual material will produce more runoff than during operation, as the residual material final cover requires a layer of clay that is 600 mm thick.

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 SWM 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.

5.4.4.1.1.3 Terrestrial and Aquatic

Potential effects resulting from Alternative Landfill Footprint No. 4 are predicted as temporary (assumed not all vegetated areas will be disturbed simultaneously) loss of existing vegetation communities (e.g., marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of re-grading activities during construction and operation. Temporary loss (it is assumed habitat will be restored following landfill closure) 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 is anticipated during construction and operation. No off-Site impacts are anticipated from Alternative Landfill Footprint No. 4.

Potential effects aquatic ecosystems include the potential loss of on-Site aquatic habitat and disturbance of aquatic biota associated with open water habitats in stormwater infrastructure due to construction and operation activities. No potential off-Site impacts are anticipated.

5.4.4.1.1.4 Atmospheric

Air, Odour and Noise

Under short-term 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 Alternative Landfill Footprint No. 4 during construction/operation. This primarily has the potential to affect receptors north of Green Mountain Road. No effects are anticipate closure/post-closure.

From an odour perspective, this Alternative Landfill Footprint is not anticipated to be different from the current operations, as the Site is not permitted to receive putrescible waste (i.e., organic material that can break down and cause odours). No effects are anticipated closure/post-closure.

From a potential noise impact exposure perspective, Potential changes to the predicted off-Site noise impacts occur due to the Reconfiguration and Horizontal Expansion associated with Alternative Landfill Footprint No. 4, and the decrease in the separation distance between the landfill activities and the adjacent residential properties. The net sound level change for up to 200 off-Site receptors is 1 dBA or lower, however, there are approximately 75 residences (to the north) that have the potential for a +2 dBA change. 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 Alternative Landfill Footprint No. 4.

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 7:00 a.m. to 7:00 p.m. under the MECP “Noise Guidelines for Landfill Sites” (N-1). Minimal effects from a noise perspective are anticipated during closure/post-closure due to the limited types of works and associated noise sources associated with this stage.

5.4.4.1.2 Built Environment

5.4.4.1.2.1 Land Use

From a land use perspective, there are no potential effects to current land use designation (Open Space/Commercial) and no change to existing land use Zoning (ME-1) during construction/ operation or closure/post-closure.

From a visual perspective, Alternative Landfill Footprint No. 4 maintains the same height as the current approved design of the SCRF (baseline condition), but property buffers are reduced to 30 m and material is reconfigured. Visibility is increased for sensitive receptors and properties adjacent to Site, including residential dwellings to South on Green Mountain Road, as well as homes along Mud Street during construction/operation or closure/post-closure.

5.4.4.1.3 Social Environment

5.4.4.1.3.1 Human Health

The Minister-approved Amended ToR made a commitment to analyze the potential effects to human health during assessment and evaluation of the Alternative Landfill Footprints utilizing the existing data and methodology established as part of the ongoing SCRF CHAR[17], which is completed on an annual basis (full report can be viewed in **Appendix F** of the Alternative Methods

[17] Intrinsik. 2018. Community Health Assessment Review: Terrapure Stoney Creek Regional Facility based on 2016 Monitoring Report. Final Report. Intrinsik Corp. Project # 400401. June 2018

Report (**Appendix I**)). 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 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 Alternative Landfill Footprint. 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 five indicators (air quality, leachate quality, groundwater quality, surface water quality, soil quality) 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 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.

Information from the Air Quality, Surface Water, and Hydrogeology analyses were used to provide data for the net effect analysis related to Human Health impacts for Alternative Landfill Footprint No. 4.

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 $PM_{2.5}$ 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 PM_{10} 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 during construction/operation. No effects are anticipated during closure/post-closure.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, Alternative Landfill Footprint No. 4 would not be expected to result in any health risks different than the existing approved landfill design during construction/operation or closure/post-closure.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative 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. No effects are anticipated during construction/operation or closure/post-closure.

Surface Water Quality

Results of the surface water study indicate that SWM ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards during construction/operation and closure/post-closure.

Soil Quality

Results of the Air Quality Assessment indicate that if airborne particulate emissions are sufficiently managed 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 Alternative Landfill Footprint No. 4 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 during construction/operation and closure/post-closure.

5.4.4.1.3.2 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 Landfill Footprint 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 Footprints 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.

With respect to the “Potential for traffic collisions” indicator, the expected effect of each Alternative Landfill Footprint on future frequency and severity of traffic collisions within the Local Study Area was assessed. With respect to the “Level of Service at intersections around the SCRF” indicator, the expected effect of each Alternative Landfill Footprint 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.

Using previous traffic counts for the intersections around the SCRF and truck count data and tonnage reports from the SCRF[18], traffic modelling[19] was completed and concluded that Alternative Landfill Footprint No. 4 is not expected to impact average daily SCRF truck volumes. With no expected change in SCRF truck volumes within the Local Study Area for Alternative Landfill Footprint No. 4; this alternative’s potential for traffic collisions is negligible within the Local Study Area. It should be noted that traffic levels during the closure/post-closure timeframe are significantly lower than during the construction/operation stage.

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; therefore, potential for collisions will not increase. For example, if 10 Site trucks occur in one hour, with Alternative Landfill Footprint No. 4, the maximum number of collisions with a Site truck is still 10.

Alternative Landfill Footprint No. 4 is not expected to impact average daily SCRF truck volumes. Therefore, with no expected change in SCRF truck volumes within the Local Study Area, Alternative Landfill Footprint No. 4 is considered to have an equally negligible impact on the Level of Service at intersections in the Local Study Area during construction/operation and closure/post closure.

5.4.4.1.4 Economic Environment

5.4.4.1.4.1 Economic

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, all six of the Alternative Landfill Footprints result in no potential effects. Landfill operation BMPs and impact management measures, such as SWM pond, landfill liner system, dust, and noise control measures will ensure potential effects to land uses are managed and mitigated. None of the presented Alternative Landfill Footprints result in a change to proposed land uses within the Site or Local

[18] 2010-2015 Truck Count Data and 1997-2015 Tonnage Reports

[19] Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009

Study Area. Therefore, there are no potential effects and no impact management steps required for the approved/land use indicator. Impact management measures are not required for approved/planned and/or proposed land uses within the Local Study Area, since each Alternative Landfill Footprint and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Impact management measures would be established to manage any potential nuisance influenced by Site construction/ operations of each Alternative Landfill Footprints relative to noise, air quality (including odour), and traffic, as described in **Section 5.4.4.2**.

Economic Benefits to the City of Hamilton and Local Community

Alternative Landfill Footprint No. 4 allows for an increase in capacity at the SCRF, but does meet the economic opportunity for Terrapure (slightly under the increase of 3,680,000 m^3). Alternative Landfill Footprint No. 4 would result in total economic activity similar to Alternative Landfill Footprint Nos. 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 (dollar per tonne) would be slightly lower than other Alternative Landfill Footprints, based on the total increase in capacity.

Employment opportunities at the Site would be increased (year over year) under Alternative Landfill Footprint No. 4, based on the increased amount of employees required for the amount of residual material by which this Alternative Landfill Footprint could expand. 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.

5.4.4.1.5 Cultural Environment

5.4.4.1.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 4 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. Due to the previous disturbance on-Site (excavation for quarry operation), Alternative Landfill Footprint No. 4 does not affect a known or potential archaeological resource, and therefore no impacts are anticipated during all project timeframes. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA.

5.4.4.1.6 Technical Environment

5.4.4.1.6.1 Design and Operations

Potential to Provide Service for Disposal

Alternative Landfill Footprint No. 4 only provides 9,780,000 m^3 of total disposal capacity for residual material. Alternative Landfill Footprint No. 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

Alternative Landfill Footprint No. 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. This infrastructure will be modified during construction/operation and will be maintained during closure/post-closure.

Stormwater Management

Alternative Landfill Footprint No. 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. This infrastructure will be modified during construction/operation and will be maintained during closure/post-closure (as necessary).

Construction

Alternative Landfill Footprint No. 4 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Alternative Landfill Footprint No. 4 requires expanding the base liner and leachate collection system horizontally to include other areas of the Site. This method has an open layout with a simple configuration and dedicated areas for the various components.

Site Operations

Alternative Landfill Footprint No. 4 does not include the importing of industrial fill, meaning that this material will no longer need to be managed. Leachate will be managed from a single area with one leachate pumping station during construction/ operation and closure/ post-closure. The proposed layout of the SWM pond limits operational flexibility. Access and egress from the Site will be modified from their current configuration. Development of the Site will require the staged relocation or removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).

Closure and Post-Closure

Alternative Landfill Footprint No. 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. During this stage, removal of existing Site infrastructure would occur (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access), but maintain and keep in place the infrastructure required to manage leachate (leachate collection system) and monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).

Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first). The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments

Cost of Facility

Alternative Landfill Footprint No. 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.

5.4.4.2 Impact Management Measures

As previously mentioned, impact management measures were developed, where possible and as required, and applied to prevent/minimize/offset potential negative environmental effects associated with Alternative Landfill Footprint No. 4.

5.4.4.2.1 Natural Environment

5.4.4.2.1.1 Geology/Hydrogeology

The evaluation of potential environmental effects described above was 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 impact management measures for Alternative Landfill Footprint No. 4. The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of Alternative Landfill Footprint No. 4. The existing liner system will be expanded to accommodate new waste placement areas.

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 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.

No impact management measures are required for effects on groundwater flow.

5.4.4.2.1.2 Surface Water

For Alternative Landfill Footprint No. 4, 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 and address any water quality issues.

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. he 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 challenging and 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, which will create 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.

5.4.4.2.1.3 Terrestrial and Aquatic

In order to mitigate potential effects to terrestrial ecosystems for Alternative Landfill Footprint No. 4, the following impact management measures will be employed throughout construction/operation and closure/post-closure:

- 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; and,
- 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.

Implementing Best Management Practices (BMP) 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 species at risk (SAR), the Site Supervisor will contact MNRF SAR biologists for advice; and,
- include naturalized landscape features into the SWM facilities design (e.g., emergent robust vegetation, shallow slope).

In order to mitigate potential effects to aquatic ecosystems, the following impact management measures are recommended:

- 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.

5.4.4.2.1.4 Atmospheric

In order for the Facility to meet MECP air quality criteria for Alternative Landfill Footprint No. 4, the following impact management measures will be required and include implementing BMPs such as:

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

Operational measures currently in place to mitigate odour will be maintained including complaint handling and monitoring. Potential noise impact management measures for Alternative Landfill Footprint No. 4 include berms at the landfill perimeter to the north. The height of barriers and/or berm may be an additional 9 m above existing base elevations (201m ASL to 208m ASL).

5.4.4.2.2 Built Environment

5.4.4.2.2.1 Land Use

Regarding current land use designation (Open Space/Commercial) and no change to Land Use Zoning (ME-1), no changes will occur and thus no impact management measures are required.

Regarding views of the Facility, installation of visual screening elements such as vegetation, fencing, or berms would minimize views of the Facility from the surrounding community during construction/operation.

5.4.4.2.3 Social Environment

5.4.4.2.3.1 Human Health

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further impact management measures be considered at the design phase to reduce ambient PM_{10} particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, it is recommended to

continue existing particulate/dust control impact management measures, with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

5.4.4.2.3.2 Traffic

As no effects to traffic are anticipated for Alternative Landfill Footprint No. 4, and as such no impact management measures are required.

5.4.4.2.4 Economic Environment

5.4.4.2.4.1 Economic

Basic landfill operation impact management measures, including stormwater management, leachate treatment, dust, and noise control will assist in mitigating effects to surrounding properties. Impact management measures are not applicable to the relative economic benefits of each Alternative Landfill Footprint.

5.4.4.2.5 Cultural Environment

5.4.4.2.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 4 does not affect a known or potential archaeological resource, therefore no impact management measures are required. Due to proximity of the heritage landscape, no interaction will occur, therefore no impact management measures are required. Alternative Landfill Footprint No. 4 does not affect Indigenous resources, therefore, no impact management measures are required.

5.4.4.2.6 Technical Environment

5.4.4.2.6.1 Design and Operations

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 Alternative Landfill Footprint No. 4, the magnitude of the potential effects is anticipated to be moderate relative to the current approved layout, since some aspects of the Site will require modifications from their existing configuration.

5.4.4.3 Net Effects

As previously mentioned, the resultant net effects associated with Alternative Landfill Footprint No. 4 were established based on the application of the developed impact management measures to the potential effects first identified.

5.4.4.3.1 Natural Environment

5.4.4.3.1.1 Geology/Hydrogeology

Based on the impact management measures proposed above, no effects to groundwater quality or groundwater flow are anticipated during construction/operation or during closure/post-closure. The key factors leading to this outcome are the use of the impact management measures and controls including the extraction well, the groundwater collection trench network, and the HCL described and the use of these impact management measures at this Site for more than two decades.

5.4.4.3.1.2 Surface Water

For Alternative Landfill Footprint No. 4, the SWM pond and perimeter ditches will be able to treat and control the runoff from the Site to the same level as the current approved design. No effects are anticipated to surface water quality, as discharge will be directed to either surface water or to sanitary sewer with no increase in TSS and related parameter concentrations, and no increase in peak flows is expected to the roadside ditches to the northwest of the Site, nor the sewer under First Road West and Davis Creek.

Notwithstanding, there may be the potential for limitations to the design and construction of perimeter ditches and the SWM pond within the allocated areas.

5.4.4.3.1.3 Terrestrial and Aquatic

With the implementation of impact management measures, net effects on terrestrial and aquatic ecosystems are anticipated to be low, as any loss in habitats during construction/operation are considered temporary and habitats will be re-established on-Site during closure/post-closure.

5.4.4.3.1.4 Atmospheric

Application of dust BMPs and remodelling, based on lower daily trucks per day, will mitigate effects to air quality during construction/operation to acceptable and approvable levels from an air quality for off-Site receptors, resulting in low net effects. No net effects are expected during closure/post-closure.

This scenario is not anticipated to be different from the current license from an odour perspective during construction/operation. No net effects are expected during closure/post-closure.

Following the implementation of impact management measures such as barriers and berms, noise levels at receptors will be below the MECP's minimum sound level limits during construction/ operation, resulting in low net effects. No net effects are expected during closure/post-closure.

5.4.4.3.2 Built Environment

5.4.4.3.2.1 Land Use

No change in current land uses during construction/operation or closure/post-closure will occur under Alternative Landfill Footprint No. 4, and as such, no net effects are anticipated. Regarding views of the Facility, installation of visual screening elements would minimize views of the Facility from the surrounding community during construction/operation resulting in a low net effect.

5.4.4.3.3 Social Environment

5.4.4.3.3.1 Human Health

For Alternative Landfill Footprint No. 4, marginal increase in larger particulate size fractions (i.e., PM_{10}) is expected when compared to the existing approved landfill design with the potential for transient short-term health concerns. All of the other criteria for Human Health do not result in any net effects when compared to the existing approved landfill design.

5.4.4.3.3.2 Traffic

Despite an increase in background development traffic, the number of potential collisions is not expected to increase, as the number of trucks to and from the Site during construction/operation will not increase and do not result in any net effects under Alternative Landfill Footprint No. 4. No effects are expected during closure/post-closure.

5.4.4.3.4 Economic Environment

5.4.4.3.4.1 Economic

No effects to approved/planned land uses during construction/operation or closure/post-closure is expected, and as such no changes to approved or planned land uses are expected.

Employment is reduced (year over year) under Alternative Landfill Footprint No. 4 during construction/operation, with subsequent employment reduction as the Facility moves into closure/ post-closure. There are Low economic benefits to the City and local community during construction/operation, with a new use established during closure/post-closure.

5.4.4.3.5 Cultural Environment

5.4.4.3.5.1 Archaeology/Built Heritage/Indigenous Resources

Due to the previous disturbance on-Site (excavation for quarry operation), no effects to archaeological sites or resources are expected during construction/operation or closure/ post-closure. No impacts on cultural heritage resources are anticipated during construction/ operation or closure/post-closure. Since no known cultural resources that are of value to Indigenous communities were identified, no effects to Indigenous resources are anticipated.

5.4.4.3.6 Technical Environment

5.4.4.3.6.1 Design and Operations

Alternative Landfill Footprint No. 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, this Alternative 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.

5.4.4.4 Summary of Net Effects

Table 5.22 summarizes the net effects established for Alternative Landfill Footprint No. 4 – Reconfiguration and Horizontal Expansion of the SCRF.

Table 5.22 Alternative Landfill Footprint No. 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 impact management 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 SWM pond within the allocated areas.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated as the effects to terrestrial environment will be temporary during construction/ operation and re-established during closure/ post-closure. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of BMPs.
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 minimize views of the Facility from the surrounding community.
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.

Table 5.22 Alternative Landfill Footprint No. 4 – Summary of Net Effects

Environmental Component	Summary of Net Effects
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 impact management measures. No net effects expected during closure/ post-closure.
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.
Traffic	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, built and cultural heritage resources, or indigenous resources are anticipated.
Design and Operations	Alternative Landfill Footprint No. 4 fails to meet the objectives for disposal and requires moderate to high increases in operational complexity as well as high cost increases associated with facilitating design implementations.

5.4.5 Alternative Landfill Footprint No. 5 – Reconfiguration and Vertical Expansion of the SCRF

5.4.5.1 Potential Effects

As mentioned, the potential effects, proposed impact management measures, and the resultant net effects associated with Alternative Landfill Footprint No. 5 are described in the following sections. **Appendix C** of the Alternative Methods Report (**Appendix I**) provides the net effects table for Alternative Landfill Footprint No. 5 (**Table C-5**), and **Appendix E** of the Alternative Methods Report provides the discipline specific memos.

5.4.5.1.1 Natural Environment

5.4.5.1.1.1 Geology/Hydrogeology

Groundwater Quality

This section discusses the evaluation results in terms of the predicted effects of Alternative Landfill Footprint No. 5 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

Leachate generation rates are provided by the HELP model as leakage through the final cover system into the waste mound. The HELP model was used to predict the leachate generation rates for each Alternative Landfill Footprint. Based on the HELP modelling conducted, **Table 5.23** summarizes the predicted leachate generation rates under closure conditions for Alternative Landfill Footprint No. 5, as well as the existing approved configuration.

Table 5.23 Predicted Leachate Generation Rates (Total)

Landfilling Section	Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Approved	41.5	121,143
Alternative No. 5	59.1	172,624

In terms of leachate generation rates during construction/operation, it was estimated to be approximately 8.0 L/s during active operation, and 5.5 L/s post-closure.

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 E** of the Alternative Methods Report (**Appendix I**).

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

- 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 under the impact management measures.
- The predicted downgradient groundwater quality for Alternative Landfill Footprint No. 5 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 Area

Any potential impacts to groundwater and/or surface water quality within the SWPA will be dependent on groundwater quality from the Alternative Landfill Footprints migrating into the IPZ for the City of Hamilton water intake. Alternative Landfill Footprint No. 5 shows minimal effects on predicted groundwater quality prior to implementation of impact management 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 (impact management 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 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** of the Alternative Methods Report (**Appendix I**)). The HELP model outputs show that leakage from the landfill liner will contribute approximately 0.064 mm each year. This leakage will predominantly enter the VFZ (which directly underlies the base of the landfill footprint in each of the Alternative Landfill Footprints), 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 = (201 mAMSL – 192.6 mAMSL) / 900 m = 0.093 m/m).

Under Alternative Landfill Footprint No. 5, 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 (Closure/Post-Closure)

As discussed above, a detailed description of the predicted contaminating lifespan for each alternative is provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

Three scenarios were modelled 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 5.24** below summarizes the contaminating lifespans calculated for chloride, as estimated using the Rowe (1991) model, for each of the three scenarios for the approved existing conditions and Alternative Landfill Footprint No. 5.

Table 5.24 Contaminating Lifespan Using the Rowe Model

Alternative Landfill Footprint	Contaminating Lifespan (years)		
	Scenario 1	Scenario 2	Scenario 3
Approved	32	53	65
Alternative No. 5	33	56	68

A comparison of the contaminating lifespan values indicates that Alternative Landfill Footprint No. 5 performs similarly to the existing approved design.

Summary

Based on the analysis completed, potential effects to groundwater quality include minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits of wellhead protection area may occur during construction/operation and closure/ post-closure. Minimal potential impacts to water quality within the SWPA during construction/ operation and closure/post-closure.

With respect to groundwater flow, no potential effects are anticipated, as there will be no change in groundwater flow due to the implementation of this alternative, therefore it will have minimal effect on groundwater recharge patterns during construction/operation and closure/post-closure.

5.4.5.1.1.2 Surface Water

For assessing effects on Surface Water, 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 Methods being considered[20]. 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 modelling 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 SWM ponds).

[20] PCSWMM Version 7.1, Computational Hydraulics International, 2018, 2), United States Environmental Protection Agency (US EPA), EPA SWMM 5 (Version 5.0.012), 2018

Table 5.25 Peak Flow Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 5 (Reconfiguration)	0.969	0.00%	5.313	-4.58%

Table 5.26 Total Runoff Volume Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 5 (Reconfiguration)	15,564	10.77%	61,735	6.47%

The modelling above represents closure/post-closure effects as this represents the greatest potential effect to surface water criteria, based on the impervious cap that will be put in place at closure, which increases the runoff volumes. The final cover for the residual material will produce more runoff than during operation, as the residual material final cover requires a layer of clay that is 600 mm thick.

Surface Water Quality

For Alternative Landfill Footprint No. 5, 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 SWM 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.

5.4.5.1.1.3 Terrestrial and Aquatic

Potential effects resulting from Alternative Landfill Footprint No. 5 are predicted as temporary (assumed not all vegetated areas will be disturbed simultaneously) loss of existing vegetation communities (e.g., marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of re-grading activities during construction/operation. Temporary loss (it is assumed habitat will be restored following landfill closure) 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 is anticipated during construction/operation. No off-Site impacts are anticipated from Alternative Footprint No. 5.

Potential effects aquatic ecosystems include the potential loss of on-Site aquatic habitat, and disturbance of aquatic biota associated with open water habitats in stormwater infrastructure, due to construction/operation activities. No potential off-Site impacts are anticipated.

5.4.5.1.1.4 Atmospheric

Air, Odour and Noise

With respect to Alternative Landfill Footprint No. 5 and air quality, there is a potential for off-Site concentrations of particulate species (TSP, PM_{10} and $PM_{2.5}$) to exceed current air quality criteria during construction/operation. This is primarily has the potential to affect receptors north of Green Mountain Road.

From an odour perspective, Alternative Landfill Footprint No. 5 is not anticipated to be different from the current operations, as the Site is not permitted to receive putrescible waste (i.e., organic material that can break down and cause odours). No effects are anticipated closure/post-closure.

With respect to Alternative Landfill Footprint No. 5 and noise, there is a potential for 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. The net sound level change for up to 200 off-Site receptors is 2 dBA or lower, however, there are approximately 75 residences (to the north) that have the potential for a +3 dBA change. 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 Alternative Landfill Footprint No. 5.

From a potential noise impact exposure perspective, Potential changes to the predicted off-Site noise impacts occur due increased line-of-sight from the elevation change associated with Alternative Landfill Footprint No. 5, and the decrease in the separation distance between the landfill activities and the adjacent residential properties.

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 7:00 a.m. to 7:00 p.m. under the MECP “Noise Guidelines for Landfill Sites” (N-1). Minimal effects from a noise perspective are anticipated during closure/post-closure due to the limited types of works and associated noise sources associated with this stage.

5.4.5.1.2 Built Environment

5.4.5.1.2.1 Land Use

From a land use perspective, there are no potential effects to current land use designation (Open Space/Commercial) and no change to existing land use Zoning (ME-1) during construction/ operation or closure/post-closure.

From a visual perspective, Alternative Landfill Footprint No. 5 requires slight height increase and property buffers are maintained. Visibility increased mostly for receptors and properties adjacent to the Site, including residential dwellings to South on Green Mountain Road, as well as homes along Mud Street during construction/operation or closure/post-closure.

5.4.5.1.3 Social Environment

5.4.5.1.3.1 Human Health

The Minister-approved Amended ToR made a commitment to analyze the potential effects to human health during assessment and evaluation of the Alternative Landfill Footprints utilizing the

existing data and methodology established as part of the ongoing SCRF CHAR[21], which is completed on an annual basis (full report can be viewed in **Appendix F** of the Alternative Methods Report (**Appendix I**)). 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 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 Alternative Landfill Footprint. 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 five indicators (air quality, leachate quality, groundwater quality, surface water quality, soil quality) 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 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.

Information from the Air Quality, Surface Water, and Hydrogeology analyses were used to provide data for the net effect analysis related to Human Health impacts for Alternative Landfill Footprint No. 5.

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this Landfill Footprint would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of $PM_{2.5}$ 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 PM_{10} 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 impact management measures be considered at the design phase to reduce ambient PM_{10} 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 Landfill Footprint would not be expected to result in any health risks different than the existing approved landfill design during construction/operation or closure/post-closure.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative 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 during construction/operation and closure/post-closure.

Surface Water Quality

Results of the surface water study indicate that SWM ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards during construction/operation or closure/post-closure.

[21] Intrinsik. 2018. Community Health Assessment Review: Terrapure Stoney Creek Regional Facility based on 2016 Monitoring Report. Final Report. Intrinsik Corp. Project # 400401. June 2018

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 Landfill Footprint 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 during construction/operation and closure/post-closure.

5.4.5.1.3.2 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 Landfill Footprint 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 Footprints 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.

With respect to the “Potential for traffic collisions” indicator, the expected effect of each Alternative Landfill Footprint on future frequency and severity of traffic collisions within the Local Study Area was assessed. With respect to the “Level of Service at intersections around the SCRF” indicator, the expected effect of each Alternative Landfill Footprint 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.

Using previous traffic counts for the intersections around the SCRF and truck count data and tonnage reports from the SCRF[22], traffic modelling[23] was completed and concluded that Alternative Landfill Footprint No. 5 is not expected to impact average daily SCRF truck volumes. With no expected change in SCRF truck volumes within the Local Study Area for Alternative Landfill Footprint No. 5; this alternative’s potential for traffic collisions is negligible within the Local Study Area. It should be noted that traffic levels during the closure/post-closure timeframe are significantly lower than during the construction/operation stage.

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; therefore, potential for collisions will not increase. For example, if 10 Site trucks occur in one hour, with Alternative Landfill Footprint No. 5, the maximum number of collisions with a Site truck is still 10.

Alternative Landfill Footprint No. 5 is not expected to impact average daily SCRF truck volumes. Therefore, with no expected change in SCRF truck volumes within the Local Study Area, Alternative Landfill Footprint No. 5 is considered to have an equally negligible impact on the Level of Service at intersections in the Local Study Area during construction/operation and closure/post closure.

[22] 2010-2015 Truck Count Data and 1997-2015 Tonnage Reports

[23] Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009

5.4.5.1.4 Economic Environment

5.4.5.1.4.1 Economic

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, all six of the Alternative Landfill Footprints result in no potential effects. Landfill operation BMPs and impact management measures, such as SWM pond, landfill liner system, dust, and noise control measures will ensure potential effects to land uses are managed and mitigated. None of the presented Alternative Landfill Footprints result in a change to proposed land uses within the Site or Local Study Area. Therefore, there are no potential effects and no impact management steps required for the approved/land use indicator. Impact management measures are not required for approved/planned and/or proposed land uses within the Local Study Area, since each Alternative Landfill Footprint and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Impact management measures would be established to manage any potential nuisance influenced by Site construction/ operations of each Alternative Landfill Footprints relative to noise, air quality (including odour), and traffic, as described in **Section 5.4.5.2**.

Economic Benefits to the City of Hamilton and Local Community

Alternative Landfill Footprint No. 5 allows for an increase in capacity at the SCRF and meets the economic opportunity for Terrapure to allow for a 3,680,000 m^3 increase in capacity. Landfill Footprint No. 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 dollar per tonne agreements. Employment opportunities at the Site would be increased (year over year) under Alternative Landfill Footprint No. 5, based on the increased amount of employees required for the amount of residual material that Alternative Landfill Footprint No. 5 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.

5.4.5.1.5 Cultural Environment

5.4.5.1.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 5 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. Due to the previous disturbance on-Site (excavation for quarry operation), Alternative Landfill Footprint No. 5 does not affect a known or potential archaeological resource, and therefore no impacts are anticipated during all project timeframes. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA.

5.4.5.1.6 Technical Environment

5.4.5.1.6.1 Design and Operations

Potential to Provide Service for Disposal

Alternative Landfill Footprint No. 5 provides 10,180,000 m^3 of total disposal capacity for residual material. Alternative Landfill Footprint No. 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

Alternative Landfill Footprint No. 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. This infrastructure would be modified during construction/operation and would be maintained during closure/post-closure.

Stormwater Management

Alternative Landfill Footprint No. 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. This infrastructure would be modified during construction/operation and would be maintained during closure/post-closure (as necessary).

Construction

Alternative Landfill Footprint No. 5 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Alternative Landfill Footprint No. 5 does not require expanding the base liner and leachate collection system horizontally to include other areas of the Site. This method has an open layout with a simple configuration and dedicated areas for the various components.

Site Operations

Alternative Landfill Footprint No. 5 does not include the importing of industrial fill, meaning that this material will no longer need to be managed. Leachate will be managed from a single area with one leachate pumping station during construction/ operation and closure/ post-closure. The proposed layout of the SWM pond provides operational flexibility. Access and egress from the Site will be maintained in their current configuration. Development of the Site will require the staged relocation or removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).

Closure and Post-Closure

Alternative Landfill Footprint No. 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. During this stage, removal of existing Site infrastructure would occur (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access), but maintain and keep in place the infrastructure required to manage leachate (leachate collection system) and monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).

Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first). The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

Cost of Facility

Alternative Landfill Footprint No. 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.

5.4.5.2 Impact Management Measures

As previously mentioned, impact management measures were developed, where possible and as required, and applied to prevent/minimize/offset potential negative environmental effects associated with Alternative Landfill Footprint No. 5.

5.4.5.2.1 Natural Environment

5.4.5.2.1.1 Geology/Hydrogeology

The evaluation of potential environmental effects described above was 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 impact management measures for Alternative Landfill Footprint No. 5. The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of Alternative Landfill Footprint No. 5. The existing liner system will be expanded to accommodate new waste placement areas.

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 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.

No impact management measures are required for effects on groundwater flow.

5.4.5.2.1.2 Surface Water

For Alternative Landfill Footprint No. 5, 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 and address any water quality issues.

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 be redesigned.

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.

5.4.5.2.1.3 Terrestrial and Aquatic

In order to mitigate potential effects to terrestrial ecosystems for Alternative Landfill Footprint No. 5, the following impact management measures will be employed throughout construction/operation and closure/post-closure:

- 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; and,
- 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.

Implementing Best Management Practices (BMP) 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 species at risk (SAR), the Site Supervisor will contact MNRF SAR biologists for advice; and,
- include naturalized landscape features into the SWM facilities design (e.g., emergent robust vegetation, shallow slope).

In order to mitigate potential effects to aquatic ecosystems, the following impact management measures are recommended:

- 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.

5.4.5.2.1.4 Atmospheric

In order for the Facility to meet MECP air quality criteria for Alternative Landfill Footprint No. 5, the following impact management measures will be required and include implementing BMPs such as:

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

No effects are anticipated and thus no Impact management measures will be required for odour.

Potential noise impact management measures for Alternative Landfill Footprint No. 5 include berms at the landfill perimeter to the north. The height of barriers and/or berm may be required to be an additional 8 m above existing base elevations (201 mASL to 208 mASL).

5.4.5.2.2 Built Environment

5.4.5.2.2.1 Land Use

No change to the current land use designation (Open Space/Commercial) and no change to Land Use Zoning (ME-1), and as such, no impact management measures are required.

Regarding views of the Facility, installation of visual screening elements such as vegetation, fencing, or berms would minimize views of the Facility from the surrounding community during construction/operation.

5.4.5.2.3 Social Environment

5.4.5.2.3.1 Human Health

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further impact management measures be considered at the design phase to reduce ambient PM_{10} particulate concentrations. Standard planned leachate treatment and management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control impact management measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

5.4.5.2.3.2 Traffic

Despite an increase in background development traffic, the number of potential collisions is not expected to increase as the number of trucks to and from the Site will not increase. As such, impact management measures are not required.

5.4.5.2.4 Economic Environment

5.4.5.2.4.1 Economic

Basic landfill operation impact management measures, including stormwater management, leachate treatment, dust, and noise control will assist in mitigating effects to surrounding properties. Impact management measures are not applicable to the relative economic benefits of each Alternative Landfill Footprint.

5.4.5.2.5 Cultural Environment

5.4.5.2.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 5 does not affect a known or potential archaeological resources, therefore no impact management measures are required. Due to proximity of the heritage landscape, no interaction will occur; therefore, no impact management measures are required. Alternative Landfill Footprint No. 5 does not affect Indigenous resources, therefore, no impact management measures are required.

5.4.5.2.6 Technical Environment

5.4.5.2.6.1 Design and Operations

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 Alternative Landfill Footprint No. 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.

5.4.5.3 Net Effects

5.4.5.3.1 Natural Environment

As previously mentioned, the resultant net effects associated with Alternative Landfill Footprint No. 5 were established based on the application of the developed impact management measures to the potential effects first identified.

5.4.5.3.1.1 Geology/Hydrogeology

Based on the proposed impact management measures, no effects to groundwater quality or groundwater flow are anticipated during construction/operation or during closure/post-closure. The key factors leading to this outcome are the use of the impact management measures and controls, including the extraction well, the groundwater collection trench network and the HCL described, and the use of these impact management measures at this Site for more than two decades.

5.4.5.3.1.2 Surface Water

For Alternative Landfill Footprint No. 5, the SWM pond and perimeter ditches will be able to treat and control quantity of the runoff from the Site to the same level as the current approved design. No effects are anticipated to surface water quality, during construction/operation or closure/post-closure, as discharge will not be released to a surface water body until testing determines all required parameters are within regulated requirements.

5.4.5.3.1.3 Terrestrial and Aquatic

With the implementation of impact management measures, net effects on terrestrial and aquatic ecosystems are anticipated to be low, as any loss in habitats during construction/operation are considered temporary and habitats will be re-established on-Site during closure/post-closure.

5.4.5.3.1.4 Atmospheric

Application of dust BMPs and remodelling, based on lower daily trucks per day, will mitigate effects to air quality during construction/operation to acceptable and approvable levels from an air quality for off-Site receptors, resulting in low net effects. No net effects are expected during closure/post-closure.

This scenario is not anticipated to be different from the current license from an odour perspective during construction/operation. No net effects are expected during closure/post-closure.

Following the implementation of impact management measures such as barriers and berms, noise levels at receptors will be below the MECP's minimum sound level limits during construction/ operation, resulting in low net effects. No net effects are expected during closure/post-closure.

5.4.5.3.2 Built Environment

5.4.5.3.2.1 Land Use

No change in current land uses during construction/operation is anticipated, and no effects are expected during closure/post-closure. Regarding views of the Facility, installation of visual screening elements would minimize views of the Facility from the surrounding community during construction/operation. However, Alternative Landfill Footprint No. 5 includes a greater height increase, resulting in a moderate net effect.

5.4.5.3.3 Social Environment

5.4.5.3.3.1 Human Health

For Alternative Landfill Footprint No. 5, marginal increase in larger particulate size fractions (i.e., PM_{10}) is expected when 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.

5.4.5.3.3.2 Traffic

Despite an increase in background development traffic, the number of potential collisions is not expected to increase, as the number of trucks to and from the Site during construction/operation will

not increase and do not result in any net effects under Alternative Landfill Footprint No. 5. No effects are expected during closure/post-closure.

5.4.5.3.4 Economic Environment

5.4.5.3.4.1 Economic

No effects to approved/planned land uses during construction/operation or closure/post-closure is expected, and as such no changes to approved or planned land uses are expected.

Employment is expected to increase (year over year) during construction/ operation, with subsequent employment reduction as the Facility moves into closure/ post-closure. Increased economic benefits to the City and local community during construction/operation, with a new use established during closure/post-closure.

5.4.5.3.5 Cultural Environment

5.4.5.3.5.1 Archaeology/Built Heritage/Indigenous Resources

Due to the previous disturbance on-Site (excavation for quarry operation), no effects to archaeological sites or resources are expected during construction/operation or closure/ post-closure. No impacts on cultural heritage resources are anticipated during construction/ operation or closure/post-closure. Since no known cultural resources that are of value to Indigenous communities were identified, no effects to Indigenous resources are anticipated.

5.4.5.3.6 Technical Environment

5.4.5.3.6.1 Design and Operations

Alternative Landfill Footprint No. 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. Alternative Landfill Footprint No. 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.

5.4.5.4 Summary of Net Effects

Table 5.27 summarizes the net effects established for Alternative Landfill Footprint No. 5 – Reconfiguration and Vertical Expansion of the SCRF.

Table 5.27 Alternative Landfill Footprint No. 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 impact management 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 as the effects to terrestrial environment will be temporary during construction/ operation and re-established during closure/ post-closure. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of BMPs.
Land Use	No Net Effects to existing land uses within the Local Study Area are anticipated. Moderate Net Effects to views of the Facility are anticipated. Installation of visual screening elements would minimize views of the Facility from the surrounding community.
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.

Table 5.27 Alternative Landfill Footprint No. 5 – Summary of Net Effects

Environmental Component	Summary of Net Effects
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 impact management measures. No net effects expected during closure/ post-closure.
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.
Traffic	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, built and cultural heritage resources, or indigenous resources are anticipated.
Design and Operations	Alternative Landfill Footprint No. 5 supports adequate disposal capacity and results in high economic benefits, with small increase in complexity relative to current construction requirements.

5.4.6 Alternative Landfill Footprint No. 6 – Horizontal and Vertical Expansion of the SCRF

5.4.6.1 Potential Effects

As mentioned, the potential effects, proposed impact management measures, and the resultant net effects associated with Alternative Landfill Footprint No. 6 are described in the following sections. **Appendix C** of the Alternative Methods Report (**Appendix I**) provides the net effects table for Alternative Landfill Footprint No. 6 (**Table C-6**), and **Appendix E** of the Alternative Methods Report provides the discipline specific memos.

5.4.6.1.1 Natural Environment

5.4.6.1.1.1 Geology/Hydrogeology

Groundwater Quality

This section discusses the evaluation results in terms of the predicted effects of Alternative Landfill Footprint No. 6 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

Leachate generation rates are provided by the HELP model as leakage through the final cover system into the waste mound. The HELP model was used to predict the leachate generation rates for each Alternative Landfill Footprint. Based on the HELP modelling conducted, **Table 5.28** summarizes the predicted leachate generation rates under closure conditions for Alternative Landfill Footprint No. 6, as well as the existing approved configuration.

Table 5.28 Predicted Leachate Generation Rates (Total)

Landfilling Section	Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Approved	41.5	121,143
Alternative No. 6	47.3	137,999

In terms of leachate generation rates during construction/operation, it was estimated to be approximately 6.4 L/s during active operation, and 4.4 L/s post-closure.

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 E** of the Alternative Methods Report (**Appendix I**).

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

- 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 under the impact management measures.
- The predicted downgradient groundwater quality for Alternative Landfill Footprint No. 6 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 Area

Any potential impacts to groundwater and/or surface water quality within the SWPA will be dependent on groundwater quality from the Alternative Landfill Footprints migrating into the IPZ for the City of Hamilton water intake. Alternative Landfill Footprint No. 6 shows minimal effects on predicted groundwater quality prior to implementation of impact management 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 (impact management 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 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 E** of the Alternative Methods Report (**Appendix I**)). The HELP model outputs show that leakage from the landfill liner will contribute approximately 0.064 mm each year. This leakage will predominantly enter the VFZ (which directly underlies the base of the landfill footprint in each of the Alternative Landfill Footprints), 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 = (201 mAMSL – 192.6 mAMSL) / 900 m = 0.093 m/m).

Under Alternative Landfill Footprint No. 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 (Closure/Post-Closure)

As discussed above, a detailed description of the predicted contaminating lifespan for each alternative is provided in **Appendix E** of the Alternative Methods Report (**Appendix I**).

Three scenarios were modelled 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 5.29** below summarizes the contaminating lifespans calculated for chloride, as estimated using the Rowe (1991) model, for each of the three scenarios for the approved existing conditions and Alternative Landfill Footprint No. 6.

Table 5.29 Contaminating Lifespan Using the Rowe Model

Alternative Landfill Footprint	Contaminating Lifespan (years)		
	Scenario 1	Scenario 2	Scenario 3
Approved	32	53	65
Alternative No. 6	42	70	86

Summary

Based on the analysis completed, potential effects to groundwater quality include minor increases in leachate indicator parameters in downgradient groundwater quality, as well as reaching upgradient limits of wellhead protection area may occur during construction/operation and closure/ post-closure. Minimal potential impacts to water quality within the SWPA during construction/ operation and closure/post-closure.

With respect to groundwater flow, no potential effects are anticipated, as there will be no change in groundwater flow due to the implementation of this alternative, therefore it will have minimal effect on groundwater recharge patterns during construction/operation and closure/post-closure.

5.4.6.1.1.2 Surface Water

To assess Surface Water effects, 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 Methods being considered[24]. 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 modelling 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 SWM ponds).

[24] PCSWMM Version 7.1, Computational Hydraulics International, 2018, 2), United States Environmental Protection Agency (US EPA), EPA SWMM 5 (Version 5.0.012), 2018

Table 5.30 Peak Flow Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 6 (Reconfiguration)	0.933	-3.72%	6.631	0.23%

Table 5.31 Total Runoff Volume Comparison

Alternative Landfill Footprint	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
Alternative Landfill Footprint No. 6 (Reconfiguration)	17,438	2.75%	58,876	1.54%

The modelling above represents closure/post-closure effects, as this represents the greatest potential effect to surface water criteria based on the impervious cap that will be put in place at closure, which increases the runoff volumes. The final cover for the residual material will produce more runoff than during operation, as the residual material final cover requires a layer of clay that is 600 mm thick.

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 SWM pond to capture runoff) will produce a larger runoff volume than the baseline condition. 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.

5.4.6.1.1.3 Terrestrial and Aquatic

Potential effects resulting from Alternative Landfill Footprint No. 1 are predicted as temporary (assumed not all vegetated areas will be disturbed simultaneously) loss of existing vegetation communities (e.g., marsh, meadow, and thicket habitat) and associated wildlife habitat as a result of re-grading activities during construction/operation. Temporary loss (it is assumed habitat will be restored following landfill closure) 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 is

anticipated during construction/operation. No off-Site impacts are anticipated from Alternative Landfill Footprint No. 6.

Potential effects aquatic ecosystems include the potential loss of on-Site aquatic habitat and disturbance of aquatic biota associated with open water habitats in stormwater infrastructure due to regrading activities during construction/operation. No potential off-Site impacts are anticipated.

5.4.6.1.1.4 Atmospheric

Air, Odour and Noise

With respect to Alternative Landfill Footprint No. 6 and air quality, there is a potential for off-Site concentrations of particulate species (TSP, PM_{10} and $PM_{2.5}$) to exceed current air quality criteria during construction/ operation. This primarily has the potential to affect receptors north of Green Mountain Road. No effects are anticipated closure/ post-closure.

From an odour perspective, this Alternative Landfill Footprint No. 6 is not anticipated to be different from the current operations, as the Site is not permitted to receive putrescible waste (i.e., organic material that can break down and cause odours). No effects are anticipated closure/post-closure.

With respect to Alternative Landfill Footprint No. 6 and noise during construction/operation, there is a potential for 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. The net sound level change for up to 200 off-Site receptors is 2 dBA or lower, however, there are approximately 75 residences (to the north) that have the potential for a +2 dBA change. 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 Alternative Landfill Footprint No. 6.

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 7:00 a.m. to 7:00 p.m. under the MECP “Noise Guidelines for Landfill Sites” (N-1). Minimal effects from a noise perspective are anticipated during closure/post-closure due to the limited types of works and associated noise sources associated with this stage.

5.4.6.1.2 Built Environment

5.4.6.1.2.1 Land Use

From a land use perspective, there are no potential effects to current land use designation (Open Space/Commercial) and no change to existing land use Zoning (ME-1) during construction/ operation or closure/post-closure.

From a visual perspective, Alternative Landfill Footprint No. 6 requires large change in height increase of 8 m, and property buffers are reduced to 30 m. Visibility of the Facility is increased for all sensitive receptors and properties in all directions during construction/operation and closure/ post-closure.

5.4.6.1.3 Social Environment

5.4.6.1.3.1 Human Health

The Minister-approved Amended ToR made a commitment to analyze the potential effects to human health during assessment and evaluation of the Alternative Landfill Footprints utilizing the existing data and methodology established as part of the ongoing SCRF CHAR[25], which is completed on an annual basis (full report can be viewed in **Appendix F** of the Alternative Methods

[25] Intrinsik. 2018. Community Health Assessment Review: Terrapure Stoney Creek Regional Facility based on 2016 Monitoring Report. Final Report. Intrinsik Corp. Project # 400401. June 2018

Report (**Appendix I**)). 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 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 Alternative Landfill Footprint. With the exception of impacts to soil, the criteria below have been evaluated in the annual Community Health Assessment Review that Intrinsik has been conducting since 1996. The evaluation of potential human health effects with five indicators (air quality, leachate quality, groundwater quality, surface water quality, soli quality) 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 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.

Information from the Air Quality, Surface Water, and Hydrogeology analyses were used to provide data for the net effect analysis related to Human Health impacts for Alternative Landfill Footprint No. 6.

Air Quality

Results of the air quality assessment indicate that this VOC emissions from this Landfill Footprint would be equivalent to the existing approved landfill design.

Particulate modelling indicated that while predicted concentrations of $PM_{2.5}$ 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 PM_{10} 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 impact management measures be considered at the design phase to reduce ambient PM_{10} particulate concentrations during construction/operation and closure/post-closure.

Leachate Quality

As humans will not be directly exposed to leachate, and all leachate will be treated and meet municipal discharge standards, this Alternative Landfill Footprint would not be expected to result in any health risks different than the existing approved landfill design during construction/operation or closure/post-closure.

Groundwater Quality

Results of the hydrogeology assessment indicate that this Alternative 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 during construction/operation and closure/post-closure.

Surface Water Quality

Results of the surface water study indicate that SWM ponds and perimeter ditches will be sized to the required level, and any discharge will be treated to meet appropriate regulatory standards during construction/operation and closure/post-closure.

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 Landfill Footprint 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 during construction/operation and closure/post-closure.

5.4.6.1.3.2 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 Landfill Footprint 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 Footprints 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.

With respect to the “Potential for traffic collisions” indicator, the expected effect of each Alternative Landfill Footprint on future frequency and severity of traffic collisions within the Local Study Area was assessed. With respect to the “Level of Service at intersections around the SCRF” indicator, the expected effect of each Alternative Landfill Footprint 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.

Using previous traffic counts for the intersections around the SCRF and truck count data and tonnage reports from the SCRF[26], traffic modelling[27] was completed and concluded that Alternative Landfill Footprint No. 6 is not expected to impact average daily SCRF truck volumes. With no expected change in SCRF truck volumes within the Local Study Area for Alternative Landfill Footprint No. 6; this alternative’s potential for traffic collisions is negligible within the Local Study Area. It should be noted that traffic levels during the closure/post-closure timeframe are significantly lower than during the construction/operation stage.

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; therefore, potential for collisions will not increase. For example, if 10 Site trucks occur in one hour, with Alternative Landfill Footprint No. 6, the maximum number of collisions with a Site truck is still 10.

Alternative Landfill Footprint No. 6 is not expected to impact average daily SCRF truck volumes. Therefore, with no expected change in SCRF truck volumes within the Local Study Area, Alternative Landfill Footprint No. 6 is considered to have an equally negligible impact on the Level of Service at intersections in the Local Study Area during construction/operation and closure/post closure.

5.4.6.1.4 Economic Environment

5.4.6.1.4.1 Economic

Approved/Planned Land Use Net Effects Summary

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 Landfill Footprints result in no potential effects. Landfill operation BMPs and impact management measures, such as SWM pond, landfill liner system, dust, and noise control measures

[26] 2010-2015 Truck Count Data and 1997-2015 Tonnage Reports

[27] Traffic Impact Study Guidelines, City of Hamilton, Public Works Department, July 2009

will ensure potential effects to land uses are managed and mitigated. None of the presented Alternative Landfill Footprints result in a change to proposed land uses within the Site or Local Study Area. Therefore, there are no potential effects and no impact management steps required for the approved/land use indicator. Impact management measures are not required for approved/ planned and/or proposed land uses within the Local Study Area, since each Alternative Landfill Footprint and relative 30 m buffer requirement is not anticipated to expand or impede on these properties. Impact management measures would be established to manage any potential nuisance influenced by Site construction/ operations of each Alternative Landfill Footprints relative to noise, air quality (including odour), and traffic, as described in **Section 5.4.6.2**.

Economic Benefits to the City of Hamilton and Local Community

Alternative Landfill Footprint No. 6 allows for an increase in capacity at the SCRF and meets the economic opportunity for Terrapure to allow for a 3,680,000 m^3 increase in capacity. Alternative Landfill Footprint No. 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 dollar per tonne agreements. Employment opportunities at the Site would be increased (year over year) under Alternative Landfill Footprint No. 6, based on the increased amount of employees required for the amount of residual material by which this Alternative Landfill Footprint could be expanded. 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.

5.4.6.1.5 Cultural Environment

5.4.6.1.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 6 requires a slight change to the footprint. However, the change in footprint occurs within previously excavated lands. Due to the previous disturbance on-Site (excavation for quarry operation), Alternative Landfill Footprint No. 6 does not affect a known or potential archaeological resource, and therefore, no impacts are anticipated during all project timeframes. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA.

5.4.6.1.6 Technical Environment

5.4.6.1.6.1 Design and Operations

Potential to Provide Service for Disposal

Alternative Landfill Footprint No. 6 provides 10,180,000 m^3 of total disposal capacity for residual material. Alternative Landfill Footprint No. 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

Alternative Landfill Footprint No. 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. This infrastructure would be modified during construction/operation and would be maintained during closure/post-closure.

Stormwater Management

Alternative Landfill Footprint No. 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. This infrastructure would be modified during construction/operation and would be maintained during closure/post-closure (as necessary).

Construction

Alternative Landfill No. 6 will require the construction of additional base liner and leachate collection system for the expanded residual material area. Alternative Landfill Footprint No. 6 requires expanding the base liner and leachate collection system horizontally to include other areas of the Site. This method has a complex layout with an integrated configuration of the various components.

Site Operations

Alternative Landfill Footprint No. 6 includes the importing of industrial fill, meaning that this material will continue to be managed. Leachate will be managed from two separate areas with two separate leachate pumping stations during construction/operation and closure/post-closure. The proposed layout of the SWM pond limits operational flexibility. Access and egress from the Site will be modified from their current configuration. Development of the Site will require the staged relocation or removal of existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).

Closure and Post-Closure

Alternative Landfill Footprint No. 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. During this stage, removal of existing Site infrastructure would occur (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access), but maintain and keep in place the infrastructure required to manage leachate (leachate collection system) and monitor (long-term) groundwater and surface water (hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, and connection to sanitary sewer).

Post-Closure (or decommissioning) would be carried out in accordance with O. Reg. 232/98, which includes the future requirement to develop a Closure Plan. Terrapure is required to prepare a closure plan when the SCRF has reached 90 percent of its approved capacity or two years of remaining capacity (whichever comes first). The final end use of the Site during Post-Closure would need to reflect the City of Hamilton land use planning controls, which currently intends the Site to be used for open space and/or recreational uses, and may include a golf course. Any deviation from the current land use controls would require local planning amendments.

Cost of Facility

Alternative Landfill Footprint No. 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.

5.4.6.2 Impact Management Measures

As previously mentioned, impact management measures were developed, where possible and as required, and applied to prevent/minimize/offset potential negative environmental effects associated with Alternative Landfill Footprint No. 6.

5.4.6.2.1 Natural Environment

5.4.6.2.1.1 Geology/Hydrogeology

The evaluation of potential environmental effects described above was 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 impact management measures for Alternative Landfill Footprint No. 6. The following paragraphs describe the environmental control systems in place at the SCRF and their relevance to the predicted environment performance of Alternative Landfill Footprint No. 6. The existing liner system will be expanded to accommodate new waste placement areas.

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 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.

No impact management measures are required for effects on groundwater flow.

5.4.6.2.1.2 Surface Water

For Alternative Landfill Footprint No. 6, 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 and address any water quality issues.

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 be redesigned. 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, which will increase the 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.

5.4.6.2.1.3 Terrestrial and Aquatic

In order to mitigate potential effects to terrestrial ecosystems for Alternative Landfill Footprint No. 6, the following impact management measures will be employed throughout construction/operation and closure/post-closure:

- 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; and,
- 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.

Implementing Best Management Practices (BMP) 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 species at risk (SAR), the Site Supervisor will contact MNRF SAR biologists for advice; and,
- include naturalized landscape features into the SWM facilities design (e.g., emergent robust vegetation, shallow slope).

In order to mitigate potential effects to aquatic ecosystems, the following impact management measures are recommended:

- 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.

5.4.6.2.1.4 Atmospheric

In order for the Facility to meet MECP air quality criteria for Alternative Landfill Footprint No. 6, the following impact management measures will be required and include implementing BMPs, such as:

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

No Impact management measures will be required for odour.

Potential noise impact management measures for Alternative Landfill Footprint No. 6 include berms at the landfill perimeter to the north. The height of barriers and/or berm may be required to be an additional 9 m above existing base elevations (202 mASL to 209 mASL).

5.4.6.2.2 Built Environment

5.4.6.2.2.1 Land Use

No change to the current land use designation (Open Space/Commercial) and no change to Land Use Zoning (ME-1), and as such, no impact management measures are required.

Regarding views of the Facility, installation of visual screening elements such as vegetation, fencing, or berms would reduce views of the Facility from the surrounding community during construction/operation, but would not fully minimize views.

5.4.6.2.3 Social Environment

5.4.6.2.3.1 Human Health

It is recommended that further refinements to the air dispersion modelling be considered to reduce uncertainties, or further impact management measures be considered at the design phase to reduce ambient PM_{10} particulate concentrations. Standard planned leachate treatment and

management is required to prevent direct exposure to leachate. Finally, continue existing particulate/dust control impact management measures with ongoing monitoring to confirm compliance with ambient guidelines to prevent soil quality impacts over the lifetime of the landfill.

5.4.6.2.3.2 Traffic

As no effects to traffic are anticipated for Alternative Landfill Footprint No. 6, and as such no impact management measures are required.

5.4.6.2.4 Economic Environment

5.4.6.2.4.1 Economic

Basic landfill operation impact management measures, including stormwater management, leachate treatment, dust and noise control will assist in mitigating effects to surrounding properties. Impact management measures are not applicable to the relative economic benefits of each Alternative Landfill Footprint.

5.4.6.2.5 Cultural Environment

5.4.6.2.5.1 Archaeology/Built Heritage/Indigenous Resources

Alternative Landfill Footprint No. 6 does not affect a known or potential archaeological resources, therefore, no impact management measures are required. Further, due to proximity of the heritage landscape, no interaction will occur; therefore, no impact management measures are required. Alternative Landfill Footprint No. 6 does not affect Indigenous resources, therefore, no impact management measures are required.

5.4.6.2.6 Technical Environment

5.4.6.2.6.1 Design and Operations

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 Alternative Landfill Footprint No. 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.

5.4.6.3 Net Effects

As previously mentioned, the resultant net effects associated with Alternative Landfill Footprint No. 6 were established based on the application of the developed impact management measures to the potential effects first identified.

5.4.6.3.1 Natural Environment

5.4.6.3.1.1 Geology/Hydrogeology

Based on the impact management measures proposed above, no effects to groundwater quality or groundwater flow are anticipated during construction/operation or during closure/post-closure. The key factors leading to this outcome are the use of the impact management measures and controls including the extraction well, the groundwater collection trench network and the HCL described and the use of these impact management measures at this Site for more than two decades.

5.4.6.3.1.2 Surface Water

For Alternative Landfill Footprint No. 6, the SWM pond and perimeter ditches will be able to treat and control quantity of the runoff from the Site to the same level as the current approved design. No effects are anticipated to surface water quality, during construction/operation or closure/ post-closure, as discharge will not be released to a surface water body until testing determines all required parameters are within regulated requirements. Notwistanding, there may be the potential for limitations to the design and construction of perimeter ditches and the SWM pond within the allocated areas.

5.4.6.3.1.3 Terrestrial and Aquatic

With the implementation of impact management measures, net effects on terrestrial and aquatic ecosystems are anticipated to be low, as any loss in habitats during construction/operation are considered temporary and habitats will be re-established on-Site during closure/post-closure.

5.4.6.3.1.4 Atmospheric

Application of dust BMPs and remodelling, based on lower daily trucks per day, will mitigate effects to air quality during construction/operation to acceptable and approvable levels from an air quality for off-Site receptors, resulting in low net effects. No net effects are expected during closure/ post-closure.

This scenario is not anticipated to be different from the current license from an odour perspective during construction/operation. No net effects are expected during closure/post-closure.

Following the implementation of impact management measures such as barriers and berms, noise levels at receptors will be below the MECP's minimum sound level limits during construction/ operation, resulting in low net effects. No net effects are expected during closure/post-closure.

5.4.6.3.2 Built Environment

5.4.6.3.2.1 Land Use

No change in current land uses during construction/operation is anticipated, and no effects are expected during closure/post-closure.

Regarding views of the Facility, installation of visual screening elements would reduce views of the Facility from the surrounding community during construction/operation, but would not fully minimize views, resulting in a high net effect.

5.4.6.3.3 Social Environment

5.4.6.3.3.1 Human Health

Marginal increase in larger particulate size fractions (i.e., PM_{10}) compared to the existing approved landfill design with the potential for transient short-term health concerns are potential net effects. All of the other criteria do not result in any net effects when compared to the existing approved landfill design.

5.4.6.3.3.2 Traffic

Despite an increase in background development traffic, the number of potential collisions is not expected to increase, as the number of trucks to and from the Site during construction/operation will not increase and do not result in any net effects under Alternative Landfill Footprint No. 6. No effects are expected during closure/post-closure.

5.4.6.3.4 Economic Environment

5.4.6.3.4.1 Economic

No effects to approved/planned land uses during construction/operation or closure/post-closure is expected, as such no changes to approved or planned land uses is expected.

Employment is expected to increase (year over year) during construction/operation, with subsequent employment reduction as the Facility moves into closure/post-closure stage. Increased economic benefits to the City and local community during construction/operation, with a new use established during closure/post-closure.

5.4.6.3.5 Cultural Environment

5.4.6.3.5.1 Archaeology/Built Heritage/Indigenous Resources

Due to the previous disturbance on-Site (excavation for quarry operation), no effects to archaeological sites or resources are expected during construction/operation or closure/ post-closure. No impacts on cultural heritage resources are anticipated during construction/ operation or closure/post-closure. Since no known cultural resources that are of value to Indigenous communities were identified, no effects to Indigenous resources are anticipated.

5.4.6.3.6 Technical Environment

5.4.6.3.6.1 Design and Operations

Alternative Landfill Footprint No. 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. Alternative Landfill Footprint No. 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.

5.4.6.4 Summary of Net Effects

Table 5.32 summarizes the net effects established for Alternative Landfill Footprint No. 6 – Horizontal and Vertical Expansion of the SCRF.

Table 5.32 Alternative Landfill Footprint No. 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 impact management 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 SWM pond within the allocated areas.
Terrestrial and Aquatic	Low Net Effects to terrestrial and aquatic ecosystems are anticipated as the effects to terrestrial environment will be temporary during construction/ operation and re-established during closure/ post-closure. Predicted effects on vegetation communities, wildlife habitat, aquatic habitat and biota would be mitigated through the implementation of BMPs.
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, since visual screening would not fully minimize views of the Facility.
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.

Table 5.32 Alternative Landfill Footprint No. 6 – Summary of Net Effects

Environmental Component	Summary of Net Effects
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 impact management measures. No net effects expected during closure/ post-closure.
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.
Traffic	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, built and cultural heritage resources, or indigenous resources are anticipated.
Design and Operations	Alternative Landfill Footprint No. 6 supports adequate disposal capacity and results in high economic benefits, However, this Alternative 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 this alternative and also requires a large increase in cost relative to expansion.

5.5 Climate Change Considerations

In accordance with the Minister-approved Amended ToR, the Alternative Landfill Footprints were reviewed from a climate change adaptation and mitigation perspective. In support of the province of Ontario's *Climate Change Action Plan*, MECP developed a Guide entitled "Consideration of Climate Change in Environmental Assessment in Ontario" (the Guide) to aid proponents in considering climate change as part of EAs for infrastructure and facilities.

The Guide outlines the Ministry's expectations for considering climate change throughout the EA process. As stated in Section 3 of the Guide, consideration is to include:

- Greenhouse gas (GHG) emissions;
- Effects of a project on climate change;
- Effects of climate change on a project; and,
- How the project will minimize identified negative effects on climate change.

The preceding was considered as part of the SCRF EA in addressing the potential climate risks to the Alternative Landfill Footprints.

5.5.1 Historical Climate and Meteorological Trends

As part of reviewing the Alternative Landfill Footprints from a climate change perspective, an understanding of the historical climate/meteorological trends, as well as the potential for extreme weather events was established. Southern Ontario, including the City of Hamilton, 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. The City of 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 (John C. Munro Hamilton International Airport) Station (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 5.33**. 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 highest extreme maximum was in July of 1988 at 37.4˚C, and the lowest extreme minimum temperature was in January of 2004 at -30.0˚C (**Table 5.34**).

Precipitation

The mean climate normal monthly precipitation data are provided in **Table 5.35**. 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 5.36**). The highest rainfall experienced was 107.0 mm in 1989, and the highest snowfall experienced was 43.2 cm in 1966.

Table 5.33 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 5.34 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)

Table 5.35 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 5.36 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 5.37**). 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 5.37** 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 5.37 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 data obtained from 2000 to 2010 from Hamilton A Station (climate ID: 6153194) are representative of those that typically occur in much of Ontario, and are presented in **Table 5.38** (EC 2016b). Predominate wind comes from the west (36 percent of the time), southwest (13 percent of the time), and east (12 percent of the time)[28]. In winter, there are typically 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 5.38 The Average Observed Speed of the Maximum Gust from Hamilton A Station from 2000 to 2011

Month	Observed Average Speed of Maximum 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)

The preceding historical climate and climate trends were used to identify any possible climate change risks of concern for the construction, operation, closure/post-closure stages of the Alternative Landfill Footprints.

5.5.2 Potential Effects of Alternative Landfill Footprints 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

[28] Based on historical records from Hamilton RBG CS Station (climate ID: 6153301) from 2005 to 2012.

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 30). A landfill gas assessment was conducted in 2011, which confirmed that very little gas is generated at the SCRF. It should be noted that a commitment was made within the Minister-approved Amended ToR that an update to the 2011 landfill gas assessment would be carried out as part of the SCRF EA. This will be done during the impact assessment stage and potential effects of the undertaking on climate change will be revisited based on the results.

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.

5.5.2.1 Mitigation

In order to minimize or offset the effects of any one of the Alternative Landfill Footprints on climate change, in particular to reduce the GHG emissions associated with the construction, operation, closure, and post-closure stages of the landfill, impact management 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). Impact management measures include actions, such as utilizing different technologies and construction materials. Impact management measures and BMPs to reduce any one of the Alternative Landfill Footprints effect on the environment will be determined and implemented at the onset of each stage of the landfill. Possible BMP/impact management measures for the landfill stages 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 impact management measures, the Air Quality Monitoring Program will continue to ensure all emissions are within accepted standards.

As the GHGs released by the landfill are already below required standards and with the implementation of BMP/impact management measures, none of the six Alternative Landfill Footprints are anticipated to have a potential effect on climate change.

5.5.3 Effects of Climate Change on Alternative Landfill Footprints

Key potential effects of climate change that may occur during the lifetime of any one of the Alternative Landfill Footprints 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, such as the SWM system. Furthermore, extreme weather events could also cause potential power outages, physical damage and reduced access to the Site.

Notwithstanding this, the potential impacts of the climate change effects for all six Alternative Landfill Footprints 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 5.39** summarizes the assessment of potential effects of climate change on the six Alternative Landfill Footprints.

Table 5.39 Estimated Sensitivity of the Six Alternative Landfill Footprints to Potential Climate Change Effects[29]

Climate Parameters	Alternative Landfill Footprints						Explanation
	1	2	3	4	5	6	
Mean Temperature	NIL	NIL	NIL	NIL	NIL	NIL	A slight change in mean temperature and an increase in frequency and/or severity of extreme temperatures will not impact any of the six Alternative Landfill Footprints. There will be no impact to the SWM system or any of the other operational systems as Landfill operations varying in design are successfully conducted in areas with significantly higher/lower mean and extreme temperatures.
Frequency and/or Severity of Extreme Temperature	NIL	NIL	NIL	NIL	NIL	NIL	
Total Annual Rainfall	NIL	LOW	NIL	LOW	NIL	LOW	A slight change in annual precipitation will not impact landfill operations. Perimeter ditches and the SWM pond with two forebays can mitigate all the effects of increased runoff flows and volumes caused by the six Alternative Landfill Footprints. Furthermore, landfill operations are successfully conducted in areas with significantly higher/lower annual precipitation. Alternative Landfill Footprints Nos. 2, 4 and 6 may have the possibility to have low sensitivity to increase in annual precipitation as there are increased complications/concerns associated with the design of the SWM ponds within the 30m buffer in the northwest corner of the Site.
Total Annual Snowfall	NIL	LOW	NIL	LOW	NIL	LOW	
Frequency and/ or Severity of Precipitation and Weather Extremes	NIL	LOW	NIL	LOW	NIL	LOW	The landfill components have been designed to accommodate a Regional storm event. The Site has sufficient operating flexibility to allow for additional stormwater generated through larger storms. Given that the Site is permitted to (and currently does) discharge to the City's sanitary sewer system, this would allow for a contingency measure for a larger storm and ensure the SWM system returns to normal operating conditions within approximately two days. Alternative Landfill Footprint Nos. 2, 4 and 6 may have the possibility to have low sensitivity to increase the frequency and/or severity of precipitation and weather extremes as there are increased complications/concerns associated with the design of the SWM ponds within the 30m buffer in the northwest corner of the Site.
Soil Moisture & Groundwater	LOW	LOW	LOW	LOW	LOW	LOW	These items relate to potential weather changes. Landfill operations with varying footprint configurations and sizes, slopes and buffer distances are successfully conducted in areas with significantly different weather conditions. All six Alternative Landfill Footprints are anticipated to have no to very low sensitivity to these climate parameters.
Evaporation Rate	LOW	LOW	LOW	LOW	LOW	LOW	
Wind Velocity	LOW	LOW	LOW	LOW	LOW	LOW	

[29] Table modified from: "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (Federal-Provincial-territorial Committee on Climate Change, November 2003).

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, and closure/post-closure) or cause any severe damage to any of the landfill components associated with the six Alternative Landfill Footprints, except potentially the leachate management system and the stormwater system during closure/post-closure. However, the leachate and SWM systems have been designed to accommodate a Regional storm even, which is much greater than the historical daily maximum precipitation amount of 107 mm (**Table 5.36**), and the rainfall depth estimated for the 100-year storm event for the SCRF of 127.8 mm (**Table 5.37**).

The leachate and SWM systems 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 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 (construction, operation, and closure/post-closure). 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.

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 monitoring measures assist in providing data and information on how best to manage 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.

