



+ Bluegums Regional Landfill

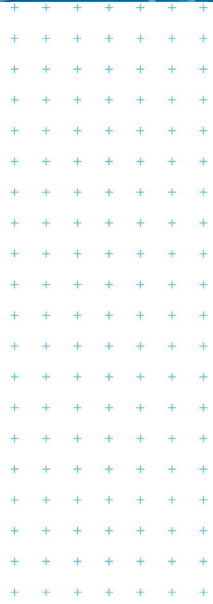
Landfill Management Plan

Prepared for
Marlborough District Council

Prepared by
Tonkin & Taylor Ltd

Date
May 2019

Job Number
85158.009.v3



Distribution:

Marlborough District Council

electronic

Tonkin & Taylor Ltd (FILE)

1 copy

Document control

Title: Bluegums Regional Landfill, Landfill Management Plan			
Date	Version No.	Description	Initials
January 2011	1	Final	HEC
April 2016	2	2016 Update	HEC
May 2019	3	2019 Update	HEC

This report has been prepared for the exclusive use of our client, Marlborough District Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Report prepared by:



.....
Hugh Cherrill

Principal Civil and Environmental Engineer

Authorised for Tonkin & Taylor Ltd by:



.....
Tony Bryce

Project Director

t:\wellington\tt projects\85158\85158.0090\issueddocuments\2019 Imp update\2019 bluegums landfill management plan update issue.docx

Table of contents

1	Introduction	1
1.1	General	1
1.2	Purpose of Management Plan	1
1.3	Structure of this LMP	1
1.4	Review/Updating of the LMP	2
2	Landfill administration	3
2.1	Management structure	3
2.1.1	Marlborough District Council responsibilities	3
2.1.2	Landfill Designer's responsibilities	4
2.1.3	Landfill Constructor's responsibilities	4
2.1.4	Landfill Operations Contractor's responsibilities	5
2.2	General requirements	6
2.2.1	Opening hours	6
2.2.2	Right of access	7
2.2.3	Health and safety	7
2.2.4	Compliance with Resource Consents	7
2.2.5	Staff training	7
2.2.6	Insurance	8
3	Landfill development/configuration	9
3.1	Design concept	9
3.2	Landfill development	9
3.3	Landfill components	9
3.3.1	Underdrains	9
3.3.2	Landfill liner	9
3.3.3	Landfill liner protection layer	9
3.3.4	Leachate drains	10
3.3.5	Structural toe dam	10
3.4	Leachate and groundwater disposal	10
3.4.1	Discharge reticulation	10
3.5	Stormwater disposal	10
3.5.1	Stormwater cut-off drains	10
3.5.2	Stormwater settling ponds	11
3.6	Groundwater monitoring wells	11
3.7	Access roads	11
3.8	Staff facilities	11
3.9	Construction of new stages	11
3.10	Scheduling of new works	12
3.11	Final capping and closure	12
3.12	End use	12
4	Landfill operations	13
4.1	Security	13
4.2	Maintenance of Landfill facilities and infrastructure	13
4.3	Signage	13
4.4	Access roads	14
4.5	Stormwater control	14
4.6	Leachate discharges	15
4.7	Under-drain discharge	16
4.8	Grassed areas	16

4.9	Litter control	16
4.10	Extension of the leachate drainage layer and leachate drains on side slopes	17
4.11	Operations and filling plans	17
4.12	Maintenance of traffic	17
4.13	Plant and labour	17
4.14	Placement of waste	17
4.15	Inspection of waste and rejection of hazardous material	18
4.16	Waste acceptance criteria	19
4.16.1	Unacceptable wastes	19
4.16.2	Acceptable wastes	20
4.16.3	Special wastes	20
4.17	Special methods of disposal	22
4.17.1	General	22
4.17.2	Sludges and animal wastes	22
4.17.3	Controlled wastes	23
4.17.4	Difficult wastes	23
4.17.5	Liquid wastes	23
4.18	Provision of cover material	24
4.19	Placement of cover layers	24
4.20	Record of waste entering site	24
4.21	Inspection of the site	24
4.22	Daily monitoring of rainfall	25
4.23	Control of nuisances	25
4.23.1	Noise	25
4.23.2	Odour	25
4.23.3	Dust	25
4.23.4	Birds and vermin	25
4.24	Emergencies	26
4.24.1	Emergency fire procedures	26
4.25	Weighbridge operation and maintenance	26
4.26	Landfill gas system management	27
4.26.1	Operating the landfill gas management system	28
4.26.2	Monitoring the landfill gas management system	29
4.26.3	Maintenance of the landfill gas management system	29
4.27	Complaints management	30
5	Monitoring programme	32
5.1	Alarm monitoring	32
5.2	Operational observations	32
5.3	Environmental monitoring	32
5.4	Review of monitoring programme	32

Appendix A :	Figures
Appendix B :	Resource consents
Appendix C :	Leachate pumping system operation
Appendix D :	Sludge testing methodology
Appendix E :	Landfill gas flare service schedule
Appendix F :	Environmental monitoring plan
Appendix G :	ETS sampling and testing plan

1 Introduction

1.1 General

The Bluegums Landfill (Landfill) is owned and operated by the Marlborough District Council (Council).

The Bluegums Landfill is located approximately five kilometres south of Blenheim's town centre. The landfill was developed in 1996 to receive waste from the entire Marlborough district. The landfill receives waste from the Blenheim waste sorting facility, the five refuse transfer stations located throughout the district and waste directly from industrial and commercial sources.

The location of the landfill is shown in Figure 1 (Appendix A). The extent of the site for contractual purposes is illustrated by the thick black line.

A copy of this Landfill Management Plan is to be available to the public by inspection at Council's offices.

1.2 Purpose of Management Plan

The purpose of this Landfill Management Plan (LMP) is to set out the operational, development and management procedures for the operation of the Landfill. It details the way Council will comply with its obligations and responsibilities for the proper operation of the Landfill in compliance with the Landfill Resource Consents, all applicable statutes, regulations and standards and good industry practice.

The operation of the Landfill is subject to the requirements of the Resource Management Act (1991), and the Landfill Resource Consents as detailed in Table 1.1. This plan has been developed to provide a foundation upon which both the short and long term management of the Landfill can be based.

Table 1.1: Landfill resource consents

Number	Type	Issue date	Expiry date
U000950	Disposal of contaminants to land, Air discharge, Discharge of stormwater to land and water, Dam and divert, To erect, place and maintain structures in the stream beds, Disturbance to land.	14 th March 2001 Note: Corrigendum issued by Commissioner 17 th Sept 2001	30 November 2030

A copy of resource consent U000950 (Landfill Resource Consents) is included in Appendix B.

This LMP is subject to and is not intended to override the conditions of the Landfill Resource Consents. The Landfill shall be operated in accordance with all Landfill Resource Consents.

This LMP is designed to supplement the Resource Consents by outlining suitable operational, development and management procedures to meet the conditions of the Landfill Resource Consents. The specifications within this document may exceed the requirements of the Landfill Resource Consents.

1.3 Structure of this LMP

The LMP is structured into the following sections:

- Section 1 Introduction
- Section 2 Landfill administration

Section 3 Landfill development/configuration

Section 4 Landfill operations

Section 5 Environmental monitoring

Appendices

This document also refers to two separate plans that form part of the Landfill Management Plan:

- Asbestos Management Plan
- Odour Management Plan

1.4 Review/Updating of the LMP

The resource consent for the landfill requires that the Landfill Management Plan is reviewed every two years or more frequently, as required to ensure compliance with the requirements of the Landfill Resource Consents, all applicable statutes, regulations and standards and good industry practice.

LMP reviews will be undertaken by Marlborough District Council's Assets and Services Department.

Compliance with some aspects of this LMP will be a Contractor obligation under the Landfill Operation Contract. Alterations to the LMP may need to be introduced into the Landfill Operation Contract as Variations. The implications of amendments to the LMP on the Landfill Operation Contract should be considered when each plan review is undertaken.

2 Landfill administration

2.1 Management structure

The management responsibility structure for the functions required to operate the Bluegums Landfill are set out in Table 2.1. This indicates where it is intended that functions be contracted to third parties. Individual contracts may be let for various functions or they may be amalgamated to form larger contracts.

More specific information relating to contractual relationships should be obtained directly from the relevant contract documents.

Table 2.1: Management roles

Responsible party	Role
Marlborough District Council	Site Owner Resource Consent Holder Requiring Authority Principal to Landfill development, operations and monitoring contracts.
Landfill Designer	Responsible to Marlborough District Council for the investigation, design, specification, construction supervision and certification for new Landfill cells.
Landfill Constructor	Responsible to Marlborough District Council for physical construction of new Landfill cells, including appropriate testing and quality control.
Landfill Operations Contractor	Responsible to Marlborough District Council for the daily operation of the Landfill.
Engineer to Landfill Operation Contract	Responsible to Marlborough District Council for the supervision and quality control of daily Landfill operations.
Environmental Monitoring Contractor	Responsible to Marlborough District Council for environmental monitoring at the Landfill.

2.1.1 Marlborough District Council responsibilities

2.1.1.1 Setting disposal fee level

The amount which users of the facility are charged will be determined by Council. Disposal fees may be adjusted from time to time by Council.

2.1.1.2 Compliance with regulatory requirements

Council will be ultimately responsible for compliance with regulatory requirements for the site. This includes, but is not limited to, the resource consents for the Landfill, and the Climate Change Response Act 2002).

2.1.1.3 Leachate disposal

Council will provide a leachate disposal main of 110mm ID MDPE or similar to the boundary of the Landfill site with a further 110mm main connection to the Blenheim sewerage system. Leachate will be disposed via the disposal main to the Blenheim sewerage system.

2.1.1.4 Stormwater disposal

Council will maintain the existing ephemeral stream located at the Landfill site boundary to ensure it has sufficient capacity to accept storm flows from the Landfill site.

2.1.1.5 Landfill gas disposal

Council will provide a suitable landfill gas extraction and disposal system at the Landfill site.

2.1.1.6 Weighbridge

Council will provide, service, calibrate and have certified a weighbridge for the weighing of waste disposed at the Landfill.

2.1.1.7 Landscape maintenance and development

Existing landscaping will be maintained and planting extended within the Landfill site. This work, excluding capped landfill areas, will be undertaken by Council.

2.1.1.8 Overall Landfill management planning

The long term planning for the Landfill site will be undertaken by Council. This plan will be available to other stakeholders to ensure that a co-ordinated approach is maintained for all landfill activities.

2.1.1.9 Specific responsibilities and tasks

Specific responsibilities and tasks that are to be carried out by the Council are set out in Section 2.2 "General requirements" and Section 4 "Landfill operations" of this document.

2.1.2 Landfill Designer's responsibilities

2.1.2.1 Site investigations

The Landfill Designer shall undertake appropriate geological, hydro geological, engineering and other necessary investigations to determine the nature of the Landfill's physical environment and allow current design standards to be maintained.

2.1.2.2 Landfill design

The Landfill Designer shall design future Landfill cells. The Landfill Designer shall ensure that designs meet the conditions of all Landfill Resource Consents, that the current standards of the Landfill facility are maintained as a minimum, and that relevant national landfill good practice is achieved.

2.1.2.3 Specification

The Landfill Designer will produce construction specifications and documentation that clearly sets out the materials, configurations, construction details, testing requirements and quality assurance methods required to construct the Landfill cells in accordance with the design.

2.1.2.4 Contract supervision

The Landfill Designer will undertake necessary construction observation to monitor compliance with the testing and quality control specifications.

2.1.3 Landfill Constructor's responsibilities

A Landfill Constructor will be appointed by Council from time to time for the purpose of establishment of new landfill cells and associated infrastructure.

2.1.3.1 Knowledge of project

It is the responsibility of the Landfill Constructor to ensure that they understand the design philosophy used for the Landfill, are fully conversant with the applicable specifications and are aware of current landfill construction methodologies and industry good practice.

2.1.3.2 Provision of construction services

The Landfill Constructor shall be responsible for the provision of all administration services, plant, equipment, materials and labour required to construct Landfill cells. The only exceptions will be those items explicitly excluded in the specifications as approved by Council.

2.1.3.3 Supervision of works

It is the Landfill Constructor's responsibility to ensure that any works undertaken comply with the specifications provided. To achieve this, the constructor must provide an adequate level of supervision for staff and sub-contractors.

2.1.3.4 Record keeping and quality control

The Landfill Constructor must keep adequate records throughout each construction contract. This will include all test results and inspection notes required to comply with the testing and quality assurance regime set out in the Landfill Designer's specification.

2.1.4 Landfill Operations Contractor's responsibilities

A Landfill Operations Contractor will be appointed by Council to receive waste at the Landfill, place it in the landfill cells, carry out necessary engineering works associated with filling of the landfill cells, and provide other services required for the operation and maintenance of the Landfill.

2.1.4.1 Provision of Landfill operation services

The Landfill Operations Contractor shall be responsible for the provision of all services required for the operation and maintenance of the Landfill except for those relating to off-site facilities for stormwater disposal (see Section 2.1.1.4). Water supply network and electricity reticulation installed at the site by Council will be available for use by the Landfill Operations Contractor. All fees and maintenance costs will be borne by the Landfill Operations Contractor.

2.1.4.2 Staff and knowledge of the facility

The Landfill Operations Contractor shall be responsible for the provision of all staff and personnel for the operation of the Landfill.

It is the Landfill Operations Contractor's responsibility to ensure that all contractor staff and personnel involved with the Landfill understand the design and operating philosophies used for the facility. All staff must be fully conversant with the current LMP.

2.1.4.3 Security

The Landfill Operations Contractor will be responsible for the security of the Landfill site both during work hours and outside of work hours.

2.1.4.4 Acceptance of waste material

The Landfill Operations Contractor shall accept waste from Landfill users, weigh the waste, reject unsuitable waste, place the waste into the Landfill, levy appropriate charges and maintain an

accurate record of waste received and shall engage suitable personnel, and utilise suitable systems and processes to properly manage these functions.

2.1.4.5 Record keeping

The Landfill Operations Contractor shall be responsible for keeping full records of all waste material entering the Landfill. This record shall be provided to Council at regular intervals.

2.1.4.6 Waste disposal fees collection

The Landfill Operations Contractor shall be responsible for all activities relating to the generation of accounts and receipt of payments for waste disposal at the Landfill and debt management for Landfill users.

2.1.4.7 Complaints procedure

The Landfill Operations Contractor shall instigate a complaints management system.

2.1.4.8 Specific responsibilities and tasks

Some specific responsibilities and tasks that shall be carried out by the Landfill Operations Contractor are set out in Section 2.2 "General requirements" and Section 4 "Landfill operations" of this document.

2.2 General requirements

2.2.1 Opening hours

The Landfill shall be open between and not less than the following hours:

Monday to Friday	7:30 am and 5.00 pm	
Saturdays	7:30 am and 12 noon	
Sundays	Hours of operation will be at the Landfill Operation Contractor's discretion (the Landfill may remain closed).	
Public Holidays	Anzac Day	12 noon and 5 pm
	Good Friday and Christmas Day	Hours of operation will be at the Landfill Operations Contractor's discretion (the Landfill may remain closed).
	Other public holidays:	8.00 am and 12 noon

Restricted hours for receipt of asbestos are set out in the Asbestos Management Plan.

Restrictions on the times that some special wastes are received may also be applicable.

The Landfill Operations Contractor may extend hours at its discretion.

The Landfill Operations Contractor shall use reasonable endeavours to make outside of hours access to the Landfill available to commercial users. Such access shall be on the basis of such reasonable conditions as the Landfill Operations Contractor shall require. The Landfill Operations Contractor's costs (if any) of making such out of hours access available to commercial users shall be payable by the commercial user.

2.2.2 Right of access

Access to the site shall be controlled by the Landfill Operations Contractor.

Staff and representatives of Marlborough District Council will have right of access for monitoring, inspection, construction and operational purposes. Access by other parties shall be at the discretion of the Landfill Operations Contractor.

2.2.3 Health and safety

The Landfill Operations Contractor shall have the primary responsibility for all matters which affect the safety and security of its personnel involved in the operation of the Landfill, all users and members of the public on the Landfill site and all persons likely to be affected by the carrying out of the Landfill operations.

The Landfill Operations Contractor shall be required to observe and comply with all relevant safety legislation, guidelines, standards and good practice including (without limiting the foregoing):

- The requirements of the Principal (as set out in the Landfill Operations Contract).
- The Health and Safety at Work Act 2015 (HSWA) and all Regulations made under the HSWA.
- The Worksafe New Zealand guidance for construction.
- The approved Excavation Safety – Good practice guidelines.
- Marlborough District Council’s HSE Responsibilities

The primary health and safety responsibility in relation to the Landfill site and the landfill operations will lie with the Landfill Operations Contractor pursuant to the Operations Contract and Part 2 of the HSWA as a Person Conducting a Business or Undertaking (PCBU).

In addition Council has direct health and safety obligations under the HSWA. Council’s health and safety obligations shall be fulfilled through inclusion of clear contractual health and safety obligations in the Landfill Operations Contract and through appropriate monitoring, reporting and auditing of health and safety of the Landfill Operations Contractor’s health and safety compliance and health and safety issues arising in relation to the Landfill Site and the carrying out of the Landfill operations.

2.2.4 Compliance with Resource Consents

Landfill operations shall be carried out in compliance with all Landfill Resource Consent conditions.

The Landfill Operations Contract will provide that the Landfill Operations Contractor shall comply with all resource consent conditions other than where it is more appropriate for Council to retain the primary compliance obligation.

The contract will emphasise resource consent compliance and provide for monitoring and audit by both the Landfill Operations Contractor and by Council.

2.2.5 Staff training

All persons undertaking work at the Landfill must have an appropriate level of training, skill and expertise to effectively complete the allocated tasks to an acceptable industry standard.

It will be the responsibility of the Landfill Operations Contractor to ensure that all staff have the required levels of training, skill and expertise and that these skills are constantly applied to work being undertaken.

2.2.6 Insurance

The primary obligation to insure the Landfill facilities and assets will remain with Council. This will include both material damage and contract works covers. Contractors working on the Landfill site will be required to hold public liability and motor vehicle third party cover.

Designers and consultants will be required to hold public liability and motor vehicle third party cover and professional indemnity cover.

3 Landfill development/configuration

3.1 Design concept

The Bluegums Landfill is designed to provide a permanent barrier against leachate transmission from waste material within the Landfill to the surrounding soil, rock and groundwater environment.

The facility provides a repository for non-hazardous waste from residential, commercial and industrial users throughout the Marlborough District.

The Landfill design includes systems for the removal of leachate from within the Landfill for treatment at the Blenheim Sewage Treatment Plant and extraction of landfill gas for incineration at the site. Provision is also made to maintain separation between stormwater at the site and the filled waste. This clean stormwater is discharged back to the natural waterway below the site.

3.2 Landfill development

The Landfill will be developed in stages to optimise the use of the facility. The proposed layout is illustrated in Figure 2 (Appendix A).

3.3 Landfill components

3.3.1 Underdrains

These drains are constructed in the base of the Landfill directly beneath the level of the Landfill liner. The drains are designed to remove groundwater to avoid hydraulic uplift pressures being generated beneath the Landfill liner.

The underdrains will be designed and constructed so they are resistant to blockage by sediment deposits and avoid erosion of the natural loess soils.

