RDC-1115509

Rotorua's Waste Assessment

2021

ROTORUA LAKES COUNCIL

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Summary

This waste assessment has been prepared to meet the requirements of the Waste Minimisation Act 2008, and to inform the development of the next Waste Management and Minimisation Plan (WMMP). It:

- summarises waste services and facilities available in Rotorua
- reviews progress against the 2016 WMMP
- reassess future demands for rubbish, recycling and recovery
- outlines goals, objectives and targets to support the shift to circular economy and low carbon future
- Develops and assesses options to meet future demand and achieve desired outcomes for waste minimisation.

The previous waste assessment and 2016 WMMP focused on improving H&S of waste services and improving the accessibility of waste services (i.e., kerbside collections). Rotorua Lakes Council has made excellent progress against the goals and targets of 2016 WMMP and transformed waste management within the district. This waste assessment and the next WMMP are aimed at facilitating transition to circular economy, as well as, contribute to mitigating greenhouse gases emissions from waste disposal.

Rotorua disposes 15,000 tonnes of municipal waste to landfill, which comprises of 56% of food and green waste, and over 10% of other divertible materials. Rotorua also produces 5,500 tonnes of recyclable materials via municipal collection. On the other hand, 5,000 tonnes of green waste, 1,200 tonnes of concrete and 9,500 tonnes of bio-solids are collected at landfill recycling area or wastewater treatment plant. These materials are diverted from landfill via recycling, reprocessing or composting.

Rotorua population and number of households and projected to grow significantly in near and long term, which would increase demand for Council's waste services. Besides, changes in waste and climate change regulations and new demand for sustainable services and circular economy would require investment in new services and initiatives for improved compliance and environmental outcome. To meet the future demand, this waste assessment has set four major goals for Rotorua's waste services:

- Create awareness on waste hierarchy for waste minimisation
- Reduce harmful effects of waste on environmental and public health
- Facilitate transition to circular economy in waste management
- Consider climate change mitigation in waste services planning

These goals are supported by five ambitious but achievable targets, including:

1. 30% reduction in municipal waste to landfill
2. Reduction in recycling contamination from 22% to 12%
3. Contamination-free glass collection
4. 60% reduction in kerbside food waste to landfill
5. 60% reduction in kerbside green waste to landfill.

To meet these goals and targets, this waste assessment outlines a number of tasks and options. The most important option is the diversion of putrescible (food and green) waste from landfill, which has the potential to divert up to 50% of waste to landfill, under ideal conditions, and drive both waste minimisation and greenhouse gases abatement goals, while providing a massive boost to Rotorua's transition into circular economy.

This waste assessment will be used to inform the development of Rotorua Lakes Council's 2022-28 WMMP. Further refinement and improvement of the proposed actions will be undertaken as part of WMMP development.

1 Introduction

This waste assessment has been prepared to meet the requirements of Section 51 of the Waste Minimisation Act 2008 (WMA). It is intended to provide an initial step towards the development of Rotorua's next Waste Management and Minimisation Plan (WMMP) for the period of 2022-28. This waste assessment:

- Describes the rubbish and recycling services within the Rotorua district
- Reviews progress against Rotorua's Solid Waste Strategy 2016 (current WMMP)
- Reassesses future demand for collection, recycling, recovery, treatment, and disposal services
- Develops a vision, goals, objectives and target for waste management and minimisation
- Outlines and evaluates options to meet future demand

1.1 Legislative and strategic context

Waste management and minimisation in New Zealand is guided by the New Zealand Waste Strategy 2010 (NZWS), which sets two high level goals:

(1) Reducing the harmful effects of waste, and;
(2) Improving the efficiency of resource use.

Territorial Authorities (TA) are required to consider the NZWS while planning waste management and minimisation activities.

The principal solid waste legislation in New Zealand is the WMA. According to Section 3 of the WMA, the purpose of the legislation is to encourage waste minimisation and decrease waste disposal, in order to protect the environment from harm; and to provide environmental, social, economic and cultural benefits.

The WMA requires TAs to prepare and adopt a WMMP to promote effective, efficient and sustainable waste management and minimisation practices within their districts. The WMA requires TAs to complete a formal review of their existing WMMPs at least every six years in accordance with Sections 50 and 51 of the legislation. Section 50 of the WMA requires all TAs to prepare a 'waste assessment' prior to reviewing the existing WMMP. Rotorua Lakes

Council's (RLC) current WMMP was prepared in 2016 and the next WMMP is due in 2022. This waste assessment will provide the foundation for preparing Rotorua's WMMP 2022.

Apart from WMA, various other legislative and non-regulatory tools apply to waste management and minimisation in New Zealand. These include Local Government Act 2002, Litter Act 1979, Hazardous Substances and New Organisms Act 1996 and Climate Change Response Act 2002.

1.2 Local planning context

RLCs approach to waste management and minimisation is consistent with the vision, purpose and performance targets of the Long Term Plans (LTP) and Rotorua 2030 goals. At the time of drafting this waste assessment, RLC was in the midst of LTP 2021-2031 preparation and public consultation on the LTP was scheduled for April 2021. Thus, it was an excellent opportunity to align the goals and targets of waste minimisation with the goals and priorities of the LTP.

Rotorua's 2030 Vision established the district's long-term goals, setting the direction for the district and for Council's work, services and planning. It has established what is special about Rotorua, identifying the district's strengths and setting out opportunities to help build on those strengths. Vision 2020 is supported by seven goals:

- *Papa whakatipu* Outstanding places to play
- *Waahi pūmanawa* Vibrant city heart
- *Whakawhanake pākihi* Business innovation and prosperity
- *Kāinga noho, kāinga haumaru* Homes that match needs
- *He hāpori pūmanawa* A resilient community
- *He huarahi hou* Employment choices
- *Tiakina to taiao* Enhanced environment

Waste management and minimisation services in Rotorua are aligned with two of these goals: (1) A resilient community, and; (2) Enhanced environment. This synergy with local planning ensures that residents and ratepayers in Rotorua are provided with efficient waste services and facilities, which will contribute to achieving environmental, social, economic and cultural benefits.

1.3 Public health considerations

Alleviation of public health issues is one of the critical aspects of waste management and minimisation. Waste that is not properly disposed of include hazards, such as communicable disease, chemical poisoning and physical injury. Health concerns may arise due to the type of waste (e.g., hazardous, putrescible, medical), facilities operation (e.g., landfill discharges, open compost pile, spillage), poor waste collection practices or other illegal activities (e.g., dumping, burning). In most cases, public health issues can be addressed via appropriate performance standards or monitoring programmes. In this waste assessment, the potential effects of planning decisions on publish health has been considered and appropriate remedies have been considered to mitigate potential risks.

1.4 Scope

The WMA requires the waste assessment to include all waste and recycling services provided in the district by the TAs, as well as, private waste collectors. However, RLC has little data on the services provided by private waste collection companies operating in Rotorua. Therefore, this waste assessment is based primarily on data available from Council's waste services and operation of Council's facilities. This Waste Assessment is focused on solid waste, bio-solids and special wastes that are managed through solid waste facilities. Liquid and gaseous wastes are not included.

1.5 Limitations and accuracy

This Waste Assessment was prepared using information gathered from a variety of sources. While every effort has been made to achieve a reasonable degree of accuracy, RLC's limited ownership of waste infrastructure implies that the waste and recycling data gathered here do not reflect waste management and minimisation in Rotorua comprehensively.

RLC has excellent data on municipal solid waste collection and disposal. Thus, this waste assessment is based primarily on municipal waste data, which is used for performance measurement. The options provided in this waste assessment pertain to improvements in RLC Council's waste services.

