Levin Closed Landfill Management Plan

Final Report

Prepared for:
Horowhenua District Council

2 September 2025

Revision Schedule

Revision	Description	Author	Date	Quality and Review	Date
01	Draft	P Landmark	12 Nov 24	K Halder	22 Nov 24
02	Draft for Client	P Landmark	24 Nov 24	K Halder	24 Nov 24
03	2nd Draft for Client	P Landmark	15 Apr 25	K Halder	16 Apr 25
04	3rd Final for Client	P Landmark	14 Jul 2025	K Halder	15 July 25
05	4th Final for Client	P Landmark	22 Aug 2025	K Halder	27 Aug 25
06	5th Final for Client	P Landmark	2 Sept 2025	K Halder	2 Sept 25

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Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
AMP	Archaeological Management Plan
BPO	Best Practicable Option
CLMP	Closed Landfill Management Plan
CNLG	Community Neighbourhood Liaison Group
CSC	Customer Services Charter
ESCP	Erosion and Sediment Control Plan
GCL	Geosynthetic clay liner
HAIL	Hazardous and Industries List
HDC	Horowhenua District Council
HDPE	High-density polyethylene
HNZ	Heritage New Zealand
HRC	Horizons Regional Council
HSWA	Health and Safety at Work Act 2015
H&S	Health and safety
ISM	Instantaneous surface monitoring
LA	Landfill Agreement
LBPO	Leachate Best Practicable Option
LF	Landfill
LFG	Landfill gas
LMP	Landfill Management Plan
NES	National Environmental Standard
NES-CS	NES for Assessing and Managing Contaminants in Soil to Protect Human Health
NES-FW	NES for Freshwater
NLG	Neighbourhood Liaison Group
OSH	Occupational Safety and Health
PAC	Poly aluminium chloride
PCBU	Person conducting a business or undertaking
PMG	Project Management Group
ppmv	Parts per million by volume
RMA	Resource Management Act 1991
TAG	Technical Advisory Group
VOC	Volatile organic compounds
WasteMINZ	Waste Management Institute of New Zealand

Glossary

Terms commonly used throughout this Closed Landfill Management Plan

Term	Definition
Act	The term “Act” refers to the Resource Management Act.
Consent Holder or Permit Holder	The term “Consent Holder” or “Permit Holder” used in this document will mean the Council or any other party to whom the Council may assign the resource consents for the landfill.
Council	The term “Council” used in this document will mean the Horowhenua District Council.
Contractor or Operator	The term “Operator” or “Contractor” used in this document will mean the Consent Holder and any person engaged on behalf of the Consent Holder to operate the landfill.
Landfill Agreement	An Agreement that was signed between Horowhenua District Council, Hōkio Environmental Kaitiaki Alliance Incorporated, Horowhenua District Ratepayers and Residents Association Incorporated, and s274 Parties. The Agreement found common ground for the operation of the landfill and the conducting of investigations for early closure and remediation of the Levin Landfill site.
Regional Council or Horizons Regional Council	The term “Regional Council” or “Horizons Regional Council” used in this document will mean the Manawatu-Wanganui Regional Council.
Shall	The word “shall” implies a requirement under this document.
Should	The word “should” implies a recommendation.
Site	The term “site” refers to that land where refuse disposal operations are taking place.
Will	The word “will” implies either a fact or intention or a requirement under some other document.

Definitions

Term	Definition
Biodiversity offset[1]	A measurable conservation outcome resulting from actions designed to compensate for residual, adverse biodiversity effects arising from activities after appropriate avoidance, remediation, and mitigation measures have been applied. The goal of a biodiversity offset is to achieve no-net-loss, and preferably a net-gain, of indigenous biodiversity values.
Clean fill[3]	A Class 5 landfill. Accepts only clean fill material, including clean excavated natural materials.
Clean fill material[3]	Virgin excavated natural materials (VENM) such as clay, soil and rock that are free of: • combustible, putrescible, degradable or leachable components; • hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown; • products or materials derived from hazardous waste treatment, stabilisation or disposal practices; • materials such as medical or veterinary waste, asbestos, or radioactive substances that may present a risk to human health if excavated; • contaminated soil and other contaminated materials; and • liquid waste.
Closed landfill[3]	Any landfill that no longer accepts waste for disposal.
Contaminated land[2]	Land that has a hazardous substance in it or on it that – (a) has significant adverse effects on the environment; or (b) is reasonably likely to have significant adverse effects on the environment
Contaminated soil[3]	Soil from contaminated land as defined in the Resource Management Act 1991.
Hazardous substance[4]	Any substance— (a) with 1 or more of the following intrinsic properties: (i) explosiveness: (ii) flammability: (iii) a capacity to oxidise: (iv) corrosiveness: (v) toxicity (including chronic toxicity): (vi) ecotoxicity, with or without bioaccumulation; or (b) which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any 1 or more of the properties specified in (a)

Term	Definition
Hazardous waste[3]	Any waste that: • contains hazardous substances at sufficient concentrations to exceed the minimum degrees of hazard specified by Hazardous Substances (Minimum Degrees of Hazard) Regulations 2000 under the Hazardous Substances and New Organism Act 1996; or • meets the definition for infectious substances included in the Land Transport Rule: Dangerous Goods 1999 and NZ Standard 5433: 1999 - Transport of Dangerous Goods on Land; or • meets the definition for radioactive material included in the Radiation Protection Act 1965 and Regulations 1982. Hazardous waste contains contaminants such as heavy metals and human-made chemicals, at levels high enough to require treatment to render them acceptable for landfill disposal.
Landfill[3]	A waste disposal site used for the controlled deposit of solid wastes onto or into land.
Landfill gas[3]	Gas generated as a result of the decomposition processes on biodegradable materials deposited in a landfill. It consists principally of methane and carbon dioxide but includes minor amounts of other components.
Leachate[3]	Liquid that, in passing through waste, extracts solutes, suspended solids or any other component of the waste material through which it has passed. This includes liquid included in the waste as received and that drains as a result of waste compression, or the ongoing breakdown of organic matter.
Municipal solid waste[3]	Any non-hazardous, solid waste from household, commercial and/or industrial sources. It includes putrescible waste, garden waste, biosolids, and clinical and related waste sterilised to a standard acceptable to the Ministry of Health. All municipal solid waste should have an angle of repose of greater than five degrees (5°) and have no free liquid component. It is recognised that municipal solid waste is likely to contain a small proportion of hazardous waste from households and small commercial premises that standard waste screening procedures will not detect. However, this quantity should not generally exceed 200 ml/tonne or 200 g/tonne.
Municipal solid waste landfill[3]	Any Class 1 landfill that accepts municipal solid waste.
PCBU	Person conducting a business or undertaking as defined in section 17 of the Health and Safety at Work Act 2015
Waste[5]	• anything disposed of or discarded; and • includes a type of waste that is defined by its composition or source (for example, organic waste, electronic waste, or construction and demolition waste); and

Term	Definition
	• to avoid doubt, includes any component or element of diverted material, if the component or element is disposed of or discarded.

[1] From “Biodiversity Offsetting under the Resource Management Act – A guidance document”, prepared for the Biodiversity Working Group, September 2018.

[2]From the Resource Management Act

[3] From the “Technical Guidelines for Disposal to Land”, WasteMINZ 2023

[4] From the Hazardous Substances and New Organisms Act 1996

[5] From the Waste Minimisation Act 2008.

1 INTRODUCTION & BACKGROUND

1.1 Purpose of this Closed Landfill Management Plan

Since resource consent was granted in 2002 for the Levin Landfill, it has operated under various Landfill Management Plans (LMPs) as shown in Table 1.

Table 1: List of Landfill Management Plans prepared for Levin Landfill

Year	Description of LMP	Status of Landfill	Applicable Resource Consent Conditions[1]
2002	Landfill Management Plan	For existing unlined landfill	Conditions 14(a to l) of Discharge Permit 6009
2004	Landfill Management Plan	For new lined landfill	Condition 29 of Discharge Permit 6009
2010	Landfill Management Plan	For new lined landfill	Conditions 14(a to m) of Discharge Permit 6009
2011	Aftercare Management Plan for Closed Area of Landfill	For closed unlined landfill	Conditions 14(n to r) of Discharge Permit 6009
2021	Landfill Management Plan	For lined landfill	Conditions 14(a to l) of Discharge Permit 6009
2021	Closed Landfill Aftercare Management Plan	For closed unlined landfill (same as 2011 plan – not re-issued)	Conditions 14(m to q) of Discharge Permit 6009

Under the terms of the Landfill Agreement (LA - see section 2.5), Horowhenua District Council decided on 31 May 2023 to officially close the Levin Landfill for future disposal of municipal solid waste (i.e., the landfill is closed for the purposes of a Class 1 landfill).

The LA requires that a closure and remediation plan be prepared for the Levin Landfill two years prior to the closure date as determined by the process anticipated under the LA. Because of the way the closure decision has unfolded, the timing of the preparation of the closure and remediation plan does not align with the programme set out in the LA. However, the scope of the closure and remediation plan is aligned with the LA and includes details of the Leachate Best Practicable Option (BPO) project required under condition 2 of Discharge Permit ATH-2002003984.02 (DP 6011), and conditions 14 and 25 of Discharge Permit ATH-2002003983.02 (DP 6010).

The purpose of this **Closed Landfill Management Plan (CLMP)** is to provide guidance for the management, maintenance and infrastructure operations of the Closed Levin Landfill, including proposed operational requirements for the Leachate BPO 3 project.

This CLMP replaces all existing LMPs for both the unlined and lined areas of the Levin Landfill.

[1] Conditions applicable at that time.

The roles and responsibilities of parties who are to implement the protocols set out in this CLMP are stated in section 8.1.3.

Note that this plan has been called the “Closed Landfill Management Plan”. It could equally well have been called the “Closed Landfill Aftercare Management Plan”.

1.2 Status of this Closed Landfill Management Plan

The status of the Closed Landfill Management Plan (CLMP) shall be managed through the Document Control table as set out at the beginning of this CLMP.

1.3 Closed Landfill Management Plan Review

Changes in closed landfill management, operational techniques and community expectations may influence the management of the closed landfill in the future and provision for future reviews of the CLMP is necessary.

This CLMP is intended to be a flexible document that can be amended, as required. As a minimum, it will require review by HDC and HRC at least once every two years.

The CLMP has been written so that minor updates, such as a change in personnel contact details, can be done by amending the relevant appendix, rather than requiring a full review of the CLMP.

Further updates of this plan, other than the specified two-yearly reviews, shall be carried out whenever:

- there are any significant changes to the activities or operational procedures on site,
- there are changes to the current resource consents or new consents are issued.

Where updates have been anticipated they have been highlighted in this CLMP *using red italics font*.

HDC is progressing with several matters concerning the Levin Landfill. As these matters are resolved, additional information will need to be included in the CLMP. Two significant matters are:

the old Landfill Leachate

- *a review of the resource consent conditions to reflect the closed nature of the landfill site.*

The Leachate BPO3 will require a resource consent and operational procedure that would require this CLMP to be amended.

The review of resource consents is likely to result in some significant changes to the consent conditions to reflect the fact that the site is closed. Additionally, because of feedback submissions received on the first draft of this CLMP and as discussed elsewhere in this CLMP, the oversight of the landfill from interested and affected parties may change. Note that feedback received from various parties on the first and second drafts of this CLMP has been included at the back of this CLMP for reference purposes (see Appendix V and Appendix W).

Figure 1 shows diagrammatically how information from the two significant matters stated above will progressively feed into future amendments of this CLMP. It is anticipated that the CLMP will be amended several times over the course of the next year or so, before it can be “finalised”.

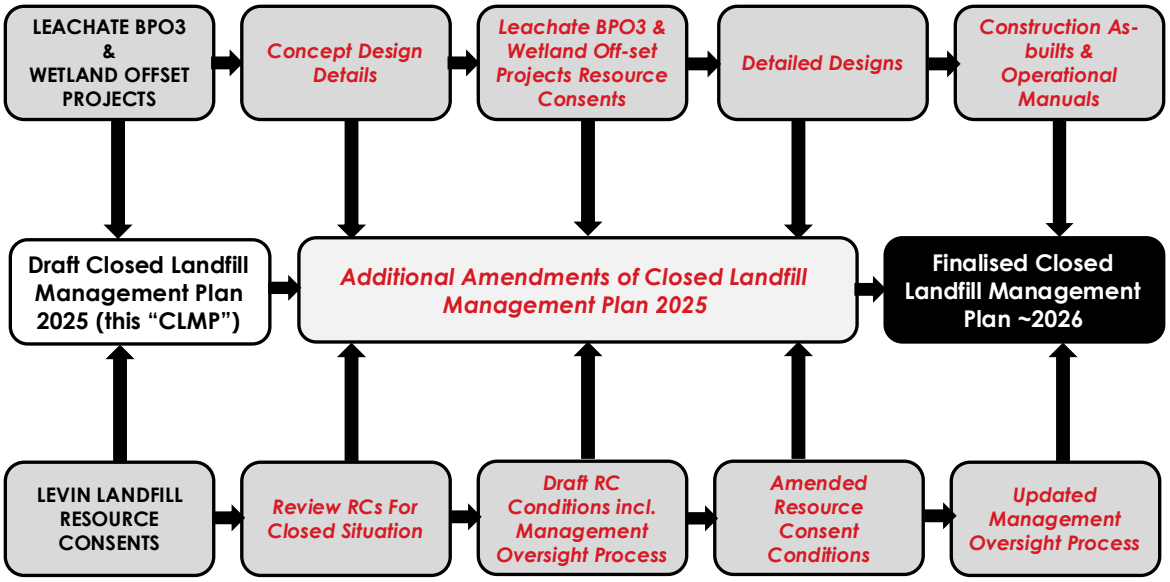

Figure 1: Diagram showing how information will be fed into additional amendments of the CLMP.

1.4 Definition of Remediation

Council has adopted the following definition of remediation:

1. The process of improving or correcting a situation - the correction of something bad or defective.
2. As stated in resource consent conditions 14(a) to (d) of consent ATH-2002003983.02 (Discharge Permit 6010), remediation refers to compacting of refuse, grading side-slope to a required grade, constructing 700mm of capping material to certain specifications of permeability, and maintaining grass cover.
3. Remediation includes the capture of leachate-contaminated groundwater originating from Closed Landfill Area A2, including the wetland mitigation/ offset and/or compensation in lieu thereof.

1.5 Levin Landfill and Surrounding Features

The Levin Landfill and immediate surroundings contain several features that are referred to throughout this document. Figure 2 has been provided below to assist and orientate readers who may be unfamiliar with the site.

Important features include (refer also to the drawings attached in section A.1 of Appendix A):

- Area A1 is the original unlined, landfill area (1950s to 1990s). It has been defined from information included in the original Levin Landfill resource consent application made in 1995.

- Area A2 is the successor unlined, landfill area (1970s to 2004). It has been defined by combining information from the original resource consent application (1995) and the original resource consent decision, issued in 2002. Note: a small portion of Area A1 continued to be used up until the 1990s, understandably for offal disposal in pits.
- Area A3 is the lined landfill area that has been defined by the footprints of Stages 1A, 2, 3A, 3B and 3C. It operated from May 2004 to October 2021.
- The Northern Farm Drain, (formerly called the “Tatana Drain”), runs along part of the northern landfill property boundary, before turning through 90º and linking to the Hōkio Stream through a culvert under the road.
- The Hōkio Stream runs approximately parallel with Hōkio Beach Road for the stretch of road adjacent to the landfill property.

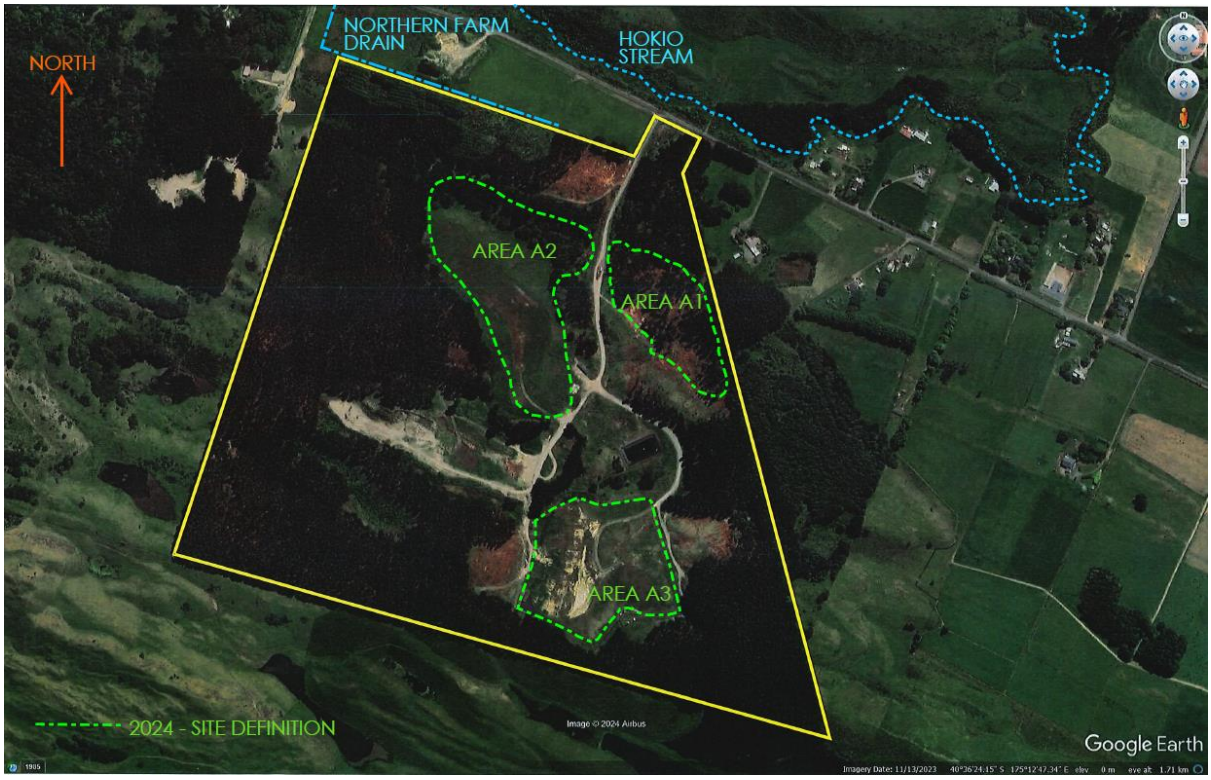

Figure 2: Features of the Levin Landfill and surroundings.

The delineation of Areas A1, A2 and A3 is shown and described in Appendix A.1.

Area A1 is approximately demarcated; Area A2 is approximate along its northern side, and more accurate around the other sides because its shape defines where waste has been placed, and Area A3 is accurately defined by as-built information of the lined landfill footprint area.

2 RESOURCE CONSENTS, DESIGNATION, LANDFILL AGREEMENT, CLOSURE DECISION, FUTURE ENGAGEMENT AND MĀTAURANGA MĀORI

2.1 Resource Consents

An important aspect of Councils' solid waste activity is to ensure that any discharge of contaminants from closed landfills to the district's land, air and natural water resources is managed responsibly.

Under the RMA, resource consents in the form of discharge and water permits are required for disposal of wastes and any associated odours and discharges both whilst landfills are operational and closed. Council holds discharge and water permits for all its solid waste activities to the extent required by the RMA.

The discharge and water permits associated with Levin Landfill are summarised in Table 2.

Table 2: Schedule of Current Discharge Permits relating to Levin Landfill

Location	Consent No.[1]	Consent Type	Effective Date	Expiry Date
Levin Landfill	ATH-2002003982.03 (DP 6009)	Discharge Permit - Discharge solid waste to land	24 May 2002	24 May 2037
	ATH-2002003983.02 (DP 6010)	Discharge Permit - Discharge landfill leachate into and onto land	24 May 2002	24 May 2037
	ATH-2002003984.02 (DP 6011)	Discharge Permit - Discharge landfill gas, odour and dust to air	24 May 2002	24 May 2037
	ATH-2002003985.01 (DP 6012)	Water Permit - Divert stormwater from around the Levin Landfill	24 May 2002	24 May 2037
	ATH-2002003680.02 (DP 7289)	Discharge Permit – Discharge liquid waste onto and into land	24 May 2002	24 May 2037
	ATH-2002009801.02 (DP 102259)	Discharge Permit – Discharge stormwater to land and potentially to groundwater via ground soakage	24 May 2002	24 May 2037
	ATH-2014015044.01 (DP 106798)	Discharge Permit – Discharge to air (flared landfill gas)	29 July 2015	24 May 2037

[1] Previous discharge permit numbers are shown in brackets.

Copies of the latest versions of the Levin LF Resource Consents are provided as part of this CLMP for reference (refer to Appendix B).

2.2 Future Resource Consents

The Leachate Best Practicable Option 3 (BPO 3) project, Wetland Offsetting project, and Future Use opportunities[2] are separate initiatives under this CLMP that will require collaborative planning and separate resource consenting applications.

Subject to final design details, the Leachate BPO 3 project is likely to require the following new resource consents:

- Consents under the National Environmental Standards for Freshwater (NES-FW) and Regional Plan for works in and around a natural inland wetland including earthworks, land disturbance, diversion of water, and taking of groundwater.
- Consents to be determined but may include vegetation clearance, earthworks and diversion of water necessary to establish a wetland offset.
- Land use consent under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) for soil disturbance on a Hazardous Activities and Industries List (HAIL) site.

This CLMP allows for the inclusion of additional resource consents for the Leachate BPO 3 and other projects, and it is intended that this CLMP be reviewed and updated when those resource consents have been procured.

As noted later in section 7.5.1, if any future activities require separate resource consents, (including an updated authority from the Historic Places Trust), Council will follow the required processes for obtaining such resource consents and authority.

2.3 Cross- Reference Resource Consent Conditions with Provisions in the CLMP

Conditions 14(a) to (l) of discharge permit ATH-2002003982.03 (DP 6009) provide details of what was required in the operational Landfill Management Plan. Conditions 14(m) to (q) of the same discharge permit listed the requirements for a Closed Landfill Aftercare Management Plan required for Closed Area A2.

The consent conditions are summarised in Table 3 below and cross-referenced against relevant sections in this CLMP, noting that some requirements are no longer needed since the landfill is closed.

[2] It is possible that future use opportunities may not require resource consents.

Table 3: Resource Consent Requirements for the Landfill Management Plan

Condition No.	Summary of Requirement	Provisions in CLMP
The Landfill Management Plan shall include, but not be limited to:		
14(a)	The specific conditions contained herein, related to the operation, management and monitoring of the landfill.	Sections 8, 9, 10, 11, 12, 13 and Appendix A
14(b)	A description of the development and maintenance of the landfill.	Sections 3, 4, 5, 6, 8, 9 and Appendix I
14(c)	A description of how the consent will be exercised in a manner to ensure compliance with the consent and the conditions thereof and the Resource Management Act 1991.	Section 2
14(d)	A description of how the consent will be exercised to minimise adverse effects on the environment.	Sections 2, 9, 10, 11 and Appendix P
14(e)	A description of the hazardous waste acceptance criteria, including the criteria set out.	Not applicable
14(f)	The emergency procedures to be followed in the event of natural emergencies and hazardous waste spills.	Section 14 and N/A for Hazardous Waste Spills
14(g)	The methods for controlling dust and odour emissions including the criteria for assessing when, and how regularly, roadways and the landfill are dampened by water or otherwise.	Sections 10 and 14
14(h)	Details of measures to avoid nuisance effects on adjacent properties, i.e., birds and vermin, as a result of landfill activities.	Section 10
14(i)	Operational, intermediate and final capping requirements.	Section 5 and N/A for Operational Requirements
14(j)	Closure and aftercare	Sections 5, 6 and 7
14(k)	Procedure to update the management plan, in light of changing circumstances, to continue compliance with Conditions of this Permit.	Section 1.3
14(l)	A screen planting implementation description.	Section 4.11
The Closed Landfill Aftercare Management Plan shall include but not be limited to those aspects that are detailed in Appendix E of the MfE publication entitled '*A guide for the Management of Closing and Closed Landfills in New Zealand (May 2001)*'. The Closed Landfill Aftercare Management Plan shall require at the least:		
14(m)	Final slopes on the landfill faces and caps to be between 1V:3H and 1V:40H.	Section 5.3 and Appendix A
14(n)	Final landfill surface to be sloped to promote run-off to the outside and prevent surface water ponding on the landfill cap.	Section 5.3 and Appendix A
14(o)	Ensure the landfill cap is at least 700 mm thick, with material added to make the cap 700 mm, or for future cap maintenance purposes, to have a permeability of not greater than 1×10^{-7} m/s.	Section 5.3 and Appendix I
14(p)	Establish and maintain vegetation cover on the capped landfill so that the cap integrity can be monitored and maintained as per Condition 15 (d) of DP 6010.	Section 5.3
14(q)	Monitor the landfill cap annually to identify areas of differential settlement, slope stability issues, erosion and changing vegetation patterns, to ensure Conditions 14(n) to (q) continue to be met.	Section 5.3 and Appendix A

Table 4 below provides a list of the table of contents stated in Appendix E of the MfE publication referred to in condition 14 of discharge permit ATH-2002003982.03 (DP 6009) and provides references against sections in this CLMP where the stated matters are covered.

Table 4: Table of Contents from MfE Closed Landfills Guide referenced against Provisions in this CLMP

Outline Table of Contents	**Provisions in CLMP**
Introduction	
Staging of stabilisation	Section 5.1
Projected aftercare period	Section 7.2
End use(s)	Section 7.5
Management overview	
Site owner	Section 3.1
Management structure and responsibilities	Section 8
Aftercare management contract	Section 8
Occupational safety and health	Section 8.5
Annual review and reporting	Sections 11.3, 11.4, 11.5 and Appendix Q
Management, maintenance and contingency measures	
Leachate collection, treatment and disposal	Sections 4.4 and 6
Drainage	Section 4.3
Landfill gas collection, treatment and use	Section 4.5
Final cover	Sections 5.2, 5.3, 5.4 and 9.7
Vegetation	Section 9.7
Remedial works	Sections 6 and 9
Monitoring	
Leachate	Section 11
Groundwater	Section 11
Surface water	Section 11
Final cover	Section 11
Vegetation	Section 11
Complaints	Section 13
Records and reporting	Sections 11, 12, Appendix Q and Appendix S
Emergency procedures	
Fire	Section 14.3
Leachate breakout	Section 10.7
First aid	Section 8.2.5

Conditions 14(a) to (d) of discharge permit ATH-2002003983.02 (DP 6010) list the requirements for closing and remediating any "*currently active and future lined landfill area*", i.e., Area 3. Condition 25 of that discharge permit states the timing for carrying out the works described in conditions 14(a) to (d) of discharge permit ATH-2002003983.02 (DP 6010).

Both conditions are referred to in the Landfill Agreement where it states in condition 12.1 that: "*The (closure and remediation) plan shall ensure compliance with Conditions 14 and 25 of permit 6010*…". These conditions are listed in Table 5 below and referenced against relevant sections in the CLMP.

Table 5: Resource Consent Requirements for Closing the Active Landfill

Condition No.	Summary of Requirement	Provisions in CLMP
Any currently active and future lined landfill area shall be closed and remediated by:		
14(a)	Compacting refuse to such an extent and consistent with CAE guidelines of 600-800 kg/m3, to ensure post closure settlement is minimised as far as practicable; and	Section 5.4
14(b)	Grading to a final slope of less or equal to 1V:3H (1 in 3) on any face; and	Section 5.4 and Appendix A
14(c)	Ensuring the landfill cap incorporates a layer at least 700 mm thick with a permeability of no greater than 1 x 10-7 m/s, or has a material and layer structure that reduces rainwater infiltration to the waste to an equivalent extent; and	Section 5.4
14(d)	Establishing and maintaining a grass or tussock vegetation cover on the capped landfill, unless it can be demonstrated to the Regional Council's satisfaction that a different vegetation cover can produce clear benefits through reducing infiltration to the covered waste. Any vegetation cover should be consistent with an ongoing capacity to monitor and maintain the ongoing integrity of the landfill cap.	Section 5.4
The Permit Holder shall have carried out the works described in Condition 14(a) to (d) of this permit to rehabilitate:		
25(a)	Any lined landfill area within four months following the closure of that lined landfill area, if the landfill area is closed before 35 years from the granting of this consent.	N/A
25(b)	Any lined landfill area before 35 years from the granting of this consent.	Sections 2.6 and 5.4

A summary of the contents of this CLMP referenced against the existing resource consent conditions is provided in Table B- 1 attached in Appendix B.

2.4 Designation

Details of the site designation are given in Table 6 below.

Table 6: Property Designation

ID	Site Location	Area Map No.	Site name / Function	Purpose of Designation	Legal Description	Area (ha)	Duration of Designation
HDCD-26	665 Hōkio Beach Road	7	Rubbish Dump	Refuse Disposal	Lot 3 DP 40743	71.5959 ha	Designation has been given effect to

2.5 Landfill Agreement

Following a process involving independent hearings and Court action by the community and iwi stakeholders, in March 2019 a Landfill Agreement was signed[3] which found common ground for the operation of the landfill and the conducting of investigations for early closure and remediation of the site. In brief, the Landfill Agreement allows for the following outcomes:

- an independent assessment of the early closure for the Levin Landfill,
- an elected member decision on the future closure date,
- a plan to remediate the closed landfill,
- a plan and action to address leachate dispersion (i.e., via groundwater) from the unlined landfill to the Hōkio Stream,
- independent reporting on compliance at the landfill, and
- ongoing work from the Council in relation to waste minimisation for the Horowhenua community.

Table C- 1 in Appendix C has a summary of clauses from the Landfill Agreement that are relevant for this CLMP.

Council committed to a Project Management Group (PMG) which is responsible for delivering these outcomes. The PMG includes two Council officers, community and iwi representatives. It also has oversight from an independent project manager with assistance from technical experts.

Council is also committed to ongoing engagement with the Community Neighbourhood Liaison Group (a broad collection of community stakeholders with interests in the Levin Landfill) and recognises the importance of engaging with these groups to inform them of Council's proposals relating to the Levin Landfill.

[3] Signatories to the Landfill Agreement are: Horowhenua District Council, Hōkio Environmental Kaitiaki Alliance Incorporated, Horowhenua District Ratepayers and Residents Association Incorporated, s274 Parties (Ngāti Pareraukawa, Peter Everton, David Stuart Andrew, Dean Murray, Leone Brown, Palmerston North City Environmental Trust, Charles Rudd, Water and Environmental Care Association).

2.6 Council Closure Decision

Council decided on 31 May 2023 (Resolution Number CO/2023/104) to officially keep the Levin Landfill closed with the option to allow revenue generated from alternative site use as determined through the Waste Management and Minimisation Plan.

Relevant screen shots from the Council Meeting Minutes are attached in Appendix D.

It is confirmed that Council does not intend in the future to use the landfill property for the development of any of the five classes of landfill, as defined in the WasteMINZ Disposal to Land Guidelines[4].

2.7 Future Engagement Approach

Several submissions on the draft CLMP have proposed that, in the future, community engagement be conducted through an oversight group that will replace the CNLG, NLG and PMG.

This approach has been accepted in principle by the Council and the changed approach will need to be included in the review of resource consent conditions.

This community group (possibly to be called "The Levin Landfill Management Oversight Group (LLMOG)), will likely consist of adjacent landowners / iwi / hapu / local township / interested individuals and groups and will represent community interests for all matters relating to the maintenance and operation of the closed landfill.

How this community group will interact with the Council and HRC on matters relating to the closed landfill management, and the frequency of meetings, will need to be determined and written into the revised resource consent conditions.

2.8 Incorporating Mātauranga Māori

2.8.1 Overview

Whaka-haumanu whenua

Whaka-haumanu tāngata

Whaka-haumanu taiao

Remediation of land

Remediation of people

Remediation of environment

[4] "*Technical Guidelines for Disposal to Land, Revision 3.1*"; Waste Management Institute of New Zealand (WasteMINZ), September 2023.

By way of contributing to this section of the CLMP, Muaūpoko have provided a statement about the Hokioi Stream (Hōkio Stream). This is included in Appendix E.1 of this CLMP.

Complementary to the remediation work of the landfill, it is recommended that remedial work with hapū and iwi is considered to ensure active involvement in the ongoing remedial work of place, land, water and people.

From a Mātauranga Māori and Te Ao Māori perspective, everything is interconnected and holistic, binding nature and people, including the physical, social, emotional and spiritual aspects of the whole of ecosystem - nothing is isolated or independent.

Whilst the remediation of, and engineered solutions for the landfill have, and will be applied, cultural and social opportunities have been identified to work collaboratively with local iwi, hapū and communities to ensure the long-term sustainability and maintenance of the landfill and surrounding area. There are prospects to work with iwi in exercising Kaitiakitanga, as has also been highlighted in the cultural and environmental impacts on Ngāti Pareraukawa and Ngātokowaru Marae (Selby R, Moore P, 2020).

The prospects are from a Mana enhancing perspective and a Mauri restoring practice, to and of whenua (land), tangata (people), wai (water) and taiao (environment). Drawing on tangata whenua mātauranga and tikanga (customary knowledge and practices) will help address some of the severances and transgressions caused to the land, water, nature and people dating back to the inception of the landfill.

Critical to the remedial work it is important to understand, appreciate and consider hapū involvement as Kaitiaki or hunga tiaki in the regeneration, rehabilitation and remedial work with regards to land, water and people concerned.

As a first step process it has been identified that restoration and remediation of key relationships is highly important to give genuine effect, spirit and obligation to Te Tiriti o Waitangi and tangata whenua within the Resource Management Act and Mana Whakahono-ā-rohe (Iwi participation arrangements).

This respectful and dignified approach is progressive and designed to be an uplifting of Mana enhancing and Mauri restorative practice which is described below as Hohou te rongo – Māori traditional restorative process.

2.8.2 Remediation of People

In considering a tikanga Māori restorative process of social, cultural, emotional, physical and spiritual aspects of the severance caused by the landfill to the local tangata whenua, it is culturally appropriate to consider ‘Hohou te rongo’ as a potential cultural restorative practice to help deal with ‘mamae’ (trauma) in its holistic form.

One of the meanings of the word ‘hohou’ is ‘to bind’. It can mean to bind what is damaged or broken. ‘Hohou’ can also means ‘to enter’ as in ‘hou mai’. It could be that ‘hohou’ is interpreted as to enter the realm of Rongo, known in the creation story as the atua kaitiaki of peace. Rongo is also a verb to listen and ‘to perceive with all the senses’, to smell, taste, feel, and hear.

Hohou rongo consists of the restoration of the tapu and mana of Atua, tangata and whenua, diminished or impaired by whakanoa. It is the peaceful enjoyment of right relationships restored, with corresponding

freedom from the state of negative noa, achieved by the exercise of pono, tika, whakakōtahitanga and aroha. Hohou rongo consists of the restoration of tapu i te tangata and whenua.

In the restoration of te tapu i te tangata, hohou rongo can bring about spiritual psychological, emotional and even physical healing of victim(s), whānau and hapū, of perpetrator and whānau, of hapū and iwi, of other people and communities affected, of people affected, and of whenua and objects damaged by acts of transgression of whakanoa. (Taite, H. 2012).

Through a hohou rongo process it is proposed that a series of kanohi ki te kanohi (face to face) hui are held on the respective marae of Horowhenua, being facilitated by an independent facilitator to ensure cultural safety and unbiased position is upheld and maintained. In this respect it also recommended that rangatira ki te rangatira (chief to chief) or Mana ki te mana (authority to authority) is present and consistent at all hohou rongo hui. A high level of respect, dignity, responsibility and reciprocation will be conducted during all aspects of Hohou rongo settings. All hui will take place in person and a high level of effective communication, integrity and professionalism will be maintained during the course of these important remedial mahi.

