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Ecocast Ltd Removal and Beneficial use of Wastewater Treatment Plant Biosolids Operating Management Plan

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1 Key Contact Details

The key people involved in the Ecocast operation are as follows. Note abbreviations as used in subsequent text.

Table 1.1. Contact numbers

Contact's Role	Organisation	Contact's Name	Phone Number
Project Manager	Ecocast	Tom McDowall	0274 938346
Site Supervisor	Ecocast	Bernie Tientjes	027 352 7097
Consent Compliance Officer	BOPRC	Hayden Graham	0800 368 267
Groundwater and air quality monitoring	WSP	Lance Robison	027 605 1390
Technical advice	WSP Air Matters Ltd	Peter Askey (WSP) Robert Murray (AM)	027 4766 459

2 Overview

The operation covers the collection of biosolids from various District Councils WWTPs (Wastewater Treatment Plants and Oxidation Ponds) and transportation of the biosolids to a processing site in Kawerau. The biosolids are then mixed in roughly equal proportions with a high carbon wood substrate (referred to below as "substrate") and then processed by compost worms and composting over 12 to 18 months. Additional material generated by dewatering septic tank and oxidation ponds sludge is also processed at the site in Kawerau.

On completion of the processing, the treated biosolids are "Aa" grade (in terms of the Biosolids Guidelines) organic soil enhancer that is used as a soil conditioner/fertilizer on maize blocks in accordance with various regulations or mixed with other composted material and used in Kiwi Fruit orchards as fertilizer and soil conditioner.

Shredded green waste is also used as a feedstock in the composting process. Processing of green waste is carried out on a separate site and is not covered in this Plan.

The carbon source can be a variety of waste wood or horticultural residue products. Historically the biosolids were mixed with reject pulp solids from Norske Skog and Oji Fiber Solutions pulp and paper processes. Since early 2023 this material was no longer available and the operation has sourced wood shred from Whakatane Board Mills (WML). The feedstock is discussed further in Section x below.

The nett outcome of the operation is that two waste streams that would otherwise be landfilled are combined and processed into a useful product.

Operation of the site is carried out by Ecocast using their own resources and machinery. The site employs approximately 4 people plus occasional use of outside contractor plant from Kawerau area.

2.1 Objectives of this Site Management Plan

This Site Management Plan (SMP) specifies how the site will be managed and operated so as to minimise the effect on the environment and neighbouring property.

The following objectives are set for the vermicomposting operation:

- To operate in compliance with the site resource consents
- To minimise discharges of contaminants to the wider environment
- To minimise nuisance effects on adjoining property
- To ensure safety of people on the site
- To make optimum use of the site capacity
- To maximise recovery of reusable material from the waste received
- To maximise the quality of the finished product

2.2 Purpose

The purpose of the Management Plan is to establish a common understanding of the technical and non-technical requirements that will be addressed by Ecocast and various other organisations. The goals of management are to ensure that requirements are controlled to establish a baseline for development, acquisition, or management; and to ensure plans, work products, and activities are consistent with the requirements.

The Management Plan establishes an orderly method by which the goals will be achieved. The plan also communicates essential information to project participants and helps newcomers get up to speed. Consequently, the plan is a living document, which will be regularly updated and supplemented throughout its life.

2.3 Plan Contents

The Plan is divided into the following key sections:

- Site management and administration
- Site design
- Vermicomposting routine operations
- Health and Safety
- Site and environment monitoring
- Reporting and documentation of activities
- Contingency planning for unlikely events

2.4 Resource Consents

Currently (March 2024) the site operates under BOPRC Consents RC 65549 granted May 2009, expiry October 2024. The Consent is included as Appendix 1. Reference is made through the Management Plan to the relevant consent condition, with the conditions included in text boxes or italics as <Condition #>. As the consent is currently subject of a renewal application, these cross references will be updated once the new consent is issued.

2.5 Management Plan is a Condition of Consent

The preparation of a Site Management Plan is a requirement of the Resource Consents held for the site <Condition #6>. The consent prescribes the matters to be covered in the Management Plan, including:

- *Raw material management, application to worm beds;*
- *Stormwater management, site management;*

- Odour and dust control, pest control and vector attenuation;
- Work instructions/ standard operating procedures;
- Protection of archaeological sites;
- Record Keeping, raw material acceptance, quality assurance, quality control;
- Health & Safety, environmental monitoring (soil, groundwater), signage;
- Contingency plans (overflow, truck overturn etc);
- Compliance with resource consent, sampling, complaints register;
- Any other relevant matters

2.5.1 Review

This SMP will be checked annually by Ecocast for currency or as any substantive changes are made. When reviewing this document, the following should be considered:

- Changes to the site infrastructure that have been made
- Environmental monitoring results
- Records of compliance with the site's resource consents, applicable legislation (refer regional and district plans and other legislation Compliance and Legislation and Planning Instruments);
- Any complaints received
- Any changes to the regulatory environment such as any new NES pertinent to waste management
- Records of Management Reviews, Incident reports, Safety and Health Committee meetings,
- Internal and external audit results (health and safety or environmental).

2.6 Contractor Induction to Management Plan

Upon engagement of any new subcontractors on the site, Ecocast will conduct an induction of the Contractor and “hand over” of this Management Plan.

2.7 Organisations Affected by this Plan

The following organisations are affected by the operations covered in the plan:

Ecocast

Ecocast Clients. Current clients include the below, others may be added

- Rotorua Lakes Council (Trility)
- Western Bay of Plenty District Council
- Tauranga City Council
- Kawerau District Council
- Kiwi Waste (septic tank waste)
- Whakatane District Council (oxidation pond waste)
- WML (supply of wood waste)
- Opotiki District Council

Regulatory Authorities

- Bay of Plenty Regional Council
- Whakatane and Kawerau District Councils (District Plans)

Landowners

- Putauaki Trust (landowners where treatment occurs)
- Te Kori Ngahehu Whanau Trust

Other

- WSP Consultants (Groundwater quality monitoring and reporting)
- Air Matters Ltd (Air quality advice)

2.8 Relevant Documents

The following documents cover the operations of the Plan

- Contract between various District and City Councils and Ecocast
- Health and Safety Management Plan
- Bay of Plenty Regional Council Resource Consents 65549 AP or replacement
- Kawerau District Council land use consent

3 Vermicomposting Site Management Structure

The consent holder shall retain an appropriately experienced person to supervise the operation of the Vermicomposting Site

3.1 Management Structure

The responsibility for management of the site lies with Ecocast.

