Tararua District Waste Assessment

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Acknowledgements

Contents

1 Introduction

This Waste Assessment has been prepared for Tararua District Council of the Horizons Region – known here as 'the Council' - by Eunomia Research & Consulting in accordance with the requirements of the Waste Minimisation Act 2008 (WMA). This document provides background information and data to support the Council's waste management and minimisation planning process.

1.1 Structure of this Document

This document is arranged into a number of sections designed to help construct a picture of waste management in our district. The key sections are outlined below.

Introduction

The introduction covers a number of topics that set the scene. This includes clarifying the purpose of this Waste Assessment, its scope, the legislative context, and key documents that have informed the assessment.

Horizons Region

This section presents a brief overview of key aspects of the region's geography, economy, and demographics that influence the quantities and types of waste generated and potential opportunities. It also provides an overview of regional waste facilities, and initiatives that may be of relevance to how we manage our waste.

The District

This section presents a brief overview of key aspects of the district's geography, economy, and demographics that influence the quantities and types of waste generated and potential opportunities.

Waste Infrastructure, Services, Data and Performance Measurement

These sections examine how waste is currently managed, where waste comes from, how much there is, its composition, and where it goes.

Gap Analysis and Future Demand

This section provides an analysis of what is likely to influence demand for waste and recovery services in the district and identifies key gaps in current and future service provision, and in the Council's ability to promote effective and efficient waste management and minimisation.

Statement of Options & Council's Proposed Role

These sections develop options available for meeting the forecast future demand and identify the Council's proposed role in ensuring that future demand is met, and that the Council is able to meet its statutory obligations.

Statement of Proposals

The statement of proposals sets out what options are available to meet the projected demand or address the key issues. The proposals will be assessed against the strategic

direction for Council, and preferred options will be carried forward into the Waste Management and Minimisation Plan (WMMP).

Appendices

The appendices include the consultation response from the Medical Officer of Health as well as additional detail on the national context.

1.2 Purpose of this Waste Assessment

This Waste Assessment is intended to provide an initial step towards the development of a WMMP by the Council and sets out the information necessary to identify the key issues and priority actions that will be included in the draft WMMP.

Section 51 of the WMA outlines the requirements of a waste assessment, which must include:

- a description of the collection, recycling, recovery, treatment, and disposal services provided within the territorial authority's area
- a forecast of future demands
- a statement of options available to meet the forecast demands with an assessment of suitability of each option
- a statement of the territorial authority's intended role in meeting the forecast demands
- a statement of the territorial authority's proposals for meeting the forecast demands
- a statement about the extent to which the proposals will protect public health, and promote effective and efficient waste management and minimisation.

1.3 Legislative Context

The principal solid waste legislation in New Zealand is the Waste Minimisation Act 2008 (WMA). The stated purpose of the WMA is to:

> "encourage waste minimisation and a decrease in waste disposal in order to
>
> (a) protect the environment from harm; and
>
> (b) provide environmental, social, economic, and cultural benefits.

To further its aims, the WMA requires TAs to promote effective and efficient waste management and minimisation within their district. To achieve this, all TAs are required by the WMA to adopt a WMMP.

The WMA requires every TA to complete a formal review of its existing waste management and minimisation plan at least every six years. The review must be consistent with WMA sections 50 and 51. Section 50 of the WMA also requires all TAs to prepare a 'waste assessment' prior to reviewing its existing plan. This document has been prepared in fulfilment of that requirement. Council's current WMMP was adopted in December 2017.

Further detail on key waste-related legislation is contained in Appendix A.4.0.

1.4 Scope

1.1.1 General

As well as fulfilling the statutory requirements of the WMA, this Waste Assessment will build a foundation that will enable Council to review and/or amend their WMMP in an informed and effective manner, as required. In preparing this document, reference has been made to the Ministry for the Environment's 'Waste Management and Minimisation Planning: Guidance for Territorial Authorities'[1] while noting that this guidance dates back to 2015 and has, to an extent, been superseded through practice.

A key issue for this Waste Assessment will be forming a clear picture of waste flows and management options in the district. The WMA requires that a waste assessment must contain:

"A description of the collection, recycling, recovery, treatment, and disposal services provided within the territorial authority's district (whether by the territorial authority or otherwise)".

This means that this Waste Assessment must take into consideration all waste and recycling services carried out by private waste operators as well as Council's own services. While Council has reliable data on the waste flows that it controls, data on those services provided by private industry is limited. Reliable, regular data on waste flows is important if a TA chooses to include waste reduction targets in their WMMP. Without data, targets cannot be readily measured.

The New Zealand Waste Strategy 2023 also repeatedly refers to central and local councils as being the key agencies by which many goals could be achieved.

Although the WMA is currently subject to review (as discussed further below in section 1.5.3, there has not been any indication that the requirements for local waste planning will be reduced.

1.1.2 Period of Waste Assessment

The WMA requires WMMPs to be reviewed at least every six years, but it is considered prudent to take a longer-term view. The horizon for the WMMP is not fixed but is assumed to be centred on a 10-year timeframe, in line with council long term plans (LTPs). For some assets and services, it is necessary to consider a longer timeframe, and this is taken into account where appropriate. Therefore the period of the Waste Assessment looks forward over at least the next ten years, and sometimes longer (in the case of facilities, e.g. landfill consenting).

[1] Ministry for the Environment (2015), Waste Management and Minimisation Planning: Guidance for Territorial Authorities

1.1.3 Consideration of Solid, Liquid and Gaseous Wastes

The guidance provided by the Ministry for the Environment on preparing Waste Management and Minimisation Plans states that:

"Councils need to determine the scope of their WMMP in terms of which wastes, and diverted materials are to be considered within the plan".

The guidance further suggests that liquid or gaseous wastes that are directly managed by a TA, or are disposed of to landfill, should be seriously considered for inclusion in a WMMP.

Other wastes that could potentially be within the scope of the WMMP include gas from landfills and the management of biosolids from wastewater treatment plant (WWTP) processes.

In line with Council's previous WMMP, this Waste Assessment is focused on solid waste that is disposed of to land or diverted from land disposal, including solid waste collected and disposed of by commercial enterprise as well as waste collected by the councils.

However, given the current work on restructuring water services (including waste water), this WA and any resulting WMMPs will not include management of solid wastes resulting from these activities.

1.1.4 Public Health Issues

Protecting public health is one of the original reasons for local authority involvement in waste management. Te Rautaki Para, the new Waste Strategy, refers to protection of human health as one of the outcomes from successful recovery of resources.

Protection of public health is currently addressed by a number of pieces of legislation. Discussion of the implications of the legislation is contained in Appendix A.4.0.

1.4.1.1 Key Waste Management Public Health Issues

Key issues that are likely to be of concern in terms of public health include the following:

- Population health profile and characteristics
- Implications of pandemic management, e.g. increases in some waste materials
- Meeting the requirements of the Health Act 1956
- Management of putrescible wastes
- Management of nappy and sanitary wastes
- Potential for dog/seagull/vermin strike
- Timely collection of material
- Locations of waste activities
- Management of spillage
- Litter and illegal dumping
- Medical waste from households and healthcare operators
- Storage of wastes
- Management of hazardous wastes (including asbestos, e-waste, etc.)
- Private on-site management of wastes (i.e. burning, burying)
- Closed landfill management including air and water discharges, odours and vermin
- Health and safety considerations relating to collection and handling.

1.4.1.2 Management of Public Health Issues

From a strategic perspective, the public health issues listed above are likely to apply to a greater or lesser extent to virtually all options under consideration. For example, illegal dumping tends to take place ubiquitously, irrespective of the waste collection and transfer station systems in place. Some systems may possibly exacerbate the problem (infrequent collection, user-charges, inconveniently located facilities etc.) but, by the same token, the issues can be reduced and managed through methods such as enforcement, education and by providing convenient facilities. It is also known that illegal dumping continues to be a problem even in areas where disposal is free of charge.

In most cases, public health issues can be addressed through setting appropriate performance standards for waste services. It is also important to ensure performance is monitored and reported on and that there are appropriate structures within the contracts for addressing public health issues that arise. There is now increased emphasis on workplace health and safety under the Health and Safety at Work Act 2015. This legislation can impact on the choice of collection methodologies and working practices and the design of waste facilities, for example.

In addition, public health impacts will be able to be managed through consideration of potential effects of planning decisions, especially for vulnerable groups. That is, potential issues will be identified prior to implementation so they can be mitigated for.

1.5 Strategic Context

1.1.5 New Zealand Waste Strategy

The 2023 New Zealand Waste Strategy is the first time New Zealand's national strategic direction for waste has been reviewed since 2002, and unsurprisingly takes quite a different approach to the previous Strategy.

The vision of the 2023 New Zealand Waste Strategy, Te Rautaki Para, is:

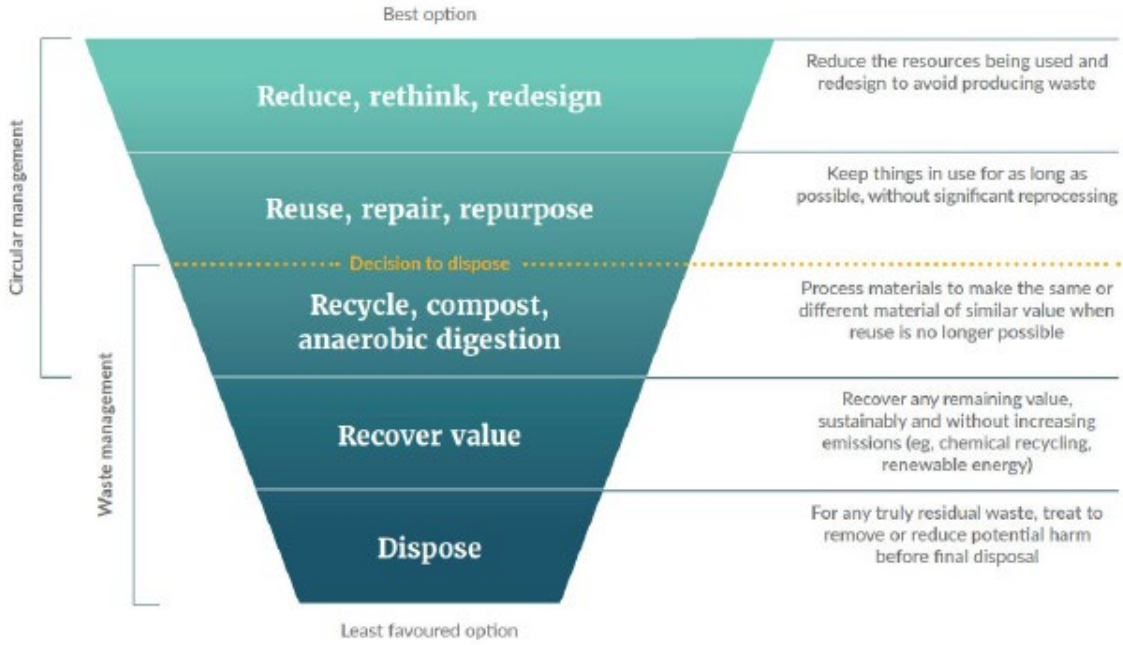
> *"By 2050, Aotearoa New Zealand is a low-emissions, low-waste society, built upon a circular economy.*
>
> *We cherish our inseparable connection with the natural environment and look after the planet's finite resources with care and responsibility"*

This vision is supported by six guiding principles:

1) Take responsibility for how we make, use, manage and dispose of things
2) Apply the waste hierarchy preferences to how we manage materials
3) Protect and regenerate the natural environment and its systems
4) Deliver equitable and inclusive outcomes
5) Ensure our systems for using, managing and disposing of materials are financially sustainable
6) Think across systems, places and generations

A revised waste hierarchy is set out (shown below), intended to illustrate which options are the best, and which are least favoured. While many versions of the waste hierarchy exist, the one in the strategy is intended to be simple and easy to understand.

Figure 1: Revised Waste Hierarchy



The strategy has three phases:

1) Embedding circular thinking into systems (by 2030)
2) Expanding to make circular normal (to 2040)
3) Helping others do the same (by 2050)

Each of the three phases has associated goals, some of which are particularly relevant to the Waste Assessment and WMMP process; others more relevant to central government, the wider public, the community/private sector, or other local government roles such as contaminated land management.

The key role for local government is described in the Strategy as:

- Getting involved in implementing the strategy and the process of developing the action and investment plan – using the strategy as a starting point for WMMPs
- Looking for opportunities to work with other councils, particularly on facilities and services that support a 'national circular resource management network'
- Supporting local community groups and non-governmental organisations with waste reduction initiatives
- Incorporating national behaviour change programmes in local activity
- Ensuring planning and consenting processes consider the need for waste management infrastructure and services
- Planning and resourcing contaminated land management including vulnerable landfills

The Strategy has three targets to be achieved by 2030:

1) Reduce waste generation by 10% per person
2) Reduce waste disposal by 30% per person
3) Reduce biogenic methane emissions from waste by at least 30%

However, at this point no baseline has been set.

Further detail on the implications of the Waste Strategy are set out in Appendix A.4.1.

Section 44 of the WMA requires councils to have regard to the NZWS when preparing their WMMP. For the purpose of this Waste Assessment, we have given regard to the NZWS and the current WMMP of the Tararua district.

These sections are discussed in more detail in Appendix A.4.0.

1.1.6 Emissions Reduction Plan

The Climate Change Commission (CCC) was established to provide impartial expert evidence to government to support initiatives that would reduce greenhouse gas emissions and address climate change mitigation and adaptation, contributing towards the goals set out in the Climate Change Response Act 2002. The CCC reviewed the waste sector as part of its work during 2020 and 2021 and has provided its final advice to government with respect to this sector, amongst others, in the Emissions Reduction Plan (May 2022)[2].

The advice of the CCC is that unless waste management practices and policy settings in New Zealand change significantly, we will not meet the targets set in the 2002 Act – "*current policies will not deliver the emissions reductions we must achieve.*" Comprehensive action is required to reduce waste overall, divert waste from landfill disposal, and improve/extend landfill gas capture systems.

The main source of biogenic methane emissions from the waste sector is the anaerobic decomposition of organic wastes in landfill (94% in 2019).

The key actions for the waste sector are:

- Enable households and businesses to reduce organic waste (reduction of food scraps at home and in businesses, and participation in improved kerbside collections)
- Divert more organic waste from landfill (improve household kerbside collections of food and garden waste, invest in processing and recovery infrastructure for organics, require organic waste to be separated)
- Reduce and divert construction and demolition waste (minimisation, sorting and processing infrastructure, separation of material)
- Bans or limits for organic waste to landfill – potentially by 2030
- Increase gas capture from Class 1 landfills (regulations requiring gas capture, investigate additional gas capture)
- Improve waste data including a national operator licensing scheme (which will improve information on greenhouse gas emissions)

The Plan includes a 'waste pathway to 2035' which is highly consistent with Te rautaki para. Key actions over the next ten years include:

- 2023: organic waste prevention programmes and increased investment in resource recovery
- 2024: new waste legislation, national waste reporting, wider coverage of kerbside organics collections, more organics recovery/processing

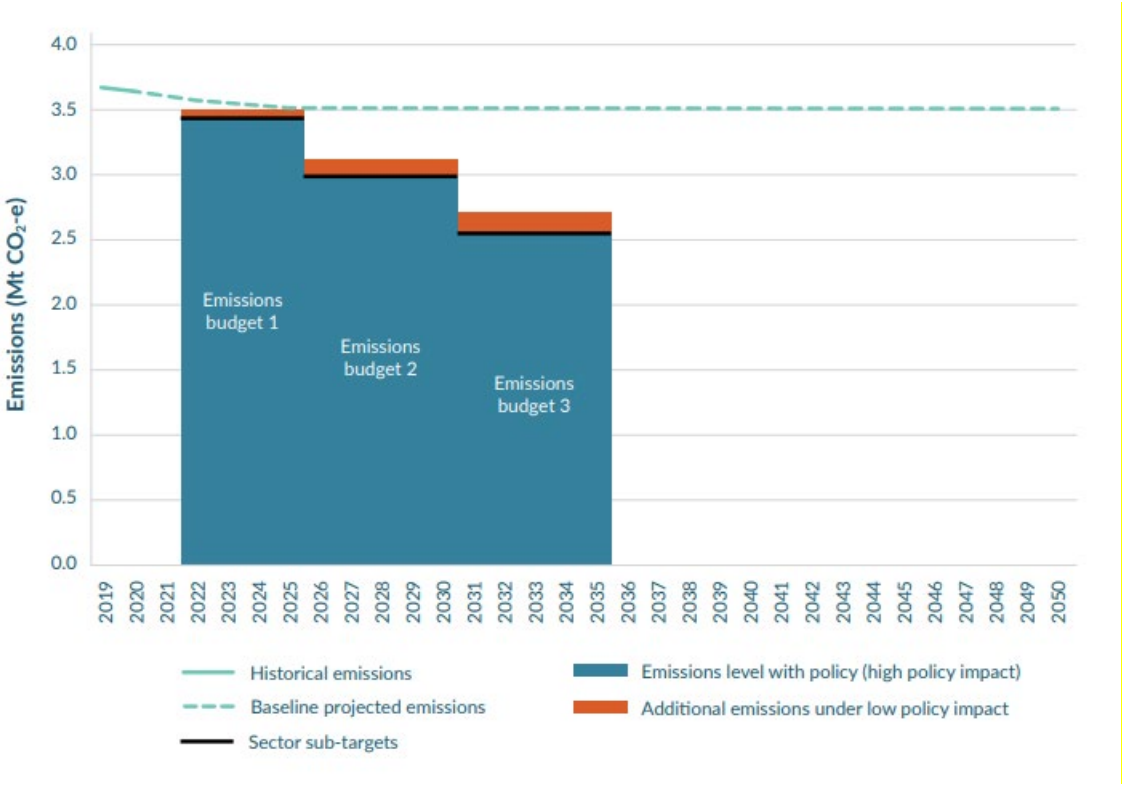
[2] https://environment.govt.nz/assets/publications/Aotearoa-New-Zealands-first-emissions-reduction-plan.pdf

- 2025: new regulations to drive emissions reduction, national waste licensing, all Class 1 landfills capturing gas
- To 2030: possibly organic waste landfill limits or bans
- To 2035: target of 40% reduction in biogenic methane (from 2017 levels)

New Zealand has a long-term target of net zero greenhouse gases by 2050, and a specific target for biogenic methane of 24 – 47% reduction by 2050 under the Climate Change Response Act (2002 Act).

It is worth noting that even with all of the initiatives proposed this would still fall short of achieving the first sub-target for the waste sector (2022 – 2025) but will come very close to the target in the period 2026 – 2035, as shown in the chart below:

Figure 2: Total projected methane emissions from waste showing the impact of proposed combined waste policy options



Source: Ministry for the Environment. 2022. *Te hau mārohi ki anamata | Towards a productive, sustainable, and inclusive economy.* Wellington: Ministry for the Environment. This assumes 40% of food waste diverted to composting and 60% to anaerobic digestion and 100% of green waste to composting.

1.1.7 Waste Minimisation Act 2008

As signalled during consultation and in the recently released Te Rautaki Para/New Zealand Waste Strategy, MfE is also currently working on a review of the WMA to improve or amend provisions and consider new provisions. The provisions for use of landfill levy funds and the administrative and decision-making processes around this use will also be reviewed and improved. This review will also consider whether, and how, the Litter Act (1979) could be reviewed to better integrate with and support the WMA. In July 2023, MfE proactively released cabinet papers, a regulatory impact statement, and minutes of decisions for the

initial stages of this process (occurring during March 2023). These proposals include the intention to replace the WMA and the Litter Act with a new single Act.

The WMA has been amended by the 2021 waste disposal levy regulations[3], which set out the progressive increase and expansion of the landfill levy starting 1 July 2021; and supplemented by regulations banning specific items, including microbeads[4] (2017), plastic shopping bags[5] (2018), and numerous tranches of plastics packaging during 2022 and 2023, as described in section 1.5.6.5.

Currently, the WMA provides for half of the revenue from the waste levy to be distributed to TAs. These funds are provided pro rata, based on population, and must be spent on waste minimisation and in accordance with each authority's WMMP.

The waste disposal levy is outlined further in the following subsection.

1.1.8 Waste Disposal Levy and Information Reporting

In April 2021 the government introduced regulation to expand the scope of the levy from Class 1 landfills to also include classes 2-4,[6] and to require operators of industrial monofills and Class 5 fills to report data on the quantity of waste received. Section 2.1 defines the different types and classes of fills.

The table below shows the timetable and rates for the new levy regime:

Table 1: Levy Rates by Disposal Facility Type and Year

DISPOSAL FACILITY CLASS	1-Jul-21	1-Jul-22	1-Jul-23	1-Jul-24
Municipal landfill (class 1)	$20	$30	$50	$60
Construction and demolition fill (class 2)		$20	$20	$30
Managed fill (class 3)			$10	$10
Controlled fill (class 4)			$10	$10

https://www.mfe.govt.nz/waste/waste-and-government

As the landfill levy is expanded and raised, there will be an impact on the quantity of material going to the different destinations; however, the extent to which this occurs, and for which materials, depends on a number of other factors. The potential impacts are explored further in appendix A.4.0.

The requirement for all fills to at least report data on the quantity of waste received will provide much greater understanding of the role that all types of facilities play in waste

[3] https://www.legislation.govt.nz/regulation/public/2021/0068/latest/LMS474556.html#LMS474591

[4] https://www.legislation.govt.nz/regulation/public/2017/0291/latest/DLM7490715.html?search=ts_act%40bill%40regulation%40deemedreg_microbeads_resel_25_a&p=1

[5] https://www.legislation.govt.nz/regulation/public/2018/0270/6.0/whole.html

[6] https://www.legislation.govt.nz/regulation/public/2021/0069/latest/whole.html

management. These requirements take effect from the beginning of 2023 at the latest with Class 3/4 disposal facilities, cleanfills, transfer stations, and industrial monofills the last to start reporting (from 1 January 2023).

Anecdotally, there is evidence that some facilities in the Horizons region are choosing to close rather than comply with the requirements to register and pay the levy and/or report waste quantities.

1.1.9 Emissions Trading Scheme (ETS)

Since 2013, Class 1 landfill owners have been required by the Climate Change (Emissions Trading) Amendment Act 2008 to surrender emission units to cover methane emissions. If any solid waste incineration plants are constructed (without energy recovery), this act would also require emission units to be surrendered to cover greenhouse gas emissions from the incineration of household wastes.

The number of emissions units that needs to be surrendered is based on a calculation of how much methane is generated from a tonne of waste. As a starting point, landfills use a default emissions factor for waste (DEF). This is the methane assumed to be generated by each tonne of waste and is currently set at 0.91 tonnes of CO_2-e (CO2 equivalent) per tonne of waste.

However, landfill operators can reduce their liabilities under the ETS through use of a unique emissions factor (UEF). The UEF is a calculation of actual methane released by the specific landfill. This can be done by either capturing the methane that is generated or showing (based on the type of waste going into the landfill) that the landfill generates a different amount of methane to the default.

1.5.1.1 Carbon Price

The other component of the calculation of a landfill's liability under the ETS is the price of carbon. New Zealand units (NZU)[7] currently change hands for $45, up from a recent low of $37[8].

The cost of NZUs has been increasing steadily for the last couple of years, due largely to changes made to the types of offsets that are eligible under the ETS; however, the market has recently been disrupted due to uncertainty over the future of the ETS, and several large funds failing to complete transactions. Class 2-5 landfills and closed landfills (along with certain other excluded landfills) are not currently covered by the ETS.

The implications of the ETS and carbon prices are explored further in appendix A.1.10.

1.1.10 Other Relevant Initiatives

1.5.1.2 Container Return Scheme

Container return schemes (CRS) place a deposit on all containers when sold. This deposit can then be redeemed by consumers when they return the containers. These schemes are

[7] NZUs are carbon credits that are officially accepted to offset liabilities under the NZETS
[8] Accessed from https://www.carbonnews.co.nz/tag.asp?tag=Carbon+prices

in wide use worldwide including Australia and are designed to promote higher rates of recovery of containers and reduce littering by providing an incentive to consumers.

In 2019, a WMF-funded project led by Auckland Council and Marlborough District Council embarked on the research and design of a potential container return scheme for New Zealand. The outcomes from this project were reported to MfE, who have analysed the information and produced advice for ministers.

MfE consulted on a detailed implementation proposal for a container return scheme in New Zealand. This was included in the 'Transforming Recycling' consultation document.

The consultation document proposed a deposit of 20c per container for a wide range of beverage containers, excluding 'fresh milk' (the logic being that this product is rarely consumed outside the home). Depending on the details of the eventual CRS, and the extent to which containers may be captured in the scheme, two key effects on household kerbside recycling collections are likely:

- The quantity of containers collected in a kerbside collection would reduce; and
- The value of containers that are part of the CRS, but are still collected in a kerbside collection, will likely result in income for the 'owner' of the items. Usually, the owner is either the Council and/or its contractor.

Possible implications for Councils may be that the frequency of recycling collections could be reduced due to lower volumes of material.

In early 2023, government announced that the CRS development would be put on hold. This position has since been softened to a 'delay' but it remains unclear when, or how, a CRS would be introduced for New Zealand.

1.5.1.3 Kerbside Standardisation

In 2019, WasteMINZ was commissioned by MfE to complete a national review of kerbside collections and make recommendations as to how to achieve consistency across the country. The report was completed in 2020[9], and MfE then considered implementing the three main recommendations:

1. A standard set of items accepted in kerbside recycling collections
2. Glass collected separately to other material streams
3. A weekly kerbside food scraps collection service for households.

MfE consulted on a detailed implementation proposal for kerbside standardisation in New Zealand. This was included in the 'Transforming Recycling' consultation document[10].

The proposals included, alongside the points above from the original review, options to achieve the diversion of food scraps from businesses. The three possible options set out in the consultation document are:

[9] https://www.wasteminz.org.nz/wp-content/uploads/2020/08/Final-1.0-Standardising-Kerbside-Collections-in-Aotearoa.pdf
[10] https://environment.govt.nz/assets/publications/Transforming-recycling-consultation-document.pdf

- Phasing in source-separation of food scraps only from businesses that produce or sell food;
- Phasing in source-separation of food scraps from all businesses; or
- Prohibiting the disposal of food scraps to landfill entirely (which would also preclude disposal of food scraps from household sources).

In March 2023, MfE announced its decisions regarding kerbside standardisation alongside the release of Te Rautaki Para /New Zealand Waste Strategy. The key aspects are:

- Standardising materials in existing council kerbside recycling collections by 1 February 2024 to glass bottles and jars, paper and cardboard (including pizza boxes), plastic bottles and containers grades #1, #2, and #5, and aluminium/steel tins and cans.
- Requiring council kerbside recycling to be provided to households in urban areas (defined as those with more than 1000 people[11]) by 2027
- Council food scraps collections to be provided to households in urban areas (defined as above) by 2030, or earlier if a nearby processing option is available[12]

MfE advise it will also be working on business food scrap diversion by 2030.

Kerbside standardisation excludes tetrapak and other gabletop/liquid paperboard containers, foil, aerosols, soft plastics, polystyrene, and plastic bottles and containers other than those mentioned above. Councils will have the discretion to choose whether or not to include compostable bin liners in organics collections and can also choose whether to collect glass separately or comingled with other materials.

Councils for which the earlier food scraps collection deadline (2027) applies does not include the Tararua district.

Kerbside standardisation will only apply to council-provided services (either in-house or via a contractor) for now, with the hope that the private and community sector will choose to align their kerbside services with these requirements. However, MfE have indicated that they intend to provide for kerbside standardisation to be regulated more widely through the new version of the WMA.

The kerbside standardisation changes also include performance standards for household waste kerbside diversion, and reporting requirements for private waste companies.

The performance standards relate to kerbside recycling and food waste, and set an increasing proportion of kerbside waste diverted from landfill:

- 30% by July 2026
- 40% by July 2028
- 50% by July 2030

Councils that do not comply with the requirements to collect a standard set of kerbside recycling materials, and/or meet the minimum diversion requirements, can have all or part of their waste levy allocation withheld. Once withheld, this is not available at a later date

[11] As defined by StatsNZ as 'small urban areas', and shown on the StatsNZ Arc GIS system based on 2022 data.
[12] Defined as within 150km of a 'main centre'.

(i.e. even if the council becomes compliant shortly after the due date, the levy funds will not then be released).

Councils that do not comply with the requirement to provide a kerbside recycling and food scraps collection service to householders in applicable urban areas will not, at this point, have waste levy funds withheld; however, it is likely that there will be regulatory requirements introduced for these aspects at a later date, and it would be very difficult for a council to achieve the minimum diversion requirements without having these services in place.

The performance requirements will be enacted by a gazette notice under the WMA, and the two household kerbside collection provisions will be enacted by a regulation issued by the Governor-General.

MfE have also clarified that 'provision' of services will require a TA to provide these either through in-house services or a contract.

Council's kerbside services are currently compliant with the requirements for kerbside recycling, but there is no household food waste collection in place.

1.5.1.4 TA Performance Reporting

In addition to the proposals for a container return scheme and the standardisation of kerbside recycling, the MfE's consultation also covered a number of related issues.

One of these was the requirement for TAs to report to MfE on a number of performance standards/targets; including a minimum 50% diversion standard for dry recyclables and food scraps in kerbside collections. This is supported by a 70% high performance 'stretch target' which would be non-enforceable but is intended to further encourage and motivate TAs.

The proposal was that the minimum standard would need to be achieved by 2030, to align with timeframes proposed in the draft New Zealand Waste Strategy and the ERP.

Some TA performance targets have now been confirmed in the outcomes from the kerbside standardisation, as discussed in the section above.

1.5.1.5 Priority Products

The WMA enables a product to be named as a 'priority product'. Once a product has been named such, an extended producer responsibility approach must be taken and a regulated product stewardship scheme development.

The first six priority products were named under the WMA in 2020 (shown below) and subsequently single-use packaging has been added. The first seven priority products named are:

1. Plastic packaging
2. Tyres
3. Electrical and electronic products (e-waste including large batteries)
4. Agrichemicals and their containers
5. Refrigerants
6. Farm plastics
7. Single-use plastic packaging

MfE has taken a 'co-design' approach, which involves industry developing and operating product stewardship schemes with central government oversight. Progress on the schemes, and parties involved, are summarised below.

Priority product	Progress made	Lead agency/ies
Tyres	Consultation on proposed regulations late 2021 Scheme accredited October 2020 Regulation in effect from late 2023	Tyrewise
Large batteries	Consultation on proposed regulations late 2021 Accreditation expected late 2023 Regulation in effect from 2024	Battery Industry Group
Refrigerants (and other synthetic greenhouse gases)	Consultation on regulations in late 2022 Scheme accreditation mid 2023 Regulation in effect from 2024	Synthetic Refrigerant Stewardship group
Farm plastics, agrichemicals and containers (farm waste)	Consultation on regulations planned late 2023	The Agrecovery Foundation
Electrical and electronic products (e-waste)	Scheme design in 2023 Consultation on regulations in 2024	TechCollect
Plastic packaging	Co-design underway	Packaging Forum and Food & Grocery Council

1.5.1.6 Product Bans

In April 2022, MfE announced that regulations had been passed to enable the implementation of the first tranche of bans for problematic plastic items. These regulations include:

- Plastic cotton buds;
- Plastic drink stirrers;
- Oxo- and photo-degradable plastic products;
- Certain PVC food trays and containers (pre-formed and rigid);
- Polystyrene takeaway packaging; and
- Expanded polystyrene food and beverage packaging.