Whilst there is no pre-determined outcome of hui ‘Hohou rongo’, the most important aspect of this practice is, of course, the transformational shift from a negative positionality to positive and transformative positionalities. Often as ‘utu’ (consequence or result) as a binding, healing and remedial aspect of the severance and or grievance, it can be marked by an exchange of taonga or tatau pounamu to affirm all parties’ commitment in achieving remediation and genuine restoration long-term.

As a potential remediation symbol in binding all concerned could be the coming together of HDC, hapū and community to carry out a restoration planting day. This could also be ongoing as an annual kaupapa/event, along other mutually agreed activities that help restore the relationship, trust and respect between the concerned parties. Also note it is not always the case that remediation will be achieved in one sitting. It may require a series of mana uplifting activities of hohou rongo and other means of restoring practices that require time effort and wrap around support over a long period of time.

Hapū and Iwi will also provide their tikanga, kawa and customary practices to hohou rongo and these unique and diverse cultural aspects should be considered when bringing about balance, equilibrium and intent to this restorative and respectful tikanga of customary practice.

Appendix E.2 contains a suggested outline and guide for what a Hohou Rongo tikanga and process might involve. As an inclusive kaupapa and process whakawhitiwhiti kōrero – shared and exchanged kōrero, wānanga - mutual deliberation is recommended to establish an appropriate ‘kawa’ and ‘tikanga’ (rituals and protocols). In considering a clear process, it may well differ from the outline and guide provided in Appendix E.2 as a step-by-step process.

The information in this section and Appendix E.2 is a general approach to restorative practices which is grounded in tikanga-based restorative justice. Local iwi and hapu may want to define more clearly what their respective restorative practices will entail, based on their own local protocols. These must come from local iwi and hapu and should not be “put onto them” by others.

3 BACKGROUND INFORMATION

3.1 Site Location and Ownership

The Levin Landfill is located approximately 4km west of Levin. It is located on the south side of Hōkio Beach Road, approximately 1.7 km from Hōkio Beach settlement, as shown on Figure 3.

Figure 3: Site Location Aerial Photograph (source: GoogleEarth)

The landfill is on land legally described as Lot 3 DP 40743 Block II Waitohu SD and is owned by the Council.

3.2 Site History

The site has been under the control of Council since the 1950s when landfilling activities first commenced at the site, occupying a limited area of the landfill site and serving the waste needs of Levin and its immediate surrounds. This original landfill activity on the site (named as Area A1 on Figure 2) reached capacity in around about 1975, so a second landfill activity adjacent to the then existing landfill commenced (named as Area A2 in Figure 2) with the original landfill being closed, except for a small area which, it is understood, was used as offal pits or for offal disposal until the 1990s. The time periods over which the original landfill was closed and the second landfill developed are not known.

In 1994 Council applied to Horizons for resource consents for a new landfill. These resource consent applications attracted a high level of submitter interest and consequently a protracted resource consenting hearing process meant that a Council decision was not granted until 1997. The consent

approval provided by the regulator (i.e., the Regional Council) was appealed to the Environment Court. The appeal was resolved by way of mediation with the consent order issued in 2002.

The lined landfill (named as Area A3 in Figure 2) was developed as a series of stages. Stage 1A was opened in May 2004 whilst Area A2 was closed as required by the resource consent conditions at that time. Stage 1A was followed by Stages 2, 3A, 3B and 3C in 2008, 2013, 2015 and 2017, respectively.

Waste disposal operations ceased at the end of October 2021 and shortly thereafter most of the lined landfill area (i.e., Area A3) was permanently capped, with the front face being capped temporarily whilst Council decided on its official permanent closure. A decision was made on 31 May 2023 to close the landfill for the disposal of Class 1 wastes, and the landfill was then permanently capped by March 2024.

3.3 Archaeological Protocol

The Levin Landfill is classified as an historic site in the Heritage New Zealand (HNZ) register. Sites of archaeological interest can be expected to be on, or near to the ground surface unless an area has been substantially disturbed.

Middens are probably the most likely archaeological find to be discovered in the area. Other possible archaeological finds could include hāngi and fire-scoops, isolated finds and a variety of remains in the remnant wetlands (inter-dune depressions).

Several middens have been identified on the landfill property. Their approximate location is shown in the aerial photograph attached in Appendix F.4. *HDC will undertake to fence off these midden areas to protect them in the future.*

Since the landfill property is an historic site, an authority is required from the HNZ to strip the topsoil. Council was issued with authority No. 2009/212 in June 2009 by the HNZ, which was valid for 10 years only. It allowed Council to modify, damage or destroy archaeological sites within the landfill property for the purposes of constructing and operating a landfill subject to certain conditions. Note: The destruction of archaeological sites within the Area A3 footprint were undertaken under the supervision of archaeologists with full documentation of any finds. *The Council is responsible for applying for a new authority to continue operations that will disturb the sand dunes on the site, including construction of the Leachate BPO 3.*

Archaeology North prepared an Archaeological Management Plan (AMP), which was a requirement of the authority. The AMP provided "… *operational guidelines and procedures for day-to-day activities that may affect archaeological material during the construction and subsequent operation of the landfill. The plan is required to ensure that the roles and responsibilities of all of those working on the project are clearly set out*".

An archaeological authority was applied and granted for in 2023 for the production thinning of the plantation pinus radiata forest.

As noted above, a new authority will be required for various ongoing site activities, including the construction of the Leachate BPO 3. The new authority will also require an updated AMP. Based on the requirements of the (now lapsed) AMP, the procedures outlined in Appendix F are likely to be required. Also attached in Appendix F for reference purposes is the NZTA P45 specification "Accidental Archaeological Discovery Specification – 2018".

4 SITE INFRASTRUCTURE DESCRIPTION

4.1 Overview

Figure 4 is *a recent (i.e. Nov. 2023)* aerial photograph of the landfill property. Relevant site infrastructure has been noted on the photograph.

Figure 4: Aerial photograph showing relevant site infrastructure (credit: Google Earth, 2023)

4.2 Landfill Liner

Areas A1 and A2 have no engineered landfill liner system. It is understood that waste was disposed of within the inter-dune depressions in those areas, though it is not known to what extent, if any, excavation of in-situ sands occurred prior to the disposal of waste.

A geo-composite liner system, consisting of a geosynthetic clay liner (GCL), overlain by a 2mm thick high-density polyethylene (HDPE) geomembrane, has been installed beneath each stage of the lined landfill in Area A3. The full details of the liner construction are shown in the Drawings in sections A.5 to A.9 of Appendix A.

The landfill liner system includes various protection layers consisting of sand and geofabric, and geogrid materials have been incorporated on the side slopes to support the gravel drainage layers.

The liner on the sides of the landfill controls horizontal migration of landfill gas as well as containing leachate.

4.3 Stormwater

Several natural stormwater soakage ponds exist within the site, located within inter-dune depressions (refer to Figure 5 below). The approximate direction in which stormwater flows off various areas of the landfill is also shown on Figure 5.

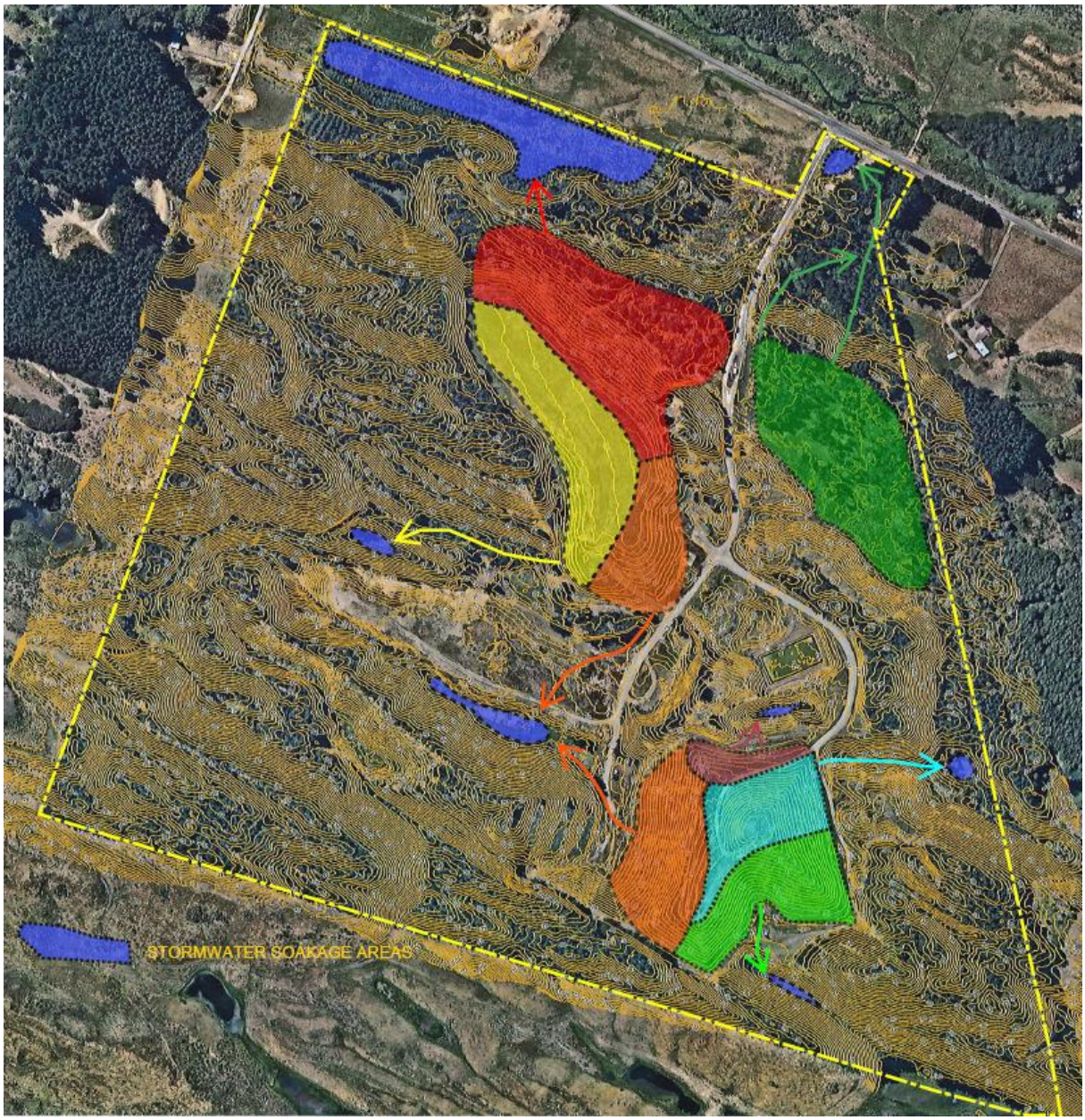

Figure 5: Indicative stormwater flows from landfilled areas.

The landfill property is located within sand dune country, and so most rain falling outside of the landfill areas is expected to soak into the ground. Rain falling on the access roads is captured by roadside swales and directed to low lying areas within the landfill property.

Area A1 is assumed to be capped with sandy material, and if so, it is expected that most rain falling on that area will soak into the ground. Being planted with trees and grass it is anticipated that a proportion of the rainfall with be removed through evapotranspiration. Some stormwater may run down the access road, from where it will soak into a wetland area within the landfill property, located south of Hōkio Beach Road, between groundwater bores BHC1 and BHG2.

Area A2 has been capped with clayey material on top, though the side slopes have a final cover layer consisting of sand. The area is mostly topsoiled and vegetated with grass, with the lower northern side being planted with trees. The top of Area A2 has been shaped to shed stormwater back into the centre area of the landfill property. On the north-facing slopes a portion of the rainwater is absorbed by the side slope, with the bulk of the water being shed down the grassed side slopes and into the low sand dunes located north of Area A2, or into the wetland area located along the northern boundary of the property near groundwater bore BHB3(s).

The lined landfill area (i.e., Area A3) has been fully capped with clayey material, topsoiled and grassed. Drains have been formed around the landfill to direct stormwater to four different soakage areas, as shown in Figure 5, all of which are in inter-dune depressions, with the largest one being located just south of the existing borrow area.

4.4 Leachate Collection

No formal leachate collection systems were installed in the unlined landfill areas A1 and A2, since this was not a consent requirement at that time.

For the lined landfill area A3, a 300mm thick gravel drainage layer was constructed on top of the liner protection layer on the base of each stage, with a main perforated leachate collection pipe placed within this drainage layer for each landfill stage. The main leachate collection pipes discharge to a single leachate collection chamber located at the toe of the eastern front face, outside of the landfill area.

Each main leachate collection pipe has a riser pipe extending up the side slopes of each stage to enable the leachate collector pipe to be flushed out from both ends (i.e., via the riser pipe or via the pipe outlet at the leachate collection chamber) – refer to Drawings in section A.3 of Appendix A for details.

Leachate is pumped from the leachate collection manhole to a manhole located adjacent to the pond using a submersible pump controlled by float-control switches. From here, leachate is pumped periodically to the Levin WWTP. The leachate pumps are monitored by SCADA and notifications are received if a fault occurs.

The pond is lined with a 1.5mm thick HDPE liner and it has sufficient capacity and freeboard to store approximately 2,000m^3 of leachate or stormwater. It is not presently used for leachate storage and currently contains stormwater that falls within the pond footprint. Leachate is pumped directly from the manhole next to the pond via a 90 mm OD MDPE rising main to connect to the Levin sewerage reticulation network (refer to the Drawings in section A.4 of Appendix A).

Leachate quantities have gradually declined as the landfill has been fully capped. The graph in Figure 6 below shows the pumped daily leachate volumes over the period from 12 August 2016 to 16 December 2024. A trend line is shown, and it is clear from the R-squared value (0.0843) that there is a poor closeness of fit. However, there appears to be a trend of declining leachate production from between August 2019 and August 2020.

By that time, the full footprint of area A3 had been covered by waste for several years, and so the full area of Area A3 was contributing to leachate production. In 2018, work commenced with capping part of the landfill, and this was done at the back of Stage 2. So, from that time, there was a gradual decrease in infiltration of rainwater into the landfill, which would help to explain the gradual decrease of leachate production.

Note that by this time the leachate collection system had been changed. Leachate now bypasses the pond and is pumped directly to the manhole next to the pond, and from there is pumped to the Levin WWTP. As water levels in the pond rise, (consisting mainly of stormwater), the pond would require periodic pumping out. This explains the periodic "spikes" in flow volumes.

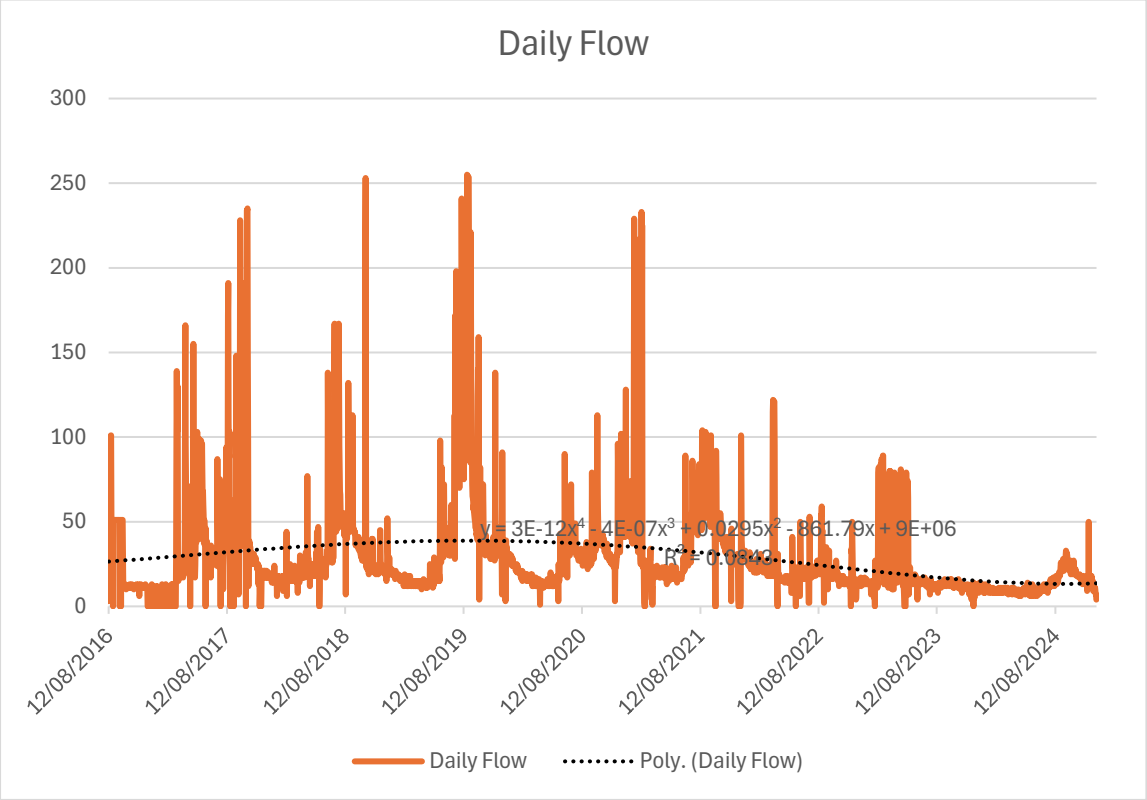

Figure 6: Daily Leachate Volumes (m^3) from July 2023 to June 2024

A leachate irrigation system was constructed to allow leachate to be irrigated to the elevated sand dunes in the south-eastern corner of the site. Irrigation has not been done since the end of 2008. The irrigation network is now redundant, and Council has no intention to reinstate and utilise it.

The pond is available for storage of leachate should it be needed. Other means of managing leachate include the following:

- transporting leachate off the site by tanker for direct disposal at the Levin WWTP,
- using the lined landfill stages for storing leachate by switching off the pump in the lower leachate collection chamber and allowing leachate to build up within the drainage gravels of the landfill.

4.5 Landfill Gas

Levin Landfill does not trigger the national environmental standard (NES) for air quality since the current total quantity of waste in the landfill contained within Area A3 is less than 1 million tonnes. However, since an enclosed landfill gas flare was installed at the lined landfill (i.e., Area A3) in 2017, the resource consent conditions have been varied to require that landfill gas be collected and flared under condition 4(l) of discharge permit ATH-2002003984.02 (6011).

Gas is collected from various horizontal collector pipes and vertical gas wells located about the landfill in Area A3. Details of the existing landfill gas collection and destruction system are shown diagrammatically in the Drawing in section A.10 of Appendix A.

General details of the landfill gas collection system are as follows (stage numbers refer to individual stages developed for the lined landfill in Area A3):

- horizontal gas collectors installed within Stage 1A,
- horizontal gas collectors installed within Stage 2,
- 11 No. of vertical gas wells developed across the top of the landfill,
- 3 No. of leachate riser pipes connected into the gas collection system,
- a GF500 landfill gas flare that can handle between 50 and 500 m^3/hour,
- a ring main that feeds the landfill gas flare and comprising of three sections of HDPE pipe with nominal diameters of 90mm, 110mm and 160mm.

The Odour Management Plan, which is a requirement of condition 4(m) of discharge permit ATH-2002003984.02 (DP 6011), provides details on the operation of the landfill gas collection and destruction system.

The Odour Management Plan was prepared in April 2021 for the then operational Area A3, and as such, is now somewhat out of date. Nevertheless, it contains valuable information on the landfill gas collection and destruction system and should be referred to and read in conjunction with this CLMP when dealing with LFG issues.

Note: No formal landfill gas collection systems have been installed in the unlined closed landfill Areas A1 and A2. However, resource consent condition 4a of Discharge Permit ATH-2002003984.02 (DP 6011) requires that the groundwater monitoring bores be tested for LFG when they are sampled. (This is for the safety of the sampling personnel as landfill gases are toxic and flammable at certain concentrations). Many of the groundwater bores are located close to closed landfill Areas A1 and A2, as can be seen in the Site Plan contained in section A.2 of Appendix A.

4.6 Biofilter

A biofilter, located at the toe of the front face of the Area A3 landfill, was constructed in 2016 to treat landfill gas that was exhausted from the leachate collection sump using a blower. Refer to Figure 7 below.

The requirements for a biofilter are stated in resource consent conditions 4e and 4h to 4k of ATH-2002003984.02 (DP 6011).

Figure 7: Biofilter structure at the toe of closed landfill Area A3.

The main structure incorporates two cells, each comprising a biofilter media area of 9 m^2. The structure is comprised of a concrete block wall on a concrete pad, with the odorous gas entering an open plenum at the base of the biofilter media. A separate leachate drainage pipe via a water trap allows for removal of any excess water.

The biofilter media consists mainly be a mixture of graded, aged and screened pine bark chips of 20 mm minimum size, with a small amount of compost and some lime or crushed shell material added to reduce acidity. When operating, the process gas being treated enters an empty cavity (plenum) as the media is supported by concrete blocks which are covered by a 6 mm mesh. A manometer is fitted to the cavity to measure the backpressure of the media so that periodic checks can be made to ensure that the pressure is less than 100 mm water gauge.

As the biofilter needs to be maintained at between 40-60% moisture content, irrigation is provided on the top lip of the biofilter on opposite sides to provide adequate coverage.

In late 2020/early 2021 it was decided to connect the ring main to the leachate sump, so directing that gas to the flare, rather than through the biofilter. *This arrangement, which makes the need for the biofilter redundant, still needs to be formalised with the Regional Council through a variation of the resource consent conditions.*

4.7 Buildings and Weighbridge

There is a site building which consists of an office, tearoom, toilet and workshop.

There are also a kiosk and weighbridge situated on the entrance road.

4.8 Access Roads

A sealed access road extends from the site entrance to the toe of the front face of the Area A3 landfill on its western side.

A metalled access road leads from opposite the site office, past the pond, and to the top of the landfill on the eastern side.

A metalled access road extends around the eastern side to the south of the landfill where the landfill gas flare is located.

Farm tracks provide access to the bores throughout the landfill property.

4.9 Signs

A sign is displayed at the site entrance which shows the name of the landfill, the closed status of the landfill, and contact information in case of an emergency.

Other signs are provided on-site for the purpose of directing and regulating traffic.

Signs are also present alerting people to the dangers of landfill gas and leachate.

4.10 Perimeter Fence

A stock proof fence runs around the whole of the landfill site and there are also some internal fences which are in various states of disrepair. There is a gate at the entrance to the landfill which should be kept locked to prevent access to the landfill by the public.

4.11 Forestry Screen

Pine trees have been planted on much of the landfill property, so providing good screening of the landfill, as seen in Figure A- 5, attached in section A.1 of Appendix A.

The pine trees are managed by Council under a Forestry Management Plan, which is attached as Appendix G.

4.12 Landfill Drawings

Landfill drawings are attached in Appendix A of this CLMP, and a series of aerial photographs are attached in Appendix H.

5 CLOSURE AND REINSTATEMENT

5.1 Summary of Landfill Development and Remediation

Table 7 summarises the landfill development and remediation that has been completed for the various areas of the landfill.

Table 7: Summary of Landfill Development and Remediation

Landfill Area	**Area A1**	**Area A2**	**Area A3**
Description	Original landfill area - closed	Replacement landfill area - closed	Lined landfill (Stages 1A, 2, 3A, 3B and 3C) - closed
Year Opened	1950s	1970s	2004
Year Closed	1990s	2004	Waste disposal ceased 2021, final capping in 2024.
Landform	Fill inter-dune depression	Fill inter-dune depressions with exposed northern and south-eastern faces at less than 1V:3H.	Fill inter-dune depressions, with slopes rising above dunes and exposed western front face at 1V:3H.
Liner	None	None	Composite GCL overlain by 2mm HDPE, textured on underside. Stages 3A to 3C have geogrid on side slopes to support gravel protection layer on thick geofabric.
Leachate Collection	None	None	300mm thick gravel drainage layer, with collection in 200mm dia. perforated pipes, leading to leachate collection manhole at landfill toe.
Landfill Gas Collection	None	None	System of horizontal collector pipes in Stages 1A and 2, with vertical wells spaced across the landfill surface. Wells are connected by a ring main header pipe, that conveys gas to an enclosed flare.
Final Capping	Assumed sandy cover and planted with grass and trees.	Initial sandy cover, followed by a low permeability clayey cap[5] in 2011 to ensure total cap thickness of 700mm. Reshaped in 2023 with clayey cap on the top, topsoiled and grassed.	700mm thick low permeability clayey cap constructed across the whole of the landfill surface, topsoiled and grassed. Completed in 2024.

[5] The clayey cap is required to have a permeability of no more than 1 x 10^{-7} m/s.

5.2 Old Landfill – Area A1

Area A1 (see the figures in section A.1 of Appendix A) was the original area where waste disposal occurred on-site. The original resource consent application indicates that it was closed by 1995, which is the time when applications were being made for Areas A2 and A3.

However, it is known that part of Area A1 was still being used as an offal pit in 1997, and that is likely reflected in Figure 1 of the resource consent decision which shows a small rectangular area as part of the existing landfill on the east side of the access road (see figures in section A.1 of Appendix A).

The figures in Appendix H show aerial photographs from 2005 to 2023 in which the progressive remediation of Area A1 can be seen.

It is assumed that Area A1 was capped with sandy material and grassed. Later, as is evident in the aerial photographs, pine trees were established across Area A1 some time between 2005 and 2010. The trees were thinned out between 2022 and 2023.

5.3 Old Landfill – Area A2

A summary of the rehabilitation of Area A2 is given below. Details of resource consent requirements at the time of each rehabilitation sequence/event are provided in Appendix I.

- Conditions 14(a) to (d) and 15 of DP 6010 stated the closure and remediation requirements for Area A2, within the original resource consent of 2002.
- Besides stating general compaction, final slope and vegetation requirements, the final cover over exposed refuse was stated to be "…*not less than 1000mm of material, of which 700mm is compacted…"*
- Following closure of Area A2 in May 2004, it is understood that Area A2 was covered with sandy materials, and Council also decided to plant pine trees over the northern area of Area A2. Shortly thereafter, (appears to be in 2005 from the aerial photograph, though may have been a few years later), Council capped part of the top of the southern end of the landfill with weathered greywacke material (not actually clayey materials, but somewhat more impermeable than the existing sand cover).
- A review of the resource consent was initiated by Horizons in September 2008[6].
- The presence of the pine trees on Area A2 was raised as a concern during pre-hearing meetings, and it was eventually agreed that they should be removed.
- Test pits were excavated in Area A2 around June 2009 and showed that the top layer consisted of between 150mm and 200mm of clayey gravel material, with the total depth of capping varying between 530mm to 850mm.
- As a result of the review and capping layer investigations, the landfill closure resource consent conditions applicable to Area A2 were amended to include removal of pine trees and gorse, re-shaping of cap to achieve at least a minimum grade of 1V:40H, annual survey to check for settlement, and capping be made at least 700mm thick with any imported materials to have permeability less than 1 x 10^{-7} m/s.

[6] HRC report entitled "*Levin Landfill – Review of Conditions Report*", 31 May 2010, contains information on the review process.

- In December 2009 a trial was conducted to strip pine trees from Area A2.
- A capping design was completed for Area A2 in September 2010, and construction of the capping occurred in Area A2 between November 2010 and April 2011.
- Thereafter the extent of settlement of the landfill surface has been monitored annually using benchmarks (GPS located pegs) that have been constructed on the capping layer.
- In 2022 minor areas of the cap were remediated because of localised settlement.

In 2023 improvements were made to the cap shape to provide a minimum grade of 5%, so facilitating further future settlement. The work was done between February and April 2023 as the leachate BPO project to improve the landfill cap, with some 3,900 m^3 of clayey soils being imported to shape the top of Area A2, thereafter it was topsoiled and grassed.

- Because of the moderate grade of slopes on the sides of Area A2, an engineering assessment, coupled with the excavation of a test pit on the side slopes, has shown that it is most unlikely that water will pond on the side slopes. So, the potential for infiltration through the side slopes is considered minimal, and coupled with budget constraints, Council does not intend to spend further funds on capping the side slopes to achieve limited effectiveness.

5.4 Lined Landfill – Area A3

The requirements for closure and remediation of Area A3 are contained in conditions 14(a) to (d) of ATH-2002003983.02 (6010). The following is a brief description of the remediation that has occurred.

- Waste disposal operations in Area A3 started in May 2004 ceased at the end of October 2021.
- Each year a topographic survey was carried out and the landfill compaction density assessed. On all occasions the density of the waste exceeded the required minimum density stated in the resource consent conditions (i.e., 600 kg/m^3).
- Between November 2021 and March 2022, all areas of the landfill, except for the western-facing front face and the area under the access road, were capped with at least 700 mm of capping material, topsoiled and grassed.
- The front face was capped with a temporary capping layer approximately 300 mm in thickness.
- Between January and March 2024, the balance of areas within Area A3 were capped with additional capping material to make the depth of capping up to 700 mm across Area 3.
- All areas of the closed landfill, except for the access road and rock-lined stormwater swales, have been topsoiled and grassed.
- Note that the access road is underlain by various materials, including over 200mm of weathered rock, and a clay capping layer at least 500 mm in thickness.
- Testing of the capping material showed that the permeability of the soils used is less than the maximum limit and so meets the consent requirements.

The first drawing in section A.15 of Appendix A shows the completed shape of Area A3 following the 2022 remediation. The second drawing shows the shape of the landfill as represented by LiDAR information prepared in 2025.

The third drawing in section A.15 of Appendix A shows how the different areas of closed landfill have been capped differently according to the requirements of the time.

6 SITE REMEDIATION LEACHATE BPO PROJECT

6.1 Leachate BPO Project Objective

The objective of the Leachate Best Practical Option Project is to comply with the BPO requirements of the Environment Court Order (19 December 2019) and Discharge Permit ATH-2002003983.02 (formerly DP 6010) condition 2A(a), which states the following:

> "*Condition 2A*
>
> *By the end of April 2021, the Permit Holder must complete an assessment of leachate remediation options (and a BPO) to:*
>
> *(a) cease, or if cessation is not feasible, materially reduce the discharge of leachate to the Tatana Drain and Hōkio Stream; or*
>
> *(b) if neither of the options in (a) are feasible then options to offset effects within the Hōkio catchment and if that is not feasible or possible options to compensate effects within the Hōkio catchment or outside of it (either option through an ecological package).*
>
> *The Permit Holder must provide a draft of the assessment to the NLG representatives and Horizons Regional Council for comments. The Permit Holder shall decide on an option that is feasible to implement, applying the hierarchy above from the assessment. The Permit Holder must notify the Regulatory Manager of Horizons Regional Council which option it selects and provide a copy of the final assessment. The selected leachate remediation option must be fully implemented by June 2023*".

I

In 2023 improvements were made to the cap shape to provide a minimum grade of 5%, so facilitating further future settlement. The work was done between February and April 2023 as the leachate BPO project to improve the landfill cap, with some 3,900 m3 of clayey soils being imported to shape the top of Area A2, thereafter it was topsoiled and grassed.

It is expected that the Leachate BPO3 project or alternatives will be developed over the next year or so, and this CLMP will be updated periodically to reflect the status quo of projects.

6.2 Progress with the Leachate BPO Project

6.2.1 Progress By Late 2023/Early 2024

6.2.1.1 Improved Capping of Area A2

The option undertaken for the BPO condition was improved capping of Area A2. This was completed in April 2023 at an approximate cost of $300,000, and it involved importing 3,900 m^3 of clayey capping material which was used to reshape the crown of Area A2.

6.2.1.2 Leachate BPO 3.0 Project Concept

Through advanced modelling of the groundwater plume originating from Closed Landfill Area A3, a concept design was completed for the Leachate BPO 3 project by late 2023/early 2024.

The concept details have been provided in the drawings contained in section A.17 of Appendix A.

The Leachate BPO 3 concept was proposed to consist of the following elements:

- *200m long subsoil drain with fabric-wrapped drainage metal intake, located along the northern property boundary (parallel to part of the Northern Farm Drain).*
- *The drain to be constructed in two parts, with Stage 1 consisting of a 100m long central section, and Stage 2 consisting of 50m extensions on either end.*
- *The drain design included access for rodding and flushing maintenance.*
- *A central pumping chamber was assumed with sufficient pumping capacity to lower the groundwater table to RL5m to match the level of the Hōkio Stream. This would involve potentially pumping approximately 350m^3 of groundwater per day.*
- *The drawdown of groundwater would affect approximately 10,600m^2 of the existing wetland area (i.e., approximately 50% of the area) located on the landfill property. However, modelling of the groundwater drawdown by pumping showed that this would be the most effective way to achieve a material reduction in the contaminants discharging into the Hōkio Stream.*
- *The captured groundwater would be pumped to the on-site storage tank from where it would be pumped to the Levin WWTP.*

There would be no discharges to the Hōkio Stream of groundwater that would be extracted under the Leachate BPO 3 project.

To off-set for the loss of wetland area, a new wetland area (or areas) would be required to be established. The proposed wetland area (or areas) have yet to be determined.

6.2.1.3 Proposed Effectiveness

Through groundwater modelling, it was estimated that Leachate BPO 3, with a proposed 200m long intercept drain, would have an efficiency of approximately 89%. It would provide an effective method of near total capture of ammoniacal-N discharge into the Northern Farm Drain, and a high material reduction in the discharge to the Hōkio Stream.

6.2.1.4 Draft Consent Conditions

Subject to final design details, the Leachate BPO 3 would be likely to require the following new resource consents:

- *Consents under the National Environmental Standards for Freshwater (NES-FW) and Regional Plan for works in and around a natural inland wetland including earthworks, land disturbance, diversion of water, and taking of groundwater.*
- *Consents to be determined but may include vegetation clearance, earthworks and diversion of water necessary to establish a wetland offset.*
- *Land use consent under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) for soil disturbance on a Hazardous Activities and Industries List (HAIL) site.*

The resource consent conditions for the Leachate BPO 3 project will include details of environmental monitoring to be undertaken to demonstrate the effectiveness of the BPO 3 project.

It is likely that the environmental monitoring programme will include monitoring of bores BH101 to BH104, which were installed to provide additional information on the nature of the contaminated groundwater plume, down-gradient of Closed Landfill Area A2.

Whilst the current resource consent conditions do not require sampling of those bores, the Council intends to continue monitoring of groundwater in those bores, in addition to the monitoring already required by the resource consent. This is to further inform continued research and investigation of options, as discussed further below.

6.2.1.5 Operational Requirements

Under the Leachate BPO 3 project the Landfill Maintenance Staff would be provided with an operations manual that covers the operation of the system. In general terms, the operations would be expected to consist of:

- *Real time checks via SCADA to confirm that the pumps are operating properly and visual checks to confirm that no damage has occurred to the infrastructure.*
- *Weekly checks of the equipment and levels/availability of dosing chemicals, if needed.*
- *Periodic cleaning of subsoil drains and treatment tanks.*
- *Regular cleaning and maintenance of any wetland reed beds, if installed.*
- *Liaison with Council staff about availability of dosing chemicals, and transport of dosing chemicals, to the site, and removal of empty containers, as needed.*

Additional maintenance tasks that would be required are described in section 9.9.

6.2.2 Progress By July 2024 – What was Known

By July 2024, the following progress had been made:

The Council had decided to move forward with investigation of Leachate BPO 3 and had allocated a budget for it.

The overall project estimate of $1.997M was approved by Council, based on technical advice and allowing a 30% contingency. (It is noted that this is a significantly higher amount than the estimated cost of $350,000 agreed to in the Landfill Agreement. If the estimated costs for implementing the Leachate BPO 3 project continue to increase, as the concept design is further developed, Council will need to see how to scale back the project to suit the committed budget).