3.2 Resource Consent Holder

The Resource Consent is held by Ecocast.

3.3 Land Ownership

The land on which the site is located is owned by Putauaki Trust and Te Kori Ngaheue Trust. The sites are leased by Ecocast.

3.4 Personnel

3.4.1 Key Functions and Interactions

The key job functions and interactions of the identified personnel are as shown in the table below:

Table 3.1: Key functions and interactions

Position	Functions	Primary Interactions
Ecocast as Site Operator Principal contact is "Project Manager"	Holder of consent Responsible for consent compliance Oversight of operations	Client organisations as source of material Environmental Scientist BOPRC Compliance Officer
Environmental Scientist	Monitoring of resource consent compliance	Vermicomposting Site Owner

Tom McDowall will liaise with suppliers of Biosolids on collection and reporting requirements.

Bernie Tientjes will control the operation of the treatment sites in Kawerau which will include

- Ensuring consent conditions are complied with on day-to-day basis
- Managing the day-to-day operation of mixing sewerage sludge and placing in windrows.
- Managing plant maintenance and operation

Tom McDowall will undertake the following responsibilities

- Arranging for ground water monitoring to occur
- Reporting to Regional Council as required
- Arranging for quality of treated material to be tested

3.4.2 Staffing Level

During operation, generally four staff members are on site, generally employed in the following operational functions:

- Site Supervision
- Waste reception
- Mixing of the feedstock
- Placement of windrows
- Turning, mixing and loadout of finished product
- General site maintenance and operations

4 Site Description

4.1 Location, Access and Layout

The site is located east of Tamarangi Drive (SH 34) Kawerau. An unsealed road accesses the site with its entrance off the private off highway forestry road, in turn with direct access to SH 34.

The site consists of the following main areas:

- Pit for receiving and mixing feedstock (6.5.1 refers);
- Windrows for processing
- Stockpile and load out area for completed product

The general public do not have access to the site.

4.2 Surrounding Land Uses

The Vermicomposting site is surrounded on 3 sides by land used for dry stock farming. Immediately to the north is a large logyard. The closest residential houses to the disposal site are approximately 900m for rural residential and 1.3km for residential in Kawerau. Industrial sites are closer, with the nearest being the logyard on the north boundary. The logyard is situated in an industrial zone where it is expected that there will be a higher tolerance of odour and dust. However this notwithstanding, there is potential for odour nuisance to adjoining property in some weather conditions and minimising this is a focus of site operations.

4.2.1 Archaeological Sites

There are no recorded archaeological sites located on the disposal site. An accidental discovery protocol applies in event of any ground disturbance turning up archaeological material. Ecocast work closely with the Putauaki Trust in relation to use of the land. The current site was specifically approved by the Trust.

4.3 Existing Vegetation

The vegetation on the surrounding land is all pasture.

4.4 Climate

4.4.1 Rainfall

The average annual rainfall for the site is estimated to be 1300mm. While this is generally more concentrated around the winter months, isolated heavy falls can and do occur at other times of the year.

4.4.2 Prevailing Winds

The prevailing wind is a light southwesterly or north-northeasterly. A northeasterly can drift any odour into Kawerau.

A weather station records rainfall and wind direction. This data is used for managing activities that could be potentially odorous (Condition #).

5 Site Design

5.1 General Principles

<Consent Conditions >

The vermicomposting operation is operated to maintain aerobic conditions in the windrows. This is essential to the worm processing. Aerobic conditions minimise leaching of nutrients and discharge of methane.

There is no lining beneath the windrows which are area extensive. The reception pit for incoming biosolids is made of concrete.

5.2 Scale of Operation

The available site area (existing Putauaki block and additional land immediately to the south) can process up to 32,000 tonnes of biosolids in any 12 month period. (Conditions #2.2).

5.3 Sources of Material

<Condition #2 and Change CH20-01775 refer>

The following sources of material are permitted:

The consent holder shall only receive the following raw materials (15% solids or more) at the site for the purpose of vermicomposting:

- (a) *dewatered primary solids from the Norske Skog Tasman and Carter Holt Harvey pulp and paper mill;*
- (b) *dewatered primary solids from CHH Whakatane;*
- (c) *dewatered solids resulting from the operation of the following wastewater treatment plants (excluding primary screenings and anaerobic digesters solids);*
 - *Te Puke wastewater treatment plant;*
 - *Rotorua wastewater treatment plant;*
 - *Tauranga wastewater treatment plant (Chapel Street, Te Maunga);*
 - *Kawerau District Council wastewater treatment plant;*
 - *Gisborne District Council wastewater treatment plant;*
- (d) *dewatered solids resulting from the operation of dredging of the following wastewater treatment plants:*
 - *Whakatane District Council wastewater treatment plant;*
 - *Western Bay of Plenty District Council wastewater treatment plant (Waihi Beach and Katikati);*
 - *Opotiki District Council wastewater treatment plant;*
- (e) *dewatered septic tank solids;*
- (f) *dissolved air flotation solids from Fonterra (Edgumbe);*
- (g) *lake weeds.*

Note the limitations on source are in the existing consent 65549. This is sought to be changed in the new consent application. The source location of the biosolids is immaterial to the management of the operation, the critical factors are the nature and quality of the incoming material.

5.4 Leachate Collection and Disposal

Leachate from the windrows soaks to ground beneath the site. The underlying soils are permeable pumice sands. Groundwater is approximately 7-10m below ground surface. Effects on groundwater are monitored, refer section 14. Consent RM23-0129 covers the abstraction and treatment of groundwater from beneath the processing area.