5.5.3.1 Adaptation

Additional analysis was undertaken to determine what adaptation measures may be required for the Site. Adaptation was focused on addressing effects of climate change on the six Alternative Landfill Footprints. The 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 that climate change will have no appreciable adverse effects on the six Alternative Landfill Footprints, identification of possible adaptation measures was undertaken to increase both the project's and the local ecosystem's resilience to climate change. It should be noted that there is no appreciable difference among the six Alternative Landfill Footprints from an adaptation perspective (all are the same).

To increase the Landfill Footprints and the local ecosystem's resilience to climate change, the Landfill Footprints 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, which is post-closure. As such, resources were focused on employing adaption measures upon closure of the landfill to ensure that it is resilient to climate change during the post-closure stage.

Adaptation measures were 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 5 to 10 years; and
- modifying the existing SWM ponds, if necessary.

The preceding is by no means a comprehensive list of the additional adaption measures that can be considered upon closure of the Site. As required by Section 31 of 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 BMPs will be prepared such that they can flexible enough to adapt to a changing climate.

5.6 Comparative Evaluation & Identification of the Recommended Landfill Footprint

As previously described, the Alternative Landfill Footprints were comparatively evaluated using a “Reasoned Argument” methodology to select a Recommended Landfill Footprint as specified in the Minister-approved Amended ToR. With this in mind, environmental component specific rankings were established based on the identified level of effect determined through the “net effects analysis”. Following this, overall rankings for each Alternative Landfill Footprint (e.g., most preferred, less preferred, least preferred) were determined based on the established component specific rankings. **Table 5.40** provides a summary of the comparative evaluation results. An explanation for the ranking summary by environmental component is provided after the table with additional details included in **Appendix D** of the Alternative Methods Report (**Appendix I**).

Table 5.40 Comparative Evaluation Summary of the Alternative Landfill Footprints

	Environmental Component	Evaluation Criteria	Landfill Footprint 1	Landfill Footprint 2	Landfill Footprint 3	Landfill Footprint 4	Landfill Footprint 5	Landfill Footprint 6
Natural	Geology & Hydrogeology	Effect on groundwater quality	🟢	🟢	🟢	🟢	🟢	🟢
		Effect on groundwater flow	🟢	🟢	🟢	🟢	🟢	🟢
		Rationale	All Alternative Landfill Footprints 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	Alternative Landfill Footprints Nos. 1, 3 and 5 are all more preferred because they maintain the Site's existing SWM ponds. Alternative Landfill Footprints Nos. 2, 4 and 6 are all less preferred because the Site's existing SWM 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 Alternative Landfill Footprints 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 impact management measures.					
	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 Alternative Landfill Footprints 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 impact management measures and no effects from an odour perspective.					
Built	Land Use	Effect on existing land uses	🟢	🟢	🟢	🟢	🟢	🟢
		Effect on views of the Facility	🟡	🟡	🔴	🟡	🟠	🔴
		Rationale	Alternative Landfill Footprints Nos. 1 and 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. Alternative Landfill Footprint No. 5 includes a greater height increase and views can be minimized through screening. Alternative Landfill Footprints Nos. 3 and 6 are less preferred because there is a relatively greater height increase and the views cannot be fully minimized through screening.					

Table 5.40 Comparative Evaluation Summary of the Alternative Landfill Footprints

	Environmental Component	Evaluation Criteria	Landfill Footprint 1	Landfill Footprint 2	Landfill Footprint 3	Landfill Footprint 4	Landfill Footprint 5	Landfill Footprint 6
Social	Human Health	Air Quality	🟡	🟡	🟢	🟡	🟡	🟡
		Leachate Quantity	🟢	🟢	🟢	🟢	🟢	🟢
		Groundwater Quality	🟢	🟢	🟢	🟢	🟢	🟢
		Surface Water Quality	🟢	🟢	🟢	🟢	🟢	🟢
		Soil Quality	🟢	🟢	🟢	🟢	🟢	🟢
		Rationale	Alternative Landfill Footprint No. 3 is considered preferred from a human health perspective. All other Alternative Landfill Footprints are considered less preferred, but would have a low potential for adverse effects with the continuation of the existing Site's impact management measures augmented with additional BMPs, where proposed, and ongoing monitoring.					
	Traffic	Effect on traffic	🟢	🟢	🟢	🟢	🟢	🟢
		Rationale	All Alternative Landfill Footprints 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.					
Economic	Economic	Effect on approved/planned land uses	🟢	🟢	🟢	🟢	🟢	🟢
		Economic benefit to the City of Hamilton and local community	🟠	🟠	🟢	🟠	🟢	🟢
		Rationale	Alternative Landfill Footprints Nos. 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. Alternative Landfill Footprints Nos. 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 Alternative Landfill Footprints 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.					

Table 5.40 Comparative Evaluation Summary of the Alternative Landfill Footprints

	Environmental Component	Evaluation Criteria	Landfill Footprint 1	Landfill Footprint 2	Landfill Footprint 3	Landfill Footprint 4	Landfill Footprint 5	Landfill Footprint 6
Technical	Design & Operations	Potential to provide service for disposal	🔴	🔴	🟢	🔴	🟢	🟢
		Leachate Management	🟡	🟠	🟢	🟠	🟡	🟠
		Stormwater Management	🟢	🟠	🟢	🟠	🟢	🟠
		Construction	🟡	🔴	🟢	🔴	🟡	🔴
		Site Operations	🟢	🔴	🟢	🟠	🟢	🔴
		Closure and Post-Closure	🟢	🟠	🟡	🟢	🟢	🟠
		Cost of Facility	🟡	🔴	🟢	🔴	🟡	🔴
		Rationale	Alternative Landfill Footprints Nos. 3 and 5 are both considered more preferred compared to the other Alternative Landfill Footprints from a design and operations perspective including their ability to provide the additional capacity being sought through the EA, but Alternative Landfill Footprints No. 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 Alternative Landfill Footprints are considered equivalent from the perspective of net environmental effects on the geologic and hydrogeological receptors, therefore, all Alternative Landfill Footprints are considered 'preferred.'

Surface Water Resources

The triangular SWM pond layout associated with Alternative Landfill Footprint Nos. 1, 3, and 5 is preferred over the narrower "L" shaped layout associated with Alternative Landfill Footprint Nos. 2, 4, and 6. This preference is due to the limitations and constraints that may occur during the design and construction of the SWM pond in the "L" shaped layout within the buffer zone. The berm that would need to be built will utilize more than half the area allocated for 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, Alternative Landfill Footprint Nos. 1, 3, and 5 are more preferred.

Terrestrial and Aquatic

Although Alternative Landfill Footprint Nos. 2, 4, and 6 result in a greater initial amount of vegetation and associated wildlife habitat (in the buffer areas) loss and disturbance to aquatic habitat and biota (stormwater pond relocations), the loss is temporary and can be mitigated similar to Alternative Landfill Footprint Nos. 1, 3, and 5. Therefore, all Alternative Landfill Footprints are equally preferred, because they would all have a low potential for adverse effects to the terrestrial and aquatic ecosystems, which are minimized through the use of standard impact management measures.

Air and Odour

From an atmospheric environment perspective, the SCRF will be required to meet MECP criteria for air quality and odour. From an odour perspective, all Alternative Landfill Footprints are equal, as the Site does not accept organic or putrescible material, ensuring minimal to no odours from the Site. With respect to Air Quality, all Alternative Landfill footprints and their associated operations are required to implement effective mitigation, such that the Facility will operate in accordance with MECP criteria.

All Alternative Landfill Footprint 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 impact management measures. All six Alternative Landfill Footprints are capable of operating within MECP guidelines with suitable dust impact management measures implemented.

Noise

All of the Alternative Landfill Footprints are considered equally preferred from a noise perspective, because there would be a low potential for adverse effects to area residents, which would be further minimized through the proposed impact management measures common to all, resulting in the required noise limits being achieved in all cases.

Land Use

All Alternative Landfill Footprints are preferred from a land use perspective, because none of the alternatives are anticipated to adversely affect or change the existing land use on both the Site and surrounding properties. From a visual perspective, Alternative Landfill Footprint Nos. 1, 2, and 4 are more preferred, because there is either no proposed height increase or a relatively low height increase and the views of the landfill can be minimized through screening. Alternative No. 5 includes a greater height increase and views can be minimized through screening. Alternative Landfill Footprint Nos. 3 and 6 are less preferred, because there is a relatively greater height increase and the views of the landfill are more extensive despite application of screening.

Human Health

All of the Alternative Landfill Footprints, except Alternative Landfill Footprint No. 3, have low net effects due to a marginal increase in larger airborne particulate size fractions (i.e., PM_{10}) modelled in the surrounding community, compared to the existing approved landfill design with the potential for transient short-term health concerns. This is not the case with Alternative Landfill Footprint No. 3, based on the proposed Alternative Landfill Footprint conceptual design. However, it is expected that these predicted exceedances are due to conservatism built into the Air Quality assessment.

Notwithstanding this, Alternative Landfill Footprint No. 3 is considered preferred from a human health perspective. All other Alternative Landfill Footprints are considered less preferred, but would have a low potential for adverse effects with the continuation of the existing Site's impact management measures augmented with additional BMPs, where proposed, and ongoing monitoring.

Traffic

All of the Alternative Landfill Footprints are considered equally preferred, because the number of trucks permitted at the Site in all cases would remain unchanged, resulting in no adverse effects on road user safety or intersection capacity.

Economic

Alternative Landfill Footprint Nos. 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. Alternative Landfill Footprint Nos. 1, 2, and 4 are less preferred, because they all result in the lowest economic benefit to the City and local economy.

Archaeology and Built Heritage

All of the Alternative Landfill Footprints are considered equally preferred from an archaeological and built heritage perspective, because none of them would adversely affect potential archaeological and cultural heritage resources.

Design and Operations

Alternative Landfill Footprint Nos. 3 and 5 are both considered more preferred compared to the other Alternative Landfill Footprints from a design and operations perspective, including their ability to provide the additional capacity being sought through the SCRF EA. However, Alternative Landfill Footprint No. 3 has the additional advantages of being easier to construct and having a lower overall capital cost compared to Alternative Landfill Footprint No. 5.

5.6.1 Ranking of the Alternative Landfill Footprints and Selection of the Recommended Landfill Footprint

Alternative Landfill Footprint No. 5: Reconfiguration and Vertical Expansion was ranked overall most preferred among the six Alternative Landfill Footprints comparatively evaluated based on the component specific rankings. The overall rankings for the six Alternative Landfill Footprints is presented as follows:

- Alternative Landfill Footprint No. 1 – Tied for Less Preferred
- Alternative Landfill Footprint No. 2 – Least Preferred
- Alternative Landfill Footprint No. 3 – Tied for Less Preferred
- Alternative Landfill Footprint No. 4 – Tied for Less Preferred
- Alternative Landfill Footprint No. 5 – Most Preferred
- Alternative Landfill Footprint No. 6 – Tied for Less Preferred

Alternative Landfill Footprint No. 5 was ranked overall most preferred, because it offered the greatest number of advantages with the fewest number of disadvantages compared to the other five

alternatives considered. The advantages associated with Alternative Landfill Footprint No. 5 are summarized as follows:

- A technically feasible design that provides for the additional capacity being sought through the SCRF EA. This will allow Terrapure to continue to support the growing local economy by providing disposal capacity for industrial residual material generated within Ontario and more specifically Hamilton and the GTA.
- A lower height increase compared to Alternative Landfill Nos. 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 components, including Geology, Hydrogeology, Surface Water, Terrestrial, Aquatic, and Atmospheric.
- Potential for adverse effects on the Natural Environment can be minimized through the use of standard impact management measures.
- No impacts to current land use designation and no change to Land Use Zoning.
- No impacts to archaeological, built heritage, or Indigenous resources.
- Maintains the existing SWM ponds, which provides design and operational flexibility.
- Leachate will be managed from a single area with one leachate pumping station.
- Access and egress from the Site will be maintained in their current configuration. A low potential for adverse effects to area residents, which would be further minimized through the use of standard impact management measures.
- Maximizes the economic benefits to the City of Hamilton, Upper Stoney Creek, and local industry by providing $349 million to $372 million to the local economy, with GDP from $218 million to $232 million. The Community Compensation would be maintained and maximized based on the current dollar per tonne agreements.
- Employment opportunities at the Site would be increased (year over year) under Alternative Landfill Footprint No. 5 based on the increased amount of employees required for the amount of residual material that this Alternative Landfill Footprint 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.
- Open layout with a simple configuration and dedicated areas for the various components. Open and uniform configuration that will simplify Site closure requirements and overall layout and contours of the Site do not limit the flexibility of potential post-closure uses.
- Disadvantages associated with Alternative Footprint No. 5 include:
    - Views of the Facility can be minimized, but less than other Alternative Landfill Footprints.
    - Generates a greater amount of leachate than other Landfill Footprint options.
    - Ease of implementation from a construction perspective is less than Alternative Landfill Footprint No. 3.
    - Requires greater capital investment.

With the preceding advantages in mind, Alternative Landfill Footprint No. 5 - Reconfiguration and Vertical Expansion was identified as the Recommended Landfill Footprint for the SCRF EA.

All of the other Alternative Landfill Footprints had fewer advantages and a greater number of disadvantages compared to Alternative Landfill Footprint No. 5, resulting in them being ranked lower. The following summarizes the rationale for the ranking of the other Alternative Landfill Footprints.

Alternative Landfill Footprint No. 1- Reconfiguration (Tied for Less Preferred)

Alternative Landfill Footprint No. 1 was considered less preferred in comparison to Alternative Landfill Footprint No. 5, because it does not meet the economic opportunity for Terrapure, and results in fewer economic benefits to the City and local community.

Alternative Landfill Footprint No. 2 – Horizontal Expansion (Least Preferred)

Alternative Landfill Footprint No. 2 was considered less preferred in comparison to Alternative Landfill Footprint No. 5, because it does not meet the economic opportunity for Terrapure, and results in fewer economic benefits to the City and local community. In addition, this alternative is less preferred in comparison to Alternative Landfill Footprint No. 5, based on the design and implementation complexities to existing stormwater and leachate management systems. Further, as many aspects of the sites infrastructure will require significant modifications, this increases this Alternatives costs, increases the complexity associated with closure requirements and reduces the flexibility of post-closure uses.

Alternative Landfill Footprint No. 3 – Vertical Expansion (Tied for Less Preferred)

Alternative Landfill Footprint No. 3 was considered less preferred in comparison to Alternative Landfill Footprint No. 5, because of the significant height increase of 12 m. Visual screening would not be able to completely mitigate views of the facility from existing visual receptors.

Alternative Landfill Footprint No. 4 – Reconfiguration and Horizontal Expansion (Tied for Less Preferred)

Alternative Landfill Footprint No. 4 was considered less preferred in comparison to Alternative Landfill Footprint No. 5, based on the design and implementation complexities to existing stormwater and leachate management systems and an increased leachate generation rates, as well as an increase in overall construction and Site operation complexities. Alternative Landfill Footprint No. 4 also results in higher facility costs than Alternative Landfill Footprint No. 5.and a high increase in Facility costs. Further, Alternative Landfill Footprint No. 4, does not meet the economic opportunity for Terrapure, and the economic benefit to the City and local community is slightly lower than Alternative Landfill Footprint No. 5.

Alternative Landfill Footprint No. 6 - Horizontal and Vertical Expansion (Tied for Less Preferred)

Alternative Landfill Footprint No. 6 was considered less preferred in comparison to Alternative Landfill Footprint No. 5, because of the height increase of 8 m which visual screening would not be able to completely mitigate the views of the Facility from existing visual receptors. Further, this Alternative is less preferred to Alternative Landfill Footprint No. 5, based on the design and implementation complexities to existing stormwater and leachate management systems, as well as increased Facility costs, increased closure requirements and reduced flexibility of post-closure uses relative to the current design.

5.6.2 Confirmation of the Preferred Landfill Footprint

The recommended **Alternative Landfill Footprint: Reconfiguration and Vertical Expansion** was presented to review agencies, Indigenous communities and the public for comments and feedback. Following consideration of all comments received, the recommended Alternative Landfill Footprint was then confirmed as the **Preferred Landfill Footprint**. This alternative was carried forward to the impact assessment stage, where additional detail from a design and operations perspective were developed, as well as more detail and specifics applied from an impact management (i.e., mitigation) perspective.

5.7 Leachate Collection and Treatment Considerations

A commitment to carry out an assessment of the existing leachate collection and treatment system as part of the SCRF EA relative to the Alternative Landfill Footprints was made in Section 5.1 of the Minister-approved Amended ToR. An assessment of the existing leachate collection and treatment system relative to the Alternative Landfill Footprints was completed as part of the alternative

assessment evaluations for several of the environmental components, including Hydrogeology and Geology, Surface Water Human Health, as well as Design and Operations.

Leachate Collection and Treatment considerations for each of the Landfill Footprints are presented in **Section 5.1, 5.4** and **Appendix I**. These include:

- the design, construction, and operating complexity of the leachate management system;
- the configuration of the base liner and leachate collection system;
- the leachate generation rate; and
- leachate pumping and discharge requirements.

For all of the Alternative landfill Footprints, leachate discharge was assumed to be via the sanitary sewer for treatment at the City of Hamilton's wastewater treatment plant. An existing sewer use agreement established with the City of Hamilton outlines requirements regarding the quantity and quality of the leachate that can be discharged from the Site. All of the Alternative landfill Footprints can incorporate additional measures on-Site as required to satisfy these requirements. These could include the pre-treatment of leachate and/or the temporary storage of excess leachate volumes in order to meet requirements of the discharge agreement. The agreement will be revised as required through consultation with the City of Hamilton in order to ensure that the treatment system is able to handle the leachate discharged from the Site.

Further considerations for Leachate Collection and Treatment system relative to the Preferred Landfill Footprint were prepared and analysed during the Impact Assessment Stage.

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Table Index

6. Detailed Impact Assessment of the Undertaking

As stated in **Section 5.6.2**, the Recommended Landfill Footprint (**Alternative Landfill Footprint No. 5 - Reconfiguration and Vertical Expansion**) was confirmed as the 'Preferred' Landfill Footprint (also referred to as the Preferred Method) taking into consideration comments received from agencies, Indigenous communities, and the public. Following confirmation of the Preferred Landfill Footprint, a detailed impact assessment was carried out in accordance with the Minister-approved Amended Terms of Reference (ToR).

The intent of impact assessment is to accomplish the following based on the Preferred Landfill Footprint being developed at a greater level of design then what was described at the Alternative Methods stage:

- Identify the potential environmental effects with more certainty;
- Develop more Site-specific impact assessment measures, as appropriate, for application;
- Identify the net environmental effects with more certainty;
- Define the appropriate monitoring requirements more clearly;
- Identify the specific approval/permitting requirements for the proposed Undertaking; and,
- Identify opportunities for design enhancements of the proposed Undertaking.

The preceding aspects were documented in the following nine standalone Detailed Impact Assessment Reports (**Appendix J-1** to **J-9**) as per the Minister-approved Amended ToR:

- Geology and Hydrogeology (**Appendix J-1**)
- Surface Water (**Appendix J-2**)
- Terrestrial and Aquatic (**Appendix J-3**)
- Atmospheric including:
  1) Air Quality and Odour (**Appendix J-4**), and
  2) Noise (**Appendix J-5**)
- Land Use and Economic (**Appendix J-6**)
- Traffic (**Appendix J-7**)
- Human Health (**Appendix J-8**)
- Design and Operations (**Appendix J-9**)

To facilitate the impact assessment, a Facility Characteristics Report (FCR) was prepared documenting the expanded level of design for the Preferred Landfill Footprint (**Appendix K**).

6.1.1 Description of the Preferred Landfill Footprint

The Preferred Landfill Footprint proposes to increase the approved capacity for post-diversion, solid non-hazardous industrial residual material at the SCRF by 3,680,000 m^3. The type (post-diversion, solid non-hazardous industrial residual material), annual volume of residual material (750,000 tonnes per year), and the maximum number of vehicles to the Site per day (250 per day) currently approved would remain unchanged with the Preferred Landfill Footprint. The capacity increase 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.

Vertical limits will extend higher increasing the peak height of the landfill by approximately 2.5 metres (m) from currently approved contour limits. Horizontal limits will extend further toward the north, back to the original approved footprint of the SCRF. The area currently approved to accept industrial fill will be replaced with a base liner system to accept post-diversion, solid non-hazardous industrial residual material.

The Preferred Landfill Footprint layout is presented in **Figure 6.1**. The limits of the base liner system will be expanded to a total footprint of approximately 59.1 hectares (ha). The overall Site area of 75.1 ha will not change. **Figure 6.1** shows the final extent of the landfill area after the final cover has been installed (the Post-Closure stage). The proposed Site entrance and exit will remain

the same, with the entrance maintained off of Upper Centennial Parkway and the exit on to First Road West. No waste vehicles will be permitted on Green Mountain Road.

Minimum on-Site buffer distances of 30 m will be maintained around the perimeter of the residual material area throughout all construction, operation, and closure/post-closure stages. Further details on the Preferred Landfill Footprint are provided in **Section 6.1.2**

LEGEND:

211.0 PROPOSED MAJOR CONTOUR (TOP OF RESIDUAL)

PROPOSED MINOR CONTOUR (TOP OF RESIDUAL)

PROPERTY BOUNDARY

ACCESS ROAD

PERIMETER DITCHING

RESIDUAL MATERIAL

BUFFER AREA

STORMWATER MANAGEMENT FACILITY

N

0 40 80 120m

STORMWATER OUTLET

GREEN MOUNTAIN ROAD

MAINTENANCE

SITE EXIT

TRUCK WASH

SITE ENTRANCE

UPPER CENTENNIAL PARKWAY

FIRST ROAD WEST

SCALE

SCALE HOUSE AND SITE OFFICE

PERIMETER DITCHING

LEACHATE PUMPING STATION

GROUNDWATER PUMPING STATION

MUD STREET

TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

11102771-00

Jun 18, 2018

PREFERRED ALTERNATIVE FOR THE STONEY CREEK REGIONAL FACILITY EXPANSION

FIGURE 6.1

CAD File: G:\Legacy\Geomorphic\GIS_Projects\11102771\GIS Figures\MXD\ACAD-Figure 1.1 Preferred Alternative Regional Facility Expansion_2013.dwg

6.1.2 Facility Characteristic Report

As mentioned, an FCR was prepared documenting the expanded level of design for the Preferred Landfill Footprint, including both its design and operations. Specifically, the FCR provides the following information:

- accepted materials, capacity, and fill rate;
- site configuration, footprint layout, and contours, including the Phases of landfill development;
- buffer areas and setbacks;
- infrastructure requirements;
- base liners and cover systems;
- leachate management;
- stormwater management;
- landfill gas management; and,
- traffic management.

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. A summary of key elements is provided below, with a fulsome description provided in **Appendix K.**

6.1.2.1 Landfill Phasing

The SCRF will be developed in stages in order to accommodate capacity demands, regulatory requirements, and operating conditions. The construction/operation of the SCRF will be developed in four (4) phases, with different sequencing for the following components:

- active landfilling area;
- constructed final cover;
- constructed base liner system;
- constructed stormwater management system;
- buffer areas; and,
- access roads and Site infrastructure.

The proposed staging of Phases 1 through 4 is presented in **Figures 6.2** through **6.5**, respectively. Post-closure conditions are presented in **Figure 6.6.** A summary of these components over each of the phases is provided in **Table 6.1.** Additional details on the progression of each Phase is provided following **Table 6.1**.

Table 6.1 Estimated Areas of SCRF Components

Component	Area (ha)					
	Existing Conditions	Phase 1	Phase 2	Phase 3	Phase 4	Post-Closure
Size of Active Landfilling Area	28.9	40.2	21.8	16.8	18.8	0.0
Total Area with Final Cover	11.3	0.0	18.4	32.9	40.3	59.1
Amount of Base Liner System Constructed during Phase	0.0	0.0	9.4	9.4	0.0	0.0
Total Area of Constructed Stormwater Management System	1.5	1.5	1.5	2.5	2.5	2.5
Total Footprint of Buffer Areas	13.5	13.5	13.5	13.5	13.5	13.5
Total Footprint of Undeveloped Areas	19.9	19.9	10.5	0.0	0.0	0.0
TOTAL	75.1	75.1	75.1	75.1	75.1	75.1

Existing Conditions → Phase 1

Construction

- The existing final cover in the southwest of the Site will be stripped.

Operations

- Landfilling activities will occur over the entire constructed base liner system.

Closure/Post-Closure

- No closure/post-closure related activities anticipated.

Phase 1 → Phase 2

Construction

- The weigh scale and scale house will be relocated to the southeast buffer area.
- A new, paved access road will be established from the existing entrance to the relocated scale facility.
- Construction of the base liner system will occur in the northeast portion of the Site.

Operations

- Residual material will be placed to the approved final grades in the southwest portion of the Site.
- Landfilling activities will occur over the east central portion of the Site.

Closure/Post-Closure

- Final cover will be constructed in the southwest portion of the Site.

Phase 2 → Phase 3

Construction

- The maintenance facility will be relocated to the northeast buffer area.
- The truck wash will be relocated to the northwest buffer area.

- The Site office will be relocated to the southeast buffer area and combined with the scale house office.
- The training center will be relocated off-Site.
- Construction of the base liner system will occur in the northwest portion of the Site.
- Stormwater drainage ditches will be constructed along the east and north perimeter of the Site.
- The stormwater management facility in the northwest corner of the Site will be reconfigured with two forebays, a detention pond, and a new outlet structure.

Operations

- Residual material will be placed to the approved final grades in the east central portion of the Site.
- Landfilling activities will occur over the northeast portion of the Site.

Closure/Post-Closure

- Final cover will be constructed in the east central portion of the Site.

Phase 3 → Phase 4

Construction

- No construction related activities anticipated.

Operations

- Residual material will be placed to the approved final grades in the northeast portion of the Site.
- Landfilling activities will occur over the northwest portion of the Site.

Closure/Post-Closure

- Final cover will be constructed in the northeast portion of the Site.

Phase 4 → Post-Closure

Construction

- Infrastructure such as the scale facility, Site office, maintenance facility, and truck wash will be removed.

Operations

- Residual material will be placed to the approved final grades in the northwest portion of the Site.

Closure/Post-Closure

- Final cover will be constructed in the northwest portion of the Site.
- Post-closure plans for the Site will be implemented.

LEGEND:

PROPERTY BOUNDARY

ACTIVE LANDFILLING AREA

CONSTRUCTED STORMWATER MANAGEMENT SYSTEM

BUFFER AREA

ACCESS ROAD

PERIMETER DITCHING

N

0 40 80 120m

GREEN MOUNTAIN ROAD

STORMWATER OUTLET

PARKING AREA

SITE OFFICE

SCALE HOUSE
SITE OFFICE

SCALE

SITE
EXIT

TRAINING CENTER

MAINTENANCE

ACCESS ROAD

TRUCK WASH

SITE
ENTRANCE

FIRST ROAD WEST

UPPER CENTENNIAL PARKWAY

LEACHATE
PUMPING
STATION

GROUNDWATER
PUMPING STATION

MUD STREET

TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

PHASE 1

11102771-00

May 7, 2018

FIGURE 6.2

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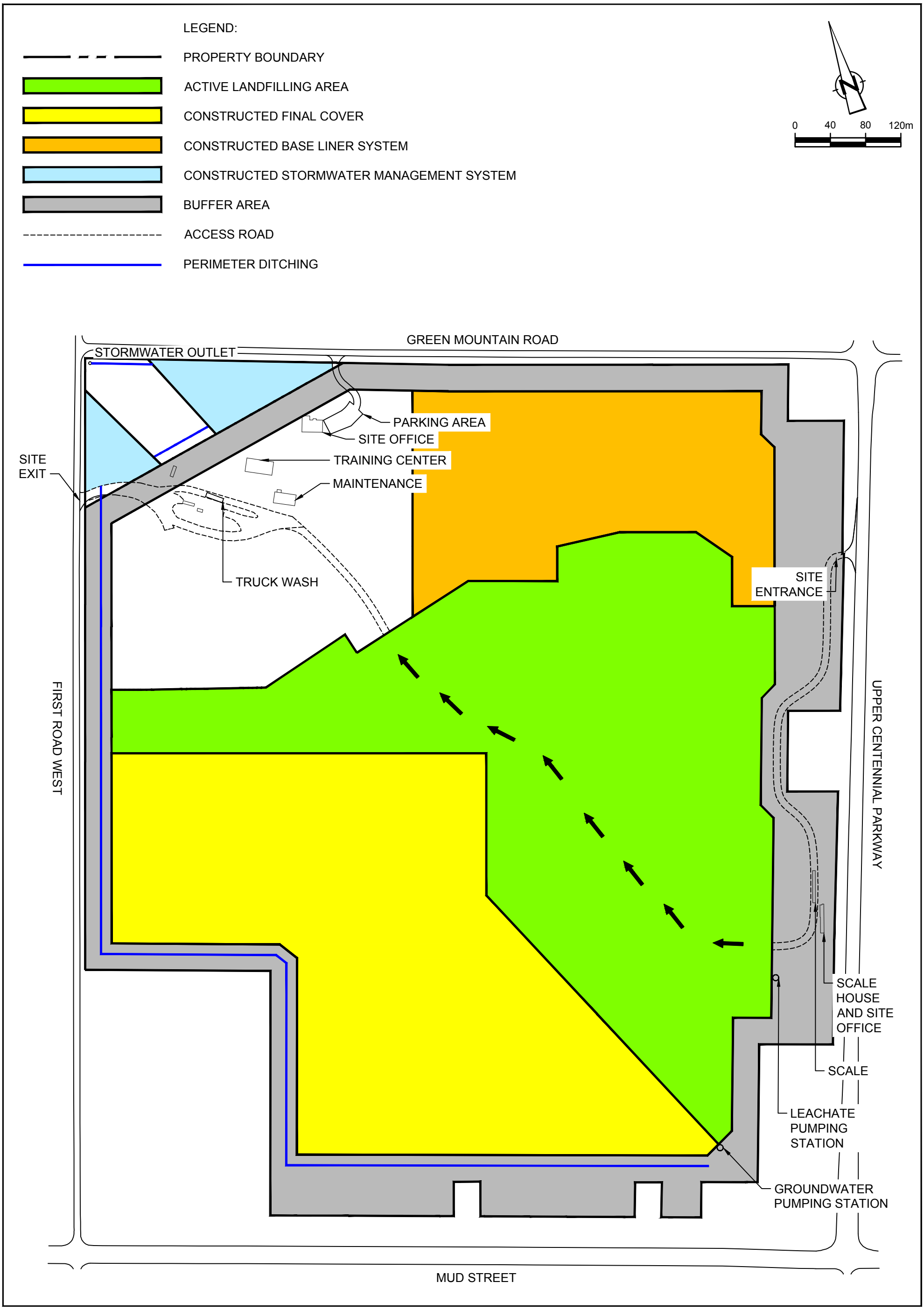

TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE
PHASE 2

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May 7, 2018

FIGURE 6.3

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LEGEND:

- PROPERTY BOUNDARY
- ACTIVE LANDFILLING AREA
- CONSTRUCTED FINAL COVER
- CONSTRUCTED BASE LINER SYSTEM
- CONSTRUCTED STORMWATER MANAGEMENT SYSTEM
- BUFFER AREA
- ACCESS ROAD
- PERIMETER DITCHING

0 40 80 120m

GREEN MOUNTAIN ROAD

STORMWATER OUTLET

MAINTENANCE

SITE EXIT

SITE ENTRANCE

TRUCK WASH

FIRST ROAD WEST

UPPER CENTENNIAL PARKWAY

SCALE HOUSE AND SITE OFFICE

SCALE

LEACHATE PUMPING STATION

GROUNDWATER PUMPING STATION

MUD STREET

TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE
PHASE 3

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FIGURE 6.4

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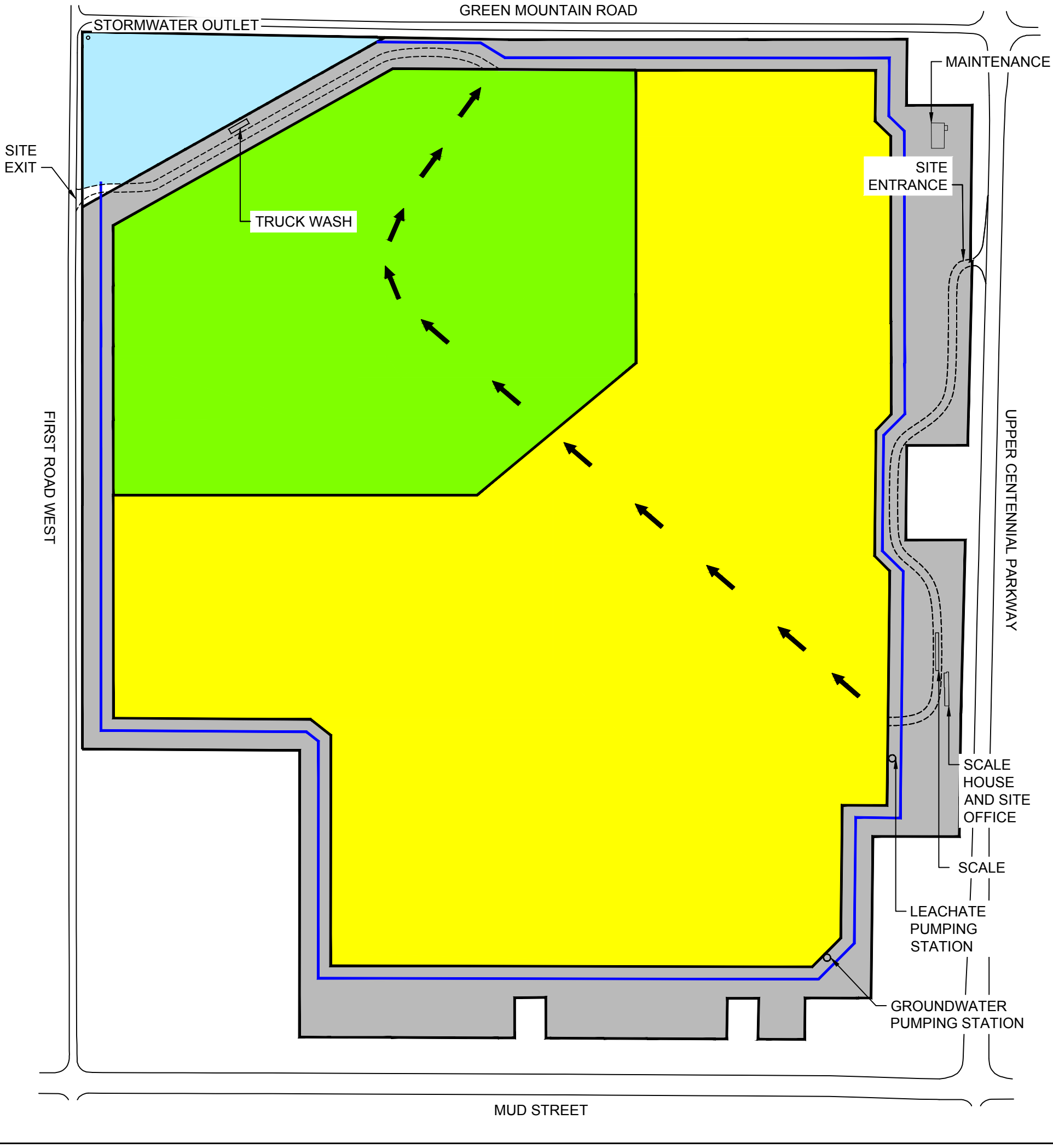
LEGEND:

- PROPERTY BOUNDARY
- ACTIVE LANDFILLING AREA
- CONSTRUCTED FINAL COVER
- CONSTRUCTED STORMWATER MANAGEMENT SYSTEM
- BUFFER AREA
- ACCESS ROAD
- PERIMETER DITCHING

0 40 80 120m



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE
PHASE 4

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May 7, 2018

FIGURE 6.5

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LEGEND:

PROPERTY BOUNDARY

CONSTRUCTED FINAL COVER

BUFFER AREA

ACCESS ROAD

PERIMETER DITCHING

0 40 80 120m

GREEN MOUNTAIN ROAD

STORMWATER OUTLET

SITE EXIT

SITE ENTRANCE

FIRST ROAD WEST

UPPER CENTENNIAL PARKWAY

LEACHATE PUMPING STATION

GROUNDWATER PUMPING STATION

MUD STREET

TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

POST-CLOSURE

11102771-00

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FIGURE 6.6

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Landfilling will occur over the completed base liner system and will generally progress in a counter-clockwise direction towards the northwest portion of the Site.

- Landfilling will occur over the entire active area of the Site during Phase 1.
- Landfilling will occur over the east central portion of the Site during Phase 2.
- Landfilling will occur over the north east portion of the Site during Phase 3.
- Landfilling will occur over the north west portion of the Site during Phase 4.

The edge of the base liner system at each phase boundary will be terminated with temporary containment berms to prevent leachate movement off the lined area. As the liner system is extended into the next phase, the temporary berms will be removed and reconstructed at the edge of the new phase.

Trucks will access the active landfilling area via internal haul roads that will vary over the life of the Site, depending on construction staging and the location of the active landfilling area. Residual material will be placed to the approved final grades in completed portions of the Site prior to applying final cover.

6.1.2.2 Site Infrastructure

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;
- A new, paved access road will be established in the east buffer area 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; and,
- site infrastructure will be decommissioned during post-closure, as dictated by Site end use.

6.1.2.3 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 (SWM) facility in the northwest corner of the Site. These buffer distances will also be maintained.

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. This will include the construction of new access roads, and relocation of the scale facility and Site office in Phase 2, and the relocation of the truck wash in Phase 3. Site infrastructure will be decommissioned and removed from the buffer area during post-closure, as dictated by Site end use.

6.1.2.4 Base Liner System

The SCRF is underlain by a 3 m thick double liner system that consists of the following components (from bottom to top):

a) base grading layer;

b) 1.0 m thick secondary compacted clay liner;

c) geotextile separator layer;

d) 0.5 m thick hydraulic control layer;

e) geotextile separator layer;

f) 1.0 m thick primary compacted clay liner;

g) 80 mil (2 mm) high density polyethylene (HDPE) geomembrane barrier layer;

h) geotextile protection layer;

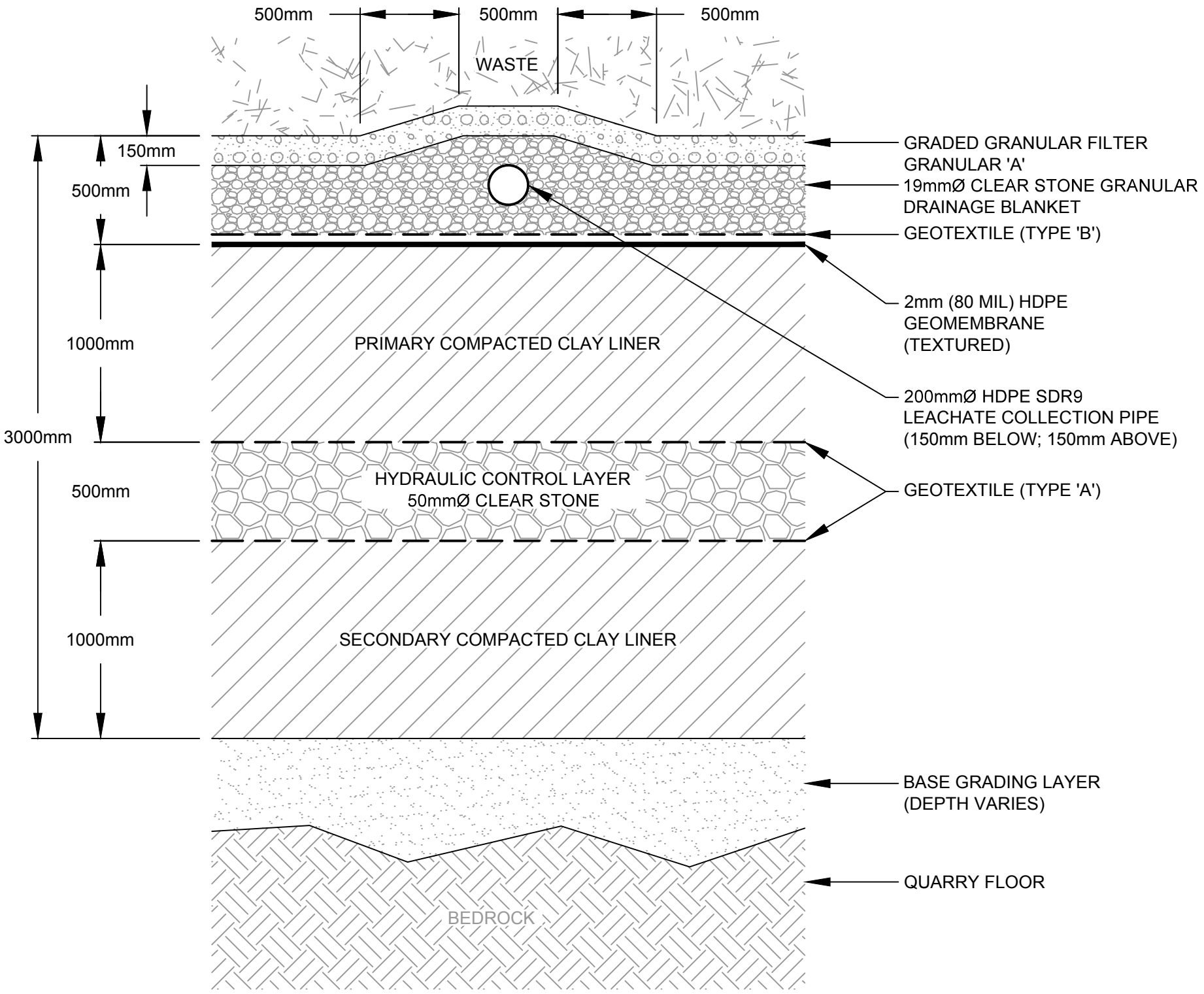
i) clear stone granular drainage blanket;

j) HDPE leachate collection pipes; and,

k) graded granular filter layer.

A typical cross-section through the base liner system is presented in **Figure 6.7**.

The design of the base liner system will remain unchanged from the current design. The base liner system will 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.



TYPICAL CROSS SECTION THROUGH BASE LINER SYSTEM

6.1.2.5 Daily Operations

The Site's normal operating hours for the receipt of waste are from 7:00 a.m. to 5:00 p.m., Monday to Friday. However, non-landfilling related activities (e.g., maintenance, monitoring) do occur outside of these hours on occasion. The Site is typically closed weekends and all statutory holidays.

The SCRF employs the following roles to maintain daily Site operations:

- scale house attendant;
- environmental monitoring technicians;
- administrative staff;
- heavy equipment operators; and,
- management staff.

The Site currently utilizes the following equipment for Site operations:

- one Caterpillar 336F excavator;
- two Caterpillar D6T bulldozers;
- two front end loaders: a Caterpillar 972M and a Caterpillar 950F; and,
- additional service vehicles including a street sweeper, water truck, crane truck, pickup trucks, and all-terrain vehicles.

The following describes the general steps involved in the waste receiving process:

a) trucks enter the Site from the Upper Centennial Parkway entrance;

b) trucks are weighed on the weigh scale;

c) drivers check-in with the scale house operator to confirm acceptance of materials, provide administrative information about the material, and to generate a record of the transaction;

d) trucks enter the active landfilling area and proceed to the waste tip face;

e) material is unloaded, spread, and compacted using a bulldozer;

f) trucks proceed to the wheel wash station; and,

g) trucks leave the Site via the First Road West exit.

Other routine operations at the Site include administrative tasks, operations management, maintenance work, and environmental monitoring activities.

The Site operating hours, staffing, equipment, waste receiving process, and other administrative tasks, operations management, maintenance work, and environmental monitoring activities are expected to remain as presented above over all phases. Residual material will no longer be accepted at the Site following closure, and daily operations will cease.

The key objective for the landfill design and operations will be to 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.

6.1.2.6 Traffic

Trucks will continue to use the existing entrance and exit over the life of the Site. A new, paved access road will be constructed in the east buffer 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.

The daily maximum number of vehicles depositing residual material at the Site will continue to be restricted to a maximum 250 vehicles.

Truck traffic associated with the operation of the landfill will generally include transfer trailers 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.

6.1.2.7 Leachate Management

The leachate collection network of perforated pipes on top of the base liner system will be expanded progressively over the entire landfill footprint. The leachate collection system will continue to be sloped at 0.5% towards the southeast, where it will drain by gravity to a leachate pumping station.

The leachate generation rate will vary over the operational and post-closure period of the Site, and is influenced by factors including precipitation, waste characteristics, 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. Leachate generation rates are expected to be generally consistent with flows predicted during the design of the Site. The leachate quality is also expected to be similar to current operations, since the residual materials accepted at the Site will remain relatively consistent. Leachate generation rates for the Preferred Landfill Footprint were developed using the Hydrologic Evaluation of Landfill Performance (HELP) model during the impact assessment stage.

Leachate is currently discharged to a gravity main that flows to the equalization pond in the adjacent closed west Site before being discharged to a sanitary sewer under Mistywood Drive. Terrapure have undertaken preliminary work to establish a new discharge location to an existing sanitary sewer under Upper Centennial Parkway. It is assumed that a new discharge connection will be established in Phase 1, separating flows between the two sites. The closed west Site will continue to use the existing discharge connection to the sanitary sewer under Mistywood Drive, but the equalization pond will be decommissioned. Any modifications to the leachate discharged from the SCRF (e.g., location of connection to sanitary sewer) will necessitate amending the existing sewer use agreement through consultation with the City.

The current estimate for the contaminating lifespan of 200 to 300 years noted in the Design and Operations Report has been reassessed during the impact assessment stage.

6.1.2.8 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 provides several important leachate control functions both during and after the operating period of the landfill.

During the operating period, the HCL functions as a contingency (secondary) collection layer for the small amounts of leachate that migrate through the primary liner, allowing the concentrations of any contaminants (if any are detected) to be assessed, and allowing for the removal of any such contaminants before they can have any impact on the environment. Injection and extraction wells

are constructed around the perimeter of the landfill footprint which are used to add or remove liquids from the HCL. The HCL is operated such that there is negligible migration of contaminants across the secondary clay liner at any time.

Hydraulic containment is not practical until the entire liner system has been constructed and a sufficient thickness of waste has been placed across the entire Site to minimize liner uplift potential. Just prior to Site closure, the HCL will be saturated with clean water from the municipal supply, and the head within the layer will be maintained above the leachate head within the landfill, in order to provide hydraulic containment. This is done by creating an inward flow of clean water across the primary liner to prevent the movement of contaminants from the waste.

The design and operation of the HCL currently in place at the SCRF will remain unchanged as a result of the proposed capacity increase. The HCL will be constructed over the remaining portions of the landfill footprint and will be hydraulically connected to the existing HCL. Injection and extraction wells will continue to be constructed around the perimeter of the landfill footprint and will be used to add or remove liquids from the HCL. The water within the HCL will continue to be monitored for the presence of leachate impacts. Any leachate that has migrated through the primary liner will be removed and discharged to the sanitary sewer, while clean water would be added from a municipal supply. The HCL will continue to be operated such that there is negligible migration of contaminants across the secondary clay liner at any time.

6.1.2.9 Final Cover

The final cover consists of 0.60 m of compacted clay and 0.15 m of vegetated topsoil.

Final cover staging 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.

Additional final cover will be constructed as active landfilling areas are progressively filled to the approved final contours, eventually covering the entire landfill.

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.

6.1.2.10 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 surface 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 SWM system is not expected to change, 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 SWM system constructed to date 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 will 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 SWM system are not expected to be required since the overall catchment area of the Site will remain largely unchanged.

6.1.2.11 Groundwater Management

Groundwater is currently collected through a series of drainage trenches excavated in the bedrock below the base liner system. Groundwater is conveyed through perforated piping where it drains by gravity to the southeast corner of the Site. From there it is recovered via a groundwater pumping station and conveyed to a storage pond in the northwest corner of the Site before being recycled for use in Site operations (e.g., truck wash, dust control) and ultimately discharged to the sanitary sewer.

The design and operation of the groundwater management system currently in place will remain as a result of the proposed capacity increase. The network of drainage trenches and piping excavated within the bedrock will be extended as construction of the base liner system progresses. Groundwater will continue to be conveyed by gravity to a pumping station in the southeast corner of the Site, where it will be recovered for use in Site operations (i.e., truck wash, dust control) and ultimately discharged to the sanitary sewer.

While no changes are anticipated to the groundwater pumping station, the discharge outlet is proposed to be relocated to the sanitary sewer under Upper Centennial Parkway.

6.1.2.12 Site Closure and End Use

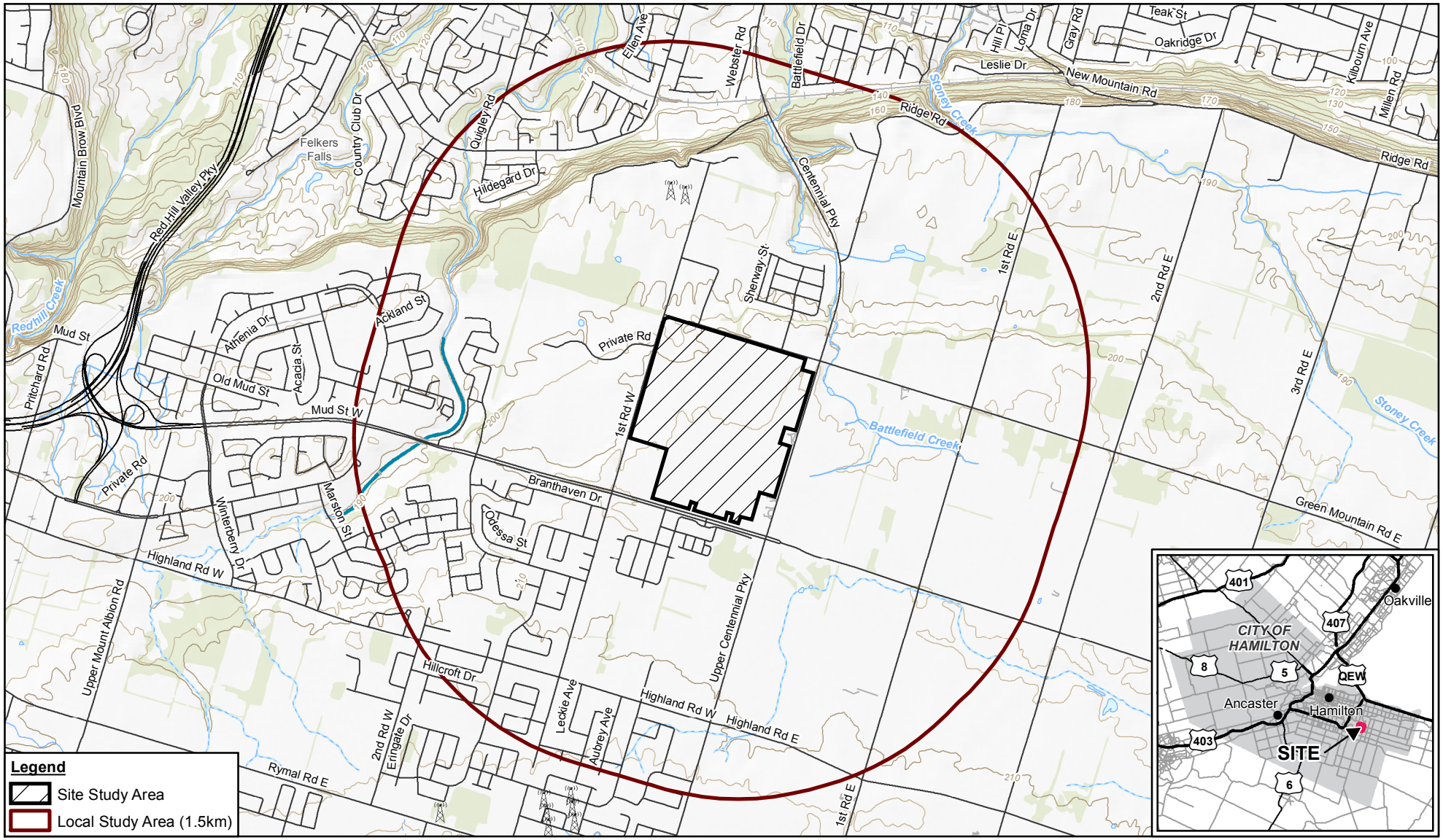
Site closure will follow the completion of the landfill to the approved contours. Closure activities include final cover construction, removal of roads and waste receipt facilities that are not required in the post-closure period, and implementation of a long-term monitoring and maintenance program.

Site end use will be determined through consultation with the local community and other stakeholders as part of the EA approvals processes. 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 environmental controls.

6.1.3 Study Areas

The specific Site Study Area and Local Study Area used for Impact Assessment purposes for each Environmental Component (Natural, Built, Social, Economic and Cultural) are consistent with those used during the Alternative Methods stage (**Figure 6.8**).



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

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
SITE AND LOCAL STUDY AREA

11102771-03
Nov 30, 2017

FIGURE 6.8

GIS File: Q:\GIS\PROJECTS\11102000s\11102771\Layouts\005\11102771-03(005)GIS-WA002.mxd

6.1.4 Impact Assessment Methodology

The assessment of impacts associated with the Preferred Landfill Footprint was undertaken through a series of steps that were based, in part, on a number of previously prepared reports (Existing Conditions Reports, and the Alternative Methods Report). The assessment of the six Alternative Landfill Footprints was based on a conceptual level of design. The effects of the Preferred Landfill Footprint were reviewed within the context of the detailed design plans developed for the Preferred Landfill Footprint to determine the type and extent of any additional investigations required to ensure a comprehensive effects assessment. Additional investigations were then carried out, where necessary, in order to augment the previous work undertaken.

With these additional investigations in mind, the potential impacts on the Natural, Built, Social, Economic and Cultural Environments of the Preferred Landfill Footprint was documented. The impact assessment has taken into account the construction, operation, and closure/post-closure periods of the proposed Undertaking.

With a more detailed understanding of the Natural, Built, Social, Economic and Cultural Environments developed, the previously identified potential effects and proposed impact management measures associated with Alternative Landfill Footprint No. 5 (Preferred Landfill Footprint) were reviewed to ensure their accuracy in the context of the preliminary design. Based on this review, the potential effects, impact management, and net effects associated with the Preferred Landfill Footprint were confirmed (or revised where necessary) and documented.

Following this confirmatory exercise, the requirement for monitoring in relation to net effects was identified, where appropriate (**Section 8**). Finally, any additional approvals required as part of the implementation of the Preferred Method were also identified (**Section 9**).

6.2 Impact Assessment Results

The impact assessment results are summarized in the following sections beginning with the Natural Environment and ending with Design and Operations.

6.2.1 Natural Environment

6.2.1.1 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.

Potential Effects on Geology and Hydrogeology

Groundwater Quality

Leachate Generation

As discussed in **Appendix A** of the Geology and Hydrogeology Detailed Impact Assessment Report (**Appendix J-1)**, 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 modelling conducted, **Table 6.2** summarizes the predicted leachate generation rates under various stages of landfill development, including closure conditions for the Preferred Landfill Footprint, as well as the current approved landfill footprint.

Table 6.2 Predicted Leachate Generation Rates

Landfilling Stages	Active Landfilling Area (ha)	Leachate Generation Rate (m^3/yr)
Existing Conditions	28.9	164,712
Current Approved Landfill Footprint – Post-Closure	0	121,136
Phase 1	40.2	183,219
Phase 2	21.8	153,084
Phase 3	16.8	172,634
Phase 4	18.8	203,357
Proposed Expansion – Post-Closure	0	172,567

The results presented in **Table 6.2** demonstrate that the annual leachate generation rates will vary during the different stages of landfill development. Leachate generation is highest during Phase 4, with 203,357 m^3 of leachate generated per year.

Leachate Leakage through the Liner System

To understand the potential impact 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 leachate leakage modelling is undertaken as a "worst-case" scenario by excluding the additional protection resulting from the HCL. The liner system incorporated into the landfill design is highly protective of the natural environment and while it is likely that there will be some leakage through the primary liner before the HCL becomes operational, it will be minimized by the presence of a composite (geomembrane and compacted clay) liner and the existing groundwater control systems in place (M4 extraction well, groundwater collection trenches beneath the liner, etc.).

Leachate leakage modelling was undertaken by calculating the amount of leachate leakage through the primary composite liner system using a method provided in *Rowe (2012)*. This method calculates the leakage that occurs through a composite liner system where a defect (hole) in the geomembrane liner is in contact with a connected wrinkle in the geomembrane. Field studies of composite liner systems at solid waste landfills have demonstrated that these conditions are common due to typical construction practices employed at landfills in North America. When a defect is in contact with a connected wrinkle in the geomembrane of a composite liner system, this defect/wrinkle combination will be the source of the majority of leakage through the composite liner. Ideal construction practices (perfect continuous contact between the geomembrane and the compacted clay liner) are uncommon and accordingly, the leachate leakage modelling undertaken is considered much more conservative and representative of typical composite liner landfills in North America than that often used.

The results of the leachate leakage modelling are provided in detail in **Appendix B** of the Geology and Hydrogeology Detailed Impact Assessment Report (**Appendix J-1)**. Leachate leakage through the primary liner was modelled for the current approved landfill footprint under final closure, as well as the Preferred Landfill Footprint under final closure. The results of this leakage modelling are summarized in **Table 6.3**.

Table 6.3 Predicted Leachate Leakage Rates

Landfilling Section	Active Landfilling Area (ha)	Leachate Leakage Rate (m^3/yr)	Leachate Leakage Rate (m^3/m^2/yr)	Leachate Leakage Rate (lphd)
Preferred Landfill Footprint	0	4,870	0.0082	226
Current Approved Landfill Footprint Post-Closure	0	3,420	0.0082	226

As presented in **Table 6.3**, the leakage rates per unit area are the same for the current approved landfill footprint and the Preferred Landfill Footprint. The difference between the total annual leakages calculated (3, 420 m^3/yr vs 4,870 m^3/yr) is a function of the difference in the total landfill footprint area between the current approved landfill footprint and the Preferred Landfill Footprint.

Effects of Leachate Leakage 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 B** of the Geology and Hydrogeology Detailed Impact Assessment Report (**Appendix J-1)**.

Additional contaminant mass from leachate leakage can result in increases in 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 calculated chloride concentrations in monitoring wells located at the downgradient boundary under closure conditions for both the Preferred Landfill Footprint, as well as the current approved landfill footprint within the Vinemount Flow Zone (VFZ). The VFZ directly underlies the landfill liner and has comparatively limited upgradient flux. Thus, the VFZ is most representative of a flow zone to be 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 mass loading would enter the VFZ.

Table 6.4 Predicted Downgradient Chloride Concentrations by Flow Zone

Well ID	Flow Zone	RUC Trigger Level	Upgradient Concentration (2017 median)	Predicted Downgradient Concentrations		2017 Median Concentration (mg/L)
				Current Approved Landfill Footprint	Preferred Landfill Footprint	
47-III	VFZ	193	**335**	**2,070**	**2,210**	**225**
48-V	VFZ	304	**335**	**2,210**	**2,310**	**820**
60-III	VFZ	342	**335**	**2,100**	**2,230**	325
61-III	VFZ	232	**335/580**	**2,130**	**2,250**	**480**
47-II	UFZ	340	**5,300**	**1,850**	**2,030**	175
61-II	UFZ	508	**5,300**	**1,870**	**2,040**	225
46-IIR	UMFZ	307	**24,500**	**850**	**1,030**	180
48-II	UMFZ	983	**24,500**	**1,450**	**1,570**	**1,005**
56-I	UMFZ	1150	**24,500**	1,060	**1,220**	480
48-I	LFZ	20,500	**59,500**	2,030	2,050	1,950
60-IV	LFZ	2,950	**59,500**	1,720	1,760	1,600

Notes: all concentrations are in mg/L
(m^3/year / m^3/day) leachate leakage rate
Median upgradient concentrations are taken from monitoring wells P10, 51, and 72
BOLD concentrations are in excess of the RUC (Reasonable Use Criteria) Trigger Levels

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 Detailed Impact Assessment Report (**Appendix J-1)**.

Two important observations are made from **Table 6.4** as follows:

1. The predicted downgradient concentrations resulting from the mass loading of modelled leachate leakage through the primary composite liner to the underlying flow zones results in relatively similar downgradient water quality for both the current approved landfill footprint and Preferred Landfill Footprint scenarios.
2. With few exceptions, the upgradient concentrations of chloride and predicted downgradient concentrations of chloride under both closure scenarios are higher than the 2017 median chloride concentrations for downgradient monitoring wells.

The first observation noted above is important in that it demonstrates that the difference between current approved landfill footprint and Preferred Landfill Footprint worst-case scenario mass loading of leachate contaminants to underlying flow zones is minor.

The second observation is of particular importance as it demonstrates that the existing groundwater protection systems in place are suitably mitigating potential leakage of leachate-related impacts to the underlying flow zones. Although the Site has been in operation for more than 20 years, there have been no observed negative impacts of any landfill leakage, and in fact the observed 2017 downgradient groundwater quality had better water quality than that observed upgradient of the landfill.

Based on the pattern in water quality presented in **Table 6.4,** and observed and reported on through the ongoing Site environmental monitoring program, it is apparent that significant impact leachate from the landfill into the underlying flow zones is not occurring. This pattern can be explained by the operation of the groundwater control systems currently in operation at the Site. A detailed description of these systems is included in Geology and Hydrogeology Detailed Impact Assessment Report (**Appendix J-1**).

In addition it is important to note that it is possible to monitor concentrations in the hydraulic control layer and, if needed, to reduce concentrations by flushing with city water prior to operation of the HCL (to occur at landfill closure). If the HCL is monitored and operated in this manner (such that concentrations remain very low in the HCL), then the HCL and the secondary clay liner alone will keep any escape of contaminants to a negligible level, providing an additional level of protection. Accordingly, a monitoring program for the HCL has been proposed (**Section 8**).

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) for the City of Hamilton water intake. As detailed in **Table 6.4**, conservative predictions of downgradient groundwater quality show very similar results for the Preferred Landfill Footprint and the current approved landfill footprint. The modelling results show minimal effects on predicted groundwater quality prior to implementation of impact management 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 (impact management 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

As discussed above, leachate leakage has been estimated using the methods provided in *Rowe* (2012). The results of the modelling provide a rate of vertical leachate leakage per time which can be used to evaluate changes in hydraulic gradients and groundwater flow in the receiving flow zone as a result of leachate leakage.

Leakage through the landfill's primary liner system under the 'worst-case' scenario will contribute an average volume of 13.3 m^3/day under the Preferred Landfill Footprint. Assuming that the volume of leakage is distributed evenly across the landfill footprint, leakage adds an additional 2.2 mm per hectare per day of hydraulic head on the existing flow zones. In theory, this leakage will 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.

Under the scenario of the current approved landfill footprint, leakage modelling shows that 9.37 m^3/day will migrate through the primary liner system. Although this is less leakage volume compared to the Preferred Landfill Footprint, that volume is divided across a smaller landfill footprint and the resulting additional hydraulic head is identical between the two scenarios (2.2 mm per hectare per day). Thus, the difference in hydraulic influence between the current approved landfill footprint and the Preferred Landfill Footprint will be minimal.

It is important to note that in 2016 and 2017, extraction well M4 (when in operation) extracted averages of 70 m^3/day and 150 m^3/day (70,000 L/day and 150,000 L/day) from beneath the landfill footprint. Groundwater contour maps in the 2017 Annual Monitoring Report (GHD, July 2018) show a depression in groundwater elevation in the vicinity of M4 of at least 6 m. M4's interpreted zone of influence extends upgradient across the landfill and covers nearly the entire landfill footprint. In comparison, potential contributions from leachate leakage are dwarfed by the groundwater extracted at M4.

It should be noted that in 2016 and 2017, groundwater levels at the SCRF were being affected by dewatering associated with sewer construction along Upper Centennial Parkway, which resulted in a historically low extraction volumes from M4. Higher extraction volumes are expected in future years which will increase the influence of M4 on the surrounding groundwater flow.

Proposed Impact Management Measures

The assessment of potential environmental effects 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 impact management measures for the Preferred Landfill Footprint.

The following describes the environmental control systems in place at the SCRF and their relevance to the predicted impacts to groundwater quality and groundwater flow of the Preferred Landfill Footprint.

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. 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 Upper Centennial Parkway, 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. On the basis of historical performance of this extraction well, potential leakage from the landfill will be mitigated by operation of M4.

As a result, extraction well M4 will be maintained and operated for the purpose of collecting potentially impacted groundwater and maintaining inward gradients for 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. Accordingly, pumping of the groundwater collection trench network should be included as part of the Site's ongoing operational practices to ensure potential impacts to shallow groundwater do not migrate beyond the landfill footprint.

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 (primary clay liner). Maintaining an upward hydraulic gradient across the primary clay liner will ensure that downward leaking of leachate across the primary clay liner cannot occur. In order to ensure proper operation of the HCL following closure, water levels, quality and flows will be monitored at the HCL injection points. The monitoring program included in the approved Design and Operations report specifies that water level monitoring will be undertaken on a monthly basis for the first two years following flooding of the HCL and quarterly thereafter. The water level data will be compared to leachate level data to ensure that hydraulic containment is maintained. Per the original Design & Operations report developed for the SCRF, it was estimated that the overall rate of water replacement in the HCL, if calculated on a continuous basis, would need to be in the order of less than 1 L/s.

Accordingly, operation of the HCL will provide a substantial degree of additional protection against discharge of leachate through the liner into the natural environment.

Because the design of the HCL does not accommodate deliberate flooding prior to full construction, it is prudent to operate the HCL in such a way as to minimize the risk of leakage to the natural environment during the operating stages of the SCRF. This can be accomplished by operating the HCL in a fully-drained condition whenever possible prior to full construction. Frequent de-watering of the HCL will ensure that leachate which has migrated through the primary liner will be removed from the HCL prior to discharging through the secondary liner and into the natural environment. As dewatering of the HCL during the operating stages of the landfill cannot ensure all leakage is

removed immediately, there will be some leakage through the secondary liner. This leakage will be managed by the groundwater management systems described above.

It is further recommended that a monitoring program is implemented for the HCL. This monitoring program would be put in place for the purpose of identifying leachate-related impacts to water quality within the HCL. Any leachate impacts identified from the HCL monitoring program would be taken as an indication of leakage through the primary liner and this information can be used to inform leachate management decisions for the SCRF. The recommended monitoring program for the HCL is outlined in **Section 8**.

A survey of all downgradient properties within the Local Study Area should be undertaken to identify existing downgradient private water supply wells. Any private water supply wells identified in this area should be incorporated into the groundwater monitoring program, pending permission from the well owners and property tenants.

Net Effects

The net environmental effects of the Preferred Landfill Footprint on geology and hydrogeology have been determined through applying the impact management measures described above to the potential environmental effects identified.

In consideration of the minor variations in predicted downgradient groundwater quality between the Preferred Landfill Footprint and the current approved landfill footprint, and the conservative nature of the modelling performed to predict the potential environmental effects, the impact management measures described in the above 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.

6.2.1.2 Surface Water

Predictive modelling 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 modelling served to evaluate the changes to the peak flows and runoff volumes for Preferred Landfill Footprint when compared to the baseline condition. Modelling 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, SWM ponds, etc.). Additional modelling was performed which includes preliminary SWM measures, which means the modelling results assume controlled flows. Rough preliminary sizing was performed so that measures that contain and capture the runoff could be shown in the modelling results. This was done to show that the proposed impact management measures are able to function at the Site.

The results of the modelling of the uncontrolled peak flows and runoff volumes for each condition are summarized in **Tables 6.5 and 6.6** below.