- *It was identified that further investigation will be required to prove the effectiveness of extraction of the contaminated groundwater, and the ability to effectively treat it.*
- *The treatment costs for the extracted groundwater to be discharged as trade waste at the Levin Wastewater Treatment Plant (LWWTP) were estimated to be some $2.4M over 30 years.*

6.2.3 Progress by January 2025 – What Has Been Discovered

By January 2025, the following further progress had been made:

Specialist advice was received that advised that consent could not be acquired without further certainty on wetland mitigation, discharge and treatment required to meet a consenting threshold.

Wetland impacts from extracting the contaminated groundwater will likely require an offset of some 1.1 ha. This had not been fully budgeted for in July 2024 and further work was required to confirm potential offset locations and costs including land purchase.

- *The LWWTP and the POT irrigation with its current capacity cannot treat the volume of contaminated groundwater until the LWWTP has been upgraded for secondary treatment, which is expected around 2031, or the POT irrigation expansion occurs around 2029.*
- *The POT is currently at capacity for nitrogen loading. Its current expansion timeline is also dependant on the draft wastewater standards.*

6.2.4 Progress by August 2025 – What Is Now Known and What Needs to Happen

Over the past eight months there has been further investigations conducted for the BPO 3 project.

Currently (i.e., August 2025) the project status is as follows:

- *The PMG have queried a technical recommendation to consider shifting the location of the subsoil trench closer to the toe of closed landfill area A2. This has also raised the question of whether there is a need for a peer review of the technical work done to date. At this stage the final location of the subsoil trench is still to be confirmed.*

Leachate BPO 3 assumes the extracted contaminated groundwater will be pumped off-site, to be treated at the LWWTP and then irrigated to land at the POT. For this to occur a timeframe of about six years is needed for the upgrade of both LWWTP, for secondary treatment, or the POT, for expansion of the irrigation area.

Initial bench-top scale testing of the leachate-contaminated groundwater show that it is technically feasible to treat onsite. The technical team has recommended that the option of on-site treatment and irrigation be further investigated. However, the NLG and PMG may not support this option.

- *The Council's position is that the focus should be on investigating the facts to support the best environmental and ratepayer outcomes.*
- *Trade waste charges that will be incurred at LWWTP may potentially be higher than expected and it is likely that, in the future, they will need to be paid to a regional Water Services Organisation, as opposed to the current arrangement where they are essentially an in-house cost transfer between Council service departments.*
- *The Council is continuing to monitor groundwater quality in the existing bores to assess the movement of the leachate plume down-gradient of closed landfill area A2. The more recent results and evidence does not align conclusively with the groundwater modelling that has been undertaken.*

Concerns have been raised by HRC about the compliance with discharge permit ATH-2002003983.02 (formerly DP 6010). The Council is to agree a plan with HRC that takes account of the implementation of the BPO.

Implementation of the Leachate BPO 3 is dependent on future actions from Council, which include upgrades to the LWWTP, expansion of the irrigation capacity at the POT, and funding commitments. It is also dependent on contaminant removal systems that may, or may not, be able to be relied on.

Council is committed to ensuring that appropriate time is taken to implement the project correctly and with due consideration, to get the best possible environmental outcomes for the available budget.

6.2.5 What This All Means for the Leachate BPO Project

6.2.5.1 Shared Goal

Important to Council meeting key objectives outlined in the Consent and Closed Landfill Agreement, the working party that met on 31 July 2025 agreed to a user-friendly shared goal that would support everyone's focus towards the most viable outcome. As the landowner and the consent holder, the Council remains committed to understanding the views of other key stakeholders, however, also appreciate that at times not all views can be accommodated. Subsequently, a shared goal has been collectively designed that will support all parties' intent to work collaboratively. This has been articulated as follows:

"That all parties to the Closed Levin Landfill work towards ensuring leachate is monitored and managed to reduce any adverse impact on the Hōkio stream, including taking all practical steps to remediate as per consent requirements".

6.2.5.2 Key Outcomes to Be Led by the Council Moving Forward

1. *That managing any issues associated with the Closed Landfill, BPO to consider and accurately address ecological, community, and cultural outcomes.*
2. *The scope and planning related to the currently proposed Leachate Extraction System (BPO 3) will be put on hold as the Council continues to validate existing monitoring data, improve data collection and investigate alternative options. BPO 3 as it stands offers the following complexities:*
    a. *The project is seen to have potential negative impacts on the existing wetlands.*
    b. *There is a reliance on the wastewater master planning to upgrade the LWWTP and the project timeframes for completion of 4-6 years in realising the upgrade that will ensure the treatment plant can adequately treat the leachate prior to its pumping to the irrigation system at the POT.*
    c. *The reliance, planning and consenting on the expansion of the POT Irrigation System. More research is needed to temporarily treat and discharge the leachate extraction on site.*
3. *The need to provide further monitoring including testing and analysis in confirming the accuracy of the original modelling expectations for the leachate plume from the Old Closed landfill.*
    a. *Research additional options based on data analysis i.e. viable alternative solutions may be available involving capping of the edges of closed dump and purchase and restoration of the existing wetland and surrounds for both ecological and/or treatment outcomes. These alternatives require an evidential base to confirm the benefits of investment to deliver an improved environmental outcome. A resolution to commit funding to progress investigations will be made at the Council meeting on 10 September 2025.*
    b. *That there is a further requirement to monitor (enhance the existing programme following expert review) the site with a focus on contaminant discharges from the toe of the landfill with appropriate triggers in the consents, to drive action where leachate is present at unacceptable levels at a future time.*
4. *That the Council will establish a collective that includes the Regulatory & Compliance Lead, Project Manager and community elected expert for the purposes of developing a joint statement regarding actual or potential flow to the Hōkio stream and their impacts. The Council is also*

committed to seeking expert advice from a Ground Water Engineer when agreed and critical points by the team.

5. *That the current timing for adopting BPO 3 generates real difficulties for all parties. However, it is also recognised that it provides a significant opportunity to make rapid progress on implementation at the site and adopt the CLMP.*

6.2.5.3 Record of Key Meetings

The following key meetings have been held recently in connection with the Leachate BPO project:

- *30 July 2025: Council and PMG Project Manager meeting with HRC to discuss status and resolution opportunities.*
- *31 July 2025: Initial Meeting with Council, PMG and NLG Chair, and selected members to update the Leachate BPO project status.*
- *6 August 2025: Council's Regulatory Lead and Project Manager met with an elected community representative to establish additional testing, monitoring, and analyses programme, which is to be ongoing.*
- *12 August 2025: A community workshop and presentation was held to consolidate work done to date, discuss a collective approach, address any concerns and confirm goals, objectives and key timeframes.*
- *13 August 2025: Council staff briefed elected members on the proposed key deliverables.*
- *15 August 2025: Council prepared a memo for HRC outlining its response to HRC's significant non-compliance finding and outlining its approach to achieving accurate and agreed deliverables and timeframes.*

6.2.5.4 Proposed Programme

The following is a proposed programme for advancing the Leachate BPO project:

August 2025 to December 2025: Research alternative options, i.e., undertake wetland design to address offsetting, as required, with community stakeholder groups to be involved in the design process..

- *11 November 2025: Stakeholder engagement update.*
- *25 November 2025: Stakeholder groups are to have input to the selection of an independent peer reviewer.*

March 2026: Council staff to confirm alternative options and suitability (including engagement with stakeholder groups).

March 2026: Councillors to approve the CLMP (Noting this has been brought forward for consideration at 10 Sept 2025 Council meeting) and BPO.

March – May 2026: Resource consenting application, as required.

7 LANDFILL AFTERCARE

7.1 Overview

All areas of the closed landfill (i.e., Areas A1, A2 and A3) shall continue to be monitored and maintained as required by resource consent conditions as may be reviewed from time to time, with consideration being given to monitoring results, aftercare requirements and landfill age.

Some of the resource consent conditions are applicable to an operational landfill (e.g., waste acceptance criteria etc.), and it is envisaged that a review of the resource consents should be undertaken to rationalise consent conditions that apply to the closed areas of landfill. Sections 11.3, 11.4, Appendix Q and Appendix S contain information for which resource consent conditions changes, or deletion, are proposed.

7.2 Projected Aftercare Period

A minimum 30-year post closure period is recommended for a municipal landfill by the Ministry for the Environment.

An aftercare period of 30 years should be assumed from the cessation of refuse disposal operations, unless the Council subject to resource consent conditions, can prove that a lesser period is appropriate.

The main tasks during the aftercare period will be monitoring and maintenance of the landfill site, together with any measures that may be required for contingencies, should they arise.

7.3 Environmental Monitoring

The requirements for monitoring leachate, ground water, surface water and landfill gas as per consent conditions, are set out in section 11 of this CLMP.

7.4 Maintenance

Maintenance requirements have been set out under section 9 which deals with Site Maintenance.

7.5 Future End Use

7.5.1 Landfill Property

Council is committed to implementing future end uses that protect the environment and quality of life of those living in the Hōkio Beach area.

The future uses will be determined through discussion with the proposed newly amalgamated partnership group and, where required by law or regulations, that would fall under separate resource consent conditions.

Excluding the closed landfill areas, which are discussed separately below, the landfill property may be used for various purposes, as outlined below. Council will work with local community groups to determine a suitable end use (or uses), which will then be stated in an updated CLMP.

As can be seen in the aerial photographs (refer to Appendix H), much of the landfill property has already been planted in pine trees, which are presently being managed by the Council.

The Council will also consider any activities that naturally support the improvement of the environment and or benefit the community wellbeing, i.e., recreational or educational use.

If such future activities require separate resource consents, as well as an updated authority from the HNZ for works within a known historical site, Council will follow the required processes for obtaining such resource consents and HNZ authority.

The end uses of the three closed landfill areas require careful consideration because of the risk of damaging the landfill caps. Each area is discussed in further detail below.

7.5.2 Area A1

Area A1 has been closed for approximately 30 years and has been planted with pine trees. Besides that, it could be used for grazing by sheep (i.e., light stock), which are unlikely to damage the existing landfill cap.

The depth of waste in Area A1 is limited and it is quite likely that most of the settlement has occurred. However, further settlement is possible, and as for all closed landfills the possible presence of landfill gas needs to be considered.

7.5.3 Area A2

Area A2 has been planted with grass. Unlike Area A1, Area A2 has extensive sloped areas. *It could also be used for grazing by sheep, and this would require the installation of appropriately specified fences to control livestock access to parts of the landfill that are not suitable for livestock grazing.*

Area A2 has an extensive top area with a gentle to moderate grade, which may make it useful for some recreational activities.

Area A2 will be subject to ongoing settlement and even though this is likely to be minor, it is more of a consideration than for Area A1. Additionally, there is more likelihood of encountering landfill gas on Area A2, than in Area A1.

7.5.4 Area A3

Area A3 is characterised by moderately steep grades and with the depth of wastes being considerably more than the other two areas, settlement will continue to occur across the area for some years into the future.

Area A3 will continue to produce landfill gas for many years, though the production will decline now that waste disposal operations have ceased.

The slopes and presence of gas wells and LFG collection pipes mean that there are limited uses for Area A3 in the short to medium term.

When gas production has dropped off and the settlement rate slowed down, whilst difficult, it may be possible to graze sheep on Area A3, provided suitable fences are erected to safeguard gas wells and collection pipes, and to keep sheep away from the erodible steeper slopes.

In the long-term, when gas production has significantly reduced, Area A3 could be used for some form of recreational purposes, provided there are safeguards to limit access to the erodible steeper slopes.

8 SITE MAINTENANCE

8.1 Appointment of Landfill Engineer

8.1.1 Overview

Council has appointed a Council staff member to be the Council Landfill Engineer who is responsible for undertaking various maintenance tasks on-site.

In future, this role may be assigned to a contractor who will be appointed by the Council.

The conditions and practices described in this document are the basis for the landfill maintenance.

8.1.2 Contract Management Structure

If a contractor is appointed as the Landfill Engineer in the future, the contract management structure will be attached in Appendix J.

8.1.3 Roles and Responsibilities

The Council and the Council Landfill Engineer are jointly responsible to ensure compliance with conditions of the resource consents.

The Council Landfill Engineer is responsible for:

- management of the closed landfills according to this CLMP and resource consents, including:
    - inspections of various parts of the closed landfill and site infrastructure, at the frequency detailed in section 9 of this CLMP,
    - maintenance and management of the Leachate BPO project infrastructure and ensuring compliance with discharge requirements,
    - maintenance and management of all on-site stormwater systems and ensuring compliance with discharge requirements,
    - maintenance and management of all on-site leachate collection and pumping systems and ensuring compliance with discharge requirements,
    - maintenance of all sealed and unsealed roads on site, and maintaining access to monitoring points,
    - landfill cap repairs and proactive management of the leachate system to avoid leachate breakouts,
    - inspecting the landfill for leachate breakouts, subsidence, blockages of stormwater drains, site security and general tidiness,
    - nuisance control and management (odour, dust, litter, vermin and vegetation, including spraying for weeds and mowing),
- working collaboratively with the Council contractors and/or consultants,
- working through Council with the members of the PMG and NLG (e.g., attending meetings, answering queries, providing information etc.), as requested on occasions by Elected Members of the Council,
- on-site fire management including response to fire events,
- undertaking a baiting and trapping programme to control vermin/cats/possums,

- proactively managing the site for existing and forecast weather conditions, site assessments and response.

Council is responsible for:

- operating and maintaining the landfill gas collection and destruction system, including the landfill gas wells and flare,
- site monitoring and preparing the annual report that records the results of environmental monitoring activities,
- landfill topographic survey, as required,
- engaging/providing consultancy services for undertaking capital works, as required,
- engaging with the members of the CNLG and PMG (as required under the current resource consent conditions and LA),
- obtaining a new authority from Heritage New Zealand (Pouhere Taonga), should there be a need to conduct works on-site that will involve stripping of topsoil,

obtaining resource consents for the Leachate extraction options,

- *procuring a variation to the existing resource consent to provide regulatory consent permission for landfill gas to be directed to the flare, as opposed through the biofilter,*
- procuring variations to existing resource consents where changes in operation are anticipated or have occurred through the landfill closure.

8.1.4 Council Landfill Engineer Contact Details

Contact numbers have been provided in Appendix U for use in the event of an incident.

8.1.5 Access to Landfill Property

The landfill is closed to the public. Access to the landfill is to be authorised by the Council The front gate is to be kept locked to prevent unauthorised access.

Maintenance of site roads will be carried out as necessary to ensure all weather access is provided for vehicles needing to access to the landfill facilities and the monitoring bores.

A sign is maintained at the entrance to the landfill, which shows the name of the landfill, and information relating to site hazards. The Emergency Services contact number is also visible on the sign at the entrance.

8.2 Responsibilities under the Health and Safety at Work Act 2015 (HSWA)

Since the Council manages the landfill property, as well as other parties involved in activities at the landfill, it is defined as a '*Person conducting a business or undertaking'*, or PCBU, under the HSWA. All PCBUs have duties and responsibilities under the HSWA, and the Council (and its Landfill Engineer) shall make themself familiar with the requirements of the HSWA, relevant parts of which are summarized below.

8.2.1 Primary Duty of Care

Section 36 of the HSWA states that the primary duty of care of all PCBUs is to ensure, so far as is reasonably practicable, that the health and safety of workers and other people are not put at risk by the work conducted by each PCBU.

This means ensuring, so far as is reasonably practicable:

- the health and safety of workers while they are at work (including contractors, subcontractors, and their workers),
- the health and safety of workers whose work activities are influenced or directed by the Council (or its Landfill Engineer),
- that the health and safety of other persons are not put at risk by any work or undertaking of the Council (or its Landfill Engineer (e.g., a visitor to the landfill property who could be affected by the Council Landfill Engineer's work)).

8.2.2 Managing Risk

Section 30 of the HSWA requires that PCBUs must, so far as is reasonably practicable, eliminate risks that arise from their work. If the risk cannot be eliminated, it must be minimised, so far as is reasonably practicable.

PCBUs must comply to the extent to which they have, or would reasonably be expected to have, the ability to influence and control the matter to which the risk relates.

8.2.3 Worker Engagement, Participation and Representation

Part 3 of the HSWA requires that PCBUs must ensure, so far as is reasonably practicable, that workers can raise concerns and express their views on work health and safety matters and that those views are considered.

PCBUs must also have practices that provide reasonable opportunities for workers to participate effectively in improving work health and safety on an ongoing basis.

8.2.4 Notification

Section 56 of the HSWA requires that, if a notifiable event occurs, a PCBU must notify WorkSafe as soon as they become aware of the event.

8.2.5 First Aid

The Health and Safety at Work General Risk and Workplace Management Regulations 2016 require that a PCBU must ensure that their workers have access to adequate first aid equipment, facilities for the administration of first aid and trained first aiders. If the PCBU shares a workplace with other PCBUs, it can coordinate sharing first aid resources with them.

8.2.6 Emergency Plans

The Health and Safety at Work General Risk and Workplace Management Regulations 2016 also require that a PCBU has a duty to prepare, maintain and implement an emergency plan at its work. The PCBU must consult, cooperate, and coordinate with other PCBUs that it shares overlapping duties with to coordinate emergency procedures.

Table K- 1 in Appendix K sets out what WorkSafe expects from PCBUs.

8.2.7 Working with Other PCBUs

The Council (and its Landfill Engineer) must, so far as is reasonably practicable, consult, cooperate, and coordinate with other PCBUs that they share health and safety duties with.

Consulting, cooperating, and coordinating can avoid PCBUs unnecessarily duplicating each other's efforts, and help prevent any gaps in managing health and safety risks.

Some ways that the Council (and its Landfill Engineer) can meet this duty and avoid gaps include (but aren't limited to):

- planning by thinking through every stage of the work,
- thinking about how the work could affect other PCBUs and the public,
- identifying the risks that need to be managed,
- consulting with other PCBUs to agree on how those risks will be managed,
- consulting with other PCBUs to decide who is best placed to manage each risk, and
- clearly defining roles, responsibilities, and actions, so that everyone knows what to expect.

The Council cannot contract out of its health and safety duties. In sharing a workplace with other PCBUs, or working together in a contracting chain, the Council (and its Landfill Engineer) is likely to share overlapping duties. Each PCBU in the contracting chain should be aware of overlaps and manage risks that are appropriate and reasonably practicable for them to control.

The Council cannot:

- contract out of its health and safety duties, or
- push risk down the contracting chain to another PCBU.

The Council is not only responsible for its own workers; its responsibility also extends to workers whose work it influences and directs, and other people at the workplace. This includes supporting those people to meet their health and safety duties and not passing on or increasing risk through its arrangements with them.

Whilst the Council cannot contract out of its health and safety duties, it can, however, enter reasonable agreements with other PCBUs that it is working with, to make sure everyone's duties (including its own) are met. Usually, the PCBU who has the greatest ability to influence and control the work or workplace will have the most responsibility.

These agreements can be documented in contracts between the PCBUs. PCBUs must monitor each other, to make sure each PCBU continues to do what was agreed. WorkSafe may check that these arrangements are working well and consider enforcement action if PCBUs are not meeting their health and safety duties.

The extent of the Council's responsibility to meet its health and safety duties will likely be different to other PCBUs that it shares duties with. This will depend on what ability they must influence and control the health and safety matter.

The more influence and control the Council (and its Landfill Engineer) has over a health and safety matter, the more responsibility it is likely to have. There are three ways a Contractor can have influence and control over health and safety matters, as shown in Table 8 on the following page.

Table 8: What WorkSafe expects from PCBUs

Control Over Work Activity	Control Over the Workplace	Control Over Workers
A PCBU in control of the work activity may be in the best position to control the health and safety risks.	A PCBU in control over the workplace, including plant and structures, has some influence and control over health and safety matters.	A PCBU has more influence and control over its own workers and contractors than those of another PCBU.

8.3 Staff Requirements

The level of staffing required at the landfill property will be adequate for the environmentally responsible and safe management of the landfill property and at a level that ensures that all specified tasks can be completed in accordance with the CLMP.

8.4 Training

All staff employed in management and maintenance activities at the closed landfill must be appropriately trained, competent, be familiar with the closed landfill facilities and operator competencies, including environmental protection systems, operating work practices, the status of site activities, resource consent conditions, typical closed landfill hazards and site safety requirements. During work hours there shall be at least one staff member available on site who is a qualified first aider.

8.5 Occupational Safety and Health

The Council shall provide for its Landfill Engineer a Health and Safety Plan that meets the requirements of the Health and Safety at Work Act 2015, and to conduct all operations in observance of that Health and Safety Plan. *The Council's Health and Safety Plan is to be attached to this CLMP as Appendix L.*

Council's "People Safety Monitoring Policy" applies to all Council employees and is attached to this CLMP as Appendix M.

All managers and employees are expected to assess the risk of the tasks that they are undertaking and take steps to mitigate those risks. The safety monitoring system is one of those steps. It should be used for all field work at the landfill, in situations where employees are working alone or in isolation or are in an area without reliable cell phone or Wi-Fi coverage or are working outside of normal business hours.

If Council appoints a Landfill Contractor, it shall confirm in writing that the provisions of the Health and Safety at Work Act 2015, the WasteMINZ Health and Safety Guidelines for the Solid Waste and Resource Recovery Sector – parts one, two, three, four and five, March 2024 (and subsequent amendments) and its stated Health and Safety Plan are being complied with. The Health and Safety Plan identifies possible hazards and records how these hazards are to be eliminated, isolated or minimised.

If Council appoints a Landfill Contractor, that contractor shall nominate a person responsible for health and safety. The person nominated is responsible ensuring that the Landfill Contractor's obligations under the Health and Safety at Work Act 2015 are met. The Landfill Contractor will then be responsible for the provision of all safety equipment and is required to ensure that it is readily accessible and fully functional.

8.6 Other Contractors on Site

Besides the Council Landfill Engineer, there are, from time to time, other contractors on-site, as engaged by the Council to conduct various tasks.

Appendix N has a list of the main contractors presently engaged on site, together with their contact details.

All contractors on site are PCBUs, as defined under the HSWA (see section 8.2), and Council (and its Landfill Engineer) is required to work with them to achieve safe work outcomes.

8.7 General Site Instructions

- All personnel required to visit the site to undertake their works are to be inducted by the Council Landfill Engineer.
- Always work in accordance with the Council Landfill Engineer directions and inductions.
- All persons must sign in on arrival and sign out before leaving the site.
- Always notify the Council Landfill Engineer on the site of your arrival.

8.8 Relevant Hazard Identification

A comprehensive list of anticipated hazards and risks associated with managing and operating a landfill site is given in Table 13 of the WasteMINZ Health and Safety Guidelines.

Whilst the landfill is not operational, it is considered that many of the hazards that occur on an operational landfill will still be present on the closed landfill.

The hazards identified in Table 13 of the guidelines have been reproduced as Appendix O of this CLMP.

If additional hazards or unsafe practices are identified at the landfill site, they are to be notified to the Council Landfill Engineer.

If in doubt of your own safety or the safety of others, you are to stop work, move to a safe area, alert others, and contact the Council Landfill Engineer.

9 SITE MAINTENANCE DETAILS

9.1 Maintenance of Buildings and Equipment

Council shall be responsible for:

- Maintaining all buildings and equipment supplied for use on-site in a sound and workable condition.
- Not allowing buildings to fall into disrepair or become untidy in appearance.
- Maintaining equipment in accordance with the manufacturer's recommendations and keep records of service dates.
- Mowing the grassed areas around the entrance, along the access road, site buildings and pond, and keeping them tidy.

9.2 Site Roading

Council shall be responsible for:

- Maintaining all roading on the site, in a good condition that is free of potholes, to provide, as far as possible, all-weather access.
- Applying dust suppression techniques such as the use of water and other methods permitted by the resource consent conditions, as necessary.
- Mowing the grass to maintain visibility and clear access to required destinations.
- Removing fallen trees.
- Signs

The Council shall be responsible for:

- Maintaining all signs on-site in a clear and legible condition.

9.3 Perimeter Fencing

The Council Landfill Engineer shall be responsible for:

- Inspecting the perimeter fencing quarterly and informing the Council of the need for any repairs.

Council shall be responsible for:

- Arranging repairs to the perimeter fences.

9.4 Control of Stormwater

The Council Landfill Engineer shall be responsible for:

- Inspecting the stormwater drains monthly to check that they are unblocked, and that stormwater flows are directed to the stormwater soakage areas as intended.
- Removing any blockages.
- Identifying any damage to the stormwater drainage system, informing the Council of the need for any repairs, and carrying out repairs as agreed with Council.
- Checking for sediments build-up in stormwater soakage ponds and arranging for them to be cleared so that the ponds can continue to function correctly.

Council will be responsible for:

- Appointing a contractor to undertake any environmental monitoring of stormwater required under the resource consents.
- Arranging for reporting of the environmental monitoring to be done, in accordance with the resource consent requirements.

9.5 Control of Leachate

Leachate is collected from the closed landfill in Area A3 only.

The leachate collector pipes, and leachate manhole are to be jetted out annually to prevent accumulation of biomass and sediments. This can be done either from the top end of the pipes via solid riser pipes that extend up the side slopes of each stage and which are connected to the landfill gas collection system, or by accessing the pipes from the upstand risers on each main collection pipe, located next to the leachate collection manhole. *Council's Landfill Engineer is to mark the locations of the riser pipes on-site with posts.*

The drawings in section A.3 of Appendix A shows the general arrangement of the leachate collector pipes in the landfill cells and connecting to the leachate collection manhole.

Landfill gas will exit the landfill in significant concentrations at both riser pipes and at the leachate collection manhole if they are opened. Extreme caution is required when working near the riser pipes and manhole. If work is to be done within the manhole, then specialist breathing apparatus and relevant confined spaces certifications are required. All equipment used around and in the riser pipes and manhole must be intrinsically safe and must not produce sparks or sources of ignition.

The Council Landfill Engineer shall be responsible for:

- Inspecting the leachate pumping system weekly to check that it is functioning properly.
- Flushing out the leachate collector pipes and leachate collection manhole annually and removing the flushed sediment for disposal at the WWTP.
- Ensuring appropriate equipment and processes are followed when working in or near the leachate collection manhole, leachate riser pipes and other gas collection pipes.

- Pumping out the contents of the pond, which shall either be transported by tanker to the WWTP or disposed of into the manhole next to the pond, from where it will be pumped to the WWTP.
- Liaising with Council if the pond needs to be used for storing leachate.

Council shall be responsible for:

- Receiving SCADA notifications for failures or errors with the leachate pumping system and acting on those notifications.
- Arranging for servicing of the leachate pumps.
- Upgrading the leachate pumping system.
- Appointing a contractor to undertake any environmental monitoring of leachate required under the resource consents.
- Arranging for reporting of the environmental monitoring to be done, in accordance with the resource consent requirements.

9.6 Landfill Gas Control

The landfill gas system requires specialist knowledge to operate and maintain. *Council has appointed a separate Landfill Gas Contractor who is responsible for that system.*

The Council Landfill Engineer shall be responsible for:

- Understanding the hazards associated with the LFG system.
- Always wearing and using appropriate personal gas detection monitors when engaged with work on the landfill property.
- Conducting weekly a general inspection of the landfill gas system This includes any aspect of the LFG system that appears abnormal (e.g., broken pipes, excessive smell of LFG, flare not working etc.) shall be reported to Council as soon as possible.
- Assisting the Landfill Gas Contractor, on occasions, where necessary. This may entail, for instance, helping to move LFG collection pipes and assisting with repairing the capping where gas discharges may be emanating.

Council shall be responsible for:

- *Appointing a Landfill Gas Contractor to operate and maintain the LFG system (or train a Council employee).*
- Displaying hazard warning signs to draw attention to the LFG hazard on site.
- Providing its workers with appropriate personal gas detection monitors for use when they are engaged with work on the landfill property.
- Appointing a contractor to undertake any LFG environmental monitoring required under the resource consents.
- Arranging for reporting of the environmental monitoring to be done, in accordance with the resource consent requirements.

9.7 Final Capping and Cover

All areas have been capped and covered with vegetation, as described in section 5 of this CLMP.

The standards applied to each area are different and reflect the resource consent conditions that were applicable, or not as the case may be, at the time of closure. Note: irrespective of the closure standards applied the maintenance requirements for all closed areas are similar.

The Council Landfill Engineer shall be responsible for:

- Undertaking weekly[7] walkover inspections of all areas of the closed landfill to check for signs of:
  - damage to the landfill cap (e.g., differential settlement, water ponding, growth of water-loving plants, fissures, riling, soil erosion, stormwater damage, animal burrows),
  - un-seasonal die-off or yellowing of grass,
  - leachate breakout and/or seepage,
  - landfill gas escaping (e.g., by using sense of smell),
  - growth of noxious weeds (e.g., gorse),
  - vermin (e.g., rodents), cats, possums.
- Completing weekly[7] inspection sheets.
- Informing Council of any of the above and taking appropriate steps to deal with any issues that may arise.
- Dealing with any leachate breakouts. If they occur, they would most likely be on the exposed front and side faces of the closed landfill areas, and especially Area A3. See section 10.7 for details on how to deal with leachate breakouts.
- Mowing grass, where safe to do so, on the closed landfills, taking account of the moisture content of the topsoil, so as not to create wheel ruts, and using appropriate mowing equipment suitable for moderately steep slopes.
- Maintaining grass coverage across the closed areas of landfill, including re-seeding and fertilising, as agreed with the Council Landfill Engineer.
- Baiting of bait stations and/or traps and conducting other approved means of eradicating or discouraging vermin from proliferating on-site.
- Spraying at least twice-yearly, and possibly more frequently if needed and agreed with the Council, for gorse and other noxious weeds.
- Understanding the archaeological protocol to be applied should topsoil stripping be required, for instance, to recover sandy material for remediating parts of the site and the harvesting of plantation pine trees.

In addition to the weekly[7] inspections, the Council Landfill Engineer shall inspect the landfill property and infrastructure within 12 hours (at first light) after a significant rainfall event[8] or of being notified of an earthquake, to check whether any damage has occurred. If there is any damage from either a storm or earthquake event, the Council Landfill Engineer is to follow the emergency response procedures stated in this CLMP.

Council shall be responsible for:

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[7] *Note: weekly inspections are currently required under the resource consents, but they may be changed to "Monthly" with a review of the consents.*
[8] The definition of heavy rainfall for this requirement shall be a minimum of 25mm of rain within a 24-hour period, or more than 15mm over a one-hour period.

- Appointing a surveyor to undertake annual surveys of Area A2 so that the rate of settlement and the shape of the closed landfill surface can be checked.
- *Obtaining an agreement from the Historic Places Trust so that topsoil stripping can occur, if needed, on parts of the site*.
- Informing the Council Landfill Engineer of any proposals to use parts of the site for purposes which currently do not occur, for instance, use of the borrow area for on-site stock piling of capping material.
- Providing copies of the weekly[7] inspection sheets to the Regional Council and parties involved in preparing annual environmental monitoring reports.

9.8 Forestry Screen

With Class 1 waste disposal operations having ceased, the need for a forestry screen is largely redundant.

Nevertheless, there may be future activities at the landfill property which may benefit from having the forestry screen retained.

Council shall be responsible for:

- Appointing a Forestry Contractor to take care of and maintain the trees on site.
- Ensuring that all forestry activities are conducted according to the Forestry Management Plan and in line with the Heritage New Zealand archaeological protocol.

9.9 Leachate Best Practicable Option 3 Project

The Best Practicable Option 3 (BPO 3 project has been designed in concept only. However, it is envisaged that a significant part of the Council Landfill Engineer's operational duties will involve operating and maintaining the BPO3 infrastructure once it has been constructed and commissioned.

The Council Landfill Engineer is likely to have responsibility for:

Inspecting daily the infrastructure comprising the BPO 3 to ensure that:

- *pumps are working,*
- *there are no blockages to flows from the extraction trench,*
- *there are no leaks in pumping lines,*
  access to the BPO 3 infrastructure is maintained (e.g., fallen trees are cleared),
- *the SCADA logger is recording pump data (e.g., hours run, or volume pumped against time),*
- *checking water levels in the natural and created wetland areas.*

- *Flushing subsoil lines annually.*

Working with other contractors who may be engaged by Council to work on the BPO 3 (e.g., for servicing of pumps, sampling of treated groundwater, maintaining wetland plants).

- *Monitoring the state of the vegetation in the mitigation or offset wetland.*
- *Council shall likely be responsible for:*

Procurement of services for the design, consenting, construction and commissioning of the BPO 3 project infrastructure.

- *Receiving SCADA notifications for failures or errors with the leachate pumping system and acting on those notifications.*
- *Arranging for servicing of the leachate pumps.*
- *Appointing a contractor to maintain, and if required, replace the wetland plants.*

Appointing Council technicians to undertake the environmental monitoring required under the new resource consents which will be issued for the BPO 3.

- *Arranging for reporting of the environmental monitoring to be done, in accordance with the new resource consent requirements.*

10 CONTROL OF NUISANCES

10.1 Odour

With waste disposal operations having ceased, odour issues are unlikely to occur unless old refuse becomes exposed through landslip, when there is a need to excavate into the landfill, or there is a failure of the landfill gas collection system which allows discharge of landfill gas (LFG), coupled with weather conditions that do not disperse the LFG.

In the case of landslip, the area of exposed refuse must be covered as soon as possible with soil, and the slip area remediated as detailed in section 10.8.

If excavation into old refuse is required, for instance, for dealing with a leachate breakout, the following controls will be used to minimise the potential for nuisance odours:

- Consideration of alternatives.
- Timing the works to coincide with favourable meteorological conditions.
- Carrying out the work in stages to limit the area of the odour source.
- Covering odour sources if works are to be left over night.

If odour is caused by LFG, refer to the emergency response procedures in section 14.4.2.2.

The LFG system will continue to operate and will be maintained by a Landfill Gas Contractor.

Gas monitoring of the landfill surface of Area A3 will also continue periodically, as required by the resource consents. Such monitoring was not required over areas A1 and A2 and so will not be undertaken. It is considered that gas generation in those two closed landfill areas is likely to be minimal, if not completely absent. There is no evidence to date of gas egressing those areas. A precautionary approach is recommended, especially if any excavation is to occur in those areas.

10.2 Litter

With no waste being disposed of on-site, litter problems are most likely to be confined to fly-tipping at the entrance of the site.

During conducting daily/weekly inspections on-site (for the BPO 3), the Council Landfill Engineer shall remove any litter or refuse that may have been deposited at the landfill site entrance, and shall dispose of it at the transfer station, or as agreed with the Council.

If needed, the Council Landfill Engineer shall inspect the litter/refuse for any indications of its source, for instance, envelopes with addresses, and shall pass this information on to appropriate staff members at the Council.

10.3 Dust

Traffic volumes on-site are likely to be minimal, and dust is not expected to be a problem. However, there may be a need to control dust occasionally, especially during dry conditions.

Dust shall be controlled by limiting vehicle speeds and using water/emulsion spraying, as necessary.

10.4 Vermin/Cats

Council shall arrange for measures to be adopted to control vermin and cats, for implementation by the Council Landfill Engineer, or HRC. Such measures shall include a baiting and trapping programme which shall be to the satisfaction of the Regional Council Compliance Officer.

An Animal Pest Management Plan will be developed when the future end use(s) has been determined.

10.5 Seagulls

With the landfill closed, there are no available food sources for seagulls.

10.6 Noxious Plants

The Council Landfill Engineer shall inspect the landfill property regularly for noxious plants and shall take appropriate measures, such as spraying, to control them. It is expected that spraying will usually occur twice-yearly.

10.7 Leachate Breakout

The Council Landfill Engineer shall inspect the closed areas of the landfill weekly for leachate break out, settlement and other adverse environmental effects.