WHERE ARE WE NOW?

This section summarises the current waste situation in Rotorua, including waste flows, waste infrastructure and services, and a forecast of future demand.

2 Waste services and facilities

RLC provides a range of services and facilities to residents for effective waste management and minimisation. These services are designed in accordance with the solid waste hierarchy of reduction, reuse, recycling, recovery and disposal, as shown in Fig. 1.

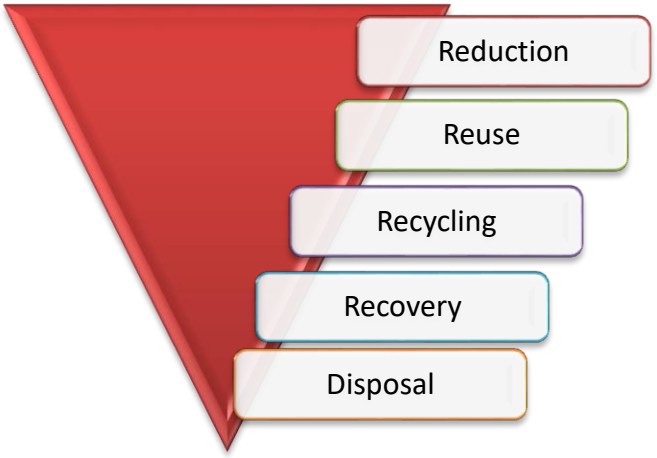

Figure 1: Waste hierarchy for effective and efficient waste management

2.1 Reduction

A critical component of councils' involvement in waste is about creating awareness and educating residents to make better choices to avoid waste generation. RLC runs a variety of waste education programs to highlight the waste problems, their impact on the environment and ways to manage an individual's waste footprint. This includes regular social media campaigns and celebrating the waste minimisation achievements of residents, at individual or community levels. RLC actively promotes community gardens, litter clean-up and other such initiatives, and; supports sustainability workshops to create awareness.

2.2 Reuse

Apart from the education programs outlined in Section 2.1, RLC has collaborated with the Red Cross Urban Ore shop to promote reuse in Rotorua. The shop is located within Rotorua's Recycling Centre and collects variety of household goods, including clothes, footwear,

books, toys and furniture. A number of other such shops are located in different parts of Rotorua to facilitate reuse and repurposing of clothes and other household stuffs.

2.3 Recycling

2.3.1 Recycling collections

The majority of residents in Rotorua have access to Council's recycling services and infrastructure. All of the residents in the urban areas are provided fortnightly kerbside collection of recyclables in a 240 L wheelie bin and a 45 L crate. Most of the people living in rural areas or in lakesides also have access to the same kerbside recycling services. In areas where kerbside collection is not possible due to narrow roads or difficult terrain, residents have been provided transfer stations with a 24/7 recycling drop-off.

In Rotorua, plastics (1, 2 and 5); paper and cardboard; tin and aluminium cans, and; glass bottles are considered recyclable materials.

2.3.2 Recycling centre

Rotorua's recycling centre is located at the centre of the town and it provides recycling drop-off facilities for a variety of items. Apart from standards recyclables accepted in bins/crates, residents can bring e-waste, batteries and whiteware to the recycling centre. A small fee may be charged depending on the items. The recycling centre also accepts large items (e.g., metals and cardboard boxes), which cannot be disposed via kerbside collection services. RLC also uses the recycling centre to conduct training sessions to highlight the challenges of recycling contamination to the residents.

2.4 Recovery

RLC provides green waste and concrete collection facilities at the Atiamuri landfill recycling area. The green waste is sent for vermi-composting at the Ecocast composting facility in Kawerau. Concrete is crushed and recycled as building material. In addition, all the bio-solids produced at Rotorua's wastewater treatment plant is also sent for vermicomposting at Kawerau. Overall, about 15,000 tonnes of organic waste (bio-solids and green waste) from Rotorua is vermi-composted every year.

2.5 Disposal

2.5.1 Closed landfill

Rotorua district currently has no active class I landfill. The Atiamuri landfill (commonly known as the Rotorua landfill) was capped in late 2018 after nearly five decades of operation. Since RLC holds the resource consent and has a duty of care in perpetuity, a comprehensive monitoring and inspection program has been put in place to minimize any H&S or environmental risks associated with capped landfills. A landfill aftercare provision was developed in 2019 to manage the closed landfill over next 35 years.

2.5.2 Refuse collections

Weekly kerbside waste collection are provided for all urban areas, as well as, most of the lakes and rural areas. In areas without kerbside collections, transfer stations are operated to ensure waste disposal services are accessible to all of the residents. Only one rural area (with about 300 houses) have not been provided kerbside collection services. Residents in these areas managed waste via private waste services providers. Alternatively, they can take rubbish to the nearest transfer station for a fee. Rotorua also has extensive public litterbin (both rubbish and recycling) infrastructure, and these are serviced based on their usage. Table 1 summarises waste collection services in Rotorua.

Table 1 A summary of current waste services

Location	Kerbside bins	Litter bins	[1]Kerbside bags	[2]Transfer stations
Urban areas	✓	✓	x	x
Rural Areas	✓	✓	✓	✓
Lakeside Areas	✓	✓	✓	✓

[1]Bags are provided in cases where bins are not available

[2]There are four transfer stations in Rotorua, two each in rural and lakes areas

2.5.3 Refuse Transfer Station (at Atiamuri Landfill)

The Atiamuri landfill has been capped and the landfill site is now operated as a refuse transfer station (RTS) by Waste Management. The RTS is open seven days a week and receives both household and commercial waste. All the waste collected at the RTS is transported to Waste Management's Tirohia landfill on a daily basis.

2.5.4 **Rural transfer stations**

RLC operates four rural transfer stations at Mamaku, Reporoa, Tarawera, and Okere. The Okere and Tarawera transfer stations are open to public 24/7 for rubbish and recycling disposal. Mamaku and Reporoa transfer station are opened on designated days to allow residents to dispose rubbish and recycling surplus to the bins. A fee may be charged for these services.

2.6 Funding for Council's services

Council provided waste services are funded by: (1) general and targeted rates; (2) external grants (e.g., MfE waste levy), and; (3) revenue from facilities. Targeted rates ($215.74 inclusive of GST per household per year) cover about 80% of the costs and support household waste collection, disposal and recycling. General rates and other revenue sources cover 20% of the costs, which include litterbin service, waste minimisation and facilities maintenance, among other tasks. The 80/20 split has been effective and will continue in future.

3 The Waste Situation

3.1 Waste quantities

Waste collection in Rotorua underwent a transformational change in 2016, when wheelie bins were introduced to replace paper bags for kerbside waste collection. This changed the way waste data was collected and processed in Rotorua. Therefore, only data from 2017 onwards has been used to describe the waste situation in Rotorua.

When the wheelie bin system was implemented in Rotorua, 60 L paper bags were replaced with a set of one each of 140 L rubbish bin, 240 L recycling bin and 45 L glass crate. While this promoted waste diversion and recycling, an unintended consequence of this shift was residents using the extra space in the relatively large rubbish bin. Consequently, Rotorua witnessed an increase in the household waste generation, as shown in Fig. 2. During 2017 to 2020, the municipal waste to landfill varied between 800-1600 tonnes per month, whereas the total waste passing through Rotorua landfill's weighing bridge (including commercial waste) was between 1400-2900 tonnes per month. The average monthly municipal waste collection in 2017 was 1114 tonnes, which gradually increased to 1368 tonnes in 2020. The increase in bin capacity was only partly responsible for the increase in waste generation. The growing

population of Rotorua and thriving tourism industry have also contributed to the increase in waste generation. There was a sharp increase in waste tonnage in early 2020 due to suspension of recycling collection during the Covid-19 lockdown and disposal of all recycling materials in landfill.