Table 6.5 Peak Flow Comparison

Preferred Landfill Footprint	Uncontrolled 2-year Storm		Uncontrolled 100-year Storm	
	Peak Flow (m3/s)	Percent Difference to Baseline	Peak Flow (m3/s)	Percent Difference to Baseline
Existing/Baseline	0.969	N/A	6.616	N/A
Preferred Landfill Footprint	0.969	0.00%	6.313	-4.58%

Table 6.6 Total Runoff Volume Comparison

Preferred Landfill Footprint	Uncontrolled 2-year Storm		Uncontrolled 100-year Storm	
	Peak Flow (m3/s)	Percent Difference to Baseline	Peak Flow (m3/s)	Percent Difference to Baseline
Existing/Baseline	14,051	N/A	57,985	N/A
Preferred Landfill Footprint	15,564	10.77%	61,735	6.47%

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 were no perimeter ditches or SWM pond to capture runoff) would 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[1]. Runoff would 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.

Proposed Impact Management Measures

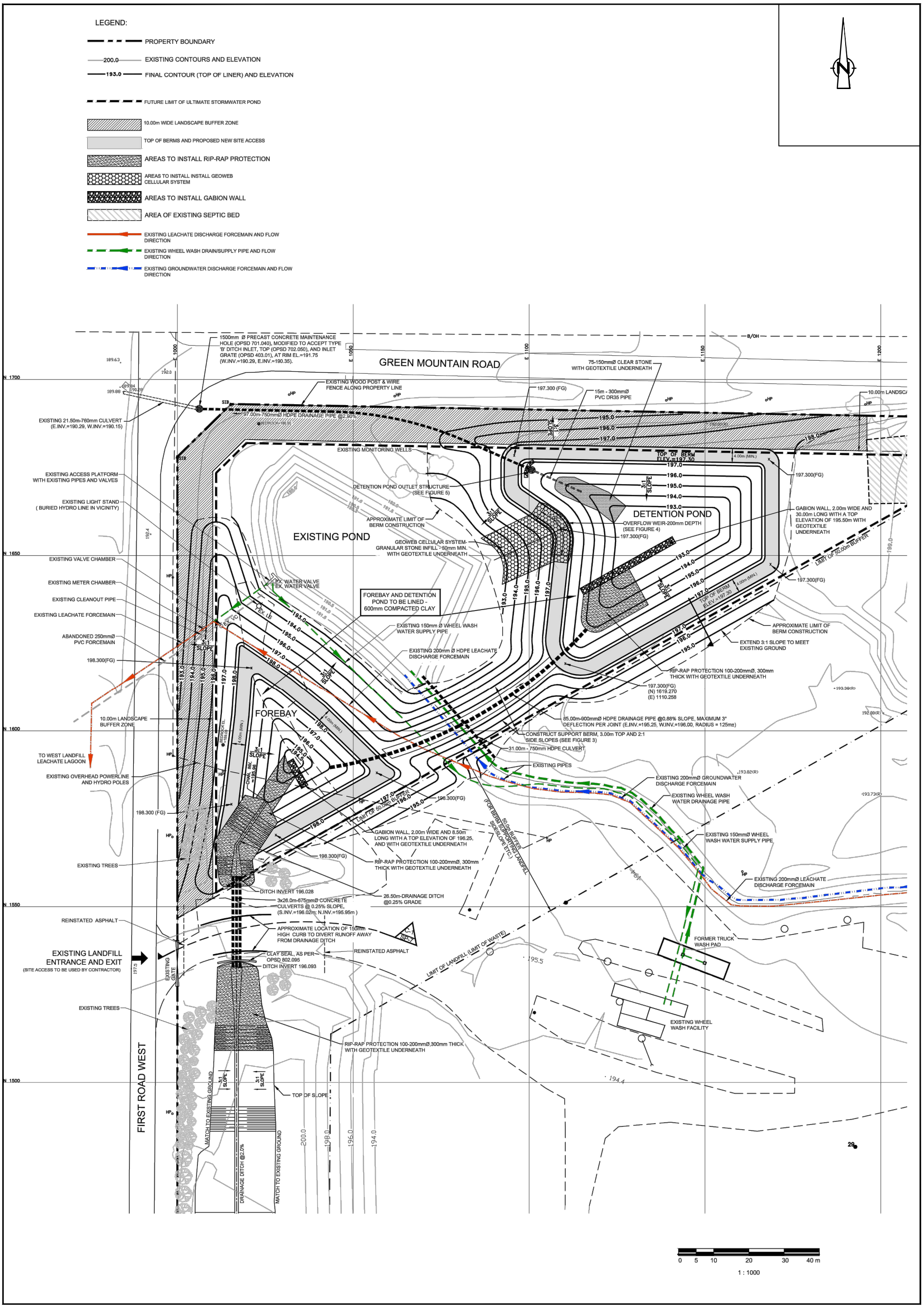
The existing SWM measures at the Site include perimeter ditches to the south and west, a forebay and a detention pond. The forebay and detention pond are located in the northwest corner of the Site. The ponds have been sized to provide quantity and quality control for the current Phase 1 of the landfill. 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 6.9**.

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 will 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. 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 will be less area available for the SWM pond.

The preliminary SWM measure sizing used in the predictive modelling 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 modelling 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 modelling is shown in **Figure 6.10**.

[1] The predicted increase in runoff is a result of a greater area being covered by a landfill cap, which does not allow for as much infiltration compared to industrial fill. With the 100-year event, the site would have less ability to infiltrate resulting in the smaller percentage increase of 6%.



SOURCE: NEWALTA-STAGE 1 SW MANAGEMENT SYSTEM INSPECTION REPORT, JULY 2013 PROJECT NUMBER 60265424 - AECOM

TERRAPURE ENVIRONMENTAL
65 GREEN MOUNTAIN RD. W, STONEY CREEK, ONTARIO
DETAILED IMPACT ASSESSMENT TERRAPURE EA - SURFACE WATER

11102771-03
Jun 8, 2018

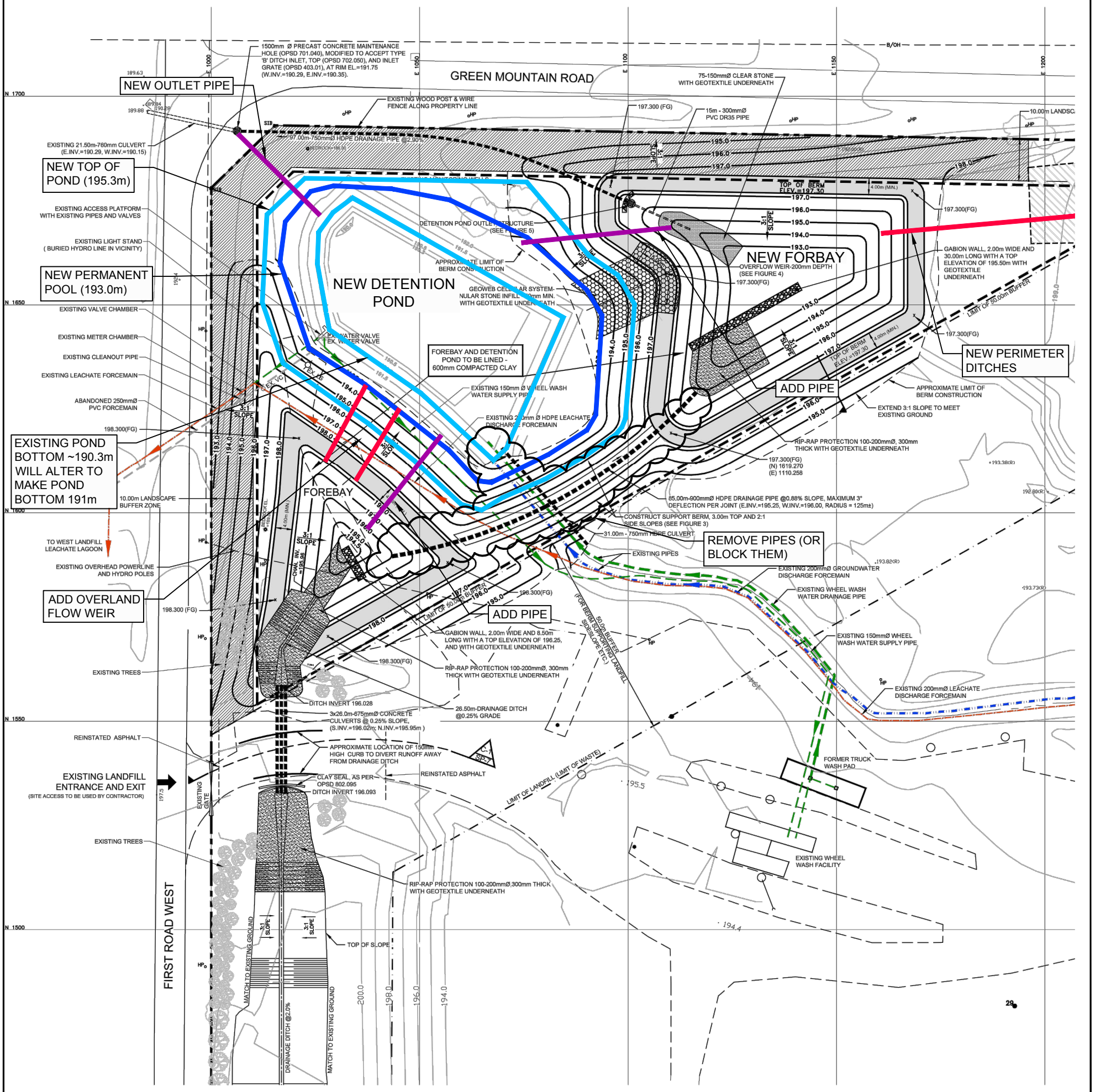
EXISTING SWM POND LAYOUT

FIGURE 6.9

CAD File: P:\drawings\11100000s\11102771\11102771 - REPORTS\11102771-03(022)\11102771-03(022)GN\11102771-03(022)GN-WA002.dwg

LEGEND:

- PROPERTY BOUNDARY
- 200.0 EXISTING CONTOURS AND ELEVATION
- 193.0 FINAL CONTOUR (TOP OF LINER) AND ELEVATION
- FUTURE LIMIT OF ULTIMATE STORMWATER POND
- 10.00m WIDE LANDSCAPE BUFFER ZONE
- TOP OF BERMS AND PROPOSED NEW SITE ACCESS
- AREAS TO INSTALL RIP-RAP PROTECTION
- AREAS TO INSTALL INSTALL GEOWEB CELLULAR SYSTEM
- AREAS TO INSTALL GABION WALL
- AREA OF EXISTING SEPTIC BED
- EXISTING LEACHATE DISCHARGE FORCEMAIN AND FLOW DIRECTION
- EXISTING WHEEL WASH DRAIN/SUPPLY PIPE AND FLOW DIRECTION
- EXISTING GROUNDWATER DISCHARGE FORCEMAIN AND FLOW DIRECTION



SOURCE: NEWALTA-STAGE 1 SW MANAGEMENT SYSTEM INSPECTION REPORT, JULY 2013 PROJECT NUMBER 60265424 - AECOM

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 6.10

CAD File: P:\drawings\11100000s\11102771\11102771 - REPORTS\11102771-03(022)\11102771-03(022)GN\11102771-03(022)GN-WA003.dwg

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

Based on the controlled conditions modelling (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 Impact Management Measures, and Net Effects for Surface Water

Potential Effect	Proposed Impact Management Measures	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.*

6.2.1.3 Terrestrial and Aquatic Environment

Potential Effects on the Terrestrial and Aquatic 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 C** of the Terrestrial and Aquatic Environment Detailed Impact Assessment Report (**Appendix J-3**).

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, including impacts to vegetation, wildlife habitat, aquatic habitat, and aquatic biota.

As part of the Preferred Landfill Footprint, there will 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 proposed Undertaking's 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 will 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 will 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 stage, 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 proposed Undertaking's 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.

Proposed Impact Management Measures

Construction

In order to mitigate the impacts to eastern meadowlark during construction related to the destruction of habitat, the following impact management 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 6.11** 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 Best Management Practices (BMP) during construction and the Compensation/Restoration Plan (**Section 8**).

Figure 6.11 Example of Graminoid Meadow as Part of Final Cover

Operation and Closure/Post-Closure

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 impact management measures 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 BMPs (**Section 8**) during operation. A Compensation/Restoration Plan will be developed as the proposed Undertaking 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 6.12** below for example of pollinator habitat).

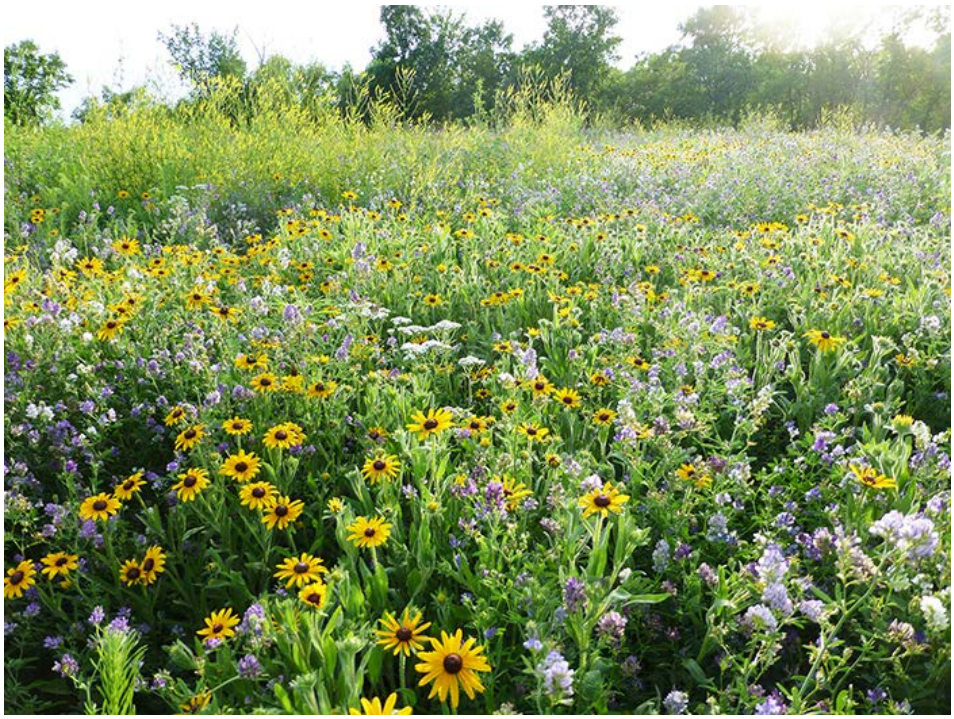


Figure 6.12 Example of Pollinator Habitat. Source: http://beeandbutterflyfund.org/our-solution

Furthermore, to compensate for the temporary loss of aquatic habitat, naturalized landscape features can be incorporated into the SWM facilities design (e.g., wet meadows, robust emergent vegetation, shallow slope). See **Figure 6.13** below for an example of a naturalized aquatic landscape feature.

Figure 6.13 Example of Naturalized Aquatic Landscape Feature (Wet Meadow)

Terrestrial and Aquatic Net Effects

Net effects as they relate to the terrestrial and aquatic environment are presented in **Table 6.8**.

Table 6.8 Potential Effects, Proposed Impact Management Measures, and Net Effects for Terrestrial and Aquatic Environment

Potential Effect	Proposed Impact Management Measures	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 impact management 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 impact management 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 and where required, compensated for through implementation of the impact management 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 impact management measures.

6.2.1.4 Atmospheric Environment - Air and Odour

Potential Effects on Air Quality and Odour

Ten hours per day, with up to (on average) 100 trucks per day of waste[2] 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 receptors. In order to mitigate potential effects of these operations on local and regional air quality, in particular airborne dust, it is necessary for impact management measures to be implemented, and special care may be required if operations are occurring in close proximity to the Facility fence line. Dispersion modelling 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 stages of this proposed Undertaking. 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).

Proposed Impact Management 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 modelling and the effects assessment for the planned capacity increase for the SCRF.

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 impact management measures, particularly for the control of fugitive dust from paved and unpaved roads, and material handling on-Site, the net effects of the

[2] The current approval allows for a maximum of 250 trucks per day.

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 investigate complaints to attempt to identify those which are related to Facility operations (versus those related to off-Site/unrelated air quality concerns). Net Effects are summarized in **Table 6.9**.

Table 6.9 Potential Effects, Proposed Impact Management Measures, and Net Effects for Air Quality and Odour

Potential Effect	Proposed Impact Management Measures	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.

6.2.1.5 Atmospheric Environment – Noise

General Assumptions and Additional Modelling

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 modelling assumptions used in this Study are presented below:

- **Noise Sources**: All sources were modelled 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 modelled appropriately to represent the worst-case elevation.

Associated Terrain: Contour lines up to 500 m around the Site were used in addition to the Site's final development topography. Road traffic noise modelling was conducted to evaluate the sound levels generated by road traffic at the closest sensitive receptor (i.e., Point of Reception (POR) 1) shown on **Figure 6.14**. The modelling was necessary in order to quantify the significant noise generated by vehicular traffic in the area and the effect on the sensitive PORs.

The MECP STAMSON ORNAMENT (STAMSON) acoustic model was used 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.

The future 2023 AM and PM peak hour traffic volumes were projected based on the anticipated additional future traffic reflecting increased traffic volumes from the developing Upper Stoney Creek community. The future 2023 hourly traffic counts for Green Mountain Road between First Road West and Upper Centennial Parkway were used. 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.

The following STAMSON inputs were used to estimate the sound level impact at the PORs:

- The receptor height was set to 4.5 m for consistency with the evaluation of stationary noise impacts. A 25 m distance was measured from the south façade of POR1 shown in **Figure 6.14** 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 modelling results are summarized in **Section 5.3** of the Detailed Noise Impact Assessment Report (**Appendix J-5**) and a sample printout of the STAMSON calculations are provided in **Appendix B** of **Appendix J-5**.
- 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.

Potential Effects on Noise

The predicted noise impacts at the residential areas range from 37 to 60 dBA. The existing and potential residences near the north of the landfill (POR-1) may be the most impacted, as they are approaching either the current MECP 55 dBA daytime noise limit and future 60 dBA Site-specific daytime noise limit for the landfill design Preferred Landfill Footprint.

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 7:00 a.m. to 7:00 p.m. under the "Noise Guidelines for Landfill Sites" (N 1) or Site-specific noise limits as detailed in **Table 6.10**.

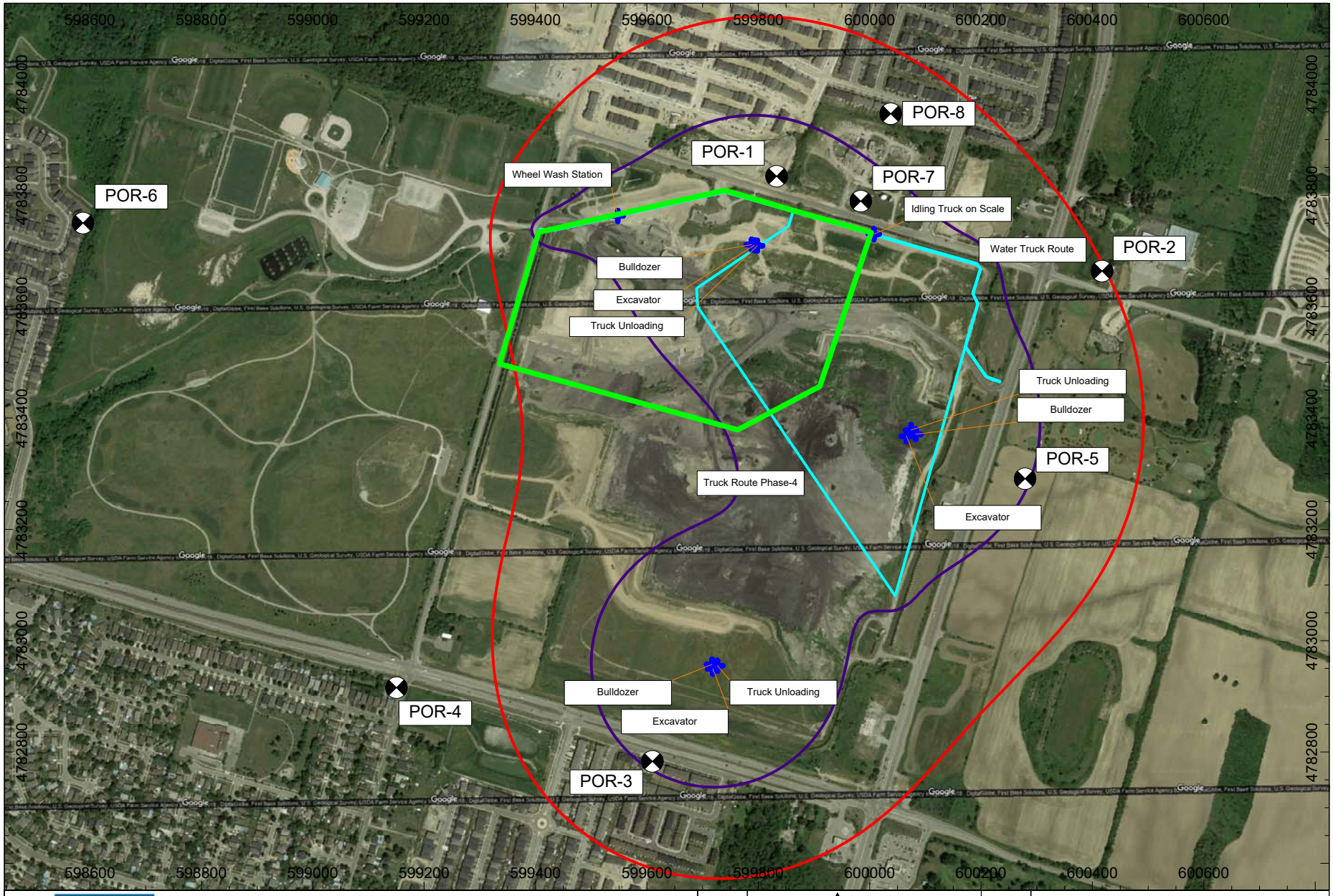
The Noise Impact Assessment is based on the worst case cumulative Site-wide sound levels estimated at each POR, based on the worst-case location of the noise sources relative to the closest POR, dependent on which phase is active. The sound levels estimated at the PORs are summarized in **Table 6.10** and graphically in **Figure 6.14**.

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)
Approximate Timing	2018-2020	2020-2023	2023-2025	2025-2027	2027-2029
POR-1	54	52	60	60	60 (2)
POR-2	47	46	47	44	61
POR-3	55	51	39	37	65 (3)
POR-4	45	42	36	36	66 (3)
POR-5	55	55	55	46	61 (3)
POR-6	37	34	34	34	55
POR-7	55	52	56	56	60 (2)
POR-8	49	48	51	51	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.
(3) Site-specific noise limits based on the Rotek Environmental Inc. 2016 Noise Monitoring Survey.

During Phases 1-2 of the expansion, all PORs will meet the minimum MECP noise limit of 55 dBA. During Phases 3 and 4, there will be a new Site-specific limit of 60 dBA which all PORs will meet. The change in the Site-specific dBA is as a result of the completion of the new residential developments to the north and west and the increased volume of road traffic adding to the background. Terrapure will be in compliance with this new limit. As a result, no noise impact management measures are required.



TERRAPURE ENVIRONMENTAL
STONEY CREEK REGIONAL FACILITY
ENVIRONMENTAL ASSESSMENT - CAPACITY INCREASE

NOISE CONTOUR PLOT – 4.5 m ABOVE GRADE

FIGURE 6.14

Proposed Impact Management Measures

During the Alternative Methods evaluation, an increase in height to the berms along Green Mountain Road was proposed as the impact management measure for potential noise effects. However, based on the revised modelling and taking into consideration the background noise levels, no further impact management measures are now required.

Noise Net Effects

The net sound level change for all off-Site receptors is 6 dBA over the phases of the project. The full range of net effects at the representative PORs are summarize in **Table 6.11** below. As shown in the table, the 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 to the east, west, and south will decrease over the phases of the project. The relative noise impacts to the North will increase by 1, to 6 dBA over the phases of the project, but will remain below the Site specific limits as detailed in **Table 6.10**.

Table 6.11 Point of Reception Net Effects

Point of Reception	Location	Net Effect relative to Phase 1 Sound Levels
POR-1	North of SCRF	-2 to 6 dBA
POR-2	East of SCRF	-3 to 0 dBA
POR-3	South of SCRF	-18 to 0 dBA
POR-4	South of SCRF	- 9 to 0 dBA
POR-5	East of SCRF	-9 to 0 dBA
POR-6	West of SCRF	-3 to 0 dBA
POR-7	North of SCRF	-3 to 1 dBA
POR-8	North of SCRF	-1 to 2 dBA

6.2.2 Built Environment

6.2.2.1 Land Use

Potential Effects

Existing Land Use

For the Preferred Landfill Footprint there is no change to the existing land use 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.

Furthermore, through the review of policies and various guidelines, the completion of a reconnaissance survey of the adjacent agriculture lands and a review of fragmentation, land use and soils data (CLI and specialty crop ratings) it has been illustrated that the Local Study Area is an area that is under transition, or an area that is under pressure due to development or urban areas and has resulted in the decline of large, intensive agricultural operations in the immediate surrounding area. As a result the Preferred Landfill Footprint is not anticipated to impact on the adjacent agricultural lands.

Existing 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 potential 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 B** of the Land Use and Economic Detailed Impact Assessment Report **(Appendix J-6)**.

Proposed Impact Management Measures

As there are no potential effects associated with the Preferred Landfill Footprint relative to the Site and adjacent land uses (including agriculture), no impact management 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 impact management 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. Impact management 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. Impact management 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 impact management measures are described below. Additional details on landfill operations can be found in the FCR.

Proposed Impact Management/Compensation Measures for Existing Land Uses

The following impact management 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 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 SWM 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 for Nuisance Mitigation

Landfill operation BMPs and impact management measures, such as SWM 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.

Proposed Visual Impact Management/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. Where possible, native vegetation will be used. 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 6.15**). 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 6.16**). 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 6.15**); or, a hedge screen (see **Figure 6.17**). Alternatively, live vegetation may be used for screening (see **Figure 6.18**). 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 6.19**). Since they are internally reinforced, mechanically stabilized earth berms can be built with steeper slopes than traditional berms.
- Freestanding green wall (see **Figure 6.20**). Green walls are freestanding structures with integrated vegetation.

Figure 6.15 View of Current Berm and Fence with Dark Green Privacy Screen on Upper Centennial Parkway

Figure 6.16 View of Current Vegetation Screening on Green Mountain Road

Figure 6.17 Example of Fencing with Hedge Screen

Figure 6.18 Example of Fencing with Live Vegetation

Figure 6.19 Mechanically Stabilized Earth Berm (Strata System)

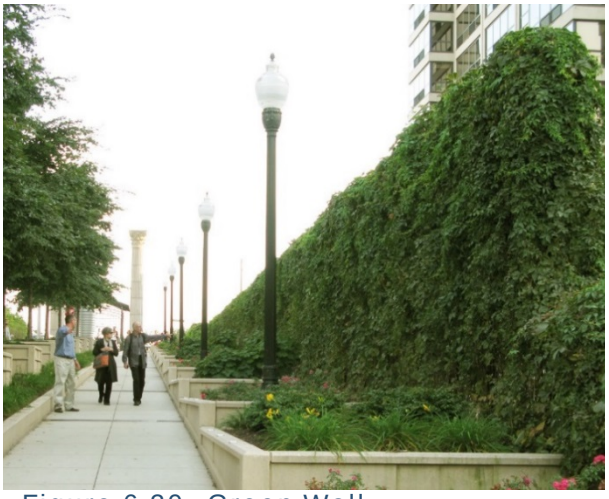


Figure 6.20 Green Wall (Greenscreen®)

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 impact management/compensation measures relative to the Preferred Landfill Footprint.

Table 6.12 Land Use – Potential Effects, Proposed Impact Management Measures, and Net Effects

Criteria	Indicators	Potential Effect	Proposed Impact Management Measures	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 impact management 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 impact management/ compensation measures will continue to be in effect: • Maintain Buffers for Nuisance Reduction • In effect nuisance preventative measures for landfill operating practices • BMPs for landfill operations	No change in current Site-specific and study area land uses

Table 6.12 Land Use – Potential Effects, Proposed Impact Management Measures, and Net Effects

Criteria	Indicators	Potential Effect	Proposed Impact Management Measures	Net Effects
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, where possible, native vegetation can be implemented to mitigate views for sensitive receptors and may include traditional berms, vegetation, fencing with privacy screen or vegetation, mechanically stabilized earth berms, and/or freestanding green walls. Progressive capping of the landfill will assist in revegetating areas at the Site to create a natural look.	Installation of visual screening elements will sufficiently obscure a majority of views of the Facility from visual receptors. Relative to the existing conditions, the changes are minimal.

6.2.3 Social Environment

6.2.3.1 Traffic

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.

Proposed Impact Management Measures

No improvements to the study area intersections are recommended in response to the SCRF truck traffic (**Table 6.13**).

Traffic Net Effects

Table 6.13 Potential Effects, Proposed Impact Management Measures, and Net Effects for Traffic

Potential Effect	Proposed Impact Management Measures	Net Effect
No change to the existing level of road user safety and intersection Level of Service within the Local Study Area	No impact management measures required.	No net effects.

6.2.3.2 Human Health

Potential Effects on Human Health

Air Quality

Air quality modelling of particulate concentrations indicated that while predicted concentrations of the $PM_{2.5}$ size fraction would be slightly higher than the current 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 $PM_{2.5}$ Exposures at each Sensitive Receptor Location in the Surrounding Community

Receptors	$PM_{2.5}$ 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 $PM_{2.5}$ Exposures at Each Sensitive Receptor Location in the Surrounding Community

Receptors	$PM_{2.5}$ 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 $PM_{2.5}$ results, particulate modelling indicated that while predicted 24-hour concentrations of PM_{10} 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 PM_{10} Exposures at each Sensitive Receptor Location in the Surrounding Community

Receptors	PM_{10} 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 PM_{10} 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 PM_{10} in the area in and around the landfill.

Table 6.17 Predicted Worst-Case Concentration Ratios for Annual Average PM_{10} Exposures at Each Sensitive Receptor Location in the Surrounding Community

Receptors	PM_{10} 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 6.17**, the worst case CR for PM_{10} 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 PM_{10} 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 SWM 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 modelling conducted as part of the Air Quality Assessment (GHD, 2018b).

Table 6.18 Comparison of Predicted Annual Total Particulate Deposition for Existing Configuration and 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 modelled 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.

Proposed Impact Management 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 impact management 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 impact management measures are necessary to ensure the conclusions of the Human Health Study that there are no potential health risks.

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 impact management 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 Impact Management Measures, and Net Effects for Human Health

Potential Effect	Proposed Impact Management Measures	Net Effect
Elevated dust concentrations in the Local Study Area.	Implementation of dust Impact Management 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.

6.2.4 Economic Environment

6.2.4.1 Economic

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 BMPs and impact management 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.

In addition, Landfill Impact Assessments have been conducted in accordance with Guideline D-4, by owners of lands adjacent to the Site as part of planning approvals. These Landfill Impact Assessments have concluded that the SCRF did not pose an issue or risk to the proposed development lands.[3]

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 BMPs and impact management 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 BMPs and impact management 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 impact management measures required for approved/planned land uses. However, any impact management 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.

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 capacity increase of 3,680,000 m^3 of residual material was approved, total economic activity is expected to

[3] MTE Consulting. February 8, 2010. Red Hill Developments, Empire Communities & 706870 Ontario Limited Nash Neighbourhood – FINAL – Revised Landfill Impact Assessment;

AMEC. September 20, 2010. Peer Review of the Revised Landfill Impact Assessment dated 14 September 2010 for the Proposed Red Hill Developments, Empire Communities and 706870 Ontario Limited Nash Neighbourhood Hamilton, Ontario. 6;

UrbanTech West. October 2, 2014. Amendment to the Review Landfill Impact Assessment Report – Redhill Developments, Empire Communities and 706870 Ontario Limited.

range between $349 million and $372 million, with GDP from $218 million to $232 million and an estimated total jobs between 662 and 671 (RIAS Inc., 2017). Further, the Preferred Landfill Footprint would allow for Terrapure to realize the economic opportunity for the SCRF (i.e., increase the capacity by 3,680,000 m^3) would ensure maximum return with respect to the compensation agreements[4] ($ per tonne). The Preferred Landfill Footprint results in high positive potential effects as the Preferred Landfill Footprint allows for potential capacity of 3,680,000 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 3,680,000 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 $14 Million based on the current agreements ($ per tonne). 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.

Proposed Impact Management Measures

As mentioned above, the Preferred Landfill Footprint will not result in any negative effects to the Economic environment, and therefore no impact management measures beyond the basic landfill operating measures will be required. Impacts to land uses are not anticipated based on the proposed impact management 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. Impact Management 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 impact management 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).

Impact Management / Compensation Measures for Approved / Planned Land Uses

The following impact management 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

[4] Agreements with the City of Hamilton and Heritage Green Community Trust and the obligations resulting therefrom remain in force irrespective of the EA process. Should the SCRF EA be approved, the financial contributions to both the Heritage Green Community Trust would continue. Compensation agreement terms would also be reviewed upon Minister approval.

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 SWM 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 for Nuisance Mitigation

Landfill operation BMPs and impact management measures, such as SWM 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;

Proposed Impact Management 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, impact management measures are not required. Positive net effects are anticipated as a result of the implementation of the Preferred Landfill Footprint.

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 impact management / compensation measures relative to the Preferred Landfill Footprint.

Table 6.20 Economic Environment – Potential Effects, Proposed Impact Management Measures, and Net Effects

Criteria	Indicators	Potential Effect	Proposed Impact Management Measures	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 impact management measures.	No impact management 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 impact management measures including; storm water management, leachate treatment, dust and noise control will assist in mitigating effects to surrounding properties. The following existing impact management/compensation measures will continue to be in effect: • Maintain Buffers for Nuisance Reduction • In effect nuisance preventative measures for landfill operating practices • BMPs for landfill operations	No net effects to approved/planned land uses.

Table 6.20 Economic Environment – Potential Effects, Proposed Impact Management Measures, and Net Effects

Criteria	Indicators	Potential Effect	Proposed Impact Management Measures	Net Effects
Economic benefit to the City of Hamilton and the local community	Employment at Site (number and duration)	Capacity increase 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 impact management or compensation measures are required.	Positive economic benefits to local community. Meets Disposal objectives.

6.2.4.1 Effect on Property Assessment and Property Taxes

During the ToR, the City of Hamilton requested that Terrapure undertake some research on the potential impact of the SCRF expansion on property values, property taxes, and the City's assessment base. Terrapure maintains that the effect on property values is speculative, as the determination of property value is based on a number of factors, including the overall health of the economy in Ontario. Terrapure cannot offer speculation as to the likely current or future values of properties, given that property values are based on a variety of factors outside of the SCRF. Terrapure engaged an appropriate technical consultant to undertake the requested work. A summary of the findings has been provided in subsequent sections and is included in **Appendix C** of the Land Use and Economic Detailed Impact Assessment Report (**Appendix J-6**).

6.2.4.1.1 Baseline and Analytical Scenarios

To determine impacts on property values, the current situation (or baseline) must be compared to the analytical scenario, which is the proposal to expand the capacity of the SCRF facility.

Under the baseline scenario, the total approved capacity at the existing SCRF is 6,500,000 m^3. Terrapure proposes to modify the Site to enable the SCRF to accommodate an additional 3,680,000 m^3 of solid, non-hazardous industrial residual materials. It is important to note that the lifespan for this analysis only relates to the additional capacity for post-diversion solid, non-hazardous industrial waste, not the additional years that the Site would be permitted to accept Table 3 materials to establish appropriate final grades at the Site, since this does not change under the baseline or analytical scenario.

6.2.4.1.2 Approach

To provide quantitative estimates (where possible) as well as qualitative assessments of the incremental effects on property values and Current Value Assessment (CVA) that the proposed expansion could have compared to the baseline situation, the analysis:

- Examines the current literature on the impacts of landfill sites on property values.
- Assesses historical trends in transactions prices and CVA within a 1.5 kilometer (km) radius of the four roads that border the existing SCRF.
- Compare changes in transactions prices and CVA within the Local Study Area to changes in surrounding neighborhoods outside of the Local Study Area, for residential properties with similar characteristics (type of dwelling, age of property, square footage of dwelling, etc.).
- Based on findings under steps 2 and 3 above, assess whether prices and CVAs within the Local Study Area over the next 14 years, with and without the expansion.

6.2.4.1.3 Literature Review

A review of the literature on the impacts of landfill sites on residential property values in Ontario and across North America was undertaken as part of the analysis.

Most studies of impacts attempt to measure negative externalities (also referred to as environmental "disamenities") that may be imposed on residential properties located near operations like shale gas exploration sites, wind turbines and landfills. These negative externalities can include such things as noise and visual disamenities, as well as environmental concerns, such as diminished water quality.

The most common approach to valuing such negative externalities is to estimate the impact on property values using hedonic pricing methods. The hedonic pricing method is often used to estimate economic benefits or costs associated with:

- Environmental quality, including air pollution, water pollution, or noise.
- Environmental amenities, such as aesthetic views or proximity to recreational sites.

The basic premise of the hedonic pricing method is that the market price of a good is related to its characteristics, or the services it provides. For example, the value of a house can be a function of its location, size, age, proximity to amenities, and property tax as well as other factors, such as the noise level in the neighbourhood, the quality of local schools, and crime rates. When housing sales take place, buyers make trade-offs between the price they are willing to pay and these attributes. Using statistical techniques, economists estimate the value of a location near landfills by comparing the price of houses abutting/in close proximity to landfills with similar houses located elsewhere. Hedonic pricing methods also enable the analyst to separate from the effects of other attributes the effect of the relevant environmental attributes, such as air quality or noise, on the price of a house (Treasury Board of Canada, 2007).

In summary, the literature review found that:

- While many studies use hedonic pricing methods to explore whether landfills have an impact on nearby property values, their results have been inconsistent.
- A number of studies show no statistical relationship between proximity to a landfill and house price (Gamble et al, 1982; Zeiss and Atwater, 1989; Bouvier et al, 2000).
- A 2010 meta-analysis found that high-volume landfill sites decrease adjacent residential property values by an average of 13.7%, diminishing by 5.9% per mile. Lower-volume landfills decrease adjacent property values by 2.7%, on average, with a gradient of 1.3% per mile (Ready, 2010). However, it was also found that 20%–26% of low volume landfills do not impact nearby property values at all.
- While there are few studies that examine impacts on property taxes, Hite et al (2001) found that property taxes are less affected than housing prices, suggesting that the cost of externalities are internalized more by individual property owners than by municipalities.
- Overall, the literature indicates that property value impacts vary from landfill to landfill and are in some cases small or nonexistent. Also, most studies are very location and context specific; study authors often caution against extrapolating results of their research to other municipalities/ counties. We also note that very few studies examine the effects of offsetting measures that are now commonly implemented by landfill operators, and the extent to which these investments by landfills negate potential property price impacts.

More specifically, we were unable to find studies that isolated on key characteristics analogous to the SCRF Facility. 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 gases and odours and has the ability to attract vectors, such as seagulls, vermin, etc.).

6.2.4.2 Key Data and Parameters Used in the Analysis

This section provides a summary of the key data and parameters used in the analysis.

6.2.4.2.1 MPAC Data

In order to examine trends in prices and CVA within the Local Study Area and in surrounding neighborhoods outside the study area, RIAS Inc. relied on data from Ontario's Municipal Property Assessment Corporation (MPAC). MPAC is responsible for assessing and classifying more than five million properties in Ontario in compliance with the *Assessment Act* and regulations set by the Government of Ontario.

MPAC's property assessment process, referred to as the Current Value Assessment Approach, involves comparing individual properties to similar properties that have sold in the same area. MPAC indicates that the following five (5) factors account for 85% of a property's value [5]:

1. Age of the property, adjusted for any major renovations or additions;
2. Living area;
3. Location;
4. Lot dimensions; and
5. Quality of construction

Over 200 additional factors are considered when assessing the remaining 15% of property value, which include:

- Primary Structures;
- Secondary Structures;
- Structural Features; and
- Site Features.

Site Features may increase or decrease the assessed value of a property, which can result in a negative, positive or no effect on the assessed value of a property. Site Features may include:

- Abutment and proximity variables;
- Access variables;
- Condominium attributes;
- Driveway and parking;
- Hydro services;
- On-Site variables;
- Sanitary services;
- Topography;
- Water services;
- Waterfront variables;

The "abutment and proximity variables" specifically include "landfill site".

[5] See https://www.mpac.ca/PropertyTypes/ResidentialProperties

6.2.4.2.2 Prices

To assess price trends within the Local Study Area, RIAS examined MPAC data for properties sold from 2014 to 2018 within the SCRF Local Study Area (within 1,500 metres of the SCRF boundary), based on:

- Sale Date
- Sale Amount
- Age of Property
- Living Area
- Lot Size

6.2.4.2.3 Relationship between prices and CVA

An examination of transactions values and CVAs within the SCRF Local Study Area shows that, as expected, CVAs track transactions prices quite consistently. Results based on 24 randomly selected properties sold in the study area in 2016 are shown in **Figure 6.21** below. Overall, CVA's average 90% of actual sales values.

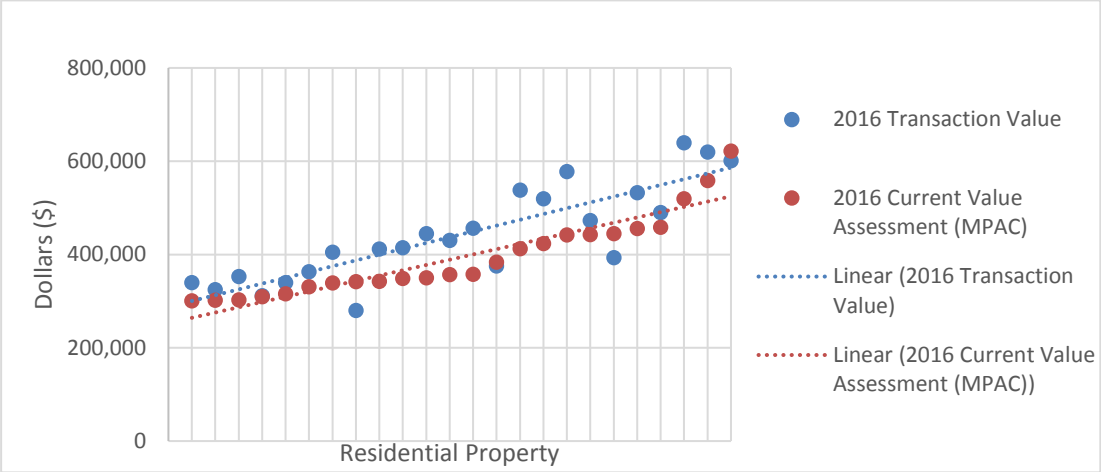


Figure 6.21 Comparison of Transactions Values and MPAC CVA – 2016

6.2.4.2.4 Comparison of Prices in Surrounding Neighborhoods

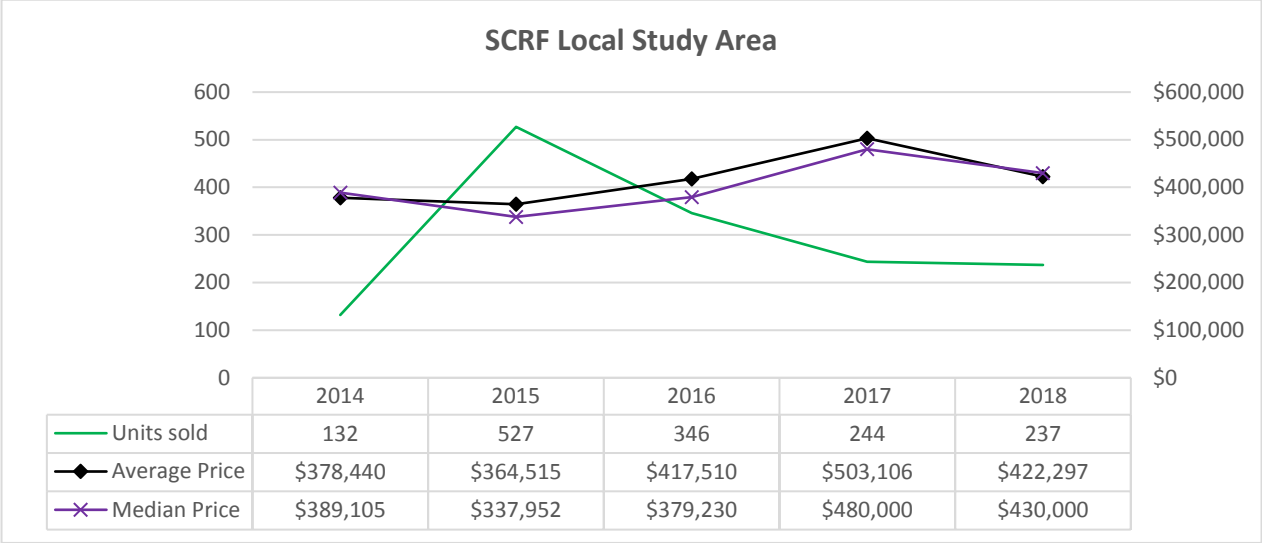
To determine whether the SCRF has had any impact on housing prices and CVAs, we compare transactions prices for a random selection of properties within the Local Study Area to transactions prices for similar properties (considering key characteristics like type of dwelling, age of property, living area and property size) in surrounding Hamilton neighborhoods over the past 5 years. We also show an analysis by MPAC of changes in CVAs between 2016 and 2017 across neighborhoods in the Hamilton area.

6.2.4.3 Findings

6.2.4.3.1 Price Trends within the Local Study Area

Figure 6.22 below shows average and median prices over the last 5 years, for a total of 1,486 properties that sold within the SCRF Local Study Area.

Average prices ranged from $364,515 in 2014 to a high of $503,106 in 2017. The average annual increase in prices was 3.8%.



	2014	2015	2016	2017	2018
Units sold	132	527	346	244	237
Average Price	$378,440	$364,515	$417,510	$503,106	$422,297
Median Price	$389,105	$337,952	$379,230	$480,000	$430,000

Figure 6.22Average and Median Prices (2014-2018)

However, to control for the different mix of type and size of properties sold, we examined the changes in average price per square metre of lot size. Since the age, location and quality of construction in the SCRF Local Study Area are similar, and since living area data was not provided in this dataset, lot size was used as a reasonable proxy for the other two key variables (living area and lot dimension) that MPAC determined have the greatest impact on property values (as discussed earlier).

Table 6.21 Average Prices per Square Metre (Lot Size)

	2014	2015	2016	2017	2018	Average
Average Lot Size (m^2)	333.8	275.7	280.7	300.2	257.8	
Average Price/m^2	$1,134	$1,322	$1,487	$1,676	$1,638	
% Change		16.6%	12.5%	12.7%	-2.3%	9.9%

Based on this measure, sales prices for properties within the SCRF study area increased by an average of 9.9% over the 2015 - 2018 period.

6.2.4.3.2 Comparison to Surrounding Neighborhoods

MPAC bases its valuation of a property on the sales prices of similar properties located within its vicinity. For valuation purposes, each residential property in Ontario is assigned a market area, locational neighbourhood, and sub-neighbourhood (also known as a homogeneous neighbourhood). For more information, please see the MPAC Assessment Procedure for the Development of Homogeneous Neighbourhoods included in **Appendix C** of the Land Use and Economic Detailed Impact Assessment Report (**Appendix J-6**).

MPAC's homogeneous neighborhood variable captures a number of important property characteristics that determine how desirable one neighbourhood is when compared to another located within a municipality. The homogeneous neighbourhood variable also reflects changes which impact the neighbourhood, such as municipal zoning changes or the emergence of incompatible uses or development.

Figure 6.23 below shows an MPAC comparison of average property values (denoted by colour scale) and the average annual change in CVA (% values) in neighbourhoods across the Hamilton area. The SCRF local area is shown in red.

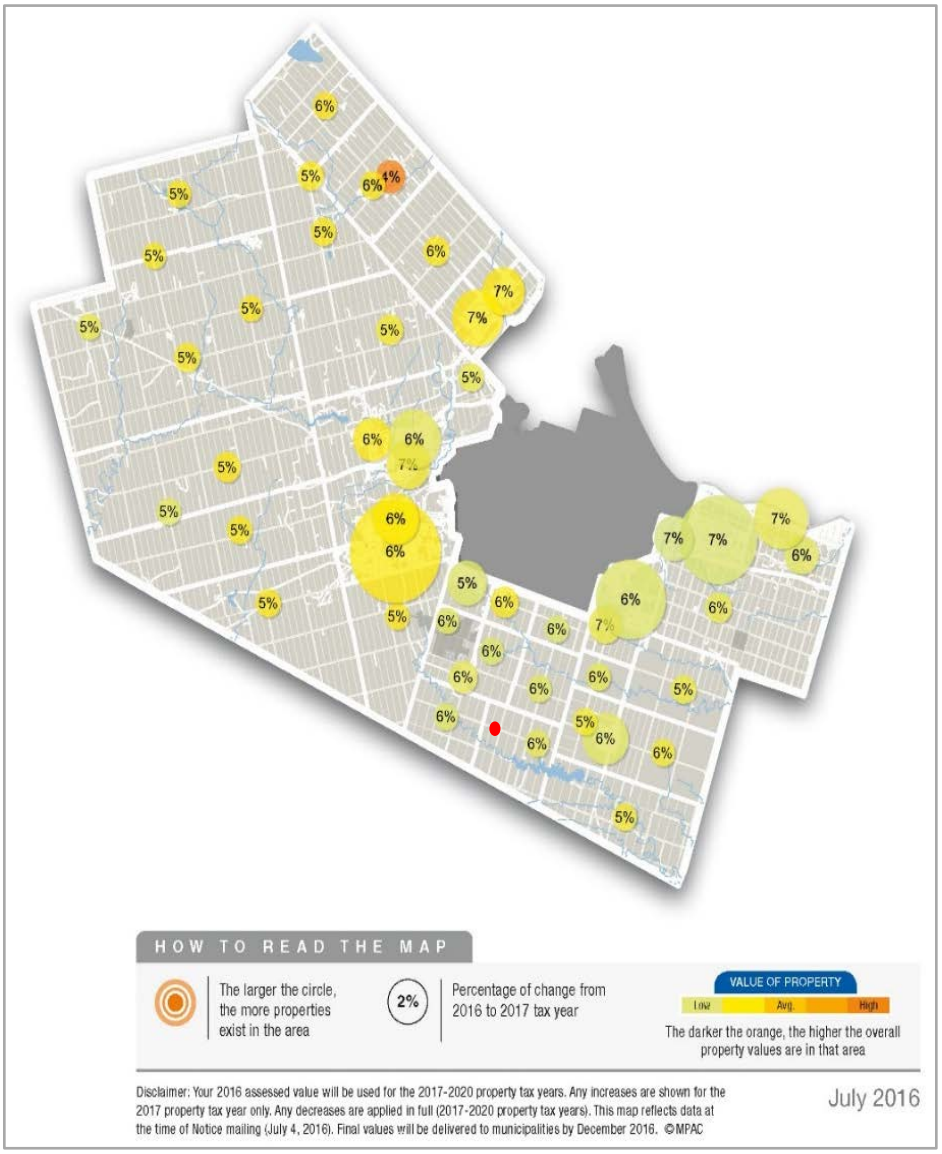


Figure 6.23 Assessed Values in the Hamilton Area, 2016 to 2017

According to MPAC, property values increased by an average of 6.9% between 2016 and 2017 across the region. In the area that includes the SCRF, property values increased by an average of 6%. From **Table 6.21** above, values within the SCRF local area increased by 12.7% between 2016 and 2017 based on actual transactions values. This indicates that the SCRF has not had a negative impact on prices or CVA.

RIAS Inc. conducted further analysis comparing transactions prices and CVAs for a sample of 36 properties sold within the Local Study Area between 2015 to 2018 to transactions prices and CVAs for similar properties in surrounding neighborhoods (Leckie Park, Hannon North, Albion Falls, Vincent, Red Hill, Gershome and Stoney Creek) over the past five years. For each property sold within the SCRF Local Study Area we identified a primary comparator from a neighbourhood outside of the SCRF Local Study Area, considering type of property, year built, site area and building area. We also identified a secondary comparator using the same criteria. For this comparison, we used price/square foot of building area and CVA/square foot of building area.

Based on a sampling of comparable properties, we found that sales prices for properties within the SCRF Local Study Area were slightly lower (about 3.5%) than prices for comparable properties outside of the Local Study Area. However, CVAs within the SCRF area were somewhat higher (4.25%) than CVAs for comparable properties outside the SCRF Local Study Area.

6.2.4.4 Observations

6.2.4.4.1 Anticipated Effect on Property Value Assessment

The analysis found no conclusive data to suggest that the SCRF facility has had a negative impact on property values to date.

Under the proposal to expand the capacity of the SCRF, there will be no change to the existing proximity of the Site to neighbouring lands. We also note that the implementation of discipline-specific impact management measures and standard operational procedures at the Site (continuation) will minimize negative environmental effects.

Therefore, in the absence of evidence to the contrary, it is reasonable to conclude that the plans to expand the capacity of the SCRF are unlikely to have any significant influence on CVA and property assessment in the future.

6.2.4.4.2 Revenue Implications for the City of Hamilton

Since it is unlikely that residential property values (MPAC CVA) will be affected by the continued operations of the SCRF and implementation of the Preferred Landfill Footprint, no negative effects to annual municipal property taxes are anticipated as a result of the SCRF operations.

However, tax and fee revenues for the municipality could be greatly affected should the SCRF not move forward with implementing the Preferred Option. For example, once the current approved capacity is met for residual material, the Site will only accept industrial fill. Terrapure may elect to review the current assessed value of the property based on the change in type of material to be accepted on Site relative to the operation (i.e., Site operations/ management for industrial fill is less intense than for residual materials). This may result in a lower property tax rate, thereby reducing the overall property tax revenue paid to the City by Terrapure. Also, other revenues for the City that would otherwise continue for an additional 13-15 years under the proposed SCRF expansion are at risk, such as the Heritage Green Community Trust, City royalties, and sewer discharge fee, all of which generate more than $1.6 million in revenues for the City per year.

6.2.5 Cultural Environment

6.2.5.1 Archaeology and Built Heritage

As stated in **Sections 4.2.5** and **5.4.5.1.5**, no cultural resources (i.e., archaeological resources, built heritage resources, and cultural heritage landscapes) are anticipated to be adversely affected by the proposed Undertaking. This was confirmed with the Ministry of Tourism, Culture and Sport (MTCS) as documented in **Section 7.4.7** (**Table 7.3**).

6.2.5.2 Indigenous Resources

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 resources on-Site due to the fact that the study area (for the landfill footprint) is limited to an exhausted quarry pit[6].

No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA. In recognition of the fact that Indigenous communities may have knowledge that can contribute to the identification of cultural resources, consultation with them included a discussion relating to this as recommended by MTCS (**Section 7.5**).

Notwithstanding this, during construction, should previously undocumented archaeological or indigenous resources be discovered, Terrapure will cease alteration of the Site immediately and

[6] See Supporting Document #2 to the Stoney Creek Regional Facility Environmental Assessment Minister Approved Amended Terms of Reference for correspondence.

engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Sec. 48 (1) of the *Ontario Heritage Act*. In accordance with the *Funeral, Burial and Cremation Service Act, 2002,* should Terrapure discover human remains, the police or coroner and the Registrar of Cemeteries, Ministry of Small Business and Consumer Services will be notified immediately.

6.2.6 Design and Operations

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 accept industrial fill material.

Detailed records of the residual materials accepted at the Site each year are documented in the Annual Monitoring Reports. **Table 6.22** 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.

Table 6.22 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 capacity increase 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, SWM system, Site infrastructure) will be undertaken as required, but will occur concurrently with Site operations over the entire operating period. 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 centre 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 SWM 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 (**Appendix K**) 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.

The primary liner will consist of 1.0 m thick layer of compacted clay and a high-density polyethylene (HDPE) geomembrane. The liner will serve to contain the leachate prior to the operation of the hydraulic trap, which is a period of about 20 years. Following this period, the hydraulic trap will serve to be the main control for preventing leachate migration out of the landfill. After the hydraulic trap is established the low permeability properties of the primary liner will-assist in operating the hydraulic trap efficiently, but these will not be critical to controlling contaminants. The HDPE component is expected to maintain its low-permeability properties for at least 40 years.

Compatibility testing between the clay liner and the leachate carried out as part of the original EA indicated that the clay was mineralogically stable and that permeability was not impacted due to contact with leachate. Additional compatibility testing carried out in 2018 on samples of the liner clay and landfill leachate again indicated that the leachate did not affect the index properties of the soil, and that there was limited potential for the leachate to degrade the permeability of the liner.

Results of this testing are presented in **Appendix A1** of the Design and Operations Detailed Impact Assessment Report (**Appendix J-9**). Further discussion of the clay liner and leachate compatibility will be included as part of the ECA.

Both in-situ and laboratory hydraulic conductivity testing are undertaken during the construction of the clay liners and the results are documented in the construction inspection reports. These tests have been carried out over a range of operating conditions (e.g., cell pressure, head pressure, effective consolidation pressure) that are representative of both the current and expanded landfill. Results of this testing have shown that hydraulic conductivity values below the required 5×10^{-8} cm/s are consistently being achieved. Further discussion of the clay liner hydraulic conductivity will be included as part of the ECA

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 in **Appendix A2** of the Design and Operations Detailed Impact Assessment Report (**Appendix J-9**), as well as supporting technical documents, including: *Geomembrane Protection Design Manual (GSE Lining Technology, 2002); Ten Year Creep Puncture Study of HDPE Geomembranes Protected by Needle-Punched Nonwoven Geotextiles (Koerner et. al., 2010);* and *GRI White Paper #14 – Modification to the "GRI-Method" for the RF_{CR}-Factor Used in the Design of Geotextiles for Puncture Protection of Geomembranes (Koerner, 2008)*.

It was calculated that the existing 445 g/m^2 nonwoven, needle-punched geotextile installed for the protection of the HDPE geomembrane meets the required factor of safety for protection against puncture.It was also checked that a geotextile with a minimum mass of 405 g/m^2 would be required to prevent minor damage (e.g., scratching) to the HDPE geomembrane during construction. Major damage (e.g., tears, punctures) will be prevented or detected and repaired by providing construction quality assurance during installation of the geomembrane and the layers above it.

Daily Operations

General Site operations are not expected to change from current practices (as presented in **Section 2.12** of the FCR (**Appendix K**)) 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 leachate collection system will be managed to maintain minimal (i.e., 0.5 m) head build-up on the liner system.

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 m^3 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) modelling to determine leachate management requirements. The anticipated leachate generation rates for each Site configuration are presented in **Table 6.23**. Detailed HELP modelling results are presented in **Appendix B** of the Design and Operations Detailed Impact Assessment Report (**Appendix J-9**).

Table 6.23 Estimated Leachate Generation Rates

	Current Approval		Proposed Expansion				
	Existing Conditions	Post-Closure	Phase 1	Phase 2	Phase 3	Phase 4	Post-Closure
Leachate generation rate (L/s)	5.3	3.9	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 final cover design has remained unchanged. As such, the infiltration rate (per-hectare) will remain essentially the same (i.e., less than 1% difference) for the expanded SCRF, at approximately 292 mm/ha/year. This indicates the increased leachate generation rate for the proposed expansion is a direct result of the expansion of 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.

To ensure that head on the liner is minimized, the leachate levels in the landfill will be monitored quarterly within the existing phases. Levels will be measured within selected leachate cleanouts as well as at leachate monitoring standpipes installed within the granular blanket. The standpipe locations will assist in determining if any leachate mounding exists between the collector pipes, should leachate levels rise to the level of the pipes. If the leachate levels begin to rise above the maximum recommended head of 0.5 m, additional pumping effort and monitoring will be implemented to keep the leachate level as low as possible.

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.

Hydraulic Control Layer

The hydraulic control layer (HCL) consists of a 0.5 m thick layer of 50 mm diameter crushed stone between the primary and secondary liners on the landfill base and side slopes. The HCL provides several important leachate control functions both during and after the operating period of the landfill. During the operating period the HCL will function as a contingency (secondary) collection layer for the small amounts of leachate that migrate through the primary liner, allowing the concentrations of any contaminants (if any are detected) to be assessed, and allowing for the removal of any such contaminants before they could have any impact on the environment. This system can be operated such that there is negligible migration of contaminants across the secondary clay liner at any time.

After completion of the landfill operating period hydraulic containment will be commenced. The layer will be saturated with clean water from a municipal supply and the head within the layer will be maintained above the leachate head within the landfill in order to provide hydraulic containment. This is done by creating an inward flow of clean water across the primary liner and will prevent the movement of contaminants from the wastes by advection. Diffusion of contaminants is expected to occur across the primary liner despite the inward flow of clean water. Contaminants that enter the hydraulic control layer by diffusion will be removed through the periodic replacement of the water within the layer. The secondary liner continues to provide redundancy by serving as a second barrier to contaminant migration.

Hydraulic containment is not practical until the entire liner system has been constructed and a sufficient thickness of waste has been placed across the entire Site to minimize liner uplift potential. This will occur just prior to Site closure.

Injection and extraction wells will be constructed around the perimeter of the landfill footprint and will be used to add or remove liquids from the HCL. The water within the HCL will to be monitored for the presence of leachate impacts. Any leachate that has migrated through the primary liner would be removed and discharged to the sanitary sewer, while clean water would be added from a municipal supply.

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

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 surface 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 SWM 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 SWM 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 SWM 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

O. Reg. 232/98 requires that landfills greater than 1,500,000 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 (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. Confirmatory monitoring for landfill gas is documented in the Annual Monitoring Report.

Landfill Gas Modelling

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 modelling carried out using the Scholl Canyon model are presented in **Appendix C1** of the Design and Operations Detailed Impact Assessment Report (**Appendix J-9**). 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.

Landfill Gas Sampling and Analysis

In addition to the modelling, GHD also performed confirmatory landfill surface scans and confirmatory sampling and analysis to verify that the findings in the Study remain correct and that any changes that may have occurred to surface and point sources of landfill gases since 2011 have been accounted for. Results of this work are provided in **Appendix C2** of the Design and Operations Detailed Impact Assessment Report (**Appendix J-9**)**.**

Results of the surface scans, grab sampling and flux chamber sampling generally confirmed the findings of the 2011 Study that some leachate cleanout structures and leachate sampling structures can be a source of low-level landfill gas emissions, mainly methane (<0.6%), but the majority of the landfill is free of surface emissions of methane. Results of the fieldwork indicate that the findings in the 2011 Study remain valid, since the 2018 measurements are in the same range and the capped areas of the landfill have zero or close to zero landfill gas emissions.

Based on the above, 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 O. Reg. 232/98 would again be granted by the MECP.

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.

GHD has undertaken a detailed review of the contaminating lifespan calculations for the SCRF, and believes that the original estimate of 200 to 300 years presented in the 1995 Design & Operations report is overly conservative. The following points describe GHD's rationale for modifying the CLS calculations:

- Previous modelling assumed a much higher amount of evapotranspiration than the value determined through current HELP modelling. This higher evapotranspiration rate reduced the amount of precipitation available for infiltration (i.e., precipitation surplus). Therefore previous modelling yielded a much lower rate of infiltration through the landfill cap, resulting in a much longer contaminating lifespan due to less water being available on an annual basis to dissolve contaminants from the waste mass.
- GHD has used the recommended minimum infiltration rate of 0.15 m/year as outlined in O. Reg. 232/98 (as amended). This infiltration rate is lower than the infiltration rate yielded by current HELP modelling and accordingly, this value represents a conservative estimate of leachate generation for the purposes of CLS calculations.
- The target concentrations for the contaminants of concern should be evaluated against the Ontario Drinking Water Standards (ODWS). Previously modelling used Reasonable Use Guideline concentrations as the basis for CLS calculations. Reasonable Use Guideline concentrations only apply at the Site boundary and accordingly using these concentrations for leachate within the landfill mound is overly conservative. .
- The original contaminants of concern used in CLS calculations (i.e., sodium and fluoride) were assumed using leachate generated from the Closed West Landfill. Based on historical waste analyses for waste streams for the active SCRF and leachate quality for the active SCRF, GHD believes that chloride and cadmium are more representative of current leachate characteristics.

Given the above, updated CLS calculations were developed for the SCRF using chloride and cadmium as contaminants of concern. CLS calculations were carried out using an approach developed by Rowe[7]. This approach returned a contaminating lifespan of 68 years. This value is conservative in comparison to O. Reg. 232, which specifically references chloride loading and requires a minimum CLS of 25 years. GHD also feels that this value is more typical for CLS based on our experience with other landfills in Ontario. Details of the CLS modelling are presented in **Appendix D** of the Design and Operations Detailed Impact Assessment Report (**Appendix J-9**).

Additional details of the potential effects of leachate on groundwater are presented in the Geology and Hydrogeology Detailed Impact Assessment Report (**Appendix J-1**).

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, and 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;

[7] Contaminant Impact Assessment and the Contaminating Lifespan of Landfills, R. K. Rowe, 1990.

- 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.

Proposed Impact Management 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.

Design and Operations Net Effects

The potential effects, impact management 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 6.24**.

Table 6.24 Potential Effects, Proposed Impact Management Measures, and Net Effects for Design and Operations

	Potential Effect	Proposed Impact Management Measures	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.
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	Maintain design and function of existing systems (leachate, stormwater, groundwater, gas) and infrastructure	No increase in complexity or reduction in operability

Table 6.24 Potential Effects, Proposed Impact Management Measures, and Net Effects for Design and Operations

	Potential Effect	Proposed Impact Management Measures	Net Effect
	operability of Facility components	(access, roads, weigh scale, wheel wash). Maintain operational flexibility of existing systems and infrastructure.	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.

6.3 Cumulative Effects of the Proposed Undertaking

A cumulative effects assessment of the Proposed Undertaking was carried out as part of the SCRF EA in accordance with the Minister-approved Amended ToR. The cumulative effects assessment of the proposed Undertaking took into account other non-SCRF projects/activities that are existing, planned/approved or reasonably foreseeable[8] within the finalized Local 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 encourages proponents to include information about potential cumulative effects of the proposed Undertaking in combination with past, present and reasonably foreseeable future activities where possible[9]. Proponents are advised to consult with government agencies to identify projects that will be built in the future and to consider their future cumulative effects. 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 were considered as part of carrying out the cumulative effects assessment for the SCRF EA[10].

Cumulative environmental effects are defined as effects that are likely to result from the proposed Undertaking in combination with other projects or activities that have been or will be carried out within the foreseeable future. The cumulative effects assessment completed as part of the SCRF EA 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.

6.3.1 Projects and Activities within the Local Study Area

Stoney Creek Regional Facility Activities

In operation since 1996, the SCRF is an engineered landfill site that currently accepts residual waste and industrial fill generated in Ontario. Prior to being an active landfill, the SCRF 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.

Local Study Area Land Uses and Activities

There are approximately 1,200 existing or registered residential dwellings within 1.5 km the Local 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.

[8] 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”,

[9] Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario, January 2014.

[10] Cumulative Effects Practitioners Guide, 1999. https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=43952694-1

Notwithstanding the residential dwellings to the north of the SCRF, 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 Local 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 1.5 km Local Study Area boundary include St. James the Apostle Catholic Elementary School, which is approximately 270 m from the 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 1.5 km of the Site. 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 1.5 km of the Local 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 1.5 km Local 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 dwellings proposed to be built within the Local Study Area suggesting there will be continued construction adjacent to and in the vicinity of the SCRF. 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 Reports **(Appendix F)** and the Land Use and Economic Detailed Impact Assessment Report **(Appendix J-6)**.

