



# **Ridge Landfill Expansion Environmental Assessment**

**Design and Operations Work Plan (Final)**

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## 1.0 Project and Work Plan Overview

This Design & Operations work plan has been prepared to support the environmental assessment (EA) for the Ridge Landfill expansion and is based on the commitments made in the final amended Terms of Reference (ToR) for the EA that was approved by the Ministry of the Environment, Conservation and Parks (MOECP) in May of 2018.

Waste Connections of Canada (Waste Connections) is proposing an expansion of the Ridge Landfill in order to continue to provide long-term residual disposal capacity for the company's large IC&I customer base and as a regional and inter-regional waste management facility to serve the projected increase in population and economic growth in southern and central Ontario.

WCC owns approximately 334 hectares (ha) of lands west of Erieau Road and an approximately 21 ha property east of Erieau Road. The existing Landfill Site Area, which is permitted by an ECA from the MOECP for waste management and environmental work purposes, is 262 ha. The area within which waste disposal is permitted, called the Waste Fill Area, is 131 ha or half of the Landfill Site Area. As of December 2017, it is estimated that the existing Waste Fill Area at the Ridge Landfill site will provide waste disposal capacity until approximately 2021 at the current fill rate.

The current approved capacity for the Ridge Landfill is 21 million cubic metres (m<sup>3</sup>). The site is approved to accept a maximum of 1,300,000 tonnes of waste per year (the MOECP approved annual waste disposal rate). The EA does not propose to increase the maximum annual fill rate (this would remain as-is); however, Waste Connections is seeking the EA to increase the life of the facility for a 20 year planning period, from 2022-2041.

The waste being landfilled is approximately 98% IC&I waste and 2% residential waste. As part of the EA approval, Waste Connections would agree to reduce their IC&I service area from all of Ontario to just southern and central Ontario, and their residential service area from Chatham-Kent and the neighbouring counties of Essex, Lambton, Middlesex and Elgin, to only the Municipality of Chatham-Kent.

This work plan outlines the tasks to support the Design and Operations component of the Environmental Assessment approval for the new expansion. This work plan also includes the tasks to address the additional commitments associated with the Terms of Reference submission and approval.

A summary of additional commitments for the Design and Operations discipline is provided below.

Commitment	Reference to applicable section in EA or supporting document
Waste Connections will consider how climate change has the potential to impact the project and how adaptive measures can be incorporated into the site design. Waste Connections will identify and propose mitigation for the effects of the undertaking on climate change, and the effects of climate change on the undertaking, as part of the EA. Discussion of this topic in the EA will consider the MOECP's guidance document, <i>Consideration of Climate Change in Environmental Assessment in Ontario</i> .	Design and Operations work plan Section 2.0 with input from the Climate Change discipline
Waste Connections commits to developing a site plan during the EA that demonstrates that the Ridge Landfill property is adequate for the proposed expansion.	Design and Operations work plan Section 2.0.
<p>The leachate contaminating life span for groundwater will be assessed for the alternative methods and the preferred alternative method as follows:</p> <ul style="list-style-type: none"> <li>• The waste loading (tonnes of waste per footprint area) for each alternative method will be determined</li> <li>• Three leachate generation rates will be assumed per alternative method based on a natural cover, low permeability clay cover and a low permeability geosynthetic cover</li> <li>• Leachate characteristics used in the contaminating life span estimates will be taken from Table 1, Section 10 of O.Reg. 232/98</li> </ul> <p>The contaminating life span for each alternative method will be estimated adapting the method used by "Barrier Systems for Waste Disposal Facilities, 2nd Edition", by R. Kerry Rowe, Robert M. Quigley, Richard W.I. Brachman &amp; John R. Booker.</p>	Design and Operations work plan Section 2.0. with input from the Hydrogeology discipline
The landfill gas contaminating life span will be determined by modelling landfill gas generation rates for the site development alternative methods. The landfill gas generation model will indicate how long landfill gas will occur (contaminating life span). An assessment of the natural subsurface landfill gas migration potential, which is limited by low permeability soil, a shallow water table and surface water features, will also be included in the landfill gas contaminating life span assessment.	Design and Operations work plan Section 2.0. with input from the Hydrogeology discipline
Waste Connections acknowledges that the Design and Operations Report will need to be reviewed by Aamjiwnaang First Nation as it is advanced.	Design and Operations work plan Section 2.0.
The specific site development alternatives will be presented for consultation during the EA.	Design and Operations work plan Section 2.0.
The conceptual design/locations for stormwater management will be incorporated into the site development and the impact assessment of the preferred alternative.	Design and Operations work plan Section 2.0.
Technical cross-sections and a discussion on the relationships between geology, waste, leachate collection and surface water features will be included as part of the EA.	Design and Operations work plan Section 2.0.