3.3.2 Landfill liner

The Landfill site shall be developed to ensure that the Landfill is lined with material that has a permeability rating equivalent to or less than 900 mm at 1×10^{-9} m/sec for base areas and 600 mm at 1×10^{-9} m/sec for side walls where the gradients are steeper than 3H: 1V. Synthetic liner materials are required in some sections to counter difficulties with terrain or subgrade conditions. Under some circumstances a composite liner construction may be used. All construction work shall be designed and placed in such a manner that it is resistant to weather damage.

Stages 5, 6 and 7 have a composite lining of 1.5 mm HDPE geomembrane over a geosynthetic clay liner (GCL). It is envisaged that Stage 8 and subsequent stages will have a similar construction.

3.3.3 Landfill liner protection layer

The need for a liner protection layer will be dependent upon the design of the liner itself. In general it is anticipated that synthetic lined sections will require a minimum 300 mm layer of protection material to avoid liner damage occurring when refuse is being placed.

A protection layer may also be required to counter desiccation, surface erosion or UV deterioration.

The placement of the protection layer on the base of new landfill cells will generally be undertaken as part of the landfill development rather than operational activity however placing of the protection layer on side slopes will generally be undertaken as part of operational activity, the extent of the protection layer being extended as waste is placed. The protection layer will generally also have a leachate drainage function. A typical liner protection/drainage layer (as used in Stages 5, 6 and 7

and envisaged for Stage 8 onwards) is 300 mm of drainage gravel on side slopes and 500 mm on base areas. The drainage gravel is placed over a protection geotextile that lies directly over the HDPE geomembrane. On side slopes where the HDPE has a smooth upper surface (most of Stage 6) a geogrid is also laid on the geotextile before placement of the protection/drainage layer. Extension of the geotextile, geogrid (where present) and protection/drainage layer up side slopes is limited to 2 m vertical lifts for stability reasons.

3.3.4 Leachate drains

Leachate drains shall be laid in the base of the landfill immediately above the landfill liner within the protection/leachate drainage layer. The extent of this network shall be such that it effectively removes leachate from the entire full volume without generating significant hydraulic pressure on the landfill liner. The drains shall be of sufficient size and have large enough perforation dimensions to prevent fouling of the drains. The leachate drains in Stage 6 consist of 160 mm diameter perforated PE 100 SDR17 HDPE pipes. Where drainage pipes extend up side slopes they shall be extended as the protection/drainage layer is extended.

In base areas the protection/leachate drainage layer will have a filter geotextile filter placed over it to reduce clogging and reduction in drainage performance.

3.3.5 Structural toe dam

An earth toe dam has been constructed to act as a buttress for the refuse within the landfill. The dam was constructed from selected on site material and keyed into the original ground to prevent sliding. The toe dam has two pipes passing through its base, one for the leachate drainage system and one for the discharge from the underdrain network.

3.4 Leachate and groundwater disposal

3.4.1 Discharge reticulation

Under normal operating circumstances leachate is discharged by gravity to a 110 mm discharge line to the Blenheim sewerage system (a length of approximately 1,700 m). However this line has limited capacity and under large flows the line backs up and the leachate pond fills. An automatic pumping system then pumps leachate from the pond to a storage pond on the Landfill for release after the storm has passed.

The underdrains will normally discharge to the stormwater ponds. They will however provide a backup extraction path for leachate if the main liner becomes breached. In these circumstances the discharge would be directed to the leachate disposal system. The use of the underdrain network for leachate disposal will be allowed in emergency situations only and only for a period of time until appropriate liner repairs can be undertaken.

3.5 Stormwater disposal

3.5.1 Stormwater cut-off drains

These drains are constructed around the perimeter of the Landfill to intercept stormwater that flows from the undeveloped higher sections of the Landfill site. The drains flow to piped sections at either end of the toe dam. From there the flow is directed to the first of two stormwater settling ponds.

As the Landfill develops it will be necessary from time to time to redevelop the stormwater cut-off drains to allow for the extension of the Landfill liner.

Stormwater from areas of the Landfill with final cover installed will also be directed to the stormwater cut-off drains and settling ponds.

Cut-off drains must be designed and constructed to ensure the invert does not allow leakage into the surrounding soil. The drains must also be installed at a level that ensures they intercept any underground erosion paths.

3.5.2 Stormwater settling ponds

Two stormwater settling ponds have been constructed below the toe dam. These ponds accept all stormwater flows from the site. The ponds allow coarse materials contained in the stormwater to settle out prior to discharging into the natural watercourse below the site.

3.6 Groundwater monitoring wells

Groundwater monitoring wells are located at eleven locations within the Landfill site. These wells have been installed at different times as the Landfill has been developed. The usefulness of a number of wells has been surpassed with the installation of new wells at more favourable locations. The actual locations of the wells and scheduled monitoring programmes are included in Appendix F of this plan.

3.7 Access roads

The main section of access road at the site provides passage for vehicles from the entrance way at Taylor Pass Road to the operator's kiosk and on to the Stages 3 to 7 of the Landfill. This roading is fully formed to double width except for the crest of the toe dam which is single width. The road is sealed until it reaches the fill area. Egress from the Landfill is provided from Stage 5 by the southern access road, a fully formed sealed road from the main access road.

A number of other roads exist at the site including the sealed road to the stormwater and leachate ponds and unsealed access tracks to soil stockpiles.

Further access roads will need to be constructed as the Landfill progresses. All roads must be of an all-weather standard and of sufficient width to allow safe passage of heavy vehicles. Speed restrictions and appropriate markings shall be used to improve safety as appropriate.

The construction of new access roads that are outside the fill area shall be included in the capital development for new cells within the Landfill. The maintenance of existing roads shall be included in the Landfill operations.

The construction and maintenance of access roads to the tip face and other facilities on the fill shall be included in the Landfill operations.

3.8 Staff facilities

All facilities required for staff during construction and operation of the Landfill are to be provided by the respective contractors. Facilities provided by contractors for their staff may be removed and new ones installed from time to time at the contractor's discretion.

3.9 Construction of new stages

New sections of landfill will need to be constructed from time to time. This work may be carried out by the Landfill Operations Contractor or by other parties appointed by Marlborough District Council. The choice of designers and constructors will be determined by Council. In general terms all design work should meet the requirements of the Centre for Advanced Engineering (CAE) Landfill Guidelines (2000) and WasteMINZ Technical Guidelines for disposal to Land (April 2016). The

determination of final design, construction and quality control standards will remain at the sole discretion of Council.

3.10 Scheduling of new works

Construction of new stages within the Landfill must be scheduled so that a minimum volume equivalent to eight months landfilling is available at autumn (end April) in any year. This requirement reflects the difficulties associated with the construction at the Bluegums site during winter.

Construction will generally follow the staging shown in Figure 2 (Appendix A), although this may be altered to improve the efficiency of site development.

3.11 Final capping and closure

Once land filling reaches the predetermined final level indicated in Figure 4 (Appendix A), the cell will be closed in a way which will minimise future environmental impact. A final cap will be placed over the fill to a depth of 600 mm using a suitable low permeability material. The material shall have a permeability of less than 1×10^{-7} m/sec. This is to be placed over a 300 mm thick intermediate cover layer. The capping shall be overlain with a thickness of 150 mm topsoil and sown in pasture.

3.12 End use

The Landfill is bordered by privately owned farmland and its higher limits adjoin the Wither Hills Walkway and Farm Park. The most likely end use of the Landfill site after closure is for grazing purposes, recreation or the encouragement of wildlife.

4 Landfill operations

4.1 Security

The Landfill Operations Contractor shall be responsible for the security of the Landfill Site.

Landfill operations shall exclude unauthorised access to the Landfill site.

Vehicular entry to the site is possible only across the weighbridge or via the adjacent weighbridge by-pass access road. Both roads have gates at Taylor Pass Road and tag operated lifting arm barriers. The Landfill Operations Contractor shall be issued with keys to the entry gates and tags to operate the barriers by Council. The gates shall be kept locked at all times outside the operating hours of the Landfill.

The Landfill Operations Contractor shall be responsible for issue of 'transactional' tags (for use over the weighbridge only) to account holders. The Landfill Operations Contractor will be issued with 'non-transactional tags' giving access through the barrier on the weighbridge by-pass road. The Landfill Operations Contractor shall not issue any of these tags outside his organisation. The Landfill Operations Contractor shall be responsible for the replacement of any lost or damaged tags.

Council will issue non-transactional tags to a small number of other authorised personnel and will provide a list to the Landfill Operations Contractor.

The weighbridge computer system will record all entries to the site by tag identification. The weighbridge also has a CCTV camera system which will record a photograph of all vehicles entering the site over the weighbridge and through the by-pass lane barrier.

From time to time Council will audit photographic records against the tag identification records to confirm that no unauthorised entry is occurring.

Any lost tags shall be reported immediately by the Landfill Operations Contractor to Council.

No public access shall be permitted outside normal landfill operating hours. The Landfill Operations Contractor shall be responsible for locking both access road gates whenever the landfill is closed.

The Landfill Operations Contractor shall maintain the landfill perimeter fencing and gates shall be maintained to stock proof standard at all times.

4.2 Maintenance of Landfill facilities and infrastructure

The Landfill Operations Contractor shall maintain all Landfill facilities and infrastructure in good working order and in a neat and tidy condition. This shall include access roads, signage, surface water and leachate drainage systems, gas collection and disposal systems including the gas flare, buildings, the weighbridge and associated control system, grassed areas, fences and gates and all other Landfill facilities and infrastructure. Specific requirements in relation to some of these items are set out in the following sections of this document.

4.3 Signage

Council shall provide and maintain a sign at the main entrance way at Taylor Pass Road giving information including:

- Landfill name.
- Statement that the Landfill is owned by the Marlborough District Council.
- Name of Landfill Operations Contractor and contact number.
- Hours of operation.

- Restrictions upon access.
- Prohibitions on waste that may be disposed at the Landfill.
- Other information relevant to users of the Landfill.

Signs shall also be posted at the Landfill as necessary to provide direction, information and warnings to landfill users. The Landfill Operations Contractor shall maintain (including replacement as required) all existing signs within the Landfill site, and provide and maintain any new signs necessary for the efficient and safe operation of the Landfill.

4.4 Access roads

Access roads within the site shall be well laid out and signposted to facilitate the safe and efficient delivery of waste to the tipping locations.

Access roads and tipping/turning areas close to the tipping head shall be extended, regraded or realigned periodically. All access roads and other trafficked areas shall be surfaced with an all-weather running surface free of mud and preventing punctures and suitable for use by road going vehicles.

Landfill access roads within the site shall be maintained in good all-weather condition. Sealed roads shall be inspected regularly and any areas of deterioration repaired as soon as practicable. Sealed roads shall be maintained free of potholes and unsealed roads shall be maintained free of soft areas and potholes.

All access roads shall have sufficient width for trucks to pass at any point if they are to be used for two-way traffic.

4.5 Stormwater control

Open stormwater cut-off drains are located around and above the Landfill footprint area to intercept overland and upper catchment flows. These will be modified as the Landfill is developed.

HDPE 'gutter' drains are located on the Stage 6 and 7 liner to intercept and divert clean stormwater run-off. Similar drains are likely to be constructed in subsequent stages.

Stormwater drains are located on areas of final cover. These will be extended as the area of final cover is increased as part of the landfill closure process.

Stormwater drains on and around the landfill discharge to a system of piped drains and gabion lined channels leading to the settlement ponds.

Stormwater run-off from areas of waste with intermediate cover shall be directed to the stormwater drainage system by the use of drains that shall be constructed on the intermediate cover as part of the covering operation.

All surface water drains shall be regularly inspected and any deterioration, leakage or blockage rectified as soon as practicable to ensure they are maintained in good working order.

The Landfill Operations Contractor shall remove accumulated silt from Settlement Pond No.1 once every summer and dispose of the material removed in the Landfill.

Stormwater run-off from active filling areas shall be designated as leachate and shall be contained within the filling area and allowed to discharge to the leachate collection system.

4.6 Leachate discharges

The leachate discharge system shall be operated to ensure that leachate is removed from the Landfill as quickly as practicable. Care must be taken, however, to ensure that large flows of leachate are not discharged to the Blenheim sewage network during or within three hours after significant storm events. The leachate discharge and control system is shown diagrammatically in Figure 3 (Appendix A).

Under normal circumstances leachate will be discharged under gravity from the Landfill directly through the 110 mm discharge main into the Council sewage system. If this line becomes blocked or the rate of leachate flow increases (in wet weather) beyond the capacity of this line, the excess leachate will divert into the leachate storage pond. A pump located in the leachate pond will then activate automatically and pump leachate to a lined storage pond on the Landfill where it may be held before being released back into the 110 mm discharge line after the storm has passed. The operation of the pumped storage system is described in the document "Marlborough District Council, Bluegums Regional Landfill, Leachate Overflow Protection System Operation" attached in Appendix C. The Landfill Operations Contractor shall be responsible for the operation of this system.

The pipework used to discharge leachate and normal valve settings are shown in Figure 3 (Appendix A). The main components of the leachate discharge system are described below.

- A. Leachate isolating valve
 - Normally open, close to isolate discharge mains and hold leachate within landfill.
- E. 50 mm leachate discharge control valve
 - Note this line is blocked and is not used.
- F. 110 mm leachate discharge control valve
 - Normally open.
- G. Leachate overflow control pump
 - Triggered automatically to pump leachate to storage pond on landfill when discharge line backs up and the leachate pond fills.
- H. 180 mm leachate pumping main to leachate storage pond.
- I. 110 mm leachate pumping main to 110 mm discharge line.
- J. 110mm leachate discharge line control valve
 - Normally open to discharge leachate to 110mm discharge line.
- K. Pumping main control valve
 - Normally open to pump leachate to the storage pond.
- L. Pumping main control valve
 - Normally closed. Open to flush leachate discharge line (F) in conjunction with closing of valves J and K.

The Landfill Operations Contractor shall 'flush' the 110 mm discharge line (Component I on Figure 3, Appendix A) weekly using the pumping system as described in the 'Leachate Overflow Protection System Operation' document (Appendix C). Additionally the Landfill Operations Contractor shall clean the discharge line from the Landfill over its full length (approximately 1,700 m) to its connection to the Blenheim sewerage system using a 'pig' at six monthly intervals.

In the event that the leachate pumping system does not work or the leachate storage pond becomes full and the leachate level in the lower pond rises, an alarm will be sent via the telemetry system to the Landfill Operations Contractor. The Landfill Operations Contractor shall provide a prompt (within 30 minutes) full time first level call out response to alarms and shall take appropriate measures to prevent leachate discharge from the site. This may include temporarily closing the isolating valve on the leachate discharge line from the landfill to hold leachate within the landfill until the storm has passed.

The Landfill Operations Contractor shall maintain the leachate discharge system (including the pumping system and leachate ponds) in good operating condition.

4.7 Under-drain discharge

The under-drainage system shall be operated to remove groundwater from beneath the Landfill liner. The discharge shall be directed into the first stormwater pond unless it is contaminated by leachate. If the discharge contains leachate as well as groundwater, it shall be directed to the leachate disposal system. The pipework and valve settings for the under-drain discharge system are shown in Figure 3 (Appendix A). The main components of the under-drain discharge system and their operation are described below.

- B. Underdrain isolating valve
 - Normally open, close to isolate underdrain discharge and hold groundwater under landfill.
- C. Underdrain diversion valve
 - Normally closed. Use in conjunction with (D) – open to allow underdrain flow to divert to leachate system in the event groundwater becomes contaminated with leachate.
- D. Underdrain discharge valve
 - Normally open. Use in conjunction with (C) – close to force underdrain flow to divert to leachate system in the event that groundwater becomes contaminated with leachate.

4.8 Grassed areas

Grassed areas of final capped landfill (currently approximately 35,000 m²) shall be maintained by the Landfill Operations Contractor to give a meadow grassland appearance with a grass length of no more than 300 mm. Non-grass vegetation shall be removed by weed killing or other means. As landfilling progresses and the final capped area of Landfill is increased, the area under grass will increase.

Areas of intermediate capped landfill may also be grassed. The Landfill Operations Contractor shall maintain such areas in a neat and tidy condition by removal/weed killing of significant non-grass vegetation as required.

4.9 Litter control

The production of litter during landfill operations shall be minimised by limiting the area of exposed refuse at the tip face as much as possible, compacting refuse as quickly as practicable and placing cover as soon as possible.

Litter that is produced can be controlled using moveable or permanent litter fences. Residual litter that is blown more than 30 m from the active filling area shall be collected from the Landfill site and the surrounding area and returned to the Landfill as soon as practicable but within 72 hours of it being produced such that the quantity of litter present at any time is minimal, does not result in an

untidy appearance and is not allowed to build up. The Landfill Operations Contractor shall employ 'litter pickers' as required to collect windblown litter.

4.10 Extension of the leachate drainage layer and leachate drains on side slopes

Prior to filling over the side slopes, as the level of waste rises, the Landfill Operations Contractor shall extend the protection/drainage layer, including the protection geotextile and, where present, the geogrid, over the HDPE liner (Refer Section 3.3.3 for details). Where leachate drains extend up the side slopes within the protection/drainage layer these shall also be extended (Refer Section 3.3.4 for details).

4.11 Operations and filling plans

Prior to the commencement of site works, the Landfill Operations Contractor shall produce an Operations Plan setting out the specific methods and procedures proposed to be employed to meet all of the requirements set out in this LMP. The Operations Plan shall include a Quality Plan and an Environmental Plan and shall be updated annually or more frequently if it becomes outdated and no longer reflects current practice. The Operations Plan shall also describe the proposed progression of filling to completion of the current available landfill volume. The Landfill Operations Contractor shall also produce a Monthly Filling Plan that shall set out filling and associated engineering and maintenance work proposed for the following six week period. The Filling Plan shall be consistent with the Operations Plan.

4.12 Maintenance of traffic

The Landfill Operations Contractor shall share access to and around the Landfill with the users of the Landfill, and other authorised visitors and contractors. The Landfill Operations Contractor shall be responsible for the management and maintenance of safe and efficient flow of traffic to and around the Landfill.

4.13 Plant and labour

The Landfill Operations Contractor shall be responsible for the provision of all personnel and the provision and maintenance of all mechanical plant required for the operation of the Landfill.

4.14 Placement of waste

Incoming waste shall be placed at the tipping face in as small an operational area as possible. At any given time, the size of the working face shall be no greater than 50 m by 50 m in plan area. Any area beyond this size shall be covered with daily or intermediate cover as appropriate.

Daily and intermediate cover from previous filling must be breached prior to placement of new fill to ensure flow paths are created for both leachate and gas within the Landfill. This will involve removal of as much cover material for reuse as is reasonably practical including complete removal of at least 20 % of the area of daily cover and intermediate cover resulting in areas of exposed refuse prior to filling at no more than 10 m centres.

The waste shall be spread and compacted as it is received in layers no more than 600 mm thick using an appropriate purpose designed trash compactor. Each layer is to be compacted in a systematic manner to ensure a uniform, compactive effort is applied over the entire surface of the layer before the next layer is placed. Special wastes shall be subject to special methods of disposal as set out in Section 4.17.

The compactive effort applied by the trash compactor shall be such that the minimum average waste density achieved, calculated from waste tonnage over the weighbridge and quarterly landfill volume surveys, shall be 800 kg/m³.