5.5 Vermicomposting Site Gas Containment and Disposal

There is no gas collection infrastructure required as the waste processing operations are aerobic.

5.6 Storm Water Control

The storm water management approach is:

- Separation of 'clean', 'dirty' and 'contaminated' water sources;
- Storm water treated and disposed of at source wherever possible; and
- Storm water management and transport designed such that site stability is maintained or enhanced;
- Stormwater is detained on to maximise treatment

Clean storm water (from the balance of the land on the property unaffected by vermicomposting operations) will generally be intercepted by cut-off drains, directed around the operational areas and discharged directly into the man-made farm drains on the wider property or allowed to dissipate by overland flow.

In the new southern processing area low bunds will be used to separate the windrow area from the adjoining ground and prevent direct discharge to the overland flow path that runs to the south. Soakaway swales and depressions will be maintained in the processing area for any runoff from the windrow lanes.

Contingency measures in event of stormwater contamination are covered in Section 16.6.

6 General Site Management & Operations

6.1 Hours of Operation

The hours of work for the operations are;

Working Hours

Monday to Sunday 6am to 12pm

The Vermicomposting Site is staffed seven days a week but with reduced number on weekends and public holidays.

6.2 Noise

During any construction works at the vermicomposting site, construction noise from the site shall be limited as recommended in, and be measured and assessed in accordance with NZS 6803 P: 1984 "The measurement of Noise from Construction, Maintenance and Demolition Work"

- NZS 6803:1999 Acoustics - Construction noise

Noise levels will be measured and assessed in accordance with the requirements of the NZS 6801:1991 "Measurement of Sound" and NZS 6802:1991 "Assessment of Environmental Sound " or their replacements. During operation of the Vermicomposting Site noise emissions will not exceed 50 dB (L10) measured at the boundary of any residential zone, or at the notional boundary of any residential building (i.e. a line 20m forward of the facade of the building).

6.3 Signs

6.3.1 Signs at the Entrance Gate

<Condition 25a>

Signs will be maintained at the entrance to the site throughout the life of the site. These signs identify the following:

- *that the site contains biohazardous material and access is only by approved persons.*
- *Any safety issues relating to the site including safe traffic management matters.*

The entrance sign includes a list of emergency after-hour contacts and associated telephone numbers.

6.4 Access

6.4.1 Traffic Flow

Vermicomposting Site access consists of permanent access roads and temporary haul roads, which are designed to consider the access requirements to the following areas:

- *Disposal face at concrete reception pit/bin*
- *Loadout area and stockpiles*

Access to the Vermicomposting Site is confined to a single entry off Tarawera Road (Off highway, private road).

Access to the site is limited to authorised vehicles and personnel only. The general public does not have access to the site.

6.4.2 Security

The site entrance is securely locked after operating hours. The working area is gated off and locked at all times except when receiving biosolids and substrate. The entire site perimeter is provided with a stock proof fence.

6.4.3 Consent Authority Staff

Staff and agents of the consent authority have right of access to relevant parts of the site at all times without notice for the purposes related to monitoring and enforcement of the resource consents as per s.332 of the Resource Management Act. Normally the Ecocast Project Manager or his representative would be contacted in advance to accompany such staff. To cover Health and Safety responsibilities of the site operator, consent authority staff with responsibility for the site inspections will be asked to complete a site induction so they are familiar with the site hazards should they be on the site unaccompanied by the operator.

6.4.4 Scavenging

Scavenging of the compost is not permitted. The public is not permitted access to the windrows, nor any other part of the property.

6.5 Ancillary Facilities

6.5.1 Feedstock reception pit/bunker

This is a concrete bunker used to deposit incoming feedstock prior to mixing. Note that the waste reception is to be relocated from its current location towards the north of the site to a new location on the proposed southern extension area. A new concrete reception bin and mixing pad has been constructed at this location. This is considerably further removed from the logyard by a further 400m. The new bunker location is also screened from Tamarangi Drive by hills immediately to the west. This location will be an improvement to odour at the logyard.

A stockpile of wood substrate material is stored directly adjacent to the bunker.

6.5.2 Processed Materials Stockpile

This hardstand area is used to stockpile processed product prior to sale.

6.5.3 Staff Facilities Building

This provides adequate and safe facilities for operations staff to undertake their work in an efficient and safe environment. Ablution facilities include toilets and adequate washing areas. Safety equipment is stored here.

6.6 Staff Training

Annual training for all site staff shall be provided on site waste acceptance criteria, hazardous waste identification, emergency procedures.

Supervisory staff are to be familiar with this Management Plan. The formal induction procedure is covered in 2.6 above.

6.7 Complaints Procedure

A register of all complaints received (directly or through another party) in relation to the Vermicomposting Site operation is kept by the Project Manager. This register records:

- Name of person who raised the issue
- Date and time the call was received
- Weather and wind direction at time of complaint
- Nature of the problem

- Name of the staff who received the call
- Person allocated to remedy problem
- Date and time problem repaired
- Action taken/proposed.
- Comment on any unusual activities onsite or weather conditions at the time

The target time frames for complaints are to acknowledge the complaint same day of receipt (if received indirectly) and to provide a response or explanation within five working days.

Record of any complaints should be forwarded to the Bay of Plenty Regional Council, within 48 hours of the complaint (Condition #). The complaint log shall be provided to BOPRC if requested (within 1 week).

