



Contaminants Present in Organic Waste: Review of New Zealand Regulations and Guidelines

Prepared for Ministry for the Environment

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Draft Report for Ministry for the Environment

Prepared by Duncan Wilson

Anita Lewis

Approved by

.....

Duncan Wilson

(Project Director)

Eunomia Research & Consulting Ltd

35 Gilfillan Street

Blockhouse Bay

Auckland 0600

Tel: +64 9 376 1909

Web: www.eunomia.co.nz

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Contents

1.0	Audience and the Purpose of the Report.....	1
1.1	Introduction	1
1.2	Contextual Framework	1
2.0	Scope	1
3.0	Methodology.....	1
3.1	Documents Reviewed	1
4.0	Legislation and Regulations	4
4.1	Natural and Built Environment Bill 2023	4
4.2	Resource Management Act 1991.....	7
4.3	Animal Products Act 1999.....	12
4.4	Animal Products Amendment Act 2012	14
4.5	Biosecurity Regulations 2005.....	14
4.6	Food Act 2014	15
4.7	Environment Act 1986	18
4.8	Conservation Act 1987.....	22
4.9	Crown Pastoral Land Reform Act 2022	25
4.10	Hazardous Substances and New Organisms Act 1996	26
4.11	Agricultural Compounds and Veterinary Medicines Act 1997	29
4.12	Agricultural Compounds and Veterinary Medicines (Exemptions and Prohibited Substances) Regulations 2011	30
4.13	Waste Minimisation Act 2008 (WMA).....	32
4.14	Responsibility for Reducing Waste Bill 2023	35
5.0	Standards.....	38
5.1	NZS4454: 2005 for Composts, soil conditioners and mulches	38
5.1.1	<i>Introduction</i>	<i>38</i>
5.1.2	<i>Standards for pathogens and contaminants.....</i>	<i>40</i>
5.1.3	<i>Contamination management</i>	<i>40</i>
5.1.4	<i>References to other standards</i>	<i>41</i>
5.2	BioGro Certification Modules 2009	43
5.3	Assure Quality – Organics Standard 2020	49

5.4	National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2012	52
6.0	Guidelines	57
6.1.1	Guidelines for beneficial use of organic materials on productive land 2017 ...	57
6.2	WASTEMINZ- technical guidelines for disposal to land 2022	63
6.3	Compost New Zealand consent guide 2009	66
6.4	Technical Guide 08: The production and use of digestate as biofertilizer of digestate derived from source segregated organic waste 2021	68
	<i>Development of Digestate Standard</i>	<i>73</i>
6.5	Organic Materials Guidelines – organic contaminants review	73
6.6	Organic Production Protocols – greenwaste composting and vermiculture	76
6.7	Working towards New Zealand risk-based soil guideline values for the management of cadmium accumulation on productive land	77
6.8	It’s Complicated: A Guide to Biodegradable Compostable Plastic Products and Packaging	80
7.0	Position Statements and Other Key Documents	82
7.1	Ministry for the Environment: Compostable Packaging Position Statement.....	82
7.2	Ministry for the Environment: Kerbside Materials Factsheet	84
7.3	Position Statement from New Zealand Composters on Compostable Packaging	85
7.4	Packaging Forum Position Statement on PFAS.....	86
7.5	Organic Waste: A position statement from the Zero Waste Network.....	87
7.6	Road Derived Sediments (RDS) and Vegetative Material Reuse Feasibility Study (2010)	88
8.0	Summary Table	91
9.0	Comparison of Contaminant Limits	109
10.0	Conclusions	115
	References.....	116

1.0 Audience and the Purpose of the Report

1.1 Introduction

MfE commissioned Eunomia Research & Consulting, Whetū Consulting Group, and Massey University, to examine issues of contaminants in organic waste. The project aims to understand and address the challenges posed by contaminants in our organic waste material streams in order to mitigate risks to soil, human and animal health and expand end markets for processed organic waste. The project outputs will build on existing knowledge and standards and provide clear action recommendations for addressing the contaminants challenge.

1.2 Contextual Framework

This report sets out a high-level approach, wherein available New Zealand legislation, standards, guidelines and position statements are reviewed. In this initial piece of work, we aim to articulate, at a high level, what the current state of the legislative and regulatory environment is, and what the documentation reflects in the context of organic waste contamination.

2.0 Scope

The work covers the full suite of available documentation for organic wastes, including legislation and regulation, standards, guidelines and position statements applicable to the New Zealand framework. Various contaminant types and standards relevant to organic waste or soils are discussed in this document. It also includes the organisations that administrative powers are assigned to under each legislation and standard, furthermore, which specific stakeholders the document appears to be directed at. Some of the documentation encompass limitations which are also described in this work.

3.0 Methodology

3.1 Documents Reviewed

Legislation and Regulation

- Natural and Built Environment Bill 2023
- Animal Products Act 1999
- Animal Products Amendment Act 2012
- Food Act 2014
- Environment Act 1986
- Conservation Act 1987
- Crown Pastoral Land Act 2022
- Hazardous Substances and New Organisms Act 1996
- Agricultural Compounds and Veterinary Medicines Act 1997
- Agricultural Compounds and Veterinary Medicines (Exemptions and Prohibited Substances) Regulations 2011
- Waste Minimisation Act 2008
- Responsibility for Reducing Waste Bill

Standards

- NZS4454 for Composts, soil conditioners and mulches
- Assure Quality – Organics Standard
- BioGro Certification Modules
- National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Protect Human Health

Guidelines

- Guidelines for beneficial use of organic materials on productive land
- WASTEMINZ- technical guidelines for disposal to land
- Compost New Zealand consent guide
- Technical Guide 08: The production and use of digestate as biofertilizer
- Organic Materials Guidelines – organic contaminants review
- Organic production protocols – green waste composting and vermiculture
- Working towards New Zealand risk-based soil guideline values for the management of cadmium accumulation on productive land
- It's complicated: A guide to biodegradable & compostable plastic products and packaging

Position statements

- MfE: Compostable packaging position statement
- MfE: kerbside materials factsheet
- Position statement from New Zealand composters on compostable packaging
- Packaging Forum Position Statement on PFAS
- Organic Waste: A position statement from the Zero Waste Network
- Road Derived Sediments (RDS) and Vegetative Material Reuse Feasibility Study (2010)

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4.0 Legislation and Regulations

4.1 Natural and Built Environment Bill 2023

The Natural and Built Environment Bill (New Zealand Government, 2023) is one of three bills intended to repeal and replace the Resource Management Act 1991. The others are the Spatial Planning Bill and the Climate Adaptation Bill. Once passed, the Bills will be known as the Natural and Built Environment Act (NBA) and the Spatial Planning Act (SPA). The legislation is expected to pass in 2024. Once passed the act will be deemed mandatory and a transitional period from the RMA 1991 will be granted. An extended transitional period is expected by the Ministry. *“The purpose of the NBE Bill updates the RMA’s focus on sustainable management. The purpose is to: enable the use, development, and protection of the environment in a way that:*

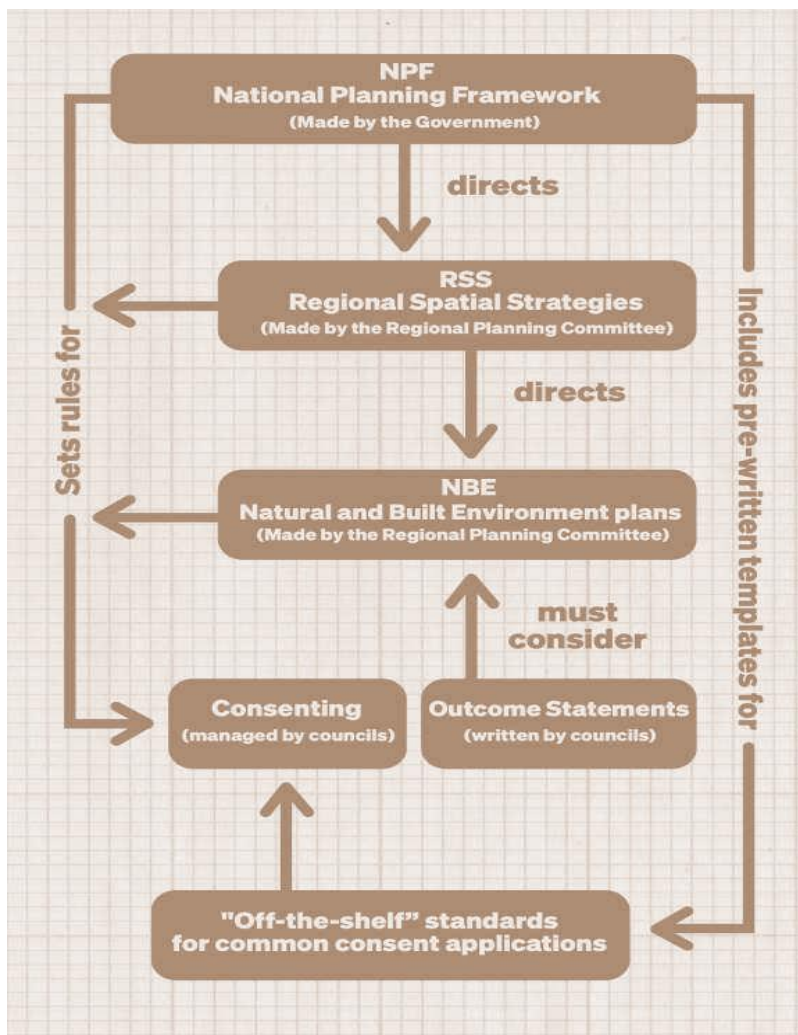
- *supports the well-being of present generations without compromising the well-being of future generations; and*
- *promotes outcomes for the benefit of the environment; and*
- *complies with environmental limits and their associated targets; and*
- *manages adverse effects; and*
- *recognises and upholds te Oranga o te Taiao”.*¹

Oranga o te Taiao is defined as the relationship between the health of the natural environment and the health and well-being of people and communities.

One of the primary changes compared with the RMA 1991 is that there will be 15 planning committees: one for each region in the country, with Nelson and Tasman counting as a single region. The government has set a minimum of six members on each committee, and no upper limit on membership numbers - the actual number will be set by the committees themselves. These groups are also responsible for designing the Natural and Built Environment (NBE) plans, which set out specific land use and resource allocation for each region.

See the administration of the various sections of the Natural and Built Environment Bill below:

¹https://www.legislation.govt.nz/bill/government/2022/0186/latest/d23267202e2.html?search=sw_096be8ed81d79755_purpose_25_se&p=1&sr=0



Source: RNZ

Key parts of the system will remain as in the RMA 1991:

- Consenting requirements remain similar and will be managed by councils, however, some categories of consents have been removed
- Councils will continue to enforce consent requirements, but their powers will be enhanced through increased funding and tools
- The responsibilities of the Environmental Court will remain the same as under the RMA 1991
- The Parliamentary Commissioner for the Environment will still carry out investigations and provide advice to decision-makers
- Land and water use will remain the same, however the bill does provision for changes in planning
- Planning will still be executed through long-term regional plans, although their number and form is changing

Matters relating to contaminated land are set out in Part 6 subpart 4 in the bill.

Contaminated land is defined in Section 7 of the Interpretation as follows:

“contaminated land means land where a contaminant is present—

(a) in any physical state in, on, or under the land; and

(b) in concentrations that—

(i) exceed an environmental limit; or

(ii) pose an unacceptable risk to human health or the environment”

Rules regarding contaminated land include:

- The rule must state the significance of the adverse effects posed by the hazardous substance on the environment
- State how likely significant adverse effects on the environment are to be avoided
- Territorial consent authority deals with contaminated land, even if no national planning framework is provisioned
- Both, landowners and Regional Council have responsibilities if an activity or industry is listed in the HAIL (The Hazardous Activities and Industries List)
- Territorial Authorities (TA's) responsibilities include assessing the possible environmental effects of the proposal and whether the proposal will benefit the environment or exert harmful effects on the environment and human health
- The EPA (Environmental Protection Authority) becomes the lead regulator once the Minister declares a site contaminated land of national significance. The EPA has similar powers and functions to the local authority and regional council.

Matters relating to a contaminant is set out in Part 6 in the bill and defined as follows in Section 7 of the Interpretation:

“contaminant includes any substance (including gases, odorous compounds, liquids, solids, and micro-organisms) or energy (excluding noise) or heat that either by itself or in combination with the same, similar, or other substances, energy, or heat,

(a) when discharged into water, changes or is likely to change the physical, chemical, or biological condition of the water; or

(b) when discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land or air onto or into which it is

discharged”

Rules regarding contaminants include:

- Restrictions on discharging contaminants into or onto land, air and water
- A regional planning committee must be satisfied that requirements can be met before it includes in a plan a rule that allows the discharge of a contaminant into water or onto land as a permitted activity
- Before deciding to include the best practicable condition when granting a permit, regard must be given to nature of any discharge of a contaminant to the receiving environment and other alternatives, including a condition requiring the observance of minimum standards of quality of the receiving environment.

Subpart 8 of the bill provides for standards, methods and requirements through the national planning framework. Regulations may without any limitation include qualitative and quantitative standards, method, processes or technology to implement standards. Furthermore, it includes exemptions from standards.

Environmental limits

The Minister must set limits in the National Planning Framework (NPF) which includes limits relating to air, native biodiversity, estuaries, coastal waters, freshwater and soil. Limits may also be set on additional aspects of the natural environment. The primary purpose of setting limits is to protect human health and the ecological integrity of the natural environment to avoid further degradation. Limits can either be set directly in the NPF or be set out in the NBE plans. Limits are set as a minimum biophysical state for a management unit or the maximum harm or stress to the natural environment that may be allowed. The Ministry for the Environment will have an auditing role to ensure draft plans comply with the NPF and environmental limits. The NPF requires the monitoring and reporting of environmental limits and targets, data to be aggregated at a national level and enable Māori to be involved in monitoring of environmental limits.

The bill makes no specific mention of organic contaminants but addresses contaminants and contaminated land in a generic sense. Under industrial or trade premises composting is mentioned, however no specifics are provided regarding consent conditions or standards.

4.2 Resource Management Act 1991²

Public Act 1991 no 69

² <https://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230265.html>

Date of assent 22 July 1991

The Resource Management Act 1991 (RMA) was enacted by the New Zealand Parliament and written by the New Zealand government (New Zealand Government, 1991). The law was a product of extensive consultations and discussions to address the country's environmental and resource management challenges while promoting sustainable development. It received Royal Assent on 23 October 1991 and came into effect on 1 October 1991.

The Resource Management Act 1991 (RMA) is administered by various entities at different levels of government in New Zealand. The administration and implementation of the Act involve multiple government bodies and agencies to ensure effective resource management and compliance with its provisions. The key entities involved in the administration of the RMA are as follows:

- The Ministry for the Environment is the primary government agency responsible for providing policy advice and overseeing the administration of environmental laws, including the Resource Management Act. It plays a central role in guiding and supporting local authorities in their implementation of the Act and in developing national policy frameworks.
- Regional councils are responsible for resource management within their respective regions. They are tasked with developing regional policy statements and regional plans that align with the objectives and principles of the RMA. Councils review and decide on resource consent applications for activities with regional significance.
- Territorial authorities include city and district councils and are responsible for creating district plans that outline land use regulations for development and infrastructure that needs to align with provisions in the RMA.
- The EPA is another government agency involved in the administration of the RMA. It is responsible for certain matters specified in the Act, such as managing applications for nationally significant proposals and hazardous substances.
- Māori authorities and iwi have the opportunity to participate in resource management processes and decision-making under the Act.
- The Environment Court hears appeals and disputes related to resource management decisions, providing an avenue for review and resolution when disagreements arise.

This Act is a key piece of legislation that governs the management of New Zealand's natural and physical resources. It was enacted to promote sustainable development

while protecting the environment and preserving cultural and natural heritage for future generations.

The primary principles include:

- Sustainability: The RMA provisions and promotes for decisions to be made to not compromise the ability of future generations to meet their needs
- It encourages the consideration of environmental, social, cultural and economic factors when making resource management decisions
- The Act requires public participation in resource management processes, thus, giving individuals and communities opportunity in decision-making
- Iwi/ Māori participation - the Act provisions for decision making by Māori as set out in Te Tiriti o Waitangi and recognises Māori holistic world view relating to the natural environment
- Resource consents are required under the RMA and outlines the process for obtaining resource consents.
- Under the RMA, local authorities are required to develop and maintain various planning documents, including regional policy statements, regional plans, and district plans. These documents outline the objectives, policies, and rules for resource management in specific regions or districts
- The RMA requires environmental impact assessments for certain activities, ensuring that potential adverse effects on the environment are carefully considered before any development proceeds
- The RMA provides a framework for appeals against resource management decisions and sets out penalties for non-compliance with its provisions

The Resource Management Act 1991 (RMA) covers waste streams and contaminants as part of its broader scope of managing New Zealand's natural and physical resources.

Below is a brief overview of the aspects of the RMA that pertain to waste streams and contaminants:

- The RMA requires that activities related to waste management and disposal, such as establishing landfills and disposing of any contaminants into the environment, require resource consent.
- The Act regulates the discharge of contaminants into the air, land, or water. It sets standards for the acceptable level of contaminants that can be released into the environment, aiming to prevent pollution and protect ecosystems, human health, and biodiversity.

- When significant activities are proposed that may lead to the generation or discharge of waste or contaminants, environmental impact assessments are required. These assessments evaluate the potential effects on the environment and consider alternatives to mitigate any adverse impacts.
- The RMA addresses the establishment and operation of landfills and other waste management facilities. It establishes rules and standards for the location, construction, and operation of these facilities to prevent contamination of soils, water, and air.
- The Act also deals with the management of hazardous substances, including their storage, use, and disposal. It ensures that proper safeguards are in place to handle hazardous materials and prevent potential harm to people and the environment.
- The RMA promotes the prevention and mitigation of pollution, including waste-related pollution. It encourages industries, businesses, and individuals to adopt best practices to minimise waste generation and manage waste in an environmentally responsible manner.
- The RMA includes provisions for enforcement and penalties for non-compliance with its waste and contaminant-related regulations.

The Resource Management Act 1991 (RMA) is targeted at a wide range of individuals, organisations, and government agencies involved in activities that use, develop, or impact New Zealand's natural and physical resources. The Act is designed to be comprehensive and all-encompassing, aiming to promote sustainable management and protection of the environment for the benefit of present and future generations.

The Resource Management Act 1991 (RMA) plays a crucial role in the framework for managing contaminants in New Zealand. It provides the legislative foundation and sets the principles and guidelines for addressing the discharge of contaminants into the environment and controlling pollution.

Management of contaminants are enabled through:

- Regulation and Standards
- Resource Consents
- Environmental Impact Assessments (EIAs)
- Enforcement and Penalties
- Waste Management and Hazardous Substances
- Collaboration with other Legislation: While the RMA addresses contaminants,

it works in conjunction with other specific laws and regulations related to hazardous substances, pollution, and waste management. These include the Hazardous Substances and New Organisms Act and the Waste Minimisation Act

- Local Authority Oversight
- The RMA emphasises public participation and consultation in resource management decisions, including those related to contaminants.

While the Resource Management Act 1991 (RMA) is a comprehensive and influential piece of legislation in New Zealand, there are certain limitations and aspects that it does not directly address. Some of the things the RMA does not do include:

- Climate Change Regulation
- Biodiversity Conservation
- Freshwater Allocation
- Urban Planning
- National Infrastructure Projects: For nationally significant infrastructure projects
- Hazardous Substances Classification
- Contaminant Standards for Drinking Water
- Fisheries Management

The Resource Management Act 1991 (RMA) has been a significant piece of legislation in New Zealand and has had a significant impact on the country's approach to environmental management and resource regulation. However, its acceptance and effectiveness have been subject to debate both within New Zealand and internationally. Within New Zealand, the RMA has both supporters and critics. Some view the Act as a progressive and comprehensive framework for sustainable resource management, emphasising public participation, environmental protection, and the integration of social, cultural, and economic factors. The RMA has faced criticism for being overly complex and time-consuming, leading to delays in development projects. Some businesses and developers have found the resource consent process burdensome and costly. There have been calls for reform to streamline the Act, make it more efficient, and address its shortcomings which have resulted in the Natural and Built Environment Bill, previously discussed in this section. Internationally, the RMA has been recognized for its innovative approach to environmental management and sustainable development. International perspectives on the RMA have not been without criticism. Some have questioned the Act's effectiveness in achieving its objectives, particularly in

terms of addressing climate change and biodiversity conservation. As the global understanding of environmental challenges evolves, there has been ongoing debate about the need for stronger and more specific legislation to address critical issues beyond what the RMA covers.

4.3 Animal Products Act 1999³

Public Act 1999 No 93 came into force on 1 November 1999, except for Part 2 that came into force 1 November 2002.

Date of assent 8 September 1999 (New Zealand Government, 1999).

This Act replaced the Meat Act 1981 and the Dairy Industry Act 1952.

Version as of 6 April 2023.

The Parliamentary Counsel Office has made editorial and format changes to this version using the powers under subpart 2 of Part 3 of the Legislation Act 2019.

This Act is administered by the Ministry for Primary Industries (MPI).

The Animal Products Act 1999 is the primary legislation that governs the production, processing, and export of animal products in New Zealand. It sets out the regulatory framework for ensuring the safety and suitability of animal products for human consumption and trade both domestically and internationally. The Act covers various aspects, including the registration and licensing of premises involved in the production and processing of animal products, requirements for product labelling, and the establishment of food safety programs. The Act also provides for the appointment of the Director-General of the Ministry for Primary Industries to administer and enforce the provisions of the Act.

“The object of this Act is to—

(a) minimise and manage risks to human or animal health arising from the production and processing of animal material and products by instituting measures that ensure so far as is practicable that all traded animal products are fit for their intended purpose; and

(b) facilitate the entry of animal material and products into overseas markets by providing the controls and mechanisms needed to give and to safeguard official assurances for entry into those markets”.

The specific requirements of this Act apply principally to animal material and animal products that are intended for human or animal consumption but may also apply or be made to apply to animal material and products intended for other purposes.