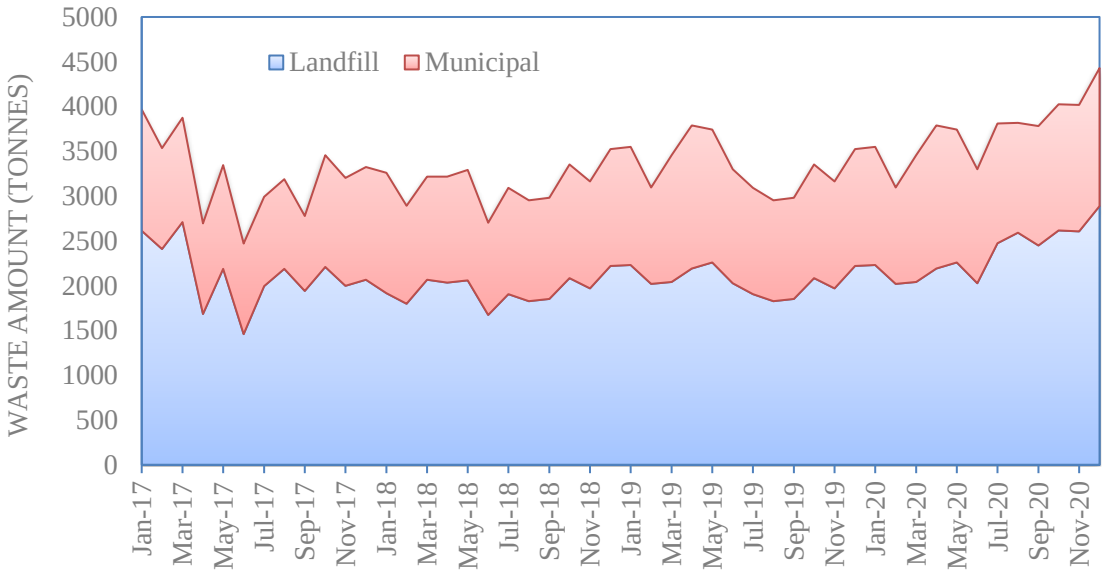

Figure 2 Waste to landfill tonnage in Rotorua

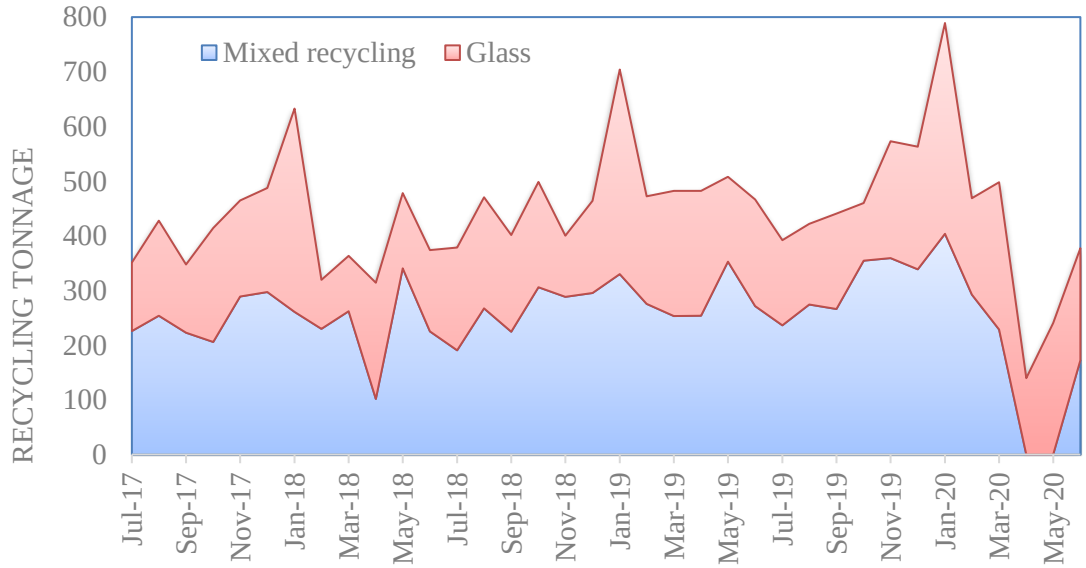

Figure 3 Recycling collections in Rotorua

Taking into account the increase in population, the waste generated per capita per year in Rotorua during 2017, 2018, 2019 and 2020 were 181, 190, 203 and 212 Kilograms, respectively. Clearly, per capita waste generation in Rotorua is showing an upward trend. However, these numbers are consistent with the national trends and comparable to waste generated by most other Councils in New Zealand.

Fig. 3 shows the kerbside recycling collection in Rotorua. During FY 19-20, the total recycling collection in Rotorua was about 5300 tonnes (including glass). This was little lower than over 5600 tonnes of recycling collected during FY 18/19 because of the effects of Covid-19 lockdown. Although recycling collections vary month by month, the amount collected has been increasing over the years and is likely to be stabilized between 5500-6000 tonnes/year.

3.2 Waste composition

Fig. 4 shows the kerbside waste composition in Rotorua, based on SWAP audit conducted in December 2020. Over 56% of refuse in kerbside collection comprised of green and food waste, whereas over 65% of the waste (including paper) was compostable. Thus, Rotorua's waste composition identified organic waste diversion as the most effective approach to reduce Rotorua's waste footprint or waste to landfill.

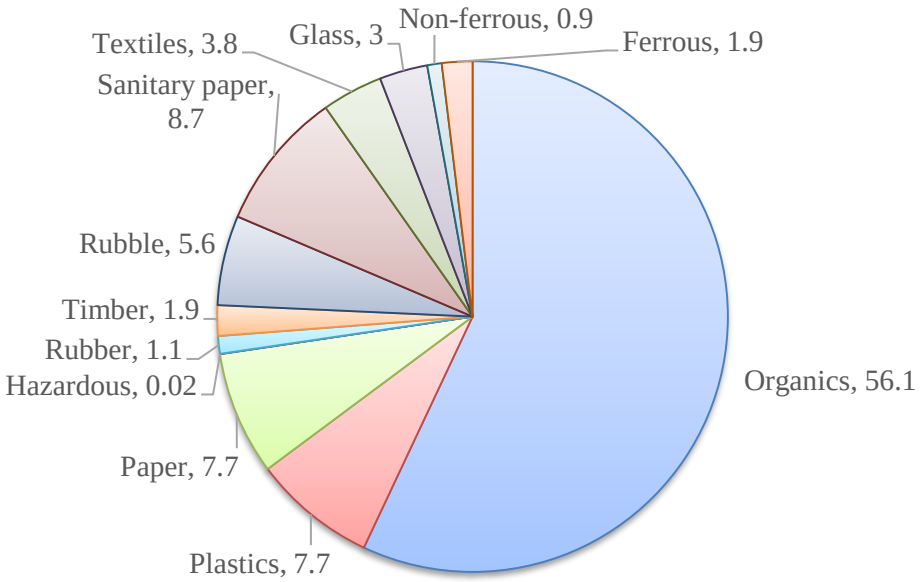

Figure 4 Composition of Rotorua's kerbside waste

In addition to compostable waste, the SWAP audit also identified over 10% of rubbish to be recyclable materials. These could be diverted via Council's existing recycling services. These included glass, plastics, paper and aluminium cans, which could be disposed in kerbside yellow bins or blue crates after cleaning. Thus, the second major approach to reduce Rotorua's waste-to-landfill would be to educate residents about transferring the recyclables to recycling bins.