6.8 Inspections

Regular visual inspections of all the key aspects of the site will be undertaken by the staff at the frequency as set out in the table below:

Table 6.1. Inspections of Vermicomposting Site

Item for Inspection	Personnel	Frequency
Windrows and feedstock bunker.	Vermicomposting Site staff	Every day site is attended, monthly overview and before and after heavy rain.
Odour	Vermicomposting Site staff	Odour sweep every day the site is attended.
Wind direction and forecast	Vermicomposting Site staff	Daily in morning prior to operations commencing. Adjust work programme as necessary for unfavourable wind direction
Perimeter stormwater drains	Vermicomposting Site staff	Monthly and before and after heavy rain
Stormwater ponds	Vermicomposting Site staff	Weekly and after heavy rain
Litter inspection	Vermicomposting Site staff	Whole site monthly, access road daily
Birds and vermin	Vermicomposting Site staff	Monthly
Dust nuisance	Vermicomposting Site staff	Daily during dry conditions
General site inspection	Project Manager with BOPRC Compliance Officer	Annually
Inspect Groundwater and surface water sampling points for access, damage to well heads etc ¹	Environmental Scientist	Quarterly (Refer Figure 1 for monitoring points)

A general site diary, recording the date and time of site inspections will be kept.

¹ Groundwater sampling should be undertaken by a trained technician, and in accordance with a BOPRC approved procedure (Condition 10.4 & 10.5).

7 Waste Acceptance

7.1 Materials accepted

The Ecocast Vermicomposting Site only accepts biosolids, and wood substrate as per Condition 2.

7.1.1 Prohibited Waste

<Condition #b>

All materials such as general municipal waste, food waste, paunch waste are **Prohibited**.

7.1.2 Sludges and Liquids

Biosolids accepted must be greater than 15% solids (Condition 2.1). Generally this can be defined as being a “spadable” sludge.

Bulk liquids are not accepted.

7.2 Records of Waste Disposals

Ecocast maintains the following records of waste disposed:

- Tonnage of feedstock received over weighbridge
- date processed material removed from site for sale

7.3 Procedures to Receive and Monitor Incoming Waste

Minimising potential for waste being disposed of which does not comply with the waste acceptance criteria.

7.3.1 Inspection Procedures

All vehicles entering the site are received by the site staff to confirm the source of the material. All materials are by prearranged delivery from preapproved sources.

Vehicles will be directed to the appropriate location for off-loading (biosolids to the reception bunker) and documentation re source and quantity confirmed.

Any potentially dusty loads will be dampened with water prior to unloading. The unloading of such loads will be supervised.

Any loads expected to be unusually odorous will be immediately covered with substrate on arrival.

Further visual checking of material occurs as feedstock is mixed and spread to windrows..

7.3.2 Delivery of Prohibited waste

<Consent Condition >

In the event a load is identified that appears to be prohibited waste or otherwise does not meet the acceptance criteria, the driver will be asked to park to one side pending resolution of satisfactory disposal. The Vermicomposting Site staff is to immediately advise the Ecocast Project Manager. In the event of a delivery of prohibited waste to the site the Project Manager shall take immediate steps to inform the BOPRC of:

- Date and time of the vehicle being held or turned away
- Registration number of vehicle
- Identity of the carrier (if known)
- Size and type of the load
- Source of the load (if known)

- Category of the Prohibited Waste (if known; refer to TCDL 2018, Appendix I)

8 Vermicomposting Operations

8.1 Equipment

Adequate plant, equipment and machinery in good working order will be kept on site at all times. The normal site plant consists of:

Tool	Version	Use
Truck x 2		Transportation of biosolids
Tractor x 3		Drive sludge mixer
Mixer Wagon x 2		Mix Sludge with substrate
Excavator x 2		Load mixer & general site maintenance
Microsoft Software		Recording data and reporting
Water Monitoring equipment		Used for taking certifiable water samples Contractor with experience undertakes this
Soil sampling equipment		Sample processed material and soil from various sites. Hills Laboratory undertakes analysis

When plant is unavailable due to maintenance or breakdown, alternative plant will be hired in as required. The Vermicomposting Site manager will have arrangements in place to provide alternative plant.

8.2 Mixing, placing and turning of Vermicompost

The vermicomposting operation proceeds as shown on the following example diagram.

Note: the diagram outlines the total process but steps 1, 11 and 12 are not done on the site so are not covered in this Management Operational Plan.