Existing and Planned Traffic Corridor and Networks

The Study Area includes two roads (Upper Centennial Parkway and Mud Street) that carry higher levels of traffic because they connect to the Red Hill Expressway and QEW highway. Major intersections around the SCRF 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); and,
- 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 F)** and the Traffic Detailed Impact Assessment Report **(Appendix J-7).**

6.3.2 Valued Ecosystem Components (VEC)

In a typical cumulative effects assessment, 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 are the assessment endpoints and represent meaningful measures of the environmental effects that may be caused by a project. The VEC used for the assessment of the proposed Undertaking were derived from the criteria and indicators finalized as part of the Alternative Methods stage of the SCRF EA. Based on the net effects analysis completed during the Alternative Methods stage and the findings of the Detailed Impact Assessment the VEC considered in the cumulative effects assessment include those listed in **Table 6.25**.

Table 6.25 Rationale for the Inclusion of VEC in the Cumulative Effect Assessment

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	Potential for changes in air quality
Noise Sensitive Receptors	3. 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)	4. Specialized and sensitive wildlife habitat provide unique habitat functions and contribute to biodiversity 5. 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: • Breeding bird species richness and diversity • Habitat diversity • Vegetation • Species of Conservation Concern • Amphibian breeding habitat • Habitat block size • Habitat continuity Presence and effects on habitats for Species At Risk
Use and Enjoyment of Private Property (Surrounding Land Uses)	6. 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	7. Changes in landscape composition by way of views and viewsheds	Change to current views and viewsheds

These VEC are utilized to conduct the cumulative effects assessment, which looks at the combined effects of the proposed Undertaking and other projects and activities within the Local Study Area, 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.

6.3.3 Cumulative Effects Assessment and Results

Table 6.26 summarizes the likely cumulative effects and impact management measures of the proposed Undertaking in combination with other non-SCRF projects/activities that are existing, planned/ approved or reasonably foreseeable within the Local Study Area.

Table 6.26 Cumulative Effects Summary

Environmental Factors	Effects of the Project	Proposed Undertaking Stage	Cumulative Effects	Impact Management	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
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 proposed Undertaking's 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 proposed Undertaking 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 impact management 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
Socio-Economic	Change in landscape composition	Operation	• Change in visual appearance, topography, loss of agricultural land	• Implement appropriate screening measures	Changes in landscape composition

6.3.4 Significance Assessment

The following criteria were defined in relation to assessing the significance of the residual adverse effects from the cumulative effects assessment:

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 6.27 provides the framework that was used to assess the degree of residual adverse effects. The framework provides the assessment criteria and the corresponding definitions for the three levels of significance associated with each of them: low, medium and high. The determination of the degree of residual effects was 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 Areas. Some of the documents used to identify potential projects and activities include:

- ***City of Hamilton Development Application Mapping Tool***[11] – 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***[12] – Used to determine intersection and roadway improvements planned for Local Study Area
- **City of Hamilton Official Plan**[13] – Used to determine land uses and zoning within the Local Study Area.
- ***Land Use Existing Conditions*** and ***Alternative Methods Reports*** prepared as part of the SCRF EA
- ***Traffic Impact Study – Red Hill Residential Development – Phase 2 (2013) –*** Documents the traffic impacts for the proposed residential development located in the northwest quadrant of the Green Mountain Road West and First Road West intersection
- ***Traffic Impact Study – Nash Neighborhood Secondary Plan – City of Hamilton (2009) –*** Documents the traffic impacts for the proposed secondary plan at the northwest quadrant of the Mud Street West and Centennial Parkway intersection.

In cases where 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.

[11] https://www.hamilton.ca/develop-property/planning-applications/development-applications-mapping

[12] https://d3fpllf1m7bbt3.cloudfront.net/sites/default/files/media/browser/2018-06-06/draft-tmp-backgroundreport-futuredemand-9.pdf

[13] https://www.hamilton.ca/city-planning/official-plan-zoning-by-law

Table 6.27 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 proposed Undertaking 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	Specific and/or cumulative effects associated with the proposed Undertaking are likely to be noticeable or measureable within the Study Area. Adverse effects will be experienced by VEC 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 impact management 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 proposed Undertaking's stages 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 proposed Undertaking's stages 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 proposed Undertaking's stages 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).
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 impact management measures and potentially those of other projects and activities will ensure that long term cumulative effects attributable to the proposed Undertaking are not measureable.	Measureable or noticeable project-specific and/or cumulative effects are likely to persist for some time over the planning horizon. Adverse regional trends and cumulative effects attributable to the proposed Undertaking are potentially reversible.	Project-specific and/or cumulative effects are not readily reversible despite the implementation of impact management measures. Adverse regional trends and cumulative effects attributable to the proposed Undertaking 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:

- **Negligible Effect (Not Significant)** are those environmental effects which, after taking into consideration applicable impact management 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.

- **Minor Adverse Effects (Not Significant)** are those environmental effects which, after taking into consideration impact management measures, have been assessed to have a “low” or “medium” level of significance for the majority of the criteria described above.
- **Moderate Adverse Effects (Not Significant)** are those environmental effects which, after taking into consideration impact management 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.
- **Significant Adverse Effects** are those environmental effects which, after taking into consideration impact management measures, have a magnitude that has a “high” magnitude, “high” extent and “high” duration.

Table 6.28 provides the significance assessment for the residual adverse effects, which includes the consideration of the residual adverse effects of the proposed Undertaking (i.e., Project-specific effects) and cumulative effects.

Table 6.28 Cumulative Effects Significance Assessment Summary

Significance of Residual Adverse Effects									
Residual Adverse Effects	Proposed Undertaking Stage	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 proposed Undertaking 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 those of other projects and activities	**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 (compensation) has occurred.	**Low** VEC species are common and abundant. The resource / VEC will continue to fulfill its ecological functions.	**Negligible Effect (Not Significant)**

Table 6.28 Cumulative Effects Significance Assessment Summary

Significance of Residual Adverse Effects									
Residual Adverse Effects	Proposed Undertaking Stage	VEC Affected	Significance Levels						Overall Significance of Residual Adverse Effects
			Magnitude	*Extent*	*Duration*	*Frequency*	*Permanence*	*Ecological Importance (of resource or VEC)*	
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 traffic 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)**

6.4 Climate Change Considerations

In support of the province of Ontario's *Climate Change Action Plan*, MECP developed a Guide entitled "Consideration of Climate Change in Environmental Assessment in Ontario" (the Guide) to aid proponents in considering climate change as part of environmental assessments for infrastructure and facilities.

The Guide outlines the Ministry's expectations for considering climate change throughout the environmental assessment process. As stated in Section 3 of the Guide, consideration is to include:

- Greenhouse gas (GHG) emissions;
- Effects of a project on climate change;
- Effects of climate change on a project; and,
- How the project will minimize identified negative effects on climate change.

The preceding was considered as part of the SCRF EA in addressing the potential climate risks to the proposed Undertaking.

6.4.1 Historical Climate and Meteorological Trends

As part of determining the potential net effects from a climate change perspective an understanding of the historical climate/meteorological trends, as well as the potential for extreme weather events was established. Southern Ontario, including the City of Hamilton, 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. The City of 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 6.29**. 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 highest extreme maximum was in July of 1988 at 37.4˚C and the lowest extreme minimum temperature was in January of 2004 at -30.0˚C (**Table 5.34**).

Precipitation

The mean climate normal monthly precipitation data are provided in **Table 6.31**. 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 6.32**). The highest rainfall experienced was 107.0 mm in 1989 and the highest snowfall experienced was 43.2 cm in 1966.

Table 6.29 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 6.30 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)

Table 6.31 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 6.32 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 6.33** 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 6.33 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 6.34** (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)[14]. 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 6.34 Average Observed Speed of Maximum Gust from Hamilton A Station from 2000 to 2011

Month	Observed Average Speed of Maximum 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)

The preceding historical climate and climate trends were used to identify any possible climate change risks of concern for the construction, operation, closure/post-closure stages of the landfill.

6.4.2 Potential Effects of the Proposed 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

14 Based on historical records from Hamilton RBG CS Station (climate ID: 6153301) from 2005 to 2012.

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 6.2.6 provides an overview of the landfill gas generation, and estimated GHG emissions.

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.

6.4.2.1 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, impact management 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). Impact management measures include actions such as utilizing different technologies and construction materials. Impact management 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/ impact management 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; and,
- Replace and plant additional vegetation to create a carbon sink.

In addition to the above impact management measures the Air Quality Monitoring Program will continue to ensure all emissions are within accepted standards.

As the GHGs released by the landfill are already below required standards and with the implementation of BMP/impact management measures the proposed Undertaking is not anticipated to have a potential effect on climate change.

6.4.3 Effects of Climate Change on the Proposed Undertaking

Key potential effects of climate change that may occur during the proposed 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 proposed Undertaking, such as the SWM system. Furthermore, extreme weather events could also cause potential power outages, physical damage and reduced access to the Site.

Notwithstanding this, the potential impacts of the climate change effects for the proposed Undertaking 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 6.35**, summarizes the assessment of potential effects of climate change on the proposed Undertaking.

Table 6.35 Estimated Sensitivity of the Undertaking to Potential Climate Change Effects[15]

Climate Parameters	Landfill Stage				Explanation
	Construction[16]	Operation[17]	Closure[18]	Post-Closure[19]	
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	

15 Table modified from: "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" (Federal-Provincial-territorial Committee on Climate Change, November 2003).

16 Excavation and grading of new waste cells; placement and grading of final cover on closed cells.

17 Placement, grading, and compaction of waste during life of each active cell.

18 Placement and grading of final cover on remaining active areas of waste area, decommissioning of ancillary Site facilities.

19 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/post-closure) of the proposed Undertaking, or cause any severe damage to any of the landfill components, except potentially the leachate management system and the stormwater system during closure/post-closure (**Table 6.36**). The leachate and SWM systems have been designed to accommodate a Regional storm, which is much greater than the historical daily maximum precipitation amount of 107 mm (**Table 6.32**), and the rainfall depth estimated for the 100-year storm event for the SCRF of 127.8 mm (**Table 6.33**).

The leachate and SWM 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 (construction, operation, and closure/post-closure). 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 6.36 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 monitoring measures assist in providing data and information on how best to manage 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 proposed Undertaking 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 (**Appendix J-1 to J-9**).

6.4.3.1 Adaptation

Additional analysis was undertaken to determine what adaptation measures may be required for the Site. Adaptation was focused on addressing effects of climate change on the proposed Undertaking. The 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 that climate change will have no appreciable adverse effects on the proposed Undertaking identification of possible adaptation measures was undertaken to increase both the proposed Undertaking's and the local ecosystem's resilience to climate change.

To increase the proposed Undertaking'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 that it is resilient to climate change during the closure/post-closure stage.

Adaptation measures were 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 5 to 10 years; and
- Modifying the existing SWM ponds, if necessary.

The preceding is by no means a comprehensive list of the additional adaption measures that can 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 BMPs will be prepared such that they can flexible enough to adapt to a changing climate.

6.5 On-Site Diversion Assessment

Although there is minimal material received at the SCRF that has the potential to be reasonably diverted or recycled, the feasibility and viability of implementing an on-Site diversion program was examined and evaluated as part of the SCRF EA in accordance with the Minister-approved Amended ToR, 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.

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 *Waste Free Ontario Act (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. Consequently, the majority of these waste materials have exhausted all recycling or recovery options and cannot otherwise be utilized.

Notwithstanding this, the examination/evaluation of an on-Site diversion program considered and assessed a reasonable number of ways in which to divert the types of waste materials typically received at the SCRF. Further, the potential for on Site diversion was reviewed in accordance with BMPs and in consideration of new and emerging technologies, and in recognition of the goals and expectations set forth in the *WFOA*.

6.5.1 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 continually 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.

6.5.2 Assessment Methodology

Terrapure conducted an assessment of potential on-Site diversion programs, through a literature review to explore other jurisdictions' BMPs 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[20].

The technologies (some still theoretical in nature) discussed for diversion of residual mixed solid waste in the literature include the following:

- Mechanical biological treatment (MBT);
- Refuse-derived fuel (RDF) with stoker firing;
- RDF with fluidized bed combustion;
- Catalytic depolymerization;
- Hydrolysis;
- Pyrolysis;
- Gasification; and,
- Plasma arc gasification.

Although, as listed, 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.

In-Situ Stabilization of Contaminated Soils

One such trend is the use of 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 and Combustion Technologies

Although, as stated, 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).

6.5.3 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 the BOF oxide recycling process described previously was more than double the price of iron ore (**Figure 6.24**).

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.

[20] Strategy for a Waste Free Ontario, p.10

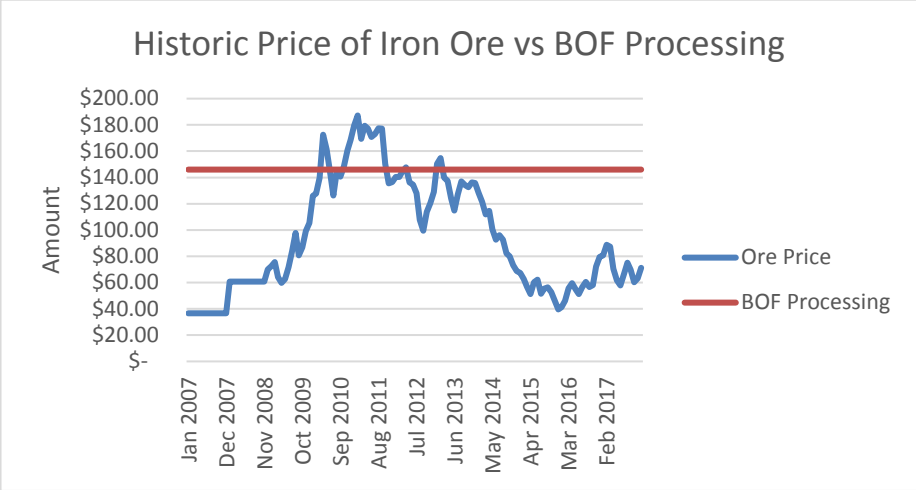


Figure 6.24 Cost of Raw Iron Ore Compared to Cost of Recovering Steel Wastes Through BOF Oxide Recovery/Processing Process

At this time, the solutions for diverting residual industrial waste, including the recovery of steel making wastes through BOF recovery and processing, are still in their formative stages. More 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 is 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-Site and off-Site as more information on emerging technologies' financial viability becomes available. As per the commitment in the existing Environmental Compliance Approval (ECA) the SCRF operates under, Terrapure will also continue to review the 3Rs 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.

6.6 Closure and Post-Closure Planning

As committed to in the Minister-approved Amended ToR, the potential effects from a construction, operation, closure/post-closure planning perspective were considered as part of the SCRF EA. For the purposes of assessing these stages of the project, a range of years was provided in which each of these stages would occur.

The additional capacity being sought through the SCRF EA is based on current economics and market dynamics. It has been established based on a reasonable business planning horizon for the next 10-15 years.

If it is determined at the end of the planning horizon that there is a further economic opportunity at the SCRF and the current owners are interested in pursuing it, then it would be subject to a separate approvals process as required by legislation at an undetermined time in the future.

If it is determined at the end of the planning horizon that there is no economic opportunity or the SCRF is not able to accommodate additional capacity, then closure and post-closure (or decommissioning) of the SCRF will take place in accordance with O. Reg. 232/98, which includes the future requirement to develop a closure plan.

Closure of the Site will be undertaken immediately following the completion of landfilling to the approved final contours of the landfill. Closure activities will include the following:

- Progressively apply final cover (vegetative) from south to north.
- Remove existing Site infrastructure (i.e., scale facility, maintenance area, wheelwash facility, Site office, Site access).
- Maintain and keep in place the infrastructure required to manage leachate (leachate collection system).
- Maintain and keep in place the infrastructure required to monitor (long-term) groundwater and surface water (i.e., hydraulic control layer, groundwater monitoring wells, surface water pond and drainage ditches, connection to sanitary sewer).
- Flexibility of post-closure design with uniform grading extending over the majority of the Site.

The overall existing Site closure requirements will remain unchanged as a result of the implementation of the proposed Undertaking.

The final closure plan under O. Reg. 232/98 is required to occur no later than the date when 90% of the total waste disposal volume is reached or two years before the anticipated date of closure, whichever comes first. Further, under the SCRF ECA, Terrapure is required to submit a complete plan for closure, post-closure, long-term maintenance, monitoring and after-use of the Site, including all buffer and landfilled areas. The closure plan will include the following:

- Final Site contours and drainage plans;
- Operation plans up to Site closure;
- Details on final grading, cover methods and source of cover materials;
- Vegetative cover and final landscaping plans;
- Operation and access to leachate and gas control systems for maintenance and monitoring;
- Anticipated costs of closure plan including operating and capital costs;
- Updated contingency plans for groundwater, surface water and if required, landfill gas;
- Prevention of public access to operational or monitoring areas;
- Post-closure ownership of the Site; and,
- Ensuring that the potential end use activities do not encumber or affect the Site's leachate or surface water controls are not affected.

The ECA also requires that the closure plan be designed in consultation with the Community Liaison Committee (CLC), the City of Hamilton and the Hamilton Conservation Authority prior to being submitted.

It should be noted that the final end use of the Site to be determined during post-closure will need to reflect the City of Hamilton land use planning controls, which currently intends for the Site to become open space and/or recreational uses and may include a golf course. Any deviation from the current land use controls would require amendments.

6.7 Impact Assessment Summary

The information presented in **Section 6.2** has been summarized and included in **Table 6.37**. As the table indicates 'No' to 'Low' net effects are anticipated across all environmental components considered for the implementation of the proposed Undertaking. Net effects for all environmental components are listed in **Table 6.37** along with a summary of associated impact management measures.

Table 6.37 Summary of the Potential Environmental Effects, Impact Management Measures, Net Effects and Monitoring Programs for the Proposed Undertaking

Environmental Component/Criteria	Potential Effects	Impact Management Measures	Net Effects	Monitoring Programs
Geology and Hydrogeology	Potential for minor increases in leachate indicator parameters in downgradient groundwater quality, as well as upgradient limits reaching wellhead protection area during construction/operation and closure/post-closure. Leachate generation rates will decrease from approximately 5.9 L/s during construction/operation to approximately 5.5 L/s during post-closure. No change in groundwater flow because proposed expansion alternatives will have minimal effect on groundwater recharge patterns during construction/operation or closure/post closure	Maintain and expand the existing environmental controls incorporated in the landfill design including: • Extend existing 3 m thick double liner system • Extraction well M4 will be maintained and operated for the purpose of collecting potentially impacted groundwater from closed west landfill and maintain inward gradients for the Preferred Landfill Footprint • construction of the network of groundwater collection trenches is completed beneath the liner system as landfill cells are constructed (as per the existing design Maintain an inward gradient across the liner system through flooding the Hydraulic Control Layer.	No off-site groundwater receptors will be affected during construction/operation or closure/post-closure. No effects to groundwater within source water protection area during construction/operation or closure/post-closure.	Continuation of long-term groundwater quality and quantity and leachate monitoring program. Long-term monitoring will include a sampling program for existing points around the site, as well as the Hydraulic Control Layer.
Surface Water	Potential contaminants of concern in the runoff are TSS. The increased area of residual material results in an increase in impermeable area due to the residual material final cover that will produce an increased 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.	The existing stormwater management pond will be altered to provide adequate storage for quality and quantity control during construction/ operation to remove TSS and to contain the 2-year through 100-year storms. The alterations include: • additional ditches along the north and west perimeter of the Site • converting the current SWM detention pond into a second forebay • re-grading the future detention pond to increase the depth and surface area of the pond 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 No increase in peak flows to the roadside ditches to the northwest of the Site, sewer under First Road West and Davis Creek The Stormwater management pond and perimeter ditches will able to treat and control the runoff from the Site to the same level as the current approved design.	Continuation of Surface Water monitoring Program including surface water sampling and annual inspections of the SWM ponds.
Terrestrial and Aquatic	During construction/ operation, there will be a 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. Temporary disturbance to terrestrial species during Site works (construction) and landfilling operations. During construction/ operation, there will be a 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. Loss of on-Site aquatic habitat and disturbance to aquatic biota associated with open water habitats in stormwater infrastructure due to 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 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.	The temporary loss of approximately 18.5 ha of vegetation and wildlife habitat during construction and operation will be minimized through implementation of the impact management measures and ultimately replaced during closure/ post-closure. The temporary disturbance to terrestrial species during construction/ operation will be minimized through implementation of the impact management measures. The temporary loss of SAR habitat during construction/ operation will be minimized and where required, compensated through implementation of the impact management measures (i.e. new habitat enhanced/ created through Habitat Management Plan). The temporary loss of on-Site aquatic habitat and disturbance to aquatic biota during construction/ operation will be minimized through implementation of the impact management measures.	Regular monitoring and regular inspections of dual purpose ESC and wildlife exclusion fencing. Vegetation monitoring program (i.e. seed mix verification, plant survivorship monitoring, invasive species management). Monitoring requirements as outlined and specified under Notice of Activity Species at Risk (SAR) permit.

Table 6.37 Summary of the Potential Environmental Effects, Impact Management Measures, Net Effects and Monitoring Programs for the Proposed Undertaking

Environmental Component/Criteria	Potential Effects	Impact Management Measures	Net Effects	Monitoring Programs
		• 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) 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. 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** Potential for off-site concentrations of particulate species (TSP, PM10 and PM2.5) to exceed current criteria during construction/operation, primarily to receptors north of Green Mountain Road when operations are near the north boundary of the site. The potential sources of odour emissions remain the same (the leachate pumping station and the aeration pond) throughout the life of the project. 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). No effects from a closure/post-closure perspective. **Noise** The predicted noise impacts at the residential areas range from 37 to 60 dBA. The existing and potential residences near the north of the landfill are the most impacted as they are approaching the existing daytime noise limit of 55 dBA for the landfill design Preferred Alternative during Phases 1 and 2 of Terrapure's Sites Development.	Implementation of dust mitigation plan for all phases of the site operations, which will include: • 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 • Continued use of the wheel-washing station near the Site exit, to reduce track-out of material from the Site onto First Road West Limit on-site vehicles to no more than 30 km/hr Progressive capping and re-vegetation to eliminate windblown dust Logging of complaints and investigation into contribution(s) of the Site to local air quality (including odour) issues. There are no exceedances above the Site-specific noise limits. Therefore, no impact management measures are required.	Facility can meet MECP and CAAQS guidelines, provided care is taken when operations are occurring near the fenceline. Based on limited odour generating materials at the SCRF and through continuation of BMPs, the Site is unlikely to contribute to significant odour issues in the area. Net sound level change for all off-Site receptors is 6 dBA or lower. Off-Site noise impacts will also decrease over the phases of the project 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 to the east, west, and south.	Continuation of monitoring station 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. A semi-annual noise monitoring will be undertaken through the lifetime of the Facility.

Table 6.37 Summary of the Potential Environmental Effects, Impact Management Measures, Net Effects and Monitoring Programs for the Proposed Undertaking

Environmental Component/Criteria	Potential Effects	Impact Management Measures	Net Effects	Monitoring Programs
	Future development to the north of the SCRF will increase the volume of vehicle traffic in the area and contribute significantly to the ambient daytime sound levels increasing the daytime sound level limit to 60 dBA along Green Mountain Road. The timing of the future daytime sound levels coincides with the staged development of Phases 3 and 4 to the SCRF. No effects from a closure/post-closure perspective.		Construction/Operation noise impacts over all phases of the project will remain below the site specific limits.	
Land Use	No change to existing land uses Slight height increase alters the existing views to some receptors around the SCRF during construction/operation and closure/post-closure.	No impact management measures are required as there are no anticipated change required to existing Site-specific and adjacent land uses during construction/operation. Change in the Sites land use during closure/ post-closure will reflect the City's current applicable land use plans/ policies. Impact management measures for existing land uses are applicable to potential nuisance related effects due to on-site construction/operation: • Maintain buffers for nuisance reduction • Basic landfill operations for nuisance mitigation • In effect BMPs for nuisance mitigation 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, where possible, native vegetation can be implemented to mitigate views for sensitive receptors and may include traditional berms, vegetation, fencing with privacy screen or vegetation, mechanically stabilized earth berms, and/or freestanding green walls. Progressive capping of the landfill will assist in revegetating areas as the Site is of the Site to create a natural look	No change in current Site-specific and study area land uses. Installation of visual screening elements will sufficiently obscure a majority of views of the Facility from sensitive receptors during construction/operation. Relative to the existing conditions, the changes are minimal.	The current environmental monitoring programs identified for groundwater, leachate, surface water, air and noise as well as existing and proposed 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. Visual mitigation measures including vegetation and fencing will be maintained and monitored in accordance to the site's operating plan.
Human Health	Potential for elevated dust concentrations in the Local Study Area during construction/operation. Minimal potential human health effects relative to leachate, groundwater, surface water and soil quality during construction/ operation and closure/ post-closure.	Implementation of dust mitigation plan and ongoing monitoring/assessment Implementation of design/operations relative to leachate management, groundwater quality, surface water quality and air quality will mitigate human health effects accordingly.	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.	Continued operation of the existing air quality monitoring station specifically to monitor airborne PM_{10} concentrations is required to demonstrate ongoing efficacy of particulate impact management measures on the Site.
Traffic	No change to the existing level of road user safety and intersection Level of Service within the Local Study Area	No impact management measures required.	No net effects.	No specific monitoring program is proposed at this time.
Economic	No anticipated potential effects on approved/ planned land uses through various site design and operation impact management measures. Increase of jobs and increase to economy and GDP (Range of economic activity between $349 and $372 million with GDP from $218-$232 million Potential for investment in local community through existing community compensation agreement, based on current $ per tonne agreement. Higher property tax rate for current use of lands than future use would continue	Impact management 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 • BMPs for nuisance mitigation.	No net effects to approved/planned land uses. Positive economic benefits to local community.	No specific monitoring program is proposed at this time.
Archaeology and Built Heritage	The proposed change in footprint occurs within previously excavated lands (former quarry). Due to	During construction, should previously undocumented archaeological or indigenous resources be discovered,	No Net Effects or impact management measures are anticipated or required.	No specific monitoring program is proposed at this time.

Table 6.37 Summary of the Potential Environmental Effects, Impact Management Measures, Net Effects and Monitoring Programs for the Proposed Undertaking

Environmental Component/Criteria	Potential Effects	Impact Management Measures	Net Effects	Monitoring Programs
	the previous disturbance on-Site (excavation for quarry operation), the Preferred Landfill Footprint does not affect a known or potential archaeological resource. One cultural heritage landscape exists within 1.5 km of the SCRF (Billy Green House), which will not be impacted, displaced or disturbed. No known or potential cultural resources that are of value to Indigenous communities were identified within the Local Study Area based on the consultation carried out as part of the SCRF EA.	alterations at the Site will cease immediately and Terrapure will engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Sec. 48 (1) of the Ontario Heritage Act. In accordance with the Funeral, Burial and Cremation Service Act, 2002 should Terrapure discover human remains, the police or coroner and the Registrar of Cemeteries, Ministry of Small Business and Consumer Services will be notified immediately		
Design and Operations	Increased design and operating complexity of leachate management system	Design of new base liner system will integrate seamlessly with existing base liner system and use 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.	The current environmental monitoring programs identified for groundwater, leachate, surface water, air, noise, terrestrial and aquatic, as well as existing and proposed 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.
	Increased design and operating complexity of stormwater management system	Design of new stormwater management system will integrate seamlessly with existing stormwater management system by maintaining the current approved location and general layout of the stormwater pond. Extension of perimeter drainage ditches to accommodate new residual material area. 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.	
	Increased design and operating complexity of groundwater management system	Design of new groundwater management system will 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.	
	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.	
	Increased complexity and reduced constructability/ operations of Facility components	Design of new base liner system to integrate seamlessly with existing base liner system. Maintain design and function of existing systems (leachate, stormwater, groundwater, gas) and infrastructure (access, roads, weigh scale, wheel wash).	Small increase in complexity relative to current construction/ operation requirements associated with: additional base liner and leachate collection system, additional final cover.	
	Increased closure and post-closure requirements and reduced flexibility of potential end uses	Design of new final cover system to integrate seamlessly with existing final cover system. Maintain open and uniform configuration that will simplify Site closure requirements and allow for flexibility of potential end uses.	Simplified closure requirements and increased flexibility of potential end uses relative to current design.	

6.8 Advantages and Disadvantages of the Undertaking

In accordance with the Minister-approved Amended ToR, the advantages and disadvantages to the environment of the proposed Undertaking are summarized in **Table 6.38**. The advantages and disadvantages are based on the net effects described above. The proposed Undertaking, with specific impact management measures and monitoring programs in place, will have low net effects on all environmental components and the Facility construction and operation will have a positive economic effect on in the community.

Table 6.38 Advantages and Disadvantages of the Proposed Undertaking

Environmental Component		Advantages	Disadvantages
Geology and Hydrogeology		With the implementation of the proposed landfill design, no net effects on the geologic or hydrogeologic conditions	No disadvantages based on the implementation of the proposed landfill design
Surface Water		Upgrades to Stormwater pond will ensure the surface water quality is treated and will meet requirements for discharge to the sanitary sewer system with no increase in TSS. Upgrades to perimeter ditches and Stormwater pond will ensure surface water quantity is managed and controlled on-site	No disadvantages to on-site or off-site surface water quality No disadvantages to receiving watercourses
Terrestrial and Aquatic		Progressive habitat replacement and enhancement as the SCRF is closed and capped, replacing the temporary loss of vegetation and wilidlife habitat	Temporary loss of approximately 18.5 ha of vegetation and associated wildlife habitat during construction/operation Temporary disturbance to aquatic habitat during construction/ operation
Land Use		Installation of visual screening elements will sufficiently obscure a majority of views of the SCRF No change in current land use required	Slight height increase relative to the existing approved SCRF will result in minor viewshed changes from the surrounding area
Economic		Total economic activity generated in the Hamilton area by the site ranges between $349 and $372 million, with GDP from $218-$232 million Extended duration of employment opportunities at the SCRF, based on operational requirements Total taxes and fees paid to City would continue (property taxes, sewer-use discharge fees, etc.) and the potential for up to $14 million to the City and community (based on existing SCRF $ per tonne agreements)	No disadvantages from an economic perspective
Atmospheric	**Air Quality**	Regulatory guidelines (MECP and current/future Federal CAAQS) will be met regarding particulate matter and nearest offsite receptors No putrescible materials are accepted at the SCRF and therefore the site is unlikely to contribute to odour issues offsite	Minimal increase in dust to some receptors
	Noise	Noise levels at receptors are below regulatory limits	Receptors may experience a temporary minor noise level increase resulting from landfilling activities
Human Health		With the implementation of the proposed landfill design to manage leachate, groundwater and surface water, no net effects to human health are anticipated	Minimal increase in dust to some receptors

Table 6.38 Advantages and Disadvantages of the Proposed Undertaking

Environmental Component	Advantages	Disadvantages
	With the implementation of the proposed management measures to address air quality (dust), no net effects to human health from an air quality or soil quality are anticipated No unacceptable health risks to the surrounding community	
Traffic	As there are no changes proposed to the existing waste haul routes, existing approved site traffic generation and no network improvements required, there are no changes to the existing level of road use safety and intersection Level of Service as a result of the SCRF expansion from a traffic perspective.	No disadvantages from a traffic perspective
Archaeology & Cultural Heritage	No loss of or disturbance to cultural and heritage resources and archaeological resources	No disadvantages from a archaeology and cultural heritage perspective
Site Design & Operations	No net effects as the complexity of site infrastructure is minor considering similarities with the previous design and environmental control/construction techniques	No disadvantages from a site design and operations perspective

6.9 Peer Review

As part of the SCRF EA, a peer review of key technical aspects of the EA was undertaken to provide an independent assessment of the technical information developed as part of the EA. This additional layer of evaluation provides Terrapure with third party expert analysis and scrutiny on the methodology and results presented in the SCRF EA. The peer review is also intended to address consistency of the information presented within the SCRF EA with design standards, BMPs, and regulatory requirements. The peer review process relies on professional judgement, supported where appropriate with references to relevant documentation.

The peer review feedback will assist Terrapure in identifying opportunities for improvement of the EA submission based on the peer reviewer's comments related to design standards, BMPs, regulatory requirements, and other relevant recommendations related to engineered landfills and their environmental control systems.

6.9.1 Peer Reviewer Profile

Dr. R. Kerry Rowe was engaged to act in a peer review capacity for the SCRF EA, including a review of potential leachate impacts to groundwater and surface water, as well as the overall design and operation of the Site. Dr. Rowe is presently a Professor in the Department of Civil Engineering at Queen's University and the Canada Research Chair in Geotechnical and Geoenvironmental Engineering. Dr. Rowe has been involved in the design and/or peer review of hydrogeology and/or design for more than 50 landfills in Canada, the US and other countries, and has performed expert reviews of municipal solid waste landfills for the US Environmental Protection Agency, US Department of Justice, and the Ontario MECP.

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. In addition, Dr. Rowe previously served as a member of an Expert Panel that conducted an extensive review of the design and operations of the SCRF (formerly the Taro Landfill) in 2000.

Further information related to Dr. R. Kerry Rowe's credentials is contained in **Section 7.8**.

6.9.2 Scope of Peer Review

As mentioned, the peer review process focused on the key technical aspects of the proposed Undertaking and not the EA process itself. The peer review focused on the following key technical aspects:

- Landfill Design and Operations; and,
- Groundwater and Surface Water (as it relates to potential leachate impacts).

As part of the peer review process, Dr. Rowe undertook a Site visit in January 2018 and reviewed a number of background and reference documents, including (but not limited to):

- Background reports and studies completed to date for the SCRF (i.e., Facility Characteristics Report, Impact Assessment Reports, etc.);
- Results of on-going monitoring being conducted at the SCRF (i.e., Annual Monitoring Reports);
- Relevant industry standards and practices;
- Applicable regulations and guidelines; and,
- Technical studies and papers relating to landfill design and operations.

With respect to specific peer review comments, Dr. Rowe reviewed and provided an analysis on the following documents that form part of the SCRF EA Report:

- Draft and Final Facility Characteristics Report (**Appendix K**)
- Draft and Final Geology and Hydrogeology Detailed Impact Assessment Report (**Appendix J-1**)
- Draft and Final Design and Operations Detailed Impact Assessment Report (**Appendix J-9**)

Based on the review of background documents and key SCRF EA documentation, an initial peer review was prepared by Dr. Rowe, which provides the formal peer review comments, as well as specific recommendations for Terrapure's consideration when finalizing the SCRF EA Report.

6.9.3 Summary of Peer Review Comments on the Draft EA

Dr. Rowe prepared a letter outlining his peer review comments based on a review of the draft SCRF EA documentation, which was submitted to Terrapure for consideration. The full and complete peer review letter has been included as **Appendix L** to the SCRF EA, with a summary of the comments as follows:

- *a) The facility is designed to operate as a hydraulic containment site following closure; this means that the water level in the hydraulic control layer (HCL) MUST be continuously maintained above the level of the leachate in the landfill. Under these circumstances, leachate cannot leak out and the only mechanism for contaminant escape is diffusion.*
- *b) The geomembrane is only required to minimize leakage while landfilling continues and before the hydraulic control becomes operative. Thus its design life is the time until the HCL is fully operational and hence its service life is less than 50 years (i.e., time from start to completion of landfilling plus time for checking that the HCL is operating as expected). Given the nature of the leachate and the expected liner temperature, this service life should be readily achievable with the proposed design, and construction using a quality HDPE geomembrane, and good field construction quality assurance (CQA). After closure the geomembrane will still serve to reduce diffusion of contaminants toward the HCL.*
- *c) The HCL can be monitored and pumped during landfill operations. By pumping any excess leachate in the HCL, excess leakage through the primary liner can be removed and the head on the secondary liner kept to a minimum. By monitoring the concentration of contaminants in the HCL sump, an assessment can be made as to when city water needs to be flushed into the HCL to reduce the concentration of any contaminants that will migrate through the secondary liner to a level such that the impact on the underlying groundwater will be acceptable.*

- *d) The presence of a groundwater control system that appears to have been effective and which can be used in the event that any unexpected contaminant leakage occurs.*
- *Based on my prior knowledge of the site (including site visits), my site visit in 2018, and my review of the documents, in my opinion, the design (at the level of detail presented for the expansion) is such that if properly implemented and operated, the expansion will have negligible negative impact on off-site ground and surface water quality. Thus, the expansion will not measurably increase any impact on the groundwater quality.*

Dr. Rowe notes that the statement above is predicated on a number of important implementation conditions associated with construction and monitoring of the liner system, including:

1. *…high quality construction quality assurance (CQA) during construction of the expansion cells.*
2. *The leachate levels in the landfill be maintained below the design level at all times going forward.*
3. *The HCL is monitored (regularly), and flushed and pumped (as needed) during landfill operations.*
4. *After closure, the water level in the HCL be maintained such as to ensure hydraulic containment (e.g., at least (i) 0.5m above the top of the primary liner at all locations, (ii) at least 0.4m above the highest leachate level observed in the 10 years prior to closure, and (iii) a minimum of 0.9 m above the liner near the highest pump out/sump - whichever is higher).*
5. *That the final design be subject to careful independent check.*

As part of finalizing the draft SCRF EA Report, Terrapure has reviewed and incorporated the above comments as required (i.e., through EA commitments or through updating the appropriate proposed monitoring plans). In addition, as per Dr. Rowe's comments, Terrapure has reviewed the contaminating lifespan calculations and predictions, and included the updated information in the Final EA Report.

6.9.4 Summary of Peer Review Comments on the Final EA

Based on the Peer Review comments received during the Draft EA, the Project Team updated the Final SCRF EA Report and re-circulated the documentation to Dr. Rowe for a subsequent Peer Review prior to formal submission of the SCRF EA to the MECP.

Similar to the Draft EA stage, Dr. Rowe prepared a letter outlining his peer review comments based on a review of the Final SCRF EA documentation, which was submitted to Terrapure for consideration. The full and complete peer review letter has been included as **Appendix L** to the SCRF EA. In summary, Dr. Rowe reiterated a number of his previous commentary provided during the Draft EA Report, including:

There are a number of important aspect of the design that should be emphasized since they are critical to my evaluation of the design (as per the D&O and Geology and Hydrogeology reports) and my opinion as stated later:

a. *The facility is designed to operate as a hydraulic containment site following closure; this means that the water level in the hydraulic control layer (HCL) MUST be continuously maintained above the level of the leachate in the landfill. Under these circumstances, leachate cannot leak out and the only mechanism for contaminant escape is diffusion.*

b. *The geomembrane is only required to minimize leakage while landfilling continues and before the hydraulic control becomes operative. Thus, its design-life is the time until the HCL is operational and hence its service-life is less than 50 years (i.e., time from start to completion of landfilling plus time for checking that the HCL is operating as expected). Given the nature of the leachate and the expected liner temperature, this service life should be readily achievable with the proposed design[2], and construction using a quality HDPE geomembrane, and good field construction quality assurance (CQA). After closure, when it is*

no longer required to prevent significant outward leakage of leachate, the geomembrane will still serve to reduce outward diffusion of contaminants toward the HCL (especially contaminants like chloride and cadmium).

c. *Prior to becoming operational as a HCL, the layer intended to provide the hydraulic control can be monitored and pumped. By pumping any leachate from this layer, leakage through the primary liner3 can be removed and the head on the secondary liner, and hence leakage through the secondary liner, minimized. By monitoring the concentration of contaminants in the HCL sump, an assessment can be made as to when city water needs to be flushed into the HCL to reduce the concentration of any contaminants that will migrate through the secondary liner to a level such that the impact on the underlying groundwater will be acceptable.*

d. *The presence of a groundwater control system that appears to have been effective and can be used in the event of any unexpected contaminant leakage.*

Based on my prior knowledge of the site (between 2000 and now, including site visits), my site visit in 2018, and my review of the documents listed above, in my opinion, the design (at the level of detail presented for the expansion) is such that if properly implemented and operated, the expansion will have negligible negative impact on off-site ground and surface water quality.

Thus, the expansion will not measurably increase any impact on the groundwater quality.

Dr. Rowe notes that the statement above on the revised and Final EA documentation is predicated on a number of important implementation conditions associated with construction and monitoring of the liner system, including:

1. *There be high quality construction quality assurance (CQA) during construction of the expansion cells. The construction of all aspects of the barrier system of the expansion be undertaken under the supervisions of a qualified quality assurance engineer with a good knowledge of, and experience with, quality assurance of compacted clay liners, the installation of geomembrane liners and geotextile protection layers, and who will be present observing the placement of the secondary CCL, the HCL, the primary CCL, the geomembrane, the geotextile protection layer, and also very importantly when the drainage gravel is being placed over the geotextile and geomembrane.*
2. *Going forward, the leachate levels in the landfill must be maintained below the design level at all times.*
3. *The HCL is monitored (regularly), and flushed and pumped (as needed) during landfill operations (see item (c) above).*
4. *After closure, the water level in the HCL be maintained such as to ensure hydraulic containment (e.g., at least (i) 0.5m above the top of the primary liner at all locations; (ii) at least 0.4m above the highest leachate level observed in the 10 years prior to closure; and, (iii) a minimum of 0.9 m above the liner near the highest pump-out/sump - whichever is higher).*
5. *That the final design be subject to careful independent check.*

In addition, to reconfirming the above commentary on the revised Final EA documentation, Dr. Rowe also reviewed and provided additional commentary on the contaminating lifespan calculations and predictions:

While I agreed with GHDs use of the Rowe (1991) approach, {{within the original calculations in the Draft EA Report documentation}} I questioned some of the parameters being used and an apparent error. In response to my concerns, GHD corrected the error, revised the calculations, and provided far more detail to support their assumptions and calculations including a calculation spreadsheet I *could check.*

In their revised calculations, GHD adopted an infiltration q_0 = 150 mm/m^2/year based on O. Reg 232/98 (as amended). This is almost half the infiltration rate given by GHDs current HELP modelling (292 mm/m^2/year). In my opinion, this is a reasonable but conservative estimate of leachate generation for the purposes of the CLS calculations.

If the waste stream is as assumed in GHDs calculations, then CLS is likely between about 50-80 years from about now (i.e., it would be reached by about 2070-2100). However, there is some

uncertainly regarding the chloride concentration in slag. For the 115,000 tonnes of slag known to have been disposed to date, it is only in the very worst combination of parameters that the CLS goes above 80 years and that is considered quite unlikely. However, if there is a future plan to dispose of more slag it is recommended that the chloride content be obtained and the impact on the CLS be assessed prior to accepting the slag.

Finally, Dr. Rowe provided the following closing commentary within his Peer Review of the Final EA Report documentation:

Despite disagreeing with some details in the reports, none of my quibbles over details impact my opinion that the design (at the level of detail presented for the expansion) is such that if properly implemented and operated the expansion will have negligible impact on off-site ground and surface water quality. Any issues that would have resulted in a different opinion on this matter have been addressed to my satisfaction.

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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. A comprehensive consultation program involving review agencies, Indigenous communities, and public stakeholders was carried out throughout the EA process, in accordance with the MECP's Code of Practice for Preparing; *Reviewing Environmental Assessments in Ontario* (January 2014); and, as required by Section 5.1 of the *EA Act*.

As presented in the Minister-approved Amended Terms of Reference (ToR) (2017), the comprehensive consultation program for the EA process, titled the EA Consultation Plan, included four elements:

1. Key decision-making milestones when consultation would occur during the SCRF EA (**Section 7.2**).
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 EA 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**).
3. 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, 7.6 and 7.7**).
4. Issues resolution strategy for resolving potential issues or disputes raised during the SCRF EA (**Section 7.9**).

In addition to elements described above, the consultation program also included:

- A Peer Reviewer, 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 (**Section 7.8**).
- Availability of the Draft SCRF EA Report for review and comment by review agencies, Indigenous communities, and the public (**Section 7.10**).
- Details of Final SCRF EA Report submission to the MECP for a decision by the Minister on the proposed Undertaking with a formal review (**Section 7.11**).
- Proposed ongoing consultation during the implementation of the approved Undertaking (**Section 7.12**).

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 wide-range of methods for review agencies, Indigenous communities, and public stakeholders to be involved and provide comments for consideration.

The SCRF EA Consultation Plan outlined five 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 (**Section 7.3.1**)
- Social media (**Section 7.3.2**)

- Educational videos (**Section 7.3.3**)
- Media relations (**Section 7.3.4**)
- Toll-free telephone number (**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 details.

Each of these activities are further 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. 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 to host 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 the level of 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 interaction and new followers during the EA phase, there were a few noteworthy engagement moments, including posts with invitations to the Public Open Houses, promotion of the Heritage Green Community Trust funds, and the educational videos.

7.3.3 Educational Videos

In response to comments received from the public during the ToR, Terrapure created two educational videos: SCRF Environmental Protection, and SCRF Waste Acceptance Process. These two videos were developed and published in November 2017, shortly after the Notice of Commencement. As of December 2018, the SCRF Environmental Protection video received 139 views, and the SCRF Waste Acceptance Process received 219 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 the phasing plan for landfilling.

The videos can be accessed and viewed at: http://bit.ly/SCRFvideos.

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 published in the Stoney Creek News, 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 (1-844-898-2380) established during the ToR phase was continued during the EA phase. 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:

Table 7.1 Review Agencies Involved in Preparation of the EA

Review Agency	Rationale for the Agency's Involvement
Federal and Provincial Agencies	
Environment and Climate Change Canada (ECCC)	Their mandate includes preserving and enhancing the quality of the natural environment including water, air, soil, flora, and fauna which may be affected by the proposed undertaking.
Ministry of Agriculture, Food and Rural Affairs (OMAFRA)	Their mandate includes supporting Ontario's agri-food sector, enforcing and improving food safety and strengthening Ontario's rural communities. Since the preliminary study area includes a rural environment that may be affected by the proposed undertaking, OMAFRA was consulted as part of the EA process.
Ministry of Economic Development and Growth (MEDC)	Their mandate includes helping to grow a strong, innovative economy that provides jobs and prosperity for all Ontarians. Since the Undertaking has the potential to affect the economic environment, MEDC was consulted.
Ministry of Environment, Conservation, and Parks (MECP)	Their mandate includes protecting, restoring and enhancing the environment to ensure public health and environmental quality, which may be affected by the proposed Undertaking. In addition, MECP is responsible for administrating the *Environmental Assessment Act*, which the proposed Undertaking is subject to.
Ministry of Natural Resources and Forestry (MNRF)	Their mandate is to oversee the province's natural resources and work to safeguard Ontario's provincial parks, forests, fisheries, wildlife, mineral aggregates, Crown lands and waters. The MNRF is responsible for

[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.

Table 7.1 Review Agencies Involved in Preparation of the EA

Review Agency	Rationale for the Agency's Involvement
	administering the *Endangered Species Act* and since the project has the potential to affect Species at Risk (SAR) including the Eastern Meadowlark, Barn Swallow, and Butternut, the MNRF was consulted.
Ministry of Tourism, Culture and Sport (MTCS)	Their mandate includes the conservation of archaeological resources and promotion of heritage conservation. Since the project has the potential to have an impact on archaeological and cultural resources, MTCS was consulted.
Ministry of Transportation (MTO)	Their mandate includes overseeing the provincial transit and transportation system. Since there is the potential for transportation impacts as a result truck traffic associated with the undertaking, the MTO was consulted.
Ontario Provincial Police (OPP)	They were consulted as part of the EA process to determine if the proposed Undertaking affects provincial policing activities within their jurisdiction.
Municipal and Regional Agencies	
City of Hamilton, including the Mayor, Councillors, and the following departments: planning, economic development, water, public health, transportation, and city manager	Since the proposed Undertaking is situated within the City of Hamilton, City staff and Councillors were consulted as part of the EA process to ensure their various interests were duly considered. In addition, two City Councillors represent the City of Hamilton on the Terrapure SCRF Community Liaison Committee (refer to **Section 7.6.6**).
Hamilton Conservation Authority (HCA)	HCA manages the natural environment with the City of Hamilton and Province of Ontario protecting water sources, guarding against flooding and erosion, managing conservation and recreational lands, and promoting environmental stewardship and education. Since the proposed Undertaking is situated within the Stoney/Battlefield Creek watershed, they were consulted as part of the EA process to ensure their interests were duly considered.
Hamilton Wentworth Catholic District School Board (HWCDSB)	Since the proposed Undertaking is situated within the school district boundaries of the HWCDSB, they were consulted as part of the EA process to ensure their interests of truck traffic, truck speeds and student safety were duly considered.
Hamilton Wentworth District School Board (HWDSB)	Since the proposed Undertaking is situated within the school district boundaries of the HWDSB and a proposed elementary school is proposed northwestern of the SCRF, they were consulted as part of the EA process to ensure their interests were duly considered.

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 Catholic District School Board, the Hamilton-Wentworth District School Board, Ministry of Agriculture, Food, and Rural Affairs, 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 7.6.3**)
- Four GRT Webinars (**Section 7.4.3**)
- Individual meetings (**Section 7.4.4**)
- Circulation of draft reports (**Section 7.4.5**)
- Circulation of the Draft Environmental Assessment and posting of the Final Environmental Assessment (**Sections 7.10 and 7.11**)

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. Summaries of the GRT webinars can be found in **Vol. 3 – Appendix A**.

7.4.3.1 GRT Webinar #1

Date: December 8, 2018 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 District School Board
- Hamilton-Wentworth District School Board
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of the Environment, Conservation, and Parks (Approvals Branch)
- Ministry of the Environment, Conservation, and Parks (West Central Region)
- Ministry of Natural Resources and Forestry
- Ministry of Tourism, Culture, and Sport

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, recap the Public Open House #1 and outline 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)
- 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
- To accommodate scheduling conflicts, a separate webinar was held with City of Hamilton Staff on June 28, 2018

Question 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.

The City of Hamilton staff asked Terrapure to elaborate on the timeframe for MECP review and process, to provide the visual cross-sections, to explain progressive capping and when the process will begin, and to discuss the assessment for the property value and property taxes.

7.4.3.4 GRT Webinar #4

Date: October 3, 2018

Attendees:

- Hamilton Conservation Authority, Ministry of Tourism, Culture, and Sport, and Ministry of Natural Resources and Forestry
- To accommodate scheduling conflicts, a separate webinar was held with staff from the City of Hamilton earlier on October 3, 2018.

Purpose: To present an overview of the Draft EA Report, and provide details for review timelines and next steps for the EA.

Questions and Comments:

The Ministry of Tourism, Culture, and Sport asked if any Indigenous communities have shown interest and/or see value in the SCRF.

The City of Hamilton asked if a domestic well survey will be conducted to better characterize the wells in the area, if any changes are being made to the sewage discharge permit, and if hydraulic conductivity testing was being incorporated to the Draft EA Report.

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 regarding the Existing Conditions, Alternative Methods, Preferred Alternative, and Detailed Impact Assessment and comments on the SCRF Draft EA. Summaries of meetings with agencies can be found in **Vol. 3 – Appendix A**.

Specifically, meetings were held with the following agencies:

Table 7.2 Individual Meetings with Review Agencies During the SCRF EA

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.
5-Mar-2018	Ministry of the Environment, Conservation, and Parks	Meeting with Regional MECP staff to discuss proposed administrative amendments to the existing SCRF ECA.
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 the 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.
24-May-2018	Ministry of the Environment, Conservation, and Parks	Meeting to discuss SCRF EA Closure Planning.
26-Jul-2018	Hamilton-Wentworth Catholic District School Board	Meeting to further discuss the SCRF EA with the context of reiterated requested that all truck traffic associated with the Facility be prohibited on First Road West because of student safety associated with walk-ins from existing and future residential developments north and west of Green Mountain Road West to separate schools south of Mud Street.
08-Aug-2018	City of Hamilton	Meeting with new City Manager, Mike Zegarac, to provide an overview of the SCRF EA and the involvement to-date by City of Hamilton staff and upcoming milestones and review periods.
15-Nov-2018	MECP	Meeting to discuss a proposed administrative amendment to the existing SCRF ECA.
22-Nov-2018	MECP	Meeting to discuss comments on SCRF Draft EA from the MECP's senior waste engineer.

Table 7.2 Individual Meetings with Review Agencies During the SCRF EA

Date of Meeting	Name of Agency or Organization	Meeting Purpose
22-Nov-2018	City of Hamilton	Meeting to discuss comments/questions from the City about the SCRF Draft EA.
26-Nov-2018	MECP	Meeting to discuss comments on SCRF Draft EA from the MECP Project Officer.
27-Nov-2018	MECP	Meeting to discuss comments on SCRF Draft EA from the MECP senior noise engineer.
6-Dec-2018	City of Hamilton	Meeting to discuss City of Hamilton comments received regarding potential noise impacts on surrounding residential developments.
11-Dec-2018	OMAFRA	Call to discuss OMAFRA comments on the Draft EA.
13-Dec-2018	MECP	Meeting to discuss the Ramp Removal Plan as part of the existing SCRF ECA.
13-Dec-2018	MECP	Meeting to discuss comments on SCRF Final EA from the MECP Project Officer.
20-Dec-2018	City of Hamilton	Meeting to discuss City of Hamilton comments received on SCRF Draft EA.

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, City of Hamilton
- Draft Land Use and Economic Detailed Impact Assessment Report – June 25, 2018
- Received correspondence from: City of Hamilton
- Draft Natural Environment Detailed Impact Assessment Report – June 25, 2018
- Draft Noise Existing Conditions Detailed Impact Assessment Report – June 25, 2018
- Received correspondence from: City of Hamilton
- 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
- Received correspondence from: Hamilton-Wentworth District School Board, City of Hamilton

In addition, to accommodate their review timelines, a preliminary draft of the SCRF Environmental Assessment Report was provided to City of Hamilton Staff for review and comment in July and August, 2018. This was done proactively prior to the Draft SCRF Environmental Assessment Report being prepared to ensure staff could report on their comments to the City of Hamilton Planning Council before Council broke for the 2018 municipal election.

Comments provided by review agencies on the Draft SCRF Environmental Assessment Report is described in **Section 7.10**.

7.4.6 Consultation with City of Hamilton Council and Planning Committee

The SCRF is located in Ward 9 of the City of Hamilton, which, until December 3, 2018, was represented on City of Hamilton Council by Councillor Doug Conley. With a change in council as a result of the 2018 municipal elections, Councillor Brad Clark began representing Ward 9 on December 3, 2018. Terrapure kept Councillors Conley and Clark informed throughout the EA process, primarily through informal telephone calls and in-person discussions.

In addition, staff from the City of Hamilton and representatives from Terrapure presented to the City of Hamilton Council and Planning Committee during review of the Draft EA. The purpose of these staff reports and delegations was to keep City of Hamilton Council apprised of the City staff's involvement in the EA process, as well as provide an opportunity for Council members to provide comments and ask questions for consideration by City staff and Terrapure.

Specifically, staff reports and delegations were made at the following meetings:

Date of Meeting	Meeting Type	Purpose
14-Aug-2018	City of Hamilton Council Planning Committee	Terrapure addressed Committee and spoke to the currently existing compensation agreement and indicated the company was agreeable to beginning a discussion regarding a new compensation agreement with the City for the proposed undertaking, should it be approved. Committee decided to table any discussion regarding a new compensation agreement until the SCRF EA process is complete.
18-Sept-2018	City of Hamilton Council Planning Committee	City staff presented to council with Terrapure as a delegate. The purpose of the presentation was to inform Council of staff comments on the Preliminary Draft SCRF EA. City staff asked that Planning Committee endorse staff comments submitted to Terrapure and that the report be adopted as formal comments on the Preliminary Draft EA. Terrapure was present to answer questions as needed.

The 14-Aug-2018 City of Hamilton Council Planning Committee Minutes can be found in **Vol. 3 – Appendix A** and the 18-Sept-2018 City of Hamilton Council Planning Committee Minutes can be found in **Vol. 3 – Appendix L.**

7.4.7 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 Terrapure and the interested parties(s) had an agreeable resolution during the SCRF EA.

As noted in **Section 7.4.1**, agencies that were more 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. The following subsections exclude comments received on the SCRF Draft EA, which are described in **Section 7.10.**

A description of comments received from all review agencies and how they were considered by Terrapure is included in **Table 7.3**. 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).

Copies of written correspondence with review agencies can be found in **Vol. 3 – Appendix B.**

7.4.7.1 City of Hamilton

As the host municipality of the proposed SCRF project, Terrapure regularly communicated and consulted with staff and Councillors at the City of Hamilton throughout the EA process. The City of Hamilton has particular interest related to traffic, property value, noise, impacts to surrounding residential developments. As a result of this consultation the following comments were received and 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.

- A Residential Development Activity section 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.

Additionally, the City of Hamilton provided comments on the SCRF Draft EA which are described in **Section 7.10.2.**

7.4.7.2 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 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 were assessed as part of the SRCF EA found in **Section 6.3.3**.

Additionally, the Hamilton-Wentworth District School Board provided comments on the SCRF Draft EA which are described in **Section 7.10.2.**

7.4.7.3 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.

Separate from the SCRF EA process, Terrapure had discussions with the Hamilton District Office and the Environmental Assessment and Permission Branch via email, telephone calls, and meetings regarding ongoing operations at the SCRF and the existing Environmental Compliance Approval. As a result of these discussions, the MECP issued an administrative amendment to the existing SCRF Environmental Compliance Approval on September 24, 2018, and Terrapure submitted an application for a second ECA amendment in December 2018 (see **Section 1.3**).

Additionally, the MECP provided comments on the SCRF Draft EA, which are described in **Section 7.10.2**.

Table 7.3 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	20-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
				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 appreciative 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 MECP 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	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.	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.	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	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	29-Mar-2018	Email

				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 Alternative (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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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-June-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
	19-Jul-2018	Email	We provide the following comments for your consideration Calculations supporting the sediment settling and dispersion lengths are recommended to demonstrate that the forebays are designed as per the MOE Guideline, 2003 recommendations The MOE Guideline, 2003 recommends to demonstrate that the drawdown time does not exceed 48 hours. 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. 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? 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.	Thank you for your comments and feedback. Please find responses in the attached letter. The current SWM pond is a theoretical conceptual design. During detailed design, the sediment settling and dispersion lengths will be calculated to ensure that the forebays are designed appropriately. The Stormwater Management System is considered Major Work under the Site's ECA, and thus requires that the detailed design and specifications be submitted to the MECP for review and approval prior to construction. Details of the existing stormwater management system (i.e., Phase 1) are provided in a report entitled " Stormwater Management Design Report, Phase 1, Newalta Stoney Creek Landfill" (Gartner Lee Limited, June 21, 2007). The current SWM pond is a theoretical conceptual design. During detailed design, the drawdown time will be calculated to ensure it does not exceed 48 hours. The Stormwater Management System is considered Major Work under the Site's ECA, and thus requires that the detailed design and specifications be submitted to the MECP for review and approval prior to construction. Details of the existing stormwater management system (i.e.,	Aug-2018	Email/Letter

			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. We have no comments on the hydrogeology report.	Phase 1) are provided in a report entitled " Stormwater Management Design Report, Phase 1, Newalta Stoney Creek Landfill" (Gartner Lee Limited, June 21, 2007) Once the proposed SWM pond is constructed, the truck/wheel wash will not discharge to the SWM facility, therefore no additional treatment is required. The truck/wheel wash system operates separately from the SWM facility, and all impacted water is discharged to the sanitary sewer The current SWM pond is a theoretical conceptual design. During detailed design, an overland flow spillway can be designed in order to safely divert flows greater than the 100-year storm. The existing Phase 1 Stormwater Management System includes an overflow weir from the detention pond that discharges into a separate retention pond for the truck/wheel wash system. The detailed design of the Phase 2 Stormwater Management System will include an overland spillway to divert flows that may exceed the 100-year storm event or in case of the system clogging. During detailed design the stability of the berm separating the SWM pond from Green Mountain Road West and First Road West. Can be investigated to ensure the berm can withstand the anticipated hydrostatic and hydrodynamic forces. The detailed design of the Phase 2 Stormwater Management System will include a stability assessment of the proposed berms in order to ensure that they are able to withstand the anticipated hydrostatic and hydrodynamic forces.		
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	20-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 MECP has not been involved in these previous discussions Discussed submission timeline for the E. 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 MECP: 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 & MECP'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 Impact Management 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: 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 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. 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 m^3 Increasing the approved capacity of the SCRF by 3,680,000 m^3 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” is included to represent the benchmark		

			“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	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 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	Terrapure is willing to review these specific arrangements with the City while the SCRF EA is being carried out 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 MECP 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 MECP 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 Impact Management 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 Impact Management 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 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.	The location of the nearest dwelling will be corrected to 60 m.		

			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 MECP 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 Hamilton 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 details of the progress of the SCRF EA including anticipated remaining timelines and review milestones.	26-Mar-2018	Meeting
	N.A.	N.A.	N.A	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)	30-Mar-2018	Email

				- 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 MECP – 1st week of Jan		
	19-Apr-2018	Email	Thank you for sending this. I will ensure staff and Councillors receive it.	Please find attached 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.	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
	27-Apr-2018	Email/Letter	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 Document #1 to the Amended ToR.	24-May-2018	Email/Letter
			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.		
			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 Impact Management	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.		

			Measures augmented with additional Best Management Practices, where proposed, and ongoing 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.			
			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	Terrapure 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 Impact Management 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	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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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

	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 questions included: Can you elaborate on the timeframe for MECP review and process? Can you provide the visual cross-sections and explain them? Can you explain progressive capping 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 MECP 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 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	29-Jun-2018	Email
	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	Attached are our staff and council comments on the Detailed Impact Assessment Reports (Draft for Discussion). Please advise when you anticipate having your responses and updated reports to us by. Further, when will the preliminary draft EA report for the purposes of my report going September 18th be sent? I've already technically missed my first internal deadline so the sooner the better, as I will need to send out components to the various experts for their technical review to ensure their comments and questions have been addressed or not.	Please find attached a copy of our responses to City Staff comments on the draft Impact Assessment Reports (July 20, 2018). I will send a separate email with the request for the Noise information. Any questions, please let me know.	03-Aug-2018	Email/Letter
	20-Jul-2018	Letter	Planning and Economic Development Department, Community Planning Section, Development Planning Section:	As per Section 6.3, "As a conservative approach for the purpose of the intersection operational analysis, based on the 250 daily maximum vehicles permitted to deposit waste at the Site and the generally random arrival and departure times of SCRF vehicles as noted		

			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.	above, the intersection analysis considers 250 SCRF vehicles arriving and departing over the Site's ten operating hours in an even distribution." The Future Background Condition analyzes the study intersections without the SCRF vehicles at the future horizon year, and the subsequent Future Total Condition analyzes the intersections with the addition of the SCRF vehicles (250 per day, as a conservative measure, not the current 100 per day estimated). Therefore the results of the analysis, as described in Potential Effects on Traffic, describes the change in operations with the added 250 SCRF vehicles per day. As stated in Section 7.1, the operational impact is 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. Ensure that future versions meet this requirement.	The report was provided in a draft format for review and discussion purposes. The final version of the report will be stamped.		
			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.	GHD's background sound level assessment of the area along Green Mountain road (POR1) was recently updated based on GHD's Traffic Detailed Impact Assessment Report, which included future volumes for Red Hill Residential Development – Phase 1 & Phase 2 as well as the Victory Development. GHD used the forecasted traffic volumes (2023) based on turning counts for vehicles travelling on Green Mountain Road. Note that the development only becomes a point of reception once the development is built and it is therefore reasonable to use the increased traffic from the development to develop site-specific limits. GHD relied on forecasted AM and PM peak traffic counts to calculate an hourly daytime average to determine a revised sound level limit of 60 dBA at POR1.		
			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.	GHD has changed the distance in the report to be from the façade of POR3 to the property line (60m) and not to the working face (130m).		
			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.	GHD updated the report to include this background assessment as well as provide the CadnaA modelling inputs used in the assessment. We will send this in a subsequent email for distribution.		
			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 Site specific limit for POR1 has been revised based on updated traffic data to be more conservative with a limit of 60 dBA. The other POR's (POR3&4) have a limit of 63 dBA due to the road traffic from Mud Street on the opposite side of the Site.		
			The study concludes that noise Impact Management 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.	The previous study was based on existing ambient conditions and did not take into account the future volume of traffic due to the new subdivision. Through further analysis based on additional documentation obtained throughout the EA process and through application of a greater level of design within the Facility Characteristic Report (FCR), the revised modeling allows for continuation of the existing berm. This is based on new traffic results, which have influenced the background noise volumes/ limits.		
			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.	The net effect for the future residences at POR1 will ~ +5 dBA from existing impacts which are either at or below the MECP limit of 55 dBA at the same location (currently not occupied). The expected impacts from the Site are estimated to be 60 dBA at the worst-case location POR1 during Phase 4 as detailed on Table 6.3. A noise contour plot was included in the report to show the impact to the north on Figure 6.1.		
			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?	The base liner system is constructed in phases that are sized to accommodate current waste disposal needs. A temporary berm is constructed surrounding each phase to ensure that full containment of waste and leachate is maintained at all times. New phases are carefully connected to existing phases to ensure that a continuous base liner system is constructed. Clay liners are connected by benching successive lifts to ensure that no seams are present. The geomembrane liner is fused together using specialized welding equipment. Pipes are connected using electro-fusion couplings. Quality assurance/quality control measures for the construction of the base liner system are outlined in technical specifications that are subject to Ministry approval. This includes both field and laboratory testing of all base liner system components such as geosynthetics, soils, aggregate, and piping. Clay is obtained from on-site stockpiles that were derived from the original quarry overburden, ensuring similarity of source material.		

			Off-Site domestic water quality information should be provided to Hamilton Water, Source Water Protection.	Originally, six domestic wells existed near the Site. Three wells were decommissioned for subdivision development, permission to sample two of the other wells has been denied, and the private well monitored most consistently (Private Well 1) has not been accessible due to subdivision construction since 2015. As this property was sold and is intended for subdivision development, it is assumed the domestic well will be decommissioned. Accordingly, there is no recent domestic water quality data available for the vicinity of the SCRF. Historical domestic water quality data can be provided to Hamilton Water, Source Water Protection, upon request.		
			Details pertaining to the establishment of true background water quality and RUC calculations should be provided.	The values used in preparation of the Reasonable Use criteria were primarily derived from the original March 1997 submission to the MECP, updated by adjusting background concentrations to reflect natural variations. The MECP Guideline B-7 and B-7-1 Incorporation of the Reasonable Use Concept into the MECP Groundwater Management Activities and Determination of Contaminant Limits and Attenuation Zones (MECP, 1994) recommends that Reasonable Use criteria be updated once every three to five years to account for natural fluctuations in background water quality. The Reasonable Use criteria used in the detailed impact assessment were consistent with those calculated for the 2016 and 2017 Annual Monitoring Reports for the Site. Background water quality is updated using data from monitoring locations located in an upgradient position relative to the SCRF.		
			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.	Clay liner/leachate compatibility testing carried out as part of the original EA indicated that the clay was mineralogically stable and that permeability was not impacted due to contact with leachate. Although no significant changes have been observed in either the clay or the leachate since this time, additional compatibility testing is currently being undertaken to confirm that there are no effects on the permeability of the clay liner. Further details will be provided in the Draft EA Report. Both in-situ and laboratory hydraulic conductivity testing are undertaken during the construction of the clay liners. These tests have been carried out over a range of operating conditions (e.g., cell pressure, head pressure, effective consolidation pressure) that are representative of both the current and expanded landfill. Results of this testing have shown that hydraulic conductivity values below the required 5 x 10^{-8} cm/s are consistently being achieved.		
			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.	Terrapure is currently conducting research into potential effects to the City of Hamilton property tax base within 1500m of the Stoney Creek Regional Facility (SCRF). Terrapure has been collecting and reviewing an inventory of historical sales records of residential properties within the 1500m study area pre and post- 1996 (i.e. when the landfill was first developed and under operation) to determine pricing trends and outside influences. Identification of any potential effects to the City's tax assessment will be determined and presented in the Draft EA Report.		
			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. Terrapure welcomes discussions on the compensation agreements with Staff and Council, which will consider the details of the preferred option.		
	N.A.	N.A.	N.A.	As per the request and our response letter in the email that passed moments ago: 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. — GHD updated the report to include this background assessment as well as provide the CadnaA modelling inputs used in the assessment. We will send this in a subsequent email for distribution. Please find attached the files as promised. Any questions, please let me know.	03-Aug-2018	Email
	08-Aug-2018	Email	PHS is aware GHD recently submitted to City Planning two additional chapters 6/8 -including more info on the impact assessment component.	The Chapters submitted to the Planning Department included all information contained in the Impact Assessment Reports. Chapter 6 is the impact assessment itself and Chapter 8 relates to the monitoring. No new information on Human Health was included in these chapters - it was the same information as the stand-alone report that you and your department reviewed, but merely a consolidation of all impact assessment reports into a	08-Aug-2018	Email

<table>
<tr><td></td><td></td><td></td><td>Is any other technical information anticipated for the Human Health Detailed Impact Assessment? I infer that's the catchphrase capturing a modified HHRA going forward.