Commitment	Reference to applicable section in EA or supporting document
<p>The EA will also consider how changing climate has the potential to impact the Project and how adaptive measures can be incorporated into the site design. This will be explored, specifically as it relates to the potential for extreme weather events to impact waste management infrastructure through power outages, physical damage, and stormwater management systems and reduced access to the site. Waste Connections will assess the potential effects of climate change on infrastructure components for the preferred undertaking and related potential risks to the environment resulting from these effects. The environmental assessment will include a consideration of climate change adaptation measures to reduce and manage such potential effects during the operation, construction, closure and post-closure phases of the undertaking. Waste Connections will use climate change assessment guidance documents that include, but are not limited to those issued by the Ministry of the Environment and Climate Change in the environmental assessment. The EA will include studies related to odour and greenhouse gas emissions when considering the preferred site development alternative.</p>	<p>Design and Operations work plan Section 2.0 with input from the Climate Change discipline and Surface Water discipline</p>
<p>The MOECP provides guidance by way of the "D-4 Land Use On or Near Landfills and Dumps" land use guidelines. The guidelines direct that several factors must be considered when land use is proposed near an operating landfill site. These include, but are not limited to, water contamination by leachate, odour, litter, dust, noise, surface runoff and landfill-generated gases. These will be considered as part of the technical studies completed as part of the EA.</p>	<p>Design and Operations work plan Section 2.0 for landfill gas and leachate. Odour, litter, dust, noise and surface runoff are addressed in their respective technical work plans.</p>
<p>The proposed expansion will be developed in phases over time. As such, the EA will consider the potential for impacts during construction, operation and post-closure of the proposed landfill expansion.</p>	<p>Design and Operations work plan Section 2.0.</p>
<p>Waste Connections will incorporate an assessment of landfill gas treatment or utilization alternatives for the expansion into the EA.</p>	<p>Design and Operations work plan Section 2.0.</p>
<p>A review of the existing leachate management system, including the Blenheim Waste Water Treatment Plant and associated piping, will be undertaken to confirm sufficient capacity for leachate management from an expanded landfill. As part of this review, Waste Connections will assess other reasonable long term leachate treatment alternatives.</p>	<p>Design and Operations work plan Section 2.0.</p>
<p>Mitigation measures will be incorporated into an overall mitigation and monitoring plan which Waste Connections will be required to implement if the EA is approved. The mitigation and monitoring plan will also include auditing of the mitigation measures to ensure they are working as planned. Contingency measures will be developed in the event that mitigation measures are not functioning properly.</p>	<p>Design and Operations work plan Section 2.0.</p>
<p>The proposed expansion will stay within the maximum height allowed for the airport.</p>	<p>Design and Operations work plan Section 2.0.</p>
<p>The design and operations facility characteristics of the preferred alternative method will be determined. Characteristics could include: modifying site contours, site preparation work such as clearing</p>	<p>Design and Operations work plan Section 2.0.</p>