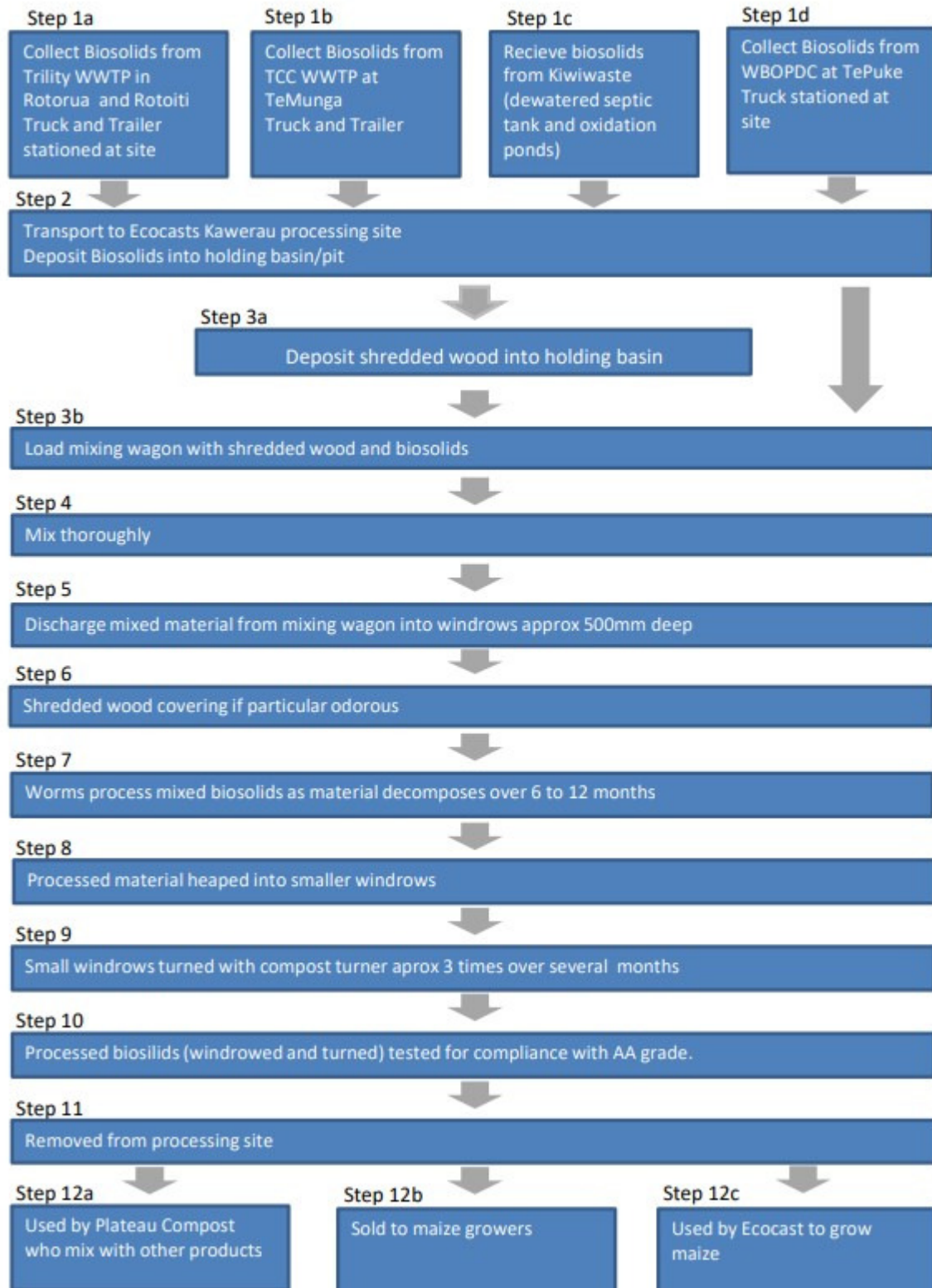


Figure 1: Vermicomposting Process

The biosolids from various sources are deposited in a bunker adjacent to a stockpile of substrate. If biosolids are from an odorous source they are immediately covered with approximately 200mm of substrate. The substrate material is largely inert and non odorous.

The biosolids and wood substrate are loaded to the mixer wagon and mixed at an approximate 1:1 by volume ratio.

The mixed biosolids and substrate is laid out in approx. 5m wide x 500mm high flat windrows where compost worms process the mixed material.

Compost worms will eat the mixed biosolids over approximately 9-12 months

The matured windrows are mounded into smaller windrows then aerated/turned by a compost turner several times over a 2 month period.

Between 12 months and 18 months the treated biosolids are tested for compliance with the Water and Wastes Association Biosolids Guidelines (2003) and the more recent "Guidelines for Beneficial Use of Organic Materials on Productive Land 2017"

The final product meets "Aa" grade requirement, which means that it can be applied to land without restrictions. However, some of the material is typically mixed with other products to enhance its saleability by another company.

Provided the appropriate requirements are met with the processed material will be applied to cultivated land in the Eastern Bay of Plenty in accordance with the Regional Councils requirements of the Bay of Plenty Regional Natural Resources Plan.

8.3 Substrate material

A variety of materials are suitable for the vermicomposting process and may be used for the substrate. The key requirements are:

- Relatively dry so as to absorb moisture from the biosolids
- High carbon content to balance the nitrogen rich biosolids
- Finely ground matrix with large surface area
- Mix well in the mixer wagon to give an even consistency of product for the windrows
- No components that would be inhibitory to the biological activity in the worm beds. This would exclude pine bark

Typically products for the substrate are sourced from the paper and board mills in the adjoining area and include wood pulp from clarifier sludge and finely shredded log peelings (wood fibre not bark).

Other high carbon horticultural residues such as maize cob are also suitable.

9 Surface Water Management

9.1 Background

Surface water is managed by retention on site and ground soakage. The site soils are highly permeable and ponding only occurs in extreme rainfalls. The material in the windrows has a large capacity to absorb water. Low bunds are used as required to prevent runoff to adjoining land.

9.2 Groundwater Management

The site is situated on permeable pumice soils. Groundwater flow is to a general northeast direction. The groundwater is some 7-10m below ground surface. 15 bores are in place for either monitoring the groundwater or abstracting it for nitrate removal.

9.2.1 Groundwater Level

The monitoring wells are located around the perimeter of the Vermicomposting site (Figure 1), one up-gradient, (BH3 north), and two down-gradient (BH1 and BH2). These were installed as part of the original site development in 2016. In May 2020 a further four bores were installed on the extension area to the south). Bores PB1 -4 were installed in 2023 as part of the nitrate remediation project under consent RM23-019

9.2.2 Damage to Bores

In the event that any of the groundwater monitoring bores is damaged or otherwise to the extent that a sample cannot be taken or water cannot be abstracted for treatment, then it is replaced with a new monitoring bore in the same general location screened over a similar depth interval.

10 Vermicomposting Site Odour Management

10.1 Vermicomposting Site Odour

Odour management is critical to the successful operation of the site and avoidance of nuisance to neighbouring property. By nature some of the feedstock materials are highly odorous. This is not in itself a reason to not accept them, as they can be effectively processed to beneficial end use. However it means particular effort is required to manage them from time of arrival on site.

10.2 Odour

10.2.1 Key Performance Requirement

There shall be no objectionable or offensive odour detected beyond the boundary of the consent holder's property as a result of the activities on site. Odour discharge shall be kept to the minimum practicable (Condition # 8.1).

10.2.2 Management of Odours

The main potential sources of odour at the Vermicomposting Site are:

- *Incoming biosolids at delivery;*
- *Loading and mixing;*
- *Laying out windrows*
- *Turning actively composting windrows.*

Incoming biosolids at delivery Loading and mixing

Odours from incoming waste can periodically occur, especially when the waste contains putrescible materials or when odorous waste is deposited at the Vermicomposting Site.

Staff involved in undertaking the tasks to implement the plan are well experienced in the various areas of responsibility.

Staff responsible for the operation of the processing site are located within 30 minutes' drive of the site so are readily available to deal with any out of hours issues as they arise.

Staff are aware of the consent requirements, are also familiar with dealing with biosolids, and associated health requirements.