³ <https://www.legislation.govt.nz/act/public/1999/0093/latest/whole.html>

The Animal Products Act 1999 encompass 11 Parts set out as follows:

- Part 1 - Preliminary provisions
- Part 2 - Risk management programmes
- Part 3 - Regulated control schemes
- Part 4 - Animal product standards
- Part 5 - Export of animal material and products
- Part 5A - Game estates
- Part 6 - Home kill and recreational catch
- Part 6A - General obligations
- Part 7 - Officers and powers
- Part 8 - Recognised agencies, persons, and classes of persons
- Part 9 - Cost recovery
- Part 10 - Offences, penalties and proceedings
- Part 11 - Miscellaneous provisions

Contaminant / contaminated is described as any substance which is undesirable, potentially harmful or unexpected in a particular product or process and is present in animal products or animal material. Contamination is managed through notices issued by the Director-General regarding the risk source. The notice must specify the following:

- Specify particular risk source
- A place or area where there is contamination from the land or environment
- A specific business or person where the contamination occurred due to human intervention or omission
- Animal, animal material or group of animals where the contamination may be transmissible
- Restrict or prohibit movement, trade in of any contaminated animal or animal material
- Sampling and testing to be undertaken by the owner or person in charge of the animal, property or animal product business to determine the contamination status
- An animal product officer may condemn, and require the owner or person in charge to destroy, dispose or rectify contaminated or diseased animals.

This Act generally refers to the trade and export of animals (alive or dead) or animal products (edible or non-edible). This Act applies to the production and processing of animal material and animal products within New Zealand and within or on all New Zealand fisheries waters. The primary focus of this act is risk management programmes to ensure that animal products are fit for their intended purpose.

4.4 Animal Products Amendment Act 2012

This Act amends the Animal Products Act 1999.

Public Act 2012 No 59

Date of assent 30 August 2012

The Animal Products Amendment Act 2012 is a piece of legislation that introduced amendments to the Animal Products Act 1999 (New Zealand Government, 2012). The main purpose of the amendment act was to strengthen and modernise the regulatory framework for animal products in New Zealand. It introduced improvements in the management and oversight of animal products by clarifying certain provisions and closing potential regulatory gaps. The amendment act aimed to enhance food safety and traceability, improve risk management, and align the regulations with international standards. Specific areas of focus in the Animal Products Amendment Act 2012 include the regulation of agricultural compounds and veterinary medicines, as well as measures to address issues related to product recalls and contaminated animal products. Substantial amendments were made to Part 8 of the Animal Products Act 1999, which defines the recognised agencies, persons and classes of persons.

4.5 Biosecurity Regulations 2005⁴

The Biosecurity (Meat and Food waste for Pigs) Regulations 2005 were introduced to control the spread of diseases like PRRS, swine vesicular disease, classical swine fever and foot and mouth disease.

The regulations are administered by the New Zealand Ministry for Primary Industries (MPI) and is a legally binding regulation (Ministry for Primary Industries, 2005).

The key clauses are:

5. Person must not feed pig untreated meat or untreated food waste

(1) A person must not feed, or allow, cause, or permit any other person to feed, a pig untreated meat or untreated food waste.

⁴ [Biosecurity \(Meat and Food Waste for Pigs\) Regulations 2005 \(SR 2005/150\) \(as at 01 March 2016\)](#)
[Contents – New Zealand Legislation](#)

(2) A person must not allow, cause, or permit a pig to eat untreated meat or untreated food waste.

6. Person must not collect, distribute, or trade untreated meat or untreated food waste for or intended for feeding to pigs

(1) A person must not collect, distribute, or trade untreated meat or untreated food waste for, or intended for, feeding to pigs.

The definition of treated is

- (a) heated to 100°C for 1 hour; or
- (b) treated to a standard approved by the Director-General and notified in the Gazette

One of the most critical concerns with mixed food waste is the risks from meat or food that has been in contact with meat. Feeding meat and food waste containing meat to pigs is considered a disease risk to New Zealand's livestock industries.

The Regulations effectively require meat and food waste that has come into contact with meat to be heated to 100°C for one hour to destroy any bacteria or virus. The easiest way to do this is to boil it for one hour.

Penalties for feeding non-compliant food to pigs are up to \$5,000 for an individual and \$15,000 for a corporation under the Biosecurity Act 1993.

4.6 Food Act 2014

Public Act 2014 No 32

Date of assent 6 June 2014 and came into force on 1 March 2016

The Act is administered by the New Zealand Ministry for Primary Industries (MPI) and is a legally binding piece of legislation.

The Food Act 2014 is legislation that was passed in New Zealand to regulate and ensure the safety of food sold or traded in New Zealand (New Zealand Government, 2014). It aims to protect public health and maintain high food safety standards by implementing a risk-based approach to food safety.

Key features of the Food Act 2014 include:

- The Act encompasses a wide range of businesses involved in the production, handling, and sale of food. This includes restaurants, food manufacturers, retailers, importers and food service operators
- Food businesses are classified into three risk categories, depending on the type of food and activities. Each category has different requirements and levels of regulation based on the risk they pose to public health. The categories are as follows: Template Food Control Plans (FCPS), National

Programmes (NPs), and Custom Food Control Plans (businesses with unique needs can develop their own plans)

- Various food safety measures are outlined by the Act to ensure the safety of food handled or produced by businesses. Inclusive are requirements relating to hygiene, staff training, storage and Standard Operating Procedures (SOPs) to prevent contamination
- It is compulsory for all food businesses that's covered by the Act to be registered with MPI and be compliant with the relevant food safety standards
- MPI is responsible for verifying and auditing food businesses to ensure compliance with the Act's requirements. Auditing frequency is dependent on the risk category assigned to the business
- Provision is made under the Act for MPI to be able to execute enforcement and take action against businesses failing compliance with the food safety standards. Potential penalties can include warnings, fines, suspension of operations, prosecution or closure if a business is found to be non-compliant. The action taken by MPI is dependent on the severity of the non-compliance and the potential impact to public health
- Education and support are emphasised to assist businesses to meet their relevant obligations as set out by the Act. Guidance materials and resources are provided to the business.

While the Act does not directly address waste streams it makes mention of some waste-related issues through emphasis on food safety measures and best practices in food handling. Regarding contaminants, the Act includes regulations to prevent contamination and to ensure food safety standards as previously mentioned.

The European Union (EU) has regulations in place for Food Contact Materials (FCMs) to ensure the safety of food in contact with these materials. The framework includes specific requirements for FCNs such as packaging, utensils, and machinery that come into contact with food. These regulations outline material composition, migration limits, labelling and compliance with Good Manufacturing Practices. Additionally, the EU may require auditing systems to ensure that manufacturers and suppliers of FCMs meet the regulatory standards. Audits could involve assessing manufacturing processes, testing procedures, and documentation to verify compliance. The EU regulations on FCMs include provisions for recycled materials. The EU has established specific requirements for the use of recycled content in FCMs to ensure food safety and consumer protection.

Recycled materials used in FCMs must meet certain criteria, such as being sourced from safe and suitable materials, undergoing appropriate recycling processes, and adhering to

migration limits for substances that could potentially transfer from the recycled material to food. These regulations aim to strike a balance between promoting sustainability by encouraging the use of recycled materials and ensuring that the materials used do not pose a risk to human health when they come into contact with food.

Businesses in the food sector are expected to adhere to the guidelines to ensure safety of food and appropriately reduce environmental footprint associated with waste management.

The scope of the Act targets various food industries:

- Any establishment that prepares and serves food to customers, whether for Dine-in, takeaway, or delivery
- Food manufacturers
- Food retailers
- Food importers
- Food service operators such as catering businesses
- Mobile food vendors
- Food producers, including farmers, growers and primary producers.

Contamination and contaminants are managed as follows:

- Hygiene and food safety measures with guidance on appropriate hygiene practices such as regular sanitisation and cleaning of premises and equipment. This enables prevention of contaminants such as pathogens, chemicals, and foreign materials
- Cross-contamination is prevented through the implementation of appropriate handling and storage of food items
- Food safety programs include addressing specific contaminants such as pathogens and how to eliminate the risk of food contamination
- MPI executes audits as deemed necessary to ensure business practices adhere to standards and guidelines to ensure food safety
- In case of suspected contamination or food safety, the Act empowers MPI to initiate food recalls or withdrawals to protect public health and safety.

While the Act is a crucial piece of legislation ensuring food safety, there are aspects that it does not cover:

- It does not regulate or manage environmental contaminants outside their potential impact on food safety

- The Act does not comprehensively regulate food labelling requirements. Labelling requirements such as nutritional information and allergen declarations are covered under separate legislation such as the New Zealand and Australian Food Standards Code (FSANZ) ⁵. FSANZ Part 1.6 addresses microbiological limits and Part 1.4 contaminants and residues
- The Act excludes dietary and nutritional standards
- Occupational Health and Safety (OH&S) for workers in the food industry is not regulated by the Act
- Animal welfare standards are not addressed by the Act
- The Act does not regulate food pricing or economic aspects of the food industry, such as market practices
- While the Act applies to businesses operational in New Zealand it does not account for import and export regulations. Import and export regulations are usually governed by customs and trade regulations such as the EU's regulations on Food Contact Materials (FCMs).

4.7 Environment Act 1986⁶

Public Act 1986 No 127

Date of assent 18 December 1986

The most recent version as of 7 August 2020

This Act is administered by the Ministry for the Environment

While a specific individual or group may have taken a leading role in drafting the legislation, the final version of the Environment Act 1986 was passed and enacted by the Parliament of New Zealand (New Zealand Government, 1986).

An Act to—

“(a) provide for the establishment of the office of Parliamentary Commissioner for the Environment:

(b) provide for the establishment of the Ministry for the Environment:

(c) ensure that, in the management of natural and physical resources, full and balanced account is taken of—

(i) the intrinsic values of ecosystems; and

⁵ <https://www.foodstandards.govt.nz/code/Pages/default.aspx>

⁶ <https://www.legislation.govt.nz/act/public/1986/0127/latest/DLM98975.html>

(ii) all values which are placed by individuals and groups on the quality of the environment; and

(iii) the principles of the Treaty of Waitangi; and

(iv) the sustainability of natural and physical resources; and

(v) the needs of future generations”

This legislation provides the framework for environmental protection and management in New Zealand. It outlines the roles and responsibilities of various agencies and authorities involved in environmental protection, sets standards for pollution control, and establishes mechanisms for public participation in environmental decision-making. The Act plays a significant role within the framework of managing contaminants in New Zealand. While the Act itself does not extensively address organic waste management or specific contaminants, it provides a broader legal foundation and regulatory framework for environmental protection and management, which includes addressing various types of contaminants.

Some primary areas covered by the Act:

- The Act provides a framework for managing the environment and balancing economic, social and cultural needs with environmental considerations
- Allocation and use of natural and physical resources, such as land, minerals forests and water
- The Act sets standards for the control and prevention of pollution to protect the environment and public health. It includes regulations on air and water quality, waste management, and hazardous substances
- The EIA process helps identify potential environmental impacts and ways to mitigate them
- Public involvement in environmental decision-making processes is encouraged
- Environmental planning - creation of district and regional plans
- It includes provisions for the protection of biodiversity and the establishment of conservation reserves
- Importance of Māori perspectives and traditional knowledge in environmental management and decision-making processes are recognised.

The Environment Act 1986, in New Zealand, covers waste streams and contaminants through various provisions aimed at controlling and managing waste and pollution:

- The Act addresses the management of different types of waste, including solid waste, hazardous waste, and liquid waste. It sets out requirements for the proper handling, storage, transportation, treatment, and disposal of waste to prevent environmental harm
- The Act establishes standards and regulations to control various types of pollution, including air pollution, water pollution, and soil contamination. It outlines measures to limit the discharge of pollutants into the environment
- Consent for discharge need to be obtained
- Regulates the importation, manufacture, use, storage, and disposal of hazardous substances
- The Act encourages waste minimisation efforts, such as recycling and reducing waste generation
- The Act addresses the identification, assessment, and remediation of contaminated sites. It provides mechanisms for managing sites contaminated by hazardous substances to protect human health and the environment
- The Act empowers the Environmental Protection Authority (EPA) to set environmental standards for various activities, including those related to waste management and pollution control
- The Act includes provisions for enforcement actions against individuals or entities that violate its regulations.

The Act contains provisions related to the identification, assessment, and management of contaminated sites. The Act addresses contaminated land, which refers to sites where hazardous substances or contaminants are present at levels that may pose a risk to human health or the environment. Here are the key points regarding contaminated sites under the Act:

- Definition of what is considered to be contaminated land is set out in the Act
- Duty to report contamination
- Site investigation and assessment
- Management and remediation of contaminated land by landowner or responsible party
- Enforcement powers are assigned to Regional Council under the Act
- The regional council may recover the costs incurred in investigating and remediating contaminated sites from the responsible parties

The Environment Act 1986 in New Zealand does not specifically address organic waste management. However, organic waste management is addressed through various other legislation, regulations, and policies at both the national and regional levels:

- Resource Management Act 1991 (RMA)
- Waste Minimization Act 2008
- Waste Management and Minimization Plans (WMMPs)
- Regulations and Bylaws
- Government Initiatives and Programs, such as the new waste strategy roll out 2023.

This Act is targeted at various stakeholders and provisions and principles are applicable to:

- Government agencies such as at local or national level, and involved in pollution control, resource management, conservation and planning
- Local authorities implementing the Act's provisions
- Businesses and industries contributing to an environmental footprint through their activities
- Individuals, communities and general public, regarding environmental responsibilities such as proper waste disposal and adhering to environmental regulations
- Environmental consultants and experts
- Developers and project managers seeking approval for projects that may have a significant environmental impact.

Below are some limitations and aspects the Act does not include:

- The Act addresses pollution control and requires consent for discharging contaminants, however it does not include comprehensive regulations for specific types of contaminants, hazardous substances, or chemicals
- Does not provide a detailed framework for waste management, including the management of organic waste
- While the Act acknowledges the importance of Environmental Impact Assessment for certain activities, it does not provide comprehensive guidelines or specific criteria for conducting EIAs. Detailed requirements for EIAs are specified in the Resource Management Act 1991 and other related legislation

- The Act does not specifically address climate change mitigation or greenhouse gas emissions reduction
- While the Act recognizes the importance of biodiversity, it does not contain comprehensive provisions for biodiversity conservation
- The Act acknowledges the significance of Māori perspectives and traditional knowledge; however, it does not fully incorporate or protect Māori rights and interests in environmental management. Specific legislation and provisions exist to address Māori rights and interests, such as the Resource Management Act 1991 and Treaty of Waitangi considerations.

The Environment Act 1986 is widely recognized and respected in New Zealand as a foundational piece of legislation for environmental protection and management⁷. It is a significant part of New Zealand's legal framework for environmental governance and has been instrumental in shaping environmental policy and regulation. The Act's principles and provisions are well-established in New Zealand's legal system, and government agencies, local authorities, businesses, and individuals involved in environmental matters are expected to adhere to its requirements⁸. New Zealand is a signatory to several international environmental agreements and treaties, indicating its commitment to addressing global environmental challenges. These agreements cover issues such as climate change, biodiversity conservation, and marine protection. While the Environment Act 1986 may not be widely recognized internationally, New Zealand's broader commitment to environmental stewardship and its efforts to address environmental issues are recognized and appreciated by the international community.

4.8 Conservation Act 1987⁹

Public Act 1987 No 65

Date of assent 31 March 1987 and came into force on 1 April 1987

The most recent version as of 12 April 2022

This Act is administered by the Department of Conservation

As with all the other Acts and New Zealand legislation, the Act was written and passed by the New Zealand parliament.

The Act encompasses a framework for the conservation and management of New Zealand's native biodiversity, landscapes (including Outstanding Natural Features) and

⁷ https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/3195/murray_msc.pdf?sequence=5

⁸ <https://environment.govt.nz/publications/the-state-of-new-zealands-environment-1997/chapter-four-environmental-management/resource-management-law-reform-1987-1991/>

⁹ <https://www.legislation.govt.nz/act/public/1987/0065/latest/versions.aspx>

sites of cultural significance (New Zealand Government, 1987). The Conservation Act and the management strategies (CMS) and plans (CMPs) that are created under the overriding principle of "protection". This is contrasted with the overriding principle of the Resource Management Act 1991 (RMA), which is "sustainable management" (s5, Resource Management Act 1991). Whilst there is often overlap between the RMA and the Conservation Act, the principle of protection has pre-eminence over that of sustainable management.

The Conservation Act also sets up a hierarchy of consideration of activities occurring on public conservation land under s6(e):

"to the extent that the use of any natural or historic resource for recreation or tourism is not inconsistent with its conservation, to foster the use of natural and historic resources for recreation, and to allow their use for tourism"

This hierarchy places the highest importance on intrinsic value, followed by non-commercial recreation, and then by tourism. An important role in conservation advocacy in New Zealand is ensuring that these three separate considerations are maintained, rather than obscured.

Primary aspects of the Act include:

- Conservation Boards - responsible for providing advice to the Minister of Conservation about matters relating to conservation in specific areas. These boards consist of elected and appointed members. They play a significant role in conservation decision making
- Department of Conservation (DOC) - Establishment of DOC as primary government organisation for implementing conservation policies and activities, as well as protecting native species, cultural sites and conservation areas
- Conservation areas and National parks - designation and management of conservation areas and national parks are provisioned for under the Act. National parks have the greatest level of legal protection in order to maintain their ecological state and provide for public enjoyment
- Wildlife and native species protection - provision under the Act for legally protecting native fauna and flora to prevent the decline and extinction of species
- Historic heritage protection - the Act enables and outline measures to protect historic and cultural sites of significance, including archaeological areas and historical buildings

- Recreational opportunities - the Act recognises the value in providing recreational opportunities to the public in conservation areas and therefore promote recreation whilst protecting natural and cultural values of an area
- Treaty of Waitangi - the principles of the Treaty of Waitangi are acknowledged under the Act. The Act takes into consideration the spiritual and cultural connectivity of Māori to the land as well as emphasising conservation decision-making by Māori.

While the Act does not directly address waste streams and contaminants, it relates to these issues through a broader objective of conserving the environment and managing conservation areas. Some of the key laws and regulations related to waste streams and contaminants in New Zealand include:

- Hazardous Substances and New Organisms Act 1996 - sets requirements for the safe handling, storage, and disposal of hazardous substances to prevent environmental contamination
- Waste Minimisation Act 2008 - primary objectives are to reduce waste, promote sustainable management of waste, and encourages waste minimisation and recycling
- Resource Management Act 1991 (RMA) - as discussed in a previous section
- Health and Safety at Work Act 2015 - health and safety of workers and the public by preventing contamination through hazardous substances in the workplace
- Regional and District Plans - outline regulations for managing waste disposal, contamination and pollution control, as well as the management of land use
- Environmental Standards and Guidelines - specific set of requirements and best practices for waste management, pollution control, and contamination prevention across sectors and industry.

The Act contributes to managing contaminants and pollution through the following ways, some of them have been already mentioned in this section:

- Conservation Areas and National Parks - protecting these areas from activities that may cause harm through pollution or contamination, the Act maintains the integrity of the environment and minimises the impact of contaminants on native species.
- Collaboration with Other Legislation - the Conservation Act works in conjunction with other environmental laws and regulations, such as the Resource Management Act 1991 (RMA) and regional and district plans,

together forming a comprehensive framework for environmental protection

- Public Awareness and Responsibility - by engaging and educating the public about the importance of conservation and the potential impacts of contaminants, the Act fosters a culture of environmental stewardship and encourages responsible behaviour to reduce pollution

Some primary aspects not covered by the Conservation Act 1987:

- The Act does not have specific provisions or regulations concerning the management or control of contaminants, pollution, or hazardous substances
- While the Act acknowledges the importance of conservation and sustainability, it does not provide detailed guidelines or requirements for waste management, recycling, or waste minimization practices in New Zealand
- No provision for land use planning and zoning
- The Act is not a comprehensive environmental protection statute
- The Act does not contain specific provisions for funding conservation efforts
- No detailed provisions for enforcing or regulating human activities within conservation areas and national parks, permits may be required for certain activities.

4.9 Crown Pastoral Land Reform Act 2022¹⁰

Public Act 2022 No 22

Date of assent 17 May 2022

The Act is administered by the Ministry for Primary Industries (MPI) and a reform from the Crown Pastoral Land Act 1998. On 17 November 2022, changes in the Act came into effect (New Zealand Government, 2022). This includes a new process for consenting discretionary pastoral activities, stock limitation exemptions, commercial recreation permits and easements to provide greater protection of inherent values.

“The purpose of this Act is to provide for the administration of pastoral land in a way that seeks to achieve the following outcomes:

(a) maintaining or enhancing inherent values across the Crown pastoral estate for present and future generations, while providing for ongoing pastoral farming of pastoral land:

¹⁰ <https://www.legislation.govt.nz/act/public/2022/0022/latest/versions.aspx>

(b) supporting the Crown in its relationships with Māori under te Tiriti o Waitangi/the Treaty of Waitangi

(c) enabling the Crown to get a fair return on its ownership interest in pastoral land.”

Key provisions and objectives of the Act include:

- Tenure review process, which allows leasehold land to be transferred from Crown ownership to freehold title, subject to conditions
- The Act seeks to promote the sustainable management of pastoral land, taking into account both economic and environmental considerations, thus balancing the productive use of land with the protection of natural resources; including soil, water and biodiversity
- The Act uphold conservation values, and seeks to protect Crown pastoral land using various mechanisms such as covenants or reserves
- Contains provisions to facilitate public access in certain areas
- Compliance and Monitoring, to ensure landowners adhere to the terms of agreement with the Crown.

The following matters are not specifically covered by the Crown Pastoral Land Reform Act 2022:

- Contaminants and waste management
- Urban land and non-pastoral land
- Indigenous land claims
- Comprehensive environmental regulation
- Water resource management
- Land use planning.

4.10 Hazardous Substances and New Organisms Act 1996¹¹

Public Act 1996 No 30

Date of assent 10 June 1996 and came into effect on 1 July 1998

This Act is administered by the Environmental Protection Authority

¹¹ <https://www.legislation.govt.nz/act/public/1996/0030/latest/DLM381222.html>

The HSNO Act regulates the import, development, and use of hazardous substances and new organisms (New Zealand Government, 1996). The intent of the Act is to protect human health and the environment.

A brief overview of the key provisions of the HSNO Act:

- Chemicals, gases, and other materials that may pose a risk to human health and the environment is managed and regulated by this Act
- Hazardous substances are placed in categories based on their potential risks and sets out requirements for handling, storage and transportation
- The Act also regulates the introduction of the release of new organisms into the environment. These include genetically modified organisms (GMOs) and non-native species. The requirement of the Act is that thorough investigations and approval processes need to be followed before introducing new organisms and species into the environment
- Individuals or companies planning to import, develop or utilise hazardous substances or new organisms must apply for approval or consent from the Environmental Protection Authority (EPA). The EPA is responsible for risk assessments before granting permission
- Inputs and consultation is sought from all stakeholders and the general public in the decision-making process
- The Act provisions for penalties and enforcement in case of non-compliance or submitting false and misleading information.