Commitment	Reference to applicable section in EA or supporting document
<p>vegetation; moving existing features such as drains or existing landfill facilities; constructing of new landfill cells; modifying leachate, stormwater, and landfill gas management systems; and ongoing operation of the landfill. Closure and post-closure characteristics will also be developed. Facility design will also consider potential extreme weather effects on landfill infrastructure components and the goals to reduce phosphorus loading to Lake Erie as set forth in the Canada-Ontario Lake Erie Action Plan.</p>	

## 2.0 Background

### 2.1 Ridge Landfill Environmental Approvals

An Environmental Assessment (EA) for the first expansion of the Ridge Landfill was completed in January, 1997 by Dillon Consulting Limited (Dillon) for an additional capacity of 21,000,000 m<sup>3</sup>. The EA was approved on June 24, 1998. The first expansion received the Waste Environmental Compliance Approval No. A021601 on April 29, 1999.

Approval for a landfill gas management system was received on April 29, 2008 with the issuance of the Air Environmental Compliance Approval No. 7958-7BMQGT.

An Environmental Screening process was undertaken in 2011 to increase the daily maximum fill rate from 4,391 tonnes per day to 6,661 tonnes per day, and the annual maximum fill rate from 899,000 tonnes per year to 1,300,000 tonnes per year, including approved alternative daily cover. An amendment to the Waste Environmental Compliance Approval No. A021601 was issued March 15, 2012, approving these increased tonnage limits.

The Waste Environmental Compliance Approval No. A021601 was reissued on May 1, 2013 to consolidate all previous Waste approvals.

The Sewage Environmental Compliance Approval No. 3-1202-98-996 issued on February 22, 1999 for Ponds 4 and 5 was replaced by the Sewage Environmental Compliance Approval No. 3082-96EQPA issued on April 11, 2013 for Ponds 3, 4 and 5.

### 2.2 Study Area

For the purposes of the Design and Operations Scope of Work, the study area has been defined as follows:

- On-Site Study Area (“on-site”) – includes the property on which the current Ridge Landfill and proposed expansion is situated.

This is an appropriate study area for the Design and Operations discipline because it represents the location where design and operational changes will occur.

## 2.3 Site Development Alternatives

In anticipation to the proposed new landfill expansion, the Design & Operations (D&O) discipline prepared a Design Alternatives Report in 2015. The 2015 Design Alternatives Report identified the following expansion options:

- Lateral expansion of the West Landfill (Area A).
- Lateral and minor vertical expansion of the South Landfill (Area B).
- Development of a new landform east of the South Landfill (Area C).
- Mining the Old Landfill.
- Vertical expansion of the Old Landfill.

Three expansion alternatives combining the above options were identified in the 2015 Design Alternatives Report to provide landfill capacity for a 20-year planning period.

The expansion alternatives have been revised since the 2015 Design Alternatives Report was issued. **Table 1** below summarizes the current expansion alternative methods.

**Table 1: Summary of Site Development Alternatives**

Alternative	Composition	Disposal Capacity (millions of m <sup>3</sup> )	New Footprint Area (hectares)
1	A, B and full vertical expansion of the Old Landfill	29.8	58.8
2	A, reduced B, and full mining and full vertical expansion of the Old Landfill	29.8	53.7
3	A, B and C	29.8	82.5



## 3.0

## D & O Discipline Work Plan

### 3.1 Scope of Work Description

We divided our scope into three groups: EA Support, D & O Report and ECA Support as described below.

#### EA Support

The following tasks are proposed for the EA Support:

- Review and assist with the preparation of the EA criteria and indicator tables. Provide input to the options evaluation matrix. Consult with Dillon's *Drainage Act* specialist to discuss approvability requirements under the *Drainage Act*.
- Revise existing expansion concepts to reflect agreement between Waste Connections and one of their neighbours. The design will change to reflect or add flexibility to meet contractual obligations.
- Prepare figures for expansion alternatives 1, 2 and 3 (combining the Old Landfill and expansion areas A, B and C as currently contemplated).
- Prepare soil balances for expansion alternatives 1, 2 and 3.
- Prepare cost estimates for three expansion alternatives.
- Provide design and operations data, information and figures to air quality, dust and noise studies in regards to internal traffic routes and operation scenarios for different development stages of the landfill expansion.
- Provide input to other disciplines.
- Prepare D&O Report summary for the EA Report.
- Answer questions from MOECP, other stakeholders and the public during the EA approval.