Leachate breakouts need to be assessed on a case-by-case basis. Typically, they are contained by digging out the affected area and filling it with a drainage medium to ensure the leachate drains back into the waste pile. Alternatively, subsoil pipes may be constructed from the breakout to the closest leachate collector pipe. The breakout area must then be repaired by resealing the capping layer and reinstating the vegetation.

A record shall be kept of the date, time, observations and any remedial action taken while carrying out regular inspections of the landfill. This record shall be made available to the Regional Council on request.

10.8 Land Slips

Land slips may occur, especially on the moderately steep side and front slopes of Area A3 and during periods of pro-longed or intense rainfall. If slips occur, they are likely to be shallow-seated and involve the clay capping and/or topsoil layers.

Land slips need to be remediated as soon as possible to limit the chance of leachate breakouts occurring and to prevent further damage to the topsoil and capping layer from stormwater flows.

The remediation required will depend on the extent and location of the land slip. In some cases, the slipped capping material may be recovered for re-use, but quite often it will be over-saturated and mixed in with topsoil and grass and cannot be used again. In this circumstances, suitable capping material and topsoil would need to be imported to site to repair the land slip. The Council should maintain a stockpile of suitable clayey capping material on-site so that remediation of slips can occur promptly. A quantity of approximately 150m^3 should be suitable and it should be located within the old borrow area, immediately to the left of the access road when driving down to Area A3.

The Council Landfill Engineer shall engage with Council in all cases where land slip occurs to agree suitable remediation. A photographic record should be kept of the event prior to, and after carrying out remediation works, and the Council Landfill Engineer shall keep records of all materials, labour and machine hours required to do the remediation. Such details should be entered on the weekly inspection logs.

11 ENVIRONMENTAL MONITORING AND REPORTING

11.1 Consent Requirements

A flow chart showing the Tasks and Assigned Responsibilities for the Environmental Monitoring is attached in Appendix P.

The Council shall appoint a contractor (or contractors) to undertake the environmental monitoring, and a consultant to undertake the reporting of the environmental monitoring.

The Council Landfill Engineer is to be aware of the general environmental monitoring and reporting requirements, since their input may be needed.

A summary of the required groundwater, surface water and leachate environmental monitoring is contained in Appendix P.

As required under the current resource consents, the results of environmental monitoring will be made available to the public. This is likely to be through Council's website.

From time to time interested parties may wish to observe how the environmental monitoring is undertaken. HDC will facilitate this through the Council Landfill Engineer.

11.2 Consent Review

As part of the consent review process, the extent of environmental monitoring shall be reviewed to ensure that it is "fit for purpose". This will entail reviewing the frequency of environmental monitoring tests, the range of parameters to be included in the indicator and comprehensive suite of tests, and the locations at which groundwater and surface water monitoring is conducted.

The following matters have been identified as areas for consideration:

- *The need for ongoing monthly monitoring of landfill leachate using the comprehensive suite of parameters.*
- *The need for monitoring of surface water location HS1.*
- *The need for continuing monthly monitoring of surface water locations HS1A, HS2 and HS3.*
- *A requirement to include the environmental monitoring of new groundwater bores 101A & B, 102, 103 and 104 in the quarterly sampling regime.*

11.3 Annual Environmental Monitoring Report

Council is required to report to HRC and the CNLG with the Annual Environmental Monitoring Report and any required quarterly monitoring results. The tables in Appendix Q provides a summary of the requirements of Council for this reporting. Note that the annual reporting requirements for the landfill gas flare under discharge permit ATH-2014015044.01 (DP 106798) are required in or at the end of June each year. Reporting activities are indicated in the table which could be increased, curtailed or reduced, on account of the landfill closure.

11.4 Other Reporting Requirements and Deadlines

In addition to the annual reporting requirements, there are other reporting requirements and deadlines to be met for various matters. These are listed in Table Q- 3 attached in Appendix Q. Reporting activities are indicated in the table which could be increased, curtailed or reduced, on account of the landfill closure.

11.5 Environmental Monitoring Requirements and Procedures

The requirements for environmental monitoring and reporting are detailed in Appendix P. Additionally, guidance is provided on the following:

- Field sampling procedures
- Sampling schedule and site plans
- Tasks and assigned responsibilities

Council has appointed a contractor to undertake the environmental monitoring work, and a consultant who does the environmental reporting.

11.6 MfE Guideline – Reduction in Environmental Monitoring Requirements

The monitoring frequency may be reduced if monitoring results remain essentially unchanged for several consecutive monitoring periods, and this will need to be discussed with HRC.

The "*MfE Guide for the Management of Closing and Closed Landfills in New Zealand (May 2001)*" provides broad guidance on recommended groundwater, surface water and landfill gas monitoring for closed landfills. The monitoring requirements vary depending on the size of the landfills and the number of years since closure. Being larger than 100,000 m^3, Levin LF would require the most extensive scope of ongoing environmental monitoring. Information from the "*MfE Guide for the Management of Closing and Closed Landfills*" is attached in Appendix R.

12 SITE RECORDS

12.1 Resource Consent Requirements

It is a requirement of the resource consent that various records be kept. Table S- 1 in Appendix S lists the records that shall be kept and maintained throughout the life of the landfill. A column has been included in the table to indicate where the requirement is now not required, given the closure of the landfill.

12.2 Recording of Information

The purpose of recording information is to provide data to assist in better management of the facilities. Information should be recorded on forms that prompt the person doing the recording to fill out appropriate information.

In general, these forms will be filled in by the Council Landfill Engineer, or other persons designated by Council, and they shall be submitted to Council for forwarding to HRC as required.

Table 9 provides a list of the records that are required. Various forms have been compiled for use, though they may be adapted by the Council to suit its mode of operations. Recording forms are provided in Appendix S of this CLMP.

Table 9: List of Information to be Recorded, Recording Frequency and Format, and Frequency to be Submitted to the Regional Council

Information to be Recorded and Format	**Frequency Recorded[9]**	**Assigned Responsibility**	**Frequency Submitted to the Regional Council**
Maintenance Record of Closed Landfill (no specific form)	When maintenance is carried out	Council Landfill Engineer	With Annual Report
Groundwater and Leachate Sampling (no specific form)	As required by consent conditions	Compliance and Regulatory Officer	Quarterly
Surface water sampling (no specific form)	As required by consent conditions	Compliance and Regulatory Officer	Monthly (Hōkio Stream for 2 years)
Topographic survey of Closed Landfill Area A2	Annually, close to end of June each year	Council's surveyor	With Annual Report
Landfill Inspection for Leachate Breakout, Settlement and Other Adverse Effects (see form in Appendix S)	Monthly	Council Landfill Engineer	On request, and with Annual Report
Landfill Gas Sampling of Monitoring Bores (no specific form)	Quarterly	Compliance and Regulatory Officer	With Annual Report

[9] Note: Frequency recorded is as per current resource consent conditions, which may be changed when the resource consents are reviewed.

Information to be Recorded and Format	Frequency Recorded[9]	Assigned Responsibility	Frequency Submitted to the Regional Council
Landfill Gas Surface Emission Monitoring of Permanently Capped Area A3 (no specific form)	Monthly	Landfill Gas Contractor	With Annual Report
Details of Action Plan if LFG Levels exceed requirements following re-test after remediation (no specific form)	If LFG retest shows levels exceed requirements	Landfill Gas Contractor	Within 48 hours of the retest
Meteorological data in suitable data file format to allow HRC to upload it on its data management system	Continuous 1-minute data collected and averaged to 10-minute and 1-hour time periods.	Council	On request and monthly
Landfill Complaints Record (see form in Appendix S)	Within 24 hours of complaint regarding odour or dust being received, or at a time mutually agreeable with the complainant	Council Landfill Engineer	Within 5 days of a request by HRC and with Annual Report
Landfill gas monitoring results (no specific form)	When landfill gas monitoring is undertaken	Environmental Reporting Consultant	Quarterly
Ambient Odour Downwind Beyond the Site Boundary between Landfill and Residential houses (no specific form)	Monthly	Council	On request, and with Annual Report
Walkover Inspection of all landfill surfaces, including areas around the pond (see form in Appendix S)	Weekly	Council Landfill Engineer	On request, and with Annual Report
Groundwater quality in bores upgradient and downgradient of the stormwater soakage areas (no specific form)	As required by consent conditions	Environmental Reporting Consultant	Quarterly
Dates and durations of all landfill gas flare outages in excess of 48 hours and any occasions for which landfill gas is discharged un-combusted (no specific form)	Whenever an event takes place	Council	Annually in month of June
Sampling of Landfill gas extraction wellheads for a variety of parameters (no specific form)	Monthly	Landfill Gas Contractor	Within one month of monitoring being undertaken
Complaints regarding dust, odour and other contaminants (no specific form)	As occurs	Council Landfill Engineer	On request, and annually in the month of June
Incident Register (see form in Appendix S)	Same day as incident occurs and in compliance with all relevant statutes, regulations and the operations contract	Council Landfill Engineer	Within 14 days of incident. Immediately if injury involved.

13 DEALING WITH COMPLAINTS

13.1 Why It Matters

It is important that complaints about the Levin Landfill be dealt with in an appropriate and timely manner.

Firstly, it helps identify and rectify issues that may be affecting the local community, ensuring that problems are addressed promptly and effectively. This proactive approach demonstrates a commitment to caring for the local community.

Secondly, handling complaints professionally can turn a negative experience into a positive one, fostering trust and long-term relationships with the local community. It also provides valuable feedback that can help drive continuous improvement and innovation within Council.

Ultimately, addressing complaints is essential for the Council to maintain a positive reputation and achieve a sustainable, long-term outcome for Levin Landfill.

The Council has acknowledged that complaints about the landfill have not always been dealt with appropriately in the past and it is committed to a more constructive approach which avoids bureaucratic responses to complaints.

The Council adopted a Customer Service Charter (CSC) in 2023 (refer to Appendix T), signaling a more constructive approach to communicating among staff, customers and other stakeholders.

As stated in the CSC, the primary customer service objective is: *"…to answer customer questions quickly and effectively, resolve issues with empathy and care, document pain points to share with internal teams, nurture relationships, and improve credibility by delivering excellent customer outcomes…*".

As the landfill activity focusses on its closure and remediation, the Council is seeking to acknowledge the needs of the local community and will elevate the importance of addressing complaints, and not just log them.

Sections 13.2 to 13.4 below set out how the Council manages complaints through a customer relationship management application, and they also show how the processing of complaints will be done to meet the resource consent conditions.

One way in which the Council's proactive approach to complaints will be demonstrated is by ensuring that every engagement meeting (e.g., with the CNLG, PMG and any successor group) will include a mandatory report on the status of complaints that may have occurred since the previous engagement meeting.

13.2 Customer Relationship Management (CRM) Application

Council is using a CRM application supplied by CIVICA to action formal complaints.

Council will respond to public enquiries originating from emails, phone calls and after-hours service.

The CRM system is designed to comply with Department if Internal Affairs (DIA) mandatory requirements for reporting complaints relating to water, wastewater and stormwater.

Whilst landfill odour is not a DIA-mandatory reporting requirement, it is dealt with using the same CRM system. The system contains drop-down menus to select the appropriate people to respond to a particular enquiry, and there are checks within the system to enable timelines to be set for replying to an enquiry.

If the timelines for replying are not met then there is an escalation mechanism to allow the enquiry to be moved to a tier manager and if that fails, then further escalations settings are enabled to move the enquiry further up the chain of command.

13.3 Complaints Record

Resource consent conditions require the Council to maintain a record of complaints, including:

- name, contact details, including email address, phone number and address of complainant,
- nature of complaint,
- date and time of complaint and alleged event,
- weather conditions at the time of the event,
- the activities that were occurring on the site at the time, and
- any action taken in response to the complaint.

In response to a complaint and upon request by the Regional Council, the Council shall keep a record of the following information in its complaints record:

- the cause or likely cause of the event and any factors that influenced its severity,
- any action taken in response to the complaint, including the nature and timing of any measures implemented by the Council to avoid, remedy or mitigate any adverse effects, and
- the steps to be taken in the future to prevent re-occurrences of similar events should this be necessary.

13.4 Air Quality Complaints

Specific resource consent conditions deal with air quality complaints. In terms of these, the Council shall nominate an odour certified person to manage any air quality complaint received, and shall provide the Regional Council with the following information:

- the liaison person's name and contact details,
- a landline telephone number,
- a cell phone number, and
- email address.

The certified person shall be available to respond to any complaint received from a member of the public regarding odour or dust originating from the landfill site and investigate it as soon as practicable and within 24 hours of the complaint being received, or at a time mutually agreeable with the party making the complaint.

The Council shall notify the Horizons Pollution Hotline (0508 800 800) and the Mid-Central District Health Board's Medical Officer of Health[10] as soon as practicable after becoming aware of any offensive or objectionable odour emanating beyond the boundaries of the landfill site. The following information shall be provided to the Regional Council Consents Monitoring Officer:

- an explanation as to the cause of the incident,
- details of any remedial and follow-up actions taken,
- the wind speed and wind direction measured at the landfill at the time of the incident, as measured at the site weather station required by condition 4(p) of discharge permit ATH-2002003984.02 (formerly DP 6011), and
- details of the activities that were occurring on site at the time.

13.5 Reporting to HRC

Council shall undertake to call the Horizons Pollution Hotline or Consents Monitoring Team as soon as it receives a complaint.

13.6 Annual Reporting

Complaints regarding dust, odour and other contaminants are to be reported as they occur and are to be included in the annual June report submitted for the landfill gas flare.

[10] As currently required by resource consent condition 8C of ATH-2002003984.02 (Discharge Permit 6011).

14 EMERGENCY RESPONSE

14.1 Emergency Response Procedures

These emergency response procedures provide instructions on whom to contact and what to do in case of an emergency that may occur at the Levin LF during normal day time work hours or after hours. The procedures summarise typically what activity triggers the emergency, provides contact names, and numbers, and identifies who else needs to be informed. Contingency plans for each of the possible emergency situations are provided where necessary in this section.

Types of emergencies covered include fire, landfill gas, leachate and stormwater systems failures, failure of roading or landfill access, and an earthquake situation.

It is assumed that all the Council Landfill Engineer will respond to the emergency situations, and will have access to appropriate equipment, will be appropriately trained in first aid, and will comply with Health and Safety Regulations.

Steps to be taken in the event of a serious incident/dangerous occurrence.

- Ensure that the safety of other personnel is not endangered.
- Make sure anyone injured or suspected of injury has received medical attention if necessary.
- Any incident including near misses whilst on-site is to be reported immediately to Council's Site Representative.
- Any incident including near misses are to be reported (Incident Register Form is included in Appendix S), recorded and investigated.
- Do not interfere with the accident scene without the permission of the relevant Occupational Health and Safety Authority, except to make the site safe.

14.2 Quick Reference Guide for Key Emergency Contacts

A quick reference guide and contact information for key emergency contacts is available in Appendix U.

Contacts for each organisation are listed in the order in which they should be contacted.

Table 10 below provides a summary of who needs to be contacted depending on the type of emergency.

Table 10: Emergency Contact Matrix

Incident	HDC – Solid Waste Manager	HRC Compliance	Council Landfill Engineer	Landfill Gas Contractor	Fire and Emergency NZ	Pump Maintenance Contractor	Hazwaste
Fire							
Landfill Gas Issues							
Leachate System Failure							
Stormwater System Failure							
Access Failure							
Earthquake							
Contact Priority							
Immediate contact							
Immediate contact, if required							
Contact within 24 hours							
Notify							

14.3 Fire

14.3.1 Fire Contact Details

Activity: Any fire at the site must be treated as an emergency.

Contact the following in order of priority (see Appendix U for contact numbers):

- Fire and Emergency NZ (FENZ)
- Horowhenua District Council (24 hours)
- Council Landfill Engineer
- Landfill Gas Contractor
- HRC Compliance
- Hazwaste Contractor (if needed)

14.3.2 Contingency Plan for Control of Landfill Fires

14.3.2.1 Introduction

Landfill fires contain potentially extra hazards for fire fighters. Urban Fire Brigades will have breathing apparatus and the correct protective clothing and are equipped and trained to deal with hazardous chemical type fires.

14.3.2.2 Overview

In summary, fire control activities should be carried out by Fire and Emergency NZ's brigades called out by dialling 111. Location is 665 Hōkio Beach Rd, Levin.

14.3.2.3 Control of Surface Fires

The assistance and advice of the Fire and Emergency NZ should be sought when fighting landfill fires. A fire extinguisher will always be carried on machines.

In most cases, the best way to control and extinguish a surface fire is to smother it with large volumes of wet or damp soil or other cover material. Work progressively inwards from the edges of the fire to slowly cover and compact the area. Then allow it to cool before moving the material to its final location.

Such an operation can take time, especially if the fire is a large one. It is suggested that the fire controlling authority initially wet the area and extinguish any flames. Once the area is wetted and cooled, it should be covered as quickly as possible.

Alternatively, a fire may be fought by conventional methods and where a fire is not completely extinguished, refuse will be excavated to the base of the fire so that water may be applied more effectively.

Vehicles and machinery on site for firefighting (or refuse) purposes should never be taken over areas of concern until the areas have been completely checked by the Council Landfill Engineer for risk of surface collapse and engulfment.

14.3.2.4 Control of Deep-Seated fires

Extinguishing deep-seated fires is usually beyond the capability of most common landfill plant, and to attempt to dig them out with inappropriate plant may make the situation worse by admitting air and exposing previously buried or encased hazardous substances.

In the event of a deep-seated fire, the area should be marked out and then surcharged with large volumes of sand. This minimises the number of outlets for gases to escape and reduces the influx of air to the area, thus containing the problem as far as is possible. For active landfills the area must be checked daily by the landfill operator for heat, smoke, cracking, subsidence and carbon monoxide in the landfill gas vents. Fire-fighting measures must be put into action before there is any significant fire breakthrough.

If there is a deep-seated fire, then the leachate riser pipe should be temporarily capped as this will serve as a chimney for combustion products to escape or for air to be drawn in. Plugging all outlets will reduce combustion and assist in extinguishing the fire. The flare will be required to be turned off and isolating inlet valves closed.

It is necessary to isolate the area to stop a deep-seated fire spreading further. It may be necessary to excavate deep trenches beyond the burning area and backfill them with soil, preferably clay, to create a barrier around the fire.

It may be possible for the Fire and Emergency NZ to extinguish a deep-seated fire by pumping an inert gas (for example, nitrogen) into the landfill. Specialist engineering and fire advice must be sought if such an option is considered.

14.4 Landfill Gas

14.4.1 Landfill Gas Contacts

Activity: (a) Fire – treat as per FIRE contingency; (b) Excessive odour or smell.

For (a), contact as for FIRE, for (b) contact the following in order of priority (see Appendix U for contact numbers):

- Horowhenua District Council (24 hours)
- Landfill Gas Contractor
- Council Landfill Engineer
- HRC Compliance

14.4.2 Contingency Plan for Landfill Gas Problems

14.4.2.1 Landfill Gas Problem from Fire

With all areas of landfill being capped, the most likely cause of fire in the landfill will be spontaneous combustion on account of entry of air into the landfill.

This is also more likely in Area A3 where wastes have been placed more recently (i.e., are actively degrading) and the landfill gas network induces a negative pressure on the landfill, which could draw air into the landfill if the landfill cap is breached.

Treat the situation as described in section 14.3.2 regarding Fire Emergency Procedures.

14.4.2.2 Landfill Gas Problem from Odour

If an abnormal amount of gas/odour is identified (by smell) then the Landfill Gas Contractor needs to be contacted. The Landfill Gas Contractor should confirm the presence of landfill gases with a personal alarm gas detection unit and:

- Locate the source of the abnormal gas/odour and then apply an extra layer of cover if safe to do so.
- Report the incident and action taken.

If the abnormal smell/odour persists then the site should be checked out with a gas analysing-meter. As a result of landfill gas being heavier than air, caution should be taken when entering low lying areas in calm conditions. Contact HDC on 06 366 0999. If required, a contractor with the appropriate equipment will be instructed to investigate the situation.

Note: there are strict requirements (OSH) which must be followed prior to any consideration being given to entering a manhole or confined space.

14.5 Leachate

14.5.1 Leachate System Failure

Activity: If the pump system fails or there is a break or blockage in the piped system or there is a possibility of the leachate collection and receiving manholes overflowing, then the Council Landfill Engineer shall contact HDC and the Pump Maintenance Contractor (Local Waters) immediately. If leachate break occurs on the landfill face, then the Council Landfill Engineer shall contact HDC. In both cases, HRC shall be notified of the occurrence.

Contact the following in order of priority (see Appendix U for contact numbers):

- Horowhenua District Council (24 hours)
- Council Landfill Engineer
- Pump Maintenance Contractor- Local Waters team
- HRC Compliance

14.5.2 Contingency Plan for Leachate System Failure

14.5.2.1 Introduction

Even though the landfill areas are capped, leachate will continue to be generated as organic matter in the waste breaks down, and the waste mass compresses. In closed landfill Area 3 the leachate is collected through a gravel drainage layer and perforated collection pipes transfer the leachate by gravity to a collection manhole. The leachate is then pumped to a manhole adjacent to the pond via a rising main. From here, the leachate is pumped to the Levin WWTP via a rising main that runs along Hōkio Beach Road. No leachate collection occurs in closed landfill Areas 1 and 2.

14.5.2.2 Possible Modes of Failure

- Leachate collection pipe becomes blocked preventing leachate flow out of one stage of the landfill. With time this would cause leachate levels to rise within the landfill until it reached a point where it flows out over the surrounding toe bunds.
- Submersible pump in the leachate collection manhole fails to operate.
- Leachate rising main becomes blocked.
- Pump at the pond fails to activate and there is a danger that the manhole next to the pond will overflow.

14.5.2.3 Action to be Taken

14.5.2.3.1 Leachate Collector Lines Become Blocked

Excavate a sump within the landfill, behind the permanent bund, and place a pump in the sump to drain leachate directly to the leachate manhole.

Engage a contractor to put a CCTV camera up leachate line to determine the reason for the blockage, then engage a contractor to jet-flush the leachate collection line.

14.5.2.3.2 Submersible Pump Fails or On-site Leachate Rising Main Becomes Blocked

Contact HDC's Pump Maintenance Contractor (Local Waters) who are responsible for maintenance of leachate infrastructure assets on the landfill. Note that specialist breathing apparatus is needed for accessing the leachate collection manhole.

Install temporary submersible pump, if needed, or use a tanker truck to lower the level of leachate within the manhole.

14.5.2.3.3 Pond Manhole Pump fails to Activate

The Council Landfill Engineer shall contact HDC who will arrange for the Pump Maintenance Contractor (Local Waters servicemen) to make the necessary repairs to the pump.

Presently, leachate is pumped directly into the manhole, bypassing the pond. If needed, the pond can be used for storage of leachate.

If pond levels become critical the leachate submersible pump at the landfill collection chamber can be switched off for a period, provided the level of leachate within the chamber is monitored and not allowed to reach critical levels.

Leachate can be conveyed directly by tanker to the Levin WWTP as a contingency measure to dispose of leachate.

14.6 Stormwater

14.6.1 Stormwater System Failure

Activity: Failure of the landfill capping could result in leachate contaminating stormwater runoff, which could contaminate the stormwater soakage system. If this occurs, then treat it as an emergency. If not, then treat as routine landfill maintenance.

Contact the following in order of priority (see Appendix U for contact numbers):

- Horowhenua District Council (24 hours)
- Council Landfill Engineer
- HRC Compliance

14.6.2 Contingency Plan for Stormwater System Failure

14.6.2.1 Introduction

The stormwater system is designed to deal with rainfall that falls onto the capped landfill areas, and other parts of site.

On the side slopes and front faces, swale drains direct clean stormwater flow into inter-dune depressions located adjacent to the close landfill areas.

14.6.2.2 Possible Modes of Failure and Action Required

A failure of the capping layer could allow leachate from the closed landfill areas to escape and enter the stormwater system. This would result in some leachate entering and contaminating the stormwater soakage areas.

The following actions are to be taken:

- Repair the area of capping that has been damaged. This may involve excavating into the waste pile to drain a leachate breakout back into the waste pile before reinstating the capping layer by sealing the surface of the landfill with clayey material. Any excavated waste material needs to be transported to the refuse transfer station, as agreed between the Council Landfill Engineer and the Council.
- Test the water in the soakage area and if significant contamination has occurred, pump the contents of the stormwater soakage area into a tanker truck for discharge into the pond, from where it will be pumped to the Levin WWTP.

14.6.2.3 Responsibilities

- In the first instance, the Council Landfill Engineer should inspect the problem and if he can deal with it – repair it or make it safe.
- Should the problem be beyond the capability of the landfill contractor, or if the Council Landfill Engineer is not available then Council's Environmental Engineer should be contacted who arrange for the site to be made safe.

14.7 Roading Access

14.7.1 Failing of Roading or Access to Landfill

Activity: If for any reason vehicle access to the landfill will not be available for longer than 48 hours, then the consequences could be:

The Council Landfill Engineer will not be able to carry out their daily activities required for the BPO 3 project and other inspections of the closed landfill areas.

- Should one of the other emergency situations occur, then alternative means of accessing the landfill site would need consideration.

Contact the following in order of priority (see Appendix U for contact numbers):

- Horowhenua District Council (24 hours)
- Council Landfill Engineer
- HRC Compliance
- Landfill Gas Contractor
- Pump Maintenance Contractor

14.7.2 Contingency Plan for Failure of Roading/Landfill Access

14.7.2.1 Introduction

The landfill has an all-weather road access to ensure that vehicles can enter and leave the landfill safely.

The situation that will lead to an emergency is when there is an unplanned failure that will take more than 48 hours to restore and this limits the ability of the Council and its contractors to access the landfill to respond to a fire, or other emergency.

14.7.2.2 Probable Mode of Failure and Action Required

The most likely cause of failure will be wide-spread flooding because of very extreme and sustained rainfall. This could create roading problems usually over a wide area and therefore put an abnormal demand on the Council and their contractors.

The following actions are to be taken:

- Determine whether the access has been blocked by a failure on the landfill site or on a Council public road.
- If possible (by 4-wheel drive or on foot), inspect the landfill for other damage such as erosion to the landfill and check the stormwater, leachate system and ponds for stability, flooding etc. and determine if any of the other emergency situations have occurred and respond according to those emergency procedures.

14.7.2.3 Responsibilities

In the first instance, the Council Landfill Engineer should be contacted (who will have access to some heavy construction equipment) to assess the situation.
If the situation is beyond the capability of the Council Landfill Engineer, or, if the Council Landfill Engineer is not available then the Council's Environmental Engineer should be contacted who will arrange for the Council Roading Network Maintenance Contractor to assist with the assessment and reinstatement of the access.

Note: The recording of the damage/access block by photographs and field notes are important for the Council to identify possible emergency claims and verify invoices post the emergency.

14.8 Earthquake

14.8.1.1 Activity

Following any notified earthquake in the Horowhenua District Council, the landfill shall be inspected for damage by the Council's Landfill Engineer.

The landfill geometry has been designed to withstand the design earthquake situation.

It is possible however, that one of the other facilities at the landfill mentioned within this document (e.g., leachate or stormwater system) may have been damaged.

14.8.1.2 Responsibility

Contact the following in order of priority (see Appendix U for contact numbers):

- Horowhenua District Council (24 hours)
- Council Landfill Engineer
- HRC Compliance
- Landfill Gas Contractor
- Pump Maintenance Contractor

The Council Landfill Engineer shall within 12 hours of being notified of an earthquake, carry out an inspection of the key services at the landfill and if any damage is found, then determine whether the response required is an emergency as per this document.

Note: If a Civil Defence Emergency situation arises, the Council Landfill Engineer shall report their findings to the Civil Defence team.

Appendices

Appendix A LANDFILL DRAWINGS

A.1 Closed Landfill Areas Definition Drawings

Figure A- 1: Definition of relevant landfill areas from Fig. 2 of the Levin landfill resource consent application documents, 1995. Note, extents of areas are approximate (source: Google Earth).

Figure A- 2: Definition of existing and new landfill areas from Fig. 1 of the Levin Landfill resource consent decision, 2002. Note, extents of areas are approximate (source: Google Earth).

Figure A- 3: Combining the areas shown on Figures A-1 and A-2. Note, extents of areas are approximate (source: Google Earth).

Figure A- 4: Delineating areas of old, unlined landfill (Areas A1 and A2), and area of new, lined landfill (Area A3). Note, extents of areas are approximate (source: Google Earth).

Figure A- 5: Definition of areas used within this CLMP (source: Google Earth).

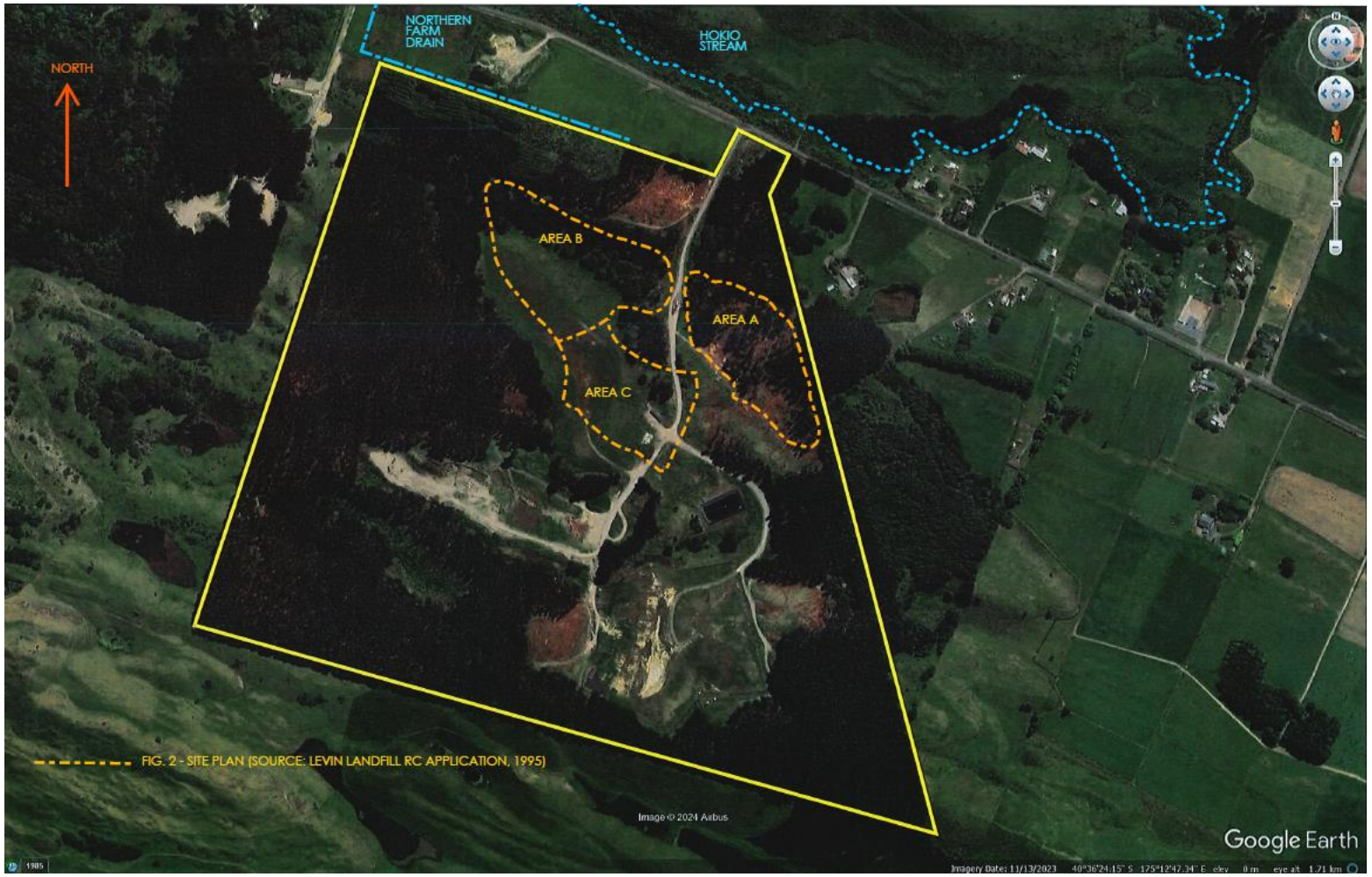


Figure A- 1: Definition of relevant landfill areas from Fig. 2 of the Levin landfill resource consent application documents, 1995. Note, extents of areas are approximate (source: Google Earth).

Area A is the old (original) landfill, Area B is the existing landfill (as at 1995), and Area C was the composting area (as at 1995).

Figure A- 2: Definition of existing and new landfill areas from Fig. 1 of the Levin Landfill resource consent decision, 2002. Note, extents of areas are approximate (source: Google Earth).

Area A is the existing unlined landfill (as at 2002), including a small area to the east of the access road, and Area B is the area proposed for the development of the new lined landfill.

Figure A- 3: Combining the areas shown on Figures A-1 and A-2. Note, extents of areas are approximate (source: Google Earth).

Figure A- 4: Delineating areas of old, unlined landfill (Areas A1 and A2), and area of new, lined landfill (Area A3). Note, extents of areas are approximate (source: Google Earth).

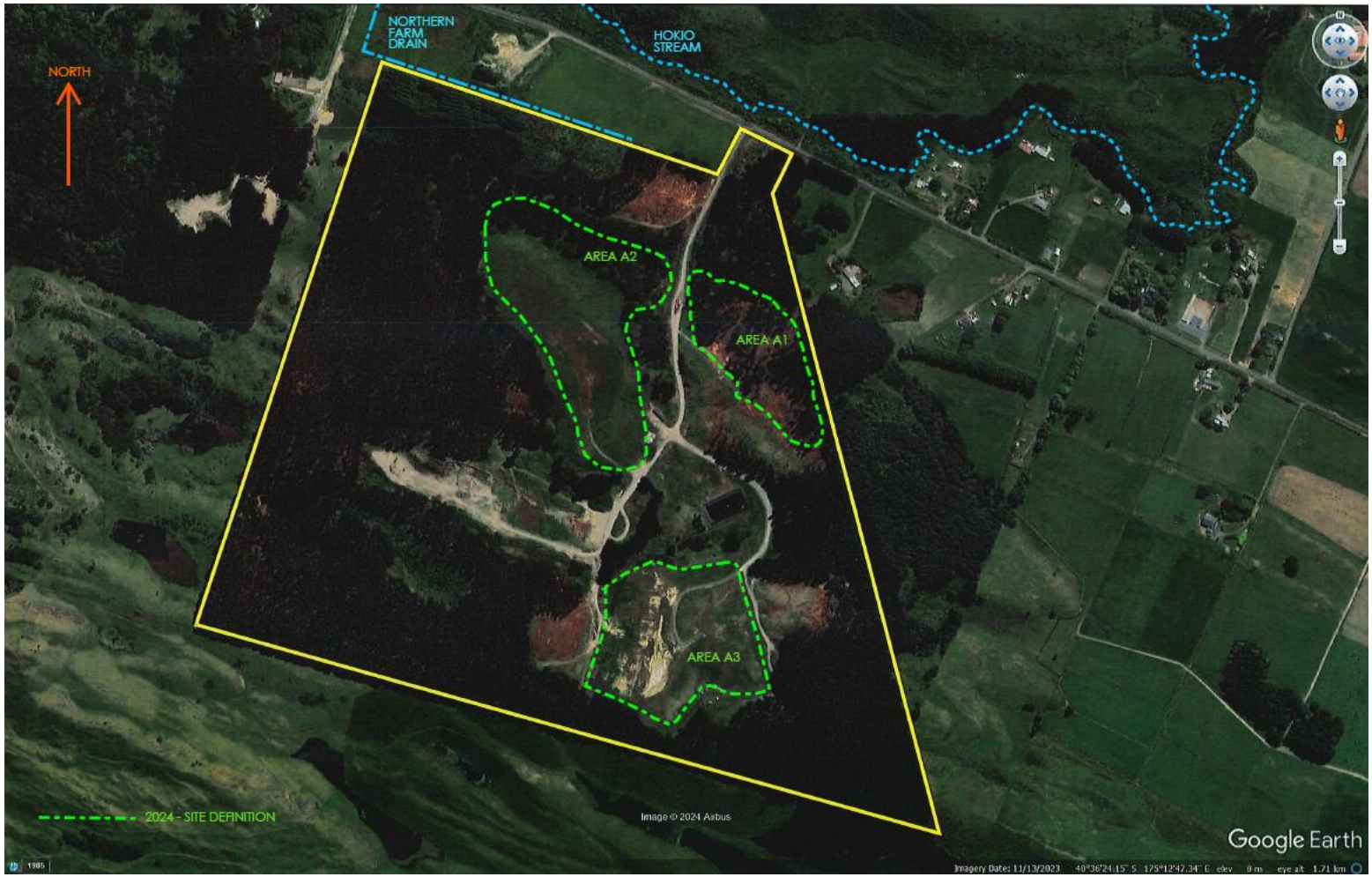


Figure A- 5: Definition of closed landfill areas used within this CLMP (source: Google Earth).