The bans took effect from 1 October 2022.

Two more 'tranches' of bans are planned. From 1 July 2023 the following were banned:

- Plastic produce bags;
- Plastic tableware;
- Plastic straws; and
- Non-compostable plastic produce labels.

From mid-2025, all other PVC and polystyrene food and beverage packaging will also be banned.

1.5.1.7 Infrastructure Investment Strategy

With the increased and expanded landfill levy comes an increased pool of funds that can be invested in waste management and minimisation initiatives.

MfE is developing a proactive strategic investment plan for waste infrastructure, supported by a detailed stocktake of current infrastructure and prioritisation of possible new infrastructure. The goal of this work is to give a national view of the waste investment New Zealand needs over the next 15 years. The outcomes will be incorporated into the action and investment plan that will supplement Te Rautaki Para and will be released in the first half of 2024.

In April 2023, MfE released a summary report of the infrastructure assessment carried out by Eunomia in 2021[13].

1.5.1.8 Data and Monitoring

Alongside the increase and expansion of the waste levy, MfE is developing protocols to collect data from the additional facilities that will now be paying the landfill levy (Class 2-4 landfills). MfE has also adopted regulations that enable the collection of some data from Class 5 fills and transfer stations[14], and has proposed an approach for performance reporting by TAs in the current consultation. These protocols will be included in the revised National Waste Data Framework, which will be completed in mid-2023.

MfE has also indicated that it is likely the new Waste Minimisation Act will also include requirements for waste operators to be licensed by a central agency, and to report data on the quantities of waste handled; and that requirements for construction site waste management plans (SWMP) will be included in a revision of the Building Act. It is not clear what the timeframes or specific requirements will be.

1.1.11 Resource Management Act Review

Government has resolved to replace the Resource Management Act (RMA) with two new Acts; the Spatial Planning Act, and the Natural and Built Environment Act. These are currently making their way through Parliament as Bills.

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[13] Eunomia (2023) "Waste and Resource Recovery Infrastructure and Services Stocktake Summary Report", available at www.mfe.govt.nz

[14] https://www.legislation.govt.nz/regulation/public/2021/0069/latest/whole.html

The increased abilities and requirements for spatial planning will have a positive impact on waste management; in particular infrastructure, as demand and supply of waste infrastructure will be an essential consideration under a spatial planning approach.

However, there is no specific reference to waste in the Bills, and so the extent to which waste planning will be undertaken successfully for the Horizons region (by the applicable Regional Planning Committee) will depend on local implementation of the provisions.

The Bills both propose a more significant role for iwi in regional-scale planning, which could result in an approach that is more aligned with te ao Māori principles and a circular economy approach to waste management and minimisation.

1.1.12 International Commitments

New Zealand is party to the following key international agreements:

1) Montreal Protocol – to protect the ozone layer by phasing out the production of numerous substances
2) Basel Convention – to reduce the movement of hazardous wastes between nations
3) Stockholm Convention – to eliminate or restrict the production and use of persistent organic pollutants
4) Waigani Convention – bans export of hazardous or radioactive waste to Pacific Islands Forum countries

1.6 Local and Regional Planning Context

This Waste Assessment and the resulting WMMP will have been prepared within a local and regional planning context whereby the actions and objectives identified in the Waste Assessment and WMMP reflect, intersect with, and are expressed through other planning documents. Key planning documents and waste-related goals and objectives are noted in this section.

1.1.13 Local Strategic Context

The Council has a long-term plan (LTP) adopted in 2021 and a current WMMP adopted in 2017. Council also has other strategies or plans that should be considered, particularly those relating to climate. The local strategic context for the council is summarised below.

1.6.1.1 Long Term Plan

The current LTP's key vision is "***Vibrant, connected communities where our land and waters are nurtured, and our people flourish***".

Four well-beings are woven into Council's vision and mission to ensure sustainable growth. These four well-beings are:

1. Social: to enable our people to achieve the goals that are important to them
2. Environmental: our natural environment is healthy, resilient, and cared for
3. Cultural: our people respect the beliefs, values, histories, and languages of our communities
4. Economic: a vibrant economy that enables a range of opportunities for our people

The environmental well-being outcome relates strongly to the solid waste management group of activities, with some impact on social and cultural well-being and velow impact expected on economic well-being.

Solid waste management could pose three significant negative impacts on the four well-beings:

1) Land use, contamination of land and odour associated with refuse
2) Loss of resources from materials ending in landfills
3) Costs of handling and processing waste, including recycling and recovery, and the infrastructure to enable this to take place

The Council vision is supported by four strategic objectives:

1) Delivering resilient infrastructure
2) Prudent financial management
3) Growing strong communities
4) Building a vibrant economy

While waste management contributes to several of the strategic objectives, ensuring a resilient solid waste infrastructure is most relevant for Tararua due to the significant population growth forecasted in the LTP. An overarching theme of the LTP is planning for growth. Council projects that, over the next 10 years, the district population will increase by 6.9%. Over the last decade Council has been investing greatly in its core infrastructure; however population growth will require ongoing investment. Some of the infrastructure investments included the construction of refuse transfer stations (RTS) and recycling centres, partly driven by the closure of landfills.

Council plans to extensively improve service levels in the following areas:

1. Community Development and well-being
2. Recycling Services
3. Growth-related services
4. Roading emergency funding
5. Water and wastewater quality

Waste was one of four key areas that residents were encouraged to give feedback on during the consultation phase of the 2021 LTP. Residents were asked specifically whether there was support for Council to expand kerbside services, and whether these should extend into collecting general waste. It was noted that any decrease in general waste going to landfill reduces cost to Council; as this waste needs to be transported to the Central Hawkes Bay landfill. Of 35 submissions received, 30 were in support of Council doing more – 21 in support of kerbside recycling provision in the four main towns, and another nine in support of Council introducing kerbside rubbish and organic waste (food scraps and garden waste) collection services. As a result, additional services were introduced from 1 July 2022.

The aim of solid waste management, as described by Council in the LTP, is to "*protect people's health and the environment by minimising the production of waste through promoting recycling and reuse*".

Key issues and risks identified in the LTP were:

1. Rates cost to increase, due to low or no market value of recyclables
2. Contractors experience business failure

3. Leachate contamination to waterways and land
4. Significant increase in recycling volumes affecting costs and rates
5. Consent conditions are not met
6. New legislation will encompass additional requirements that Council will need to adhere to, including the closure of the Pongaroa landfill
7. Contract price for Council's refuse is increased significantly over the next few years
8. Significant increase in costs to deliver current level of service
9. Not meeting legislation as well as increased requirements on waste and closed landfill management

1.6.1.2 Waste Minimisation and Management Plan

The 2017 WMMP identified that Council will continue existing recycling services, with a new glass recycling program that will see glass transported to Auckland for reprocessing into new bottles and jars. Increased initiatives in education and support for home composting is aimed at reducing the volume of green waste and food waste entering the waste stream.

Council has three primary roles in solid waste management, namely to:

- identify, educate and promote methodology to decrease waste and improve resource value;
- enable local solutions to local waste management issues; and
- ensure that waste management practices do not impact human health, animal and plant health, amenity and cultural values

The waste reduction targets are not being met, as Council has faced some challenging external trends and effects over the last few years.

Key local drivers in relation to waste for Tararua include the following:

- changes to the world market for recyclable materials has severely reduced the revenue possible from these materials;
- Covid-19 and national lockdowns resulted in months of recyclables being sent to landfill;
- private contractors moving to wheelie bins for waste services has resulted in residents having additional volume available for 'waste' at a fixed price;
- government legislation and standards have increased the costs of disposing to landfill;
- and changes in ownership of a Council contractor has altered some operational practices.

Paraphrased from the Tararua District Council LTP and WMMP[15]

1.1.14 Solid Waste Bylaw

The current Bylaw for Solid Waste was adopted in 2018 and ensures rubbish is stored, collected and disposed of in the interests of public health in an effective and cost-efficient

[15] /https://www.tararuadc.govt.nz/__data/assets/pdf_file/0021/5817/Waste-Management-and-Minimisation-Plan-2017-2023.pdf
/https://www.tararuadc.govt.nz/__data/assets/pdf_file/0019/5950/2018-2028_Consultation_Document.pdf

manner, while ensuring that any obstruction of streets is limited. The Bylaw further supports the implementation of Council's WMMP, and the goals set out in the previous New Zealand Waste Strategy. There are provisions for licensing of waste collectors and transporters, and for landfills.

The bylaw was adopted under (amongst others) the Waste Minimisation Act, so doesn't require updating until 2028.

1.1.15 Horizons Regional Council

The Tararua district is part of the Manawatu-Wanganui Regional Council, trading as Horizons Regional Council.

The Horizons Regional Council adopted the 'One Plan' in November 2014[16]. This document covers the requirements of the consolidated regional policy statement, the regional plan, and the regional coastal plan for the region.

In the One Plan, the regional council states that it recognises "the need to focus on the full life cycle of waste from generation to disposal, and that waste is a wasted resource." The Plan goes on to discuss specific requirements with respect to hazardous substances and contaminated land.

Waste is defined as "*any material, solid, liquid or gas that is unwanted or unvalued and discarded or discharged."*[17]

Chapter Three of the One Plan sets out the objectives, policies and methods relating to waste.

Increased quantities of waste produced, and hazardous substances used is resulting in concern in several areas:

- Wasted resources and an increasing need for appropriate disposal
- Potential for poor management of hazardous substances
- Potential for land contamination, leading to risks to people and environment.

The waste management objective included in the One Plan is:

"*The Regional Council and Territorial Authorities must work together in a regionally consistent way to:*

(i) Minimise the quantity of waste generated in the Region and ensure it is disposed of appropriately,

(ii) Manage adverse effects from the use, storage, disposal and transportation of hazardous substances, and

(iii) Manage adverse effects from contaminated land.

Solid waste facilities such as landfills, transfer stations and resource recovery facilities should be recognised as being physical resources of regional and national importance; and

[16] Available at www.horizons.govt.nz/publications-feedback/one-plan
[17] Glossary section of the One Plan

these should be managed in a way that considers the significant benefits derived from the assets.

The One Plan includes four policies intended to give effect to the objective above. These policies are as follows:

Policy 3-8 Waste policy hierarchy

Wastes, including solid, liquid, gas and sludge waste, must be managed in accordance with the following hierarchy:

(a) reducing the amount of waste produced

(b) reusing waste

(c) recycling waste

(d) recovering resources from waste

(e) appropriately disposing of residual wastes.

Policy 3-9 Consent information requirements – waste policy hierarchy and hazardous substances

Where a proposal has the potential to give rise to significant adverse effects on the receiving environment, an assessment must be required, as part of the consent information requirements for all discharges to air, land, water and the coastal marine area, of:

(a) reduction, reuse, recycle and recovery options for the discharge in accordance with Policy 3-8, and

(b) any hazardous substances that may be present in the discharge, and alternatives to those hazardous substances.

Policy 3-10 Cleanfills, composting and other waste reduction activities

Waste reduction activities will be encouraged, in particular by generally allowing cleanfills and composting activities.

Policy 3-11 Landfill management

Landfills must generally be designed, constructed, managed, operated, remediated and monitored in line with appropriate guidelines and national environmental standards. Taking into account the applicability of these guidelines and standards in relation to the type and scale of activity proposed, the following guidelines may be considered appropriate:

(a) Centre for Advanced Engineering Landfill Guidelines, April 2000

(b) Ministry for the Environment, Module 1: Hazardous Waste Guidelines – Identification and Record Keeping, June 2002, ME637

(c) Ministry for the Environment, Module 2: Hazardous Waste Guidelines, Landfill Waste Acceptance Criteria and Landfill Classification, May 2004, ME510

(d) Ministry for the Environment, A guide to the Management of Cleanfills, January 2002, ME418

(e) Ministry for the Environment, A guide to the Management of Closing and Closed Landfills in New Zealand, May 2001, ME390

(f) Ministry for the Environment, Guide to Landfill Conditions, May 2001, ME389

(g) Ministry for the Environment, Good Practice Guide for Assessing and Managing the Environmental Effects of Dust Emissions, September 2001

(h) Landfill gas collection and destruction or reuse in accordance with the Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins and other toxics) Regulation 2004.

Cleanfills are defined as landfills only accepting:

"*materials such as clay, soil and rock, and other inert materials such as concrete or brick that are free of:*

a) *Combustible, putrescible (except that cleanfill material can contain up to 5% by weight putrescible matter), degradable or leachable components*
b) *Hazardous substances*
c) *Products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices*
d) *Materials that may present a risk to human health*
e) *Liquid waste.*

This definition departs from the waste acceptance criteria set out in the 2016 Technical Guidelines for Disposal of Waste to Land[18] in two key respects – firstly the criteria allow no more than 2% of biodegradable material by volume per load; and manufactured materials such as concrete and brick are permitted to make up no more than 5% by volume per load.

The non-regulatory methods associated with the objective and policies above are:

Method 3-1 Regional Territorial Authority Waste Forum… Work with the territorial authorities to achieve a regionally consistent approach to waste and to progress Region-wide waste issues and implement agreed initiatives, including:

- hazardous waste disposal facilities

- recycling facilities

-resource recovery network waste exchange

- public information

-waste education schools

- consistent waste data collection and reporting

- development of region-wide waste reduction targets in line with the New Zealand Waste Strategy 2002

- cleanfill management and monitoring

- waste minimisation and cleaner production in business/trade sectors

[18] Available on www.wasteminz.org.nz

- economic instruments including incentives for waste reduction

Method 3- 2 Public Information: Easily accessible information will be developed and provided to increase public awareness on waste issues generic to the Region, including:

- cleanfill management and guidelines

- waste minimisation

- availability of waste disposal and recovery facilities (including for campervans)

- fly tipping

- hazardous substances

- burning of waste

- offal pits and farm dumps

- septic tank discharges

- composting

Some actions in the One Plan are now obsolete, as they refer to requirements for waste planning under the Local Government Act (2002) rather than the Waste Minimisation Act (2008). The One Plan also refers to the New Zealand Waste Strategy 2002, particularly with respect to targets, even though this document was reviewed in 2010 and any specific targets removed.

Although the One Plan was not adopted until 2014, large sections of the Plan were notified for consultation as early as 2007 and so referred to strategies and legislation that were in effect at this time. As no submissions were received with respect to the waste section of the Plan, it was not possible to update this section prior to final adoption.

The Horizons Regional Council acknowledges that there are references in the One Plan that are now dated and perhaps even obsolete, but also notes that the changes which took place following the introduction of the Waste Minimisation Act in 2010 have significantly reduced any statutory role they play in solid waste management and planning, beyond a consenting and monitoring role.

1.7 Our District

This section presents a brief overview of key aspects of the regional and local geography, economy, and demographics. These key aspects influence the quantities and types of waste generated and potential opportunities for Council to manage and minimise these wastes in an effective and efficient manner.

1.1.16 Physical Characteristics

The Tararua district encompass seven primary towns; Ākitio, Dannevirke, Eketāhuna, Norsewood, Ormondville, Pongaroa, Pahiatua, and Woodville.

Dannevirke is the largest community in the Tararua district. Eketāhuna was established in an area in the Seventy Mile Bush and is the southern gateway to the Tararua region. Eketāhuna is 42 kms north of Masterton and 65km southeast of Palmerston North. Norsewood is at the northern end of the Tararua district. Ormondville is situated 22km northeast of Dannevirke. Pongaroa (meaning tall tree fern), is located approximately

midway between Masterton and Dannevirke. Woodville is the gateway to the spectacular Manawatu Gorge which is bordered by the Tararua and Ruahine Ranges and is distinctive in having between these ranges a State Highway, the Manawatu River and a railway.

Figure 3: Map of District

Source: Tararua District Council LTP

1.7.1.1 Geography

The Tararua district is characterised by vast ranges, bush covered ravines, a remote coastline, two national forest parks with significant tributary systems.

The Tararua district extends from Mount Bruce to north of Norsewood and is surrounded by the foothills of the majestic Ruahine and Tararua Ranges, and the shore of the Pacific on the East Coast. The district covers 424,000 hectares (3rd largest District in New Zealand). Approximately 95% of Tararua's 424,000 hectares is farmed and well recognised for producing high quality stock. Sheep, beef, and dairy are the primary types of farming, representing 90% of all farms and accounting for 99% of total stock units. Forestry is an expanding industry in the area and there are currently greater than 13,000 hectares planted in *Pinus radiata.*

1.7.1.2 Climate

The Tararua district's climate is temperate with an average of 14.02C; and with the mean annual rainfall of 1000mm near the coast and around 1500mm in the ranges.

The area is known for sustained wind, especially in spring, particularly in the foothills of the Tararua and Ruahine ranges[19]. Close to Woodville are the largest series of 'wind farms' in the southern hemisphere, with 286 turbines providing power for around 50,000 homes[20].

1.7.1.3 Demographics

The Tararua district had an estimated population of 19,122 in June 2022; an increase from 16,854 in the 2013 census and a population of 17,943 in the 2018 census.

Council has forecast that the district population is expected to increase from 19,122 for 2021 to 20,439 by 2031; a population increase of 6.9% over the next 10 years. The forecast for 2031 is 11.7% higher than the forecast included in the 2018 Long Term Plan. The median age in the district is 41.8 years, however the Māori median age is 24.5 years (compared to the national average of 37.7).

The following table shows key demographic metrics for the district:

Table 2: Key Demographic Indicators (2018 census)

Demographic indicators	Households (Occupied Dwellings)	HH Size	Median income	Home ownership	Building consents
Tararua district	7,032	2.71 people	26,300	57.4%	524 (2022 year)
New Zealand	NA	2.7 people	31,800	64.6%	NA

Source: https://www.stats.govt.nz/tools/2018-census-place-summaries/tararua-district#population-counts

The majority of the population identifies themselves as ethnically European (84.5%, an increase from the 75.4% in the 2006 census and above the NZ average of 70.2%) with a second large ethnic group identifying themselves as Māori (24.6%, an increase from the 2006 census and slightly above the 18.5% NZ average).

The district had 7,032 occupied dwellings at the 2018 census, and a slightly higher-than-average number of unoccupied dwellings (858, or 10.8% compared to 10.3% nationally). The median income in the district is $26,300, under the national average ($31,800). The proportion of permanent Tararua residents that own their own home is lower than the national average – 57.4%, compared to 64.6% nationally.

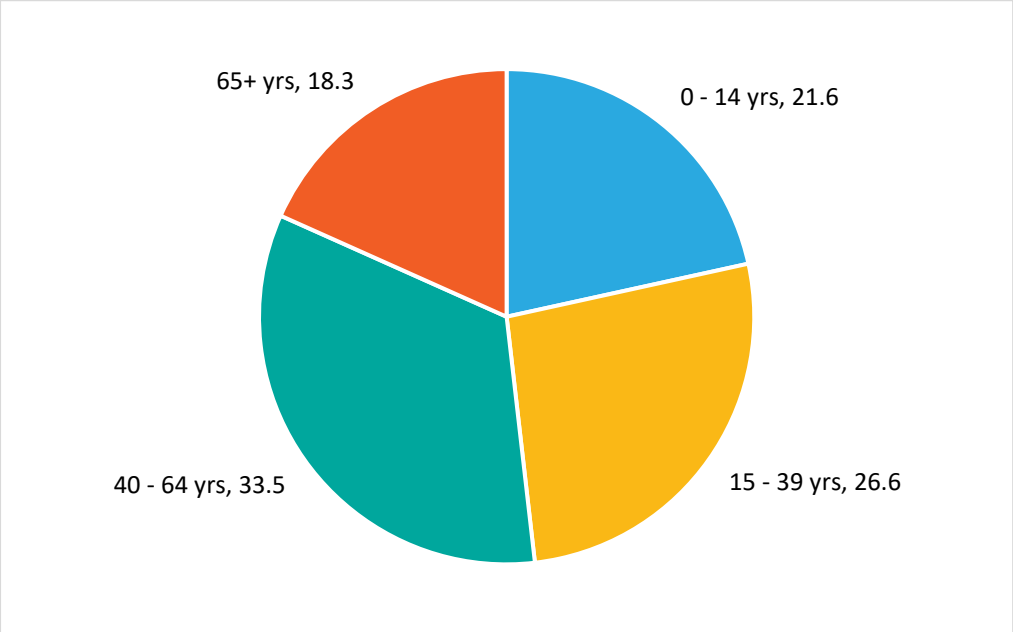
Tangata whenua are the Rangitāne iwi and Ngāti Kahungunu, with local hapu including Ngāti Hineaute, Ngāti Rangiaranaki, Ngāti Rangitepaia, and Ngāti Tauira[21].

[19] Collated from www.niwa.govt.nz, and www.en.climate-data.org.
[20] Summarised from www.windenergy.org.nz
[21] https://www.tkm.govt.nz/localauthority/tararua-district-council/

The average household size in the Tararua district is 2.71 people, compared with 2.7 in New Zealand as a whole. The number of single person households is expected to rise over the next 30 years, primarily due to an ageing population.

The population profile for the Tararua district in 2018 is shown in the chart below:

Figure 4: Population Profile for the Tararua District (2018 census)

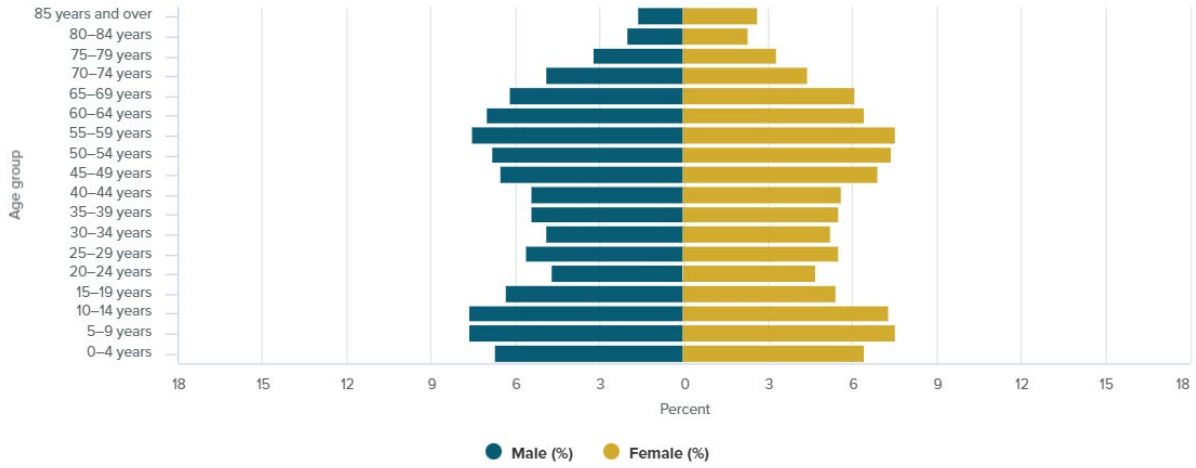


The median age (half are younger, and half older, than this age) is 41.8 years for people in Tararua. For New Zealand as a whole, the median age is 37.4 years.

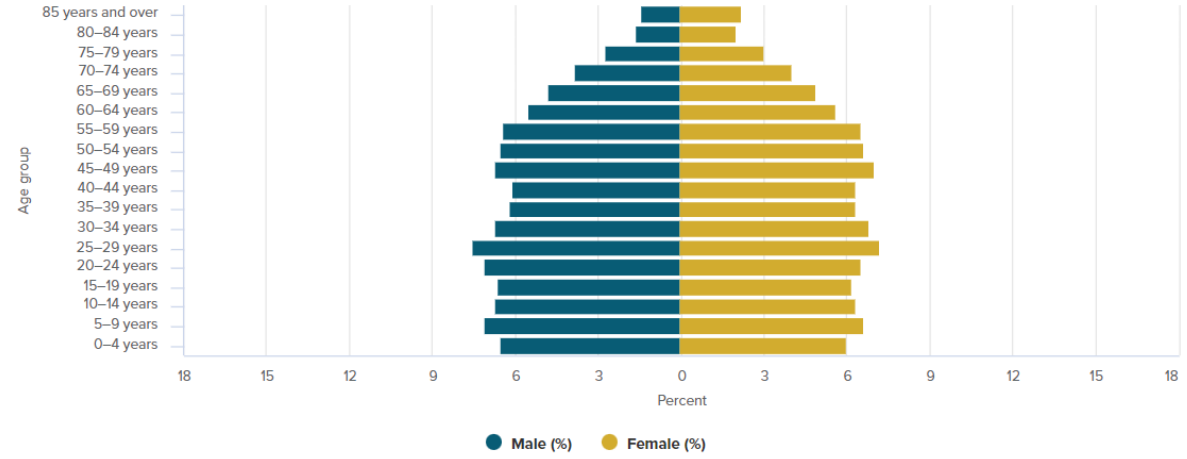
The age distribution of the population relative to NZ as a whole is shown in the figures below.

Figure 5: Total Population (Age group and sex)

Tararua district, 2018 Census



New Zealand, 2018 Census



The population shows a bulge in the 40 – 64 year age group, reflecting the aging population in the area. The increase in older individuals has occurred at a comparable rate to that projected in the 2018 Long Term Plan. Given the uncertainties over international migration flows due to Covid-19, the percentage of older people may not increase as quickly as forecasted. This will be due to more younger people living in the district, not being able to travel overseas. Greater inward net migration tends to reduce the ageing population trajectory.

Projections have been based on the Stats NZ figure of 6,858 occupied dwellings in 2013 as well as the Council infometrics forecasted over 10 years.

Table 3: Households and Projected Household Growth

Number of households	2013	2018	2021	2031
Tararua district	6,858	7,032	7,603	8,202

Average annual change		34.8	190.3	59.9
Average annual growth rate		0.5%	2.5%	0.7%

Source: https://Tararua-District-Council-Long-Term-Plan-2021-2031.pdf

1.1.17 Economy

Agriculture is the Tararua district's primary industry. Additional industries include textiles, food processing, and retailing. Commercial forestry is likely to become more significant to the district's economy in the next few years due to increased harvesting as crops mature. The Tararua District Council's economic development plan depicts that council will investigate opportunities such as replanting initiatives, to maximise the economic impact from forestry. Planting Manuka trees for honey production is one such initiative being investigated.

Council have started land use research projects that may identify reasonable alternatives to support with the challenges faced by pastoral farmers. Land use optimisation research projects are funded by the Central Government's Provincial Growth Fund. The feasibility of four horticulture crops are being investigated; feijoas, hazelnuts, cider apple trees and berries.

Furthermore, Council has a collaborative approach to advance relationship with the local iwi to enhance development of Māori economy in the district.

Tourism is an important contributor to the Tararua district's economy and therefore an important part of Council's economic strategy. Current yearly visitor spending in Tararua district is $52 million according to Tourism New Zealand. Increasing the appearance and feel of a town holds several advantages such as establishing a sense of local pride and an increased appeal for tourists to visit. Additionally, it promotes the establishment of new, or the progression of existing enterprises. Council has completed town centre improvements in Dannevirke, Woodville and Eketāhuna in previous years and commenced the project for Pahiatua.

2 Waste Infrastructure

This section outlines existing waste management and minimisation infrastructure across the Tararua district, and further abroad where applicable. The facilities available in the Tararua district are a combination of those owned, operated and/or managed by the Council, and those that are owned and/or operated by commercial entities or community enterprise.

This inventory is not to be considered exhaustive, particularly with respect to the commercial waste industry as these services are subject to change. It is also recognised that there are many small private operators and second-hand goods dealers that are not specifically listed. However, the data is considered accurate enough for the purposes of determining future strategy and to meet the requirements of the WMA.

2.1 Disposal Facilities

In 2021, MfE adopted regulations to extend the landfill levy and apply information requirements to facilities that were not already subject to the levy and reporting requirements. These regulations also established legal definitions for disposal facilities and other fills. Previously, disposal facilities had been categorised according to the 2016 Waste Management Institute of New Zealand (WasteMINZ) Technical Guidelines for Disposal to Land.[22] As there are differences, albeit slight, between the two; the legal definitions take precedence[23].

The definitions of the six classes of facilities in the regulations are summarised below.

Class 1 - Municipal Disposal Facility

Accept any of the following:

- Household waste
- Waste from commercial or industrial sources
- Waste from institutional sources
- Green waste
- Waste that is not accepted at Class 2-5 disposal facilities.

Class 2 – Construction and Demolition Disposal Facility

Accepts waste from construction and demolition activities. Does not accept Class 1 waste.

Classes 3 and 4 – Managed or Controlled Fill Disposal Facility

Accepts any of the following:

- Inert waste material from construction and demolition activities
- Inert waste material from earthworks or site remediation

Does not accept Class 2 waste.

[22] www.wasteminz.org.nz/pubs/technical-guidelines-for-disposal-to-land-april-2016/

[23] www.legislation.govt.nz; It is likely that the Technical Guidelines will be revised so it is aligned as closely as possible with the MfE definitions.

Class 5 – Cleanfill

Accepts only virgin excavated natural material (such as clay, soil, or rock) for disposal – but is not a 'disposal facility'.

Industrial Monofill

A facility that accepts disposal waste that:

- Discharges or could discharge contaminants or emissions
- Is generated from a single industrial process (e.g. steel or aluminium making, or pulp and paper making) carried out in one or more locations.

The actual wording used in the regulations and examples of types of waste accepted at each facility is provided in appendix A.3.0.

The regulations also define a transfer station as a facility that receives waste and where waste is then transferred to a final disposal site or for further processing. Significantly, if a site does not accept waste that is then transferred to a final disposal site (i.e. residual waste), it is not a transfer station (but is instead a recycling drop-off site or similar) and isn't required to report data.

2.1.1 Class 1 Disposal Facilities

There are Class 1 disposal facilities within reach of the Tararua district.

Residual waste from the district is currently consolidated in Dannevirke and Pahiatua, and then sent to the Class 1 landfill on Farm Road, near Waipukurau, which is owned by Central Hawkes Bay District Council and operated (on its behalf) by Higgins. This is lined Class 1 landfill with no gas capture, with a consent until 2030. This landfill is over an hour from Dannevirke, and one ½ hours from Pahiatua.

A similar distance away is Bonny Glen landfill, a lined Class 1 landfill with gas capture in place operated by Midwest Disposals (a joint venture between EnviroNZ Ltd and Waste Management NZ Ltd). This is one hour from Pahiatua, and an hour ¼ from Dannevirke. Bonny Glen has an anticipated life of around 50 to 80 years from 2013 (when its consent was last extended).

Tararua District Council also operate a Class 1 landfill at Pongaroa. A consent application for ongoing operation has been lodged with Horizons.

2.1.2 Emissions from Waste to Class 1 Landfills

When organic waste is landfilled, it breaks down in the anaerobic (lacking oxygen) environment of the landfill and instead of producing carbon dioxide or CO2 (as would be the case in an oxygenated environment), produces methane or CH4. Methane is a far more potent greenhouse gas than carbon dioxide, with an immediate (less than 20 years) global warming impact 80 times higher.