#### D & O Report

Dillon prepared the Operation and Development Report in December 1996 to support the first landfill expansion approval. The Operation and Development Report was prepared before the Ont. Reg. 232/98 and before the Landfill Standards were published by the Ministry of the Environment, Conservation and Parks (MOECP).

A tentative to update the Operation and Development Report was made in 2011 concurrently with the Environmental Screening process to increase the maximum fill rates. The intent of the 1996 Operation and Development Report update was to reflect current operations and approvals in place at that time. No structural changes or attempt to change format and content to follow the 1998 Landfill Standards were made. The report update was not finalized in 2011 since it was not required for the increased fill rates approval.

In January 2012, the MOECP released a revised version of the Landfill Standards.

Once the preferred expansion alternative is selected through the EA process, we will prepare a D & O Report to support the applications for the proposed Ridge Landfill expansion under the Environmental Assessment Act (EAA), and also to support subsequent Environmental Compliance Approvals (ECA) under the Environmental Protection Act (EPA). A D & O Report will be prepared for the preferred proposed expansion alternative and will consider the approved 1996 Operation and Development Report, the unfinished draft report partially updated in 2011, current and proposed operations, approvals in place, Ont. Reg. 232/98 and the MOECP 2012 Landfill Standards.

The D & O Report will provide a detailed description of the site design and operations that should satisfy the MOECP approval requirements. The D & O Report will also be a document that will be used by operators and future detailed design and construction activities. The D & O Report will address the following key components:

- Regulatory and approval requirements.
- Estimated waste characteristics and quantities to be accepted.
- Site development plans and details, including limits and contours.
- Landfill capacity and soil balance.
- Landfill development sequencing.
- Leachate management. We will estimate leachate quality and quantity. Based on comments received from the MOECP we have included a task to assess on-site and off-site leachate management (see below).
- Landfill gas management. We will estimate landfill gas quality and quantity and prepare a conceptual design for the landfill gas collection system.
- Assessments of potential site impacts.
- Design and operation assumptions for the Site.
- Environmental controls to manage potential impacts from the Site.
- Monitoring, inspection, maintenance and reporting programs.
- Trigger mechanisms for the implementation of remedial measures, as part of a contingency plan.
- Site closure and post-closure description.

The following tasks will be completed for the preparation of the D & O Report:

- Attendance at one site meeting to establish/confirm baseline conditions. Collect information needed to reflect current operation practices and details, such as equipment and recent operations practices.
- Review and update site contours and mapping with the 2016 aerial flyover information that is expected to be available late June 2016.
- Review design files and other relevant background information such as reports prepared for the first landfill expansion and the current Environmental Compliance Approvals (ECAs).
- Refine and finalize waste limit, base and final contours.
- Refine and finalize landfill capacity and soil balance tables for preferred option.
- Review hydrogeo investigation report and other discipline reports for the proposed expansion. In particular, we will look for information that should be addressed in the proposed D & O Report.
- Update LFG generation.

- Update leachate generation model.
- Prepare facility characteristics summary table.
- Prepare a site plan showing current and proposed site features, including waste final contours, roads, berms, stormwater management ponds, ditches, municipal drains and flood control facility.
- Prepare a draft D & O Report. We expect to prepare the following Figures:
  1. Location Plan
  2. Existing Conditions
  3. Approved Final Contours and Stockpiles (Before Proposed Expansion)
  4. Proposed Final Contours and Final Cover Detail
  5. Phasing Plan
  6. Phasing Sections
  7. Landfill Perimeter Cross-Sections
  8. Proposed Base Contours
  9. Proposed Leachate Collection System
  10. Perimeter Road/Waste Interface Sections
  11. Leachate Collection System Details
  12. Landfill Gas Collection System (Final Buildout)
  13. Gas Extraction Well and Condensate Sump Sections and Details
  14. Groundwater Monitoring Program
  15. Surface Water Monitoring Program
- Address client's comments and finalize D & O Report.
- Attend 5 meetings in Oakville or Toronto and various conference calls related to the D & O report.