If so - what and when? Has any input been given by the MECP on what is required around this subject area (human health) or is this still yet to be determined as the EA moves forward.</td><td>single Chapter for the EA Report. We were providing this to the City so they had the chance to review the "pre-draft" EA Report in order to ensure we hit the Committee Meeting date in September to provide a report to Committee and Council. We anticipate the Draft EA Report will be formally posted for public and agency comment at the end of August/Beginning of September, but we do not anticipate new information on Human Health at this time.
Hope this helps clarify things.</td><td></td><td></td></tr>
<tr><td></td><td>N.A.</td><td>N.A.</td><td>N.A.</td><td>We received a voicemail asking about our timelines and asked me to forward along our anticipated schedule.
Please see below.
<table>
<tr><th>EA Phase</th><th>Anticipated Timeline</th></tr>
<tr><td>Draft EA Available for Review – Terrapure committed to making the draft EA available in the Terms of Reference. This will be for 7 weeks for review and comment by stakeholders (including the City, comments come directly to Terrapure)</td><td>August 31st 2019 to October 24th 2018</td></tr>
<tr><td>After Draft Review - Terrapure will make changes and address comments on draft EA to finalize for submission</td><td>October 24th 2018 to December 2018</td></tr>
<tr><td>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 MECP at this time)</td><td>Jan 4th 2019 to Feb 22nd 2019</td></tr>
<tr><td>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.)</td><td>Feb 22nd 2019 to March 29th 2019</td></tr>
<tr><td>Public Inspection of Ministry Review – 5 weeks for public to comment on the Ministry's review (City can comment here as well)</td><td>March 29th 2019 to May 3rd 2019</td></tr>
<tr><td>Minister Review and Decision - Minister has 13 weeks after the 5 week public inspection review period to make a decision</td><td>May 3rd 2019 to August 2nd 2019</td></tr>
</table></td><td></td><td></td></tr>
<tr><td rowspan="5">Hamilton-Wentworth Catholic District School Board (HWCDSB)</td><td>N.A.</td><td>N.A.</td><td>N.A.</td><td>Terrapure provided the Notice of Terms of Reference Approval and Commencement of the Stoney Creek Regional Facility Environmental Assessment</td><td>20-Nov-2017</td><td>Email & Mailed Letter</td></tr>
<tr><td>N.A.</td><td>N.A.</td><td>N.A.</td><td>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</td><td>28-Nov-2017</td><td>Email</td></tr>
<tr><td>08-Dec-2017</td><td>GRT Meeting</td><td>HWCDSB attended the GRT#1 Webinar</td><td>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.</td><td>8-Dec-2018</td><td>GRT Meeting</td></tr>
<tr><td>N.A.</td><td>N.A.</td><td>N.A.</td><td>Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies</td><td>14-Dec-2017</td><td>Email</td></tr>
<tr><td>24-Jan-2018</td><td>Email</td><td>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.</td><td>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</td><td>24-Jan-2018</td><td>Email</td></tr>
</table>

				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.		
	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 Ministry 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 Interested in project safety including safe streets, sidewalks, and bus routes Would like to see safety be addressed in Traffic Impact Assessment	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
	N.A	N.A	N.A	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 #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	Thank you for your comment and information regarding the local schools and buses. 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	24-May-2018	Letter

			3,680,000 m^3 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. 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.	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 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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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 Traffic Design & Operations Facility Characteristics Report	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
	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	N.A	N.A	N.A

			for a meeting next week, which we understand will provide an update to the project.			
	26-Jul-2018	Meeting	In advance to the meeting, in their April 27, 2018 correspondence, the HWCDSB requested that all truck traffic associated with the Facility be prohibited on First Road West because of student safety associated with walk-ins from existing and future residential developments north and west of Green Mountain Road West to separate schools south of Mud Street.	The purpose of the meeting was to further discuss the Terrapure Stoney Creek Regional Facility Environmental Assessment (SCRF EA) with the context of the March 13, 2018 meeting held with the HWCDSB and their reiterated comments of July 19, 2018.	26-Jul-2018	Meeting
	N.A	N.A	N.A	Please find attached our follow up correspondence to our meeting held with Mr. Daly and yourself for your review. Thanks again for meeting with us and we look forward to hearing from you in near future. In the mean-time, please contact us if you have any questions on the preceding information or the project in general.	08-Aug-2018	Email
	N.A	Letter	The provision of school bus transportation services is expected to be reduced in the area of the SCRF with the urbanization of First Road West in accordance to the Board's Transportation policy. Therefore, students are expected to rely on other modes of transportation, including walking, cycling, etc. to and from school. As a result, the HWCDSB requested that all truck traffic associated with the SCRF be prohibited on First Road West.	We would like to reiterate the fact that trucks exiting the SCRF must do so via First Road West and travel southbound towards Mud Street West before turning east or west at the signalized intersection. This truck route is as per the existing approvals for the Site (Environmental Compliance Approval). Since First Road West would remain the existing exit for trucks leaving the Site, Terrapure would be willing to request that the City post a speed limit of 40 km/hr on First Road West to enhance road safety. Terrapure is not aware of any other City sponsored safety related aspects associated with the urbanization of First Road West beyond a much wider pavement platform for traveling vehicles and a sidewalk on the west side of the road to separate pedestrians from vehicular traffic. However, as previously mentioned by Terrapure, we still believe that it is appropriate for the City to install pedestrian signals and painted crosswalk at the reconstructed First Road West and Mud Street intersection as part of urbanizing First Rd West.	08-Aug-2018	Letter
Hamilton-Wentworth District School Board (HWDSB)	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	20-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. 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
	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	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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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
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	20-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.	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. 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
	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	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	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 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.	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

			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.			
	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	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 legislation, with species being uplisted and downlisted, and any changes should be considered throughout the whole process.	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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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
Ministry of the Environment, Conservation and Parks (MECP)	14-Nov-2017	Email	I would like to take this opportunity to inform you that the Minister of the Environment and Climate Change has approved the amended Terms of Reference for the proposed Stoney Creek Landfill Facility Expansion, with amendments. Please find attached the Notice of Approval and accompanying cover letter. A hard copy of the Notice and cover letter will be sent by mail to Ms. Kim Bailey of Terrapure Environmental. In closing, I would like to extend an invitation to Terrapure Environmental to meet with Ministry of the Environment and Climate Change staff to discuss the next steps in the approvals process. Should you have any questions or concerns, or to set up a meeting, please feel free to contact me at your earliest convenience.	N.A	N.A	N.A
	15-Nov-2017	Email	Thank you for your e-mail, and follow-up phone call. As requested, I have reviewed the draft Notice and have made some suggested edits for your consideration. As discussed during our phone call, the intent of these edits is to ensure that the preamble of the Notice is not interpreted as presupposing the outcome of the EA process, and that the language used reflects the template wording in the Ministry's Codes of Practice.	Following up with you with regards to the Notice of EA Commencement and to make a request to meet with you as part of initiating the Stoney Creek Regional Facility EA now that the Minister has approved the Amended Terms of Reference. With that in mind, please find attached our proposed Notice of EA Commencement for your review prior to us issuing in the newspaper and posting it on the Project's website. The Notice is based on the Ministry's Codes of Practice reflecting the particulars of this EA.	15-Nov-2017	Email

			In addition, I have secured a boardroom for the proposed meeting on Friday November 24, 2107. The boardroom has been reserved from 9:30 am to 11:00. I will send out a formal meeting invite shortly. Should you have any questions or concerns, please feel free to contact me at your earliest convenience.	In terms of the meeting, I understand that you are currently available on Friday, Nov. 24th. As a result, we can meet with you at your offices anytime btw 10:30 am and 2:30 pm on that day. Please confirm a time that works best for you within that time slot		
	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	20-Nov-2017	Email & Mailed Letter
	17-Nov-2017	Email	The copy of the ToR is in hand and we will have it available should anyone wish to review it here at the District.	Just wanted to let you know that we are sending a copy of the Approved amended ToR for the Stoney Creek Regional Facility EA to your attention as Gavin Battarino wanted us to put a copy on public display at the Hamilton District Office. The Notice of Commencement (EA) will appear in the paper tomorrow and Saturday. I'll give you a shout as well.	16-Nov-2017	Email
	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
	05-Dec-2017	Email	Thank you very much for the summary of how stakeholders were notified about the commencement of the EA process; and, engagement opportunities.	As requested in your recent meeting with the project team, below is a summary of how stakeholders were notified of the commencement of the EA and of this week's Open House. Please let me know if you have any questions on this Notice of Commencement The Notice of Commencement was placed in the Hamilton Spectator on November 17 and 18, 2017 and in the Stoney Creek News on November 23, 2017 November 17, 2017 - the Notice of Commencement was: sent by registered mail and email to Indigenous Communities sent by registered mail to over 40 Adjacent Property Owners. sent by email to Review Agencies, along with the initial invitation for the GRT Meeting on December 8 sent by email to the public (142 people) and by mail to people on the Stakeholder Contact List that we did not have an email for (~30 people). Advertised on Facebook and Twitter project account Posted on the website November 30, 2017 - follow calls were made for both the Notice of Commencement and Public Open House to Indigenous Communities Notice of Open House Notice of Open House was placed in the Hamilton Spectator on November 23, 2017, the Stoney Creek News on November 30, 2017 and will run in Hamilton Spectator again on December 2, 2017. November 21, 2017 - the Notice of Public Open House was sent by mail to people on the Stakeholder Contact List that we did not have an email for (~30 people). November 22, 2017 - the Notice of Public Open House was sent by registered mail to Indigenous Communities and Adjacent Property Owners. November 22, 2017 - a mobile sign announcing the Open House was placed south of the south-west corner of Upper Centennial Parkway and Green Mountain Road on Terrapure property (see photo below). November 22 -24 - the postcard version of Open House Notice was sent by unaddressed mail to 7,256 residences and businesses within 1.5 km of the Site November 23, 2017 - the Notice was place on the website and advertised on Facebook and Twitter project accounts November 23, 2017 - the post card version of Open House Notice was sent by addressed mail out to 690 residences in Victory Ridge and Penny Lane Estates November 24, 2017 - the Notice was emailed to Indigenous Communities and the public (142 people) November 28, 2017 - the Notice was sent to GRT with a another invitation for the GRT meeting on December 8, 2017 November 29, 2017 - the Notice was advertised again on the Facebook and Twitter project accounts November 30, 2017 - follow calls were made for both the Notice of Commencement and Public Open House to Indigenous Communities	05-Dec-2017	Email

				November 30, 2017 – story in the Stoney Creek News on the Open House (https://www.thespec.com/community-story/7968847-open-house-seeks-feedback-on-taro-dump-expansion-bid/)		
	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 MECP 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 MECP 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 MECP 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 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.	Terrapure provided an email with electronic links to the Conceptual Design, Work Plans and Existing Conditions Reports to review agencies	14-Dec-2017	Email
	N.A.	N.A.	N.A.	As requested, this email is to confirm that the Conceptual Design Report and certain Work Plans and Existing Condition Reports that reflect agencies' jurisdictional mandate were distributed to the GRT on December 14, 2017. The materials were sent to the following agencies: **Agency** / **Recipients** Conservation Hamilton: Alex Nizharadze, Scott Peck City of Hamilton: Tiffany Singh City of Hamilton - Public Health: Matthew Lawson, Roger Finkenbrink MECP: Barbara Slattery, Natalie Stacey, Anthony Martella, Husein Awad, Michael Spencer, Ian Parrott, Yousouf Kalogo HWDSB: Bob Fex, Ellen Warling, Davis Anderson, Jeff Beattie, Pat Hudyma, Todd White HWCDSB: Nicole Pereira, Patrick Daly, Paul DiFrancesco, Mary Nardini MTCS: Dan Minkin OMAFRA: Jackie Van de Valk MCI: Chis Stack	14-Dec-2017	Email

				<table><tr><td>MTO</td><td>Jason White</td></tr><tr><td>MEDEI</td><td>John Bullen Michael Helfinger</td></tr><tr><td>OPP</td><td>Joy Fish Pool</td></tr><tr><td>MNRF</td><td>Michelle Karam Tara McKenna</td></tr><tr><td>Environment and Climate Change Canada</td><td>Rob Dobos</td></tr></table> Please let me know if you have any questions.		
	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.	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
	22-Jun-2018	Telephone call	SCRF EA update meeting on the draft Impact Assessment reports	SCRF EA update meeting on the draft Impact Assessment reports	22-Jun-2018	Telephone call
	02-Aug-2018	Telephone call	SCRF EA update meeting on the progress of the draft EA and anticipated availability of the draft EA documentation for review.	SCRF EA update meeting on the progress of the draft EA and anticipated availability of the draft EA documentation for review.	02-Aug-2018	Telephone call
	02-Aug-2018	Email	Please be advised that the submission and review of a draft Environmental Assessment document is not a requirement under the Environmental Assessment Act; however, the Ministry of the Environment, Conservation and Parks encourages proponents to submit a draft document to the Ministry, and any relevant members of the Government Review Team and Aboriginal communities, so that any potential issues of concern can be identified and possibly addressed before an Environmental Assessment is submitted formally. Should a proponent wish to submit a draft Environmental Assessment document to the Ministry of the Environment, Conservation and Parks, it is recommended that the proponent submit a formal request to the Ministry asking that a review of the draft be carried out, and clearly indicate when the proponent anticipates submitting the draft. It is the Ministry’s expectation that a minimum of three weeks advance notice be given prior to the submission of a draft Environmental Assessment document, so that Ministry staff can allocate the time and resources needed to carry out the review. Please be advised, that in order to ensure that the Ministry has an adequate amount of time to review the draft Environmental Assessment, it is the Ministry’s expectation that a minimum of five to six weeks be provided for the completion of the review.	As discussed yesterday please find attached Terrapure’s formal notification of intent to submit the Draft Environmental Assessment Report for the Stoney Creek Regional Facility EA. Please contact me if you have any questions. I look forward to your reply.	03-Aug-2018	Email/Letter
	08-Aug-2018	Telephone call	SCRF EA update on Indigenous consultation.	SCRF EA update on Indigenous consultation.	08-Aug-2018	Telephone call
	08-Aug-2018	Email	Please let us know if you hear anything from HCCC about what this means for EA consultation processes. We will let you know if we hear anything further as well.	We were advised by HCCC that the process remains the same and that we are to address the application to an unnamed Director. Aaron Detlor and Brian Doolittle are still with HDI, Hazel Hill is not. With this in mind, we submitted the development application today to	15-Aug-2018	Email

				facilitate HDI's involvement in the SCRF EA and are scheduling a meeting for early September.		
	09-Aug-2018	Email/Letter	Thank you for your letter of August 3, 2018, on behalf of Terrapure Environmental, requesting that the Ministry of the Environment, Conservation and Parks carry out a review of the draft Environmental Assessment for the proposed expansion of the Stoney Creek Regional Facility. Please find attached the Ministry's response to the request. Should you have any questions or concerns, please feel free to contact me at your earliest convenience.	Thank you for your August 9, 2018 letter regarding our request. Please find attached our confirmation that we will be making the draft Environmental Assessment available on August 31, 2018 for a 7 week review period, ending on October 24, 2018. A hard copy of this letter is being sent to you today. I appreciate your assistance with this matter.	10-Aug-2018	Email/Letter
	13-Aug-2018	Email	Thank you for you submission of the draft notice. The notice was reviewed and was found to include the required information as outlined in the Ministry's Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario. Should you have any questions or concerns, please feel free to contact me at your earliest convenience.	Following up on this letter, please find attached our proposed Notice for release of the Draft Environmental Assessment for your information.	10-Aug-2018	Email
	15-May-2018	Meeting	Meeting to discuss the proposed ECA Amendment for the Terrapure Stoney Creek Regional Facility	Meeting to discuss the proposed ECA Amendment for the Terrapure Stoney Creek Regional Facility	15-May-2018	Meeting
	26-Jul-2018	Email	As previously noted, I've completed the site volume verification for the SCRF using the following information: • Figure 3 of the 1995 Design and Operations Report was used to generate the surface for the bottom of waste, the contours for the base grading surface in Figure 3 were raised 3 metres to account for the leachate collection layer, and the side walls are sloped at 3(H):1(V); • Top of waste contours were generated using Figure 6 of the 1995 D & O report, the final contour elevations were lowered by 1 metre for the final cover; • The total site capacity, which is the airspace between the bottom of waste and top of waste contours, was calculated using Autodesk Civil 3D to be 6.46 million cubic metres. In 2013, the ECA was amended to approve the footprint reconfiguration. You indicated that the total waste volume based on the revised base grading plan and final waste contours is approximately 6.4 million cubic metres, which is very close to the site volume as calculated above. As such, upon thorough review of the original site design, as well as the more recent reconfiguration and ECA amendment, the following comments are provided: 1. Conditions 10 and 22 of the ECA amendment dated November 22, 2013 states that the landfill Site waste final contours shall not exceed those outlined on Figure 5 of the report "Newalta Stoney Creek Landfill Reconfiguration Supporting Documentation" prepared by AECOM dated August 2013. This is the most recent approval related to final waste contours and was based on the information submitted by Newalta. We found no ground to warrant the change of the final waste contours approved in 2013 as a result of this review; 2. According to the 2013 AECOM report, as a result of the footprint reconfiguration, 1.5 million cubic metres of fill or soil is required to fill the northern portion of the site outside of the reduced waste footprint. This area is more than adequate to accommodate any unsuitable soil on site.	We have undertaken immediate action to confirm the total waste volume currently in the SCRF and to demonstrate that we are in compliance with the limits outlined in the ECA. An aerial topographic survey will be undertaken at the site the week of August 6th, as soon as weather conditions permit. Following this we will undertake an assessment of the current waste volume based on a comparison of the surveyed surface and the approved final cover contours from the 2013 reconfiguration. We expect to provide an updated assessment to the MECP the week of August 13th. We understand the importance of maintaining confidence in the site and will seek to expedite this process as much as possible. We remain confident that the SCRF continues to operate in compliance with the ECA and that the site has not exceeded the approved capacity. Records indicate that the site has received approximately 100,000 m3 of waste to date in 2018. This is well within the remaining capacity estimates noted in the 2017 AMR and discussed in detail during multiple meetings and other correspondence with MECP staff. We would still like to sit down with MECP staff to understand the rationale behind your recent findings and to outline a plan for actions going forward. We remain available on August 7th as originally proposed and would appreciate the opportunity to discuss this matter further with you.	01-Aug-2018	Email
	N.A.	N.A.	N.A	In response to your request we have prepared the attached isopach drawing showing a cut/fill analysis between the contours from the 2018 topographical survey and the 2013 approved final waste contours. The table below summarizes our current estimate of the remaining waste capacity: Item Volume (m3) Cut/Fill Analysis Based on 2018 Topographic Survey and 2013 Approved Final Waste Contours -12,500 Final Cover 84,000 Topsoil Stockpiles 8,500	01-Aug-2018	Email

				Pre-Existing Unsuitable Material 180,500 Access Ramp/Roads 110,000 Estimated Waste Receipts (February - July 2018) -85,000 Total Waste Capacity Remaining 285,500 Hopefully this addresses your concerns and demonstrates that the site is well with the approved maximum waste capacity. In light of this, we note that there should be no immediate need to conduct an updated topographic survey and request that the MECP consider revoking this requirement in order to prevent undue effort and cost.		
	03-Aug-2018	Teleconference	Call to discuss the ECA A181001 Amendment Application regarding the SCRF Capacity	Call to discuss the ECA A181001 Amendment Application regarding the SCRF Capacity	03-Aug-2018	Teleconference
	N/A	N/A	N/A	I wanted to extend our thanks for the conference call this afternoon – it really helped to clear up some of the confusion and get us all on the same page. We certainly agree that full transparency is critical to bring this to matter to resolution. As we understand it, the path forward will generally include the following: • MECP will render a decision on the current ECA amendment application, which will only include the proposed waste volume adjustment to 6,500,000 m^3 • Pending resolution on the current application, Terrapure will submit a subsequent ECA amendment application to reflect proposed final waste contours that are in alignment with the agreed upon waste capacity As discussed, we will also be completing an aerial survey of the site next week and will provide an updated assessment of the waste volume and remaining capacity relative to the currently approved contours.	03-Aug-2018	Email
	2018-Aug-11	Email	Thanks for providing the updated letter to address my comments. As per our conversation, now are in agreement on the total site capacity and the remaining volume. Attached please find attached the draft ECA amendment for this application. Please let us know if you have any comments. We also clarified that the remaining capacity of 180,000 m3 includes 110,000 m3 for ramp/roads, which need to be removed to utilize this volume. In addition, according to the August 7 2018 topographic survey illustrated on Figures 1 and 2, there is a fairly large area in the centre of the landfill, where waste has been placed to 5-6 metres above the 2013 approved final contours. Terrapure shall provide a plan to the ministry and take action to relocate the overfilled waste to the northern area, in order to bring the site back to compliance with the ECA.	As requested by the Ministry of the Environment, Conservation and Parks (MECP), Terrapure has recently undertaken an aerial topographic survey of their Stoney Creek Regional Facility (SCRF) in order to prepare an updated assessment of the remaining waste capacity. The following figures have been attached for reference: • Figure 1 – Cut/Fill Assessment • Figure 2 – Aerial Image The aerial survey was conducted on August 7th, 2018 – the aerial image and the contours shown in Figure 2 reflect site conditions at that time. The cut/fill analysis presented in Figure 1 is based on a comparison between the existing contours (from the August 7, 2018 survey) and the current approved final waste contours (as approved during the 2013 reconfiguration). Since the aerial survey only captures surface elevations, manual adjustments are then required to remove non-waste materials from the surveyed surface in order to accurately reflect only the waste volume. A summary of these deductions and the resultant waste capacity remaining are presented in the table below. **Item** / **Volume (m3)** Cut/Fill Analysis Based on August 7, 2018 Topographic Survey and 2013 Approved Final Waste Contours: -134,000 Final Cover: 84,000 Topsoil Stockpiles: 40,000 Pre-Existing Unsuitable Material1: 80,000 Access Ramp/Roads: 110,000 Total Waste Capacity Remaining: 180,000	10-Sept-2018	Letter

				Notes: 1. Total allowance for pre-existing unsuitable material of 180,500 m3, less 100,500 m3 which is already accounted for in the 2013 approved final contour volume of 6,420,000 m3. Based on pending MECP approval of an increase to the total approved capacity to 6,500,000 m3. The remaining waste capacity at the SCRF as of August 7, 2018 was estimated to be 180,000 m3. Based on a comparison of the survey surfaces between January 25 and August 7, 2018, a difference of approximately 118,000 m3 was observed. Accounting for an increase of 31,500 m3 in the topsoil stockpile volume between the surveys, approximately 86,500 m3 of waste was landfilled during this period. Based on waste receipts between January 25 and August 6, 2018, approximately 146,266 tonnes of waste was landfilled during this period, resulting in a corresponding waste density of approximately 1.7 tonnes/m3. Based on waste receipts between August 7, 2018 and August 31, 2018, approximately 20,407 tonnes of waste was landfilled during this period. Based on the calculated density of 1.7 tonnes/m3, it is estimated that an additional 12,004 m3 of capacity has been consumed in August. As such, it is estimated that the remaining waste capacity of the SCRF as of September 1, 2018 is approximately 167,996 m3. Going forward it is understood that an estimate of the remaining waste capacity (calculated based on tonnage receipts) will be provided to the MECP by the 5th of each month. Aerial topographic surveys will continue to be carried out at least once per year to confirm the actual airspace consumed and reported each year. It is also understood that pending changes to the ECA for the SCRF will necessitate further discussion with the MECP to confirm how these values are calculated.		
	2018-Sept-25	Email	Attached is a copy of the Environmental Compliance Approval (ECA) A181008 Notice 14 issued on September 24, 2018 to Revolution Environmental Solutions Acquisition GP Inc., as general partner for and on behalf of Revolution Landfill LP sent by email at 5.00pm. The attached replaces the paper copy of the ECA that was previously sent by mail. If you experience any issues with retrieving the attached ECA,please contact me at 416-314-1564. For additional contact information, please see my signature below. Please reply back to this email within **5 business days** confirming you have received the ECA. Thank you,			
	2018-Nov-15	Meeting	Meeting to review and discuss the EA submission and review timelines and to discuss the ECA amendments including: - Capacity Correction - Waste Contours - Ramp/Road Removal Plan - Materials Management Plan - Phase 8 construction - Capacity Increase - Updated Draft ECA	Meeting to review and discuss the EA submission and review timelines and to discuss the ECA amendments including: - Capacity Correction - Waste Contours - Ramp/Road Removal Plan - Materials Management Plan - Phase 8 construction - Capacity Increase - Updated Draft ECA	2018-Nov-15	Meeting
	2018-Dec-13	Meeting	Meeting to discuss a proposed administrative amendment to the existing SCRF ECA.	Meeting to discuss a proposed administrative amendment to the existing SCRF ECA.	2018-Dec-13	Meeting
	2018-Nov-07	Email	Thanks again for forwarding the email below to us. We have brought it to the (Acting) Director's attention, so there is no need for you to forward it. We will be responding directly to the Haudenosaunee Development Institute (HDI) as their request is predominantly part of the substantive aspects of consultation that are the Crown's responsibility. Below we offer some background and a proposed path forward. As you may know, the Crown has a duty to consult, and potentially accommodate, when it takes an action or makes a decision that could impact an established or credibly asserted Aboriginal or treaty right. The proposed project is located in the area covered by the Nanfan Treaty of 1701. It is Ontario's view that the Nanfan Treaty provides for the continuation of hunting and fishing rights by the Six Nations of the Grand River. For the purposes of consultation at the present time, the Six Nations are represented by the Elected Chief and Council and by the Haudenosaunee Confederacy Chiefs Council (HCCC) and/or the HDI.	We understand that the Director of the Environmental Approvals Branch is to be informed when an Aboriginal community has identified potential impacts to aboriginal or treaty rights (Section 4.1.1. of the Codes of Practice for EAs). On other projects we have been advised to send an email to the Director at EAASIBGen@ontario.ca with the subject line "Potential Duty to Consult". With this in mind, we'd like to request that the Director be notified. Please advise if you would like us to send the email or if you will notify the Director, copying Blair and myself.	2018-Oct-31	Email

			Because the final environmental assessment has not been reviewed by this ministry, we are not yet in a position to comment on the extent to which accommodation may be required for any infringement on an Aboriginal or treaty right. However, it seems unlikely at this time that the undertaking proposed would impact Aboriginal or treaty rights, such as the ability to hunt or fish. Nonetheless, we must wait for the conclusion of the environmental assessment process to make this determination. As stated, we will be contacting the HDI to further understand the issues raised (below). In the meantime, we encourage you to continue consulting with the Six Nations of the Grand River, as represented by both the Elected Chief and Council and HCCC/HDI, on the environmental assessment, including the site tour as requested below.			
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	20-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, 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).	Terrapure proposed and committed to send copies of the Archaeological and Cultural Heritage screenings to MTCS with supporting documentation (i.e. extent of quarrying operations/ license, etc.) for their review and schedule a follow-up call after reviewing the information.	17-Jan-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
	N.A.	N.A.	N.A	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 an 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.	27-Mar-2018	Email

				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-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	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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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	20-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.	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 Repott 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.	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	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	29-Mar-2018	Email

				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.		
	N.A.	N.A.	N.A	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	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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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	20-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. 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.	14-Dec-2017	Email
	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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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.	25-Jun-2018	Email

				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	20-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 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.	02-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	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 Impact Management Measures and monitoring plans. Over the next several weeks Terrapure will be receiving feedback on the detailed impact assessment and proposed Impact Management 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	25-Jun-2018	Email

				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
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	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.	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.=	21-Dec-2017	Email
Ministry of Economic Development and Growth	N.A.	N.A.	N.A.	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 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	Email
	27-Dec-2017	Email	It would be appropriate to remove MEDG from the contact list.	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

The preceding Indigenous communities were identified for consultation during the ToR. As described in Section 9.1.1 in the Minister-approved ToR (Vol 1. - Appendix C) these Indigenous communities were identified following a review of the following:

- Aboriginal and Treaty Rights Information System (ATRIS)
- Previous Environmental Assessments conducted by Terrapure
- Previous Environmental Assessments carried out in the vicinity of the SCRF

In addition, as described in Section 9.1.1 in the Minister-approved ToR (Vol 1. - Appendix C), on June 21, 2016, MECP identified the Mississaugas of the New Credit First Nation, Six Nations of the Grand River, and Haudensaunee Confederacy Council as potentially interested in the project/ activity.

The following **Table 7.4** provides a description for why each Indigenous community identified was engaged as part of the EA process, including the Indigenous rights, asserted rights or interests that prompted the initial engagement with each of the communities identified, and how any potentially affected Indigenous rights, asserted rights or interests were confirmed, considered and addressed during the EA process.

Table 7.4 Indigenous Communities Consulted During the SCRF EA

Indigenous Rights, Asserted Rights or Interests that Prompted Initial Engagement	How Potentially Affected Indigenous Rights, Asserted Rights or Interests were Considered
Haudenosaunee Development Institute (HDI) on behalf of Haudenosaunee Confederacy Chiefs Council (HCCC)	
During a meeting on November 20, 2018, HDI indicated their interest in the natural environment, including groundwater, terrestrial and aquatic environment, and air and the potential impacts as a result of the Undertaking. In addition, the SCRF is located in the area covered by the Nanfan Treaty of 1701. As communicated by the MECP, "it is Ontario's view that the Nanfan Treaty provides for the continuation of hunting and fishing rights by the Six Nations of the Grand River."2 (December 17 2018 letter from Annamaria Cross, included in **Vol. 3 - Appendix N**)	With respect to effects on the natural environment: • No net effect on groundwater quality or quantity are anticipated, since groundwater will continue to be managed and protected by existing environmental controls. • The temporary loss of vegetation and wildlife habitat and disturbance to terrestrial species will be minimized through implementation of the impact management measures. • The temporary loss of on-site aquatic habitat and disturbance to aquatic biota in stormwater infrastructure due to regrading activities will be

[2] Six Nations' members are represented by both the Elected Chief and Council (Six Nations of the Grand River First Nation) and by the Haudenosaunee Confederacy Chiefs Council

Table 7.4 Indigenous Communities Consulted During the SCRF EA

Indigenous Rights, Asserted Rights or Interests that Prompted Initial Engagement	How Potentially Affected Indigenous Rights, Asserted Rights or Interests were Considered
	minimized through the implementation of the impact management measures. • The SCRF will meet air quality guidelines set out by the MECP (See Section 6.7) With respect to hunting and fishing rights, since the proposed Undertaking has the same horizontal footprint as the original approved SCRF footprint (1996), there is no change in access to lands that may be used for traditional purposes (See **Section 6.1.1**). Further, the MECP provided the following assessment on potential impacts to the hunting and fishing rights of the Six Nations' members: "It is the ministry's view at this time that the project is not likely to impact the ability of Six Nations' members to exercise hunting rights in the Nanfan treaty area. The Terrapure Facility is an existing waste disposal site located on private land that has been incompatible with hunting rights and other traditional land use practices for many years."(December 17 2018 letter from Annamaria Cross, included in **Vol. 3 - Appendix N**).
Métis Nation of Ontario	
The Métis Nation of Ontario did not provide any information to Terrapure during the EA on their rights, asserted rights or interests (see **Section 7.5.3**). According to the Métis Nation of Ontario, "in Métis traditional harvesting territories, the Crown's duty to consult is triggered when it plans, undertakes or authorizes a policy, project or development that has the potential to affect the rights, interests or way of life of the regional Métis communities that rely on these territories."[3]	'No' to 'Low' net effects are anticipated across all environmental components considered for the implementation of the Preferred Landfill Footprint. Where there are net effects, a summary of impact management measures is provided **(See Section 6.7).** In addition, since the proposed Undertaking has the same horizontal footprint as the original approved SCRF footprint of the SCRF (1996), there is no change in access to lands that may be used for traditional purposes. **(See Section 6.1.1)**
Mississaugas of the New Credit First Nation	
The SCRF is located in the area covered by the Between the Lakes Purchase of 1792 (http://mncfn.ca/treaty3/). During a meeting on February 6, 2018 and subsequent comments on the Draft EA, the Mississaugas of the New Credit First Nation expressed their interest in conserving and preserving water and restoring watersheds, environmental protection, and potential archaeological resources (see **Sections 7.5.4** and **7.10.2**).	With respect to preserving water and restoring watersheds: • No net effect on groundwater quality or quantity are anticipated, since groundwater will continue to be managed and protected by existing environmental controls. • Low net effects on surface water quality or quantitate are anticipated, since the existing stormwater management pond will be altered as required to treat runoff and stormwater from the pond will not be released to a surface water body until testing determines all discharge parameters have been met. (See Section 6.7).

[3] Métis Nation of Ontario. Métis Consultation & Accommodation: A Guide for Government & Industry on Engaging Métis In Ontario. Accessed December, 2018 (http://www.metisnation.org/media/51974/duty_to_consult_guide.pdf)

Table 7.4 Indigenous Communities Consulted During the SCRF EA

Indigenous Rights, Asserted Rights or Interests that Prompted Initial Engagement	How Potentially Affected Indigenous Rights, Asserted Rights or Interests were Considered
	With respect to environmental protection in general, 'No' to 'Low' net effects are anticipated across all environmental components considered for the implementation of the Preferred Landfill Footprint. With respect to archaeological resources, no net effects anticipated from an archaeological perspective since the proposed Undertaking occurs within previously excavated lands (See **Section 6.7**).
Six Nations of the Grand River First Nation	
During a meeting on April 6, 2018, the Six Nations of the Grand River indicated their interest in groundwater protection, the types of material accepted, and the closure plan (see **Section 7.5.5**). As noted above, the SCRF is located in the area covered by the Nanfan Treaty of 1701, which provides for the continuation of hunting and fishing rights by the Six Nations of the Grand River.	With respect to groundwater, no net effect on groundwater quality or quantity are anticipated, since groundwater will continue to be managed and protected by existing environmental controls (see **Section 6.7**). With respect to material accepted, the SCRF is only permitted to receive non-hazardous, residual materials (see **Section 6.1.1**). With respect to closure, the EA has reviewed the potential effects from a construction, operation, closure/post-closure planning perspective (see **Section 6.6**). With respect to hunting and fishing rights, since the proposed Undertaking has the same horizontal footprint as the original approved SCRF footprint (1996), there is no change in access to lands that may be used for traditional purposes (See **Section 6.1.1**).

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 EA 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, on behalf of Terrapure, 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 the March 8, 2018 meeting, Terrapure indicated by email that they would be interested in completing the development application to allow HDI to review the project. On August 15, 2018, Terrapure submitted a completed development application to HDI. Until submission of the Draft EA, HDI did not provided comments on the Project. Consultation with HDI on the SCRF Draft EA is described in **Section 7.10.2.**

Table 7.5 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). All correspondence and engagement with HDI from the Notice of EA Commencement to the availability of the SCRF Draft EA for review can be found in **Vol.3 – Appendix C**.

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.

MNO did not provided any comments for consideration in the SCRF EA. Consultation with MNO on the SCRF Draft EA is described in **Section 7.10.2.**

Table 7.5 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). All correspondence and engagement with MNO from the Notice of EA Commencement to the availability of the SCRF Draft EA for review can be found in **Vol.3 – Appendix D**.

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 **Vol 3. - Appendix E**. 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. No additional field surveys were been undertaken during the EA.

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. In August 2018, the MNCFN confirmed by phone and email that there were no immediate concerns and to continue to provide them with updates on the project as the EA process continues.

Consultation with MNCFN on the SCRF Draft EA is described in **Section 7.10.2.**

Table 7.5 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). All correspondence and engagement with MNCFN from the Notice of EA Commencement to the availability of the SCRF Draft EA for review can be found in **Vol.3 – Appendix E**.

7.5.5 Six Nations of the Grand River First Nation

Terrapure provided the Notice of EA 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.

At this meeting, Six Nations indicated their interest in groundwater, wetland recreation, and closure plan and their potential impacts as a result of the Undertaking. The impact assessment was not complete at this time; however, Terrapure did provide these details when it was available in June 2018 to indicate the impact assessment reviewed the potential effects from a construction, operation, closure/post-closure planning perspective and that there will be no net environmental effects from the Preferred Landfill Footprint on the geologic or hydrogeologic conditions. 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. No comments were received on the draft Impact Assessment Reports.

Consultation with Six Nations on the SCRF Draft EA is described in **Section 7.10.2.**

Table 7.5 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). All correspondence and engagement with Six Nations from the Notice of EA Commencement to the availability of the SCRF Draft EA can be found in **Vol.3 – Appendix F**.

7.5.6 Consideration of Comments Received and Issues Raised

Table 7.5 describes the email, letter and telephone correspondence with 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. 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 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
Haudenosaunee Confederacy Chiefs' Council and Haudenosaunee Development Institute	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.	Thank you for taking the time to speak with me yesterday. In our conversation you indicated that you are interested in setting up a meeting at your offices to further discuss the Terrapure Stoney Creek Regional Facility Environmental Assessment. As requested, please see Blair Shoniker's contact information below for you to set up a meeting.	01-Dec-2017	Email
	01-Mar-2018	Email	Sorry for the delay in responding. March 2nd is not a good date for the HDI. Next week the 7th or 8th looks good. And I need to confirm this is just a discussion not consultation and did you have an agenda you wanted to propose? Let me know	The 8th would be good. It is a discussion not a consultation meeting. I would like to present material regarding the proposal for the Site. The purpose of the meeting is to determine if there is a need for engagement, and if you determine that there is a need--then we can have that discussion on how we engage for consultation purposes. I will bring a person with me that is well aware from a technical perspective of the project to make the presentation	01-Mar-2018	Email
	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
	25-Apr-2018	Email	We were sidetracked a bit. Back on things this week. We will prepare the letter to Terrapure.	Just wondering if a letter has been prepared instructing Terrapure in regard to the process of engaging with HDI. Terrapure is prepared to enter into application process, and would like to understand the cost and schedule requirements. They do understand that HDI will not review documents before they enter into the application process. For your information to check up on Terrapure, there documents are available in their document Library http://www.terrapurestoneycreek.com/document-library. The following links are to the existing reports in the 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	25-Apr-2018	Email
	N.A.	N.A.	N.A.	Any movement on dealing with the Terrapure proposal regarding the Site at Stoney Plain. Perhapswe should go take a look at the Site to get a better understanding of what is being developed there.	23-May-2018	Email
	30-May-2018	Email	Good morning: Please see attachment. (HDI Engagement Package.PDF)	N.A.	N.A.	N.A.
	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.	Last time we spoke, it was in regard to the letter and map that was forwarded. The map that was sent of the Haldimand Tract and did not include the location of the Terrapure Site Stoney Creek. You were going to send over the proper location map, The Mitchel map?, which is not specific to the tract. Perhaps we can have a short discussion in the next couple of days.	03-Jul-2018	Email
	06-Jul-2018	Telephone Call	Sending a better map outlining the Treaty areas of the Haudenosaunee.	RE: updating HDI Engagement Package map	06-Jul-2018	Telephone Call
	08-Aug-2018	Telephone Call	Regarding the dissolution of the HDI Board. The process remains intact, the names will be changing.	Following confirmation of the appropriate process, Terrapure submitted the application to HDI to facilitate their participation in the EA	08-Aug-2018	Telephone Call

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
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 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.	30-Jan-2018	Email
	25-Feb-2018	Telephone	Requested to be kept in the loop of the SCRF EA but that the MNO would not be reviewing 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
	09-May-2019	Email	Email Bounce backs from two MNO employees indicating that they no longer work at MNO and to contact the Chief Operating Officer of the MNO.	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	9-May-2018	Email

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
				landfill expansion design, refining the proposed Impact Management 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 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.		
	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.		30-May-2018	Telephone
	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 Impact Management 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 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.	29-Jun-2018	Email

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
				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 Terrapure once back from vacation.	Followed up with email send on June 29, 2018 with request to confirm what materials the MNO is interested in reviewing.	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 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.	30-Jan-2018	Email

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
				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)? • 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.	7-Feb-2018	Email
	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 Impact Management 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):	11-Apr-2018	Email

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
				• 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	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 Impact Management 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. 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.	17-Apr-2018	Email
	05-Jun-2018	Email	Thank you for the invite but we will not be attending the Open House. Please let us know if there are in changes in the plans though.	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.	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	Email
	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	13-Jul-2018	Voicemail
	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
	01-Aug-2018	Telephone Call	Returning a phone call following receiving the email and voicemails regarding reviewing the materials for the SCRF EA to-date. Indicated that at this time there was no need to review the materials based on existing conditions and impacts from current operations. Requested to continue to be kept in the loop.		01-Aug-2018	Telephone call

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
	01-Aug-2018	Email	Thank you for taking my call this morning. Sorry about the delay. We do not need any FLR's on Site for the work that is upcoming because it is a part of the operations for the Site and all the EA work is completed already. At this time we have no immediate concerns. Please let us know if there are any changes to the plan as our interests may change at that time.	Thank you for getting back to me, I understand you spoke to my colleague Katrina Kroeze earlier today and she gave you an update on the project. We will certainly let you know if there are any changes to the plan. There will, as well, be another opportunity for a conference call or meeting once the Draft EA is released if you would like. We expect the Draft EA to be released late August, but I will reach out to you again at that time.	01-Aug-2018	Email
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. 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.	30-Jan-2018	Email
	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

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
	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. 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.	6-Apr-2018	Meeting
	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 Impact Management 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 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	29-Jun-2018	Email

Table 7.5 Indigenous Community Comments and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
				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
	N.A.	N.A.	N.A.	Thank you for speaking with me over the phone this morning. As I was mentioning, I was following up on my colleague Katrina M's email on June 29 and voicemail on July 13, 2018 regarding the Stoney Creek Regional Facility Environmental Assessment. See below the request for your confirmation of what materials you are interested in reviewing along with the links to the docents for the project. Please email us at your earliest convenience to confirm.	26-Jul-2018	Email

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 ways to solicit their feedback and address concerns they may have had 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
- City of Hamilton Councillors, including those in office prior to and after the 2018 municipal election.
- Members of Parliament David Sweet (Flamborough – Glanbrook) and Bob Bratina (Hamilton East – Stoney Creek) November 2015 - Present
- Community Representatives on the Community Liaison Committee (CLC)
- Non-government organizations and community based organizations with interest in the project
- Terrapure customers and vendors

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.

A full list of Public Participants can be found in **Vol. 3 – Appendix G.**

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 through each of the consultation activities and considered at each key milestone of the SCRF EA. The full list of consultation activities undertaken 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 the Draft Environmental Assessment and circulation of the Final Environmental Assessment (see **Sections 7.10 and 7.11**)

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 MECP on November 9, 2017, Terrapure distributed a Notice of EA Commencement announcing the start of the EA process. The Notice of Commencement included the locations where the Approved Amended ToR was available for viewing as well as encouraging 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:

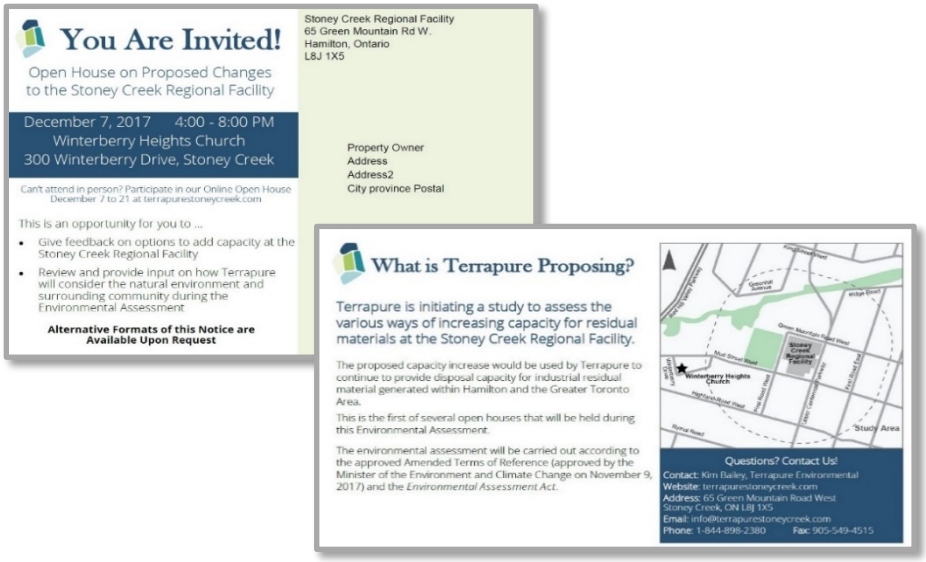
- Advanced courtesy notice by email/telephone calls to City of Hamilton Mayor Fred Eisenberger, Doug Conley (Ward 9), Maria Pearson (Ward 10), Donna Skelly (Ward 7), Judi Partridge (Ward 15), Chad Collins (Ward 5)
- Advanced courtesy notice by email to Terrapure SCRF Community Liaison Committee
- Direct mailing and emailing on November 17, 2017, to all identified agencies, Indigenous communities, City of Hamilton Council, 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.

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.

- Ad in the Stoney Creek News on November 23, 2017.
- Terrapure notified stakeholders of the Notice of EA Commencement, Public Open House and Online Open House through a variety of means to increase awareness and the potential number of public members participating. For each of the notifications, Terrapure promoted both the in-person public Open House as well as the Online Open House. Specifically, the following notifications for the event were distributed:
- Advanced courtesy notice by email/telephone calls to City of Hamilton Mayor Fred Eisenberger, Councillor Doug Conley (Ward 9), Maria Pearson (Ward 10), Councillor Donna Skelly (Ward 7), Councillor Judi Partridge (Ward 15), Councillor Chad Collins (Ward 5).
- Advanced courtesy notice by email to Terrapure SCRF Community Liaison Committee.
- 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, City of Hamilton Council and members of the public in the project-specific contact database.
- Addressed postcards mailed between November 22-24, 2017 to residences in adjacent Penny Lane Estates and Empire Victory residential developments.

- 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.
- 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:

- Advanced courtesy notice by email/telephone calls to City of Hamilton Mayor Fred Eisenberger, Councillor Doug Conley (Ward 9), Councillor Maria Pearson (Ward 10), Councillor Donna Skelly (Ward 7), Councillor Judi Partridge (Ward 15), Councillor Chad Collins (Ward 5).
- Advanced courtesy notice by email to Terrapure SCRF Community Liaison Committee.
- 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, City of Hamilton Council, and members of the public in the project specific contact database between March 8 15, 2018.
- Addressed postcard mail between March 8-15, 2018 advertising the Public Open House #2 to Penny Lane, Victory Developments and the newly built Empire Community immediately north of the SCRF.
- Unaddressed postcard mail between March 8-15, 2018 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:

- Advanced courtesy notice by email/telephone calls to City of Hamilton Mayor Fred Eisenberger, Councillor Doug Conley (Ward 9), Councillor Maria Pearson (Ward 10), Councillor Donna Skelly (Ward 7), Councillor Judi Partridge (Ward 15), Councillor Chad Collins (Ward 5).
- Advanced courtesy notice by email to Terrapure SCRF Community Liaison Committee.
- 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, City of Hamilton Council, and members of the public in the project specific contact database between June 5-12, 2018.
- Addressed postcard mail between June 5-12, 2018 advertising the Public Open House #2 to Penny Lane, Victory Developments and the newly built Empire Community immediately north of the SCRF. 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 Alternative Methods, the evaluation criteria and indicators to be applied to the Alternative Methods, and the evaluation methodology that will be utilized.
- **Public Open House #2** - reviewing the results of the comparative evaluation of the Alternative Methods and identifying the Recommended Alternative Method.
- **Public Open House #3** - reviewing the impact assessment results of the Preferred Landfill Footprint (Preferred Method), including potential environmental effects, recommended impact management measures, proposed monitoring requirements, and proposed approvals/permits required for implementing the Preferred Landfill Footprint.

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 review and 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 considered 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 community members with an opportunity to review, ask questions, seek clarifications, and comment on:

- EA process
- Six Alternative Landfill Footprint 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 comment on:

- EA process
- Assessment and Evaluation Methodology
- Results of the evaluation for each of the six Alternative Methods, as well as the comparative evaluation of the six Alternative Methods against one another
- Recommended Reconfiguration and Height Increase Alternative Method No. 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 comment on:

- EA process
- Confirmation of the preferred reconfiguration and height increase Alternative Method
- Results of the detailed impact assessment for the Preferred Landfill Footprint
- Proposed impact management measures, monitoring and commitments
- Next steps and future consultation opportunities

Public Open House Summary Reports can be found in **Vol. 3 – Appendix H**.

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.

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.).

As noted in **Section 7.4.6**, this included informal telephone calls and in-person discussions with Councillors Doug Conley and Brad Clark, the past and current City of Hamilton Ward 9 Councillors. Informal telephone calls and in-person discussions were also held with former Councillor Donna Skelly, who became the Member of Provincial Parliament for Flamborough – Glanbrook, where the SCRF is located, in June 2018. An in-person meeting was held with M.P.P. Skelly on October 15, 2018 to provide an update on the project.

Finally, a number of Terrapure's clients, suppliers, and business partners submitted letters to the MECP in support of the proposed undertaking. These letters included details of their existing and ongoing working relationships with Terrapure as well as the vital role the SCRF plays in supporting local industries and the regional economy.

Correspondence with Public Stakeholders including the individual Letters of Support can be found in **Vol. 3 – Appendix I**.

7.6.6 Community Liaison Committee Workshop

The existing Terrapure SCRF CLC meets quarterly to discuss the Site's current operations as part of its existing permit. 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 offered the CLC an opportunity to hold special 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 requested one additional workshop meeting in advance of 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

A summary of the CLC Workshop can be found in **Vol. 3 – Appendix J**.

7.6.7 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 Terrapure and the interested person(s) had an agreeable resolution during the SCRF EA.

Table 7.6 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:

- 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 Alternative Method No.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

7.7 Summary of Consultation with City of Hamilton and Local Elected Officials

As important stakeholders representing the interests of the City of Hamilton and their respective constituencies, Terrapure made significant efforts to keep the City of Hamilton and local elected officials informed at key milestones throughout the SCRF EA process. With this in mind, the following is a summary of the consultation undertaken with the City of Hamilton Staff, Mayor and Councillors, Members of Provincial Parliament (MPP), and Members of Parliament (MP):

- Participation by City of Hamilton staff in GRT Webinars (see Section 7.4.3).
- Individual meetings with City of Hamilton staff (see Section 7.4.4).
- Circulation of draft reports prepared during the EA process to City of Hamilton staff for their review and comment, including work plans for individual environmental components, existing condition reports for individual environmental components, the Conceptual Design Report, the Alternative Methods Report, the Facility Characteristics Report, and detailed impact assessment reports for individual environmental components (see Section 7.4.5).
- Circulation of the preliminary Draft Environmental Assessment Report to City of Hamilton staff for review and comment (see Section 7.4.5).
- Presentations to the City of Hamilton Council Planning Committee by City of Hamilton staff Terrapure representatives on the existing compensation agreements and on staff comments on the preliminary draft Environmental Assessment Report (see Section 7.4.6).
- Subsequent revisions to the reports prepared during the EA process and the preliminary Draft Environmental Assessment Report as a result of comments received from City of Hamilton staff (see Section 7.4.7).
- Advanced courtesy notice of Public Open Houses by email/telephone calls to City of Hamilton Mayor, Councillor Doug Conley (Ward 9), and other members of council (see Section 7.6.3).
- Circulation of all notifications to City of Hamilton Mayor, Councillors, including the Notice of Commencement and Open House #1 (see Section 7.6.3.1), Notice of Open House #2 (see Section 7.6.3.2), Notice of Open House #3 (see Section 7.6.3.3), Notice of Draft EA (see Section 7.10.1) and Notice of Submission (see Section 7.11.1).
- Participation by Councillor Doug Conley (Ward 9) and Councillor Maria Pearson (Ward 10), at the Community Liaison Committee Workshop (see Section 7.6.6).
- Attendance by Councillor Doug Conley (Ward 9) at Open Houses #1, #2 and #3 (Section 7.6.3).
- Multiple informal telephone and in-person discussions with Councillors Doug Conley and Brad Clark (Ward 9) throughout the EA process (see Section 7.4.6).
- Notifications to and informal telephone and in-person discussions with current M.P.P. Donna Skelly (Flamborough – Glanbrook) during her tenure as City of Hamilton Councillor, and in-person meeting with M.P.P. Skelley on October 15, 2018 (see Sections 7.6.3 and 7.6.5).
- Correspondence with local and regional elected officials can be found in Vol. 3 – Appendix I.

Table 7.6 Public Stakeholder Comments and Consideration by Terrapure

Comment Received 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; close the SCRF immediately.	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 (**see Section 3**).
Consider a different site; consider a site 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 (**see Section 3**).
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 new videos Terrapure produced, based on community questions, 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
Terrapure should 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.
Concern regarding the possibility of additional expansions in the future.	Additional expansions beyond the capacity increase being sought through this EA would require separate approvals.
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 Environmental Compliance Approval.
Feeling that the presentation of the material at the In-Person Public Open House indicated that the proposed expansion is already a "done deal".	As the Environmental Assessment progressed, Terrapure considered ways to improve the way information was presented at Open Houses. The proposed capacity increase is not final until the Minister approves, rejects or approves with conditions Terrapure's Environmental Assessment Report.
The Online Open House format only invites comments to the promotional content on the Site. The participant 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 was very similar to the last open house. No staff member formally invited participants to fill out the comment form and not all stations were attended by a member of the PR team.	The Online Open Houses included the same content as the in-person Open Houses. The Online Open Houses included opportunities 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 project team were available both at the various stations and circulating throughout the room.
Concerned with the use of the terms industrial fill and residual material which is inconsistent with what the MECP 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. Terrapure published a video on the waste acceptance process at the Site to help explain what kind of materials are received at the SCRF (http://bit.ly/SCRFvideos).
GHD prides itself on its website as being a member of the IAP2 organization and to the code of ethics for public participation. The Public's participation in these types of studies is paramount and GHD has undertaken numerous occasions to keep the public informed. However, some of the public involved, feel that although there has been public info sessions and documents provided; the process of a business (Terrapure) trying to continue its operations for decades into the future at this Site, gets the most favourable slant in the documents provided by the process. The public needs its point of views, as this code of ethics to be followed notes, to be considered and to be seriously put forward by GHD.	Members of the GHD project team are members of the International Association of Public Participation (IAP2), and as such, follow the IAP2’s Code of Ethics. Consultation for the SCRF EA was undertaken in accordance with the *Environmental Assessment Act* and applicable MECP Codes of Practice. In keeping with these guidance documents and requirements, Terrapure established the purpose of this Environmental Assessment at the beginning of the project - to increase the approved capacity of the SCRF by 3,680,000 m^3. This purpose statement was developed during the Terms of Reference and was based on the business case established by Terrapure. Once the purpose was established, Terrapure proceeded with the subsequent stages of the Environmental Assessment, including assessing the various options that would meet that purpose and consulting stakeholders on those options.
Offended that Greg Jones of Terrapure rudely cut off participants’ questions during the Open House presentation and in front of other community members and GHD personnel. Mr. Jones offered to speak to the individual in private for some reason, but refused to answer any further questions with other community members present. The invite to the Open House says it is an opportunity to give feedback on the preferred reconfiguration and height increase. If this is how Terrapure is going to react to feedback from the community that doesn't align with their preferred option, there is really no value in having an Open House.	Staff members do their best to answer questions received while also being considerate of other members of the public that they are speaking to.
Study Area and Existing Conditions	
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.	As part of evaluating the six options, a 1.5km study area was establish the existing conditions for elements of the environment such as visual, noise, traffic, and odour and confirmed during the impact assessment as it reflected the extent of potential environmental effects.
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:	As a result of this comment, the most recent road network map data, which showed the new roads and streets, was obtained and all future maps reflected the most recent road network available. Notwithstanding the above, the neighbourhoods highlighted in the comment were 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* (Appendix E).** The purpose of the *Land Use Existing Conditions Report* is to identify the existing land use, zoning and official plan designations, and more specifically

Table 7.6 Public Stakeholder Comments and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
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. website 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 MECP.	describes the existing and surrounding neighbourhoods. The *Land Use Existing Conditions Report* was reviewed by City of Hamilton Planning staff (**see Section 7.4.5**). The two schools included in the comment were St. James Apostle School and Saltfleet High School. 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* (Appendix E). In addition, Terrapure consulted the Hamilton-Wentworth District School Board and the Hamilton-Wentworth District Catholic School Board regarding this project, and they were provided with these reports for their review (**see Section 7.4.5).** The development applications referenced in the letter were considered as part of this project. The applications referenced in the letter and included in **Figure 4.3 and Table 4.2 of the *Land Use Existing Conditions Report*** as follows: Application # / Number of Units / ID# in Table 4.2 of the Land Use Existing Conditions Report ZAC-13-005 / 340 units / #60 ZAC-13-025 / 96 units / #61 (our records indicate 120 units) ZAC-15-015 / 450 units / #65 ZAC-15-059 / 39 units / Not included in the Existing Conditions Report, as the status of this application recently changed. ZAC-16-065 / 197 units / #70 ZAC-16-066 / 135 units / #69 ZAC-17-001 / 97 units / #68 As 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 and conducting the impact assessment.
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* (Appendix E),** 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 did not have any proposed development plans for these parcels. As well, they are currently zoned for agriculture purposes. As a result, the categorization of these properties remained as agricultural.
Evaluation of the 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. The SCRF is permitted to receive 750,000 tonnes of material/year. Through this Environmental Assessment, Terrapure are not seeking approval to change the type of waste we accept on-site (**see Section 3**).
Feedback received on the six Alternative Methods during Open House #1: Option / What do you like about this option? / What do you dislike about this option? Option 1: Reconfiguration / Nothing (x5) No height increase (x6) Original footprint (x5) Of all the options this would appear to be the best (x5) Earliest closure (x1) / Increases volume (x3) The footprint expansion (x1) Option 2: Footprint Expansion / No height increase (x5) Nothing (x7) Neutral (x1) / The footprint expansion (x4) Increase volume (x2) Neutral (x1) Keeps industrial fill = open longer (x1) Option 3: Height Increase / Nothing (x8) No change in footprint (x1) / The height increase (x8) Increase volume (x3) Infringes on sight for neighbouring housing (x1) Do not want it to be higher than the surrounding area (x1) Keeps industrial fill = open longer (x1) Option 4: Reconfiguration and Footprint Expansion / Nothing (x7) No height increase (x4) / Volume increase too high (x4) Footprint change (x3) Nothing (x1) Option 5: Reconfiguration and Height Increase / Nothing (x8) / Volume increase too high (x4) Height increase (x7) Option 6: Footprint Expansion and Height Increase / Nothing (x8) / Volume increase too high (x2) Height Increase (x7) Everything (x3) Keeps industrial fill = open longer (x1)	This aspects that were raised in relation to the Alternative Methods were taken into account by the evaluation criteria and indicators used to evaluate the Alternative Methods (**see Section 5.4**)

Table 7.6 Public Stakeholder Comments and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
What matters most to the community is the height of the landfill and the length of time that it will take to close and cap the Site. These topics are sadly under represented in the Evaluation Criteria as there is only one line that partially captures the height issue (predicted change in views of the Facility from the surrounding area) and none on closure date, as compared to 5 lines on Terrestrial and Aquatic Environment and 3 on Archaeology and Built Heritage even though I doubt that differs at all between the 6 options. In my opinion, once again, Terrapure has selected criteria that is not commensurate with the desires of the community, has ignored the most important criteria and consequently scoring the Evaluation Criteria as constructed will be useless. The community wants no further increase in height and a closure date as soon as possible. These two factors should be at the top of the Evaluation Criteria and receive the largest share of the point structure when evaluating the 6 options. 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. The effect of the SCRF on existing views was one of the evaluation criteria that was used to evaluate the six options (**see Section 5.6**). None of the evaluation criteria were weighted as more or less important. The alternatives will be compared using a reasoned argument approach where advantages and disadvantages are used to identify preferences among the options (**see Section 5.3**).
The Environmental Components selected by Terrapure to make this decision were not appropriate and resulted in the outcome that Terrapure had desired at the outset. Of the 9 Environmental Components, 5 had no differentiation amongst the 6 options (Archaeology, Geology, Terrestrial, Transportation, and Atmospheric), 2 more had only an insignificant difference (Surface Water and Human Health) leaving only 2 (Land Use, Visual, Economic and Design & Operations) to base the decision on.	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 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.
In the "What We Heard from Community Members" section [Open House #2}, Terrapure states "In general, the public expressed a preference for options that included no or little height increase and for options that allowed the SCRF to close as soon as possible". Yet Terrapure in forming their Environmental Components excluded closure date entirely, and had only 1 criteria for visual that as stated above was incorrectly scored.	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", [Open House #3 Display Panels] 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 m increase for Option 5. Please revise that comment.	The text in the "Highlight of Community Feedback" section did not state that Terrapure selected a preferred option with the lowest height increase. The text was 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 #2) changed the results of the comparative evaluation, Option 5 was confirmed as preferred (**see Section 5.12.1**). 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.
From the March 22 Open House the 'Comparative Evaluation of Options Summary" handout was provided to attendees. There are issues with this analysis. As stated by GHD in other documents, the preferred option for Terrapure going forward is Option 5. It is amazing that Option 5 did not have one red circle in its evaluation on the Summary sheet; kind of misleading and in our minds simply a portrayal to unjustly favour Terrapures wishes.	Option 5 was determined to be the recommended option as a result of the comparative analysis of the net overall outcome of these the category independent rankings (**see Section 5.12**).
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 m (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. Nothwithstanding, in response to comments on 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) (**see Section 5.12**).
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.	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 (**see Section 5.6.1).** In response to comments on 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) (see Section 5.12).
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).	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 (see).
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.	Profit/operation viability is not considered as part of this criteria. 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 (**see Section 5.8**). 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 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 City and MECP 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 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.

Table 7.6 Public Stakeholder Comments and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
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. In the "Design & Operations" component, The Stormwater management line should all be Green circles as the 72" sewer trunk runs right beside the property.	
Design & Operations – Alternative No. 1 is red for the criteria "Potential to Provide Service for Disposal" meaning Terrapure's ability to maximize revenue. This should be orange or yellow as all options allow for Terrapure to increase revenue from the existing Site license.	The criteria "potential to provide service for disposal" is related to the ability for Terrapure to provide 3,680,000 m^3 of additional disposal capacity for post diversion solid, non-hazardous industrial residual material. The differences in the rankings reflect that the different Options provide different amounts of disposal capacity. Options 3, 5 and 6 would all result in the greatest disposal capacity (**see Section 5.10**).
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. For the transportation component, Option 1 should be green and Option 5 should be red to reflect closure dates.	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, the potential current and future impact on traffic at intersections surrounding the SCRF as a result of trucks coming to and from the SCRF were evaluated. 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 (see Section 5.7.1).
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"	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 The purpose rationale for the Undertaking was determined, in part, by the economic opportunity available to Terrapure (**see Section 3.3**). We will consider ways to make this more transparent in future open houses.
Please review Table 4.1 Comparison of Alternatives in the Conceptual Design Report as I think there may be an error. Under Height Relative to Surrounding Area for Green Mountain and First Road it shows 192 MASL whereas I believe the surrounding land in those areas are 201 MASL and 204 MASL respectively, not 192 MASL shown. 192 MASL is the elevation for the bottom of the original quarry.	The existing road elevation at the intersection of Green Mountain Road West and First Road West is approximately 192 mASL. The proposed road works to be carried out in this area will maintain the existing grades at approximately 192 mASL.
Potential Effects on Land Use and the Economic Environment	
Consider the large population expansion within the area and of the sensitive land uses of the surrounding area because of rapid population growth.	The potential impact of the proposed Undertaking on the existing and future land uses, including planned and approved new development, was assessed as part of assessment of the alternative methods and impact assessment under the Built Environment and Economic Environment categories (**see Sections 5.6, 5.8, 6.4 and 6.6**).
Would like assurance that the MECP guidelines for distances from the landfill are respected within the decision for the Site.	The proposed capacity increase was designed in accordance with minimum 30 m buffers in accordance with O.Reg 232/98, which outlines design guidelines and considerations for property boundary setbacks and buffer zones (see Section 6.1.1).
Provide more specifics to claims of $28 million/yr in total economic activity and $18 million/yr in GDP. Need to be specified and quantified. Interest in learning more abou the claims for economic benefits and GDP as a result of the SCRF.	The details regarding economic claims of the SCRF are detailed in Appendix A – Economic Impacts of the SCRF of the Supporting Document #1: Purpose and Description of and Rationale for the Undertaking.
Potential Effects on Visual	
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).	Potential visual screening measures, such as fences, berms and tree plantings, were presented at Open House #3 for comment. Specific screening techniques will be developed further during detailed design to mitigate the visual impact from the surrounding community (**see Section 6.4.1**).
Consider the visual impacts on the landscape. Concern with additional height increase of some of the proposed options and the visibility from surrounding community viewpoints. Opposition to the height increase.	The visual effects of each of the options were considered as part of the evaluation, which included consideration of height increases. The preferred option (Option 5) results in a height increase of 2.5 m. The 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 (**see Section 5.6.1**). Specific screening techniques, such as fences, berms and tree plantings, which mitigate visual impact and noise will be developed further during detailed design to mitigate the visual impact from the surrounding community (**see Section 6.4.1**)
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.	Specific screening techniques will be developed further during detailed design and will be tailored to site conditions and anticipated visual impact from surrounding vantage points. Where possible, native vegetation will be used.
Potential Effects on Air Quality and Odour	
Consider the impact of odour permeating the surrounding area depending on the direction of the wind / Concern the smell on the surrounding community from the Site	The impact assessment for odour considered This historical and future model predictions of wind speed and direction (**see Section 6.3.4**).
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.	With regards to odour, the 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. The future potential for odour from the SCRF is not predicted to change as a results of the SCRF EA. Regarding dust, Terrapure is required to adhere to the Ministry of the Environment, Conservation and Parks Point of Impingement (POI) Criteria for particulates. For the preferred option to add capacity to the SCRF, dispersion modelling was used 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 Ministry of the Environment, Conservation and Parks requirements. This analysis determined that, with additional 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 operating below the maximum capacity on a daily basis), the SCRF will be able to meet the Ministry of the Environment, Conservation and Parks guidelines at all locations under the proposed undertaking.