The primary functions of the EPA under the HSNO Act include:

- Assessment and approval
- Public consultation
- Monitoring and compliance
- Enforcement and penalties
- Risk communication
- Emergency response

The HSNO Act covers waste streams and contaminants that are considered hazardous substances. Below is a summary of the key aspects covered by the Act:

- A system is in place for classifying hazardous substances, including hazardous waste based on their properties.
- Hazardous wastes are encompassed under the Acts regulatory framework and management subject to specific requirements
- The Act sets guidelines and regulations for the appropriate disposal and management of hazardous waste streams and aim to minimise adverse effects posed on soil, water and air

- The Act sets minimum requirements for the safe transportation of hazardous waste including necessary labelling to minimise risk during transportation
- The Act addresses contaminated sites by outlining the responsibilities of landowners and occupiers to identify and contain contamination
- Responsible parties are required to clean-up and participate in remediation of contaminated sites. If failed to do so enforcement and penalties might be applied.

The HSNO Act is targeted at a wide range of individuals, organisations, and industries involved in hazardous substances:

- Importers and manufacturers
- Users and handlers
- Environmental consultants and assessors
- EPA
- Public and community groups
- Landowners and occupiers.

Some key limitations of the HSNO Act include:

- Non-hazardous chemicals are not provided for under the Act, thus not subject to the Act's approval and management requirements
- No regulatory oversight for existing organisms present in New Zealand before the enactment of the Act
- The Act does not cover the regulation of radioactive substances
- The Act does not cover issues such as climate change and broader ecological concerns
- The international trade or export of hazardous substances and new organisms are not directly regulated by the Act
- Does not cover all aspects of workplace health.

The HSNO is widely accepted and can be attributed to:

- The comprehensive scope of the Act ensures that most industries and activities involved in dealing with hazardous substances and new organisms are subject to its regulations
- Emphasis on environmental protection resonates with the public and community
- Public trust is fostered through the transparency and public decision-making of the Act
- The risk-based approach of the Act is deemed a sensible and practical method
- Scientific robustness ensures for scientific based evidence and therefore accepted as credible

- Adaptability and reviews have been executed to keep accredited with emerging and new technologies, new risks and public expectations, which demonstrates the government's commitment to maintain the relevance of the Act.

4.11 Agricultural Compounds and Veterinary Medicines Act 1997¹²

Public Act 1997 No 87

Date of assent 21 November 1997

Version reviewed as of 30 November 2022

The Agricultural Compounds and Veterinary Medicines Act 1997 is administered by the New Zealand Agricultural Compounds and Veterinary Medicines (ACVM) Group.

This Act regulates the manufacture, import, distribution, sale, and use of agricultural compounds, including veterinary medicines and animal health products (New Zealand Government, 1997). The act aims to ensure the safety, efficacy, and quality of these products to protect human health, animal welfare, and the environment.

Primary objectives of the Act include:

- Regulating the registration, assessment, and approval of agricultural compounds and veterinary medicines before they can be sold or used in New Zealand
- This Act requires thorough scientific investigation prior to usage to ensure safety and efficacy
- Guidelines are set out for appropriate labelling and packaging explaining usage, dosage, handling and storage
- The act addresses the potential risk of residues in food products originating from the use of agricultural compounds and veterinary medicines in animals intended for human consumption
- ACVM Group is responsible for implementing and enforcing the provisions of the Act
- The act includes provisions for monitoring compliance and enforcement actions to address any breaches or violations of the legislation

The relevance of the Act regarding contaminants and waste streams include:

- Robust product evaluation is a requirement under the Act. Product evaluation takes into consideration any contaminants that might be present in the product hence ensuring that adverse effects are minimised or eliminated

¹² <https://www.legislation.govt.nz/act/public/1997/0087/latest/DLM414577.html>

- The main focus of the Act is to ensure animal and human health, however potential environmental effects are also considered before registering a product
- The act includes provisions for monitoring compliance with product safety standards. In case of any contamination incidents or waste stream issues related to the use of these compounds and medicines.

The primary groups the Act is targeted at includes:

- Manufacturers and importers involved in production or formulation of agricultural compounds and veterinary medicine
- Distributors and retailers
- Farmers and animal owners
- Veterinarians and their practises
- Scientific researchers involved in development of products
- Governmental authorities.

Below is some provisions not covered within the framework of this Act:

- The Act does not provision for comprehensive environmental regulation
- The act is not a comprehensive framework for managing contaminants in general
- While it requires assessments of potential environmental impacts during product registration, it does not provide a comprehensive framework for managing waste generated from agricultural compounds and veterinary medicines, such as packaging waste or waste from manufacturing processes
- It does not encompass broader regulations for farming practices, crop protection, or agricultural chemicals not falling under the category of veterinary medicines
- The Act does not regulate human medicines or pharmaceuticals
- The Act does not offer comprehensive food safety regulations.

4.12 Agricultural Compounds and Veterinary Medicines (Exemptions and Prohibited Substances) Regulations 2011¹³

Assent of Act 19 September 2011

Came into force on 1 November 2011

Version reviewed as of 18 July 2022

This regulation is administered by the ACVM group

¹³ <https://www.legislation.govt.nz/regulation/public/2011/0327/latest/DLM3982210.html>

The Agricultural Compounds and Veterinary Medicines Act 1997 and the Agricultural Compounds and Veterinary Medicines (Exemptions and Prohibited Substances) Regulations 2011 are two separate but related pieces of legislation in New Zealand (New Zealand Government, 2011). While they both pertain to agricultural compounds and veterinary medicines, they serve different purposes and address distinct aspects of regulation.

The primary differences between these two pieces of legislation is summarised below:

- The Agricultural Compounds and Veterinary Medicines (Exemptions and Prohibited Substances) Regulations 2011 is a set of regulations that complement the Agricultural Compounds and Veterinary Medicines Act 1997. These regulations provide additional details and specific provisions related to certain exemptions and prohibited substances within the context of the Act
- Exemptions are for certain types of substances or products that may not need full registration but can be exempted from certain provisions under certain conditions
- Both the act and the regulations work together to ensure the safety and quality of agricultural compounds and veterinary medicines used in the country while providing necessary flexibility for certain exempted substances and outlining prohibited ones
- The regulations outline substances that are prohibited from use as agricultural compounds and veterinary medicines in New Zealand
- The regulations may also include provisions related to restricted substances, which may be allowed for specific uses or under certain conditions but have limitations on their application

These regulations are targeted at similar groups as for the Agricultural Compounds and Veterinary Medicines Act 1997.

Below is a summary of how the regulations fit into the framework of managing contaminants:

- Prohibiting Harmful Substances ensure prevention of contaminant introduction into the environment including, soil, water or food products
- Restricting the use of risky substances and only allowing use where risk is considered manageable
- Promoting safe use by suggesting the use of safer alternatives
- The regulations work in conjunction with the Act to ensure product safety standards are met

- The regulations do not include provisions for monitoring or testing environmental contamination resulting from the use of agricultural compounds and veterinary medicines.

4.13 Waste Minimisation Act 2008 (WMA)¹⁴

Public Act 2008 no 89

Date of assent 25 September 2008

Version reviewed as of 28 October 2021

This Act is administered by the Ministry for the Environment.

The Act focuses on waste minimization, product stewardship, and encouraging resource efficiency across various industries and sectors to promote waste reduction and sustainable waste management (New Zealand Government, 2008).

Purpose of this Act

“The purpose of this Act is to encourage waste minimisation and a decrease in waste disposal in order to—

1. *protect the environment from harm; and*
2. *provide environmental, social, economic, and cultural benefits”.*

Key objectives of the WMA 2008:

- Primary objective of the WMA is waste minimisation through promoting reuse, reduce and recycling practices
- Product stewardship is encouraged, meaning that producers, retailers, and consumers take responsibility for the environmental impacts of products throughout their lifecycle, including at end-of-life
- The WMA requires territorial authorities to develop and implement waste management and minimization plans (WMMPs), outlining strategies to reduce waste within their respective regions. These plans must be reviewed and updated every six years to ensure they remain relevant
- The WMA introduced a waste levy that applies to landfill disposal, which is intended to create an economic incentive for waste reduction and promote recycling and sustainable waste management practices

¹⁴ <https://www.legislation.govt.nz/act/public/2008/0089/latest/DLM999802.html?src=qs>

- The WMA established the Waste Minimisation Fund, which is funded by the waste levy, to support projects and initiatives that promote waste reduction, recycling, and sustainability
- Promotes public education and awareness regarding waste management and reduction through collaboration between the government, local authorities, businesses and the public.

The WMA provides a framework for addressing various waste-related issues and encourages measures to reduce the environmental impact of waste and contaminants. Here are some key aspects of the Act that relate to waste streams and contaminants:

- Waste Minimisation Plans address various waste streams such as kerbside refuse, industrial waste, hazardous waste, recycling, organic waste and others with the emphasis on employing sustainable waste management practices
- One aspect of product stewardship includes the responsible management of waste and contaminants generated throughout the lifecycle of products such as electronic waste, tyres and hazardous substances
- By discouraging the disposal of waste to landfills, through the implementation of the waste levy, it indirectly prevents the release of contaminants from landfills and encourages alternative waste management methods
- The Waste Minimisation Fund may be used to support research, technological development, and innovative solutions for managing waste streams and mitigating their potential environmental impacts
- The WMA integrates with the HSNO Act to manage hazardous waste and substances more effectively and safely.
- Provision for voluntary product stewardship schemes to be accredited.
- The declaration of products as priority products which require them to be only place on the market in accordance with an accredited product stewardship scheme.
- The WMA provides for regulations to be made in relation to priority products, controlling or prohibiting the disposal of products or waste and, also controlling or prohibiting the 'manufacture or sale of products that contain specified materials'.

A brief summary below of some aspects encompassed in the Act regarding organic waste:

- Product stewardship schemes may be developed to encourage responsible management of organic waste end-of-life, including composting or processing

organic waste to create valuable resources such as compost or biogas, or control of products and materials that could become contaminants in organic waste (such as farm chemicals, farm plastics, plastic packaging, tyres, e-waste).

- Banning of products that could become contaminants in organic waste streams – for example plastic microbeads, plastic drinking straws, fruit stickers, single use plastic cutlery and tableware, single use plastic shopping bags and produce bags.
- The levy incentivizes waste generators to investigate alternatives, more sustainable options for dealing with organic waste, such as composting or anaerobic digestion, which result in the avoidance of the levy's cost.
- The Waste Minimization Fund support projects and initiatives related to organic waste management, such as composting facilities, organic waste collection programs, or research and development of innovative organic waste solutions.
- WMMPs include strategies to prevent contamination of organic waste, such as public education and awareness campaigns, informing the public of best practises for separation of various waste streams.
- Local authorities may conduct audits to identify sources of contamination in organic waste.

The Waste Minimisation Act is targeted at various stakeholders involved in waste management and waste generation:

- Territorial authorities
- Any business, organisation or member of public that are waste producers
- Product producers and retailers
- Waste management and recycling companies
- Central Government Agencies
- Community Groups and Non-Governmental Organizations (NGOs)
- Researchers and innovators

The following is considered to be some limitations of the Act:

- No detailed regulations specifically focused on managing individual contaminants or hazardous substances are pertained within the Act
- The Act does not set comprehensive standards for waste collection and disposal methods, but instead promotes the development of plans by TA's tailored to the region's specific needs and available infrastructure.

4.14 Responsibility for Reducing Waste Bill 2023¹⁵

The Waste Minimisation Act 2008 and the Litter Act 1979 is being repealed and replaced by a new Act. Four Cabinet papers have been issued seeking policy decisions on the content of the new Act (Ministry for the Environment, 2023). The aim is to have the bill referred to a select committee in 2023 and enacted in 2025. Some aspects will take immediate effect such as the strategic planning and reporting framework. The primary purpose of the new Act is to support the vision of the waste strategy which have a three-fold objective:

1. Low carbon emissions
2. Low waste society
3. Circular economy

These are:

1. Waste Legislation 1: Overview and overarching provisions

Waste legislation 2: Regulating products and materials to promote circularity

Waste Legislation 3: Regulating how people manage waste

Waste Legislation 4: Waste levy collection and administration, waste data, and general compliance regime.

The new Act will be administered by the Ministry for the Environment.

1. Waste Legislation 1: Overview and overarching provisions

This document provides information regarding the proposals, timing and the relationship of the new legislation with other initiatives such as the new waste strategy. Agreement from Cabinet is sought on:

- Overarching provisions
- Governance of the new legislation including responsibilities of the central and local government
- Strategic planning and reporting as well as legal obligations
- Use and allocation of waste level funds.

The following topics are proposed to be encompassed by the new legislation:

Preliminary Paper 1:

- Purpose, principles
- Definitions
- Commencement

Governance Paper 1:

- Central government roles and responsibilities
- Local government roles and responsibilities

¹⁵ [Cabinet papers seeking policy decisions on the content of new waste legislation | Ministry for the Environment](#)

- Long-term strategy, planning and reporting requirements
- Use and distribution of waste levy funds.

Regulating products and materials to promote circularity Paper 2:

(1) Enabling provisions for:

- Extended producer responsibility schemes
- Deposit return schemes
- Environmental performance standards
- Provision of information to consumers
- Facilitating repair
- Powers to ban specific products and materials
- Powers to control disposal of specific products and materials
- (2) Beverage CRS.

Regulating how people manage waste Paper 3:

- Duties of care to manage waste appropriately (including aspects of the Litter Act obligations)
- Licensing waste management operators and facilities
- Tracking system for waste
- Powers to set national standards for waste management activity

Levy on final disposal of waste Paper 4:

- Application of levy to disposal facilities
- Collection and administration of levy

Compliance, monitoring, enforcement (including litter) Paper 4:

- Enforcement agencies, officers
- Investigation powers
- Infringement offences, offences, penalties

Record-keeping and reporting Paper 4:

- Data gathering powers and controls.

The various parts of the new waste legislation as outlined above are compared against the waste hierarchy.¹⁶ The new legislation is focused on implementing actions through the Emissions Reduction Plan to reduce greenhouse gas emissions produced from organic waste to landfill. Three primary strategies will be implemented; national regulation of the waste and resource recovery sector, authoritative powers on collection and disposal of organic waste, and ensuring data is collected in a consistent manner to build a robust database.

2. Waste legislation 2: Regulating products and materials to promote circularity

¹⁶<https://environment.govt.nz/assets/waste-legislation-1-overview-and-overarching-provisions.pdf>

The second paper recommends an update of the authoritative powers Government exerts over materials and products. Since the introduction of the WMA a need was noticed to:

- Protect the environment from negative impacts products and materials can have across the entirety of their lifecycle
- Rebalance and create transparency from producers regarding the information to be made available to consumers about negative environmental impacts from products.

The summary below provides a brief overview of the proposed change in authoritative powers:

- Products or materials can be banned regardless of whether an alternative suitable product is available or not, furthermore bans will be expanded to imports
- Expand landfill bans to enable action on all products and materials with a shift of focus from where a product cannot go to where it must go
- Environmental performance standards across the entirety of the product value chain and not just when it reaches end-of-life
- Information made available to consumers and businesses on the broader environmental performance of a product
- Extend producer responsibility through a clearly defined regulatory framework.

3. Waste Legislation 3: Regulating how people manage waste

This paper seeks to create a nationally consistent waste management system. Consistency could be achieved by:

- Controlling how people manage waste through implementing duties of care for composting, recycling, disposal or recovery
- National licensing scheme for resource recovery operators and facilities
- Regulation-making power to develop technical standards
- Electronic tracking of waste material moving through the New Zealand value chain
- Waste levy proposals.

4. Waste Legislation 4: Waste levy collection and administration, waste data, and general compliance regime

The objective of the fourth paper is focused on the waste disposal levy. No significant changes will be made to the general structure and operation of the waste disposal levy.

The fourth paper outlines the following points:

- Collection, administration, and monitoring of the waste disposal levy
- Improving waste and resource recovery data
- Design principles and primary components of compliance monitoring and enforcement protocol of the new legislation.

5.0 Standards

5.1 NZS4454: 2005 for Composts, soil conditioners and mulches

5.1.1 Introduction

This document has been compiled by Compost New Zealand to serve as a “toolkit” for the New Zealand standard for composts, soil conditioners and mulches (Compost New Zealand, 2005). Compost New Zealand is a sector group of the Waste Management Institute of New Zealand. This document enables achievement and informs standardisation across organic processing technologies and operational management in order to prevent the production of sub-standard compost. Producing compost with varying standards could potentially have a significant impact on existing and future compost markets. The Waste Strategy 2002 identified increased targets of diverting organic waste from landfill which resulted in an increase of organic waste being composted hence requiring setting standards. This document provisions quality assurance and certification for new and existing compost markets.

The standard covers the characteristics, testing, and use of composts, soil conditioners, and mulches intended for various applications, including agriculture, horticulture, landscaping, and soil improvement.

Who compiled the Standard?

A committee or technical working group is usually formed to develop the standard. This committee include experts from academia, industry professionals, representatives from government agencies, and other stakeholders with expertise in the relevant field.

Standards development involves a robust process of research, consultation, and consensus-building among the committee members to ensure that the standard reflects current best practices and addresses the needs of the industry and society.

Stakeholders targeted by the Standard include:

- Compost producers
- Soil conditioner manufacturers
- Mulch producers
- Agricultural and horticultural sector
- Environmental and waste management authorities
- Research and testing laboratories

- Consumers and end-users

The Standard is administered by the Ministry of Business, Innovation and Employment (MBIE)

The status of NZS 4454 is voluntary and not legally required to be adhered to.

While the standard was not mandatory, it provided valuable recommendations and quality requirements to ensure that these materials were produced and used in a safe, effective, and environmentally responsible manner. Many businesses, organisations, and professionals in the agricultural, horticultural, and landscaping sectors in New Zealand voluntarily adopted the standard to improve their practices and meet industry best practices.

The standard is based on a two-part conceptual model:

- Compulsory quality standards for end products
- Establishing general requirements for best practices to achieve desired quality

This standard applies to:

- Organic products and mixes that have been treated by pasteurising or composting procedures
- Vermicasts that have not been pasteurised or composted before or after being worked by the worms need to adhere to additional provisions

This standard excludes:

- Non-pasteurised and non-composted organic waste due to containing pathogens and plant propagules
- Home composting products
- Organic fertilisers (blood and bone)
- Liquid organic waste and liquid seaweed
- Non-organic mulches (e.g gravel), soils, and soil conditioners
- Non-compostable organic materials (e.g. plastics)
- Materials described as compost activators
- Feedstocks containing animal mortalities due to MPI standards or under Health Act as notifiable infectious diseases

The US Composting Council¹⁷ states the following as beneficial for standard assured compost products:

- Improves value and image of compost
- Improves field results
- Promotes customer-oriented composters

¹⁷ <https://www.compostingcouncil.org/default.aspx>

- Improves customer satisfaction
- Reduces the chance of additional regulation
- Competitive advantage over non-STA products
- Internal quality control program for composters
- Standardised laboratory test protocols for compost evaluation
- Beneficial across the entirety of the compost sector value chain

Compulsory quality standards are classified into 5 groups:

- Physical
- Chemical
- Biological
- **Limits for pathogens**
- **Contaminants**

In the next section we will discuss in brief the limits for pathogens and contaminants.

5.1.2 Standards for pathogens and contaminants

E. coli and total *Faecal coliform* are the only pathogens of concern addressed within this standard. Glass, metal, rigid, light, flexible plastics, stones, and clay lumps are the contaminants considered of importance in standardisation.

5.1.3 Contamination management

For pathogens and contaminants, such as heavy metals, pesticides, and other pollutants, acceptable limits may be set by relevant regulatory bodies or health authorities. These limits often consider factors such as the intended use of the compost or soil conditioner and potential exposure scenarios.

For example, in some regions, compost intended for agricultural use may have different contaminant limits than compost used in public parks or playgrounds, where children may come into direct contact with the soil.

Below is a brief overview of some aspects of contamination management as set out in the standard:

- **Feedstock selection** - the standard include recommendations for selecting appropriate organic waste materials as feedstock for composting or soil conditioning. By choosing suitable waste streams, potential contaminants can be minimized from the outset
- **Composting process** - appropriate composting processes could contribute to reducing and eliminating contaminants. When conducted correctly, can result in

the degradation of certain contaminants, such as pathogens and organic pollutants

- **Quality control** - The standard specifies quality requirements for composts, soil conditioners, and mulches, which include limits on specific contaminants, such as heavy metals, pathogens, and pesticide residues
- **Testing and analysis** - assessing the presence and concentration of contaminants to ensure compliance with the established quality standards
- **Environmental considerations** - environmental considerations to prevent potential risks related to contaminants are incorporated, which include recommendations for proper application practices to avoid contaminant leaching or runoff
- **End use** - guidance are provided to ensure appropriate application of product with different uses encompassing varying tolerance levels for contaminants

5.1.4 References to other standards

- **New Zealand Standards:**
 1. NZS 8410:2003, Organic production.
 2. NZS ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories
- **Joint Australia / New Zealand Standards:**
 1. AS/NZS 9001:2000, Quality management systems – Requirements.
 2. AS/NZS ISO 9004:2000, Quality management systems – Guidelines for performance improvements
 3. SAA/SNZ HB 18: Guidelines for third-party certification and accreditation
 4. Part 2:2003 Standardization and related activities – General vocabulary
 5. Part 22:2003 General criteria for supplier’s declaration of conformity
 6. Part 28:1991 Guide 28 General rules for a model third-party certification system for products.
- **Australian Standards:**
 1. AS 1199: Sampling procedures and tables for inspection by attributes
 2. Part 0:2003 Introduction to the ISO 2859 attribute sampling system
 3. Part 1:2003 Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.
 4. AS 4454:2003, Composts, soil conditioners and mulches.
- **Other Documents:**

1. NZWWA Guidelines for the safe application of biosolids to land in New Zealand (New Zealand Water and Wastes Association), 2003
2. NZEA Best practice guidelines and standards (NZ Earthworm Association), 2002
3. SWAP Solid waste analysis protocol (Ministry for the Environment), 2002

NZS 4454 is recognised and accepted in the industry and, while it is widely considered a standard for best practices, only a limited number of composters actively adhere to the standard. There is no certification process for NZ 4454 in New Zealand and while some operators look to this standard as a benchmark to ensure best practises and quality in their operations, there is almost no consumer recognition. This limits the value of the standard in the market and means that other systems such as BioGro, which do offer certification, have developed wider market recognition and hence operators are more likely to use this as the standard for their operations.

The NZS 4454 Standard is recognised internationally, especially in countries with a similar agricultural and environmental landscape as New Zealand. This standard aligns with other international standards such as the British PAS110 Standard.