3.3 Review of 2016 WMMP

Rotorua's 2016 Sustainability Strategy (the WMMP) was aimed at minimising waste and maximising value recovery, by enabling the community to make active contributions, at both collective and individual levels. The WMMP aimed to empower residents to conveniently recover and recycle materials and support diversion of waste from landfills.

The 2016 WMMP defined four major goals. These were focused on improvements in waste collection, disposal, recycling, as well as, improving the management of Rotorua landfill. The specific objectives along with the status have been summarized in Table 2. Over the past five years, Rotorua has made excellent progress against the objectives listed under WMMP 2016, with waste management services undergoing a transformative change and residents supporting all of the sustainability initiatives.

The 2016 WMMP also set out two ambitious waste management and minimisation targets. It was expected that by 2022, the improvement in waste services would lead to:

- At least 50% increase from current levels in the recovery of recyclables
- 30% reduction in kg per household of waste in the kerbside collection

Over the past five years, the recycling collection in Rotorua has jumped by 40% to 5500 tonnes/year. While the increase is a little short of the 50% target, it should be noted that recycling industry has faced massive disruptions since 2018, when the demand for recyclables in overseas market declined dramatically, as China unveiled its National Sword policy. Since then, policy changes at national and international levels and developments in the local recycling industry have affected recycling collections all over New Zealand.

Table 2 Progress against Rotorua's WMMP 2016

Goals	Status	Achievements
Industry Leading Health and Safety (H&S) Standards		
• Enhance waste collections health and safety performance	Completed	Kerbside bins collections via mechanized trucks has eliminated H&S risks from manual collections.
• Enhance landfill health and safety performance	Completed	Atiamuri landfill is now capped and operated as a transfer station. This has alleviated most of the H&S and environmental risks. An extensive inspection and monitoring program has been implemented to assess and mitigate risks
Significantly improve the District's environmental footprint		
• Engage and educate residents and facilitate increased diversion of recyclables	Ongoing	A new recycling collection system is in place. A series of waste education programs, and training/ workshops are being conducted to increase waste diversion. New projects are being implemented as the recycling industry is adapting to changes in international markets and national industries.
• Optimise the diversion of recyclables and achieve reducing trends of waste sent to the landfill(s)	Ongoing	Rotorua diverts over 10,000 tonnes of green waste and recyclables from the landfill every year. New initiatives are being planned to improve waste diversion further.
• Reduced volumes of organic waste to landfill(s)	In planning stages	Organic waste diversion is a part of the LTP 2021 consultation process. If implemented successfully, it has the potential to divert up to 60% of Rotorua municipal waste from landfills.
• Increase customer satisfaction rating for rubbish and recycling collection services in Council's annual community survey	Ongoing	The Waste management system in Rotorua is working well and our customer satisfaction rating has varied between 84-93% over last three years.
A public litter bin management system that promotes and encourages recycling		
• Optimise the litter bins network throughout the District	Completed	A comprehensive bin replacement, removal and upgradation program successfully completed. Recycling bins provided at few public places.
• Promote passive waste minimisation education through standardisation and the deployment of the national waste colour framework	Completed	All public and kerbside rubbish mixed recycling and glass bin/crates in Rotorua follow standard colour codes.
Improve the Atiamuri Landfill		
• Minimise health and safety risks and impact on the environment	Completed	The Atiamuri landfill has been capped and the scale of operations have reduced now that the site is being operated as a transfer station. A comprehensive inspection, monitoring and auditing program is in place to improve H&S.
• Establish a sustainable long term option for the Atiamuri Landfill	Completed	Since the landfill was capped, Rotorua's rubbish is being sent to Tirohia landfill.

The 30% waste reduction target was set based on diversion of organic waste from landfill. Organic waste diversion is part of RLC's LTP 2021-2031, which will be ready for public consultation in April 2021. Organic waste (food and green) comprise over 50% of household waste. Their diversion from the rubbish stream will help RLC achieve the 30% waste reduction target.

4 Performance management

The performance of RLC's waste services is measured by six KPIs, related to waste disposal, recycling, resource recovery, H&S and customer feedback. The KPIs have been summarized in Table 3, along with the data from last three financial years.

While most of the KPIs have been met and exceeded, waste to landfill and green waste diversion KPIs have not been met. The proposed organic waste diversion service in Rotorua will help in meeting these KPIs.

Table 3 Rotorua's waste services KPIs

KPI	Latest Target	2017/18	2018/19	2019/20
Waste to landfill	≤ 320 kg/ household /year	532	459	532
Recycling	≥5,000 tonnes	3,351	5,695	5342
Green waste diversion	≥7,000 tonnes	5,179	4,718	5133
Concrete diversion	≥1,500 tonnes	2626	2,207	1066
Customer satisfaction	90%	93%	91%	84%
Compliance	100%	1 failure	1 failure	0 failures

In addition to the KPIs listed in Table 3, another KPI under consideration is recycling contamination. The changes in the recycling industry over the last three years and the disruptions brought by Covid-19 saw recycling contamination rates rise throughout New Zealand. The new KPI on recycling contamination will help focus attention on better management of recycling materials and reduced contamination.

5 Future demand

5.1 Population

The future projected population trends in Rotorua is shown in Fig. 5. Under the baseline scenario, the population is projected to grow from 76,200 in 2020 to 90,800 in 2051, a rise of 14,600 people and an annual average growth rate of 0.6% per year. Under the low growth scenario, the population is projected to grow by 3,900 people to 80,000 in 2051. Under the high growth scenario, the population is projected to grow by 28,900 people to 105,200 in 2051.

Under both the baseline and high growth scenarios, the population is expected to grow until 2051, but the rate of population growth is projected to steadily decline. On the other hand, under the low growth scenario, the population is projected to grow until 2037 after which it will undergo a moderate decline. In near term, however, population is expected to grow until 2035.

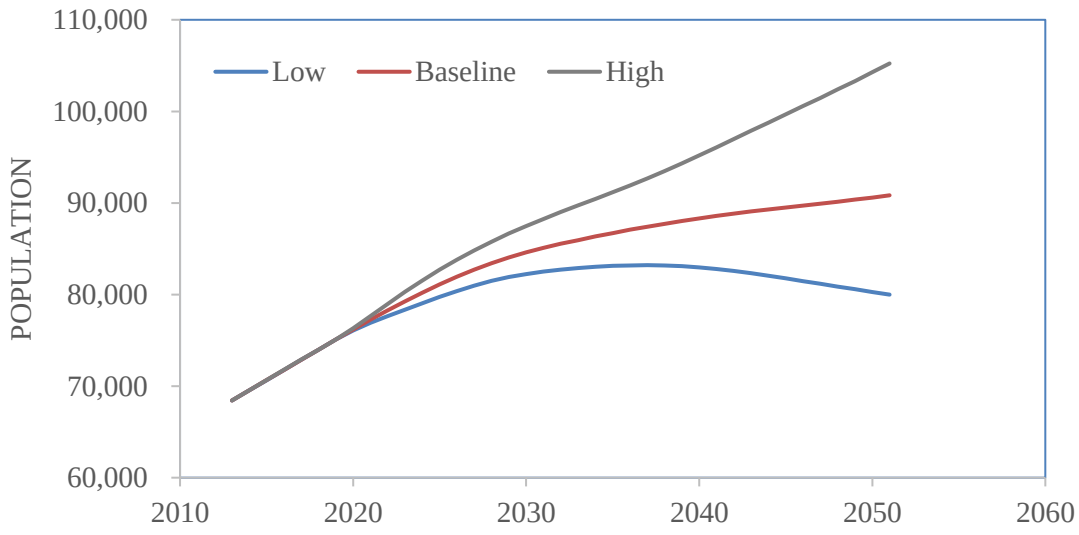

Figure 5 Projected increase in Rotorua's population

The future projected household trends in Rotorua is shown in Fig. 6. Under the baseline scenario, the number of households in Rotorua District is projected to grow from 29,000 in 2020 to 37,000 in 2051, a rise of 8,000 households and an annual average rate of 0.8% per year. Under the low growth scenario, the number of households is projected to grow by 3,300

to 32,300 in 2051. Under the high growth scenario, the number of households is projected to grow by 14,000 to 43,000 in 2051.