The following operational practices are applied to minimize odour:

1. Biosolids placed in the pit are covered with approx. 200mm of substrate immediately a load is dropped off. Drivers have been instructed to text the worm farm operator 30 minutes ahead if the expected arrival time is outside normal delivery times. The pit operations are a main potential source of odour in the operation.
2. A supply of substrate sufficient to cover the needs of incoming waste with a three day buffer is to be maintained on site. In any case the source of the substrate material is the Whakatane Board Mills 30 minutes away.
3. Historically the most susceptible location to the odours generated by the pit operation is the log yard. This log yard is 350m from the original pit but will be 750m from the second pit (which will become the primary pit with the new consent) The second pit is also further east therefore the predominant wind direction from the south will not carry odours from the pit to the log yard. The site will operate 2 pits with the primary pit being the pit that will be twice the distance from the log yard as is the current one. The original pit will only be used when wind directions are from the west or north.

Laying out windrows

Once the biosolids and wood substrate are mixed in the correct ratios it has been proven that there is minimal odour generated from the mixed product.

The need to mix the product in the correct ratio is a significant process to get right and staff are drilled on this aspect of the operation.

However if it occurs incorrectly and odour is generated then the following actions occur.

Sufficient weed mat is stored on site so that it can be layed out to cover several days of windrowed biosolids. This weed mat can be laid out within hours of staff becoming aware the layed out rows are generating odour.

In addition lime is stored on site that can be spread over the offending area.

If neither of these action can occur for some reason than a layer of wood substrate is laid over the offending material.

The freshly windrowed material loses its odour within several days.

As with the old pit the most sensitive area for generating odour is close to the log yard

4. Ecocast will not work on the site near the log yard to lay out biosolids if there is a southerly wind until the log yard closes for the day.
5. To minimise the impact of the activities in this area the following will occur
 - a. The on-site weather station and wind sock are used to guide suitable conditions for laying out operations
 - b. As much as possible the laying out of windrows in this area occurs outside working hours of the log yard or the wind is not from the south

Turning actively composting windrows

The windrows when processing are generally complete after approximately 12 months. Initial turning of an actively composting windrow is the other main potentially odour generating action in the process. This activity is managed as follows to minimise odour.

- a) Prior to raking up a processed windrow into a heaped windrow after the initial composting period, the operator is to uncover a small section with the excavator bucket to assess the odour level. If the odour is low and deemed acceptable (and

wind conditions are favourable) then the windrow heaping is completed. If the odour and wind conditions are determined to be unacceptable the operator recovers the area. Further composting time is then allowed.

- b) As with the raking up process the initial turning of the windrow operator will turn approx. 5 m of windrow and then assess if the turning is generating an odour.
- c) If there is no odour continuing to turn the balance of the windrow will occur.
- d) If the odour is minimal continuing to turn will only occur if the wind direction is favourable.
- e) If significant odour is generated turning will cease and turning will be retried in a weeks time where the above steps will be repeated.
- f) Once the initial turning has occurred further turn will be undertaken subsequent week following the same procedure (however typically only the initial turn generates any odour)

As with the laying out the area close to the log yard is sensitive due to the proximity of staff. Work in this area will be monitored much closer and only when it is known it can be undertaken without causing a nuisance by monitoring wind direction and long term weather forecasts. Sound day to day management practices on the site as described above are key to minimising odour offsite. The weather station is an important tool for managing odour effect from specific operations and proving that this site is not generating the odour that may be coming from other operators.

10.2.3 Monitoring for and prevention of Odour

Odour is the main cause of complaint from Vermicomposting Sites. Odour management must be proactive. Specifically:

- Daily when opening the site check the wind direction and check for odour at the north end of the site
- If odour is noticeable at these locations scout around the site itself to see if there is any obvious source/cause
- Use the weather forecasts and known wind flows to time any potentially odour releasing operations (Condition #).
- Be aware that wet weather is often worse for odour as the biosolids decomposition accelerates. Be prepared with additional substrate cover in stockpile. Maintain surface drainage away from the windrows. Do not allow leachate to pool at the base of the windrows as this will cause anaerobic conditions. If necessary excavate pits to break through any sealing layers that are preventing drainage.

11 Dust Control

11.1 General

Dust discharged from the site will be in the size range of 1-100 micron as soil and road dust.. Larger particles are responsible for nuisance effects as they are visible and cause deposits on surfaces.

Most of the vermicomposting operations have inherently low dust potential as the materials arriving are moist and moist conditions in the windrows are essential for the vermicompost process.

Traffic movement between the windrows in dry weather would be the main source.

11.2 Measures to control dust

The following measures are applied to control dust:

- Separation distances. Maintain a buffer zone between the most northerly windrow and the site boundary
- Limit vehicle speeds to 15 km/hr on site
- Maintain moisture content in the windrows. This is an essential process parameter anyways
- Ensure substrate delivered to site is damp
- Use water cart if dust from roadways becomes an issue
- Maintain on site weather station and use it to manage timing of potentially dusty activities such as turning mature windrows in dry weather

11.3 Bioaerosols

The risk of bioaerosols has been assessed to be low. Measures as outlined above to control odour and dust will also minimise any discharge of bioaerosols beyond the site boundary. Bioaerosols are a potential health risk to on-site staff and are managed appropriately with aircon to machinery and PPE (Section 13.2).

12 Nuisance Control

12.1 Summary of Actions

Nuisance control measures are summarised in Table 11.1 and expanded on in the sections below:

Table 11.1: Nuisance control measures

Nuisance Factor	Compliance Requirement	Routine Control	Inspection and Monitoring	Contingency Control
Dust	Cause least practicable emission	Water cart in dry weather, grassing to all areas not in use. Wetting down of dusty loads	Daily by Project Manager dry weather	Deploy water cart, change dumping location to minimise trafficking of dusty surfaces
Odour	Unpleasant odour easily detectable off-site	Refer Section 10	Daily assessment by site staff	Odour suppressing fog system
Birds	Prevent populations establishing	Cover biosolids, deploy bird scaring devices	Periodic assessment by Project Manager	Birds are not generally an issue at the site
Vermin	Prevent populations establishing	maintain bait stations on Vermicomposting Site perimeter	Six monthly assessment by Project Manager	More extensive poisoning if infestations develop. Trap or shoot cats
Stray Dogs	None stated	None required	As required	Call KDC Animal Control
Insects		Cover windrows with substrate	Periodic assessment by	Spraying of problem areas as required.