It is worth noting that the NZ standard was developed based on the equivalent Australian Standard (AS 4454:2003). However AS 4454 was revised in 2012. New Zealand declined to join the Australian review of the standard in 2012.

The major changes to the 2012 edition of the Standard include the following:¹⁸

- (a) The Application has been extended to include ‘all levels of government’ and ‘as feedstocks to manufacturers’ (Clause 1.2).
- (b) A definition of raw mulch (Clause 1.5.9) and mature compost (Clause 1.5.4) have been added.
- (c) The requirements for compliance with national environment and health standards have been clarified, limits for chemical contaminants set, and a contaminant warning label and statement is now required if copper and zinc levels fall within certain ranges. (Clause 2.1, Table 3.1(C) and Clause 5.3(h)).
- (d) A clause addressing the classification of products by application and use has been added (Clause 3.1.2).
- (e) The method of measuring bulk density and volume of product as delivered has been clarified (new Appendix J).

¹⁸ [AS4454-2012A1.pdf \(SECURED\) \(soilwealth.com.au\)](#)

- (f) The nitrogen drawdown index has been reinstated as a test for determining maturity/stability (Appendix O).
- (g) An optional revised health warning has been added (Clause 5.2 (e)).
- (h) Additional information on nutrients, trace elements and feedstocks is now required (Clause 5.5).
- (i) The self-heating test reverts to an optional test for determining maturity (Appendix N).
- (j) The determination of CaCO₃ equivalent is now only required if pH >8.0 (Table 3.1(A)).
- (k) A requirement to test for pathogen indicators when high risk raw materials are used (Table 3.1(A)) has been added.
- (l) A new Appendix N, Method for determination of maturity index, has been included.
- (m) The reinstatement of carbon to nitrogen ratio (C:N).
- (n) The name of the 'Method for determination of toxicity to plants' test has been changed to 'Method for plant growth test (Bioassay)' and the method modified to accommodate physical properties of composts and mulches (Appendix F).
- (o) Additional requirements for claiming compliance are specified (Clause 4.2 and Appendix Q).
- (p) A new Appendix A, Methods of sampling, sample handling and preparation prior to analysis has been added.
- (q) Requirements to report test results for some parameters (pathogens, nutrients, contaminants, etc.) in mg/kg dry mass equivalent have been added.
- (r) Appendices on best practice guidelines for composting systems and vermiculture systems have been deleted as some of the information was obsolete and information on current best practice is readily available from other sources.

5.2 BioGro Certification Modules 2009

The BioGro Standards are administered by the New Zealand Biological Producers & Consumers Council Inc. (NZBPCC) and was founded in 1983 to promote the interests of organic production in New Zealand (BioGro, 2009). It was originally formed by representatives of the Soil & Health Association of New Zealand Inc., The Bio Dynamic Farming & Gardening Association in New Zealand Inc., and the Doubleday Research Association of New Zealand Inc., as an umbrella organisation for organic agriculture.

The primary responsibilities of the NZBPCC include:

- the maintenance and development of the BioGro Organic Standards; and
- promotion and support of organics.

The BioGro Standards are reviewed and updated as required to maintain compliance with the International Federation of Organic Agricultural Movements (IFOAM) Basic Standards and all relevant export market regulations.

BioGro modules are a compilation of the standards outlining the requirements for certification or input of products for use in BioGro certified organic production systems.

A few of the modules that have relevance to organic composting and contaminants are discussed below:

Module 22 from May 2009, describe the standard for evaluation inputs and replaced the BIO-GRO New Zealand Organic Standards, 30 April 2001: Module 3.1

The reasons for replacing the previous standard include:

- Regular review required under IFOAM accreditation;
- Incorporation of notified changes since the 30 April 2001 Standards were published;
- Incorporation of other changes required for ongoing compliance with the IFOAM Basic Standards,
- The NZFSA OOAP, and overseas market regulations;
- Organic production systems are continuously evolving.

Standards must be met by:

- applicants seeking BioGro certification for an input product;
- and applicants seeking BioGro approval for an input product

Organic certification is a secure, widely used traceability system. BioGro certification serves as a verification that all aspects of an industries operations adhere to compliance of organic standards. Biogro certified products can be traced back to its origin. BioGro certification is well recognised in New Zealand, however, needs to be renewed annually.

BioGro certification guarantee that:

- A product has been manufactured without Genetically Modified Organisms (GMOs)
- No testing conducted on animals
- No pesticides used
- Not subject to irradiation.

The BioGro Standards Appendix B: Permitted and Restricted Materials and Practices lists generic materials allowed for permitted or restricted use for fertilisation and soil conditioning, pest and disease management, animal health, processing, and other uses in BioGro certified organic production.

BioGro certification takes into account:

- Environmental safety
- Human health and quality
- Product quality
- Ethical aspects and animal welfare
- Consumer perception
- Necessity of all ingredients of an input product
- Source of ingredients, extraction, and method of production
- Pest control must be achieved primarily through good facility and site management practices.

The following characteristics of all ingredients are taken into consideration:

- **Degradability** - all ingredients should be degradable by naturally occurring metabolic pathways
- **Acute toxicity to non-target organisms** - high acute toxicity for non-targeted organisms is classified as restricted inputs
- **Chemically synthesised products and heavy metals** - no levels of synthetic products or heavy metals that are considered xenobiotic¹⁹ products

Module 9 from May 2009, describe the standard for crop production and replaced the BIO-GRO New Zealand Organic Standards, 30 April 2001: Module 4.2. The module has been reviewed for similar reasons explained previously under model 22.

Aspects taken into consideration and that should be adhered to are:

- **Soil fertility and health** - sustain and enhance the fertility and life-supporting ability of soil, including its biological, physical and chemical components
- **Soil testing** - regular soil testing is required
- **Organic matter** - tests must be included to estimate organic matter levels
- **Compost and vermicasts** - may be purchased from BioGro approved sources or made on the farm in which case it then needs to be compliant with the *BioGro Compost Guide*
- **Leaching** - losses from stored and applied composts must be minimised
- **Nitrogen rates** - prevent excessive nitrogen build up and levels (< 170 kg nitrogen per hectare per year)

¹⁹ Products or heavy metals which are harmful, or potentially harmful to humans.

- **Raw animal Manures** - not allowed to be directly applied to soils
- **Sewage by-products (sludge and biosolids)** - not to be used as an ingredient in compost or be applied directly
- **Industrial by-products** - allowed to be used if subjected to hot composting and if they are free from synthetic additives
- **Mulches** - only to be sourced from certified farms
- **Water requirements** - water source for irrigation not contaminated, catchment information needs to be supplied, optimal watering practices must be adhered to, appropriate methods of water monitoring, water supply to meet consents and Regional Plan, and temporary irrigation systems must be removed after use
- **Treated timber** - use of timber treated with arsenate and/or other prohibited materials is a restricted practice and requires BioGro written approval. All alternatives must be evaluated first
- **Plastic and reflective mulches** - plastic mulches are permitted, but must be retrieved after use, and must not be burnt. Only plastic products based on polyethylene, polypropylene and polycarbonates are allowed.

BioGro Compost Guideline

Targeted at following stakeholders / producers:

- BioGro certified primary producers making aerobic compost, anaerobic compost, or vermicompost for use on their certified properties
- Commercial enterprises that produce more than 50 cubic metres of completed compost per year or if you are on selling the compost.

This guideline does not specify compost production protocols.

Prohibited ingredients include:

- Sewage wastes
- DAF sludges from processing facilities
- Urea
- Recycled wallboard
- Factory farmed manure.

For each non-organic ingredient assess source, storage, and transport for potential contamination by materials prohibited under the BioGro Organic Standards for application to land and crops, including:

- Pesticides (insecticides, fungicides, and herbicides) by direct or indirect application
- Persistent pesticide residues such as DDT
- Synthetic fertilisers

- Heavy metals such as Arsenic, Chromium, Copper, Mercury, Nickel, Zinc, Lead and Cadmium
- For manures to be sourced from non-organic farms, such as poultry manure, all livestock feeds used on those farms must be assessed for prohibited inputs including veterinary treatments, GMO feeds such as soy and corn, and GMO / GMO derivatives such as enzymes and vitamins
- Industrial contaminants such as PCBs
- Machinery inputs such as fuel, oil, and grease
- Timber treatments such as chrome and arsenic
- Paints
- Waste and rubbish such as plastics

Accepted value levels are outlined in the tables below.

Maximum permitted levels for organochlorines in soil:

Chemical	BioGro Standard for soil (mg/kg)
Total DDT (including all metabolites and isomers)	0.2
Lindane	2.0

Source: Appendix A of BioGro Standard

Maximum permitted pesticide residue and heavy metal levels in food and water:

Chemical	New Zealand (Maximum Residue Limits of Agricultural Compounds) Food Standard and the Australia New Zealand Food Standards Code (mg/kg)		BioGro Standard for food and water (mg/kg)	
Arsenic (total) in grains		1.0		0.1
Azinphos-methyl, in fruit		2.0		0.20
Benomyl, in avocados		0.5		0.05
Benomyl, in cereals		0.2		0.02
Cadmium, in vegetables and fruit		1.0		0.1
Carbaryl, in fruit/vegetables		3.0		0.30
Lead, in fruit and vegetables		0.2		0.02
Lindane, in any food		2.0		0.20
Tebufenozide, in kiwifruit		0.5		0.05
Total DDT (including all metabolites and isomers)	Meat fat	5.0	Meat fat	0.5
	Milkfat	1.25	Milkfat	0.125
	Eggs	0.5	Eggs	0.05

Note: Where a food residue or contaminant is not stated in the New Zealand (Maximum Residue Limits of Agricultural Compounds) Food Standard and the Australia New Zealand Food Standards Code then, the default MRL for the residue is 0.1 mg/kg (therefore 0.01 mg/kg for the BioGro Standard).

Source: Appendix A of BioGro Standard

Limits for heavy metals in soils and composts:

Metal	BioGro Standard for soil (mg/kg dry weight soil)	BioGro Standard for compost – ingredients other than household waste (mg/kg dry weight compost)	BioGro Standard for compost – ingredients including household waste (mg/kg dry weight compost)
Arsenic	20	20	20
Cadmium	2	1	0.7
Chromium (total)	150	150	70
Chromium (VI)	1	1	0 detectable
Copper	60	60	70
Lead	100	250	45
Mercury	1	1	0.4
Nickel	35	60	25
Zinc	300	300	200

Any product found to have residues of a prohibited substance in excess of 5% of the USA EPA (Environmental Protection Agency) tolerance for that substance, can not be exported to the USA with either the USDA Seal or the label “organic” or the BioGro trademark or logo.

Source: Appendix A of BioGro Standard

5.3 Assure Quality – Organics Standard 2020

AssureQuality Organic Standard version 8

This Standard is effective from 15 June 2020 until such time as a new edition, or amendment, is released under the authority of AssureQuality Limited. All changes to this Standard which differ from the AQOS v7 and subsequent amendments of the Standard shall be implemented no later than 30 June 2021.

This Organic Standard is issued and administered by AssureQuality Limited (AssureQuality Limited, 2020).

AssureQuality is another certification body in New Zealand that offers organic certification services.

The aims of this Standard are:

- To protect consumers against deception and fraud in the marketplace and against unsubstantiated product claims
- To protect producers of organic produce against misrepresentation of other agricultural produce as being organic
- To ensure that all stages of production, preparation, storage, transport and marketing are subject to inspection and comply with this Standard.

This Standard applies to the following products, which carry, or are intended to carry, descriptive labelling referring to organic production methods:

- Unprocessed plant, animal or aquaculture products
- Processed product derived mainly from above.

Overview of primary aspects:

- The operator must prepare and maintain an **Organic Management Plan (OMP)** outlining the conversion production, preparation, handling and management practices employed to meet this Standard, and any input used
- **Monitoring for contamination** - testing is not recognised as a means of determining the organic status of an end product; however, it has a role in verifying that the production process has appropriate measures in place
- **Prohibition of synthetic chemicals** - prohibit the use of synthetic fertilizers, pesticides, herbicides, and genetically modified organisms (GMOs). Instead, organic farmers should rely on natural and sustainable methods to manage pests and enrich the soil
- **Sustainable farming practices** - organic farming promotes environmentally friendly practices, such as crop rotation, composting, and water conservation, to minimize negative impacts on ecosystems and biodiversity

- **Animal welfare** - standards include guidelines for the ethical treatment of animals, ensuring they have access to outdoor areas, natural feed, and are raised without the use of growth hormones or antibiotics
- **Labelling and traceability** - organic products must meet specific labelling requirements to be identified as organic
- **Certification process** - organic standards require farms and producers to undergo an inspection and certification process by accredited certifying bodies such as AssureQuality to verify compliance with the organic regulations
- **Handling and processing** - standards extend to the handling and processing of organic products, ensuring that organic integrity is maintained throughout the entire value chain.

This standard makes reference to:

- Accredited to ISO 17065 plus additional evaluation requirements
- IFOAM accredited and there are no additional requirements needed to be recognised under the AssureQuality Programme.

A farm waste management plan which details how manures and residues are managed:

- Minimise nutrient losses
- Recycle nutrients

Compost guidelines include:

- Composting may take the form of either aerobic or anaerobic techniques and is recommended within the organic production system as an effective means of cycling and binding nutrients, while eliminating or reducing hazardous agents such as potentially lethal pathogens and weed seeds
- Where feasible, heaps shall be turned to enable heat transmission to all parts of the heap
- Practices shall be such as to enable destruction of harmful microbes, disease pathogens and weed seeds, and to assist in the breakdown of potential residual chemicals (55 degrees Celsius for minimum of 3 days)
- Compost heaps shall not be allowed to become waterlogged, nor to dry out to such an extent that biological activity is discouraged
- No leaching of nutrients from the heap that may pose environmental impacts
- Feedstock shall be selected so as not to pose contamination risk

Contamination management includes:

- All equipment from conventional farming systems is properly cleaned and free from residues before being used on your organically managed areas
- All relevant measures should be taken to minimise contamination

- Not store prohibited crop inputs within the organic production site
- Potentially contaminated areas on a property, such as dip sites, should be excluded from certified areas
- In the case of reasonable suspicion of contamination, AssureQuality will make sure that an analysis of the relevant products and possible sources of pollution (soil, water, air and inputs) takes place to determine the level of contamination and takes measures accordingly
- The use of polychloride (PVC) based products is prohibited

The following are considered as background contamination:

- DDT Levels should not exceed:
 - Meat 5.0mg/kg
 - Milk fat 1.25mg/kg
 - Eggs 0.5mg/kg
- Lindane in food 2.0mg/kg
- Heavy metals in compost shall not exceed the following levels:
 - Arsenic 20mg/kg
 - Cadmium 3mg/kg
 - Chromium 400mg/kg
 - Copper 270mg/kg
 - Hexavalent Chromium (VI) 2.0mg/kg
 - Lead 200mg/kg
 - Mercury 1mg/kg
 - Nickel 60mg/kg
 - Zinc 575mg/kg

The Standard is targeted at:

- Organic farmers
- Food processors and manufacturers
- Distributors and retailers
- Consumers
- Certification institutions
- Governmental authorities

5.4 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2012²⁰

Official title as per MfE website: “*Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011*”

These regulations came into force on 1 January 2012.

Administered by MfE, EPA and is a mandatory, legally binding standard.

The NES was developed due to New Zealand having a history of soil contamination (Ministry for the Environment, 2012). The contamination is primarily associated with past practices involving storage and use of hazardous substances, and disposal of hazardous wastes. The NES complements other environmental laws and regulations in New Zealand, ensuring that the management of contaminated soil aligns with broader environmental protection objectives. The policy objective of the NES is to ensure that contaminants in soil are equitably identified and assessed prior to land development taking place. Furthermore, if necessary, remediation of the land or the contaminants contained to ensure the land is safe for human utilisation. The NES is used to evaluate and control the actual or potential harm that pollutants in soil may cause to human health as a result of five activities: soil disturbance, soil sampling, land use change, subdivision, and removal of fuel storage systems.

Past activities and industries that have led to the creation of contaminated sites in New Zealand include:

- the manufacture and use of pesticides
- the production of gas and coal products
- the production, storage and use of petroleum products
- mining
- timber treatment
- sheep-dipping.

The contaminants in soil left by these activities and industries include:

- pesticides (such as DDT, DDD, dieldrin)
- metals (such arsenic, chromium, copper, lead and mercury)
- hydrocarbon compounds.

²⁰ <https://www.legislation.govt.nz/regulation/public/2011/0361/latest/whole.html>

The safe use of contaminated land are enabled by:

- Regulations for five activities are established to enable district planning to control and assess public health risks in line with national consistency
- Establishing soil contaminant standards to protect human health
- Best practise protocols are ensured under the NES dealing with land affected by or potentially affected by contaminants.

The NES encompasses three pillars:

- National set of planning controls
- Mandated method for regulating applicable standards
- Standardised procedure for site investigations and reporting.

Controls imposed by the NES are classified under one of four primary categories:

- Permitted activity - no resource consent required
- Controlled activity - resource consent required
- Restricted discretionary activity - resource consent required
- Discretionary activity status - resource consent required.

If the land use corresponds to the specific exposure scenario, applicable limits for 12 contaminants—referred to as "priority contaminants" in regulation 7(2) of the NES—were derived and must be used. The five land use scenarios are: rural/lifestyle block, residential, high-density residential, parks/recreational and commercial/industrial outdoor worker and the 12 contaminants include: arsenic, boron, cadmium, chromium, copper, lead, mercury, benzo(a)pyrene, DDT, dieldrin, PCP and dioxin (including dioxin-like PCBs). The concentrations allowed in soil (SCSs) vary greatly with land use.

Standards for soil contaminants (SCSs) serve two purposes:

- Health-based trigger values
- Remediation targets

The NES requires best practises for examining and disclosing hazardous sites and makes referral to the following documents published on MfE's website:

- Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand (Revised 2011) (referred to in this Users' Guide as CLMG No.1)
- Contaminated Land Management Guidelines No. 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011) (referred to in this Users' Guide as CLMG No.2)
- Contaminated Land Management Guidelines No. 5 – Site Investigation and Analysis of Soils (Revised 2011) (referred to in this Users' Guide as CLMG No.5)
- Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated

Sites in New Zealand (Revised 2011) (referred to in this Users' Guide as the Petroleum Guidelines).

The HAIL is a list of organisations and activities which frequently use or store hazardous materials that may contaminate the environment if they leached from secure vessels, were discarded on a site, or were released into the environment as a result of their use. The mere fact that a particular activity or industry is listed here does not imply that all of the sites used by that activity or industry have used or stored hazardous substances, nor does it imply that a site of this type will always have contaminants present in the soil at levels that are dangerous to human health. As a mechanism of identifying parcels of land to which the NES applies, the list simply specifies those activities and enterprises that are more likely to utilise or store hazardous substances.

How the NES connects to other statutory obligations:

- **Resource Management Act 1991**

Regional Council - all discharges into the environment are required to be managed by regional councils. Regional regulations might necessitate consent or authorise these discharges as a permitted activity. Regional councils are permitted to investigate contaminated land. Many regional councils have compiled information concerning contaminated land into a database, including land that is known to have been utilised by hazardous industrial or hazardous activities.

District/ City Council - land use decisions are made by district and city councils. Resource consents may be necessary under district regulations for subdivisions and specific categories of land uses.

Resource consents - if a resource consent was issued before this NES went into effect on January 1, 2012, it is still in force.

- **Building Act 2004**

Site history - to make sure the clause's requirements are followed, Clause F1 of the Building Code¹ Building Regulations 1992 recommends taking the site history into account before submitting a building permit application.

Hazardous substances on site - the requirements for buildings to be constructed to avoid the likelihood of people within the building being adversely affected by hazardous agents or contaminants on the site.

Territorial authority - if resource consent is necessary, a certificate must be issued. An accompanying process called a project information memorandum (PIM) is used to check for infrastructure and RMA concerns. This procedure, which is typically carried out by a PIM officer falls outside the scope of the Building Act.

The tables below outline soil contaminant values for organic and inorganic substances respectively.

Soil contaminant standards for health (SCSs(health)) for inorganic substances:

	Arsenic	Boron	Cadmium (pH 5) ¹	Chromium		Copper	Inorganic lead	Inorganic mercury
				III	VI			
				mg/kg	mg/kg			
Rural residential / lifestyle block 25% produce	17	>10,000	0.8	>10,000	290	>10,000	160	200
Residential 10% produce	20	>10,000	3	>10,000	460	>10,000	210	310
High-density residential	45	>10,000	230	>10,000	1,500	>10,000	500	1,000
Recreation	80	>10,000	400	>10,000	2,700	>10,000	880	1,800
Commercial / industrial outdoor worker (unpaved)	70	>10,000	1,300	>10,000	6,300	>10,000	3,300	4,200

Notes: All concentrations refer to dry weight (ie, mg/kg dry weight).

¹ Default value is for soil that is pH 5. Concentrations increase with increasing pH (see *Methodology*).

Source: Appendix B NES Guide

Soil contaminant standards for health (SCSs(health)) for organic compounds:

Scenario	BaP ¹	DDT	Dieldrin ²	PCP	Dioxin	
					TCDD	Dioxin-like PCBs
					mg/kg TEQ	mg/kg
Rural residential / lifestyle block 25% produce	6	45	1.1	55	0.12	0.09
Residential 10% produce	10	70	2.6	55	0.15	0.12
High-density residential	24	240	45	110	0.35	0.33
Recreation	40	400	70	150	0.6	0.52
Commercial / industrial outdoor worker (unpaved)	35	1,000	160	360	1.4	1.2

Notes: All concentrations refer to dry weight (ie, mg/kg dry weight or µg/kg dry weight).

Source: Appendix B NES Guide

The primary target audience includes:

- Landowners
- Land developers
- Local Government Authorities
- Environmental Consultants especially specialising in contaminated land management
- Regulatory organisations
- General public and future occupants of land

Limitations of the NES include:

- The NES only controls contaminants in soil; it has no regulations for air or water pollution
- The primary focus of the NES is centred around protecting human health and does not comprehensively recognise the effect of contaminated soil on ecosystems or biodiversity
- Not fully regard impacts of contaminated land on cultural or heritage values, especially recognising the implications on whakapapa, whenua, kaitiakitanga and tapu from a Māori worldview perspective
- The NES does not explicitly require a cost-benefit analysis of remediation action
- Challenges regarding soil erosion and sedimentation are not expressly addressed by the NES
- Some emerging contaminants or specific pollutants may not be explicitly covered.