The New Zealand ETS requires Class 1 landfill operators to surrender carbon credits, based on the amount of greenhouse gases released. This in turn is calculated using the quantity of waste received by the landfill, and the composition of that waste – as different material types contain differing levels of carbon, and break down at different rates (for example food scraps breaks down very quickly, while timber breaks down extremely slowly).

Large Class 1 landfills (over 1 million tonnes total capacity) are required to operate landfill gas capture systems, where the methane is captured before escaping to the atmosphere and can be burned to create energy or to convert to the less harmful CO2. However, landfill gas capture and recovery systems do not capture all the methane gas that is produced, and so a proportion still escapes to the atmosphere. The proportion of methane produced and captured, over the life of a landfill, is likely to be around 55% to 65%.

Bonny Glen currently captures methane and burns this in a flare, converting the CH4 to CO2 (a much less harmful greenhouse gas). There are plans to use the captured methane for beneficial use in future, such as producing electricity.

Central Hawkes Bay District Council's landfill on Farm Road does not have a gas capture system in place, and therefore none of the methane produced at this landfill is captured for either flaring or beneficial use.

2.1.3 Class 2-5 Fills

Research estimates that waste disposed of to land other than in Class 1 landfills accounts for approximately 70% of all waste disposed of, and these operators are not required currently to pay the waste levy to central government, and some have only recently started reporting waste quantity data.[24] Other disposal sites include Class 2-5 fills and farm dumps.

Class 2-5 fills can be an issue for effective and efficient waste management as, for some materials, these disposal sites are competing directly with other options such as composting sites and Class 1 landfills; while Class 2-5 fills are much less costly than Class 1 landfills to establish and require much lower levels of engineering investment to prevent discharges into the environment. Class 2-5 fills also have much lower compliance costs than Class 1 landfills and have not previously been required to pay the waste levy. Because of these differing cost structures, Class 2 landfills generally charge markedly less for disposal than Class 1 landfills.

From 1 July 2022, Class 2 disposal facilities have been required to pay the levy at a rate of $20 per tonne (going up to $40 per tonne in 2024). Class 3 and 4 disposal facilities have been required to pay the levy from 1 July 2023 at a rate of $10 per tonne. True Class 5 fills (accepting virgin excavated and natural material, or VENM, only) will not be required to pay the levy but were required to report on quantities starting from 1 January 2023.

Class 2 disposal sites and RTS were required to start reporting data on waste quantities from 1 January 2022.

Following these changes, MfE will hold data on the quantities of waste disposed of at these sites and are in the process of developing a database of Class 2-5 facilities around the country. Because of the varying dates that the requirements become effective, the data currently available from MfE only includes Class 2-4 landfills; it may also not reflect closures since mid-2022.

[24] Ministry for the Environment (2014) Review of the Effectiveness of the Waste Disposal Levy. The report estimates 56% of material disposed to land goes to non-levied facilities, 15% to farm dumps and 29% to levied facilities.

Storage areas for cleanfill material are available at Dannevirke and Pahiatua transfer stations.

There are a number of registered facilities in the district, shown in Table 4 below.

Table 4: Registered Class 2-5 fills and Industrial Monofills in Tararua District

Company	Type of Facility	Location
Contact Energy	Class 5 - excess fill disposal from wind farm construction	Waitahora Wind Farm
Genesis Power	Class 5 - excess fill disposal	Puketawa Road
Mercury NZ Ltd	Class 5 – excess fill disposal from wind farm construction	Aokautere Wind Farm
Mighty River Power	Class 5 – excess fill disposal from wind farm construction	Puketoi Wind Farm
NZ Windfarms Ltd	Class 5 – excess fill disposal	Aokautere Wind Farm
Ruahine Timber Ltd	Industrial monofill	Ormondville
Kiwi Lumber	Industrial monofill	Dannevirke

2.1.4 Transfer Stations, Resource Recovery Parks, and Recycling Drop-off Points

Refuse transfer stations (RTS) or resource recovery parks (RRPs) and recycling drop-off points (RDOPs) provide for those that can't or choose not to make the journey to a disposal facility. Waste can be dropped off at these sites by the public and commercial collectors after paying a gate fee, and, in most cases, the waste is compacted before transport to a Class 1 disposal facility.

The terms 'RTS' and 'RRP' are frequently used interchangeably; however, RTS were traditionally, and primarily, established as a point to dispose of residual waste and where this waste could be bulked and prepared for transport to a disposal site. 'RRPs' are usually expected to have a focus on waste diversion, and include a wide variety of waste diversion opportunities – such as green waste, scrap metal, cleanfill, hazardous wastes, recyclables, batteries, etc. The most well developed RRPs would include additional aspects such as a reuse store and/or an education facility, support product stewardship schemes, and divert more difficult material streams. Appendix A.5.2.3 discusses the various forms that an RRP (or RRC, resource recovery centre) can take and how they can significantly contribute to a circular economy.

RDOPs can be defined by size and location; in that the sites are usually intended primarily as a site for recyclables, with perhaps a few other materials; but very seldom providing for the disposal of residual waste.

The table below shows these facilities located in the region.

Table 5: Transfer Stations & Resource Recovery Centres, RDOPs

Facility Description	Operation	Hours	Materials Accepted
Dannevirke RTS (Easton Street)	Operated on behalf of Council by Smart Environmental LTD	Monday to Friday 9:00am–4:00pm Saturday 10:30am–4:00pm Sunday 12:00pm–4:00pm	Recycling, greenwaste, cleanfill, refuse
Eketāhuna RTS (Marchant Street)	Operated on behalf of Council by Smart Environmental LTD	Sunday 9:00am–11:00am Thursday and Saturday 2:00pm–4:00pm	Recycling, greenwaste, cleanfill, refuse
Pahiatua RTS (Ridge Road North)	Operated on behalf of Council by Smart Environmental LTD	Sunday and Wednesday 12:00pm–4:00pm Friday 1:00pm–4:00pm	Recycling, greenwaste, cleanfill, refuse
Woodville RTS (Oxford Road)	Operated on behalf of Council by Smart Environmental LTD	Wednesday 9:00am–11:00am Saturday 1:00pm–4:00pm	Recycling

2.1.5 Closed Landfills

There are a number of consented closed landfills that council have responsibility for; shown in the table below.

Facility Description	Information
Dannevirke landfill (Miller Street)	Closed December 2010
Pahiatua landfill (North Ridge Road/Pukemiku Road)	Closed December 2010
Woodville landfill	Designation uplifted by the Tararua District Council by formal notice dated 14 October 2020

Ormondville landfill (Louise Street)	No information available
Eketāhuna landfill (Marchant Street)	Closed June 2018
Pongaroa landfill (Urupa Street)	Consent application lodged for ongoing operation

2.2 Hazardous Waste Facilities and Services

The hazardous waste market comprises both liquid and solid wastes that, in general, require further treatment before conventional disposal methods can be used. The most common types of hazardous waste include:

- Organic liquids, such as those removed from septic tanks and industrial cesspits
- Solvents and oils, particularly those containing volatile organic compounds
- Hydrocarbon-containing wastes, such as inks, glues and greases
- Contaminated soils (lightly contaminated soils may not require treatment prior to landfill disposal)
- Chemical wastes, such as pesticides and agricultural chemicals
- Medical and quarantine wastes
- Wastes containing heavy metals, such as timber preservatives
- Contaminated packaging associated with these wastes.

A range of treatment processes are used before hazardous wastes can be safely disposed.

Most disposal is either to Class 1 landfills or through the trade waste system. Some of these treatments result in trans-media effects, with liquid wastes being disposed of as solids after treatment. A very small proportion of hazardous wastes are 'intractable' and require exporting for treatment.

These include polychlorinated biphenyls, pesticides, and persistent organic pollutants.

All Hazardous waste from the Tararua district goes to Waipukurau landfill. Agrecovery provides hazardous waste management services for agricultural chemicals. Additionally, hazardous waste service providers in the area include Waste Management, Enviro Waste and 3R.

2.3 Wastewater Treatment

As outlined earlier in this report, wastewater treatment is considered where it results in waste being managed through solid waste systems.

The future of wastewater management in the district, as across New Zealand, is currently somewhat uncertain depending on the implementation of the national three waters management proposals.

All biosolids from Tararua are transported to Palmerston North.

2.4 Recycling and Reprocessing Facilities

There are no recycling processing facilities within the district.

2.4.1 Recycling and Reprocessing Facilities Outside the District

Recycling from the Tararua district is processed at a number of facilities outside the district. The available options are shown below in Table 5.

Table 6: Processing/Reprocessing Infrastructure Outside the Region

Name/Operator	Type	Key services/waste streams	Location	Capacity & Estimated Operational life
Palmerston North City Council	Materials recovery facility	Recyclables	Palmerston North	Processes 9,000 tonnes pa ongoing
Smart Environmental	Materials recovery facilities	Recyclables	Feilding and Masterton	Unknown
Awapuni Resource Recovery Park / Council	Composting	Greenwaste, pallets/untreated timber, plasterboard, foodwaste, agricultural/food processing residues	Awapuni Closed landfill	Processes 18,000 tonnes pa ongoing
Macauley Metals	Scrap metal	Accept scrap metal for recycling at a yard on the access road to Awapuni RRP	Awapuni Closed Landfill	Ongoing operation
OJI Full Circle	Bulking	Bulking and baling of paper & card	Awapuni Closed landfill	Processes 14,000 tonnes pa ongoing
Budget Plastics	Reprocessing	Plastic	Valour Drive, Palmerston North	Processes 4,500 tonnes pa, ongoing

Paranui Composting	Composting	Organic waste from the region	Paranui Road Foxton	N/A
Hawk Group	Reprocessing	Fibre (paper/card)	Hawkes Bay	Processes 10,000 tonnes pa, ongoing
O-I NZ Ltd	Reprocessing	Colour-sorted glass	Penrose, Auckland	Processes 130,000 tonnes pa, ongoing
SIMS Pacific	Reprocessing	Ferrous metals	Otahuhu, Auckland	Processes 5,500 tonnes pa, ongoing
OJI Fibre Solutions	Reprocessing	Fibre – paper and some card	Auckland, Kinleith	Processes 160,000 tonnes pa, ongoing
MyNoke	Vermicomposting	Organic wastes	Kinleith, Tokoroa	Currently expanding
Flight Plastics	Reprocessing	Plastic	Wellington	10,000 capacity however limited at present by end markets

In addition, there are a large number of charity shops, second-hand stores, and smaller scrap metal recyclers that have a role in diverting material from landfill disposal.

While many material types are transported out of the district and even out of the region for recycling and reprocessing, this is not an unusual situation in New Zealand.

2.5 Summary and Assessment

There are notable gaps in reprocessing for organics and C&D waste, both large waste streams and making up a considerable proportion of what is currently going to landfill. These material streams are dense, and it is rarely economical to transport these long distances for reprocessing.

Tararua district has reasonable access to recycling and reprocessing facilities, although most of them (with the exception of fibre recycling) are at a significant distance. There are no material recycling facilities (MRFs) within the district, however there are MRFs in Palmerston North, Feilding and Masterton, which are within a reasonable distance from the

main towns in Tararua. Dannevirke, Eketāhuna, Pahiatua and Woodville with their lower north island location have several potential processing options within reach in Wellington, Hawkes Bay, and Auckland for a wide range of materials.

Standardised kerbside collection of organic waste and recyclables in urban areas will become mandatory under new waste legislation following on from the waste strategy published by central government in 2023. The Council currently offer a kerbside recycling collection but no organics collection. Urban towns, as classified by statistics New Zealand that are considered mandatory for the kerbside service include; Dannevirke, Woodville and Pahiatua[25].

Within the context of current legislative and policy arrangements there is limited provision for e-waste collection and recovery within the region – although there is still scope for greater levels of recovery. The cost of separate disposal of e-waste compared to landfilling is a disincentive for greater recovery. E-waste is collected annually at an amnesty drop-off day and some e-waste could also be disposed of at the transfer stations within the district at a cost to the public.

[25] Stats NZ urban classification
https://statsnz.maps.arcgis.com/apps/webappviewer/index.html?id=6f49867abe464f86ac7526552fe19787

3 Waste Services

3.1 Council-provided Waste Services

Since Council withdrew from kerbside collections in 2017, most services have been provided by the private sector. In 2020, Council re-entered the market; providing a kerbside collection of paper/card, plastics, and aluminium and steel tins/cans to households in Dannevirke, Eketahuna, Pahiatua, and Woodville. The material was collected from tied plastic bags, with no formal container provided.

A new kerbside recycling service was introduced to these areas on 1 July 2022; with comingled recyclables collected fortnightly from a 240L wheeled bin, and glass bottles/jars collected from a 45L crate on alternate weeks. A collection is also provided to Norsewood and Normanville, still from plastic bags[26].

There are also ten recycling drop-off points provided by Council around the district; including in the four urban areas that receive the kerbside collections.

There are currently no refuse, kerbside food scraps or garden waste collections offered through the council.

Council also provides a range of communication and education initiatives to inform ratepayers, schools and services users of the available waste services and to promote waste minimisation. Key communication and education initiatives that Council supports include:

- Community and industry education programmes;
- Recycling information packs for households and;
- TDC supports the Paper 4 Trees programme in local schools through EERST (Environmental for Education Resource Sustainability Trust).

3.1.1 Solid Waste Bylaw

In addition to key strategic waste infrastructure assets, the Council also has responsibilities and powers as regulators through the statutory obligations placed upon them by the WMA. The Council operates in the role of regulator with respect to:

- management of litter and illegal dumping under the Litter Act 1979
- trade waste requirements
- nuisance-related bylaws.

Council adopted their Waste Management and Minimisation bylaw in 2018.

3.2 Non-Council Services

There are a number of non-Council waste and recycling service providers operating in the district; in particular residual waste collection from wheeled bins, and garden waste collection.

[26] This service is provided by Vivid Investments under contract to November 2025.

The table below describes the kerbside collection services provided by the private sector.

Table 7: Non-Council Kerbside Collections

Kerbside collection service	Charges/funding	Refuse collection provider
Weekly collection of household residual waste from wheeled bins	User pays charges varying depending on size – 80L to 240L bins available	Murray Contractors, Smart Environmental, Waste Management, EnviroNZ
Weekly or fortnightly collection of garden waste from wheeled bins	User pays charges varying depending on size – 80L to 240L bins available; also large 1m3 bags from some providers	Smart Environmental, Waste Management, EnviroNZ
Regular collection of commercial residual waste and recycling in various containers	User pays charges depending on type, size, and frequency	Smart Environmental, Waste Management, EnviroNZ
Regular collection of hazardous and medical waste	User pays charges depending on type, size and frequency of collection	3R Group Ltd Medi Chem

3.3 Summary and Assessment

1. The commercial collection market is reasonably competitive with two large private sector operators offering services;
2. The commercial market for recyclables materials also seems to be relatively well catered for with a range of collection and drop-off options in the district;
3. The variety of kerbside bin services provided makes it more difficult to consistently educate about kerbside services – which is one of the drivers behind the MfE's kerbside standardisation proposals.
4. While leaving the provision of kerbside services, apart from a council recycling service, to the private sector does provide the community with full choice over which service provider they use, and which type of service; data from elsewhere in New Zealand does suggest that this can reduce the effectiveness of waste minimisation and diversion efforts particularly where large (240L) wheeled bins are provided for rubbish collections.
5. Where private sector services have a large part of the market, it can be more difficult to plan for waste management and minimisation due to lack of data and detailed understanding of how private sector services are performing, and also to encourage the use of preferable alternatives.

6. While facilities for handling of medical wastes exists, there is a notable lack of readily available data on commercial medical and hazardous waste flows, and with better data it would be possible to better identify potential opportunities for improved waste minimisation.

4 Situation Review

4.1 Waste to Class 1-5 Disposal Sites

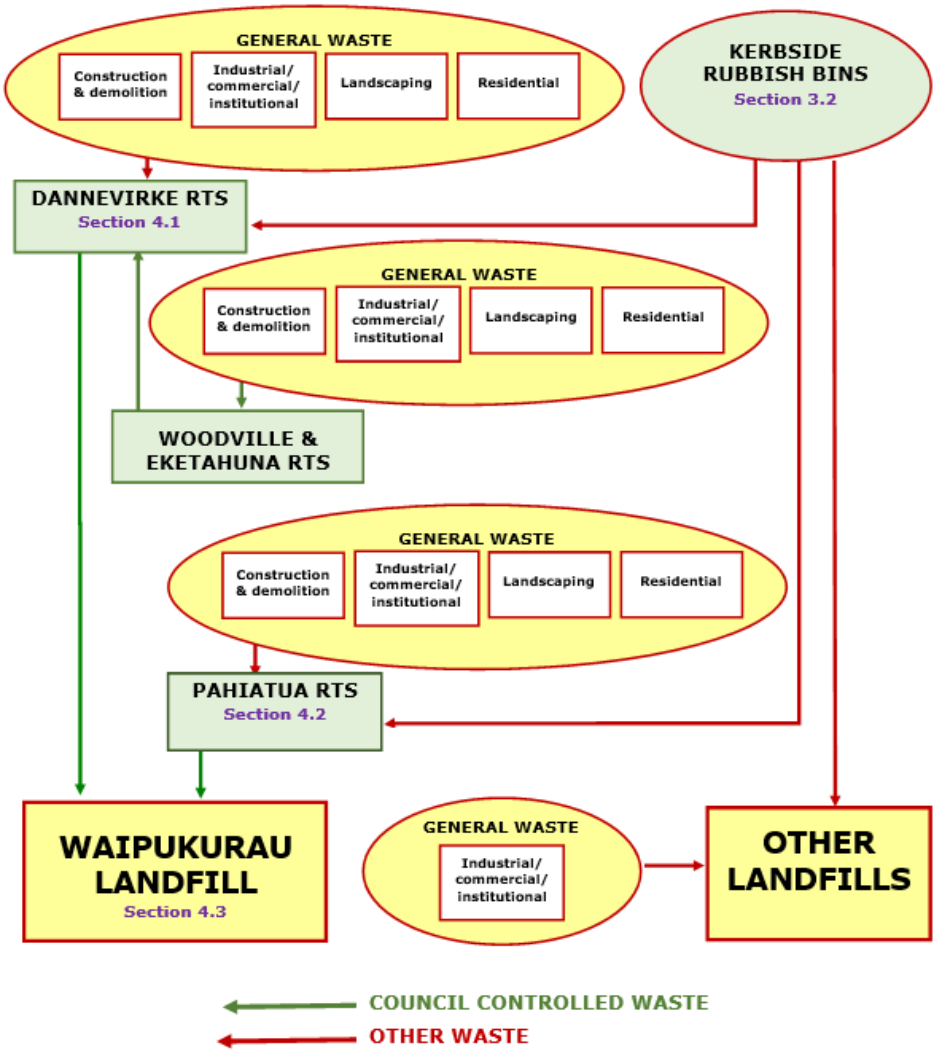
The terminology that is used in this section to distinguish sites where waste is disposed of to land are taken from the relevant MfE regulations, as discussed earlier in section 2.1.

Much of the data presented in this section comes from a solid waste analysis protocol (SWAP) audit carried out for Council by Waste Not Consulting Ltd in 2023. We gratefully acknowledge the permission to share this information here.

Most of the waste from the Tararua district that is landfilled goes to Waipukurau landfill, in Central Hawkes Bay. The waste travels from the source indirectly to Waipukurau landfill by first being bulked at the Dannevirke, Woodville, Eketahuna or Pahiatua RTS. The majority passes through the Dannevirke RTS first, including waste from the Woodville and Eketahuna RTS. Waste from the Pahiatua RTS is directly transported to the Waipukurau landfill.

The diagram below shows a summary of the waste flows within the district

Figure 6: Key Waste Flows in Tararua District



Source: Waste Not Consulting Ltd's 2023 Solid Waste Analysis Protocol Report

4.2 Waste Quantities

4.2.1 Waste to Class 1 Landfills

The table below shows the overall quantity of waste sent to Class 1 landfill from the Tararua district, and the per capita rate.

Table 8: Annual Tonnage of Waste to Landfill from Tararua District

	Tonnes per annum
Waste to landfill	5,922
Population of Tararua district	19,050
Per capita disposal of waste to Class 1 landfill	0.311

4.2.2 Waste to Class 2-5 Landfills

As discussed earlier in this report, MfE does now receive tonnage reports from operators of Class 2-5 facilities and industrial monofills. However, as there are none of these disposal facilities within the region, and information is not reported on the geographical source of the waste received at these types of facilities, there is no way to ascribe a particular portion to the Tararua district.

As discussed earlier in this report, there is very little information available regarding most cleanfilled waste as Horizons Regional Council do not require these facilities to be consented unless they take very large quantities (over 3,500 tonnes per year).

A 2011 MfE report on non-levied disposal facilities stated:[27]

> *No information about cleanfill quantities was compiled for this report because the few sites with available data are unlikely to be indicative of what is happening around the country.*

Several other studies have attempted to quantify the disposal of waste to Class 2-4 landfills, often on a per capita basis, with greatly varying results. In practical terms, the lack of precise data about disposal of waste to Class 2-5 landfills makes it impossible to reliably monitor any changes over time in the disposal of major waste streams, such as construction and demolition waste.

4.3 Waste to Class 1 Landfill

All waste to Class 1 landfills from Tararua district includes:

- waste from the two RTS (Dannevirke [including Woodville/Eketahuna] and Pahiatua), which is transported to Waipukurau Landfill and,

[27] Ministry for the Environment (2011) *Consented Non-levied Cleanfills and Landfills in New Zealand: Project Report*. Wellington: Ministry for the Environment

- waste collected by a private waste operator, which is disposed of outside of the district.

All waste to class 1 landfills from Tararua district	% of total	Tonnes per week	Tonnes per annum (indicative)
Council RTS - both combined	92%	96	5,010
Privately collected kerbside waste disposed of outside of district	8%	9	465
TOTAL	**100%**	**105**	**5,475**

Waste from the Council-owned RTS accounted for 92% and privately controlled waste disposed of outside the district for 8% of the total weight.

4.3.1 Composition

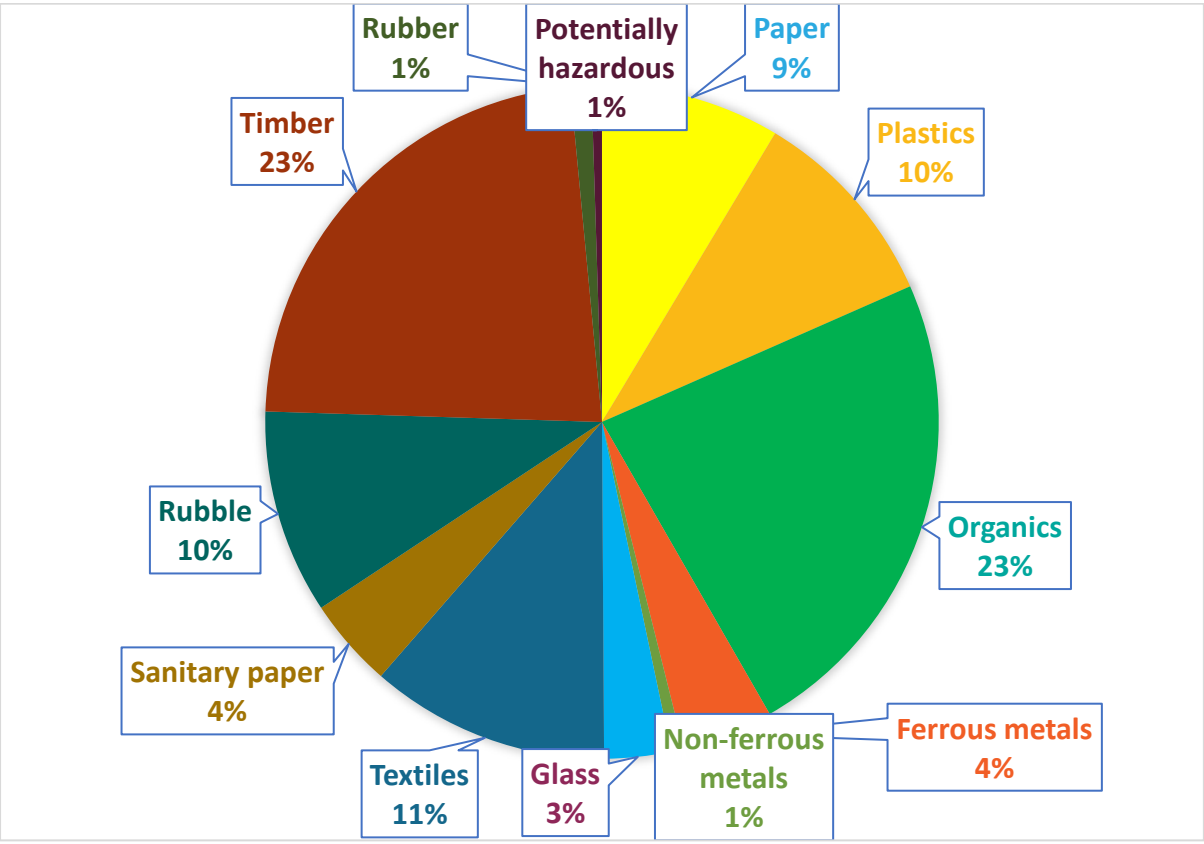
The table below demonstrates the overall composition of waste to landfill, inclusive of kerbside refuse.

Table 9: Composition of all Waste to Class 1 Landfill

Material Type	Proportion of total (%)	Tonnes per week
Paper	8.6	9.8
Plastics	9.8	11.1
Organics	23.3	26.5
Ferrous metals	4.4	5.0
Non-ferrous metals	0.6	0.7
Glass	3.2	3.6
Textiles	11.5	13.0
Sanitary paper	4.3	4.9
Rubble	9.8	11.2
Timber	23.0	26.1
Rubber	1.0	1.1
Potentially hazardous	0.5	0.6

TOTAL	**100.0%**	**113.6**

Figure 7: Composition of all Waste to Class 1 Landfill



Organics is the largest single material type going to landfill disposal (23.3%) with timber very similar at 23.0%. Nearly half of the organic waste (46%) is food scraps, with a large part of the remainder garden waste at 37%.

4.3.2 Activity Source

It is useful to understand the 'activity source' of the waste being sent to landfill, as different activities tend to create different types of waste materials. Interpreting the data this way also enables potential actions to be identified, as one particular activity source may be the primary source of a certain waste material.

A good example of this is food scraps; which tend to reach landfill from residential waste; both kerbside collections and residential waste being delivered directly to RTS.

Table 9 below shows the activity sources of waste at the two RTS audited for Council according to the solid waste analysis protocol (SWAP) in 2023. These figures were calculated from information provided to Council by the private waste operator and the SWAP audit conducted at the council owned RTS at Dannevirke and Pahiatua. Kerbside rubbish has been excluded from this analysis, as the choice of RTS for kerbside rubbish is largely within Council's control.

Table 10: Activity Sources of Waste at Dannevirke and Pahiatua RTS (excluding kerbside rubbish)

Activity Source	Percentage of Total Weight (%)		Tonnes per week	
	Dannevirke RTS	*Pahiatua RTS*	*Dannevirke RTS*	*Pahiatua RTS*
Construction and demolition	18	36	8.8	5.6
Industrial/commercial/institutional	20	15	10.0	2.3
Landscaping and earthworks	1	1	0.7	1.0
Residential	60	43	29.5	6.8
TOTAL	100	100	49.0	15.7

Significantly more construction and demolition waste is disposed of to Pahiatua RTS. In comparison, Dannevirke RTS is used more by the ICI sector and for residential waste. The landscaping and earthworks sector use both RTS fairly equally.

These activity sources can be combined to calculate the activity sources of all waste sent to Class 1 landfill from the district. This is shown in below.

Table 11: Activity Sources of All Waste to Class 1 landfill

Activity sources	Percentage of total (%)	Tonnes per week	Tonnes per annum (indicative)
Construction and demolition	15	18	914
Industrial/commercial/institutional	13	15	787
Landscaping and earthworks	2	2	110
Residential	39	44	2,306
Subtotal – general waste	***70***	***79***	***4,117***
Kerbside rubbish	30	35	1,806
TOTAL	**100**	**114**	**5,922**

Waste from residential activities (excluding kerbside rubbish) was the single largest component at 39%; around 2,306 tonnes per annum. Kerbside rubbish followed closely behind at 30%. While this is a high proportion of household waste compared to some other districts, it is unsurprising given the relatively low amount of industrial activity in the district.

4.3.3 Diversion Potential

The composition of waste going to landfill can be further broken down to materials that could be diverted through existing pathways, such as recycling and composting.

Table 12 shows the proportion of all waste currently disposed of to Class 1 landfill that could potentially be diverted using existing systems and options. The table also shows the tonnes per week of each material that could have been diverted.

Table 12: Diversion Potential of Tararua District Waste Stream – 2020

Potentially divertable materials	Proportion of total (%)	Tonnes per week
Recyclable paper	3.8	4.4
Recyclable cardboard	3.9	4.4
Recyclable plastics	1.2	1.4
Iron/steel	4.4	5.0
Aluminium	0.6	0.7
Recyclable glass	2.1	2.4
Clothing	3.1	3.5
Cleanfill	2.1	2.4
Reusable timber	0.9	1.0
Subtotal	***22.1***	***25.1***
Food scraps	10.6	12.1
Compostable garden waste	8.4	9.5
New plasterboard	1.6	1.8
Untreated/ unpainted timber	2.3	2.6
Subtotal	***23.0***	***26.1***
TOTAL	**45.1**	**51.2**

Overall, nearly half of the waste going to Class 1 landfill (45%) could have been diverted through recycling or composting; approximately 22% recycled and 23% composted. Food scraps (10.6%) and garden waste (8.4%) comprised the greatest divertible components.

It is worth noting that these are theoretically divertible quantities, as no waste system is capable of capturing 100% of a material. It is possible that some items may also not be in a recoverable form at the point of capture.