Area A1 is the original unlined landfill (1950s – 1990s); Area A2 is the successor unlined landfill (1970s to 2004), Area A3 is the new, lined landfill (May 2004 – October 2021).

A.2 General Site Plan

310101088-19-001-G001/F: Levin Landfill – Monitoring Bores, Soil Sampling locations & Borrow Areas – Site Plan, Locations and Details

A.3 Leachate Collection Network Drawings

Figure A- 6: Leachate collection network (diagrammatic).

Figure A- 7: Photographs of the leachate collection infrastructure.

Figure A- 8: Diagrammatic sketch of the pipe connections to the leachate collection manhole.

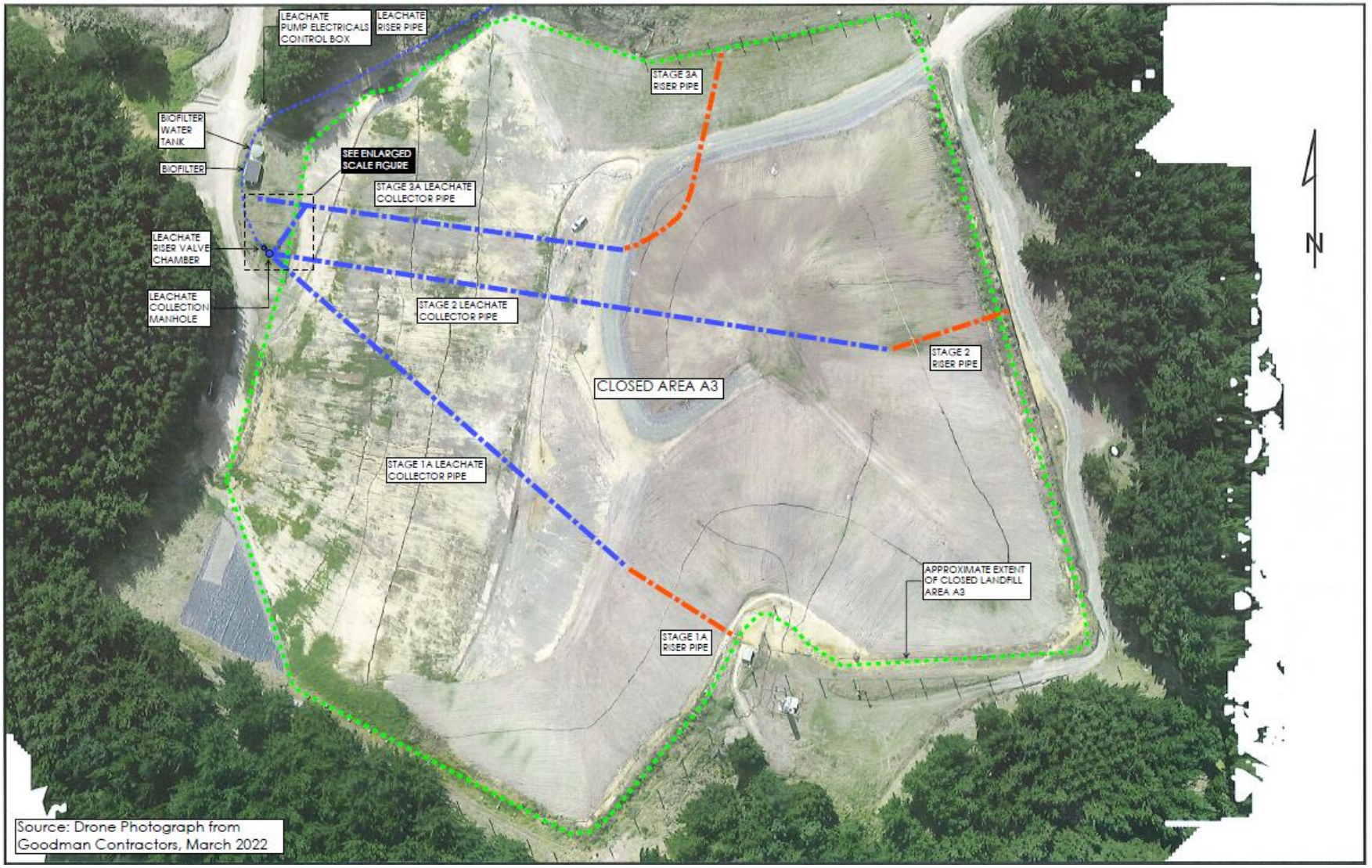


Figure A- 6: Leachate collection network (diagrammatic)


Leachate collection manhole


Leachate collection manhole and valve chamber


Riser pipe for Stage 1A next to shed


Riser pipe for Stage 2


Riser pipe for Stage 2 near U-bend in LFG pipe


U-bend in LFG pipe is at the 9th pole along


Upper end of riser pipe for Stage 3A


Lower end of riser pipe for Stage 3A

Figure A- 7: Photographs of the leachate collection infrastructure.

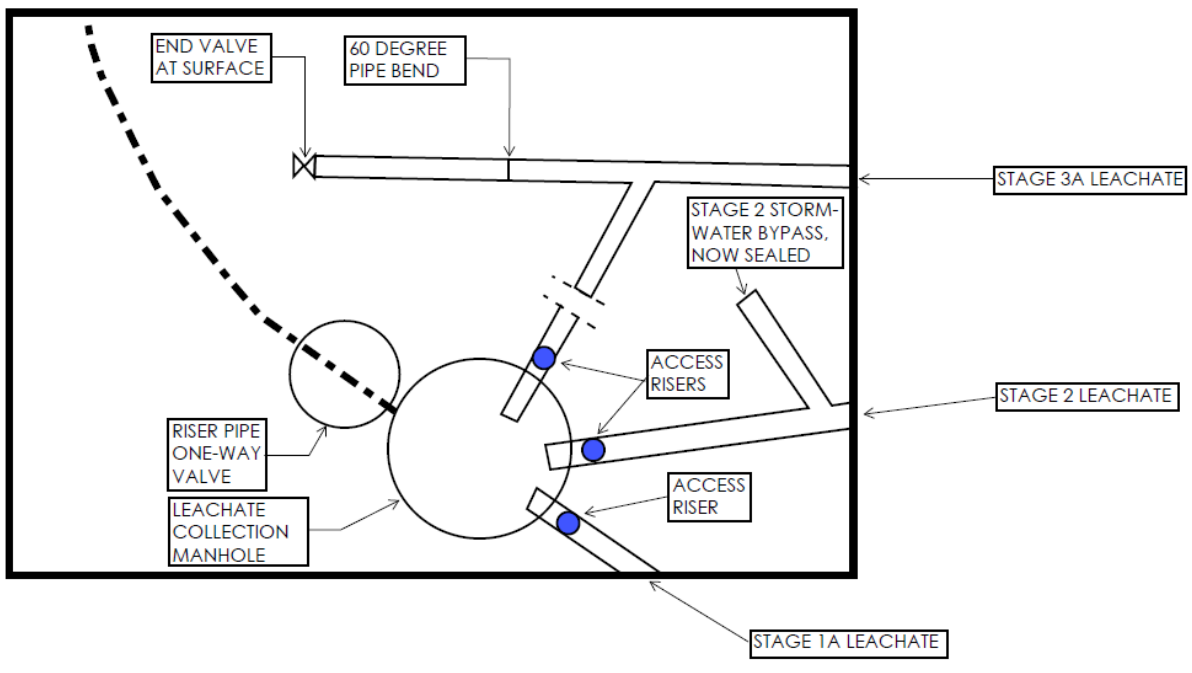


Figure A- 8: Diagrammatic sketch of the pipe connections to the leachate collection manhole

A.4 Leachate Pumping and Irrigation System Drawings

Z1518103/C003/1: Leachate Irrigation and Recirculation System Upgrade – Stage 1 Distribution Pipework Details

Z1518103/C100/AB: Leachate Transfer Pipeline - General Layout

Z1518103/C101/AB: Leachate Transfer Pipeline - Plan of Pipe Route Sheet 1

Z1518103/C102/AB: Leachate Transfer Pipeline - Plan of Pipe Route Sheet 2

Z1518103/C103/AB: Leachate Transfer Pipeline - Plan of Pipe Route Sheet 3

Z1518103/C110/AB: Leachate Transfer Pipeline – Typical Details and Valve Schematics

Z1518107/G004/1: Leachate System – Site Plan

Z1518109/C200/A: Stage 2 Leachate Reticulation – Leachate Line Layout

A.5 Closed Landfill Area A3 - Stage 1A Drawings

88471-06/5/1: Site Plan

88471-06/6/1: Proposed Site Works

88471-06/7/1: Access Road Horizontal and Vertical Layout

88471-06/8/1: Phase 1 of Stage 1 Landfill Cell

88471-06/9/1: Leachate Pond Plan and Setting Out Details

88471-06/10/1: Leachate Collection and Disposal System Typical Sections (1)

88471-06/11/1: Leachate Collection and Disposal System Typical Sections (2)

A.6 Closed Landfill Area A3 - Stage 2 Drawings

Z1129601/C004/1: Existing Site Plan

Z1129601/C005/1: Site Works

Z1129601/C006/1: Details of Proposed Development of Stage 2

Z1129601/C007/1: Details and Cross Sections – Sheet 1

A.7 Closed Landfill Area A3 - Stage 3A Drawings

80500663-01-001-C002/0: Existing Site Plan

80500663-01-001-C003/0: Landfill Earthworks Plan

80500663-01-001-C004/0: Leachate Pipe Layout

80500663-01-001-C005/0: Landfill Slope Bench Details

80500663-01-001-C006/0: Landfill Liner Construction Details

80500663-01-001-C007/0: Landfill Leachate Collection Pipe Details

A.8 Closed Landfill Area A3 - Stage 3B Drawings

80500663-01-001-C010/1: Extent of Stage 3B Lining

80500663-01-001-C011/1: Existing Landfill Slope Bench Details

80500663-01-001-C012/1: Stage 3B Side Slope Construction Details

A.9 Closed Landfill Area A3 - Stage 3C Drawings

80500663-01-001-C020/1: Extent of Stage 3C Lining

80500663-01-001-C021/1: Existing Landfill Slope Bench Details

80500663-01-001-C022/1: Stage 3C Side Slope Construction Details

A.10 Closed Landfill Area A3 - Landfill Gas Wells and Collection Network

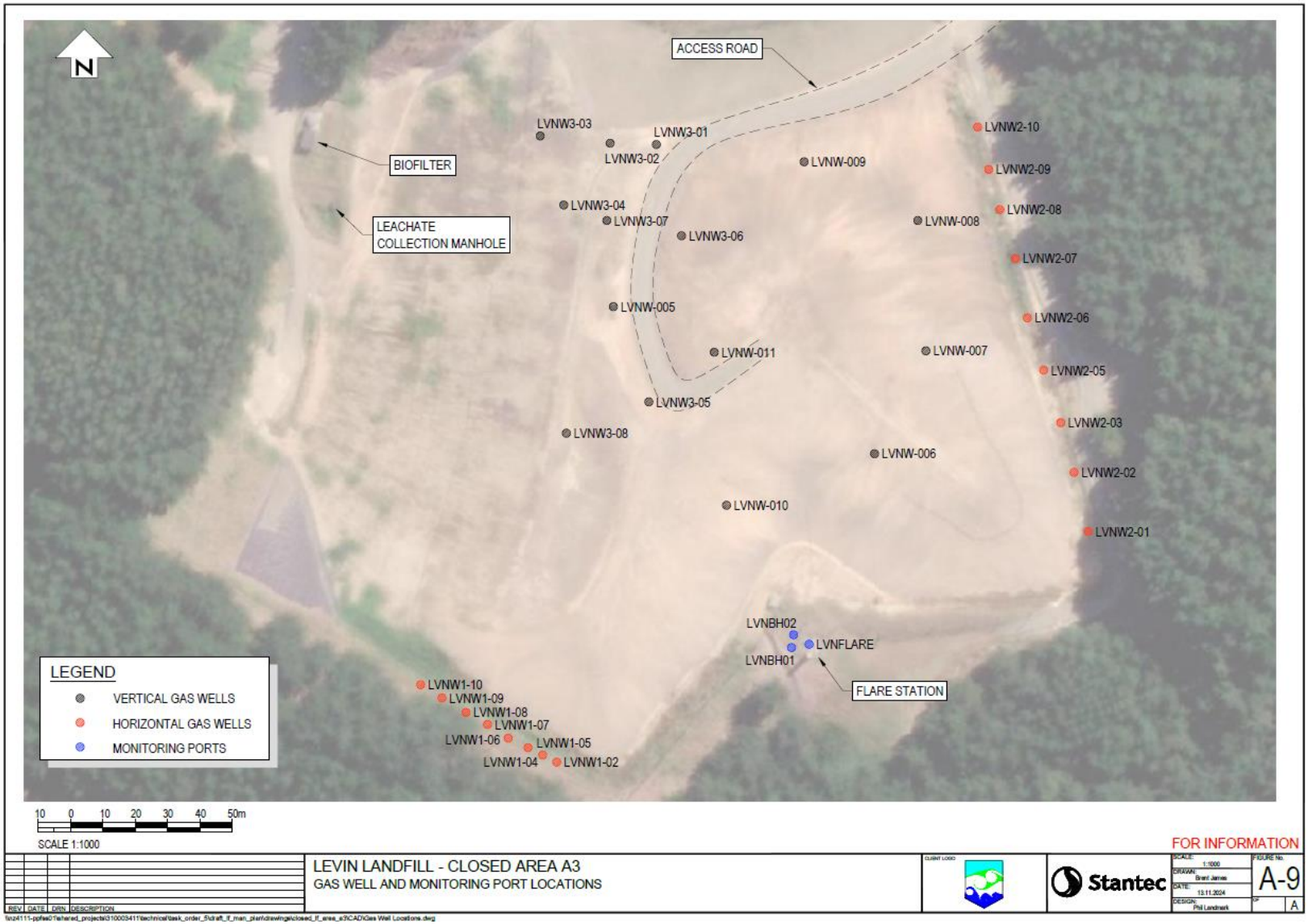


Figure A- 9: Gas Well and Monitoring Port Locations

A.11 Closed Landfill Area A2 - 2010 Capping Details

Z1518109/C150/1: Landfill – Area A – Existing Site Plan as Surveyed in July 2010

Z1518109/C151/1: Landfill – Area A – Stripped Area of Footprint Setout

Z1518109/C152/1: Landfill – Area A – Finished Contour Setout

Z1518109/C153/1: Landfill – Area A – Typical Sections & Finished Contour Point Setout Table

Z1518109/C160/1: Landfill – Area A Site Plan – Showing Depth of Excess or Required Cover on Landfill

Z1518109/C161/1: Landfill – Area A Site Plan – Depth of Cover in Excess of Required 0.7m Cover

A.12 Closed Landfill Area A2 - 2023 Capping Details

Figure A- 10: Concept Plan for Re-capping Area A2 - 2023

Figure A- 10: Concept Plan for Re-capping Area A2 – 2023

A.13 Closed Landfill Area A2 - Survey Benchmarks and Monitoring

Figure A-11: Drone Photograph of Closed Area A2 from January 2024 (not to scale).

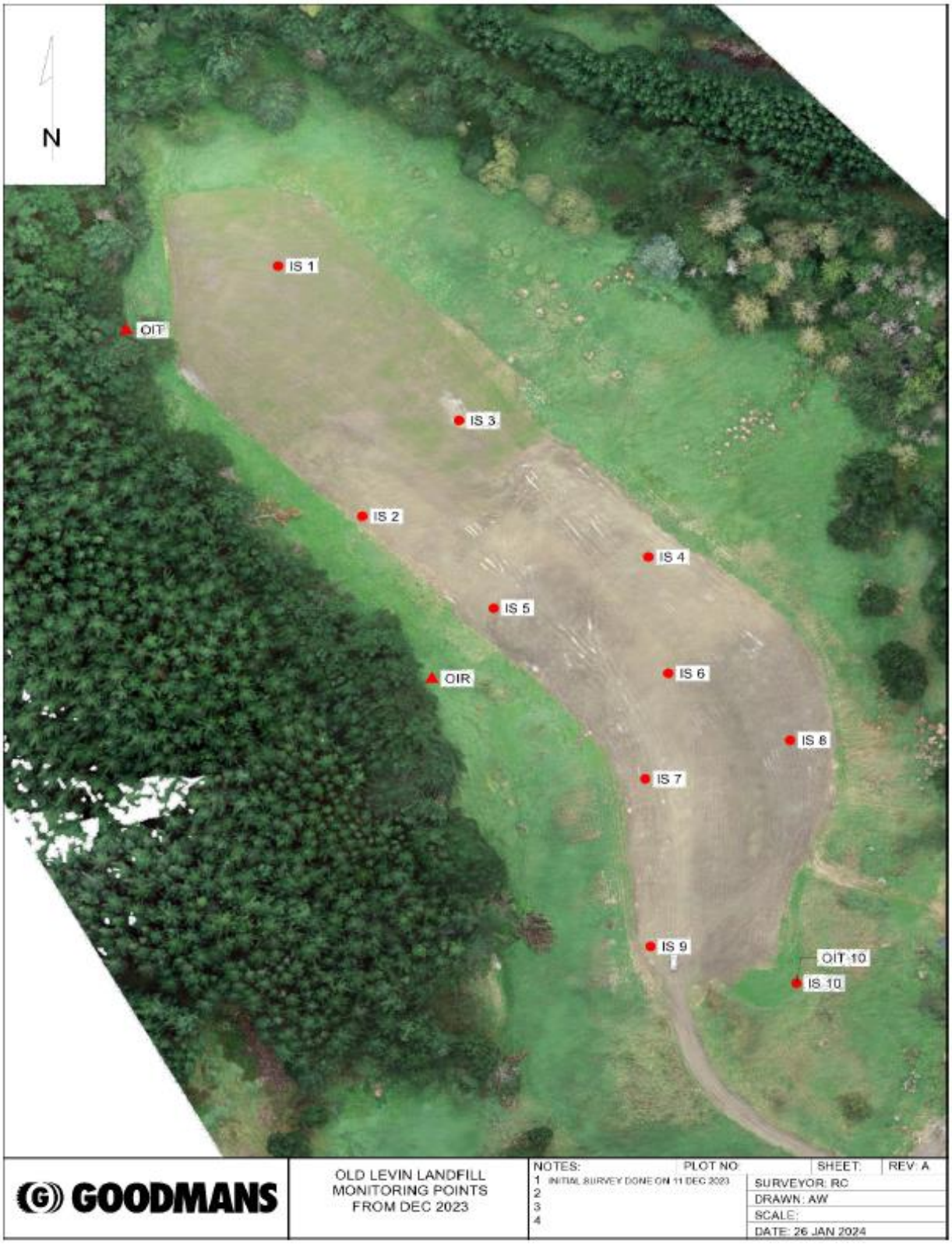


Figure A- 11: Drone Photograph of Closed Area A2 from January 2024 (not to scale)

Old Levin Landfill Monitoring Data since recapped in 2023

Survey on 11 December 2023 (Hor datum = Wang2000 Vert datum = local))

Survey Mark	Easting	Northing	Elevation	Description
IS1	376478.648	759713.597	99.857	Iron spike in conc 50mm below ground level
IS2	376503.377	759632.469	99.440	Iron spike in conc 50mm below ground level
IS3	376531.744	759663.530	101.273	Iron spike in conc 50mm below ground level
IS4	376587.312	759619.259	102.457	Iron spike in conc 50mm below ground level
IS5	376541.883	759602.603	100.525	Iron spike in conc 50mm below ground level
IS6	376593.185	759581.564	101.783	Iron spike in conc 50mm below ground level
IS7	376586.386	759547.354	101.163	Iron spike in conc 50mm below ground level
IS8	376628.900	759559.912	103.182	Iron spike in conc 50mm below ground level
IS9	376587.953	759493.063	100.917	Iron spike in conc 50mm below ground level
IS10	376630.758	759481.113	101.646	Iron spike in conc 50mm below ground level
OIT10	376630.649	759481.231	101.575	Iron tube 300mm below ground level from previous monitoring previous level = 101.619

Control Points				
OIR	376523.769	759579.650	100.000	Iron rod 200mm below ground level
OIT	376433.977	759692.587	105.026	Iron Tube 300mm above ground level

Figure A- 12: Monitoring Data of Closed Landfill Area A2 from December 2023.

Survey on 22 August 2024 (Hor datum = Wang2000 Vert datum = local))

Survey Mark	Easting	Northing	Elevation	Description
IS1	376478.652	759713.598	99.843	Iron spike in conc 50mm below ground level
IS2	376503.379	759632.480	99.432	Iron spike in conc 50mm below ground level
IS3	376531.749	759663.529	101.254	Iron spike in conc 50mm below ground level
IS4	376587.323	759619.267	102.442	Iron spike in conc 50mm below ground level
IS5	376541.897	759602.604	100.522	Iron spike in conc 50mm below ground level
IS6	376593.199	759581.571	101.780	Iron spike in conc 50mm below ground level
IS7	376586.386	759547.362	101.155	Iron spike in conc 50mm below ground level
IS8	376628.924	759559.916	103.170	Iron spike in conc 50mm below ground level
IS9	376587.977	759493.075	100.905	Iron spike in conc 50mm below ground level
IS10	376630.780	759481.123	101.641	Iron spike in conc 50mm below ground level
OIT10	376630.674	759481.234	101.569	Iron tube 300mm below ground level from previous monitoring previous level = 101.619

Survey Mark	E	N	Z
IS1	0.004	0.001	-0.013
IS2	0.002	0.011	-0.007
IS3	0.005	-0.001	-0.019
IS4	0.011	0.008	-0.015
IS5	0.015	0.001	-0.003
IS6	0.014	0.007	-0.003
IS7	0.000	0.008	-0.007
IS8	0.024	0.005	-0.011
IS9	0.024	0.012	-0.011
IS10	0.022	0.010	-0.004
OIT10	0.025	0.003	-0.006

Figure A- 13: Monitoring Data of Closed Landfill Area A2 from August 2024.

A.14 Closed Landfill Area A3 - Stage 2 Intermediate Capping Drawings

80500663-01-001-C025/1: Intermediate Cover Levels and Setout Details

80500663-01-001-C026/1: Intermediate Cover Depth Contour Plan

80500663-01-001-C027/1: Capping Layout Plan

80500663-01-001-C027/1: Stage 2 Capping Details

A.15 Closed Landfill Area A3 – Final Capped Contour Levels

Levin Landfill Capping – Finished Contours – Drone Flight on 30 March 2022 – Goodman Contractors

LiDAR information showing grades on Closed Landfill Area A3

A.16 Closed Landfill Areas A1, A2 and A3 – Applied Capping Treatment

Figure A-14: Plan showing the different capping treatments applied to the closed landfill areas, according to the requirements of the time

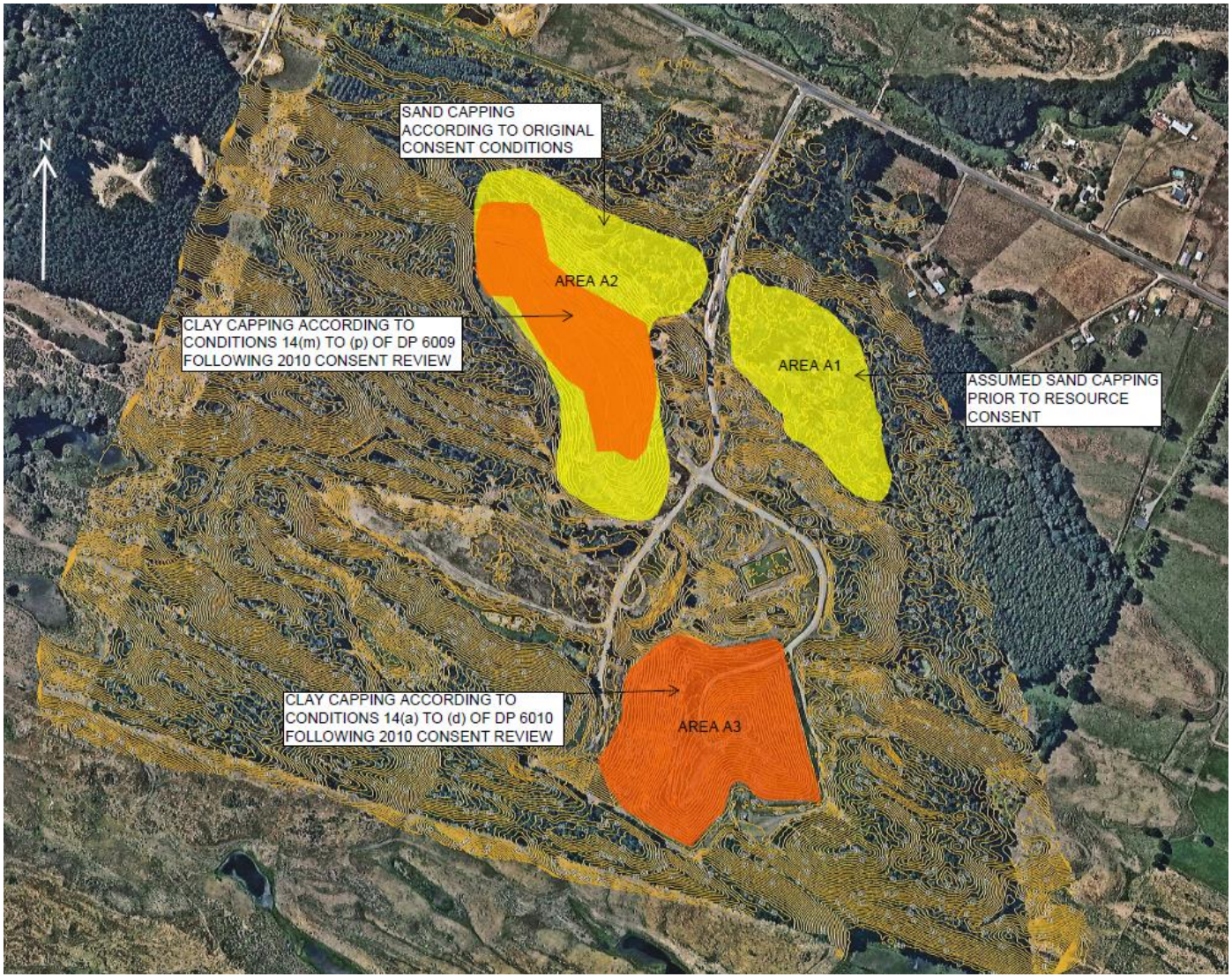


Figure A- 14: Plan showing the different capping treatments applied to the closed landfill areas, according to the requirements of the time.

A.17 Leachate Best Practicable Option Project Drawings

Appendix B RESOURCE CONSENTS

Levin Landfill Resource Consent Conditions (note: these are the latest available from Horizons Regional Council and reference the original discharge permit numbers). Table B.1 – Cross referencing of the Table of Contents of this CLMP with the resource consent conditions

Table B- 1: Table of Contents Cross-referenced with Resource Consent Conditions

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
DOCUMENT CONTROL			DP 6009 cond. 35 d. iv
SUMMARY OF DOCUMENT REVIEW			
ABBREVIATIONS			
GLOSSARY			
	Terms commonly used throughout this Closed Landfill Management Plan		
	Definitions		
1 INTRODUCTION & BACKGROUND			
	1.1 Purpose of this Closed Landfill Management Plan		
	1.2 Status of this Closed Landfill Management Plan		
	1.3 Closed Landfill Management Plan Review		DP 6009 cond. 14 k
	1.4 Definition of Remediation		
	1.5 Levin Landfill and Surrounding Features		
2 RESOURCE CONSENTS, DESIGNATION, LANDFILL AGREEMENT, CLOSURE DECISION, FUTURE ENGAGEMENT AND MĀTAURANGA MĀORI			
	2.1 Resource Consents		
	2.2 Future Resource Consents		
	2.3 Cross- Reference Resource Consent Conditions with Provisions in the CLMP		
	2.4 Designation		
	2.5 Landfill Agreement		
	2.6 Council Closure Decision		
	2.7 Future Engagement Approach		

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
	2.8 Incorporating Mātauranga Māori		
		2.8.1 Overview	
		2.8.2 Remediation of People	
3 BACKGROUND INFORMATION			
	3.1 Site Location and Ownership		
	3.2 Site History		
	3.3 Archaeological Protocol		DP 6009 cond. 30
4 SITE INFRASTRUCTURE DESCRIPTION			
	4.1 Overview		
	4.2 Landfill Liner		DP 6009 conds. 28 a – 28 d
	4.3 Stormwater		DP 6012 cond. 4 DP 102259 cond. 12 DP 102259 cond. 13
	4.4 Leachate Collection		
	4.5 Landfill Gas		DP 6011 cond. 4 (l) DP 106798 condition 5 DP 106798 condition 8 & 9 DP 106798 condition 10 - 14
	4.6 Biofilter		DP 6011 conds. 4 (i) – (k)
	4.7 Buildings and Weighbridge		
	4.8 Access Roads		
	4.9 Signs		
	4.10 Perimeter Fence		

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
	4.11 Forestry Screen		DP 6009 cond. 14 l
	4.12 Landfill Drawings		DP 102259 cond. 13 DP 6010 cond. 14 b
5 CLOSURE AND REINSTATEMENT			
	5.1 Summary of Landfill Development and Remediation		DP 6009 cond. 14 b DP 102259 cond. 13 DP 6010 cond. 14 b DP 6010 cond. 15(a) DP 6010 cond. 15(b)
	5.2 Old Landfill - Area A1		
	5.3 Old Landfill - Area A2		DP 6010 cond. 15(a) DP 6010 cond. 15(b)
	5.4 Lined Landfill - Area A3		DP 6010 cond. 14 b DP 6010 cond. 15(c)
6 SITE REMEDIATION LEACHATE BPO PROJECT			DP 6010 cond. 2A
	6.1 Leachate BPO Project Objective		
	6.2 Progress with the Leachate BPO Project		
		6.2.1 Progress by Late 2023/Early 2024	
		6.2.2 Progress by July 2024 – What Was Known	
		6.2.3 Progress by January 2025 – What Has been Discovered	
		6.2.4 Progress by August 2025 – What is Now Known and What Needs to Happen	
		6.2.5 What This AI Means for the Leachate BPO 3 Project	

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
7 LANDFILL AFTERCARE			
	7.1 Overview		
	7.2 Projected Aftercare Period		DP 6009 cond. 14 j
	7.3 Environmental Monitoring		DP 6010 cond. 15e DP 6009 cond. 14 a DP 6011 cond. 4 (e)
	7.4 Maintenance		DP 6009 cond. 14 b DP 6010 cond. 15 d DP 6010 cond. 15 e
	7.5 Future End Use		
		7.5.1 Landfill Property	
		7.5.2 Area A1	
		7.5.3 Area A2	
		7.5.4 Area A3	
8 SITE MAINTENANCE			
	8.1 Appointment of Landfill Engineer		
		8.1.1 Overview	
		8.1.2 Contract Management Structure	DP 6009 cond. 14 a
		8.1.3 Roles and Responsibilities	
		8.1.4 Council Landfill Engineer Contact Details	
		8.1.5 Access to Landfill Property	
	8.2 Responsibilities under the Health and Safety at Work Act 2015 (HSWA)		

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
		8.2.1 Primary Duty of Care	
		8.2.2 Managing Risk	
		8.2.3 Worker Engagement, Participation and Representation	
		8.2.4 Notification	
		8.2.5 First Aid	DP 6009 cond. 14 f
		8.2.6 Emergency Plans	
		8.2.7 Working with Other PCBUs	
	8.3 Staff Requirements		
	8.4 Training		
	8.5 Occupational Safety and Health		
	8.6 Other Contractors on Site		
	8.7 General Site Instructions		
	8.8 Relevant Hazard Identification		
9 SITE MAINTENANCE DETAILS			
	9.1 Maintenance of Buildings and Equipment		
	9.2 Site Roading		
	9.3 Signs		
	9.4 Perimeter Fencing		
	9.5 Control of Stormwater		DP 6012 cond. 5 DP 102259 cond. 6 DP 102259 cond. 8 DP 102259 cond. 11
	9.6 Control of Leachate		

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
	9.7 Landfill Gas Control		DP 6009 cond. 14 g DP 6011 cond. 4 (a) DP 6011 cond. 6 DP 6011 cond. 8D DP 6011 cond. 4 (l) DP 106798 condition 5 DP 106798 condition 8 & 9 DP 106798 condition 10 - 14
	9.8 Final Capping and Cover		DP 6010 cond. 15(c) DP 6010 cond. 14(c)
	9.9 Forestry Screen		DP 6009 cond. 14 l
	9.10 Leachate Best Practicable Option Project		
10 CONTROL OF NUISANCES			
	10.1 Odour		DP 6009 cond. 14 g DP 6011 cond. 3 DP 6011 cond. 4 (m) DP 6011 cond. 8D
	10.2 Litter		
	10.3 Dust		DP 6009 cond. 14 g DP 6011 cond. 2 DP 106798 condition 5
	10.4 Vermin/Cats		DP 6009 cond. 5
	10.5 Seagulls		DP 6009 cond. 5
	10.6 Noxious Plants		DP 6009 cond. 6
	10.7 Leachate Breakout		DP 102259 cond. 11

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
	10.8 Land Slips		
11 ENVIRONMENTAL MONITORING AND REPORTING			
	11.1 Consent Requirements		
	11.2 Consent Review		
	11.3 Annual Environmental Monitoring Report		
	11.4 Other Reporting Requirements and Deadlines		
	11.5 Environmental Monitoring Requirements and Procedures		
	11.6 MfE Guideline – Reduction in Environmental Monitoring Requirements		
12 SITE RECORDS			
	12.1 Resource Consent Requirements		DP 6010 cond. 15(f)
	12.2 Recording of Information		DP 6010 cond. 15(f) DP 6011 cond. 8F DP 102259 cond. 6 DP 102259 cond. 16 DP 102259 cond. 18
13 COMPLAINTS PROCEDURES			
	13.1 Why It Matters		
	13.2 Customer Relationship Management (CRM) Application		
	13.3 Complaints Record		DP 6011 cond. 7 DP 106798 condition 17
	13.4 Air Quality Complaints		DP 6011 cond. 8A
	13.5 Reporting to HRC		DP 6011 cond. 7

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
	13.6 Annual Reporting		
14 EMERGENCY RESPONSE			DP 6009 cond. 14 f
	14.1 Emergency Response Procedures		DP 6009 cond. 14 f
	14.2 Quick Reference Guide for Key Emergency Contacts		DP 6009 cond. 14 f
	14.3 Fire		DP 6009 cond. 14 f
		14.3.1 Fire Contact Details	
		14.3.2 Contingency Plan for Control of Fires	
	14.4 Landfill Gas		DP 6009 cond. 14 f DP 6011 cond. 6 DP 6011 cond. 4 (l) DP 106798 condition 5 DP 106798 condition 8 & 9
		14.4.1 Landfill Gas Contacts	
		14.4.2 Contingency Plan for Landfill Gas Problems	
	14.5 Leachate		DP 6009 cond. 14 f
		14.5.1 Leachate System Failure	
		14.5.2 Contingency Plan for Leachate System Failure	
	14.6 Stormwater		DP 6009 cond. 14 f DP 102259 cond. 6 DP 102259 cond. 8 DP 102259 cond. 11 DP 102259 cond. 12

Main Section	Sub-section	Sub-sub-section	Resource Consent Conditions
		14.6.1 Stormwater System Failure	
		14.6.2 Contingency Plan for Stormwater System Failure	
	14.7 Roading Access		
		14.7.1 Failing of Roading or Access to Landfill	DP 6009 cond. 14 f
		14.7.2 Contingency Plan for Failing of Roading or Access to Landfill	
	14.8 Earthquake		DP 6009 cond. 14 f

Appendix C LANDFILL AGREEMENT

Table C- 1: List of Conditions in the Landfill Agreement that relate to this CLMP

Condition Description	**Condition Number**
PMG Functions with respect to the CLMP	5.10 5.10 (e) 5.10 (j) 5.10 (k) 5.10(m)(v)
PMG to receive draft and final closure remediation plan and closure resource consent applications.	5.12 (d)
PMG to receive information on the management and operations of the Levin Landfill and options that may reduce effects.	5.12 (f)
TAG - Landfill Closure Experts	6.3 (a) 6.3 (a)(iii)
TAG - Water Quality Expert	6.3 (d)
TAG - Groundwater Expert	6.3 (e)
Scope and function of the TAG experts to be agreed by the PMG.	6.6
Scope of Works for TAG experts	8.11
Reduction in monitoring	8.13
TAG air quality expert to review OMP annually and check that best practice is being applied	10.1 10.1 (a) 10.1 (b)
Process for determining Levin LF closure date	11.1 11.1 (a) 11.1 (d) 11.1 (e) 11.1 (g) 11.1 (h) 11.1 (i) 11.2
Timing of, and scope of Closure and Remediation Plan	12 12.1
TAG water, air and groundwater quality experts to assist	12.2
TAG landfill experts to provide scope of works for PMG to approve	12.2 (a) to (c)
HDC to provide information	12.3
Process for finalising closure and remediation plan	12.4
Programme for draft closure and remediation plan, and resource consents	12.4 (a) to (g)
Fees for TAG experts	12.5
Process for when consents not granted, or conditions materially different	12.6 (a) and (b)

Appendix D COUNCIL RESOLUTION TO CLOSE THE LANDFILL

Council

OPEN MINUTES CONFIRMED

Minutes of a meeting of Council held in the Council Chambers, 126-148 Oxford St, Levin on Wednesday 31 May 2023 at 10.00am.