### ***Assessment of Leachate Management Alternatives***

This section outlines the technical review and assessment of options for leachate management. This task will focus on the alternative of the treatment of raw or pre-treated leachate at the Blenheim Sewage Treatment Plant (STP).

We will also add a controlled leachate recirculation option during the active life of the landfill, i.e. direct soaking at the working face as practiced at the Seneca Meadows Landfill.

The Blenheim STP provides treatment of wastewater for the former Town of Blenheim and Charing Cross, as well as for leachate that is pumped intermittently from the Ridge Landfill. The Blenheim STP consists of a variation of the New Hamburg process, and includes the following unit process: belt filter screen, two-cell aerated lagoon, four facultative lagoons and intermittent sand filters. The average day rated capacity of the Blenheim STP is 4,045 m<sup>3</sup>/d, and the plant is currently operating at 35% of its rated capacity, based on 2015 data.

According to the Municipality of Chatham-Kent's Water and Wastewater Master Plan Report dated May 2012 prepared by Dillon, the Blenheim STP appears to have no hydraulic restrictions or bottlenecks. The

Master Plan identified the need for the replacement of the existing New Hamburg process with a mechanical treatment plant based on:

- Need to meet current Environmental Compliance Approval (ECA) requirements for seasonal discharge.
- Sufficient future demand which approaches rated capacity of the system.

Future additional leachate volumes associated with the proposed Ridge Landfill expansion might trigger the need for expansion.

Dillon previously prepared a report in 2011 that included an assessment of current Ridge Landfill leachate quality and quantity, as well an assessment of the impact of estimated future leachate loading on the Blenheim STP. This report evaluated the pre-treatment of leachate upstream of the Blenheim STP, as well as a plant upgrade. The report noted that the Total Kjeldahl Nitrogen (TKN) and Biological Oxygen Demand (BOD) concentrations in the Ridge Landfill were found to be above the Sewer Use By-Law limits for a long period of time.

This task consists of the following scope of work:

- Review leachate characterization, as a function of landfill expansion and operation, including:
  - Leachate quality.
  - Leachate quantity.
  - This information will be used to identify the design load and flow rate for landfill leachate generated at the Ridge Landfill site. Literature data for leachate quality modeling will be used to estimate leachate quality as function of time for the design horizon. We may adjust the literature data to reflect historical site-specific data.
- Visit the STP site to confirm existing conditions and meet/discuss plant operations with Blenheim STP Operators.
- Review background information including leachate monitoring data and accumulated sludge monitoring data, including these parameters: Total Suspended Solids (TSS), BOD, heavy metals and chloride.
- Estimate combined sewage and leachate flow and loading rates for the design horizon to the Blenheim STP.
- Assess the capacity of existing WCC infrastructure, such as the leachate equalization tank, leachate pumping station and forcemain, as well as Chatham-Kent PUC infrastructure such as the Blenheim STP.
- Work with the Chatham-Kent PUC to prepare a calculation of the uncommitted reserve capacity of the Blenheim STP for current and future conditions, according to MOECP Procedure D-5-1.
- Identify, evaluate and screen alternatives for leachate handling and storage at the Ridge Landfill to satisfy future requirements. This will include controlled leachate recirculation.
- Evaluate alternatives for leachate pumping to the Blenheim STP, including pumping station and forcemain infrastructure, as well as odour control to meet future requirements.