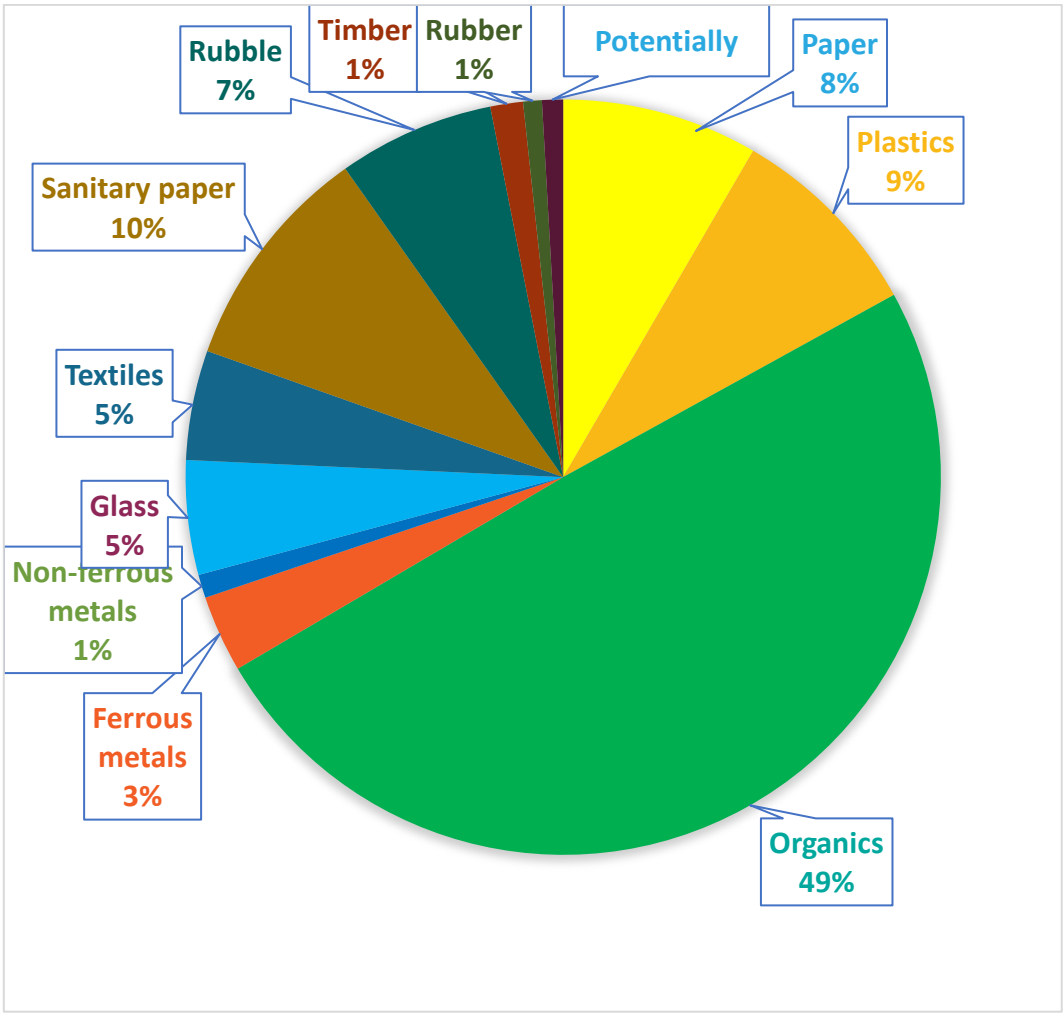
4.4 Kerbside-Collected Waste

The composition of the combined Tararua district kerbside waste stream is shown below.

Table 13: Composition of Tararua district kerbside-collected waste 2023

Kerbside Rubbish	Proportion of total (%)	Mean weight per rubbish bin (kg) – *assuming the 2020 average bin weight of 22.19kg*
Paper	8.4	1.9
Plastics	8.6	1.9
Organics	49.6	11.0
Ferrous metal	3.3	0.7
Non-ferrous metal	1.0	0.2
Glass	4.9	1.1
Textiles	4.7	1.0
Sanitary paper	9.8	2.2
Rubble	6.7	1.5
Timber	1.4	0.3
Rubber	0.8	0.2
Potentially hazardous	0.9	0.2
Total	**100%**	**22.2**

Figure 8: Kerbside-Collected Rubbish Composition



Organic material, half of which was kitchen waste, was the largest primary component of the combined kerbside waste stream. Sanitary paper was the second largest component, 9.5%, and plastics, at 8.4%, was the third largest component. The impact of the new glass recycling collection can be seen in the reduction of glass from an estimated 7.4% in 2020 to 4.9% in this audit.

4.4.1 Diversion Potential of Tararua District kerbside waste

There are a number of ways that households could be diverting waste from kerbside rubbish collections; such as the Council's kerbside recycling collection, private green waste collections, RTS or RDOP facilities, and home composting or vermicomposting.

Table 14 shows the proportion and weight per bin (assuming the 2020 average bin weight) of Tararua district's kerbside rubbish that could have been diverted using these methods.

Table 14: Diversion Potential of Tararua District Kerbside Waste Stream – August 2020

Divertible materials in kerbside rubbish bins	Percentage of total (%)	Kg per rubbish bin
Kerbside-recyclable materials		

Recyclable paper	7.0	1.6
Recyclable plastic	3.2	0.7
Steel cans	1.1	0.2
Aluminium cans	0.6	0.1
Glass bottles/jars	4.4	1.0
Subtotal	***16.2***	***3.6***
Compostable materials		
Food scraps	24.8	5.5
Garden waste	17.8	3.9
Subtotal	***42.6***	***9.5***
Total potentially-divertable material	**58.8**	**13.0**

Once again, the introduction of the kerbside glass recycling collection can be seen in the reduction of glass bottles/jars from 6.9% in 2020 to 4.4% in 2023. This is expected to have dropped further now, as the quantities capture through the glass recycling collection continue to increase.

Overall, approximately 16.2% of the combined kerbside waste stream (3.6kg, assuming the same average wheelie bin weight as in 2020) could have been recycled through the kerbside recycling collection or at an RDOP or RTS. A further 42.6% could have been composted, with food waste comprising nearly 60% of all compostable materials.

In total, 58.8% of kerbside waste from Tararua district (or 13kg per bin, using 2020 wheeled bin weights) could have been diverted from landfill by either recycling or composting.

Other materials, such as clothing and other metals, are also recoverable, but have not been included in these calculations.

4.5 Activity Source of Divertable Materials

This table, from Waste Not Consulting Ltd's audit report for Council, shows the activity source breakdown for each divertable material, in a 'heat map' format. This clearly shows the primary 'activity' that has caused the materials to arise and then be sent to landfill; which helps to identify priority actions that could divert this material.

Figure 9: Potentially Divertable Materials by Activity Source

Divertable materials in all waste to landfills - By activity source - March 2022 - February 2023	Construction & demolition	Industrial/ commercial/ institutional	Landscaping & earthworks	Residential	Kerbside rubbish
Paper - Recyclable	0.0 t/week	0.6 t/week	0.0 t/week	1.3 t/week	2.4 t/week
Paper - Cardboard	0.5 t/week	1.0 t/week	0.0 t/week	2.7 t/week	0.3 t/week
Plastic - Recyclable	0.0 t/week	0.1 t/week	0.0 t/week	0.2 t/week	1.1 t/week
Ferrous metals	0.3 t/week	0.5 t/week	0.0 t/week	3.1 t/week	1.1 t/week
Non-ferrous metals	0.0 t/week	0.1 t/week	0.0 t/week	0.2 t/week	0.3 t/week
Glass - Recyclable	0.0 t/week	0.3 t/week	0.0 t/week	0.6 t/week	1.5 t/week
Textiles - Clothing	0.0 t/week	0.5 t/week	0.0 t/week	1.7 t/week	1.2 t/week
Rubble - Cleanfill	1.6 t/week	0.1 t/week	0.4 t/week	0.5 t/week	0.0 t/week
Timber - Reusable	0.5 t/week	0.1 t/week	0.0 t/week	0.4 t/week	0.0 t/week
Food waste	0.0 t/week	1.4 t/week	0.0 t/week	2.1 t/week	8.6 t/week
Compostable greenwaste	0.1 t/week	0.3 t/week	0.9 t/week	2.6 t/week	5.5 t/week
New plasterboard	1.6 t/week	0.0 t/week	0.0 t/week	0.2 t/week	0.0 t/week
Timber - Untreated/unpainted	1.2 t/week	0.8 t/week	0.0 t/week	0.7 t/week	0.0 t/week
TOTAL	**5.8 t/week**	**5.8 t/week**	**1.3 t/week**	**16.2 t/week**	**22.1 t/week**

Source: Waste Not Consulting Ltd's 2023 Solid Waste Analysis Protocol Report

This shows that the primary source of food waste and garden waste going to landfill is household kerbside rubbish; this could be reduced by constraining the space available to households for rubbish collections (ensuring only smaller wheeled bins are used), and providing and/or promoting organic waste options such as a kerbside food scraps collection, the existing garden waste collections, and home composting or vermicomposting. Educating householders on the implications of this organic waste going to landfill may also be helpful.

Other key opportunities are the recyclables reaching landfill through household rubbish collections and residential waste to RTS; paper/card, plastics, metals, and glass. It may also be possible for some of the clothing to be reused through secondhand and charity stores, rather than going to landfill. Textiles can have some of the highest carbon footprints of any consumer product; and so reusing or recycling these (such as through Little Yellow Bird's scheme) is even more important.

Other, albeit smaller, opportunities include the diversion of rubble, timber, and plasterboard from the construction and demolition sector; and recyclables and food scraps

from the ICI sources. However, these are far smaller in quantity compared to the kerbside rubbish and residential waste streams.

4.6 Diverted Materials

Diverted materials in Tararua include green waste, other organic material, and recyclables such as paper, card, glass, metals and plastic.

A large proportion of diverted organic waste is composted at the Awapuni resource recovery park in Palmerston North.

Other materials generally leave the district for further processing, with much of the fibre (paper/card) being transported to Hawk Packaging in the Hawkes Bay or to an OJI Fibre Solutions site. Glass and metals are generally transported to Auckland, with some metals and most plastic being sold to varying markets depending on price.

4.7 Performance Measurement

This section provides comparisons of several waste metrics between Tararua district and other territorial authorities. The data from the other districts has been taken from a variety of research projects undertaken by Eunomia Research & Consulting and Waste Not Consulting.

4.7.1 Per Capita Waste to Class 1 Landfills

The total quantity of waste disposed of at Class 1 landfills in a given area is related to a number of factors, including:

- the size and levels of affluence of the population
- the extent and nature of waste collection and disposal activities and services
- the extent and nature of resource recovery activities and services
- the level and types of economic activity
- the relationship between the costs of landfill disposal and the value of recovered materials
- the availability and cost of disposal alternatives, such as Class 2-4 landfills
- seasonal fluctuations in population (including tourism).

The per capita disposal to landfill for Tararua has been calculated, as shown earlier, as 0.311 tonnes per capita per annum. This is only lower than Gisborne/Tairawhiti, at 0.296.

Other similar districts where this has been calculated recently include Gisborne (0.296), Waimakariri District (0.325 tonnes/capita/annum), Ashburton District (0.366 tonnes/capita/annum) and Matamata-Piako District (0.419 tonnes/capita/annum). The New Zealand average (calculated in 2019) is around 0.750 tonnes per capita per annum.

Areas with lower per capita waste disposal tend to be rural areas or urban areas with relatively low levels of manufacturing activity. The areas with the highest per capita waste generation are those with significant primary manufacturing activity or with large numbers of tourists.

4.7.2 Per Capita Domestic Kerbside Refuse to Class 1 Landfills

The quantity of domestic kerbside refuse disposed of per capita per annum has been found to vary considerably between different areas. There are several reasons for this variation.

Kerbside refuse services are used primarily by residential properties, with small-scale commercial businesses comprising a relatively small proportion of collections (typically on the order of 5-10%). In districts where more businesses use kerbside wheelie bin collection services - which can be related to the scale of commercial enterprises and the services offered by private waste collectors - the per capita quantity of kerbside refuse can be higher. There is relatively little data in most areas on the proportion of businesses that use kerbside collection services, so it is not usually possible to provide data solely on residential use of kerbside services.

Evidence indicates that the most important factor determining the per capita quantity of kerbside refuse is the proportion of households that use private wheelie bin collection services. Households that use private wheelie bins, particularly larger 240-litre wheelie bins, tend to set out greater quantities of refuse than households that use bags. As a result, in general terms the higher the proportion of households that use private wheelie bins in a given area, the greater the per capita quantity of kerbside refuse generated.

The disposal rate of domestic kerbside refuse for Tararua has been calculated to be 95kg per capita in 2019/2020.

Table 19 compares the per capita rate of disposal of kerbside refuse in Tararua with other comparable areas in New Zealand. Data for the other districts has been taken from SWAP surveys conducted by Waste Not Consulting.

Table 15: Per Capita Disposal of Kerbside Refuse – Comparison with Other Areas

District and year of survey	Kg/capita/annum	Comment
Tararua District 2022-23	***95***	***Private wheelie bins only***
Gisborne District 2017	122	Rates-funded rubbish bags with stickers
Ashburton District 2021	144	Rates-funded weekly 80L rubbish bins and private wheelie bins
Taupo District 2017	243	User-pays rubbish bags and private wheelie bins
Whangarei District 2017	153	User-pays rubbish bags and private wheelie bins
Hastings/Napier 2019	221	Rates-funded bags (2 bags h/h max) + User-pays rubbish bags + private MGBs

The disposal rate of 95 kg/capita/annum for Tararua district is one of the lowest that has been measured from recent audits. Areas with significant rural populations such as Gisborne and Tararua districts often have lower disposal rates per capita than urban areas.

This is due to the relatively low number of residents that have access to kerbside services, and instead manage waste on-property (e.g. farms) or take waste directly to transfer stations. This is consistent with the Tararua WMMP data indicating much of the district's recycling is collected at the drop off facilities rather than through the kerbside collection.

4.7.3 Comparison of Activity Sources with Other Areas

Table 23 compares the activity sources of waste disposed to Class 1 landfills from Tararua district with four other areas. Data for the other districts has been taken from SWAP surveys conducted by Waste Not Consulting with the audit year displayed in the table.

Table 16: Comparison of Activity Sources of Waste to Landfill

Activity Source	Tararua (2022/23)	Tauranga (2017)	Hamilton (2016)	Taranaki Region (2016)	Napier/ Hastings (2016)
C&D	15%	23%	22%	15%	7%
ICI	13%	34%	40%	43%	41%
Landscaping	2%	3%	5%	3%	2%
Residential	39%	6%	5%	9%	6%
Subtotal - general waste	***70%***	***66%***	***72%***	***70%***	***57%***
Kerbside refuse	30%	34%	28%	30%	43%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**

The notable points for the Tararua are:

- A much higher proportion of residential waste
- A lower proportion of waste from the ICI sector

The low quantities of ICI waste is reflective of the character of the district, with a fairly low presence of commercial and industrial activities.

The high proportion of residential waste reflects the significant numbers of residents taking household waste directly to RTS; shown through the individual visits noted during the SWAP audits (82% of individual loads at Dannevirke and 67% at Pahiatua). This behaviour pattern is also noted in the proportion of recyclables that are taken to RDOPs or RTS.

The percentage of C&D waste was considerably higher in Tauranga and Hamilton, indicative of increased levels of construction activity than in the other areas.

4.7.4 Comparison of Kerbside Rubbish Composition

Composition audits have been carried out on kerbside rubbish material in a number of council areas in New Zealand (both council and private collections).

This analysis shows that the amount of recyclable material in rubbish bins in Tararua district is higher than any other areas audited. This is likely to relate to a number of factors, particularly:

- The relatively recent provision of kerbside recycling services
- The use of private rubbish collections with a high proportion of large (240L) wheeled bins

There is also a very high proportion of organic waste in kerbside rubbish bins – second only to that found in Napier/Hastings in 2019 from private 240L wheeled bins (as opposed to council bins).

Detail of the comparisons can be found in the Waste Not Consulting Ltd audit report.

5 Review of the 2017 Waste Management and Minimisation Plan

As required by the WMA, Council has carried out a review of their last WMMP, which was adopted in December 2017. This followed a Waste Assessment which was adopted as complete in August 2017, meaning this review and Waste Assessment needs to be adopted as complete by August 2023.

This WMMP had a vision of making "effective progress towards reducing waste through addressing waste management needs in a sustainable, innovative and affordable manner". The words 'reducing waste' were seen as a more achievable vision than 'zero waste', which had featured in the previous WMMP.

The WMMP included ten principles:

1. Act in the long term interests of the community
2. Exercise leadership to achieve our vision
3. Current generations have a responsibility to maintain the life sustaining capacity of the environment for present and future generations
4. The principle of stewardship – acknowledges the responsibility we each have in managing the environment for the good of all
5. Collaborate with all those who want to work in the best interests of the community
6. View the waste stream as a resource
7. Continue with the principle "polluters pay"
8. Communicate to the community so that the strategies, aims, objectives and actions are transparent, understood and accepted
9. Favour local utilisation of materials to support the local economy
10. Implement systems that are:
    a. User friendly
    b. Affordable
    c. Cost effective
    d. Fair
    e. Resilient

Five strategies were proposed:

1. Encourage minimisation of waste at source through reduction and the separation of recyclable, recoverable and reusable material from waste
2. Encourage waste minimisation through a system of user charges and education
3. Encourage waste minimisation by following the waste hierarchy
4. Provide for the collection, transport and disposal of waste in a manner that meets the current and future management and minimisation needs of the district, is affordable to residents but reflects the true cost of waste management, and does (or is not likely to) cause adverse environmental effects including nuisance.
5. As appropriate, enter partnership arrangements with the private sector and/or other local government organisations to ensure the most effective management of waste issues.

The targets in the 2017 WMMP were to:

- Reduce total waste tonnes being transported to landfill compared to 2016/17 measured on a per capita basis by 10% by 2023; and
- Increase the tonnage of recycled materials by 20% by 2023 from 2016/17 baseline levels.

The key issues outlined were:

1. Glass recycling, with the closure of the Eketahuna landfill (where glass was previously used as cover);
2. Increased efficiency required in management contracts for transfer stations in the southern areas;
3. Levels of service for the kerbside recycling collection needed changing to reflect usage and control cost;
4. Plastic shopping bags were phased out, requiring a change in collection methodology;
5. Green waste diversion was costly and quantities were low;
6. Waste minimisation education for households, businesses, and rural areas needed to be increased;
7. High proportions of organic waste in household rubbish collected from urban areas;
8. Woodville transfer station arrangements and location required rationalising;
9. Limited data on waste, especially that handled by the private sector;
10. Small transfer stations were required for Eketahuna and Pongaroa following the closure of the landfills.

The table below comments on the vision, principles and strategies.

2018 Plan	Commentary
Vision	Recent years have seen a focus on the concept of a 'circular economy' for waste which incorporates many zero waste principles, but goes a step further to raising the importance of 'circularity' in waste systems. This is closely linked to a growing awareness of the environmental impacts (especially GHG emissions) of waste management practices. The vision from the current WMMP could be extended to include a reference to the circular economy, or a new vision could be developed that more fully encompasses this strategic direction for better alignment with Te rautaki para.
Principles	The principles are generally still useful and relevant; although there is no mention of circular economy principles. These could easily be added for a future WMMP.
Strategies	Similarly, the additional strategies could be added to better reflect the wider circular economy approach to waste management and minimisation.

Target	The targets are generally useful, but a new target could be added to reflect the new government performance standards for councils. Thought would need to be given as to how this would be measured, given that the performance target will include privately-collected kerbside household material. Targets for the next six to ten years should be based on the final agreed action plan.

5.1 Actions

The table below shows the key actions from the previous WMMP, and a brief comment on the extent to which each has been achieved.

Table 17: Review of the Previous WMMP Action Plan (actions with contribution towards targets)

Action	Planned timeframe and progress	Contribution to target and commentary
Strategy One: Waste Minimisation Options – Reduction, Reuse and Recycling		
Education: Expanded household and business education programmes also covering rural areas. Some advertising.	Urban kerbside recycling literature accompanied receptacle roll out June 2022 – planned Waste Minimisation Support role will be expanding education programme	Expand changes throughout the community including commercial operations. Still have relatively low costs as tapping into existing programmes.
Subsidise and promote: household composting/worm farm project to reduce organic refuse	Part of the Waste Minimisation Support role will be to further develop and implement education programmes around our district.	Change refuse practices by providing simple and subsidised products that encourage households to compost / reuse food and greenwaste
Recycling services: continue existing 'drop-off' type glass services at villages and towns	Continuing as normal – Also commenced urban kerbside 45L glass crate collection service June 2022.	Gives people the option to recycle based in all urban areas. Costs are relatively high for the volume.
Recycling services: ensure the residents of major urban areas have access to cost effective co-mingle recycling services through kerbside collections (but shift to fortnightly service), drop off points and other facilities	Urban kerbside collections are fortnightly, and we have replaced old collection methods with 240L comingled recycling bins & 45L glass crates	Gives people the option to recycle based in all urban areas. Reduces costs for the same service. Allows more community input. Shifting to fortnightly co-mingle plastic bag kerbside collection will save $30,000. Usage has dropped significantly with access to new transfer stations. Phasing out of supermarket plastic bags requires Council to consider alternative options in 2018/19.

Recovery centres: no service	As above	Resources are not fully utilised, but costs are lower as well. Residents have less access to re-use of products.
Pricing of landfills and transfer stations: Status quo strategy – lower than competitors but still increasing.	Our transfer station refuse disposal rates sit above our neighbouring disposal rates	Prices too low will result in out of District waste being disposed through transfer stations and significantly increase costs. Prices need to be balanced between affordability, price levels in other nearby areas and the rising cost of disposal.
Pricing of landfills and transfer stations: ensure cost of greenwaste is low	Green waste disposal continues to sit well below refuse disposal rates	Pricing greenwaste at a significantly lower level than general waste encourages its separation at collection and the transfer station. This reduces waste volumes to be transported and results in a useable resource.
Bulky inorganic kerbside collection: status quo, no service	No service	Not identified as an issue and would keep costs affordable. These items can still be taken to transfer stations but at a cost to individuals.
Waste monitoring: three-yearly survey of waste stream materials	Completed	Important to understand the waste flow so tailored programmes can be developed. This should be done prior to each LTP process.
E-waste: provide for an annual subsidised e-waste drop-off day	A 'Drop off Day' has not yet been held. E-Waste is accepted at all transfer stations.	Rapidly increasing volumes of e- waste (TVs, phones, computers etc) is an identified problem across New Zealand, but it is expensive for Council to recycling these items. Funding would come from the waste minimization levy

Product stewardship advocacy: Support the sector and other organisations who advocate for a container deposit scheme and product stewardship for key waste streams such as agricultural waste, tyres, e-waste and packaging.	Completed; in support of any/all product stewardship schemes.	Council should support waste reduction at source and costs borne by those creating the cost of collection, recycling and disposal.
Strategy 2: Waste Disposal Services and Facilities – Disposal of Residual Waste		
Collection: exit refuse kerbside collections	Council did exit refuse kerbside collections during the term of this plan.	There are many private options for this service. Demand has shifted to favour wheelie bin collections. Competition has resulted in the private sector being able to offer these services cheaper than Council.
Disposal: Provide options for waste disposal across the district by having transfer stations at the major urban towns.	Dannnevirke, Eketahuna, Woodville & Pahiatua Transfer Stations	Social and economic benefits from access to alternative disposal facilities. Greater control over levels of service.
Landfill disposal: close Eketahuna in 2017/18, and plan to close Pongaroa landfill in 2020/21.	Eketahuna was closed as planned, and is now a transfer station. Pongaroa landfill is still operating.	These two small landfills provide a convenient and cost-effective waste disposal solution for Eketahuna and Pongaroa under the existing consents. The cost of renewing resource consents is prohibitive and the volumes of local waste very small.

Central glass sorting and transport facility: build large sorting bins for all recycled glass and loading facilities to transport glass to Auckland, or supply to local business.	Sorted glass bays are in place at Dannevirke refuse transfer station – and then bulk transported to Auckland	Council has new opportunities to send sorted glass to the OI glass factory in Auckland, or to supply local business for recycling into new glass products. Revenue will help to reduce costs, while overall the costs of transport and sorting are the same or slightly less than current costs.
Strategy 3: integrated waste management		
Regional cooperation, collaboration: investigate the value of aligning the timing of solid waste contracts with other Councils in order to minimise costs through joint tenders.	Currently in talks with CHB – although contracts are not aligned	Sharing resources and economies of scale may reduce costs as well as make resource levels reach economic levels.

Not only has Council completed the majority of the planned actions, in some cases the outcome of the planned action has subsequently been implemented.

For this reason, and due to the changes already implemented and due to be implemented in national policy, regulations and work programmes, it is recommended that Council adopt a new WMMP that reflects these changes, with an appropriate vision, goals and objectives aligned with Te Rautaki Para.

6 Future Demand and Gap Analysis

There are a wide range of factors that are likely to affect future demand for waste management and minimisation. The extent to which these influence demand could vary over time and in different localities. This means that predicting future demand has inherent uncertainties. Key factors are likely to include the following:

- Overall population growth
- Economic activity
- Changes in lifestyle and consumption
- Changes in waste management approaches

In general, the factors that have the greatest influence on potential demand for waste and resource recovery services are population and household growth, construction and demolition activity, economic growth, and changes in the collection service or recovery of materials.

The last couple of years have also demonstrated how unpredictable factors can influence demand and provision of services; with COVID-19 pandemic management making normal waste services difficult to deliver at times due to lock-downs and staffing shortages, and disaster-related wastes requiring management often with very short notice.

6.1.1 Resident Population

Population projections are shown in the table below.

Table 18: Resident Population Projections to 2043

Projection	2018	2023	2028	2033	2038	2043	Change 2018 – 2043: number	Change 2018 – 2043: average annual percent
Population	18,450	19,550	20,300	20,900	21,500	22,000	3,550	0.6

6.1.2 Economic Activity

Tararua district's GDP in the year to March 2023 was $1,057M – an annual increase of 1% (compared to New Zealand as a whole, at 2.9%). Regardless of a decrease in the housing market and declining employment growth, economic development in Tararua is supported through an increase in consumer spending. According to MarketView data, consumer spending increased with 11% over the March 2023 period as a result of recovery in tourism to the district[28].

[28] https://www.marketview.co.nz/

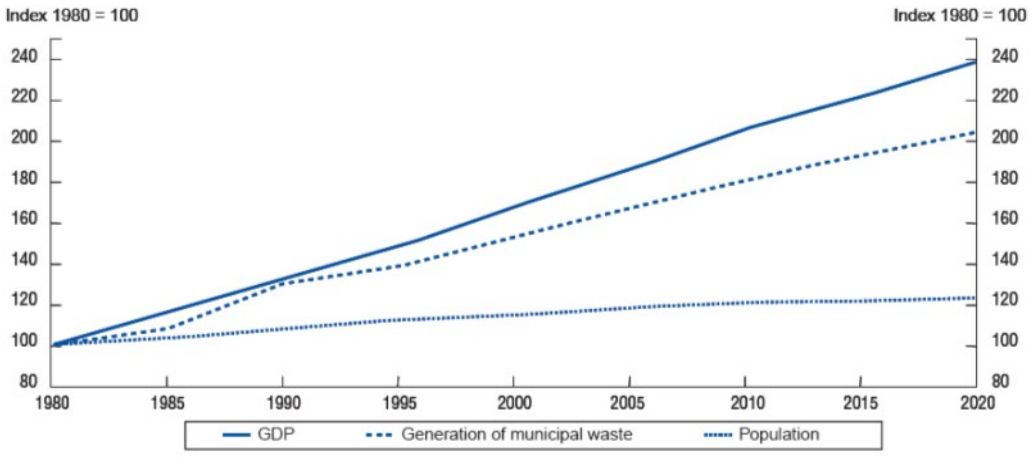
The Tararua labour market is demonstrating some weakening, with the unemployment rate continuing to edge upwards. However, it is still challenging to recruit and find talent. Employment of Tararua locals continues to increase, even though the pace of job development has weakened. Job growth rose with 1.4% over the March 2023 year, however, this is a decline on the previous peak of 3.4% over the March 2022 period. Retail and hospitality were primary contributors to the increase in job growth which is indicative of the influx of tourism spending to the area. These employment gains have been offset slightly by the latest declines in dairy, sheep and beef farming due to declining income and increased costs faced by farmers. Infometrics indicate that dairy farm pay-outs will decrease with $34m in the 2022/2023 season but will still contribute $265m to the economy[29].

House values declined 5.4%pa in the March 2023 quarter. House sales demonstrated a high of approximately 350 sold in 2021 compared with 180 over the March 2023 period. Increased interest rates discourage buyers as it is challenging to acquire financing. Contractors are also responding to decreasing prices and rising building costs, with residential consents only rising 1.6% over the March 2023 year.

GDP and waste production has been shown to have a strong relationship.

For reference, Figure 7 below shows the growth in municipal waste in the OECD plotted against GDP and population.

Figure 10: Municipal Waste Generation, GDP and Population in OECD 1980 - 2020



Source: OECD 2001.

Research from the UK[30] and USA[31] suggests that underlying the longer-term pattern of household waste growth is an increase in the quantity of materials consumed by the average household and that this in turn is driven by rising levels of household expenditure.

[29] https://qem.infometrics.co.nz/tararua-district

[30] Eunomia (2007), *Household Waste Prevention Policy Side Research Programme*, Final Report for Defra, London, England

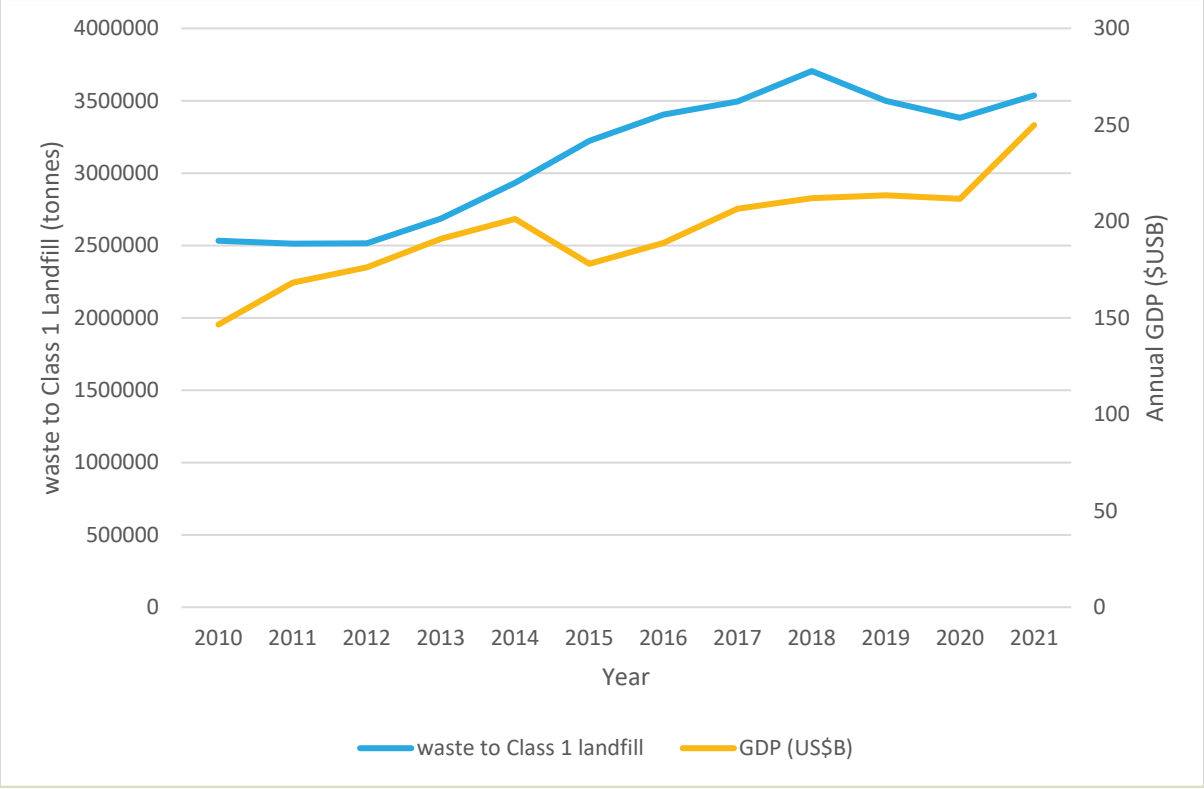
[31] EPA, 1999. National Source Reduction Characterisation Report for Municipal Solid Waste in the United States

The relationship between population, GDP, and waste seems intuitively sound, as an increased number of people will generate increased quantities of waste and greater economic activity is linked to the production and consumption of goods which, in turn, generates waste.