6.0 Guidelines

6.1.1 Guidelines for beneficial use of organic materials on productive land 2017²¹

Reviewing Volume 1 & 2 (2017) could only locate a draft copy to review (Water New Zealand, 2017).

The Guide comprises two volumes:

- Volume 1 - Guide on safe use of organic materials and management framework
- Volume 2 - Technical manual, supporting information on how limits were decided, current regulatory framework and implementation of recommendations from the Guide.

It needs to be noted that Volume 2 contains a large proportion of excerpts from the 2003 NZ Biosolids Technical Manual. Mention is made to the fact that the 2003 document exclusively refers to biosolids but that much of the advice on contaminant transfer mechanisms and management controls could equally be applied to other similar organic material.

The Guide supersedes Guidelines for the Safe Application of Biosolids to Land in New Zealand, 2003 and is made reference to in NZS 4454:2005, Composts, Soil conditioners and Mulches.

Technical manual developed by for primary waste sector partners: Water New Zealand, WasteMINZ, the Centre for Integrated Biowaste Research (CIBR) and the New Zealand Land Treatment Collective (NZLTC).

The primary objective of this document is to create a more uniform approach to the management and benefit from using quality organic products as fertiliser in New Zealand, through providing background information in support of national guidance on the application of these materials.

Overview of the objectives of the Guide:

- Protecting the life-supporting capability of soils
- Encouraging the appropriate, sustainable use of all organic materials
- Protecting human health and the environment
- Recognising the risk with use of these products and advocating best practise for minimising risk

²¹/https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=3291

- Provisioning a standard approach to regulate organics application to land
- Creating public awareness of the pros and cons of this practice
- Decrease risk to the economy

The primary topics covered include:

- Identification of beneficial organic product that could be utilised
- Recommendations are provided for suitable application rates
- Nutrient management to enable maximum crop yield
- Ensuring that the environment is protected through responsible management of organic application
- Soil health maintained through appropriate soil management procedures
- Best practices for storage and transportation
- Compliance to national regulations and robust record-keeping
- Standardised monitoring protocols
- Engagement with iwi and local community.

The primary groups targeted:

- Farmers and landowners who cultivate and manage productive land for agriculture, horticulture, and other purposes
- Agricultural practitioners such as agronomists, consultants, and soil scientists
- Local Governmental Authorities
- Environmental and agricultural research scientists
- Industry stakeholders such as compost producers and waste management companies
- Environmental organisations such as NGOs and advocacy groups
- Public community and iwi.

The Guide applies to the following waste streams:

- Domestic organic waste such as food and green waste
- Cardboard and paper
- Organic waste from secondary industry such as meat works waste
- Deceased stock without posing a security risk
- Manures and sewage sludge
- Pulp and paper waste
- Biodegradable nappies and sanitary items.

The Guide excludes the following waste streams:

- Farm Dairy Effluent

- Home products for self-utilisation
- Liquid seaweed products
- Non-organic mulches, soils, or soil-conditioners
- Non-compostable materials such as plastics.

It is essential to note that organic material is classified in the guide based on their stabilisation and contamination grades. The following table summarises the organic product types:

Type	Stabilisation Grade	Contamination Grade	Activity Status
A1	A	Compliant	Permitted Activity planning control
B1	B	Compliant	Controlled Activity planning control
A2	A	Non-compliant	Specific discretionary resource consent or safely disposed of
B2	B	Non-compliant	Specific discretionary resource consent or safely disposed of

Source: Guide Vol 1

Where:

A = pathogen free

B = contains Pathogens

Compliant = organic products containing contaminants < specified limit

Non-Compliant = organic products containing contaminants > specified limit

Nitrogen loading is the primary limit on organic application to land:

- An average of 200 Kg total N/Ha/year over up to two years should not be exceeded where continual application to productive land occurs
- A one-off nitrogen application of 150 kg mineral N/Ha is applied to remediate degraded and contaminated soil

The Guide refers to two standards for assessing and managing risks:

- AS/NZS ISO 31000:2009 Risk management - Principles and guidelines (the Standard)²²
- SA/SNZ HB 436:2013 Risk management guidelines - Companion to AS/NZS ISO 31000:2009²³

Product pathogenic standards are summarised in the following table:

Pathogen	Standard
Verification sampling:	
<i>E. coli</i>	<100 MPN/g
<i>Campylobacter</i>	<1/25g
<i>Salmonella</i>	<2 MPN/g
<i>Human adenovirus</i>	<1 PFU/0.25g
<i>Helminth ova</i>	< 1/4g
Routine sampling:	
<i>E. coli</i>	<100 MPN/g

²² <https://www.standards.govt.nz/shop/asnz-iso-310002009/>

²³ <https://www.standards.govt.nz/shop/sasnz-hb-4362013/>

Product contaminant concentration limits:

Parameter	Concentration limit (mg/kg dry weight)
Metals:	
Arsenic	30
Cadmium	10
Chromium	1500
Copper	1250
Lead	300
Mercury	7.5
Nickel	135
Zinc	1500
Emerging Organic Contaminants (EOCs):	
Nonyl phenol and ethoxylates (NP/NPE)	50
Phthalate (DEHP)	100
Linear alkydbenzene sulphonates (LAS)	2600
Musks – Tonalide	15
Musks – Galaxolid	50

To attain the necessary stabilising levels, producers have recourse to a variety of treatment procedures. While some of these procedures are more effective at reducing both pathogens and vector attraction (VAR), whereas others are more effective against one or the other. To ensure that the final product acquire the needed stabilisation grade, it may be necessary to combine various treatment processes.

Capability of common production processes to meet pathogen reduction, VAR requirements and stabilisation are summarised in the table below:

Process	Grade A Pathogen Reduction	VAR	Stabilisation
Pasteurisation	Yes	No	No
Irradiation	Yes	No	No
Lime Stabilisation	Yes	Yes	Yes
Composting	Yes	Yes	Yes
Vermicomposting	Yes	Yes	Yes
Aerobic digestion:			
Ambient	No	Yes	Yes
Thermophilic	Yes	Yes	Yes
Anaerobic Digestion:			
Mesophilic	No	Yes	Yes
Thermophilic	Yes	Yes	Yes
plus Thermal Hydrolysis	Yes	Yes	Yes
Thermal Drying	Yes	Yes	Yes
Air Drying	Yes	Yes	Yes
Sludge Pond Storage	No	Yes	Yes

Some limitations of the guidelines include:

- A set of generalised recommendations not necessarily taking into consideration local climatic conditions or soil types prevalent in each region
- It is not a legalised document and needs to be used in synergy with legislation to ensure an appropriate regulatory framework
- Expert advice from agronomists and soil scientists should still be sought and cannot be replaced by the guidelines

- The management of organics in a non-agricultural context is not addressed within the guidelines as its primarily focused on productive land.

6.2 WASTEMINZ- technical guidelines for disposal to land 2022²⁴

Revision 3 reviewed

October 2022

Waste Management Institute New Zealand (WasteMINZ) produced these guidelines through provision of funding by the Ministry for the Environment (WasteMINZ, 2023). These guidelines were developed through consultation with various stakeholders, including consultancies, councils and waste management companies. The guidelines for disposal to land in New Zealand are primarily governed by MfE. Technical guidelines for disposal to land, are an amalgamation of requirements and recommendations that regulate how different types of refuse should be managed and disposed of appropriately on land but more specifically in relation to landfill management.

This document supersedes the following guidelines:

- A Guide to the Management of Clean fills (Ministry for the Environment [MfE] 2002a)
- Centre for Advanced Engineering (CAE) Landfill Guidelines (2000)

These guidelines should be evaluated concurrently with:

- Guide to Landfill Consent Conditions (MfE 2001a)
- A Guide to the Management of Closing and Closed Landfills in New Zealand (MfE 2001b)
- Landfill Full Cost Accounting Guide for New Zealand (MfE 2004a)

Overview of the guidelines and aspects covered:

- Waste classification based on characteristics and environmental impacts
- Specifications on the types of waste that can be disposed of in landfills, including forbidden substances
- Landfill siting and design to minimise environmental effects caused by leachate and gas
- Appropriate landfill management and maintenance to ensure stability and a reduction of risk

²⁴/https://www.wasteminz.org.nz/files/Disposal%20to%20Land/TG%20for%20Disposal%20to%20Land_12Oct22_FINAL.pdf

- Standardised monitoring and reporting on parameters such as groundwater quality, gas emissions and landfill stability
- Closure and post-closure maintenance and monitoring
- Landfill classification based on materials accepted.

In the context of these guidelines the following disposal practices and activities are excluded:

- Biosolid spreading in a thin layer on land
- Excavation and moving of uncontaminated soil, clean fill material including engineered landfills
- Disposal sites or offal holes on-farm for waste produced on the same land
- Bioremediation of soil contamination caused by hydrocarbons
- Waste minimisation efforts before refuse disposal
- Handling and sorting of materials at transfer stations
- Emergency responses to significant events and natural disasters.

Waste streams discussed in these guidelines:

- Industrial and hazardous waste
- Clean fill, controlled fill and managed fill material
- Construction and demolition waste
- Mixed household, commercial and industrial refuse (MSW)
- Domestic, industrial and commercial refuse
- Hazardous waste.

The following legislative documents are summarised and referenced in this document:

- Health Act 1956
- RMA 1991
- Health and Safety at Work (HSW) Act 2015
- Hazardous Substances and New Organisms Act 1996
- Local Government Act 2002
- Climate Change Response Act 2002
- WMA 2008.

The target audience includes:

- Government officials involved in environmental protection, waste management and public health
- Professionals involved in waste management
- Environmental consultants
- Researchers and academics
- Landfill engineers

- Community and environmental proponents.

All classes of landfills pose contamination risks, below is a summary of the main points:

- Class 1 landfill - leachate, contaminated stormwater, landfill gas, odour and dust
- Class 2 landfill - leachate, contaminated stormwater, decreased risk of landfill gas, hydrogen sulphide odour and dust
- Class 3 landfill - mobilisation of contaminant posing a risk to groundwater and surface water, dust
- Class 4 landfill - minor risk of contaminant mobility and contamination of surface water through sediment, dust
- Class 5 landfill - contamination of surface water through sedimentation.

There are two primary mechanisms by which contaminants could be transported in leachate:

- Advection - referring to the process by which a fluid (liquid or gas) carries or transports a property, such as heat, moisture, or contaminants, from one location to another. Advection can be influenced by various factors, such as wind patterns, ocean currents, and temperature gradients
- Diffusion - contaminants move against a concentration gradient from a high concentration area to a lower concentration, seeking an equilibrium.

Contamination is managed and minimised throughout the disposal to land process:

- Contaminated soils are only accepted at Class 1 landfills
- Class 3 managed fills might contain contaminant levels exceeding limits, however, site specific management control discharges to the environment
- Regional Councils monitor and control the discharge of contaminants
- Discharge permits and consents required for discharging contaminants to water, air or on land
- Design of landfill localities take into consideration pathways by which contaminants could be discharged
- Geological and site soil investigation considers if existing land contamination is present
- Groundwater protection from possible contamination release
- Erosion and sedimentation control to prevent contaminant discharge
- Stormwater management protocols to eliminate possible contamination
- Waste Acceptance Criteria (WAC) need to reduce hazards associated with contaminants that pose risk to human health.

This guideline is essential for contaminant management in landfill scenarios; however, some limitations include:

- Emphasis are placed on minimising the potential for contaminant migration, however, some contaminants may still leach over time
- The guidelines are focused on new and existing landfills and don't pertain to historic contamination landfill sites
- Other significant contaminant sources such as, industrial discharges, agricultural run-off or contaminated sites not related to landfills are excluded
- Additional adaptation strategies are needed to fully account for potential contamination caused by climate change
- Not sufficient emphasis are placed on encouraging waste reduction and recycling
- The guidelines focus on managing hazardous waste but do not comprehensively address potential environmental impacts
- Site specific factors are not considered but general guidance is provisioned
- The effectiveness of contamination control in its entirety may be impacted by discrepancies in implementation and enforcement practices.

6.3 Compost New Zealand consent guide 2009²⁵

Prepared by Sinclair Knight Merz Ltd on behalf of WasteMINZ (WasteMINZ, 2009)

It is stated that this document is not necessarily endorsed by MfE or WasteMINZ

Published May 2009

Overview of the guide:

- A guide to support with the composting consent process
- Provide an overview of primary features of commercial composting regarding consenting
- Implementation of relevant and effective resource consent conditions
- A list of additional information sources are provided
- An overview of the regulatory environment regarding composting is provided
- Benefits of composting are discussed

Organic waste materials are categorised in the guide as follows:

²⁵<https://www.regenpreneur.com/uploads/3/9/4/8/39486393/compost-nz-consent-guide.pdf>

Potential Environmental Impact	Type of feedstock	Examples
Low	Garden and landscaping supplies	Leaves, plants, loppings, branches, tree trunks and stumps
	Untreated timber	Sawdust, shavings, timber off-cuts, crates, pallets, wood packaging
	Natural organic fibrous products	Peat, seed hulls/husks straw, bagasse and other natural organic fibrous products
	Processed fibrous products	Paper, cardboard, paper-processing sludge products

Potential Environmental Impact	Type of feedstock	Examples
Medium	Natural or processed vegetable organics	<ul style="list-style-type: none"> ▸ vegetables, fruits, seeds, and processing sludges and wastes; ▸ winery, brewery and distillery wastes; ▸ other food organics not listed in the 'High Impact' category
High	Meat, fish and fatty foods	Carcasses and parts of carcasses, blood, bone, fish, and fatty food or processing wastes
	Fatty and oily sludges and organics of animal or vegetable origin	Dewatered grease traps and fatty and/or oily sludges of animal and vegetable origin
	Grass	Grass clippings
	Biosolids and manures	Sewage biosolids, animal manure and mixtures of manure and biodegradable animal bedding
	Mixed residual wastes containing putrescible organics	Wastes containing putrescible organics, including household domestic waste that is set aside for kerbside collection or delivered by the householder directly to the processing facility, and waste from commerce and industry

Source: *Compost NZ consent guide*

The guide's target audience include:

- Compost facility operators
- Entrepreneurs or companies considering establishing composting facilities will find the guide beneficial in applying for resource consents
- Environmental consultants could use the guide to assist clients in navigating legislative framework to establish composting operations
- Local and regional governmental authorities overseeing composting operations in their region
- Community groups and environmental advocates that are interested in establishing composting facilities as a sustainable waste management system
- Academics and scientist may refer to this guide for an overview on the regulatory framework.

The following points are limitations and not comprehensively covered in the guide:

- A lack of real-time updates, composting practises and technologies are constantly evolving and therefore need to be regularly reviewed
- Not a substitute for robust legal advice regarding consent applications and conditions
- Provide general best practises but not a highly technical guide
- Future developments in regulations, environmental standards and industry practises are not fully regarded.

6.4 Technical Guide 08: The production and use of digestate as biofertilizer of digestate derived from source segregated organic waste 2021²⁶

Guide prepared by Alzbeta Bouskova, Alistair Broughton and Jurgen Thiele, March 2021 for the Bioenergy Association. The guide will be referred to as TG8 in the summary (Bouskova, Broughton, & Thiele, 2021).

The aim of the guide is to:

- Encourage delivery of high quality and consistent best practice bioenergy solutions
- These guidelines are voluntary but do provide regulatory framework for New Zealand bioenergy sector
- The guide is a result of collaboration between various industry stakeholders
- Guidelines on production of high-quality and safe digestate to use as fertiliser
- Framework for certification of anaerobic digestion (AD) facilities digestate as biofertilizer
- The TG8 provides an alternative to the currently widely used Composting Standard NZS4454
- This document provides information on the process of AD and its derived products
- The TG8 specifically addresses source segregated waste and animal manure as digestates
- BSI PAS110 Specification and Quality Protocol, two widely used and respected UK standards, are used as reference in the TG8 with amendments made to ensure relevance to New Zealand and Australian markets.

The target audience include:

²⁶<https://www.biogas.org.nz/documents/resource/TG08-Production-and-use-of-digestate-as-fertiliser.pdf>

- Waste management professionals
- Biogas and Biofertilizer industry engineers and plant operators
- Farmers and agricultural professionals
- Environmental consultants and experts
- Regulatory authorities responsible for regulation and enforcement
- Scientists and academics
- Policy makers and planners
- Agricultural advisors

The TG8 identifies and discuss four types of organic waste:

- Biosolids
- Animal waste (manure, litter)
- Mixed waste (municipality solids or liquid)
- Industrial, household, or commercial organic waste that has been source-separated.

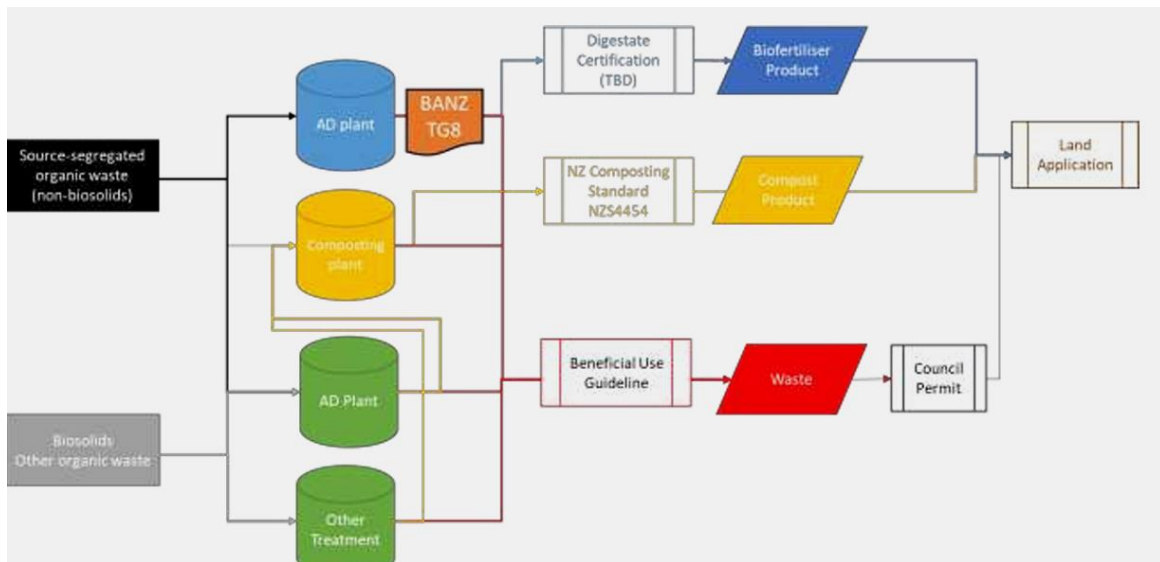
Excluded from the TG8:

- Digestate from municipal sludges originating from human waste
- Animal waste with a disease risk

Specific aspects discussed in the TG8 includes:

- Requirements for plant operators to ensure quality (QA)
- Type and management of input sources
- Facility management including supplementary equipment
- Standard Operating Procedures (SOPs) for testing
- Minimum digestate quality or product generated from digestate after additional processing.

The figure below was taken from the TG8 document, and it demonstrates regulatory requirements for various feedstocks.



Source: TG8 (Pg. 17)

The guide comprises of five main sections:

- *Quality Assurance System*
- *Feedstock Control*
- *Process Management*
- *Product Management*
- *Application Management*

Contamination is addressed under the feedstock control section and divided into four primary groups:

- Heavy metals, such as trace elements, include copper, selenium, zinc, cobalt and several others
- Persistent Organic Pollutants (POPs)
- Physical contaminants, such as non-biodegradable materials could include, metal, plastic or wood
- Biological contaminants such as *E. coli*, parasites, and helminth ova.

It is important to note that POPs and heavy metals will remain in the digestate as they are not removed through the AD process.

Contamination is controlled through application of the following:

- Robust selection and quality control of feedstock that is accepted for AD
- Feedstock pre-treatment to ensure pathogen free digestate and to avoid cross-contamination

- Process control, further avoids cross-contamination of final product with rejected and un-treated product
- Strict document and data keeping procedures to enable trace backs if contamination occurs
- Pasteurisation to significantly decrease presence of pathogens
- Farm cross-contamination is avoided by using dedicated trucks for each farm and specific days of service
- The TG8 took product pathogen standards from Table 5.4 of The Guidelines:

Pathogen	Standard
Verification Sampling	
<i>E. coli</i>	less than 100 MPN/g
<i>Campylobacter</i>	less than 1/25 g
<i>Salmonella</i>	less than 100 MPN/g
<i>Human adenovirus</i>	less than 1 PFU/0.25g
<i>Helminth ova</i>	less than 1/4 g
Routine Sampling	
<i>E. coli</i>	less than 100 MPN/g

- The TG8 took product contaminant concentration limits from Table 5.5 of The Guidelines:

Parameter	Concentration Limit (mg/kg dry weight)
Metals	
Arsenic	30
Cadmium	10
Chromium	1500
Copper	1250
Lead	300
Mercury	7.5
Nickel	1500
Zinc	135
Emergent Organic Compounds (EOCs)	
Nonyl phenol and ethoxylates (NP/NPE)	50
Phthalate (DEHP)	100
Linear alkydbenzene sulphonates (LAS)	2600
Musks – Tonalide	15
Musks – Galaxolid	50

- Time required for 90% destruction of pathogens in AD systems (Al Sadi & Lukehurst, 2012):

Bacteria	53°C (hours)	35°C (days)
<i>Salmonella typhimurium</i>	0.7	2.4
<i>Salmonella Dublin</i>	0.6	2.1
<i>Escherichia coli</i>	0.4	1.8
<i>Staphylococcus aureus</i>	0.5	0.9
<i>Mycobacterium paratuberculosis</i>	0.7	6.0
Coliform bacterial	-	3.1
Groups D Streptococci	-	7.1
<i>Streptococcus faecalis</i>	1.0	2.0

Source: TG8 Table 5

The TG8 briefly discuss the presence of microplastic particles in digestate. Below is a summary of the main points:

- Most domestic waste encompasses plastic contamination
- Complete removal of plastic not possible even when employing the most advanced process technologies
- Processing waste containing plastic in anaerobic digesters result to a further breakdown which then result in residual microplastic particles being present in the digestate
- A research gap exists in understanding microplastic behaviour and properties during and after being subjected to the anaerobic digestive process
- No microplastic concentration limits can be set due to a lack in standardised monitoring protocol
- An agreement is in place with MfE and the Ministry of Health that no concentration limits will be set for microplastics until standardised sampling protocols have been developed and knowledge gaps addressed
- An effort is made across the entirety of the value chain to reduce or eliminate plastic entering the AD facility.
- Reduction or elimination of plastics entering the AD facility is achieved through:
 - Educating the public regarding effects of plastic across the entirety of the value chain
 - Waste collectors visually inspecting bins upon collection
 - Feedstock acceptance protocols
 - Appropriate processing technologies such as de-packing infrastructure.