PRESENT

Mayor	His Worship The Mayor Bernie Wanden	
Deputy Mayor	Councillor David Allan	
Councillors	Councillor Mike Barker	
	Councillor Rogan Boyle	
	Councillor Ross Brannigan	
	Councillor Clint Grimstone	
	Councillor Nina Hori Te Pa	From 10.53am
	Councillor Sam Jennings	
	Councillor Paul Olsen	
	Councillor Jonathan Procter	
	Councillor Justin Tamihana	From 10.11am
	Councillor Piri-Hira Tukapua	
	Councillor Alan Young	

Reporting Officer	Monique Davidson	Chief Executive
	Daniel Haigh	Group Manager - Community Infrastructure
	Jacinta Straker	Group Manager - Organisation Performance
	Brent Harvey	Group Manager - Community Experience and Services
	David McCorkindale	Group Manager – Community Vision and Delivery
	Blair Spencer	Group Manager – Housing & Business Development
	Ashley Huria	Business Performance Manager
	Grayson Rowse	Principal Advisor – Democracy
Meeting Secretary	Jody Lygo	Democracy Support Officer
	Lisa Campbell	Strategic Communications Manager
	Carolyn Dick	Strategic Planning Manager
	Janna Isles	Strategic Planner
	Vai Miller	Compliance Manager
	Arthur Nelson	Parks & Property Manager

6.3 Deliberations Report 2 - Future of the Levin Landfill

To present to Council for deliberation, the submissions received on the Long Term Plan 2021-2041 Amendment in relation to the consultation issue: Future of the Levin Landfill.

Resolution Number CO/2023/103

MOVED by Mayor Wanden, seconded Cr Allan:

2.1 That Report 23/336 Deliberations Report 2 - Future of the Levin Landfill be received.

2.2 That this matter or decision is recognised as not significant in terms of S76 of the Local Government Act

2.3 That Council acknowledges, with thanks, all who have submitted on the Future of the Levin Landfill.

CARRIED

Resolution Number CO/2023/104

MOVED by Mayor Wanden, seconded Cr Young:

That Council adopt Option 2 Keep Levin Landfill closed with revenue generated from alternative site use determined through the WMMP development.

A division was called for, voting on which was as follows:

For:	**Against:**
Councillors: David Allan	
Mike Barker	
Rogan Boyle	
Ross Brannigan	
Clint Grimstone	
Nina Hori Te Pa	
Sam Jennings	
Paul Olsen	
Jonathan Procter	
Justin Tamihana	
Piri-Hira Tukapua	
Bernie Wanden	
Alan Young	

The division was declared CARRIED by 13 votes to 0.

CARRIED

Appendix E MĀTAURANGA MĀORI MATTERS

E.1 Muaūpoko Statement about Hokioi Stream

E.2 Guide for Hohou Rongo Tikanga and Process

Step 1: Create a safe space – Wāhi āhuru mōwai

Conduct hui in a Māori setting and preferably on the marae. The attitude and wairua (spirit) of participants changes when we are surrounded by Te Ao Māori - to be respectful and conciliatory. If this is not possible then create a wairua Māori (atmosphere/vibe) underpinned by values of Tika, Pono and Aroha and Manaakitanga: using the steps below.

a) **Tautoko / Supporters** - Include whānau or associates of the affected parties to come along to provide moral support or evidence if required.

b) **Karakia** - Always start with karakia. It calms the mood and settles the wairua (soul). People are transported into the spiritual world, to the domain of the atua tūpuna (ancestor god) Rongo and peace. When we karakia we know automatically to be respectful and quiet.

c) **Mihi / Whakawhanaungatanga** - All people present acknowledge who they are through greetings, name, pepehā and whakapapa. Those disconnected from their Māori world who cannot do this, support them to do as much as they can anyway. We do this because on the marae no business starts until the formal procedures of welcome, connection, whakapapa (genealogy) whanaungatanga (relationships), hongi and kai is completed. This process also tones down any agitation.

Step 2: Arrange seating accordingly – Tikanga-ā- noho

Arrange seating in a circle. Explain to the parties that a circle encourages a sense of community, inclusivity, '*we and not me.'* Our tūpuna were group focused and community-minded with everyone working for the benefit of everyone else because survival depended upon it. It also opens up the space for everyone to participate should they wish to.

a) **Rau Aroha -** A symbolic branch (preferably a native plant of the area that associates to Rongo) of peace is laid between the participants. Later this will be the exchange of the koha aroha (gift of peace) to symbolise the dispute being settled.

b) **Tikanga** - Set down the protocols for engagement particularly around how to address the gathering and the Kaupapa (subject/topic or theme) of the hui.

For Example – Hei tauira:

- All kōrero is confidential and remains in the whare or room.
- The domain of Rongo (Hohou) must be adhered to. Kōrero is calm and respectful
- When someone speaks, they have the rakau kōrero (figuratively). As with whaikōrero when someone has the rākau kōrero there are no interruptions.
- When speakers speak, they turn and address the facilitator of the group and not across the circle to the other party. This will help reduce tension.

If someone chooses to not follow this tikanga the following should happen:

- Hei whakatūpato - A warning to check their behaviour.

- Should the misbehaviour occur again the person will sit outside the circle with no further interaction or involvement in the decision-making.

- Should the person continue to interrupt they will depart the whare and wait outside with no further interaction/involvement.

Given that people are there to 'hohou i te rongo' (settle the peace) they will have been strongly influenced by the kawa and tikanga (rituals) performed beforehand and will be locked into the wairua of the whare so the process will be positive. Additionally, people want to be part of the decision-making, so sitting out or leaving is not an option for them.

Step 3: Questions and response - Tū atu / Tū mai (Tau-utuutu)

Using a restorative justice structure ask the protagonist the questions below:

a) ***"Tell us what happened ...name…."*** Here we get a breakdown of how the issue(s) began and context.

b) ***"How we arrived at the current position?"*** This question opens the person(s) to understand their motivation for their behaviour.

c) ***"What was the impact (on the other parties)?"*** This is the part where mana is upheld. The protagonist is asked to explain the impact of their actions on the other party. Usually, they will have no understanding. The affected party now describes in detail how they feel. The power is theirs to tell it how it is. They give a voice to their pain. The protagonist will 'feel' firsthand how the other party has been affected.

d) ***"How can we restore this, what are some intentional and deliberate plans/strategies we can put in place to restore the damage impacted and caused?"*** Plans and strategies are put in place to address the issues. Unprompted parties will shake hands at this stage and even apologise.

e) ***"How can we be sure this won't happen again?"*** The protagonist is asked how they can be trusted that they won't make the same mistake again. In front of everyone they voluntarily make the commitment not to raise the issue(s) again.

Step 4: Settle the peace - Hohou Rongo – Taonga exchange of Mana commitment of intent, respect and responsibility.

Tūpuna (ancestors) exchanged taonga once everything was concluded. The rau is the symbol of rongo (peace). Split it and share it between the central figures to keep as a signature of reconciliation. Hongi to seal the pact. Conclude with a karakia and or waiata, whakamihi all participants hongi, hariru (shake hands) in the process of bringing everyone together. Kai is the final tikanga to lift tapu, 'hohou i te rongo' (settle the peace) and acknowledge whanaungatanga, manaakitanga and aroha. This is a very empowering process that gives everyone involved an opportunity to speak, be heard and be part of the solution. Mana is something we all have, and it is important to remember this. Upholding mana is key to bringing about an outcome that sits well and is lasting. This structure drawn from principles embedded in Te Ao Māori combined with contemporary restorative justice practices, will ensure that mana is upheld.

Tēnei te mauri ka whakapiki ake

Tēnei te mana ka whakapiki ake

Tēnei te take ka ea!

Tēnei te utu ka utua!

Tēnei te tapu me te noa ka tāwhia ka whakamaua kia tīna! Haumi e, hui e, tāiki e!

Appendix F ARCHAEOLOGICAL PROTOCOL

F.1 Procedure Prior to Vegetation Clearing and Topsoil Stripping

The procedure prior to vegetation clearing and topsoil stripping is as follows:

1. Ensure that the contractor has read the Operational Plan[11], including the Heritage NZ authority and accompanying research strategy. The contractor must sign the register contained in that plan to show that it understands the requirements of the Operational Plan.
2. Clearly identity and mark on site the area to be cleared and stripped.
3. Obtain approval for stripping from Council.
4. Liaise with Council, Onsite Archaeology and other interested parties (e.g., local iwi - discuss this with Council) for timing of stripping and having appropriate observers on site.

F.2 Procedure for Vegetation Clearing and Topsoil Stripping

The procedure for vegetation clearing and topsoil stripping is as follows

1. Only commence clearing of vegetation and topsoil stripping when the required observer(s) is (are) on site
2. Clear gorse and shrubs (not grass) in a manner so to disturb the topsoil as little as possible. Stockpile cleared vegetation so it can be transported to a green waste stockpile.
3. Strip grass and uppermost topsoil in thin layers (<100mm) using an excavator bucket (not a bulldozer) with a straight cutting edge (no teeth).
4. Stop vegetation clearing of topsoil stripping immediately if any evidence of past activities is noted (shells, stones, bones, wood fragments, darkened soil) or if instructed by the observer.

F.3 Procedures if an Archaeological Feature is Found

The procedure if an archaeological feature is found is as follows:

1. Stop work immediately.
2. In consultation with the observer make whatever precautions are necessary to protect and make safe the immediate site. This includes demarcating a 20m buffer area around the maximum extent of the discovery using suitable means (e.g., waratah fencing standards and hazard tape).
3. Advise the Council and consultant archaeologist (if the work is part of a contract) that an archaeological feature has been found.
4. Follow instructions as required by the Council or consultant archaeologist.
5. Do not commence other topsoil stripping work on site, or other activities such as vehicle movements, harvesting of trees or other non-earthwork related activities that could uncover further archaeological sites, without discussing with the Council or consultant archaeologist.
6. Recommence work only when given clearance by the Council or consultant archaeologist.

[11] It is anticipated that an Operational Plan will be needed to implement the Archaeological management Plan requirements, under a new HNZ authority.

F.4 Location of Archaeological Sites at Levin Landfill Property

Figure F- 1 below shows the location of known archaeological sites on the Levin Landfill property.

Figure F- 1: Known Archaeological Sites at Levin Landfill Property

F.5 Minimum Standard P45 – Accidental Archaeological Discovery Specification

Appendix G FORESTRY MANAGEMENT PLAN

Appendix H LANDFILL AERIAL PHOTOGRAPHS

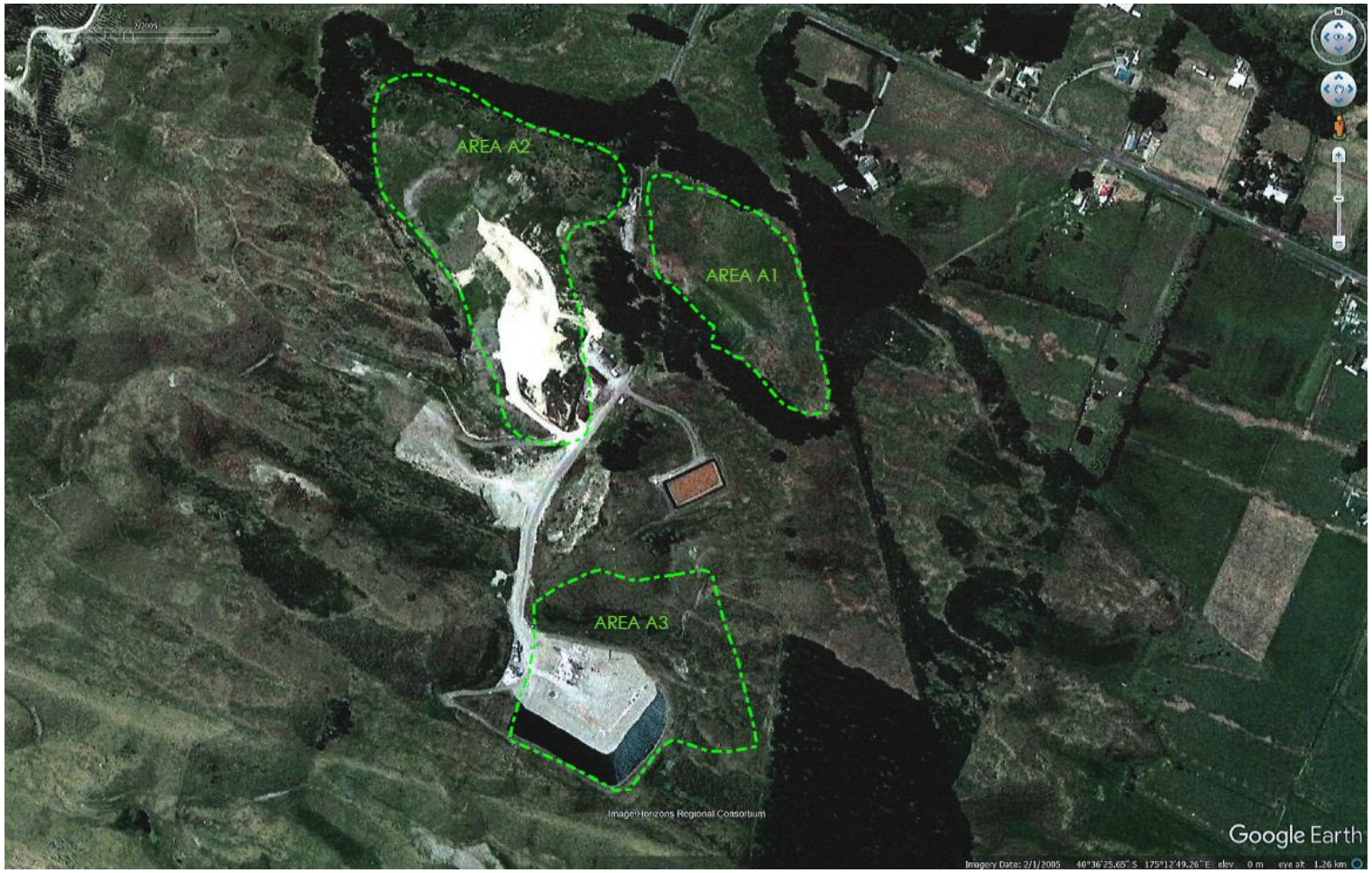


Figure H- 1: 2005 aerial photograph (source: Google Earth)

- Area A1: Closed and remediated.
- Area A2: capping with weathered greywacke over southern area.
- Area A3: Stage 1A of lined landfill in operation.

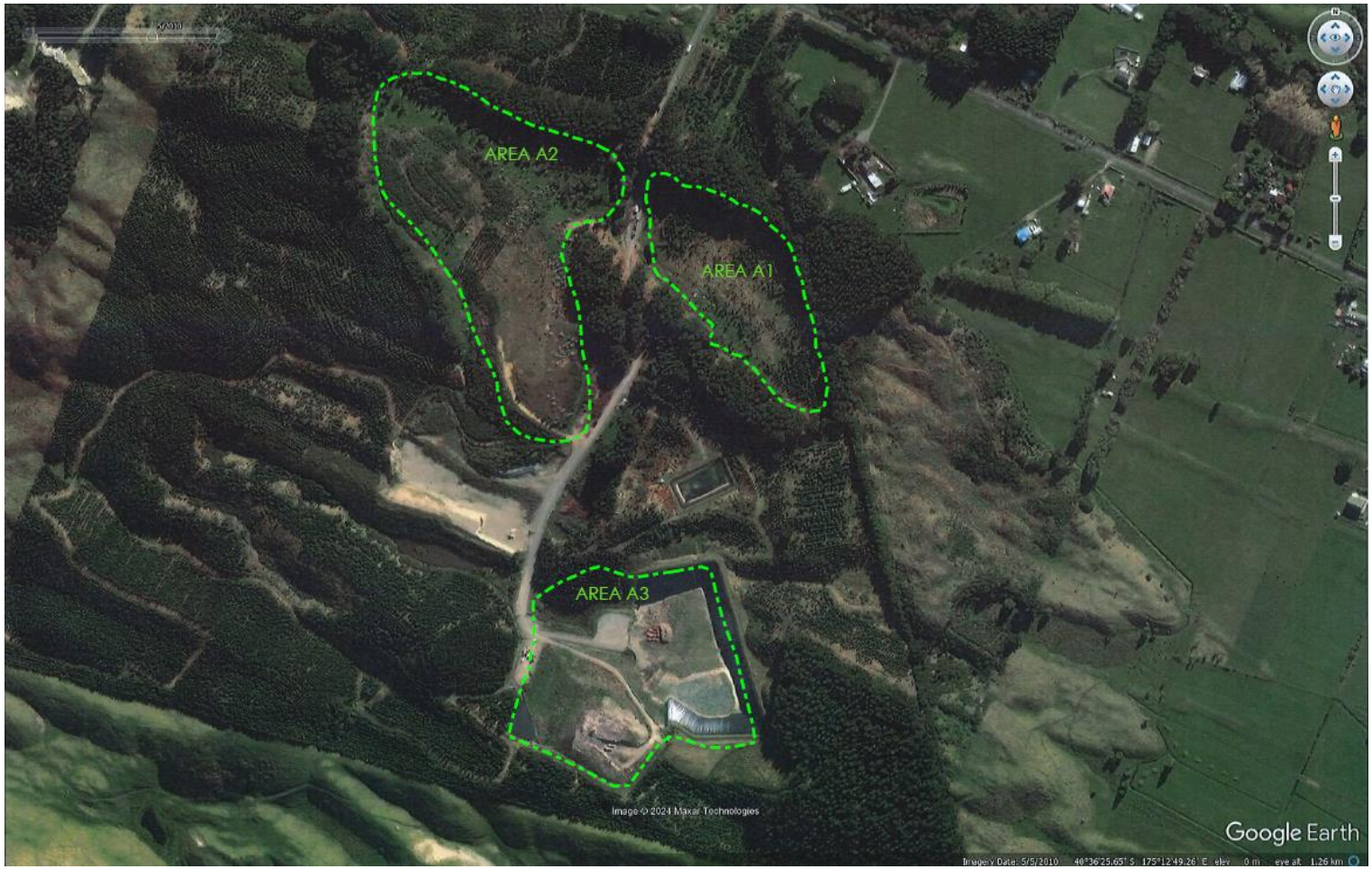


Figure H- 2: 2010 aerial photograph (source: Google Earth).

- Area A1: planting of pines occurred across part of the remediated landfill.
- Area A2: planting of pines occurred across northern part of the remediated landfill.
- Area A3: Stage 2 in operation, Stage 1A being capped (later removed when vertical height extension occurred).

Figure H- 3: 2011 aerial photograph (source: Google Earth).

- Area A1: trees continue to grow.
- Area A2: pine trees removed, capping of top of area completed (test pit locations visible).
- Area A3: landfill operations continue in Stage 2, Stage 1A capped.

Figure H- 4: 2022 aerial photograph (source: Google Earth).

- Area A1: trees continue to grow.
- Area A2: minor shape correction at top of landfill (low-lying areas infilled).
- Area A3: permanent capping across eastern half of the landfill, with temporary capping on west-facing front face.

Figure H- 5: 2023 aerial photograph (source: Google Earth).

- Area A1: thinning of pine trees occurred over area.
- Area A2: shape correction completed, topsoiled and grassed, on top of area.
- Area A3: no change from previous year – final capping on front face occurred in 2024.

Appendix I REMEDIATION OF CLOSED LANDFILL AREA A2

Original (i.e., 2002) resource consent 14(a) to (d) and 15 of DP 6010 required:

14. *Any landfill area shall be closed and remediated by:*

    a) *Compacting refuse to such an extent that post closure settlement is minimised as far as practicable; and*
    b) *Grading to a final slope of less or equal to 1V:3H (1 in 3) on any face; and*
    c) *Covering exposed refuse with not less than 1000mm of material, of which 700mm is compacted; and*
    d) *Establishing and maintaining vegetation on the covered landfill.*

15. *The Permit Holder shall close and remediate the existing landfill within 2 years and 6 months from the commencement of the consent in accordance with condition 14A – D above.*

    The area of the existing landfill to be remediated is defined as Area A on Figure 1 attached.

16. *Within one month following the remediation of the Levin landfill, the Permit Holder shall report in writing to the Regional Council of the Permit Holder's compliance with Condition 14 of this permit.*

Consent condition 25 of DP 6010 required rehabilitation of any closed area of the lined landfill to the same extent outlined under conditions 14 A – D, and within stated timeframes.

Area A2 was closed for waste disposal in May 2004, when Stage 1A of the lined landfill (Area A3) was opened.

It is understood that it was covered with sandy materials, and a decision was also made to plant pine trees over the northern area of the landfill. At some stage, though to be around 2007, Council capped part of the top of the southern end of the landfill with weathered greywacke material (not actually clayey materials, but somewhat more impermeable than the existing sand cover).

A review of the resource consent was initiated by Horizons in September 2008. Information on that process is summarised in the HRC report entitled "*Levin Landfill – Review of Conditions Report*", 31 May 2010.

During pre-hearing meetings, the presence of the pine trees was raised as a concern, and it was eventually agreed that they should be removed.

Test pits were excavated around June 2009, and showed top is 150-200mm thick of clayey gravel material, with depth of capping varying between 530mm to 850mm.

Advised that pine trees and gorse be removed, cap re-shaped to achieve at least a minimum grade of 1V:40H, annual survey to check for settlement, capping be made at least 700mm thick.

As a results of the review, and investigations that had been carried out to determine the thickness of the capping layer, the resource consent conditions for DP 6010 were amended to the following.

14. Any currently active and future lined landfill area shall be closed and remediated by:

- *a) Compacting refuse to such an extent and consistent with CAE guidelines of 600-800 kg/m^3, to ensure post closure settlement is minimised as far as practicable; and*
- *b) Grading to a final slope of less or equal to 1V:3H (1 in 3) on any face; and*
- *c) Ensuring the landfill cap incorporates a layer of at least 700 mm thick with a permeability of no greater than 1 x 10^{-7} m/s, or has a material and layer structure that reduces rainwater infiltration to the waste to an equivalent extent; and*
- *d) Establishing and maintaining a grass or tussock cover on the capped landfill, unless it can be demonstrated to the Regional Council's satisfaction that a different vegetation cover can produce clear benefits through reducing infiltration to the covered waste. Any vegetation cover should be consistent with an ongoing capacity to monitor and maintain the ongoing integrity of the landfill cap.*

15. The Permit Holder shall close and remediate the existing unlined landfill by April 2011 by:

- *a) Grading to a final slope on the landfill faces and caps of between 1V:3H (1 in 3) and 1V:40H (1 in 40);*
- *b) Ensuring the final landfill surface is sloped to promote run-off towards the outside of the landfill footprint and prevent surface water ponding on the landfill cap;*
- *c) Ensuring the landfill cap incorporates a layer at least 700 mm thick. All material added to the existing cap to bring the thickness up to 700 mm, or for future cap maintenance purposes, is to have a permeability of no greater than 1 x 10^{-7} m/s;*
- *d) Establishing and maintaining a grass or tussock cover on the capped landfill consistent with an ongoing ability to monitor and maintain the integrity of the landfill cap. The vegetation is to be managed to exclude tree species that can potentially develop root systems capable of disrupting the landfill cap and thereby enhancing rainwater infiltration;*
- *e) Monitoring the landfill cover on an annual basis to identify areas of differential settlement slope stability issues, erosion and changing vegetation patterns, including a topographic survey to ensure Conditions 15(a) to (d) continue to be met; and*
- *f) Reporting requirements …*

In December 2009 a trial was conducted to strip (i.e., cut down, clear and grub) a section of pine trees that had been established on the top surface of Area A2. The trial was successful, and it was agreed that all pine trees could be removed when the clay capping was constructed the following year.

A capping design was completed for Area A2 in September 2010. Construction of capping occurred in Area A2 between approximately November 2010 and April 2011. From thereon, settlement monitoring of the A2 area has continued each year using benchmarks cast into the clay capping.

As a result of noticed settlement and seen by ponding within low lying areas, improvements to cap were proposed as a solution for the Leachate BPO project. This was done through Separable Portion 2 of Contract 901/2021/5/1 when some additional 3,870 m^3 of clay capping was constructed on top of

Area A2 to reshape it and increase the capping thickness. Testing of the clay capping showed that it achieved a permeability value of less than 1 x 10^{-7} m/s.

Appendix J MAINTENANCE CONTRACT

To be inserted if Council chooses to appoint a Contractor in the role of Landfill Engineer.

Appendix K RESPONSIBILITIES UNDER THE HSWA 2015

Table K- 1: What WorkSafe expects from PCBUs

Level in Contracting Chain	What WorkSafe expects from PCBUs
Lead PCBU (e.g., Council)	• To be a H&S leader. • To set clear H&S expectations and incorporate these into contracts with contractors. • To work with designers to eliminate risks so far as is reasonably practicable or minimise risks if they cannot be eliminated. • To choose the best contractors and site managers for the job using prequalification, not simply choosing them based on cost. • To check H&S records of potential contractors. • To put clear and effective reporting procedures in place to be confident all duties are being met. • To set up a clear framework for information sharing for the duration of the project.
Lead Contractor (e.g., Contractor) The lead contractor will likely have the most influence and control over the workplace.	• To possibly act as site manager – this would include being always on-site and having an overview of the site. • To hold high H&S expectations of the contractors that they hire. • To choose the best contractors for the job using prequalification, not simply choosing them based on cost. • To check H&S records of potential contractors. • To oversee inductions on-site. • To be in charge of communication about H&S at the start of each day (e.g. toolbox talks). • To coordinate and communicate the on-site rules and procedures to everyone who accesses the work site. • To work with subcontractors to create a H&S plan. • To monitor their workers and/or subcontractors they hire. • To put clear and effective reporting procedures in place so they can be confident all duties are being met. • To make sure they have all the required information from the lead PCBU. • To make sure, so far as is reasonably practicable, that the H&S of workers and other people are not put at risk by their work.
Contractor working as a PCBU (e.g., landfill gas contractor)	• To hold high H&S expectations of the subcontractors that they hire. • To choose the best subcontractors for the job using prequalification, not based on cost. • To check H&S records of potential subcontractors. • To monitor their workers and the subcontractors they hire. • To ensure that their workers and the subcontractors they hire have all the relevant information, and are aware of the onsite rules and procedures, inductions, toolbox talks, safety plans and reporting procedures. • To ensure, so far as is reasonably practicable, that the H&S of workers and other people are not put at risk by their work.
Subcontractor working as a PCBU (e.g., operator contracted to the Contractor)	• To ensure, so far as is reasonably practicable, that the H&S of workers and other people are not put at risk by their work. • To monitor their workers and the subcontractors they hire. • To ensure that their workers and the subcontractors they hire have all the relevant information, and are aware of the onsite rules and procedures, inductions, toolbox talks, safety plans and reporting procedures. • To work closely with other contractors, including the lead contractor, to help manage risks.

Appendix L COUNCIL'S (OR CONTRACTOR'S) H&S PLAN

Insert Council's Health & Safety Plan.

If Council chooses to appoint a contractor as the Landfill Engineer, then insert the Contractor's Health & Safety Plan.

Appendix M COUNCIL'S "PEOPLE SAFETY MONITORING POLICY"

Appendix N OTHER CONTRACTORS WORKING ON SITE

On occasions other contractors will be working on the Levin LF site. A list of the most common contractors and their contact information is listed below.

Table N- 1:Contractors Contact List

Task / Project	Contractor	Contact
Landfill Gas Contractor	Whanganui Environmental Engineering - Ryan Hughes	020 407 49301
Pump Maintenance Contractor	Council's Local Waters Team	06 366 0999
Environmental Monitoring Contractor	HDC's – Compliance & Regulatory Team	06 366 0999
Forestry Contractor	John Turkington Forestry	06 327 5263
Consulting Engineer	Stantec - Phil Landmark	06 357 4034
Archaeologist	Onsite Archaeology - Daniel Parker	027 421 0803
Consulting Engineer	Envitech – Lindsay Strachan	021 0250 9386

Appendix O SITE HAZARDS

Table 13 from the "*WasteMINZ Health & Safety Guidelines: for the Solid Waste and Resource Recovery Sector – parts one, two, three, four and five (2024)*" is reproduced in this appendix.

Note: Table 13 has been prepared for an **Operational Landfill**. Whilst Levin Landfill is a **Closed Landfill**, many, but not all the hazards identified will still be present.