Nuisance Factor	Compliance Requirement	Routine Control	Inspection and Monitoring	Contingency Control
			Project Manager	Insects generally not a problem
Smoke/ Fire		Burning on this site is not permitted		Extinguish immediately, refer to emergency contingency plans
Noise		Adhere to working hours Machinery maintenance		Hire plant
Livestock		Maintain fences that exclude livestock	Monthly assessment by Project Manager	Repair fences as necessary
Weeds		Spraying, cutting as required	Monthly assessment by Project Manager	Call in spray contractor if beyond staff resources

13 Health and Safety

13.1 General

Ecocast is SHE compliant which mean there are recognized methods of managing operating practices that minimize the risk to staff.

The operating practices are reviewed by staff and management on an ongoing basis to continually improve safety practices.

13.2 Hazard Register

The Vermicomposting Site is a hazardous site. The table below lists the main hazard areas.

Table 13.1. Hazard Register

Hazard	Specific Measures to Mitigate
Heavy machinery	- Maintain adequate roading and turning areas - Public prohibited from Vermicomposting Site - Site staff and visitors to wear Hi-vis safety jackets, and other appropriate PPE on site
Chemical Spillages	- Visual inspection of loads at reception prior to mixing - Use of PPE including respirator - Refer Contingency Plan Section - Watch for any fumes, strong odours associated with loads or spilt material
Asbestos containing materials	None – should be no asbestos on site

Noise	• Ear protection for site staff • Visitors encouraged to wear ear protection
Dust & Bioaerosols	• Face masks or respirators as appropriate for site staff • Enclosed cab with filtered air for all compaction and earthmoving plant working on the Vermicomposting Site
Infection	• Provide hygienic wash facilities and ensure they are used by staff. • Require current tetanus vaccination.
Trips & falls	• Maintain a tidy site and remove unnecessary trip hazards.

13.3 Equipment

The following safety related equipment is kept on site:

- First aid kits (at office, in main plant)
- Spare Hi-vis safety jackets and hard hats
- Potable water
- Warning tape, cones and safety fencing mesh
- Tyvek protective suit, rubber boots and gloves (3 sets minimum)
- Clean 200 l HDPE drums for spill containment
- Clean sand or sawdust for liquid spill absorption

All visitors to the site will be required to provide and wear PPE; Hi-vis safety clothing, steel-cap footwear. Depending upon activities, safety glasses, hearing protection and hard hats may also be required.

13.4 Training

All operators will be licensed for heavy plant operation and have received adequate safety training. At least yearly, all staff will receive training in Vermicomposting Site operation and emergency procedures, and other relevant skills, including identification and handling/storage of hazardous wastes.

Full training will be given to any back-up staff and/or temporary staff as appropriate for the work being undertaken. The training will include emergency procedures.

13.5 Health & Safety Meetings

Regular review of health and safety matters is a key part of building a health and safety culture for the operation. The following are held:

- Weekly health and safety tailgate meeting by Ecocast staff
- Specific health and safety plan and start up meeting for any one off construction or maintenance activities

13.6 Emergency Contacts

A list of emergency contact telephone numbers is held at the Vermicomposting Site office at all times. A sign at the entrance to the site also displays the afterhours emergency contact telephone numbers.

13.7 First Aid

First aid kits are kept on site at all times. Kits are of sufficient content to provide for the number of staff, contractors, and general public expected on site at any one time and to provide for the nature of the hazards the site may pose.

At least two on-site staff members have a first aid certificate to a NZ Red Cross CPR and Basic First Aid level or equivalent standard.

One phone is available at all times on site (either a fixed line or a mobile phone) for emergency purposes.

14 Environmental Monitoring

14.1 Responsibilities

Environmental monitoring for consent compliance and general status information is undertaken by Ecocast staff and consultant staff from WSP. The Ecocast Project Manager is responsible for ensuring data is collected according to the timetable and reported to BOPRC in the specified timeframes.

The Ecocast Project Manager is responsible for protecting all the monitoring points from damage, keeping them clear of vegetation and ensuring easy access for monitoring and compliance staff.

14.2 Groundwater Monitoring

<Consent Condition 10: Groundwater Monitoring>

Groundwater is monitored on a three monthly basis at three locations for compliance purposes (Figure 1 – site map with monitoring locations).

G1 is at the northern boundary of the site. Groundwater flow is in a north easterly direction, as such, G2 is downstream of the vermicomposting activity and G3 is representative of upstream baseline water quality.

When operations extend into the proposed southern area, Bores BH1-4(South) will be added to the monitoring schedule for all parameters as per the current consent.

Table 14.1: Monitoring parameters for quarterly groundwater sampling at all 3 sites

Parameters	
Water Level	
pH	
Conductivity	
Ammoniacal Nitrogen	
Total Nitrogen	
Nitrate Nitrogen	
Total Kjeldahl Nitrogen	
Dissolved Reactive Phosphorus	
Carbonaceous Oxygen Demand	Biochemical
Chemical Oxygen Demand	
E. coli	

Dissolved Arsenic
Dissolved Cadmium
Dissolved Chromium
Dissolved Copper
Dissolved Lead
Dissolved Nickel
Dissolved Zinc
Dissolved Mercury

14.3 Raw Material Monitoring

<Consent Condition 11 – Raw Material Monitoring>

As required by consent condition 11.1, TCLP (toxicity characteristic leachate procedure) tests of the incoming waste are undertaken annually. This is generally carried out in Sept/October and the TCLP tests for faecal coliforms and (total) heavy metals including:

- Mercury
- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Nickel
- Zinc

14.4 Finished Product Monitoring

The finished product is monitored for compliance with biosolids Guidelines for “Aa” standard. This is a market requirement and not a consent condition.