Table 7.6 Public Stakeholder Comments and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
	Regardless, it is a priority for Terrapure to operate in a way that is respectful and considerate of our neighbours. Anyone who experiences an odour or dust issues can reach our community response line at 1-905-561-0305. You can also report an odour and dust issues to the Ministry of Environment, Conservation and Parks at 1-905-521-7650. Odour and dust complaints are summarized in the annual report, and the MECP is informed of all complaints and how each request has been addressed. See Section 6.3.4 and the Air Quality Impact Assessment Report in Appendix J.
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. **See Section 6.3.4** and the **Air Quality Impact Assessment Report in Appendix J.**
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 ongoing commitment to undertake PM monitoring along the Facility fenceline - something that should be happening now anyway. Proponent should also be required to monitor for PM2.5 -now confirmed as a known cause of lung cancer in humans.	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 MECP. 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 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 MECP on an annual basis. PM_{10} incorporates $PM_{2.5}$, and the existing monitoring program continues to be deemed acceptable by the MECP 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. **See Section 6.3.4 and the Air Quality Impact Assessment Report in Appendix J.**
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 MECP, 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, the MECP reviewed the Air Quality technical work plan and isopleth maps were not requested or required to be included in the Impact Assessment Report. 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). **See Section 6.3.4 and the Air Quality Impact Assessment Report in Appendix J.**
Potential Effects on Natural Environment	
Consider the future impact of the Facility on animal populations.	The potential impact of the proposed capacity increase on animal populations was assessed as part of the assessment of the alternative methods and the impact assessment **(see Sections 5.5.3 and 6.3.3).**
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?	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 **(see Section 6.3.3).**
Consider natural beauty of the escarpment.	The proposed capacity increase is not anticipated to have an effect on the Niagara escarpment.
Potential Effects on Traffic	
Consider the assessment of the increase in roadway volumes as a result of the activities at the landfill site and assess truck impacts beyond the study area.	The effects of truck traffic were considered as part of the assessment of the alternative methods and impact assessment (**see Sections 5.7.1 and 6.5.1**)
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. Terrapure currently enforces reduced speed limits on-site and encourages drivers to maintain reduced speeds as they exit and will continue to do so.

Table 7.6 Public Stakeholder Comments and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
How much will the project affect the future efforts to make Upper Stoney Creek more valuable and transit friendly?	As part of the evaluating alternative methods, the potential effect on traffic, approved/planned land uses, and the economic benefits to the City of Hamilton and local economy were.
Potential Effects on Human Health	
Concern for human health.	Human Health was considered as part of the assessment of the alternative methods and impact assessment. 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 Impact Management Measures would be used to reduce or eliminate any impacts **(see Section 6.6).**
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 assessment of the alternative methods and impact assessment (**see Section 6.6**). With regards to current operations, Hamilton Public Health has reviewed health and environmental monitoring data that Terrapure has provided and confirmed that the SCRF does not pose 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.
The financial contributions are not as important as the cost to the community.	Comment noted.
Closure Planning	
Interest in what the closure plan will include. Ideas presented included gardens, ski hill, small restaurant, and golf course.	In accordance with O. Reg. 232/98, 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 A recommendations will be provided to and discussed with the Closure Planning Advisory Committee, established outside of the EA process, will consult the community on potential post-closure uses.
Operations of the Existing SCRF	
Skeptical of the current operations and proposal following contacting the Ministry of the Environment, Conservation and Parks 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 operates in compliance with regulatory requirements.
Concern about acceptance of hazardous material.	The SCRF does not accept hazardous materials.
Concern with odour coming from the existing SCRF.	The SCRF is only permitted to receive non-hazardous residual material from industrial, commercial and institutional sources. The SCRF is not permitted to receive any compost or garbage that decomposes and has the potential to cause odours. Often, when inquiries related to odour are received and investigated, it is determined that they are associated with other activities happening nearby. A community response line (905-561-0305) is established for residents to notify Terrapure of odour concerns. Residents may also call the Ministry of the Environment, Conservation and Parks at 416-325-3000 or 1-800-268-6060. This complaint protocol will continue (**see Section 6.3.4**)
Concern with existing visual aesthetics of the Site. Comments about the current black fencing, damage from the wind storm, and lack of beautification around the SCRF.	In response to comment received during the EA, additional visual screening measures were installed around the SCRF. Berms have been heightened to increase screening around Site access points and fencing has been installed on the west side of the Site. Additional screening techniques, such as fences, berms and tree plantings, which mitigate visual impact and noise will be developed further during detailed design to mitigate the visual impact from the surrounding community (**see Section 6.4.1**).
Concerns with current truck traffic (i.e. noise, messy).	Presently, the Site is permitted to receive up to 250 trucks per day; however, the average daily number received is about 70-80 trucks.
Request to post all current provincial permits on the project website.	In response to this comment, the following documents were added to the document library section of the project website: Waste Disposal Environmental Compliance Approval Stormwater Management Environmental Compliance Approval Permit to Take Water Quarrying Permit
Terrapure has exceeded the final approved height of the landfill by 2.5 m in anticipation of getting approval from the Ministry for Option # 5	Terrapure uses temporary stockpiles during the construction of the liner system. This is not related to the Environmental Assessment for the proposed capacity increase.
Terrapure has exceeded the approved capacity of the SCRF.	The SCRF has not exceeded its approved capacity and is operating in accordance with its Environmental Compliance Approval.
More of the testing and monitoring should be done by third parties.	Terrapure employs a mix of in-house and 3rd party monitoring of the operations of the SCRF. Each year, Terrapure develops an Annual Report outlining how we are meeting our Environmental Compliance Approvals. The Annual Report is issued to the MECP and City of Hamilton.
Concerns about ammonia plume beneath residential development to the north of the Site.	In 2010, MTE Consultants Inc. conducted a Landfill Impact Assessment (LIA), for the Empire lands to the north of the Stoney Creek Regional Facility. It was determined that as an Impact Management Measures for the elevated ammonia levels in the groundwater as a result of the Closed Landfill (to the west of the SCRF, across First Road West), a 1m of clay around basement foundations would be applied from the Operating Landfill, as a conservative measure.

7.8 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.

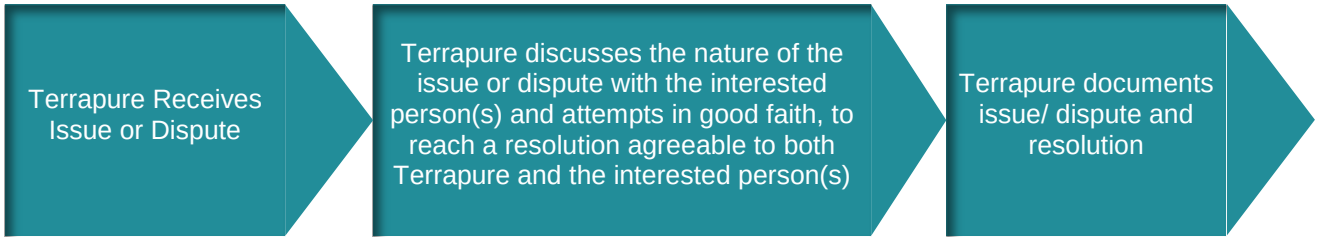
The Peer Reviewer had the opportunity to review and provide recommendations at each key milestone of the SCRF EA process including reviewing the following documents:

- Draft Facility Characteristics Report
- Draft Geology and Hydrogeology Impact Assessment Report

The details of Dr. Rowe's review and recommendations can be found in **Section 6.9**.

7.9 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:



7.10 Review of the Draft Environmental Assessment

In accordance with the Approved Amended SCRF ToR, the Draft SCRF EA Report was made available to review agencies, Indigenous communities, and the public for review and comment prior to formal submission of the SCRF EA to the MECP. The Draft EA Report was available for review from August 31 to October 24, 2018, with comments requested by the end of the seven (7) week period.

7.10.1 Availability for and Notification of the Review of the Draft SCRF EA

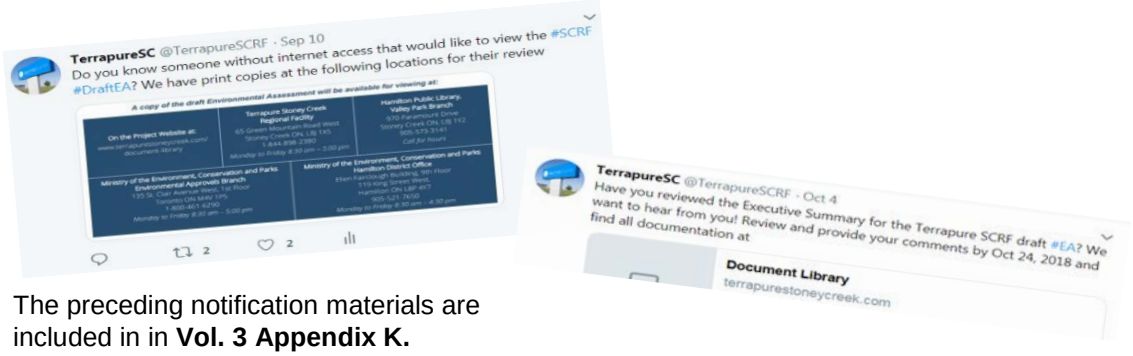
The Draft SCRF EA Report was available for review on the project-specific website (www.terrapurestoneycreek.com) and at the following locations:

- Terrapure's Stoney Creek Regional Facility Administrative Office (65 Green Mountain Road).
- City of Hamilton Valley Park Library.

- Ministry of the Environment, Conservation and Parks West Central Region Office (Hamilton).
- Ministry of the Environment, Conservation and Parks Environmental Assessment and Permissions Branch (Toronto).

Notifications of the availability of the Draft SCRF EA Report for review was provided through the following means:

- Advanced courtesy notice by email/telephone calls to City of Hamilton Mayor Fred Eisenberger, Doug Conley (Ward 9), Maria Pearson (Ward 10), Judi Partridge (Ward 15), Chad Collins (Ward 5).
- Advanced courtesy notice by email to Terrapure SCRF Community Liaison Committee.
- Emailing of the Draft EA Report Notification to all review agencies and Indigenous communities, on August 17, 2018 in advance to the release of the Draft EA Report.
- Mailing or emailing of the Draft EA Report to all review agencies and Indigenous communities, on August 31, 2018.
- Direct mailing and emailing to SCRF EA contact database including City of Hamilton Council, members of the public and property owners adjacent to the SCRF on August 31, 2018.
- Advertisement in the Stoney Creek news on August 30, 2018 and Hamilton Spectator on August 31, 2018.
- Posting on the SCRF EA project website on August 31, 2018.
- Distribution of flyers to approximately 8,000 addresses within the SCRF Study Area using Canada Post's unaddressed admail between August 29-31, 2018.
- Mobile sign along Upper Centennial Parkway with details for the Draft EA Report from September 4 to September 18, 2018.
- Reminder emails distributed to Agencies and Indigenous Communities about the SCRF Draft EA on October 11, 2018.
- Reminder email distributed to those in the project-specific contact database about the SCRF Draft EA on October 11, 2018.
- Notices on the SCRF website and advertised on SCRF Twitter and Facebook accounts were published on throughout the 7-week review period between August 31 – October 24, 2018.
- Individual follow up emails and voicemails with Indigenous Communities following closing of October 24, 2018 review period ending to ensure SCRF Draft EA materials were received and request to complete an acknowledgement form that they had no comments on the SCRF Draft EA. Terrapure heard back from MNCFN and Six Nations.
- Individual follow up emails and voicemails to GRT following closing of October 24, 2018 review period ending to ensure SCRF Draft EA materials were received and request to complete an acknowledgement form that they had no comments on the SCRF Draft EA. All GRT completed and returned the acknowledgment letter.



The preceding notification materials are included in in **Vol. 3 Appendix K.**

7.10.2 Consideration of Comments Received on the Draft EA

A total of eight (8) comment submissions on the Draft SCRF EA Report were received from review agencies, Indigenous communities, and the public. With this in mind and as discussed in **Section 7.4.3.4**, a webinar was held for all review agencies on October 3, 2018, to present an overview of the Draft EA Report, review initial comments on the Draft EA, and provide details for review timelines and next steps for the EA. In addition, following receipt of comments from the City of Hamilton and MECP, face to face meetings and conference calls were held with these agencies to review their comments and discuss Terrapure's proposed responses.

The comments received through the 8 submissions and how they have been considered by Terrapure in finalizing the SCRF EA Report are summarized in a series of tables by participant group in accordance with Section 4.3.7 of the MECP Codes of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014):

- **Table 7.7** summarizes the comments received from review agencies and how they were considered by Terrapure (organized by agency).
- **Table 7.6** summarizes the comments received from Indigenous communities and how they were considered by Terrapure (organized by Indigenous community).
- **Table 7.8** summarizes the comments received from the public and how they were considered by Terrapure, which have been arranged by in order of the Final SCRF EA Sections.

As part of considering comments received, Terrapure issued individual responses to those who provided comments on the Draft SCRF EA Report. The issues responses were either in the form of a formal letter or email correspondence to how the comments were received by Terrapure.

All correspondence received on the Draft SCRF EA Report and responses letters provided for agencies, Indigenous communities, and public stakeholders can be found in **Vol.3 – Appendix N.**

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
Hamilton Conservation Authority	2018-11-06	Email	The attached email from me in August is our last comments on this issue. We noted we had no further issues with the submission but noted required for storm water management at design stage.	Thank you for letting us know you are satisfied and have no further comments. We will provide you the Stormwater management plan when we are at that stage.	2018-11-09	Email
City of Hamilton	2018-08-31	Email/ Letter	Our understanding is that updated (complete) Draft Environmental Assessment material will be released shortly. However, we will be unable to provide a fulsome review and report regarding these forthcoming updated documents in time for the next and final Planning Committee Date – Tuesday, September 18th, 2018, due to the upcoming municipal election. As such, the attached letter also forms Appendix A to our update report going forward to Planning Committee on September 18th. A hard copy of the attached letter will be sent via mail shortly.	Comment noted.	2018-09-14	Letter
			Real Estate Based on the response from the consultant, the proponent does not intend on providing the requested land economic and property tax impact analysis and information requested until a later date - with the release of their actual Draft EA document. We cannot comment further on the material provided except to acknowledge that they intend to address the request, albeit later.	As requested by the City, Terrapure has completed and documented the research into potential effects to the City of Hamilton property tax base within proximity to the Stoney Creek Regional Facility (SCRF). This assessment has been included in the Draft EA Report (dated August 31, 2018). Found in **Section 7**, Pages 19-22 of the Draft EA Report.		
			Planning – Noise Please provide the Stamson sheets which were used to calculate the ambient (background) sound level at POR1, 3, and 4. The Detailed Impact Assessment report refers to the sheets being attached as Appendix 1, but we cannot locate them. The report indicates that the ambient (background) sound level at POR1 will be 60 dBA, accounting for future residential development. The report identifies 60dBA as the sound performance limit, based on the ambient sound level. The predicted future sound levels at POR1 resulting from the landfill are 60 dBA, just meeting the performance limit. Staff therefore need to review the Stamson sheets to confirm that the ambient sound level was calculated correctly and are based on the appropriate traffic volumes. If the ambient sound level is actually below 60dBA, this would result in a need for noise mitigation requirements. Therefore, this review is needed. While it appears that GHD has addressed staff's remaining comments, without an updated Noise Impact Assessment it is not possible to confirm.	Thank you for highlighting this. The Road Traffic Modelling STAMSON output sheets have been added as **Appendix B** of the Noise Detailed Impact Assessment Report and this report has been reissued. The updated report is available on the project website. Found in **Appendix B** of the Detailed Noise Impact Assessment		
			Source Water Protection Source Water Protection recommends that any available domestic water quality downgradient from the property be sampled to demonstrate the level of off-site impact originating from landfill operations. If offsite groundwater quality can not be obtained, Source Water Protection and Cambium recommend that Terrapure collaborate with neighbouring property owners to verify that no offsite impacts are observed owngradient, and to verify their conceptual model. The applicant should provide methodologies as to how RUC trigger values were calculated in their original submission. As a result, Source Water Protection and Cambium cannot verify the validity of the RUC calculations. Upon review of the Design and Operations as well as the Facility Characteristics Report, details on compatibility testing other than puncture risks were not found. The applicant should provide specific details as per Cambium's request. GHD shall provide details of this analysis to the satisfaction of Cambium and Source Water Protection, as they were not provided in GHD's response. A number of groundwater monitoring wells along the downgradient property boundary show exceedances of Ontario Drinking Water Quality Standards, exceedances of Hamilton's Sewer Use Bylaw, or both. Parameters such as sulphate, boron, pH, and uranium exceed such standards. As a result, if construction dewatering is required for future development downgradient of the operating and/or closed landfill (25T-201301, 25T-201510, 25T- 201601, 25T-201612, 25T-201611, 25T-201701), these applicants should be aware that groundwater quality may be compromised, and special agreements with Hamilton Water and/or the Ministry of Environment, Conservation and Parks may be required. Refer to attached formal peer review of the submitted hydrogeological report from Cambium Inc.	GHD concurs that downgradient private water supply wells, if available, should be included in the site monitoring program. However, as described previously, the identified private water supply wells are no longer available for sampling. In accordance with Source Water Protection's request, GHD recommends that a survey of properties downgradient of the SCRF should be undertaken in order to identify additional private wells available for inclusion in the future groundwater monitoring program. The original trigger criteria were developed in 1996 by Gartner Lee Limited and were based on two factors. The first factor, deemed the most stringent, was based on MOEE Policy B7: The Reasonable Use Policy. The calculation of Reasonable Use Criteria (trigger criteria) was based upon background groundwater quality, the Ontario Drinking Water Objectives (ODWO), and a multiplication factor (0.25 for health based or 0.5 for non-health based ODWOs). Background concentrations were selected as the highest value reported in the available database at the time (1990 – 1996) for each representative location, ignoring data points considered to be anomalous and assuming a concentration of zero where parameters were reported below detection limits. The second factor accounted for natural upgradient groundwater quality at the Site being notably poor. Parameters such as iron, chloride, sulphate, manganese, and sodium were present in concentrations above of their respective ODWO in groundwater upgradient of the Site. Policy B7 stipulates that no additional loading of these parameters should occur at the downgradient site boundary. Concentrations of many of these parameters are lower in leachate at the Site, thus, leakage into the underlying aquifer would cause dilution and decreases in concentrations. For this scenario, the upgradient groundwater quality was used as the trigger criteria. The available database (1990-1996) was used to determine upgradient water quality and the maximum reported concentrations at each individual location were used as the trigger criteria.		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
				Gartner Lee Limited recommended that as water quality changes were observed over time, the trigger criteria should be reassessed and re-calculated annually. Additional water quality data has been added to the database and trigger criteria have been updated annually to reflect those changes, whenever appropriate. For the purposes of the Geology and Hydrogeology Impact Assessment, the trigger criteria from the 2016 Annual Monitoring Report (Jackman Geoscience, 2017) were used as the basis for downgradient groundwater quality compliance comparison. GHD does not have access to the calculations used to update these trigger criteria. As there is now a substantial database of groundwater quality accumulated for the site monitoring well network, GHD recommended in the 2017 Annual Monitoring Report that trigger criteria should be reassessed every 3 to 5 years (as opposed to annually) to account for potential on-going changes to water quality. In accordance with this recommendation, it is intended that trigger criteria will be re-calculated for the 2019 Annual Monitoring Report using the methodology described above.		
			Public Health Hamilton Public Health Services (PHS) has reviewed discussion documents "Stoney Creek Regional Facility Environmental Assessment - Human Health Assessment Review Workplan" (Intrinsik Science Consulting, 2018), as well as the Community Health Assessment Review (2017 Annual Monitoring and Operations Report, Appendix E - Intrinsik Science Consulting, 2018). Other supplemental technical papers included but not limited to as part of the Draft Environmental Approval Process - Chapter 6 "Detailed Impact Assessment of the Undertaking" (GHD - 2018) have also been reviewed. PHS has no objection to the comparative evaluation chosen to identify the "recommended landfill footprint" - Option 5. No information reviewed within the above-referenced documents suggests air quality or leachate pose an unacceptable risk to the health of the surrounding community. PHS recommends that as the EA process advances, all requirements set forth in the Environmental Compliance Approval for the SCRF are abided by. As well, environmental best management practices should be maintained.	Thank you for your comment. We agree with the recommendation put forward from Public Health Services, that as the EA process advances, all requirements set forth in the Environmental Compliance Approval for the SCRF will be met and best management practices will be maintained.		
			Finance Current terms and conditions of the existing Compensation Agreements should be revisited and revised as part of any approval to changes to the existing ECA.	We understand that, according to Minutes from the Planning Committee meeting on August 14th, the Terrapure Stoney Creek Regional Facility EA – Compensation Agreement, was TABLED until a decision has been made by the Province respecting Terrapure's Environment Assessment process.		
			Commitments & Monitoring The Commitments and Monitoring Chapter does not specify exactly what type of screening feature or technique will be utilized at the various vantage points to mitigate visual impacts of the facility and operations.	A variety of screening options have been proposed as part of the SCRF EA. Final details on the screening feature(s) will be carried forward and determined during the subsequent ECA amendment process as the detailed Design & Operations report is prepared. Terrapure will update Chapter 8 to include a commitment with respect to finalizing screening measures as part of future approvals. Found in **Section 6**, pages 28-30 of the SCRF Draft EA Report.		
	2018-10-22	Email/ Letter	**The City of Hamilton provided the following comments on the Draft SCRF EA via letter which were subsequently discussed at meetings on December 6, 2018 and December 20, 2018.**		2019-01-07	Email/Letter
			Planning and Economic Development, Planning Division In the Traffic Detailed Impact Assessment Report (Draft for Discussion), prepared by GHD, dated August 21, 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. The increase to the permitted 250 vehicles is not considered to be negligible or minor, and additional rationale and analysis should be provided to ensure that adequate intersection operations are maintained.	Section 7.1 states that the operational impact of the increase to the maximum allowable/ permitted 250 vehicles per day is negligible, not that the increase to the permitted 250 vehicles per day is negligible or minor. The 2023 Future Background volumes are forecasted volumes to the 2023 horizon year, with any SCRF truck volumes removed from the dataset. The 2023 Future Total volumes include the addition of the maximum permitted 250 trucks per day (or 25 two-way trucks per hour) to the 2023 Future Background forecasts. The results of this analysis do not indicate any operational impact associated with the added SCRF truck traffic – even if it were to increase from its current average to the maximum permitted volume. For example, the most noticeable impact the SCRF truck traffic has is at the intersection of First Road West at Mud Street, during the p.m. peak		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
				hour, in which the reported 95th percentile eastbound left-turn queue increases by 14 metres, or approximately 2 vehicle lengths; this increase is considered nominal.		
			The Land Use and Economic Detailed Impact Assessment Report (Draft for Discussion), prepared by GHD, dated August 31, 2018, does not list an expert such as a Land Economist on the Land Use Economic Study Team. It is important to have an expert involved in studies that relate to property valuation and impacts on the tax base.	During the ToR, the City recommended that Terrapure and its consultants undertake some research in this matter (impact of landfill developments on property values) and consult with an expert such as a Land Use economist. It was also suggested that the research should also include an assessment of the impact on the City's assessment base. Terrapure responded to the comment on the Draft ToR that we would work with the City of Hamilton during the SCRF EA to design a property value assessment and consult with experts – such as a land economist – for implementation during the Impact Assessment of the Preferred Method stage of the SCRF EA. As the City declined the offer from Terrapure to develop a joint methodology during the EA, Terrapure has retained an expert land economist from an economics consulting firm to assess the impact of the SCRF on residences. The results of this assessment are included in Appendix C of the Land Use and Economic Impact Assessment Report (**Appendix J-6**) and **Section 6.2.4.1** of the Final EA Report.		
			• With regards to the Noise Detailed Impact Assessment Report (Draft for Discussion), prepared by GHD, dated August 31, 2018, the following comments and questions should be addressed; • The Stamson sheets for the background (ambient) noise calculations for POR 3 and 4 should be provided. • The rationale for using 2023 Traffic data for the calculation of the background sound level at POR 1 should be provided. Is this assuming that houses will not be developed on the north side of Green Mountain until 2023. One of the subdivisions is already registered, so it would appear that development could commence at an earlier date. What is the impact on background noise calculation if traffic data from an earlier date is utilized? • An overview of timing for each of the five Phases of development of the preferred method should be provided, including the approximate timing of when each phase will start and conclude. The noise report Table 6.1 indicates that the noise levels will not exceed the exclusionary limit of POR 1 until Phase 3. • At what point will noise levels be a concern on the north side of Green Mountain Road in relation to the timing of future development, and in relation to existing homes further north?	• The background limits for PORs 3 and 4 were based on the site specific limits as reported in the Facility's 2013 AAR, using the Facility's 2012 Noise Survey. Based on the Facility's 2016 Noise Survey these site specific limits are actually higher than previously reported. Page 6 of the 2016 Noise Survey provides the appropriate site specific limits and includes the supporting Stamson Calculations. The Noise Detailed Impact Assessment Report will be updated in the Final EA Report to include this information. • Phase 3 construction of the Stoney Creek Regional Facility is anticipated for 2023. Prior to Phase 3, the predicted noise impacts to the north of Green Mountain Road are below the exclusionary limits and therefore traffic data from an earlier date will not affect the development's compliance status. In addition, as requested by the Ministry of Environment, Conservation and Parks, the noise modelling will be updated to include additional receptors, specifically by adding a point of reception (POR) to the West. Table 6.1 of the Detailed Noise Impact Assessment Report will be updated to include the approximate timing for the phases of development and will include results of the additional modelling of the additional point of reception. • Noise levels on the north side of Green Mountain road are predicted to exceed the exclusionary limits in 2023 with the implementation of Phase 3. However, our analysis predicts that the Facility will be in compliance with the Ministry of Environment Conservation and Parks (MECP) applicable performance limit. The existing noise levels at the receptors north of Green Mountain road will be calculated based on current traffic volumes for comparison purposes		
			Public works Department, Source Water Protection The following comments are provided regarding the Geology and Hydrogeology Impact Assessment Report and the Design and Operations Detailed Impact Assessment (Draft for Discussion), both prepared by GHD, dated August 31, 2018: • The wells providing drinking water to the surrounding properties should be surveyed and included in the groundwater monitoring program. • An attempt should be made to re-establish a relationship with those residences who have historically refused to participate in the monitoring program. • An attempt should be made to locate and include Private Well 1 into the monitoring program, provided it has not been decommissioned. • The RUC trigger calculated should be updated annually with new data. • The wells located farthest off-site (monitoring wells 69 and 73), as identified in the most recent annual monitoring program should be included in the sampling program. • The groundwater quality results of these wells should be included in the RUC trigger calculations. • Clay liner leachate compatibility testing should be provided. It is understood that it will be provided before Final Environmental Assessment submission.	• A survey of surrounding properties downgradient of the SCRF will be undertaken in order to identify private wells providing drinking water, and these wells will be included in the groundwater monitoring program, as applicable. This commitment is included **Section 8.1** of the Final EA Report. • Private wells located downgradient of the SCRF will be included in the monitoring program if permission is granted by the property owners or tenants. • An attempt will be made to locate and include Private Well 1 in the monitoring program, provided it has not been decommissioned. • RUC values will be re-calculated for the 2018 Annual Monitoring Report. The SCRF groundwater monitoring program will be conducted in accordance with the recommendations of the MECP to re-calculate RUC values every 3 to 5 years to account for variability in background groundwater quality over time. As RUC values haven't been re-calculated in recent years, RUC values will be re-calculated for the 2018 Annual Monitoring Report. This commitment is included in **Section 8.3** of the Final EA Report. • Monitoring well nest 73 was decommissioned in July 2005 and monitoring well nest 69 was decommissioned in July 2011. Both well nests were decommissioned in response to property development to the south of the SCRF. GHD recognizes that these monitoring well nests were presented on the figure illustrating the monitoring		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			• Clay liner hydraulic performance under the range of pressures associated with the range of waste depths proposed should be assessed. It is understood that it will be provided before Final Environmental Assessment Submission.	well network (Site Plan). These wells should be shown as historical/abandoned. The Site Plan will be modified accordingly. • Terrapure concurs that water quality from background/upgradient monitoring wells is appropriate for use in RUC trigger value calculations. Accordingly, Terrapure will review available monitoring wells and identify which wells are most appropriate for representing background groundwater quality for the purposes of future RUC trigger value calculations. • Compatibility testing carried out as part of the original EA indicated that the clay was mineralogical stable and that permeability was not impacted due to contact with leachate. Additional compatibility testing carried out in 2018 on samples of the liner clay and landfill leachate again indicated that the leachate did not affect the index properties of the soil, and that there was limited potential for the leachate to degrade the permeability of the liner. Results of this testing will be provided before the submission of the Final Environmental Assessment. • Both in-situ and laboratory hydraulic conductivity testing are undertaken during the construction of the clay liners. These tests have been carried out over a range of operating conditions (e.g., cell pressure, head pressure, effective consolidation pressure) that are representative of both the current and expanded landfill. Results of this testing have shown that hydraulic conductivity values below the required 5 x 10^{-8} cm/s are consistently being achieved. Results of this testing were provided to the City via email on November 23, 2019.		
			Planning and Economic Development Department, Transportation Transportation Planning would like to reiterate that they will not authorize the use of Green Mountain Road as it is not the most direct delivery Route and is not identified on the truck route map, and is therefore subject to enforcement.	As stated in the Traffic Detailed Impact Assessment Report, (Section 6.7, page 10), SCRF truck traffic will not utilize Green Mountain Road. In addition, the Environmental Compliance Approval (ECA) for the operation of the site does not permit truck use on Green Mountain Road.		
			Healthy and Safe Communities Department, Public Health Services 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 or review of the modified Human Health Risk Assessment Report (HHRA). Further, Public Health Services is requesting the inclusion of a Pest Control Plan in the Final Environmental Assessment.	The current Pest Control Plan for the SCRF building was provided to the City via email on November 23, 2019 and is included as **Vol 3. - Appendix M** of the Final EA Report. As noted in our November 30, 2018 email, there is no specific Pest Control Plan for the landfill. As part of the currently approved Environmental Compliance Approval for the SCRF, countermeasures for vectors and vermin were confirmed to be not warranted because the waste stream does not include putrescible materials and thus bird and rodent problems will not occur. Over 20 years of operations of the SCRF have confirmed that pest control for the landfill is not a concern. With this in mind, since the proposed expansion will not alter the waste steam received at the SCRF, we do not expect that one will be warranted going forward. We understand from your December 3, 2018 email, that the City of Hamilton Public Health approves the pest control plans that are currently in place for the existing structures and supports the Environmental Compliance Approval for the SCRF whereby one is not is warranted for the landfill itself.		
			Corporate Services Department, Legal Services All sections dealing with the compensation agreements (including 4-105, 5-54, 6-38, 7-16, H43, APP J-15) should be amended to explicitly confirm that the Agreements with the City of Hamilton and Heritage Green Community trust will remain in force and the obligations resulting therefrom will continue irrespective of the EA process. All references to compensation agreements should be revised to confirm the terms will be reviewed should the proposed undertaking and changes to the ECA be approved.	All references to the compensation agreements will be amended to explicitly confirm that the Agreements with the City of Hamilton and Heritage Green Community trust will remain in force irrespective of the EA Process and that the terms will be reviewed should the proposed undertaking be approved. We understand that, according to Minutes from the Planning Committee meeting on August 14th, the Terrapure Stoney Creek Regional Facility EA – Compensation Agreement was TABLED until a decision has been made by the Province respecting Terrapure's Environment Assessment process. Notwithstanding, Terrapure welcomes further discussion with the City on a Compensation Agreement. As stated in our delegation to the Planning committee on September 14, Terrapure is willing to continue the agreements with the Heritage Green Community Trust and the City of Hamilton. We have always been proud of the projects that we have been able to contribute to through the compensation program, and we look forward to continuing to support the community.		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			Planning and Economic Development Department, Economic Development Division, Real Estate Section The following comments are provided regarding the Land Use and Economic Detailed Impact Assessment Report (Draft for Discussion), prepared by GHD, dated August 31, 2018. • A Land Economist should be included on the team. • Examination of the impacts of landfill developments on property values should be completed by conducting research of similar studies in Ontario and North America. There are numerous studies available that use economic modeling and other empirical methods to analyze this impact. Include this examination including references to comparable studies in the EA. • In their response to the City dated August 3 2018, Terrapure indicated that they were collecting and reviewing historical sales records within the 1,500m study area pre- and post-1996 (when the landfill was first developed) to determine the pricing trends. This analysis has not been provided in the draft EA. • The report includes a chart showing average and median house prices in Stoney Creek from 2006 – 2016 only. This does not offer insider into whether property values in the area of the Terrapure site have been depressed since the development of the landfill. If property values in the study area were negatively impacted by the initial development of the landfill, the continuation or expansion of the landfill would likely perpetuate these depressed values. • The discussion of Assessment Factors in the draft EA report does not fully capture the potential impact on property values. • The draft EA report suggests that based on MPACs methodology, a landfill site (a type of 'abutment and proximity' variable_ is one of the 200 variables that determine only 15% of property value. It is Staff's opinion that this is not an accurate way of examining the impact of landfill sites on assessment base. • First, the number of factors that MPAC looks at does not imply that a single variable cannot have a significant impact on assessed value. Second, MPAC assigns all residential properties to market areas, which are further delineated into homogeneous neighbourhoods. Then property sales from a given neighbourhood are used to develop an adjustment for location in that neighbourhood. • If a landfill site has an impact on surrounding property values, this would be reflected in the sale prices in that neighbourhood and the location variable in MPAC's model. • The abutment and proximity variables are meant to show the impact of certain site features on properties that share a common boundary with the feature or are directly/diagonally across the street from the feature. • The abutment and proximity variables alone does not capture the potential impact of a landfill site on property values in the surrounding area. Other elements, such as increased activity/operations at the landfill (visibility), increased truck traffic on surrounding roads, and the stigma associated with landfills, may have a negative effect on property values in the neighbourhood, and this would be reflected in the sales data used my MPAC and the location variable.	As noted above, Terrapure has retained an expert land economist from an economics consulting firm to assess the impact of the SCRF on residences within the Local Study Area using the following methodology as confirmed and agreed to by City Staff in our November 23, 2018 email: • Review of the literature: RIAS Inc. will provide a brief review of recent studies estimating the impacts of commercial development, including landfill sites, on residential property values as measured in terms of both transactions prices and current value assessments (CVA). We will provide an overview of the quantitative methods employed to measure impacts on property values (predominately hedonic pricing approaches), summarize the results of recent studies, and evaluate the applicability of those results to the SCRF assessment. • Changes within the local study area pre- and post- 1996: RIAS Inc. will assess available historical data on transactions prices and CVA, pre- and post-1996. Subject to availability of price and CVA data, our assessment will examine changes in transactions prices and CVA within the local study area (1,500 metres from the SCRF site boundary) pre- and post- 1996 when the SCRF facility was initially developed • Comparison to surrounding neighborhoods: RIAS Inc will compare changes in transactions prices and CVA within the local study area to changes in surrounding, homogeneous neighborhoods outside of the local study area, for residential properties with similar characteristics (age of the property, living area, lot size, etc.) pre- and post- 1996 • Trend analysis: RIAS Inc will compare trends in transactions prices and CVA within the local study area to trends within surrounding, homogeneous neighbourhoods for residential properties with similar characteristics. The results of this assessment are included in Appendix C of the Land Use and Economic Impact Assessment Report (**Appendix J-6**) and **Section 6.2.4.1** of the Final EA Report.		
	2018-12-06	Email/ Letter	**Cambium Inc.** The author should provide a discussion of the sample analysis for optimal water content and Atterberg limits with reference to industry standards or similar studies for compact clay liners. The hydraulic conductivity analysis provided favourable results with the lean clay and sand samples having lower hydraulic conductivities than the silty clay with sand samples as would be expected. The in-situ permeameter tests were corrected for temperature in the field and provided favourable results though one location was just below the threshold for acceptable hydraulic conductivity.	In accordance with the ECA, Detailed Design Drawings and Technical Specifications are submitted to the MECP for approval prior to the construction of each Phase of the Base Liner and Leachate Collection System, including specifications for the Compacted Clay Liner (CCL). In-situ testing is carried out on the CCL to ensure that the moisture content throughout each layer of material is as uniform as practicable and controlled to within 1 percent to 3 percent wet of the optimum water content. Atterberg limit testing is also carried out to ensure that the material has a plasticity index of 30 > PI > 12. Notwithstanding this, the specifications for the CCL are primarily performance based, requiring that a re moulded permeability of 5 x 10^{-8} cm/s or less be achieved. This is verified using a combination of in situ and laboratory hydraulic conductivity testing.	2019-01-07	Email/Letter
			The Authors should provide a discussion of the corrections applied to the field permeameter testing.	Field permeameter testing of the CCL is carried out using Stage 1 of the Two-Stage Borehole Test (Boutwell and Tsai, 1992). The test methodology uses a control (i.e., a		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
				sealed permeameter) to monitor the expansion/contraction of the water due to changes in temperature and to determine a correction factor that can be applied to the test results to account for these effects.		
			The effective consolidation pressure used for the lab permeameter analyses was 18 to 25 kPa, the author should discuss the relevance of the effective consolidation pressure applied during testing to the anticipated consolidation pressures of the liner once the landfill is at capacity.	The effective consolidation pressure will increase as the load (i.e., depth and density of the overlying materials) increases. Increased consolidation reduces the void ratio of the soil and further decreases the permeability. Given that the expanded landfill could have up to 30 m of waste on top of the CCL at a density of approximately 1.7 tonnes/m^3, an effective consolidation pressure of 18 to 25 kPa represents a conservative estimate of the anticipated consolidation pressure of the CCL once the landfill is at capacity.		
			There was no leachate interaction / compatibility discussion or mineralogical assessment of the clay to identify its swelling potential, where smectite or illite clay minerals are predominant, additional conductivity analyses may be warranted using synthetic leachate. The author should discuss the clay compatibility with respect to the anticipated leachate water quality.	Testing of the compatibility of the CCL material with landfill leachate was carried out in accordance with ASTM Standard STP886. Testing was carried out using actual samples of the clay and leachate collected from the site. The Standard notes that before permeability tests are performed, the index properties of the soil should be determined by mixing the soil with water and by mixing the soil with the leachate. If the leachate does not affect the index properties of the soil, it is not likely to affect the permeability. The solubility of the soil in the leachate should also be checked if the soil is acidic or basic. Test results confirmed that the index properties of the soil were not affected by the landfill leachate, and that the leachate has a relatively neutral pH of approximately 7.5. As such, the permeability of the CCL is not expected to be affected by the landfill leachate.		
Hamilton-Wentworth Catholic District School Board (HWCDSB)	2018-10-24	Letter	We have completed additional analysis related to the Board policy eligibility distances and walking routes to the future residential parcels within the Green Mountain Road development. As a result of the analysis, we have determined that school bus transportation will continue to be required for all students from the development. Therefore, we withdraw our request that truck traffic be prohibited on First Road West. We request however, that in order to enhance road safety that First Road West be provided with a speed limit of 40 km/hr.	Terrapure takes the safety of the surrounding community seriously and agrees with your recommendation to reduce the speed on First Road West to 40 km/hr. Notwithstanding, the speed limit on First Road West is set by the City of Hamilton. With this in mind, Terrapure would be pleased to co-sign a request to the City with the HWCDSB to reduce the speed on First Road West to 40 km/hr.	2018-11-20	Email/Letter
Hamilton-Wentworth District School Board (HWDSB)	2018-11-12	Email/ Letter	HWDSB provided Terrapure a signed acknowledgment form and provided the following comments on the Draft SCRF EA: On behalf of the Facilities Management Department, comments are, and continue to be, as addressed in the Terms of Reference response – letters dated February 2017 and November 2016.	Comment noted.	2018-11-05	Email/Letter
Ministry of Natural Resources and Forestry (MNRF)	2018-10-24	Email/ Letter	The proposal would likely result in damage or destruction of habitat for Eastern Meadowlark. Although some habitat may remain on site during the operation of the landfill, this would not avoid adverse effects to the species and their habitat. Therefore, the proponent will have to determine whether they are eligible to register the activity online (i.e. they can comply with the conditions listed in the regulation). If the proponent cannot comply with the conditions, then an Overall Benefit permit may be required. For more information on determining eligibility for registering, see the following website: https://www.ontario.ca/page/bobolink-and-eastern-meadowlark-habitats-and-land-development	Thank you for your comment. 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. This is noted in **Section 9.2.3** of the EA Report.	2018-11-20	Email/Letter
Ministry of the Environment, Conservation, and Parks (MECP)	2018-10-25		**Ministry of the Environment, Conservation, and Parks (MECP) provided the following comments on the Draft SCRF EA via letter which were subsequently discussed at meetings on November 15, 22, 26, 27 and December 13, 2018.**		2018-10-25	Email
		Letter	Executive Summary A number of suggested edits, comments and questions have been raised on the draft EA documentation. It is suggested that any changes, edits or amendments to the draft documentation that may result from addressing the edits, comments and questions that have been raised should be incorporated into the Executive summary where appropriate.	Any changes, edits or amendments to the draft documentation that result from addressing the edits, comments and questions raised will be incorporated into the Executive Summary of the Final EA Report as appropriate.		
			Section 1.0 Introduction and Overview			
			a) Subsection 1.1, entitled "Introduction", provides an overview of the EA process that was carried out to seek approval under the EAA to increase the current capacity of the Stoney Creek Regional Facility. As part of this overview, it is stated that in November 2017 the Minister approved the amended Terms of Reference (ToR) for the proposed Stoney Creek Regional Facility. It should be noted that the Minister's decision to approve the amended ToR included an additional amendment, which required Terrapure to examine and evaluate the feasibility and	**Section 1.1** of the Final EA Report will clarify that the Minister's approval of the ToR included an additional amendment requiring Terrapure to examine and evaluate the feasibility and viability of implementing an onsite diversion program as part of the EA process. Further, a brief explanation of the required amendment and how it has been incorporated and addressed as part of the EA process will be provided as well.		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			viability of implementing an onsite diversion program as part of the EA process. It is suggested that consideration be given to clarifying that as part of the Minister decision to approve the amended ToR an additional amendment was imposed. It is also suggested that a brief explanation of the required amendment, and how it has been incorporated and addressed as part of the EA process, be provided.			
			b) Subsection 1.3, entitled "Site History and Operations", explains that the Stoney Creek Regional Facility operates in accordance with the requirements of its Environmental Compliance Approval (ECA) and other applicable provincial legislation. Although it is understood that the operation of the Facility is governed by the conditions of its ECA, and other applicable provincial legislation, a review of the compliance history of the Facility, including abatement and reporting records that are maintained by the Ministry, has found that there have been instances where the Facility has been in noncompliance with these conditions and requirements. It therefore may not be appropriate to state that the Facility operates in accordance with its ECA, and other applicable provincial legislation. It is suggested that consideration be given to simply stating that the operation of the Facility is governed by the conditions of its ECA and any applicable provincial legislation. In addition it is also suggested that the any applicable provincial legislation governing the operation of the Facility be cited.	**Section 1.3** of the Final EA Report will state that the operation of the Stoney Creek Regional Facility (SCRF) is governed by the conditions of its ECA and any applicable provincial legislation. In addition, any applicable provincial legislation governing the operation of the SCRF will be cited.		
			c) Subsection 1.3, entitled "Site History and Operations", explains that the Stoney Creek Regional Facility does not accept waste capable of decomposing and generating gases. As a result, the Facility has received an exemption from the requirement to have a landfill gas collection system as prescribed by Ontario Regulation 232/98, landfill Sites. Although it is understood that the Facility is currently exempted from the requirement to have a landfill gas collection system, this exemption may not extend to the proposed expansion of the Facility. It is therefore suggested that consideration be given to clarifying that should approval under the EAA be granted for the proposed expansion, Terrapure may have to re-apply for an exemption to the requirement to have a landfill gas collection system under Ontario Regulation 232/98.	**Section 1.3** of the Final EA Report will state that should approval under the EAA be granted for the proposed expansion, Terrapure may have to re-apply for an exemption to the requirement to have a landfill gas collection system under Ontario Regulation 232/98.		
			d) Subsection 1.3.1, entitled "Amendments to the SCRF ECA" explains that the ECA for the Stoney Creek Regional Facility has been amended a number of times. In addition to this, it is understood that the Facility's ECA is in the process or has been recently amended. It is suggested that consideration be given to including or making reference to the most recent amendment process; and, to including the most recent version of the ECA in the final EA.	**Section 1.3** of the Final EA Report will make reference to the most recent amendment process. Also, the most recent version of the ECA will be included as part of the Final EA Report.		
			Section 2.0 Overview of the Environmental Assessment Process and Study Organization			
			a) Subsection 2.2, entitled "Ontario Environmental Assessment Act", provides and explanation about the purpose of the EAA. It is explained that the purpose of the Act is to promote sound environmental planning through the protection, conservation, and wise management of Ontario's environment. Although the purpose of the Act is to provide for the protection, conservation, and wise management of Ontario's environment, the intent of the Act is to set forth a proponent driven planning process that incorporates the consideration of the environment into project planning and decision making. This is referred to as the EA process. The first step in the EA process is the preparation and submission of a ToR. An approved ToR serves as a framework for how a proponent will address the legislated requirements of the EAA when preparing an EA; and, sets forth how an EA will be prepared, including: presenting the problem statement; identifying the alternatives that will be evaluated; and, the public, government agency and Indigenous consultation activities that will be carried out. Once a ToR is approved, a proponent may procced with the preparation of an EA. An EA must be prepared in accordance with an approved ToR. The EA process begins with the identification of a problem or opportunity. This represents the objective of carrying out the EA process. A reasonable number of alternative ways and approaches of addressing the problem or opportunity are then identified and compared. This involves the evaluation and comparison of the potential effects, both direct and indirect, of each alternative on the environment. Under the EAA, the environment is broadly defined to include the natural, social, economic, cultural and built environments. Actions to avoid, reduce, manage or mitigate the potential environmental effects of each alternative are also identified and considered. The environmental process must clearly demonstrate how the advantages and disadvantages of each alternative, in terms of their impacts on the environment, have been identified, measured and assessed. The solution to the problem or opportunity that prompted	**Section 2.2** of the Final EA Report will be amended so that the explanation about the purpose of the EA Act aligns with the summary provided by MECP in their comment. In addition, Subsection 2.2 will clarify that the purpose of the Act is to provide for the protection, conservation, and wise management of Ontario's environment; and, that the purpose of the Act is achieved through a prescribed proponent driven planning process that incorporates the consideration of the environment into project planning and decision-making.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			the EA process is determined through a systematic evaluation of a reasonable range of alternatives. The end result is the identification of an alternative that has a preferred balance of advantages and disadvantages, which is referred to as the recommended preferred undertaking. The EA process determines, on the basis of environmental effects, an undertaking for which approval under the Act will be sought; and, how environmental effects of the undertaking can be managed. During the EA process, a proponent will consult with interested stakeholders, including government agencies, potentially affected Indigenous communities and interested members of the public. The purpose of which is to ensure that their respective legislative mandates, rights and interest are identified and considered as part of the EA planning and decision-making process. The results of consultation are to be documented in a Record of Consultation. It is therefore suggested that consideration be given to amending the explanation about the purpose of the EAA provided in the draft EA so that it aligns with the summary provided above. It should be clarified that the purpose of the Act is to provide for the protection, conservation, and wise management of Ontario's environment; and, that the purpose of the Act is achieved through a prescribed proponent driven planning process that incorporates the consideration of the environment into project planning and decision making.			
			b) Subsection 2.2, entitled "Ontario Environmental Assessment Act", explains that the draft EA has been prepared in accordance with the requirements set forth in the approved amended ToR and the requirements of the EAA. It is stated that Appendix D of the draft EA includes details about how the draft EA has fulfilled these requirements. Although it is understood that the draft EA has been prepared in accordance with the requirements set forth in the approved amended ToR and the requirements of the Act, it is the Minister that makes the determination as to whether these requirements have been fulfilled. It is suggested that consideration be given to clarifying that Appendix D of the draft EA includes an explanation about how the requirements of the approved amended ToR and Act have been addressed.	**Appendix C** of the Final EA Report will include an explanation about how the requirements of the approved amended ToR and Act have been addressed		
			c) Subsection 2.2, entitled "Ontario Environmental Assessment Act", includes a list of some of the requirements set forth in the approved amended ToR and the EAA that have been considered in preparing the draft Environmental Assessment. Although it is understood that the list does not include all the requirements that have governed the EA process and preparation of the draft EA, the list provided does not align with certain requirements set forth in the EAA. It should be noted that the Section 6.1(1) of the Act sets forth that an EA must be prepared in accordance with an approved ToR and must consist of the following: A description of the purpose of the undertaking; A description of and a statement of the rationale for the undertaking and the alternatives being considered as part of the EA process; A description of the environment that will be affected or that might reasonably be expected to be affected, directly or indirectly by the undertaking and the alternatives being considered as part of the EA process; A description of the effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking and the alternatives being considered as part of the EA process; A description of 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 and the alternatives being considered as part of the EA process; An evaluation of the advantages and disadvantages to the environment by the undertaking and the alternatives being considered as part of the EA process; and, A description of any consultation about the undertaking by the proponent and the results of the consultation. It is suggested that consideration be given to clarifying that the EAA requires that an EA must be prepared in accordance with an approved ToR; and, that an EA must consist of the contents set forth above.	**Section 2.2** of the Final EA Report will be revised to clarify that the EA Act requires that an EA must be prepared in accordance with an approved ToR; and, that an EA must consist of the contents as set out by MECP in their comment.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			d) Subsection 2.4, entitled "Organization of the EA Report", explains that the draft EA has been organized according to the Code of Practice. It should be noted that the Code of Practice does not set forth how an EA should be organized. It is suggested that consideration be given to simply stating that the draft EA has been prepared in accordance with the expectations set forth in the Codes of Practice.	**Section 2.4** of the Final EA Report will be revised to state that the Final EA Report has been prepared in accordance with the expectations set forth in the MECP's Codes of Practice.		
			Section 3.0 Purpose of and Rationale for the Undertaking			
			a) Subsection 3.1, entitled "Description of the Undertaking", explains that the undertaking proposed by Terrapure is an increase to the existing capacity of the Stoney Creek Regional Facility by 3,680,000 cubic metres (m3). It should be noted that in accordance with Section 4.2.5 of the Code of Practice, the description of the undertaking presented in an EA document represents the recommended preferred alternative that has been determined through the EA process; and, describes the solution to the problem or opportunity that prompted the EA process. The description of the undertaking is the undertaking for which approval under the EAA is being sought. The description of the undertaking should therefore include, at a minimum, a conceptual description of the undertaking for which approval is being sought. It is understood that Section 6.0 of the draft EA, entitled "Detailed Impact Assessment of the Undertaking", provides a more thorough description of the undertaking for which approval under the Act is being sought; however, the brief summary presented in Subsection 3.1 only describes the purpose of the undertaking, which is to expand the current capacity of the Stoney Creek Regional Facility by 3,680,000 m3. It is suggested that consideration also be given to providing an explanation about how through the EA process the proposed increase in capacity is to be achieved.	**Section 3.1** of the Final EA Report will be removed as Section 6.0 provides a detailed description of the undertaking.		
			b) Subsection 3.2, entitled "Purpose of the Undertaking", explains that the purpose of the undertaking is to address an economic opportunity associated with the disposal of post diversion solid, non-hazardous industrial residual materials by increasing the current capacity of the Stoney Creek Regional Facility by 3,680,000 m3. It is stated that Terrapure has determined that there is a strong market demand for residual disposal capacity for the foreseeable future, and that Terrapure wants to take advantage of the economic opportunity; however, there is no supporting documentation, reports or studies referenced to demonstrate how this was determined. It is suggested that consideration be given to citing, and including as a separate and standalone supporting document, the Terrapure Stoney Creek Regional Facility Business Case Analysis that was included in the approved amended ToR and any other relevant documentation, reports or studies.	**Section 3.2** of the Final EA Report will cite the Terrapure Stoney Creek Regional Facility Business Case Analysis that was included in the Minister Approved Amended ToR and include it as a separate, stand alone document as **Appendix E** to the Final EA Report.		
			c) Subsection 3.2, entitled "Purpose of the Undertaking", explains that Terrapure has determined that there is a strong market demand for the disposal capacity for post diversion solid, non-hazardous industrial residual materials. It is proposed that this demand represents an economic opportunity for Terrapure; and, that the opportunity can be addressed through an increase in the current capacity of the Stoney Creek Regional Facility. It is understood that this demand, and associated economic opportunity, was determined through a Business Case Analysis carried out by Terrapure in February 2017. The Business Case Analysis was used to support and justify the statement of purpose that was presented in approved amended ToR. It should be noted that in accordance with Section 4.2.1 of the Code of Practice, the statement of purpose presented in an approved ToR must be reviewed as part of EA process to confirm that it is still valid or, where appropriate, to demonstrate how it may have been refined. It is suggested that consideration be given to providing an explanation about how the conclusions of the Business Case Analysis were reviewed as part of the EA process to demonstrate that they remain valid.	**Section 3.2** of the Final EA Report will be revised to explain how the conclusions of the Business Case Analysis were reviewed as part of the EA process to demonstrate that they remain valid.		
			d) Subsection 3.2, entitled "Purpose of the Undertaking", explains that the economic opportunity that prompted the initiation of the EA process was based on a number of factors, including minimizing environmental impacts by offering a modern, engineered landfill as a local solution for waste disposal rather than exporting. Although the statement that the proposed capacity increase of the Stoney Creek Regional Facility may have the potential to minimize environmental impacts by offering a modern, engineered landfill as a local solution is not being questioned, it is not understood how this conclusion was determined. It is also not understood how minimizing the environmental impacts associated with exporting was considered as part of the economic opportunity associated with increasing the current capacity of the Facility. It is	**Section 3.2** of the Final EA Report will be revised to remove the statement that the economic opportunity was based on minimizing environmental impacts.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			suggested that consideration be given to explaining how it was determined that the proposed increase in the capacity of the Facility would minimize the impacts associated with the current waste management practices regarding the disposal of post diversion solid, non-hazardous industrial residual materials in Ontario. The explanation should identify those impacts associated with the current waste management practices and describe how they can be minimized. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates this conclusion. It is also suggested that consideration be given to explaining how it was determined that the economic opportunity associated with increasing in the current capacity of the Facility was based on minimizing environmental impacts.			
			e) Subsection 3.3, entitled "Rationale for the Undertaking", explains that the rationale for the undertaking for which approval under the EAA is being sought is that the undertaking will allow Terrapure to continue to provide disposal capacity for solid, non-hazardous industrial residual waste within the Hamilton & Greater Toronto Area; and, that the undertaking aligns with the province of Ontario's Strategy for a Waste Free Ontario: Building the Circular Economy. It should be noted that in accordance with Section 4.2.5 of the Code of Practice, the rationale for the undertaking presented in an EA document should explain why the undertaking for which approval under the Act is being sought is the most appropriate solution to the problem or opportunity that prompted the EA process. The rationale for the undertaking represents the conclusion of the EA process, and explains how the preferred undertaking for which approval under the Act is being sought was determined. It is suggested that consideration be given to providing a more reasonable explanation about how it was determined that Alternative Method No. 5, Reconfiguration and Height Increase, was determined to be the recommended preferred alternative to addressing proposed expansion to the current capacity of the Stoney Creek Regional Facility by 3,680,000 m3.	**Section 3.3** of the Final EA Report will be removed and an explanation as to why Alternative Method No. 5 was determined to be the recommended preferred alternative will be included in Section 5.		
			f) Subsection 3.3.2, entitled "Industrial Waste Diversion Rate & Disposal Capacity", explains that the proposed increase to the capacity of the Stoney Creek Regional Facility will address the need for landfill capacity in the province to accommodate solid, non-hazardous industrial residual waste disposal; and, will support the transition to zero waste by the province. Although the statement that the proposed capacity increase of the Facility will address the need for landfill disposal capacity in the province for solid, non-hazardous industrial residual waste is not being questioned, it is not understood how this conclusion was determined. It is also not understood how addressing the need for landfill disposal capacity was considered as part of the economic opportunity associated with increasing the current capacity of the Facility. It is suggested that consideration be given to explaining how it was determined that there is a need for increased disposal capacity for solid, non-hazardous industrial residual waste in Ontario; and, how the proposed increase in the capacity of the Facility will address this need. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates this conclusion. It is also suggested that consideration be given to explaining how it was determined that he economic opportunity associated with increasing in the current capacity of the Facility was based addressing the need for landfill capacity in the province to accommodate solid, non-hazardous industrial residual waste disposal and the proposed transition to zero waste by the province.	**Section 3.3.2** of the Final EA Report will be removed.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			g) Subsection 3.3.3, entitled "Historic Waste Volumes Received at the SCRF", explains that based on the historic tonnages accepted at the Stoney Creek Regional Facility, Terrapure was able to determine the amount of post-diversion solid, non-hazardous industrial residual material generated within the approved service area of the Facility. Based on the historic tonnages accepted at the facility, Terrapure was able to determine that there is a sustainable economic opportunity to continue to provide disposal capacity for post diversion solid, non-hazardous industrial residual material. Although it is understood that an evaluation of historic tonnages of wastes accepted at the Facility was considered as part of the assessment that formed the Business Case Analysis carried out by Terrapure to establish the economic opportunity associated with the proposal to increase the current capacity of the Facility, it is not understood how the assessment of historic tonnages allowed Terrapure to determine the amount of post-diversion solid, non-hazardous industrial residual material that was generated within Ontario. It is also not understood how the evaluation of historic tonnages of wastes accepted at the Facility was considered as part of the economic opportunity associated with increasing the current capacity of the Facility. It is suggested that consideration be given to clarifying how the evaluation of historic tonnages of wastes accepted at the Facility was used to determine the amount of post-diversion solid, non-hazardous industrial residual material generated within the approved service area of the Facility. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates this conclusion. It is also suggested that consideration be given to explaining how it was determined that the economic opportunity associated with increasing in the current capacity of the Facility was based on the evaluation of historic tonnages of wastes accepted at the Facility.	**Section 3.3.3** of the Final EA Report will be removed.		
			h) Subsection 3.3.4, entitled "Market & Local Business Considerations", explains that the proposed increase to the current capacity of the Stoney Creek Regional Facility will allow Terrapure to continue to provide its existing regional customer base with a local, reliable, secure and cost effective disposal alternative for post-diversion, solid non-hazardous industrial residual materials. It is also explained that should the capacity of the Facility not be increased, it is anticipated that the Facility's regional customer base will incur costs of ranging from $4.8 million to $17.5 million, per year, to dispose of their wastes at alternative landfill sites. Although the statement about the costs associated with the disposal of post-diversion, solid non-hazardous industrial residual materials by the Facility's existing regional customer base at alternative landfill sites is not being questioned, it is not understood how this conclusion was determined. It is also not understood how continuing to provide the Facility's existing regional customer base with a local, reliable, secure and cost effective disposal alternative for post-diversion, solid non-hazardous industrial residual materials was considered as part of the economic opportunity associated with increasing the current capacity of the Facility. It is suggested that consideration be given to explaining how it was determined that the Facility's regional customer base will incur costs of ranging from $4.8 million to $17.5 million, per year, to dispose of their wastes at alternative landfill sites. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates this conclusion. It is also suggested that consideration be given to explaining how it was determined that the economic opportunity associated with increasing in the current capacity of the Facility was based on continuing to provide the Facility's existing regional customer base with a local, reliable, secure and cost effective disposal alternative for post-diversion, solid non-hazardous industrial residual materials.	**Section 3.3.4** of the Final EA Report will be removed.		
			i) Subsection 3.3.5, entitled "Environmental Solution", explains that the proposed increase to the current capacity of the Stoney Creek Regional Facility will minimize the environmental impacts of Green House Gas (GHG) emissions through a reduction in the number of waste related trucks hauling material over longer distances. Although the statement that the proposed increase to the current capacity of the Facility will minimize the environmental impacts of GHG emissions by reducing transportation distances is not being questioned, it is not understood how this conclusion was determined. It is also not understood how the potential reduction in GHG emission through shorter hauling distances was considered was considered as part of the economic opportunity associated with increasing the current capacity of the Facility. It is suggested that consideration be given to explaining how it was determined that the proposed increase to the current capacity of the Facility will result in a reduction or minimization of the GHG emissions associated with the transportation of post-diversion, solid non-hazardous industrial residual materials. The explanation should include relevant supporting information,	**Section 3.3.5** of the Final EA Report will be removed.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			such as studies, models or reports, which demonstrates, confirms or validates this conclusion. It is also suggested that consideration be given to explaining how it was determined that the economic opportunity associated with increasing in the current capacity of the Facility was based on the potential reduction in GHG emission through shorter hauling distances.			
			j) Subsection 3.4, entitled "Predetermined Alternative to the Undertaking" explains that because Terrapure is successfully operating the Stoney Creek Regional Facility, and wishes to continue the operation of the Facility, the establishment of a new landfill site or an alternative form of waste disposal facility elsewhere are not feasible alternatives. It should be noted that the rationale presented in the approved amended ToR for limiting the alternatives that would be considered during the EA process is based upon the determination that, given the capitol costs associated with the development of a new landfill and the difficulties in securing an adequate or suitable site, the creation of a new landfill or alternative form of waste disposal were not found to be reasonable alternatives to address the economic opportunity of providing increased disposal capacity for post-diversion, solid non-hazardous industrial residual materials. The wishes of Terrapure to continue the operation of the Facility may not be a suitable or adequate explanation to support why Terrapure has concluded that a new landfill or alternative form of waste disposal are not reasonable alternatives for consideration as part of the EA process. It is suggested that consideration be given to providing an explanation about how it was determined that the establishment of a new landfill site or an alternative form of waste disposal facility elsewhere are not feasible alternatives that aligns with the rationale presented in the approved amended ToR.	**Section 3.2** of the Final EA Report will provide an explanation about how it was determined that the establishment of a new landfill site or an alternative form of waste disposal facility elsewhere are not feasible alternatives that aligns with the rationale presented in the Minister-approved amended Terms of Reference.		
			k) Subsection 3.4, entitled "Predetermined Alternative to the Undertaking" explains that factors influential to the Terrapure's business opportunity, such as geography, financial constraints, and a need for local, cost-effective, solid, non-hazardous waste disposal capacity, demonstrate that an EA prepared in accordance with Section 6.(2)(c) of the EAA is justified and appropriate in this case. Although it is understood that cost was a major consideration in determining how to address the economic opportunity associated with providing increased capacity for the disposal of post-diversion, solid non-hazardous industrial residual materials, it is not understood how geography and the need for local, cost-effective, solid, non-hazardous waste disposal capacity was a determining factor in the rationale which supports the preparation of an EA in accordance with Section 6.(2)(c) of the EAA. In accordance with the rationale presented in the approved amended ToR, which supports the preparation of an EA in accordance Section 6.(2)(c) of the EAA, it has been explained that as a private sector proponent with a current landfill there are a limited number of reasonable ways in which Terrapure is able to approach the economic opportunity associated with creating increased disposal capacity for post-diversion, solid non-hazardous industrial residual materials. As set forth in the approved amended ToR, the approaches that would reasonably available to Terrapure would generally include the establishment of a new landfill, the creation of an alternative form of waste disposal or the expansion of existing Stoney Creek Regional Facility. Given the capitol costs associated with the development of a new landfill or a new waste disposal alternative, and the difficulties in securing or developing a suitable site to locate a new landfill, it was determined that the creation of a new landfill or new waste disposal alternative were not a viable alternatives to address the economic opportunity of providing increased disposal capacity. Accordingly, it was determined that the most reasonable way of approaching or dealing with the economic opportunity associated with providing increased disposal capacity was to look at the various ways in which current capacity of the Facility could be increased. It is suggested consideration be given to ensuring that the rationale which supports the preparation of the EA in accordance with Section 6.(2)(c) of the EAA be consistent with that provided in the approved amended ToR.	**Section 3.2** of the Final EA Report will provide an explanation about how it was determined that the establishment of a new landfill site or an alternative form of waste disposal facility elsewhere are not feasible alternatives that aligns with the rationale presented in the Minister-approved amended Terms of Reference.		
			l) Subsection 3.5, entitled "Benefits of the Undertaking", explains that the proposed undertaking will allow Terrapure to continue to provide a local solution 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. Although the undertaking may allow Terrapure to provide a waste disposal option for generators of post-diversion, solid non-hazardous industrial residual materials, the primary benefit of the proposed undertaking is to allow Terrapure to address the economic opportunity associated with creating additional capacity for the disposal of these materials. It is suggested that consideration be given to clarifying that, in accordance with the purpose and rationale for the undertaking	**Section 3.5** of the Final EA Report will be removed. An explanation as to why Alternative Method No. 5 was determined to be the recommended preferred alternative, taking into consideration relative advantages and disadvantages, will be included in **Section 5**.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			presented in the approved amended ToR, the main benefit of the undertaking is that it will allow Terrapure to address the economic opportunity associated with creating additional capacity for the disposal of these materials. The additional benefits that have been cited may be referenced as the indirect benefits of the undertaking; however, an explanation must be provided to clarify how these benefits were determined and should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates this conclusion.			
			m) Subsection 3.5, entitled "Benefits of the Undertaking", list a number of benefits that can be achieved should the undertaking receive approval under the EAA. In particular, it has been identified that the undertaking is likely to result in eliminating the need for the creation of a new landfill for the disposal of post-diversion, solid non-hazardous industrial residual materials; result in less waste being exported to landfills in the other jurisdictions; that wastes generated from the predominant customer base in the Hamilton and Greater Toronto Area will not require additional transportation costs; and, will result in the reduction of GHG emissions associated with lengthier hauling distances. It is not understood how these benefits were determined. It is suggested that consideration be given to explaining how it was determined that these benefits that can be achieved should the undertaking receive approval under the EAA. The explanation should include all relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates these conclusions.	**Section 3.5** of the Final EA Report will be removed. An explanation as to why Alternative Method No. 5 was determined to be the recommended preferred alternative, taking into consideration relative advantages and disadvantages, will be included in **Section 5**.		
			Section 4.0 Description of the Environment Potentially Affected by the Undertaking			
			a) Section 4.3, entitled "Existing Conditions", provides a description of the EA study area for each of the components of the environment defined under the EAA. For each of the components of the environment, a list of the resources that were used to determine their description has been provided. Although it is understood that a number of resources were relied upon to gain an understanding of the environment within the EA study area, it is not clear how the studies, tests, surveys or mapping were used to determine the environment that may be potentially affected by the undertaking and alternatives being considered as part of the EA process. It should be noted, that in accordance with the expectations set forth in Section 4.2.3 of the Code of Practice, an EA document should clearly identify and include an explanation or overview of the studies, tests, surveys or mapping that were used to determine the environment that may be potentially affected by the undertaking and alternatives being considered as part of the EA process. Although the draft EA document does include a list of references that were used in developing a description of the EA study area, there is no explanation about how the studies, tests, surveys or mapping that were used. It is therefore suggested that consideration be given to ensuring that an explanation or overview is provided for each of the studies, tests, surveys or mapping that were used to describe each component of the environment setting and the rationale that supports their use. In addition, when information from the studies, tests, surveys and mapping is used to describe the EA study area environment, they studies, tests, surveys or mapping used should be cited.	An explanation about how each of the studies, tests, surveys, mapping was used is included as **Appendix G**. Where applicable, citations and references to the studies, tests, surveys or mapping used will be added to **Section 4**.		
			b) Subsection 4.3.5, entitled "Cultural Environment" provides a summary of the archaeological, cultural and heritage resources in the EA study area. There is, however, a lack of detail regarding the potential for Indigenous resources. It should be noted that a fundamental requirement under the EAA is consultation with interested persons, including consultation with First Nation and Métis communities. Consultation with Indigenous communities provides an opportunity for communities to engage in the EA planning process, exchange information and provide opinions about how an undertaking may affect their rights or interests. This includes the identification of any resources within the EA study area upon which Indigenous communities may rely or have been identified as being of significance to a community. It is suggested that consideration be given to providing an explanation about the potential for Indigenous resources in the EA study area. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates these conclusions.	**Section 4.2.5** of the Final EA Report will be revised to provide an explanation that based on the evaluation of archaeological potential and engagement with Indigenous communities, no potential Indigenous resources have been identified in the study area.		
			Section 5.0 Alternative Methods of Carrying out the Undertaking			
			a) Subsection 5.1, entitled "Alternative Methods", explains that a series of criteria and assumptions were established to guide the development of the Alternative Methods for the Stoney Creek Regional Facility. Although it is understood that the proposed criteria and assumptions were used in the development of the alternatives being considered as part of the EA process, it should be noted that the primary objective of these criteria is to aid in the	**Section 5.1** of the Final EA Report will be revised to clarify that a series of parameters and assumptions were established to guide the development of the alternative methods that would be considered as part of the EA process for increasing the current capacity of the Stoney Creek Regional Facility.		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			identification of a reasonable number of various ways in which the solution to the problem or opportunity that prompted the initiation of the EA process can be carried out. In accordance with section 4.2.2 of the Codes of Practice, a proponent will identify and describe the alternatives that will be considered as part of the EA process, and explain the rationale that supports selection of those alternatives that are to be carried forward for further consideration. The purpose of which is to ensure that the EA process is clear, logical and traceable, so that anyone with the same information could reach the same conclusion without any additional assumptions. It should be noted that as part of the EA process, alternative methods are developed to examine the various ways in which the solution to the problem or opportunity that prompted the initiation of the EA process can be implemented or carried out. It is therefore suggested that consideration be given to clarifying that a series of criteria and assumptions were established to guide the development of the alternatives methods that would be considered as part of the EA process for increasing the current capacity of the Stoney Creek Regional Facility.			
			b) Subsection 5.5.1, entitled "Geology and Hydrogeology", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives that were considered as part of the EA process as it relates to their impacts on geology and hydrology. It is explained, that as part of this process, alternatives were assessed under closure conditions. It should be noted that the comparative evaluation process undertaken for the assessment of potential impacts on geology and hydrology for each of the alternatives being considered as part of the EA process may not be consistent with the requirements of the EAA. In particular, it may not be appropriate to assess the potential effects associated with each alternative only under closure conditions. In accordance with the requirements of section 6.1(2)(c)(ii) of the EAA, an EA document is to include a description of the effects that will be caused or that might reasonably be expected to be caused to the environment by the alternatives being considered as part of the EA process. This is to include a description of the potential effects, both direct and indirect, that may result from the construction, operation and decommissioning of each alternative, on each of the components of the environment as defined under the Act. The identification and comparison of environmental effects for the entire life cycle of each alternative being considered is necessary to provide a balanced picture of their potential environmental effects as a whole. By not adequately considering all the potential effects that may result from the construction, operation and decommissioning of each alternative, it may be difficult to understand how the advantages and disadvantages of each of the alternatives being considered as part of the EA process were compared. It is therefore suggested that consideration be given to ensuring that the comparison and evaluation of each of the alternatives being considered as part of the EA process, as it relates to impacts on geology and hydrology, include the identification, assessment and comparison of all of the potential effects, both direct and indirect, that may result from their construction, operation and decommissioning.	**Section 5** of the Final EA Report will be updated to ensure that the assessment and evaluation of the alternative methods include the identification of all potential effects, both direct and indirect, that may result from their construction, operation and closure/post closure (or decommissioning). Rather than being distinct sequential phases, landfill construction and landfill operation phases are concurrent occurring over the same time period. As a result, they need to be viewed or assessed and considered as one phase. As outlined in the **Appendix J-9** (Design and Operations Impact Assessment Report) and **Appendix K** (Facility Characteristics Report) during the placing of waste material (operations) construction of the final cover and base liner system will also be taking place (construction). The Final EA Report will also be updated to reflect this so that 'construction/operation' is viewed as one phase for potential effects identification purposes. However, where applicable, effects associated with construction activities will be distinguished from effects associated with operations.		
			c) Subsection 5.5.1, entitled "Geology and Hydrogeology", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on geology and hydrology. It is explained that as part of the assessment of effects on groundwater, a leachate generation rate was estimated, using the Hydrologic Evaluation of Landfill Performance model, for each of the alternatives. The model was used to calculate daily, monthly, and annual averages for the amount of surface water runoff, evapotranspiration, drainage, and leachate collection. A reference has been made to Appendix H of the draft EA, in which a more detailed explanation of the model can be found; however, there is no reference to a supporting document in which the modelling that was completed to support the conclusions used as part of the process to identify, compare and evaluate the potential effects of each of the of alternatives being considered as part of the EA process as they relate to geology and hydrology are presented. There appears to be a lack of information to demonstrate how the conclusions of the modelling that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including geology and hydrology, is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the EAA, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include as appendices or supporting information all studies, models or reports that have been cited. Any interested person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the potential effects of each of the alternative being considered as part of the EA process, in terms of their impacts to geology and hydrology; and, that information cited, such as studies, models or reports, which demonstrates, confirms or validates how the potential effects of each of the alternatives were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.			
			d) Subsection 5.5.1, entitled "Geology and Hydrogeology", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts to geology and hydrology. It is explained that the potential effects of the alternatives being considered as part of the EA process were assessed without taking into consideration several environmental control systems that are incorporated into the current design of the Stoney Creek Regional Facility. These control systems have been identified as important aspects of the Facility's groundwater protection strategy, and have been taken into consideration as impact management measures as part of the comparison and evaluation of the effects of each of the alternatives being considered, as it relates to geology and hydrology. Although an explanation has been provided about how the environmental control systems currently in place at the Facility could affect the anticipated potential effects of each of the alternatives being considered as part of the EA process, in terms of their impact on geology and hydrology, the explanation does not appear to give consideration to any potential modifications or changes that may be required to ensure that they are able to adequately address the potential effects identified for each of the alternatives. Furthermore, the anticipated performance of the environmental control systems currently in place at the Facility to address the anticipated potential impacts to geology and hydrology from each of the alternatives being considered appears to be based solely on the performance of these control systems as they relate to the current design of the facility. It would appear that consideration has not been given assessing the performance of each environmental control system based on the potential modifications or changes that may be required as part of the construction, operation and decommissioning of each of the alternatives. It should be noted that in accordance with subsection 6.1(2)(c)(iii) of the EAA, a proponent is required to describe the actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects to the environment of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include a description about the impact management measures that will be used to reduce the negative environmental effects of each of the alternatives being considered. These impact management measures are mainly required for effects which are negative or anticipated to have a negative effect either directly or indirectly on the environment. Where measures are either unnecessary because of the nature of the effect or are not reasonably available a proponent must discuss how and why this was determined. Where a variety of impact management measures are available, the relative merits of each should be considered through the consideration of their respective costs and effectiveness, including any environmental effects to which they may themselves give rise. The effects remaining after the application of impact management measures are considered net effects. These net effects must also be described in the EA document. It is suggested that consideration be given to providing an explanation about how the potential effects of each of the alternatives being considered as part of the EA process, as they relate to	**Section 5** of the Final EA Report will explain how the potential effects of each of the alternatives being considered as part of the EA process, including those associated with geology and hydrology, will be prevented, changed, mitigated or remedied (i.e., impact management measures), as appropriate. The explanation will include relevant supporting information (e.g., studies, models or reports), which demonstrates, confirms or validates how the proposed impact management measures will achieve their intended purpose. In addition, any effects that may remain after the application of the proposed impact management measures will be clearly identified/described (i.e., net effects).		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			impacts on geology and hydrology, will be prevented, changed, mitigated or remedied. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates how the proposed actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects of each of the alternatives will achieve their intended purpose. It is also suggested that consideration be given to clearly identifying and describing any effects that may remain after the application of the proposed actions or potential actions. These are commonly referred to as net effects.			
			e) Subsection 5.5.2, entitled "Surface Water", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on surface water. It is explained that as part of the assessment of impacts on surface water, predictive modelling was performed using PCSWMM Version 7.1 with SWMM5 version 5.1.012 for the each of the alternatives being considered. The model was used to evaluate the changes to the peak flows and runoff volumes for each alternative when compared to the baseline condition. It has been noted that there is no reference to a supporting document in which the modelling that was completed to support the conclusions used as part of the process to identify, compare and evaluate the potential effects of each of the of alternatives being considered as part of the EA process in terms of their impact to surface water are presented. There appears is a lack of information to demonstrate how the conclusions of the modelling that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the Act, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include as appendices or supporting information all studies, models or reports that have been cited. Any interested person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the potential effects of each of the alternative being considered as part of the EA process, in terms of their impacts on surface water; and, that information cited, such as studies, models or reports, which demonstrates, confirms or validates how the potential effects of each of the alternatives were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including surface water, is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		
			f) Subsection 5.5.2, entitled "Surface Water", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on surface water. It is explained that the potential effects to surface water from the alternatives being considered were assessed as being uncontrolled, and that there were no measures in place to address their potential effects. It is further explained that the current Stoney Creek Regional Facility includes perimeter ditches and a storm water management pond as part of its mitigation measures to address potential impacts to surface water; and, that these mitigation measures were taken into consideration as part of the identification, comparison and evaluation of the effects of each of the alternatives being considered as it relates to their impacts on surface water. Although an explanation has been provided about how the mitigation measures currently in place at the Facility could affect the anticipated potential effects of each of the alternatives being considered as part of the EA process, in terms of their impact on surface water, the explanation does not appear to give consideration to any potential modifications or changes that may be required to each mitigation	**Section 5** of the Final EA Report will explain how the potential effects of each of the alternatives being considered as part of the EA process, including those associated with surface water, will be prevented, changed, mitigated or remedied (i.e., impact management measures), as appropriate. The explanation will include relevant supporting information (e.g., studies, models or reports), which demonstrates, confirms or validates how the proposed impact management measures will achieve their intended purpose. In addition, any effects that may remain after the application of the proposed impact management measures will be clearly identified/described (i.e., net effects).		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			measures to ensure that they are able to adequately address the potential effects identified for each alternatives. Furthermore, the anticipated performance of the mitigation measures currently in place at the Facility to address the anticipated potential impacts to surface from each of the alternatives appears to be based solely on the performance of these measures as they relate to the current design of the facility. It would appear that consideration has not been given assessing the performance of each mitigation measure based on the potential modifications or changes that may be required as part of the construction, operation and decommissioning of each of the alternatives. It should be noted that in accordance with subsection 6.1(2)(c)(iii) of the EAA, a proponent is required to describe the actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects to the environment of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include a description about the impact management measures that will be used to reduce the negative environmental effects of each of the alternatives being considered. These impact management measures are mainly required for effects which are negative or anticipated to have a negative effect either directly or indirectly on the environment. Where measures are either unnecessary because of the nature of the effect or are not reasonably available a proponent must discuss how and why this was determined. Where a variety of impact management measures are available, the relative merits of each should be considered through the consideration of their respective costs and effectiveness, including any environmental effects to which they may themselves give rise. The effects remaining after the application of impact management measures are considered net effects. These net effects must also be described in the EA document. It is suggested that consideration be given to providing an explanation about how the potential effects of each of the alternatives being considered as part of the EA process, as they relate to impacts on surface water, will be prevented, changed, mitigated or remedied. The explanation should include all relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates how the proposed actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects of each of the alternatives will achieve their intended purpose. It is also suggested that consideration be given to clearly identifying and describing any effects that may remain after the application of the proposed actions or potential actions. These are commonly referred to as net effects.			
			g) Subsection 5.5.3, entitled "Terrestrial and Aquatic (Natural) Environment", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the terrestrial and aquatic environment. It is explained that the assessment of effects on the terrestrial and aquatic environment included the predicted impacts on vegetation communities and wildlife habitat, including rare, threatened or endangered species; and, the predicted impact on aquatic habitat and aquatic biota. It has been noted that there is no reference to a supporting document in which the assessment that was completed to support the conclusions used as part of the process to identify, compare and evaluate the potential effects of each of the of alternatives being considered as part of the EA process in terms of their impact to the terrestrial and aquatic environment are presented. There appears is a lack of information to demonstrate how the conclusions of the assessment that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the EAA, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include, as appendices or supporting information, all studies, models or reports that have been cited. Any interested	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including on the terrestrial and aquatic environment, is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the potential effects of each of the alternative being considered as part of the EA process, in terms of their impacts on the terrestrial and aquatic environment; and, that information cited, such as studies, models or reports, which demonstrates, confirms or validates how the potential effects of each of the alternatives were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.			
			h) Subsection 5.5.3, entitled "Terrestrial and Aquatic (Natural) Environment", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on terrestrial and aquatic environment. It is explained that in order to address the potential effects of the alternatives being considered as part of the EA process, in terms of their impact on the terrestrial and aquatic environment, a number of impact management measures and best management practices would be employed. Although the proposed impact management measures and best management practices have been identified, the anticipated performance of these measures and practices to address the potential effects from each of the alternatives being considered in terms of their impact on the terrestrial and aquatic environment has not been identified. It would appear that consideration has not been given assessing the performance of each impact management measure and best management practice based on the potential modifications or changes that may be required as part of the construction, operation and decommissioning of each of the alternatives. It should be noted that in accordance with subsection 6.1(2)(c)(iii) of the EAA, a proponent is required to describe the actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects to the environment of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include a description about the impact management measures that will be used to reduce the negative environmental effects of each of the alternatives being considered. These impact management measures are mainly required for effects which are negative or anticipated to have a negative effect either directly or indirectly on the environment. Where measures are either unnecessary because of the nature of the effect or are not reasonably available a proponent must discuss how and why this was determined. Where a variety of impact management measures are available, the relative merits of each should be considered through the consideration of their respective costs and effectiveness, including any environmental effects to which they may themselves give rise. The effects remaining after the application of impact management measures are considered net effects. These net effects must also be described in the EA document. It is suggested that consideration be given to providing an explanation about how the potential effects of each of the alternatives being considered as part of the EA process, as they relate to impacts on the terrestrial and aquatic environment, will be prevented, changed, mitigated or remedied. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates how the proposed actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects of each of the alternatives will achieve their intended purpose. It is also suggested that consideration be given to clearly identifying and describing any effects that may remain after the application of the proposed actions or potential actions. These are commonly referred to as net effects.	**Section 5** of the Final EA Report will explain how the potential effects of each of the alternatives being considered as part of the EA process, including those associated with the terrestrial and aquatic environment, will be prevented, changed, mitigated or remedied (i.e., impact management measures), as appropriate. The explanation will include relevant supporting information (e.g., studies, models or reports), which demonstrates, confirms or validates how the proposed impact management measures will achieve their intended purpose. In addition, any effects that may remain after the application of the proposed impact management measures will be clearly identified/described (i.e., net effects).		
			i) Subsection 5.5.4, entitled "Atmospheric Environment - Air and Odour", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the atmospheric environment, with respect to air and odour. It is explained that the assessment of effects on the atmospheric environment included the predicted off-site point of impingement concentrations of particulate matter size fractions; and, the predicted off-site point of impingement concentrations of volatile organic compounds. It has been noted that there is no reference to a supporting document in which the assessment that was completed to support the conclusions used as part of the process to identify, compare and evaluate the potential effects of each of the of	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including on the atmospheric environment (i.e., air and odour), is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			alternatives being considered as part of the EA process in terms of their impact on the atmospheric environment with respect to air and odour are presented. There appears is a lack of information to demonstrate how the conclusions of the modelling that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the EAA, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include as appendices or supporting information all studies, models or reports that have been cited. Any interested person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the potential effects of each of the alternative being considered as part of the EA process in terms of their impact on the atmospheric environment with respect to air and odour; and, that information cited, such as studies, models or reports, which demonstrates, confirms or validates how the potential effects of each of the alternatives were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.			
			j) Subsection 5.5.4, entitled "Atmospheric Environment - Air and Odour", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the atmospheric environment with respect to air and odour. It is explained that in order to mitigate the potential effects of the alternatives being considered as part of the EA process on the atmospheric environment, a number of impact management measures and best management practices would be employed. Although the proposed impact management measures and best management practices have been identified, the anticipated performance of these measures and practices to address the potential effects from each of the alternatives being considered in terms of their impact on the atmospheric environment with respect to air and odour has not been identified. It would appear that consideration has not been given assessing the performance of each impact management measure and best management practice based on the potential modifications or changes that may be required as part of the construction, operation and decommissioning of each of the alternatives. It should be noted that in accordance with subsection 6.1(2)(c)(iii) of the EAA, a proponent is required to describe the actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects to the environment of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include a description about the impact management measures that will be used to reduce the negative environmental effects of each of the alternatives being considered. These impact management measures are mainly required for effects which are negative or anticipated to have a negative effect either directly or indirectly on the environment. Where measures are either unnecessary because of the nature of the effect or are not reasonably available a proponent must discuss how and why this was determined. Where a variety of impact management measures are available, the relative merits of each should be considered through the consideration of their respective costs and effectiveness, including any environmental effects to which they may themselves give rise. The effects remaining after the application of impact management measures are considered net effects. These net effects must also be described in the EA document. It is suggested that consideration be given to providing an explanation about how the potential effects of each of the alternatives being considered as part of the EA process, as they relate to	**Section 5** of the Final EA Report will explain how the potential effects of each of the alternatives being considered as part of the EA process, including those associated with the atmospheric environment (i.e., air and odour), will be prevented, changed, mitigated or remedied (i.e., impact management measures), as appropriate. The explanation will include relevant supporting information (e.g., studies, models or reports), which demonstrates, confirms or validates how the proposed impact management measures will achieve their intended purpose. In addition, any effects that may remain after the application of the proposed impact management measures will be clearly identified/described (i.e., net effects).		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			impacts on the atmospheric environment with respect to air and odour, will be prevented, changed, mitigated or remedied. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates how the proposed actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects of each of the alternatives will achieve their intended purpose. It is also suggested that consideration be given to clearly identifying and describing any effects that may remain after the application of the proposed actions or potential actions. These are commonly referred to as net effects.			
			k) Subsection 5.5.5, entitled "Atmospheric Environment - Noise", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the atmospheric environment with respect to noise. It is explained that the assessment of effects on the atmospheric environment included the predicted off-site noise levels; and, the number of off-site receptors potentially affected. It has been noted that there is no reference to a supporting document in which the assessment that was completed to support the conclusions used as part of the process to identify, compare and evaluate the potential effects of each of the of alternatives being considered as part of the EA process in terms of their impact on the atmospheric environment with respect to noise are presented. There appears is a lack of information to demonstrate how the conclusions of the modelling that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the EAA, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include as appendices or supporting information all studies, models or reports that have been cited. Any interested person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the potential effects of each of the alternative being considered as part of the EA process in terms of their impact on the atmospheric environment with respect to noise; and, that information cited, such as studies, models or reports, which demonstrates, confirms or validates how the potential effects of each of the alternatives were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including on the atmospheric environment (i.e., noise), is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		
			l) Subsection 5.5.5, entitled "Atmospheric Environment - Noise", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the atmospheric environment with respect to noise. It is explained, that as part of this process, general assumptions were made that included the selection of worst-case equipment locations based on proximity and elevated line-of-sight exposure to the off-site residential dwellings; and, the selection of the worst-case elevation based on the landfill cell development and the corresponding topography detail. It should be noted that the comparative evaluation process undertaken for the assessment of potential impacts on the atmospheric environment, with respect to noise, for each of the alternatives being considered as part of the EA process may not be consistent with the requirements of the EAA. In particular, it may not be appropriate to assess the potential effects associated with each alternative based on effects that may not be considered reasonable. In accordance with the requirements of section 6.1(2)(c)(ii) of the EAA, an EA document is to include a description of the effects that will be caused or that might reasonably be expected to	**Section 5** of the Final EA Report will be updated to ensure that the assessment and evaluation of the alternative methods include the identification of all potential effects, both direct and indirect, that may result from their construction, operation and closure/post closure (or decommissioning). Rather than being distinct sequential phases, landfill construction and landfill operation phases are concurrent occurring over the same time period. As a result, they need to be viewed or assessed and considered as one phase. As outlined in the Appendix J (Design and Operations Report) and Appendix I (Facility Characteristics Report) during the placing of waste material (operations) construction of the final cover and base liner system will also be taking place (construction). The Final EA Report will also be updated to reflect this so that 'construction/operation' is viewed as one phase for potential effects identification purposes.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			be caused to the environment by the alternatives being considered as part of the EA process. This is to include a description of the potential effects, both direct and indirect, that may result from the construction, operation and decommissioning of each alternative being considered, on each of the components of the environment as defined under the Act. The identification and comparison of environmental effects for the entire life cycle of each alternative being considered is necessary to provide a balanced picture of their potential environmental effects as a whole. By not adequately considering all the potential effects that may reasonably result from the construction, operation and decommissioning of each alternative, it may be difficult to understand how the advantages and disadvantages of each of the alternatives being considered as part of the EA process were compared. It is therefore suggested that consideration be given to ensuring that the comparison and evaluation of the potential effects of each of the alternative being considered as part of the EA process on the atmospheric environment, with respect to noise, include the identification, assessment and comparison of all of the potential effects, both direct and indirect, that are likely to reasonably result from their construction, operation and decommissioning.			
			m) Subsection 5.5.5, entitled "Atmospheric Environment - Noise", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the atmospheric environment with respect to noise. It is explained that in order to mitigate the potential effects of the alternatives being considered as part of the EA process on the atmospheric environment, a number of impact management measures a would be employed. These include the construction of the north property line berm at an appropriate height to block the line of sight to the residential areas to the north; and, that the required that the required height of the berm be between 7 and 10 metres (m) above the base landfill elevations. Although the proposed impact management measures have been identified, the anticipated performance of these measures to address the potential effects from each of the alternatives being in terms of their impact on the atmospheric environment, with respect to noise, has not been identified. It would appear that consideration has not been given assessing the performance of each impact management measure based on the potential modifications or changes that may be required as part of the construction, operation and decommissioning of each of the alternatives. It should be noted that in accordance with subsection 6.1(2)(c)(iii) of the EAA, a proponent is required to describe the actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects to the environment of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include a description about the impact management measures that will be used to reduce the negative environmental effects of each of the alternatives being considered. These impact management measures are mainly required for effects which are negative or anticipated to have a negative effect either directly or indirectly on the environment. Where measures are either unnecessary because of the nature of the effect or are not reasonably available a proponent must discuss how and why this was determined. Where a variety of impact management measures are available, the relative merits of each should be considered through the consideration of their respective costs and effectiveness, including any environmental effects to which they may themselves give rise. The effects remaining after the application of impact management measures are considered net effects. These net effects must also be described in the EA document. It is suggested that consideration be given to providing an explanation about how the potential effects of each of the alternatives being considered as part of the EA process, as they relate to impacts on the atmospheric environment with respect to noise, will be prevented, changed, mitigated or remedied. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates how the proposed actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects of each of the alternatives will achieve their intended purpose. It is also suggested that consideration be given to clearly identifying and describing any effects that may remain after the application of the proposed actions or potential actions. These are commonly referred to as net effects.	**Section 5** of the Final EA Report will explain how the potential effects of each of the alternatives being considered as part of the EA process, including those associated with the atmospheric environment (i.e., noise), will be prevented, changed, mitigated or remedied (i.e., impact management measures), as appropriate. The explanation will include relevant supporting information (e.g., studies, models or reports), which demonstrates, confirms or validates how the proposed impact management measures will achieve their intended purpose. In addition, any effects that may remain after the application of the proposed impact management measures will be clearly identified/described (i.e., net effects).		
			n) Subsection 5.7.2, entitled "Human Health", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on human health. It is explained that the	**Section 5.4** of the Final EA Report will cite the most recent annual Community Health Assessment Review and include it as a separate and standalone supporting document (Appendix F of the Alternative Methods Report (**Appendix I**). In addition, **Section 5.4**		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			potential effects of the alternatives being considered as part of the EA process were assessed using existing data and a methodology established as part of the on-going Community Health Assessment Review. It has been noted that there is no reference to an appendix or supporting document in which the Community Health Assessment Review can be found. As a result, there is a lack of information about the data and methodology used as part of the assessment of the potential effects on human health from each of the alternatives being considered. It is suggested that consideration be given to citing, and including as a separate and standalone supporting document, the most recent annual Community Health Assessment Review.	will be revised to include information on how the Community Health Assessment Review workplan was developed and consulted on.		
			o) Subsection 5.7.2, entitled "Human Health", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on human health. It is explained that as part of the assessment of the potential effects on human health, five indicators based on effects to air, leachate quality, ground water quality, surface water quality and soil quality for each of the alternatives being considered were evaluated. It has been noted that there is no reference to a supporting document in which the assessment that was completed to support the conclusions used as part of the process to identify, compare and evaluate the potential effects of each of the of alternatives being considered as part of the EA process in terms of their impact to human health are presented. There appears to be is a lack of supporting information to demonstrate how the conclusions of the assessment that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the EAA, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include as appendices or supporting information all studies, models or reports that have been cited. Any interested person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the potential effects of each of the alternatives being considered as part of the EA process, in terms of their impacts on human health; and, that information cited, such as studies, models or reports, which demonstrates, confirms or validates how the potential effects of each of the alternatives were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including human health, is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		
			p) Subsection 5.7.2, entitled "Human Health", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on human health. It is explained that in order to mitigate the potential effects of the alternatives being considered as part of the EA process on human health, a number of recommended impact management measures have been proposed. Although the proposed impact management measures have been identified, the anticipated performance of these measures, to address the potential effects from each of the alternatives in terms of their impact on human health, have not been identified. It would appear that consideration has not been given assessing the performance of the proposed impact management measures as they relate to the anticipated potential effects to human health from each of the alternatives being considered as part of the EA process. It should be noted that in accordance with subsection 6.1(2)(c)(iii) of the EAA, a proponent is required to describe the actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects to the environment of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4	**Section 5** of the Final EA Report will explain how the potential effects of each of the alternatives being considered as part of the EA process, including those associated with human health, will be prevented, changed, mitigated or remedied (i.e., impact management measures), as appropriate. The explanation will include relevant supporting information (e.g., studies, models or reports), which demonstrates, confirms or validates how the proposed impact management measures will achieve their intended purpose. In addition, any effects that may remain after the application of the proposed impact management measures will be clearly identified/described (i.e., net effects).		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			of the Codes of Practice, this should include a description about the impact management measures that will be used to reduce the negative environmental effects of each of the alternatives being considered. These impact management measures are mainly required for effects which are negative or anticipated to have a negative effect either directly or indirectly on the environment. Where measures are either unnecessary because of the nature of the effect or are not reasonably available a proponent must discuss how and why this was determined. Where a variety of impact management measures are available, the relative merits of each should be considered through the consideration of their respective costs and effectiveness, including any environmental effects to which they may themselves give rise. The effects remaining after the application of impact management measures are considered net effects. These net effects must also be described in the EA document. It is suggested that consideration be given to providing an explanation about how the potential effects of each of the alternatives being considered as part of the EA process, as they relate to impacts on human health, will be prevented, changed, mitigated or remedied. The explanation should include relevant supporting information, such as studies, models or reports, which demonstrates, confirms or validates how the proposed actions or potential actions that may be necessary to prevent, change, mitigate or remedy the effects or the potential effects of each of the alternatives will achieve their intended purpose. It is also suggested that consideration be given to clearly identifying and describing any effects that may remain after the application of the proposed actions or potential actions. These are commonly referred to as net effects.			
			q) Subsection 5.8, entitled "Economic Environment", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the economic environment. It is explained that as part of the assessment of the potential effects on the economic environment, the conclusions of an economic impact assessment were used. It has been noted that there is no reference to a supporting document in which the assessment that was completed to support the conclusions used as part of the process to identify, compare and evaluate the potential effects of each of the of alternatives being considered as part of the EA process in terms of their impact to the economic environment are presented. There appears to be is a lack of supporting information to demonstrate how the conclusions of the assessment that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the EAA, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include as appendices or supporting information all studies, models or reports that have been cited. Any interested person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the potential effects of each of the alternatives being considered as part of the EA process, in terms of their impacts on the economic environment; and, that information cited, such as studies, models or reports, which demonstrates, confirms or validates how the potential effects of each of the alternatives were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including the economic environment, is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		
			r) Subsection 5.9, entitled "Cultural Environment", provides a summary of the assessment undertaken as part of the comparison and evaluation of the alternatives being considered as part of the EA process as it relates to their impacts on the cultural environment. It is explained that as part of the assessment of effects on the cultural environment, the potential impacts of	**Section 5.4** of the Final EA Report will be revised to include an assessment of the potential effects of each alternative on Indigenous resources in the EA study area. Since, as noted in the response to Comment 4 b) above, no potential Indigenous		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			the alternatives on the archaeological, cultural and heritage resources in the EA study area were assessed. It should be noted that a fundamental requirement under the EAA is consultation with interested persons, including consultation with First Nation and Métis communities. Consultation with Indigenous communities provides an opportunity for communities to engage in the EA planning process, exchange information and provide opinions about how an undertaking may affect their rights or interests. This includes the identification of any resources within the EA study area upon which Indigenous communities may rely or that are identified as being of significance to a community. It is therefore suggested that consideration be given to ensuring that the assessment of the potential effects of each of the alternative being considered as part of the EA process on the cultural environment include the identification, assessment and comparison of potential effects on any Indigenous resources in the EA study area.	resources were identified in the study area, none of the Alternatives are anticipated to affect potential Indigenous resources.		
			s) Subsection 5.10, entitled "Design and Operations", provides a summary of the assessment undertaken as part of review of the anticipated changes to the design and operational requirements of the current Stoney Creek Regional Facility that are associated with implementation of each of the alternatives being considered as part of the EA process. It has been noted that there is no reference to a supporting document in which the assessment that was completed to support the conclusions used as part of the process to identify the anticipated changes to the design and operational requirements that may result from the implementation of each alternative being considered are presented. There appears to be is a lack of supporting information to demonstrate how the conclusions of the assessment that was undertaken for each alternative being considered were determined. In accordance with the requirements of subsection 6.1(2)(d) of the EAA, an EA document must consist of an evaluation of the advantages and disadvantages to the environment of each of the alternatives being considered as part of the EA process. As per the expectations set forth in Section 4.2.4 of the Codes of Practice, this should include an explanation about how the potential positive and negative effects, both direct and indirect, of each alternative on the environment, as defined under the EAA, were identified, compared and evaluated. An EA document must clearly explain the environmental planning and decision making process that was followed to determine the advantages and disadvantages of each of the alternatives being considered. The explanation should include reference to all relevant supporting information, such as studies, models or reports, which demonstrate how the conclusions that support how the potential positive and negative effects, both direct and indirect, for each alternative were identified, compared and evaluated. An EA document should also include as appendices or supporting information all studies, models or reports that have been cited. Any interested person reading an EA document should be able to follow the process used by the proponent in determining how the potential effects of each alternative being considered as part of the EA process were identified, compared and evaluated. It is suggested that consideration be given to citing all relevant information that was used to identify, compare and evaluate the anticipated changes to the design and operational requirements of the Stoney Creek regional Facility that may be required to implement each of the alternative being considered; and, that the information cited, such as studies, models or reports, which demonstrates, confirms or validates how the anticipated changes and operational requirements were identified, compared and evaluated be included as part of the draft EA documentation as separate and standalone supporting documents or appendices.	**Section 5** of the Final EA Report will be updated so that the relevant information used to identify the potential effects of each of the alternatives being considered as part of the EA process, including design and operations, is cited (i.e., studies, models or reports) for demonstration, confirmation, or validation purposes. The relevant information will be included as part of the Final EA Report as separate and standalone supporting documents or appendices.		
			Section 6.0 – Detailed Impact Assessment of the Undertaking			
			a) Subsection 6.2.5, entitled "Cultural Environment", provides a summary of the assessment undertaken on the potential impacts to the cultural environment from the construction, operation and decommissioning of the undertaking for which approval under the EAA is being sought. This includes an assessment of the potential impacts of the undertaking on the archaeological, cultural and heritage resources within the EA study area. It should be noted that a fundamental requirement under the EAA is consultation with interested persons, including consultation with First Nation and Métis communities. Consultation with Indigenous communities provides an opportunity for communities to engage in the EA planning process, exchange information and provide opinions about how an undertaking may affect their rights or interests. This includes the identification of any resources within the EA study area upon which Indigenous communities may rely or that are identified as being of significance to a community. It is therefore suggested	**Section 6.2.5** of the Final EA Report will be revised to include an assessment of the potential effects of the undertaking on Indigenous resources in the EA study area. Since, as noted in the response to Comment 4 b) above, no potential Indigenous resources were identified in the study area, the undertaking is not anticipated to affect potential Indigenous resources.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			that consideration be given to ensuring that the assessment of the potential impacts on the cultural environment from undertaking for which approval under the EAA is being sought include the identification, assessment and comparison of potential effects on Indigenous resources in the EA study area.			
			Subsection 6.6, entitled "Closure and Post-Closure Planning", explains that as part of the EA process the potential effects from a construction, operation and closure of the undertaking for which approval under the EAA is being sought were reviewed. This included the identification of a range of years in which each of these phases is likely to occur. For the closure phase, it has been identified that decommissioning will occur based upon a future determination that there is no longer an economic opportunity to remain in operation; or, upon the determination that no additional capacity can be accommodated. At such time, the decommissioning of the undertaking will take place in accordance with Ontario Regulation 232/98. It should be noted that the detailed description and assessment of the undertaking for which approval under the EAA is being sought may not be consistent with the requirements of the Act. In particular, it may not be appropriate to defer the description and assessment of the decommissioning phase of the recommended preferred undertaking until a later time. In accordance with the requirements of section 6.1(2)(c)(ii) of the EAA, an EA document is to include a description of the effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking for which approval under the Act is being sought. This is to include a description of the potential effects, both direct and indirect, that may result from the construction, operation and decommissioning of the undertaking on each of the components of the environment as defined under the Act. As per the expectations set forth in Section 4.2.5 of the Codes of Practice, the description must cover the entire life cycle of the undertaking; and, include sufficient information for the Minster to fully understand the undertaking for which approval is being sought. It is suggested that consideration be given to ensuring that the description and assessment of the undertaking for which approval under the EAA is being sought include, at a minimum, a conceptual description and assessment about the decommissioning of the undertaking.	Under *Ontario Regulation 232/98: Landfilling Sites*, the owner/operator of the landfilling site must provide a written report (Closure Report) on activities for the closure (i.e. decommissioning) of the site and the proposed end use of the site. The Closure Report must be provided no later than the date 90 percent of the total waste disposal volume is reached or two years before the anticipated date of closure, whichever comes first. Further, under the site's Certificate of Approval, Terrapure is required to submit a complete plan for closure, post-closure, long term maintenance, monitoring, and after-use of the site, including all buffer and landfilled areas. The final plan will include the following; • Final site contours and drainage plans; • Operation plans up to site closure; • Details on final grading, cover methods and source of cover materials; • Vegetative cover, landscaping plans • Operation of leachate and gas control; • Long-term groundwater and surface water monitoring; • Proposed maintenance schedules; • Anticipated costs of closure plan (operating/capital); • Updated contingency plans for ground water, surface water and gas; and, • Post-closure ownership of the site. The ECA also requires that the Closure Plan be design in consultation with the Community Liaison Committee (CLC), the City and the Hamilton Region Conservation Authority prior to being submitted. **Section 6.6** of the Final EA Report will be revised to include the above information and will include a conceptual description based on the land use controls currently in place.		
			Section 7.0 Public and Agency Consultation			
			a) Subsection 7.4.1, entitled "Agencies Consulted", lists the government agencies that were engaged and consulted with during the EA process. Although the government agencies have been identified, there is a lack of detail about why each government agency was engaged as part of the EA process. In accordance with the expectations set forth in Section 2.1 of the Code of Practice, a proponent who initiates an undertaking that is subject to the requirements of the EAA is responsible for determining those government agencies, Indigenous communities and members of the public that may be affected or may have an interest in a proposed undertaking. Proponents are responsible for identifying, engaging and providing information to any relevant government agencies, Indigenous communities and members of the public that may reasonably be expected to be potentially affected, directly or indirectly, by a proposed undertaking and the alternatives being considered as part of an EA process. The purpose of which is to confirm whether a particular jurisdictional mandate, Indigenous right or stakeholder interest may be affected; and, to determine how a potentially affected jurisdictional mandate, Indigenous right or stakeholder interest should be considered and addressed during the EA process. By not adequately explaining why each government agency, Indigenous community or member of the public was engaged as part of the EA process or how a potentially affected jurisdictional mandate, right or interest was confirmed, considered and addressed during the EA process, it is difficult to understand if their respective jurisdictional mandates, rights or interests have been accurately identified for consideration as part of an EA process. It is suggested that consideration be given to providing an explanation about why each government agency identified was engaged as part of the EA process. This should include, but not be limited to, identifying the legislative mandates, permitting or approval requirements or	**Section 7.4.1** of the Final EA Report will explain why each identified government agency was engaged as part of the EA process including, but not be limited to, Identifying the legislative mandates, permitting or approval requirements or interests that prompted the initial engagement with each of the government agencies Describing how any potentially affected legislative mandates, permitting or approval requirements or interests were confirmed, considered and addressed during the EA process		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			interests that prompted the initial engagement with each of the government agencies identified. It is also suggested that an explanation be provided to describe how any potentially affected legislative mandates, permitting or approval requirements or interests were confirmed, considered and addressed during the EA process.			
			b) Subsection 7.5.1, entitled "Indigenous Communities Consulted", lists the Indigenous communities that were engaged and consulted with during the EA process. Although the Indigenous communities have been identified, there is a lack of detail about why each community was engaged as part of the EA process. In accordance with the expectations set forth in Section 2.1 of the Code of Practice, a proponent who initiates an undertaking that is subject to the requirements of the EAA is responsible for determining those government agencies, Indigenous communities and members of the public that may be affected or may have an interest in a proposed undertaking. Proponents are responsible for identifying, engaging and providing information to any relevant government agencies, Indigenous communities and members of the public that may reasonably be expected to be potentially affected, directly or indirectly, by a proposed undertaking and the alternatives being considered as part of an EA process. The purpose of which is to confirm whether a particular jurisdictional mandate, Indigenous right or stakeholder interest may be affected; and, to determine how a potentially affected jurisdictional mandate, Indigenous right or stakeholder interest should be considered and addressed during the EA process. By not adequately explaining why each government agency, Indigenous community or member of the public was engaged as part of the EA process or how a potentially affected jurisdictional mandate, right or interest was confirmed, considered and addressed during the EA process, it is difficult to understand if their respective jurisdictional mandates, rights or interests have been accurately identified for consideration as part of an EA process It is suggested that consideration be given to providing an explanation about why each Indigenous community identified was engaged as part of the EA process. This should include, but not be limited to, identifying the Indigenous rights, asserted rights or interests that prompted the initial engagement with each of the communities identified. It is also suggested that an explanation be provided to describe how any potentially affected Indigenous rights, asserted rights or interests were confirmed, considered and addressed during the EA process.	**Subsection 7.5.1** of the Final EA Report will be revised to explain why each Indigenous community identified was engaged as part of the EA process including, but not be limited to, • Identifying the Indigenous rights, asserted rights or interests that prompted the initial engagement with each of the communities identified • Describing how any potentially affected Indigenous rights, asserted rights or interests were confirmed, considered and addressed during the EA process		
			c) Subsection 7.5.6, entitled "Consideration of Comments Received and Issues Raised", provides a summary of the key comments submitted by Indigenous communities during the EA process and an explanation about how they have been considered. As the consultation process for the EA process is still ongoing, and because there is no information about whether Indigenous communities are satisfied about how their comments have been summarized and considered as part of the EA process, no comments have been provided at this time. A full review of this subsection will be undertaken when the EA is formally submitted.	Comment noted.		
			d) Subsection 7.6.7, entitled "Consideration of Comments Received and Issues Raised", provides a summary of the key comments submitted by members of the public during the EA process and an explanation about how they have been considered. As the consultation process for the EA process is still ongoing, and because there is no information about whether members of the public are satisfied about how their comments have been summarized and considered as part of the EA process, no comments have been provided at this time. A full review of this subsection will be undertaken when the EA is formally submitted.	Comment noted.		
			Section 10.0 Amending the EA			
			Subsection 10.1, entitled "Amending the EA", outlines that process that is to be undertaken should it be determined that a change to the undertaking after the completion of the EA process be required, should approval under the EAA be granted. Two amendment processes have been identified, one for minor changes and the another for major changes. It should be noted that the proposed approach to addressing a change to the undertaking after receiving approval under the EAA may not be consistent with the requirements Act. In accordance with the requirements of section 12 of the EAA, if a proponent wishes to change an undertaking after receiving approval to proceed with it, the proposed change to the undertaking shall be deemed to be a new undertaking for the purposes of the Act. In addition, Section 9.2 of the Code of Practice explains that if a proponent wishes to make changes to an undertaking after it has received approval to proceed, the proposed change will be considered a new undertaking for	**Section 10** has been removed from the Final EA Report.		