Total GDP is also a useful measure as it takes account of the effects of population growth as well as changes in economic activity. The chart suggests that municipal solid waste growth tracks above population growth but below GDP. The exact relationship between GDP, population, and waste growth will vary according to local economic, demographic, and social factors.

Figure below shows the annual tonnes sent to Class 1 landfill disposal, against the annual GDP of New Zealand (in billions of US$). This relationship is not a complete picture, as Class 1 landfills tonnes are a subset of all waste disposed of in New Zealand, and this further does not represent waste produced, but only waste disposed of. This data also can only be shown from 2010, as this was the first time that waste to Class 1 landfill disposal was measured accurately.

Figure 11: Waste to Class 1 Disposal and GDP (2010 - 2021)



As the Tararua district's population is anticipated to experience steady and moderate growth, alongside economic growth, it is likely that the region will experience an approximately similar increase in waste generated assuming no change to waste behaviour or resource recovery rates.

6.1.3 Changes in Lifestyle and Consumption

Consumption habits affect the waste and recyclables generation rates. For example, there has been a national trend related to the decline in newsprint. In New Zealand, the production of newsprint has been in decline since 2005, when it hit a peak of 377,000

tonnes, falling to 276,000 tonnes in 2011.[32] Anecdotally, this has been accompanied by an increase in the use of printed direct mail ('junk mail') both in real terms and proportionally. This presents challenges for fibre recycling as this is a less desirable recycling commodity.

COVID-19 pandemic management saw a significant increase in online purchasing, including regular purchases such as groceries, and to an extent this is likely to continue as purchasing behaviours have become habit. This is likely to result in an increased proportion of cardboard boxes and paper bags in homes; although this is not yet a measurable impact.

The ongoing growth in electronic devices will ensure that e-waste continues to be a growing waste stream, with (for example) data showing that households now tend to access the internet through multiple devices within the home and out, rather than a single home computer[33].

6.1.4 Changes in Waste Management Approaches

There are a range of drivers that mean methods and priorities for waste management are likely to continue to evolve, with an increasing emphasis on diversion of waste from landfill and recovery of material value. These drivers include:

- Te Rautaki Para / New Zealand Waste Strategy – with a strong focus on reducing emissions and waste, to achieve a more circular economy
- Infrastructure investment - an increased landfill levy and other funding sources will drive increased investment in waste infrastructure. MfE are currently working a long-term strategic waste infrastructure investment plan.
- Increased cost of landfill - landfill costs have risen in the past due to higher environmental standards under the RMA, introduction of the Waste Disposal Levy (currently $30 per tonne for Class 1 disposal facilities but set to increase to $60 per tonne as of July 2024) and the New Zealand Emissions Trading Scheme. The current price for carbon credits, and the ongoing increases in the landfill levy, will make disposal prices a more significant consideration in waste management practices.
- Kerbside standardisation now requires that kerbside recycling and kerbside food waste collections are introduced, with associated performance standards for TAs based on kerbside diversion; this will increase existing community demand for kerbside services where they don't already exist
- Waste industry capabilities - as the nature of the waste sector continues to evolve, the waste industry is changing to reflect a greater emphasis on recovery and is developing models and ways of working that will help enable effective waste minimisation in cost-effective ways. COVID-19 pandemic management presents ongoing challenges in resourcing, both staff and vehicles.
- Local policy drivers, including actions and targets in the WMMP, bylaws, and licensing.
- Recycling and recovered materials markets - recovery of materials from the waste stream for recycling and reuse is heavily dependent on the recovered materials

[32] http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10833117
[33] Data from www.stats.govt.nz 'Household Use of Information and Communication Technology' accessed September 2018

having an economic value. This particularly holds true for recovery of materials by the private sector. Markets for recycled commodities are influenced by prevailing economic conditions, by commodity prices for the equivalent virgin materials, and by market controls in key destinations such as China. The risk is linked to the wider global economy through international markets, and the impact of the China National Sword policies has demonstrated this.

- Household collection systems: The current kerbside services in Tararua district differ somewhat from the proposed standardised services; most significantly in the lack of an organic waste collection. There are likely benefits that will accrue from increased national education campaigns.

6.1.5 Summary of Demand Factors

The analysis of factors driving demand for waste services in the future suggests that demand will increase over time as a result largely of population growth and economic activity. It is likely that some new waste management approaches will be introduced as a result of the central government work programme, which could create demand in specific areas. Initial indications are that, for Tararua, this new demand is likely to be largely related to efforts to divert organic waste materials from landfill, including possible business food scraps diversion and recovery of construction wastes. There is also likely to be an increasing focus and demand in other waste activities and types, including:

- Disaster waste – recent events have highlighted the need for proactive disaster waste management plans, particularly with respect to local resilience where there is reliance on waste infrastructure located elsewhere in the region, or outside the region
- Equity of service provision, particularly relating to the impact of user-pays rubbish collections on lower socio-economic communities considering the relatively low apparent benefit for waste diversion
- Smaller but difficult waste streams such as soft plastics, packaging that isn't accepted in kerbside recycling collections, compostable packaging as replacements for what will become banned packaging items, farm wastes
- The impact of a possible future container return scheme.

6.2 Future Demand – Gap Analysis

The aim of waste planning at a territorial authority level is to achieve effective and efficient waste management and minimisation. The following significant 'gaps' or key issues have been identified:

- Significant proportions of organic waste going to landfill
- Compliance with government requirements for kerbside standardisation and performance standards
- No Council market share in the domestic kerbside refuse market
- The Class 1 landfill currently used for disposal is an unlined facility with no gas capture system in place
- As found in other areas, there is a significant data gap relating to private waste collections, Class 2-5 fills, and farm waste management practices

- Waste charges at three of the four RTS are based on volume; and RTS provision is generous for the size of district and population
- Significant gaps in reprocessing for C&D waste, a large waste stream contributing to the proportion of waste going to landfill, and many other difficult materials
- There are no material recycling facilities (MRFs) within the district
- Other infrastructure is limited, including provision for reuse
- Householders sending large quantities of recyclables and organic wastes to landfill
- Proactive iwi liaison is limited
- Medical waste management will become an increasing issue with an ageing population
- Disaster waste management is becoming an increasing issue
- Additional waste minimisation education could help address many of the issues above

These high-level gaps are explored in more detail below.

6.2.1 Organic Waste

Although garden waste is accepted at all RTS, there are still large quantities of organic wastes going to landfill, with nearly a quarter potentially compostable. This compostable material is mostly food waste and garden waste (46% and 37% respectively) with some new plasterboard and untreated/unpainted timber (7% and 10% respectively). This is shown earlier in section 4.3.1.

Organic waste going to landfill breaks down anaerobically (without oxygen), creating methane CH_4 – a very powerful greenhouse gas. This is particularly an issue for Tararua, as the landfill receiving waste from the district does not have a gas capture system in place and so none of the methane produced is being captured for beneficial use (compared to a lifetime rate around 55% to 65% for most modern lined landfills).

6.2.2 Compliance with Government Requirements

Tararua's kerbside recycling collections are compliant with government requirements. However, Council will need to introduce a household kerbside food scraps collection by 1 January 2030. The district will also need to comply with performance standards requirements for diversion of household kerbside waste from landfill – 30% by 1 July 2026 (40% by 1 July 2028 and 50% by 1 July 2030). The estimated current diversion rate is around 22%.

While the introduction of a kerbside household food scraps collection will increase the diversion rate, this isn't required until 1 January 2030, and the first performance target date is under two years away.

A key barrier to improving kerbside diversion is the reliance on the private sector for household kerbside rubbish collections. This causes two main problems – firstly the data is not clear, as private operators will frequently mix household and commercial kerbside waste. Although private operators will be required to report kerbside data to MfE, this is unlikely to be available to Council on a regular basis and it will not be until MfE has completed their calculations (incorporating both council and private data) that the final diversion performance will be known.

The second issue is that households using large (240L) wheeled bins for their rubbish collections tend to recycle less. Rubbish from these households will usually contain more recyclables and organic waste, particularly garden waste. If householders are able to continue using these large bins for rubbish collections, this is going to have a negative impact on progress towards achieving the performance standards.

As the payment of waste levy funds for the Tararua district is contingent on achieving the performance standards, it will be a much higher priority for Council compared to private operators, and the impact will be on the waste minimisation activities funded through the landfill levy.

6.2.3 Data/Monitoring

As mentioned above, the reliance on the private sector for rubbish collections reduces the extent to which Council can understand what is happening in this part of the system, and therefore the extent to which issues and possible solutions can be identified.

With Dannevirke the only RTS in the district with a weighbridge, charging at other RTS requires making estimates of volume and then using conversion factors to apply charges. The increased reporting required by MfE from RTS and drop-off points is also more difficult to provide accurately.

6.2.4 Infrastructure

In some respects, the district has generous provision of infrastructure; with four RTS across the district for a population of around 20,000 residents and 4,365km^2 (compared to, for example, Whakatāne district with two RTS, 35,000 residents and 4,465km^2).

However, there is a lack of infrastructure in other respects such as MRFs (none in the district). Like many other councils, Tararua also relies on reprocessing infrastructure at some distance such as glass and fibre recycling in Auckland. The Class 1 landfill currently used for disposal of waste from the RTS is an unlined landfill with no gas capture system, and the only Class 2-4 landfills in the district are privately owned and only available for waste from specific project sites.

6.2.5 Household Waste Management

Although most households now have access to a kerbside recycling system, or at least a drop-off point or RTS, the bulk of recyclables and organic wastes going to landfill via the RTS come from residential and kerbside sources (residential waste being waste from households that is delivered directly to transfer stations). Key materials include paper/card, iron/steel, glass, textiles, food waste and garden waste. There is significant potential to reduce the amount of waste going to landfill significantly through better management by householders.

6.2.6 Non-Household Waste Management

Businesses have access to services enabling them to divert key recyclables such as aluminium cans, glass, and paper/card; however there are still some recyclables going to landfill via the RTS, such as paper/card,

There are few services that enable the diversion of construction and demolition waste in the district.

6.2.7 Iwi Liaison

The usual consultation methods were used during the development of the 2017 WMMP.

With the national focus on a circular economy approach to waste management (which closely aligns to the Māori world view), there is increasing awareness of the need for the wider waste management industry to engage more proactively with iwi, and to be good treaty partners.

This waste assessment covers off the Māori world view in a generic sense only.

6.2.8 Medical Waste

Medical waste can be an issue at home and in medical facilities. Generally, it is comprised of:

- Hazardous waste (which can be sharps, such as needles, or non-sharps such as infectious waste or radioactive);
- Controlled waste (such as potentially infectious bodily fluids); and
- Non-hazardous waste (which is general waste or recyclables).

At home, non-hazardous waste can generally be managed through usual general refuse and recycling services (although there are some exceptions through either the size of the item, or the sheer quantity). However, the management of hazardous and controlled wastes at home can be difficult, and with the increasing prevalence of in-home medical care, this is becoming a more significant problem.

Anecdotally, a significant proportion of in-home medical waste is disposed of through general waste and recycling systems. This could result in significant health and safety concerns for the collection and processing staff.

Ideally, in-home medical care would include provision for appropriate handling and disposal of medical wastes. However, for various reasons such as lack of awareness or cost, this is not always the case.

For healthcare in medical facilities, The Pharmacy Practice Handbook states:[34]

> *4.1.16 Disposal of Unused, Returned or Expired Medicines*
>
> *Members of the public should be encouraged to return unused and expired medicines to their local pharmacy for disposal. Medicines, and devices such as diabetic needles and syringes, should not be disposed of as part of normal household refuse because of the potential for misuse and because municipal waste disposal in landfills is not the disposal method of choice for many pharmaceutical types. Handling and disposal should comply with the guidelines in NZ Standard 4304:2002 – Management of Healthcare Waste.*

While Council is not responsible for the provision of medical waste management services for either home-based care or medical facilities, it would be beneficial for Council to work

[34] https://nzpharmacy.wordpress.com/2009/06/09/disposal-of-unwanted-medicines/

proactively with the health service and other medical service providers to ensure that appropriate services are being offered and put in place.

6.2.9 Waste Minimisation Education

While increased effort has been put in to this area recently, this has not previously been the case particularly given Council's quite limited involvement in kerbside services.

The low (but increasing) quantities of recyclables captured by the kerbside collection services, and the amount of recyclables still sent to landfill by residents, suggests that this is an area that requires increased activity.

6.2.10 Reuse

There is limited provision for the recovery of reusable items in the district.

In other areas, such as Auckland, this material is recovered both through a charged collection service, and by establishing a network of community resource recovery centres (CRRCs).

7 Statement of Options

This section sets out the range of options available to Council to address the key issues that have been identified in this Waste Assessment. Options presented in this section need to be fully researched and the cost implications understood before being implemented through the WMMP action plan and LTP/Annual Plan.

The key issues identified in the previous section of this Waste Assessment are listed below. Addressing these issues will ensure that council is meeting its statutory obligations, and improving waste management and minimisation in the Tararua district.

- Significant proportions of organic waste going to landfill
- Compliance with government requirements for kerbside standardisation and performance standards
- No Council market share in the domestic kerbside refuse market
- As found in other areas, there is a significant data gap relating to private waste collections, Class 2-5 fills, and farm waste management practices
- Waste charges at three of the four RTS are based on volume
- Significant gaps in reprocessing for C&D waste, a large waste stream contributing to the proportion of waste going to landfill
- There are no material recycling facilities (MRFs) within the district
- Other infrastructure is limited, including provision for reuse
- Householders sending large quantities of recyclables to landfill
- Proactive iwi liaison is limited
- Medical waste management will become an increasing issue with an ageing population
- Additional waste minimisation education could help many of the issues above

Council's role can vary, with the main approaches being:

- Simply identify the need at a **strategic** level, with other sectors able to respond to the need as they wish
- Take a **facilitation and leadership** role in addressing the need, such as by creating working groups focusing on a particular material e.g. construction waste
- **Regulator** - use regulatory tools available to Councils to create an environment that encourages solutions, such as requiring construction site waste management plans, banning certain materials from landfill, etc.
- Influence the way gaps are addressed by others by making **funding** available for specific initiatives that address the need in some way
- Take direct action by **providing** services or facilities that address the need.

7.1 Regulation

Ref	Option	Issues Addressed	Impact on Current/Future Demand	Councils' Role
R1	Amend the solid waste bylaw to support kerbside services and reflect changes in legislation	Achievement of performance standards Data gaps	Local regulation can be very effective in supporting and encouraging diversion services. With a new Act in development, this action should be scheduled to take place in 2027/28 once the detail of new legislation is known	Regulator
R2	Fully implement provisions in the current bylaw and require private collectors to report on quantities of household kerbside waste collected	Enable provisional calculation of kerbside diversion and progress towards performance targets	Assist in planning interventions towards achieving kerbside diversion performance targets	Regulator
R3	Require private collectors to provide small wheeled bins for household kerbside rubbish collections	Householders will have additional motivation to divert materials through recycling and other means	An increase in material diverted will improve waste management and minimisation overall, make kerbside recycling more efficient, and support progress towards kerbside diversion performance targets	Regulator
R4	Regularly audit kerbside recycling bins (and food scraps, when started) and implement a contamination enforcement system	Households will be encouraged to use kerbside services correctly with minimal contamination, and awareness of what materials are accepted will increase	Awareness, and correct use, of services will increase which will contribute towards better waste management and minimisation overall and support progress towards kerbside diversion performance targets	Regulator / provider

7.2 Measuring and Monitoring

Ref	Option	Issues Addressed	Impact on Current/Future Demand	Council's Role
M1	Collect data on participation and set out rates and use audit data mentioned above for kerbside recycling collections (and food scraps, once started), by locality	Better understanding of the community's use of council services and opportunities for education and engagement	Will enable Councils to identify localities where there is low participation in services, or high contamination, and target education and engagement accordingly	Provider
M2	Increase monitoring where necessary to provide more information on non-household waste streams	Better quality data on wider range of waste types and sources, including farm waste	Addresses some current gaps in understanding on certain waste streams. Better data could enable Council to improve and target services more appropriately	Regulator, Provider
M3	Identify alternative ways to monitor waste going through RTS with no weighbridges – e.g. seek funding, or use a nearby weighbridge	Waste must be charged by volume at three of the four RTS, with conversion factors used to report by weight	More accurate charging and measuring of waste quantities at these facilities	Provider

7.3 Education and Engagement

Ref	Option	Issues Addressed	Impact on Current/Future Demand	Council's Role
EE1	Identify opportunities for consistent, targeted, direct engagement that can be delivered where there is low participation in recycling (and food scraps services, when these are in place), and/or high contamination	Prevent contamination in kerbside recycling through education and engagement Encourage participation in services such as kerbside recycling and (when available) food scraps collections	Need for education/ engagement (i.e. demand) is proactively identified and addressed	Provider or Funder

		E&E can be targeted in areas where it is needed		
EE2	Regular reminders through various channels of Council's services, and what options are available to divert different materials	Proactive reinforcement of initial service introduction information to ensure a consistent high level of awareness	More diversion of recyclables and other materials is encouraged and reinforced to become routine behaviour	Provider or Funder
EE3	Initiate wider engagement with industry, community, and other agencies through regional waste action groups (e.g. C&D, health, retail, industry)	Improve the management of various materials, moving up the hierarchy, by engaging with the sources – C&D waste, non-household recyclables, agricultural wastes, etc. Working with the community and industry would improve their engagement, understanding, and awareness of waste issues, and enable closer relationships with other agencies such as Te Whatu Ora	Improved understanding of needs in the district and service gaps, and who is best to address them. Increased responsibility taken by various sectors for waste management within the community. Better understanding across the board of non-household waste management and opportunities to move up the hierarchy	Facilitation/Leadership, Funder, Provider Councils could initiate groups and facilitate, possibly with low-level funding for project work Council may be able to provide options that support these other sectors in moving up the hierarchy

7.4 Collection & Services

Ref	Option	Issues Addressed	Impact on Current/Future Demand	Council's Role
CS1	Investigate options for meeting central government's requirement for a household food scraps collection for Dannevirke, Woodville, and Pahiatua and begin implementation to ensure service is available from 1 January 2030	Compliance with kerbside standardisation requirements, and progress towards meeting performance standards	Householders in these areas will have a convenient service to enable diversion of food scraps from landfill Council may wish to extend the collection service to a wider are than that strictly required	Provider
CS2	Investigate options for introducing a rates-funded (but user-pays) council-	Council would have more ability to influence waste management practices	Reduced household kerbside waste to landfill (and, conversely, increased	Provider - implement preferred collection

	run or -contracted household kerbside rubbish collection service; consult with community and implement overall best option (based on, for e.g. value for money to community)	of householders, and would be able to ensure that large (240L) wheeled bins are not routinely used for rubbish collections. Services could be funded through a UAC or targeted rate per user package.	diversion through recycling and, when introduced, food scraps collection) would strongly support progress towards meeting performance standards	methodology where possible – e.g. new or amended contracts
CS3	Introduce a user-pays garden waste collection to urban areas where this is not already provided by the private sector	May encourage further diversion of green waste from landfill and reduce need for recycling centres and transfer stations	Provision of a convenient service may encourage more residents to divert garden waste from landfill rather than putting it in rubbish bins or taking it to transfer stations.	Liaise with contractor/s to facilitate provision of user-pays service
CS4	Provide access to kerbside services to the commercial sector on a user-pays basis	Will improve recycling diversion from the commercial sector by providing commercial premises that only need a household-type service with an easy option	Some increased diversion of commercial recycling and food waste services for those it is appropriate for.	Provider - negotiate with contractor to provide service and administer customers
CS5	Support/introduce virtual trading marketplaces e.g. freecycle pages, Civilshare, FB marketplace	Increase reuse of materials and diversion of target materials e.g. C&D waste	Meets demand for materials, and demand for increased reuse	Facilitate/leadership, and/or provision
CS6	Introduce regular e-waste collection 'amnesty' days	Improve management of this waste stream	Improved management of this waste stream	Facilitate/leadership, and/or provision

7.5 Infrastructure

Ref	Option	Issues Addressed	Impact on Current/Future Demand	Council's Role
IN1	Rationalise RTS provision, using a Circular Resource Network approach (focusing on materials and logistics at different scales)	Provision of RTS is efficient, while also ensuring that sites are available at an appropriate scale and size across the district	RTS sites can provide more effectively for capture and diversion of a range of materials	Strategic and/or facilitation/leadership and/or funder and/or provider

IN2	Consider landfill disposal options from the perspective of greenhouse gas implications	Other landfill disposal options may have a better carbon outcome than the current one used	The loss of greenhouse gas emissions will be reduced if rubbish is sent to a lined landfill with gas capture system	Provider
IN3	Ensure that a processing option is available for organic wastes either in the district or nearby	High quantity of organic waste going to landfill	Meet demand for organic waste diversion	Facilitation/leadership and/or funder and/or provider
IN4	Processing for C&D waste and provision for C&D deconstruction	Increased diversion of C&D waste	Meet demand for C&D waste diversion	Strategic and/or facilitation/leadership and/or funder and/or provider
IN5	Explore options for recyclables processing in nearby districts	No MRF within the district	Ensuring long term access to a high quality MRF facility in a nearby district will give certainty that recyclables can be processed to a high standard	Strategic and/or facilitation/leadership and/or funder and/or provider
IN6	Processing for difficult materials e.g. soft plastics	Difficult material streams	Ensure that capture and reprocessing of these materials is facilitated, e.g. by providing space at RTS or coordinating logistics	Strategic and/or facilitation/leadership and/or funder and/or provider
IN5	Provide for reuse stores, repair sites, community workshops, demonstrations and courses at key network sites	Improve access to infrastructure, provide for reuse channels, provide space for community	There will be better access to infrastructure across the region, with consistent provision of the various facilities, materials accepted, and education/engagement undertaken	Collaborate and/or facilitate/leadership and/or provision
IN6	Standardised signs and branding, material acceptance and quality standards, customer service	Supports many other initiatives	Supports actions to meet many key issues	Facilitate/leadership – direct provision

IN7	Provide space for product stewardship schemes collection points at network sites	Supports and enables diversion of several difficult materials Could support focus on higher levels of waste hierarchy (depending on PS system)	Enables better management of many difficult materials	Facilitate/leadership – direct provision
IN8	Provide for container reuse at network sites (eg collection space)	Supports focus on higher levels of waste hierarchy Supports better management of some difficult materials	Increases reuse of materials	Facilitate/leadership – direct provision
IN9	Extend Dannevirke to act as a regional hub	Supports wider RR network, enables better material diversion	Addresses a number of issues	Facilitate/leadership – direct provision

7.6 Leadership and Management

Ref	Option	Issues Addressed	Impact on Current/Future Demand	Councils' Role
LM1	Advocate to central government for extended producer responsibility	Implementation of product stewardship addresses problem waste streams at the source	Using the provisions in the WMA will help to ensure that the true cost of waste management of a product is reflected in its price. Product stewardship schemes for difficult waste streams such as e-waste and tyres will help Council provide management options for these waste streams.	Facilitate/leadership - advocate to central government for stronger regulation and extended producer responsibility. Work with other councils and agencies to support similar lobbying efforts.
LM2	Work closely with mana whenua, community groups, and the private sector to progress opportunities for	Successful implementation will enable waste reduction and increased waste diversion	Encourage the community to be more involved in waste	Facilitate/leadership, funder: coordinate and support initiatives.

	increased waste reduction and diversion		minimisation, and potentially reduce waste and increase waste diversion.	
LM4	Support regional and national projects improving waste management planning in disaster situations	Proactive planning in place for disaster waste	Proactive planning in place for disaster waste	Facilitate/leadership - provide information as requested, and any other input required.
LM5	Support national sector organisations in lobbying for better vocational training and to encourage new recruits to the sector	Ensures that Tararua-focused issues are incorporated in national-level work on these issues	Tararua-specific issues are addressed in national-level work	Facilitate/leadership – provide support and information to national sector organisations.

8 Statement of Council's Intended Role

8.1 Statutory Obligations and Powers

Councils have a number of statutory obligations and powers in respect of the planning and provision of waste services. These include the following:

- Under the WMA Council "must promote effective and efficient waste management and minimisation within its district" (s 42). The WMA requires TAs to develop and adopt a Waste Management and Minimisation Plan (WMMP).[35]
- The WMA also requires TAs to have regard to the New Zealand Waste Strategy, Te rautaki para.
- Under Section 17A of the Local Government Act 2002 (LGA) local authorities must review the provision of services and must consider options for the governance, funding and delivery of infrastructure, local public services and local regulation. There is substantial cross over between the section 17A requirements and those of the WMMP process; in particular in relation to local authority service provision.
- Under the Local Government Act 2002 (LGA) Councils must consult the public about their plans for managing waste.
- Under the Resource Management Act 1991 (RMA), TA responsibility includes controlling the effects of land-use activities that have the potential to create adverse effects on the natural and physical resources of their district. Facilities involved in the disposal, treatment or use of waste or recoverable materials may carry this potential. Permitted, controlled, discretionary, non-complying and prohibited activities and their controls are specified within district planning documents, thereby defining further land-use-related resource consent requirements for waste-related facilities.
- Under the Litter Act 1979 TAs have powers to make bylaws, issue infringement notices, and require the clean-up of litter from land.
- The Health Act 1956 provisions for the removal of refuse by local authorities have been repealed by local government legislation. The Public Health Bill is currently progressing through Parliament. It is a major legislative reform reviewing and

[35] The development of a WMMP in the WMA is a requirement modified from Part 31 of the LGA 1974, but with even greater emphasis on waste minimisation.

updating the Health Act 1956, but it contains similar provisions for sanitary services to those currently contained in the Health Act 1956.

- The Hazardous Substances and New Organisms Act 1996 (the HSNO Act) provides minimum national standards that may apply to the disposal of a hazardous substance. However, under the RMA a regional council or TA may set more stringent controls relating to the use of land for storing, using, disposing of or transporting hazardous substances.
- Under current legislation and the new Health and Safety at Work Act the Council has a duty to ensure that its contractors are operating in a safe manner.

Council, in determining its role, needs to ensure that its statutory obligations, including those noted above, are met.

8.2 Overall Strategic Direction and Role

The role taken by Councils in implementing the options described in the previous section can vary significantly, for example Councils can:

- Simply identify the need at a strategic level, with other sectors able to respond to the need as they wish
- Take a facilitation and leadership role in addressing the need, such as by creating working groups focusing on a particular material e.g. construction waste
- Regulator - use regulatory tools available to Councils to create an environment that encourages solutions, such as requiring construction site waste management plans, banning certain materials from landfill, etc.
- Influence the way gaps are addressed by others by making funding available for specific initiatives that address the need in some way
- Take direct action by providing services or facilities that address the need.

The overall strategic direction and role is presented in the Waste Management and Minimisation Plan.

9 Statement of Proposals

Based on the options identified in this Waste Assessment and Council's intended role in meeting forecast demand, a range of proposals are put forward. Specific actions and timeframes for delivery of these proposals will be identified in the development of the Waste Management and Minimisation Plan.

It is expected that the implementation of these proposals will meet forecast demand for services as well as support Council's goals and objectives for waste management and minimisation. These goals and objectives will be confirmed as part of the development and adoption of the Waste Management and Minimisation Plans.

9.1 Statement of Extent

In accordance with section 51 (f), a Waste Assessment must include a statement about the extent to which the proposals will (i) ensure that public health is adequately protected, (ii) promote effective and efficient waste management and minimisation.

9.1.1 Protection of Public Health

The Health Act 1956 requires councils to ensure the provision of waste services adequately protects public health. The Waste Assessment has identified potential public health issues associated with each of the options, and appropriate initiatives to manage these risks would be a part of any implementation programme.

In respect of Council-provided waste and recycling services, public health issues will be able to be addressed through setting appropriate performance standards for waste service contracts and ensuring performance is monitored and reported on, and that there are appropriate structures within the contracts for addressing issues that arise.

Privately-provided services will be regulated through local bylaws until national regulation is in place.

Uncontrolled disposal of waste, for example in rural areas and in cleanfills, can be regulated through local and regional bylaws and through central government regulation.

It is considered that, subject to any further issues identified by the Medical Officer of Health, the proposals would adequately protect public health.

9.1.2 Effective and Efficient Waste Management and Minimisation

The Waste Assessment has investigated current and future quantities of waste and diverted material, and outlines Council's role in meeting the forecast demand for services.

It is considered that the process of forecasting has been robust, and that Council's intended role in meeting these demands is appropriate in the context of the overall statutory planning framework for Council.

Therefore, it is considered that the proposals would promote effective and efficient waste management and minimisation.

Appendices

A.1.0 Medical Officer of Health Statement

29 August 2023

Te Whatu Ora
Health New Zealand

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Kia ora Lisa Eve,

Tararua District Council Waste Assessment

I, Dr. Rob Weir, Medical Officer of Health (MOoH) for the MidCentral Public Health Service make the following comments on the Tararua District Waste Assessment pursuant to Section 51(5) of the Waste Minimisation Act 2008 (the Act). I note the Act requires that a Territorial Authority must consult with the MOoH on the Waste Assessment.

I recognise that effective waste management is critical for good public health outcomes. The purpose of the Waste Minimisation Act (WMA) 2008 is to encourage waste minimisation and a decrease in waste disposal to protect the environment (including people and communities) from harm and to provide environmental, social, economic, and cultural benefits. The WMA requires that a Waste Assessment must state the extent to which public health is adequately protected.

The protection of public health includes ensuring that the impact of waste management and minimisation does not create or increase inequalities between different groups within the community. It would be important that the decisions around waste management consider unintended consequences for vulnerable groups (e.g., the elderly, people with disabilities, low socioeconomic households) prior to implementation. The approach should be reflected in the Waste Management and Minimisation Plan (WMMP), e.g., by ensuring collection systems are accessible and affordable for all; incentivising and supporting waste minimisation activities in addition to the use of penalties for incorrect waste management.

The Tararua Waste Assessment 2023 identifies several waste streams that require special management:

- Tyres (decomposing tyres).
- Electrical and electronic products (e-waste including large batteries).
- Agrichemicals and their containers.
- Organic waste

Tyres - I suggest measures are taken to limit the release of carbon, zinc and sulphur into the environment from decomposing tyres (especially if tyres are stored longer than anticipated).

E-Waste - I support further investigations for the re-use of e-waste items and stewardship schemes. If e-waste is being exported we assume it is being stored in a safe way. E-waste contains potentially harmful components such as lead. With the increasing quantity of electronic devices, e-waste management and planning will become increasingly important. We would encourage increasing publicity of the e-waste being disposed of safely.

Hazardous Substances - I support the provision for good information regarding hazardous substance disposal being provided to the community to minimise associated health risks. This is particularly important with regard to agrichemicals.

I advise TDC to educate their staff and contractors around any risks working with contaminated waste resulting from disaster events.

I support the provision for the general-public to dispose of their asbestos waste. Disposal of asbestos waste after natural disasters was problematic during cyclone recovery. Currently, only approved contractors can do this.