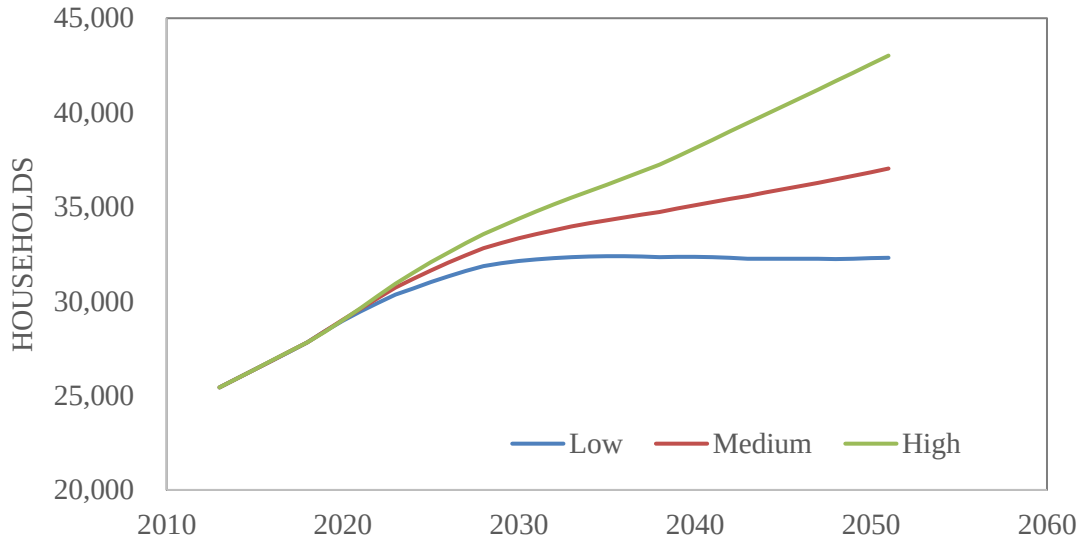

Figure 6 Projected increase in Rotorua's household number

The trends in population and number of households over the near and long term imply that waste generation in Rotorua will continue to increase in the near future, and new interventions will be required for effective and efficient waste management and minimisation.

5.2 Economic activity

Between 2020 and 2051, strong employment growth is projected in Rotorua district. This includes employment in public administration and safety, health care and social assistance, education and training, and arts and recreation services industries. However, employment growth in construction and professional, scientific and technical services industries is projected to be much slower than it has been in the past.

The health care and social assistance, public administration and safety, education and training, arts and recreation services and retail trade industries are expected to see a total of 9,000 additional jobs by 2051, accounting for almost all the of 10,000 additional jobs during this time. In the retail trade industry, the accommodation and food services industry is projected to create the most jobs because of growing visitor numbers. Employment in supermarkets and grocery stores is expected to decline slightly due to automation.

International visitor projections in Rotorua is shown in Fig. 7. An estimated 991,000 international overnight visitors visited Rotorua in 2019. By 2032 (under the baseline scenario), international overnight visitors are projected to top 1.5 million and by 2049, 2 million. Under the low growth scenario, international overnight visitors are expected to reach 1.5 million by 2051. Under the high growth scenario, they are expected to top 1.5 million by 2029 (three years earlier than the baseline scenario), 2 million by 2039 (10 years earlier than the baseline scenario), and 2.5 million by 2049.

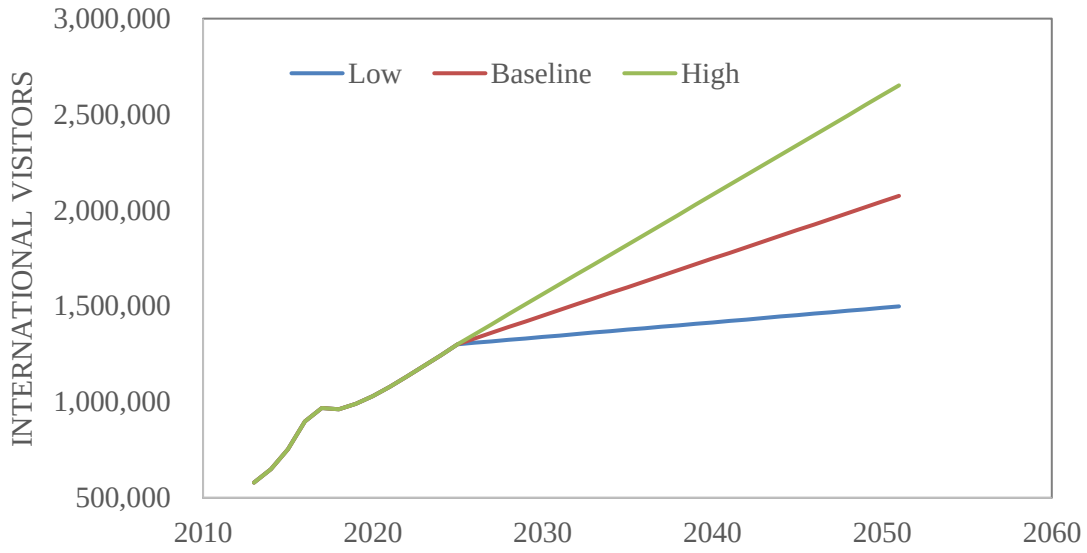

Figure 7 Projections of international visitors in Rotorua

The domestic visitor projections in Rotorua are shown in Fig. 8. An estimated 1.8 million trips were made by domestic overnight visitors to Rotorua in 2019. By 2028 (under the baseline scenario), domestic overnight trips are projected to pass 2 million, reaching 2.43 million by 2051. Under the low growth scenario, domestic overnight trips are expected to surpass 2 million by 2032 (4 years later than under the baseline) and reach 2.19 million by 2051. Under the high growth scenario, domestic overnight trips are expected to top 2 million by 2028 (the same as the baseline), and 2.5 million by 2045, reaching 2.67 million by 2051.

Anecdotal evidence suggests that waste generation in Rotorua is strongly influenced by the number of visitors. Currently, during the peak summer months of December to February, waste generation in Rotorua increases by up to 15% due to large number of tourists and

holiday homeowners in the city and District. Therefore, the future waste planning framework must take into account the increase in the number of visitors in Rotorua.