Table 13: Additional hazards/risks for landfills This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'								
Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
Design and construction	Interaction between construction and operations	• Fatality • Notifiable Event		Minimise	• Consider the presence of methane on adjacent operational areas when developing controls for the construction zone • Procedures to communicate responsibilities			
General landfill hazards	Abusive and threatening customers	• Traumatic harm		Minimise	• Procedures to deal with abusive and threatening customers • Train staff to deal with aggressive customers • Secure cash handling • Regular removal of cash from the site			
	Confined space entry	• Fatality • Notifiable Event		Eliminate Minimise	• Avoid entry into confined spaces including under weighbridges • Confined space entry procedures • Lock access ways and signpost • Rescue procedures			
	Environmental health hazards e.g. dust, biological, fumes, noise	• Notifiable Event		Minimise	• Environmental monitoring • Dust and fume control systems, • Engineering controls to reduce noise levels (e.g. guarding, maintenance, sound proofing)			

Table 13: Additional hazards/risks for landfills This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'								
Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					• PPE • Health monitoring			
	Falling objects (refuse, uncontrolled vehicles, trailers)	• Struck by falling objects		Minimise	• Exclusion zones • Procedures • Monitoring customer behaviour • Storage of weighbridge materials in a suitable racking system • PPE			
	Fire	• Fatality • Notifiable Event • Burns and scalds		Minimise	• Storage and segregation for hazardous substances and dangerous goods • Emergency plans, training, evacuation procedures • Fire warning and protection systems • Smoking in designated areas only			
	Fitness for work	• Fatality • Notifiable Event • Other Injuries		Minimise	• Monitor and manage work hours to identify fatigue risks • Policies and procedures to support in the management of non-work-related fatigue • Drug and alcohol policy			
	Ground instability	• Fatality • Notifiable Event • Other injuries		Eliminate Minimise	• Tip face area is made safe for vehicles discharging waste (e.g. ground stability and evenness) • Traffic and pedestrian management, sufficient distance between unloading			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					vehicles • Management of stuck loads • Control of vehicles while backing • Where trenching and excavation occurs, ensure compliance with the Excavation Safety Good Practice guidelines.			
	Hazardous substances and dangerous goods	• Fatality • Notifiable Event		Minimise	• Procedures for identification, isolation, handling, segregation of incompatible substances; storage; disposal; and ceasing of work activities • HSNO approved handlers • Signage/safety data sheets • Emergency procedures • Emergency PPE available • Trained operators			
	Infection and illness from handling waste	• Notifiable Event		Minimise	• Equipment should be cleaned prior to being maintained. • Ensure vaccination for common diseases, including hepatitis • Avoid walking on waste materials • Develop and implement a 'needle stick' response policy and seek medical attention for any needle stick injuries • Immediately clean and dress all wounds • Cover dressing on hand wounds with			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					durable waterproof gloves • Workers to wear appropriate PPE to maintain good hygiene • Provide hygienic washing and welfare facilities • Train staff in good hygiene practices, e.g. washing hands before eating, drinking or smoking • Consider use of steel mid-sole footwear			
	Landfill fire	• Notifiable Event		Minimise	• Load inspections • Waste acceptance criteria • Procedures for customer waste deliveries with hot, smouldering or smoking loads • Landfill inspections • Gas well temperature monitoring • Reporting procedures			
	Landfill gas and gas plant	• Fatality • Notifiable Event	Yes	Minimise	• Eliminate the need to undertake hot work through the use of alternative engineering solutions • Provide intrinsically safe equipment • Permit system • Gas detection and monitoring • Ventilation systems • Manage sources of ignition (i.e. heat,			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					smoking) • Implement fire control and warning systems • All electrical conduits exiting the ground must be sealed • No electrical work should be undertaken without testing for methane • Lock out and tag out system to be implemented before work undertaken on gas plant. • Pipes should be lagged where there is a risk of burns. • Follow appropriate electrical industry safety guidelines.			
	Manual handling	• Notifiable Event • Strains/sprains	Yes	Minimise	• Mechanical lifting devices • Manual handling risk assessment • Ensure all workers receive adequate training in manual handling (Code of practice for manual handling 2001) • Workers to wear fit-for-purpose gloves and other PPE to prevent cuts from sharp objects and to maintain good hygiene • Pre-employment monitoring and annual health monitoring • Early reporting of musculoskeletal symptoms			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
	Non-conforming waste	• Fatal • Notifiable Event • Other health effects	Yes	Isolate Minimise	• Waste acceptance criteria • Special waste permit system • Load inspections • Customer reporting protocols • Appropriate PPE to be used when receiving, inspecting and for disposal • GPS monitoring of disposal locations			
	People working on the landfill who are unfamiliar with the site	• Fatality • Notifiable Event	Yes	Minimise	• Contractor management systems • Direction, monitoring and assistance for customers and contractors; supervision where necessary • Signage to be installed that clearly describes site rules and procedures • Provide employee assistance programme • No person to walk beneath raised hydraulically operated rear door on waste delivery vehicles			
	Pests	• Infection	No	Minimise	• Procedures for managing site hygiene • Bait stations • Building maintenance programme • Bird wires • PPE • Suitable procedure to be developed for the			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					use of firearms • First Aid training in minor wound care • Removal of birds' nests			
	Poor ergonomics	• Strains/sprains		Minimise	• Workstation assessment and postural setup for weighbridge/kiosk operator • Anti-fatigue mats • Early reporting procedures			
	Poor housekeeping	• Notifiable Event		Minimise	• Keep walkways/stairways/access ways clear • Safe storage of items • Spill procedures • Workplace inspections • Litter control/appropriate PPE to be used			
	Power and hand tools	• Notifiable Event		Minimise	• Guarding on moving parts • Training in correct use of power tools and hand tools • Procedures • Electrical test and tag • RCD devices to be used • Appropriate PPE to be used • Maintenance and lockout-tagout procedures			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
	Site traffic	• Fatality • Notifiable Event		Minimise	• Traffic management plan including consideration of construction versus operations traffic • Manage gradients of access roads • Manage roads in line with good engineering practice • Speed limits • Road markings/cones/barriers/exclusion zones • Signage and direction • PPE • Spotters • Vehicles and machines should have beacons, strobes, audible alarms and reversing cameras • Designated areas for mobile plant parking and storage, and for stockpiling • Controls to segregate people entering and leaving the weighbridge kiosk			
	Slips, trips and falls	• Fatality • Notifiable Event • Other Injuries		Minimise	• Suitable access walkways on landfill batters • Guards and handrails • Fall protection, restraint, arrest or work positioning systems • Training in safe working at height including harness use and rescue			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					• Avoid walking on waste materials • Edge protection systems • Edge protection/covers for vehicle maintenance pits			
	Stacking and storage	• Fatality • Notifiable Event		Minimise	• Stable storage of stockpiles and materials			
	Stationary and mobile plant and equipment. (includes lifting using excavators)	• Fatality • Notifiable Event		Minimise	• Licensed, authorised, competent, capable and trained operators • Communication systems between operators • Guards, interlocks, lighting, beacons, emergency stops and warning devices - refer AS 4024 Safety of Machinery. • Certified ROPS, FOPS, TOPS, COPS to be fitted, as required, to mobile plant • Use of reversing beepers and cameras • Scheduled preventative maintenance and permit systems • Pre-start checks • Signs and labels • Maintenance and lockout-tagout procedures • Maintenance/repairs to be undertaken off the landfill (aside from breakdown repairs) • Operating procedures			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					• Exclusion zones • Access controls to manage slips, trips and fall risks including handrails and non-slip steps, where applicable • Operators to maintain three points of contact for access/egress • Seatbelts to be worn at all times • Fire protection devices to be fitted • Electrical safety regulations must be complied with, including where gas levels may exceed lower explosive levels and may require mobile/stationary plant to be intrinsically safe • Chains, strops and lifting points to be certified • Nominated spotter trained in effective communication and, where possible, isolated from manoeuvring vehicles • No persons to stand beneath raised load • Anti-drop protection on excavator hydraulics • Quick hitch and safety pins to be used • Tie down loads when moving with excavator bucket • Procedure for towing stuck vehicles			
	Stormwater ponds, leachate ponds and	• Notifiable Event		Minimise	• Fencing, signage, rescue methods & flotation devices			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
	other water-bodies				• 'Permit to work' system			
	Tour groups and visitors	• Notifiable Event		Minimise	• Site introduction • Site rules • Isolate tour groups from operational areas • PPE where appropriate • Full- time escort • Adult/child ratios • Children and pets stay in vehicles • Specific plans to manage tour groups • Signage and warning of electrical equipment/plant for those with pacemakers			
	Unauthorised public access	• Notifiable Event		Minimise	• Site access controls (including perimeter fences and signage) • Segregation/isolation barriers to separate customers from operational activities			
	Underground and overhead services	• Fatality • Notifiable Event • Other injuries		Minimise	• Refer to site plans • Liaise with asset owner before working near services • Where trenching and excavation occurs, ensure compliance with the Excavation Safety Good Practice guidelines • Refer Guide for Safety with Underground Services			

Table 13: Additional hazards/risks for landfills

This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'

Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					• Report to www.beforeudig.co.nz when excavation and trenching work is undertaken • If working near overhead power, ensure appropriate permits are in place and keep to required distances • Spotters may be required • Hand digging when excavating near services			
	Weather conditions	• Sun/heat stroke • Foreign bodies in eye • Hypothermia		Minimise	• Suitable high-vis clothing/sunscreens/long sleeves/wet weather gear • Control wind-blown dust and particles • Ensure adequate lighting • Nutritious foods and adequate water for hydration • Control temperature, air flow, in offices and mobile plant			
	Spilt substances	• Environmental harm • Minor injuries		Minimise	• Training in spill procedures and spill kit use • Signage to warn of spills • Procedures to clean up spills immediately after they occur • Adequate number and location of spill kits			
Lone Workers	• Uneven surfaces • Working around water	• Fatality • Notifiable Event • Other injuries		Minimise	• Procedures to record and manage the task and location • Departure time and expected return time			

Table 13: Additional hazards/risks for landfills This hazard/risk register should be read in conjunction with 'Appendix 7: Generic hazards/risks associated with all waste collection and processing methods'								
Work Activity or Area	Hazards	Describe risk to worker health and safety	Risk Rating	Eliminate? Minimise?	Control Measures	Residual risk rating	Review Frequency	Review Date
					• Communication methods • Plans for checking in at regular intervals and for emergency situations			

Appendix P ENVIRONMENTAL MONITORING FIELD PROCEDURES

P.1 Introduction

The purpose of this document[12] is to provide guidance to Horowhenua District Council (HDC) on surface water and groundwater environmental monitoring field procedures for Levin Landfill to comply with resource consent conditions stated in Discharge Permits ATH-2002003983.02 and ATH-2002003984.02 (formerly DPs 6010 & 6011, respectively).

In addition, gas sampling of the groundwater bores is also included, as required by resource consent condition 4(a) of Discharge Permit ATH-2002003984.02 (formerly DP 6011), but sampling of the landfill gas wells and surface sampling of the capped landfill, as required under Discharge Permit ATH-2002003984.02, is not included in this document.

This document is an update of the following predecessor documents:

- "*Levin Landfill – Environmental Monitoring & Reporting Requirements*"; prepared for Horowhenua District Council by MWH New Zealand Ltd., November 2010.
- *"Addendum to Levin Landfill – Environmental Monitoring & Reporting Requirements*"; prepared for Horowhenua District Council by Stantec New Zealand, March 2018

HDC owns Levin Landfill (LF) which is located on Hōkio Beach Road, approximately 6km west of Levin (see Figure P-1 below).

[12] Extracted from: "*Levin Landfill - Environmental Monitoring & Reporting Requirements*", Stantec November 2024.

Figure P- 1: Site Location

These guidelines have been compiled from several sources including Ministry for the Environment (MfE) best practice procedures and guidelines, as well as the December 2019 revised resource consent conditions, and they pertain particularly to the type of sampling required at Levin LF.

The document has been set out into different sections, commencing with general procedures and practices, followed by the various types of sampling required at Levin LF.

A Sampling Schedule for Levin LF, including parameters to be analysed, has been provided in Attachment A. Also included in Attachment A is *Site Plan – Drawing 310101088-19-001-G001/E,* that shows the locations of all groundwater bores and surface sampling locations.

Attachments B and C provide flow charts of the tasks and assigned responsibilities for drinking bore monitoring and environmental monitoring of the landfill, respectively, as required by the resource consent conditions.

P.2 Health and Safety

The following Health and Safety (H&S) measures are in place:

- Notification of HDC staff of presence and numbers on site.
- Comply with all landfill H&S requirements.
- Care to be taken when sampling locations close to roads. Use an orange warning beacon on the vehicle, if necessary, to warn other road users.
- Wear appropriate personal protective equipment, including:
  - Steel capped boots,
  - High visibility protective clothing,
  - Disposable gloves,
  - Protective eyewear,
  - Hard hat and hearing protection if around heavy machinery,

- Personal gas detection meter.

Specific H&S issues involved with landfills need to be taken into consideration, including the following:

- Contact with toxic substances such as leachate. Toxic substances may be absorbed through the skin, inhaled or they may burn the skin and/or eyes. Protection clothing forms a fundamental line of defence. It is also important to wear gloves when opening bores and while sampling.
- No eating or drinking when carrying out sampling. Wash hands thoroughly after completing sampling, and prior to eating. Use may be made of the site facilities where there is running water and soap.
- Asphyxiation. In some instances, the atmosphere in the sampling location may not be safe due to the presence of landfill gases. This may typically occur in depressions or confined spaces where vapours are given off at significant levels and are not as easily dispersed. These gases are only likely on the active or closed landfill and no sampling locations are located on the active or closed landfill, though some are close to such locations. Use of a personal gas detection meter is advocated to warn staff of elevated concentrations of gas.
- Confined space entry is prohibited.
- No smoking at any time.
- Any hazardous atmospheres discovered should be vented if possible and reported to HDC's Solid Waste Manager as soon as possible.

P.3 Field Cleaning

The following field cleaning procedures are based on USEPA guidelines. They are aimed at ensuring sample results are representative, consistent, and repeatable by maximising sample preservation and minimising external or cross contamination.

An area should be established away from the sampling site where the equipment may be cleaned without risk of contamination to the sampling site.

- Disposable nitrile gloves should be always worn when cleaning equipment.
- Clean equipment on a clean piece of plastic sheeting.
- Wash equipment in laboratory grade phosphate-free detergent such as Decon 90®.
- Rinse equipment in water.
- Wipe equipment over with clean paper towels.
- Rinse copiously with high purity analytical grade de-ionised water (available from testing laboratory).

Where organic contaminants are likely to be present the equipment should also be wiped with a hexane-soaked pad and rinsed with a high-performance liquid chromatography (HPLC) grade acetone prior to rinsing with deionised water.

After cleaning the equipment should be wrapped in aluminium foil for transport to the next sampling location. Equipment that should be cleaned by this procedure, include:

- Non-dedicated bailers.
- Sampling buckets and jugs.
- Any other equipment in direct contact with each sample such as field parameter measurement probes and depth to water level meters.
- Soil sampling equipment such as a handheld auger or trowels/shovels.

The suggestion to wrap the equipment in aluminium foil is to ensure that the equipment does not become contaminated between sample locations. As an alternative, to save the use of aluminium foil, the equipment can be rinsed in deionised water following sampling.

On arrival at the next sampling location the equipment should then be cleaned in full using the protocol outlined above and placed on a clean ground sheet prior to use to ensure no cross-contamination between samples.

P.4 Quality Control

P.4.1 Field Books and Record Sheets

All data collected during the sampling event such as static water depths, depth to bore base and amount of water purged prior to sampling should be recorded in the field book. Water levels and borehole elevations should be recorded to the top of the standpipe. Ground level to the top of standpipe should also be recorded for the permanent record.

A record of samples collected should be kept by the field technician. This record should incorporate the following information:

- Job number
- Client name
- Sampling location
- Sample ID number
- Date
- Initials of field technician
- Weather conditions during sampling

Each sample should be labelled with the following information, which correlates directly with the record of sampling to be kept by the field technician.

- Job number
- Sampling location
- Sample ID number
- Date

This information should be made available along with the results to HDC and/or the consultant preparing the compliance monitoring reports on behalf of HDC.

Field sheets are attached in Attachment D for each groundwater monitoring bore and surface water sampling location. They outline the information required to be recorded. These field sheets should be filled out as completely as possible.

A photograph should also be taken of each monitoring location and the water that has been extracted for analysis. It is suggested that the sample bottle made of clear plastic be placed on a white sheet of paper following filling to allow a clear picture of the visual quality of the water to be taken. If possible, the camera used should geo-reference the picture so that the location of the subject of the picture can

be plotted. In addition, it is helpful to label the sheet of paper (or white board) with the bore or surface water location number so that the sample location it refers to can be easily identified.

It is important to record the date and time on the field sheets as this information assists with the analyses. Rainfall records are often used in conjunction with quality data and therefore having an accurate collection date for each sample is important. It is valuable to record as many details as possible on the field sheet as this can help with the analysis. Details such as whether the bore standpipe is intact and free of standing water and whether any stock or other animals (either physically or through signs of tracks and animal droppings) were observed nearby can be helpful.

P.4.2 Chain of Custody Records

Chain-of-custody (CoC) documentation should be completed on site, or as soon as possible after leaving the site. In the case of the latter, all relevant information for the CoC form will be recorded in the field book.

Information to be recorded in the CoC will include:

- Job number
- Project name
- Date and time of sample collection
- Borehole, or sample location
- Sampling parameters
- Person relinquishing samples
- Person receiving samples.

On submission of the samples to the laboratory and signing of the relevant sections by the person relinquishing and the person receiving the samples, a copy of the CoC form should be returned from the laboratory for records and to be sent with the results to HDC or the consultant compiling the monitoring reports.

P.4.3 Quality Assurance / Quality Control (QA/QC) Samples

QA/QC samples are taken to identify sample quality problems, which might otherwise go undetected. There are three main types of QA/QC samples:

- Field duplicates are two independent samples, which are collected as close as possible to the same point in space and time. These samples are stored in separate containers and analysed independently. Duplicates are used to document the precision of the sampling analytical processes.
- A field blank is a sample of contaminant free medium (water, soil, or air) taken to the field, opened in the field while a sample is collected, and analysed with the environmental samples. Field blanks are used to identify laboratory errors or to document other sources of contamination.
- Equipment blanks are produced by rinsing cleaned sampling equipment using deionised water, and collecting the rinse water in a cleaned sample jar or bottle with a foil lined cap. All soil sampling equipment blanks should be documented on the CoC form. Equipment blanks

are necessary to document that the sampling equipment is not contaminating the environmental samples.

Condition 10 of Discharge Permit ATH-2002003983.02 (formerly DP 6010) requires that all analyses on water quality samples shall be carried out by an IANZ accredited laboratory.

All equipment used in the field must be regularly calibrated to ensure accuracy. Instructions for calibration should be provided with any equipment (e.g., landfill gas analyser).

P.5 Landfill Gas Monitoring Procedure in Bores

P.5.1 Introduction

Landfill gas (LFG) monitoring requirements under resource consent condition 4(a) of Discharge Permit ATH-2002003984.02 (formerly DP 6011) require that: "G*roundwater monitoring wells shall be sampled for landfill gas when groundwater samples are taken from the wells. As a minimum, sampling shall be undertaken for methane, carbon dioxide and oxygen".* It is also appropriate to measure concentrations of hydrogen sulphide.

Therefore, all monitoring bores are to be monitored for landfill gases prior to groundwater sampling (see the *Site Plan – Drawing 310101088-19-001-G001/E* attached in Appendix A for monitoring bore locations). The points below are covered by Condition 7 of Discharge Permit ATH-2002003984.02 (formerly DP 6011).

> *The Permit Holder shall also keep a record of landfill gas monitoring results including:*
> *a. Date and time of sampling.*
> *b. The concentrations of gasses detected.*
> *c. Weather conditions at the time of sampling.*
> *d. Barometric pressure and ambient temperature should also be recorded.*

P.5.2 Pre-sampling

Prior to visiting the site ensure that:

- The landfill gas analyser is fully charged.
- The landfill gas analyser calibration is current.
- Site inspection sheets have been prepared.
- The analyser's filter has been checked and replaced if required.
- The locations of all sampling points are known and that the correct keys are obtained for opening monitoring bores.

On arrival:

- Measure the wind speed and record using a hand-held anemometer (if available). Other weather conditions (precipitation, wind direction and any other factors) should also be noted.
- The landfill gas analyser should be switched on and allowed to carry out the self-check and calibration functions prior to any sampling.

P.5.3 Landfill Gas Sampling

The following sequence of actions is required for sampling LFG:

- Ensure that the landfill gas analyser has been purged prior to the last analysis.
- Record the details of the monitoring location.
- Gas monitoring of each bore should be undertaken before any other monitoring. The gas probe should be run as soon as practicable after the bore cap has been removed to minimise the escape of gas. The groundwater monitoring field sheets attached in Attachment D include a section to record the concentration of methane, carbon dioxide, oxygen, and hydrogen sulphide at each bore.
- For monitoring bores, remove the cap and the inner cover. For other points, identify an access hole in the structure or service being monitored.
- Insert the air sampling tube to at least a depth of 300mm into the bore to ensure no cross-contamination from air entering the well. If necessary, use a plastic ring at the wellhead to temporarily seal the borehole.
- Start the pump on the landfill gas analyser.
- Allow the unit to run for at least 45 seconds, or until gas levels have stabilised. Record peak and steady readings.
- Stop the pump and measure for hydrogen sulphide (if an odour is present).
- Store data.
- Purge landfill gas analyser for at least 30 seconds and move onto next sample location.
- The landfill gas data should be stored in the landfill gas analyser internal memory, but a written record should also be kept of any significant results.
- A quality control sample in `fresh' air (away from influence of landfill and traffic emissions) should be taken on completion of site monitoring.
- On return to the office the gas analyser memory should be downloaded and entered onto an Excel spreadsheet.

P.5.4 General LFG Analyser Care

The following precautions must be taken with respect to the LFG analyser:

- Always ensure the landfill gas analyser is protected from impacts/liquids/rain and extremes of temperature.
- Avoid at all costs any contact between the inlet tube and liquids, keeping a careful eye on the clear inlet tubing whenever the pump is operating.
- Check both the inline and internal filter on a regular basis and replace as required following manufacturer's recommendations.
- Always ensure that the unit is fully charged prior to commencing a sampling round.

All field data should be made available along with the results to HDC and/or the consultant preparing the compliance monitoring reports on behalf of HDC.

P.6 Surface monitoring of landfill gas

P.6.1 Preliminary requirements

The following requirements are a guide for an Instantaneous Surface Monitoring (ISM) survey, but it may be difficult to achieve these all of the time. The ISM survey report must identify the items from this list which were not met during the survey. All reasonable efforts should be made to ensure that the following are met as this will produce the most representative outcome.

- On the day of monitoring the site should be dry and with no rain (less than 0.5 mm) having fallen for at least two days.
- Wind speed should be less than 25 km/hr and ideally around 5-10 km/hr.
- Ideally monitoring should be done during a period of declining atmospheric pressure after several days of high pressure. The declining pressure will tend to draw gas out from the landfill and provide “worst-case” results.
- A preliminary walk path for the surface monitoring should be prepared on a topographical plan of the landfill surface. The distance between each of the lines of walk should generally not exceed 30 metres. The walk path needs to be repeatable and therefore each path needs to be recorded using a physical feature on the ground or a GPS system. If practical, subsequent monitoring plans and monitoring points of the surface should be staggered between previous rounds to ensure that the full surface of the landfill is covered.
- The landfill surface must be relatively dry and grasses not longer than 100 mm. If grass is longer than this within the monitoring area it should be noted as it may affect the Flame Ionisation Detector (FID) readings.
- The use of a GPS to assist in relocating previous emission should be considered.

P.6.2 Equipment requirements

The equipment shall meet the following requirements:

- Monitoring shall be conducted using a portable instrument such as an OVA-FID (Organic Vapour Analyser- Flame Ionisation Detector) or any other device capable of meeting US EPA method 21 requirements.
- The detector shall be capable of responding to methane.
- The scale of the instrument shall be readable to ±2.5% of the specified concentration.
- The instrument shall be equipped with an electrically driven pump to ensure that a sample is provided to the detector at a constant flow rate.
- The instrument shall be intrinsically safe in an explosively atmosphere if the instrument is going to be used in hazardous atmosphere zones when compliance with the requirements of AS/NZS 2430.3.7:2004 Classification of Hazardous Areas. Part 3.7 is required. Examples of area classification-Landfill gas, sewage treatment and sewage pumping plants”.
- The instrument shall be capable of reading between 5ppmv and 10,000 ppmv.

P.6.3 Calibration procedure

The following calibration procedure shall be undertaken before each round of monitoring is conducted.

- The instrument shall be calibrated in accordance with the manufacturer's instructions and should include calibration with a zero gas and a high-level gas.
- Zero gas shall be air containing less than 10 ppmv VOC.
- High level gas (Span gas) shall be a certified "standard" gas comprising of methane with a minimum concentration of at least 80% of the instrument span range.
- It is good practice to calibrate every time the instrument is re-started and record the calibration data.
- A check of the instrument's response should be checked at the end of monitoring day with the high-level gas and record the instrument reading.

P.6.4 On-site operational procedures

On arrival at the site the following procedures shall be adopted:

- Record date, time, site conditions (should be dry) and barometric pressure reading (can be obtained from the on-site weather station).
- The calibration check should be conducted using the appropriate zero gas and span methane calibration gas and results of the calibration check should be recorded.
- Check that the instrument is within calibration date.
- Check wind speed is less than 25 kph.
- Commence surface monitoring by walking the predetermined walk path at a slow pace of around 0.5 to 1.0 m/s.
- The monitoring probe inlet should be held approximately 5 to 10 centimetres above the ground surface.
- Recordings of time, the maximum methane concentration, position (using GPS or a grid number) and any comments should be made approximately every 30 metres.
- All locations where concentrations are above 50 ppmv should be recorded. The recording of a unique identifier (e.g. 1, 2, 3, etc) for each logging point may be useful but is not essential given the recording time itself is a unique identifier.
- If surface concentrations of methane exceed the following trigger levels while monitoring, personnel shall search the immediate area for the source of the odour or gas as described in the next bullet point:
- 100ppmv for permanently capped areas
- 200ppmv for temporary capped areas
- 5,000 ppmv for on-site buildings and structures
- Where elevated concentrations of methane (as noted above) are detected, the survey should deviate to locate the likely source of the emission. Once an exceedance is recorded the surveyor should change to a closer spaced grid to define the extent of the area / feature. Once the extent of the area has been determined the main survey shall resume on the designated walk path.

- Areas where concentrations of methane are elevated above the trigger levels are to be remediated as per subsection P.6.6.
- Monitoring for methane shall give particular attention to areas and features such as:
- Surface fissures
- Stressed vegetation
- Landfill edges and side slopes
- Monitoring wells
- Gas collection pipework
- Leachate sumps, towers, risers and other monitoring points.
- Pegs, poles or other protrusions through the landfill capping.

P.6.5 Record keeping

Surface methane emission monitoring records must be included in the Annual Report, as stated in condition 4(e) of discharge permit ATH-2002003984.02 (formerly DP 6011), and upon request by the HRC.

The following information shall be recorded for each survey:

- Date and time that monitoring started and finished.
- Reading of the span gas check at the beginning and end of each day.
- Meteorological and site conditions when monitoring was undertaken including:
- Barometric pressure during monitoring (note that this can be markedly different between morning and afternoon and therefore regular checks are necessary).
- Average wind speed during monitoring.
- Wind direction.
- Details of any rainfall up to 3 days before monitoring commenced.
- Ground moisture (dry, damp or wet).
- Vegetation moisture (dew).
- Vegetation status (short or long grass, shrub, bark cover, etc)
- Methane gas readings (including zero results) and notes of ground features where elevated gas has been recorded.
- A plan showing all sampling locations and the walk path should be prepared using either data from the GPS unit or from plotted field locations.
- The data should be summarised and, if possible, with reasons (e.g., crack, peg in ground, dead grass etc.) in a table indicating areas where readings above 50 ppm were detected.

P.6.6 Remediation of areas exceeding trigger levels

An exceedance of the methane trigger levels stated in section P.6.4 requires remedial action to be undertaken within 24 hours and retesting within 24 hours of the remediation being completed.

On the landfill surface the remediation could typically include:

- Re-compaction of capping.
- Additional cover or capping.
- Regular watering of surface.
- Removal of capped landfill surface penetrations
- Capping and sealing of surface penetrations that must remain (e.g. monitoring points)
- Increasing gas vacuum (where available).

If the second round of testing results in a continued exceedance at the same location, then an action plan shall be developed and implemented to reduce methane concentrations below the specified levels. Details of the action plan are to be provided to the Regional Council within 48 hours of the failed retest.

The installation of additional gas wells is one possible further remediation solution that could be adopted

P.7 Bore Development

After drilling and installation of a new bore, bore development is necessary to remove sediment disturbed or introduced by drilling and to develop good flows to the bore. There are several methods for bore development. For monitoring bores, the most effective methods are over-pumping and surging. The over-pumping method is probably the most suitable for new bores at Levin LF. Surging can be used in conjunction with pumping if a properly constructed surge block is available. The procedure for developing is as follows:

- Record static water level and total well depth.
- Set the pump and record pumping rate and field parameters (pH, temperature, and electrical conductivity (EC)).
- The pumping rate used must be greater than the highest rate expected to be used during subsequent purging and sampling.
- The pump should be lowered to the start of the screen and pumped until it runs clear.
- If a properly constructed surge block is available discontinue pumping and surge the well – if not skip this step.
- Reset pump and lower further into the screened section; repeat previous step if surging otherwise continue till the entire screen has been developed.
- Measure static water level and depth of well.

Adequate development must be verified based on stabilisation of basic water chemistry parameters (EC, pH, and temperature) and the production of sediment free water. Records of development should be kept including date, pumping rate, field parameters (including turbidity and odour), length of pumping and depth to bottom of well. Developing of the wells may take from under an hour to several hours depending on the depth of the well, drilling method used and geology.

The development pump and all items inserted into the bore should be cleaned as outlined in Section O.3.

Provision must be made for disposal of development water.

Although not always possible, ideally it is best to let a bore stabilise for 1 month after being drilled and developed before sampling.

P.8 Groundwater Sampling

This section outlines the sampling procedure required for groundwater monitoring at Levin Landfill (see the *Site Plan – Drawing 310101088-19-001-G001/E* attached in Attachment A for monitoring bore locations) and is based on the MfE, "*Nationally Standardised Protocol for State of the Environment Groundwater Sampling in New Zealand"* guidelines.

Tables A and B of Condition 3 of Discharge Permit ATH-2002003983.02 (formerly DP 6010) summarise groundwater monitoring locations, parameters, and frequency. Tables E and F of that condition provide comprehensive and indicator analyses lists, which are reproduced below in Table P-1.

Table P- 1: Test Parameters

Type	Indicator Parameters	Comprehensive Parameters
Physico-chemical characteristics	pH, Electrical Conductivity (EC)	pH, Electrical Conductivity (EC), Alkalinity, Total Hardness, Suspended Solids
Oxygen demand	Chemical Oxygen Demand (COD), scBOD5**	Chemical Oxygen Demand (COD), soluble carbonaceous Biochemical Oxygen Demand (scBOD5**)
Nutrients*	Nitrate nitrogen (NO_3-N), Ammoniacal-nitrogen (NH_3-N)	Nitrate nitrogen (NO_3-N), Ammoniacal-nitrogen (NH_3-N), Dissolved Reactive Phosphorus (DRP), Sulphate (SO4)
Metals*	Aluminium (Al), Manganese (Mn), Nickel (Ni), Lead (Pb), Mercury (Hg)**	Aluminium (Al), Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe)***, Magnesium (Mg), Manganese (Mn), Nickel (Ni), Lead (Pb), Zinc (Zn), Mercury (Hg)**
Other elements	Boron (B), Chloride (Cl)	Boron (B), Calcium (Ca), Chloride (Cl), Potassium (K), Sodium (Na)***
Biological+	E. coli	E. coli
Organics	Not required	Total organic carbon, total phenols, volatile acids

Notes:

*Analyses performed for nutrients and metals are for dissolved rather than total concentrations.

** $ScBOD_5$ and soluble mercury added as per revised consent conditions for Discharge Permit ATH-2002003983.02, December 2019.

*** Iron and sodium are tested at certain groundwater bores only.

P.8.1 Pre-sampling Checks

Prior to visiting the site:

- Check site details.
- Choose sampling method – bailing/pumping and gather equipment.
- Calibrate field meters:
  - pH: Calibrate at the start of each day using at least 2 standards solutions (pH 4 and 7 or 10).
  - Conductivity: Calibrate at the start of each day. Use at least 1 standard (50 -750µS/cm).
  - Temperature: Calibrate annually. Use at least 3 standard solutions (5 - 25°C).

Carry out the following checks on-site:

- Confirm correct sampling point.
- Check meter calibration.
- Clean sampling equipment (see Section O.3).

P.8.2 Purging of Monitoring Bores

Prior to sampling each monitoring bore it will need to be purged to ensure that the sample is representative of the general groundwater. This involves the following steps:

Measure the depth to water.

- Calculate the total volume to be purged (i.e., 3 times the volume of water in the bore) using the following equation:

$$Total\ purge\ volume = 3.14x[D - W][R]^2\ x\ 1000\ x\ 3$$

Where *D* = bore depth in metres
W = depth to water in metres
R = radius in metres

- Remove the calculated purge volume of water using the preferred pumping method.
- Monitor field parameters.
- Assess the adequacy of purging by checking whether the field water chemistry measurements have stabilised.

The above equation is used to determine the volume of water required to be purged from each bore before sampling. This calculates three times the volume of water within the well. Removing three times the well volume ensures that the sample is representative of the water within the aquifer and not just standing water within the bore casing.

To simplify the calculation of a purge volume the groundwater monitoring field sheets attached in Attachment A provide the volume in litres per metre for each bore based on the diameter of the bore. The field sheets then step through the process for calculating the purge volume based on the difference between the total bore depth and depth to water.

During purging conductivity, pH and temperature should be measured using a field probe. Once the well volume has been removed three times then the well should continue to be purged until these three parameters have stabilized at which stage the sample can be collected. This is to ensure that there is consistent water chemistry which would indicate that the water from the aquifer is being

abstracted. The range within which the parameters are required to be stabilised to collect the sample are as follows:

- Temperature: +/- 0.2 ° C
- Conductivity: +/- 3% (or if <100, +/- 5%)
- pH: +/- 0.1

These ranges are also provided on the field sheets.

The probes for the water quality meter should be placed in the bucket that collects the water during purging. Generally, more accurate readings are obtained from probes that are immersed in flowing water. Readings should be taken at each purge volume and recorded on the field sheet. Once all three purge volumes have been removed a reading should be recorded every 1-2L until the parameters have stabilised at which point a sample can be collected.

Note that the field probes need to be calibrated using standard solutions on each occasion that the probe is taken out into the field. Details for doing this should be provided in the manual for the field probes.

P.8.3 Sample Collection

This entails the following steps:

- Samples should be collected in the following general order[13] from the boreholes:
  - Xs2, D1, D6, F3, F2, D5 and E1s
  - D3rs, G1D, G1s, F1, D4, E1d and D3rd
  - D2, E2d, E2s, C2DD, Xd1, Xs1 and G2
  - C2DS, C1, B2, B3, B1 and C2
- This ensures that the bores are generally sampled in an order which ensures the least contaminated are sampled first with the most contaminated sampled last. This helps minimise cross contamination. Whilst this is not the most efficient way of collecting samples around the site, it is important to avoid cross-contamination as far as is practically possible.
- Prior to the commencement of sampling a clean piece of plastic should be placed on the ground beside the well. All equipment should be placed on this sheet when not in use and all cleaning should be carried out on the plastic sheet. As sampling equipment is removed from the well, care shall be taken to place it on the plastic sheet.
- If using a bailer, it should be lowered gently to avoid disturbance of any sediment that may still be in the bore and to avoid damage to the bailer or rope.
- Samples should be recovered from beside the slotted section of the standpipe and if using a pump, use a low flow pump rate when sampling to reduce mobilisation of sediment. While this is best practice it may not be practicable. Generally submersible pumps only pump at one speed. The key is to minimise the mobilization of sediment which can be done by ensuring that the pump is not placed near the bottom of the bore where the sediment would collect.

[13] This is based on ranking median values of four leachate indicators (ammoniacal-N, boron, chloride and conductivity) for 2022-2023 for each bore, coupled with taking a pragmatic approach to bore access and a need to minimise double-tracking, as far as possible.

- Care should be taken when sampling to avoid any opportunity for excess aeration of the sample.
- Sample bottles should be filled directly from the pump hose. If this is not practicable the jug or receptacle used to fill the sample bottles must be cleaned between sample locations. Unpreserved bottles can be filled first directly from the tube.
- Bottles with preservative in them should be filled using one of the unpreserved sample bottles being very careful not to overfill the sample bottle as this would cause some of the preservative to be lost. The bottle for microbiological contaminants should be filled last as this is a sterile bottle.
- Containers shall be filled to the very top of the container neck to avoid air in the sample. This is particularly important for volatile organic compounds and microbiological contaminants as exposure to air can affect the sample results for these parameters.
- As the bailer or pump is removed from the well, care should be taken to place the rope or pump leads on the plastic sheet.
- Water samples should be placed in screw capped containers, which shall be prepared by the laboratory. Bottles supplied shall be plastic for metals and inorganics and glass for organics.
- A sample collection record form should be completed for each sample collected.
- All samples should be labelled and chilled immediately at < 4°C. Transfer to the analytical laboratory should ideally be the same day as collection. Water for microbiological analysis should be at the laboratory within 24 hours of collection.
- Measure the depth to water level, ensuring that the level has stabilised within the bore, and avoiding cross-contamination between bores by cleaning the dip meter prior to using it in the next groundwater bore.

All field data should be made available along with the results to HDC and/or the consultant preparing the compliance monitoring reports on behalf of HDC.

P.9 Surface Water Sampling

Table C of Condition 3 of Discharge Permit 6010 summarises the surface water monitoring locations, parameters, and frequency. Tables E and F of that condition provide comprehensive and indicator analyses lists.

The following is the procedure required for sampling the Hōkio Stream (see the *Site Plan – Drawing 310101088-19-001-G001/E* attached in Attachment A) for sampling locations HS1A, HS1, HS2, HS3, TD1, and the manhole next to the pond.

- Samples should be collected in the following general order from the surface water sampling locations: HS1A, HS1, HS2, HS3, TD1, and manhole next to the pond.
- This ensures that the surface water sampling locations are sampled in an order which ensures the least contaminated are sampled first with the most contaminated sampled last. This helps minimise cross contamination. Whilst this is not the most efficient way of collecting samples around the site, it is important to avoid cross-contamination as far as is practically possible.
- Prior to the commencement of sampling a clean piece of plastic should be placed on the ground beside the pond or stream. All equipment should be placed on this sheet when not in use and all cleaning should be carried out on the plastic sheet in accordance with Section 3. Equipment shall be cleaned prior to the recovery of each sample.