Off-farm Waste Disposal - I support investment into Off-farm Waste Disposal being provided. Farm waste can negatively affect the environment, land, air and water. It is concerning that farmers may burn or bury farm waste. A disposable facility that provides this service must be secure and clean (tamper-proof and clean from spillage). Safety and security should be considered in any planning.

School Education Programmes/ Organic Waste - I encourage school education programmes and initiatives that support waste minimisation. Schools in the area should be involved in the waste minimisation programmes including composting and separation of organic waste from mainstream waste. The involvement of local Kura Kaupapa would be expected as part of the education programme.

Recycling projects - I support community ownership of waste minimisation programmes and promoting recycling initiatives in the community. Innovative ways of reducing waste would be best developed by working alongside the community. I encourage the inclusion of vulnerable groups such as Māori, Pacifica, groups with disabilities, aged care and childcare facilities in any such considerations.

I support programmes that encourage whanau to reduce food waste e.g., repurposing waste food or stock food.

I support the Container Return Scheme as a strategy for reducing waste and litter. This scheme is currently undergoing public consultation with a view to being implemented in 2025. This scheme would involve returning beverage containers for a refund. The intended audience is consumers and businesses.

Waste Management During Holiday Periods - I would encourage a waste management plan during high-use periods for recreational locations and holiday home areas (holiday periods).

Iwi engagement - I support an emphasis on Māori perspectives that align with the circular economy and recognition of Kaitiakitanga giving effect to Te Tiriti o Waitangi. Te Whatu Ora asserts that full account be taken of the rights of Māori to exercise Tino Rangatiratanga to protect Māori health and wellbeing. These rights are recognised and protected under Te Tiriti o Waitangi. There is an obligation for early inclusion and involvement of local Iwi/Hapū in the writing of this plan and that their views are reflected in the assessment. The assessment did not address these obligations.

Equity - Equity, as one of the principles of Te Tiriti o Waitangi, requires the Crown to commit to achieving equitable outcomes for Māori. To honour this commitment, the Crown must address and eliminate the inequities in the determinants of health and wellbeing for iwi, hapū, whānau and Māori communities.

In the New Zealand context, the population groups more likely to experience inequitable health outcomes include Māori, Pacific peoples, communities with lower socioeconomic status and marginalised groups. Equity means equal outcomes for all the community. How will equity be managed?

We look forward to reviewing the draft Waste Plan when it is available.

Nga Mihi

pp Robert Holloway
Coordinator Public Health Regulation

Rob Weir

Medical Lead, Medical Officer of Health

National Public Health Service

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Te Whatu Ora – Health New Zealand

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A.2.0 Glossary of Terms

Class 1-5 facilities	Classification system for facilities where disposal to land takes place. The classification system is provided in appendix A.3.0 below for reference.
Cleanfill	A cleanfill (properly referred to as a Class 5 fill) is any disposal facility that accepts only cleanfill material. This is defined as material that, when buried, will have no adverse environmental effect on people or the environment.
C&D Waste	Waste generated from the construction or demolition of a building including the preparation and/or clearance of the property or site. This excludes materials such as clay, soil and rock when those materials are associated with infrastructure such as road construction and maintenance, but includes building-related infrastructure.
Diverted Material	Anything that is no longer required for its original purpose and, but for commercial or other waste minimisation activities, would be disposed of or discarded.
Domestic Waste	Waste from domestic activity in households.
ETS	Emissions Trading Scheme
ICI	Industrial, Commercial, Institutional
Landfill	A type of disposal facility as defined in S.7 of the Waste Minimisation Act 2008, excluding incineration. Includes, by definition in the WMA, only those facilities that accept 'household waste'. Also referred to as a Class 1 landfill.
LGA	Local Government Act 2002
Managed Fill	A Class 3 disposal site requiring a resource consent to accept well-defined types of non-household waste, e.g. low-level contaminated soils or industrial by-products, such as sewage by-products.
MfE	Ministry for the Environment

MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
NZ	New Zealand
NZWS	New Zealand Waste Strategy
Putrescible, garden, greenwaste	Plant based material and other bio-degradable material that can be recovered through composting, digestion or other similar processes.
RRP	Resource Recovery Park
RTS	Refuse Transfer Station
Service Delivery Review	As defined by s17A of the LGA 2002. Councils are required to review the cost-effectiveness of current arrangements for meeting the needs of communities within its district or region for good-quality local infrastructure, local public services, and performance of regulatory functions. A review under subsection (1) must consider options for the governance, funding, and delivery of infrastructure, services, and regulatory functions.
TA	Territorial Authority (a city or district council)
Waste	Means, according to the WMA: a) Anything disposed of or discarded, and b) Includes a type of waste that is defined by its composition or source (for example, organic waste, electronic waste, or construction and demolition waste); and c) To avoid doubt, includes any component or element of diverted material, if the component or element is disposed or or discarded.
WA	Waste Assessment as defined by s51 of the Waste Minimisation Act 2008. A Waste Assessment must be completed whenever a WMMP is reviewed
WMA	Waste Minimisation Act 2008

WMMP	A Waste Management and Minimisation Plan as defined by s43 of the Waste Minimisation Act 2008
WWTP	Wastewater treatment plant

A.3.0 Classifications for Disposal to Land

MfE have classified disposal and other waste facilities under two regulations, which enable the application of the disposal levy and the collection of data. Facilities had also previously been categorised according to the WasteMINZ 'Technical Guidelines for the Disposal of Waste to Land', and there are some slight variations between the two.

A.3.1 Technical Guidelines Definitions

Class 1 - Landfill

A Class 1 landfill is a site that accepts municipal solid waste. A Class 1 landfill generally also accepts C&D waste, some industrial wastes and contaminated soils. Class 1 landfills often use managed fill and clean fill materials they accept, as daily cover.

Class 1 landfills require:

- a rigorous assessment of siting constraints, considering all factors, but with achieving a high level of containment as a key aim;
- engineered environmental protection by way of a liner and leachate collection system, and an appropriate cap, all with appropriate redundancy; and
- landfill gas management.

A rigorous monitoring and reporting regime is required, along with stringent operational controls. Monitoring of accepted waste materials is required, as is monitoring of sediment runoff, surface water and groundwater quality, leachate quality and quantity, and landfill gas.

Waste acceptance criteria (WAC) comprises:

- municipal solid waste; and
- for potentially hazardous leachable contaminants, maximum chemical contaminant leachability limits (TCLP) from Module 2 Hazardous Waste Guidelines – Class A4.

WAC for potentially hazardous wastes and treated hazardous wastes are based on leachability criteria to ensure that leachate does not differ from that expected from non-hazardous municipal solid waste.

For Class 1 landfills, leachability testing should be completed to provide assurance that waste materials meet the WAC.

Class 2 Landfill

A Class 2 landfill is a site that accepts non-putrescible wastes including C&D wastes, inert industrial wastes, managed fill material and clean fill material. C&D waste can contain biodegradable and leachable components which can result in the production of leachate – thereby necessitating an increased level of environmental protection. Although not as strong as Class 1 landfill leachate, Class 2 landfill leachate is typically characterised by mildly acidic pH, and the presence of ammoniacal nitrogen and soluble metals, including heavy metals. Similarly, industrial wastes from some activities may generate leachates with chemical characteristics that are not necessarily organic.

Class 2 landfills should be sited in areas of appropriate geology, hydrogeology and surface hydrology. A site environmental assessment is required, as are an engineered liner, a leachate collection system, and groundwater and surface water monitoring. Additional engineered features such as leachate treatment may also be required.

Depending on the types and proportions of C&D wastes accepted, Class 2 landfills may generate minor to significant volumes of landfill gas and/or hydrogen sulphide. The necessity for a landfill gas collection system should be assessed.

Operational controls are required, as are monitoring of accepted waste materials, monitoring of sediment runoff, surface water and groundwater quality, and monitoring of leachate quality and quantity.

Waste acceptance criteria comprises:

- a list of acceptable materials; and
- • maximum ancillary biodegradable materials (e.g. vegetation) to be no more than 5% by volume per load; and
- • maximum chemical contaminant leachability limits (TCLP) for potentially hazardous leachable contaminants.

Class 3 Landfill – Managed/Controlled Fill

A Class 3 landfill accepts managed fill materials. These comprise predominantly clean fill materials, but may also include other inert materials and soils with chemical contaminants at concentrations greater than local natural background concentrations, but with specified maximum total concentrations.

Site ownership, location and transport distance are likely to be the predominant siting criteria. However, as contaminated materials (in accordance with specified limits) may be accepted, an environmental site assessment is required in respect of geology, stability, surface hydrology and topography.

Monitoring of accepted material is required, as are operational controls, and monitoring of sediment runoff and groundwater.

Waste acceptance criteria comprises:

- a list of acceptable solid materials; and
- maximum incidental or attached biodegradable materials (e.g. vegetation) to be no more than 2% by volume per load; and

- maximum chemical contaminant limits.

A Class 3 landfill does not include any form of engineered containment. Due to the nature of material received it has the potential to receive wastes that are above soil background levels. The WAC criteria for a Class 3 landfill are therefore the main means of controlling potential adverse effects.

For Class 3 landfills, total analyte concentrations should be determined to provide assurance that waste materials meet the WAC.

Class 4 Landfill – Controlled Fill

A Class 4 landfill accepts controlled fill materials. These comprise predominantly clean fill materials, but may also include other inert materials and soils with chemical contaminants at concentrations greater than local natural background concentrations, but with specified maximum total concentrations.

Site ownership, location and transport distance are likely to be the predominant siting criteria. However, as contaminated materials (in accordance with specified limits) may be accepted, an environmental site assessment is required in respect of geology, stability, surface hydrology and topography.

Monitoring of accepted material is required, as are operational controls, and monitoring of sediment runoff and groundwater.

Waste acceptance criteria comprises:

- a list of acceptable solid materials; and
- maximum incidental or attached biodegradable materials (e.g. vegetation) to be no more than 2% by volume per load; and
- maximum chemical contaminant limits.

A Class 4 landfill does not include any form of engineered containment. Due to the nature of material received it has the potential to receive wastes that are above soil background levels. The WAC criteria for a Class 4 landfill are therefore the main means of controlling potential adverse effects.

Class 5 – Landfill

A Class 5 landfill accepts only clean fill material. The principal control on contaminant discharges to the environment from Class 5 landfills is the waste acceptance criteria.

Stringent siting requirements to protect groundwater and surface water receptors are not required. Practical and commercial considerations such as site ownership, location and transport distance are likely to be the predominant siting criteria, rather than technical criteria.

Clean filling can generally take place on the existing natural or altered land without engineered environmental protection or the development of significant site infrastructure. However, surface water controls may be required to manage sediment runoff.

Extensive characterisation of local geology and hydrogeology is not usually required.

Monitoring of both accepted material and sediment runoff is required, along with operational controls.

Waste acceptance criteria:

- virgin excavated natural materials (VENM), including soil, clay, gravel and rock; and
- maximum incidental inert manufactured materials (e.g. concrete, brick, tiles) to be no more than 5% by volume per load; and
- maximum incidental5 or attached biodegradable materials (e.g. vegetation) to be no more than 2% by volume per load; and
- maximum chemical contaminant limits are local natural background soil concentrations.

Materials disposed to a Class 5 landfill should pose no significant immediate or future risk to human health or the environment.

The WAC for a Class 5 landfill should render the site suitable for unencumbered potential future land use, i.e. future residential development or agricultural land use.

The WAC for a Class 5 landfill are based on the local background concentrations for inorganic elements, and provide for trace concentrations of a limited range of organic compounds.

Note: The Guidelines should be referred to directly for the full criteria and definitions.

A.3.2 Ministry for the Environment Classifications

The Ministry for the Environment have recently extended the payment of the landfill levy to a wider range of disposal facilities, and have also required reporting of data from 'cleanfills' and transfer stations. This has entailed two regulations – the first to extend the levy to other facilities[36] and the second to require data reporting from 'cleanfills' and transfer stations[37].

These regulations establish definitions for a range of disposal and other waste facilities beyond the Class 1 landfills that were captured by the landfill levy when it was first introduced.

These are summarised in the table below:

[36] https://www.legislation.govt.nz/regulation/public/2021/0068/latest/LMS474556.html
[37] https://www.legislation.govt.nz/regulation/public/2021/0069/latest/whole.html

Disposal facility class	Description	Types of waste not accepted	Examples of types of waste accepted
1 Municipal Disposal Facility	A facility, including a landfill: • where waste is disposed of • that operates, at least in part, as a business to dispose of waste • accepts waste that is or includes any one or more of the following: household waste waste from commercial or industrial sources waste from institutional sources (eg, hospitals, educational facilities and aged-care facilities) green waste (eg, degradable plant materials such as tree branches, leaves, grass, and other vegetation matter) waste that is not accepted at other disposal facilities in the WMA. It is not a: • class 2: construction and demolition disposal facility • class 3 and 4 managed or controlled fill disposal facility • an industrial monofill facility • a cleanfill facility.		Types of waste may include (but not limited to): • mixed municipal waste from residential, commercial and industrial sources • construction and demolition waste • contaminated soils • rocks, gravel, sand, clay • sludges • slurries • putrescible waste • green waste • biosolids • clinical waste • treated hazardous waste • incidental hazardous waste.
2 C&D Disposal	Accepts waste from construction and demolition activity It is not a: • class 3 and 4 managed or controlled fill disposal facility • an industrial monofil facility • a cleanfill facility.	Does not accept any of the following for disposal: • household waste • waste from commercial or industrial sources • waste from institutional sources (eg, hospitals, educational facilities, and aged-care facilities) • waste generated from a single industrial	Mixed construction and demolition waste including: • rubble, plasterboard, treated and untreated timber • wood products,including softboard, hardboard, particle board, plywood, MDF, customwood, shingles, sawdust

		process (eg, steel or aluminium-making, or pulp and paper-making) carried out in one or more locations • Is not a class 3 and 4 managed or controlled fill facility	• concrete, including reinforced or crushed concrete blocks • clay products including pipes, tiles • asphalt (all types), and roading materials, including road sub-base • plasterboard and Gibraltar board • masonry, including bricks, pavers • metal, or products containing metals, including corrugated iron, steel, steel-coated tiles, wire, wire rope, wire netting, aluminium fittings • plastic products, including plastic bags, pipes, guttering, building wrap • insulation products • laminate products, including Formica • flooring products, including carpet and underlay, vinyl/linoleum, cork tiles • paper and cardboard products, including wallpaper, lining paper, building paper • site clearance and excavation materials including soils, clays, rocks, gravel, tree stumps
3/4 Managed or Controlled Fill Disposal	Accepts any one of the following for disposal: • inert waste material from construction and demolition activities	Does not accept: • household waste • waste from commercial or industrial sources	Types of waste may include (but not limited to): • lightly contaminated soil below applicable consent limits and inert

	• inert waste material from earthworks or site remediation	• waste from institutional sources (eg, hospitals, educational facilities, and aged-care facilities • waste generated from a single industrial process (eg, steel or aluminium-making, or pulp and paper-making) carried out in one or more locations • waste material from construction and demolition activity (except for inert waste material).	construction and demolition materials, including: site facilities clearance and excavation materials including soils, clays, rocks, gravel, tree stumps masonry, including bricks and pavers clay products, including pipes, tiles concrete, including crushed concrete and blocks (for reinforced concrete, exposed reinforcing must be removed) asphalt (bitumen-based only) road sub-base.
5 **Cleanfill**	A facility that accepts only virgin excavated natural material (such as clay, soil, or rock) for disposal	Any materials other than virgin excavated natural materials (VENM)	VENM such as clay, soil and rock
Industrial monofill	A facility that accepts for disposal waste that: • discharges or could discharge contaminants or emissions • is generated from a single industrial process (eg, steel or aluminium-making, or pulp and paper-making) carried out in one or more locations.	• household waste • waste from commercial or institutional sources (eg, hospitals, educational facilities, and aged-care facilities) • waste not generated by a single industrial process.	Waste generated by industrial processes such as: • steel-making • aluminium-making • pulp and paper • oil exploration and extraction
Transfer station	A facility: • that contains a designated receiving area where waste is received; and • from which waste or any material derived from that waste is: transferred to a final disposal site transferred elsewhere for further processing that does not itself provide	N/A (no disposal of waste occurs)	N/A

	long-term storage for waste or material derived from that waste.		

A.4.0 National Legislative and Policy Context

A.4.1 The New Zealand Waste Strategy 2023

The New Zealand Waste Strategy 2023 provides the Government's strategic direction for waste management and minimisation in New Zealand. This strategy was released in 2023 and replaced the 2010 Waste Strategy.

The strategy aims to provide direction to central and local government, businesses (including the waste industry), and communities on where to focus their efforts to manage waste. It will be supported by an action and investment plan (AIP) which will be developed in consultation with local authories, the waste management sector, and others; and will set out priority actions required over the next five years. The 2023 strategy has a focus on achieving a more 'circular economy' for waste and sets out a multi-decade pathway towards this.

Under section 44 of the Waste Management Act 2008, in preparing their waste management and minimisation plan (WMMP) councils must have regard to the New Zealand Waste Strategy, or any government policy on waste management and minimisation that replaces the strategy. Guidance on how councils may achieve this is provided in section 4.4.3.

A copy of the current New Zealand Waste Strategy is available on the Ministry's website.

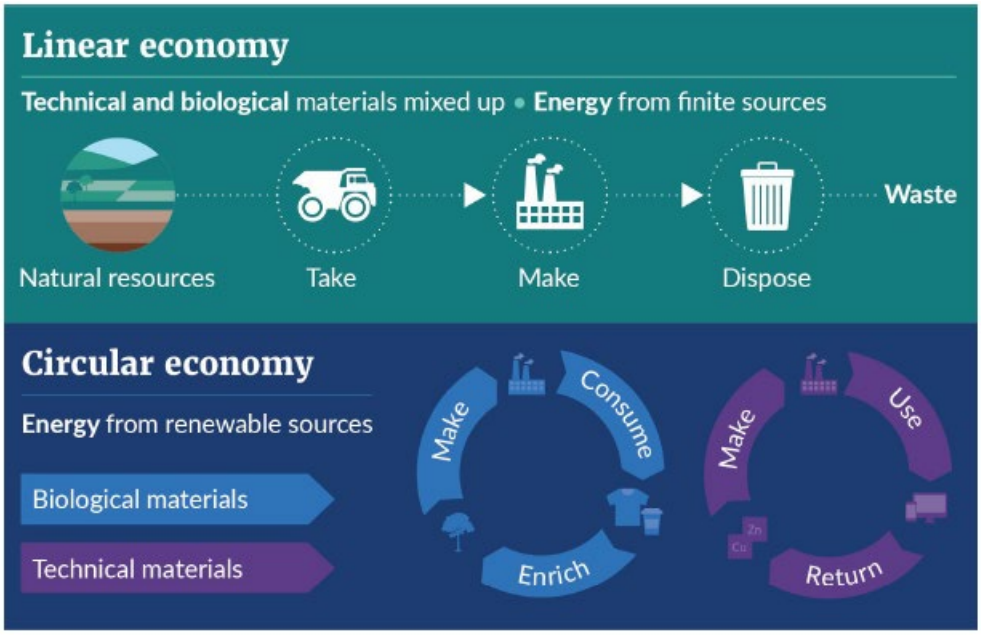
Sections of the new strategy are discussed here in more detail.

A.4.1.1 Circular Economy principles

The strategy includes some background on circular economy, including some summary figures that compare a linear economy to a circular economy, and a revised waste hierarchy. It also emphasises the role of te ao Māori in considering waste appraoches.

The figures mentioned above are shown here (with permission from MfE):

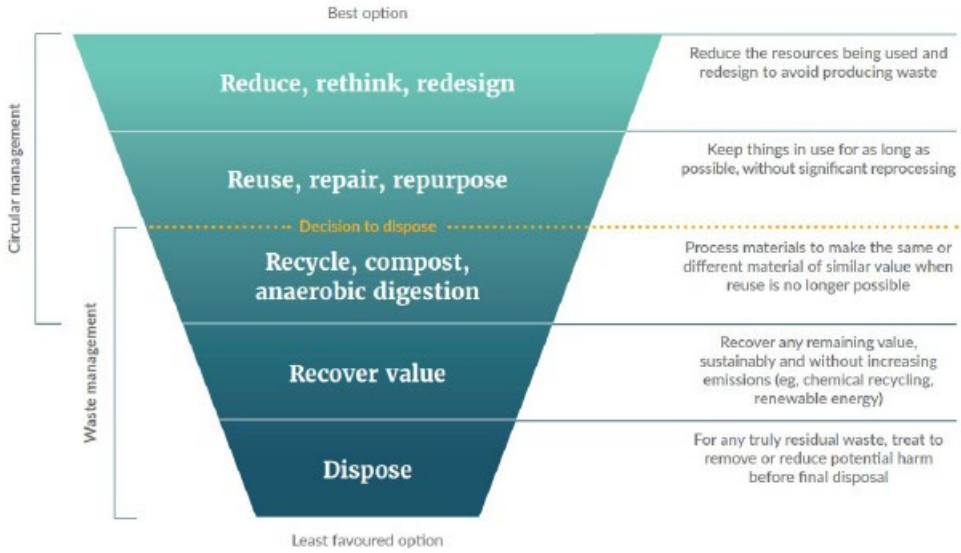
Figure 12: Characteristics of Linear and Circular Economies



Source: Te Rautaki Para | Waste Strategy (page 14), Ministry for the Environment 2023

The waste hierarchy is still a core principle guiding waste management and minimisation in New Zealand, but has been refined to more closely support and align with a circular economy approach.

Figure 13: Revised Waste Hierarchy



Source: Te Rautaki Para | Waste Strategy (page 14), Ministry for the Environment 2023

The strategy highlights several key facts that demonstrate New Zealand's relatively poor performance in waste management and minimisation:

- Emissions from waste produce 9% of New Zealand's biogenic methane emissions, and 4% of our total greenhouse gas emissions, with organic waste decomposing in landfills contributing 94% of these emissions.
- On average, nearly 700 kg of waste per capita goes to municipal landfills[38] annually – compared to the OECD average of 538 kg; and trends are for this to increase
- Domestic recovery infrastructure is limited, and exporting challenging due to our relative geographic isolation and distance from markets
- Lack of data relating to waste practices, significantly non-municipal landfills and diverted materials
- Historical management has been poor, with numerous legacy disposal sites around the country causing local environmental harm.

A.4.1.2 The Strategy

The direction of the strategy is important in many, very practical, ways; it provides a clear vision through to 2050, principles that support this vision, a phased approach with three clear stages, and targets to measure progress and encourage ambitious action.

Three key strategic issues are core to the strategy – domestic resource recovery and recycling, the role of waste to energy, and net zero emissions by 2050.

The vision is:

> *"By 2050, Aotearoa New Zealand is a low-emissions, low-waste society, built upon a circular economy.*
>
> *We cherish our inseparable connection with the natural environment and look after the planet's finite resources with care and responsibility."*

Six guiding principles are included.

A.4.1.3 A staged process

While the strategy has a view out to 2050, the work required to get there has been divided into three high level work stages:

1. 2022 – 30: embedding circular thinking into systems
2. 2030 – 40: expanding to make circular normal
3. 2040 – 50: Helping others do the same

Each stage has a number of goals, some of which are more relevant to TAs than others – Phase 1 is shown in the table below and has been addressed in the options list.

[38] 'municipal landfill', 'municipal solid waste landfill' 'sanitary landfill' and 'Class 1 landfill' are all terms that essentially refer to the same type of facility.

Phase 1 Goals – By 2030, our enabling systems are working well and behaviour is changing	
The building blocks are in place to enable change	
Strategic planning, regulatory, investment and engagement systems are in place and operating to drive and support change	TAs have a role in strategic planning at a local level (through WMMPs), which will both inform and be informed by the AIP TAs also have a role, albeit limited compared to the national role, to contribute through local bylaws and any local funding pools that are available TAs carry out local engagement and can support national campaigns
We have a comprehensive national network of facilities supporting the collection and circular management of products and materials	TAs will be well placed to understand what this means at a local level, and be able to drive and coordinate the development of a network approach
We all take responsibility for how we produce, manage, and dispose of things, and are accountable for our actions and their consequences	This is likely to be aimed mainly at personal responsibility – although TAs can encourage this attitude locally
Specific Priorities:	• Support the creation of national planning, regulatory and investment systems. • Consider how the timing and interactions of central government and local government waste planning could best be integrated, and communicate to MfE • Consider how to use waste levy funding to support the overall strategic framework of funding and investment, given the AIP context, direction and priorities – collaborate with other councils and with central government to a greater extent • Support the development of simple ways for central and local government to collaborate and work in partnership

	• Work with central government, the waste sector, and others to develop a shared view of what a 'comprehensive national network of facilities' looks like • Align overall direction and approach with this • The network needs to have nationwide coverage (significant for the Otago region), include a range of products and materials, and focus on circular management options where possible • Prioritise reducing greenhouse gas emissions • Ensure planning and consenting teams require new builds to have appropriate space for waste management, there is space for community facilities, and feed in to regional plans to ensure they provide for a 'coherent network' • Identify and work with community partners to extend services into hard-to-reach areas • Promote waste minimisation using long-term, evidence-based hehaviour change programmes • Provide timely, accurate and clear information when creating additional obligations through bylaws or introducing new services •
More activity is circular and we produce less waste	
We use fewer products and materials, and using (sic) them for longer, by making them more durable, and repairing, reusing, sharing and repurposing them	As above, TAs have a detailed understanding of what is required to enable repair, reuse, sharing and repurposing at the local level
Resource recovery systems are operating effectively for core materials and across all regions	Question: what are 'core materials'? Goal 5 doesn't say. Is it meant to align with kerbside standardisation? TAs will have a key role in developing and maintaing resource recovery systems at the local level. Regional and cross-regional collaboration will be needed to ensure these form part of a cohesive network.

We look for ways to recover any remaining value from residual waste, sustainably and without increasing emissions, before final disposal		TAs will need to consider any potential role for energy-from-waste technologies at the local and/or regional level – particularly those that operate landfills
Specific Priorities	• Support repair initiatives by, for example, making space in resource recovery centres or other community facilities • Think about how to cater for future reuse systems when developing infrastructure to support collection and processing of products and materials • Take responsibility for kerbside collection of household recycling and general waste • Find solutions to provide services to small towns and rural areas • Implement kerbside standardisation locally • Recover value from 'truly residual waste' without harming the environment • Consider the purpose, feedstock, processing and potential energy production of any 'waste to energy' methodology	
Emissions and other environmental indicators are improving		
Emissions from waste are reducing in line with our domestic and international commitments		TAs will need to model and monitor emissions from their local activities – waste emissions are being considered at a regional level for the Otago region
Contaminated land is sustainably managed and remediated, to reduce waste and emissions and enhance the environment		TAs are responsible for the management of their closed landfills.
Specific Priorities	• Maximise the amount of organic waste being recycled into beneficial uses (composting and anerobic digestion are options) • Implement standardised kerbside collections locally for organic wastes (with support and education) • Fund and invest in infrastructure to collect, process, manage and recycle organic waste (food, garden and C&D organics)	

- Landfill gas capture at Class 1 facilities by the end of 2026 or cease accepting organic waste
- Potentially implement landfill organics ban by 2030 at all Class 1 facilities
- Address the management of ‘vulnerable landfills’ if any are identified that are council’s responsibility that are not already included in a closed landfill management plan.

A.4.1.4 Targets

The strategy includes targets; although it is acknowledged that there currently isn't enough (or reliable enough) data to set an accurate baseline or monitor these fully.

TAs should consider these, however, when setting targets in their WMMPs as it would make sense for these metrics to be reflected in local target setting and monitoring. This will also provide more support to the process of monitoring these targets at a national level.

A.4.1.5 Strategic Planning Cycle

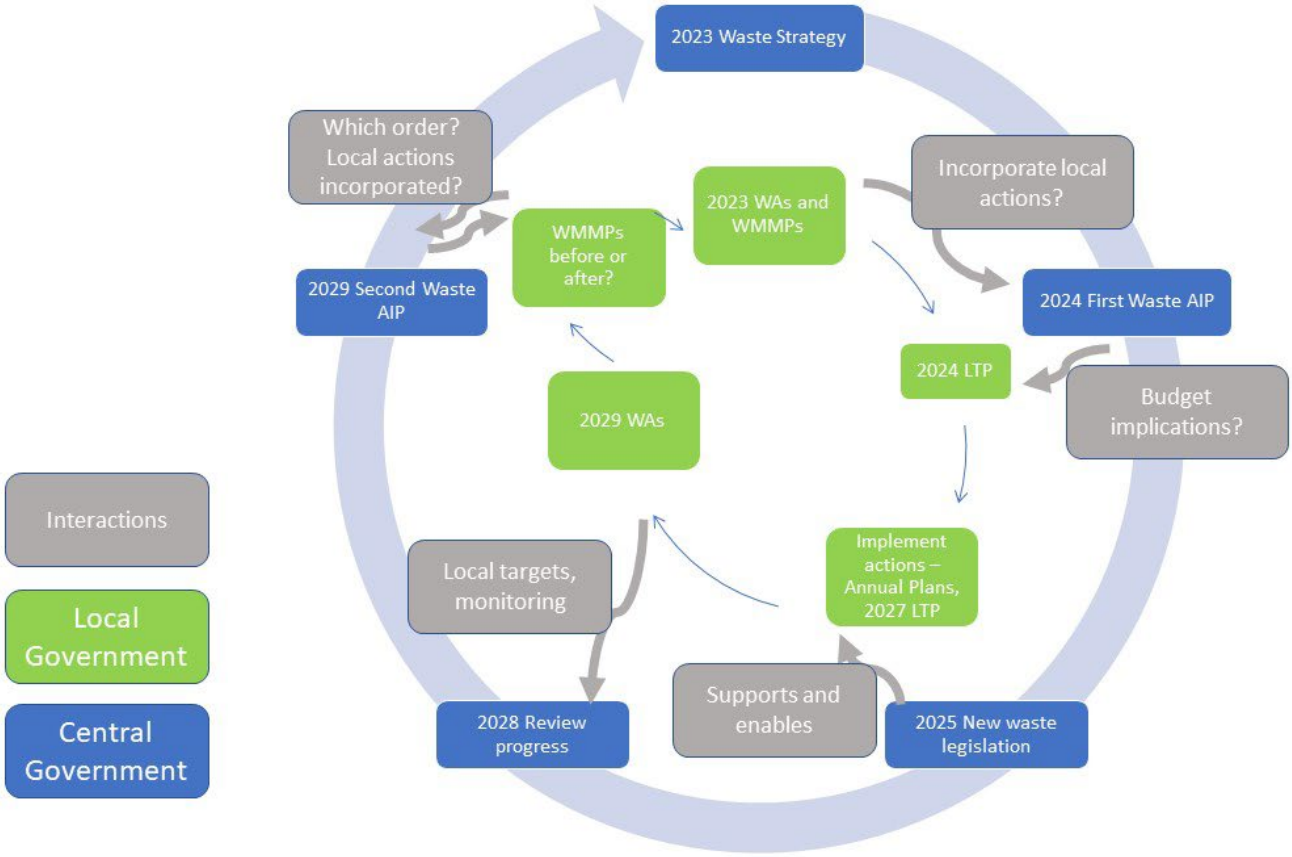
Many TAs are currently in the process of completing a Waste Assessment with a view to reviewing their WMMPs (if necessary) during the second half of 2023 so actions can be budgeted and included in 2024 LTPs. The current proposal is for the first of the MfE AIP to be out in 2024, and then a five year cycle to occur from there – so the second AIP will be due in 2029. This doesn't fit neatly with the local government planning cycle, particularly for the Otago region TAs which are all completing a Waste Assessment during 2023 (and therefore would need to repeat this process no later than 2029) .