- Evaluate alternatives for upgrade and/or expansion of the Blenheim STP to meet future requirements for Ridge Landfill leachate.
  - Future municipal wastewater projections will be based on the Chatham-Kent's Water and Wastewater Master Plan Report dated May 2012 prepared by Dillon.
  - Leachate pre-treatment requirements will be considered to reduce loadings of heavy metals, total suspended solids (TSS), and biochemical oxygen demand (BOD) to the Blenheim STP.
  - These treatment upgrade alternatives for the Blenheim STF will be evaluated based on their environmental impact to receiver (Cameron Drain), sludge quality and quantity and capital and operating costs, in addition to other evaluation criteria.
  - Plant upgrades will consider:
    - Upgrades to meet present effluent quality requirements as stated in the Blenheim STP CofA/ECA.
    - Upgrades to meet future effluent quality requirements in the case of new ECA for the Blenheim STP, and potentially more stringent effluent criteria.
  - Prepare an opinion of probable cost for the alternatives. This will be presented separately and may not be included in the report to be submitted to MOECP.
  - Present alternatives at a client meeting.
  - Summarize this work as an appendix to the Design and Operations Report, including the preferred design concept (including conceptual-level design details).

### **ECA Support**

Once the EA is approved, an ECA application will be prepared under the EPA. We allowed time to answer questions from MOECP, other stakeholders and the public during the ECA approval.

## **3.2 Assumptions**

We have assumed the following for this scope of work:

- The Howard Drain will be relocated. The other municipal drains will have capacity to accommodate post-development drainage and no changes will be made to those drains.
- The existing wood lots can be replanted to the north of the existing site access road.
- The site will be rezoned to accommodate the proposed expansion with no restrictions.
- No expansion to the north of the site access road.
- The existing site entrance, access road, scale house, administration building and maintenance building will not change.
- Mining will be contemplated at early stages of the EA process. A mining field investigation program will be completed under a separate task to enhance site-specific understanding. The D & O Report will not include a mining component.
- Processing facilities can be located on the east side of Erieau Road (will also require rezoning). Processing facilities will be shown on site plans, with no intent to approve processing operations at

this stage. Separate D & O reports for waste processing facilities will be prepared in the future under a separate scope if needed.

- We will not review technology options for leachate and landfill gas treatment/utilization alternatives. We assume the current concepts will be applied to the new expansion. The relocation of the existing leachate storage tank and the existing landfill gas flare will be considered.
- We assume the existing liner and leachate collection system will be applied to the expansion.
- Supporting documentation for OWRA approval for the proposed stormwater management system and leachate management system will be completed after the EA and EPA approvals under a separate scope.
- Drainage Act approval to relocate the Howard Drain will be completed under a separate scope after the EA approval.
- Conservation Authority approval for the stormwater management system and drain modifications will be completed under a separate scope after the EA approval.
- Climate change will be considered for the flood control facility. Landfill gas, leachate generation and other design components will not include mitigation allowance related to climate change. If available, we will summarize recent feasibility studies for landfill gas utilization such as electricity generation or gas treatment for pipeline grade.
- A geotechnical report will not be needed for the EA approval. Climate change considerations on slope stability will not be reviewed at the EA stage.

### 3.3 Deliverables

We will deliver a Draft D & O Report. Following review and comment of the draft report from Waste Connections, we will finalize and submit the Final D & O Report as part of the overall EA document.

We allowed time under this task to summarize D & O related information for the applicable sections of the EA Report.

The following is a draft table of contents for the D & O Report:

## **1.0 Introduction**

- 1.1 Purpose and Scope
- 1.2 Regulatory Requirements
- 1.3 Description of the Undertaking

## **2.0 Site Description**

- 2.1 Site Location
- 2.2 Site Boundaries
- 2.3 Land Use
- 2.4 Topography
- 2.5 Hydrology
- 2.6 Hydrogeology

## **3.0 Waste Quantities and Characteristics**

- 3.1 Service Area
- 3.2 Waste Quantities
- 3.3 Waste Characteristics

## **4.0 Expanded Fill Area Design**

- 4.1 Design Approach
- 4.2 Design Criteria
- 4.3 Limits of Landfilling
- 4.4 Base Contours
- 4.5 Final Contours
- 4.6 Landfill Capacity Calculations