Some of the limitations of the TG8 identified include:

- Provision of site-specific recommendations absent. General guidance is offered and best practices applicable to a wide range of scenarios, however, it is

important to address specific site conditions, local regulations and unique challenges faced by individual users

- The guide is a “live” document with regular reviews and updates, however no real-time updates can be provided
- Only some of the contaminants are addressed
- No legal advice is given, and users should seek additional support
- Ecological effects are not covered.

Development of Digestate Standard

It is worth noting that at the time of writing, the Bioenergy Association, with funding support from the Waste Minimisation Fund, is in the process of developing a standard for digestate. The intent is that digestate that meets the standard would be certified by the Fertiliser Quality Council and so be able to be applied under the same conditions as fertiliser.

6.5 Organic Materials Guidelines – organic contaminants review²⁷

Authors: Louis A Tremblay, Gerty Gielen and Grant L Northcott

Centre for Integrated Biowaste Research (CIBR)

Published: Volume 2, August 2014 in affiliation with Cawthron Institute, Scion Research and Northcott Research Consultants Limited (Tremblay, Gerty, & Grant, 2014)

Scope and objectives of the report:

- This report supported the amendments made to the *2003 Guidelines for the safe application of Biosolids to Land in New Zealand* through offering a robust review of the contaminant section of the Guidelines
- The validity of suggested threshold values and the relevance of chemical targets were reviewed
- Recommendations reflecting current state of research were made towards the amendments
- Emphasis is placed on the emerging organic contaminants (EOCs) group
- Review the necessity to include the following organics: DDT/DDD/DDE; Aldrin; Dieldrin; Chlordane; Heptachlor & Heptachlor epoxide; Hexachlorobenzene (HCB); Hexachlorocyclohexane (Lindane); Benzene hexachloride (BHC); Total polychlorinated biphenyls (PCBs); Total dioxin TEQ

²⁷ /https://www.waternz.org.nz/Resources/Attachment?Action=Download&Attachment_id=3297

- Supporting evidence provided as to which organic contaminants should be included in the revised guide
- Recommendations are provided regarding allowable contaminant limits and concentrations, and whether it should be updated in the new guideline document.

The tables below summarise EOCs identified by the Water Environment Research Foundation (WERF):

Tier 1 EOCs - chemicals present in consumer products that are released in high quantities:

Compound	Application
2,6-Di-t-butyl-p-cresol (BHT)	Skin care, hobby supplies
Dibutyl phthalate	Plasticizer, finish, nail care
Atrazine	Herbicide
Bisphenol A (BPA)	plasticizer, epoxy, glue
Benzophenone	Car wash, facial products
Oxybenzone	Skin care, insect repellent
Triclosan	Antibacterial, soap, lotion
Vanillin	Fragrance, cosmetics, various
o-Phenylphenol	germicide, fungicide
2-Phenoxyethanol	Preservatives, cosmetics, fragrance
Hexabromocyclododecane (HBCD)	Flame retardant

Source: *Organic contaminant review report*

Tier 2 EOCs - chemicals frequently used domestically or present in domestic products:

Compound	Application
Simazine	Herbicide, anti-algae products
DEET	Insect repellent
Hydrocortisone	Anti-itch cream
Butylated hydroxyanisole (BHA)	Antioxidant, various
3-Indolebutyric acid	Fertilizer
Camphor and menthol	Fragrance, various
2-Methylresorcinol	Hair colour, cosmetics
Isobutylparaben	Preservative, cosmetics, various
Acriflavine	Pesticide
Trifluralin	Herbicide
Propylparaben	Preservative, various

Source: *Organic contaminant review report*

The effects exerted on high production volume (HPV) chemicals by the following processes were evaluated in the WERF report:

- Biological treatment - activated sludge and membrane bioreactor (MBR)
- Disinfection - UV light, chloramines and chlorine
- Advanced oxidation - ozone and ozone/hydrogen peroxide

The findings were:

- >80% of Tier 1 and Tier 2 compounds were removed by activated sludge and MBR, thus a high efficiency of biological treatment presented
- Partial transformation achieved by chlorination of both Tier 1 and Tier 2 compounds
- Increased quality of effluent is achieved through ozonation and ozone/hydrogen peroxide treatment but fail to eliminate all compounds
- Hydrophobic compounds are likely to be bound to solids and removed during the separation process.

Chlorinated POPs (Cl-POPs) have significantly decreased in the New Zealand environment with only “background” environmental concentrations remaining. Furthermore, similarly reduced concentrations are observed in sewage sludge and biosolids. Regulations to monitor Cl-POPs residuals in biosolids and sewage sludge in New Zealand is a costly process with minimal applicability. Whereas novel organic compounds of concern posing a high risk to human health and the environment have been identified internationally with limited data availability in New Zealand.

The review established a framework of reasons at which organic contaminant concentrations in biosolids should be regulated:

- Present any risk and could exert an impact on the economy, human and environmental health
- Environmental accumulation, bioaccumulation due to use exceeding degradation rates or insufficient degradation
- Possible contamination of groundwater.

The types of chemicals to consider for inclusion in the regulations based on the above properties are:

- Perfluoro chemicals (PFCs)
- Chlorinated dioxins and furans
- Polychlorinated biphenyls (PCB)
- Polycyclic aromatic hydrocarbons (PAHs)
- Flame retardants
- Surfactants (nonylphenols and nonylphenol ethoxylates)
- Pharmaceuticals and antibiotics
- Phthalates and plasticizers
- Endocrine disruptors, sterols and stanols
- Organotin
- Pentachlorophenol's (PCPs)
- Pesticides.

Contamination is managed through:

- Products containing EOCs of concern are regulated in importation and manufacturing
- Improved efficacy of wastewater and sludge treatment processes
- Regulating limits on yearly loading rates of biosolids applied to land
- Applying and regulating limits on contaminants posing a risk in biosolids.

6.6 Organic Production Protocols – greenwaste composting and vermiculture²⁸

Internal document compiled by Revital Fertilisers, September 2017 describing the procedures involved in vermiculture and greenwaste processing.

The document describes the protocols that needs to be followed throughout the value chain, including the receiving of certified feedstock, quality control and testing during both processes, final product testing, packaging requirements of the final product, as well as storage and transportation (Revital Fertilisers, 2017). Visual inspection for contamination is executed at each stage of production. Composting of the greenwaste is based on the windrow system.

Materials excluded from use in both vermiculture and greenwaste composting include:

- Treated timber
- Domestic refuse
- Food scraps are used in vermiculture only as per this document and make no mention of combined food organics and garden organics (FOGO) procedures

The finished product of both processes are tested by an ISO 17025 accredited laboratory for:

- Nutrients
- Heavy metals
- Multi-residue
- Acidic herbicide test including clopyralid (clopyralid only required if grass clippings is an input source)
- Carbon/nitrogen ratio

²⁸<https://www.trc.govt.nz/assets/Documents/Environment/Consent-applications/Remediation2019/FurtherInfo/22Furtherinformatoin-AppendixR.pdf>

6.7 Working towards New Zealand risk-based soil guideline values for the management of cadmium accumulation on productive land²⁹

MPI Technical Paper No: 2012/06

Prepared for Ministry for Primary Industries by Jo Cavanagh, Landcare Research

Background

Cadmium exists naturally in NZ soils in low concentrations. The main source of cadmium is through the application of superphosphate fertiliser, which contains traces of cadmium. Superphosphate improves plant growth. But ongoing use of phosphate-based fertilisers can lead to a build-up of cadmium in soils.

In response to concerns in the late 1990s about cadmium levels in fertilisers, the fertiliser industry in New Zealand voluntarily adopted a limit for cadmium in fertilisers of 280mg Cd/kg. Testing shows current average fertiliser content of 180mg Cd/kg.³⁰

Strategy

MPI released the strategy document *Cadmium and New Zealand Agriculture and Horticulture: A Strategy for Long Term Risk Management in February 2011 (MAF 2011)*.

The strategy has the objective:

To ensure that cadmium in rural production poses minimal risks to health, trade, land use flexibility and the environment over the next 100 years.

This project was conducted to assist the Cadmium Management Group to identify how it will develop a set of New Zealand-derived, risk-based soil guideline values (SGV) to manage cadmium accumulation in soils on production land. The project was funded by the Ministry for Primary Industries and conducted by Landcare Research between December 2011 and May 2012 (Ministry for Primary Industries, 2012). To identify a preferred approach and research priorities for deriving a set of risk-based soil guidelines for use in the Tiered Fertiliser Management System (TFMS) specified in the Cadmium Management Strategy.

In 2019 the Strategy was updated. The strategy provides an agreed ongoing approach to managing cadmium in New Zealand. It also provides a basis for government agencies, regional councils, and the farming and fertiliser sectors to work together and includes monitoring and research.

²⁹ [/https://www.mpi.govt.nz/dmsdocument/3659/direct](https://www.mpi.govt.nz/dmsdocument/3659/direct)

³⁰ [Monitoring cadmium in NZ soils | NZ Government \(mpi.govt.nz\)](#)

The four endpoints considered:

- protection of human health,
- protection of ecological receptors (e.g. microbial processes, soil invertebrates, plants),
- protection of food standards,
- and protection of groundwater quality.

The strategy identifies two main strands of risk: health and trade, and land use flexibility and environmental risks. These two risk areas are monitored through a) a food monitoring programme, and b) soil and fertiliser monitoring programmes. This provides key information for identifying problems and threats, which can be addressed through education and management programmes.³¹

The strategy comprises a number of work programmes that cover:

1. Governance and oversight of cadmium management in New Zealand;
2. Monitoring to ensure the risks are being managed appropriately, and to contribute to the knowledge base of where and how risks from cadmium arise;
3. Management of the accumulation of cadmium in soils and of priority produce for noncompliance with food standards;
4. Research on ways to manage cadmium;
5. Scanning of the trade, regulatory and research sectors to identify new emerging issues.

Contaminants may be referred to as either threshold or non-threshold contaminants with regard to their effects on human health. Threshold contaminants are those considered to manifest toxic effects only if exposure exceeds a threshold dose level, and primarily include non-carcinogens. Non-threshold contaminants are carcinogens and are considered to have effects at all levels of exposure. Cadmium is considered a threshold contaminant, and a provisional tolerable monthly intake (PTMI) of 25 µg/kg body weight adopted by FAO/WHO (2010) is the 'acceptable intake' of Cd.

Results and conclusions

Of the endpoints considered, protection of food standards and ecological receptors are the most relevant to agricultural land. However, there are limited data available to develop New Zealand-specific values for these endpoints. Protection of human health is considered in the *National Environmental Standard for assessing and managing contaminants in soil to protect human health*. Soil contaminant standards have been developed for cadmium and incorporated in this National Environmental Standard, so there is limited need for further research. Protection of groundwater should be

³¹ [Rys_2011.pdf \(massey.ac.nz\)](#)

considered on a site-specific basis, and is particularly important for soils prone to leaching, e.g. stony soils.

A summary of the soil guideline values developed for the protection of ecological receptors for Cd in New Zealand and internationally is shown in the table below:

Table 7 Cadmium soil guideline values developed for the protection of ecological receptors in New Zealand and internationally.

Country	Value name	Cadmium (mg/kg)	Source
NZ	Soil limit ¹	1	NZWWA 2003
	Minimal risk	1	Cavanagh 2006
	Serious risk	12	
	Minimal risk, microbial	6	
	Serious risk, microbial	86	
Australia	EIL	3	NEPC 1999a
Canada	SQG _e – agricultural ²	3.8	CCME 1999
	SQG _e – residential	10	
	Commercial/ industrial	22	
European Union	PNEC soil	1.15-2.3	EU 2007
	Cd soil,crit	0.9	
USA	Eco-SSL – plants	32	US EPA 2005
	Invertebrates	140	
	Birds	0.77	
	Mammals	0.36	
UK	Soil screening values	1.5-2.3	Environment Agency 2008
The Netherlands	SRC _{eco}	13	Lijzen et al. 2001
	IV	13	VROM 2009

EIL – ecological investigation level; SQG_e – soil quality guideline environmental; Eco-SSL – ecological soil screening level; SRC_{eco} – serious risk concentration ecotox; IV – intervention value; PNEC – Predicted no effect concentration.

Source: MPI Technical Paper No: 2012/06

A set of increasing soil Cd concentrations is required to trigger different management options in the Tiered Fertiliser Management System. This could be achieved using soil guideline values determined using the same endpoint, but different levels of protection, e.g. protection of 95% of species and 80% of species, or it could be achieved by using endpoints that have a different sensitivity.

Recommendations

To develop New Zealand-specific values for use in the Tiered Fertiliser Management System the research paper recommends the following actions (stated in order of priority):

1. Undertake research to better understand the pathway of cadmium accumulation in animal agricultural systems in New Zealand.

2. Undertake research to establish how plant uptake of cadmium is influenced by species, cultivar, and soil properties (for relevant plant species). This would establish the relative sensitivity of protection of food safety standards compared to other endpoints. Industry input is required to determine what species and cultivars are most economically important and widely grown to maximise the value of the research being undertaken. This research should include both low accumulators and high accumulators.
3. Use this methodology to generate preliminary SGVs to enable assessment of the relative sensitivity of ecological receptors and protection of food standards. New Zealand toxicity data for plant species relevant to New Zealand agricultural soils are required to confirm the validity of preliminary values.
4. Undertake research to better establish the risk of leaching to groundwater, in particular for vulnerable soils (such as stony soils), and the effects of land use change on leaching.

6.8 It's Complicated: A Guide to Biodegradable Compostable Plastic Products and Packaging³²

WasteMINZ produced guidelines to provide best practise advise to waste industry, producers, consumers and advertisers regarding biodegradable compostable plastic products and packaging (WasteMINZ , 2019).

Main objectives of this guide include:

- Clarifies some of the terminology used for plastic products (plant or fossil fuel based) that are advertised as compostable, biodegradable or degradable
- Explains the substantiation (proof) needed to make these claims
- Provides information about where to dispose of them

In certain cases, advertisements for plastics claim that they can be composted, biodegrade under set conditions, or degrade at end-of-life. All plastics that are subjected to environmental conditions inevitably degrade over time into smaller particles of plastic (occasionally microplastics). Under various conditions, some plastics will biodegrade and convert into biomass, carbon dioxide, and water instead of merely smaller pieces of plastic. Some plastics are compostable, which implies that under the appropriate conditions, they will decompose into water, carbon dioxide, and biomass in a relatively short amount of time.

The guide distinguishes between the following terminology:

³²<https://www.wasteminz.org.nz/files/Organic%20Materials/Its%20complicated%20guide%20final%202019.pdf>

- **Degradable** - something can “break down” and includes all types of plastic that can break into little pieces, either over time, by mechanical cutting, shredding or from exposure to environmental forces and ultraviolet light (from the sun), or through pro-degradant additives
- **Oxo-degradable** - products are made from traditional oil-based plastics with a pro-degradant additive to make it fragment into smaller pieces faster than traditional plastic when exposed to sunlight and oxygen
- **Biodegradable** - means the material is “eaten” by naturally occurring micro-organisms such as bacteria, fungi and algae to produce water, carbon dioxide, and biomass
- **Home composting** - some products and packaging are designed to biodegrade in a home composting system within a specific timeframe
- **Biodegradation in soil, water and marine environments** - Standards and accredited verification schemes exist for biodegradation in soil, water and marine environments, but these have been developed for products that are specifically designed to be used in these environments (e.g. mulch film, or mussel ropes).

Test guides and methods:

- ASTM D6954-18 - Standard Guide for exposing and testing plastics that degrade in the Environment by a combination of oxidation and biodegradation
- BS 8472 - Methods for the assessment of the oxo-biodegradation of plastics and of the Phyto-toxicity of the residues in controlled laboratory conditions

Test guides and methods provide a framework or roadmap of steps, criteria, procedures or a general approach but do not provide a pass or fail for degradability or biodegradability.

7.0 Position Statements and Other Key Documents

7.1 Ministry for the Environment: Compostable Packaging Position Statement³³

Background

The Ministry for the Environment (MfE) published a position statement in March 2022 describing the Ministry's position on where compostable products could play a role in a circular economy in Aotearoa New Zealand (Ministry for the Environment, 2022). It does not provide guidance and should not be interpreted as such. Rather, the position outlined in this document provides information to support Government policy initiatives, including consultation on improving household kerbside recycling collections, the phase-out of single-use and hard-to-recycle plastics, and regulated product stewardship schemes for priority products. The document is available on MfE's webpage.

Position

The Ministry considers that a cautious approach to compostable products is needed. Other jurisdictions are managing the challenges of compostable products and taking similarly cautious approaches. MfE recognises their duty of care to our whenua (land) and our soil. MfE acknowledge that compostable packaging can contain chemicals, additives, inks, and dyes which may negatively impact our environment once they enter the soil. More research is needed before the use of compostable products could increase. Compostable products are also often not properly processed and end up in our landfills, adding to our greenhouse gas emissions by producing methane. Therefore, we need to be sure that when these products are used, they will be collected, sorted, and processed, and that they will not end up in landfill, littered in the environment, or harming our whenua and soils. MfE consider that compostable products could have a role in a circular economy in New Zealand in some situations.

This is summarised in the diagram below:

³³<https://environment.govt.nz/publications/compostable-products-ministry-for-the-environment-position-statement/>

Using compostable products in a circular economy in Aotearoa New Zealand

Principles to consider before exploring using compostable products

If reduction or reuse is not possible, consider whether using compostable packaging would help divert food waste that would otherwise go to landfill

Can you certify the compostable product, in its final form, to a recognised overseas standard and ensure it is free from intentionally added per- and poly-fluorinated alkyl substances?

Situations where compostable products might be used in a circular economy in Aotearoa New Zealand

Where the product would otherwise end up in a compost bin due to excessive food contamination or being difficult to separate from food, such as tea bags or produce labels

Where you can establish a bespoke, closed-loop food waste diversion system and the compostable products are sorted, de-contaminated and collected, and a facility has agreed to accept the products

Source: *MfE compostable packaging statement*

The Ministry considered certain principles before exploring usage of compostable products:

1. Elimination, reduction and reuse should be the first choice.
2. Compostable products should divert food waste away from landfill.
3. Use certified overseas standards.
4. Compostable products should not contain intentionally added PFAS.

There are many aspects affected by central government policy changes, shifting the landscape for a range of materials, including compostable products.

These include:

1. Plastic phase-outs
2. Regulated product stewardship for plastic packaging.
3. Review of the Waste Minimisation Act and Litter Act.
4. Kerbside standardisation.
5. Plastics Innovation Fund.
6. National Plastics Action Plan.
7. New Zealand Plastic Product Declaration.

Packaging innovation and improved systems and infrastructure for materials continue to evolve rapidly. MfE ensure changes to their position on compostable products are reflected in this document and any future policy documents.

7.2 Ministry for the Environment: Kerbside Materials Factsheet³⁴

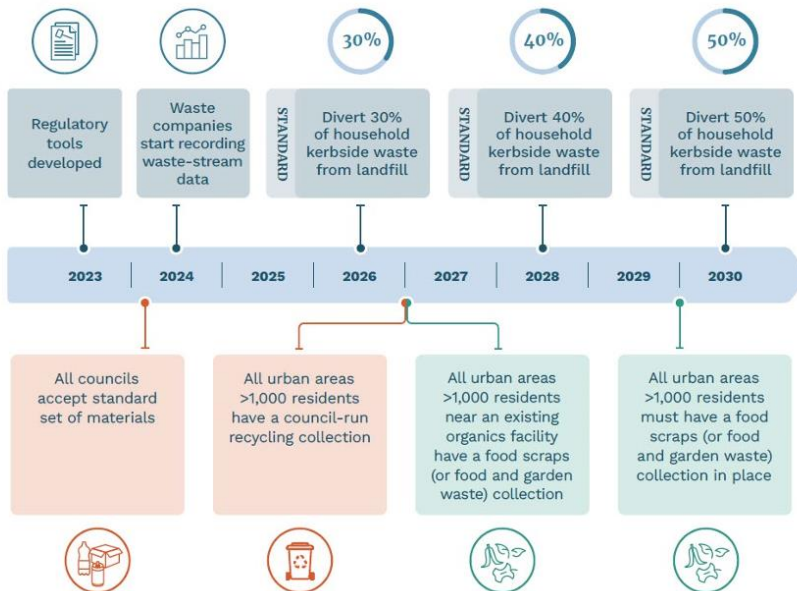
The Ministry has set out to make it easier for people to recycle and divert food scraps from landfills (Ministry for the Environment, 2023). A consensus exist where people are unsure about can and can't be recycled with items going in incorrect bins. More than 300 000 tonnes of food scraps end up in landfills every year, increasing greenhouse gas emissions, which will result in not meeting the 40 percent reduction of methane by 2035.

Three significant changes will be introduced to support a low emission and low waste circular economy in Aotearoa:

- Standardised recyclables will need to be collected across all councils in Aotearoa by 2024
- Recycling collections will be available to households in all urban areas with 1000 people or more by 2027
- Food scraps collections will be available to households in all urban areas with 1000 people or more by 2030, however if organic processing facilities are within 150km from a council the service needs to be provided by 2027

Minimum standards for waste diversion are introduced to councils with a more robust data collection system across the entirety of the waste sector. These changes will be funded through the expanded waste levy. The diagram below is a timeline for implementation of the changes:

Figure 1: Timeline for implementing the changes to recycling and food scraps collections



Source: MfE, 2023

³⁴ <https://environment.govt.nz/publications/improving-household-recycling-and-food-scrap-collections/>

Funding and support is offered to councils by the Ministry for the new rollouts with an increase in the waste levy to \$60 per tonne by 2024. Not a lot of mention is made regarding organic waste contamination or contamination standards. Brief reference is made that only certain materials could be accepted such as food scraps and FOGO collections. No materials that could potentially contaminate the soil are accepted, however, this is very broad and lack specifics. Councils will have some discretion over a few materials, such as compostable bin liners. Compliance monitoring is still aligned with the WMA 2008.

7.3 Position Statement from New Zealand Composters on Compostable Packaging

Background

Position Statement from New Zealand Composters on Compostable Packaging was issued in February 2019 due to concerns regarding contamination in composting practices (New Zealand Composters, 2019). Minimising and eliminating contamination is a crucial area of concern for composters. It is currently challenging for both the public and industry to differentiate between some compostable and non-compostable plastic products, due to their similarity in appearance (such as cups made from PLA and cups made from PET). Removing contamination is both expensive and time-consuming.