As a general guide the waste shall be placed in a cellular manner with intermediate earth bunds between cells as necessary. The volume of cleanfill used in the formation of intermediate bunds shall be kept to a minimum. Filling shall be planned and carried out to minimise leachate generation and prevent leachate discharge to the surface water drainage system.

Where possible filling shall be progressed to its final level as soon as possible to allow final capping to be constructed, leachate generation minimised and extraction of landfill gas extraction maximised.

The Landfill has a geosynthetic lining system and it is essential that this is not damaged. On initial entry to a new Landfill stage and as waste is filled up lined side slopes, filling shall commence with 'soft' waste that does not contain any materials that may result in damage to the liner system e.g. glass, metal poles etc. This material should also not contain any silty or clayey material that may clog the leachate drainage layer and piped drains. Typically bagged domestic refuse is appropriate but other selected wastes may be used if they meet these criteria.

The first layer of waste shall be spread carefully ensuring that there is always a minimum compacted waste thickness beneath plant of 1 m. A minimum thickness of waste of 2 m shall be in place before the trash compactor is used. Particular care should be taken not to disturb or damage leachate drainage pipes.

Waste shall be spread over the full base area as quickly as possible on entry to a new cell in order to provide attenuation of leachate generation and discharge to the leachate drain during rainfall events.

Where access is required over the liner, compacted engineered fill shall be placed to the approval of the Landfill Designer and Council (e.g. access ramps) to a minimum thickness of 900 mm.

Filling shall progress in a sequence approved by the Landfill Designer and Council.

The refuse shall be placed in such a way that it does not jeopardise the stability of the Landfill. Waste shall generally be placed level over a given cell in lifts no more than 2 m high. Temporary batters of refuse shall not exceed 2H: 1V under any circumstances and in general shall be much gentler. In order to maintain stability slopes as gentle as 10H: 1V may be required and in this respect the Landfill Operations Contractor shall comply with the instructions of the Council.

4.15 Inspection of waste and rejection of hazardous material

The Landfill Operations Contractor shall be required to assign a landfill attendant to be at the tipping area during operating hours to supervise the safe tipping of refuse and to monitor what is being tipped.

The landfill attendant must remain vigilant to detect potentially hazardous waste entering the Landfill and remove it from the refuse stream. In addition to this general care, a programme of detailed inspection of at least 10 incoming vehicles shall be undertaken each month. Inspection reports shall be produced.

Records of waste type, volume removed from the refuse stream and inspection reports shall be kept by the Landfill Operations Contractor and forwarded to Council on request.

The landfill attendant shall also check that the waste type stated on the weighbridge dockets is consistent with the waste tipped by any given vehicle. If it is not, but the waste is acceptable at the landfill, the actual waste type shall be recorded by the landfill attendant on a manually produced

docket that the driver will be asked to sign before being given a copy. This docket will, later, be used to revise the computer record at the weighbridge and the associated disposal fee.

4.16 Waste acceptance criteria

Waste from outside the Marlborough District shall not be accepted at the Landfill without the prior approval of Council. Council will consider acceptance of such waste on a case by case basis and approval will be decided by Council.

4.16.1 Unacceptable wastes

Wastes which are unacceptable at the Bluegums Landfill in their raw (untreated) form include:

- Explosive wastes.
- Materials subject to spontaneous combustion.
- Oxidising wastes.
- Corrosive wastes.
- Cyanide wastes.
- Wood preservatives.
- Intractable wastes (e.g. PCBs).
- Mutagenic compounds.
- Carcinogenic compounds.
- Soluble toxic materials.
- Radioactive materials.
- Liquid resins, latex and plasticisers, glues, adhesives, solvents.
- Halogenated organic compounds.
- Biocides, pesticides, herbicides, insecticides, weed killers and fungicides that are persistent or bioaccumulative.
- Inks, dyes, pigments, paints, lacquers, varnish.
- Tyres.

Some of the above material types may be accepted at Bluegums Landfill if appropriate treatment or handling processes are undertaken. Authority must be obtained from Council prior to disposal of such materials and records of nature, quantity, source and location within the Landfill of all such materials must be forwarded to Council. The process for gaining acceptance for any of the materials listed above is outlined below:

- a The decision as to whether or not a waste listed above will be accepted for disposal at the Landfill following pre-treatment will be made by a suitably qualified landfill engineer and notified by Council.
- b Until such time as this notification is received, the waste cannot be disposed of at the Landfill.
- c The general criteria for acceptance is that the disposal of the waste will not significantly alter the characteristics of leachate and landfill gas generated at the tip by the disposal of municipal waste only. Compliance with USEPA Waste Acceptance Criteria for Municipal Landfills (subtitle D) will be deemed to satisfy this requirement.
- d If acceptable for disposal following pre-treatment the waste may still be classified as a special waste (Refer Section 4.16.3) and special disposal measures may be required.
- e Any unacceptable wastes found within the material to be disposed of at the landfill shall be isolated and the Council notified.

4.16.2 Acceptable wastes

Wastes acceptable for disposal at the Landfill without special disposal procedures are:

- Household refuse which is normal domestic refuse in bagged or other form as delivered by contract collection.
- Refuse generally accepted as household or domestic refuse.
- Trade refuse arising from commercial or industrial premises, but excluding special wastes as defined in the following sections.
- Clean soil wastes.
- Putrescible wastes, but excluding special wastes as defined in the following sections.
- Garden wastes, including weeds, pruning's etc (although composting operations may remove this waste from the waste stream).
- Sewage sludge that has been stabilised over six months can be accepted at the landfill for disposal without further mixing or treatment. This permission is based on the assumption that the sludge moisture content is reduced to a satisfactory level during the stabilisation period.
- Bagged sewage plant screenings.

If any doubt exists as to the acceptability of any wastes, Council shall be consulted. The ultimate discretion in relation to the acceptability or unacceptability of waste materials lies with Council.

4.16.3 Special wastes

Special wastes are wastes which are acceptable but which due to their physical and or chemical nature require specific disposal management as set out in Section 4.17.

Special wastes fall into four categories as set out in the following sections. The decision as to the classification into one of the categories for any specific waste shall be Council's.

4.16.3.1 Sludges and animal wastes

Sludges and animal wastes require special handling and disposal management due to their physical properties, potential to cause nuisance (primarily odour and vermin) and due to health issues.

Sludges and animal wastes include:

- Offal.
- Animals and animal parts.
- Fish waste.
- Sewage screenings.
- Raw sewage sludge.
- Grease trap residues.
- Winery wastes.

Sludges will be accepted only if they are sufficiently dewatered to meet the following criteria when tested in accordance with the procedures outlined in Appendix D.

- No free water.
- Greater than 20 % solid content.
- A slump less than 200 mm.

Sludges that do not comply with these criteria shall be classified as liquid waste.

4.16.3.2 Controlled wastes

Controlled wastes are wastes which because of their nature have the potential to cause an immediate or future threat to human health or the environment. These wastes will not generally be difficult to handle physically (although they may be) but are likely to require special handling and safety measures to be taken e.g. spraying to keep down dust, special personal protective equipment etc.

Controlled waste includes:

- Contaminated soil.
- Asbestos containing wastes.
- Medical wastes including infected materials, anatomical parts, sharps (needles etc).
- Biodegradable pesticides e.g. 1080.
- Pharmaceutical wastes including drugs, medicines and veterinary compounds.

4.16.3.3 Difficult wastes

These are wastes which present no significant health, environmental or nuisance issues but which by their physical nature are difficult to handle and which cannot be spread and compacted by the trash compactor in the manner that general refuse is handled.

Wastes in this category include:

- Vineyard posts.
- Mussel rope.
- Salmon nets.
- Concrete demolition rubble.
- Irrigation drip line.
- Bird netting.
- Tree stumps.
- Wet mud.
- Bulky items.
- Sawdust.
- Bulk polystyrene waste.

4.16.3.4 Liquid wastes

Liquid wastes are wastes that when tested in accordance with the procedures outlined in Appendix D meet one or more of the following criteria:

- Free water present.
- Less than 20 % solid content.
- A slump more than 200mm.

Liquid wastes include:

- Wet 'sludges'.
- Bulk liquid wastes of any kind of emulsions.

4.16.3.5 Conditions of acceptance of special wastes

Special wastes may be disposed of at the Landfill subject to the following conditions:

- Suitable arrangements for placement are made in accordance with the Council's and Landfill Operations Contractor's requirements. Minimum requirements for the disposal of special wastes are given in Section 4.17. Council will provide details of any special precautions or disposal methods required as a condition of acceptance of a particular controlled waste and will notify the Landfill Operations Contractor of such requirements. The Landfill Operations Contractor shall make his own assessment of all special wastes accepted to the Landfill with regard to health and safety and avoidance of nuisances, and may implement additional measures as appropriate to meet his obligations under the Landfill Operations Contract. These may include the requirement that the Landfill Operations Contractor is notified in advance of delivery, to allow appropriate arrangements to be made to receive the waste, or that particular wastes are not delivered after a certain time of day, to allow sufficient time for handling and covering before the end of the day.
- Prior notice and approval is given for disposal of controlled wastes.
 - The authority of Council is required for the disposal of any controlled waste at the Landfill. For some controlled wastes (e.g. contaminated soils) the decision as to whether or not the waste will be accepted for disposal at the Landfill will be made by a suitably qualified landfill engineer and notified by Council. Council will provide ongoing approvals for specified quantities of particular waste products from specific customers that are produced on an ongoing basis which will remain in force unless the nature or quantity of the waste changes.
- Asbestos. Conditions applying to acceptance of asbestos containing wastes at Bluegums Landfill are set out in the Asbestos Management Plan.

4.17 Special methods of disposal

Special wastes shall be subject to special methods of disposal as directed by Council. However the minimum standards presented in the following sections shall apply.

4.17.1 General

These requirements shall apply to all special wastes:

- Special wastes shall not be placed nearer than 3 m to the liner on the base of the landfill nor 10 m on the side slopes.
- The compatibility of wastes shall be considered when the disposal area is selected.
- Special waste shall be covered by a thickness of at least 1 m of general (non-special waste) refuse.

4.17.2 Sludges and animal wastes

A steady amount of offal, sludge and animal wastes can be expected at the Landfill. This material shall be either buried immediately upon receipt at the facility or deposited into a covered offal/sludge pit.

The intermittent process for such wastes has potential to create odours and specific safety issues. The nature of controls required to mitigate these effects will vary for specific circumstances but may include the erection of fences, gas detection or extraction systems and the use of odour beds or chemical odour suppressants. It shall be the Landfill Operations Contractor's responsibility to

identify and implement suitable measures as appropriate to meet its obligations under the Landfill Operations Contract.

Offal/sludge pits will require moving from time to time. This will involve the excavation of a new pit, transfer of the lid structure, sealing of the structure/landfill interface and re-connection of the extraction or deodorising system and covering the previous pit. The location of the pits shall be identified on the Landfill Operations Contractor's Filling Plan.

All sludges and animal wastes shall be covered by minimum of 600 mm of non-special waste/cover material as soon as possible and no later than by the end of the day on which it is received.

Particular measures are required for raw sewage sludge. Upon advice that a load of raw sewage sludge is to be received, the Landfill Operations Contractor shall designate an area within the Landfill site for disposal. That area shall be within the day's active tipping area, but shall be an area which can be isolated from other tipping operations until the sludge/screenings has been tipped, spread and covered. The sludge material shall be deposited on the selected area of compacted refuse, spread over sufficient area to achieve a sludge thickness of no greater than 100 mm and covered as soon as possible with two 300 mm layers of selected dry refuse, spread and compacted as standard.

4.17.3 Controlled wastes

Controlled wastes shall be covered over as soon as practicable such that risk to human and environmental health is avoided. In some cases this may require disposal in a specifically excavated hole followed by immediate burial. All controlled waste shall be covered by a minimum of 600 mm of non-special waste/cover material by the end of the day on which it is received. Specific controlled wastes may be subject to additional health and safety measures and disposal procedures as directed by Council.

4.17.3.1 Asbestos

Requirements for the disposal of asbestos containing wastes are set out in the Asbestos Management Plan.

4.17.4 Difficult wastes

Difficult wastes shall generally be disposed of in the general waste stream as determined and directed by the Landfill Operations Contractor in such a way that normal landfilling operations are maintained, compaction of the waste is maximised and nuisances are avoided. Council may also require particular measures are taken for specific difficult wastes.

4.17.5 Liquid wastes

Liquid waste shall be emptied from containers and dispersed into the Landfill via specially excavated soak pits or bunded reception areas. These dispersion points shall be located where there is at least 10 m depth of waste above the landfill liner. Liquid wastes shall not be dispersed into the landfill in any location where there is a possibility of a direct link to the leachate drainage system that could result in a surge in leachate flow. Care shall be taken to ensure that liquid waste cannot be forced out of the Landfill, under the weight of 'overburden' or vehicles or plant operating on the Landfill. Any residual sludges left after dispersion of liquid waste into the Landfill shall be covered in accordance with the requirements for sludges and animal wastes in Section 4.17.2.

4.18 Provision of cover material

The Landfill Operations Contractor shall ensure that suitable cover material is available at all times for use as daily and intermediate cover. This material may be received as part of the waste stream, sourced from off-site or won from stockpiles or borrow areas within the Landfill site.

Alternative daily cover systems such as weighted tarpaulins, foam or mulch may be used subject to the approval of Council. If an alternative daily cover system is not used, daily cover material shall generally consist of cleanfill. Use of some waste materials, e.g. sawdust, may be acceptable for use as daily cover subject to the approval of Council.

Intermediate cover material shall be a clean soil material. Soils that are potentially suitable for use in liner construction shall not be used for cover unless specifically authorised by Council.

Cover material shall be removed prior to daily operations to the extent reasonably possible and stockpiled for later reuse provided it does not contain more than 25 % refuse by volume.

4.19 Placement of cover layers

Daily cover shall be placed to a minimum depth of 200 mm at the conclusion of each day's operations. This may be substituted with an alternative daily cover system subject to the approval of Council as set out in Section 4.18. Daily cover shall be of sufficient standard to provide a continuous coverage over the waste such that control of vermin, dust and odours is achieved.

At the completion of waste placement in areas where no further refuse is planned to be placed for a period of 3 months or more, intermediate cover shall be placed over the surface to provide a minimum total cover thickness of 300 mm. Intermediate cover shall be compacted to a smooth, firm surface by tracking with a bulldozer and shaped to promote stormwater run-off.

Placement of intermediate cover shall include the construction of surface water drains to divert stormwater run-off to the stormwater drainage system and prevent erosion of the intermediate cover layer.

4.20 Record of waste entering site

The Landfill Operations Contractor shall record the date, customer name, waste type and quantity for each consignment of refuse received at the Landfill. This information will be available from the weighbridge software reporting package. A record shall also be made of the location and description of any asbestos containing wastes deposited in the Landfill. This information shall be forwarded to Council on a monthly basis.

4.21 Inspection of the site

The Landfill Operations Contractor shall inspect the Landfill site weekly to ensure all structures, facilities, infrastructure and services are operating correctly. This will include stormwater drains, stormwater ponds, inlets and pipes, leachate ponds and discharge mains, litter controls, any exposed liner, roadways and signs, odour control measures, gas extraction system, weighbridge and fences.

Records of such inspections shall be kept by the Landfill Operations Contractor in an appropriate form. These records and any deficiencies identified shall be rectified and actions taken recorded.

4.22 Daily monitoring of rainfall

Records shall be kept by the Landfill Operations Contractor of the daily rainfall at the Landfill site. These records shall be forwarded to Council upon request. Rainfall and other weather conditions are recorded by the site's weather station.

4.23 Control of nuisances

4.23.1 Noise

Noise arising from landfill activities shall not exceed the following limits at or within the notional boundary of adjacent dwellings, as specified in NZS 6801:2008.

55 dBAL10	0700 hours to 2200 hours Monday to Saturday
	0900 hours to 1900 hours Sunday
45 dBAL10	at all other times
75 dBALmax	on any day between 2200 hours and 0700 hours.

4.23.2 Odour

Requirements for the control of odours are set out in the Bluegums Landfill Odour Management Plan.

The Landfill Operations Contractor shall employ whatever measures are necessary to prevent unacceptable odours on or around the Landfill site.

4.23.3 Dust

Permanent access roads approaching the Landfill site shall be sealed.

Exposed earthwork/tipping areas and metalled access tracks are potential sources of dust nuisance when they dry out. Dust can be picked up by wind alone, but the problem will generally be exacerbated by moving refuse vehicles or equipment, the degree of aggravation being a function of vehicle speed.

During dry conditions, vehicle speeds within the working area shall be restricted to 15 kph. A water cart shall be used on high risk areas, particularly vehicular access tracks, as necessary to keep the level of dust under control. The Landfill Operations Contractor shall implement controls such that dust is not blown across the site boundary towards neighbouring properties and such that workers, visitors and users of the site are not subjected to unpleasant or potentially unhealthy levels of dust or levels of dust that restrict visibility.

Exposed earthworks and landfill areas that are not going to be reworked within a six month period shall be revegetated either with grass or hydroseeding.

4.23.4 Birds and vermin

The bird and vermin population attracted to the Landfill site can be minimised through good compaction of all refuse and prompt, thorough and effective covering. Bird scaring devices and other means of harassment, including overhead wires and wire screens shall be used when necessary to minimise the number of birds.

The whole of the Landfill site shall be inspected three times a year to check on vermin population. Rats can be controlled by the use of traps and poison baits. Flies can be controlled by spraying. Advice on the most effective procedures for dealing with vermin problems if they arise may be

sought from commercial pest destruction firms and appropriate measures shall be taken as necessary.

The Landfill Operations Contractor shall ensure birds and vermin (without limitation including cats, flies and possums) numbers shall be kept at a level such that they do not impact on neighbours or become visible to users of the Landfill.

4.24 Emergencies

The Landfill Operations Contractor shall be responsible for putting in place procedures for dealing with emergencies at the Landfill and for their implementation if and when required.

Procedures for dealing with emergencies at the Landfill are to be covered in the Landfill Operations Contractor's Health and Safety Plan. Emergencies that shall be considered include both natural emergencies e.g. extreme rainfall, earthquake or high winds and those that relate to the nature of the landfill operation e.g. failure of equipment or infrastructure that has a significant impact upon the environment or individual health and safety, fire, prohibited waste found at the site, excessive landfill gas leakage or leachate leakage. Procedures for dealing with fire at the Landfill shall include the requirements set out in Section 4.24.1.

The Landfill Operations Contractor shall keep the Engineer to the Contract for landfill operations and Council closely informed of any emergency situations that arise at the Landfill.

4.24.1 Emergency fire procedures

No burning of refuse shall be permitted. In the event of a fire outbreak, immediate action shall be taken to extinguish the fire. The Landfill Operations Contractor shall keep basic fire-fighting equipment at the Landfill site and maintain it in a serviceable order for such purposes. This shall include as a minimum, a long handled shovel and a 5 kg dry power type fire extinguisher.

Good refuse compaction and cover will restrict the potential spread of any outbreak of fire within the Landfill.

In the event of any incoming vehicle containing burning or smoking material, the load shall immediately be thoroughly hosed down and drained off. If any doubt remains whether the fire has been extinguished the load shall not be accepted into the landfill and the Fire Service shall be called. A similar procedure shall apply for any minor outbreak of fire at the tipping face that can be extinguished quickly and safely by the Landfill Operations Contractor. If there is any doubt about the Landfill Operations Contractor's ability to extinguish the fire immediately and/or safely, the Fire Service shall be called.