Table 7.7 Review Agency Comments on SCRF Draft EA and Considerations by Terrapure

Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			the purposes of the Act unless such change has been accounted for in the EA or through a condition of approval. It is suggested that consideration be given to clarifying that any change to the proposed undertaking described in the draft EA will have to be considered in the context of the Act, and any legislative requirements under the Act, before any change to the undertaking can be implemented; and, that any proposed change to the undertaking shall be deemed to be a new undertaking for the purposes of the Act unless such change has been accounted for in the EA or through a condition of approval			
			Appendix A: West Central Region's Technical Support Review			
			Surface Water			
			a) Section 6.2.1.2 provided the results of modelling of the 2 year and 100 year storm events for the current approved site (baseline) and the Preferred Landfill Footprint and the proposed preliminary stormwater management measures for quality and quantity control which is acceptable for the Environmental Assessment process. For any future stormwater related amendment to Environmental Compliance Approval No. A181008 and/or Industrial Sewage Certificate of Approval No. 5400-7DSSHU, the stormwater management assessment should assess a variety of events from the 2 year to 100 year storm events for pre-landfill and Preferred Landfill Footprint in accordance with the Ministry document "Stormwater Management Planning and Design Manual, March 2003".	For any future stormwater-related amendment to Environmental Compliance Approval No. A181008 and/or Industrial Sewage Certificate of Approval No. 5400-7DSSHU, Terrapure will include an assessment of a variety of events from the 2 year to 100 year storm events for pre-landfill and Preferred Landfill Footprint in accordance with the Ministry document "Stormwater Management Planning and Design Manual, March 2003". This will be included in **Section 9.2**.		
			Section 9.2.2 identified that Environmental Compliance Approval No. A181008 would need to be amended for changes to the stormwater management system. It should also be identified that Industrial Sewage Certificate of Approval No. 5400-7DSSHU will also need to be amended	**Section 9.2** of the Final EA Report will be updated to include the fact that the Industrial Sewage Certificate of Approval No. 5400-7DSSHU may need to be amended.		
			We conclude that surface water impacts have been successfully addressed for the purpose of meeting the requirements of the environmental assessment. An opportunity for further technical review will be available when applications are made to amend existing servicing approvals.	Comment noted.		
			Groundwater			
			Section 4.2 Source Water Protection: The final report should include a figure to show the location of the study area with respect to the Hamilton Source Water Protection mapping	A figure showing the location of the Study Area with respect to the Hamilton Source Water Protection Area will be included in the Final Geology and Hydrogeology Detailed Impact Assessment Report.		
			Section 5 Geology and Hydrogeology Net Effect: The final report should provide information on the method of construction of the proposed expansion and all other related activities and assess the potential impact on groundwater flow within the study area.	Sections 1.2. 1.3, and 3.0 of the Draft Geology and Hydrogeology Detailed Impact Assessment Report briefly describes the Preferred Landfill Footprint with further details including construction and other related activities provided in the Facilities Characteristics Report (**Appendix K**). With this information in mind, Section 5 identifies the predicted effects to groundwater quality and groundwater flow from the Preferred Landfill Footprint within the Study Area.		
			Section 5.1 Potential Effects on Geology and Hydrogeology, Tables 5.1 and 5.2: Under the column labeled Active Landfilling Area, how were the active areas are calculated? How was a leachate leakage rate of 4,870 m3/yr predicted	The Active Landfilling Areas presented in Table 5.1 were derived from the "Active Landfilling Areas" associated with each of the 4 phases of progressive landfill development as calculated and presented in the in the Facilities Characteristics Report (**Appendix K**). The Design & Operations Detailed Impact Assessment Report (**Appendix J-9**) provides various Phasing Figures that present the configuration of the landfill under the development phases, including the "Active Landfilling Area". A description of the basis for the calculated leachate leakage rate of 4,870 m^3/yr (preferred alternative) is provided in Appendix B of the Design & Operations Detailed Impact Assessment Report. Appendix B attachments B-1 and B-2 provide the details of calculations used to estimate leachate leakage under closure scenarios for both the existing approval (B-1) and the preferred alternative (B-2).		
			Section 5.1.3 Effects on Downgradient Water Quality,Table 5.3: Why was median concentration used rather than mean? Please provide justification for use of median concentration. What are the numbers under the column labeled "Predicted Downgradient Concentrations"? Are they the predicted concentrations or leachate generation rates?	Median concentrations were used, as opposed to mean concentrations, as median values are more representative of typical values within a dataset where outliers might greatly affect calculated mean or average values. Mean or average values are appropriate for use in large datasets with normal distributions, however in smaller datasets with higher variability, median values more often provide better representation of "typical" values. The numbers under the column "Predicted Downgradient Concentrations" in Table 5.3 are predicted downgradient concentrations. It is recognized that the header included in		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
				this table is a source of confusion. The table header will be clarified for the Final Geology and Hydrogeology Detailed Impact Assessment Report.		
			Section 5.3 Proposed Mitigation Measures: The proposed mitigation measures include continued maintenance and operation of Groundwater Extraction Well M4, Groundwater Collection Trench Network and the Hydraulic Control Layer. With the final layout of the preferred landfill footprint shown in Figure 1.1, it is not clear as to how Extraction Well M4 will be maintained.	Groundwater extraction well M4 will be maintained by extending it to the final surface of the landfill throughout landfill development and after final closure. This approach is consistent with the approach approved as part of the original Design and Operations Report (1995).		
			Section 7.1.1 Environmental Effects Monitoring: The proposed monitoring network as defined in Table 7.1 should be expanded to include all private wells located within the study area and any newly installed monitors.	A survey of surrounding properties downgradient of the SCRF will be undertaken in order to identify private wells providing drinking water, and these wells will be included in the groundwater monitoring program, as applicable. Private wells located downgradient of the SCRF will be included in the monitoring program if permission is granted by the property owners or tenants. A commitment to complete this survey will be included in **Section 8.1.1** of the Final EA Report.		
			Air Quality			
			Given local meteorological conditions, on-site monitoring was appropriately located based on the site residual material fill areas at the time of commissioning of the monitoring station. With the proposed preferred landfill footprint extending its horizontal limits to the north of the site property during Phases 3 and 4, the on-site monitoring station would no longer be in an ideal location based on predominant meteorological conditions within this area. It is acknowledged in Section 5.1 of the Air Quality and Odour Detailed Impact Assessment Report that the MECP Point of Impingement criteria for Suspended Particulate Matter (SPM) may be exceeded when operating near the property boundary. Accordingly, Terrapure should expect that MECP may request additional monitoring to be performed at a more suitable location(s) if off-site SPM becomes a concern to nearby receptors. Table 4.5 in the draft EA report summarizes regional particulate matter having a diameter of 2.5 micrometers (PM2.5) and the rationale for choosing the appropriate station for assessing baseline concentrations at the SCRF site. Current annual averages in regional PM2.5 National Air Pollution Surveillance stations are below the Canadian Ambient Air Quality Standard (CAAQS) for PM2.5. In 2020, CAAQS for PM2.5 will be more stringent and Table 5.2 in the Detailed Impact Assessment Report summarizes assessed cumulative effects indicating potential exceedances of these standards. Due to the growing focus on PM2.5 in ambient air and the proximity of the SCRF to neighbouring residential receptors, consideration may be given to additional monitoring for PM2.5.	Terrapure is aware that the MECP may request additional monitoring to be performed at a more suitable location(s) if off-site SPM becomes a concern to nearby receptors. Terrapure is aware that additional monitoring may also be required beyond 2020 for PM2.5.		
			Land Use Compatibility			
			In our comments on the 2016 draft Terms of Reference, we noted that the obvious impact that will result to neighbouring residents may be is the visual impact associated (real and/or perceived) with the alternatives that include vertical expansion. While the revised document also states that the existing berms and other visual screening will continue being maintained, this will not mitigate the height increase that may result. We previously suggested that in order to assist the public's understanding of this particular impact and facilitate a more realistic comparison of the alternatives, Terrapure could consider including simulations of the alternatives to show the final visual impact of each. Visual simulations have been done quite successfully for other landfill expansion EAs and for Renewable Energy Approvals for wind turbine installations. Evidence of the merit of conducting this kind of visual simulation can be taken from section 9.12 of the revised document, where stakeholder concern with the "Visual impacts – height of the proposed reconfiguration, visibility from the surrounding community, and requirements for additional berms and/or fences" has been stated. In their November 2016 response back to the ministry, Terrapure indicated that it would "consider" the use of visual simulations to better depict the visual impacts of each of the alternatives. Table 6.35 suggests that "relative to the existing conditions, the changes are minimal" and that "installation of visual screening elements will sufficiently obscure a majority of views…." except for residents adjacent to the site along Green Mountain Road to the north and Mud Street to the	A brief written description of the proposed mitigation measures is included in **Sections 6.2.2.1** and **6.7** of the Final EA Report. **Table 8.3** of the Final EA Report will be updated to include a commitment with regards to the proposed visual mitigation measures.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			south. To substantiate this statement, we note that Volume 2, Appendix H provides photographic images of all the alternative configurations taken from 9 locations surrounding the subject area. Also included are photographic images to show the proposed mitigation measures that are proposed to address the visual impacts for Preferred Option 5. While these photographic images are effective, a brief written description of the proposed mitigation measures would add to the reader's understanding of what is intended. Table 8.3 however, does not contain any commitments that speak to the visual impacts that the preferred alternative will create. A commitment to maintain buffers and adhere to its operating plan, best management practices and conditions within the existing ministry approval are for the purpose of mitigating nuisance type impacts. Inclusion of the proposed visual mitigation measures as commitments appears to be missing.			
			Appendix B: Environmental Approvals Services Section, Senior Review Engineer			
			I agree that the preferred alternative is able to be implemented and that compliance with Ontario Regulation 232 (Landfill Standards) can be demonstrated during the technical of the Environmental Compliance approval. The design of the proposed expansion will use the same design as the existing site, which has performed well.	Comment noted.		
			Section 6.1.14 Groundwater Management (Pg 24): The consultant indicates that two methods of estimating the contaminating lifespan of the expanded landfill site were used and both predicted that it would be between 25-50 years which is significantly lower than original estimate (1996) of between 200-300 years. Given that the design of the expanded site is essentially identical to the existing design and 3.68 million m3 of amount of waste is being added, it is difficult to accept, without additional justification, that the contaminating lifespan can be reduced by such a significant amount. Additionally, the calculations were performed for two parameters (chloride and cadmium) with cadmium replacing fluoride as a contaminant of concern. Consideration should be given to considering other contaminants as well, particularly since chloride . appears to be present in the waste at a much lower concentration that normally encountered in municipal waste landfill sites. Other contaminants that already have trigger limits established could be considered since these parameters are present in the landfill leachate in amounts that have the potential to exceed trigger limits.	The Final Design & Operations Detailed Impact Assessment Report (**Appendix J-9**) will provide the additional justification supporting the reduction in the number of contaminating years from the original estimate (1996) including the methodology used, the rationale for the parameters selected, and all calculations and assumptions.		
			Appendix D provides details on the assumptions used to apply the Rowe (1990) method of calculating contaminating lifespan, however, in the application for an Environmental Compliance Approval, additional detail and justification will be expected. Specifically the ECA application should include: The equations and calculations for each method used; A direct comparison to the calculations done previously to estimate a Contaminating Lifespan of between 200-300 years which highlights the assumptions which are now being changed; particularly the ones that decrease the estimate by such a significant amount; Any assumptions being changed should be supported by a ration. ale, including data/evidence collected from the existing landfill site; Consideration to expanding the list of contaminants used to calculate the contaminating lifespan; and Any assumptions made should err on the conservative side However, I am also satisfied that the calculations can be addressed during the ECA approvals process and does not alter the recommendations or decisions being made in the EM process. However, the proponent does need to understand that the ministry does not accept the estimate of contaminating lifespan as presented in the draft EA without more detail and justification.	The ECA application will include the information specified by MECP to ensure the additional detail and justification is provided. This will be included in **Section 9.2** of the Final EA Report. Please see the preceding response with regards to the estimated contaminating lifespan presented in the Draft Design & Operations Detailed Impact Assessment Report.		
			Appendix C: Environmental Approvals Services Section, Senior Noise Engineer			
			Section 4: When ambient sound levels are predicted using traffic data, they are to be calculated based on existing traffic data rather than future traffic data. More details of the actual traffic data should be given, with corresponding hourly equivalent sound levels based on the current hourly traffic volumes.	• GHD will complete modelling to present the current existing conditions on Green Mountain Road using City of Hamilton data turning counts in conjunction with the		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			Why were assumed truck percentages used? Was this data not available in the traffic studies?	data from the GHD traffic report. The Final Noise Detailed Impact Assessment Report will be revised to include these results. • Additional details of the actual traffic data including corresponding hourly equivalent sound levels based on the current hourly traffic volumes will be provided in the Final Noise Detailed Impact Assessment Report. • The traffic studies were not inclusive of truck percentages on Green Mountain Road as all traffic counts were collected south of Green Mountain. Assumed truck percentages were used as the traffic studies did not assess future truck percentages on Green Mountain Road.		
			Section 5: Figure 5.1 shows that there are houses to the west within the 1000m radius. A point of reception should also be selected in that direction. As stated in the Noise Guidelines for Landfill Sites, construction and rehabilitation is assessed apart from other activities. Please also see general notes below.	• A point of reception to the west of the Stoney Creek Regional Facility will be added in the Final Noise Detailed Impact Assessment Report. • All activities on site are construction related and have been assessed accordingly as per the Noise Guideline for Landfill Sites. The specific sources requested for re-examination, if assessed as stationary source, would be in compliance with NPC-300. This would not affect the Facility's construction noise impact assessment. The results of this assessment will be included in the Final Noise Detailed Impact Assessment.		
			Section 6: Please comment on the net effects of off-site vehicles in particular. The Noise Guideline· for Landfill Sites discusses the assessment of off-site vehicle routes in terms of qualitative impact ratings.	• A qualitative impact rating of off-site vehicles on First Road West, Mud Street and Upper Centennial Parkway will be included in the Final Noise Detailed Impact Assessment Report.		
			Appendices: Please comment on the degree of possible noise sensitivity of the "ND" (Neighbourhood Development zones) surrounding the site.	• While these areas are zoned "Neighbourhood Development," they are within Terrapure's property boundary and Terrapure has no plans to develop this land as residential.		
			General: As stated in the Noise Guidelines for Landfill Sites, construction and rehabilitation is assessed apart from the actual landfilling operations. It is important to distinguish these activities clearly and use the appropriate assessments and sound level limits. If sources can be considered ancillary to the landfill operation itself, they are considered stationary sources and NPC-300 applies. Please re-examine sources such as, but not limited to, the wheel wash station, loaders using sweepers (2 sources) and water truck route to determine if they are part of the landfilling activities. The noise report is to include all required information from the Noise Guidelines for Landfill Sites, including prevaiilng meteorological conditions at the landfill site, and should be formatted according to that document as well as NPC-233. In Section 06 (Detailed Impact Assessment) of the EA Report, there is mention of screening features that will mitigate noise (as well as visual impact). Are these features, such as berms, accounted for in the noise modelling? Detailed sample calculations should be provided.	• All activities on site are construction related and have been assessed accordingly as per the Noise Guideline for Landfill Sites. • The prevailing meteorological conditions at the SCRF will be included in the Final Noise Detailed Impact Assessment Report and will include a wind rose. The report will also be formatted according to the Noise Guidelines for Landfill Sites as well as NPC-233. • The assessment accounts for the topography of Option 5 which is accounted for in the noise modelling but there are no additional berms or screening with the purpose of noise mitigation in the assessment. Detailed sample calculations will be provided in the Final Noise Detailed Impact Assessment Report. • CADNA for 1 worst case point of reception will be provided as part of the Final Noise Detailed Impact Assessment Report.		
			Appendix D: Environmental Approvals Services Section, Senior Waste Water Engineer			
			In general, the preferred alternative landfill expansion is acceptable and I do not have any additional comments or concerns	Thank you for the comment.		
			As outlined under Section 9.1 "Compliance Environmental Approval" of the draft EA, the proponent indicates that ECA amendment will be required only for the existing Waste Site ECA No. A181008. Our IDS record shows that there is an existing industrial sewage works ECA No. 5400-7DSSHU issued on May 1, 2008 for stormwater management facility at the site. Based on this, I would like to point out that an application to amend the existing ECA No. 5400-7DSSHU will also be required for any changes to the existing stormwater management facility at the site.	Terrapure will add the Industrial Sewage Certificate of Approval No. 5400-7DSSHU into **Section 9.2** of the Draft EA.		

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Review Agency	Comment Date	Method	Comments from Review Agency	Terrapure's Response	Response Date	Method
			For this purpose, the proponent needs to submit a completed application and a design brief for the upgraded or modified stormwater management facility.			
	2018-11-20	Email	WCR Technical reviewers are satisfied with the responses that were provided to us in draft last week. Accordingly, there is no necessity to discuss the response at the scheduled T/C for this afternoon. However, if you feel that there is value to discuss the response at the scheduled T/C for this afternoon. However, if you feel that there is value to discuss "next steps in the process", I would suggest that a T/C with myself and Gavin would suffice?	We appreciate your review. We will be discussing next steps with Gavin when we meet with him, Andrew and Jennie in person next week. Therefore if there is no need to discuss the responses, I agree there is no need for the conference call this afternoon.	2018-11-20	Email
Ministry of Tourism, Culture, and Sport	2018-10-03	GRT Webinar on Draft EA	MTCS asked if any Indigenous communities have shown interest/value in the site	Terrapure indicated that they have been in consultation with the following Indigenous communities: • 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	2018-10-03	GRT Webinar on Draft EA
	2018-11-15	Email	MTCS signed and returned the acknowledgment form confirming that they are satisfied with the draft SCRF EA and have no further comments.	Not required.	2018-11-16	Email
Ministry of Transportation	2018-11-21	Email	MTO confirmed via that they are satisfied with the Draft EA documentation and have no further comments.	Not required.	2018-11-21	Email
Ministry of Agriculture, Food, and Rural Affairs (OMAFRA)	2018-12-07	Email	Further to your request for confirmation, I acknowledge receipt of the Terrapure Stoney Creek Regional Facility (SCRF) Draft Environmental Assessment (EA) and provide the following comments. 1. As part of our earlier input on this EA, OMAFRA requested that maps and a list of farm businesses and farm operation types in the Local Study Area be included as part of the existing conditions documentation. This request appears to have been partially met through the provision of information identifying the ownership of four properties zoned for agricultural use within 500 m of the Stoney Creek Regional Facility property and crops that may have been grown on these properties. The breadth and certainty of the agricultural information presented in the Land Use and Economic Environment Existing Conditions report (Vol. 2, Appendix E) is noted as potentially limiting a fulsome characterization of agriculture in the Local Study Area. For example, the types of farm operations and potential presence of farm infrastructure (e.g. barns) or other sensitive/unique farm characteristics (e.g. roadside sales of farm produce) is not identified, there is uncertainty and inconsistency in the identification of crops grown in the study area (as noted by wording such as "it is difficult to determine the exact species of flora at these locations," "potentially farmed for corn or soybeans or wheat," "some cleared fields" and "the presence of a fruit or nut tree orchard"). OMAFRA's original information request was designed to ensure sufficient characterization of agricultural businesses, infrastructure and land uses in the Local Study Area, to in turn allow for potential avoidance and/or assessment of agricultural impacts, and effective impact management. It is also noted that separate documentation in the Land Use and Economic Detailed Impact Assessment Report (Vol. 2, Appendix J) describes the location of the same four "agricultural properties/parcels," notes soil capability classifications on these properties, and states, "41 additional properties within the Local Study Area are currently zoned for agricultural use." While the additional soil capability and agricultural property zoning information is helpful, it does not appear to have been included as part of the existing conditions documentation and it's addition still wouldn't allow for a full understanding of the number, location and type(s) of farm businesses, nor the type and extent of agricultural production that is occurring in the area. For example, just because a property is identified as "agriculture" on property assessment rolls or in a municipal zoning by-law, it doesn't mean that the property is actually used for agriculture, and no comprehensive map of agricultural operations, farm buildings (if any), and types of crop production is provided. 2. It is appreciated that a list of the Land Use and Economic study team members is provided as part of the Draft EA (Vol. 2, Appendix J) but there is no indication of which study team members were responsible for the collection of agricultural information and the assessment of	Thank you again for taking the time on Monday to discuss the steps to addressing OMAFRA's comments on the Terrapure SCRF DRAFT EA. With that in mind, the following summarizes our approach based on our discussion for your information: • Terrapure to engage a professional who specializes in agricultural assessments (i.e., a Professional Agrologist (P. Ag)) from a company that specializes in the assessment and documentation of agricultural and soil resources. • The Professional Agrologist would be responsible for carrying out the agricultural assessment capitalizing on the land use assessment already carried out as part of the SCRF EA. • The study area for the assessment would be within 500 m of the existing SCRF primarily focused on the lands to the east of Upper Centennial Parkway recognizing that the lands south, west, and north of the existing SCRF are designated for urban related land uses and no direct impacts to agricultural activities are expected. • The agricultural assessment would identify the agricultural characteristics of the study area including items such as: type and intensity of existing agriculture, land use, parcel size and shape, land tenure, capital investment in agriculture and collection of crop type (based on crop stubble). • The documentation of the above agricultural characteristics would then allow for assessment of direct and indirect impacts to existing agricultural activities and uses such as; impacts to drainage features, loss of infrastructure, changes in landform, potential effects on farming operation, impact to agricultural character. • Upon completion of the assessment a review of proposed mitigation measures would be conducted to determine if any additional mitigation measures are required. • The agricultural assessment would be documented in a standalone letter report or memo and will include description of methodologies, findings, mitigative measures and conclusions as well as any relevant mapping. The draft document will be provided to Jackie for her review and finalized based on comments received. • A summary of the agricultural assessment will be included in the Final EA Report with reference to the document being made. In light of the planned Final EA Report submission to the Minister for review and approval beginning January 11, 2019, the review and finalization of the draft Agricultural Assessment may continue after January 11, 2019.	2018-12-14	Email

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			potential agricultural impacts. This information should be provided along with identification of the professional qualifications and experience of such study team members as they specifically relate to the assessment of agricultural impacts This will assist in demonstrating the qualifications of staff responsible for conducting the agricultural assessment and for contributing to the stated conclusion that "there are no potential effects associated with the Preferred Landfill Footprint relative to the site and adjacent land uses." 3. Two technical documentation issues are also noted in the Draft EA: • Section 4, page 4-67, the first paragraph references soil class mapping on Figure 4.17; the reference should likely be to "Canada Land Inventory (CLI) soil capability for agriculture" mapping on page 4-68. • Section 6, page 6-59 makes reference to meeting planning objectives set out in the City of Ottawa Official Plan; the reference should likely be to the "City of Hamilton Official Plan.			
	2018-12-18	Email	Thanks for your email. The proposed approach sounds reasonable.	As discussed during our call on December 10th, 2018, please find attached the Draft Agricultural Characterization memo for your review and comment. Based on the approach discussed during that call we believe this should satisfy any previous concerns and comments.	2019-01-04	Email/Letter
Ontario Provincial Police (OPP)	2018-11-15	Email/ Letter	The OPP signed and returned the acknowledgment form confirming that they are satisfied with the draft SCRF EA and have no further comments.	Not required.	2018-11-15	Email

Table 7.8 Indigenous Community Comments on SCRF Draft EA and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
Haudenosaunee Development Institute (HDI)/Haudenosaunee Confederacy Council of Canada (HCCC)	2018-10-18	Meeting	HDI/Terrapure Meeting to review the Project's interference with Haudenosaunee rights and interests including the Haudenosaunee unsurrendered title interest to the lands in question.	HDI/Terrapure meeting to learn more about HDI and present an overview of the SCRF EA.	2018-10-18	Meeting
	2018-10-19	Email	Thank you for meeting with us on October 18, 2018. We confirm the following who were in attendance: Merv Mcleod Blaire Shoniker Mike Jovanovic Greg Jones Aaron Detlor Tracey General Todd Williams Brian Doolittle As discussed we reviewed the Project's interference with Haudenosaunee rights and interests including the Haudenosaunee unsurrendered title interest to the lands in question. We have indicated that we are open to negotiating a process by which Haudenosaunee consent can be granted for your Project. Our discussions moving forward would look to a lease of the Haudenosaunee interests with consideration to the Haudenosaunee to include a parcel of land approximating the size of the land used by your Project, revenue sharing and at the same time a determination if there are short term or long term employment opportunities. In terms of revenue sharing we attach the following for your ease of reference: https://www.mndm.gov.on.ca/sites/default/files/rrs_agreement_gct3_-_eng.pdf You had asked for a 'term sheet'. Please accept the following in lieu of a formal term sheet. With respect to land we are interested in the following property: https://www.realtor.ca/real-estate/19814309/single-family-95-newport-road-brant-county-ontario-n3t5l6 As to revenue sharing we are proposing $0.40 per tonne. We can work on jobs going forward. A tour of the facility was discussed and we have left it with Tracey General and Merv Mcleod to organize. Again it was a pleasure meeting with you and we look forward to meeting in the near future to finalize an agreement.	The Ministry of Environment, Conservation and Parks provided the following response to Haudenosaunee Confederacy Council of Canada and Haudenosaunee Development Institute: Dear Haudenosaunee Confederacy Chiefs Council: I am in receipt of the attached email sent from Aaron Detlor (aarondetler@gmail.com) on your behalf to Merv Mcleod on Friday, October 19th with "Terrapure Facility" as the subject. I would like to offer a response on behalf of the Ontario Ministry of the Environment, Conservation and Parks (the ministry). Please also be advised that we directed Terrapure (the proponent) to contact Six Nations as part of the environmental assessment process, and we have instructed Terrapure through its consultant GHD to continue engaging with you on the environmental assessment (EA) of the Stoney Creek Regional Facility (the project). We understand from Mr. Detlor's email that you believe that the project will interfere with Haudenosaunee rights and interests, including the "Haudenosaunee unsurrendered title interest to the lands in question". Mr. Detlor indicated that you wish to negotiate a process to grant consent, lease interests, share revenue and determine employment opportunities. The province acknowledges that the proposed project is located in the area covered by the Nanfan Treaty of 1701. It is Ontario's view that Nanfan Treaty provides for the continuation of hunting rights by the Six Nations in this area. The proponent has submitted a draft EA report to the ministry for review. Terrapure has indicated to the ministry that a final EA submission is to be submitted on January 11, 2019. Although the final version has not been submitted, it is the ministry's view at this time that the project is not likely to impact the ability of Six Nations' members to exercise hunting rights in the Nanfan treaty area. The Terrapure Facility is an existing waste disposal site located on private land that has been incompatible with hunting rights and other traditional land use practices for many years. Impact management and mitigation measures are expected to continue to provide appropriate protection of ground and surface water, as well as aquatic and terrestrial habitats and biota. Further, monitoring will be in place to make sure predictions made in the EA are accurate and can be validated. Nonetheless, if you have additional information about specific potential impacts to your Aboriginal or treaty rights, please let us know so that we may conduct an analysis and provide a response to any specific concerns you may have. Once Terrapure submits the final EA there is a 7-week comment period. Ministry staff will be in contact with you after the submission of the final EA to ensure you have received a copy of the EA document. If you have any outstanding concerns, we encourage you to submit any comments once the final EA is submitted. Should you have any questions, or if we can be of any assistance in your review of the EA, please contact Jennie Weller at 416-314-7232 or toll free At 1-800-461-6290 or by email at jennie.weller@ontario.ca Sincerely, Annamaria Cross Acting Director Environmental Assessment and Permissions Branch	N/A	N/A