Current household collections of food and garden waste are often contaminated with non-compostable items. Composting facilities are not willing to accept compostable packaging in household food waste or green waste collections due to the proven risk of non-compostable packaging being inadvertently included. This is further complicated by the inability to quickly and easily distinguish between compostable and non-compostable packaging, as noted above.

New Zealand councils have unanimously agreed that until the technology improves to enable non-compostable plastics to be easily identified and removed, current and future council provided kerbside food and green waste collections will not accept compostable packaging.

Position

Composters do not need compostable packaging to make quality compost, as it doesn't add value to the final product. This is because compostable packaging provides little to no nutrient value for compost.

Food waste is a rich source of nutrients for compost. So, products and packaging which assist in the diversion of food waste from landfill should be made compostable, e.g. compostable food waste caddy liners. Furthermore, small hard-to-remove items which cause contamination in both commercial and home composting systems should also be made compostable, e.g. fruit stickers, tea and coffee bags, asparagus ties, banana tape. Also, agricultural items which are currently made from conventional plastic, where there is a risk that they will inadvertently remain in the soil after use, should also be made

compostable. E.g. mulch film; net vine clips New Zealand composters are gravely concerned that a wide range of compostable materials which could devalue compost are appearing on the market. This includes nappies and sanitary products, and containers which contain residues that impact compost quality and value, e.g. containers for janitorial products, cleaners, shampoos; pens etc

7.4 Packaging Forum Position Statement on PFAS

Background

The Packaging Forum (PF) initiated a technical advisory group to determine the PF position on PFAS in food-contact packaging and determine, if possible, a pathway forward (Packaging Forum, 2022). The PF in New Zealand is primarily driven by a combination of factors, including scientific research, consumer preferences, and international regulations. These factors influence decisions related to packaging materials, sustainability practices, and waste management strategies within the country. This position has been developed from the recommendation of the PFAS Technical Advisory Group Final Report, October 22, completed by Kim Renshaw on behalf of the Packaging Forum as technical lead of the project. This is available on the Packaging Forum Members Portal.

Position

Evidence is mounting to suggest that the action required to prevent further harm from per and polyfluoroalkyl substances (PFAS), needs to be bold and swift. There is significant work and research being undertaken globally to phase these chemicals out of food packaging. Given the need to limit further harm action needs to be taken as quickly as possible.

The Packaging Forums position is industry should work together to voluntarily phase out all intentionally added PFAS from food packaging.

A proactive approach requires members commit voluntarily to:

1. Commence investigation into their own supply chains immediately to ascertain whether they are affected by the phase out.
2. Begin running down affected stock lines and replacing with alternative materials as soon as practicable.
3. Cease procuring affected packaging (materials with intentionally added PFAS) by 31 December 2023.
4. Complete run down of affected stock lines by 30 December 2024.

Packaging Forum acknowledges the presence of low levels of Total Fluorine inadvertently present in all starter materials for packaging, due to its ubiquitous nature. Stakeholders should continue to monitor global guidance on non-intentionally added and background levels of Total Fluorine as new evidence emerges.

Industry has the capacity to implement a solution. The PF would support the development of national standards and screening protocols and the PF would look to work with stakeholders and regulators to support this development.

7.5 Organic Waste: A position statement from the Zero Waste Network

Background

Organic Waste: A position statement from the Zero Waste Network was issued in March 2021 to explain their position on organic waste and the steps needed to deal with the entirety of the value chain (Zero Waste Network, 2021). New Zealand currently generates approximately 15 million tonnes of waste per year, with 4 million of that recovered. From the perspective of the Zero Waste Network, the building of a circular economy that creates strong communities, develops employment opportunities and enhances the environment means that organics must be viewed as a valuable resource to be recovered. At the same time, diverting and separately collecting organics is a vital step in improving collection, recovery and recycling of non-organic materials because organics are one of the most significant sources of contamination of different waste streams.

Position

The Zero Waste Network's opinion is that regulatory instruments should be utilised in response to the issue of organic waste, and specifically organics in landfills, and food waste. This is because the negative consequences of business as usual are too great to rely on voluntary responses by producers, manufacturers, suppliers and consumers, or on the small-scale responses by community groups or on the capturing of methane at landfills. Organic waste must not be treated in a siloed manner, as how we address it has huge flow-on effects in many different areas.

The Zero Waste Network believe a national strategy for food waste reduction is necessary and should provide guidance for all sectors across the food cycle. A holistic approach needs to be taken in designing this national strategy. It needs to be in line with the waste hierarchy, with emphasis on reduction. It also needs to consider the unique context of Aotearoa, including cohesion with te ao Māori and Te Tiriti obligations, and serve to uphold related policy including climate targets and freshwater quality targets, as well as goals for waste reduction, resilience, community health and wellbeing. Setting a national target for food waste reduction would facilitate planning, monitoring and delivery of action on this issue.

Mandating separate collection and 'recycling' (processing) of organics can be another useful and bold policy tool to drastically increase capture and processing of organics. For example, in the EU, by 31 Dec 2023 all member states must ensure organic waste is "either separated and recycled at source or is collected separately and is not mixed with other types of waste." (European Union, 2008).

Exploring a ban of organic waste to landfill or mandatory recycling of organic waste as happens in countries like Austria, Finland, Germany, Norway and Sweden is the kind of bold action required.

7.6 Road Derived Sediments (RDS) and Vegetative Material Reuse Feasibility Study (2010)

Background

The New Zealand Transport Agency (NZTA) manages the Auckland motorway network, from the Bombay Hills in the south to Pokeno in the North, through the Auckland Motorway Alliance (AMA). This document reports the results of a feasibility study investigating the potential to use RDS and vegetative material from the Auckland Motorway network as a feedstock for compost and producing a useful resource (New Zealand Transport Agency, 2010). The study also investigates the possible regulatory implications of this option and the feasibility of the AMA operating and managing the composting process from collection to use as compost.

The AMA is responsible for the operations and maintenance of the network which includes:

- road sweeping,
- catch pit clearing
- maintenance of stormwater treatment devices
- landscaping and weeding

These activities generate significant amounts of sediment (termed road derived sediment or RDS) that require disposal to landfill. Over 3000 tonnes of RDS is disposed of annually from the Auckland motorway network at a cost of approximately \$450,000 for landfill disposal.

Description

A literature review on international perspectives for RDS reuse found:

- RDS is known to contain increased levels of hydrocarbons and also heavy metals, such as copper, lead and Zinc
- Regulations and guidelines allow for disposal of RDS to land, usually with some form of pre-treatment to minimise potential effects on the environment
- Composting of RDS may treat and dilute RDS to levels which is acceptable for reuse as a soil conditioner or compost
- The addition of appropriate stabilisers to the composted RDS material can immobilise the heavy metals

A review of New Zealand Regulations and Guidelines found that:

- RDS is not specifically mentioned with regard to reuse
- RDS typically has only moderate contaminant levels when compared to contaminant guidelines

- Regarding copper, lead, zinc, TPH and PAH's in RDS are typically above background soil limits when compared to TP 153, Background Concentrations of Inorganic Elements in Soils from the Auckland Region

An investigation of composting processes and plants showed that:

- There are several options available for composting facilities
- If RDS could be composted and utilised as a resource, it will result in significant cost savings for NZTA
- RDS on the AMA network has levels of contaminants (particularly copper, lead, zinc, TPH and PAH's) that are above Auckland background soil levels. As such it is likely that application of the untreated RDS to land without resource consent and potential risks to the environment would be not possible
- Composting of RDS is a viable way to turn a waste material into a valuable resource and potentially
- reduce contaminants to a level where application to land would be possible without resource consent
- The information available from this study does not allow for conclusions to be drawn about the metal leaching potential of the final composted product
- Consultation and liaison with the regulatory authority is required to confirm if a resource consent is needed for use of composted RDS
- Opportunities to influence regulation to allow for composted RDS application to land should be investigated
- Composting and reusing RDS will meet the NZ Waste Minimisation Act and Waste Strategy Objectives
- Composting and reusing RDS will allow the AMA and NZTA to work towards the objectives of resource efficiency and GHG emissions reduction in line with their Environmental Management Plan Objectives
- Composting and reusing RDS will meet the AMA objectives of finding opportunities for of Value for Money, Positive Legacy, Network Efficiency, Healthy Organisation and Customer Stakeholder Obligations

The following outlines the recommendations to further understand the viability of composting and reusing RDS on the AMA network:

- To confirm existing regulatory requirements for reuse with the regulatory authority
- NZTA to proceed with a small-scale composting trial to allow for understanding of environmental effects, operational requirements, optimisation of proportion RDS for composting, confirm that final product will be fit for purpose, and to better understand the accumulation risk of contaminants when RDS is applied

Summary of contaminant concentrations (mg/kg) in the <9mm fraction of AMA RDS samples:

contaminant	median	mean	range	Typical Values (Literature Review)
TPH	670	465	<70-1000	1000 -2000
PAH ¹	0.95	0.82	0.10-1.13	5-8
cPAH ²	0.37	0.33	0.05-0.47	-
BaP equivalents ³	0.11	0.09	0.01-0.12	-
copper	59	58	22-85	40-180
lead	29	31	16-49	100-200
zinc	250	222	80-380	219-450

¹ sum of 16 EPA PAHs listed as priority contaminants. ² sum of the seven PAHs considered carcinogenic. ³ Calculated using the toxicity equivalency factors (TEFs) (Nisbet and LaGoy, 1992).

Source: Road Derived Sediments (RDS) and Vegetative Material Reuse Feasibility Study (2010)

The preliminary findings of this study are very encouraging for composted RDS to be turned from waste material to a resource. The recommendation is for NZTA to proceed with a composting trial study which will enable key information gaps to be addressed, allowing an informed decision to be made regarding the feasibility of establishing a pilot plant to implement RDS composting and reuse on the AMA network. Partnership opportunities should also be investigated to support alternative composting options and regulatory requirements.

8.0 Summary Table

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
Legislation and Regulation				
Natural and Built Environment Bill 2023	Prescribes restrictions relating to land, coastal marine area, river and lake beds, water, and discharges. Establishes a national planning framework (NPF) to provide directions on integrated environmental management, resolve conflicts on environmental matters, and to set environmental limits and strategic directions.	A contaminant must be present in concentrations exceeding an environmental limit or be an unacceptable risk to human health/environment to be classed as contaminated land.	Polluter pays principle applies to those who cause or allow contamination, and the owner of land is responsible for management of contamination.	Mandatory, integrated national direction in the form of a National Planning Framework, a clearer and more directive statutory framework for area-based protections like significant biodiversity areas, and targets for improvement. Also, to be implemented, compulsory environmental limits.
Animal Products Act 1999	Governs the production, processing, and export of animal products. Sets out regulations related to the safety and quality of animal products. Also establishes standards for the management of risks associated with animal products. Applies to primary producers, processors, exporters, importers, retailers and distributors,	Contamination is broadly defined to scenarios where animal products are deemed unsafe or unsuitable for human consumption or use due to the presence of foreign substances, pathogens, and chemicals.	Contamination prevention measures are to be implemented by the various stakeholders throughout the value chain. This include; good agricultural practices, good manufacturing practices, hazard analysis and critical control points, testing and monitoring, quality assurance, traceability,	Mandatory by law, grants regulatory authorities and government agencies specific powers to enforce compliance with its provisions.

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	government agencies and researchers.		regulatory oversight, biosecurity, sanitary design and training.	
Animal Products Amendment Act 2012	<p>Amendment to the Animal Products Act 1999. Address evolving concerns, and improve regulations in food safety, animal welfare, export certification, labelling and packaging, incorporation of international standards, and enforcement and penalties.</p> <p>Applies to primary producers, processors, exporters, importers, retailers and distributors, government agencies and researchers</p>	No definition is described in the amendment Act.	The following prevention measures are described; good manufacturing practices, hazard analysis and critical control points, testing and monitoring, traceability, allergen control, chemical residue monitoring, microbiological standards, sanitation protocols, temperature control, training, packaging and labelling.	Mandatory by law, grants regulatory authorities and government agencies specific powers to enforce compliance with its provisions.
Food Act 2014	<p>This Act governs regulations and standards related to food safety, handling and preparation. It focuses on risk-based measures to ensure food safety at all stages of the food supply chain.</p> <p>This Act is applicable to food retailers, manufacturers, producers, importers and exporters, transporters, distributors, food service providers in healthcare sectors, and food businesses</p>	Contamination is defined as the introduction of any harmful or undesirable substances (physical, chemical, or biological) into food that could make it unsafe for consumption.	Contamination is controlled through hygiene practices, cross-contamination prevention, cooking and heating, chilling and storage, food safety plans, cleaning and sanitizing, supplier and ingredient management, training, traceability, waste management, inspections and audits.	Primary legislation governing food safety, handling and preparation in New Zealand.

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
Biosecurity Regulations 2005	<p>Measures aimed at preventing the introduction and spread of harmful organisms, both animal and plant, into the country.</p> <p>This Act applies to importers and exporters, shipping and transportation industries, agriculture and primary production, manufacturers and distributors, individuals, government agencies</p>	<p>In the context of this Act, contamination is referred to the introduction or presence of organisms, substances, or materials that have the potential to harm the environment, human health, and agriculture in New Zealand.</p>	<p>A comprehensive framework of controls are established to prevent and manage contamination. These controls include import and export regulations, quarantine measures, risk assessments, border inspection, biosecurity responses, education and awareness, surveillance and monitoring, enforcement, management plans, and partnerships.</p>	<p>Significant legislation granting the government and relevant authorities the power to manage and respond to biosecurity risks. Legal framework for preventing and managing the entry, establishment, and spread of pests, diseases and other harmful organisms.</p>
Environment Act 1986	<p>Covers environmental protection measures. Establishes a framework for managing and regulating activities that may affect the environment negatively.</p> <p>This Act applies to individuals, businesses, and organisations that engage in activities that could potentially have an environmental impact.</p>	<p>The introduction of substances, materials, or conditions into the environment that could harm or degrade environmental quality.</p>	<p>Some of the primary controls include resource consents, environmental impact assessments, waste disposal regulations, contaminated land management, enforcement, pollution prevention measures, monitoring and reporting.</p>	<p>This Act is still in force and have not been repealed or replaced</p>
Conservation Act 1987	<p>Legislation that focuses on the conservation and management of New Zealand's natural and cultural heritage. The Act aims to ensure the sustainable use and protection of New Zealand's</p>	<p>This Act does not explicitly provide a definition of contamination.</p>	<p>The controls in place on contamination in New Zealand are primarily governed by the RMA1991 and other related legislation</p>	<p>The Act is still in force in New Zealand</p>

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	<p>unique natural and cultural resources for the benefit of present and future generations.</p> <p>Applies to individuals, organisations and entities. These include government agencies, landowners, tourism and recreation operators, scientists and researchers, cultural and historical entities and local communities.</p>			
Crown Pastoral Land Act 2022	<p>Covers the management, leasing and use of Crown-owned land used for pastoral farming. It aims to balance economic, environmental and cultural factors by regulating the tenure and sustainability of land use, while considering conservation and Māori rights.</p> <p>Applies to leaseholders and landowners, iwi, various government agencies</p>	Contamination is not directly defined in this Act.	N/A	Legal statute that has authority and governs specific matters related to the management, leasing and use of Crown-owned land for pastoral farming.
Hazardous Substances and New Organisms Act 1996	Regulates the management of hazardous substances and new organisms. Framework for protecting human health and the environment from the risks	Contamination refers to the presence or introduction of hazardous substances or new organisms into the environment in a manner that causes adverse effects or poses risks to human	Controls include classification and approval, labelling and packaging, safety data sheets, notification and reporting, storage and handling regulations, environmental release controls,	The Act is still in effect and is the primary legislation governing the management of hazardous substances and new organisms in New Zealand.

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	<p>posed by these substances and organisms.</p> <p>It applies to importers, manufacturers, users and handlers, producers, distributors and retailers, applicants for approvals, government agencies, environmental and community groups.</p>	<p>health, the environment, or property.</p>	<p>contaminated site management, enforcement and penalties.</p>	
<p>Agricultural Compounds and Veterinary Medicines Act 1997</p>	<p>Regulation of agricultural compounds to ensure the safety, efficacy, and proper labelling of these products.</p> <p>This Act applies to manufacturers, distributors, retailers, farmers, growers, veterinarians, importers and exporters. In essence, the Act covers anyone who is engaged in activities related to the use of agricultural compounds and veterinary medicines in New Zealand.</p>	<p>Contamination is defined as the presence of a substance in an agricultural compound or veterinary medicine that is not an intended ingredient and could potentially harm humans, animals or the environment.</p>	<p>Controls on contamination include manufacturing standards, product registration labelling requirements, quality assurance and testing, import and export controls, reporting of adverse events, penalties and enforcement.</p>	<p>Legislation currently in effect, not repealed.</p>
<p>Agricultural Compounds and Veterinary Medicines (Exemptions and</p>	<p>A set of regulations that complement the Agricultural Compounds and Veterinary Medicines Act 1997. These regulations provide additional details and specific provisions related to certain exemptions</p>	<p>The presence of a substance in an agricultural compound or veterinary medicine that is not an intended ingredient and could potentially harm humans, animals or the environment.</p>	<p>Prohibiting harmful substances.</p> <p>Restricting the use of risky substances and only allowing use where risk is considered manageable.</p>	<p>Currently applicable in New Zealand</p>

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
Prohibited Substances) Regulations 2011	<p>and prohibited substances within the context of the Act.</p> <p>Applies to manufacturers, distributors, retailers, farmers, growers, veterinarians, importers and exporters. veterinary medicines in New Zealand.</p>		<p>Promoting safe use by suggesting the use of safer alternatives.</p>	
Waste Minimisation Act 2008	<p>The Act focuses on waste minimization, product stewardship, and encouraging resource efficiency across various industries and sectors to promote waste reduction and sustainable waste management.</p>	<p>Contamination refers to the introduction of harmful substances or pollutants into the environment.</p>	<p>No detailed regulations specifically focused on managing individual contaminants or hazardous substances are pertained within the Act. Product stewardship includes the responsible management of waste and contaminants generated throughout the lifecycle of products. By discouraging the disposal of waste to landfills, through the implementation of the waste levy, it indirectly prevents the release of contaminants from landfills and encourages alternative waste management methods. The Waste Minimisation Act integrates with the HSNO Act to manage hazardous waste and substances more effectively and safely</p>	<p>Still in effect, however a waste legislation reform are being developed to replace the current Waste Minimisation Act 2008 and the Litter Act 1979.</p>
Standards				

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
<p>NZS4454:2005 for Composts, soil conditioners and mulches</p>	<p>New Zealand standard that provides guidelines for composts, soil conditioners, and mulches.</p> <p>Manufacturers, suppliers, and users of composts, soil conditioners and mulches in New Zealand.</p>	<p>In the context of NZS44:53:2005, contamination is defined as the presence of materials, substances, or organisms in composts, soil conditioners, and mulches that may adversely affect human health, plant growth, or the environment.</p>	<p>Control measures include limits on the presence of physical, organic and chemical contaminants, and pathogens. Accurate labelling and documentation are required. Quality control and testing.</p>	<p>Published standard recognised by the New Zealand Standards Approval Board (SAB). The standard does not hold legal power but can be referenced to establish quality and safety criteria.</p>
<p>Assure Quality – Organics Standard</p>	<p>The aim of this standard is to protect consumers against deception and fraud in the marketplace and against unsubstantiated product claims.</p> <p>To protect producers of organic produce against misrepresentation of other agricultural produce as being organic.</p> <p>To ensure that all stages of production, preparation, storage, transport and marketing are subject to inspection and comply with this standard.</p> <p>This standard applies to organic farmers, food processors and manufacturers, distributors and retailers, consumers, certification institutions and governmental authorities.</p>	<p>The definition for contamination in this standard relates to background contamination. Also known as unavoidable residual environmental contamination (UREC). Background levels of naturally occurring or synthetic chemicals that are present in the soil, or present inorganically produced products, that are below established tolerances.</p>	<p>All equipment from conventional farming systems is properly cleaned and free from residues before being used on your organically managed areas. Not store prohibited crop inputs within the organic production site. Potentially contaminated areas on a property, such as dip sites, should be excluded from certified areas. The use of polychloride (PVC) based products is prohibited.</p>	<p>The standard does not hold legal power but can be referenced to establish quality and organic status.</p>

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
<p>BioGro Certification Modules</p>	<p>BioGro is one of the leading certifiers for organic products in New Zealand. BioGro approval refers to the certification granted by BioGro to agricultural producers, processors, and manufacturers who meet their strict organic standards and guidelines.</p> <p>This standard applies to organic farmers, food processors and manufacturers, distributors and retailers, consumers, certification institutions and governmental authorities.</p>	<p>A contaminant is materials prohibited under the BioGro standards that are present in a certified product. Contaminated – has come into contact with or contains materials prohibited under the BioGro standards. Even if no measurable contamination is present, a product may still be deemed to be contaminated if there is evidence that contamination may have occurred.</p>	<p>All equipment from conventional farming systems is properly cleaned and free from residues before being used on your organically managed areas. Not store prohibited crop inputs within the organic production site. Potentially contaminated areas on a property, such as dip sites, should be excluded from certified areas.</p>	<p>The standard does not hold legal power but can be referenced to establish quality and organic status.</p>
<p>National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health</p>	<p>The NES was developed due to New Zealand having a history of soil contamination. The contamination is primarily associated with past practices involving storage and use of hazardous substances, and disposal of hazardous wastes. The NES complements other environmental laws and regulations in New Zealand, ensuring that the management of contaminated soil aligns with broader environmental protection objectives.</p>	<p>The Hazardous Activities and Industries List (HAIL) lists a variety of activities that can potentially result in soil contamination on a piece of property. Common contaminants include heavy metals such as arsenic or lead, persistent pesticides such as DDT, petroleum hydrocarbons and asbestos.</p>	<p>Controls imposed by the NES are classified under one of four primary categories:</p> <ul style="list-style-type: none"> Permitted activity - no resource consent required Controlled activity - resource consent required Restricted discretionary activity - resource consent required Discretionary activity status - resource consent required 	<p>The NES encompasses three pillars:</p> <ul style="list-style-type: none"> National set of planning controls Mandated method for regulating applicable standards Standardised procedure for site investigations and reporting