In all other cases the Landfill Operations Contractor shall summons the Fire Service immediately a fire becomes evident and notify Council.

4.25 Weighbridge operation and maintenance

All vehicles coming to the Landfill to drop off refuse must first stop at the weighbridge. All such vehicles shall be weighed before proceeding to the appropriate disposal area, reweighed on return and the fee based upon the weight and type of refuse that has been offloaded. The weighbridge is fully automated and is not required to be manned. Barrier arms and traffic lights control entry and exit.

Vehicles bringing waste for disposal at the Landfill will access the weighbridge using their 'transactional tag' (Refer Section 4.1) to operate the lifting arm barrier. Once on the weighbridge the tag will permit the driver access into the kiosk where information, including the waste type being disposed of, will be entered on a touchscreen.

Each vehicle driver will be issued with a docket stating the type of waste the vehicle is carrying for inspection by the landfill attendant at the tipping face (Refer Section 4.15). On exit from the Landfill over the weighbridge, vehicle drivers will re-enter the kiosk and will be issued with another docket stating the weight of waste disposed at the Landfill and associated fee to be invoiced before the barrier arm is raised allowing the vehicle to exit the site.

The weighbridge computer will have 'Touch Weigh' weighbridge software installed (by Council). This software will enable full records of all waste disposed at the Landfill to be retained and invoices to be produced. The Landfill Operations Contractor will be given training in the operation of the weighbridge and use of the software by Council.

The Landfill Operations Contractor shall provide, sufficient stocks of consumable materials e.g. weighbridge docket tapes, forms etc to ensure that receipts can always be provided to customers, and data records can be maintained at all times.

The weighbridge will be fitted with a telephone for use by users of the weighbridge if the weighbridge malfunctions or if assistance in the operation of the weighbridge is required. This telephone will have a dedicated link to the Landfill Operations Contractor's office. On receiving a call the Landfill Operations Contractor shall provide assistance to ensure continued operation of the weighbridge including:

- Provision of instructions over the phone to weighbridge users.
- Provision of instructions in person if required.
- Rectification of simple malfunctions e.g. software problems.
- Notification to Council if a malfunction occurs that cannot be rectified.
- Manual operation of the weighbridge (if possible) and recording of all waste disposed in the event of a malfunction that cannot be rectified by the Landfill Operations Contractor until such time as the malfunction is rectified by Council's weighbridge service contractor.

The Landfill Operations Contractor shall carry out routine day to day maintenance of the weighbridge and associated control equipment and keep them in good working order in accordance with the instructions of the relevant manufacturers. Scheduled servicing, replacement of worn out and damaged parts (unless caused by the Landfill Operations Contractor) and annual calibration of the weighbridge will be arranged by Council through a service contract between Council and the supplier of the weighbridge.

4.26 Landfill gas system management

The landfill gas extraction and disposal system in place at the Landfill currently consists of wells from which landfill gas is drawn by suction. The wells are connected by gas pipelines to a stack where the landfill gas is flared.

It is not practicable to collect and flare all landfill gas. The overall goal of the landfill gas system is to collect and flare sufficient of the landfill gas to achieve compliance with consent conditions and other regulatory requirements, within practical operational constraints. The objectives of the gas field management are:

- 1 To reduce surface emissions of methane at any point on the landfill (excluding the active filling area) to the extent that these emissions do not exceed 5,000 ppm in the air above the ground surface. This requirement applies in areas of the landfill that have received an intermediate or final cap and is a requirement of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004. Note that other measures such as capping play a part in achieving this objective and these must be considered collectively.

- 2 To reduce the emission of landfill gas, by collecting and flaring sufficient landfill gas, to a level that minimises odour at or beyond the site boundary.
- 3 To flare the collected landfill gas to destroy methane and other potentially harmful or odorous compounds to the extent required to comply with the requirements of the NES (Air Quality).
- 4 To maintain anaerobic conditions in the waste. Overdrawing from the extraction system can draw air into the waste, resulting in aerobic conditions and potentially leading to landfill fires which can have serious environmental and operational consequences.
- 5 To maximise the collection and destruction of methane, as far as is economical and compatible with other objectives, to minimise MDC's ETS liabilities.
- 6 To minimise any leakage or other loss of gas from the collection system.

Landfill gas has a number of properties that may be hazardous to health. Collectively the objectives set out above will also contribute to maintaining a safe environment for workers and users of the landfill. Detailed assessment and measures relating to health and safety and landfill gas are set out in the Operator's Health and Safety Plan which should be referred to in this respect.

Council will provide the Landfill Operations Contractor with:

- A set of as-built drawings of the gas collection and flaring infrastructure.
- Operation and maintenance (O&M) manuals for the system.

The Landfill Operations Contractor shall be responsible for:

- Maintenance of the landfill gas assets.
- At completion of the contract term, handing over the landfill gas assets in good operating condition to Council.

Council shall be responsible for:

- Provision of gas monitoring equipment (gas monitor with current calibration certificate and associated software).
- Maintaining operating records and collecting gas flow and other data.

4.26.1 Operating the landfill gas management system

The Landfill Operations Contractor shall:

- Prevent blockages, sags and hogging in surface pipelines that could result in the accumulation of condensate and maintain adequate control of the systems so as to permit sections of the landfill gas management system to be isolated, checked and adjusted.
- Collect condensate from the landfill gas extraction systems and dispose of into the Landfill.
- Provide a prompt (within 30 minutes) full time first level call out response to alarms from the flare.
- Cooperate with Council in optimising system performance and operational outcomes as and where required.
- Recommend to Council in a timely manner any extensions to the landfill gas extraction system (either new wells or extensions to existing wells) that may be required to achieve the Landfill Operations Contractor's broader operational obligations.

The Council shall:

- Provide the Landfill Operations Contractor with an automated alarm call out signal to a pager or a mobile phone (supplied by the Landfill Operations Contractor) where the operation of the primary flare causes an alarm to be triggered.
- Regularly 'balance' the gas wells and make adjustments as landfill gas production changes over time as a result of weather conditions, season, settlement and maturation of the waste mass.
- Extract landfill gas from the balanced gas wells at a rate that ensures a surface gas emissions upper limit of 5,000 ppm methane in air at the surface of the Landfill is not exceeded at all times (as required by the NES (Air Quality)), odours at or beyond the site boundary caused by gas emissions are minimised and methane extraction is maximised (to minimise ETS liabilities) without overdrawing on wells to ensure that anaerobic conditions are maintained within the waste and landfill fires are prevented.
- Maintain nominal operational parameters for the primary gas flare so as to achieve the gas combustion temperature and retention time requirements of the NES (Air Quality).
- Supply all necessary technical support for flare operation and well field optimisation.

4.26.2 Monitoring the landfill gas management system

Council shall:

- At each wellhead, in accordance with the landfill gas management system O&M manual, measure and record the following parameters at a monthly frequency during stable periods of operation of the landfill gas system (i.e. when the system is tuned and balanced):
 - Gas flow rate.
 - Gas pressure.
 - Methane concentration.
 - Carbon dioxide concentration.
 - Oxygen concentration.
 - Gas temperature.

4.26.3 Maintenance of the landfill gas management system

4.26.3.1 Gas extraction system

The Landfill Operations Contractor shall:

- Maintain the landfill gas extraction network in good working order in accordance with the Bluegums Landfill Gas Management System – Phase 1, Operations and Maintenance Manual, Section C, Field Balancing Notes and Procedures and including:
 - Wells and well heads.
 - All pipework.
 - Balancing and isolation values.
 - Condensate collection/disposal systems.
 - Keep the surface pipelines clear of vegetation.

Council will advise the Landfill Operations Contractor of any maintenance requirements identified during monitoring activities.

4.26.3.2 Gas flare

It is important that the gas flare is continuously operating in order to control gas emissions from the Landfill.

The Landfill Operations Contractor shall maintain the gas flare in good working order in accordance with the requirements of the Bluegums Landfill Gas Management System – Phase 1, Operations and Maintenance Manual, Section B, Gas Phase including the routine scheduled replacement of parts and replacement of consumables (e.g. media for hydrogen sulphide filter). The Landfill Operations Contractor shall arrange for quarterly servicing of the flare to be carried out in accordance with the Service Schedule in Appendix E by a suitably qualified technician who shall be approved by the Engineer to the Contract for landfill operations. The Landfill Operations Contractor shall also enter into a sub-contract with Windsor Engineering Group Ltd (the manufacturer of the flare) for the following services:

- Annual site visit to inspect the flare, carry out a full service and any scheduled replacement of components e.g. gas filter including provision of parts.
- Six monthly recalibration of gas concentration monitoring instrumentation.
- Two yearly recalibration of gas flow meter instrumentation.
- Provide telephone and written back-up (as appropriate and required) for:
 - Quarterly services to be carried out by the Landfill Operation Contractor’s technician.
 - Resolution of any problems encountered with the flare during its normal operation where assistance is required to resolve a problem.
- Provision of any parts required for fitting by the Landfill Operation Contractor’s technician.
- Unplanned site visits (as requested) to resolve any problems that cannot be dealt with by provision of telephone or written advice. These visits are likely to be required at short notice with a quick response necessary to avoid prolonged non-operation of the flare with the consequent adverse environmental impacts that may result.

The Landfill Operations Contractor shall provide a full time first level call out response to alarms from the flare to establish the cause of the alarm and to rectify any problems. If a problem cannot be rectified by the Landfill Operation Contractor’s staff, Windsor Engineering shall be asked for assistance, with their attendance on site to resolve the problem if necessary. If the flare is non-operational because of the problem, Windsor Engineering shall visit the site within 24 hours of the identification of the problem and the flare shall be made operational as soon as possible.

Council will advise the Landfill Operations Contractor of any maintenance requirements identified during monitoring activities.

4.26.3.3 Extensions and additions to the landfill gas management system

As the landfill is developed more gas wells will be added and some of the existing wells will be raised or otherwise modified.

4.27 Complaints management

Complaints by members of the public as to the operation of the Landfill or relating to the Landfill shall be directed to the Landfill Operations Contractor in the first instance.

The Landfill Operations Contractor shall implement a complaints management system. All complaints received shall be logged and investigated promptly to determine their validity.

When each complaint is received the Landfill Operations Contractor shall record:

- a Name and address of complainant.
- b Nature of complaint.
- c Date and time of complaint and alleged event.
- d Weather conditions at time of the event.

Investigation of complaints shall take the form of a telephone conversation with the complainant as soon as possible as a minimum and shall, if appropriate, include a visit to the complainant's location as soon as possible after the complaint is received in order that an assessment may be made of the conditions to which the complaint relates.

The Landfill Operation Contractor shall submit a monthly report to Council listing all complaints received, detailing the investigation undertaken, and the conclusion reached as to the validity of the complaint and the action taken in response to the complaint.

All dealings with complainants shall be undertaken in a courteous and professional manner. All complaints shall be followed to a conclusion. In the event that a dispute develops with a complainant that cannot be resolved this shall be brought to the attention of Council as soon as practicable.

If any complaints are received by Council these will be referred to the Landfill Operations Contractor for investigation.

5 Monitoring programme

5.1 Alarm monitoring

A remote monitoring (telemetry) station is installed at the Landfill. This station will connect to a level transducer in the leachate pond that produces an alarm through the Council's paging system if the pond level becomes high (at risk of overflowing).

An alarm will also be sent via telemetry if the landfill gas flare shuts down.

5.2 Operational observations

A number of parameters must be recorded at the Landfill site on a regular basis. These include measurement of rainfall, leachate pond depth and leachate discharge volume. These measurements are collected by instrumentation at the site and records are stored and transmitted via the telemetry station.

Monitoring of waste composition and landfill gas is also required in relation to Council's obligations under the New Zealand Emissions Trading Scheme (ETS). This monitoring programme is detailed in Appendix G.

5.3 Environmental monitoring

The purpose of the environmental monitoring programme is to demonstrate that the Landfill is achieving the level of environmental protection it is designed to achieve.

This monitoring will be carried out by the Environmental Monitoring Contractor for Council and in accordance with the attached monitoring plan (Appendix F). The plan will be reviewed annually and may be updated from time to time. Parameters monitored in the environmental monitoring programme will include groundwater, surface water, leachate and landfill gas.

5.4 Review of monitoring programme

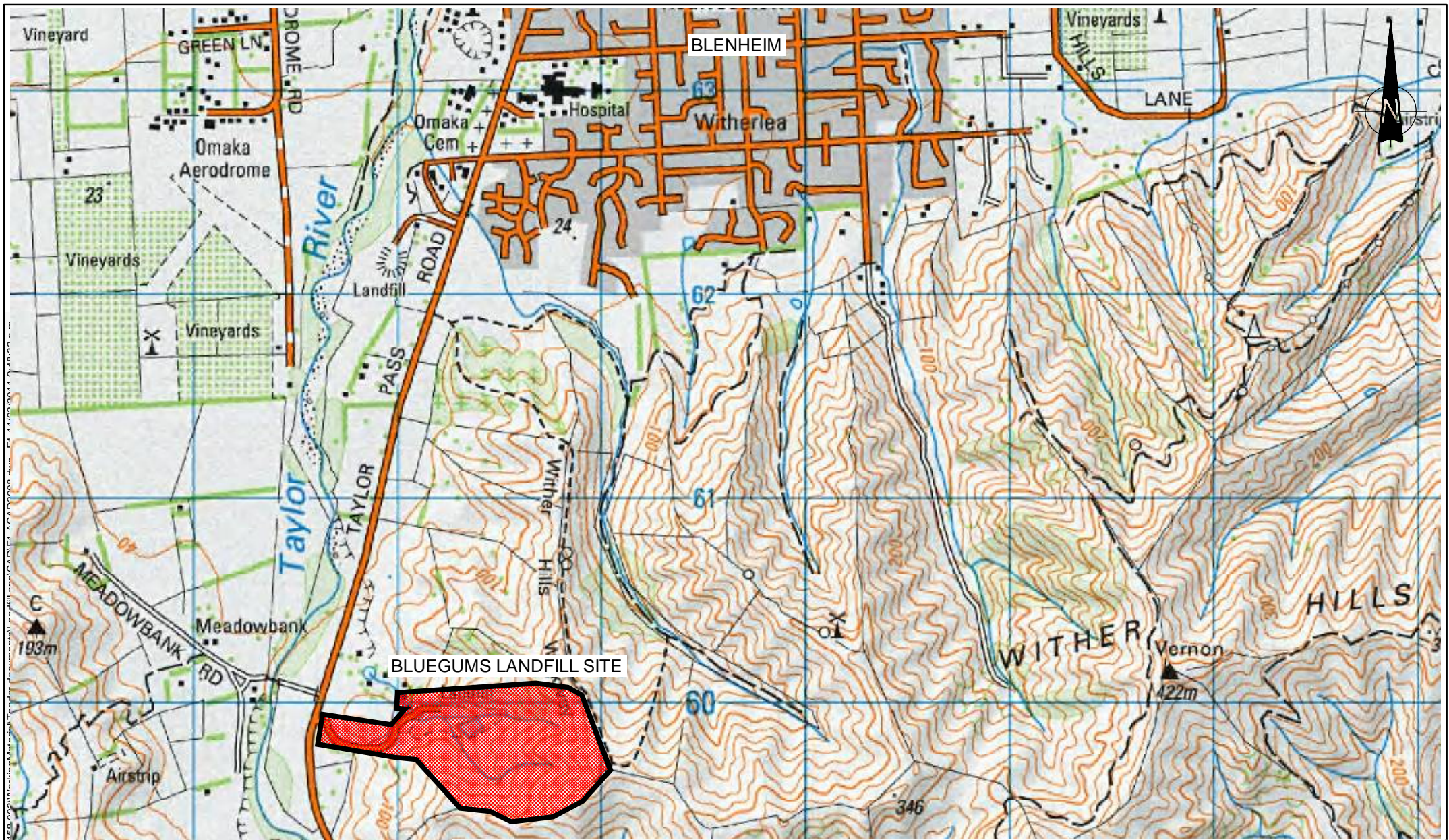
An annual review will be undertaken by Council of monitoring results for each year ending 30 June. The review will be completed prior to 30 August each year. The review will be provided to the consent authority and shall be available to the public at Council offices. The review shall also be made available to interested parties on request.

The review will be used as a basis for determining an appropriate monitoring programme for the following annual period.

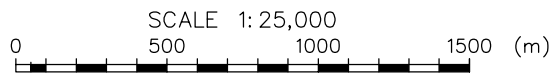
Each annual monitoring programme and the availability of the monitoring review shall be publicly notified.