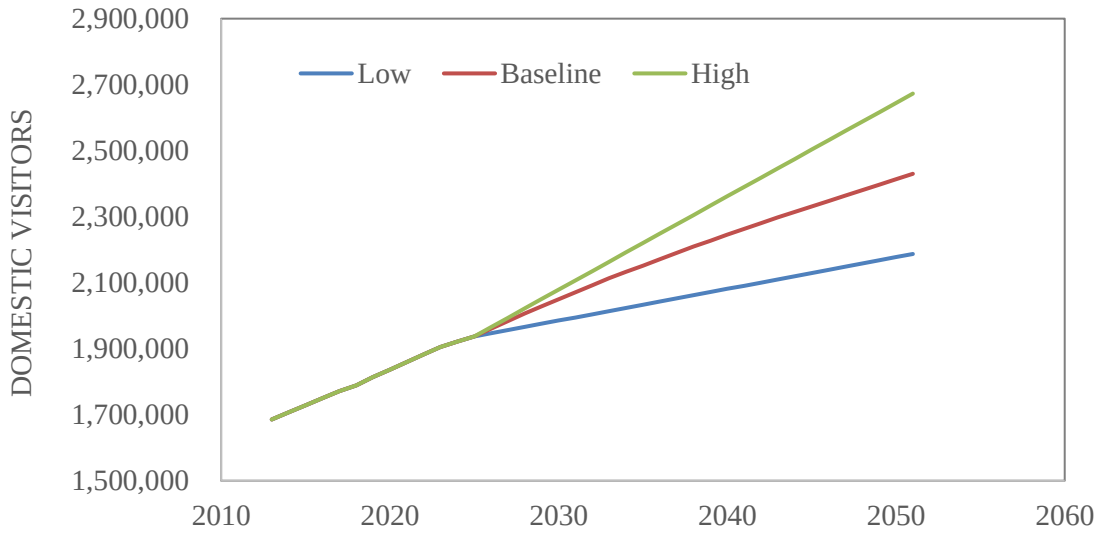

Figure 8 Projections of domestic visitors in Rotorua

5.3 Consumer behaviour and lifestyle

Consumer behaviour and lifestyle affects waste generation and minimisation. However, these trends are very difficult to predict. Based on the current trends in waste generation in Rotorua, it may be assumed that waste behaviour has not changed dramatically, and most of the changes have been favourable for waste minimisation. For example, Council's recycling services have received excellent support from the residents, which is evident from the nearly 40% jump in recycling collections over past few years. With New Zealand declaring a climate emergency and with sustainability dominating lifestyle conversations, it is expected that consumers will be more conscious of their waste footprint and participate in waste minimisation activities.

5.4 Future projected waste quantities

Based on waste generation trends and an expected increase in population, the annual waste generation in Rotorua is likely to be about 18,000 tonnes/year by 2030. During this period, the population is expected to increase from 77,000 at present to between 82,000 and 88,000.

On the other hand, the number of households is expected to increase from 29,000 to 33,000 during this period.

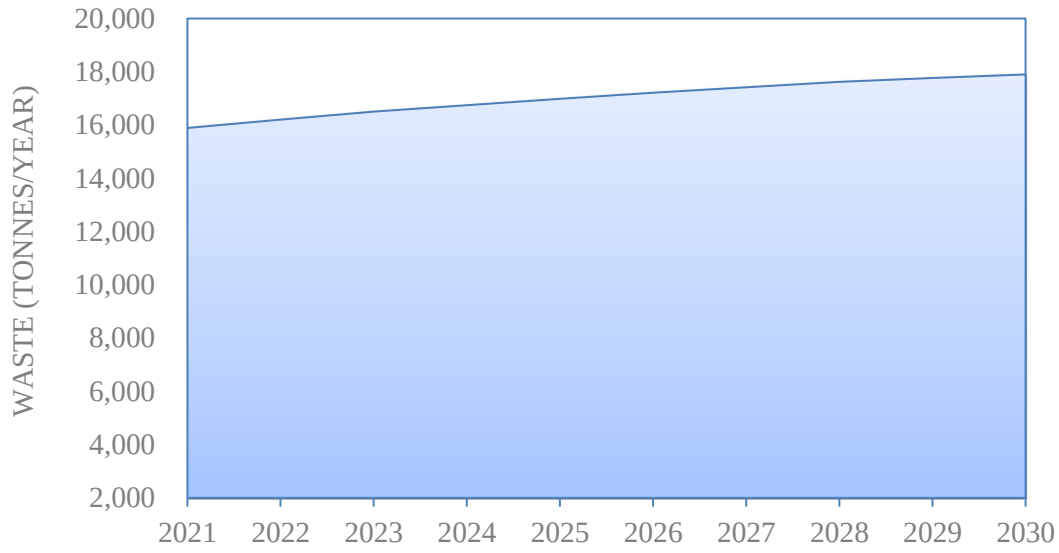

Figure 9 Projections of municipal waste generation in Rotorua at current levels of service

These forecasts indicate over 10-15% net increase in waste disposal in landfills by 2030, as shown in Fig. 9. Since the future waste volumes are based on current trends in per capita/household waste generation, changes in waste generation behaviour or lifestyle, and new services to divert additional waste would be required to reduce Rotorua's waste footprint.

It should be noted that these projections are based on current levels of service, and do not take into account proposed services of food and green waste diversion.

5.5 Legal framework

Central government policies can influence waste minimisation through economic disincentives. A number of importance policy decisions have been made recently, or are under consideration, which could dramatically alter waste generation and behaviour in New Zealand. These include:

- The waste levy is a very powerful tool, but is currently set too low to drive significant change. The Government has recently announced an increase in the landfill levy from

$10 to $20 per tonne of waste, effective from 1 July 2021. The waste levy will be increased in stages to $60 per tonne-waste by 2024.

- The Emission Trading Scheme (ETS) is another effective tool to reduce waste to landfill. The reforms brought by the Climate Change Response Amendment Act 2020 have imposed a higher costs on waste dumped in landfill, which will encourage reduction of waste to landfills, as well as, the upgrading of old landfills. Along with the waste levy, the ETS can be a very effective policy tool to reduce waste production and disposal.
- Recycling standardization is a policy tool being considered by the Government. If adopted, all of New Zealand will have uniform recycling collection services, in terms of materials collected and rejected. This will allow National level messaging or recycling and has the potential to reduce recycling contamination, and improve recycling collections throughout the country.
- Product stewardship schemes can help reduce waste through improved design to reduce waste upfront or by increasing diversion from landfill via producer/supplier 'take-back' schemes. However, the influence of the scheme can be maximized only if it is backed by legislation and is not a voluntary service.

5.6 Greenhouse gas considerations

Waste originating in Rotorua produced 76,280 tCO2e in 2018/19. Direct emissions from waste services made up 93.7% of RLC's corporate carbon footprint, while making up nearly 5.9% of Rotorua district's total gross emissions.

Solid waste emissions include emissions from open landfills and closed landfills. Both open and closed landfills emit landfill (methane) gas from the breakdown of organic materials disposed of in the landfill. The only open landfill site, Tirohia, contributed 62 tCO2e (less than 1% of total gross emissions). Emissions from the closed landfill site (Atiamuri) produced 76,218 tCO2e (5.5% of total gross emissions). Since Tirohia is located about 115 km away from Rotorua, there would also be increased transport emissions associated with solid waste.

With climate emergency declared in New Zealand, emissions from waste is expected to be under scrutiny and TAs will have to take up new actions to manage and reduce these emissions.

5.7 Projections of future demand

The analysis of factors driving demand for waste services in Rotorua suggests that an increase in demand over time is inevitable, considering the projected increase in number of households and population. However, the normalised waste generation (per household or per capita) is unlikely to undergo a dramatic shift at current levels of service. Awareness on climate change and sustainability, as well as, policy changes from Government are likely to influence consumer behaviour towards waste minimisation. Similarly, new waste services to improve diversion from landfill (e.g., kerbside organic waste collection) have potential to lower the District's waste footprint significantly.