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	<p>The NES applies to landowners, land developers, local government authorities, environmental consultants especially specialising in contaminated land management, regulatory organisations, general public and future occupants of land.</p>			
Guidelines				
<p>Guidelines for beneficial use of organic materials on productive land</p>	<p>The guidelines encompasses two volumes. Volume 1 Guide, which provides guidance on how to safely use organic materials and derived organic products and discusses management issues and the recommended grading and management framework; and Volume 2 Technical Manual, which provides detailed supporting information about how the limit values were decided, the current regulatory framework, how to implement some of the recommendations in the Guide and selected technical information from Volume 2 of the 2003 New Zealand Biosolids Guidelines for historical reference.</p>	<p>Any substance (including heavy metals, organic compounds and micro-organisms) that, either by itself or in combination with other substances, when discharged onto or into land or water, changes or is likely to change the physical, chemical or biological condition of that land or water.</p>	<p>Contaminant levels in organic materials and derived products are determined by the inherent contaminant levels in the raw materials processed. Source controls are important in managing and limiting the amounts of these contaminants. For livestock and poultry manure, practices include feed and bedding management as well as control over veterinary medicines. Each industry has issued good advice on these issues. For biosolids they include enforcement of trade waste bylaws.</p>	<p>This Good Practice Guide for the Beneficial Use of Organic Materials on Productive Land (the Guide) covers the application of good quality organic materials, it is not compulsory.</p>

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	<p>The Guide contains information and recommendations to assist producers, applicators and consent authorities gain the benefits of applying good quality organic material to land to increase soil fertility and productivity.</p>			
<p>WASTEMINZ-technical guidelines for disposal to land</p>	<p>Technical guidelines for disposal to land, are an amalgamation of requirements and recommendations that regulate how different types of refuse should be managed and disposed of appropriately on land but more specifically in relation to landfill management.</p> <p>This guideline applies to government officials involved in environmental protection, waste management and public health, professionals involved in waste management, environmental consultants, researchers and academics, landfill engineers, community and environmental proponents.</p>	<p>Any substance (including gases, odorous compounds, liquids, solids, and microorganisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy, or heat:</p> <p>a) when discharged into water, changes or is likely to change, the physical, chemical, or biological condition of water; or</p> <p>b) when discharged onto or into land or into air, changes or is likely to change, the physical, chemical, or biological condition of the land or air onto or into which it is discharged.</p>	<p>Contamination is managed and minimised throughout the disposal to land process</p>	<p>The document has been designed to provide technical guidance on the siting, design, construction, operation, and monitoring for disposal to land.</p>
<p>Compost New Zealand consent guide</p>	<p>A guide to support with the composting consent process. Provide an overview of primary</p>	<p>No formal definition on contamination is described in this document, however mention</p>	<p>The Standard also specifies acceptable levels of physical, chemical and microbiological</p>	<p>Not a legally binding document but a guide that is frequently used.</p>

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	<p>features of commercial composting regarding consenting. Implementation of relevant and effective resource consent conditions. A list of additional information sources are provided. An overview of the regulatory environment regarding composting is provided. Benefits of composting are discussed.</p> <p>This document applies to compost facility operators, entrepreneurs or companies considering establishing composting facilities, environmental consultants, local and regional governmental authorities, community groups and environmental advocates, academics and scientists.</p>	<p>is made to contamination in relation to the NZS 4454.</p>	<p>contamination, and effective control of feedstock will assist the compost operator with avoiding unacceptable contamination of the end product. This is achieved through management plans.</p>	
<p>Technical Guide 08: The production and use of digestate as biofertilizer</p>	<p>This Technical Guide 8 (TG8) provides specific guidance on the production of high-quality, safe and healthy digestate for use as a fertiliser substitute. It provides a fundamental basis for the AD facility certification of their digestate as Biofertilizer.</p>	<p>No formal definition is offered for contamination. However, feedstock contamination is divided into the following categories heavy metals, persistent organic pollutants, physical contaminants, biological contamination.</p>	<p>Robust selection and quality control of feedstock that is accepted for AD.</p> <p>Feedstock pre-treatment to ensure pathogen free digestate and to avoid cross-contamination.</p> <p>Process control further avoids cross-contamination of final</p>	<p>Not a legally binding statutory document but widely used as a guide in New Zealand.</p>

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	<p>Waste management professionals</p> <p>Biogas and Biofertilizer industry engineers and plant operators, farmers and agricultural professionals, environmental consultants and experts, regulatory authorities, scientists and academics, policy makers and planners, agricultural advisors.</p>		<p>product with rejected and untreated product.</p> <p>Strict document and data keeping procedures to enable trace backs if contamination occurs.</p> <p>Pasteurisation to significantly decrease presence of pathogens.</p> <p>Farm cross-contamination is avoided by using dedicated trucks for each farm and specific days of service.</p>	
<p>Organic Materials Guidelines – organic contaminants review</p>	<p>This report supported the amendments made to the <i>2003 Guidelines for the safe application of Biosolids to Land in New Zealand</i> through offering a robust review of the contaminant section of the Guidelines.</p> <p>The validity of suggested threshold values and the relevance of chemical targets were reviewed. The review established a framework of reasons at which organic contaminant concentrations in biosolids should be regulated.</p> <p>This report applies to regional councils, territorial authorities,</p>	<p>There is an emphasis on a group of contaminants referred to as emerging organic contaminants (EOCs). The US Geological Survey has defined an EOC as “any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment but has the potential to enter the environment and cause known or suspected adverse ecological and (or) human health effects.</p>	<p>Contamination is managed through:</p> <p>Products containing EOCs of concern are regulated in importation and manufacturing</p> <p>Improved efficacy of wastewater and sludge treatment processes</p> <p>Regulating limits on yearly loading rates of biosolids applied to land</p> <p>Applying and regulating limits on contaminants posing a risk in biosolids</p>	<p>The Ministry for the Environment New Zealand Water and Wastewater Association (2003) Guidelines for the Safe Application of Biosolids to Land in New Zealand are designed to safeguard the life-supporting capacity of soils, promote the responsible use of biosolids, protect public health and the environment and minimise risk to the New Zealand economy.</p>

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	<p>biosolids producers (like wastewater treatment plants), land managers, and anyone involved in the application of biosolids to land.</p>			
<p>Organic production protocols – green waste composting and vermiculture</p>	<p>The document describes the protocols that needs to be followed throughout the value chain, including the receiving of certified feedstock, quality control and testing during both processes, final product testing, packaging requirements of the final product, as well as storage and transportation.</p> <p>Apply to individuals, farms, or organizations involved in organic agriculture, gardening, or horticulture.</p>	<p>No formal definition is described in this document.</p>	<p>The finished product are tested by an ISO 17025 accredited laboratory for; nutrients, heavy metals, multi-residue, acidic herbicide test including clopyralid (clopyralid only required if grass clippings is an input source) and carbon/nitrogen ratio.</p>	<p>Internal document compiled by Revital Fertilisers, September 2017 describing the procedures involved in vermiculture and greenwaste processing.</p>
<p>Working towards New Zealand risk-based soil guideline values for the management of cadmium accumulation on productive land</p>	<p>This project was conducted to assist the Cadmium Management Group to identify how it will develop a set of New Zealand-derived, risk-based soil guideline values (SGV) to manage cadmium accumulation in soils on production land. The project was funded by the Ministry for Primary Industries and conducted by Landcare Research</p>	<p>Contaminants may be referred to as either threshold or non-threshold contaminants with regard to their effects on human health. Threshold contaminants are those considered to manifest toxic effects only if exposure exceeds a threshold dose level, and primarily include non-carcinogens. Non-threshold contaminants are carcinogens</p>	<p>Appendix B describes the methodology to protect groundwater. In New Zealand and the United States generic guideline values for the protection of groundwater quality have been developed, where desired groundwater quality is typically drinking water standard.</p>	<p>MPI released the strategy document <i>Cadmium and New Zealand Agriculture and Horticulture: A Strategy for Long Term Risk Management in February 2011 (MAF 2011)</i>.</p> <p>The strategy has the objective:</p> <p>To ensure that cadmium in rural production poses minimal risks</p>

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
	between December 2011 and May 2012.	and are considered to have effects at all levels of exposure. Cadmium is considered a threshold contaminant.		to health, trade, land use flexibility and the environment over the next 100 years.
<p>It's complicated: A guide to biodegradable & compostable plastic products and packaging</p>	<p>WasteMINZ produced guidelines to provide best practise advise to waste industry, producers, consumers and advertisers regarding biodegradable compostable plastic products and packaging.</p> <p>Main objectives of this guide include:</p> <p>Clarifies some of the terminology used for plastic products (plant or fossil fuel based) that are advertised as compostable, biodegradable or degradable</p> <p>Explains the substantiation (proof) needed to make these claims.</p> <p>Provides information about where to dispose of them.</p>	No definition for contamination is included in this guide.	No significant methodology on control of contamination offered.	Test guides and methods provide a framework or roadmap of steps, criteria, procedures or a general approach but do not provide a pass or fail for degradability or biodegradability.
Position Statements				
<p>MfE: Compostable packaging</p>	The Ministry for the Environment (MfE) published a position	Contamination in the context of this document refers to	The Ministry considers that a cautious approach to compostable products is needed.	This document is a position statement, and it does not

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
position statement	<p>statement in March 2022 describing the Ministry’s position on where compostable products could play a role in a circular economy in Aotearoa New Zealand.</p> <p>The position outlined in this document provides information to support Government policy initiatives, including consultation on improving household kerbside recycling collections, the phase-out of single-use and hard-to-recycle plastics, and regulated product stewardship schemes for priority products.</p>	<p>biodegradables as a contamination source.</p> <p>Consumers often incorrectly believe that compostable products can break down when littered; however, when littered or lost to waterways or the sea, compostable products are contaminants. They are not designed to degrade in these environments.</p> <p>Confusion about compostable products leads to contamination of recycling streams</p>	<p>Other jurisdictions are managing the challenges of compostable products and taking similarly cautious approaches. MfE recognises their duty of care to our whenua (land) and our soil.</p>	<p>provide guidance and should not be interpreted as such.</p>
MfE: kerbside materials factsheet	<p>The Ministry has set out to make it easier for people to recycle and divert food scraps from landfills. A consensus exist where people are unsure about can and can’t be recycled with items going in incorrect bins.</p>	<p>Not a lot of mention is made regarding organic waste contamination or contamination standards. Brief reference is made that only certain materials could be accepted such as food scraps and FOGO collections.</p>	<p>No materials that could potentially contaminate the soil are accepted, however, this is very broad and lack specifics. Councils will have some discretion over a few materials, such as compostable bin liners. Compliance monitoring is still aligned with the WMA 2008.</p> <p>The way MfE work is guided by their compliance, monitoring and enforcement strategy. Their auditing programme will expand to include the new requirements</p>	<p>The new waste strategy is the driving force behind this factsheet and have legislative power.</p>

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
			<p>and auditors may contact local authorities to check on progress. Where non-compliance with the new obligations is found, they may take enforcement action.</p>	
<p>Position statement from New Zealand composters on compostable packaging</p>	<p>Position Statement from New Zealand Composters on Compostable Packaging was issued in February 2019 due to concerns regarding contamination in composting practices. Minimising and eliminating contamination is a crucial area of concern for composters.</p> <p>It is currently challenging for both the public and industry to differentiate between some compostable and non-compostable plastic products, due to their similarity in appearance (such as cups made from PLA and cups made from PET). Removing contamination is both expensive and time-consuming.</p>	<p>Current household collections of food and garden waste are often contaminated with non-compostable items.</p> <p>Therefore, contamination in the context of this paper is defined as non-compostable materials ending up in the compost production chain.</p>	<p>Composting facilities are not willing to accept compostable packaging in household food waste or green waste collections.</p> <p>New Zealand councils have unanimously agreed that until the technology improves to enable non-compostable plastics to be easily identified and removed, current and future council provided kerbside food and green waste collections will not accept compostable packaging.</p>	<p>This document is not legally binding.</p>
<p>Packaging Forum Position</p>	<p>The Packaging Forum (PF) initiated a technical advisory group to determine the PF position on PFAS in food-contact</p>	<p>No definition provided on contamination.</p>	<p>Industry has the capacity to implement a solution. The PF would support the development of national standards and</p>	<p>Not a legally binding document.</p>

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
Statement on PFAS	packaging and determine, if possible, a pathway forward. The PF in New Zealand is primarily driven by a combination of factors, including scientific research, consumer preferences, and international regulations. These factors influence decisions related to packaging materials, sustainability practices, and waste management strategies within the country.		screening protocols and the PF would look to work with stakeholders and regulators to support this development.	
Organic Waste: A position statement from the Zero Waste Network	<p><i>Organic Waste: A position statement from the Zero Waste Network</i> was issued in March 2021 to explain their position on organic waste and the steps needed to deal with the entirety of the value chain.</p> <p>The Zero Waste Network's opinion is that regulatory instruments should be utilised in response to the issue of organic waste, and specifically organics in landfills, and food waste.</p>	Organics are being described as a source of contamination in various waste streams.	Diverting and separately collecting organics is a vital step in improving collection, recovery and recycling of non-organic materials because organics are one of the most significant sources of contamination of different waste streams.	Not a legally binding document.
Road Derived Sediments (RDS) and Vegetative	This document reports the results of a feasibility study investigating the potential to use RDS and vegetative material	Contamination means the mulch must be effectively composted before use to kill the weed seeds/branches.	Composting standard contamination limits and compares them to typical RDS contaminant levels. Although the	Not a legally binding document but a feasibility study.

COMMERCIAL

Title	What it covers/who it applies to	Definition of contamination	Controls on contamination	Currency and status/powers
<p>Material Reuse Feasibility Study (2010)</p>	<p>from the Auckland Motorway network as a feedstock for compost and producing a useful resource. The study also investigates the possible regulatory implications of this option and the feasibility of the AMA operating and managing the composting process from collection to use as compost.</p>		<p>proposed standards are related to existing contamination in soils and required “clean up” or management standards they provide a comparison for understanding the potential limitations of applying RDS-containing materials to land.</p>	

9.0 Comparison of Contaminant Limits

The table below provides a comparison of the contaminants and contaminant limits for the various New Zealand standards and guidelines. All measures are in mg/kg of dry weight for the product/soil.

Contaminant	NZS4454: 2005	BioGro	AsureQuality	NES Standard ³⁵ (soil concentrations)	2017 Guidelines – Organics on Productive Land	Technical Guide 08 ³⁶	MPI Technical Paper No: 2012/06
Chemical (mg/kg dry weight)							
Cadmium (Cd)	3	2 (soil) 1 (compost excl. HW) ³⁷ 0.7 (compost incl. HW)	3	0.8 (rural soil) 3 (residential soil) 230 (HDR soil) ³⁸ 400 (recreation soil) 1,300 (industrial soil)	10	10	1 (soil limit) 1 (minimal risk) 12 (serious risk) 6 (minimal risk, microbial) 86 (serious risk, microbial)
Chromium (Cr)	600	150 (total) 1 (VI)	400	>10,000 (III) VI: 290 (rural soil) 460 (residential soil) 1,500 (HDR soil)	1500	1500	-

³⁵ Assumed a soil pH of 5; > pH increase concentrations

³⁶ The TG8 took product contaminant concentration limits from “The Guidelines”

³⁷ HW is household waste

³⁸ HDR is high density residential

COMMERCIAL

Contaminant	NZS4454: 2005	BioGro	AsureQuality	NES Standard ³⁵ (soil concentrations)	2017 Guidelines – Organics on Productive Land	Technical Guide 08 ³⁶	MPI Technical Paper No: 2012/06
				2,700 (recreation soil) 6,300 (industrial soil)			
Arsenic (As)	20	20	20	17 (rural soil) 20 (residential soil) 45 (HDR soil) 80 (recreation soil) 70 (industrial soil)	30	30	-
Boron (B)	-	-	-	>10,000	-	-	-
Lead (Pb)	250	100 (soil) 250 (excl. HW) 45 (incl. HW)	200	160 (rural) 210 (residential) 500 (HDR) 880 (recreation) 3,300 (industrial)	300	300	-
Nickel (Ni)	60	35 (soil) 60 (excl. HW) 25 (incl. HW)	60	-	135	135	-
Mercury (Hg)	2	1 0.4 (incl. HW)	1	200 (rural) 310 (residential)	7.5	7.5	-

Contaminant	NZS4454: 2005	BioGro	AsureQuality	NES Standard ³⁵ (soil concentrations)	2017 Guidelines – Organics on Productive Land	Technical Guide 08 ³⁶	MPI Technical Paper No: 2012/06
				1000 (HDR) 1,800 (recreation) 4,200 (industrial)			
Zinc (Zn)	600	300 200 (incl. HW)	575	-	1500	1500	-
Copper (Cu)	300	60 70 (incl. HW)	270	>10,000	1250	1250	-
Organic (mg/kg dry weight)							
DDT/DDD/DDE	0.5	0.2	5.0 (meat) 1.25 (milk fat) 0.5 (eggs)	45 (rural) 70 (residential) 240 (HDR) 400 (recreation) 1,000 (industrial)	-	-	-
Lindane (Hexachlorocyclohexane)	0.02	2.0	2.0	-	-	-	-
Aldrin	0.02	-	-	-	-	-	-
Dieldrin	0.05	-	-	1.1 (rural) 2.6 (residential) 45 (HDR) 70 (recreation)	-	-	-

COMMERCIAL

Contaminant	NZS4454: 2005	BioGro	AsureQuality	NES Standard ³⁵ (soil concentrations)	2017 Guidelines – Organics on Productive Land	Technical Guide 08 ³⁶	MPI Technical Paper No: 2012/06
				60 (industrial)			
Chlordane	0.05	-	-	-	-	-	-
PCP	-	-	-	55 (rural) 55 (residential) 110 (HDR) 150 (recreation) 360 (industrial)	-	-	-
BaP	-	-	-	6 (rural) 10 (residential) 24 (HDR) 40 (recreation) 35 (industrial)	-	-	-
Heptachlor and Heptachlor epoxide	0.02	-	-	-	-	-	-
Hexachlorobenzene (HCB)	0.02	-	-	-	-	-	-
Dioxin							
Total PCBs	0.5	-	-	-	-	-	-

Contaminant	NZS4454: 2005	BioGro	AsureQuality	NES Standard ³⁵ (soil concentrations)	2017 Guidelines – Organics on Productive Land	Technical Guide 08 ³⁶	MPI Technical Paper No: 2012/06
Dioxin-like PCBs (ug/kg dry weight)	-	-	-	0.09 (rural) 0.12 (residential) 0.33 (HDR) 0.52 (recreation) 1.2 (industrial)	-	-	-
TCDD (ug/kg dry weight)	-	-	-	0.12 (rural) 0.15 (residential) 0.35 (HDR) 0.6 (recreation) 1.4 (industrial)	-	-	-
Emerging Organic Contaminants (EOCs) (mg/kg dry weight)							
Nonyl phenol and ethoxylates (NP/NPE)	-	-	-	-	50	50	-
Phthalate (DEHP)	-	-	-	-	100	100	-
Linear alkydbenzene sulphonates (LAS)	-	-	-	-	2600	2600	-
Musks – Tonalide	-	-	-	-	15	15	-
Musks – Galaxolid	-	-	-	-	50	50	-
Pathogens (count)							

COMMERCIAL

Contaminant	NZS4454: 2005	BioGro	AssureQuality	NES Standard ³⁵ (soil concentrations)	2017 Guidelines – Organics on Productive Land	Technical Guide 08 ³⁶	MPI Technical Paper No: 2012/06
<i>E. coli</i> or Faecal coliforms	<100 MPN/g	-	-	-	<100 MPN/g	<100 MPN/g	--
<i>Campylobacter</i>	-	-	-	-	<1/25 g	<1/25 g	-
<i>Salmonella</i>	-	-	-	-	<2 MPN/g	<100 MPN/g	-
<i>Human adenovirus</i>	-	-	-	-	<1 PFU/0.25g	<1 PFU/0.25g	-
<i>Helminth ova</i>	-	-	-	-	< 1/4g	< 1/4g	-

A review of the above data indicates that there is no uniform agreement across all of the standards and guidelines. Cadmium is the only contaminant that is covered by all of the limits. Here the product limits range from 0.7 mg/kg for the Biogro Standard (compost including household waste) 10 mg/kg in the Guidelines for Organics on Productive Land and the Technical Guide 08 (The contaminants considered, and the limits, are the same for the Technical Guide 08 and the Guidelines for Organics on Productive Land which is consistent with the Technical Guide -08 deliberately aligning itself with the Guidelines for Organics on Productive Land).

The three compost standards (NZS 4454, Biogro, and AssureQuality) are broadly similar and cover similar contaminants with, in general, NZS 4454 covering a wider range of contaminants and Biogro having slightly lower limits. The contaminant levels for these standards are consistently lower than the contaminant levels in the Technical Guide 08 and the Guidelines for Organics on Productive Land. It is also worth noting that the various guidelines cover a range of pathogens and emerging contaminants where, of the compost standards, NZS4454 only covers one pathogen, and the others do not cover pathogens or emerging contaminants. None of the standards or guidelines cover PFAS, PFOS or microplastics.

10.0 Conclusions

There are a range of standards and guidelines which provide some coverage of the issue of contamination in the organic waste stream. These standards and guidelines have served to manage contamination in organic waste streams; however, they have been developed independently of each other over time and, while there is some broad alignment, they do not form a comprehensive approach.

Some inconsistencies are notable, such as there is no standard definition of contamination, the range of contaminants covered, and the nominated contaminant thresholds vary – often considerably – between the standards and guidelines. In terms of the controls that have been developed in New Zealand, the focus has been on product and application controls.

There has recently been some development in terms of input controls specifically in relation to organics with kerbside standardisation with guidance on food organics and FOGO collections specifically excluding specific materials.³⁹ Other non-organic specific input controls include restrictions on single use plastic packaging.

There are some notable gaps. For example, there are no standards or controls for AD digestate (although one is under development by the Bioenergy Association), no specific standards for vermicast/vermicomposting⁴⁰, and also no standards for use of manures or biochars.

Very little reference is made to the Treaty of Waitangi/ te tiriti o waitangi and mātauranga Māori, as well as what is acceptable when considering cultural, as well as environmental, human, and animal health.

Finally, there is no consistent framework for updating and integrating emerging new contaminants or processes. This is evident with contaminants such as microplastics and PFAS. It is currently the responsibility of the various industry organisations administering the standards and guidelines to identify issues, determine thresholds, and formulate a response. Ideally, an agreed process should be incorporated to regularly review the issues, standards and guidelines with accessibility where reference could be made to a commonly held list.

³⁹ the [Standard Materials for Kerbside Collections Notice 2023 \(Notice No. 1\) - 2023-go4222 - New Zealand Gazette](#) excludes paper and cardboard; compostable packaging; tea bags; sawdust from treated timber; animal waste; and ash.

⁴⁰ Vermicast is covered to an extent in NZS4454 but it essentially requires a pasteurisation phase, which does not align with industry practice.

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