Appendix A: Figures

- **Figure 1 – Site location plan**
- **Figure 2 – Landfill layout and development stages**
- **Figure 3 – Leachate and groundwater discharge pipework**
- **Figure 4 – Final landfill profile**



Wellington\Projects\85158\85158.dwg 4/10/2019 10:40:00 AM



Tonkin+Taylor
Level 4, 2 Hunter St, Wellington
www.tonkintaylor.co.nz

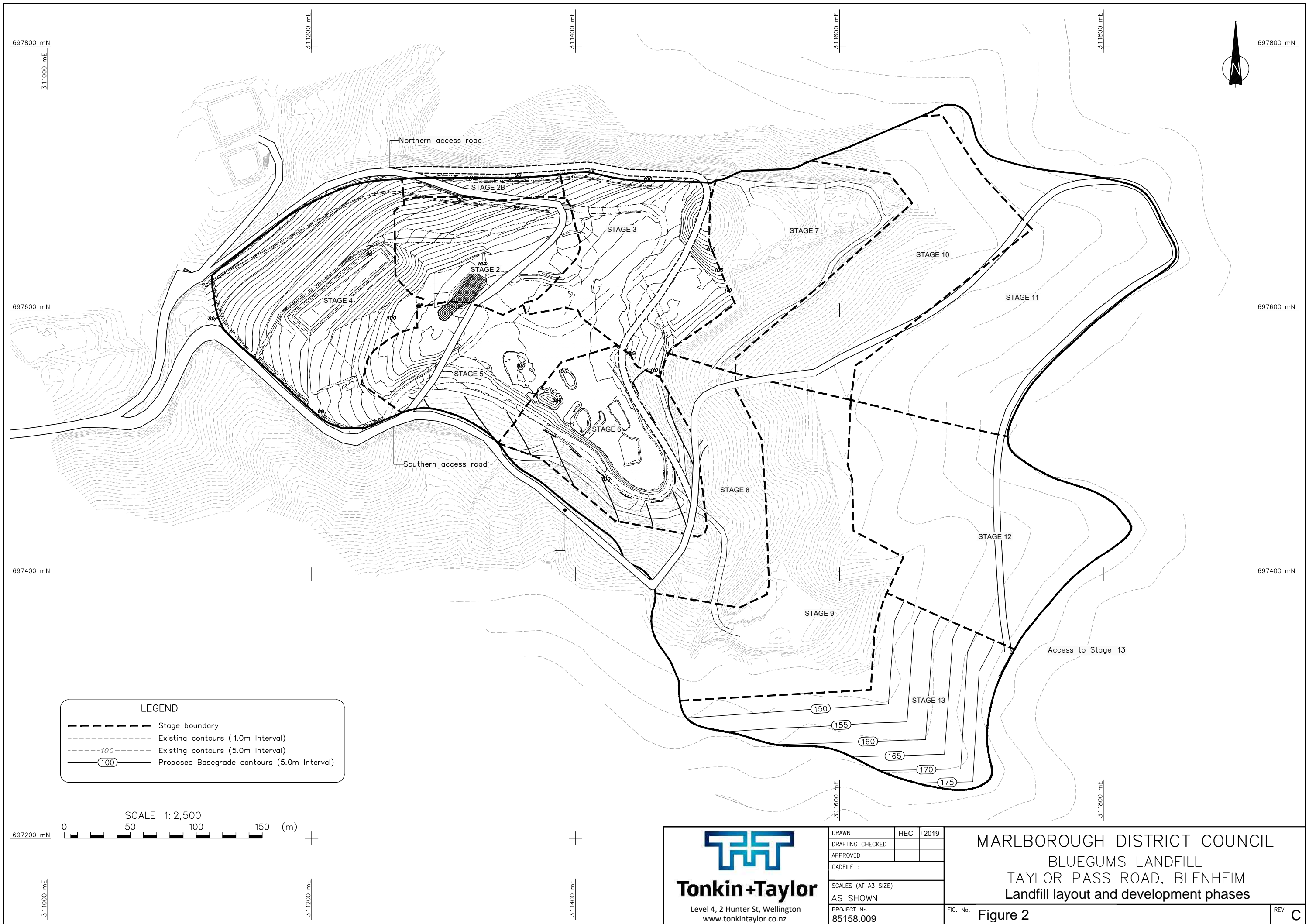
DRAWN	HEC	2019
DRAFTING CHECKED		
APPROVED		
CADFILE :		
SCALES (AT A3 SIZE)		
AS SHOWN		
PROJECT No.		
85158.009		

MARLBOROUGH DISTRICT COUNCIL
BLUEGUMS LANDFILL
TAYLOR PASS ROAD, BLENHEIM
Site location plan

FIG. No. Figure 1

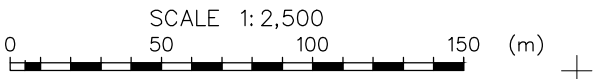
REV. B

\\tgroup.local\corporate\Wellington\IT Projects\85158\WorkingMaterial\Stage 7\Cad\FIG\85158.007-F01.dwg, 001, 2/10/2017 1:24:14 PM, arac



LEGEND

- Stage boundary
- - - Existing contours (1.0m Interval)
- - - Existing contours (5.0m Interval)
- Proposed Basegrade contours (5.0m Interval)



<p>Tonkin+Taylor Level 4, 2 Hunter St, Wellington www.tonkintaylor.co.nz</p>	DRAWN	HEC	2019	<p>MARLBOROUGH DISTRICT COUNCIL BLUEGUMS LANDFILL TAYLOR PASS ROAD, BLENHEIM Landfill layout and development phases</p>	<p>FIG. No. Figure 2</p>	<p>REV. C</p>
	DRAFTING CHECKED					
	APPROVED					
	CADFILE :					
<p>SCALES (AT A3 SIZE) AS SHOWN</p>			PROJECT No.			
<p>PROJECT No. 85158.009</p>						

\\Wellington\Projects\85158\85158.003\WorkingMaterial\Tender documents\Landfill ops\CAD\F3-ACAD2008.dwg F3 11/02/2011 9:49:30 a.m.

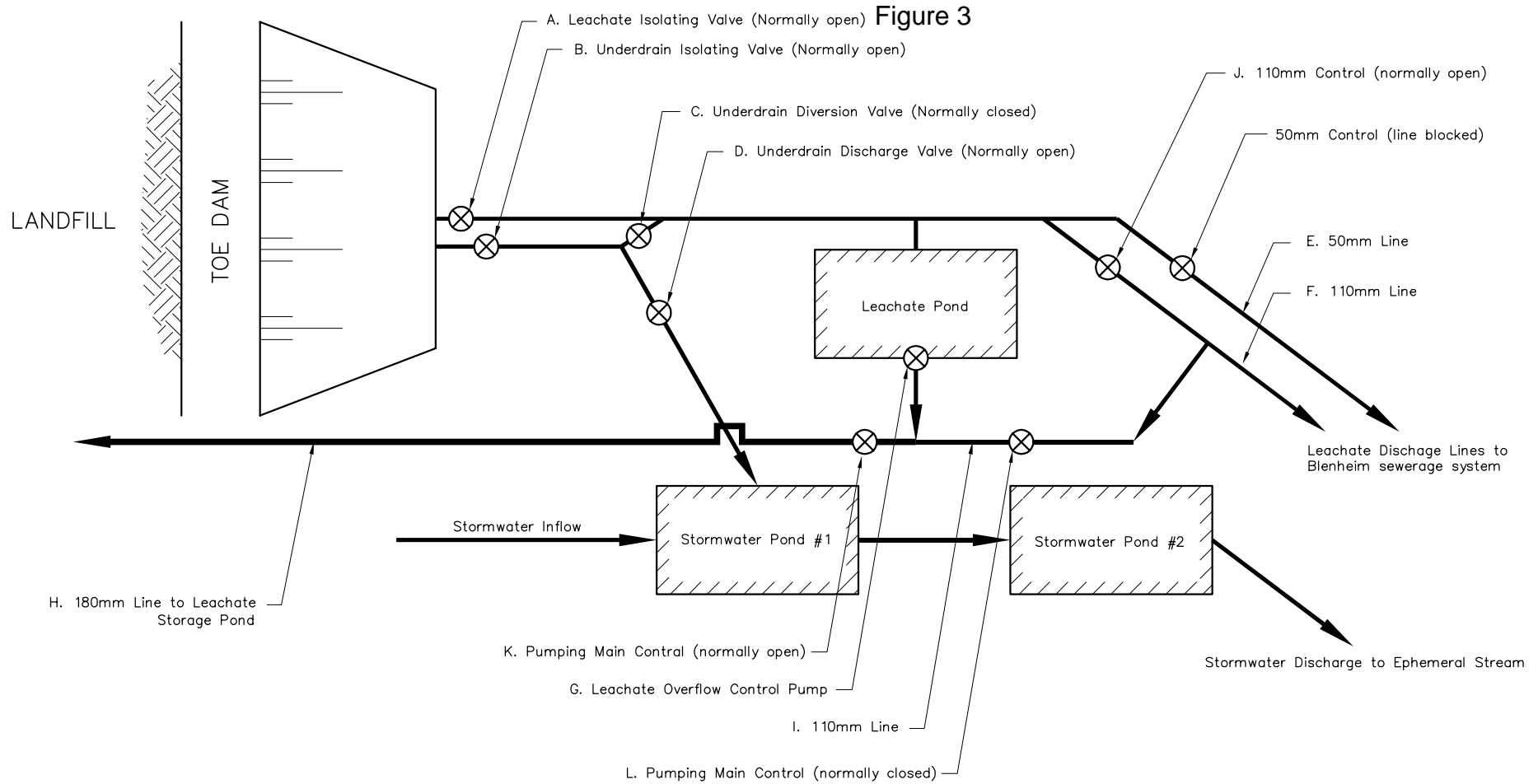

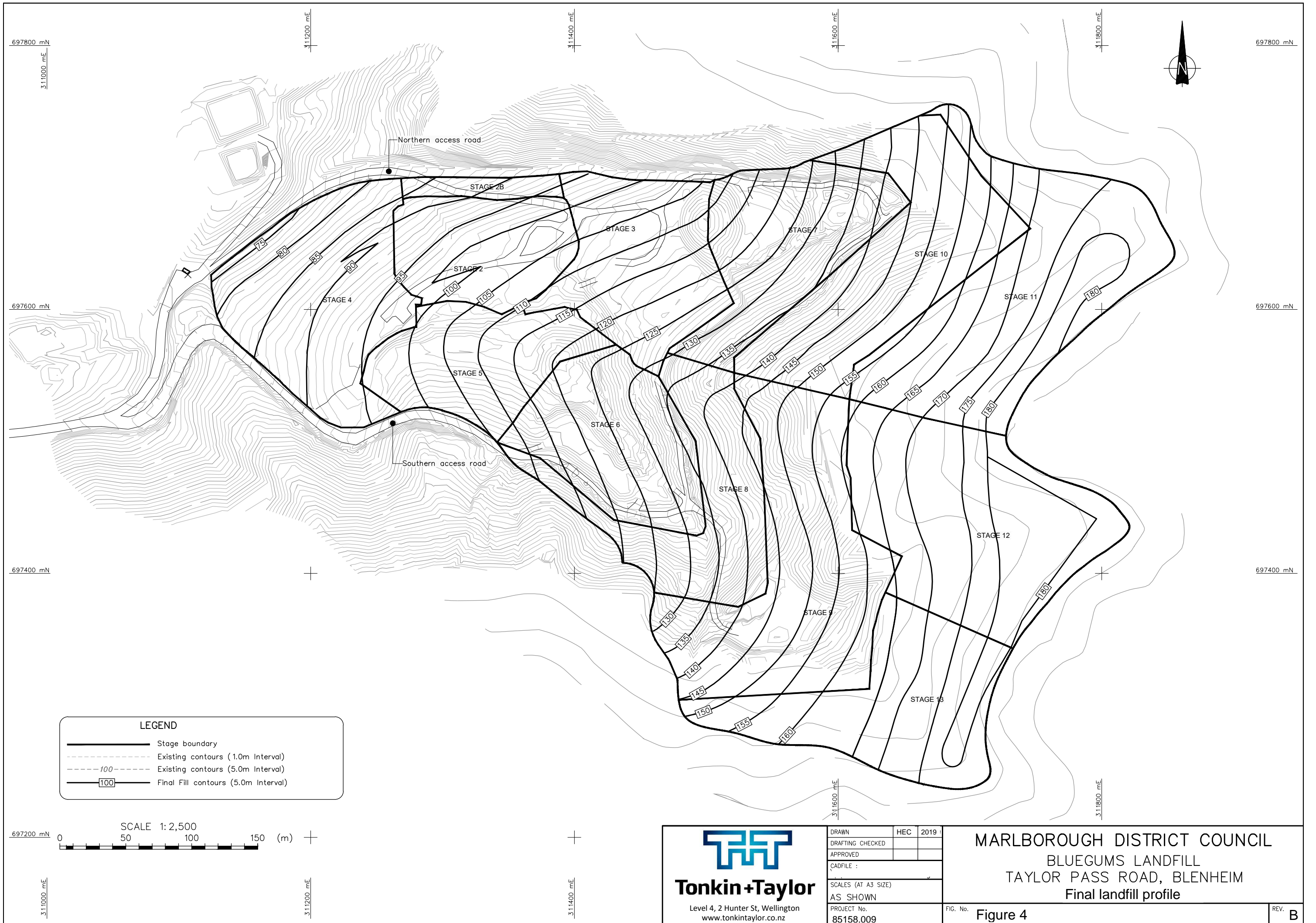


Figure 3

 Tonkin+Taylor Level 4, 2 Hunter St, Wellington www.tonkintaylor.co.nz	DRAWN	HEC	2019	MARLBOROUGH DISTRICT COUNCIL BLUEGUMS LANDFILL TAYLOR PASS ROAD, BLENHEIM Leachate and groundwater discharge pipework	FIG. No. Figure 3	REV. B
	DRAFTING CHECKED					
	APPROVED					
	CADFILE :					
SCALES (AT A3 SIZE) AS SHOWN						
PROJECT No. 85158.009						



LEGEND

- Stage boundary
- - - Existing contours (1.0m Interval)
- - -100- - - Existing contours (5.0m Interval)
- 100— Final Fill contours (5.0m Interval)

SCALE 1:2,500

0 50 100 150 (m)

Tonkin+Taylor
 Level 4, 2 Hunter St, Wellington
 www.tonkintaylor.co.nz

DRAWN	HEC	2019
DRAFTING CHECKED		
APPROVED		
CADFILE :		
SCALES (AT A3 SIZE)		
AS SHOWN		
PROJECT No.		
85158.009		

MARLBOROUGH DISTRICT COUNCIL
BLUEGUMS LANDFILL
 TAYLOR PASS ROAD, BLENHEIM
 Final landfill profile

FIG. No. **Figure 4**

REV. **B**

Appendix B: Resource consents

addressed through the issue of a corrigendum. I agree with this approach. Accordingly in what follows I have reproduced the conditions as they appeared in my decision of 14 March and then identified – by strikeout and insertion between square brackets – the corrections now made. In each case I have satisfied myself that the alterations shown are indeed corrections of my own typographical errors, and that in making those changes I have neither departed from my original intentions nor introduced anything of substantive effect.

Schedule of corrected conditions:

Disposal of Contaminants to Land

1. The consent holder shall prepare a Landfill Management Plan (LMP) addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved. The environmental effects arising from implementation of the LMP, and any subsequent version required under Condition 2, shall be within the limits set by the conditions on this consent.
2. The LMP shall be reviewed and updated at not greater than two yearly intervals. The consent holder shall publicly notify that the updated LMP is available for inspection at Council Offices.
3. In case of any difference between the LMP and the conditions of this resource consent, the conditions of this resource consent shall prevail.
4. The consent holder shall ensure that all site staff working at the landfill are effectively trained on the content and implementation of the LMP, and are advised immediately of any revision or additions to the LMP.
5. The consent holder shall:
 - a) construct a liner in all areas where refuse is to be placed. In base areas of the landfill, the liner shall be constructed from compacted soil 900mm thick with a permeability of less than or equal to 1×10^{-9} m/s. On side walls where the gradients are steeper than 3H:1V, the liner shall be constructed from compacted soil 600mm thick with a permeability of less than or equal to 1×10^{-9} m/s. The consent holder may use materials and a specification other than described above, provided that overall liner performance is to equivalent standard;
 - b) provide for collecting leachate from the liner and transferring it either to a pipeline for connection to an approved disposal site elsewhere or to a pond within the landfill property boundary, such pond to be lined as specified in Condition 7(a) [5(a)] above;

- c) ensure there is no discharge of refuse to land or water in any area without the liner as required in Condition 5(a) above; and
 - d) remove at least 20% of any daily cover and sufficient of the intermediate cover to ensure continuous drainage pathways are available for landfill gas and leachate, before placing further refuse on an existing cell.
6. The construction, installation, placement, integrity and expected performance of landfill lining systems, groundwater drainage systems, and leachate interception, collection, holding and recirculation systems on any part of the site shall be certified by a registered engineer, prior to discharge of waste in those areas.
7. The consent holder shall ensure that:
- a) Medical waste is managed in accordance with AS/NZS 3816:1998, AS/NZS 4261:1994 and AS/NZS 4478/1997 [see Notes];
 - b) Animal parts are buried immediately upon receipt;
 - c) Waste that is potentially a health hazard shall be placed in a hole specifically excavated and immediately covered with appropriate cover material.
8. All waste disposed of in the landfill shall be covered at the end of the daily operations with a layer of cleanfill no less than 200mm thickness, weighted tarpaulins or equivalent.
9. At the completion of each cell, intermediate cover shall be placed over the surface of the cell to a minimum thickness of 300mm.
10. Any contaminated soils that are accepted at the landfill the contaminant concentration of which exceeds the levels specified in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (Australian and New Zealand Environment and Conservation Council, January 1992) as being appropriate for industrial unpaved sites [see Notes] shall be covered over as soon as practicable such that the risk to human and environmental health is avoided.
11. The consent holder shall designate an officer to control entry of waste into the landfill.
12. The consent holder shall not dispose of hazardous waste of an explosive, flammable, reactive, toxic, radioactive, corrosive or infectious nature other than minor quantities of such waste where they are ordinarily part of and found in general wastes, in a manner and to a standard not less than that defined in the CAE Landfill Guidelines – April 2000. [see Notes]. Special wastes shall not be deposited within 3 m of the base or

within 10 m of the sides of the landfill. Special wastes are wastes which are acceptable, but which due to their physical nature require specific disposal management. These wastes include fish and animal wastes, liquid wastes, raw sewage sludge, sawdust, medical wastes, oil or petroleum based products, and bulky items.

13. The consent holder shall take all practicable measures to avoid the discharge of contaminants from within the landfill site to surrounding land. To this end, the consent holder shall ensure:
 - a) refuse is spread in thin layers and is compacted on the same day refuse is received;
 - b) the amount of refuse exposed at any one time is confined to a practicable minimum; and
 - c) exposed refuse is covered regularly with appropriate material and in any case no less frequently than daily.
14. The consent holder shall:
 - a) compact refuse to such an extent that post closure settlement is minimised, targeting a compacted refuse density averaging at least 700 kg/m^3 as far as practicable;
 - b) progressively, as parts of the landfill are completed, cover exposed refuse with not less than 600 mm of material, with a permeability of less than $1 \times 10^{-7} \text{ m/s}$, and no less than 100 mm of topsoil, and establish and maintain pasture on those completed areas at the landfill.
15. The consent holder shall maintain an Annual Monitoring Plan prepared in consultation with the Regulatory Department, Marlborough District Council. The first Annual Plan is to be received by the Regulatory Department Manager within two months following the grant of this consent. The Plan shall describe in detail practices for water and air monitoring, and shall contain guidelines for the determination of whether contamination is occurring including trigger levels for individual contaminants. The Monitoring Plan is to cover at a minimum:
 - a) monitoring of groundwater levels and water quality of each on-site monitoring bore;
 - b) physical and chemical monitoring of surface water quality in the stormwater ponds that discharge to the unnamed tributary of the Taylor River;
 - c) measurement of volume of leachate removed from the site monthly;

- d) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured.
16. The results of the Annual Monitoring Programme for the year ending 30 June shall be provided to the Manager Regulatory Department, Marlborough District Council by 31 August of each year following the monitoring, and be made available to any interested party, and to the public.
17. The consent holder will publicly notify both the coming into existence of each Annual Monitoring Plan [and] the availability of the results of monitoring carried out in accordance with each Annual Monitoring Programme.
18. The consent holder shall prevent surface runoff of water or contaminants to the unnamed tributary of the Taylor River from any surface area being used or previously used for the deposition of refuse, unless such surface area has been covered and rehabilitated.
19. The consent holder shall install automatic level monitoring and alarm equipment within the leachate system. This alarm system shall operate 24 hours a day and generate a pager alarm to Council Operations staff when the level within the leachate pond rises to within 250mm of the leachate pond overflow level.
20. Where any leachate or other contaminants associated with the consent holder's activities or processes associated with the landfill significantly affect surface and ground water, the consent holder shall:
- a) adopt the best practicable option [as defined by Section 2 of the Act] for remedial action or other such action reasonably required by the Manager Regulatory Department, Marlborough District Council to minimise the extent or effect of contamination;
 - b) as soon as reasonably practicable, notify the Manager Regulatory Department, Marlborough District Council, of the escape of wastes;
 - c) review the Monitoring Programme and Management Plan and incorporate such reasonable modifications as are considered necessary by the Manager Regulatory Department, Marlborough District Council; and
 - d) where water supplies are significantly affected, immediately provide alternative supplies as reasonably required by the Manager Regulatory Department, Marlborough District Council.

"Significantly affected" for the purposes of this condition shall be determined by the Manager Regulatory Department, Marlborough District Council,

by reference to the monitoring data and taking into account the purpose for which the water is to be used.

21. The Marlborough District Council may, under Section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent at intervals of five years and within 12 months of the exercise of this consent, for the purpose of:
- i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 16 [15] of this consent; and
 - ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to land.