It is not yet clear the extent to which local planning (through WMMPs) will be used to build, and be incorporated in, the AIPs. It is also not clear what the impact would be if the AIP included actions or investments that would require implementation at a local level, as is likely – and therefore may need to be included in WMMPs. Significant amendments to WMMPs do, of course, require that the full special consultative process is completed again.

The question then arises as to how TAs handle the situation where they are required, through regulation or through implementation of national AIPs, to implement actions that their local communities disagree with (and therefore essentially make the consultation process pointless).

The figure below attempts to align and show the interactions between the central and local government waste planning cycles.

Figure 14: Central and Local Government Waste Planning



A.4.1.6 Summary

The direction of the New Zealand Waste Strategy, the supporting goals, and the proposed targets all have clear implications for the future direction of waste disposal facilities in this country.

- The overall direction of the Waste Strategy is towards a circular economy, which is not supported by a landfill disposal-based linear system;
- there are specific actions relating to reducing a wide range of waste streams, and specifically and particularly organic waste – in concert with work to reduce emissions. This could extend to a ban on organic waste going to landfill; and
- the targets focus on reducing waste generation and waste disposal by 2030 – by quite significant proportions.

The overall tone of the strategic direction is not in support of continued or extended disposal of waste; and particularly not organic wastes.

A.4.2 Waste Minimisation Act 2008

The purpose of the Waste Minimisation Act 2008 (WMA) is to encourage waste minimisation and a decrease in waste disposal to protect the environment from harm and obtain environmental, economic, social and cultural benefits.

The WMA introduced tools, including:

- waste management and minimisation plan obligations for territorial authorities
- a waste disposal levy to fund waste minimisation initiatives at local and central government levels
- product stewardship provisions.

Part 4 of the WMA is dedicated to the responsibilities of a council, in that it "must promote effective and efficient waste management and minimisation within its district" (section 42).

To meet this requirement, councils are required to develop and adopt a WMMP. The development of a WMMP in the WMA is a requirement modified from Part 31 of the Local Government Act 1974, but with even greater emphasis on waste minimisation.

To support the implementation of a WMMP, section 56 of the WMA also provides councils the ability to:

- develop bylaws
- regulate the deposit, collection and transportation of wastes
- prescribe charges for waste facilities
- control access to waste facilities
- prohibit the removal of waste intended for recycling.

A number of specific clauses in Part 4 relate to the WMMP process. It is essential that those involved in developing a WMMP read and are familiar with the WMA and Part 4 in particular.

The Waste Minimisation Act 2008 (WMA) provides a regulatory framework for waste minimisation that had previously been based on largely voluntary initiatives and the involvement of territorial authorities under previous legislation, including Local Government Act 1974, Local Government Amendment Act (No 4) 1996, and Local Government Act 2002. The purpose of the WMA is to encourage a reduction in the amount of waste disposed of in New Zealand.

In summary, the WMA:

- Clarifies the roles and responsibilities of territorial authorities with respect to waste minimisation e.g. updating Waste Management and Minimisation Plans (WMMPs) and collecting/administering levy funding for waste minimisation projects.

- Requires that a Territorial Authority promote effective and efficient waste management and minimisation within its district (Section 42).
- Requires that when preparing a WMMP a Territorial Authority must consider the following methods of waste management and minimisation in the following order of importance:
    - Reduction
    - Reuse
    - Recycling
    - Recovery
    - Treatment
    - Disposal
    - Put a levy on all waste disposed of in a landfill.
    - Allows for mandatory and accredited voluntary product stewardship schemes.
    - Allows for regulations to be made making it mandatory for certain groups (for example, landfill operators) to report on waste to improve information on waste minimisation.
    - Establishes the Waste Advisory Board to give independent advice to the Minister for the Environment on waste minimisation issues.

Various other aspects of the Waste Minimisation Act are discussed in more detail below.

A.4.3 Waste Levy

The waste levy originally came in to effect from 1st July 2009, adding $10 per tonne to the cost of landfill disposal at sites which accept household solid waste (essentially Class 1 disposal facilities). The levy has two purposes, which are set out in the Act:

- to raise revenue for promoting and achieving waste minimisation
- to increase the cost of waste disposal to recognise that disposal imposes costs on the environment, society and the economy.

This levy is collected and managed by the Ministry for the Environment (MfE) who distribute half of the revenue collected to territorial authorities (TA) on a population basis to be spent on promoting or achieving waste minimisation as set out in their WMMPs. The other half is retained by the MfE and managed by them as a central contestable fund for waste minimisation initiatives (the Waste Minimisation Fund).

In April 2021, the government introduced regulation to expand the scope of the levy from Class 1 landfills to also include classes 2-4.[39]

The table below shows the timetable and rates for the new levy regime:

Table 19: Levy Rates by Fill Type and Year

LANDFILL CLASS	1-Jul-21	1-Jul-22	1-Jul-23	1-Jul-24
Municipal landfill (class 1)	$20	$30	$50	$60
Construction and demolition fill (class 2)		$20	$20	$30
Managed fill (class 3)			$10	$10
Controlled fill (class 4)			$10	$10

https://www.mfe.govt.nz/waste/waste-and-government

If the landfill levy is expanded and raised as planned this will have an impact on the quantity of material going to the different destinations; however, the extent to which this occurs, and for which materials, depends on a number of other factors.

One impact that has been noted in some areas of New Zealand, for example, is Class 2 landfill operators choosing to close rather than add $20 per tonne to their gate fee, and undertake the administrative task of monitoring waste quantities to the extent required by the online waste levy system (OWLS). Some of these facilities don't have weighbridges in place and instead base their charges on volume estimates. To report to the OWLS, these facilities then need to translate volumes to weights, and it is on this basis that their landfill levy obligations are calculated. Therefore, any variances in conversion rates between volume and weight could result in an over- or under-calculation of the required landfill levy at the gate.

A.4.4 Product Stewardship

Under the Waste Minimisation Act 2008, if the Minister for the Environment declares a product to be a priority product, a product stewardship scheme must be developed and accredited to ensure effective reduction, reuse, recycling or recovery of the product and to manage any environmental harm arising from the product when it becomes waste.[40]

[39] https://www.legislation.govt.nz/regulation/public/2021/0069/latest/whole.html
[40] Waste Management Act 2008 2(8)

The following voluntary product stewardship schemes have been accredited by the Minister for the Environment:[41]

- Agrecovery rural recycling programme
- Envirocon product stewardship
- Fonterra Milk for Schools Recycling Programme
- Fuji Xerox Zero Landfill Scheme
- Holcim Geocycle Used Oil Recovery Programme (no longer operating)
- Interface ReEntry Programme
- Kimberly Clark NZ's Envirocomp Product Stewardship Scheme for Sanitary Hygiene Products
- Plasback
- Public Place Recycling Scheme
- Recovering of Oil Saves the Environment (R.O.S.E. NZ)
- Refrigerant recovery scheme
- RE:MOBILE
- Resene PaintWise
- The Glass Packaging Forum

Further details on each of the above schemes are available on: http://www.mfe.govt.nz/waste/product-stewardship/accredited-voluntary-schemes

Until July 2020, the ability under the WMA to name a product as a 'priority product' had not been used. Once a product has been named such, an extended producer responsibility approach must be taken and a regulated product stewardship scheme developed. The first six priority products named are:

1. Plastic packaging
2. Tyres
3. Electrical and electronic products (e-waste including large batteries)
4. Agrichemicals and their containers
5. Refrigerants
6. Farm plastics

MfE has taken a 'co-design' approach, which involves industry developing and operating product stewardship schemes with central government oversight. To date regulated product stewardship schemes are in development for tyres, large batteries, e-waste, refrigerants, and agrichemicals and farm plastics, although only tyres have currently been accredited. Consultation on regulations to enable the schemes for tyres and large

[41] http://www.mfe.govt.nz/waste/product-stewardship/accredited-voluntary-schemes

batteries was undertaken in late 2021 and is due to take place in the second half of 2022 for refrigerants and farm plastics.

A.4.5 Waste Minimisation Fund

The Waste Minimisation Fund has been set up by the Ministry for the Environment to help fund waste minimisation projects and to improve New Zealand's waste minimisation performance through:

- Investment in infrastructure;
- Investment in waste minimisation systems and
- Increasing educational and promotional capacity.

Criteria for the Waste Minimisation Fund have been published:

1. Only waste minimisation projects are eligible for funding. Projects must promote or achieve waste minimisation. Waste minimisation covers the reduction of waste and the reuse, recycling and recovery of waste and diverted material. The scope of the fund includes educational projects that promote waste minimisation activity.

2. Projects must result in new waste minimisation activity, either by implementing new initiatives or a significant expansion in the scope or coverage of existing activities.

3. Funding is not for the ongoing financial support of existing activities, nor is it for the running costs of the existing activities of organisations, individuals, councils or firms.

4. Projects should be for a discrete timeframe of up to three years, after which the project objectives will have been achieved and, where appropriate, the initiative will become self-funding.

5. Funding can be for operational or capital expenditure required to undertake a project.

6. For projects where alternative, more suitable, Government funding streams are available (such as the Sustainable Management Fund, the Contaminated Sites Remediation Fund, or research funding from the Foundation for Research, Science and Technology), applicants should apply to these funding sources before applying to the Waste Minimisation Fund.

7. The applicant must be a legal entity.

8. The fund will not cover the entire cost of the project. Applicants will need part funding from other sources.

9. The minimum grant for feasibility studies will be $10,000.00. The minimum grant for other projects will be $50,000.00.

Application assessment criteria have also been published by the Ministry.

The Ministry recently announced that the next Waste Minimisation Fund round would work in quite a different way. Instead of opening for a fixed period of time in May 2022,

it will instead open in October 2022 and will consider applications as they are received, and will agree to fund successful applications until funds are exhausted.

Further details will be released soon on how the restructured fund would work.

A.4.6 Local Government Act 2002

The Local Government Act 2002 (LGA) provides the general framework and powers under which New Zealand's democratically elected and accountable local authorities operate.

The LGA contains various provisions that may apply to councils when preparing their WMMPs, including consultation and bylaw provisions. For example, Part 6 of the LGA refers to planning and decision-making requirements to promote accountability between local authorities and their communities, and a long-term focus for the decisions and activities of the local authority. This part includes requirements for information to be included in the long-term plan (LTP), including summary information about the WMMP.

More information on the LGA can be found at ww.dia.govt.nz/better-local-government.

A.4.6.1 Section 17A Review

Local authorities are now under an obligation to review the cost-effectiveness of current arrangements for meeting community needs for good quality infrastructure, local public services and local regulation. Where a review is undertaken local authorities must consider options for the governance, funding and delivery of infrastructure, local public services and local regulation that include, but are not limited to:

a) in-house delivery
b) delivery by a CCO, whether wholly owned by the local authority, or a CCO where the local authority is a part owner
c) another local authority
d) another person or agency (for example central government, a private sector organisation or a community group).

Local authorities had three years from 8 August 2014 to complete the first review of each service i.e. they must have completed a first review of all their services by 7 August 2017 (unless something happened to trigger a review before then).

Other than completion by the above deadline, there are two statutory triggers for a section 17A review:

- The first occurs when a local authority is considering a significant change to a level of service
- The second occurs where a contract or other binding agreement is within two years of expiration.

Once conducted, a section 17A review has a statutory life of up to six years. Each service must be reviewed at least once every six years unless one of the other events that trigger a review comes into effect.

While the WMMP process is wider in scope – considering all waste service provision in the local authority area – and generally taking a longer term, more strategic approach, there is substantial crossover between the section 17A requirements and those of the WMMP process, in particular in relation to local authority service provision. The S17A review may however take a deeper approach go into more detail in consideration of how services are to be delivered, looking particularly at financial aspects to a level that are not required under the WMMP process.

Because of the level of crossover however it makes sense to undertake the S17A review and the WMMP process in an iterative manner. The WMMP process should set the strategic direction and gather detailed information that can inform both processes. Conversely the consideration of options under the s17A process can inform the content of the WMMP – in particular what is contained in the action plans.

A.4.7 Resource Management Act 1991

The Resource Management Act 1991 (RMA) promotes sustainable management of natural and physical resources. Although it does not specifically define 'waste', the RMA addresses waste management and minimisation activity through controls on the environmental effects of waste management and minimisation activities and facilities through national, regional and local policy, standards, plans and consent procedures. In this role, the RMA exercises considerable influence over facilities for waste disposal and recycling, recovery, treatment and others in terms of the potential impacts of these facilities on the environment.

Under section 30 of the RMA, regional councils are responsible for controlling the discharge of contaminants into or on to land, air or water. These responsibilities are addressed through regional planning and discharge consent requirements. Other regional council responsibilities that may be relevant to waste and recoverable materials facilities include:

- managing the adverse effects of storing, using, disposing of and transporting hazardous wastes
- the dumping of wastes from ships, aircraft and offshore installations into the coastal marine area
- the allocation and use of water.

Under section 31 of the RMA, council responsibility includes controlling the effects of land-use activities that have the potential to create adverse effects on the natural and physical resources of their district. Facilities involved in the disposal, treatment or use of waste or recoverable materials may carry this potential. Permitted, controlled, discretionary, noncomplying and prohibited activities, and their controls, are specified in

district planning documents, thereby defining further land-use-related resource consent requirements for waste-related facilities.

In addition, the RMA provides for the development of national policy statements and for the setting of national environmental standards (NES). There are currently two enacted NESs that directly influence the management of waste in New Zealand:

5) The Resource Management (National Environmental Standards for Air Quality) Regulations 2004; this NES requires certain landfills (e.g., those with a capacity of more than 1 million tonnes of waste) to collect landfill gases and either flare them or use them as fuel for generating electricity. Unless exemption criteria are met, the NES for Air Quality also prohibits the lighting of fires and burning of wastes at landfills, the burning of tyres, bitumen burning for road maintenance, burning coated wire or oil, and operating high-temperature hazardous waste incinerators. These prohibitions aim to protect air quality.
6) The Resource Management (National Environmental Standards for Storing Tyres Outdoors) Regulations 2021; this NES provides nationally consistent rules for the responsible storage of tyres.

The implementation of the National Policy Statement for Freshwater Management[42] may reduce the application rates of some organic wastes to land, which is currently a low cost management option for wastes such as effluent. This may increase the quantities of these organic materials that will be available for processing, which would then impact on the types of materials requiring processing, the technologies best suited to these material mixes, and the markets for the end product.

The RMA is currently subject to extensive reform, which will entail repealing the RMA and replacing it with three separate pieces of legislation:

1) National and Built Environments Act;
2) Spatial Planning Act; and
3) Climate Adaptation Act.

It is likely that this reform process will be completed before the end of 2023.

A.4.8 New Zealand Emissions Trading Scheme

The Climate Change Response Act 2002 and associated regulations is currently the Government's principal response to manage climate change. A key mechanism for this is the New Zealand Emissions Trading Scheme (NZ ETS). The NZ ETS puts a price on greenhouse gas emissions, providing an incentive for people to reduce emissions and plant forests to absorb carbon dioxide. Certain sectors are required to acquire and surrender emission units to account for their direct greenhouse gas emissions or the emissions associated with their products. Landfills that are subject to the waste disposal

[42] https://environment.govt.nz/publications/national-policy-statement-for-freshwater-management-2020/

levy are required to surrender emission units to cover methane emissions generated from landfill. These disposal facilities are required to report the tonnages landfilled annually to calculate emissions (this is separately to the tonnages required to be reported for the landfill levy, through the OWLS).

The NZ ETS was introduced in 2010 and, from 2013, landfills have been required to surrender 'New Zealand emissions units' or NZUs for each tonne of CO_2 (equivalent) that they produce. Until around 2017, however, the impact of the NZETS on disposal prices was limited. There were a number of reasons for this:

- The global price of carbon crashed during the GFC in 2007-8 and was slow to recover in the following years. Prior to the crash it was trading at around $20 per tonne. The price had been as low as $2, although in June 2015, the Government moved to no longer accept international units in NZETS and the NZU price increased markedly. NZUs[43] currently change hands for between $70 and $85, with prices at $74.40 at the time of writing[44].
- The transitional provisions of the Climate Change Response Act, which were extended in 2013 but have now been reviewed, meant that landfills only had to surrender half the number of units they would be required to otherwise. These transitional provisions were removed in January 2017, effectively and immediately doubling the price per tonne impact of the ETS.
- Landfills are allowed to apply for 'a methane capture and destruction unique emissions factor (UEF)'. This means that if landfills have a gas collection system in place and flare or otherwise use the gas (and turn it from methane, CH_4 into carbon dioxide, CO_2) they can reduce their liabilities in proportion to how much gas they capture. Up to 90% capture and destruction is allowed to be claimed under the regulations, with large facilities applying for UEF's at the upper end of the range.

Taken together (a low price of carbon, only two-for-one surrender required, and methane destruction of 80-90%) the actual cost of compliance with the NZETS had been small for most landfills – particularly those that were able to claim high rates of gas capture. Disposal facilities typically imposed charges (in the order of $5 per tonne) to their customers, but these charges mostly reflected the costs of scheme administration, compliance, and hedging against risk rather than the actual cost of carbon.

The way the scheme has been structured has also resulted in some inconsistencies in the way it is applied – for example class 2-5 landfills and closed landfills do not have any liabilities under the scheme. Further, the default waste composition (rather than a SWAP) can be used to calculate the theoretical gas production, which means landfill owners have an incentive to import biodegradable waste, which then increases gas production and which can then be captured and offset against ETS liabilities.

[43] NZUs are carbon credits that are officially accepted to offset liabilities under the NZETS
[44] According to carbon prices on www.carbonforestservices.co.nz and https://www.carbonmatch.co.nz/

Recently, however the scheme has had a greater impact on the cost of landfilling, and this is expected to continue in the medium term. Many small landfills which do not capture and destroy methane are now beginning to pay a more substantial cost of compliance. The ability of landfills with high rates of gas capture and destruction to buffer the impact of the ETS will mean a widening cost advantage for them relative to those without such ability. This appears to be putting further pressure on small (predominantly Council-owned) facilities and will drive further tonnage towards the large regional facilities (predominantly privately owned).

For example, with a price of carbon at $75 per tonne, the liability for a landfill without gas capture will be $68.25 (based on a DEF of 0.91 tonnes of CO_2e per tonne of waste), whereas for a landfill claiming 90% gas capture (the maximum allowed under the scheme), the liability will be only $6.83. This type of price differential will mean it will become increasingly cost competitive to transport waste larger distances to the large regional landfills.

More information is available at www.climatechange.govt.nz/emissions-trading-scheme.

A.4.9 Litter Act 1979

Under the Litter Act[45] it is an offence for any person or body corporate to deposit or leave litter:

- in or on any public place; or
- in or on any private land without the consent of its occupier.

The Act enables Council to appoint Litter Officers with powers to enforce the provisions of the legislation.

The legislative definition of the term "litter" is wide and includes 'refuse, rubbish, animal remains, glass, metal, garbage, debris, dirt, filth, rubble, ballast, stones, earth, waste matter or other thing of a like nature'.

Any person who commits an offence under the Act is liable to:

- An instant fine of $400 imposed by the issue of an infringement notice; or a fine not exceeding $5,000 in the case of an individual or $20,000 for a body corporate upon conviction in a District Court.
- A term of imprisonment where the litter is of a nature that it may endanger, cause physical injury, disease or infection to any person coming into contact with it.

Under the Litter Act 1979 it is an offence for any person to deposit litter of any kind in a public place, or onto private land without the approval of the owner.

[45] https://www.legislation.govt.nz/act/public/1979/0041/latest/DLM33082.html

The Litter Act is enforced by territorial authorities, who have the responsibility to monitor litter dumping, act on complaints, and deal with those responsible for litter dumping. Councils reserve the right to prosecute offenders via fines and infringement notices administered by a litter control warden or officer. The maximum fines for littering are $5,000 for a person and $20,000 for a corporation.

Council powers under the Litter Act could be used to address illegal dumping issues that may be included in the scope of a council's waste management and minimisation plan.

The Litter Act may be reviewed alongside the review of the Waste Minimisation Act.

A.4.10 Health Act 1956

The Health Act 1956 places obligations on TAs to provide sanitary works for the collection and disposal of refuse, for the purpose of public health protection (Part 2 – powers and duties of local authorities, section 25). Where the Ministry of Health considers that a local authority is not taking the necessary action to meet these obligations and protect public health, it can require a local authority to do so.

It specifically identifies certain waste management practices as nuisances (S 29) and offensive trades (Third Schedule) and section 23 directs every local authority to improve, promote, and protect public health by inspecting its district regularly to identify any nuisance or condition likely to be offensive or harm human health. If any issues are noted, the local authority should take steps to rectify the situation. Improperly managed waste would be considered a nuisance. Section 34 enables councils to abate nuisances without notice and recover costs.

Section 54 places restrictions on carrying out an offensive trade and requires that the local authority and medical officer of health must give written consent and can impose conditions on the operation. The local authority's responsibilities under section 54 only applies where resource consent has not been granted under the RMA (i.e., no need to give written consent twice). Local authorities should seek to coordinate with their local public health unit where offensive trades are being established, such as refuse collection and other waste treatment practices.

The Health Act enables TAs to raise loans for certain sanitary works and/or to receive government grants and subsidies, where available.[46] It also means that where TAs incur costs in meeting their responsibilities to abate nuisances by (for example) removing refuse that is likely to harm public health, the TA can seek payment of these costs.

Health Act provisions to remove refuse by local authorities have been repealed.

[46] From: MfE 2009: Waste Management and Minimisation Planning, Guidance for Territorial Authorities.

A.4.11 Hazardous Substances and New Organisms Act 1996 (HSNO Act)

The HSNO Act addresses the management of substances (including their disposal) that pose a significant risk to the environment and/or human health. The Act relates to waste management primarily through controls on the import or manufacture of new hazardous materials and the handling and disposal of hazardous substances.

Depending on the amount of a hazardous substance on site, the HSNO Act sets out requirements for material storage, staff training and certification. These requirements would need to be addressed within operational and health and safety plans for waste facilities. Hazardous substances commonly managed by TAs include used oil, household chemicals, asbestos, agrichemicals, LPG and batteries.

The HSNO Act provides minimum national standards that may apply to the disposal of a hazardous substance. However, under the RMA a regional council or TA may set more stringent controls relating to the use of land for storing, using, disposing of or transporting hazardous substances.[47]

A.4.12 Health and Safety at Work Act 201548

The new Health and Safety at Work Act, passed in September 2015 replaces the Health and Safety in Employment Act 1992. The bulk of the Act came into force from 4 April 2016.

The Health and Safety at Work Act introduces the concept of a Person Conducting a Business or Undertaking, known as a PCBU. The Council will have a role to play as a PCBU for waste services and facilities.

The primary duty of care requires all PCBUs to ensure, so far as is reasonably practicable:

4) the health and safety of workers employed or engaged or caused to be employed or engaged, by the PCBU or those workers who are influenced or directed by the PCBU (for example workers and contractors)
5) that the health and safety of other people is not put at risk from work carried out as part of the conduct of the business or undertaking (for example visitors and customers).

The PCBU's specific obligations, so far as is reasonably practicable:

- providing and maintaining a work environment, plant and systems of work that are without risks to health and safety
- ensuring the safe use, handling and storage of plant, structures and substances

[47] From: MfE 2009: Waste Management and Minimisation Planning, Guidance for Territorial Authorities.
[48] http://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html#DLM6564701

- providing adequate facilities at work for the welfare of workers, including ensuring access to those facilities
- providing information, training, instruction or supervision necessary to protect workers and others from risks to their health and safety
- monitoring the health of workers and the conditions at the workplace for the purpose of preventing illness or injury.

A key feature of the new legislation is that cost should no longer be a major consideration in determining the safest course of action that must be taken.

WorkSafe NZ is New Zealand's workplace health and safety regulator. WorkSafe NZ will provide further guidance on the new Act after it is passed.

A.4.13 Other legislation

Other legislation that relates to waste management and/or reduction of harm, or improved resource efficiency from waste products includes:

- Biosecurity Act 1993
- Radiation Protection Act 1965
- Ozone Layer Protection Act 1996
- Agricultural Chemicals and Veterinary Medicines Act 1997.

For full text copies of the legislation listed above see www.legislation.govt.nz.

A.4.14 International commitments

New Zealand is party to international agreements that have an influence on the requirements of our domestic legislation for waste minimisation and disposal. Some key agreements are the:

- Montreal Protocol
- Basel Convention
- Stockholm Convention
- Waigani Convention
- Minamata Convention.

More information on these international agreements can be found on the Ministry's website at www.mfe.govt.nz/more/international-environmental-agreements.

A.5.0 A Circular Resource Recovery Network

Historically, our economic system has operated primarily on the basis of linear processes. This system involves extraction, processing, manufacturing, consumption and disposal (end-of-life). This system is not sustainable as it involves systematically using up non-renewable raw materials (such as minerals and fossil fuels) and degrading the natural environment, which is necessary to support life, through unsustainable agricultural and extractive activities (such as logging of native forests), and the creation of waste and pollution. To address this, a paradigm shift is needed. This requires a change in how the economic system produces, assembles, sells and uses products in order to minimise waste and maximise the value of materials in use. The circular economy is a model that enables resources to be kept in use for as long as possible, extract maximum value from them, and then recover and regenerate materials at end-of-life.

Within the context of enabling a circular economy, it is proposed to re-organise how the recovery of materials in the economy occurs by establish a **'circular resource network'**.

The key organising principle behind the concept of a circular resource network is that the resource recovery system should be consciously designed to facilitate the circular flow of materials through the economy, by 'completing the circle'. To date, the 'reverse logistics' aspect of the economy that is responsible for collecting widely dispersed and mixed materials has been a poor relation to the 'logistics' part of the economy that is responsible for the dispersion.

The following subsections expand on what a circular resource network concept that is designed for the circular economy could entail. The circular resource network concept borrows from and builds on the existing concept of a resource recovery network (RRN).

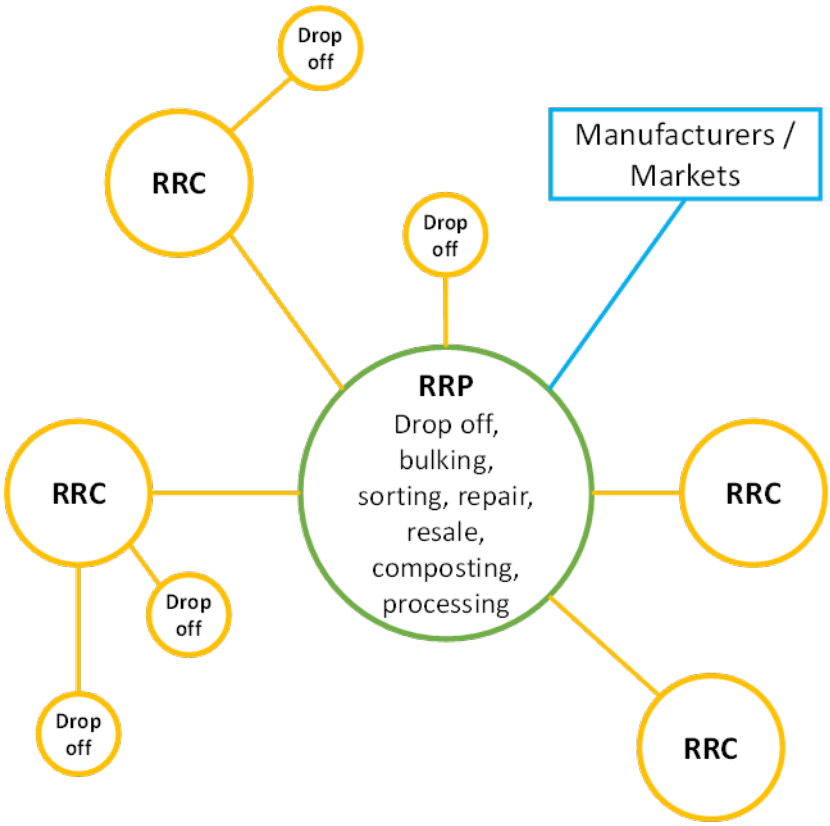
A.5.1 Conventional Resource Recovery Network (RRN)

The concept of a RRN is a longstanding one with various examples including Auckland Council working to develop a network of community run facilities in partnership with the Zero Waste Network[49], the development of a Māori and Pasifika Eco Park, in South Auckland[50], and Selwyn District Council recently announcing their resource recovery park concept[51].

[49] https://www.makethemostofwaste.co.nz/resource-recovery-network/
[50] https://www.stuff.co.nz/business/126810349/the-1-billion-plan-to-lift-mori-and-pasifika-prosperity-in-aucklands-south-and-west
[51] https://www.selwyn.govt.nz/services/rubbish,-recycling-And-organics/recovery-park/reconnect-project

These examples (which have different approaches) can be expanded into a nationwide state of the art network of resource recovery parks (RRPs) which consist of linked (sub) regional hubs, with smaller satellite facilities (resource recovery centres or RRCs) feeding recovered materials into the hub for processing and sale. These potentially can be further supplemented by local drop off sites that feed the satellite facilities. This concept is illustrated in the figure below.

Figure 15: Network of Resource Recovery Centres Linked to Resource Recovery Parks



The functions that are performed by the RRP consolidate a range of resource recovery functions into a single site. The intent is both to provide a 'one stop shop', but also to take advantage of economies of scale and sharing of infrastructure, services, and overheads, and optimising transport of materials to reduce costs. Furthermore, by co-locating functions there can arise the possibility of synergies between the different functions. For example, reclaimed timber and building materials can provide materials for a 'Community Shed' type operation[52], or items salvaged from the waste stream can be sold at low cost to the public. The proposed form of a resource recovery network is

[52] https://menzshed.org.nz/about-us/what-is-a-shed/

to have a series of sites with physically co-located functions, and for these to be operated by or overseen by a single entity.