5.8 Gap analysis

Based on future demand considerations and community feedback on waste services, several 'gaps' have been identified in the current level of services:

- Low diversion of green waste
- No diversion of food waste
- Lack of a kerbside collection services to all the rural areas
- Better management of recycling contamination
- Absence of local commercial composting facility
- Waste minimisation support for businesses and public events
- Reducing the instances of illegal dumping

The options considered in this Waste Assessment are aimed at addressing some of these gaps, as well as, managing the District's future demands.

WHERE DO WE WANT TO BE?

This section includes the vision, goals, objectives and targets for the waste assessment, which will form part of the draft WMMP. It is necessary to develop the vision, goals, objectives and targets at this stage, so that options to meet the forecast demands of the district can be developed.

6 Future Planning Framework

This Section outlines the vision, goals, objectives and targets of waste minimisation in Rotorua. It has been prepared based on RLC's LTP 2021-2031 priorities and Rotorua's vision 2030; emerging national level legislation and existing waste strategy; other developments related to waste, sustainability and climate change.

6.1 Vision

Consistent with the WMA and NZWS, RLC's vision for waste minimisation is:

"To empower Rotorua communities to minimize waste generation, and maximize waste diversion and resource recovery, by offering convenient, effective and innovative waste services."

The waste minimisation vision is consistent with Council' long-term vision and plans, and aligns well with Council's climate change action plan.

6.2 Goals

The major goals for waste management and minimisation are outlined below:

- Create awareness of the waste hierarchy for waste minimisation
- Reduce the harmful effects of waste on environmental and public health
- Facilitate a transition to a circular economy in waste management
- Consider climate change mitigation in waste services planning

6.3 Objectives

The waste minimisation objectives are designed to establish specific strategies and policies to support achievement of the goals above.

- Reduce the total quantity of municipal waste to landfill
- Reduce the amount of contaminants in the recycling collection
- Reduce greenhouse gases emissions from waste collection and disposal
- Increase the quantities of diverted materials through recycling and recovery
- Create local resource recovery infrastructure

- Upgrade landfill leachate collection and monitoring infrastructure
- Increase community awareness on waste minimisation and diversion
- Increase the number of zero-waste events in Rotorua

6.4 Targets

- 30% reduction in municipal waste to landfill
- Reduction in recycling contamination from 22% to 12%
- Contamination-free glass collection
- 60% reduction in kerbside food waste to landfill
- 60% reduction in kerbside green waste to landfill

The targets above are bold but achievable. It will require engaging Rotorua communities; collaborating with community groups and organisations advocating circular economy and climate change mitigation, and; designing and offering new services.

HOW ARE WE GOING TO GET THERE?

This section identifies options, assesses the suitability of each option (a required step under section 51 of the WMA), and includes consultation with the Medical Officer of Health. The preferred options will be presented in the WMMP.

7 Statement of Options

This section reviews the practicable options available to meet the forecast demand for waste management and minimisation services in the Rotorua region.

It is expected that growing population of Rotorua will create extra demand and require additional capacity. These have been considered in existing contracts for waste collection and disposal services. The contracts have provisions for accommodating increasing demand. On the other hand, the increasing costs of servicing a larger population is accounted in Council's LTP. This options assessment, is therefore, focused on new services and initiatives to improve waste diversion from landfills and to facilitate a transition to a circular economy.

7.1 Considerations and diversion potential

The options described in this waste assessment rely heavily on the findings reported in Rotorua's SWAP audit conducted in December 2020. The audit identified that over 75% of the kerbside municipal waste could be diverted. Of this, about 55-60% materials, including food waste, green waste and cellulosic fibres could be composted. On the other hand, about 10% of the materials could be diverted via Council's kerbside recycling services. Based on the audit, the following were identified to be the priority waste stream for diversion.

- Organic waste (food and green waste)
- Kitchen tissues and towels -
- Recyclable paper
- Recyclable plastic
- Others (glass/metals)

To maximize the benefits of waste diversion, a combination of different approaches were considered, including:

- providing new kerbside collection services for putrescible waste
- creating local infrastructure for resource recovery
- engaging with the community on waste minimisation and behaviour change
- advocating and supporting good waste minimisation efforts by other TAs, community groups and residents
- acting in its regulatory capacity to control and minimise undesirable waste

7.2 Proposed options and assessment

The most significant waste minimisation proposal is about organics diversion. There are two steps to divert organics: organics collection and resource recovery. Four options were considered for organics collection, as shown in Table 4:

Table 4 Options for kerbside collection of organic waste

Option	Advantages/disadvantages
1. Green waste only (GO)	✓ Fortnightly collection ✓ Cheap windrow composting × 25% diversion from landfill × No change in rubbish collection
2. Food waste only (FO)	✓ Weekly collection; rubbish fortnightly ✓ Digestion or composting (green waste mixing) x 25% diversion from landfill x Compliance concerns
3. Separate food (FO) and green (GO)	✓ High and efficient recovery (>50%) ✓ Weekly collection; rubbish fortnightly × High collection costs (most expensive) × Compliance concerns
4. Mixed food and green (FOGO)	✓ Weekly collection; rubbish fortnightly ✓ Suitable for in-vessel composting ✓ High recovery x Compliance concerns

Table 5 Options for resource recovery from organic waste

Process	**Advantage**	**Disadvantage**
Composting	• Aerobic process • Green and food accepted • Produces compost • $50-60 per tonne • Natural process • Bio-solids can be processed • Composting site available	• No local infrastructure • Composting food can be expensive
Anaerobic digestion	• Anaerobic process • Produces biogas and digestate • Local facility in Reporoa • Green waste cannot be digested • Natural process	• Green waste not accepted • Expensive (≈ $200 per tonne) • Bio-solids cannot be processed

Apart from an organics collection, two options were considered for resource recovery from organic waste: composting and anaerobic digestion. The advantages and disadvantages have been summarized in the Table 5.

While both anaerobic digestion and composting are excellent natural processes for resource recovery from organic waste, composting is effective on both food and green waste. In addition, composting is expected to be a more fiscally prudent option and RLC has a site available for composting operations. In case food waste is processed via anaerobic digestion, RLC may still be required to consider a separate kerbside green waste collection and processing service for residents. Considering the relatively small volume of waste in Rotorua, using two different processes may not be economical. Therefore, advanced composting that could be used to recover resources from both food and green waste appears to be the preferred option for Rotorua.

Table 6 Comparison of different organic waste collection options

	BAU	**GO**	**FO**	**GO and FO**	**FOGO**
Diversion from landfill (%)	0	20	20	40	40
[1]Savings from diversion ($/year)	-	319 k	319 k	637 k	637 k
Additional Opex – collection/disposal ($/year)	-	951 k	1.3 m	2.3 m	1.3 m
[2]Total costs– including bin costs ($/hh/year)	-	40	49	89	45
[3]New landfill taxes ($/year)	797 k	637 k	637 k	478 k	478 k
New costs ($/hh/year)	33	27	27	20	20
[4]Targeted rate ($/hh/year)	33	67	75	109	65
Net costs ($/hh/year)	**-**	**34**	**42**	**76**	**32**

[1]Assuming FO collections are processed via anaerobic digestion and GO/FOGO via composting

[2]Based on houses in urban areas

[3]Assuming landfill levy to increase to $60 per tonne

[4]Sum of costs related to new services and new taxes

Table 6 presents a comparison of different collection options for organic waste in Rotorua. It takes into account increase in waste disposal charges with recent changes in waste levy and ETS. It can be seen that separate collection and processing of green waste is the most expensive option, whereas one-bin collection of food and green waste (FOGO) is the most economical option, while providing comparable diversion rates. It can be noted that the cost of FOGO collection/processing (with 40% diversion) is comparable to that of GO collection/processing (20% diversion). Thus, FOGO seems to be the most desirable option.