- Observations of stream flow, substrate, aquatic life, staining, odour, and recent weather shall be recorded in the field book and referenced to each sampling location.
- A clean stainless-steel jug should be used to collect the sample, and a new pair of disposable gloves should be worn for each new sample. It is also acceptable to use the largest unpreserved sampling bottle and fill all other bottles from this bottle. This will save requiring to clean the jug between samples.
- Stream samples shall be collected from below the stream surface to prevent accidental sampling of surface slicks. It is understood that generally the flow in Tatana's Drain is too low to collect a sample from below the surface. To combat this a depression should therefore be excavated within the stream to locally deepen the channel. The site should be left until the disturbed sediment has settled and/or washed away and then the sample collected. This method is a good solution to the issue so long as enough time is allowed to ensure the sediment has settled.
- During sampling the field pH, temperature and electrical conductivity of each sample should be recorded once just prior to taking the samples, and a photograph taken of the recovered sample, placed against a white background as a visual reference.
- Care should be taken not to introduce any excess aeration to the sample during collection.
- The sampling equipment should be lowered gently to avoid disturbance of any sediment.
- Water samples should be placed in screw capped containers, which shall be prepared by the laboratory. Bottles supplied shall be plastic for metals and inorganics and glass for organics.
- Containers shall be filled to the very top of the container neck to avoid air in the sample. Note, do not overflow bottles containing preservatives.
- A sample collection record form should be completed for each sample collected.
- All samples should be labelled and chilled immediately at < 4°C. Transfer to the analytical laboratory should ideally be the same day as collection. Water for microbiological analysis should be at the laboratory within 24 hours of collection.

All field data should be made available along with the results to HDC and/or the consultant preparing the compliance monitoring reports on behalf of HDC.

P.10 Private Bore Sampling

Consent condition 13 of Discharge Permit ATH-2002003983.02 (formerly DP 6010) requires the sampling of private bores within a 1.5km radius down-flow or across-flow from the landfill property boundary. These bores will only be monitored if requested by the landowner by written invitation. The frequency of monitoring is to be determined by HDC and discussed with the property owner. The *Tasks and Assigned Responsibilities* for monitoring private drinking bores are shown in a flow diagram attached as Attachment B.

The following are the procedures for sampling from private bores:

- If direct access to the bore is possible follow groundwater monitoring bore sampling procedures as described in Section M.7.
- If direct access to the bore is not possible, sample the tap closest to the bore that receives only unfiltered bore water. The tap should be cleaned following the cleaning procedures outlined in Section 3 to avoid transference of any introduced matter from around the tap into the sample. Leave tap running for 5 to 10 minutes prior to sample collection to avoid introduction of potential contaminants from plumbing.

- If all water is mixed (i.e., roof and bore) a sample can be collected from any tap. The tap should be cleaned following cleaning procedures outlined in Section 3 to avoid transference of any introduced matter from around the tap into the sample. Leave tap running for 5 to 10 minutes prior to sample collection to avoid introduction of potential contaminants from plumbing.
- Bore details such as total depth, screening depth, static water levels (where available or can be measured) should be collected at each location.
- Care should be taken not to introduce any excess aeration to the sample during collection.
- Water samples should be placed in screw capped containers, which shall be prepared by the laboratory. Bottles supplied shall be plastic for metals and inorganics and glass for organics.
- Containers shall be filled to the very top of the container neck to avoid air in the sample. Note: Do not overflow bottles containing preservatives.
- A sample collection record form should be completed for each sample collected.
- All samples should be labelled and chilled immediately at < 4°C. Transfer to the analytical laboratory should ideally be the same day as collection. Water for microbiological analysis should be at the laboratory within 24 hours of collection.

All field data should be made available along with the results to HDC and/or the consultant preparing the compliance monitoring reports on behalf of HDC.

P.11 General Comments on Sampling

Samples requiring microbiological analysis must be analysed by the laboratory before 24 hours has elapsed from collection. This means that samples should be couriered to the laboratory overnight. This is likely to mean that the sampling day will need to conclude early so that the samples can be sent with the last courier. It is important that all samples are chilled to approximately 4ºC.

It is recommended that gloves are worn when sampling to minimise cross contamination. Chemicals applied to the skin from insect repellents, sunscreen etc. can affect the results. Wearing a new pair of disposable gloves when filling the sample bottles and when cleaning the equipment for each sampling location can ensure this cross-contamination does not occur. If gloves are not worn it is important to ensure that the inside of the lid and the neck of the sample bottles are not touched during collection of the sample.

P.12 Soil Sampling

If irrigation of leachate is to recommence (which is considered highly unlikely), consent condition 4 of Discharge Permit ATH-2002003984.02 (formerly DP 6010) requires the following soil sampling to be conducted in the irrigation area.

- Background samples should be collected prior to any leachate irrigation commencing again at the landfill.
- The first samples required by the schedule shall be taken during April and October immediately following the start of irrigation, whichever comes first.
- Soil sample sites shall be chosen in consultation with the Regional Council.

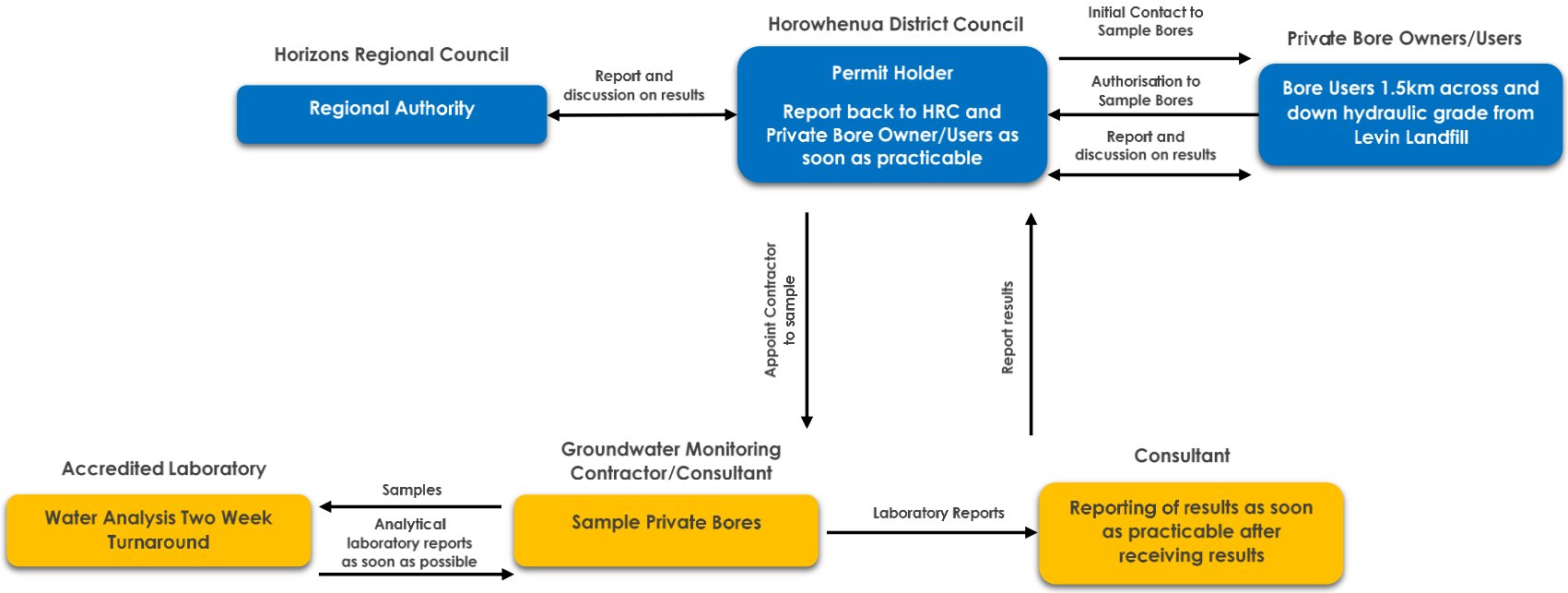
- Soil samples shall be obtained from two locations within each leachate irrigation area, with the sampling locations separated by at least 50m. Soil samples shall also be obtained from one location down gradient from each leachate irrigation area, with the sampling point selected at a low point between the old dunes. Note that four soil sampling sites were selected in conjunction with the Regional Council in 1994. They are sites A to D, shown on the *Site Plan - Drawing 310101088-19-001-G001/E* attached in Attachment A. The fitness of these sites should be confirmed with the Regional Council if soil sampling is required in the future, as indicated by the first bullet point.
- A handheld auger should be used to collect the samples. The auger should be cleaned following procedures outlined in Section 3 prior to sample collection.
- Fresh disposable gloves should be used for the collection of each sample.
- Each soil sample shall consist of a continuous soil core obtained from the surface to a depth of 0.2m.
- Samples should be placed into jars provided by the laboratory, chilled, and sent under CoC documentation to the laboratory for analysis.
- The location, date, time, sample ID and a site plan should be recorded in the Field Book.

All field data should be made available along with the results to HDC and/or the consultant preparing the compliance monitoring reports on behalf of HDC.

Attachment A - Sampling Schedule and Site Plan

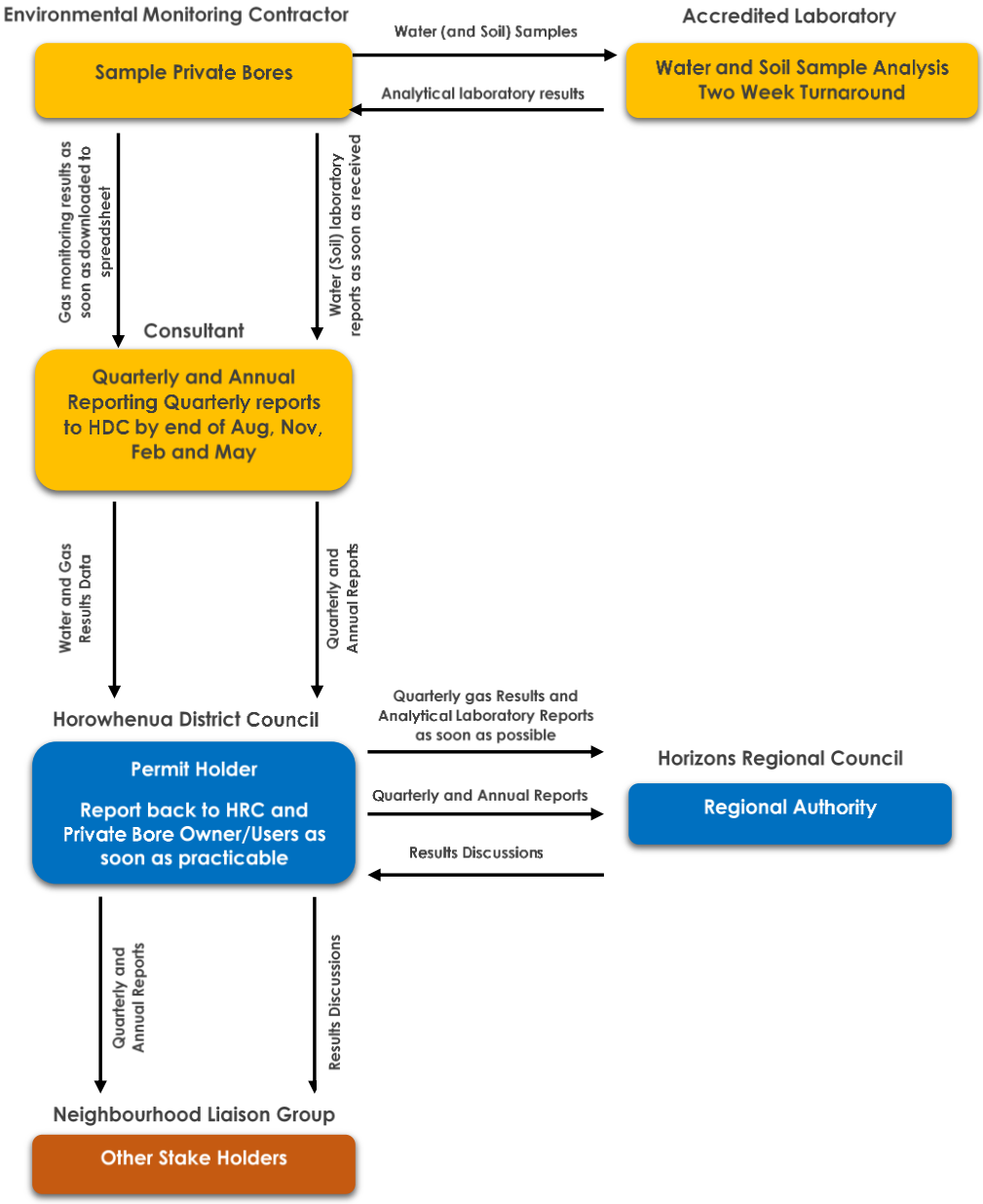
Attachment B - Responsibilities for Monitoring Drinking Water Bores

DRINKING BORE MONITORING – TASKS AND ASSIGNED RESPONSIBILITIES



Attachment C - Responsibilities for Environmental Monitoring

ENVIRONMENTAL MONITORING – TASKS AND ASSIGNED RESPONSIBILITIES



Attachment D - Field Sheets

Appendix Q ENVIRONMENTAL MONITORING AND REPORTING REQUIREMENTS

Groundwater, surface water and gas monitoring (of monitoring bores) is to be undertaken at Levin Landfill in compliance with the resource consents, as listed in Table Q- 1 below. Listed also, are the parties responsible for various activities. Additionally, activities are indicated in the table which could be curtailed or reduced, on account of the landfill closure.

Table Q- 1: Levin Landfill Environmental Monitoring Requirements

Discharge permit ATH-2002003983.02 (DP 6010) - Discharge Landfill Leachate onto and into Land		
Condition	**Description**	**Responsibility**
3	Quarterly groundwater, surface water and leachate monitoring of various parameters, and monthly monitoring of surface water in the Hōkio Stream (for a period of two years)	HDC to appoint a sampling contractor. HDC to commission report on monthly sampling. HDC to liaise with HRC about stopping monthly sampling.
4	Six monthly soil monitoring within the leachate irrigation area.	HDC to appoint a sampling contractor. Sampling required only if irrigation of leachate is to be undertaken.
13	Groundwater monitoring of groundwater bores within a 1.5km radius of the landfill property boundary.	If invited to do so by bore owners.
Discharge permit ATH-2002003984.02 (DP 6011) - Discharge Landfill Gas, Odour and Dust to Air		
Condition	**Description**	**Responsibility**
4(a)	Quarterly sampling of groundwater wells for landfill gas (CH_4, CO_2 and O_2) when groundwater samples are taken	HDC to appoint a sampling contractor.
4(e)	Monthly methane surface monitoring of areas capped with a temporary or permanent cap, and the bio-filter bed.	HDC to appoint a sampling contractor. Discuss with HRC the need for monthly monitoring of capped Area A3. Bio-filter has been disconnected – monitoring not required.
4(j)	Weekly and monthly monitoring of various parameters at the bio-filter.	Bio-filter has been disconnected – monitoring not required.
4(p)	Continuous 1-minute interval collection of meteorological data from an on-site weather station.	HDC to install and maintain an on-site weather station. Discuss requirements to continue with HRC.
8D	Monthly field investigations of ambient odour at locations beyond the site boundary that are downwind of the landfill and residential houses.	Waste disposal operations completed – odour monitoring not needed – combine with weekly/monthly inspections?

8E	Weekly walkover inspections of all landfill surfaces, including areas around the bio-filter and pond.	Council Landfill Engineer to undertake. Does not need to include the bio-filter.
Discharge permit ATH-2002009801.02 (DP 102259) - Discharge Stormwater to Land and potentially to Groundwater via ground soakage		
Condition	**Description**	**Responsibility**
14	Quarterly monitoring of groundwater quality in at least one upgradient and one downgradient bore of the stormwater soakage area. Use can be made of the other groundwater monitoring bores.	HDC to appoint a sampling contractor.
Discharge permit ATH-2014015044.01 (DP 106798) - Discharge to Air (Flared Landfill Gas)		
Condition	**Description**	**Responsibility**
15	Monthly sampling of each extraction wellhead for a variety of parameters as stated in the consent conditions.	HDC to appoint a sampling contractor.

HDC is required to report to HRC and the NLG with the Annual Environmental Monitoring Report and quarterly monitoring results. Table Q- 2 on the following page is a summary of the requirements of HDC for this reporting. Note that the annual reporting requirements for the landfill gas flare under discharge permit ATH-2014015044.01 (DP 106798) are required in or at the end of June each year. Reporting activities are indicated in the table which could be increased, curtailed or reduced, on account of the landfill closure.

Table Q- 2:Annual Environmental Monitoring Report Requirements

Discharge permit ATH-2002003983.02 (DP 6010) - Discharge Landfill Leachate onto and into Land		
Condition	**Description**	**Action to be Taken and Timeframe**
5	Results of environmental monitoring to be reported to HRC, and to the NLG, by 30 September each year.	HDC to provide Environmental Monitoring Report to HRC and NLG by 30 September each year.
	Results of quarterly monitoring to be made available to HRC and NLG.	Quarterly monitoring results to be provided by the end of August, November, February and May each year for the respective quarters.
11 (aa)	Surface water sampling results to be assessed against the ANZECC (2000) Water Quality Guidelines for 95% protection levels for Aquatic Ecosystems.	Parameter exceedances to be reported to HRC to determine if further investigation or remedial measures are required.
11d	Evaluate contaminant mass loading projections using monitoring data obtained from the “B”, “C” and “X” series bores.	To be done annually. Methodology to be reviewed in light of additional work by Earthtech.
15 f	The condition of the unlined landfill is to be reported on each year in the Annual Report.	HDC to report each year by 30 September. Report to cover inter alia: settlement, vegetation condition, construction carried out, results of annual survey, proposed construction.
27	HDC to keep a log of leachate quantities irrigated, irrigation system inspections carried out, as well as weather conditions. In lieu of (when not irrigating) HDC is to keep a record of leachate volumes re-circulated and pumped to the WWTP.	Provide copies of the log to HRC on 28 February and 31 August each year. No leachate irrigation occurring.
28 & 29	Carry out monthly inspections of the landfill for leachate break out, settlement and other adverse effects. Record the date, time observations and any remedial action taken as a result of the inspections.	Monthly inspections required and include copies in the Annual Report. Amend to monthly inspections and after all heavy rain events.
Discharge Permit ATH-2002003982.03 (DP 6009) – Discharge Solid Waste to Land		
Condition	**Description**	**Action to be Taken and Timeframe**
8	Any hazardous wastes accepted for disposal at the landfill needs to be recorded in a permanent record.	Hazard wastes disposed of shall be reported on annually by 30 September each year. Not needed any longer.
14 (q)	Monitor the closed landfill annually to identify any issues of; instability, erosion, differential settlement or changing vegetation patterns.	To be done annually and reported on with the annual report by the end of September each year.
Discharge Permit ATH-2002003984.02 (DP 6011) - Discharge Landfill Gas, Odour and Dust to Air		
Condition	**Description**	**Action to be Taken and Timeframe**

4 (a)	Sample groundwater monitoring wells for methane, carbon dioxide and oxygen.	Included as part of groundwater sampling and reported in the annual report.
4 (g)	Records of surface emission monitoring.	Results to be included in the annual report and made available to HRC on request.
8 F	HDC to maintain a log of all other inspections, investigations and actions taken in accordance with the monitoring and odour inspection conditions of consent.	Log to be made available to HRC on request and submitted in summary form in the annual report.

Discharge Permit ATH-2002009801.02 (DP 102259) – Discharge Stormwater to Land and potentially to Groundwater via ground soakage

Condition	Description	Action to be Taken and Timeframe
16	Results of monitoring to be sent to HRC by 30/09 each year.	Send raw water quality analysis data to HRC after receiving it back from the laboratory.

Discharge Permit ATH-2014015044.01 (DP 106798) – Discharge to Air (Flared Landfill Gas)

Condition	Description	Action to be Taken and Timeframe
11	HDC to review the Operations and Management plan annually.	Review to be done in the month of June, commencing 2017.
14	HDC to keep a record of all flare outages in excess of 48 hours and forward a copy of the record to HRC annually in month of June.	HDC to send records of outages in June each year.
18	HDC to forward a copy of the complaint log to HRC annually.	HDC to send copy of log in June each year.

In addition to the annual reporting requirements, there are other reporting requirements and deadlines to be met for various matters. These are listed in Table Q- 3 below. Reporting activities are indicated in the table which could be increased, curtailed or reduced, on account of the landfill closure.

Table Q- 3:Additional Reporting Requirements and Deadlines to be Met

Discharge permit ATH-2002003983.02 (DP 6010) - Discharge Landfill Leachate onto and into Land		
Condition	**Description**	**Action to be Taken and Timeframe**
5		We will await consent conditions on frequency of reporting
22	If the quality of leachate being irrigated to land exceeds the STV parameters as set out in the ANZECC Guidelines for metals in Irrigation Water, the significance is to be reported to HRC as soon as practicable.	HDC to test regularly the quality of leachate that is irrigated to land. No irrigation is currently occurring.
Discharge Permit ATH-2002003984.02 (DP 6011) - Discharge Landfill Gas, Odour and Dust to Air		
Condition	**Description**	**Action to be Taken and Timeframe**
4 (e)	Carry out methane surface monitoring of all areas of the landfill that have been capped temporarily or permanently, and also include the bio-filter bed.	Monitoring of Area A3 to be done monthly, but not during or immediately after heavy rainfall events, or during strong wind speed conditions. Discuss with HRC the need for monthly monitoring of capped Area A3. Bio-filter has been disconnected – monitoring not required.
4 (h)	Leachate collection chamber to be vented to a bio-filter within 6 months of the date of commencement of the 2015 review decision.	Bio-filter has been completed and leachate collection chamber is being vented. Bio-filter has been disconnected – not applicable now.
4 (i)	HDC to arrange for a comprehensive assessment of the bio-filter covering; media size distribution and composition, effectiveness in removing contaminants, and review of records and measurements made under condition 4 (j).	A comprehensive assessment is required annually. Bio-filter has been disconnected – not applicable now.
4 (l)	HDC to install a landfill collection system and a flare.	LFG flare has been installed, and gas collection system is being extended regularly. Extent of gas collection system is complete.
4 (m)	HDC to prepare an Odour Management Plan (OMP) covering matters described under conditions (i) to (xiv).	The OMP is to be provided to the Regional Council's Regulatory Manager within 2 months of the commencement date of the 2015 review of conditions. Completed. Odour management plan is designed for operational landfill. OMP needs full review.

4 (n)	HDC to consult with the NLG.	During development of the OMP and at any time when the OMP is reviewed. Completed.
4 (q)	HDC to provide HRC with collected meteorological data.	To be provided monthly in a format suitable for HRC to upload on its data management system. Discuss requirements to continue with HRC. Weather reporting now redundant as landfill closed.
7	HDC to keep a record of complaints received.	Complaints Record Register to be set up. Record to be made available to HRC on request. Completed.
8A and 8 B	HDC to nominate a liaison person to manage air quality complaints.	Complaints regarding dust or odour emanating from the landfill are to be investigated with 24 hours, or at a time mutually agreed with the complainant. Ongoing.
8 C	HDC to advise HRC and Mid-Central Health of any offensive or objectionable odour emanating from beyond the landfill boundaries. Provide an explanation for the odour, and details of any remedial and follow-up actions to be taken, and details of the wind speed and direction at the time of the incident	To be done as soon as practicable after becoming aware of the odour. Ongoing.

Discharge Permit ATH- 2002003680.02 (DP 7289) – Discharge Liquid Waste onto and into Land		
Condition	**Description**	**Action to be Taken and Timeframe**
5	HDC to notify HRC and CNLG of intention to dispose of liquid waste.	To be done as soon as possible after receiving notification to dispose. CNLG to be notified in writing. No longer needed.
17	HDC to maintain a Liquid Waste Register.	HDC to maintain a Liquid Waste Register. No longer needed.

Discharge Permit ATH-2014015044.01 (DP 106798) – Discharge to Air (Flared Landfill Gas)		
Condition	**Description**	**Action to be Taken and Timeframe**
6	Replacement flare to be installed by 1 July 2016 and HRC to be notified in writing within 2 working days of the installation.	Completed by HDC.
10	HDC is to provide an Operation and Management Plan to HRC providing a range of details about the landfill gas flare and collection infrastructure.	HDC to provide the Operation and Management Plan 2 months prior to the installation of the new flare.

13	HDC to notify HRC 2 days prior to commencing of flaring from the existing and replacement flare.	HDC has complied.
14	HDC to keep a record of all flare outages in excess of 48 hours and forward a copy of the record to HRC annually in month of June.	HDC to send records of outages in June each year.
15	HDC to sample each extraction wellhead and the flare for a variety of parameters.	HDC to comply.
16	HDC to provide sampling results under 15 to HRC within 1 month of monitoring being done.	HDC to comply monthly whilst flare is operating.
17	HDC to maintain a log of all complaints regarding dust, odour or other contaminants.	HDC to comply.

Appendix R MFE GUIDELINE

The "*MfE Guide for the Management of Closing and Closed Landfills in New Zealand (May 2001)*" provides guidance on recommended water and landfill gas monitoring for closed landfills. The recommendations vary depending on the size of the closed landfill (i.e., amount of refuse that has been deposited in the landfill over its lifetime) and the time elapsed since closure.

The table below lists the recommendations for a landfill exceeding 100,000 m^3 in volume.

Recommend building MfE water and gas sampling guidelines into body of the CLMP

Table R- 1: MfE Guide for Environmental Monitoring after Closure

Years since Closure	Water	Landfill Gas
0 - 5	**Comprehensive** Leachate – yearly Groundwater – bi-annually Surface water – bi-annually **Indicator** Groundwater – quarterly Surface water – quarterly	**Three Monthly** • visual inspection • surface monitoring • subsurface monitoring • building monitoring
5 - 15	**Comprehensive** Groundwater – yearly Surface water – yearly **Indicator** Groundwater – bi-annually Surface water – bi-annually	**Six Monthly** • visual inspection • subsurface monitoring • building monitoring
15 - 40	**Indicator** Groundwater – yearly Surface water – yearly	**Six Monthly** • visual inspection • building monitoring

Appendix S SITE RECORDS AND RECORDING FORMS

It is a requirement of the resource consent that various records be kept. The following records shall be kept and maintained throughout the life of the landfill. A column has been included in the table to indicate where the requirement is now superfluous, given the closure of the landfill.

Table S- 1:Record Requirements

Discharge permit ATH-2002003982.03 (DP 6009) - Discharge Solid Waste to Land		
Condition	**Records Description**	**Still Required Following Landfill Closure?**
8	Details of hazardous wastes accepted including copies of manifests issued.	Not required
14(q)	Document the condition of the unlined (old) landfill and any maintenance carried out.	Required
25	Maintain records of the following for biosolids and sludges: • The type of waste received. • The volume of waste received. • Source of waste. • The location (by survey) in which the material was placed.	Not required
Discharge permit ATH-2002003983.02 (DP 6010) - Discharge Landfill Leachate onto and into Land		
Condition	**Records Description**	**Still Required Following Landfill Closure?**
3	Groundwater, surface water and leachate monitoring of various parameters.	Required
4	Soil monitoring within the leachate irrigation area, if irrigation of leachate is to be undertaken.	Not required
13	Groundwater monitoring of groundwater bores within a 1.5km radius of the landfill property boundary, if invited to do so by bore owners.	May be required
14	Carry out annual topographic survey and assess the in-situ refuse density.	Reuse density not required
15(f)	Document the condition of the unlined (old) landfill and any maintenance carried out (links to condition 14(q) of DP ATH-2002003982.03 (DP 6009)).	Required
23	Meter and record the volume of leachate irrigated to land daily.	Not required
27	For the leachate irrigation area, keep records of: • The date and times of leachate irrigation. • The total volume of leachate irrigated daily. • The volumes of leachate irrigated to specific areas. • Weather and ground conditions during irrigation.	Not required

	• Observations made during the weekly inspections of the pump, irrigation systems and irrigation areas. • Repairs and maintenance carried out on the irrigation system.	
29	Record date, time and observations and any remedial action taken as a result of leachate breakout, settlement and other adverse effects.	Required

Discharge Permit ATH-2002003984.02 (DP 6011) - Discharge Landfill Gas, Odour and Dust to Air		
Condition	**Records Description**	**Still Required Following Landfill Closure?**
4(a)	Sample groundwater wells for landfill gas (CH_4, CO_2 and O_2) when groundwater samples are taken.	Required
4(g)	Maintain records of monthly methane surface monitoring of areas capped with a temporary or permanent cap, and the bio-filter bed.	Not required for bio-filter
4(j)	Measure and record the following parameters at the bio-filter: • Daily visual inspection of the state of the bio-filter bed • Daily inspection of the inlet gas fan and duct work and any maintenance required • Weekly recording of pressure across the bio-filter bed. • Weekly monitoring and recording of the bio-filter media moisture content. • Monthly monitoring and recording of the pH of the bio-filter media.	Not required
4(p)	Collect and record the following meteorological data: • Wind direction • Wind speed • Air temperature • Barometric pressure • Relative humidity • Rainfall	Required
7	Keep a record of any complaints received, including, where possible: • Names and addresses of complainants. • Nature of complaint. • Date and time of the complaint and alleged event. • Weather conditions at the time of the complaint. • The activities that were occurring on site at the time. • The cause or likely cause of the event and any factors that influenced its severity. • Any action taken in response to the complaint. • Steps to be taken in the future to prevent a re-occurrence.	Required
8	Keep a record of landfill gas monitoring results including: • Date and time of sampling. • The concentration of gases detected. • Weather conditions at the time of the sampling.	Required
8D	Undertake monthly field investigations of ambient odour at locations beyond the site boundary that are downwind of the landfill and residential houses.	May be required Needs reviewing
8E	Carry out a weekly walkover inspection of all landfill surfaces, including areas around the bio-filter and pond.	Not required for bio-filter. Weekly may need to be moved

		to monthly to reflect a closed landfill
8F	Maintain a log of all inspections, investigations and actions taken in accordance with all monitoring and odour inspection conditions of the consent.	Required

Discharge Permit ATH-2002003680.02 (DP 7289) – Discharge Liquid Waste onto and into Land		
Condition	**Records Description**	**Still Required Following Landfill Closure?**
17	Record the following with respect to liquid waste: • The type of liquid waste received. • The volume of liquid waste received. • The source of liquid waste. • The location (by survey) in the landfill in which the material was placed.	Not required

Discharge Permit ATH-2002009801.02 (DP 102259) – Discharge Stormwater to Land and potentially to Groundwater via ground soakage		
Condition	**Records Description**	**Still Required Following Landfill Closure?**
14	Monitor groundwater quality in at least one upgradient and one downgradient bore of the stormwater soakage area. Use can be made of the other groundwater monitoring bores.	Required

Discharge Permit ATH-2014015044.01 (DP 106798) – Discharge to Air (Flared Landfill Gas)		
Condition	**Records Description**	**Still Required Following Landfill Closure?**
14	Record dates and durations of all flare outages (due to equipment failure or maintenance) in excess of 48 hours and for any occasion for which landfill gas was discharged un-combusted.	Required Consideration needs to be made that the flare gas volumes are falling, and the flare may not have enough volume to operate 24/7
15	Sample each extraction wellhead for a variety of parameters as stated in the consent conditions.	Required
17	Maintain a log of all complaints regarding dust, odour and other complaints.	Required

The following forms are provided as a guide for the information required:

- Site Walkover Sheet
- Landfill Complaints Record
- Landfill Incident Record

LEVIN LANDFILL – HOROWHENUA DISTRICT COUNCIL

SITE WALKOVER SHEET

Recording Form to be completed by the Council Landfill Engineer
Complete All Information Where Possible

Assessor:			**Time:**	**Date:**
Weather Conditions: Fine / Overcast / Showers / Rain			**Wind Strength & Direction:**	
	OK	**Issue**	**Comments / Action Required**	**Close Out**
GENERAL SITE:				
Road maintenance / dust				
Odour / Refuse / Gas				
Gas System / Flare				
Settlement				
Evidence of Vermin / Pests /				
OSH issues / Signage				
Litter				
Presence of noxious weeds				
Other				
CLOSED LANDFILL AREAS:				
Vegetation cover				
Capping condition				
Areas of ponding / settlement				
Evidence of landfill gas				
Other				
STORMWATER:				
Drains and outlets clear				
Soakage ponds clear				
Other				
LEACHATE:				
Breakouts				
Irrigation operating				
Pond in operation				
Pond level				
Other				

LEVIN LANDFILL – HOROWHENUA DISTRICT COUNCIL

LANDFILL COMPLAINTS RECORD

Recording Form to be completed by the Council Landfill Engineer
Complete All Information Where Possible

Landfill: _____Person recording Details: _____

Date: _____Time:_____

Complainant's name: _____

Address of Complainant: _____

Complaint: (Circle) Litter, Dust, Visual, Rodents, Odour, Fire, Noise, Road/Mud, Locked in/out, Staff Attitude,

Other_____

_

Details of Complaint: _____

_

_____

_____

_____

_____

Date of alleged event: _____Time of alleged event: _____

Weather Conditions at the time: _____

Wind direction: _____Wind Speed: _____

Temperature (°C): _____Rain (circle): Y/N

Activities occurring on site at the time: _____

Dates that complaint details were advised to Horizons Regional Council _____and

Mid-Central District Health Board_____

Follow up by Council Landfill Engineer:

Date	**Time**	**Actions to Rectify:** May include phone or visit landfill, check weather and wind, investigate source, remedy action, notify complainant

Date the complainant was informed of the results of the investigation:
_____

Complaint Rectified:

Staff Name: _____

Date: _____Time:_____

LEVIN LANDFILL – HOROWHENUA DISTRICT COUNCIL
LANDFILL INCIDENT RECORD

Recording Form to be completed by the Council Landfill Engineer

Landfill: _____Person recording Details: _____

Date: _____Time:_____

Type of Incident: (Circle) Fire, Landfill Gas Problems, Leachate System Failure, Stormwater System Failure, Failing of Roading or Access to Tip Face, Machinery Breakdown, Earthquake,
Other_____

Reasons for the Incident: _____

_____

_____

Date of incident: _____Time of incident: _____

Location of Incident: _____
Follow up by Council Landfill Engineer (to be completed by Council Landfill Engineer):

Date	Time	Actions to mitigate the incident or prevent reoccurrence

Incident Rectified/Mitigated:

Staff Name: _____

Date: _____Time:_____

Appendix T CUSTOMER SERVICE CHARTER

Appendix U EMERGENCY CONTACTS LIST

Table U- 1:Emergency Contact List

Site Address: 665 Hōkio Beach Road, Levin 5571			
Contact Person or Organisation	**Title**	**Office Phone**	**Mobile Phone**
Horowhenua District Council		06-366 0999 (24 hours)	
David McMillan	Solid Waste Manager	06-366 0999	027 249 1292
Compliance Monitoring (HRC)	Duty Officer	0508 800 800	
Council Landfill Engineer			
Scott Wardlaw	Council Landfill Engineer	06-366 0999	027 225 0884
Others			
Fire and Emergency		111	
Medical Emergency		111	
Mid Central Health Board	Medical Officer of Health	06-350 9110	
Pump Maintenance Contractor	Local Waters Team	06-366 0999	
Landfill Gas Engineer	Whanganui Environmental Engineering	020 4074 9301	
Archaeologist	Daniel Parker	0274210803	
Additional Numbers			
Police	Levin	06-366 0500	
National Poison Centre		0800 764 766 (Urgent)	
Horowhenua Medical Centre	Levin	06-366 0888	
Hospital	Palmerston North	06-356 9169	

Appendix V FEEDBACK RECEIVED ON THE 1ST DRAFT OF THIS CLMP

Feedback was received from the following parties:

- *Archaeologist*
- *Catalyst Group*
- *Horowhenua District Ratepayers and Residents Association Inc*
- *Hōkio Progressive Association Inc*
- *Horizons Regional Council*
- *Neighbourhood Liaison Group*
- *Water and Environmental Care Association Inc*

Appendix W FEEDBACK RECEIVED ON THE 2ND DRAFT OF THIS CLMP

Feedback was received from the Catalyst Group.