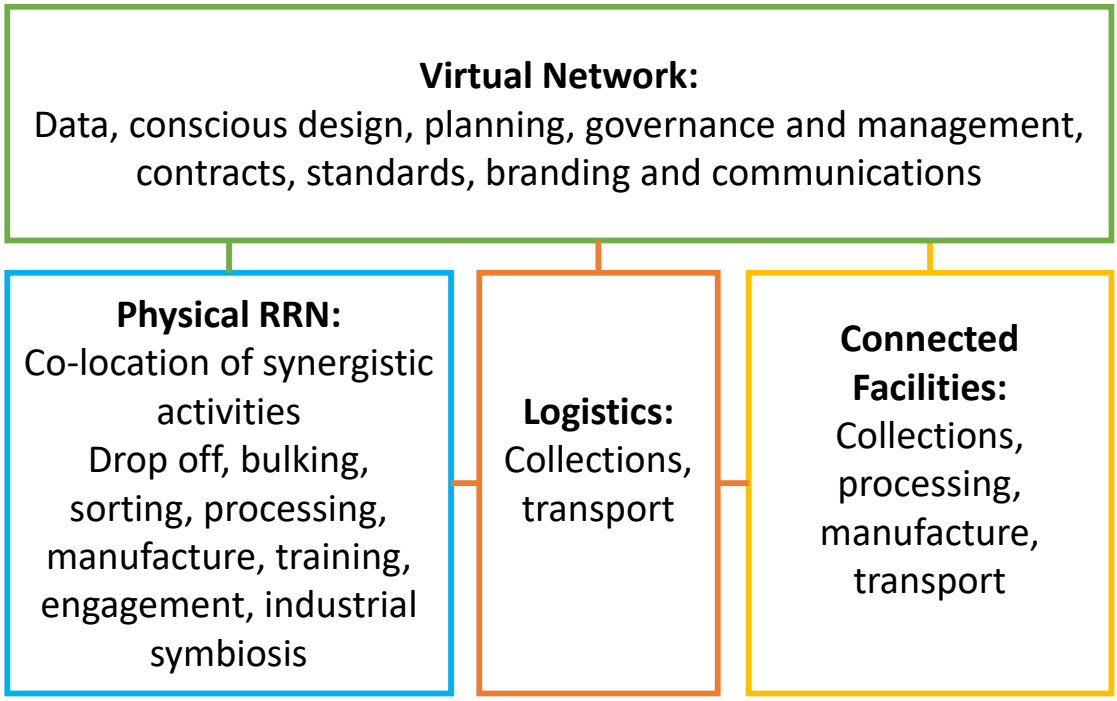
A.5.2 Expanding the Resource Recovery Network

While the conventional concept of a resource recovery network has much to recommend it, in our view there is potential to evolve it further to create the core functionality needed to enable the circular economy.

It is proposed to evolve the concept of physical co-location of synergistic activities to encompass a virtual and holistic network of sites, some co-located (where this provides efficiency gains, and is practical), but also including other sites that may be physically stand-alone sites, but which are connected to the circular resource network. The method of connection would be through supplying and receiving material, utilising network transport arrangements, operating to agreed performance standards, utilising standardised signage and specifications, providing and receiving data, and being linked through virtual directories.

A physical network of sites and logistic can be replicated virtually in an information management system. A nation-wide virtual circular resource network could, eventually, track and/or manage the flow or materials through the entire resource recovery sector in Aotearoa, and enable the optimisation of infrastructure, logistics, and services. Underpinning the virtual network is a physical network of sites and facilities that operate to agreed standards (akin to the traditional RRN concept), supplemented by standalone sites that are connected to the network. Connecting the physical network and standalone sites is a highly efficient, flexible, and low-carbon logistics network. The high-level structure of the network is illustrated in the figure below:

Figure 16: Circular Recovery Aotearoa High-Level Structure



A.5.2.1 Spatial Representation

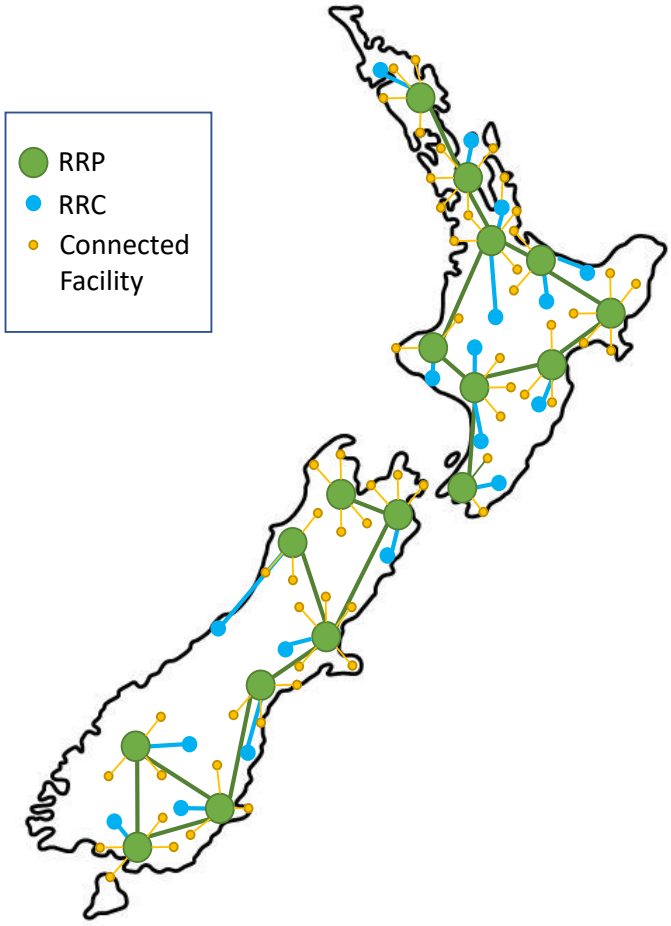
Figure 36 below shows a high-level visual representation of a national resource recovery network.

The large green dots represent regional RRPs that consolidate and process material at a regional level. Depending on the material stream, materials could also be transported between the regional hubs (for example glass being consolidated in Christchurch for shipping to Auckland for manufacture). Regional hubs could also specialise in processing certain materials and swap materials accordingly.

The mid-sized blue dots represent local RRCs that accept a full range of materials and send to the regional RRPs for bulking (or to 'connected facilities' for local processing). Not shown are smaller drop-off sites.

The small yellow dots represent the potentially hundreds of facilities that are not co-located at an RRP or RRC but are linked and operate to the standards of the network. These facilities could accept materials from the RRP or RRC for processing, or supply materials to these sites.

Figure 17: Concept Map of Circular Resource Network

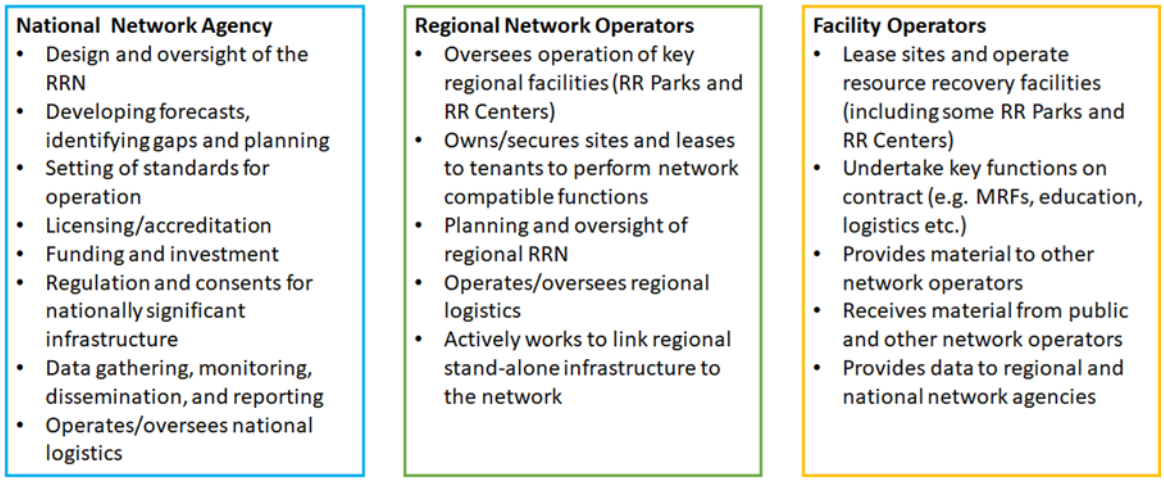


A.5.2.2 Virtual Network

The core of the concept is that the reverse logistics system is actively planned and optimised to 'close the circle' and enable a circular economy. This requires planning, analysis, and data gathering and analysis functions, alongside the active ongoing management of material flows. This is what is covered by the 'virtual network' element.

The roles of the key organisations involved in the circular resource network are shown in the figure below:

Figure 18: Key Agents and Roles in the Resource Recovery Network



A digital model could be developed of the key material flows within the resource recovery sector (ideally this would ultimately encompass a mass balance of materials through the economy, although this is likely to be more difficult to achieve and therefore a more long-term aspiration).

By digitally mapping material flows nationally, across both core facilities and connected facilities, potential gaps and issues could be quickly identified and planning undertaken to ensure the system remains optimised and is resilient and adaptive in the face of change.

The digital model would include current material flows and allow for projections and modelling of new facilities, changes to material types and quantities, logistics etc. This would enable the potential impact of new facilities and options to be investigated before implementation.

The core of the circular resource network is the establishment of a set of standards of operation that all facilities that form part of the circular resource network operate to. These standards would apply to both operations co-located at an RRP or RRC, as well as connected facilities. In this regard what is proposed is similar to a franchise model: as well as designing the overall system the government (or its agents) set the basis by which the circular resource network would function.

A.5.2.3 Physical RRN – Structure

The 'Physical RRN' is the aspect of the system that is most recognisable interface of the network. A national network could be made up of regional nodes (circular resource networks) that are linked but that can operate as independent regional entities.[53] This

[53] For the purposes of this exercise, it should be assumed that 'regional' broadly corresponds to current regional council and unitary council boundaries.

would enable planning with a national perspective (as noted above) but empower the governance and management at a regional level to enable agile response to regional and local requirements. It should be noted, however, that there could be a number of different models.

The role at a regional level is primarily:

- Site ownership, management, development, and leasing.
- Operating region-wide logistics to consolidate materials from RRCs and Connected Facilities at the regional RRP for bulking, sorting, processing and bulk transport or local manufacture.
- Overseeing and applying the operating standards for the network
- Advocating for the development of the network and working with operators and stakeholders to facilitate its continued development.
- Promotion and communication with users.

Regional networks would operate to national standards that include the following (as noted above):

- Branding and communications
- Core materials accepted and material acceptance criteria
- Output material quality standards and contamination levels (referencing existing market specifications or official standards where appropriate)
- Customer service levels
- Appropriate employment conditions
- Standard contracts and agreements for supply of services, provision or sale of materials, leases etc.
- Access to and participation in online marketplaces for recovered materials generated by network participants.

The regional network operators in turn would be responsible for applying and enforcing these standards for local and connected facilities.

A.5.2.4 RRPs – Regional Hubs

The heart of a regional network consists of one or two large RRPs, where a range of key functions are co-located. The purpose of the RRP is to provide a 'hub' for the efficient regional consolidation of a wide range of materials collected at the RRC and Connected Facilities, as well as those that may be collected at the RRP itself.

The core of the concept is to have regional consolidation of materials and provide a hub for the regional network. In addition, these sites could provide a 'flagship' centre with a full range of services for drop-off and community engagement etc.

The RRP all can have different mixes of facilities depending on local requirements. The logistics and flagship public facing operations could be co-located or at different sites depending on local situations.

Typical facilities may include:

- Material recovery facilities for sorting of collected comingled materials.
- Anaerobic digestion facilities to process putrescible wastes and generate biogas that is used to fuel the regional logistics collection fleet.
- Logistics sorting centre for managing the inputs and outputs of a range of facilities.
- Construction and demolition waste sorting facility
- Wash plants and fleet management facilities for reusable containers
- Regional consolidation and logistics for a range of product stewardship schemes such as:
    - E-waste dismantling and processing operations.
    - Used large battery (EV and stationary storage) assessment and consolidation centres.
    - Farm plastics and agrichemical containers
    - Tyres
    - Mattresses
- Education centre
- Reuse stores/mall
- Food rescue
- Manufacturing businesses utilising recovered materials. In some instances, these businesses are co-located to utilise others' discarded materials and surplus process heat, with ongoing work to develop industrial symbiosis models.
- Research on material reuse/recovery
- Drop off facilities for a full range of materials.

A.5.2.5 Local RR Centres

While the RRPs are the hub of the regional networks, the RRC form the primary nodes where the majority of material is dropped off and consolidated locally. Many RRCs will start off as local transfer station sites that are upgraded and re-purposed to have a predominant focus on resource recovery. The RRCs are the local centre for community activity, with many run by community enterprises or iwi, and serve to engage, educate and empower the local communities to not only recover materials but extract and apply the value of those materials for community benefit.

There are a range of different services and facilities at each site, but a set of core facilities could include the following:

- Drop off facilities for a standard range of materials (nominally as follows):
    - Cardboard
    - Metals
    - Paper
    - Glass
    - Plastics 1,2,5
    - Shrink-wrap
    - Garden waste
    - DIY construction and demolition waste
- Dropoff/consolidation sites for current and future product stewardship schemes, for example:
    - Reusable containers
    - Single use containers
    - E-waste and batteries
    - Farm plastics and chemical containers
    - Tyres
    - Mattresses
    - Textiles
    - Paint and household chemicals
- Reuse drop off, refurbishment and resale (furniture, household items, furnishings and clothing, toys, books, tools).

Optional services and facilities could include:

- Café
- Construction and bulky materials sales yard
- Education, training
- Workshops/refurbishment
- Food rescue
- Cooking oil – biodiesel/soap manufacture
- Reusable nappies
- Mattress recycling
- Business incubator space.

A.5.2.6 Logistics

A core feature of the concept is the establishment of an efficient logistics network that is able to consolidate and transport materials as efficiently as possible, including utilising

back-loading, bulk transport, and using flexible methodologies to facilitate bulk transport of smaller volume materials (for example, modular bins transported on side loaders).

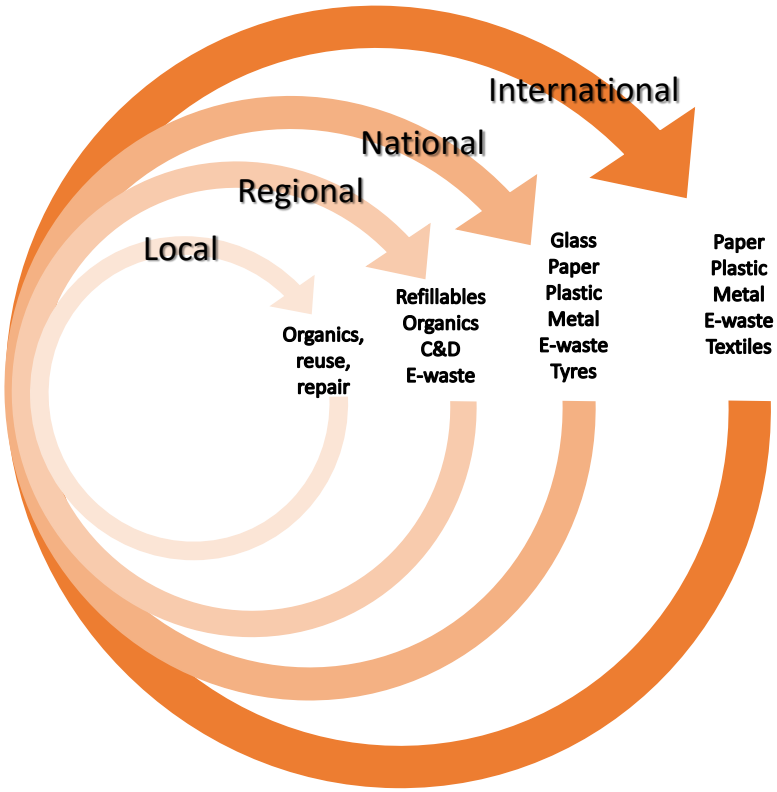
Vehicles utilised by the network could take advantage of low-carbon and waste-based technologies to minimise the carbon footprint of materials managed by the network. For example:

- Vehicles could be powered by gas/energy generated from anaerobic digestion of organic waste.
- Battery electric vehicles could utilise second-life batteries or charging infrastructure built using second life batteries.
- Bulk transport using rail (ideally electrified).

Materials are dealt with in the most appropriate manner through the network with some materials manged locally or regionally, and other materials utilising the logistics capabilities of the network to be delivered to national end uses at low cost.

The figure below illustrates how certain materials are likely to be managed locally, regionally, nationally, or internationally.

Figure 19:Geographical Circulation of Material Types



In the above indicative representation, organics (such as garden waste), reusables, and repairable items are likely to be utilised in local communities; refillables, organics that require more capital intensive processes (such as food waste or sludges), construction and demolition waste, and e-waste dismantling are likely to be undertaken on a regional level; processing and manufacture of products from glass, paper, plastic, metal, e-waste,

and tyres are likely to be processed at national or sub-national scale facilities. Finally, there will be a range of materials that are sold into international commodity markets. These are likely to include paper, plastics, metals, e-waste, and textiles.

The above is intended purely for the purposes of illustration – as markets, material types, and processing technologies evolve these circles of re-integration into the economy are likely to change. The key point is that the network will involve a redistribution of different products and materials to different points and designing this redistribution to be as efficient and effective as possible will be critical to the functioning of the circular economy.

Local Logistics

A key part of the concept is to facilitate the ability to capture the widest possible range of materials by taking advantage of economies of scale to capture economic quantities. This can be achieved through a standardised modular approach to material separation and collection. An example of this is the system deployed in Upper Austria, which utilised 1 cubic metre stackable bins that can be moved using forklifts and transported on curtainsider trucks (see Figure 39).

Figure 20: Standardised Bins Being Loaded onto Curtainsider Truck

The system collects 80 different types of separated material. The possible downside of it taking time to gather economic quantities of less common material types is minimised as

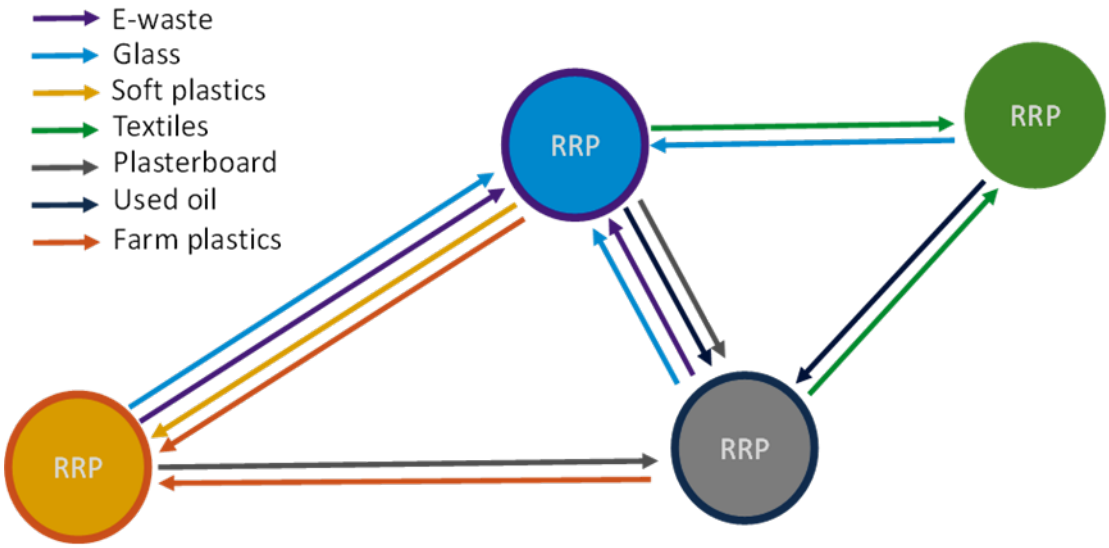
economic quantities can be achieved across the whole region, and the systems components are low cost and have proven efficiency.

The use of the same bins the same types of materials and common signage provides standardisation across the network, despite a wide range of operators being responsible for the individual resource recovery sites.

Inter-Regional Logistics

There is also potential to optimise the flows of materials between regional/sub regional hubs. For example, each regional hub could specialise in processing of one or more material types, with flows of materials then able to be balanced between sites, optimising logistics through backloading, as well as creating economies of scale. A hypothetical illustration is provided in the figure below.

Figure 21: Inter-Regional Logistics Model

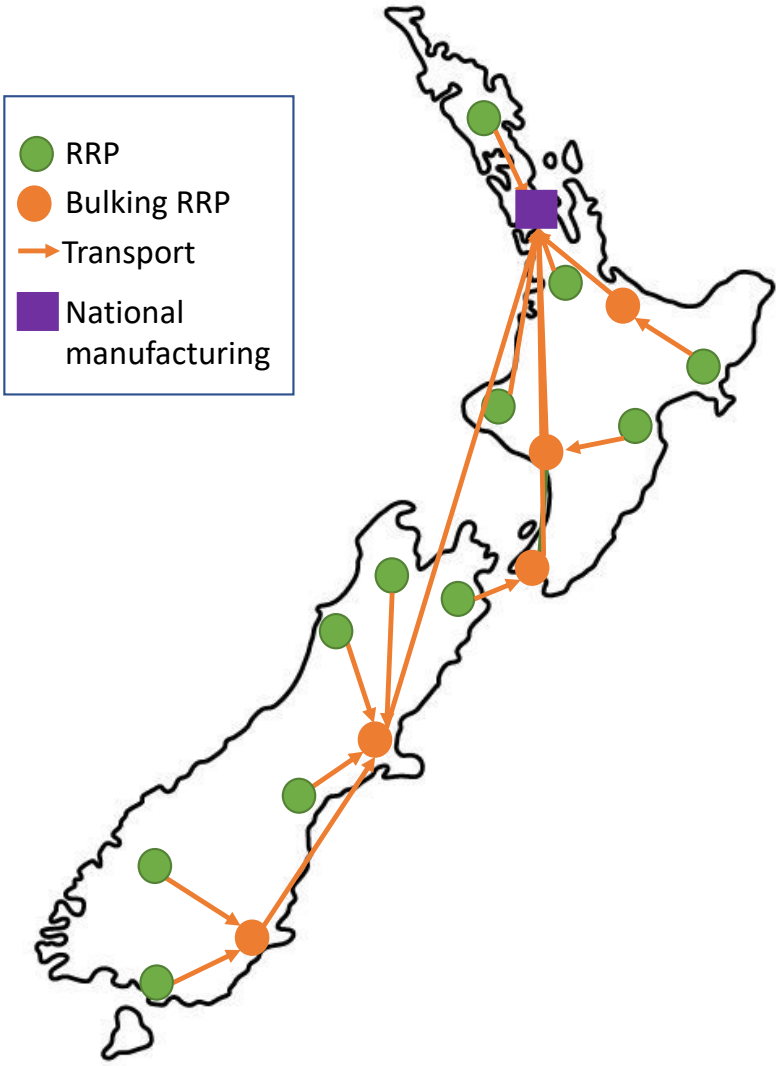


In the above hypothetical illustration, the blue RRP processes e-waste and glass from other proximate RRPs, while sending other materials such as soft plastics, farm plastics, textiles, plasterboard and used oil to other proximate RRPs. This is repeated across the RRPs, so that the quantities and movements of material are approximately balanced. The location of specialised processing and balancing of logistics would be part of the design and planning role of the national level 'virtual network'.

National Logistics

In addition to the local and inter-regional flows of materials, a range of materials handled by the network would need to go to national scale processing/manufacturing facilities (e.g. glass, paper, plastics). Logistics across the network could be optimised to take advantage of bulk transport through strategic bulking points, and there is even the possibility of constructing new national scale facilities in locations to balance national materials flows. The figure below illustrates how materials could be consolidated through regional networks to key bulking points for long-haul transport.

Figure 22: National Logistics Illustration



A.5.2.7 The Role of Local/Regional Government

Local government has historically had a major role in waste management planning and service delivery, and this is likely and desirable to continue. Local government own a significant proportion of the existing transfer station sites, and well as processing infrastructure sites and are familiar with local circumstances. Many councils are already in the process of developing resource recovery parks or local networks. These existing and planned sites could form a starting point for the physical circular resource network. It would primarily be a matter of collaborating to establish consistency and linkages across the existing and planned sites as well as promoting the development of new sites by local government.

In addition, there may be a vital role for regional entities. One of the key issues identified in the stocktake work was a lack of appropriate delivery structures for regional level infrastructure. Some facilities require a regional level approach to achieve appropriate economies of scale (for example processing of food waste, MRFs, regional bulking for key materials such as glass etc.). The proposed circular resource network concept is centred around a regional approach, with one or two regional scale RRPs that form the core hubs for collecting and consolidating material from the RRC sites, and undertaking processing and, potentially, manufacture. Key aspects of the roles for regional and local government could include:

- Service operation/contracting
- Local and regional expertise and coordination
- Local infrastructure investment and operation
- Identification and provision of appropriate sites
- Local consents monitoring, and enforcement
- Gathering and analysis of data

A.5.2.8 The Role of Iwi

Iwi also have an important role to play in the co-development of the circular resource network. The concept of resource recovery is aligned with the te ao Māori principle of kaitiakitanga, and the Para Kore programme is already in place in 476 marae across the country[54]. In addition to performing a similar role to the private and community sectors in service delivery, iwi have a role as kaitiaki of the land and people, and where resources are available, iwi can contribute financial investment and sites to the network and provide leadership in the development of the network. Key aspects of the roles for iwi could include:

[54] https://www.parakore.maori.nz/our-story/

- Service operations
- Infrastructure investment and operation
- Guardians / developers of RR Park and RR Centre sites
- Recovering value from materials
- Ownership and sale of recovered materials
- Utilising recovered value to leverage other community outcomes (e.g. employment, training, rehabilitation)

A.5.2.9 The Role of Private Sector Operators

Private sector operators currently manage the vast majority of waste materials recovered and disposed of in NZ, whether via private commercial arrangements or under contract to the public sector, and this would be expected to continue under the proposed model. The expectation is that, for the operation of the physical circular resource network, the public sector would generally own the land and generic infrastructure (such as buildings or, concrete pads, roading etc.) but would lease the sites or contract out for the delivery and operation of the circular resource network sites (such as separation of materials, composting, processing, manufacture). Sites could have a range of private and community sector operators involved (see below). Key aspects of the roles for private sector operators could include:

- Service operations
- Infrastructure investment and operation (either privately or under contract)
- Recovering value from materials (including repair and reuse)
- Ownership and sale of recovered materials

A.5.2.10 The Role of the Community Sector

Although the community sector is a minor player in terms of the total quantity of waste materials managed in New Zealand, they have had a significant role in the industry in terms of community engagement, innovating around recovery, and extracting value from waste materials to apply to social and community outcomes. The community sector role can potentially be further embedded and given added importance in the delivery of the circular resource network concept. Community groups could not only provide services such as reuse and repair across multiple sites but could also be empowered to deliver all services on sites (as has been demonstrated in Auckland). Key aspects of the roles for community sector operators could include:

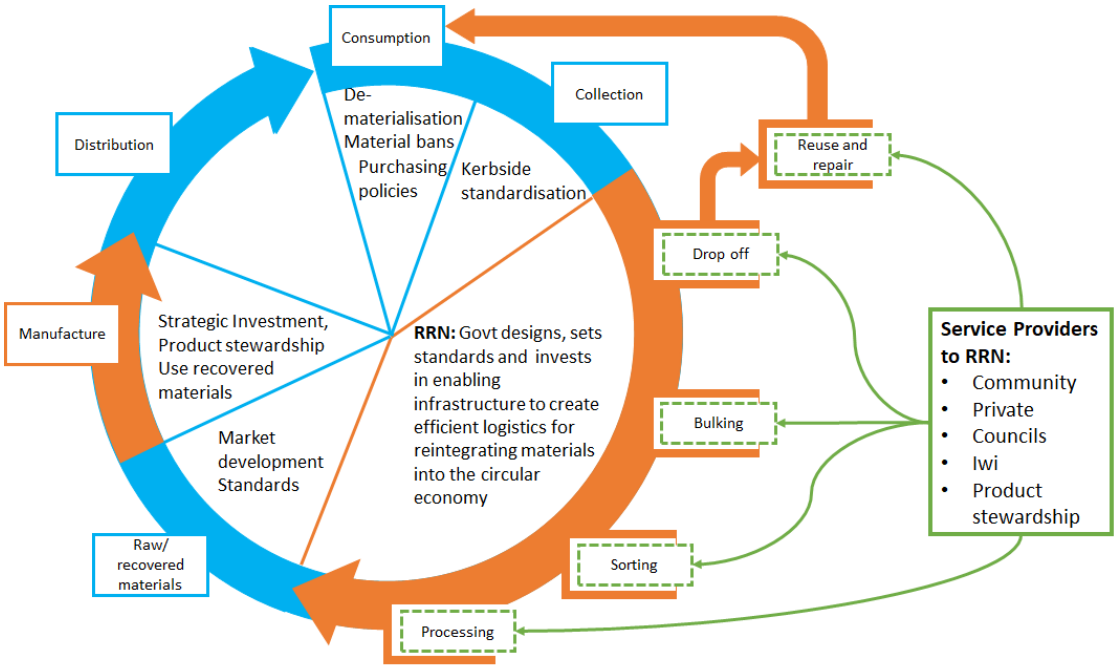
- Service operations
- Infrastructure operation
- Recovering value from materials (including repair and reuse)

- Ownership and sale of recovered materials
- Utilising recovered value to leverage other community outcomes (e.g. employment, training, rehabilitation)

A.5.2.11 Summary

The figure below illustrates how the roles and functions of a national resource recovery network could integrate to provide key reverse logistics functions in the circular economy. The orange elements of the circle are the parts that form the circular resource network.

Figure 23: Roles and Functions of a Circular Recovery Network in the Circular Economy



In the above chart material flows around in a clockwise direction. The arrows represent the material flows. The boxes indicate the key steps within the value chain. The graphic shows how different providers to the can deliver all of the key functions, but within an overall connected framework (that is established and overseen by central/regional/local government).

A.5.3 Benefits of Circular Resource Network Approach

A Circular Resource Network approach would have a range of benefits. These include:

- **Consistent with the Waste Strategy.** At its core the approach is about enabling the circular economy by building out the infrastructure required for the circular flow of materials in the economy. The circular resource network concept synthesises this into a practical approach with wide ranging applications.
- **A practical, easily articulated, investment strategy**. Because the core component of the circular resource network concept is an arrangement of physical infrastructure it is intuitively easy to communicate the intent.
- **Improved efficiency and value.** By focusing on how value can be preserved and enhanced through the resource recovery value chain rather than purely on environmental and social outcomes, it is possible to unlock the potential value of recovered materials and unleash the innovative power of the sector to achieve environmental and social outcomes.
- **Future flexibility.** Flows of materials will change over time. By government investing in the skeleton structures that enable functions, then investment is not locked into a time-limited solution. As materials, markets and processes change over time existing

infrastructure and governance can be efficiently and nationally adapted for the new functions.

- **Data harvesting.** The development of the digital model circular resource network will enable an unprecedented level of insight into recovered material flows and enable effective and intelligent planning and nimble responses by the sector to evolving situations.
- **Baskets of materials.** By co-locating and handling of a range of material and product types at single locations this enables efficiencies through the sharing of support structures and cross subsidisation, and hence the viable recovery of a wider range of materials.
- **Builds on existing infrastructure.** As noted, existing infrastructure (such as existing and planned RR Parks, and transfer stations) would form the foundation of the circular resource network, and these could be progressively integrated.
- **Provides valuable roles for all stakeholders.** The circular resource network will be significant in scale and scope, and it will require the input, collaboration, innovation, and power of all parts of the sector to fully realise its' potential.
- **'No regrets' approach.** The circular resource network concept proposed here is potentially far reaching in its scope and what it could eventually encompass. However, whatever level the concept is implemented to, it will still have multiple benefits. At a minimum it would result in the creation of a number of RR Parks or regional circular resource networks, which will still be positive outcomes.
- **Scalability.** The network can be "right"-sized in a flexible manner with the ability to effectively respond to changing circumstances.