## **5.0 Site Features**

- 4.1 Site Entrance
- 4.2 On-Site Roads
- 4.3 Weigh Scale and Scale House
- 4.4 Administration and Maintenance Buildings
- 4.5 Landfill Gas Management Facility
- 4.6 Leachate Pre-Treatment Facility
- 4.7 Storm Water Management Ponds
- 4.8 Flood Control Facility
- 4.9 Municipal Drains

- 4.9 Stockpiles
- 4.10 Screening Berms
- 4.11 Waste Processing Facilities
  - 4.11.1 Soil Processing
  - 4.11.2 Composting
  - 4.11.3 Recycling
  - 4.11.4 Wood Chipping
  - 4.11.5 Construction and Demolition Waste
  - 4.11.6 Existing Facilities

## **5.0 Surface Water Management**

- 5.1 Drainage Design Goals and Objectives
  - 5.1.1 Water Quality
  - 5.1.2 Flood Hazard
- 5.2 Plan Components
  - 5.2.1 Water Quality
  - 5.2.2 Flood Hazard

## **6.0 Leachate Management System**

- 6.1 Leachate Management Objectives
- 6.2 Leachate Management Philosophy
  - 6.2.1 Controlled Leaching of Contaminants
  - 6.2.2 Containment and Collection of Leachate
  - 6.2.3 Pre-treatment of Leachate
- 6.3 Leachate Characterization
- 6.4 Final Cover Design
- 6.5 Leachate Generation
- 6.6 Leachate Control System Design
- 6.7 Leachate Recirculation Option
- 6.8 Leachate Treatment Pre-Disposal
- 6.9 Leachate On-Site Pre-treatment Facility
- 6.10 Leachate Of-Site Treatability Assessment

## **7.0 Landfill Gas Management Systems**

- 7.1 Gas Management Objectives
- 7.2 Gas Management Philosophy
- 7.3 Gas Characterization



- 7.4 Gas Quantities
- 7.5 Gas Collection System
- 7.6 Gas Combustion
- 7.7 Condensate Management
- 7.8 Remedial Action for Landfill Gas Control
- 7.9 Compliance with Engineered Facilities Guideline
- 7.10 Climate Change Considerations

## **8.0 Landfill Development**

- 8.1 Initial Construction
  - 8.1.1 Construction Activities

## **9.0 Landfill Operations**

- 9.1 Hours of Operation
- 9.2 Site Equipment
- 9.3 Landfill Staff
- 9.4 Landfilling Operations
  - 9.4.1 Normal Waste Landfilling Operations
  - 9.4.2 Daily, Intermediate and Final Cover Placement
  - 9.4.3 Initial Lift Landfilling Operations
- 9.5 Surface Water Management
- 9.6 Leachate Management
- 9.7 Landfill Gas Management

## **10.0 Site Control and Maintenance**

- 10.1 Access and On-Site Traffic Control
- 10.2 Waste Control
- 10.3 Litter Control
- 10.4 Odour Control
- 10.5 Dust Control
- 10.6 Bird and Non-Bird Vector Control
- 10.7 Fire Control
- 10.8 Site Inspection and Maintenance

## **11.0 Monitoring and Reporting**

- 11.1 Operation and Development Monitoring
- 11.2 Environmental Monitoring
  - 11.2.1 Groundwater Monitoring

- 11.2.2 Surface Water Monitoring
- 11.2.3 Leachate Collection System Monitoring
- 11.2.5 Landfill Gas Monitoring
- 11.3 Complaint Response Procedure
- 11.4 Annual Reports
- 11.5 Ridge Landfill Liaison Committee

#### **12.0 Site Closure**

- 12.1 Site Closure Works
- 12.2 Post-Closure Care
- 12.3 End Use

#### **13.0 Contingency Plans**

- 13.1 Groundwater Contingency Plans
- 13.2 Surface Water Contingency Plans
- 13.3 Other Contingencies

#### **14.0 References**

#### **Sub-Appendix A – Leachate Treatability Assessment Report**