14.5 Nitrate Treatment Project

The management of the nitrate treatment project is covered in the Adaptive Management Plan as required under RM23-019.

15 Reporting

15.1 Quarterly Groundwater Monitoring

Groundwater monitoring results are compiled into a long-term monitoring spreadsheet with applicable charts and forwarded to the BOPRC compliance officer upon receiving the laboratory results (Condition 12.2).

15.2 Inspection Reports

Inspections following significant rainfall events as required by condition 7.8 include the time and date of the inspection, the person who undertook the inspection and any works or maintenance required/undertaken. If necessary, the reports are made available to BOPRC upon request (Condition 12.1).

15.3 Volume & Quality

The following information is reported to third parties:

Associated Information	Use	Captured By
Volumes	Reporting to Regional Council and RDC WBOPDC, TCC, KDC, WDC and Norske Skog	Weigh Bridge
Water quality	Reporting to Regional Council	WSP and Labs
Vermicompost quality	Supply info to end users and report to Regional Council	Soil analyst and Labs

16 Contingency Response Plans

16.1 Emergency equipment and Resources

Equipment kept on site:

- First aid kit and protective gear
- Soil stockpile for smothering fires and containing liquids
- Absorbents (wood substrate)
- Lime

Equipment and materials available on site or call:

- Earthmoving equipment
- Water cart (hire in as required)

16.2 Contacts for Specific Emergency Situations

The following sections give guidance on indicative responses to possible contingency situations. In all cases outside advice will be sought where uncertainty as to the appropriate response exists.

Table 17.1. Emergency details

Emergency	Service	Contact number
Fire	Fire Department	111
Hazardous Waste Spill	Fire Department; BOP Regional Council	111 0800 368 267
Groundwater Bore Contamination	BOPRC WSP	0800 368 267 0274 766 459
Medical Emergency	Fire & Ambulance	111

16.3 Fire

<Condition >

No Fires will be deliberately lit at the site. All fires must be extinguished immediately.

The probability of fire at the site is low due to the nature of the material and the process.

The main prevention measure is to maintain grass low in summer so grass fires do not take hold.

16.3.1 After A Fire

<Condition 32>

As soon as practicable after any fire or smoke where emergency services are called, Ecocast will provide an investigation report to the BOPRC setting out:

- *The cause, or likely cause, of the fire/smoke*
- *When it was first noticed*
- *Actions taken*
- *Any remedial actions necessary*
- *Measures that shall be taken to avoid re-occurrence and subsequently updating the relevant parts of the Site Management Plan as necessary with these measures as well as other relevant lessons learned*

16.4 Hazardous Waste Spill

Immediate response by site staff shall be:

- (i) Isolate spillage area with safety fence/warning tape
- (ii) Check for fumes or smoke
- (iii) Don protective clothing, masks etc
- (iv) Identify material. If the material cannot be identified, seek specialist advice
- (v) If in doubt, isolate the material until it can be identified.
- (vi) Apply absorbents for liquid waste and /or contain the liquid with bunds of silt
- (vii) If small quantity can be safely contained in drum or canister then do so. Clearly label and identify contents, remove to secure storage.
- (viii) Notify Ecocast Project Manager
- (ix) Under no circumstances hose material away until authorised to do so

Follow up by Ecocast Project Manager:

- (x) Notify BOPRC
- (xi) Obtain advice with respect to treatment, storage and disposal of hazardous material
- (xii) Prepare and implement emergency response

16.5 Groundwater Contamination Response

16.5.1 Trigger Levels

<Consent Condition xx: Trigger Levels>



Trigger levels are set for the groundwater in the consent (Condition #). Response to a groundwater trigger level exceedance is set out in Condition #.

Table 15.5: Groundwater trigger levels

Parameter	Proposed Trigger Value (g/m ³)
Nitrate	15.75
Ammoniacal N	2.3
Chemical Oxygen Demand (COD)	250 (based on existing BOP Comprehensive Stormwater Consents)
Dissolved Reactive Phosphorus (DRP)	0.086 (based on BH1 baseline data at north site)
Arsenic	0.14
Copper	0.0025
Lead	0.0094
nickel	0.017
Zinc	0.031
Cadmium	0.0008
Mercury	0.0054

16.5.2 Response to Groundwater Contamination

Refer the Adaptive Groundwater treatment Management Plan of Consent RM23-019.

16.6 Stormwater Contamination

This section describes the infrastructure and operational measures employed to minimise contamination of stormwater leaving the site.

16.6.1 Site Layout

In the existing area stormwater soaks to ground

In the proposed processing area low bunds will be used to separate the windrow area from the adjoining ground and prevent direct discharge to the overland flow path that runs to the south. Soakaway depressions will be maintained in the processing area for any runoff from the windrow lanes.

In the event of stormwater contamination being apparent an inspection will be made of the stormwater controls and any deficiencies in bunds or soakaways rectified as necessary.

16.6.2 Flooding

Flooding from outside the Vermicomposting Site may affect drainage from the site. The following actions to be taken in advance of high water or heavy rainfall warning:

- (i) Inspect site perimeter
- (ii) Ensure all perimeter cut off drains and bunds are in sound condition

17 Vermicomposting Site Closure

This section to be updated closer to closure

17.1 Site Monitoring

Water quality monitoring of the site will continue as detailed in the 'Monitoring' section of this report unless specifically varied by a change to the consent.

17.2 Aftercare Period

The period for this will be determined in consultation with the BOPRC. It would be expected that once the vermicomposting ceases and windrows are removed then effects will cease and the site will be returned to pasture. Groundwater treatment for nitrate removal will likely be required for some years post operations.

18 References

- WasteMINZ. (2022, October). *Technical Guidelines for Disposal to Land Revision 3*.

Figures

Figure 1: Site Layout and Compliance Monitoring Plan

Appendix A

Resource Consent 65549



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