The review of conditions may allow for:

- a) modification of the Monitoring Programme and methods of implementation outlined in Condition 16 [15] of this consent;
- b) deletion or changes to Conditions 5, 7, 8, 9, 10, 12, 13, 14, 18, and 19;
- c) the adoption of new and more stringent Standards or Guidelines in place of those specified above; and
- d) addition of new special conditions as necessary to avoid, remedy or mitigate contamination of land and/or water.

Air Discharge

1. The consent holder shall prepare a Landfill Management Plan (LMP) addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved. The environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 2, shall be within the limits set by the conditions on this consent.
2. The Management Plan shall be reviewed and updated at not greater than two yearly intervals.
3. In case of any difference between the Management Plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.

4. The consent holder shall at all times adopt the best practicable option (as defined in Section 2 of the Act) to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the landfill operation.
5. There shall be no burning of waste at the site.
6. There shall be no separate composting of waste at the site.
7. There shall be no extraction venting of untreated landfill gas within 200 metres of the boundary of the site.
8. The consent holder shall take all practicable measures to avoid the discharge of waste or contaminants from within the landfill site to the surrounding environment. To this end, the consent holder shall ensure:
 - a) refuse is spread in thin layers and is compacted on the same day refuse is received;
 - b) the amount of refuse exposed at any one time is confined to a practicable minimum;
 - c) exposed refuse is covered regularly with appropriate material and in any case no less frequently than daily; and
 - d) that as far as practicable, litter that is blown further than 30m from the working face is retrieved to the landfill within a 72-hour period.
9. The consent holder shall maintain an Annual Monitoring Plan, prepared in consultation with the Manager Regulatory Department, Marlborough District Council, and setting out details of monitoring to be carried out and containing guidelines for the determination of whether contamination is occurring. The Monitoring Plan is to cover, at a minimum:
 - a) sampling of landfill gas constituents at six-monthly intervals
 - b) assessment of odour around the perimeter of the site.
10. Where any contaminants associated with the consent holder's activities or processes associated with the landfill significantly affect the air resource, the consent holder shall adopt the best practicable option (as defined in Section 2 of the Act) with regard to appropriate remedial action as soon as practicable, or other such action reasonably required by the Manager Regulatory Department, Marlborough District Council, to minimise the extent or effect of contamination.

11. The consent holder shall keep a record of any complaints received relating to discharges to air with respect to the landfill activity. The complaints record shall include the following where possible:
 - a) name and address of complainant;
 - b) nature of complaint;
 - c) date and time of the complaint and alleged event;
 - d) weather conditions at the time of the event; and
 - e) any action taken in response to the complaint.

12. The results of the Annual Monitoring Programme and the complaints record for the year ending 30 June shall be provided to the Manager Regulatory Department, Marlborough District Council by 31 August of each year following the monitoring, and be made available to any interested party, and to the public. The consent holder will publicly notify the both the coming in to existence of each Annual Monitoring Plan and the availability of the results of each Annual Monitoring Programme.

13. The Marlborough District Council may, under Section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent at intervals of five years and within 12 months of the exercise of this consent, for the purpose of:
 - i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition ~~4~~ [9] of this consent; and
 - ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to air.

The review of conditions may allow for:

- a) modification of the Monitoring Programme and methods of implementation outlined in Condition ~~4~~ [9] of this consent;
- b) deletion or changes to Conditions ~~4, 5~~, [5, 6, 7] and 8; and
- c) addition of new special conditions as necessary to avoid, remedy or mitigate contamination to air.

Discharge of Stormwater to Land & Water

1. The consent holder shall prepare a Landfill Management Plan (LMP) addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved. The environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 2, shall be within the limits set by the conditions on this consent.
2. The Management Plan shall be reviewed and updated at not greater than two yearly intervals.
3. In case of any difference between the Management Plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.
4. No leachate discharge shall be permitted by the exercise of this consent.
5. The consent holder shall at all times adopt the best practicable option [as defined in Section 2 of the Act] to keep stormwater separate from any surface area being used or previously used for the deposition of refuse, unless such surface area has been covered and rehabilitated.
6. The consent holder shall operate and maintain stormwater holding ponds, designed to contain a 10-year return frequency, 30-minute duration rainfall event.
7. All stormwater shall be routed through the stormwater holding ponds prior to discharge to the unnamed tributaries of the Taylor River to ensure that the requirements of Conditions 8 ~~to 11~~ [and 9] can be met for 99.5% of the time.
8. The exercise of this consent shall not cause the water quality in the Taylor River downstream of the mixing zone [- defined as extending 100 metres downstream from the point of discharge -] to exceed the following criteria:

<u>Parameter</u>	<u>Limit</u>
BOD ₅	2g/m ³
Dissolved reactive phosphorus	15 mg/m ³ at low flows
Faecal coliforms (inclusive)	107 n/100 ml (1 Nov. to 1 April)

9. The exercise of this consent shall not cause the visual clarity of the Taylor River beyond the mixing zone to be [become] so low as to be unsuitable for bathing.
10. All stormwater diversion and containment channels shall be designed, constructed and maintained so as to prevent or minimise erosion of the channel.
11. The earthworks and construction associated with the landfill and the stormwater diversion and containment channels shall be designed, constructed and maintained so as to minimise instability of the surrounding land.
12. The consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the diversion channels or landfilling operations associated with the exercise of this consent. Any fill surfaces or cut batters left exposed shall be adequately protected from erosion and all such surfaces where subsequent earthworks are not proposed for a period of more than 6 months shall be hydroseeded or otherwise re-grassed.
13. The consent holder shall maintain an Annual Monitoring Plan prepared in consultation with the Manager Regulatory Department, Marlborough District Council. The Plan shall describe in detail practices for water monitoring. The Monitoring Plan is to cover at a minimum:
 - a) monitoring of the stormwater ponds for the parameters as set out in Conditions 9 [8] and 10 above, and also alkalinity, and conductivity; and
 - b) analysis shall be conducted by a laboratory with appropriate accreditation for those parameters measured.
14. The results of the Annual Monitoring Programme for the year ending 30 June shall be provided to the Manager Regulatory Department, Marlborough District Council by 31 August of each year following the monitoring, and be made available to any other interested party, and to the public. The consent holder will publicly notify both the coming in to existence of each Annual Monitoring Plan and the availability of the results of each Annual Monitoring Programme.
15. The Marlborough District Council may, under Section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent at intervals of five years and within 12 months of the exercise of this consent, for the purpose of:
 - i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 15 [13] of this consent; and

- ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the discharge of contaminants to land and water.

The review of conditions may allow for:

- a) modification of the Monitoring Programme and methods of implementation outlined in Condition 15 [13] of this consent;
- b) deletion or changes to Conditions 8 and 9; and
- c) addition of new special conditions as necessary to avoid, remedy or mitigate contamination of land and/or water.

Dam and Divert

1. The consent holder shall prepare a Landfill Management Plan (LMP) addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved. The environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 2, shall be within the limits set by the conditions on this consent.
2. The Management Plan shall be reviewed and updated at not greater than two yearly intervals.
3. In case of any difference between the Management Plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.
4. All stormwater diversion and containment channels shall be designed, constructed and maintained so as to prevent or minimise erosion of the channel in all circumstances.
5. The earthworks and construction associated with the landfill and the stormwater diversion and containment channels shall be designed, constructed and maintained so as to minimise instability of the surrounding land.
6. The consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the diversion channels or landfilling operations associated with the exercise of this consent.

7. The consent holder shall maintain an Annual Monitoring Plan prepared in consultation with the Manager Regulatory Department, Marlborough District Council. The Plan shall describe in detail practices and sites for water monitoring.
8. The results of the Annual Monitoring Programme for the year ending 30 June shall be provided to the Manager Regulatory Department, Marlborough District Council by 31 August of each year following the monitoring, and be made available to any other interested party, and to the public. The consent holder will publicly notify both the coming in to existence of each Annual Monitoring Plan and the availability of the results of each Annual Monitoring Programme.
9. The Marlborough District Council may, under section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent at intervals of five years and within 12 months of the exercise of this consent, for the purpose of:
 - i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 7 of this consent; and
 - ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the damming and diversion of water.

The review of conditions may allow for:

- a) modification of the Monitoring Programme outlined in Condition 7 of this consent; and
- b) addition of new special conditions as necessary to avoid, remedy or mitigate adverse effects on land and/or water.

To Erect, Place & Maintain Structures in the Stream Beds

1. The consent holder shall prepare a Landfill Management Plan (LMP) addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved. The environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 2, shall be within the limits set by the conditions on this consent.
2. The Management Plan shall be reviewed and updated at not greater than two yearly intervals.

3. In case of any difference between the Management Plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.
4. The earthworks and construction associated with the erection, placement and maintenance of structures shall be designed, constructed and maintained so as to minimise instability of the stream banks and the surrounding land.
5. The consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to the construction or maintenance of the structures.
6. The consent holder shall maintain an Annual Monitoring Plan prepared in consultation with the Regulatory Manager, Marlborough District Council. The Plan shall describe in detail practices and sites for water monitoring.
7. The results of the Annual Monitoring Programme for the year ending 30 June shall be provided to the Manager Regulatory Department, Marlborough District Council by 31 August of each year following the monitoring, and be made available to any other interested party, and to the public. The consent holder will publicly notify both the coming in to existence of each Annual Monitoring Plan and the availability of the results of each Annual Monitoring Programme.
8. The Marlborough District Council may, under Section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent at intervals of five years and within 12 months of the exercise of this consent, for the purpose of:
 - i) assessing the ongoing adequacy of the Monitoring Programme and methods of implementation outlined in Condition 7 [6] of this consent; and
 - ii) assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the damming and diversion of water.

The review of conditions may allow for:

- a) modification of the Monitoring Programme outlined in Condition 7 [6] of this consent;
- b) addition of new special conditions as necessary to avoid, remedy or mitigate adverse effects on land and/or water.

Disturbance to Land

1. The consent holder shall prepare a Landfill Management Plan (LMP) addressing proposed operation, management and monitoring at the landfill for the purpose of demonstrating among other things the means by which compliance with the conditions set in this consent shall be achieved. The environmental effects arising from implementation of the Management Plan, and any subsequent version required under Condition 2, shall be within the limits set by the conditions on this consent.
2. The Management Plan shall be reviewed and updated at not greater than two yearly intervals.
3. In case of any difference between the Management Plan and the conditions of this resource consent, the conditions of this resource consent shall prevail.
4. The earthworks associated with landfill construction, operation and maintenance shall be designed and carried out so as to minimise disturbance to land, the generation of dust, and the effects of stormwater run-off.
5. The consent holder shall repair and rehabilitate any land made unstable and any erosion occurring due to excavation activities at the landfill.
6. The area of unvegetated land within the landfill shall not exceed 5 hectares at any one time, without the prior approval of the Regulatory Manager, Marlborough District Council.
7. The consent holder shall progressively, as parts of the landfill are completed, cover exposed refuse with not less than 600 mm of material, with a permeability of less than 1×10^{-7} m/s, and no less than 100 mm of topsoil, and establish and maintain pasture on those completed areas at the landfill.
8. Exposed earthwork areas that will not be reworked within a six-month period be revegetated.
9. The Marlborough District Council may, under Section 128(1)(a) of the Resource Management Act 1991, serve notice of review of conditions of this consent at intervals of five years and within 12 months of the exercise of this consent, for the purpose of assessing the effectiveness of conditions in avoiding, remedying or mitigating adverse effects on the environment from the construction and maintenance of structures. The review of conditions may allow for:
 - a) deletion or changes to Conditions 6 and 7;

- b) addition of new special conditions as necessary to avoid, remedy or mitigate adverse effects on land and/or water.

Term of 'Discharge' Consents

Except to the extent provided by section 123(b) of the Act, the term of the consents hereby granted shall expire on 30 November 2030.

[Notes:

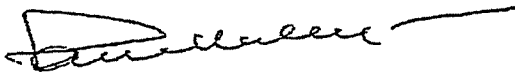
(1) The foregoing conditions of consent neither completely define nor exhaust the duties and responsibilities of the Marlborough District Council, considered either as a local authority or as a consent holder. By way of example:

(a) Section 35 of the Act imposes a duty upon local authorities to monitor the state of the environment and the exercise of resource consents and to "take appropriate action (having regard to the methods available to it under this Act) where this is shown to be necessary";

(b) Section 17 of the Act imposes a duty upon those carrying out activities (including the present consent holder in the exercise of these consents) a duty to avoid, remedy or mitigate adverse effects on the environment arising thereby. That duty is enforceable by way of an Enforcement Order under Part XII of the Act, applications for which may be made by any person; and

(c) Other statutes or statutory instruments may impose duties upon the operators of sanitary landfills and/or those handling particular substances, which duties operate independently of the provisions of the Resource management Act or the conditions of this consent

(2) Some of the conditions of this consent require compliance with specified Standards or Guidelines. In the event that those are amended or replaced so as to provide for more stringent standards it is recommended that those more stringent standards be adopted.]



John Milligan
Commissioner
September 17, 2001

Appendix C: Leachate pumping system operation

Marlborough District Council

Bluegums Regional Landfill

Leachate overflow protection system

Operation

1 Description of the system

1.1 Purpose

The leachate overflow protection system has been constructed to control leachate overflows from the landfill during severe rainfall events. The leachate collection system within the landfill comprises a number of gravity drains that combine into a single drain under the toe bund. This drain discharges to a pipeline laid along Taylor Pass Road to connect to the Blenheim sewerage system.

Two upstream landfill stages (3 and 5) were constructed across the two valleys that make up the landfill site. Stormwater from small catchments above each of these stages drains into the leachate drainage system. During severe rainfall events this additional stormwater is added to the leachate generated within the landfill and flow exceeds the capacity of the pipeline along Taylor Pass Road. This results in leachate backing up into and overflowing from the small leachate pond below the toe bund. Previous practice has been to throttle or shut the valve on the leachate pipe from the landfill to control the flow to the Taylor Pass Road pipeline in order to prevent it backing up. However, this results in a build-up of leachate within the landfill and during two extreme rainfall events in 2008 (and subsequently) this resulted in overflows of leachate through two clean-out riser pipes on the leachate system that emerge onto the landfill surface above the toe bund. The new system has been installed to minimise the potential for future overflows.

Stage 6 has now been constructed up-slope from Stage 5. Once Stage 6 has been filled all stormwater runoff from upstream catchments in the southern valley will be diverted around the landfill. Future construction of Stage 7 up-slope from Stage 3 will similarly prevent stormwater entering the system from catchments in this area.

1.2 Description

The system operates by pumping leachate that cannot be accommodated by the Taylor Pass Road pipeline to a storage pond located on the landfill surface. Once the conditions leading to an overflow have passed, the leachate stored in the pond can be discharged into the Taylor Pass Road pipeline.

The system comprises:

- A pump installed within the existing small leachate pond downstream of the toe bund (lower leachate pond).

- A new clay lined leachate storage pond constructed on the surface of the landfill with a high level spillway to the adjacent stormwater drain (upper leachate pond).
- A 180 mm OD PE rising main from the pump to the leachate storage pond on the landfill.
- An ABB Magmaster flow meter on the leachate rising main
- A Cla-Val float control valve on the end of the rising main at the storage pond.
- A pipe and valve system to select whether the contents of the pond are discharged to the stormwater system or the leachate system.
- A branch pipeline on the rising main to divert leachate back to the Taylor Pass Road leachate pipe.

The layout and details of the system are shown on Figures 1 and 2 attached.

1.3 Operation overview

The system operates as follows:

- The valves on the leachate pipe from the landfill will remain open at all times.
- Pump selector to be in 'Auto' position.
- Should the leachate flow exceed the capacity of the pipeline along Taylor Pass Road the leachate will back up and flow into the small concrete lined lower leachate pond downstream of the toe bund.
- When the water level in the pond has risen to 300 mm above the pond floor (measured by a Multitrode level sensor in the pond) the pump will start to pump leachate to the upper leachate pond on the landfill.
- The pump will continue to pump leachate until there is a low level in the lower leachate pond or the upper leachate pond is full, closing off the inlet valve.
- Once the conditions leading to the overflow event have passed, the operator manually initiates the discharge of leachate from the upper leachate pond to the leachate pipeline.
- Stormwater can collect in the upper leachate pond. This can be manually discharged to the stormwater system.

The pump can also be used for pumping water/leachate into the Taylor Pass Road pipeline at a high rate for flushing, but not at the full flow of the pump. The pump's maximum capacity will exceed the Taylor Pass Road pipe capacity. Flow control will be achieved by partially closing valve No 3.

The detailed operation of the system is described in Section 2 below.

1.4 Equipment list

Key items of equipment installed include:

Pump:	KSB Amarex KR K 80-315/232UG-P submersible motor pump with IP68 rating.
Control Valve:	150 mm diameter Cla-Val Model 124-01 Float Valve
Flow meter:	150 mm diameter ABB Magmaster Flowmeter.
Isolation valves:	Keystone Fig 583 and Fig 580 Ballcentric valves
Non-return valve:	Keystone Fig86 swing check valve
Level control:	Multitrode level sensor

1.5 Alarms and set points

Pump Control:

Pump on/off is controlled by water level in the pond/sump measured by a Multitrode level sensor. The pump is also turned off when a high water level in the upper leachate pond on the landfill closes the float valve on the inlet to the pond, causing “no flow” in the rising main, measured by the flow meter on the rising main.

The commissioning set points are:

Pump Start	water level 300 mm above pond floor
Pump Stop	water level 400 mm above bottom of pump sump
Pump Stop	no flow in rising main.
High level alarm	water level 800 mm above pond floor

The pump start point is intended to be high enough to allow for minor discharges into the lower leachate pond without the pumping system starting. The high level alarm point is set to allow some time for the operator to take action to prevent an overflow. The set points described should be reviewed and modified as appropriate based on operational experience.

Alarms:

Alarms are sent to the SCADA system, with the following alarms being paged to the landfill operator:

High level in lower leachate pond

Recording:

All functions are connected to the MDC SCADA system. The following information will be recorded:

Pump start/stop

Flow rate to the upper leachate pond

Today's total flow pumped to the upper leachate pond

Alarms

Valve positions:

During normal landfill operation (no flood) the valves shall be set as follows:

Valve	1	2	3	4	5	6
Position	Open	Open	Closed	Open	Closed	Closed

2 System operation

2.1 Daily

The following shall be completed at the beginning of each day – timed to suit other landfill operation requirements.

1. Manually record the reading on the flow meter in a log book held in the site office. The flow meter display is located in the panel in the telemetry cabinet adjacent to the small leachate pond. Compare with the preceding day's reading to determine whether leachate pumping has occurred.
2. Inspect the upper leachate pond. If leachate pumping has occurred (as indicated by item 1), and leachate is present in the pond, follow procedures described below under "After a flood event".
3. If no leachate pumping has occurred, and stormwater is present in the upper leachate pond, open valve 6 and discharge water to the adjacent stormwater drain. Once the pond has emptied, shut the valve.
4. Remove any litter and debris from the screen at the outlet of the upper leachate pond.
5. Remove any litter and debris from the screen covering the pump in the lower leachate pond.
6. Check that all valves are in their correct position.

2.2 Flood event

When on site during heavy rainfall conditions, the operator should visually inspect the system to determine whether or not it is operating.