Among the different options proposed here, Option 2 (GO), Option 3 (FO and GO) and Option 4 (FOGO) include food waste segregation and collection. Considering the readily biodegradable nature of food waste, there is a moderate public health risk along with the potential for strong odour and ability to attract vermin. Nevertheless, food waste is collected as part of current rubbish collection services and bagging the rubbish, followed by disposal in closed lid wheelie bins, has been effective in preventing any adverse effects of food waste on public health. Therefore, the following steps would be taken to minimize public health risks:

- Weekly collection of bins containing food waste
- Bagging of food waste in compostable (or paper) packaging, where applicable
- Wheelie bins with lids for outdoor storage
- Small food scrap bins or kitchen caddie with lockable lid for indoor storage

These steps have been effective with food waste collection services offered by other TAs and they are likely to alleviate the challenges associated with food waste collection.

In addition to the above, a local composting solution is preferred from public health perspective. This would reduce reliance on others to manage a core health protection sanitary service that will prevent nuisance and protect health. Local solutions provide greater confidence in continuity of services over a longer period, and are effective measures to mitigate public health risks.

7.3 Preferred option

Based on the assessment of options outlined in Section 7, FOGO would be the preferred collection option for organic waste in Rotorua, with mixed food and green waste processed in a local composting facility.

Apart from organic waste (about 65%), there are some other options that would be considered as part of this waste assessment and RLC's LTP 2021-2031. These are:

- Kerbside collection extension to the remaining rural areas, including Ngakuru, Horohoro and Upper Atiamuri. Pending adoption by the Council, the residents would be offered standard rubbish and recycling services for a targeted rate. If the community consultation results in a favourable outcome, the services would be extended to the new areas.
- Waste education and awareness campaigns are ongoing activities, which are very effective in shaping waste behaviour and improving compliance to waste disposal guidelines. Several new projects are under consideration to improve community engagement and reach waste minimisation targets, including a reduction in recycling contamination.
- A number of opportunities have been identified at the Rotorua landfill site to increase the efficiency of the leachate management system. Upgrades have been planned to limit stormwater ingress into leachate lines.

8 Statement of Proposal

Rotorua Lakes Council proposes that the WMMP be for a six-year term. The preferred option, as outlined in Section 7, are recommended to help RLC meet the future demands (over the next 10 years) for waste management and minimisation services, as well as, reduce Rotorua's waste and carbon footprints. Implementation of these services/projects is expected to meet forecast demand and support Council's vision and goals. This will be confirmed as part of the development and adoption of the WMMP during FY 2021-22.

9 Medical Officer of Health Statement

TOI TE ORA
PUBLIC HEALTH
Bay of Plenty + Lakes Districts

BAY OF PLENTY DISTRICT HEALTH BOARD HAUORA A TOI

LAKES DISTRICT HEALTH BOARD

Toi Te Ora Public Health
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7 April 2021

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Rotorua Lakes Council
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ROTORUA 3046

Tēnā koe Prashant

Medical Officer of Health Review of Rotorua's Waste Assessment 2021

I appreciate this opportunity to provide comment to version two of the draft waste assessment.

Medical Officers of Health have a responsibility through their designated positions for reducing conditions within their local community which are likely to cause disease or be injurious to health. My comments seek to assist Council in promoting a healthy and safe environment for their community now and into the future.

Waste management is important for the health of the public. If not disposed of properly, waste can present a health hazard through physical injury, chemical poisoning, exposure to infectious material and encouraging pests such as vermin, flies and mosquitoes. Waste can also block stormwater systems, contaminate land and water and create odours.

Waste services and infrastructure should be provided in ways which do not increase the risk to health, are affordable and are accessible to everyone. In this context I make the following comment.

I note that Council falls short of the recycling tonnage target to increase recycling collection and recognise the effect the overseas market decline has had across all of New Zealand recycling collections. However, I encourage council to continue to work upstream to reduce waste generation from the outset, by explore local service delivery opportunities that design waste, pollution and greenhouse gas emissions out of the system.

I am pleased to see Council has made progress against their 2016 waste management and minimisation plan. I am particularly pleased to learn that council is now able to divert organic

waste from landfill and intends to consult with the community through the 2021 Long Term Plan. Organic waste is a significant proportion of Rotorua's waste stream and provided the diversion process chosen by Council does not increase the risk to health or create a nuisance I am very much supportive.

Due to the ongoing public health response to the COVID-19 pandemic, Toi Te Ora Public Health will not be submitting to council's 2021 long term plan. Had we capacity to submit, I would take the opportunity to highlight my support for a local composting solution and encourage the community to take on board this significant waste minimisation opportunity.

As organic waste is odorous by nature, it is more likely to be offensive. I request Council seeks my preference and comment on the options for providing services independent of the long-term plan consultation process.

The vision, goals, objectives and targets are all supported. I suggest Council considers reducing greenhouse gas emissions from not only waste collection and disposal services that council provides, but all waste management and minimisation practices in the district. Likewise, council's objectives to reduce the percentage of food and green waste is supported however this reduction should not be limited to only kerbside collected waste but all waste across the whole district.

In relation to the assessment for food and greenwaste diversion options. I support the preferred option to process the waste in a local composting facility. The identified measures needed to manage the risks public health are essential to prevent nuisance situations arising. In particular weekly food collection and lidded receptacles that prevent vermin and other pests gaining access.

Council should consider including an assessment of which options have the highest likely level of community buy-in and compliance. For instance, the least complex system, most accessible and affordable will have the most participation, highest compliance and the least waste generated.

Whilst we recognise there needs to be public consultation, the provision of waste services for all rural areas and any new areas should be the default position of council unless there is substantial objection.

As I raised in 2015 long term plan and 2016 waste strategy consultations, waste services are a core sanitary service which have district wide benefit. They are a public good. This is why waste services and infrastructure funded by the entire community rather than individual user-pay systems protect the health of everyone equally. Delivering waste services and infrastructure in a way that is affordable and accessible to everyone no matter where they live in the district is when public health will be protected.

I support the inclusion of all the other options in the assessment. These are positive steps and will contribute to good health outcomes.

As this review progresses including the waste management and waste minimisation action plan, it is suggested council has regard to Toi Te Ora Public Health, Issues of Health and Wellbeing Population Survey 2020. This survey reflects the community views, including Rotorua across a range of public health topics. People were asked for example about their overall level of concern about environmental issues affecting their health and wellbeing. Nearly half said it was high or very high (44%). Of particular relevance to waste management and minimisation is the level of satisfaction with rubbish disposal systems and recycling systems and their importance. For people in the lakes health district this was 74% and 79% respectively. The survey is available on the Toi Te Ora website.

Decisions that reduce environmental contamination, reduce resource use and the impacts of climate change are supported because these will safeguard the health of existing and future populations.

Lakes District Health Board Waste Management and Waste Minimisation Position Statement provides guidance for council to consider when considering their options and preferences.

If you wish to discuss this feedback please contact Annaka Davis, Health Protection Officer in the first instance.

Nāku noa, nā

Dr James Miller
Medical Officer of Health