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Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
Métis Nation of Ontario (MNO)	N/A	N/A	No comments provided	Not required		
Mississaugas of the New Credit First Nation (MNCFN)	2018-10-10	Telephone	Consultation manager call with Terrapure to discuss questions	Call with Environmental & Regulatory Advisor to review/discuss questions on draft SCRF EA.	2018-11-01	Telephone
	N/A	N/A	MNCFN provided the following comments via telephone call on October 10, 2018 which were responded to by Terrapure via letter.		2018-11-01	Email/Letter
			How much will the landfill expand into the existing buffer area to the north, if any? Please clarify the references to 59, 41 and 75 ha.	In the northern part of the site, the footprint for the preferred option will extend into the area that is now approved for industrial fill. This area represents the original footprint approved in 1996 and does not extend beyond the limits of the former quarry. A minimum 30-meter buffer will be maintained between the residual material area and all property boundaries, including in the north. The 75 ha refers to the entire SCRF property. The 41 ha refers to the current limit of the landfill and the 59 ha refers to the proposed limit of landfill for the preferred option.		
			Is it possible for the Mississaugas of the Credit First Nation to obtain the Environmental Management Plan once it is prepared?	Yes, Terrapure will provide the Mississaugas of the Credit First Nation with the Environmental Management Plan. The Environmental Management Plan will be prepared following approval of the undertaking and prior to construction and will include a description of the proposed mitigation measures, commitments and monitoring specifically related to the terrestrial and aquatic environment (e.g. habitat compensation if required and the vegetation monitoring program).		
			Does the City of Hamilton own the former landfill to the west of the SCRF? Who is responsible for monitoring that property? Will Terrapure continue to own the SCRF post-closure?	Terrapure owns the former landfill to the west of the SCRF and continues to conduct monitoring within that property. The property is now occupied by the Heritage Green Passive Park, which is maintained by the City of Hamilton. Similarly, following closure of the SCRF, Terrapure would continue environmental monitoring at the SCRF.		
			If the Environmental Assessment is approved, will there be conditions? Where will it be posted? Would the Mississaugas of the Credit First Nation be notified?	Following the ministry review period, the Minister of the Environment, Conservation, and Parks (MECP) may give approval to proceed with the undertaking, with or without conditions, or refuse to give approval to proceed. As per the Code of Practice for Environmental Assessments, the Project Officer will provide notification of the Minister's decision to applicable Indigenous communities and those members of the government review team who provided comments. In addition, the notice of the decision will be posted on the environmental assessment page of the Ministry's website (https://www.ontario.ca/page/stoney-creek-regional-facility-landfill-expansion). In addition to the notification undertaken by the MECP, Terrapure will also notify all project participants of the Minister's decision and post the notification on the project website (http://www.terrapurestoneycreek.com/).		
			How do you ensure that the environment will be protected for the duration of the contaminating lifespan? How does Financial Assurance work?	The contaminating lifespan is defined as the period of time following closure of the SCRF where contaminants have the potential to leach from the waste above background groundwater concentrations. Hence it also defines the length of time that the base liner system will need to function to ensure contaminants are collected and property treated. Once monitoring indicates that the contaminants leaching from the waste are below these concentrations, monitoring can be discontinued. Currently the contaminating lifespan for the SCRF is estimated to be 200 - 300 years. This timeframe will be confirmed during the detailed design phase of the project. Financial Assurance is a reserve fund required by the MECP for private landfill site owners such as Terrapure. This fund is intended to cover closure (e.g., final cover) and post-closure (e.g., maintenance and monitoring) activities over the contaminating lifespan should the company no longer be able to meet these obligations.		
			Can the Mississaugas of the Credit First Nation be involved in ongoing consultation following completion of the Environmental Assessment (e.g. site tours, monitoring habitat restoration, etc.)?	Terrapure welcomes the involvement of the Mississaugas of the Credit First Nation following the Environmental Assessment. Please advise which activities specifically you would be interested in being involved in.		
			We understand there will be no change to greenhouse gas emissions. However, can anything be done to offset the current emissions?	For this project, most of the existing greenhouse gas emissions are associated with trucks transporting material to the SCRF. The SCRF receives very little putrescible		

Table 7.8 Indigenous Community Comments on SCRF Draft EA and Consideration by Terrapure

Indigenous Communities	Comment Date	Method	Comments from Indigenous Community	Terrapure's Response	Response Date	Method
				material (i.e., organic material that will break down and decompose) compared to other municipal solid waste (MSW) landfills. As such, only a small amount of landfill gas is generated by the SCRF relative to a MSW landfill of the same size. While Terrapure aims to minimize the amount of greenhouse gases generated by the SCRF, there are currently no plans to offset these emissions.		
			There was a reference that under the existing landfill, there was 10 years of remaining capacity. How many years of operation will the proposed capacity increase add? Has a closure date been determined?	The remaining capacity at the SCRF under the current approval is largely related to the importation of industrial fill. The proposed capacity expansion will replace this industrial fill with residual material, and not add to it. The additional capacity Terrapure is seeking through this Environmental Assessment is based on current economics and market dynamics. It has been established based on a reasonable business-planning horizon for the next 10-15 years. If it is determined at the end of the planning horizon (10-15 years) that the economic opportunity is still available, this would be subject to a separate approvals process as required by legislation at an undetermined time in the future. If it is determined at the end of the planning horizon that there is no economic opportunity or the SCRF cannot accommodate additional capacity, then closure of the SCRF would take place.		
Six Nations of the Grand River First Nations	2018-11-13	Email	After reviewing the Draft EA Six Nations has no additional comments at this time, we do wish to be kept up to date on the project as it continues. We will review the final EA to see if we have any comment when it is made available.	Thank you for your reply. We will continue to provide you with project updates including the final EA report which we anticipate being submitted in early 2019.	2018-11-13	Email

Table 7.9 Public Stakeholder Comments on SCRF Draft EA and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
Purpose of the Undertaking/Alternatives To the Undertaking	
As a long time community member living near the Terrapure site, I am strongly opposed to the proposal to further increase the site capacity to 10 million cubic meters (m3). I personally believe that Terrapure will not stop seeking increases to this site until the Ministry of the Environment (MOE) stops them. If this EA is approved, years from now the company will find a way to seek a further increase.	Comment noted.
I found the amount of repetition in the documentation monotonous. The same comments were cut and pasted so many times in each section to the detriment of the overall document. It was almost as if the consultants GHD were being paid by the page.	The EA documentation was prepared in accordance with the Codes of Practice for Preparing and Reviewing Environmental Assessments. There is some repetition throughout the EA document which is required to provide background and contextual information to explain the purpose of the technical work. The executive summary provides a brief summary of the main points of the document.
I seriously question how much community feedback you can expect to the Draft EA, based on the unwieldy size of this document and the lack of change that past input has resulted in. The community has provided input to the Draft TOR, the actual TOR, and 3 Open Houses. I have read all of the community input, and with the exception of some form letters that Terrapure asked "friendly" suppliers to write, all of the input from the community has been opposed to a further expansion of the site. I believe there were 78 community responses sent in March 2017 to the MOE stating their opposition to this proposal. In addition, both the Hamilton City Council and the Terrapure Community Liaison Committee have repeatedly stated their opposition to the proposal. In essence, how many times does the community need to say NO?	Public consultation has been conducted in accordance with the Codes of Practice and has been an important component to this EA. The review of the draft EA is just one of the consultation opportunities provided. Previous consultation undertaken to obtain feedback during key milestones throughout the EA process and how it was considered is documented in **Section 7**.
Executive Summary	
The document states "Based on the current economics and market dynamics for industrial fill, the original market demand is significantly less than what was forecast for that material". In reality, based on Terrapure Annual Reports, the company hasn't received any industrial fill material in the 5 years since the change to shrink the footprint for the 6.32 million m^3 residual material from 59 hectares to 41.5 hectares. The Terrapure EA approved in 2013 by the MOE now looks like a big mistake. The company took advantage of this decision to add 4.5 meters in height to the site, but never followed through on putting clean industrial fill in the remaining 17.6 hectares set aside for this change as promised. The new EA now seeks to return that 17.6 hectares representing 2 million m^3 to residual material and increase the overall site another 2.5 meters or a further 1.68 million m^3 for a total increase of 3.68 million m^3. Many in the community would argue that if Terrapure can't meet its commitment to fill the 17.6 hectares with industrial fill, the 2013 amendment should be voided and the company should simply plow the extra height from the 41.5 hectares into the open area, thus reverting to the initial agreement. I support this position. There is surprisingly very little in the Draft EA documentation Appendix B – ECA No.A181008 about the rationale for this 2013 EA change considering how important this decision has turned out to be in relation to the current Draft EA. I find it hard to believe that after proposing the 2013 EA change, things suddenly changed so much that the company never proceeded at all with receiving industrial fill. Either it was never really their intent to do so, or they had very poor management at the time of that decision. I recommend that the Draft EA should require significantly more detail about why the 2013 change was proposed, the stated benefits to the community of that change, why the company did not proceed with accepting industrial fill in the last 5 years and what happens to the promised benefits to the community now with this Draft EA.	Information regarding the 2013 ECA amendment is included in **Section 1.3**. The details provide background and context on the site history and operations.
Page ES-2: I recognize that Terrapure can apply for an EA for whatever they want, BUT the fact that there is a business opportunity for the company doesn't mean that this location makes sense or in any way infers acceptance by the community. The establishment of a new landfill site should in fact be a reasonable alternative compared to what Terrapure is proposing to the Stoney Creek community. I believe it is important to remember what the initial 1995 site approval as presented in the documentation Appendix B – ECA No. A181008 page 8 says. "Capacity – the maximum volume of waste and cover materials, excluding final cover which may be disposed at the site is 6,320,000 m3. The maximum tonnage of waste and cover materials, excluding final cover, which may be disposed at the site is 10,000,000 tonnes". Years later when the company determined that the tonnes/m3 ratio was closer to 2.0 than the 1.6 this ratio infers, they sought and received MOE approval to drop the tonnes amount in order to maximize their revenue. If this EA is approved it would represent 10 million m3 or ~20 million tonnes which is twice the original approval. I believe that this EA needs to clearly address how it possibly makes sense to receive twice the volume of material that the site was initially licensed for.	The purpose of the Undertaking as described in **Section 3** of the EA, is to increase the approved capacity for post-diversion solid, non-hazardous, industrial residual material by 3,680,000 m3.
The quarry floor back in 1995 was 192 meters above sea level (MASL) and the surrounding lands averaged 205 MASL so the quarry required 13 meters of fill. Yet the initial approval had a peak of 214 MASL, considerably higher than the surrounding lands. Then the 2013 EA increased the height to 218.5 MASL and now this EA would see it go up another 2.5 meters to 221 MASL which would be 16 meters or 52 feet above the surrounding lands. I believe that this EA needs to specifically address why building a 5 story mountain of landfill surrounded by a growing residential community should even be considered.	**Section 6** describes in detail the potential effect of the SCRF on the built environment, including on views of the facility, the proposed impact management measures, and net effects.
Page ES-4: As pointed out previously in the Online Open House feedback, the evaluation criteria that the company selected for ranking the 6 alternatives did not reflect the 2 largest concerns of the community; the height of the landfill and the earliest possible closure date. Instead, the evaluation criteria was full of items that provided no differentiation between the alternatives (eg. Terrestrial and Aquatic). I believe that the Draft EA needs to be modified to give commensurate weighting in the evaluation criteria to the height of the landfill and the closure date.	None of the evaluation criteria are weighted as more or less important. The options were compared using the "trade-off" method where advantages and disadvantages were used to identify preferences among the options. This methodology is outlined in Section 7.1.1.2 of the Minister Approved Terms of Reference and described further in **Section 5** of the Environmental Assessment Report.
Saying that "the recommended alternative method of Reconfiguration and Height Increase was presented to review agencies, Indigenous communities and the public for comments and feedback, and then was confirmed as the "Preferred Alternative Method" is misleading as it infers that the community agreed with Option 5 and factually it did not. In fact, Terrapure totally ignored the input as	The recommended Alternative Method of Reconfiguration and Height Increase was presented to review agencies, Indigenous communities and the public for comments and feedback. Following consideration of all comments received and based on the results of the Reasoned Argument method, the recommended alternative was then confirmed as the 'Preferred' Alternative Method.

Table 7.9 Public Stakeholder Comments on SCRF Draft EA and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
evidenced by their selection of Option 5 which had zero positive comments from community members who took the time to respond to the Open House, compared to Option 1 that had 17 positive comments. This wording needs to be corrected to reflect that the community comments were not taken into consideration and that in fact the community supported Option 1.	This section will be modified in the Environmental Assessment Report to provide greater clarity.
Section 3 - Purpose and Rational for the Undertaking	
Page 3-3: When it is to Terrapure's advantage they speak of a yearly average of 700,000 tonnes received, or ~350,000 m3, but when calculating remaining capacity they only use 250,000 m3. Make up your mind, it needs to be consistent!	**Section 3.3** provides an overview of the historic waste volumes received at the SCRF over the past 5 years. The actual annual tonnage, volumes, and remaining capacity are reported in the Annual Monitoring Report. These numbers fluctuate and are updated annually based on operational considerations.
Page 3-4: the document says "the establishment of a new landfill site elsewhere is not a feasible alternative". Simply saying so doesn't make it true. There needs to be way more detail in terms of alternative site availability in the EA showing what sites were considered and reasons why they are not viable.	The assessment of the "Alternatives To" the existing SCRF is described in Supporting Document #1 to the Approved Amended ToR and Appendix C of the Environmental Assessment Report.
Page 3-5: Terrapure lists the benefits of the Undertaking, but once again ignores the negatives in the proposal. The following negatives should be stated clearly in the EA in order to be representative: • increased height to 221 MASL or 16 meters (52 feet) above surrounding lands. • negative perception of an unsightly landfill in one of Upper Stoney Creeks busiest intersections. • the potential negative impact on 7,000 neighboring homes. • another 10 – 15 years of site life beyond the 20 years initially promised to the community. • another 10 – 15 years of truck traffic in an area now growing with homes and with a new school coming neither of which existed at the time of the original approval.	An explanation as to why Alternative Method No. 5 was determined to be the recommended preferred alternative, taking into consideration relative advantages and disadvantages, is included in **Section 5**.
Greg Jones has clearly stated the benefits to the community and the Ministry of the 2013 ECA that while increasing the height of the 41.6 hectares by 4.5 meters, would replace residual fill in the remaining 17.6 hectares with clean industrial fill. Terrapure has taken advantage of this change to increase the height of the 41.6 hectares, but has totally reneged on its commitment to fill the remaining 17.6 hectares with clean industrial fill, and now with their current EA application all the benefits to the community/Ministry listed below would be negated. In the words of Greg Jones (Managing Director, Communications and Public Affairs for Terrapure) back in the 2013 email below "We believe the revised design is a better all-around option for the site. It would allow more flexibility for future, after-life use of the site; increase the set-back from future residential development along Green Mountain Road; improve the integrity of the liner and leachate collection system from the original design concept; and avoid having to move the site entrance to Mud Street opposite Penny Lane Estates". Please consider the 2013 Newalta commitments as you prepare your response to my comments as I have shared all this information with the Toronto office of the MOE.	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 m3), and the reconfiguration effectively added to the height, while shrinking the overall residual material footprint to approximately 41.5 ha. In addition to a smaller residual footprint, the SCRF was permitted to accept approximately 2,000,000 m3 of industrial fill to complete the final grading in the section of the section of the Site that would no longer receive residual materials. Information on the 2013 ECA Amendment is included in Section 1.3 of the EA Report. The benefits stated at that time related to the proposed 2013 ECA Amendment. The current EA is a separate approvals process, taking into account the site history and previous approvals, including the 2013 ECA Amendment. Similar to how the benefits of the ECA Amendment were considered in 2013, the current Environmental Assessment assesses the advantages and disadvantages of the proposed Undertaking for the Minister of the Environment, Conservation and Parks' consideration. Since 2013 the market demand for industrial fill has dropped significantly, affecting the financial viability of the SCRF under the current approvals while the market demand for residuals has increased and is much stronger and more consistent than that for industrial fill. As a result Terrapure conducted a Business Case Analysis, which concluded that there is a clear need to provide additional residual material capacity for the local and regional customer base to support the economy for the foreseeable future.
Regarding Blair Shoniker's attached December 20, 2018 response to my November 23, 2018 submission, I would like to be clear that I found the company's response totally inadequate. The response did not address whatsoever how the company plans to respond to the 5 community benefits listed below that were clearly stated in the 2013 ECA proposal. These commitments were key to getting the 2013 reconfiguration approved, and if they now will be eliminated by the 2018 EA proposal, the company needs to explain why these important benefits to the reconfiguration in 2013 are not still important today. While I understand that the 2013 ECA and 2018 EA are separate approval requests, I don't support ignoring the facts of the 2013 approval. The Ministry's approval of the 2013 reconfiguration was based on the trade-off of increased height in the 41.5 hectares versus the 5 benefits of the change to the community with the reconfiguration. Had the 2013 ECA simply sought an increased height without any corresponding improvements from the community's standpoint, there would have been significantly more negative input from the community and likely an outright rejection by the Ministry. So you can't ignore the loss of these benefits now. To propose the 2013 ECA reconfiguration and then not receive 1 truckload of clean industrial fill in the 17 hectares during the 5 intervening years was either gross incompetence by the proponents management team, or a scam whereby it was never the intent to fill the 17 hectares with clean industrial fill. Regardless of which of these two is correct, neither should be rewarded by allowing the current proposal to proceed and negate the promised benefits to the community of the 2013 ECA change. This is an important issue for the community and a critical change from the 2013 agreement, and as such I would suggest that detailed information on the loss of these 5 community benefits must be included in the company's final EA submission. Please confirm that the company will in fact fully address the loss of the 5 community benefits in the final EA submission.	We maintain our previous response that the items referred to related to the proposed 2013 ECA Amendment. The current EA is a separate approvals process. As such, the current Environmental Assessment assesses the advantages and disadvantages of the proposed Undertaking, as is required by the MECP.
Section 4 – Description of the Environment Potentially Affected by the Undertaking	
Page 4-93 thru 4-100: the document states "views of the SCRF from the surrounding built-up areas are generally obscured". This is no longer true with the increased height and this wording needs to be removed from the EA. Waste can be seen from points in any of the 4 directions, and more clearly during the countless times that the wind has blown down the fence screening. The 40 pictures selected are not representative of what the community sees today at the site and need to be updated to reflect some of the less flattering ones, specifically some pictures from the dog park on First Road West or by Dofasco Park on First Road East where the site already appears like a mountain on the horizon.	**Section 4.3.3.2** describes the existing environment surrounding the SCRF and includes the details for the areas where locations from the SCRF are somewhat visible. The photos included in this section were taken in September 2017 and are satisfactory for the purposes of the Environmental Assessment.

Table 7.9 Public Stakeholder Comments on SCRF Draft EA and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
Section 5 – Alternative Methods of Carrying Out the Undertaking	
As stated above and previously in my Open House comments, the evaluation criteria was poorly constructed as it was filled with criteria that didn't differentiate between the alternatives and didn't include those important to the community. This made the entire ranking process and selection of Option 5 a joke. It appears that the company selected evaluation criteria that would allow for their favored option to come out on top. The company said they wanted feedback from the community on the options; the community provided 17 positive comments pertaining to Option 1, none to Option 5, and the company selected Option 5. The reason for this needs to be clearly explained in the EA.	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 are consistent with other EAs undertaken throughout Ontario, and were confirmed in the Minister-Approved Amended Terms of Reference. Since none of the feedback received on the recommended option changed the results of the comparative evaluation, Option 5 was confirmed as preferred (see **Section 5**).
To the community, it appears that Option 5 is simply more "greedy" than Option 1 as it adds an additional 1.68 million m3 representing an additional $168 million in revenue.	As described in **Section 5** of the Environmental Assessment Report, Option 5 was 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 Alternative Method Nos. 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 impact management 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 impact management measures. • Maximizes the economic benefits to the City of Hamilton, Upper Stoney Creek, and local industry.
Page 5-78: Effect on views of the facility should be Green for Option 1, not Yellow as there is no increase in volume.	As previously noted in our responses on May 14, 2018 and June 19, 2018, the ranking for the "Effect on views of the facility" 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. Option 1 resulted in a yellow circle as opposed to green, because even though there is no height increase from the existing approved contours, there would be a change from what is currently visible.
Page 5-79: Effect on traffic should be Red for all options other than Option 1 as they require the site to stay open longer and hence a longer period of truck traffic.	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 (see **Section 5**).
Potential to provide service for disposal should be Yellow for Option 1 not Red as it permits an additional 2 million m3 of residual.	As previously noted in our May 14, 2018 response, the criteria "potential to provide service for disposal" is related to the ability for Terrapure to provide up to 3,680,000 m3 of additional disposal capacity for post diversion solid, non-hazardous industrial residual material that was outlined in the Approved Amended Terms of Reference. The differences in the rankings reflect that the different Options provide different amounts of disposal capacity. Options 3, 5 and 6 would all result in the greatest disposal capacity -- and the ability to meet the additional capacity outlined in the Approved Amended Terms of Reference -- while Option 1 and 2 would result in the least capacity -- and would not be able to meet the additional capacity outlined in the Approved Amended Terms of Reference.
Section 6 – Detailed Impact Assessment of the Undertaking	
Page 6-1: the document says "The Recommended Landfill Footprint was confirmed taking comments into consideration". As addressed above, this is not true and should be removed from the document.	Similar to our response to question #8, this sentence will be modified to provide greater clarity.
Page 6-59: the document states "The project has the potential to affect up to ~7,000 properties due to disruption of their use and enjoyment of property resulting from nuisance effects. That is a pretty big negative hidden deep in the thousands of pages of this document.	The potential cumulative effect of disruption to use and enjoyment of private property identified on page 6-59 will be mitigated through the impact management measures described on page 6-69. The significance assessment for the residual adverse effects, taking into account magnitude, extent, duration, frequency, and performance, is described in **Table 6.26.** The significance of this effect was determined to be minor or not significant.
Landfill Truck Travel Patterns: At Page 6-2, the proponent states that no waste vehicles will be permitted on Green Mountain Road. We support this approach, particularly given the significant amount of residential development that exists and continues to be built along and north of Green Mountain Road. We also understand that a school is proposed for the northwest corner of Green Mountain Road and First Road West – another important reason not to allow trucks to travel along this stretch. But we do remain concerned about the fact that trucks will travel from the First Road West exit south along First Road West to Mud Street. This street is becoming busier as residential development continues north of the landfill. Meanwhile, the Heritage Green Sports Park is also becoming a more popular destination for community members. Recent experience has confirmed for us that it is often challenging to safely exit the Sports Park because of increased traffic volumes. We note, too, that the landfill exit is in very close proximity to the park entrance/exit – with the landfill exit situated almost immediately north of the park entrance/exit. We wonder whether this has already generated risks and conflicts. Is there a safe route to and from the new neighbourhood to the north for those walking or biking to the park? Do car/truck conflicts emerge because of this mix of local residential traffic, broader regional traffic into the park, and the truck traffic from the landfill?	The safety of our employees, customers and the community is Terrapure's highest priority. The detailed traffic impact assessment carried out as part of the Stoney Creek Regional Facility Environmental Assessment (SCRF EA) determined that traffic from the SCRF from continued operations is not expected to result in any safety concerns for the community. In addition, the City of Hamilton will be reconstructing First Road West to an urban standard from north of Green Mountain Road south to Mud Street. As a result, the road allowance will be widened a total of 10 feet and sidewalk will be constructed on the west side of First Road West. This will allow pedestrians safer access to the Sports Park and Dog Park. Also, Terrapure is in support of a 40 km/hr speed limit as recommended by the Hamilton-Wentworth District Catholic School Board (HWCDSB) and Terrapure will continue to work with the City of Hamilton to discuss and resolve any traffic safety concerns as they arise during operation of the SCRF.
Remaining Questions Surrounding Service Area for Landfill: In addition to participating in the consultation associated with the individual environmental assessment for this proposed landfill expansion, we have been actively involved in the public commenting process for the company's application to amend its ECA – waste processing – for its 52 Imperial Street facility in lower Hamilton. As part of that process, we had the opportunity to talk with staff from that facility. We continue to wonder what percentage of the waste received at that facility ends up at the Stoney Creek landfill. While the landfill itself is approved to accept waste from the Province of Ontario, 52 Imperial Street is permitted to accept waste from across Canada and the United States. We understand that, once processed at 52 Imperial Street, waste is then considered to be from Hamilton and eligible for disposal at the Stoney Creek facility. We wonder what amount of waste falls into the category of being from outside of	Typically, less than 5% of the total tonnage received at the SCRF from Imperial Street on an annual basis comes from outside of Ontario.

Table 7.9 Public Stakeholder Comments on SCRF Draft EA and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
Ontario – then processed at 52 Imperial Street – and ultimately landfilled at the Stoney Creek facility? This is a question worth reflecting on because the proposed expansion being requested by the proponent is being framed in terms of local need for disposal capacity. We would like a better sense of how much material is currently being generated (not processed) by Hamilton facilities versus how much is coming in from outside of Ontario to Imperial Street and then the Stoney Creek landfill. And we wonder whether, if the expansion is granted, there exists potential for the 'out of Ontario' waste streams to grow. This is a fair question – given that it is this community that must shoulder both the benefits and the negative impacts of the landfill.	
Landfill Height: We are also trying to get a handle on the FINAL height of this landfill, if the proponent succeeds in getting approval for its preferred Option 5. It is stated that Option 5 results in a 2.5 meter (or 8.2 foot) increase in final landfill height. The landfill diagrams in the report that include height contours are very difficult to read. As far as we can ascertain, the final height could be as much as 14m (45 feet) or greater at the highest point of the landfill. This is almost equivalent to the height of a 5 storey building – making the final height the highest point in the surrounding area. This is a concern for us – especially given that we had been led to believe that there was a general movement away from permitting landfills with such height.	The preferred landfill footprint (Option 5) has a height increase of 2.5 m at its peak (218.5 to 221.0 masl) compared to the currently approved SCRF. We are currently unaware of any movement (e.g., policy, regulation, etc.) in Ontario that is limiting the permitting height of a landfill.
Surface water and total suspended particulate: At Page 6-13, the proponent explains that, with the preferred Option 5, the increase in height combined with the change in material landfilled (all now solid, non-hazardous industrial residual material) which, in turn, results in a lower permeability cover and faster overland flow of stormwater, there is a greater potential for increased levels of total suspended particulate in stormwater flows. There will also be increases in peak flows and runoff volumes. While explanations are provided regarding how steps will be taken to ensure that TSS will not impact nearby Davis Creek, we continue to have concerns about the risks associated with the scenario described. It would appear that planning has focused on storms no larger than a 'regional storm event' or a 100 year storm. We have profound concerns about the fact that this is the largest storm event considered – especially given recent history in this watershed. In less than a decade, there have been at least 2 major rainstorms that have exceeded the magnitude of a 100 year storm. It would seem prudent, in light of this climate-related trend, for the proponent to plan for scenarios greater than a 100 year storm. We are not confident that the measures in place to protect the Davis Creek, and the landfill's stormwater infrastructure for that matter, are adequate given the failure to assess beyond the 100 year storm level. While a shut-off valve system is described as the main method for containing stormwater if there is a quality problem, we wonder whether this system will continue to work if we experience a larger than 100 year storm event.	The detailed impact assessment of the Preferred Landfill Footprint (**Section 6.4** of the EA Report) assessed the risks of increased climate change effects on the Undertaking including the frequency and/or severity of precipitation and weather extremes. The assessment adhered to the following provincial and federal guidelines for climate change considerations: • Consideration of Climate Change in Environmental Assessments in Ontario (Ministry of the Environment and Climate Change) • Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners (Canadian Environment Assessment Agency) The stormwater management system has been designed to accommodate a Regional storm, which is much greater than the historical daily maximum precipitation amount of 107 mm and the rainfall depth estimated for the 100-year storm event for the SCRF of 127.8 mm.
Assessment of 100 Year Storm flows: At Page 6-17, in Table 6.6, the proponent explains that the increased area of residual material results in an increase in impermeable area due to the residual material final cover.' Further, it is explained that '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.' We wonder whether these figures are correct. Would it not be the case that the runoff volume would be greater for a 100-year storm event than it would be for a 2-year storm event? If these percentages are, indeed, correct, it would be useful to share estimates of the actual volumes of runoff so that the reader has a sense of the magnitude involved. Please clarify this issue for us!	The percentages included are correct. With Option 5, the industrial fill area is replaced with residual material. The previously allocated industrial fill area would not have a cap. In comparison, the residual material will have a cap, which results in less infiltration and more run-off since water can only infiltrate the top layer of topsoil above the cap. During the 2-year storm event, this difference in infiltration is more dramatic, which results in the larger percentage increase of 11%. Whereas, during the 100-year storm event, there is much more run-off due to the intense rainfall, resulting in the ground becoming saturated. The saturation would occur in both the residual material and industrial fill during the larger rainfall event, however, there is less ability to infiltrate in the 100-year event, regardless of scenario, hence the smaller percentage increase of 6%. Terrapure will revise **Section 6.2.1.2** of the Final EA Report to provide further clarification.
Air Quality Concerns At Page 6-22, it is explained that '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.' We are concerned about this possibility, especially when the contributions are happening close to the recreational area where people – especially kids and seniors – may be out exercising and potentially exposed. We expect that the times of year when it is most likely there will be higher levels of SPM are during hot, dry periods in the summer. We urge the proponent to consider measures above and beyond to ensure that no particulate emissions are added to the local airshed- especially during these times of year. At Page 6-23, the company explains that '…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.' We wonder whether consideration was given to the very real possibility of long, hot, dry summers when dust mitigation will be far more challenging. We have seen both extremes in the Hamilton area – very wet summers, but also very dry summers. The proponent must be prepared for either extreme as we continue to see each of these extremes with climate change.	Terrapure is committed to meet Ministry of Environment, Conservation, and Parks (MECP) air quality guidelines, as stated in Section 6 of the Draft EA Report. In order to meet this commitment, the existing Dust Management Plan will be updated to bring the plan into alignment with MECP's latest guidance "Technical Bulletin: management approaches for industrial fugitive dust sources" (updated February 14, 2018). With the updates to the Dust Management Plan, specific dust mitigation measures will be employed, as identified in the Draft EA Report. Specific dust mitigation measures will ensure that adverse air impacts are managed throughout the operations at the SCRF and during all weather conditions, including long, hot, dry summers and very wet summers. Daily watering will be carried out at the SCRF during long, hot, dry summer days if required.
Potential Effects on Noise At Page 6-25, the proponent explains that '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 may be the most impacted as they are either approaching or exceeding the current 55 dBA daytime noise limit for the landfill design Preferred Landfill Footprint. The increased height of the landfill in addition to the shortened separations distance to residential areas for the Preferred Landfill Footprint will result in a potential changes to the line-of-sight noise impact exposure to the off-Site residential dwellings.' The proponent then goes on to state that '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, no noise impact management measures are required.' This latter statement seems to contradict the highlighted information above. We would like additional explanation regarding noise impacts and the need for mitigation. We note, further, that the proponent acknowledges at Page 6-37 that 'The closest residential dwelling (currently under construction) is located approximately 35 m north of the Site.'	All PORs will meet the current MECP noise limits or future Site-specific noise limits. **Section 6.2.1.5** will be revised to clarify this. Based on the proposed equipment and operating locations, Terrapure will meet the minimum MECP noise limit of 55 dBA during phases 1-2 of the SCRF expansion. In the future it is predicted that there will be a new site specific limit of 60 dBA resulting from the completion of the new residential developments. The reason for this increased limit is the associated increase to the volume of road traffic from these developments which will increase the background noise levels in the area. Phases 3 and 4 of the SCRF expansion are expected to begin after these new residential developments are completed and are therefore assessed against these elevated site specific noise limits. Based on the proposed equipment and operation locations, Terrapure will be in compliance with these elevated site specific limit during Phases 3 and 4 of the SCRF expansion.

Table 7.9 Public Stakeholder Comments on SCRF Draft EA and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
Estimated Sensitivity of the Proposed Undertaking to Climate Change While we appreciate that the proponent opted to consider climate change when assessing the preferred option, we are concerned that the assessment is not rigorous enough. At Page 6-69, Table 6.33 provides an assessment of sensitivity to climate impacts during construction, operation, closure and post-closure. One specific climate parameter considered is *Frequency and/ or Severity of Precipitation and Weather Extremes*. For this parameter, an 'estimated sensitivity to climate change' is assessed at LOW for each stage of landfill operation based on the explanation that: '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.' Again, as we have already stated in a section above, in recent history (between 2009 and 2018) there have been at least two extreme rainfall events (>100 year storm) within the vicinity of the landfill facility. There is a need to consider a larger than 100 year storm event when assessing the potential impact of extreme rainfall on the landfill – particularly on the facility's stormwater management systems. We simply do not accept the proponent's assessment that the sensitivity is LOW for this climate parameter.	The detailed impact assessment of the Preferred Landfill Footprint (**Section 6.34**) assessed the risks of increased climate change effects on the Undertaking including the frequency and/or severity of precipitation and weather extremes. The assessment adhered to the following provincial and federal guidelines for climate change considerations: • Consideration of Climate Change in Environmental Assessments in Ontario (Ministry of the Environment and Climate Change) • Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners (Canadian Environment Assessment Agency) The data used for the analysis, the Rainfall Intensity Duration Frequency (IDF), meets the current guidance requirements. The stormwater management system has been designed to accommodate a Regional storm, which is much greater than the historical daily maximum precipitation amount of 107 mm and the rainfall depth estimated for the 100-year storm event for the SCRF of 127.8 mm.
Assessment of potential to divert waste streams from the landfill site In our submission on the draft Terms of Reference, we raised the possibility that there are waste streams being received at the Stoney Creek facility that could be diverted because they are waste streams *that are being diverted* in other jurisdictions. One example we highlighted in our submission is foundry sand. It is our understanding that other jurisdictions have made progress in ensuring materials like this are reused rather than landfilled. We readily found detailed information through the United States Environmental Protection Agency that speaks specifically to the need to and viability of recycling spent foundry sand from the iron and steel sector (see https://www.epa.gov/smm/beneficial-uses-spent-foundry-sands). The fact that this waste stream is being actively diverted in other jurisdictions led us to ask why this is not the case in Ontario and, further, why this would be referred to as a waste stream for which all recycling options have been exhausted. We hope that, as part of its efforts to 'evaluate the feasibility and viability of implementing an on-site diversion program as part of the environmental assessment process', the company seriously explores all of the opportunities to divert waste streams – including streams that may not currently be diverted in Ontario, but are being actively and effectively diverted in other nearby jurisdictions like the United States.	As per the Minister-approved Amended Terms of Reference, an assessment on the feasibility and viability of on-site diversion at the SCRF is included in **Section 6.5** of the EA Report. As stated in **Section 6.5**, the diversion technologies available would not be technically feasible or economically viable, and the infrastructure associated with the technologies would require greater space than currently available on-site at the SCRF. Terrapure will continue to investigate emerging technologies for potential diversion options, both on and off-Site, as part of providing services to the marketplace that minimize waste and maximize the recovery or recycling of valuable industrial by-products.
Section 7 – Public and Agency Consultation	
Page 7-71: the document still has the old incorrect answer to Open House #3 where Terrapure incorrectly stated "We have selected a preferred option with the lowest height of all options". Terrapure has subsequently acknowledged this error, and that correction needs to be included in this document.	This statement will be corrected.
General	
I believe that there are many things that are wrong with the Draft EA that I have articulated above, but none more important than my comments from the Executive Summary section page ES-1. The company reached an agreement with the MOE in 2013 to add 4.5 meters in height to 41.6 hectares of the site in return for committing to put clean industrial fill in the remaining 17.1 hectares closest to the new housing community. The company has fully taken advantage of the change to add the 4.5 meters in height to the 41.6 hectares, but has totally reneged on their commitment to put clean industrial fill in the remaining hectares. That in itself should disqualify Terrapure from achieving a successful result to a subsequent EA. Consequently, I call on the MOE to stop the EA process at this time and reject the Draft EA based on Terrapure's failure to comply with the actions from the 2013 EA agreement.	Comment noted.
We have also reviewed the staff report prepared for the City of Hamilton and presented at the September 18, 2018 Planning Committee meeting. In that report, planning staff reiterate that Hamilton City Council continues to oppose the proponent's application to increase the capacity of the landfill. Staff also provided a list of outstanding concerns that they indicate have not yet been adequately addressed by the proponent. Some of these items appear to be significant and we are interested in being kept informed about Terrapure's response to these items.	All responses to comments received on the Draft EA Report will be documented in **Section 7.10** of the Final EA Report and be available for review by all stakeholders including Environment Hamilton.
We would also like to restate the concerns we raised in our submission on the draft Terms of Reference, because these concerns continue to exist for us within the context of this proposal to expand the capacity of the Terrapure landfill. In reviewing information about residential development activity around the landfill site, we learned that municipal planning decisions were influenced by the changes to the landfill footprint that were approved back in 2013. Holding provisions were lifted and tracts of land developed as a result of the 2013 changes. We therefore continue to be very concerned that Terrapure has put forward a preferred option that impacts on landfill footprint and height and reduces the buffer zones between potential landfilling areas and current and future residential developments. While we understand that the development decisions were made at the municipal level, there are implications as far as this landfill and the nature of potential future activities at the site and the impact of these activities on surrounding, sensitive land uses. Terrapure does acknowledge that there are and will be residences in close proximity to the site, but no details are provided regarding the dynamic that has evolved where municipal planning and MOECC Guideline D-4 related assessments and requirements are concerned.	As documented in Section 6.2.1 of the Draft Land Use and Economic Impact Assessment Report, the potential effects of the Preferred Landfill Footprint on future approved and planned land uses was assessed. It was determined that the Preferred Landfill Footprint, and relative 30 m buffer, will have no impact on approved and planned residential development. With regards to the lifting of the holding provisions, in order for the Hold to be lifted on Empire's lands, the developer had to meet and satisfy 3 conditions, only one of which was attached to Terrapure lands (SCRF), but with no specific reference to the operating landfill itself: "That all residential lands within 160 metres of the working licensed limits of an active quarry or the limits of a former quarry under rehabilitation shall not be developed until such time as the completion of mining and the completion of rehabilitation on the quarry lands immediately adjacent to the residential holding zone have been finalized to the City's satisfaction." Terrapure is not aware of a document that addresses the above noted condition of the Hold provision. If the City used the 2013 amendment to the SCRF footprint as part of its justification to remove the Hold, then only the limit of waste changed. Industrial fill was still approved to be placed within 30m from the property boundary, in order to continue the rehabilitation of the former quarry lands, matching the previously approved landfill footprint limit of waste. This would also correspond with the limits of the former east quarry. Since the lifting of the holding provisions is not directly related to the potential adverse effects of the Preferred Landfill Footprint on approved or planned land uses, this information was not included in the Draft EA Report. The Landfill Impact Assessments, conducted in accordance with Guideline D-4 (i.e., the reports completed by MTE, AMEC and UrbanTech) concluded that the SCRF did not pose an issue or risk to the proposed development lands. This information will be added to the Final Land Use and Economic Impact Assessment Report.

Table 7.9 Public Stakeholder Comments on SCRF Draft EA and Consideration by Terrapure

Comment Received from Member of the Public	How the Comment was Considered
The reality is that there are implications should the proponent secure approval to revert back to a larger footprint for solid, non-hazardous industrial residual waste at this site. The site reconfiguration set out in Option 5 has implications for 'sensitive use' developments that are already happening or proposed for the future. Even the more detailed 'Supporting Document #3 – Land Use and Social Environment Existing Conditions Report' fails to get into these details and the understandings regarding development challenges caused by the proximity of the landfill to these residential areas. This list of reports provided information to us regarding the challenges around residential development surrounding the landfill site that has already been developed, is currently under development, or is proposed for future development: MTE Consulting. February 8, 2010. Red Hill Developments, Empire Communities & 706870 Ontario Limited Nash Neighbourhood – FINAL – Revised Landfill Impact Assessment. AMEC. September 20, 2010. Peer Review of the Revised Landfill Impact Assessment dated 14 September 2010 for the Proposed Red Hill Developments, Empire Communities and 706870 Ontario Limited Nash Neighbourhood Hamilton, Ontario. 6 UrbanTech West. October 2, 2014. Amendment to the Review Landfill Impact Assessment Report – Redhill Developments, Empire Communities and 706870 Ontario Limited.	The potential adverse effects of the Preferred Landfill Footprint on the surrounding existing, approved and planned development were assessed as part of the EA taking into account the last 20 plus years of operations at the SCRF. With the operations history in mind, the potential adverse effects on the surrounding development from the Preferred Landfill Footprint are anticipated to be as follows: • Noise • Odour • Visual Similar to how the current operations at the SCRF are managed, the preceding potential adverse effects will be minimized by applying industry standard impact management measures such as: • Maintain buffers for nuisance reduction; • Basic landfill operations for nuisance mitigation; and • Best Management Practices (BMPs) for nuisance mitigation. The preceding information is documented in the Draft Land Use and Economic Impact Assessment Report (August 31, 2018). In addition, as mentioned, the MTE, AMEC and UrbanTech reports indicated that the SCRF did not pose an issue or risk to the proposed development lands. This information will be added to the Final Land Use and Economic Impact Assessment Report.
In conclusion, we appreciate the opportunity to provide input on the Individual Environmental Assessment Draft EA Documentation. We have provided some detailed input on issues and concerns related to what we reviewed in the documentation and we have reiterated concerns raised in our submission on the draft Terms of Reference. We also want to restate our opposition to Terrapure's application to expand the capacity of this landfill site. At the bigger picture level, we do not believe that it is appropriate to expand an industrial landfill in this location, given the amount of residential development that has taken place surrounding the site over recent years.	Comment noted.

7.11 Submission of the Environmental Assessment

In accordance with the MECP's Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario (January 2014), the SCRF EA Report was submitted to the MECP for a decision by the Minister of the Environment, Conservation and Parks on the proposed undertaking. The formal review period for the SCRF EA Report started on January 11, 2019.

7.11.1 Availability for and Notification of the Review of the SCRF EA

The SCRF EA Report was available for review on the project-specific website (www.terrapurestoneycreek.com) and at the following locations from January 11 to March 1, 2019:

- Terrapure's Stoney Creek Regional Facility Administrative Office (65 Green Mountain Road)
- City of Hamilton Valley Park Library
- City of Hamilton's Clerk's Office
- Ministry of the Environment, Conservation and Parks West Central Region Office (Hamilton)
- Ministry of the Environment, Conservation and Parks Environmental Assessment and Permissions Branch (Toronto)

Notifications of the availability of the Draft SCRF EA Report for review was provided through the following means:

- Advanced courtesy notice by email/telephone calls to City of Hamilton Mayor Fred Eisenberger, Brad Clark (Ward 9), Maria Pearson (Ward 10)
- Advanced courtesy notice by email to Terrapure SCRF Community Liaison Committee
- Emailing of the SCRF EA Report Notification to all review agencies and Indigenous communities, on December 14, 2019 in advance to the release of the Draft EA Report.
- Mailing or emailing of the SCRF EA Report to all review agencies and Indigenous communities, on January 11, 2019
- Direct mailing and emailing to SCRF EA contact database including City of Hamilton Council, members of the public and property owners adjacent to the SCRF between January 10-11, 2018.
- Emailing or mailing to all interested public members in the SCRF EA contact database, and property owners adjacent to the SCRF on January 11, 2019
- Advertisement in the Stoney Creek news on January 10, 2019 and Hamilton Spectator on January 11, 2019
- Posting on the SCRF EA project website on January 11, 2019
- Distribution of flyers to approximately 8,000 addresses within the SCRF Study Area using Canada Post's unaddressed admail between January 10-11, 2019
- Mobile sign along Upper Centennial Parkway with details for the Draft EA Report from January 11-25, 2019.

The preceding notification materials are included in in **Vol. 3 Appendix O**.

7.12 Commitments for Ongoing Consultation

Subject to approval being received by the Minister of the Environment, Conservation and Parks, Terrapure is proposing to continue consultation during the construction and operation of the proposed capacity increase for residual material at the SCRF. In particular, the following activities are proposed:

Review Agencies

- Consult with review agencies through meetings and correspondence on an as-needed basis during design and construction to discuss issues related to their agencies' mandates, such as the permits and approvals identified in **Section 9** required prior to construction or operation.
- Terrapure will undertake the following as part of ongoing consultation with review agencies:
    - Provide the Hamilton Conservation Authority with the Stormwater Management Plan post-approval during the Design Stage.
- Complete a survey of the surrounding properties downgradient of the SCRF to identify private wells to be included, where appropriate, in the groundwater monitoring program.
    - Compensation agreements with the City of Hamilton and Heritage Green Community trust will remain in force. The terms will be reviewed should the proposed Undertaking be approved.
    - Re-calculate reasonable Use Criteria (RUC) values for the 2018 Annual Monitoring Report.
    - Following completion of the residential development to the north of the Site, complete additional traffic counts to validate modelling assumptions and proposed site specific limits.
    - Include an assessment of a variety of events from the 2-year to 100-year storm events for pre-landfill and Preferred Landfill Footprint in accordance with the Ministry document "Stormwater Management Planning and Design Manual, March 2003", if future stormwater-related amendments to Environmental Compliance Approval (ECA) No. A181008 and/or Industrial Sewage Certificate of Approval No. 5400-7DSSHU are undertaken.
    - Include the following in the application to amend ECA No. A181008:
- The equations and calculations for each method used.
- A direct comparison to the calculations done previously to estimate a Contaminating Lifespan of between 200-300 years which highlights the assumptions which are now being changed; particularly the ones that decrease the estimate by such a significant amount.
- Any assumptions being changed should be supported by a rationale, including data/evidence collected from the existing landfill site.
- Consideration to expanding the list of contaminants used to calculate the contaminating lifespan.
- Any assumptions made should err on the conservative side.

Indigenous Communities

- Continue to inform Indigenous communities of project updates and provide the opportunity for topic-specific meetings on an as-needed basis.
- Consider future requests by the Mississaugas of the New Credit First Nation for ongoing consultation following the EA including but not limited to site tours and monitoring or habitat restoration, at their request.
- Provide the Mississaugas of the New Credit First Nation with the Environmental Management Plan (EMP) for their information.

Public

- Continue to release an annual report highlights for the operations of the SCRF.
- Maintain the CLC and utilize the existing CLC website for public communications about SCRF.
- Where possible, use native vegetation as implementation for additional visual screening around the SCRF.

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8. Commitments and Monitoring of the Undertaking

To ensure that the proposed impact management 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 Landfill Footprint to ensure that:

- Predicted net effects are not exceeded
- Unexpected negative effects are addressed
- Predicted mitigation effects are realized

Table 8.1 below summarizes 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
Land Use	Existing environmental monitoring programs identified in the Facility Characteristics Report (FCR) (i.e., leachate, groundwater, surface water, landfill gas) and periodic program updates and adaptations Maintain buffers and other visual impact management measures (i.e. fencing and vegetation).

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.

In light of the importance of the Hydraulic Control Layer (HCL) as a means of providing early detection of leachate leakage through the primary liner, the long-term monitoring program will include a sampling program for the HCL. This sampling program will involve quarterly monitoring of HCL water quality at various points within the HCL. The exact sampling locations which can be accessed within the HCL will change as the Site develops and additional cells are constructed. Accordingly, the monitoring program will need to evolve to accommodate changing conditions. It is recommended that 4 discrete sampling points within the HCL are accessed during each monitoring event. Ideally sampling points are located on all 4 sides of the HCL. The HCL monitoring program (***defined in Table 7.1 of Appendix J-1 – Geology and Hydrogeology Detailed Impact Assessment Report***) includes provisions for modifying sample locations to suit the configuration of the HCL as Site development progresses.

In addition, once the Site is fully constructed, the long-term monitoring program will include monitoring of water levels within the HCL to ensure that the inward hydraulic gradient between the HCL and the landfilled waste is maintained. This monitoring would be completed by measuring static water levels at selected reference locations within the HCL and calculating the static water elevation from these measurements. This monitoring data will be used to verify that the static water elevation within the HCL is continuously maintained above the elevation of leachate mounding within the waste or leachate collection system.

As part of the ongoing groundwater monitoring program, a survey of surrounding properties downgradient of the SCRF will also be undertaken in order to identify private wells providing drinking water, and these wells will be included in the groundwater monitoring program, as applicable. Private wells will be included in the monitoring program if permission is granted by the property owners or tenants

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 stormwater management (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 will be implemented 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

8.1.3.1 Erosion and Sediment Control/Wildlife Exclusion Fencing

Dual purpose erosion and sediment control (ESC) and wildlife exclusion fencing will be inspected on a regular basis during construction 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.

8.1.3.2 Vegetation

The vegetation monitoring program will 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.

8.1.3.3 Species at Risk

Monitoring requirements related to Species at Risk (SAR) are specified as part of the applicable Notice of Activity protocol – should this be required. Further details are provided below in **Table 8.2**.

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) 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. The results of monitoring will be documented as part of the annual reporting process.

8.1.5 Noise Monitoring

As part of required semi-annual noise monitoring, a survey was completed in 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. The results of monitoring will be documented as part of the annual reporting process.

8.1.6 Land Use Monitoring

The current environmental monitoring programs identified in the FCR (**Appendix K**) (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. Buffers will be maintained and visual impact management measures including vegetation and fencing will be maintained and monitored in accordance to the Site's operating plan.

8.2 Development of Environmental Management Plans, Best Management Practice Plans, and Compliance Monitoring Program

Environmental Management Plan (EMP) and/or Best Management Practice (BMP) Plans identified in the Impact Assessment Reports (**Appendix J**) will be prepared following approval of the proposed Undertaking by the Minister of the Environment, Conservation and Parks (Minister), and prior to construction associated with the approved Undertaking. The EMP and/or BMP Plans will identify a description of the proposed impact management measures, commitments and monitoring, as well as a description on the standard BMPs that are currently in place at the Site that will continue. Copies of current BMP Plans and Standard Operating Procedures in place at the SCRF are included in **Appendix M**.

The EMPs and BMP Plans are tools by which Terrapure can demonstrate how the EA commitments and monitoring requirements have been addressed through subsequent construction, operation and closure/post-closure stages.

As per Section 4.3.5 of the Ministry of the Environment, Conservation and Parks (MECP) Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario, January 2014, if the proposed Undertaking is approved by the Minister under the *EA Act*, Terrapure will report to the MECP on how the monitoring framework was complied with. If the proposed Undertaking is approved by the MECP under the *EA Act*, Terrapure will prepare an EA Compliance Monitoring Program in order to fulfil this reporting requirement, which will include all of the commitments outlined in **Table 8.3**, as well as any *EA Act* Conditions of Approval.

Following establishment of the EA Compliance Monitoring Program, Terrapure will report annually on how they fulfilled the commitments until all commitments are fulfilled. The results of EA Compliance reporting will be retained at the SCRF office. The results will also be made available to the MECP, upon request, in accordance with the Ministry's Codes of Practice for Preparing a Reviewing Environmental Assessments in Ontario, January 2014.

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 Report Section -** Where the specific commitment can be found in the EA
- **EA Commitment -** Specific commitment made in the EA
- **Basis of Commitment -** Company/Agency responsible for commitment
- **EA Compliance Monitoring -** Mechanism(s) by which the commitment will be monitored to ensure fulfilment
- **Commitment Timing -** Appropriate stage of the undertaking during which commitment is to be implemented (e.g., pre-implementation, ongoing)

Table 8.3 SCRF EA Commitments and Compliance Monitoring

Category	EA Report Section	EA Commitment	Basis of Commitment	EA Compliance Monitoring	Commitment Timing
General	6.7	Implement the impact management measures as outlined in **Table 3.37** (**Section 6.7**), unless they are determined and documented to be no longer applicable or required	Terrapure	Confirm impact management measures have been implemented	Pre-implementation of Undertaking; ongoing and post-closure
	6.7, 8.1	Implement the monitoring programs as outlined in **Table 3.37** (**Section 6.7**) and **Section 8.1** unless they are determined and documented to be no longer applicable or required.	Terrapure	Confirm monitoring programs have been implemented	Pre-implementation of Undertaking; ongoing and post-closure
	8.2	Prepare an Environmental Management Plan (EMP) and/or Best Management Practice (BMP) Plans following approval of the proposed Undertaking. The EMP and/or BMP Plans will identify a description of the proposed impact management measures, commitments, and monitoring, as well as a description on the standard best management practices (BMPs) that are currently in place at the Site that will continue.	Terrapure	Confirm EMP and/or BMP Plan(s) have been prepared prior to implementation of the Undertaking.	Pre-implementation of Undertaking
	8.2	Prepare a Compliance Monitoring Program following approval of the proposed Undertaking, which will include the commitments outlined in **Section 8.3** as well as any EA Act conditions of approval. Report annually on how commitments have been fulfilled until all commitments are fulfilled.	Terrapure	Confirm Compliance Monitoring Program have been prepared prior to implementation of the Undertaking	Pre-implementation of Undertaking
	8.4	Review and modify existing contingency plans.	Terrapure	Confirm contingency plans have been reviewed/modified prior to implementation of the Undertaking.	Pre-implementation of Undertaking
	9	Acquire all necessary permits/approvals, as outlined in **Section 9**.	Terrapure/MECP	Confirm permits/approvals are obtained prior to implementation of the Undertaking.	Pre-implementation of Undertaking
Archaeology	6.2.5.2	Should previously undocumented archaeological or indigenous resources be discovered during construction, Terrapure will cease alteration of the Site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Sec. 48 (1) of the Ontario Heritage Act. In accordance with the Funeral, Burial and Cremation Service Act, 2002 should Terrapure discover human remains, the police or coroner and the Registrar of Cemeteries, Ministry of Small Business and Consumer Services will be notified immediately.	Terrapure	Confirm no previously undocumented archaeological or indigenous resources are discovered during construction	Pre-implementation of Undertaking

Table 8.3 SCRF EA Commitments and Compliance Monitoring

Category	EA Report Section	EA Commitment	Basis of Commitment	EA Compliance Monitoring	Commitment Timing
Human Health	6.5.2.2	Continue to undertake the Community Health Assessment Review as part of the Annual Monitoring Report for the SCRF.	Terrapure	Verify annually that this review has been conducted	Pre-implementation of Undertaking; ongoing
Ongoing Consultation	7.12	Consult with review agencies through meetings and correspondence on an as-needed basis during design and construction to discuss issues related to their agencies' mandate, such as the permits and approvals identified in **Section 9** required prior to construction or operation.	Terrapure	Confirm permits and approvals have been obtained.	Pre-implementation of Undertaking
	7.12	Provide the Hamilton Conservation Authority with the Stormwater Management Plan post-approval during the Design Stage	City of Hamilton	Confirm the Hamilton Conservation Authority has received the Stormwater Management Plan	Pre-implementation of Undertaking
	7.12	Re-calculate reasonable Use Criteria (RUC) values for the 2018 Annual Monitoring Report and provide to the City of Hamilton.	City of Hamilton	Confirm updated RUC values are included in 2018 Annual Monitoring Report	Pre-implementation of Undertaking, ongoing
	7.12	The potential visual screening measures presented in **Section 6.2.2.1** will be finalized following approval of the Undertaking, and implemented, as appropriate.	MECP, City of Hamilton	Confirm visual screening measures have been implemented, as appropriate	Pre-implementation of Undertaking, ongoing
	7.12	Continue to inform Indigenous communities of project updates and provide the opportunity for topic-specific meetings on an as-needed basis.	Terrapure	Confirm Indigenous communities are consulted, as required.	Pre-implementation of Undertaking; ongoing
	7.12	Consider future requests by the Mississaugas of the New Credit First Nation for ongoing consultation following the EA including but not limited to Site tours and monitoring or habitat restoration, at their request	Mississaugas of the New Credit First Nation	Confirm requests by the Mississaugas of the New Credit First Nation are considered	Pre-implementation of Undertaking; ongoing
	7.12	Provide the Mississaugas of the New Credit First Nation with the Environmental Management Plan (EMP) for their information	Mississaugas of the New Credit First Nation	Confirm the EMP is provided to the Mississaugas of the New Credit First Nation	Pre-implementation of Undertaking
	7.12	Continue to release an annual report highlights for the operations of the SCRF	Terrapure	Verify in Annual Facility Reporting that these commitments have been fulfilled.	Pre-implementation of Undertaking; ongoing
	7.12	Maintain the Community Liaison Committee (CLC) and utilize the existing CLC website for public communications about the Stoney Creek Regional Facility.	Terrapure	Confirm the CLC is maintained	Pre-implementation of Undertaking; ongoing

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 Environmental Compliance Approval 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 existing contingency plans that will be modified as required. Copies of these plans are included in **Appendix M**.

Table 8.4 Contingency Plan Overview

Contingency Plan	Contingency Plan Summary
Emergency Response Plan	This plan includes the following components: • Hazardous substances and their locations • Types of potential emergencies • Pre-emergency planning and training • Roles and Responsibilities • Recommended alerting procedures • Response equipment • Personal protective equipment • Standard operating procedures • Reporting requirements and notifications • Post emergency procedures
Landfill Fire Safety Plan	The Fire Safety Plan is designed to: • provide occupant safety in the event of fire, • to provide effective utilization of the fire safety features of the building • to minimize the possibilities of fires This plan outlines: • what occupants are to do in the event of a fire • fire safety • functions and responsibilities of supervisory staff and • other related duties and issues pertaining to this plan This plan includes the following components: • Description of buildings • Human resources • Fire wardens • Fire plan distribution • Occupant fire procedures • Emergency procedure signage • Fire extinguishment/control/confinement • Control of fire hazards • Roles and responsibilities • Evacuation of persons requiring assistance • Fire drill procedures • Fire drill reporting • Testing, maintenance, of building fire safety and life safety systems
Noise/Odour/Dust/Drag-out Control Procedures	The purpose of this plan is to outline the procedure if noise, odour, dust, or drag-out is detected within or around the perimeter of the landfill Site. This plan includes the following components: • Hazard Assessment & Identification • EHS Requirements • References (Terrapure Safety Handbook, Dust Management Plan, etc.)
Stormwater Contingency and Remedial Action Plan	The purpose of this plan is to outline the contingency and remedial action measures associated with the stormwater management facility at the SRCF. This plan includes the following components: • brief overview of the Stormwater Management Facility • summary of the monitoring and recording requirements • list of contingency actions • list of remedial actions that have been developed

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9. Approvals Required for the Undertaking

In addition to *Environmental Assessment (EA) Act* approval, there are other approvals that are anticipated to be required in order to implement the proposed Undertaking at the Stoney Creek Regional Facility (SCRF). Potential additional approvals were identified in the Minster-approved Amended Terms of Reference (ToR), with a commitment to confirm them as part of carrying out the SCRF EA. The potential additional approvals expected were confirmed during the "Impact Assessment" stage of the SCRF EA. The additional approvals anticipated to be required are described below and have been grouped by agency.

9.1 City of Hamilton

No post-*EA Act* approvals are required from the City of Hamilton to implement the proposed Undertaking. However, 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.

As a result, 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 SCRF post-closure.

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 existing sewer use agreement will remain in effect for the proposed Undertaking. Should any modifications be proposed to the leachate discharged from the SCRF (e.g., location of connection to sanitary sewer), then the existing agreement would need to be amended in consultation with the City.

9.2 Hamilton Conservation Authority

A portion of the northeast corner of the SCRF is located in the Hamilton Conservation Authority Regulated Area. As a result, alterations to the drainage within the regulated area related to the stormwater management ponds may require approvals from the Hamilton Conservation Authority.

9.3 Ministry of the Environment, Conservation and Parks

Environmental Compliance Approval

An application to amend the existing Environmental Compliance Approval (ECA) A181008 for the Site will need to be submitted to the Ministry of the Environment, Conservation and Parks (MECP) for approval. Changes to the design and operations of the landfill required as a result of the proposed Undertaking will be documented in an update to the existing Design and Operations (D&O) Report for the SCRF. Specifically, the D&O Report and ECA will include a comparison of the previous and revised contaminating lifespan calculations, including the assumptions, equations and calculations used, the rationale for the change, and the evidence that supports the change.

The updated D&O Report and amended ECA will include details of any changes required to the approved on-Site stormwater management system. This will include an assessment of a variety of events from the 2-year to 100-year storm events for pre-landfill and Preferred Landfill Footprint in accordance with the Ministry document "Stormwater Management Planning and Design Manual, March 2003". Any changes would also be documented through an amendment to existing ECA 5400-7DSSHU for Industrial Sewage Works. No other approvals are expected to be required with respect to stormwater.

The collection and monitoring of groundwater in the vicinity of the SCRF is governed by Permit To Take Water (PTTW) Number 6543-9ZGNU5 issued by the MECP. No changes are anticipated to the existing PTTW as a result of the proposed Undertaking, which will be up for renewal in 2025.

In addition, the updated D&O Report and amended ECA will include any additional noise sources associated with landfill operations. No other approvals are expected to be required with respect to noise. The Facility is not required to register for an Environmental Activity and Sector Registry (EASR) or apply for an ECA (noise) under current regulations.

No further approvals are required from an air quality and odour perspective. As previously stated, the types of material accepted at the SCRF generate very little landfill gas and the MECP has previously exempted the SCRF from requiring a gas collection system, however, should approval under the *EA Act* be granted for the proposed expansion, Terrapure may have to re-apply for an exemption to the requirement to have a landfill gas collection system under O.Reg. 232/98. The SCRF is not required to register for an EASR or apply for an ECA (air) under current regulations. The existing Dust Management Plan for the SCRF will continue to be implemented in order to ensure local air quality is maintained to regulatory standards.

9.4 Ministry of Natural Resources and Forestry

With respect to the Ministry of Natural Resources and Forestry (MNRF), a Notice of Activity process will be followed (if required) 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*. In addition, necessary approvals for fish/wildlife rescue activities (e.g., MNRF License to Collect Fish for Scientific Purposes) will be obtained prior to initiation of any in-water works at the SCRF, as appropriate.

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Glossary of Terms

Acronym	Definition
C of A	Certificate of Approval
C&D	Construction and Demolition
CDR	Conceptual Design Report
CEAA	Canadian Environmental Assessment Act
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada (formerly AANDC – INAC)
D&O	Design & Operations
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EA Act	*Environmental Assessment Act*
ECCC	Environment and Climate Change Canada
ECA	Environmental Compliance Approval
EPA	*Environmental Protection Act*
EPR	Extended Producer Responsibility
GHG	Greenhouse Gases
GRT	Government Review Team
HC	Health Canada
IC&I	Industrial Commercial and Institutional
ISWM	Interim Stormwater Management
MIRR	Ministry of Indigenous Relations and Reconciliation (formerly Ministry of Aboriginal Affairs)
MMAH	Ministry of Municipal Affairs and Housing
MNRF	Ministry of Natural Resources and Forestry
MECP	Ministry of the Environment, Conservation and Parks (formerly MOE, MOECC)
MTCS	Ministry of Tourism, Culture and Sport
MTO	Ministry of Transportation
OH	Open House
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
CLC	Citizen Liaison Committee
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
PWQMN	Provincial Water Quality Monitoring Network
SAR	Species at Risk
SCRF	Stoney Creek Regional Facility

Unit	Definition
ha	hectare
km	kilometre
L	litre
m	metre
m^3	cubic metres

Term	Definition
Approval	Permission granted by an authorized individual or organization for an undertaking to proceed. This may be in the form of program approval, certificate of approval or provisional certificate of approval.
Certificate of Approval	A license or permit issued by the Ministry of the Environment Climate Change for the operation of a waste management site/facility (now referred to as an Environmental Compliance Approval).

Term	Definition
Construction and demolition (C&D) waste	Solid waste produced in the course of residential, commercial, industrial or institutional building construction, demolition or renovation (e.g., lumber, brick, concrete, plaster, glass, stone, drywall, etc.).
Cover material	Material used to cover the waste in the disposal cells during or following landfilling operations. May be daily, intermediate or final.
Design and operations (D&O) plan	A document required for obtaining a Certificate of Approval, which describes in detail the function, elements or features of the landfill site/facility, and how a landfill site/facility would function including its monitoring and control/management systems.
Design capacity (Total Disposal Volume)	The maximum total volume of air space available for disposal of waste at a landfill site for a particular design (typically in m^3); includes both waste and daily cover materials, but excludes the final cover.
Environmental Compliance Approval (ECA)	Technical approval of the Facility issued by MOECC under Sections 9 and 27 of the *Environmental Protection Act* and Section 53 of the *Ontario Water Resources Act*).
Environment	As defined by the Environmental Assessment Act, environment means: (a) air, land or water; (b) plant and animal life, including human life; (c) the social, economic and cultural conditions that influence the life of humans or a community; (d) any building, structure, machine or other device or thing made by humans; (e) any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities; or (f) any part or combination of the foregoing and the interrelationships between any two or more of them (ecosystem approach).
Environmental Assessment	A systematic planning process that is conducted in accordance with applicable laws or regulations aimed at assessing the effects of a proposed undertaking on the environment evaluation criteria. Evaluation criteria are considerations or factors taken into account in assessing the advantages and disadvantages of various alternatives being considered.
Hazardous waste	Any residual hazardous materials which by their nature are potentially hazardous to human health and/or the environment, as well as any materials, wastes or objects assimilated to a hazardous material. Hazardous waste is defined by Ontario Regulation 347, and may be explosive, gaseous, flammable, toxic, radioactive, corrosive, combustive or leachable.
Indicators	Indicators are specific characteristics of the evaluation criteria that can be measured or determined in some way, as opposed to the actual criteria, which are fairly general.
Industrial, commercial and institutional (IC&I) wastes	Wastes originating from the industrial, commercial and institutional sectors landfill gas. The gases produced from the wastes disposed in a landfill; the main constituents are typically carbon dioxide and methane, with small amounts of other organic and odour-causing compounds.
Landfill site	An approved engineered site/facility used for the final disposal of waste.
Mitigation	Action(s) that remove or alleviate to some degree the potential negative effects associated with an activity.
Monitoring	A systematic method for collecting information using standard observations according to a schedule and over a sustained period of time.
Net Effects	Positive or negative environmental effects of a project and related activities that will remain after mitigation and impact management measures have been applied.
Non-hazardous waste	Non-hazardous wastes includes all solid waste that does not meet the definition of hazardous waste, and includes designated wastes, such as asbestos waste.

Term	Definition
Ontario Environmental Assessment Act	Legislation that defines a decision making process used to promote good environmental planning by assessing the potential effects of certain activities on the environment. The purpose of the Ontario *EA Act* is the betterment of the people of the whole or any part of Ontario, by providing for the protection, conservation and wise management in Ontario of the environment.
Potential Effect	An effect that is deemed possible to result from an activity.
Proponent	A person who: (a) carries out or proposes to carry out an undertaking; or (b) is the owner or person having charge, management or control of an undertaking service life. The period of time during which the components of a properly designed and maintained engineered facility will function and perform as designed.
Site life	The period of time during which the landfill can continue to accept wastes.