Upon becoming aware that the system is operating:

1. Check that all valves are in the correct position.
2. Check that no debris is present on the screen above the pump.
3. Check that leachate is pumping to the upper leachate pond as intended.
4. Visually monitor the water level in the lower leachate pond. If the level is continuing to rise even with the pump operating, throttle valve 1 (leachate pipe under the toe bund) until the level stops rising. Monitor for possible leachate breakout from the cleanout risers on the leachate system in the landfill.
5. Should the lower leachate pond high level alarm sound (paged to the landfill operator), the following action should be taken:
 - Check the reason for the high level. If the pump is still operating and the upper leachate pond has remaining storage capacity, throttle valve 1 so that the flow into the lower pond matches the pump capacity.
 - If the pump has stopped and the upper leachate pond is not full, check the position of the valve to the upper leachate pond (valve 4) to ensure it is fully open. After adjusting this valve, visually monitor the level in the lower leachate pond to ensure it is falling.
 - If the pump has stopped due to the upper leachate pond being full, throttle valve 1 until flow can be accommodated by the Taylor Pass Road pipeline and the water level in the lower leachate pond starts to fall. Monitor for possible leachate breakout from the cleanout risers in the landfill. Arrange for tankers to remove leachate from the lower or upper pond to cart leachate to the Blenheim wastewater treatment plant. Once capacity has been restored, fully open valve 1.
 - If the pump has stopped due to an electrical supply failure, throttle valve 1 until flow can be accommodated by the Taylor Pass Road pipeline and the water level in the lower leachate pond starts to fall. Arrange for a portable generator to be brought onto site. Fully open valve 1 once power has been restored.
 - If the pump has stopped due to mechanical or electrical failure or blockage, throttle valve 1 until flow can be accommodated by the Taylor Pass Road pipeline and the water level in the lower leachate pond starts to fall. Arrange for immediate repairs. Fully open valve 1 once operation has been restored.

2.3 After a flood event

Following a rainfall event that has resulted in leachate being pumped to the upper leachate pond, and once capacity has been restored in the Taylor Pass Road sewer, the following procedure should be implemented to empty the upper leachate pond:

1. Leave valve 2 open to allow ongoing discharge of leachate from the landfill
2. Open valve 3.
3. Remove any debris from the screen at the outlet of the upper leachate pond. Continue to check for possible debris build-up throughout the draining operation.
4. Open valve 5 (Valve 6 must remain closed). Leachate will start to flow to the sewer.
5. Observe whether leachate is flowing freely into the sewer, or whether it is backing up into the lower leachate pond.
6. If leachate is backing up into the lower leachate pond with valve 2 open, the discharge rate is exceeding the sewer capacity. Throttle valve 3 until leachate is flowing freely into the sewer.
7. Once the upper leachate pond is empty close valve 3 and close valve 5.

Alternative procedure:

1. Set pump selector to 'manual' position.
2. Close valve 2. Leachate from the landfill will discharge into the lower leachate pond. Monitor the level in this pond visually and close valve 1 to store leachate in the landfill if required to prevent an overflow from the lower pond.
3. Open valve 3.
4. Remove any debris from the screen at the outlet of the upper leachate pond. Continue to check for possible debris build-up throughout the draining operation.
5. Open valve 5 (valve 6 must remain closed). Leachate will start to flow to the sewer. The flow rate into the sewer will self-regulate for the driving head available.
6. Once the upper leachate pond is empty close valves 3 and 5. Open valve 2 to drain the contents of the lower leachate pond, then open valve 1.

2.4 Flushing of sewer

The pump can be used to pump water into the Taylor Pass Road sewer at a high rate for flushing the sewer. This should be done on a regular basis to minimise the build-up of calcite and other leachate products on the inside of the sewer. Experience by MDC during the winter of 2010 indicates that flushing should be undertaken on a weekly basis. The need

for flushing at other times may become apparent if leachate is backing up into the lower leachate pond during dry conditions or minor rainfall events.

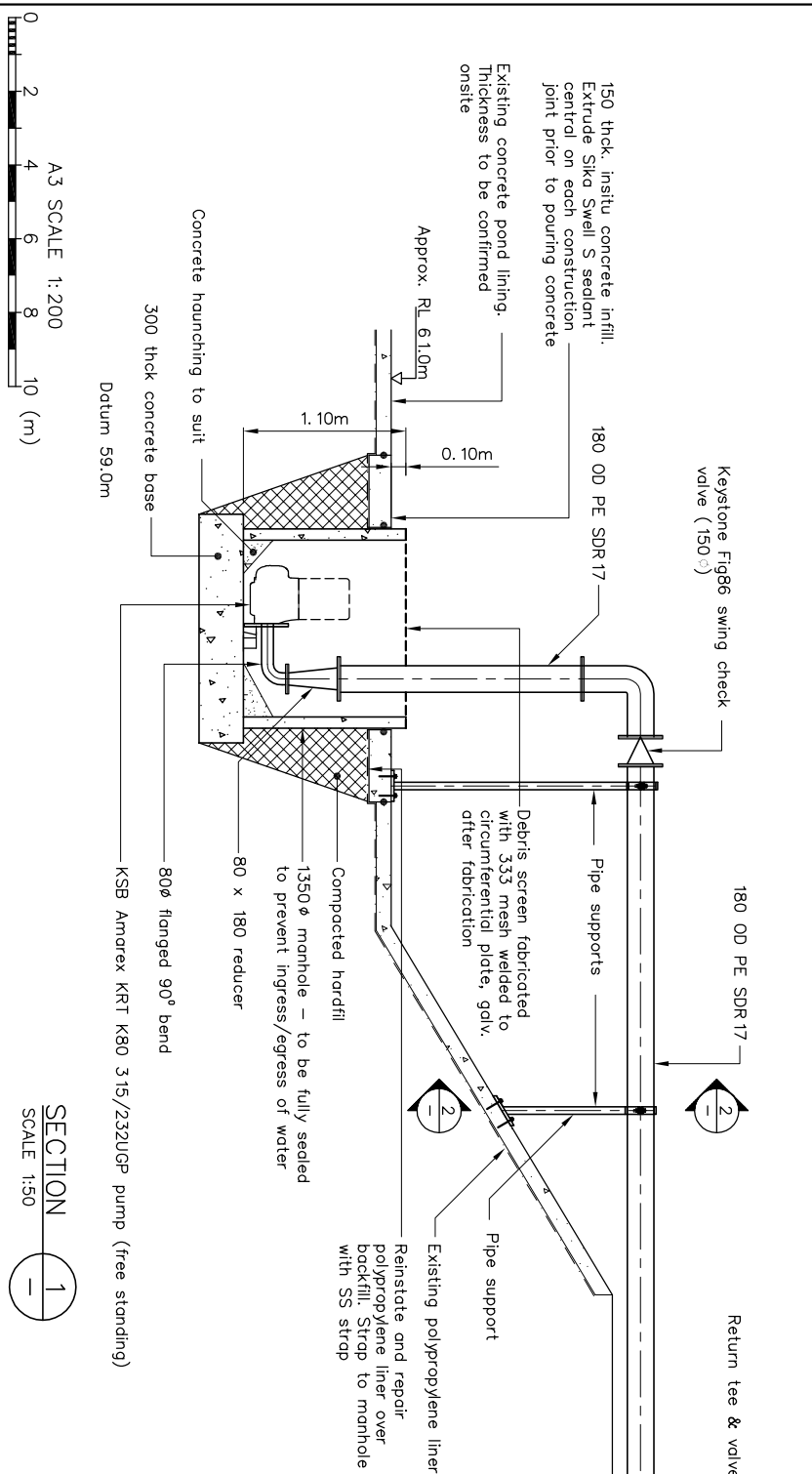
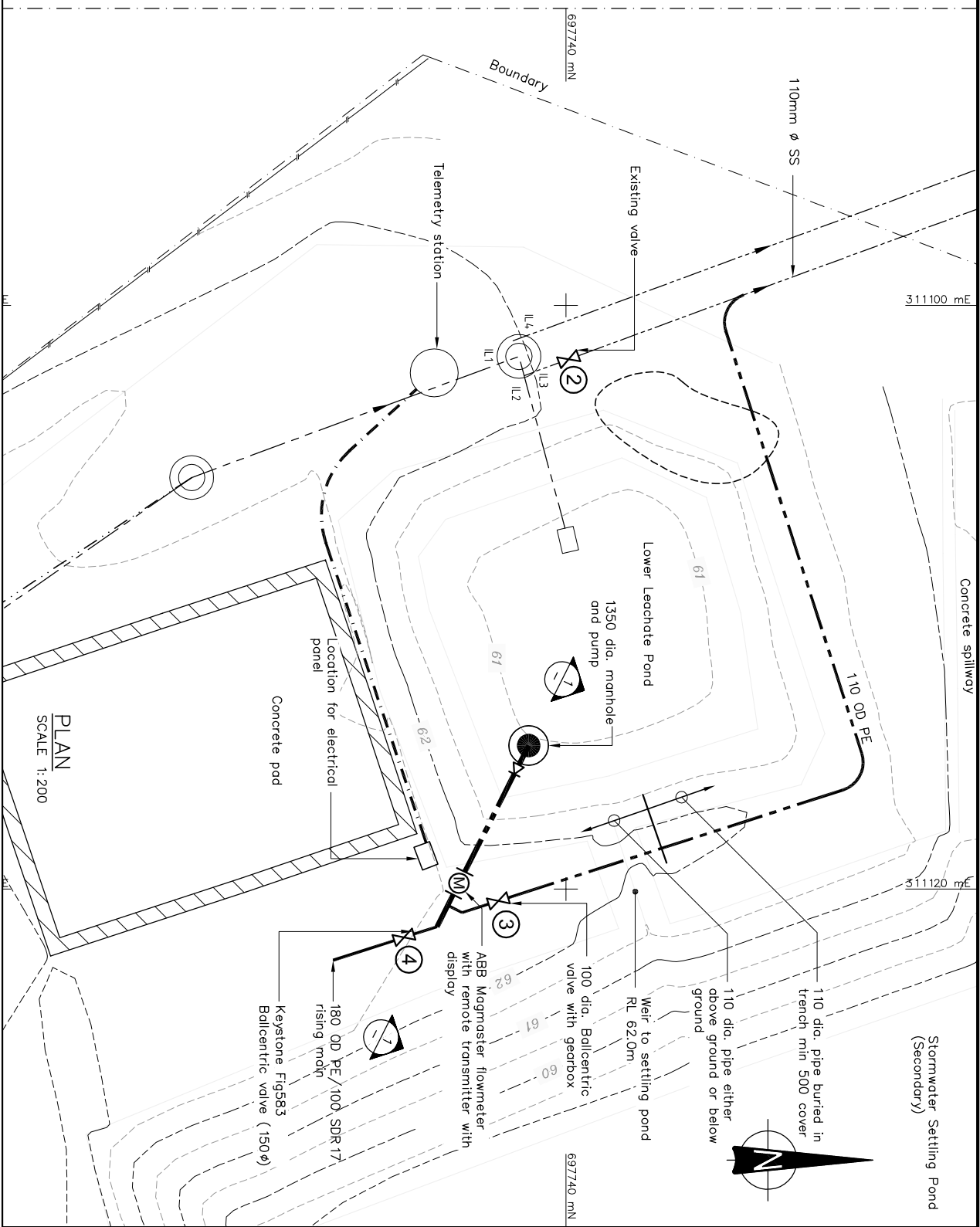
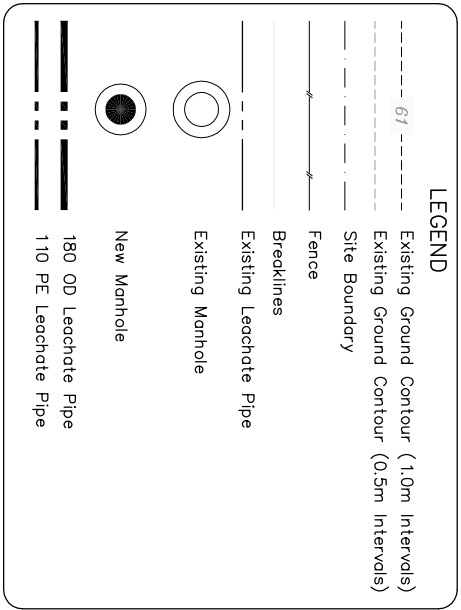
The following procedure is required for flushing of the sewer:

1. Set the pump to manual operation
2. Close valve 2 to allow leachate to flow into the lower leachate pond (or fill the pond from another source (e.g. pumping from the adjacent stormwater pond)).
3. Close valve 4 and open valve 3.
4. Once pond is full, start the pump to pump the contents of the lower leachate pond into the sewer.
5. Valve 3 can be throttled if required to regulate the flow into the sewer to a set flow rate indicated on the flow meter.
6. Pump will stop on low water level once the lower leachate pond has emptied.
7. Open valve 2, open valve 4 and close valve 3.
8. Repeat the exercise if required.

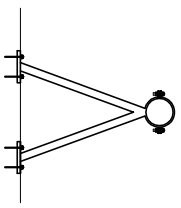
2.5 Inspections and maintenance

Six monthly:

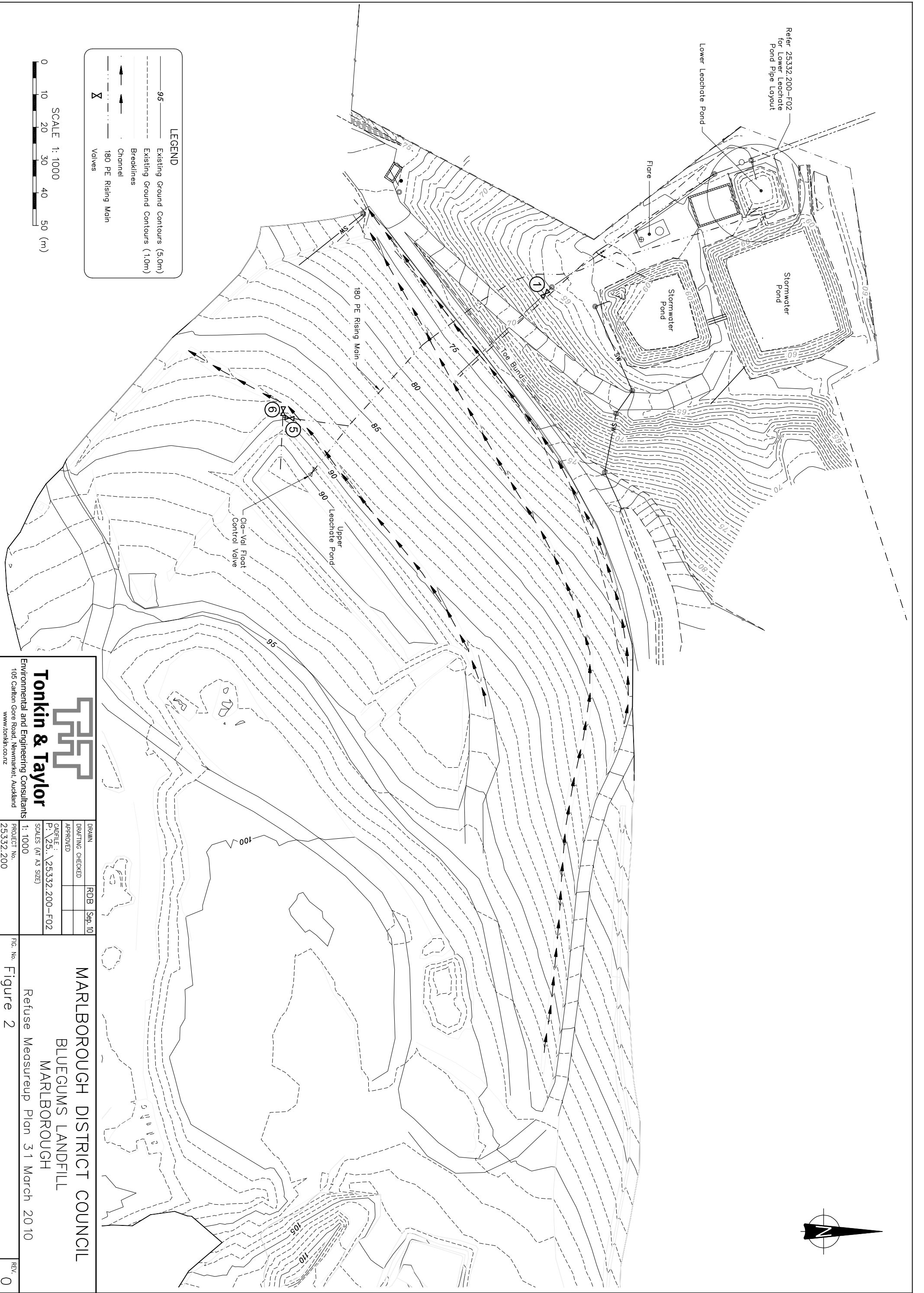
1. Check the upper leachate pond for settlement and significant cracking/deterioration. The pond has been built on the landfill and will be subject to differential settlement, causing possible ponding of water and cracking of the liner. Ensure that all parts of the pond are draining to the outlet. Carry out repairs as necessary to reinstate drainage grades and reinstate damaged liner.
2. Maintain the pump, float valve, meter and other components of the system in accordance with the manufacturer's instructions.
3. Inspect for any build-up of solids in the lower leachate pond, and particularly in the pump sump. Remove any material present.



SECTION 2 TYPICAL PIPE SUPPORT
SCALE 1:50



<p>Tonkin & Taylor Environmental and Engineering Consultants 105 Carlon Gore Road, Newmarket, Auckland www.tonkin.co.nz</p>	DRAWN	RDB	Apr. 09
	DRAFTING CHECKED		
	APPROVED		
DATE: 25.09.2010 PROJECT No. 25332.200-F01 SCALES (AT A3 SIZE) 1:200			
MARLBOROUGH DISTRICT COUNCIL BLUEGUMS LANDFILL MARLBOROUGH		FIG. No. Figure 1	
Leachate Pipe Layout & Sections		REV. 0	



LEGEND

- Existing Ground Contours (5.0m)
- - - Existing Ground Contours (1.0m)
- Brecklines
- Channel
- 180 PE Rising Main
- ⊗ Valves



<p>Tonkin & Taylor Environmental and Engineering Consultants 105 Carlon Gore Road, Newmarket, Auckland www.tonkin.co.nz</p>	DRAWN	RDB	Sep. 10
	DRAFTING CHECKED		
APPROVED			
DATE: 29.09.2010 PROJECT No. 25332.200-F02 SCALES (AT A3 SIZE) 1: 1000			
<p>MARLBOROUGH DISTRICT COUNCIL BLUEGUMS LANDFILL MARLBOROUGH Refuse Measureup Plan 31 March 2010</p>		FIG. No. Figure 2	
REV. 0			

Appendix D: Sludge testing methodology

Sludge testing methodology

Sludges shall initially be examined visually and in most cases it is anticipated that classification as a sludge or liquid waste will be possible on that basis e.g. free water visible = liquid, very sloppy = liquid, relatively dry and stiff = sludge.

Where visual inspection is not sufficient to classify the waste, sludges shall be tested in accordance with the following tests to determine whether they are classified as a sludge waste or a liquid waste.

- i The presence of free water in a sludge (if not evident by visual inspection) shall be determined by use of the USEPA SW-846 Method 9095B, Paint Filter Free Liquids Test (EPA 2004); methodology attached.
- ii The slump of a sludge shall be determined by use of the NZS3112, Part 1L1986 slump test as set out in the CCANZ Information Bulletin, IB49 attached.
- iii Solids content of sludges shall be determined by use of the American Public Health Associates test, APHA 2540G.

Appendix E: Landfill gas flare service schedule

Quarterly landfill gas flare service schedule

Weekly maintenance

- 7 **Fastener check – Check all threaded fasteners.**
 - Motor hold-down bolts
 - Fan bolts
 - Pipe work flanges
 - Flare body flange bolts
- 8 **Fan motor inspection**
 - Listen to fan motor bearings for unusual noise or vibration. If a fault is detected determine the cause and rectify.
 - Visually check cable glands, saddles, cable condition and terminals
- 9 **Gas particulate filter check**
 - Inspect gas filter every two weeks if any physical changes or additions have been made to the gas field.
 - See quarterly schedule for details.
- 10 **Gas sampling line**
 - Check water trap on gas sampling line for build-up of water.
- 11 **Compressed air filter**
 - Check compressed air filter and water trap and ensure clean. Located under control panel.
- 12 **Compressor**
 - Drain compressed air receiver.
- 13 **Instrument panel**
 - Check all sampling tubes are connected properly.
 - Check for any signs of water present in this system and clear immediately.
 - Check for condensation inside water trap and clear immediately.
 - Check H₂S scrubber. Replace filter media if used up (refer manual for details)
- 14 **Dampers**
 - Check dampers for free movement. Lubricate if required.
- 15 **Vents**
 - Check operation of main safety valves and vents are clear of any obstruction.
 - Check vents on damper actuators.
 - Check vent on gas analysing system under control panel and ensure all tubes are clear of debris.
- 16 **Insects**
 - Check for beetle nests, wasp nests and ants as they cause blockages and could cause the fan variable speed drive to overheat.

Quarterly maintenance (In addition to weekly maintenance)

1 Fan motor inspection

- Grease nipples
- Check seals and retaining screws
- Listen to bearings when rotated by hand
- Check terminal boxes for condensation
- **Note:** New bearings and installation, if required.

2 Sample line blow out

- Disconnect sample lines both ends and blow out with compressed air
- Remove any blockages and water
- Check for corrosion
- Disconnect pressure transducer lines both ends and blow out with compressed air. DO NOT USE COMPRESSED AIR ON CONNECTED PRESSURE TRANSDUCERS.
- Reconnect all sample and pressure transducer lines

3 Gas particulate filter check

- Inspect gas filter
- Check for tears in fabric
- Check for excessive fabric blockages
- Check any foreign material in filter housing
- **Note:** Gas filter will be wet but housing should not contain more than a cup of water

4 Check auto drains, air filters and water traps

- Check air traps located underneath the control panel
- Inspect filters and clean if required
- Adjust air pressure on regulator if required

5 Check thermocouples

- Check thermocouples in working order
- Open head and check for condensation
- Check connections and cable condition

6 Check sparkplug and replace

- Check sparkplug and clean with wire brush
- Listen for audible spark when igniting
- Replace if any doubt arises
- **Note:** Try to use a NON-resistance sparkplug. Ensure the gap is at least 2.5 – 3mm.

7 Check compressor

- Check compressor oil level and top up if necessary
- Check motor amps
- Check drive belt tension
- Check connections for leaks

8 Lube damper bearings

- Check bearings and grease
- Check operation of dampers are smooth

9 **Paint touch-up**

- Corrosion protection

10 **Refractory checks**

- Check refractory lining to stack

Annual maintenance (In addition to weekly and quarterly maintenance)

1 **Full service**

- Carry out a full check of the complete system to ensure that all units are operating as commissioned. This will require checking that all gas pressure monitors, proximity sensors and limit switches are operating and that all air and natural gas pressures are as set during commissioning. It is suggested that this work be carried out by a service engineer fully familiar with Industrial Combustion Equipment.

2 **Gas filter**

- Gas filter should be replaced every year

Appendix F: Environmental monitoring plan

BLUEGUMS LANDFILL

MONITORING PROGRAMME

COMMENCING SEPTEMBER 2013

1 Background

This Monitoring Plan sets out the rationale and monitoring schedule for groundwater, surface water and landfill gas monitoring at Bluegums Landfill, Marlborough. It has been set out in fulfilment of the requirements of resource consent U000950 granted By Marlborough District Council in March 2001.

Sampling procedures should be in general accordance with the guidance set out in the Ministry of Health/Ministry for the Environment 1997 *Health and Environmental Guidelines for Selected Timber Treatment Chemicals*.

This plan was updated in September 2013 to add the names of sample locations in the Taylor River and its tributary and to add an upstream monitoring location in the Taylor River. Also added were testing requirements for the Taylor River and its tributary for those parameter which most often exceed trigger levels in the surface and groundwater monitoring.

2 Monitoring rationale

The proposed monitoring approach comprises:

- Annual review and preparation of this programme
- Tiered evaluation of results.

Water Quality

The key potential events which water quality monitoring addresses are:

- leachate leakage through the liner into:
 - underdrains
 - groundwater (shallow gravel and colluvium)
- leachate discharge into the perimeter drains or stormwater ponds (and from the ponds into groundwater)
- emergence of contaminated groundwater into streams downgradient of the landfill.

Because sufficient natural surface water runoff for sampling occurs only low in the catchment during storm events, upgradient monitoring of surface water quality is considered impractical. Only deep (greywacke) groundwater can be monitored upgradient of the landfill. The quality of this groundwater is significantly different to the shallow (alluvial gravel) groundwater downgradient of the landfill, so no upgradient control site can be established. As comparison of 'site' and 'control'

water quality is not feasible, leachate effects on water quality must be evaluated by checking for changes in water quality over time.

Air Quality

Landfill Gas

Landfill gas is being generated at Bluegums. Given its rural setting and early development stage, no health and safety hazard is considered to exist. Three main gas constituents (CO₂, CH₄ and O₂) are recorded every 5 minutes at the gas flare.

Odour

Odour assessment is not ongoing. A complaints register is maintained by the landfill operator and Marlborough District Council. The landfill operator correlates ant complaints with weather conditions and type of waste received at the time of the complaint.

3 Monitoring locations

Current monitoring locations are shown in Figure 1 of T&T's report "Bluegums Regional Landfill: Annual Monitoring Report July 2010 - June 2011" (T&T Ref. 85158.004). All current sites are summarised below.

Groundwater:

p28w/5A	Immediately downgradient of landfill, in gravels
p28w/6A	Distant downgradient, in gravels
p28w/7	Southwest ridge (alternative leachate path), in greywacke

Surface Water:

TIP-055	Stormwater pond
TIP-056	Stormwater pond outlet - ephemeral flow
Tributary (TIP-046)	Tributary of Taylor River, downstream of landfill
Taylor River downstream (TIP-058)	Downstream of point of discharge
Taylor River upstream	Upstream of point of discharge

Other:

TIP-047	Leachate
TIP-057	Underliner discharge

4 Monitoring schedule for annual reporting

Monitoring should be carried out as described below and summarised in Table 1.

Table 1: Summary of monitoring requirements

	Groundwater			Surface water				Leachate	Underliner
	p28w/5A	p28w/6A	p28W/7	TIP-055	TIP-056	Taylor River (upstream and downstream)	Tributary	TIP-047	TIP-057
Alkalinity (HCO ₃ + CO ₃)	x	x	x	x	x			x	x
Ammonia-N	x	x	x	x	x	x	x	x	x
Biochemical oxygen demand (BOD)	o	o	o	o	o	o	o	o	o
Calcium	x	x	x	x	x			x	x
Chemical oxygen demand (COD)	x	x	x	x	x	x	x	x	x
Chloride	x	x	x	x	x	x	x	x	x
Conductivity (field)				--	--				--
Conductivity (lab)	x	x	x	x	x	x	x	x	x
Copper (dissolved)	o	o	o						
Copper (soluble)				o	o			o	o
Dissolved reactive phosphorus (DRP)				o	o	o	o		
Faecal coliforms				o	o	o	o		
Iron (dissolved)	x	x	x						
Iron (soluble)				x	x			x	x
Lead (dissolved)	o	o	o						
Lead (soluble)				o	o			o	o
Magnesium	x	x	x	x	x			x	x
Manganese (dissolved)	o	o	o						
Manganese (soluble)				o	o			o	o
Nickel (dissolved)	o	o	o						
Nickel (soluble)				o	o			o	o
Nitrate-N	x	x	x	x	x	x	x	x	x
Nitrite-N	x	x	x	x	x			x	x
pH (field)				--	--				--
pH (lab)	x	x	x	x	x			x	x
Potassium	x	x	x	x	x			x	x
Sodium	x	x	x	x	x			x	x
Sulphate	x	x	x	x	x			x	x
Visual inspection				--	--				--
Zinc (dissolved)	o	o	o						

Zinc (soluble)				o	o			o	o
----------------	--	--	--	---	---	--	--	---	---

-- Weekly x Quarterly (March, June, September, December) o March only

Weekly monitoring:

Pond water (TIP-055 and TIP-056) and underliner discharge (TIP-057) will be monitored weekly for pH and conductivity and visually for any unusual indication of contamination.

Monthly monitoring:

Monthly totals of the volume of leachate discharged (measured at the leachate pump) should be recorded.

Quarterly monitoring:

Samples of groundwater from p28w/5A, p28w/6A, and p28w/7, surface water in the stormwater pond (TIP-055 and TIP-056) and tributary if water is flowing, leachate (TIP-047) and underliner discharge (TIP-057) are to be taken at quarterly intervals in September, December, March and June and tested for the parameters shown in Table 1.

The presence of flow, or not, at the outflow of stormwater pond 2 and in the tributary should be noted.

Annual monitoring:

Additional parameters are required to be tested in the March monitoring round, as shown in Table 1.

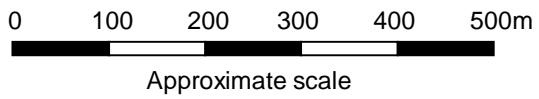
Also in the March monitoring round, a sample shall be taken from the Taylor River, downstream of the mixing point with the tributary from the landfill. This should be tested for the parameters shown in Table 1.

If any of the parameters in the Taylor River exceed the limits set in Resource Consent U000950, upstream and downstream samples should be taken and their values compared.



Source: Google Earth

. Surface water monitoring location
 O Groundwater monitoring location
 Monitoring locations are approximate



Tonkin & Taylor
Environmental & Engineering Consultants

Hamilton Wellington
 Christchurch Dunedin
 Nelson Auckland Tauranga

DRAWN	KJSS	Apr. 12
DRAFTING CHECKED		
APPROVED		
CADFILE :		
SCALES (AT A4 SIZE)		
PROJECT No.	85158.004	

MARLBOROUGH DISTRICT COUNCIL
BLUEGUMS REGIONAL LANDFILL MONITORING REPORT

Monitoring location plan

Figure 1

FIG. No.	
REV.	0

Appendix G: ETS sampling and testing plan

Bluegums Regional Landfill – Emissions Trading Scheme sampling and testing plan

Last updated: August 2017

1 Introduction

The Landfill is required to comply with the requirements of the New Zealand Emissions Trading Scheme (ETS) under the Climate Change Response Act 2002. Under this Act, the operator of a disposal facility (Marlborough District Council), is entitled to apply for a Unique Emissions Factor/s (UEF) such that their surrender requirements under the ETS better reflect their actual greenhouse gas emissions. The requirements for a UEF are set out in the Climate Change (Unique Emissions Factors) Regulations 2009, and includes the need for an ongoing sampling and testing plan for the activity. The ongoing sampling and testing plan for the Landfill to enable compliance with these regulations is detailed below.

2 Objective

The objective of carrying out ongoing sampling and testing is to identify any changes in waste composition, or landfill gas destruction which may impact on the UEFs that have been approved for use at the Landfill.

3 Waste composition sampling and testing

Council applies for individual UEFs for the non-inert waste that enters the Landfill. This system was developed to allow for changes in the waste stream over time. Monitoring of the incoming waste composition is carried out as follows:

- Visual inspections of loads at the weighbridge to classify loads with regard to the specific waste classifications developed for the site.
- Solid Waste Analysis Protocol (SWAP) assessments of mixed, non-inert waste classifications with a frequency not greater than 12 months, but at least 3 months apart.

3.1 Visual inspections

All waste entering the landfill is classified into one of the weighbridge classifications presented in Table 3.1. The classifications are made by the driver delivering the waste. Regular visual inspections are carried out by the landfill attendance at the tip face to verify that the classifications are being made correctly. These visual inspections form part of the landfill operations contractor's responsibilities as described in the Landfill Management Plan.

New waste classifications may be added from time to time as new waste streams are introduced to the landfill, or in response to operational changes at the site.

Table 3.1: Weighbridge classification descriptions

Product name	Product Id	Description	Inert
Asbestos	ASB	Asbestos containing building materials	Y
Ash	ASH	Ash from industrial sources	Y
Bulk polystyrene	BULK	Minimal volumes received from industrial sources	Y
Contaminated Soil	C SOIL	Contaminated soil	Y
General refuse	GEN	Kerb side domestic refuse, delivered by contractors	N
Grass	GRASS	Grass clipping derived from the Blenheim Transfer Station	N
Grape marc	GM	Solids remaining after pressing of grapes during wine making	N
Liquid waste	LIQ	Mostly sourced from the wine industry	Y
Litter	LITTER	Litter bins and roadside litter collected by roading, parks and reserves contractors	N
MDC cleanfill	MDC-C	Cleanfill material sourced from council contractors	Y
MDC general refuse	MDC-G	Kerb side waste delivered by council contractors	N
MDC special waste	MDC-S	Sewage screenings from wastewater treatment plant	N
Mussel shells	MSHELL	Mussel shells from commercial mussel farms with no flesh attached	Y ¹
Sawdust	SAWD	Sourced from timber industry	N
Sludges and animal wastes	SLDG	Wet wastes mainly sourced from the winery industry and abattoirs, and mussel shells containing flesh	N
Waste Sorting Centre	WSC	General waste and transfer station waste that has been pre-sorted to remove recyclable materials at the Waste Sorting Centre	N
Winery filter media	WFM	Diatomaceous earth sourced from the winery industry	Y
Transfer station waste	XFER	Waste from transfer stations delivered in bulk	N

Notes:

1. Mussel shell waste changed from non-inert to inert at start of 2015.

3.2 SWAP assessment methodology

The SWAP assessments are required to be undertaken in accordance with Procedure 2 in Section 5 of the SWAP published by Ministry for the Environment in March 2002. Two different methodologies are used depending on the nature of the non-inert waste streams as described in Table 3.2.

When new waste classifications are introduced to the site that include non-inert waste, they will be included in the SWAP assessment. Mono wastes will be confirmed as such visually and weighed by load on the weighbridge, and mixed wastes will be included in the sort and weigh assessment.

Table 3.2: Composition assessment methodology for non-inert waste classification

Product name	Product Id	Assessment methodology	Justification
General refuse	GEN	Sort and weigh	Mixed waste stream
Grass	GRASS	Visual / weighbridge	Mono waste – 100 % garden (GW)
Grape marc	GM	Visual / weighbridge	Mono waste – 100 % food (OPW)
Litter	LITTER	Sort and weigh	Mixed waste stream
MDC general refuse	MDC-G	Sort and weigh	Mixed waste stream
MDC special waste	MDC-S	Visual / weighbridge	Mono waste – 100 % sludge (SSW)
Sawdust	SAWD	Visual / weighbridge	Mono waste – 100 % wood (TMW)
Sludges and animal wastes	SLDG	Sort and weigh	Mixed waste stream
Waste Sorting Centre	WSC	Sort and weigh	Mixed waste stream
Transfer station waste	XFER	Sort and weigh	Mixed waste stream

Based on available information regarding the waste streams and expected volumes and compositions, the assessment will be carried out over a six day sampling period using the sampling regime presented in Tables 3.3 and 3.4 below. The sampling sizes are based on an analysis of waste entering the site in 2012, and have been reassessed in 2017, following the Waste Sorting Centre coming on line, to ensure that they meet the requirements of a representative sample as stated in the SWAP.

Previous SWAP results, and visual assessments at the site show typically minor variability in the organic content of the individual waste classifications between assessments. Therefore the time of year of the SWAP assessments is not considered to be critical. The assessments will be carried out in accordance with the UEF regulations and will be no more than 12 months apart, and no less than 3 months apart.

Table 3.3: Monday to Friday sampling summary (per day)

Waste classification	Estimated number of loads/ bags per day	Estimated average weight/ number of bags per load	Approx. sample size per load (2% of total load)	Approx. sample time per sample/ bag	Approx. total sample time per day
Kerbside bags	3 loads/ 11,000 bags	730 bags	~15 bags	10 mins per bag	7.5 hrs
Skip	18 loads	0.9 – 1.6 tonnes	~20 – 30 kg	15 mins	4.5 hrs
Front/ rear end loader	5 loads	3.4 tonnes	~70 kg	55 mins	4.6 hrs
Compactor	5 loads	1.8 tonnes	~40 kg	30 mins	2.5 hrs
Other	2 loads	1.1 tonnes	~20 kg	15 mins	0.5 hrs
Transfer station waste	5 loads	4.5 – 5.4 tonnes	~90 – 100 kg	75 mins	6.5 hrs

Table 3.4: Saturday sampling summary

Waste classification	Estimated number of loads/ bags per day	Estimated average weight/ number of bags per load	Approx. sample size per load (2% of total load)	Approx. sample time per sample/ bag	Approx. total sample time per day
Kerbside bags	N/A	N/A	N/A	N/A	N/A
Skip	2 loads	0.9 – 1.6 tonnes	~20 – 30 kg	15 mins	0.5 hours
Front/ rear end loader	1 loads	3.4 tonnes	~70 kg	55 mins	0.9 hours
Compactor	1 loads	1.8 tonnes	~40 kg	30 mins	0.5 hours
Other	1 loads	1.1 tonnes	~20 kg	15 mins	0.25 hours
Transfer station waste	4 loads	4.5 – 5.4 tonnes	~90 – 100 kg	75 mins	5 hours

4 Landfill gas sampling and testing

Landfill gas flow and composition data is collected on a continuous basis at the flare facility. The data includes all gas conveyed to the flare. This data is required for the day-to-day operation of the landfill, but is also required for the calculation of the UEFs for the Landfill. With regard to the UEF calculations, the data will include:

- Collecting representative measurements of gas flow at the flare (12 hourly data is typically used).
- Collecting representative data of methane concentrations in the landfill gas (12 hourly data is typically used).
- Ensuring the gas flow meter and gas analyser are calibrated in accordance with the manufacturer's recommendations.

5 Review of sampling and testing data

The waste composition data and landfill gas flow and concentration data will be reviewed on an annual basis, and the UEFs recalculated in accordance with the UEF regulations.

The Climate Change Response Act states that the data shall be reviewed for material change, and where a material change in the information or factors has occurred, the approved UEF shall cease. A material change has been defined as a greater than 5 % change in one or more of the individual UEFs for the Landfill. This change will be reviewed on an annual basis. Where a material change is identified, an application for new UEFs will be made to the EPA, or the Default Emissions Factor (DEF) shall apply to the Landfill.

